

| MECHANICAL SYMBOLS LIST | | | | |
|----------------------------------|--|--------------------------------------|--------------------------|---|
| <div>AC-1</div> <div>TXF-1</div> | | EQUIPMENT SYMBOL | CONTROLS AND SENSORS | |
| | | POINT OF NEW CONNECTION TO EXISTING | <div>①</div> | THERMOSTAT |
| AIR DEVICES | | | <div>①_s</div> | TEMPERATURE SENSOR |
| | | | <div>③_d</div> | DUCT SMOKE DETECTOR |
| | | | DUCTWORK | |
| | | CEILING DIFFUSER SUPPLY | ===== | AIR DUCT W/ 1.5" ACOUSTICAL LINING |
| | | CEILING DIFFUSER RETURN | | FLEXIBLE DUCT |
| | | 4-WAY DROP BOX DIFFUSER | | FLEXIBLE CONNECTION |
| | | | | RECTANGULAR DUCT (WIDTH X DEPTH) |
| | | SIDEWALL/DUCT MOUNTED GRILLE--SUPPLY | | SUPPLY AIR RECTANGULAR DUCT CROSS SECTION |
| | | SIDEWALL/DUCT MOUNTED GRILLE--RETURN | | RETURN AIR RECTANGULAR DUCT CROSS SECTION |
| | | | | ROUND DUCT (DIAMETER) |
| | | | | ROUND DUCT CROSS SECTION |
| | | ROUND DIFFUSER | | |
| DUCT ACCESSORIES | | | | |
| | | BACK DRAFT DAMPER | | |
| | | VOLUME DAMPER W/ ACCESS DOOR | | |

| MECHANICAL ABBREVIATIONS | |
|--------------------------|------------------------------------|
| AL | ACOUSTIC LINING |
| CDS | CEILING DIFFUSER SUPPLY |
| CDR | CEILING DIFFUSER RETURN |
| CFM | CUBIC FEET OF AIR PER MINUTE |
| COP | COEFFICIENT OF PERFORMANCE |
| EER | ENERGY EFFICIENCY RATIO |
| EN | ENERGY ANALYSIS |
| FC | FLEXIBLE CONNECTION |
| IEER | INTEGRATED ENERGY EFFICIENCY RATIO |
| EF | EXHAUST FAN |
| SEER | SEASONAL ENERGY EFFICIENCY RATIO |
| TEF | TOILET EXHAUST FAN |
| VD | VOLUME DAMPER |
| VFD | VARIABLE FREQUENCY DRIVE |
| FD | FIRE DAMPER |
| OA | OUTSIDE AIR |
| RTU | ROOF TOP UNIT |
| W.M.S | WIRE MESH |
| S.A.E. | SAME AS EXISTING |
| V.I.F. | VERIFY IN FIELD |
| D.B.D | DRUM LOUVER |

| MECHANICAL DRAWING LIST | |
|-------------------------|--|
| M-001 | MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS |
| M-002 | MECHANICAL SPECIFICATIONS |
| M-100 | MECHANICAL FLOOR PLAN |
| M-101 | MECHANICAL ROOF PLAN |
| M-500 | MECHANICAL DETAILS |
| M-600 | MECHANICAL SCHEDULES |

| APPLICABLE CODES | |
|------------------|---|
| IBC | 2015 INTERNATIONAL BUILDING CODE |
| IFC | 2015 INTERNATIONAL FIRE CODE |
| IMC | 2018 INTERNATIONAL MECHANICAL CODE |
| IPC | 2018 INTERNATIONAL PLUMBING CODE |
| IECC | 2015 INTERNATIONAL ENERGY CONSERVATION CODE |
| IFGC | 2018 INTERNATIONAL FUEL GAS CODE |
| NEC | 2015 NATIONAL ELECTRICAL CODE |

ROUND ROCK BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF THE 2015 BUILDING CODE AND ALL AMENDMENTS AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

- THE CONTRACTOR SHALL ENGAGE THE 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 2015 BUILDING CODE REQUIREMENTS AS OUTLINES IN SECTION [BC 1704].
- THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.
- TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SECTIONS OF THE 2018 MECHANICAL CODE:

A. VENTILATION SYSTEM BALANCING MC 403.3.1.5
- THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:

A. STANDARDS OF HEATING – 2018 IMC 309.1

B. DUCT CONSTRUCTION AND INSTALLATION – 2018 IMC 603

C. AIR INTAKES, EXHAUSTS AND RELIEF – 2018 IMC 401.5

D. AIR FILTERS – 2018 IMC 605

E. SMOKE DETECTION CONTROL SYSTEM – 2018 IMC 606
- MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
- VENTILATION OF ALL AREA SHALL COMPLY WITH 2018 IMC 401.
- A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY 2018 IMC 403.3
- REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.
- THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.
- ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
- AIR BALANCING REPORT SHALL BE PROVIDED IN ACCORDANCE WITH 2015 IECC C408.2.2.

FIELD VERIFY ALL CONDITION

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

SCOPE OF WORK

- THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR SAFE OPERATION OF THE SYSTEMS AS DESCRIBED IN THE SPECIFICATIONS, FLOOR PLAN(S) DESIGN, DETAIL DRAWINGS, NOTES, RFI'S, ETC. FOR THIS PROJECT. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.
- THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH THE DEPARTMENT HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER, BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
- THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

GENERAL NOTES

- CONTRACTOR SHALL SURVEY THE AREA OF THIS WORK BEFORE SUBMITTING A BID AND SHALL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT OF ANY CONDITIONS WHICH WOULD PREVENT THE INSTALLATION OF THE WORK AS SHOWN ON DRAWINGS.
- ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.
- BEFORE PROCEEDING WITH ANY WORK IN OCCUPIED OR USED AREAS, THE CONTRACTOR SHALL APPLY TO OWNER FOR PERMISSION TO ENTER SUCH AREAS. THE CONTRACTOR IS OBLIGED TO PERFORM HIS WORK ONLY AT THE TIMES DESIGNATED BY OWNER. THERE WILL BE NO ADDITIONAL COMPENSATION FOR THE WORK PERFORMED AFTER HOURS OR ON OFF-DAYS WITHOUT PRIOR WRITTEN APPROVAL.
- CONTRACTOR SHALL ASCERTAIN THE APPROPRIATE METHOD FOR BRINGING THE UNITS INTO AND THROUGH THE BUILDING TO POSITION UNIT IN LOCATION SHOWN ON THE PLANS. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH RESTRICTIVE SPACES. COORDINATE WITH BUILDING OWNER APPROPRIATE TIMES OF DAY SUCH EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
- DUCTWORK AND PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL MAKE ALLOWANCE IN PRICING FOR ROUTING OF DUCTWORK AND PIPING TO AVOID OBSTRUCTIONS. EXACT LOCATIONS ARE SUBJECT TO APPROVAL OF ARCHITECT. COORDINATION WITH THE OTHER TRADES IS REQUIRED.
- SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER.
- PROVIDE ALL NECESSARY FLASHINGS AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.
- SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL. (FIBERGLASS INSULATION IS NOT ACCEPTABLE).
- WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED, THE CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.
- INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.
- REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN HUNG CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS LOCATION REQUIREMENTS TO GENERAL CONTRACTOR. ACCESS TILE IDENTIFICATION: PROVIDE BUTTONS, TABS, AND MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.
- THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY PARTS AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY PERIOD BEGINS UPON PROJECT ACCEPTANCE.
- ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WITH ITS COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY OF THE SAME WHICH MAY BE DAMAGED, LOST, OR STOLEN WITHOUT ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.
- SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.
- INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS THE CONTRACTOR SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.
- WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.
- SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.

DEFINITIONS:

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

GENERAL HVAC NOTES

- PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
- CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING, AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.
- THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
- WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
- COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
- INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
- WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.
- COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.
- ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.
- PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.
- PROVIDE VIBRATION ISOLATORS FOR ALL PIPING SUPPORTS CONNECTED TO, AND WITHIN 50 FT. OF, ISOLATED EQUIPMENT (EXCEPT AT BASE ELBOW SUPPORTS AND ANCHOR POINTS).
- LOCATE ALL TEMPERATURE, PRESSURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH THE STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.
- WHERE BEAMS ARE INDICATED TO BE PENETRATED WITH DUCTWORK OR PIPING, COORDINATE DUCTWORK AND PIPING LAYOUT WITH BEAM OPENING SIZE AND OPENING LOCATIONS. COORDINATION SHALL BE DONE PRIOR TO THE FABRICATION OF DUCTWORK, CUTTING OF PIPING, OR FABRICATION OF BEAMS.
- ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
- PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION. ACCESS PANELS SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL.
- MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM A METAL DECK.
- ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION-FREE INSTALLATION.
- ALL DUCTWORK, PIPING, AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.
- ALL ROOF-MOUNTED EQUIPMENT CURBS/STEEL RAILS FOR EQUIPMENT PROVIDED BY THE MECHANICAL CONTRACTOR SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE GENERAL CONTRACTOR.
- LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.
- ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.
- ALL AIR CONDITIONING CONDENSATE DRAIN LINES FROM EACH AIR HANDLING UNIT SHALL BE PIPED FULL SIZE OF THE UNIT DRAIN OUTLET, WITH "P" TRAP, AND PIPED TO THE NEAREST DRAIN. SEE THE DETAILS SHOWN IN THE DRAWINGS OR THE CONTRACT SPECIFICATIONS FOR THE DEPTH OF THE AIR CONDITIONING CONDENSATE TRAP.
- REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.

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REVISIONS

8/20/24

MECHANICAL GENERAL
NOTES, SYMBOL LIST &
ABBREVIATIONS

M-001

SPECIFICATIONS

SECTION 0001 – NOTICE TO BIDDERS

- 1.1 BIDDERS REPRESENTATIONS
- A. THE BIDDER BY MAKING A BID REPRESENTS THAT:
- THE BIDDER HAS READ AND UNDERSTANDS THE BIDDING DOCUMENTS, TO THE EXTENT THAT SUCH DOCUMENTATION RELATES TO THE WORK FOR WHICH THE BID IS SUBMITTED, AND FOR OTHER PORTIONS OF THE PROJECT, IF ANY, BEING BID CONCURRENTLY OR PRESENTLY UNDER CONSTRUCTION.
- B. THE BID IS MADE IN COMPLIANCE WITH THE BIDDING DOCUMENTS.
- C. THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO SERVE JOINTLY AS A BASIS FOR THE BIDDER TO SUBMIT A CONTRACT PRICE FOR THE MATERIAL AND LABOR.
- D. SHOULD CONFLICTS OR DISCREPANCIES OCCUR WITHIN THE BIDDING DOCUMENTS, THE ITEM OR ITEMS IN DISPUTE THAT REPRESENT THE GREATER COST SHALL PREVAIL IN THE FINAL BID.
- E. THE BID IS BASED UPON THE MATERIALS, EQUIPMENT AND SYSTEMS REQUIRED BY THE BIDDING DOCUMENTS WITHOUT EXCEPTION.
- 1.2 EXISTING CONDITIONS AND COORDINATION
- A. THE BIDDER HAS VISITED THE SITE, BECOME FAMILIAR WITH LOCAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND HAS CORRELATED THE BIDDER'S PERSONAL OBSERVATIONS WITH THE REQUIREMENTS OF THE PROPOSED BIDDING DOCUMENTS.
- B. THE BIDDER SHALL PROPOSE COORDINATION OF WORK SUCH THAT CONFLICTS WITH OTHER TRADES AND SPACE ALLOCATIONS ARE AVOIDED.
- 1.3 RESPONSIBILITIES
- A. THE BIDDER UNDERSTANDS THAT ANY CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE TIMELY COMPLETION AND ACCEPTANCE OF THEIR WORK AND THAT ANY ITEMS DAMAGED, LOST OR STOLEN DURING TIME OF CONSTRUCTION SHALL BE REPAIRED OR REPLACED WITHOUT ANY ADDITIONAL COST TO THE OWNER.
- B. THE BIDDER UNDERSTANDS THAT ANY PROPOSED WORK IN OCCUPIED TENANT SPACES SHALL BE PERFORMED DURING TIMES OF NON-TENANT OCCUPANCY OR AS SCHEDULED OR DIRECTED BY THE BUILDING MANAGER.
- C. THE BIDDER UNDERSTANDS THAT ANY PROPOSED SHUT-DOWN OF EXISTING SYSTEMS DURING CONSTRUCTION SHALL BE PRE-ARRANGED WITH THE BUILDING MANAGER AND THAT SUCH SHUT-DOWNS ARE TO BE KEPT TO A MINIMUM.
- END OF SECTION 0001

SECTION 0101 – QUALITY OF WORK

- 1.1 WORKMANSHIP
- A. ALL WORK SHALL BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.
- B. ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED WITHIN THIS PERIOD SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ARCHITECT OR BUILDING MANAGER AT NO ADDITIONAL COST TO THE OWNER.
- C. UPON COMPLETION OF THE WORK THE CONTRACTOR SHALL REMOVE FROM THE SITE, ALL TOOLS, DEMOLISHED APPLIANCES AND ANY SURPLUS MATERIAL.
- 1.2 CODE COMPLIANCE
- A. ALL WORK SHALL MEET ALL STATE AND LOCAL CODES HAVING JURISDICTION.
- END OF SECTION 0101

SECTION 0102 –REQUIRED DOCUMENTS

- 1.1 SHOP DRAWINGS
- A. A SET OF PRINTS FOR ANY MECHANICAL WORK INCLUDING BUT NOT LIMITED TO, DUCTWORK AND PIPING LAYOUT SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO CONSTRUCTION OR PURCHASE OF MATERIALS.
- 1.2 SUBMITTALS
- A. EQUIPMENT SUBMITTALS OF ALL PROPOSED MECHANICAL AND ANCILLARY EQUIPMENT INCLUDING ALL ACCESSORIES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. ALL PERTINENT MODELS, SIZES, ACCESSORIES AND CHOICES SHALL BE CLEARLY CHECKED, PRINTED OR OTHERWISE INDICATED ON THE SUBMITTALS.
- 1.3 RECORD DRAWINGS
- A. UPON COMPLETION OF THE WORK, A RECORD DRAWING SHALL BE SUBMITTED TO THE OWNER DEPICTING ALL SUBSEQUENT CHANGES, ADDITIONS AND OR CORRECTIONS TO THE CONTRACT DRAWINGS AND OR CONTRACT SCOPE MADE DURING CONSTRUCTION. THIS DRAWING SHALL REPRESENT A COMPLETE RECORD OF THE WORK INSTALLED.
- 1.4 EQUIPMENT OPERATING INSTRUCTIONS
- A. ON COMPLETION AND ACCEPTANCE OF WORK, THIS CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS,EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
- B. THESE INSTRUCTIONS SHALL BE TYPED ON 8–1/2 IN. X 11 IN. PAPER AND BOUND IN THREE–RING BINDERS WITH CLEAR ACETATE COVERS. THE CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE ELECTRONIC COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BE ORGANIZED IN SECTIONS, WITH ONE SECTION PER SYSTEM. THE COVER OF THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND PHONE NUMBER OF THE PROJECT, ARCHITECT, ENGINEER, MECHANICAL CONTRACTOR AND SUBCONTRACTORS.
- END OF SECTION 0102

SECTION 078413–PENETRATION FIRE–STOPPING

- 1.1 QUALITY ASSURANCE
- A. INSTALLER QUALIFICATIONS: AN FM GLOBAL-APPROVED FIRE–STOP CONTRACTOR OR A UL–QUALIFIED FIRE–STOP CONTRACTOR.
- B. FIRE–TEST–RESPONSE CHARACTERISTICS: UL, INTERTEK ETL SEMKO OR FM GLOBAL
- 1.2 PENETRATION FIRESTOPPING
- A. PENETRATIONS IN FIRE–RESISTANCE–RATED WALLS: F–RATINGS PER ASTM E 814 OR UL 1479.
- B. PENETRATIONS IN HORIZONTAL ASSEMBLIES: F– AND T–RATINGS PER ASTM E 814 OR UL 1479.
- C. PENETRATIONS IN SMOKE BARRIERS: L–RATINGS PER UL 1479.
- D. W–RATINGS: PER UL 1479.
- 1.3 INSTALLATION
- A. IDENTIFICATION: PREPRINTED METAL OR PLASTIC LABELS.
- 1.4 FIELD QUALITY CONTROL
- A. INSPECTION OF INSTALLED FIRE–STOPPING: BY OWNER–ENGAGED AGENCY ACCORDING TO ASTM E 2174.
- 1.5 THROUGH–PENETRATION FIRESTOP SYSTEM SCHEDULE
- WHERE UL–CLASSIFIED SYSTEMS ARE INDICATED, THEY REFER TO SYSTEM NUMBERS IN UL'S "FIRE RESISTANCE DIRECTORY" UNDER PRODUCT CATEGORY XHEZ.
- FOR THE FOLLOWING SYSTEMS:
- METALLIC AND NON–METALLIC PIPES, CONDUIT, OR TUBING, ELECTRICAL CABLES, CABLE TRAYS WITH ELECTRIC CABLES, MISCELLANEOUS ELECTRICAL PENETRANTS, INSULATED PIPES, GROUPINGS OF PENETRANTS, USE ON OR MORE THE FOLLOWING MATERIALS:
- g. LATEX SEALANT
- d. SILICONE SEALANT
- c. INTUMESCENT PUTTY
- d. MORTAR
- e. SILICONE FOAM
- f. PILLOWS/BAGS
- g. INTUMESCENT WRAP STRIPS
- h. INTUMESCENT COMPOSITE SHEET
- 1.6 MANUFACTURERS
- A. HILTI CONSTRUCTION CHEMICAL, INC
- B. TREMCO INC.
- C. 3M FIRE PROTECTION PRODUCTS
- END OF SECTION 078413

SECTION 230593 – TESTING, ADJUSTING, AND BALANCING FOR HVAC

- 1.1 SUMMARY
- A. TESTING, ADJUSTING, AND BALANCING FOR THE FOLLOWING:
1. MOTORS.
2. CONDENSING UNITS.
3. AIR SYSTEM: CONSTANT VOLUME
- 1.2 QUALITY ASSURANCE
- A. THE CONTRACTOR SHALL PROCURE THE SERVICES OF A TESTING, ADJUSTING AND BALANCING (TAB) SPECIALIST WHO SPECIALIZES IN HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS. THE TAB AGENT SHALL HAVE THE FOLLOWING QUALIFICATIONS: ABC, NEBB OR TABB CERTIFIED.
- 1.3 EXECUTION
- A. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL EXISTING AIR AND HYDRONIC SYSTEMS THAT ARE TO REMAIN OR TO BE INCORPORATED INTO NEW WORK PRIOR TO THE STARTING OF WORK IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
- B. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL NEW AIR AND HYDRONIC SYSTEMS AS LISTED ABOVE IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
- C. THE REPORT SHALL INDICATE A SCHEMATIC DIAGRAM INDICATING LOCATIONS OF ALL EQUIPMENT TESTED AND MEASUREMENT LOCATIONS.
- D. PRIOR TO FINAL INSPECTION OF THE WORK, THE TAB SPECIALIST SHALL BALANCE ALL SYSTEMS AS INDICATED ABOVE TO THE REQUIREMENTS OF THE DESIGN.
- E. THE CONTRACTOR SHALL HAVE FURNISH AND INSTALL ALL ADDITIONAL BALANCING EQUIPMENT, PRESSURE TAPS, GAUGES AND OTHER EQUIPMENT AS REQUIRED FOR A PROPERLY BALANCED SYSTEM AT NO ADDITIONAL COST TO THE OWNER. SUCH ADDITIONAL EQUIPMENT SHALL ADHERE IN STRICT ACCORDANCE WITH THE RESPECTIVE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.
- F. THE CONTRACTOR SHALL HAVE THE TESTING AND BALANCING SPECIALIST COORDINATE ALL WORK OF THIS SECTION WITH THE BUILDING MANAGER. BALANCING WORK SHALL NOT CONFLICT WITH OTHER WORK SO AS TO MAINTAIN COMPLETION WITHIN THE SPECIFIED TIME.
- G. ALL INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN GOOD WORKING CONDITION AND ACCURATELY CALIBRATED.
- H. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN VALUES.
- I. INSPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITECT TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING REPORT.
- J. ADDITIONAL TESTS: RANDOM TESTS WITHIN 90 DAYS OF COMPLETING TAB TO VERIFY BALANCE CONDITIONS AND SEASONAL TESTS.
- END OF SECTION 230593

SECTION 230518 – ESCUTCHEONS FOR HVAC PIPING

- PART 1 – PRODUCTS
- 1.1 ESCUTCHEONS
- A. ONE–PIECE, CAST–BRASS TYPE: WITH POLISHED, CHROME–PLATED AND ROUGH–BRASS FINISH AND SETSCREW FASTENER.
- B. ONE–PIECE, DEEP–PATTERN TYPE: DEEP–DRAWN, BOX–SHAPED BRASS WITH CHROME–PLATED FINISH AND SPRING–CLIP FASTENERS.
- C. ONE–PIECE, STAMPED–STEEL TYPE: WITH CHROME–PLATED FINISH AND SPRING–CLIP FASTENERS.
- 1.2 FLOOR PLATES
- A. ONE–PIECE FLOOR PLATES: CAST–IRON FLANGE WITH HOLES FOR FASTENERS.
- PART 2 – EXECUTION
- 2.1 INSTALLATION
- A. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FINISHED FLOORS.
- B. INSTALL ESCUTCHEONS WITH ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF PIPING AND WITH OD THAT COMPLETELY COVERS OPENING.
1. ESCUTCHEONS FOR NEW PIPING:
- a. PIPING WITH FITTING OR SLEEVE PROTRUDING FROM WALL: ONE–PIECE, DEEP–PATTERN TYPE.
- b. INSULATED PIPING: ONE–PIECE, STAMPED–STEEL TYPE.
- c. BARE PIPING AT WALL AND FLOOR PENETRATIONS IN FINISHED SPACES: ONE–PIECE, CAST–BRASS TYPE WITH POLISHED, CHROME–PLATED FINISH OR STAMPED–STEEL TYPE.
- d. BARE PIPING AT CEILING PENETRATIONS IN FINISHED SPACES: ONE–PIECE, CAST–BRASS TYPE WITH POLISHED, CHROME–PLATED FINISH OR STAMPED–STEEL TYPE.
- 2.2 FIELD QUALITY CONTROL
- A. REPLACE BROKEN AND DAMAGED ESCUTCHEONS AND FLOOR PLATES USING NEW MATERIALS.
- END OF SECTION 230518

SECTION 230529 – HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

- 1.1 PERFORMANCE REQUIREMENTS
- A. DELEGATED DESIGN: DESIGN TRAPEZE PIPE HANGERS AND EQUIPMENT SUPPORTS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.
- B. STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.
1. DESIGN SUPPORTS FOR MULTIPLE PIPES CAPABLE OF SUPPORTING COMBINED WEIGHT OF SUPPORTED SYSTEMS, SYSTEM CONTENTS, AND TEST WATER.
2. DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND
3. DESIGN SEISMIC–RESTRAINT HANGERS AND SUPPORTS FOR PIPING AND EQUIPMENT AND OBTAIN APPROVAL FROM AUTHORITIES HAVING JURISDICTION.
- 1.2 SUBMITTALS
- A. SHOP DRAWINGS: SIGNED AND SEALED BY A PROFESSIONAL ENGINEER
- 1.3 QUALITY ASSURANCE
- A. AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE – STEEL"
- 1.4 COMPONENTS
- A. METAL PIPE HANGERS AND SUPPORTS: CARBON OR STAINLESS STEEL
- B. FIBERGLASS PIPE HANGERS: –CLEVIS, CENTURY COMPOSITES, COOPER B–LINE
- D. METAL FRAMING SYSTEMS: MFMA MANUFACTURER
- E. FIBERGLASS STRUT SYSTEMS: COOPER B–LINE
- F. THERMAL–HANGER SHIELD INSERTS:
- G. FASTENER SYSTEMS: POWDER–ACTUATED FASTENERS OR MECHANICAL–EXPANSION ANCHORS
- H. PIPE STANDS: COMPACT, LOW TYPE, SINGLE PIPE, HIGH TYPE, SINGLE PIPE, HIGH TYPE, MULTIPLE PIPES, CURB–MOUNTED TYPE
- I. EQUIPMENT SUPPORTS.
- END OF SECTION 230529

SECTION 233713 – DIFFUSERS, REGISTERS, AND GRILLES

- 1.1 PRODUCTS
- A. DIFFUSERS, REGISTERS AND GRILLES SHALL BE FURNISHED AND INSTALLED FOR CAPACITIES AND IN LOCATIONS INDICATED ON DRAWINGS. ALL REGISTERS AND DIFFUSERS SHALL BE PRIME COATED STEEL OR EXTRUDED ALUMINUM FINISHED UNLESS OTHERWISE NOTED IN BAKED WHITE ENAMEL.
- B. MANUFACTURERS: TITUS
1. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:
- g. METALAIRE, INC.
- b. RUSKIN
- C. ALL DIFFUSERS SHALL HAVE CONTROLLING/EQUALIZING GRID AND OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.
- D. ALL DUCTED RETURN REGISTERS SHALL HAVE AN OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.
- END OF SECTION 233713

SECTION 230548 – VIBRATION CONTROLS FOR PIPING AND HVAC EQUIPMENT

- PART 1 – GENERAL
- 1.1 PERFORMANCE REQUIREMENTS
- A. SEISMIC–RESTRAINT LOADING:
1. SITE CLASS AS DEFINED IN THE IBC: A, B
2. ASSIGNED SEISMIC USE GROUP OR BUILDING CATEGORY AS DEFINED IN THE IBC: I II III
- a. COMPONENT IMPORTANCE FACTOR: 1.0
- b. COMPONENT RESPONSE MODIFICATION FACTOR: 2.5
- c. COMPONENT AMPLIFICATION FACTOR: 2.5.
3. DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS (0.2 SECOND) 18%
4. DESIGN SPECTRAL RESPONSE ACCELERATION AT 1–SECOND PERIOD: 8%
- 1.2 COMPONENTS
- A. VIBRATION ISOLATORS:
1. ISOLATOR PADS: NEOPRENE, RUBBER, HERMETICALLY AND/OR SEALED COMPRESSED FIBERGLASS
2. MOUNTS: DOUBLE–DEFLECTION TYPE.
3. RESTRAINED MOUNTS: ALL DIRECTIONAL MOUNTINGS WITH SEISMIC RESTRAINT; CAST–DUCTILE–IRON HOUSING.
4. SPRING ISOLATORS: FREESTANDING, Laterally STABLE, OPEN–SPRING TYPE.
5. RESTRAINED SPRING ISOLATORS: FREESTANDING, STEEL, OPEN–SPRING TYPE WITH SEISMIC RESTRAINT.
6. HOUSED SPRING MOUNTS: DUCTILE–IRON OR STEEL HOUSING, WITH INTEGRAL, VERTICALLY ADJUSTABLE SEISMIC SNUBBERS.
7. ELASTOMERIC HANGERS: DOUBLE–DEFLECTION TYPE.
8. SPRING HANGERS: COMBINATION COIL–SPRING AND ELASTOMERIC–INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION.
9. SPRING HANGERS WITH VERTICAL–LIMIT STOP: COMBINATION COIL–SPRING AND ELASTOMERIC–INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION AND WITH VERTICAL–LIMIT STOP.
10. PIPE RISER RESILIENT SUPPORT: ALL–DIRECTIONAL, ACOUSTICAL PIPE ANCHOR.
11. RESILIENT PIPE GUIDES.
- B. AIR–MOUNTING SYSTEMS:
1. AIR MOUNTS: FREESTANDING, SINGLE OR MULTIPLE, COMPRESSED–AIR BELLOWS.
2. RESTRAINED AIR MOUNTS: HOUSED COMPRESSED–AIR BELLOWS.
- C. RESTRAINED VIBRATION ISOLATION ROOF–CURB RAILS: FACTORY–ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR– AND WATERTIGHT CURB RAIL; WITH SPRING ISOLATORS MOUNTED ON ELASTOMERIC ISOLATION PADS, AND SNUBBER BUSHINGS.
- D. VIBRATION ISOLATION EQUIPMENT BASES:
1. STEEL BASE: FACTORY–FABRICATED, WELDED, STRUCTURAL–STEEL BASES AND RAILS
2. INERTIA BASE: FACTORY–FABRICATED, WELDED, STRUCTURAL–STEEL BASES AND RAILS READY FOR FIELD APPLIED, CAST–IN–PLACE CONCRETE
- 1.3 FIELD QUALITY CONTROL
- A. TESTING: BY EITHER: OWNER–ENGAGED AGENCY, CONTRACTOR–ENGAGED AGENCY, OR CONTRACTOR.
- PART 2 – PRODUCTS
- 1.4 VIBRATION ISOLATORS & SEISMIC–RESTRAINT DEVICES
- A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
- B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
1. ACE MOUNTINGS CO., INC.
2. AMBER/BOOTH COMPANY, INC.
3. CALIFORNIA DYNAMICS CORPORATION.
4. COOPER B–LINE, INC.; A DIVISION OF COOPER INDUSTRIES.
5. HILTI, INC.
6. ISOLATION TECHNOLOGY, INC.
7. KINETICS NOISE CONTROL.
8. LOOS & CO.; CABLEWARE DIVISION.
9. MASON INDUSTRIES.
10. TOLCO INCORPORATED; A BRAND OF NIBCO INC.
11. UNISTRUT; TYCO INTERNATIONAL, LTD.
12. VIBRATION ELIMINATOR CO., INC.
13. VIBRATION ISOLATION.
14. VIBRATION MOUNTINGS & CONTROLS, INC.
- END OF SECTION 230548

SECTION 233113 – METAL DUCTS

- 1.1 CONSTRUCTION
- A. EACH DUCT SYSTEM SHALL BE CONSTRUCTED FOR THE SPECIFIC SMACNA DUCT PRESSURE CLASSIFICATIONS SHOWN ON THE CONTRACT DRAWINGS. WHERE NO PRESSURE CLASSES ARE SPECIFIED BY THE DESIGNER, THE SMACNA 1 INCH WG PRESSURE, SEAL CLASS "A".
- B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 1" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:
1. CONSTRUCT SO THAT ALL INTERIOR SURFACES ARE SMOOTH. USE SLIP AND DRIVE OR FLANGED AND BOLTED CONSTRUCTION WHEN FABRICATING RECTANGULAR DUCTWORK. USE SPIRAL LOCK SEAM CONSTRUCTION WHEN FABRICATING ROUND SPIRAL DUCTWORK. SHEET METAL SCREWS MAY BE USED ON DUCT HANGERS, TRANSVERSE JOINTS AND OTHER SMACNA APPROVED LOCATIONS IF THE SCREW DOES NOT EXTEND MORE THAN 1/2 INCH INTO THE DUCT.
2. SHEET STEEL SHALL COMPLY WITH ASTM A653 STANDARD SPECIFICATION FOR STEEL SHEET METAL, ZINC COATED (GALVANIZED) OR ZINC IRON ALLOY–COATED (GALVANNEALED) BY HOT DIP PROCESS, AND A924 STANDARD SPECIFICATION FOR GENERAL REQUIREMENTS FOR SHEET METALLIC–COATED BY HOT DIP PROCESS. ALL ANGLE IRON USED FOR SUPPORT SHALL BE GALVANIZED. CONNECTIONS TO WALLS OR FLOOR SHALL BE AIR TIGHT WITH ANGLE IRON AND CAULKING. SEAL ALL DUCT SEAMS, TRANSVERSE AND LONGITUDINAL, AIR TIGHT. PROVIDE TURNING VANES ALL 90° ELBOWS.
3. USE ELBOWS AND TEES WITH A CENTER LINE RADIUS TO WIDTH OR DIAMETER RATIO OF 1.5 WHEREVER SPACE PERMITS. WHEN A SHORTER RADIUS MUST BE USED DUE TO LIMITED SPACE, INSTALL SINGLE WALL SHEET METAL SPLITTER VANES IN ACCORDANCE WITH SMACNA PUBLICATIONS, TYPE RE 3. WHERE SPACE WILL NOT ALLOW AND THE C VALUE OF THE RADIUS ELBOW, AS GIVEN IN SMACNA PUBLICATIONS, EXCEEDS 0.31, USE RECTANGULAR ELBOWS WITH TURNING VANES AS SPECIFIED IN SECTION 23 33 00. SQUARE THROAT–RADIUS HEEL ELBOWS WILL NOT BE ACCEPTABLE. STRAIGHT TAPS OR BULLHEAD TEES ARE NOT ACCEPTABLE.
4. WHERE RECTANGULAR ELBOWS ARE USED, PROVIDE TURNING VANES IN ACCORDANCE WITH SECTION 23 33 00.
5. PROVIDE EXPANDED TAKE–OFFS OR 45 DEGREE ENTRY FITTINGS FOR BRANCH DUCT CONNECTIONS WITH BRANCH DUCTWORK AIRFLOW VELOCITIES GREATER THAN 700 FPM. SQUARE EDGE 90–DEGREE TAKE–OFF FITTINGS OR TIGHT TAPS WILL NOT BE ACCEPTED.
6. BUTTON PUNCH SNAP–LOCK CONSTRUCTION WILL NOT BE ACCEPTED ON ALUMINUM DUCTWORK.
- C. WHERE LATEST EDITION OF SMACNA DOES NOT CLEARLY STATE GAUGES AND/OR STIFFENERS TO BE USED OR, WHERE SMACNA STANDARDS REQUIRE INTERPRETATION, THE FOLLOWING MINIMUM METAL GAUGES AND BRACING SHALL BE USED:
- SUPPORT SCHEDULE – DUCTWORK
- | MAX SIDE INCHES | TRANSVERSE JOINT AND BRACING |
|-----------------|--|
| UP TO 12 | S SLIP, DRIVE, ONE INCH POCKET ON 8 FOOT |
| 13 TO 24 | 1"X1"X1/8" ANGLES ON 4 FOOT CENTERS |
| 25 TO 35 | 1"X1"X1/8" ANGLES ON 2 FOOT CENTERS |
- D. PROVIDE TAPPING IN DUCTS FOR THERMOMETERS WHERE SPECIFIED. IN ADDITION, PROVIDE AN AIRTIGHT PLUGGED TAPPING LOCATED AS FOLLOWS:
1. UPSTREAM OF EACH REHEAT COIL AND VAV BOX.
2. DOWNSTREAM OF EACH REHEAT COIL AND VAV BOX.
- E. FLAT OVAL OR ROUND DUCTWORK MAY BE PROVIDED IN LIEU RECTANGULAR DUCTWORK WITH THE REINFORCEMENT FOR FLAT SIDES SAME AS SPECIFIED FOR THE RECTANGULAR DUCTWORK, AND AS PER SMACNA FLAT OVAL DUCT CONSTRUCTION STANDARDS
- F. ALL DUCTWORK SHALL BE SEALED TO CLASS "A" AND LEAK TESTED TO MEAT SMACNA CLASS 6 FOR RECTANGULAR AND CLASS 3 FOR ROUND DUCTS.
- 1.2 MATERIALS
- A. SINGLE–WALL RECTANGULAR DUCTS AND FITTINGS.
- B. SINGLE–WALL ROUND AND FLAT–OVAL DUCTS AND FITTINGS.
- C. SHEET METAL MATERIALS:
1. GALVANIZED SHEET STEEL.
2. STAINLESS–STEEL SHEETS.
3. ALUMINUM SHEETS.
4. FACTORY–APPLIED ANTI–MICROBIAL COATING.
- D. DUCT LINER:
1. FIBROUS GLASS, TYPE I, FLEXIBLE WITH ANTI–MICROBIAL EROSION–RESISTANT COATING.
2. FLEXIBLE ELASTOMERIC.
- E. SEALANT MATERIALS:
1. TWO–PART TAPE SEALING SYSTEM.
2. WATER–BASED JOINT AND SEAM SEALANT.
3. SOLVENT–BASED JOINT AND SEAM SEALANT.
4. FLANGED JOINT SEALANT.
- 1.3 DUCT SCHEDULE
- A. ALL DUCTS SHALL BE GALVANIZED STEEL EXCEPT AS FOLLOWS:
1. MOIST ENVIRONMENT DUCT MATERIAL: ALUMINUM.
- END OF SECTION 233113

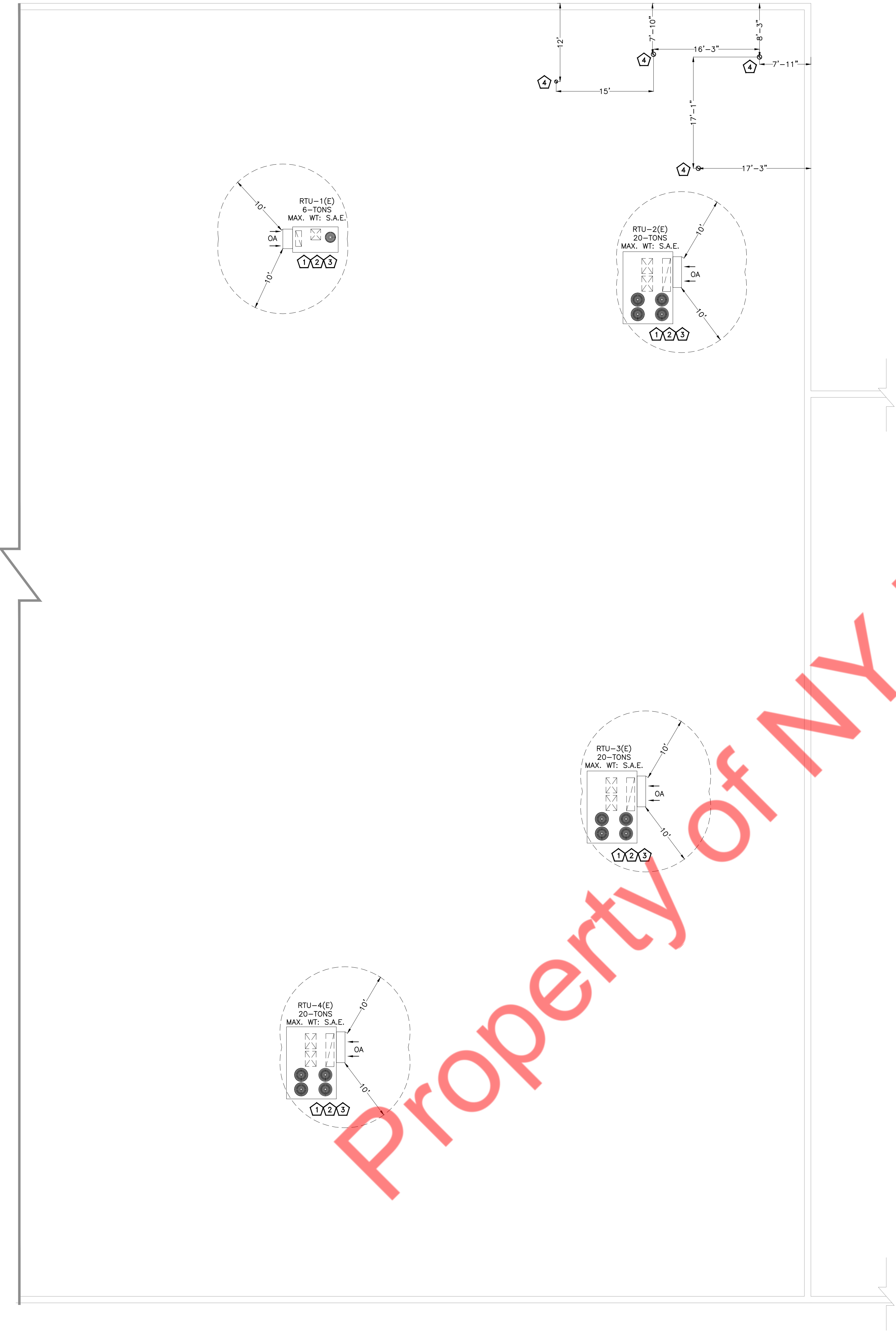
SECTION 230713 – DUCT INSULATION

- 1.1 QUALITY ASSURANCE
- SURFACE–BURNING CHARACTERISTICS: ALL INSULATION SHALL HAVE COMPOSITE (INSULATION JACKET OR FACING AND ADHESIVE USED TO ADHERE THE FACING OR JACKET TO THE INSULATION) A FLAME–SPREAD INDEX OF 25, AND SMOKE–DEVELOPED INDEX OF 50 FOR INSULATION INSTALLED INDOOR, 75, AND SMOKE–DEVELOPED INDEX OF 150 FOR INSULATION INSTALLED OUTDOORS; ACCORDING TO ASTM E 84.
- 1.2 FIELD QUALITY CONTROL
- A. FIELD INSPECTIONS: BY OWNER–ENGAGED AGENCY.
- 1.3 INDOOR DUCT AND PLENUM INSULATION SCHEDULE:
- A. CONCEALED, RECTANGULAR, ROUND AND FLAT–OVAL, SUPPLY–RETURN, OUTDOOR–AND EXHAUST–AIR DUCT AND AIR PLENUM INSULATION:
- B. FLEXIBLE ELASTOMERIC, MINERAL–FIBER BLANKET, MINERAL–FIBER BOARD OR POLYOLEFIN WITH MINIMUM INSTALLED THERMAL RESISTANCE AS FOLLOWS:
- UNCONDITIONED SPACES WITHIN BUILDING: R–6
- WITHIN BUILDING ENVELOPE ASSEMBLY: R–8
- OUTSIDE OF BUILDING: R–8
- 1.4 ITEMS NOT INSULATED:
1. FIBROUS–GLASS DUCTS.
2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE ANDASHRAE/IESNA 90.1.
3. FACTORY–INSULATED FLEXIBLE DUCTS.
4. FACTORY–INSULATED PLENUMS AND CASINGS.
5. FLEXIBLE CONNECTORS.
6. VIBRATION–CONTROL DEVICES.
7. FACTORY–INSULATED ACCESS PANELS AND DOORS.
8. DUCTS THAT HAVE INTERNAL ACOUSTICAL LINING.
- 1.5 PRODUCTS
- A. THE FOLLOWING INSULATION MANUFACTURERS WILL BE ACCEPTABLE:
1. JOHNS–MANVILLE
2. OWENS–CORNING
- 1.6 ACOUSTICAL TREATMENT
1. WHERE SHOWN ON THE DRAWINGS, LOW PRESSURE DUCTWORK SHALL BE LINED WITH 1.5" THICK R–6 AS MANUFACTURED BY DUCTMATE, 1–1/2 POUND MINIMUM DENSITY, NEOPRENE COATED, FLEXIBLE FIBERGLASS DUCT LINER. LINING SHALL COMPLY WITH NFPA 90A AND SHALL HAVE A FLAME SPREAD CLASSIFICATION OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50. DUCT SIZES WHERE LINING IS INDICATED ON PLANS ARE MINIMUM INSIDE CLEAR DIMENSIONS REQUIRED.
- END OF SECTION 230713

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REVISIONS

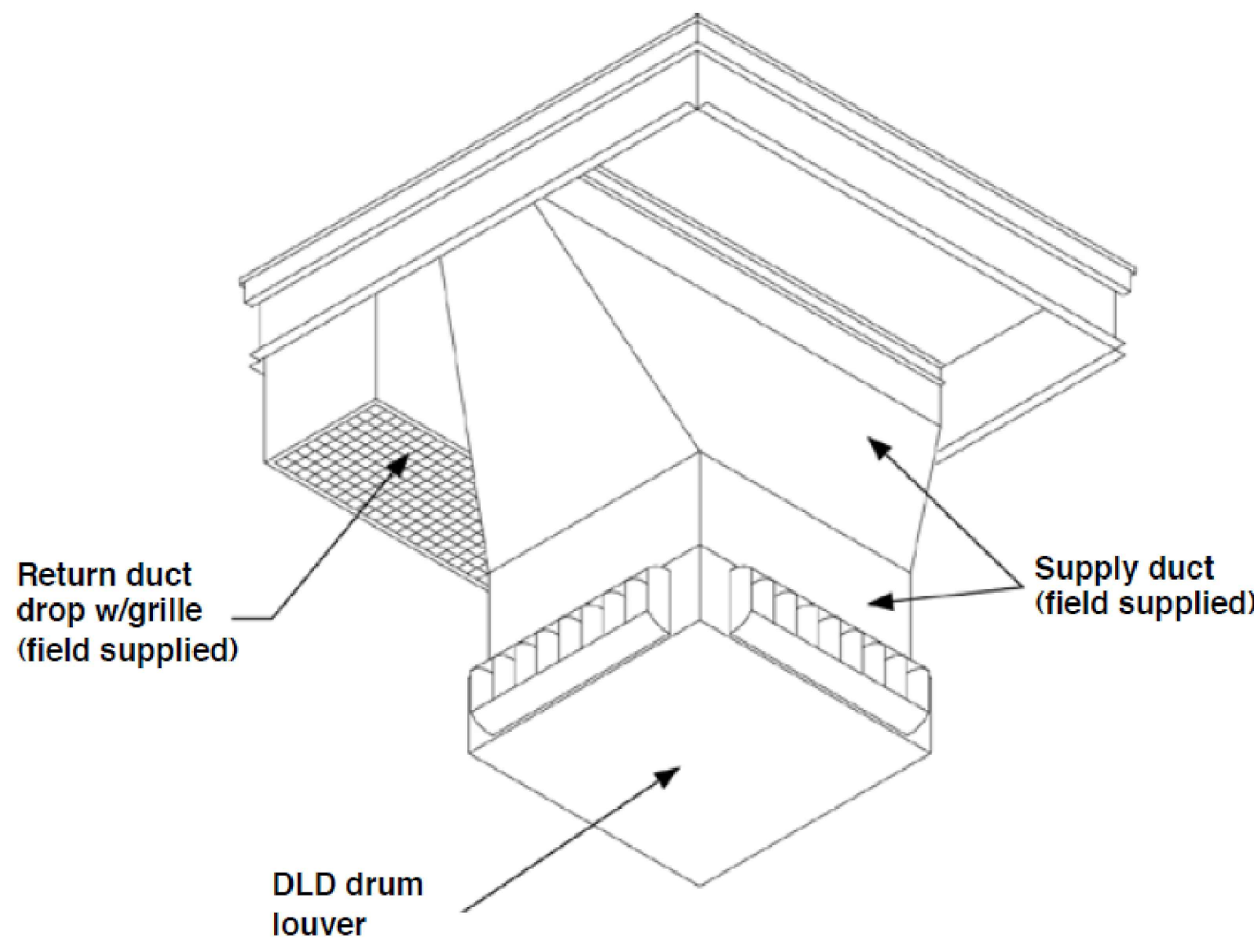


MECHANICAL GENERAL NOTES:

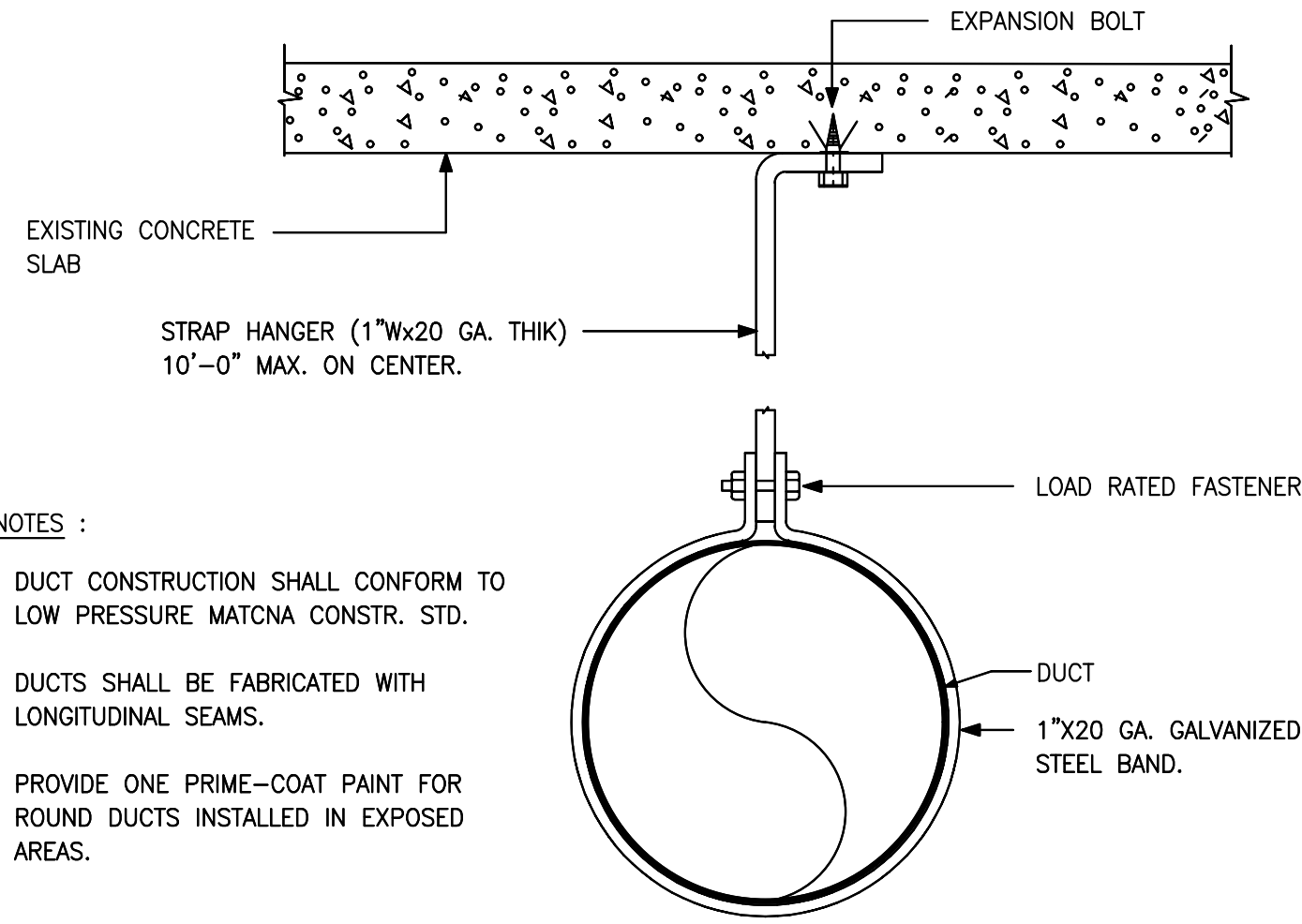
- A. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING ROOF TOP UNITS AND OTHER EQUIPMENT IF ANY.
- B. COORDINATE LOCATIONS AND SIZES OF ROOF OPENINGS WITH OWNER AND STRUCTURAL ENGINEERS.
- C. REUSE THE EXISTING ROOF TOP UNITS AS SHOWN ON MECHANICAL ROOF PLAN.
- D. ALL ITEMS TO BE RE-USED OR RELOCATED SHALL BE CLEANED, REPAIRED, AND RESTORED TO LIKE NEW CONDITION PRIOR TO RE-USE.
- E. EXISTING ROOF CURBS TO BE REUSED WHEREVER POSSIBLE. CONTRACTOR TO FIELD VERIFY THE CONDITION OF EXISTING CURBS, REPLACE EXISTING CURBS IF NOT IN A GOOD CONDITION.
- F. ALL SHUT DOWNS OF EXISTING SYSTEMS SHALL BE SCHEDULED AND APPROVED BY THE OWNER PRIOR TO COMMENCING WITH WORK.
- G. ALL SOURCE OF MECHANICAL INTAKE SHALL MAINTAIN 10 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST. CONTRACTOR IS RESPONSIBLE TO ADJUST DUCT LENGTH AS NEEDED.
- H. G.C. TO PATCH & REPAIR EXTRA PENETRATION ON ROOF TO MATCH EXISTING IN ALL ASPECTS.
- I. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.

MECHANICAL ROOF PLAN KEY NOTES:

- 1 ANY EXHAUST TERMINATION TO BE AT LEAST 10 FT. AWAY FROM OUTDOOR INTAKE OPENING.
- 2 EXISTING MECHANICAL ROOFTOP UNIT WITH CURB TO REMAIN & TO BE REUSED. CLEAN AND REFURBISH TO "LIKE-NEW" CONDITION. REPAIR/REPLACE ANY ACCESSORIES AS REQUIRED TO PROVIDE A FULLY FUNCTIONING UNIT. VERIFY IN FIELD PRIOR TO BID. VERIFY FINAL LOCATION ON FILED. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES PRIOR TO BID AND START OF WORK.
- 3 CONDENSATE DRAINS FROM EXISTING RTUS TO REMAIN AS IT IS. CONTRACTOR TO FLUSH THE EXISTING DRAIN LINES. REPLACE AS IF REQUIRED.
- 4 6"x8" EXHAUST DUCT UP THROUGH ROOF WITH GOOSE NECK, BIRD SCREEN, ROOF JACK, STORM COLLAR, AND ALL-WEATHER CAP. MAINTAIN A MINIMUM OF 10 FT. HORIZONTAL DISTANCE OR 3 FT. VERTICAL DISTANCE FROM ALL OUTSIDE AIR INTAKES.

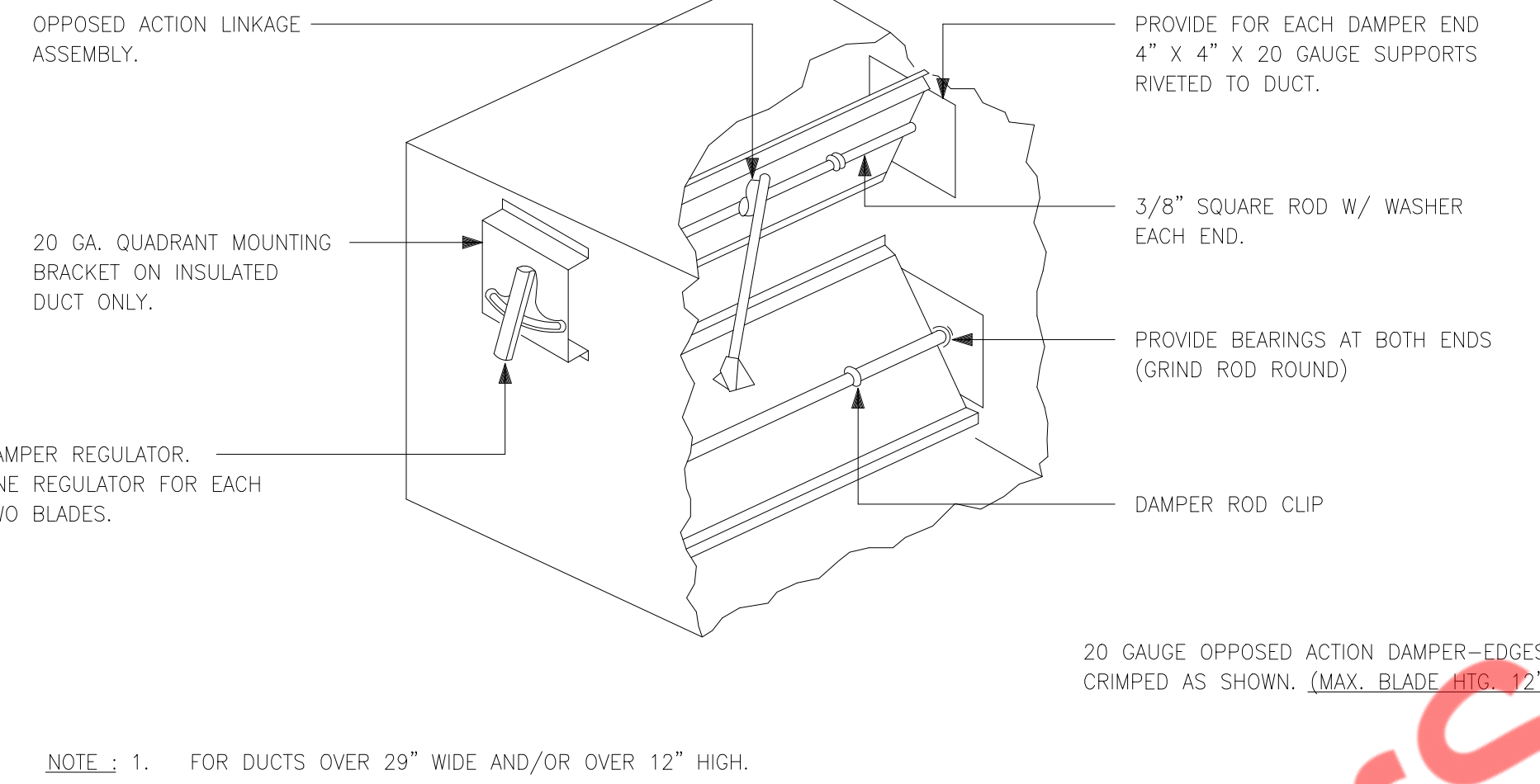


1 DRUM BOX LOUVER DIFFUSER INSTALLATION
M-500 N.T.S.



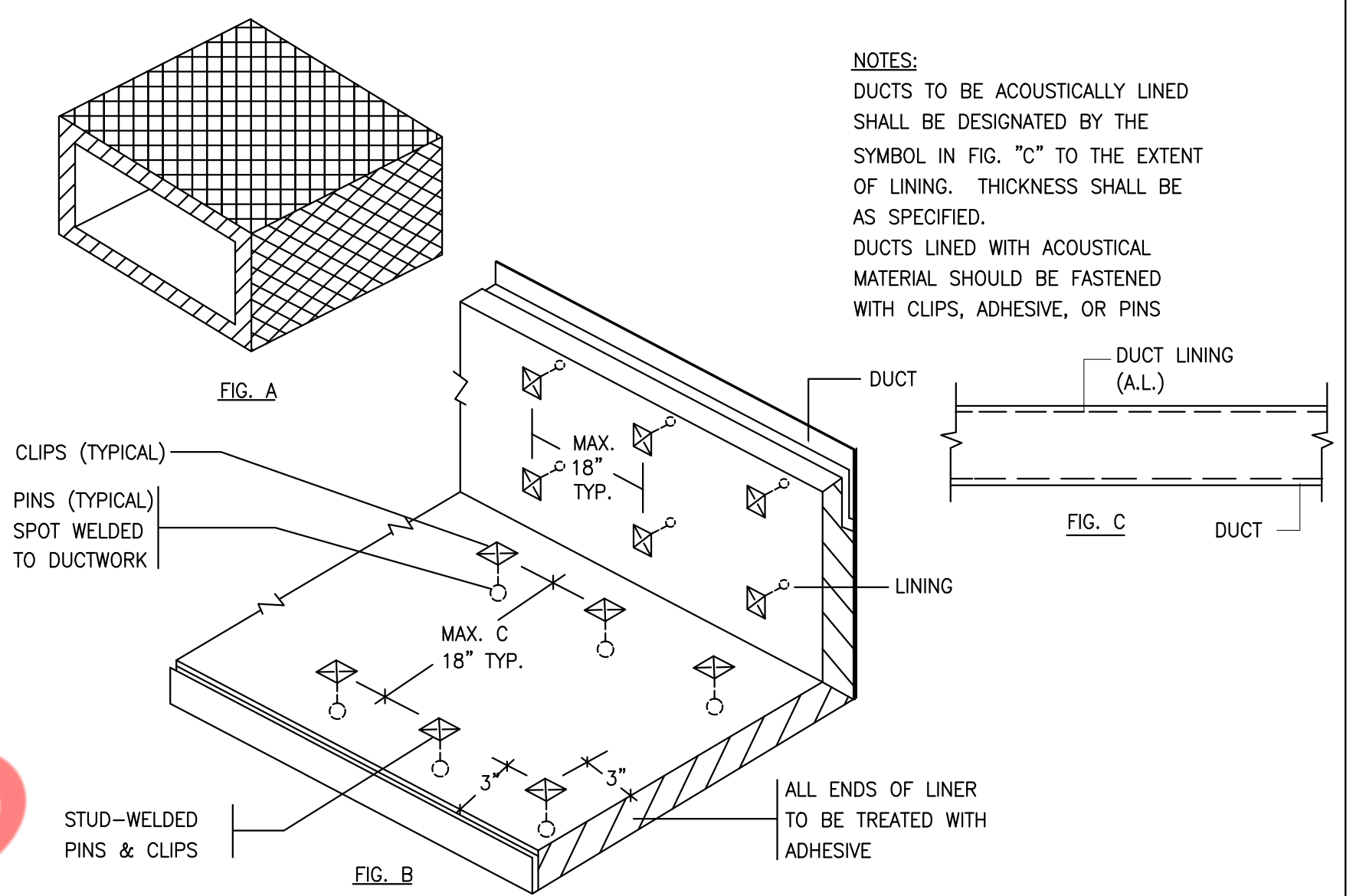
- NOTES :
1. DUCT CONSTRUCTION SHALL CONFORM TO LOW PRESSURE MATCHA CONSTR. STD.
 2. DUCTS SHALL BE FABRICATED WITH LONGITUDINAL SEAMS.
 3. PROVIDE ONE PRIME-COAT PAINT FOR ROUND DUCTS INSTALLED IN EXPOSED AREAS.

2 METHOD OF HANGING ROUND DUCT
M-500 N.T.S.

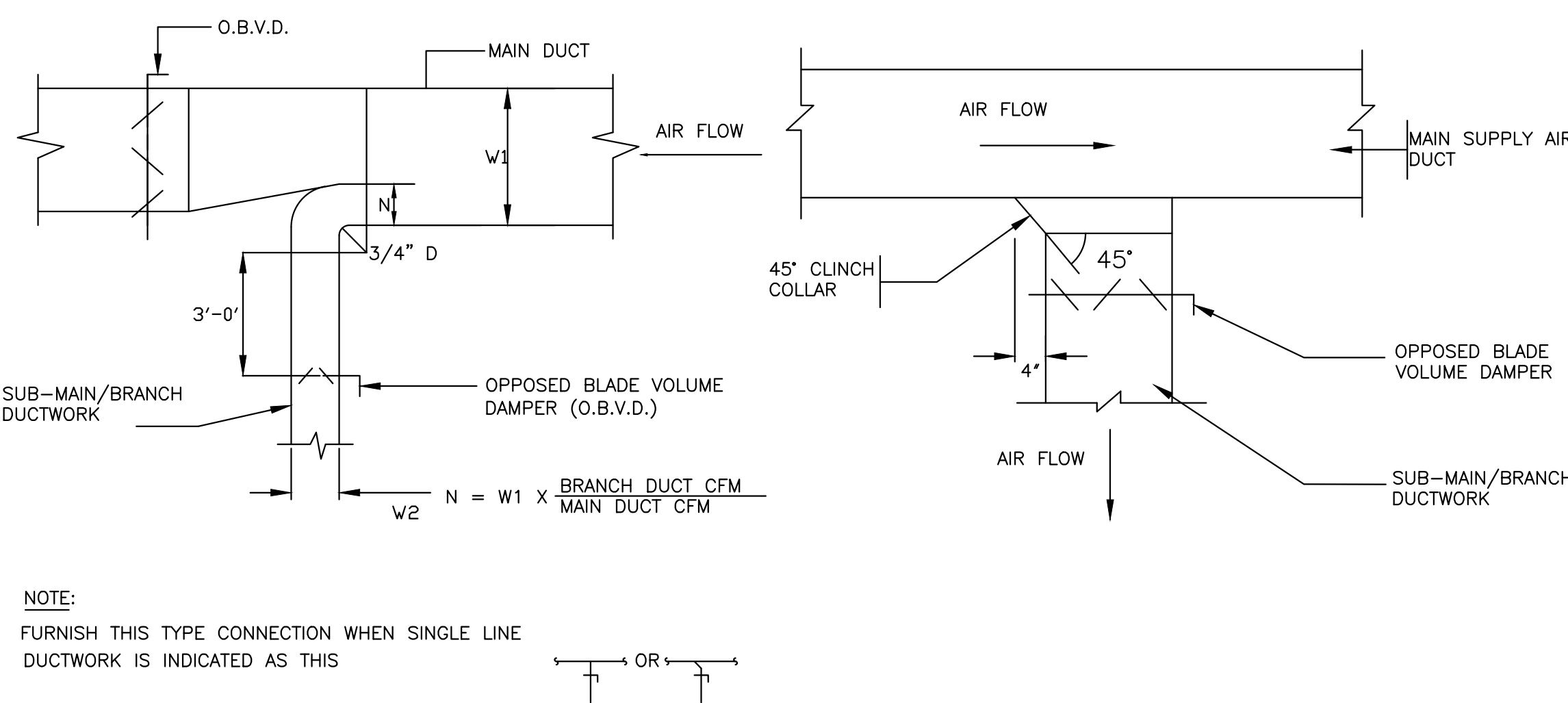


NOTE: 1. FOR DUCTS OVER 29" WIDE AND/OR OVER 12" HIGH.

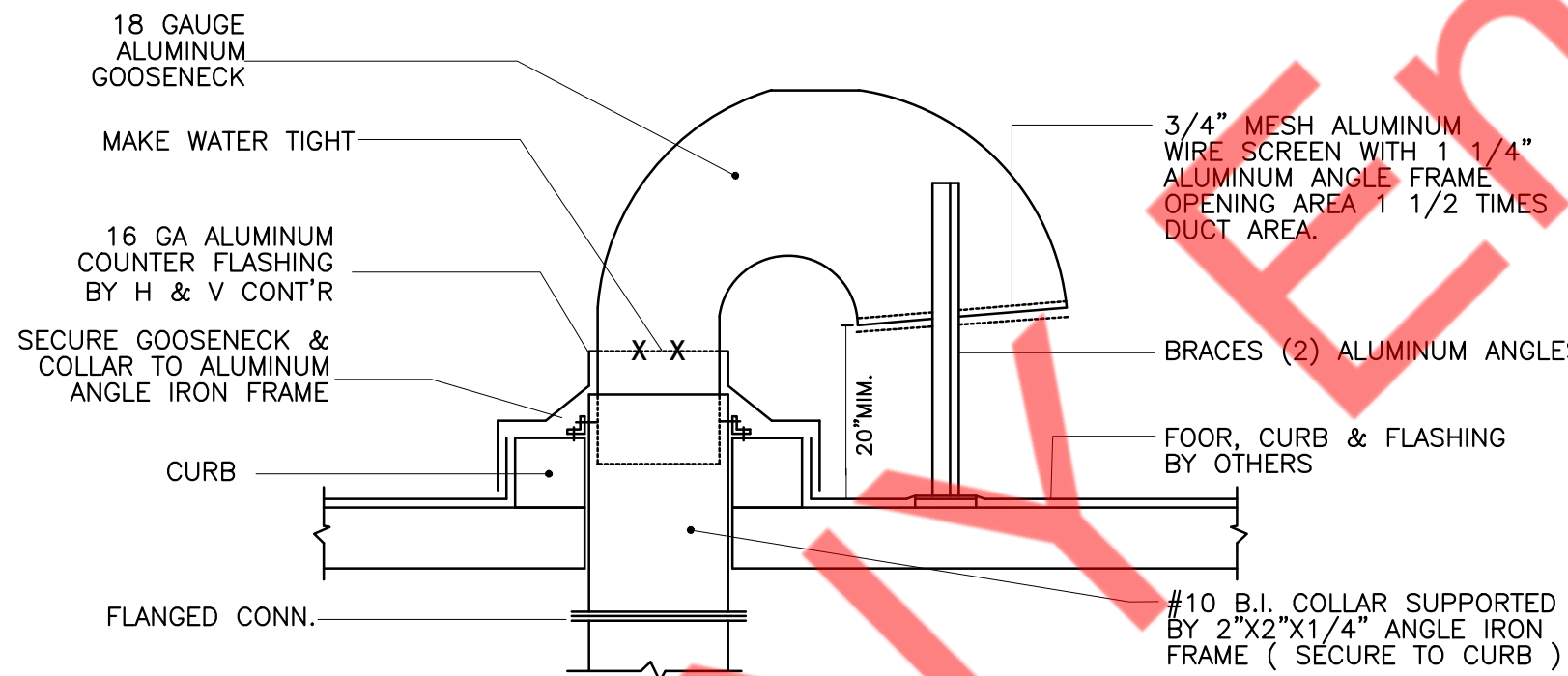
3 LOW PRESSURE BALANCING DAMPER
M-500 N.T.S.



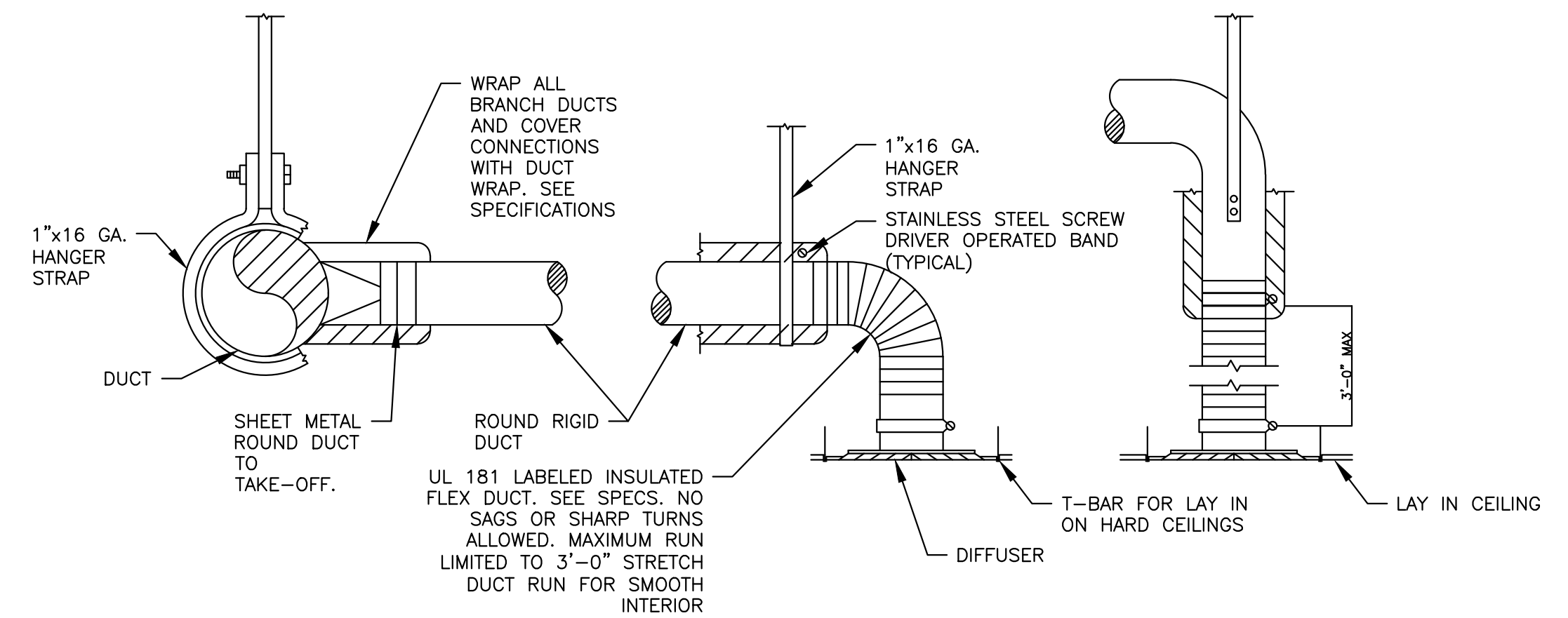
4 ACOUSTICAL TREATMENT DUCT LINING
M-500 N.T.S.



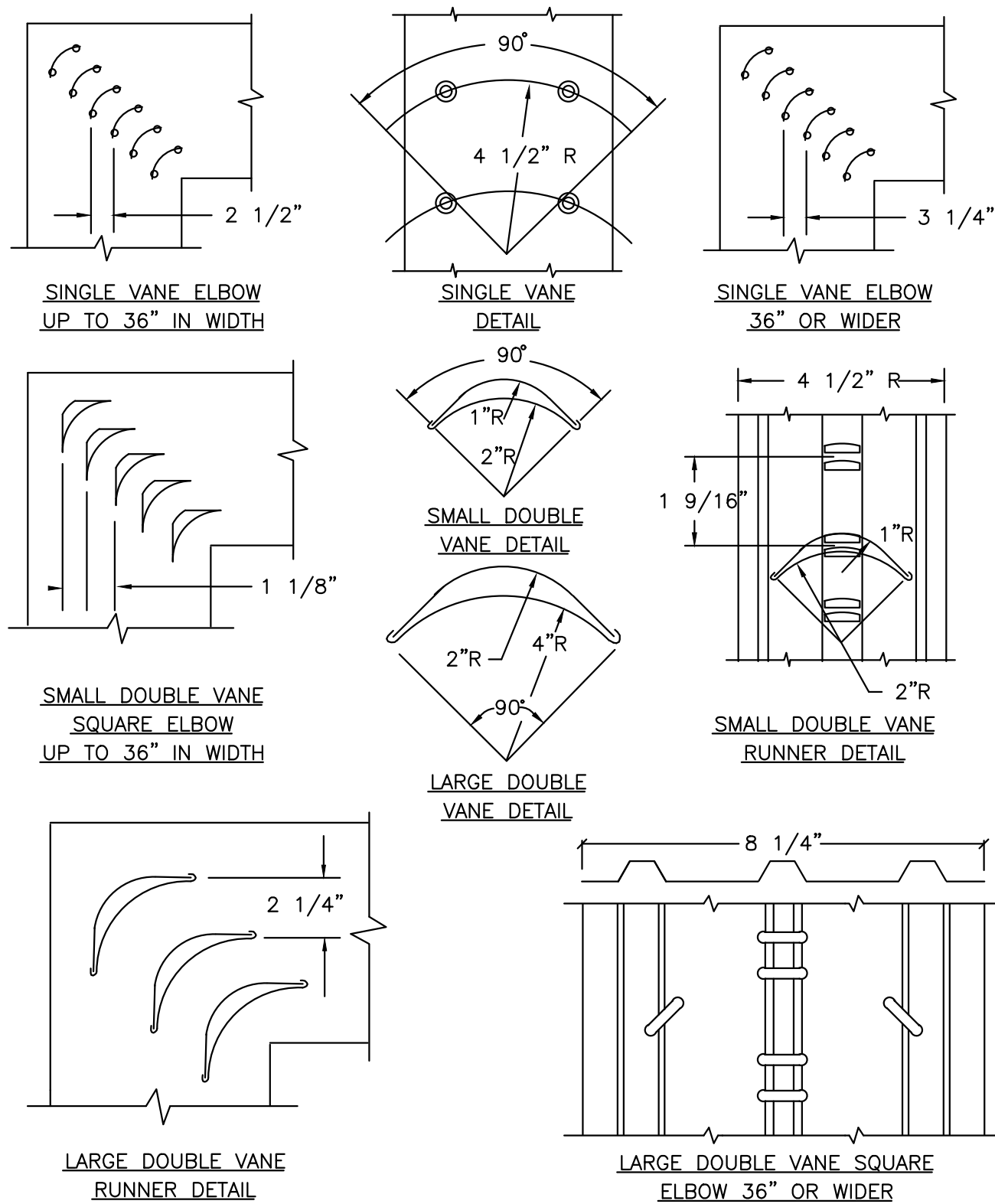
5 SUPPLY AND DUCTWORK SUB-MAIN/BRANCH DUCT CONNECT
M-500 N.T.S.



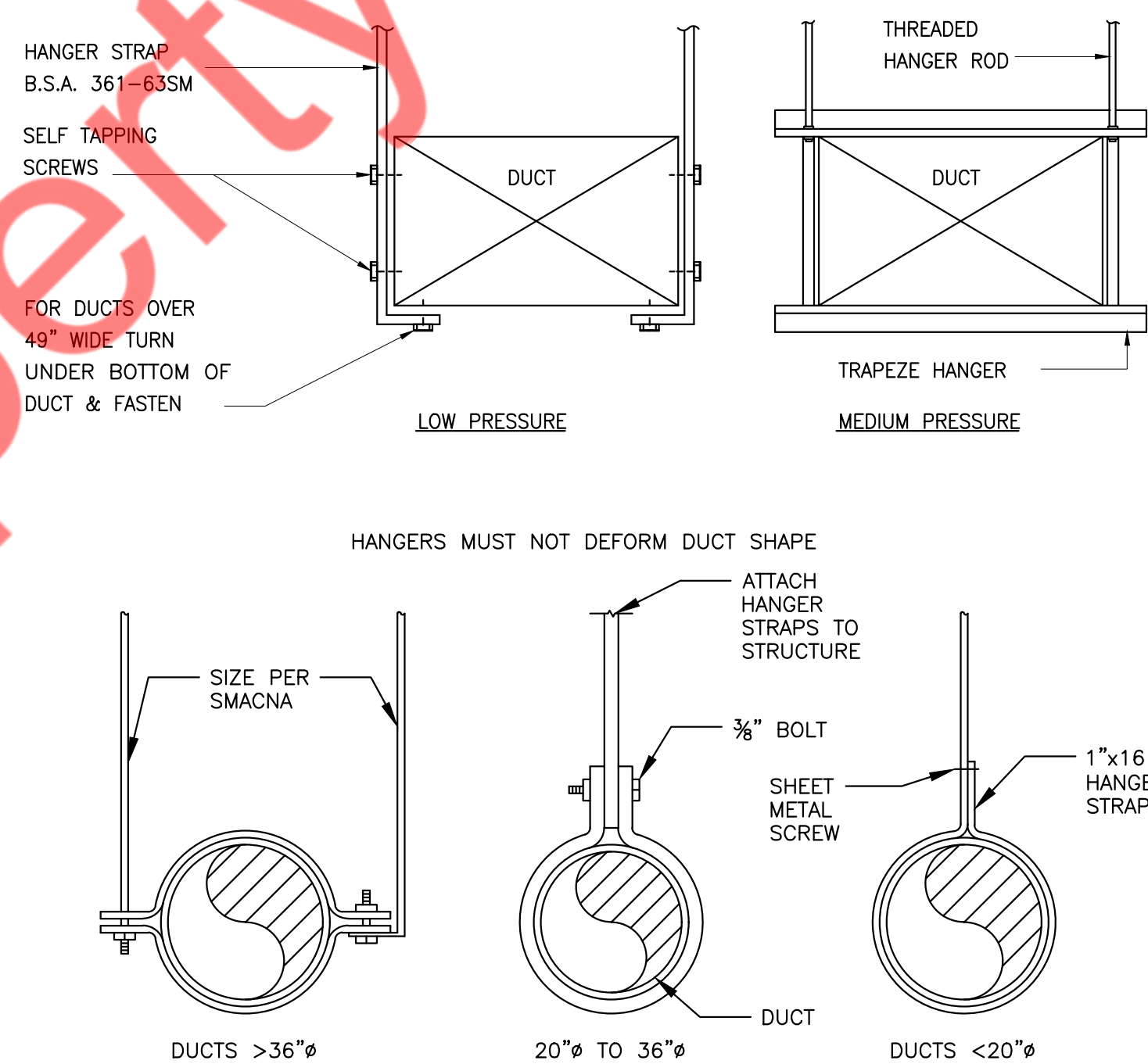
6 TYPICAL DETAIL OF ROOF GOOSENECK
M-500 N.T.S.



7 TYPICAL DIFFUSER CONNECTION DETAIL
M-500 N.T.S.

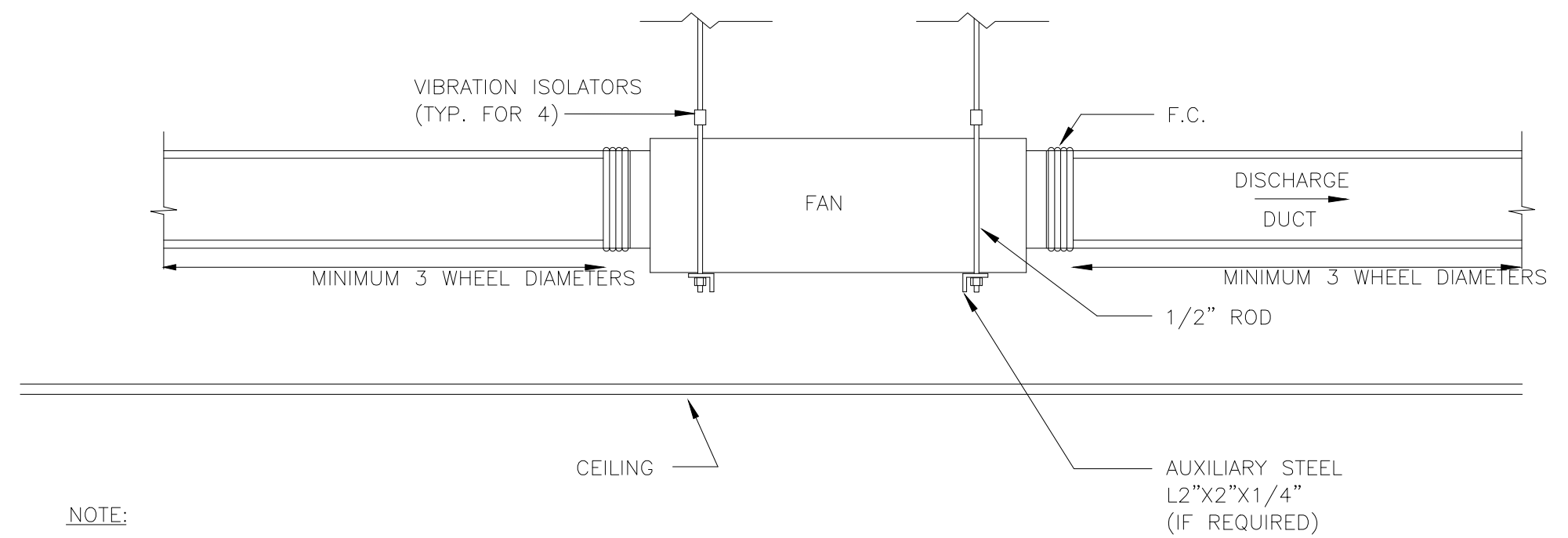


8 LOW VELOCITY DUCTWORK ELBOWS
M-500 N.T.S.



| DUCT HANGER SCHEDULE | | |
|---------------------------|-------------------|--------------|
| DUCT CROSS SECTIONAL AREA | STRAP HANGER SIZE | MAX. SPACING |
| UNDER 2 SQ. FT. | 1" X 1/16" | 6'-0" O.C. |
| 2 TO 4 SQ. FT. | 1" X 1/8" | 8'-0" O.C. |
| 4 TO 8 SQ. FT. | 1" X 1/8" | 6'-0" O.C. |
| OVER 8 SQ. FT. | 1" X 1/8" | 4'-0" O.C. |

9 DUCTWORK HANGING DETAIL
M-500 N.T.S.



NOTE:
1. DUCT LENGTH TO BE MINIMUM THREE WHEEL DIAMETER ON DISCHARGE AND INLET.

10 INLINE FAN SUPPORT DETAIL
M-500 N.T.S.

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REVISIONS

8/20/24

MECHANICAL
DETAILS

M-500

| EXISTING ROOF TOP UNITS SCHEDULE | | | | | | | | | | | | | | | | | | | | |
|--|-----------------|-----------------------|--------------|-----------------|-------------|---------------------|--------------|--------------|--------------|----------|---------------|----------------|-----------------|------------|-------------|-------------|--------|-----------|------------------------|----------|
| UNIT ID | MANUFACTURER | MODEL | NOMINAL TONS | SUPPLY FAN DATA | | | GAS HEAT | | COOLING DATA | | | | ELECTRICAL DATA | | | | EER | IEER/SEER | OPERATING WEIGHT (LBS) | REMARK |
| | | | | TOTAL | OUTSIDE AIR | EXTERNAL STATIC | INPUT | OUTPUT | TOTAL | SENSIBLE | AMBIENT TEMP. | ENTERING TEMP. | VOLTS | PHASE | MCA(A) | MOC(PA) | | | | |
| | | | | CFM | CFM | PRESSURE (IN. W.C.) | MBH | MBH | MBH | MBH | DB (°F) | DB / WB(°F) | | | | | | | | |
| RTU-1(E) | LENNOX (V.I.F.) | KGA0724BH4G (V.I.F.) | 6 | 2400 (V.I.F.) | 590 | S.A.E. | 150 (V.I.F.) | 120 (V.I.F.) | 69 (V.I.F.) | S.A.E. | S.A.E. | S.A.E. | 460 (V.I.F.) | 3 (V.I.F.) | 15 (V.I.F.) | 20 (V.I.F.) | S.A.E. | S.A.E. | S.A.E. | EXISTING |
| RTU-2(E) | | KGA240S4BS2G (V.I.F.) | 20 | 8000 (V.I.F.) | 1540 | S.A.E. | 260 (V.I.F.) | 208 (V.I.F.) | 228 (V.I.F.) | S.A.E. | S.A.E. | S.A.E. | 460 (V.I.F.) | 3 (V.I.F.) | 51 (V.I.F.) | 60 (V.I.F.) | S.A.E. | S.A.E. | S.A.E. | EXISTING |
| RTU-3(E) | | KGA240S4BS2G (V.I.F.) | 20 | 8000 (V.I.F.) | 1540 | S.A.E. | 260 (V.I.F.) | 208 (V.I.F.) | 228 (V.I.F.) | S.A.E. | S.A.E. | S.A.E. | 460 (V.I.F.) | 3 (V.I.F.) | 51 (V.I.F.) | 60 (V.I.F.) | S.A.E. | S.A.E. | S.A.E. | EXISTING |
| RTU-4(E) | | KGA240S4BS2G (V.I.F.) | 20 | 8000 (V.I.F.) | 1540 | S.A.E. | 260 (V.I.F.) | 208 (V.I.F.) | 228 (V.I.F.) | S.A.E. | S.A.E. | S.A.E. | 460 (V.I.F.) | 3 (V.I.F.) | 51 (V.I.F.) | 60 (V.I.F.) | S.A.E. | S.A.E. | S.A.E. | EXISTING |
| NOTES FOR EXISTING RTUs : | | | | | | | | | | | | | | | | | | | | |
| 1. S.A.E :- SAME AS EXISTING. V.I.F.:- VERIFY IN FIELD. | | | | | | | | | | | | | | | | | | | | |
| 2. EXISTING RTUs WITH ALL ACCESSORIES TO REMAIN AND TO BE REUSED. | | | | | | | | | | | | | | | | | | | | |
| 3. CONTRACTOR TO CONFIRM IF EXISTING RTUs ARE WORKING AT 100% RATED CAPACITY. | | | | | | | | | | | | | | | | | | | | |
| 4. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND CONFIGURATION OF RTUs ON SITE. | | | | | | | | | | | | | | | | | | | | |
| 5. IF REQUIRED, PROVIDE NEW THERMOSTATS AND TEMPERATURE SENSORS COMPATIBLE WITH EXISTING RTUs. COORDINATE FINAL LOCATION WITH ARCHITECT/OWNER. | | | | | | | | | | | | | | | | | | | | |
| 6. CONTRACTOR TO REBALANCE OUTSIDE AIR & RETURN AIR DAMPERS ON EXISTING RTUs TO MATCH VALUES MENTIONED IN ABOVE TABLE. | | | | | | | | | | | | | | | | | | | | |
| 7. REPLACE ALL THE FILTERS, IF REQUIRED. PROVIDE MINIMUM MERV-8 FILTERS. | | | | | | | | | | | | | | | | | | | | |

| EXHAUST FANS SCHEDULE | | | | | | | | | | | | |
|---|----------|-----------|-------------------------|-------|------------------------|----------|------------|--------------|-----------------|-----------|---------------|---------|
| TAG | QUANTITY | FLOW RATE | EXTERNAL | SPEED | ELECTRICAL INFORMATION | | | MAXIMUM | BASIS OF DESIGN | | WEIGHTS (LBS) | REMARK |
| | | | STATIC PRESSURE IN W.G. | | V/PH/HZ | MOTOR HP | FLA (AMPS) | LOUDNESS DBA | | | | |
| EF-1 (N) | 1 | 70 | 0.15 | 1342 | 120/1/60 | 18.5 (W) | 0.19 | 1 (SONES) | PANASONIC | FV-08VRE2 | 10 | 1,2,5 |
| EF-2 (N) | 1 | 70 | 0.15 | 1342 | 120/1/60 | 18.5 (W) | 0.19 | 1 (SONES) | PANASONIC | FV-08VRE2 | 10 | 1,2,5 |
| EF-3 (N) | 1 | 70 | 0.15 | 1342 | 120/1/60 | 18.5 (W) | 0.19 | 1 (SONES) | PANASONIC | FV-08VRE2 | 10 | 1,2,5 |
| EF-4 (N) | 1 | 70 | 0.15 | 1342 | 120/1/60 | 18.5 (W) | 0.19 | 1 (SONES) | PANASONIC | FV-08VRE2 | 10 | 1,2,5 |
| EF-5 (N) | 1 | 70 | 0.15 | 1342 | 120/1/60 | 18.5 (W) | 0.19 | 1 (SONES) | PANASONIC | FV-08VRE2 | 10 | 1,2,5 |
| EF-6 (N) | 1 | 70 | 0.15 | 1342 | 120/1/60 | 18.5 (W) | 0.19 | 1 (SONES) | PANASONIC | FV-08VRE2 | 10 | 1,2,5 |
| EF-7 (N) | 1 | 70 | 0.15 | 1342 | 120/1/60 | 18.5 (W) | 0.19 | 1 (SONES) | PANASONIC | FV-08VRE2 | 10 | 1,2,5 |
| EF-8 (N) | 1 | 100 | 0.6 | 825 | 115/1/60 | 116 (W) | 0.46 | 34 | GREENHECK | CSP-A200 | 50 | 1,3,4,5 |
| NEW FAN NOTES: | | | | | | | | | | | | |
| 1. PROVIDE ALL NECESSARY ACCESSORIES AS PER MANUFACTURER'S RECOMMENDATIONS. | | | | | | | | | | | | |
| 2. CONTRACTOR TO FIELD VERIFY THE SPECIFICATION OF LIGHT COMBINATION EXHAUST FAN WITH VENDOR. | | | | | | | | | | | | |
| 3. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH. | | | | | | | | | | | | |
| 4. INTERCONNECT WITH THE RTU-2(E). | | | | | | | | | | | | |
| 5. INSTALL AS PER MANUFACTURER'S RECOMMENDATION. | | | | | | | | | | | | |

| MECHANICAL AIR TERMINAL DEVICES SCHEDULE | | | | | |
|---|----------------|-------------------------------------|-----------------|----------|-----------|
| TAG | SIZE | DESCRIPTION | BASIS OF DESIGN | | NOTES |
| | | | MANUFACTURER | MODEL | |
| CDS-1 | 24"X24" | SUPPLY AIR DIFFUSER | TITUS | OMNI | 1,2,3,4,5 |
| CDS-2 | 6"Ø, 8"Ø, 10"Ø | ROUND SUPPLY AIR DIFFUSER | TITUS | TMR-AA | 1,3,4 |
| CDR-1 | 24"X24" | RETURN AIR GRILLE | TITUS | 350FL | 1,2,3,4 |
| CDE-1 | 6"Ø | ROUND EXHAUST AIR DIFFUSER | TITUS | TMR-AA | 1,3,4 |
| DD-1 | 32"X32" | 4-WAY DOUBLE DEFLECTION DRUM LOUVER | CARNES | TDBA36G4 | 1,3,4 |
| DD-2 | 36"X36" | 4-WAY DOUBLE DEFLECTION DRUM LOUVER | CARNES | TDBA36G4 | 1,3,4 |
| NOTES: | | | | | |
| 1. COORDINATE FINAL COLOR/FINISH WITH ARCHITECT/OWNER. | | | | | |
| 2. PROVIDE FRAME FOR MOUNTING AIR DEVICE IN LAY-IN GRID CEILING UNLESS REFLECTED CEILING PLAN INDICATES HARD CEILING. IN AREAS WITH HARD CEILINGS, PROVIDE FRAMES FOR SURFACE MOUNTING. | | | | | |
| 3. UNLESS OTHERWISE NOTED, BRANCH DUCTS SERVING AIR DEVICES SHALL BE SAME SIZE AS NECK OF AIR DEVICE. | | | | | |
| 4. AIR DEIVCE SHALL BE OF GALVANIZED FINISH WHEN INSTALLED ON EXPOSED DUCTWORK. | | | | | |
| 5. PROVIDE CORD OPERATED DAMPER IN INACCESSIBLE CEILING. | | | | | |
| FOR ROUND NECK DIFFUSERS: | | | | | |
| 6" DIA: 0-100 CFM | | | | | |
| 8" DIA: 101-200 CFM | | | | | |
| 10" DIA: 201-400 CFM | | | | | |
| 12" DIA: 401-650 CFM | | | | | |
| 14" DIA: 651 CFM & ABOVE | | | | | |

| AIR BALANCE | | | | | |
|--|-------------|------------------|-------------------|------------------|-------------------|
| UNIT | AREA SERVED | SUPPLY AIR (CFM) | OUTSIDE AIR (CFM) | RETURN AIR (CFM) | EXHAUST AIR (CFM) |
| RTU-1(E) | SEE PLAN | 2400 | 590 | 1810 | 0 |
| RTU-2(E) | SEE PLAN | 8000 | 1540 | 6460 | 0 |
| RTU-3(E) | SEE PLAN | 8000 | 1540 | 6460 | 0 |
| RTU-4(E) | SEE PLAN | 8000 | 1540 | 6460 | 0 |
| EF-1 (N) | SEE PLAN | 0 | 0 | 0 | 70 |
| EF-2 (N) | SEE PLAN | 0 | 0 | 0 | 70 |
| EF-3 (N) | SEE PLAN | 0 | 0 | 0 | 70 |
| EF-4 (N) | SEE PLAN | 0 | 0 | 0 | 70 |
| EF-5 (N) | SEE PLAN | 0 | 0 | 0 | 70 |
| EF-6 (N) | SEE PLAN | 0 | 0 | 0 | 70 |
| EF-7 (N) | SEE PLAN | 0 | 0 | 0 | 70 |
| EF-8 (N) | SEE PLAN | 0 | 0 | 0 | 100 |
| TOTAL: | | 26400 | 5210 | 21190 | 590 |
| BUILDING PRESSURE: | | | 4620 | POSITIVE | |
| NOTES: | | | | | |
| 1. CONTRACTOR TO RE-ADJUST MOTORIZED DAMPER ON FRESH AIR TAP TO PROVIDE OUTSIDE AIR AS MENTIONED IN ABOVE TABLE. | | | | | |

| VENTILATION CALCULATION | | | | | | | | | | | | | |
|-------------------------|---------------|---|----------------------------------|-----------------|------------------|---------------------------------|-----------|---------------|-------------------|---|------------------------|----------------------------|--|
| ROOM NAME | AREA (SQ.FT.) | NUMBER OF PEOPLE/1000 SQ.FT AS PER 2018 IMC | NUMBER OF PEOPLE AS PER 2018 IMC | NUMBER OF CHAIR | FINAL PEOPLE NO. | MIN OUTSIDE AIR AS PER IMC 2018 | | REQ. OA (CFM) | PROVIDED OA (CFM) | EXHAUST AIR FLOW RATE (CFM/SQ.FT. OR /FHT.) | REQ. EXHAUST AIR (CFM) | PROVIDED EXHAUST AIR (CFM) | |
| | | | | | | CFM/PEOPLE | CFM/SQ.FT | | | | | | |
| CHECK-IN DESK | 1420 | 10 | 15 | 0 | 25 | 5 | 0.06 | 210 | 210 | 0 | 0 | 0 | |
| COMMUNITY ROOM | 590 | 5 | 3 | 16 | 16 | 5 | 0.06 | 115 | 120 | 0 | 0 | 0 | |
| STORAGE SW | 52 | 0 | 0 | 0 | 0 | 0 | 0.12 | 6 | 10 | 0 | 0 | 0 | |
| OFFICE | 168 | 10 | 2 | 0 | 2 | 5 | 0.06 | 20 | 20 | 0 | 0 | 0 | |
| STORAGE SE | 1210 | 0 | 0 | 0 | 0 | 0 | 0.12 | 145 | 150 | 0 | 0 | 0 | |
| HALLWAY | 75 | 0 | 0 | 0 | 0 | 0 | 0.12 | 9 | 10 | 0 | 0 | 0 | |
| CLOSET | 47 | 0 | 0 | 0 | 0 | 0 | 0.12 | 6 | 10 | 0 | 0 | 0 | |
| ELECT/STORAGE | 313 | 0 | 0 | 0 | 0 | 0 | 0.12 | 38 | 40 | 0 | 0 | 0 | |
| SHOWER 1 | 66 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 50 | 70 | |
| SHOWER 2 | 66 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 50 | 70 | |
| DRESSING AREA | 238 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.25 | 59.5 | 100 | |
| WOMENS RR | 155 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 70 | 140 | 140 | |
| MENS RR | 178 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 70 | 210 | 210 | |
| CIRCULATION | 19110 | 7 | 134 | 40 | 60 | 20 | 0.18 | 4640 | 4640 | 0 | 0 | 0 | |
| TOTAL | | | | | | | | 5189 | 5210 | - | 510 | 590 | |

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REVISIONS

8/20/24

MECHANICAL
SCHEDULES

M-600

| ELECTRICAL SYMBOLS LIST | | | | GENERAL NOTES (APPLY TO ALL "E" DRAWINGS) | | | |
|--|---|-------------------------|--|---|--------------------------------|-------|--|
| LIGHTING | | | | ELECTRICAL ABBREVIATIONS | | | |
| | | | TELEPHONE/DATA OUTLET, 4"SQUARE OUTLET BOX WITH SINGLE GANG COLLAR AND BLANK PLATE, PROVIDE 3/4" E.C., U.O.N., UP TO HUNG CEILING AND TERMINATE WITH 90° ELBOW, BUSHING AND DRAG WIRE. | A | AMPERES | EA | EACH |
| | | | DATA OUTLET – (1) PORT UNO, +18" AFF, UNO TEL / DATA OUTLET TO BE PROVIDED WITH 1" CONDUIT U.O.N. TO H.C. AND TERMINATED WITH 90 DEGREE ELBOW AND BUSHING. TEL / DATA OUTLET PLATE SHALL BE PROVIDED WITH 1 1/4" DIAMETER GROMMETED OPENING. | A/C, AC | AIR CONDITIONING UNIT | EC | EMPTY CONDUIT/ ELECTRICAL CONTRACTOR |
| | | | CABLE TV OUTLET, WALL-MOUNTED AT 18" AFF UNO. | AF | AMPERE FRAME/AMP FUSE | EF | EXHAUST FAN |
| SWITCHES AND CONTROLS | | | | AFF | ABOVE FINISHED FLOOR | EM | EMERGENCY |
| | 20A SPST TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE CONTROLLED. | | | AS | AMP SWITCH | EMT | ELECTRICAL METALLIC TUBING |
| | WALL BOX INCANDESCENT DIMMER SWITCH, LUTHRON MAESTRO SERIES. "a" DENOTES LIGHTING FIXTURE CONTROLLED. | | | AIC | AMPS INTERRUPTING CAPACITY | EQUIP | EQUIPMENT |
| | WALL MOUNTED PHOTOCELL MOUNTED IN NEMA 3R ENCLOSURE. | | 30A/600V NON FUSED DISCONNECT SWITCH | AT | AMP TRIP | ER | EXISTING TO BE RELOCATED |
| | CEILING OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE. 'A' LETTER REFERES TO WIRING DIAGRAM. | | MANUAL MOTOR SWITCH | ATS | AUTOMATIC TRANSFER SWITCH | ETR | EXISTING TO REMAIN |
| | CEILING VACANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE. | ANNOTATION | | AUTO | AUTOMATIC | EWf | ELECTRIFIED WORKSTATION FURNITURE |
| | DOOR JAMB SWITCH | | | AWG | AMERICAN WIRE GAUGE | EWH | ELECTRIC WATER HEATER |
| WIRING SYSTEMS | | | | C | CONDUIT | FA | FIRE ALARM |
| | POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 1#12 Ø, 1#12 N. & 1#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED. | | KEYED NOTE REFERENCE | C/B,CB | CIRCUIT BREAKER | FBO | FURNISHED BY OTHERS, INSTALLED & WIRED BY EC |
| | POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 2#12 Ø, 2#12 N. & 2#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED. | | DETAIL REFERENCE: DETAIL NUMBER INDICATED ON TOP; DRAWING NUMBER INDICATED ON BOTTOM | CKT | CIRCUIT | FDR | FEEDER |
| | POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 3#12 Ø, 3#12 N. & 3#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED. | POWER DISTRIBUTION | | CLG | CEILING | FIBO | FURNISHED & INSTALLED BY OTHERS, WIRED BY EC |
| | CONDUIT TURNING UP, SEE FLOOR PLANS FOR CONDITIONS. | | MAJOR ELECTRICAL COMPONENT OR DEVICE. VOLTAGE AND AMPERAGE AS NOTED. | COMM | COMMUNICATION | FIXT | FIXTURE |
| | CONDUIT TURNING DOWN, SEE FLOOR PLANS FOR CONDITION. | | BRANCH PANELBOARD, 480Y/277V–SURFACE OR FLUSH MOUNTED | CT | CURRENT TRANSFORMER | FL | FLOOR |
| | CONDUIT AND WIRE TO BUILDING GROUND. | | | CU | COPPER | FLUOR | FLUORESCENT |
| | CABLE TRAY, WIDTH AND MOUNTING AS NOTED. | | BRANCH PANELBOARD, 208Y/120V–SURFACE OR FLUSH MOUNTED TRANSFORMER, SIZE AS NOTED. | °C | DEGREE CELSIUS | G | GROUND |
| | UNDERGROUND | | | °F | DEGREE FAHRENHEIT | GFI | GROUND FAULT INTERRUPTER |
| | EXISTING | | DISTRIBUTION PANELBOARD, 480Y/277V–SURFACE OR FLUSH MOUNTED. | DIA | DIAMETER | GP | GENERAL PURPOSE |
| | NEW | | DISTRIBUTION PANELBOARD, 208Y/120V–SURFACE OR FLUSH MOUNTED. | DISC | DISCONNECT | HC | HUNG CEILING |
| POWER AND TELECOMMUNICATION | | | | DN | DOWN | HP | HORSEPOWER |
| | JUNCTION BOX WITH BLANK COVER PLATE, WALL MOUNTE, +18" AFF OR AS NOTED. | | | DP | DISTRIBUTION PANEL | HWH | HOW WATER HEATER |
| | JUNCTION BOX WITH BLANK COVER PLATE, CEILING MOUNTED.. | ELECTRICAL DRAWING LIST | | DWH | DOMESTIC WATER HEATER | HZ | HERTZ |
| | DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED. | E-001 | ELECTRICAL SYMBOL LIST, ABBREVIATIONS & GENERAL NOTES | DWG | DRAWING | IC | INTERRUPTING CAPACITY |
| | DOUBLE DUPLEX RECEPTACLE – 20A-1P, 125V, NEMA 5–20R. | E-002 | ELECTRICAL SPECIFICATIONS | JB | JUNCTION BOX | PP | POWER PANEL |
| | | E-100 | ELECTRICAL LIGHTING PLAN | KCMIL | ONE THOUSAND CIRCULAR MILS | PVC | POLYVINYL CHLORIDE |
| | | E-200 | ELECTRICAL POWER PLAN | KV | KILOVOLT | PWR | POWER |
| | | E-201 | ELECTRICAL POWER PLAN – ROOF | KVA | KILOVOLT–AMPERES | R | REMOVE |
| | | E-400 | ELECTRICAL DETAILS | KW | KILOWATTS | RE | RELOCATED EXISTING |
| | | E-501 | ELECTRICAL RISER DIAGRAM | LP | LIGHTING PANEL | REC | RECEPTACLE |
| | | E-600 | ELECTRICAL PANEL SCHEDULES | LTG | LIGHTING | RGS | RIGID GALVANIZED STEEL |
| | | | | MAX | MAXIMUM | RR | REMOVE & RELOCATE |
| | | | | MC | MOTOR CONTROLLER | SECT | SECTION |
| | | | | MCB | MAIN CIRCUIT BREAKER | SPDT | SINGLE POLE DOUBLE THROW |
| | | | | MER | MECHANICAL EQUIPMENT ROOM | SPST | SINGLE POLE SINGLE THROW |
| | | | | MIN | MINIMUM | SPEC | SPECIFICATION |
| | | | | MLO | MAIN LUGS ONLY | SW | SWITCH |
| | | | | MTD | MOUNTED | SWBD | SWITCHBOARD |
| | | | | MTS | MANUAL TRANSFER SWITCH | SYM | SYMMETRICAL |
| | | | | N | NEUTRAL | SYS | SYSTEMS |
| | | | | NE | NEW DEVICE TO REPLACE EXISTING | TELE | TELEPHONE |
| | | | | NIC | NOT IN CONTRACT | TEMP | TEMPERATURE |
| | | | | NL | NIGHT LIGHT | TXF | TOILET EXHAUST FAN |
| | | | | NTS | NOT TO SCALE | TYP | TYPICAL |
| | | | | OC | ON CENTER | UON | UNLESS OTHERWISE NOTED |
| | | | | P | POLES | V | VOLT/VOLTAGE |
| | | | | PB | PULLBOX | VA | VOLT AMPERE |
| | | | | PC | PERSONAL COMPUTER | VAV | VARIABLE AIR VOLUME |
| | | | | ø | PHASE | VFD | VARIABLE FREQUENCY DRIVE |
| | | | | PNL | PANEL | VP | VAPORPROOF |
| | | | | W | WATT | WP | WEATHER PROOF |
| | | | | W | WIRE | XFMR | TRANSFORMER |
| | | | | WH | WALL HEATER | ZRT | ZONE REGISTER TERMINALS |
| | | | | E | EXISTING | IG | ISOLATED GROUND |
| CODES & STANDARDS | | | | | | | |
| 2015 NATIONAL ELECTRICAL CODE (NEC) | | | | | | | |
| 2015 INTERNATIONAL ENERGY CONSERVATION CODE (IECC) | | | | | | | |

- ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE CURRENT VERSION OF THE NYC ELECTRICAL CODE, 2008 NEC WITH NYC AMENDMENTS, LOCAL JURISDICTION REQUIREMENTS, AND ALL GOVERNING LOCAL CODES, LAWS, AND REGULATIONS.
- CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO DO SO.
- CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, AND CERTIFICATIONS FOR TEMPORARY AND FINAL CERTIFICATE OF OCCUPANCY.
- FIRE STOP ALL PENETRATIONS OF FIRE RATED CONSTRUCTION IN A CODE APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. ALL PENETRATIONS SHALL BE SLEEVED AND SEALED WATERTIGHT.
- SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHELDS OR INSERTS (CONCRETE AND BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK), NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
- LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH FISH WIRE.
- VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS, AND MECHANICAL EQUIPMENT. VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE, CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.
- CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
- ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.
- CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE-EXISTING CONDITIONS OR BETTER.
- MINIMUM SIZE OF CONDUIT SHALL BE ¾", AND TYPE SHALL BE ELECTRICAL METALLIC TUBING (EMT), UNLESS OTHERWISE NOTED. PROVIDE NYLON DRAG LINE AND CONDUIT CAP FOR ALL EMPTY CONDUITS.
- CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK), DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.
- PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHALL BE CONSIDERED SHOWN AT THEIR APPROXIMATE LOCATION. THE CONTRACTOR SHALL LOCATE THEM AS FIELD CONDITIONS DICTATE. ADDITIONAL PULL AND JUNCTION BOXES NOT SHOWN ON DRAWINGS SHALL BE PROVIDED WHERE REQUIRED BY APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR BY FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYPE IN UNFINISHED AREAS AND INSTALLED CANCEALED IN FINISHED AREAS, AND ALL COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE.
- SUPPORT PANEL, JUNCTION AND PULLBOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.
- FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AND SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CEILING AND POWER PLANS.
- ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE TIGHTLY GASKETED FOR A COMPLETE RAINIGHT INSTALLATION. ALL BUILDING EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED IN WEATHERPROOF ENCLOSURE.
- ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
- ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALLATION OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED TRADES IN A TIMELY MANNER. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL, DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
- ALL CONDUITS AND EQUIPMENT TO BE CONCEAL ED IN FINISHED SPACES UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONCRETE FLOOR SLAB.
- ALL EQUIPMENT AND MATERIALS INSTALLED IN PLENUM CEILINGS SHALL BE APPROVED FOR THAT APPLICATION.
- OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE-RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES, UNLESS FIRE-RATED BOXES OR PUTTY PADS ARE UTILIZED.
- COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITHR THE ENGINEER AND OWNER BEFORE INSTALLATION.
- COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS, COMMUNICATIONS OUTLETS, AND RECEPTACLES WITH THE ARCHITECTURAL CASEWORK DRAWINGS AND DETAILS. COORDINATE LOCATIONS OF LIGHT FIXTURES, SWITCHES, AND RELATED DEVICES WITH THE ARCHITECTURAL DRAWINGS AND DETAILS.
- REFER TO ARCHITECTURAL PLANS FOR FINAL LOACTIONS OF ALL LUMINAIRES AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS.
- REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECTRICAL DEVICES, AND FOR FINAL CEILING AND WALL HEIGHTS AND LAYOUTS.
- LIGHTING FIXTURES PROVIDED WITH EMERGENCY BATTERY PACKS AND INDICATED WITH SWITCH CONTROL SHALL BE WIRED WITH BATTERY CHARGING/SENSING CIRCUIT WIRED AHEAD OF SWITCH CONTROL.
- NUMBER(S) SHOWN AT RECEPTACLES, JUNCTION BOXES AND EQUIPMENT INDICATES CIRCUIT NUMBERS IN PANELBOARD. PROVIDE WIRE AND CONDUIT TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMBERS AND RUN TO PANELBOARD.
- LUMINAIRES IN EACH ELEVATOR CAB: THE SUM OF ALL LUMENS/SUM OF ALL WATTS SHALL NOT BE <35 LUMENS/WATT. VENTILATION FANS IN ELEVATORS THAT DO NOT HAVE THEIR OWN AIR CONDITIONING SYSTEM SHALL NOT CONSUME >0.35WATT/CFM AT THE MAXIMUM RATED SPEED OF THE FAN. ELEVATOR CONTROLS SHALL DE-ENERGISE FANS AND LIGHTING WHEN THE ELEVATOR IS STOPPED, UNOCCUPIED, WITH DOORS CLOSED.

- ### ELECTRICAL SPECIFICATIONS
1. GENERAL:
- THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
 - DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.
 - BIDDERS, BEFORE SUBMITTING PROPOSALS, SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE, AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR MATERIALS, REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
 - INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWING MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
 - REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE REQUIRED FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.
 - CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES. AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.
 - DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
 - THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
 - SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL, UNLESS OTHERWISE NOTED.
 - PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING AND INTEGRITY OF THE BUILDING. AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT, PROVIDE EQUIPMENT CURBS AS REQUIRED.
 - ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
 - THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDEDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS, WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
 - UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
 - ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
 - INSURANCE: PROVIDE IN ACCORDANCE WITH OWNER/BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
 - THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATED OF INSPECTION AND APPROVAL.
2. GENERAL PROVISIONS FOR ELECTRICAL WORK:
- A. DEFINITIONS:
- "PROVIDE": TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
 - "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
 - "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE, AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
 - "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
 - "WIRING": RACEWAY, FITTINGS, WIRE, BOXES, AND RELATED ITEMS.
 - "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
 - "EXPPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
 - "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.
- B. TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS. FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING OWNER. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.
- C. QUALITY ASSURANCE
- QUALITY OF MATERIALS: ALL EQUIPMENT SHALL BE NEW SPECIFICATION GRADE, FREE FROM DEFECTS AND LISTED BY APPROVED TESTING AGENCY AND BEARING THEIR LABEL. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
 - GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PARAGRAPH 2.C.
 - CURRENT CHARACTERISTICS:
 - SERVICE: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.
 - DISTRIBUTION: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.
 - HEIGHTS OF OUTLETS:
 - FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR:
 - RECEPTACLES AND TELEPHONES: 1 FT–6 IN.
 - WALL SWITCHES: 4 FT–0 IN.
 - WALL FIXTURES: 7 FT–0 IN.
 - MOTOR CONTROLLERS: 5 FT–0 IN.

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REVISIONS

8/20/24

ELECTRICAL SYMBOL LIST, ABBREVIATIONS & GENERAL NOTES

E-001

- CLOCKS: 7 FT 6 IN
- b. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.
- D. PRODUCT DELIVERY, STORAGE AND HANDLING
- 1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.
- 2) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR, MINOR DEVIATIONS SHALL BE PERMITTED, CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.
- E. MATERIALS
- 1) NAMEPLATES: PROVIDE BLACK LAMCROID SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER, ENCLOSURE, MOTOR CONTROLLER AND THE LIKE. NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.
- 2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.
- 3) INSERTS AND SUPPORTS:
- a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.
- SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
- MULTI-ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
- CLIP FORM NAILS FLUSH WITH INSERTS.
- MAXIMUM LOADING 75 PERCENT OF RATING.
- b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.
- c. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.
- d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.
- F. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARKED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.
- G. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.
- H. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT.
- I. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
3. SCOPE OF WORK:
- A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMING WITH THE 2008 NATIONAL ELECTRICAL CODE (NEC) NYC AMENDMENTS, AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.
- B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLIED OR SPECIFIED HEREIN.
- C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OF ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER, THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDED THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR
- D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
- E. CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS IN ACCORDANCE WITH THE NYC BUILDING CODE. SECURE ALL REQUIRED PERMITS AND APPROVALS AND SUBMIT SAME TO OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES.
- F. AREAS WITH NO ELECTRICAL WORK SHALL REMAIN AS IS. CONTRACTOR SHALL MAINTAIN CONTINUITY OF ALL ELECTRICAL SYSTEMS TO ALL AREAS NOT COVERED BY THIS RENOVATION AND SHALL PROVIDE 48 HOUR NOTICE TO LANDLORD OF ANY PLANNED POWER INTERRUPTIONS OR SIGNAL SYSTEM OUTAGES.
4. SHOP DRAWINGS
- A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.
- B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:
- 1) PROJECT NAME AND LOCATION
- 2) NAME OF ARCHITECT AND ENGINEER
- 3) ITEM IDENTIFICATION
- 4) APPROVAL STAMP OF PRIME CONTRACTOR
- C. SUBMISSIONS:
- 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
- 2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT TWO PRINTS AND ONE PAPER SEPIA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPIA TO THE ENGINEER.
- D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:
- 1) SAFETY/DISCONNECT SWITCHES
- 2) FUSES
- 3) CIRCUIT BREAKERS
- 4) PANELBOARDS/LOADCENTER (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG CUTS).
- 5) RACEWAYS
- 6) WIRE AND CABLE

- 7) WALL SWITCHES
- 8) INSERTION RECEPTACLES
- 9) MOMENTARY CONTACT SWITCHES
- 10) TIME SWITCHES
- 11) LIGHTING FIXTURES.
- E. ASSIST AND PROVIDE ALL NECESSARY INFORMATION, DIAGRAMS, SKETCHES, ETC. TO THE HVAC CONTRACTOR, FOR THE PREPARATION OF COORDINATED SHOP DRAWINGS INDICATING ROUTING OF FEEDERS, CONTROL CONDUITS, RECESSED FIXTURES AND ADJACENT NEARBY PIPING AND DUCTWORK WHERE APPLICABLE. CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED. SUBMIT FOUR(4) BOOKBOUND OPERATING AND SERVICE MANUALS WHICH SHALL INCLUDE COPIES OF ALL SHOP DRAWINGS. PROVIDE SHOP DRAWINGS FOR PANELS, FIXTURES, WIRING DEVICES, CONDUIT, CABLE, DISCONNECT SWITCH, RELAYS, CONTRACTORS, AND OTHER SYSTEMS AS DIRECTED BY THE ENGINEER.
5. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS
- A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
- B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
- D. REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.
6. LOW-VOLTAGE DISTRIBUTION EQUIPMENT:
- A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS.
- B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS.
- C. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS. TWO-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 8808F. THREE-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 7810F. KNIFE-BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK-MAKE- QUICK-BREAK, UL CLASS R UP TO 600 AMP. MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. SWITCHES SHALL BE SIMILAR TO GENERAL ELECTRIC QMR. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED.
7. FUSES:
- A. CIRCUITS 0 TO 600 AMPERES SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMAN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.
- B. MOTOR CIRCUITS – ALL INDIVIDUAL MOTOR CIRCUITS WITH FULL LOAD AMPERE RATINGS (FLA) OF 480 AMPERES OR LESS SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMANN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.
- C. ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER.
- D. PROVIDE 1 SPACE MATCHING FUSE FOR EACH SET OF 3.
- E. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL-MAGNETIC, QUICK-MAKE-QUICK-BREAK, BOLT-ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP-FREE HANDLE. TYPE MULTIPOLE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT-TRIPPING, OPEN A ND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED. FRAMES, IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:
- 1) 120 VOLTS, 100-AMP FRAME: 10,000 AMPS, 1 POLE.
- 2) 120/240 VOLTS, 225-AMP FRAME: 22,000 AMPS MINIMUM
8. DISTRIBUTION PANELBOARDS, CIRCUIT BREAKER TYPE:
- A. THREE PHASE, 4 OR 5 WIRE, COPPER BUS BARS, WITH 2, 3, OR 4 WIRE BRANCHES, AS NOTED. CAPACITY OF PANEL AND CIRCUITS, AS NOTED BELOW. PANELBOARD TO HAVE GROUND BUS SAME SIZE AS PHASE BUSES.
- B. CABINETS: CODE GAUGE GALVANIZED SHEET STEEL PRIMED AND PAINTED WITH TRIM AND DOOR TYPE AS NOTED, LAP AND RIVET CORNERS OR FORM AS APPROVED.
- C. TRIM: ONE PIECE FULL FINISH PRIMED AND PAINTED SHEET STEEL. TRIM SHALL BE MOUNTED WITH A CONTINUOUS PIANO HINGE CONFIGURED IN SUCH A MANNER THAT IT SHALL BE POSSIBLE TO GAIN FULL ACCESS TO CIRCUIT BREAKERS AND WIRING GUTTERS WITHOUT REMOVING THE TRIM. PROVIDE A MULTI-PIN CYLINDER LOCK (YALE, CORBIN OR EQUAL) TO LATCH THE TRIM. KEYS SHALL BE MILLED.
- D. HARDWARE: MULTI-PIN, CYLINDER LOCKS WITH MILLED KEYS. ALL PANELS SHALL BE KEYS ALIKE. DOOR OVER 48" HIGH SHALL BE EQUIPPED WITH A CHROME PLATED VAULT HANDLE, BUILT IN LOCK, AND 3-POINT CATCH FASTENING DOOR AT TOP, BOTTOM AND CENTER.
- E. HINGES: CONCEALED, CONTINUOUS PIANO HINGE AS DESCRIBED ABOVE.
- F. DIRECTORY HOLDER: METAL FRAME WITH NONBREAKABLE TRANSPARENT COVER AND DIRECTORY CARD. ENTRIES TO BE TYPEWRITTEN BY ELECTRICAL CONTRACTOR. PROVIDE AN ENGRAVED LAMINATED NAMEPLATE, ADJACENT TO EACH BRANCH BREAKER, MOUNT WITH SELF TAPPING MACHINE SCREWS.
- G. FURNISH MULTI-CABLE LUGS WHERE REQUIRED. DOUBLE LUGGING NOT PERMITTED. SECURE LUGS TO BUS BY STUD BOLTS.
- H. PANELBOARD CONSTRUCTION FOR BOLTED TYPE BREAKERS, MINIMUM SHORT CIRCUIT RATING 25,000 AMPERES, RMS SYMMETRICAL FOR ALL 120/208V APPLICATIONS. INDIVIDUAL CIRCUIT BREAKERS SHALL HAVE MINIMUM 100A FRAME, TRIPS SIZED AS SHOW ON THE PLANS.
- I. MINIMUM GUTTER SPACES: PANELS WITH 225 AMPERE MAINS, 5-3/4" MINIMUM, 400 AMPERES AND OVER, MINIMUM GUTTERS 8" FOR PANELS WITH THROUGH FEEDERS, INCREASE GUTTER WIDTH BY 2" MINIMUM AND PROVIDE A SHEET STEEL BARRIER BETWEEN THE PANEL GUTTER AND THE THROUGH FEEDER PORTION OF THE BACK BOX. BRANCH CIRCUIT BREAKERS SHALL BE MECHANICALLY INTERLOCKED WHEN SHOWN ON DRAWINGS.
- J. DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARDS SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.
- K. PANELBOARD SHALL HAVE MAIN CIRCUIT BREAKER OR MAIN LUGS AS INDICATED ON THE DRAWINGS. QUANTITY, POLES AND TRIP RATINGS OF BRANCH CIRCUIT BREAKERS TO BE AS INDICATED ON DRAWINGS.
- L. PANELBOARD SHALL HAVE ENGRAVED WHITE CORE, BLACK LAMACOID NAMEPLATE SCREWED ONTO PANE TRIM WITH DESIGNATION LISTED (PANELBOARD NAME, VOLTAGE, RATING OR MAINS IN AMPS).
8. DISTRIBUTION PANELBOARDS, SWITCH AND FUSE:
- A. THREE PHASE, 3 OR 4 WIRE WITH COPPER BUS BARS. ALL THROUGH BUS SHALL BE INSULATED.
- B. NEMA CLASS 1 CONSTRUCTION TO ACCOMMODATE FUSIBLE, INDIVIDUALLY ENCLOSED SWITCHES, FRONT REMOVABLE, SWITCH AND DOOR INTERLOCKS. COVERS TO BE PAD-LOCKABLE.
- C. PANELBOARD SHALL BE CONSTRUCTED OF CODE-GAUGE STEEL, GRAY FINISH OVER RUST INHIBITOR, FOR SURFACE MOUNTING. BOX

- AND PANEL FRAME SHALL BE FLANGED AND REINFORCED FOR RIGID SUPPORT OF INTERIOR AND ACCURATE ALIGNMENT OF INTERIOR WITH FRONT. TRIMS TO BE FASTENED TO BACK BOX WITH SCREWS.
- D. ALL BRANCH SWITCHES SHALL HAVE INDIVIDUAL ENGRAVED LAMCROID NAMEPLATES (BLACK WITH WHITE CORE).
- E. DISTRIBUTION PANELBOARD CONSTRUCTION MINIMUM SHORT CIRCUIT RATING 25,000 AMPERES, REMS SYMMETRICAL FOR ALL 120/208V APPLICATIONS. APPLICATIONS.
- F. DISCONNECTS
- 1) DISCONNECT SWITCHES SHALL CONFORM TO NEMA AND UL STANDARDS, AND SHALL BE HORSEPOWER RATED.
- 2) SWITCHING MECHANISM SHALL BE QUICK-MAKE, QUICK-BREAK, SINGLE THROW WITH EXTERNAL OPERATING HANDLE MECHANICALLY INTERLOCKED WITH ENCLOSURE COVER TO PROVIDE ACCESS TO INTERIOR WHEN DISCONNECT IS IN OFF POSITION ONLY. PROVIDE MEANS TO LOCK OPERATING HANDLE IN THE OPEN AND CLOSED POSITION. DESIGNATE ON THE ENCLOSURE THE OPEN AND CLOSED POSITION OF THE OPERATING HANDLE.
- 3) SWITCHES SHALL BE OF THE DOUBLE STATIONARY CONTACT TYPE.
- 4) SWITCHES SHALL BE EQUIPPED WITH REJECTION TYPE FUSE HOLDERS, FUSIBLE AS SHOWN ON THE DRAWINGS; PROVIDE COMPLETE WITH FUSES AS SCHEDULED.
- G. INSTALLATION
- 1) DISTRIBUTION PANELBOARD SHALL BE MOUNTED TO STRUCTURAL STEEL CHANNEL (KINDORF) WHICH SHALL BE BOLTED TO THE WALL USING EXPANSION ANCHORS FOR LARGE PANELS.
- H. IDENTIFICATION
- 1) PROVIDE NAMEPLATE AT EACH SWITCH IDENTIFYING THE LOAD SERVED.
- 2) NAMEPLATES SHALL BE MOUNTED ON THE FRONT COVER SECURED WITH SELF-TAPPING SCREWS OR NUTS AND BOLTS. NAMEPLATES SHALL BE LAMINATED PHENOLIC, BLACK WITH A MINIMUM OF 1/4" HIGH WHITE LETTERING.
- I. DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARDS SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.
- J. POWER PANELBOARDS SHALL BE SIMILAR TO GENERAL ELECTRIC TYPE "QMR", AS MANUFACTURED BY ATLAS SWITCH COMPANY, ELECTRIC SWITCHBOARD COMPANY OR APPROVED EQUAL.
- K. PANELBOARD SHALL HAVE MAIN CIRCUIT BREAKER OR MAIN LUGS AS INDICATED ON THE DRAWINGS. QUANTITY, POLES AND TRIP RATINGS OF BRANCH CIRCUIT BREAKERS TO BE AS INDICATED ON DRAWINGS.
- L. PANELBOARD SHALL HAVE ENGRAVED WHITE CORE, BLACK LAMACOID NAMEPLATE SCREWED ONTO PANE TRIM WITH DESIGNATION LISTED (PANELBOARD NAME, VOLTAGE, RATING OR MAINS IN AMPS).

- B. MATERIALS
- 1) RACEWAYS:
- a. RIGID STEEL CONDUIT: FULL-WEIGHT PIPE, GALVANIZED, THREADED.
- b. ELECTROMETALLIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS.
- c. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP, GALVANIZED.
- d. WIREWAYS: WIRE SHALL BE AS NOTED, MINIMUM NO. 16 GAUGE STEEL WITH GROUND CONTINUITY. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.
- e. SURFACE METAL RACEWAY: SIZE AS NOTED. BASE 0.04 IN., COVER 0.25 IN. MATERIAL SHALL BE STEEL. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.
- 2) FITTINGS AND ACCESSORIES:
- a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC DIE CAST NOT PERMITTED.
- b. ELECTROMETALLIC TUBING: COMPRESSION TYPE, GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.
- c. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.
- d. BUSHINGS: METALLIC INSULATED TYPE.

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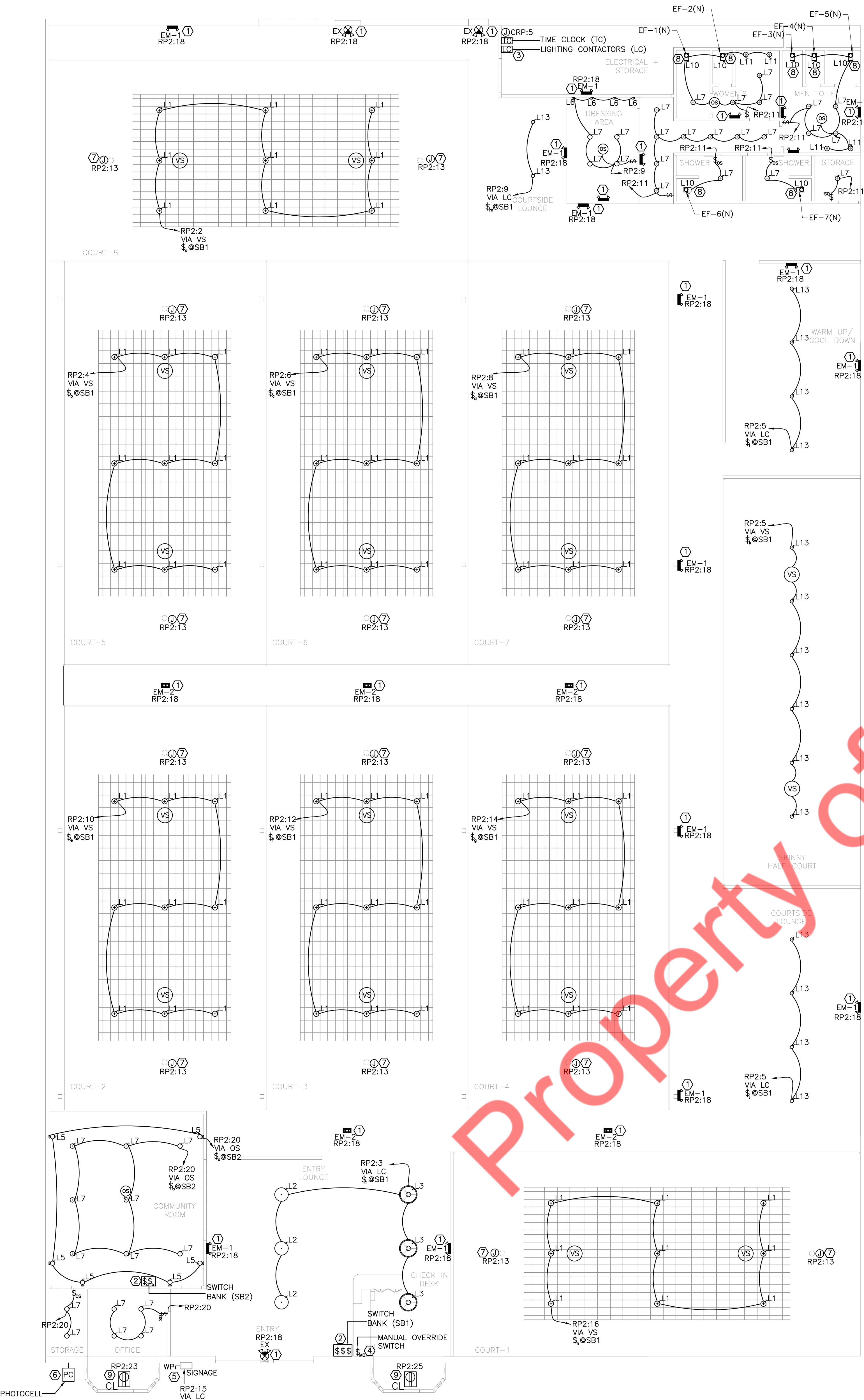


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ELECTRICAL
SPECIFICATIONS

E-002



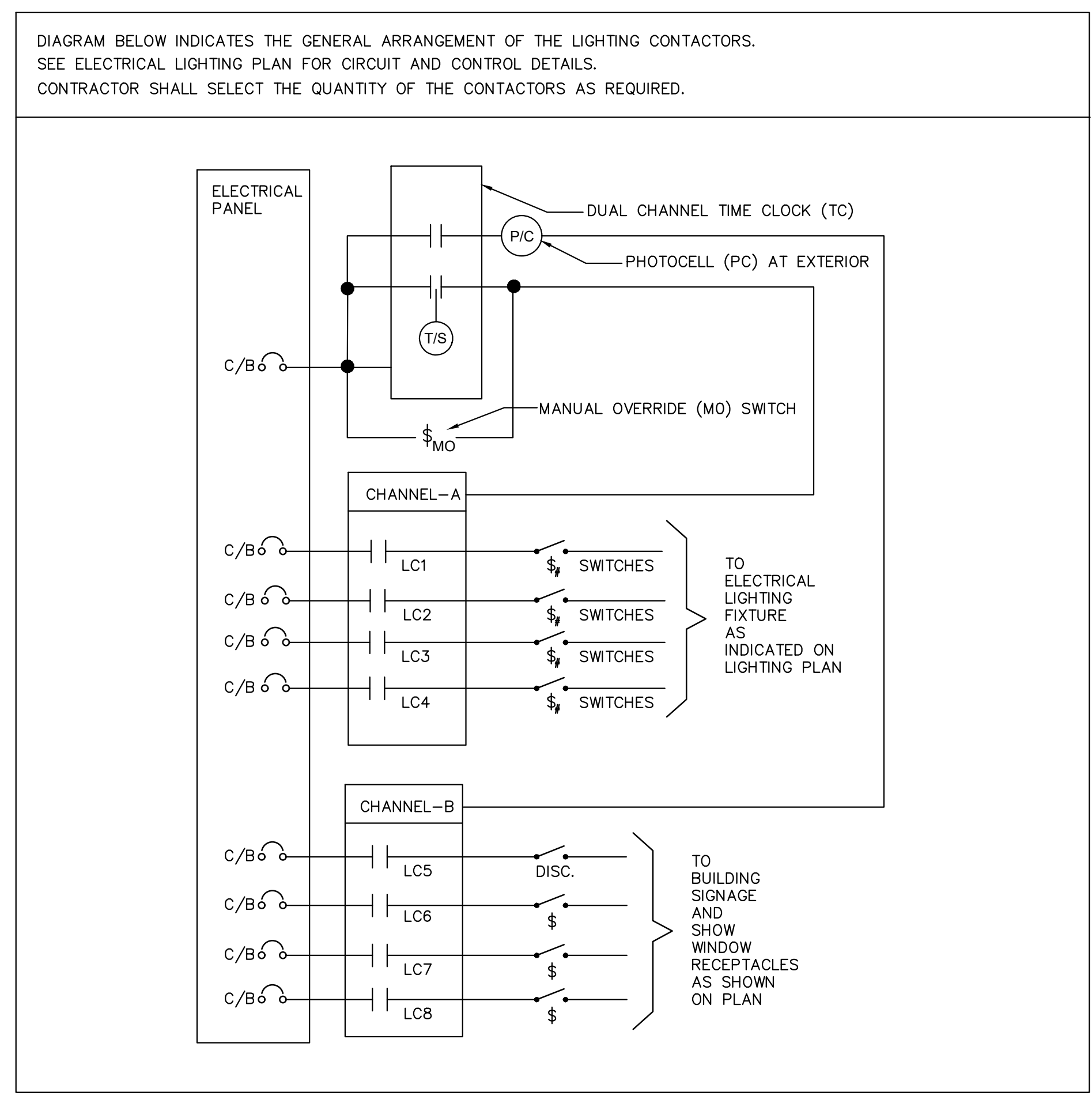
1 LIGHTING PLAN
SCALE: 1/8" = 1'-0"

- LIGHTING FIXTURE SCHEDULE NOTES
- A. ALL LIGHTING FIXTURES SHOWN ON THE LIGHTING FIXTURES SCHEDULE ARE SUBJECT TO THE ARCHITECT'S APPROVAL. E.C. SHALL COORDINATE MAKE, MODEL, FINISHES, AND OTHER CRITICAL PARAMETERS WITH THE ARCHITECT BEFORE PURCHASING.
 - B. THE ADDITIONAL ACCESSORIES (VIZ. DRIVERS AND CURRENT LIMITERS) REQUIRED FOR THE PROPER WORKING OF THE LIGHTING FIXTURES MIGHT NOT BE PROVIDED BY THE VENDOR. E.C. SHALL PURCHASE IT SEPARATELY.
 - C. ALL LIGHTING FIXTURES ARE RATED FOR 120V UNLESS OTHERWISE NOTED.
 - D. ALL EMERGENCY LIGHTING FIXTURES AND EXIT SIGNS SHALL HAVE A MINIMUM OF 90 MINUTES OF BATTERY BACKUP OR AS REQUIRED BY AHJ.
 - E. WATTS PER FACE FOR EXIT SIGNS SHALL NOT EXCEED 5 WATTS

- ELECTRICAL LIGHTING PLAN GENERAL NOTES
- A. SOME 24 HOUR, 7 DAY-A-WEEK OPERATIONAL FACILITIES DO NOT REQUIRE AUTOMATIC SHUT OFF (TIME CLOCK CONTROLLED) LIGHTING. VERIFY WITH OWNER AND AUTHORITY HAVING JURISDICTION.
 - B. ALL LIGHT FIXTURES NOT ON TIME CLOCK OR OCCUPANCY SENSOR SHALL BE CONTROLLED BY LIGHTING CONTACTOR(S). E.C. SHALL PROVIDE ADDITIONAL CONTACTORS AS REQUIRED.
 - C. COORDINATE SWITCH BANK LOCATION WITH OWNER/ ARCHITECT.
 - D. ALL WIRING SHALL BE THINW RATED FOR 75°C, COPPER.
 - E. ALL SECURITY AND EMERGENCY LIGHTING CIRCUITS, SMOKE DETECTORS, FIRE PROTECTION CIRCUITS AND OTHER CRITICAL SYSTEM CIRCUITS SHALL BE PROVIDED WITH A LOCK-ON DEVICE.
 - F. MINIMUM #12 AWG COPPER WIRING SHALL BE USED FOR THE LIGHTING CIRCUIT.
 - G. THE NEUTRAL AND GROUNDING ARE NOT SHOWN ON THE DRAWING. E.C. TO PROVIDE AS REQUIRED.
 - H. EMERGENCY LIGHT SHALL TURN ON DURING POWER FAILURE WHEREAS ALL EXIT SIGNS SHALL BE PERMANENTLY ON.
 - I. INSTALL VACANCY SENSORS IN ALL COURTS TO AUTOMATICALLY CONTROL THE LIGHTING FIXTURES. ALSO, A MANUAL SWITCH SHOULD BE PROVIDED AT SWITCH BANK (SB1) LOCATED AT THE CHECK-IN AREA. THE CONTROL WIRING SHOULD BE SET UP SO THAT THE FIXTURES CAN BE TURNED ON MANUALLY AND WILL TURN OFF AUTOMATICALLY WITHIN 15 MINUTES OF THE OCCUPANTS LEAVING.
 - J. ALL SUSPENDED OR SURFACE MOUNTED EXIT SIGNS AND EMERGENCY LIGHT WALL PACK TO HAVE BLACK HOUSING OR BEZELS.
 - K. ALL COURT LIGHTING TO BE CONTROLLED AT THE CHECK-IN-DESK.

- ELECTRICAL LIGHTING PLAN KEYED NOTES
1. LOOP ALL EMERGENCY LIGHT FIXTURES, AND EXIT SIGNS AND WIRE THEM BACK TO THE EMERGENCY LIGHTING CIRCUIT IN THE PANEL BOARD. THE CIRCUIT BREAKER SHALL HAVE A LOCKOUT.
 2. SWITCH BANK (SB1) CONSISTS OF #13 SWITCHES (a TO m) AND SB2 CONSISTS OF #2 SWITCHES (a TO b) AS INDICATED ON THE PLAN. VERIFY LOCATION, QUANTITY AND TYPE OF SWITCHES WITH OWNER/ARCHITECT. COORDINATE EXACT REQUIREMENT WITH THE LIGHTING VENDOR.
 3. COORDINATE EXACT LOCATION OF THE LIGHTING CONTACTOR (LC) AND TIME CLOCK (TC) WITH THE ARCHITECT / OWNER. REFER TO THE LIGHTING CONTACTOR TYPICAL DETAIL.
 4. MANUAL OVERRIDE SWITCH LIGHTING CONTROL. COORDINATE EXACT LOCATION IN FIELD.
 5. COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION OF DISCONNECT SWITCH FOR EXTERIOR BUILDING SIGNAGE.
 6. COORDINATE EXACT LOCATION OF THE PHOTOCELL IN FIELD.
 7. E.C. SHALL COORDINATE SPEAKER LOCATION AND POWER REQUIREMENT WITH LV VENDOR.SPEAKER CABLING TERMINATE AT WALL MOUNTED RACK LOCATED IN ELECTRICAL ROOM.
 8. EXHAUST FAN CONTROLLED FROM NEAREST LIGHTING CIRCUIT IN THE FIELD.
 9. PROVIDE CEILING MOUNTED RECEPTACLE FOR SHOW WINDOW AS REQUIRED BY CODE. VERIFY WITH LOCAL ENERGY AGENCY. VERIFY EXACT LOCATION WITH ARCHITECT. RECEPTACLES SHALL BE CONTROLLED THROUGH LIGHTING CONTACTOR AND PHOTOCELL.

| LIGHT FIXTURE SCHEDULE | | | | | | | |
|------------------------|--|---------------------|---------------------------|----------------|-------------------------|------|---------|
| TAG | DESCRIPTION | MANUFACTURER | STYLE | SIZE | COLOR | TYPE | WATTAGE |
| L1 | SUSPENDED HIGH BAY FIXTURE | LED LIGHTING SUPPLY | MLLG-LED-HB3-200-50-120 | - | BLACK | LED | 140 |
| L2 | SUSPENDED DOWNLIGHT | HILITE | HEMISPHERE | 24" DIA | BLACK | LED | 6 |
| L3 | CIRCULAR PENDANT | KUZCO | CERCHIO PD87732 | 32" DIA | BLACK | LED | 78 |
| L5 | WALL SCONCE | KUZCO | REMY | 8" | BLACK | LED | 60 |
| L6 | WALL SCONCE | KUZCO | CHUTE W514923 | 24" | BLACK MATTE | LED | 13 |
| L7 | RECESSED CAN - SMALL | ELCO | - | 4" | WHITE TRIM/WHITE BAFFLE | LED | 18 |
| L10 | RECESSED EXHAUST FAN COMBO | PANASONIC | PANASONIC COMBO LIGHT/FAN | - | - | LED | 18.5 |
| L11 | PENDANT | KUZCO | CHROMA | 8 5/8" DIA | BLACK MATTE | LED | 11 |
| L13 | SUSPENDED CYLINDER DOWNLIGHT - MED | PROGRESS LIGHTING | - | 6" DIA X 12" H | BLACK | LED | 32 |
| EM-1 | EMERGENCY LIGHT | CHLORIDE | EM UNIT CLU2 | - | - | LED | 2.2 |
| EM-2 | CEILING MONTED EMERGENCY LIGHT | - | - | - | - | LED | 5 |
| EX | EXIT SIGN WITH EMERGENCY LIGHT | CHLORIDE | EXIT / UNIT COMBO | - | - | LED | 2.2 |
| NOTE: | | | | | | | |
| 1 | COORDINATE WITH THE ARCHITECT FOR THE FINAL FINISH, COLOR AND QTY. OF THE LIGHT FIXTURE. | | | | | | |
| 2 | ALL LIGHTING CONTROLS SHALL BE PER AHJ AND CODE COMPLIANCE. | | | | | | |

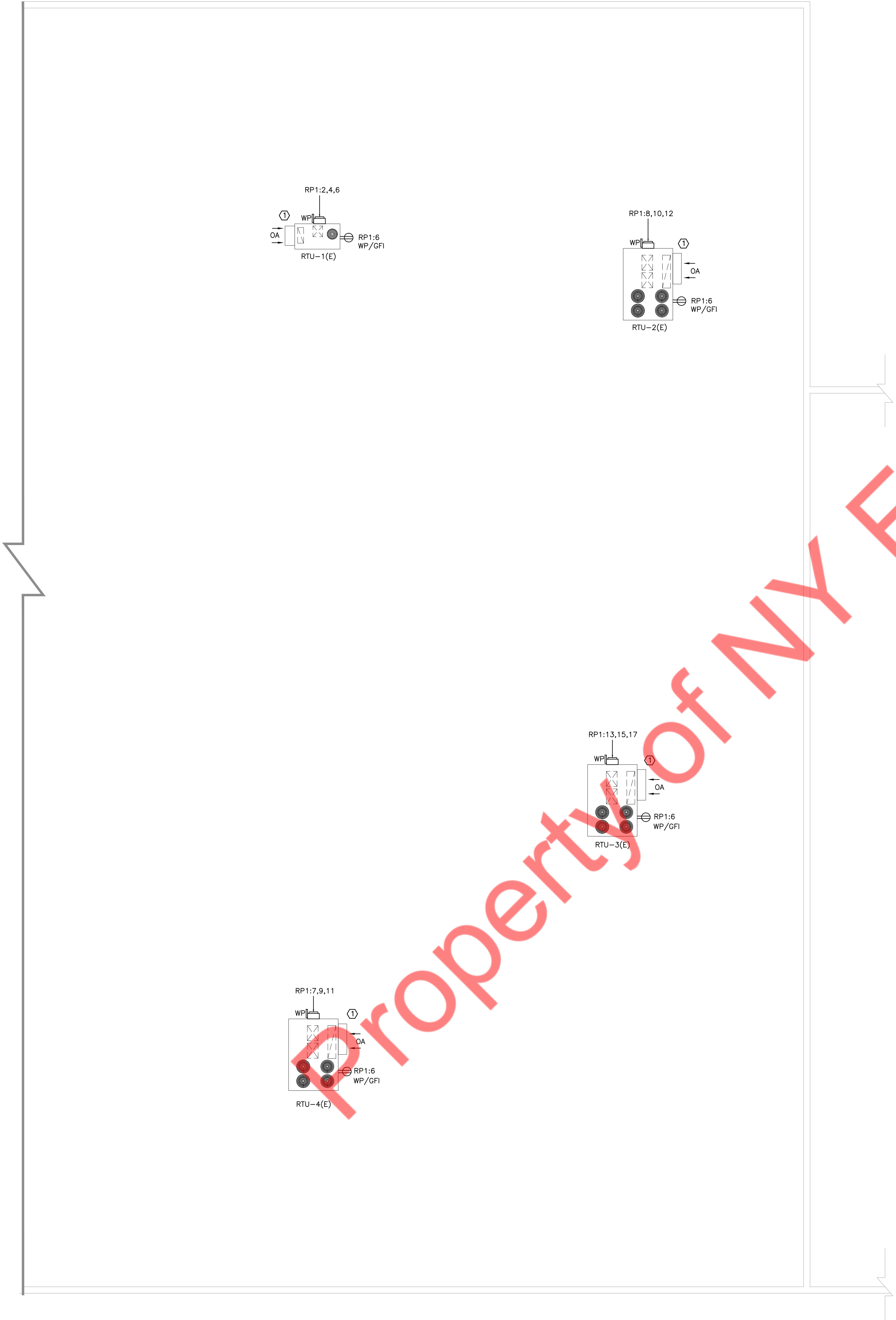


2 LIGHTING CONTACTOR DETAIL (TYPICAL)
SCALE: N.T.S.

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1 ELECTRICAL POWER PLAN - ROOF
SCALE: 1/8" = 1'-0"

- ELECTRICAL POWER PLAN GENERAL NOTES
- A. ELECTRICAL CONTRACTOR SHALL COORDINATE DISCONNECT FOR MECHANICAL UNIT WITH CONTRACTOR AND EQUIPMENT CONTRACTOR AND EQUIPMENT MANUFACTURER PRIOR TO ROUGH-IN AND PROVIDE AS REQUIRED. COORDINATE LOCATION OF DISCONNECT WITH/MANUFACTURER AND MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN. LOCATE AS REQUIRED TO MAINTAIN NEC CLEARANCES.

B. ROOF RECEPTACLES SHALL BE GFI/WP/WR TYPE.

C. ALL THE ELECTRICAL ELEMENTS VIZ. CONDUITS, WIRING, AND DISCONNECT SWITCHES SHALL BE RATED FOR THE EXTERIOR USE.

D. EXISTING (E) MECHANICAL UNITS SHALL REMAIN CONNECTED TO THE EXISTING CIRCUIT. E.C. TO VERIFY THE OPERABLE CONDITION OF THE ELECTRICAL CIRCUIT AND CONTROLS IN THE FIELD. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.

E. E.C. SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR FOR THE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENT OF THE HVAC UNIT IN THE FIELD. PROVIDE CIRCUIT AND CONTROLS AS REQUIRED.

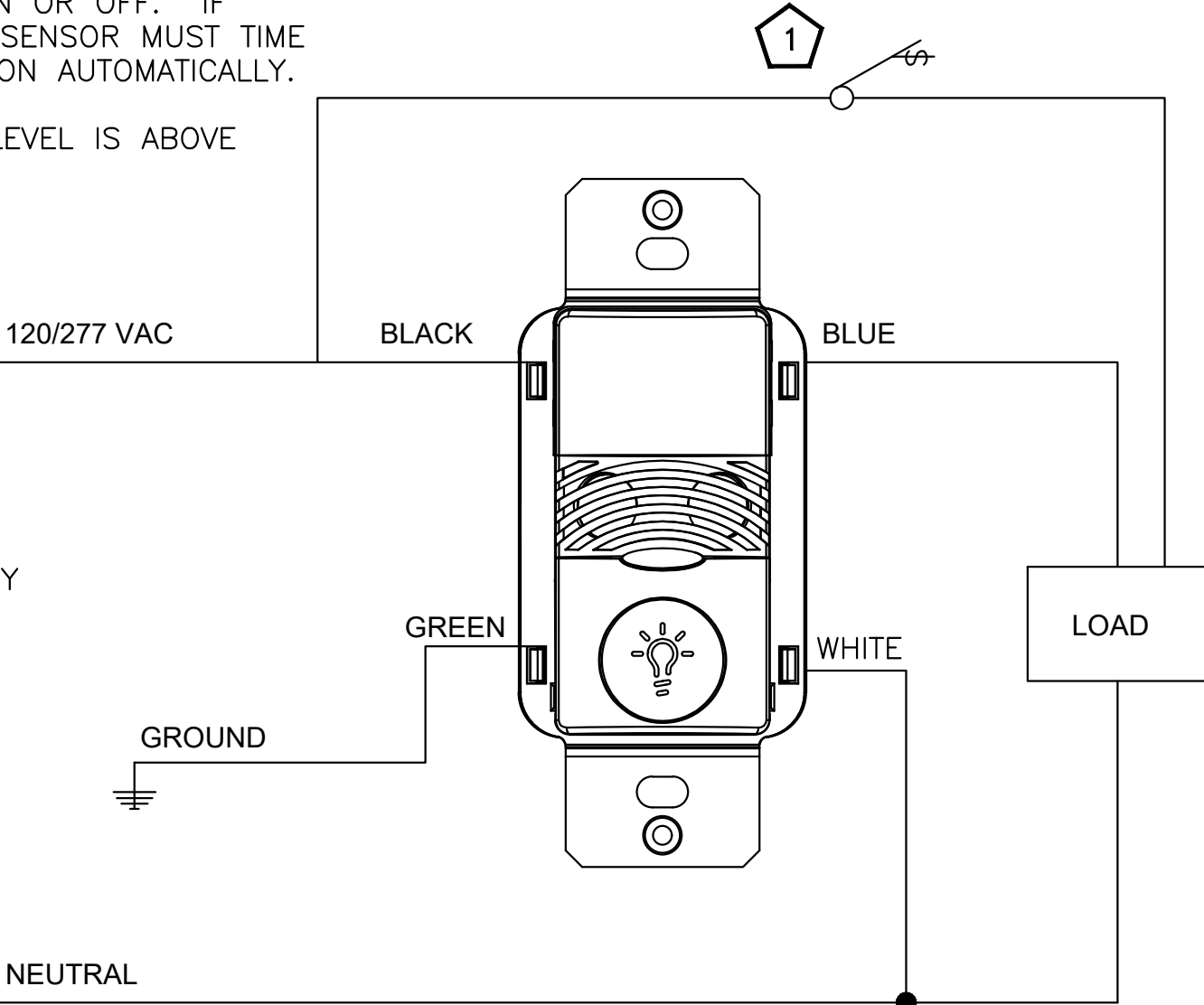
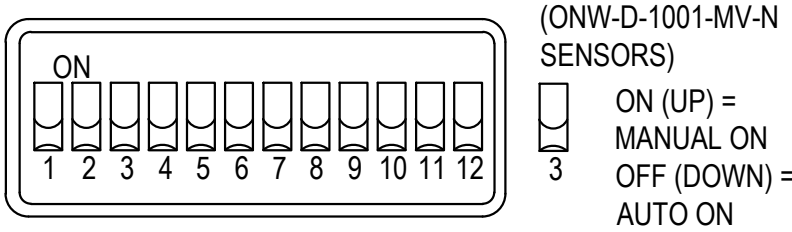
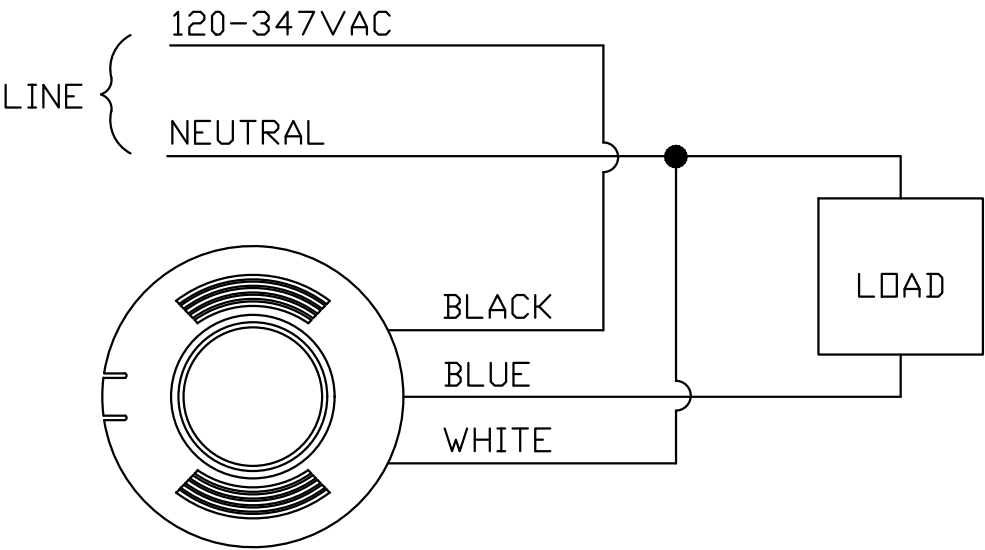
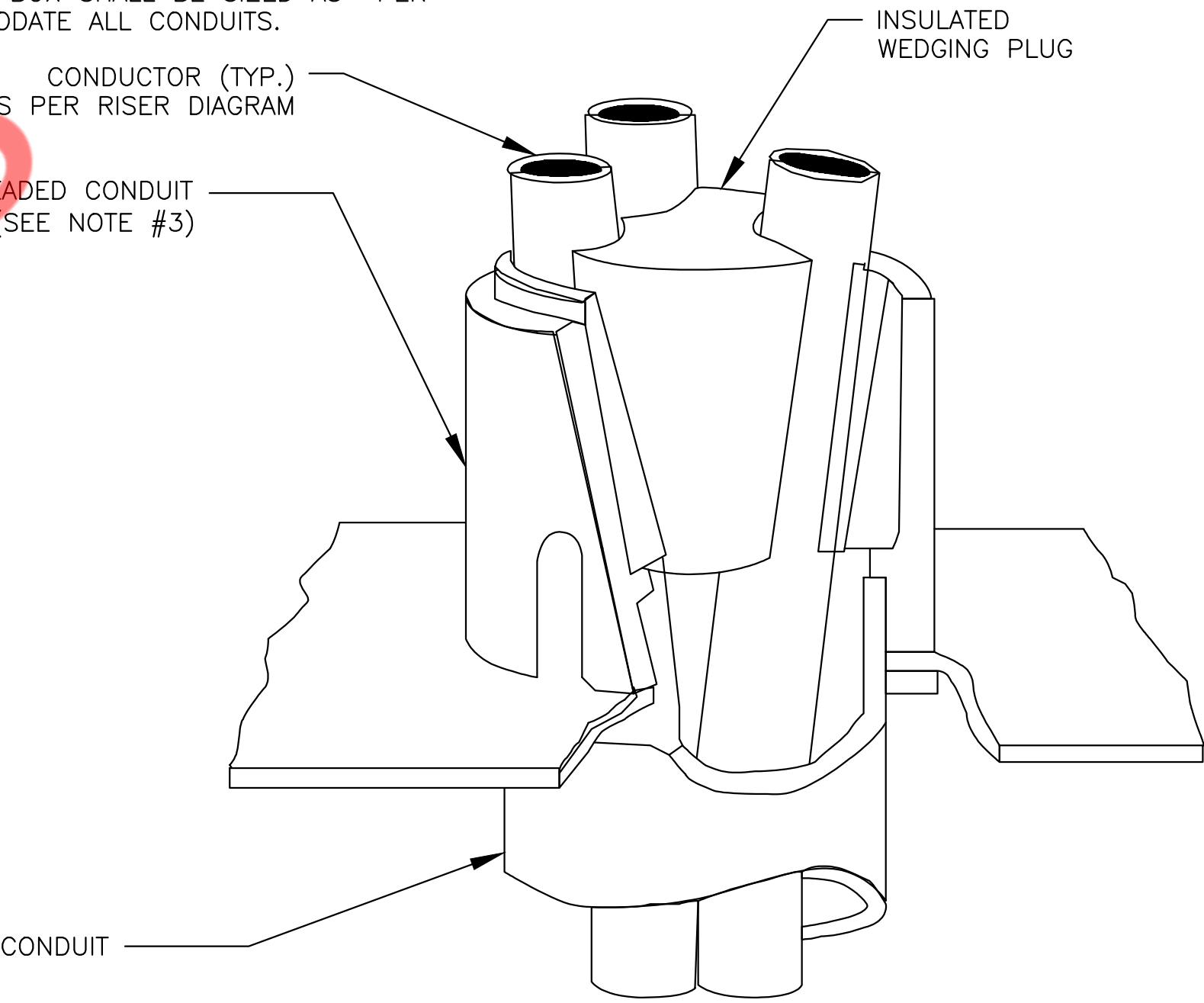
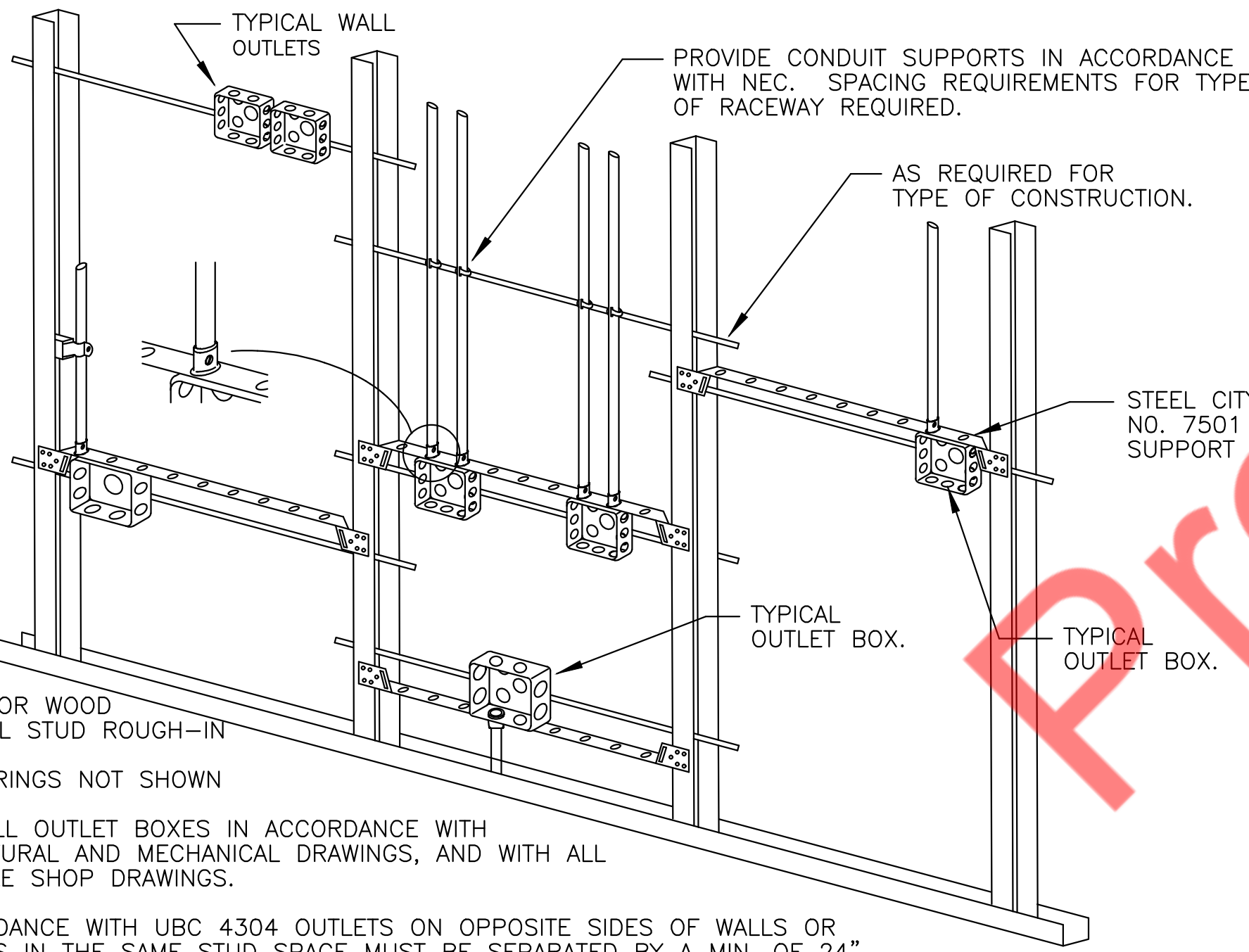
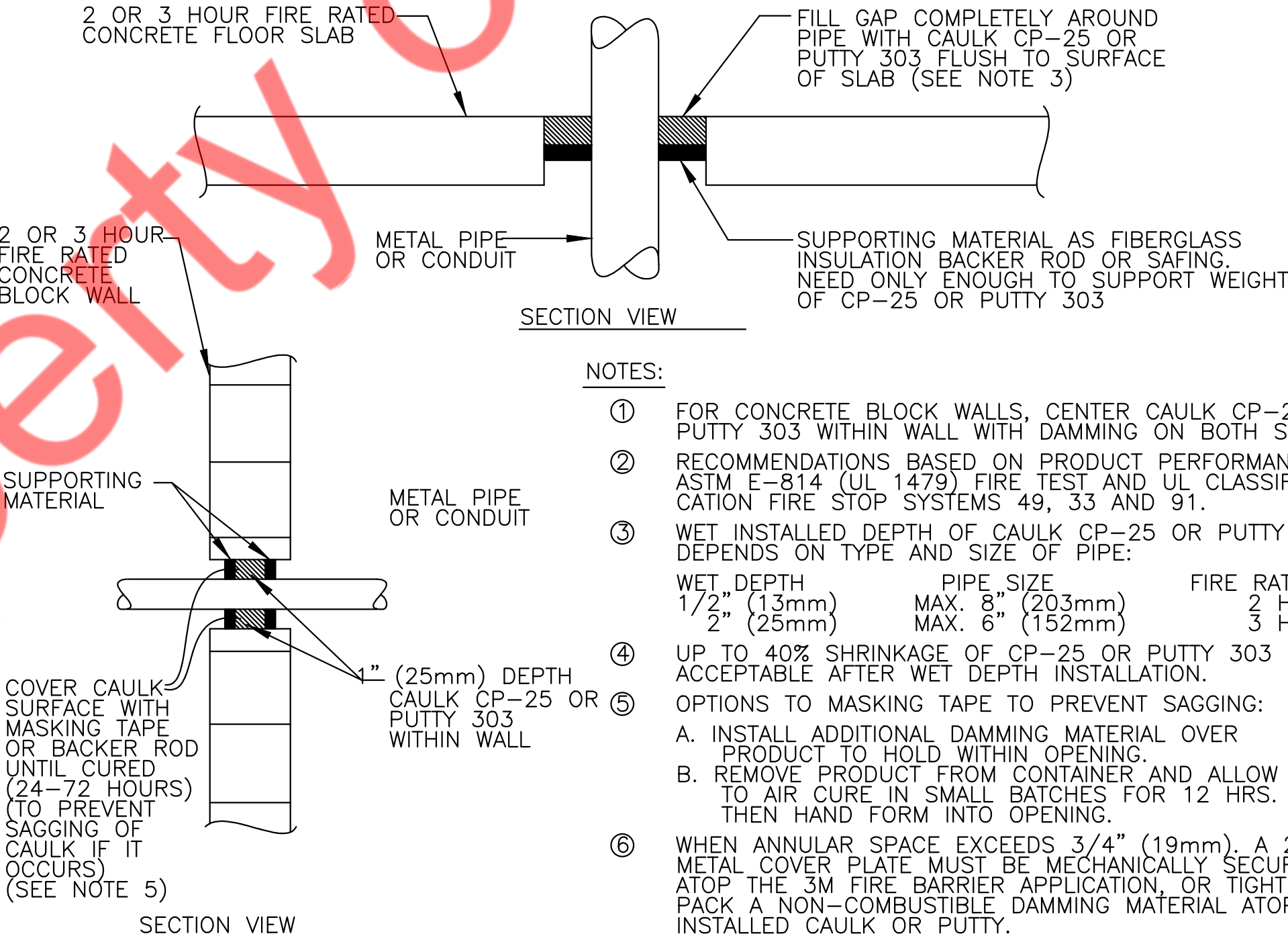
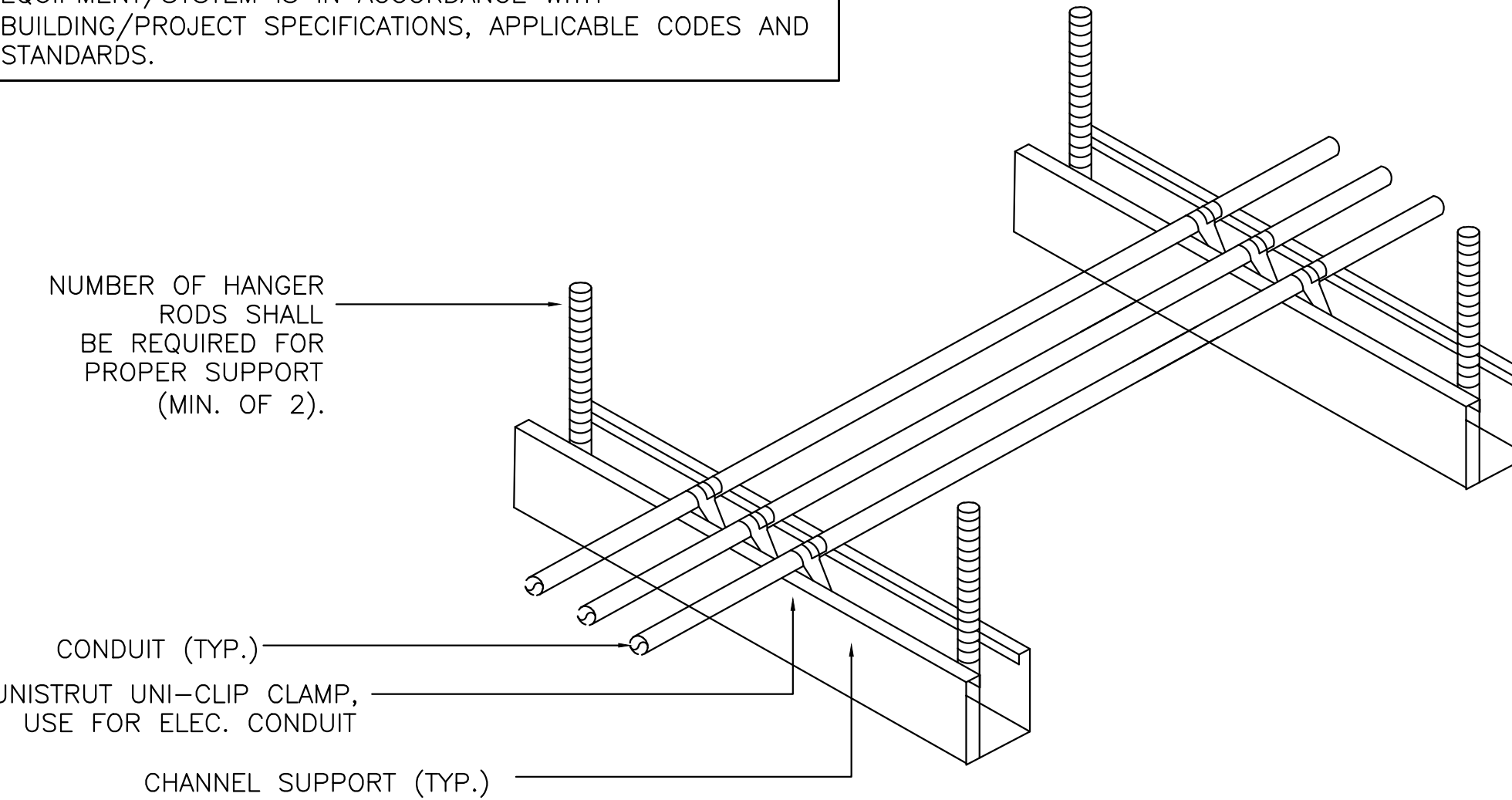
F. GFI MARKED ON THE PLAN INDICATES THAT THE CIRCUIT SHALL BE GFI PROTECTED. E.C. SHALL PROVIDE A GFI BREAKER IN THE PANEL FOR THE INDICATED CIRCUIT IF EITHER THE RECEPTACLE IS NOT AVAILABLE OR NOT ACCESSIBLE.

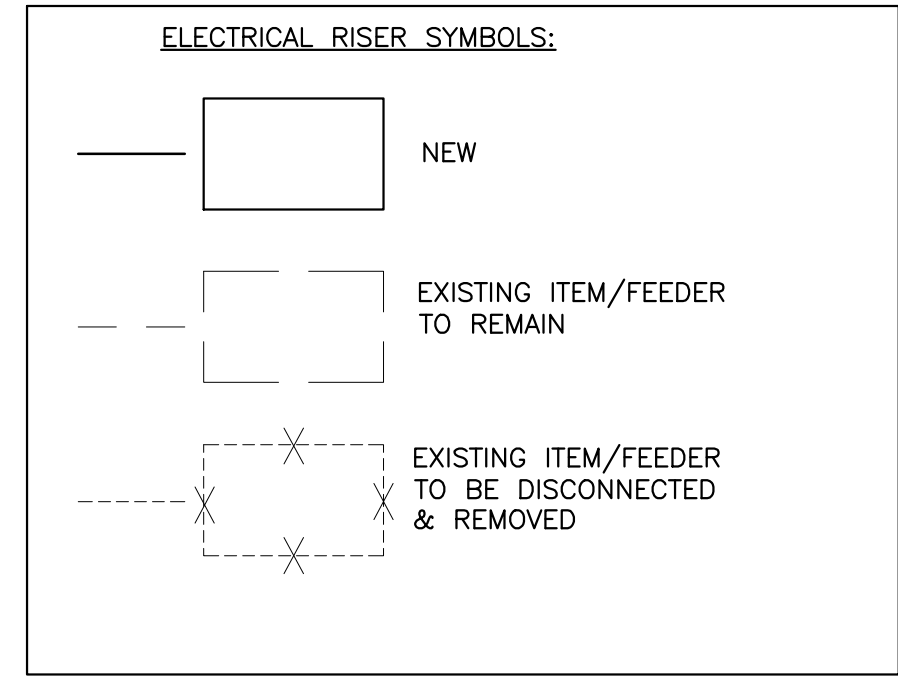
G. A 125-VOLT, SINGLE-PHASE, 15- OR 20-AMPERE-RATED RECEPTACLE OUTLET SHALL BE INSTALLED AT AN ACCESSIBLE LOCATION WITHIN 7.5 M (25 FT) OF THE EQUIPMENT AS SPECIFIED IN 210.63(A) AND (B) AS PER NEC 210.63.
- ELECTRICAL POWER PLAN KEYED WORK NOTES
1. E.C. SHALL VERIFY THE EXACT LOCATION AND OPERABLE CONDITION OF THE EXISTING MECHANICAL UNITS IN THE FIELD. PROVIDE NEW CIRCUIT, DISCONNECT/SWITCH IF EXISTING IS INOPERABLE. REUSE EXISTING SERVICE RECEPTACLE OR PROVIDE NEW IF EITHER EXISTING IS NOT AVAILABLE OR NOT OPERABLE.

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| <p>MANUAL MODE OPERATION:</p> <ol style="list-style-type: none"> PUSHBUTTON PRESS IS REQUIRED TO TURN LOAD ON. LOAD TURNS OFF WHEN SENSOR TIMES OUT OR BY PRESSING PUSH BUTTON. IF DAYLIGHT SENSOR IS ENABLED AND LIGHT LEVEL IS ABOVE SETPOINT, LOAD WILL NOT TURN ON. <p>AUTOMATIC MODE OPERATION:</p> <ol style="list-style-type: none"> WHEN SENSOR ACTIVATES LOAD TURNS ON. PUSHBUTTON CAN BE USED TO TURN LOAD ON OR OFF. IF PUSHBUTTON IS USED TO TURN LOAD OFF, SENSOR MUST TIME OUT FIRST, BEFORE LOAD CAN TURN BACK ON AUTOMATICALLY. IF DAYLIGHT SENSOR IS ENABLED AND LIGHT LEVEL IS ABOVE SETPOINT, LOAD WILL NOT TURN ON. <p>SENSOR TYPES INCLUDE:</p> <p>ONW-D-1001-MV-N</p>  <p>1 PROVIDE SENSING CONDUCTOR TAPPED AHEAD OF ANY SWITCHES WHERE SWITCH SERVES EMERGENCY FIXTURES.</p>  <p>(ONW-D-1001-MV-N SENSORS) ON (UP) = MANUAL ON OFF (DOWN) = AUTO ON</p> | <p>AUTOMATIC MODE OPERATION:</p> <ol style="list-style-type: none"> WHEN SENSOR ACTIVATES LOAD TURNS ON. LOAD TURNS OFF, WITHIN 20 MINUTES OF OCCUPANT LEAVING SPACE. IF DAYLIGHT SENSOR IS ENABLED, AND LIGHT LEVEL IS ABOVE PRESET SETPOINT, LOAD WILL NOT TURN ON. <p>SENSOR TYPES INCLUDE:</p> <p>OAC-DT-2000-MV, OAC-U-2000-MV, OAC-P-0500-MV, OAC-P-1500-MV</p>  | <p>NOTES:</p> <ol style="list-style-type: none"> 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. CABLE SUPPORT SYSTEM SHALL BE AS MANUFACTURED BY O-Z GEDNEY WITH pOzi-GRIP "S-STYLE" WEDGING PLUG OR APPROVED EQUAL. FOR THREADLESS CONDUIT (RIGID, IMC OR EMT), ATTACH CONDUIT BODY TO MALE THREADS OF A SET SCREW OR COMPRESSION CONNECT, AS PERMITTED BY SPECIFICATIONS. PROVIDE PULL BOX AT EACH LOCATION OF CABLE SUPPORTS. PULL BOX SHALL BE SIZED AS PER CODE TO ACCOMMODATE ALL CONDUITS.  | | | | | | | | | |
|---|---|--|-----------|-------------|---------------|-----------------|--------|-----------|-----------------|--------|--|
| <p>1 WIRING DIAGRAM-LINE VOLTAGE WALL SWITCH SENSOR(NEUTRAL CONNECTION) OCCUPANCY/VACANCY-SINGLE LEVEL</p>  <p>NOTES:</p> <ol style="list-style-type: none"> TYPICAL FOR WOOD AND METAL STUD ROUGH-IN PLASTER RINGS NOT SHOWN LOCATE ALL OUTLET BOXES IN ACCORDANCE WITH ARCHITECTURAL AND MECHANICAL DRAWINGS, AND WITH ALL APPLICABLE SHOP DRAWINGS. IN ACCORDANCE WITH UBC 4304 OUTLETS ON OPPOSITE SIDES OF WALLS OR PARTITIONS IN THE SAME STUD SPACE MUST BE SEPARATED BY A MIN. OF 24" HORIZONTAL DISTANCE. | <p>2 OCCUPANCY-SINGLE RELAY WIRING DIAGRAM-LINE VOLTAGE CEILING SENSOR</p>  <p>NOTES:</p> <ol style="list-style-type: none"> FOR CONCRETE BLOCK WALLS, CENTER CAULK CP-25 OR PUTTY 303 WITHIN WALL WITH DAMMING ON BOTH SIDES. RECOMMENDATIONS BASED ON PRODUCT PERFORMANCE PER ASTM E-814 (UL 1479) FIRE TEST AND UL CLASSIFICATION FIRE STOP SYSTEMS 49, 33 AND 91. WET INSTALLED DEPTH OF CAULK CP-25 OR PUTTY 303 DEPENDS ON TYPE AND SIZE OF PIPE: <table border="1"> <thead> <tr> <th>WET DEPTH</th> <th>PIPE SIZE</th> <th>FIRE RATING</th> </tr> </thead> <tbody> <tr> <td>1 1/2" (13mm)</td> <td>MAX. 8" (203mm)</td> <td>2 HRS.</td> </tr> <tr> <td>2" (25mm)</td> <td>MAX. 6" (152mm)</td> <td>3 HRS.</td> </tr> </tbody> </table> <ol style="list-style-type: none"> UP TO 40% SHRINKAGE OF CP-25 OR PUTTY 303 IS ACCEPTABLE AFTER WET DEPTH INSTALLATION. OPTIONS TO MASKING TAPE TO PREVENT SAGGING: A. INSTALL ADDITIONAL DAMMING MATERIAL OVER PRODUCT TO HOLD WITHIN OPENING. B. REMOVE PRODUCT FROM CONTAINER AND ALLOW TO AIR CURE IN SMALL BATCHES FOR 12 HRS. THEN HAND FORM INTO OPENING. WHEN ANNULAR SPACE EXCEEDS 3/4" (19mm), A 28 AWG METAL COVER PLATE MUST BE MECHANICALLY SECURED ATOP THE 3M FIRE BARRIER APPLICATION, OR TIGHTLY PACK A NON-COMBUSTIBLE DAMMING MATERIAL ATOP INSTALLED CAULK OR PUTTY. | WET DEPTH | PIPE SIZE | FIRE RATING | 1 1/2" (13mm) | MAX. 8" (203mm) | 2 HRS. | 2" (25mm) | MAX. 6" (152mm) | 3 HRS. | <p>3 VERTICAL CABLE SUPPORT DETAIL</p> <p>NOTE: THIS INFORMATION MAY NOT CONTAIN ALL DETAILS REQUIRED FOR CONSTRUCTION. APPROPRIATE MODIFICATION MAY BE REQUIRED TO ENSURE SUITABILITY OF THESE DRAWINGS FOR THE SPECIFIC APPLICATION. IT IS THE USER'S RESPONSIBILITY TO ENSURE INSTALLATION OF THE EQUIPMENT/SYSTEM IS IN ACCORDANCE WITH BUILDING/PROJECT SPECIFICATIONS, APPLICABLE CODES AND STANDARDS.</p>  <p>NOTES:</p> <ol style="list-style-type: none"> ALL CONDUIT MAY BE COMBINED ON SAME SUPPORT CHANNEL WHERE PRACTICAL. SUPPORT CHANNEL LENGTH SHALL NOT BE DETERMINED UNTIL ALL PIPING, CONDUIT, ETC. TO BE SUPPORTED IS COORDINATED. SUPPORT CHANNEL SPACING SHALL BE NO MORE THAN 10'-0". UNISTRUT AND CONDUIT INSTALLATION MAY BE REVERSED. |
| WET DEPTH | PIPE SIZE | FIRE RATING | | | | | | | | | |
| 1 1/2" (13mm) | MAX. 8" (203mm) | 2 HRS. | | | | | | | | | |
| 2" (25mm) | MAX. 6" (152mm) | 3 HRS. | | | | | | | | | |
| <p>4 DETAIL TYPICAL ROUGH-IN REQUIREMENTS</p> | <p>5 FIRE STOP DETAIL</p> | <p>6 CONDUIT SUPPORT DETAIL</p> | | | | | | | | | |

[illegible]

RISER DIAGRAM GENERAL NOTE:

- A. E.C. SHALL VERIFY/COORDINATE THE FOLLOWING INFORMATION IN THE FIELD WITH THE UTILITY/LANDLORD/OWNER AND INFORM THE ENGINEER ON RECORD OF ANY DISCREPANCY.
- B. THE EXACT POWER DISTRIBUTION AND SCOPE OF WORK WITH THE LANDLORD/OWNER BEFORE BID.
- C. THE ELECTRICAL WORK SHALL BE PERFORMED IN COMPLIANCE WITH THE NEC, LOCAL CODES AND AHJ.
- D. COORDINATE THE EXACT LOCATION OF ALL THE ELECTRICAL DEVICES SHOWN ON THE RISER. ENSURE THE CLEAR WORKING AND DEDICATED SPACE HAS BEEN PROVIDED AS PER NEC 110.26.
- E. COORDINATE AVAILABLE FAULT CURRENT (AIC RATING) WITH UTILITY/LANDLORD/OWNER. CALCULATE THE EXACT AIC RATING OF EACH EQUIPMENT IN THE FIELD. AIC RATING SHALL BE WRITTEN ON EACH EQUIPMENT AS PER STANDARD.
- F. ENSURE THE COMBINED VOLTAGE DROP OF THE FEEDER AND BRANCH CIRCUIT SHALL NOT EXCEED 5% PER CODE.
- G. PROVIDE GEC AND EGC AS PER 250.66 & 250.122 RESPECTIVELY, AS NEEDED. PROVIDE SEPARATE GROUND CONDUCTORS IN ALL CONDUITS.
- H. THE PART OF RISER MARKED AS EXISTING IS FOR REFERENCE PURPOSE ONLY. E.C. SHALL VERIFY THE RISER IN THE FIELD. INFORM THE ENGINEER ON RECORD OF ANY DISCREPANCY FOUND.
- I. SPARE AMPS AVAILABLE IN THE EXISTING ELECTRICAL SERVICE ARE MORE THAN THE NEWLY ADDED DEMAND AMPS.
- J. VERIFY THE LOCATION, RATING, AND OPERABLE CONDITION OF ALL THE EXISTING DEVICES BEING REUSED. REPLACE IF FOUND INOPERABLE (WITHIN THE SCOPE OF WORK). BASE BID ACCORDINGLY.
- K. REFER POWER PLAN FOR THE LOCATION OF THE ELECTRICAL PANELS AND TRANSFORMERS. INFORM THE ENGINEER ON RECORD OF ANY DISCREPANCY.
- L. ADDITION OR ALTERATION TO THE EXISTING SYSTEM SHALL NOT BE DONE WITHOUT THE WRITTEN CONSENT OF THE OWNER.
- M. DEMOLISHED UN-USED PANEL, COORDINATE WITH THE OWNER.

RISE/ DIAGRAM KEY NOTE:

1. E.O TO VERIFY THE AVAILABILITY OF THE EXISTING & DEDICATED ELECTRICAL METER AND DISCONNECT SWITCH FOR THE PROJECT SPACE. VERIFY THE LOCATION, RATING, AND OPERABLE CONDITION OF THE EXISTING METER AND DISCONNECT IN THE FIELD. OTHERWISE, PROVIDE A NEW METER AND SERVICE DISCONNECT AS REQUIRED. INFORM ENGINEER OF RECORD OF ANY DISCREPANCY PRIOR TO THE BID.
2. E.C. SHALL VERIFY THE EXACT LOCATION, RATING, AND OPERABLE CONDITION OF EVERY EQUIPMENT MARKED AS EXISTING IN THE FIELD. INFORM THE ENGINEER OF RECORD OF ANY DISCREPANCY, BEFORE BIDDING.
3. DEMOLISH PANEL IN COORDINATION WITH THE OWNER.

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REVISIONS

8/20/24

ELECTRICAL RISER DIAGRAM

E-500

| PANEL: | MDP | (EXISTING) | | | | | | | | | | | MOUNTING: | | EXISTING |
|---|-----------|---------------------|-----------|------------|------------------------|-----------------|-------|-------|------------------------|------------|-----------|---------------------|-----------------|-----------------|----------|
| 480Y/277 | VOLTS, | | 3 | PHASE | 4 | WIRE | | | TOTAL DEMAND LOAD | 193.45 | KVA | | PANEL LOCATION: | ELECTRICAL ROOM | |
| MCB | 800A | | | | | | | | TOTAL DEMAND AMP | 232.96 | AMP | | FED FROM: | EXISTING | |
| NOTE: L : LIGHTING, H : HVAC LOAD, M : MOTOR LOAD, R : RECEPTACLES, O : OTHER/MISC. (TYPICAL) | | | | | | | | | | | | | | | |
| CKT NO. | TRIP AMPS | DESCRIPTION OF LOAD | LOAD TYPE | LOAD (KVA) | MINIMUM BRANCH CIRCUIT | PER PHASE (KVA) | | | MINIMUM BRANCH CIRCUIT | LOAD (KVA) | LOAD TYPE | DESCRIPTION OF LOAD | TRIP AMPS | CKT NO. | |
| | | | | | | A | B | C | | | | | | | |
| 1 | | | | | | 4.10 | | | | 4.10 | H | RTU-1 (E) | 20/3P** | 2 | |
| 3 | 20/3P | SPARE | | | | | 4.10 | 4.10 | | | | | | 4 | |
| 5 | | | | | | | | | | 4.10 | H | | | 6 | |
| 7 | | | | | | | | | | 4.10 | H | | | 8 | |
| 9 | 60/3P** | RTU-4(E) | H | 14.10 | | 28.20 | | | | 14.10 | H | RTU-2(E) | 60/3P** | 10 | |
| 11 | | | H | 14.10 | | | 28.20 | | | 14.10 | H | | | 12 | |
| 13 | | | H | 14.10 | | | | | | | | | | 14 | |
| 15 | 60/3P** | RTU-3(E) | H | 14.10 | | 14.10 | | | | | | SPARE | 20/3P | 16 | |
| 17 | | | H | 14.10 | | | | 14.10 | | | | | | 18 | |
| 19 | | | | | | 0.00 | | | | | | | | 20 | |
| 21 | 20/3P | SPARE | | | | | | 0.00 | | | | SPARE | 20/3P | 22 | |
| 23 | | | | | | | | | 0.00 | | | | | 24 | |
| 25 | | | O | 13.56 | | 13.56 | | | | | | | | 26 | |
| 27 | 70/3P** | TRANSFORMER TR | O | 13.56 | | | 13.56 | | | | | SPARE | 20/3P | 28 | |
| 29 | | | O | 13.56 | | | | 13.56 | | | | | | 30 | |
| 31 | | | O | 4.52 | | 4.52 | | | | | | | | 32 | |
| 33 | 30/3P** | TRANSFORMER CR | O | 4.52 | | | 4.52 | | | | | SPARE | 20/3P | 34 | |
| 35 | | | O | 4.52 | | | | 4.52 | | | | | | 36 | |
| 37 | | SPACE | | | | 0.00 | | | | | | | | 38 | |
| 39 | | SPACE | | | | | | 0.00 | | | | SPARE | 20/3P | 40 | |
| 41 | | SPACE | | | | | | | 0.00 | | | | | 42 | |
| 43 | | SPACE | | | | 0.00 | | | | | | SPACE | | 44 | |
| 45 | | SPACE | | | | | 0.00 | | | | | | | 46 | |
| 47 | | SPACE | | | | | | 0.00 | | | | SPACE | | 48 | |
| | | | | | | 64.48 | 64.48 | 64.48 | | | | | | | |

| PANEL: | LP | (EXISTING) | | | | | | | | | | | MOUNTING: | | EXISTING |
|---|-----------|---------------------|-----------|------------|------------------------|-----------------|------|------|------------------------|------------|-----------|---------------------|-----------------|--------------------|----------|
| 480Y/277 | VOLTS, | | 3 | PHASE | 4 | WIRE | | | TOTAL DEMAND LOAD | 0.00 | KVA | | PANEL LOCATION: | ELECTRICAL ROOM | |
| MLO | 125A | | | | | | | | TOTAL DEMAND AMP | 0.00 | AMP | | FED FROM: | EXISTING MDP PANEL | |
| NOTE: L : LIGHTING, H : HVAC LOAD, M : MOTOR LOAD, R : RECEPTACLES, O : OTHER/MISC. (TYPICAL) | | | | | | | | | | | | | | | |
| CKT NO. | TRIP AMPS | DESCRIPTION OF LOAD | LOAD TYPE | LOAD (KVA) | MINIMUM BRANCH CIRCUIT | PER PHASE (KVA) | | | MINIMUM BRANCH CIRCUIT | LOAD (KVA) | LOAD TYPE | DESCRIPTION OF LOAD | TRIP AMPS | CKT NO. | |
| | | | | | | A | B | C | | | | | | | |
| 1 | 20 | SPARE | | | | 0.00 | | | | | | SPARE | 20 | 2 | |
| 3 | 20 | SPARE | | | | | 0.00 | | | | | SPARE | 20 | 4 | |
| 5 | 20 | SPARE | | | | | | 0.00 | | | | SPARE | 20 | 6 | |
| 7 | 20 | SPARE | | | | 0.00 | | | | | | SPARE | 20 | 8 | |
| 9 | 20 | SPARE | | | | | 0.00 | | | | | SPARE | 20 | 10 | |
| 11 | 20 | SPARE | | | | | | 0.00 | | | | SPARE | 20 | 12 | |
| 13 | 20 | SPARE | | | | 0.00 | | | | | | SPARE | 20 | 14 | |
| 15 | 20 | SPARE | | | | | 0.00 | | | | | SPARE | 20 | 16 | |
| 17 | 20 | SPARE | | | | | | 0.00 | | | | SPARE | 20 | 18 | |
| 19 | 20 | SPARE | | | | 0.00 | | | | | | SPARE | 20 | 20 | |
| 21 | 20 | SPARE | | | | | 0.00 | | | | | SPARE | 20 | 22 | |
| 23 | 20 | SPARE | | | | | | 0.00 | | | | SPARE | 20 | 24 | |
| 25 | 20 | SPARE | | | | 0.00 | | | | | | SPARE | 20 | 26 | |
| 27 | 20 | SPARE | | | | | 0.00 | | | | | SPARE | 20 | 28 | |
| 29 | 20 | SPARE | | | | | | 0.00 | | | | SPARE | 20 | 30 | |
| 31 | 20 | SPARE | | | | 0.00 | | | | | | SPARE | 20 | 32 | |
| 33 | 20 | SPARE | | | | | 0.00 | | | | | SPARE | 20 | 34 | |
| 35 | 20 | SPARE | | | | | | 0.00 | | | | SPARE | 20 | 36 | |
| 37 | 20 | SPARE | | | | 0.00 | | | | | | SPARE | 20 | 38 | |
| 39 | 20 | SPARE | | | | | 0.00 | | | | | SPARE | 20 | 40 | |
| 41 | 20 | SPARE | | | | | | 0.00 | | | | SPARE | 20 | 42 | |
| | | | | | | 0.00 | 0.00 | 0.00 | | | | | | | |

PANEL SCHEDULE ABBREVIATIONS:

L = LIGHTING, R = RECEPTACLE, H = HVAC, E = EQUIPMENT, M = MOTOR, O = OTHER

(*) IN THE PANEL SCHEDULE INDICATES THAT THE EXISTING BREAKERS SHALL BE REPLACED WITH NEW BREAKERS AS INDICATED ON THE DRAWING.

(**) IN THE PANEL SCHEDULE INDICATES THAT BREAKER SIZE SHALL BE VERIFIED IN THE FIELD. PROVIDE BREAKER OF THE DESIRED RATING IF REQUIRED.

PANEL SCHEDULE GENERAL NOTES:

A. E.C. SHALL VERIFY IF THE RATING OF THE BREAKERS AND FEEDER SIZE FOR EACH AND EVERY EQUIPMENT IS CORRECT AND ALL THE EQUIPMENT HAVE BEEN INCLUDED IN THE PANEL SCHEDULE. PRIOR TO BID, INFORM ENGINEER ON RECORD IN CASE OF ANY DISCREPANCY.

B. THE RECEPTACLES MARKED AS "GFI" ON THE FLOOR PLAN INDICATES THAT THE RECEPTACLE SHALL BE GFI PROTECTED. E.C. SHALL PROVIDE GFI BREAKER IN PANEL IF GFI RECEPTACLE IS NOT READILY ACCESSIBLE OR FOR THE RECEPTACLES OTHER THAN 20A.

C. E.C. SHALL VERIFY THE OPERABLE CONDITION OF THE BREAKERS IN THE EXISTING PANEL IN THE FIELD. REPLACE OR PROVIDE NEW BREAKER IN THE EXISTING PANEL TO BE IN LINE WITH THE PANEL SCHEDULE, IF REQUIRED, BASE BID ACCORDINGLY.

D. ALL EXISTING CIRCUITS SHOWN ON THE EXISTING ELECTRICAL PANELS ARE FOR REFERENCE PURPOSE ONLY. E.C. TO FIELD VERIFY AND INFORM ENGINEER OF RECORD BEFORE BID.

E. E.C TO PROVIDE A CIRCUIT DIRECTORY FOR EACH PANEL BOARD.

F. ALL SECURITY AND EMERGENCY LIGHTING CIRCUITS AND OTHER CRITICAL SYSTEM CIRCUITS SHALL BE PROVIDED WITH A LOCK-ON DEVICE

| PANEL: | CRP | (EXISTING) | | | | | | | | | | | MOUNTING: | | EXISTING |
|---|-----------|--|-----------|------------|------------------------|-----------------|------|------|------------------------|-------------------|-----------|---------------------|--|-----------------|----------|
| 208Y/120 | VOLTS, | | 3 | PHASE | 4 | WIRE | | | TOTAL DEMAND LOAD | 20* | KVA | | PANEL LOCATION: | ELECTRICAL ROOM | |
| MCB | 50A | | | | | | | | TOTAL DEMAND AMP | 0.00 | AMP | | FED FROM: | MDP VIA XMER CR | |
| NOTE: L : LIGHTING, H : HVAC LOAD, M : MOTOR LOAD, R : RECEPTACLES, O : OTHER/MISC. (TYPICAL) | | | | | | | | | | | | | | | |
| CKT NO. | TRIP AMPS | DESCRIPTION OF LOAD | LOAD TYPE | LOAD (KVA) | MINIMUM BRANCH CIRCUIT | PER PHASE (KVA) | | | MINIMUM BRANCH CIRCUIT | LOAD (KVA) | LOAD TYPE | DESCRIPTION OF LOAD | TRIP AMPS | CKT NO. | |
| | | | | | | A | B | C | | | | | | | |
| 1 | 20 | SPARE | | | | | | | | 2#12, 1#12, 3/4"C | 0.36 | R | STORAGE & WARM UP/ COOL DOWN RECEPTACLES | 20 | 2 |
| 3 | 20 | RESTROOM GFI RECEPTACLES | R | 0.72 | 2#12, 1#12, 3/4"C | 0.36 | 1.52 | | | 2#12, 1#12, 3/4"C | 0.80 | R | COURT TV RECEPTACLES | 20 | 4 |
| 5 | 20 | RECEPT TIME CLOCK | O | 1.00 | 2#12, 1#12, 3/4"C | | | 1.80 | | 2#12, 1#12, 3/4"C | 0.80 | R | COURT TV RECEPTACLES | 20 | 6 |
| 7 | 20 | HAND DRYER | O | 1.00 | 2#12, 1#12, 3/4"C | 1.80 | | | | 2#12, 1#12, 3/4"C | 0.80 | R | COURT TV RECEPTACLES | 20 | 8 |
| 9 | 20 | COURT AREA GENERAL RECEPTACLES | R | 0.72 | 2#12, 1#12, 3/4"C | | 1.26 | | | 2#12, 1#12, 3/4"C | 0.54 | R | BEAUTY BAR & LOCKER ROOM RECEPTACLE | 20 | 6 |
| 11 | 20 | ENTRY & CHECK-IN DESK GENERAL RECEPTACLE | R | 0.54 | 2#12, 1#12, 3/4"C | | | 1.54 | | EXISTING | 1.00 | O | FIRE PANEL | 20 | 12 |
| 13 | 20 | SPARE | | | | 0.00 | | | | | | SPARE | 20 | 14 | |
| 15 | 20 | SPARE | | | | | 0.50 | | | 2#12, 1#12, 3/4"C | 0.50 | R | DRINKING FOUNTAIN | 20 | 16 |
| 17 | 20 | SPARE | | | | | | 0.36 | | 2#12, 1#12, 3/4"C | 0.36 | R | COURT TROOM GENERAL RECEPTACLES | 20 | 18 |
| 19 | 20* | COURT AREA GENERAL RECEPTACLES | R | 0.90 | 2#12, 1#12, 3/4"C | 1.30 | | | | 2#12, 1#12, 3/4"C | 0.40 | R | COMMUNITY ROOM RECEPTACLE | 20 | 20 |
| 21 | 20* | ILLUMINATED SIGN/LOGO | O | 1.20 | 2#12, 1#12, 3/4"C | | 1.92 | | | 2#12, 1#12, 3/4"C | 0.72 | R | STORAGE & COMMUNITY ROOM GENERAL RECEPTACLES | 20* | 22 |
| 23 | 20* | HAND DRYER | O | 1.00 | 2#12, 1#12, 3/4"C | | | 1.00 | | | | SPARE | 20* | 24 | |
| 25 | 20* | RCP-1 | O | 0.20 | 2#12, 1#12, 3/4"C | 0.20 | | | | | | SPARE | 20* | 26 | |
| 27 | 20* | SPARE | | | | | 0.00 | | | | | SPARE | 20* | 28 | |
| 29 | 20* | SPARE | | | | | | 0.00 | | | | SPARE | 20* | 30 | |
| 31 | 20* | SPARE | | | | 0.00 | | | | | | SPARE | | 32 | |
| 33 | | SPACE | | | | | 0.00 | | | | | SPACE | | 34 | |
| 35 | | SPACE | | | | | | 0.00 | | | | SPACE | | 36 | |
| 37 | | SPACE | | | | 0.00 | | | | | | SPACE | | 38 | |
| 39 | | SPACE | | | | | 0.00 | | | | | SPACE | | 40 | |
| 41 | | SPACE | | | | | | 0.00 | | | | SPACE | | 42 | |
| | | | | | | 3.66 | 5.20 | 4.70 | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------|--|------------|--|---|-----------|-------------------|------------------------|--|-----------------|------|------|------------------------|------------|-------------------|-------------------------------|-----|--|----|-----------|-----------------|-----------------|
| PANEL: | | RP1 | (EXISTING) | | | | | | | | | | MOUNTING: | | EXISTING | | | | | | | |
| 208Y/120 | VOLTS, | | | | 3 | PHASE | | | | 4 | WIRE | | | | TOTAL DEMAND LOAD | 20.00 | KVA | | | | PANEL LOCATION: | ELECTRICAL ROOM |
| MLO | 50A | | | | | | | | | | | | | | TOTAL DEMAND AMP | 20.00 | AMP | | | | FED FROM: | PANEL RP2 |
| NOTE: L : LIGHTING, H : HVAC LOAD, M : MOTOR LOAD, R : RECEPTACLES, O : OTHER/MISC. (TYPICAL) | | | | | | | | | | | | | | | | | | | | | | |
| CKT NO. | TRIP AMPS | DESCRIPTION OF LOAD | | | | LOAD TYPE | LOAD (KVA) | MINIMUM BRANCH CIRCUIT | | PER PHASE (KVA) | | | MINIMUM BRANCH CIRCUIT | LOAD (KVA) | LOAD TYPE | DESCRIPTION OF LOAD | | | | TRIP AMPS | CKT NO. | |
| | | | | | | | | | | A | B | C | | | | | | | | | | |
| 1 | 20 | SPARE | | | | | | | | 0.00 | | | | | | SPARE | | | 20 | 2 | | |
| 3 | 20 | ELECTRICAL ROOM RECEPTACLES | | | R | 0.40 | 2#12, 1#12, 3/4"C | | | | 0.80 | | 2#12, 1#12, 3/4"C | 0.40 | R | SKINNY HALF-COURT | | | 20 | 4 | | |
| 5 | 20 | OFFICE RECEPTACLES | | | R | 0.80 | 2#12, 1#12, 3/4"C | | | | | 1.16 | 2#12, 1#12, 3/4"C | 0.36 | R | RECEPT ON ROOF | | | 20 | 6 | | |
| 7 | 20 | MUSIC SYSTEM CONTROL RECEPTACLE | | | R | 0.18 | 2#12, 1#12, 3/4"C | | | 0.54 | | | 2#12, 1#12, 3/4"C | 0.36 | R | RECEPT ON ROOF | | | 20 | 8 | | |
| 9 | 20 | SECURITY CAMERA DATA RECORDER RECEPTACLE | | | R | 0.18 | 2#12, 1#12, 3/4"C | | | | 0.18 | | | | | | | | 10 | | | |
| 11 | | SPACE | | | | | | | | | | 0.00 | | | | SPACE | | | 12 | | | |
| 13 | | | | | | | | | | 0.00 | | | | | | | | | 14 | | | |
| 15 | 20 | COURT TV RECEPTACLES | | | R | 0.80 | 2#12, 1#12, 3/4"C | | | | 0.80 | | | | | SPARE | | | 20 | 16 | | |
| 17 | | | | | | | | | | | | 0.00 | | | | SPARE | | | 20 | 18 | | |
| 19 | | SPACE | | | | | | | | 0.00 | | | | | | SPARE | | | 20 | 20 | | |
| 21 | | | | | | | | | | | | 0.00 | | | | SPARE | | | 20 | 22 | | |
| 23 | 20 | SPARE | | | | | | | | | | 0.50 | 2#12, 1#12, 3/4"C | 0.50 | O | SECURITY CAMERA | | | 20 | 24 | | |
| 25 | 20 | SPARE | | | | | | | | 0.00 | | | | | | SPARE | | | 20 | 26 | | |
| 27 | 20 | SPARE | | | | | | | | | 0.00 | | | | | SPARE | | | 20 | 28 | | |
| 29 | 15 | SPARE | | | | | | | | | | 0.72 | 2#12, 1#12, 3/4"C | 0.72 | R | CHECK-IN DESK QUAD RECEPTACLE | | | 20 | 30 | | |
| 31 | 20 | EXISTING FACP | | | O | 0.50 | EXISTING | | | 0.50 | | | | | | SPARE | | | 20 | 32 | | |
| 33 | | | | | | | | | | | 0.00 | | | | | SPARE | | | 20 | 34 | | |
| 35 | | SPACE | | | | | | | | | | 0.00 | | | | SPARE | | | 20 | 36 | | |
| 37 | | | | | | | | | | 0.40 | | | 2#12, 1#12, 3/4"C | 0.40 | R | PROSHOP TV RECEPTACLES | | | 20 | 38 | | |
| 39 | 25 | SPARE | | | | | | | | | 0.00 | | | | | SPARE | | | 20 | 40 | | |
| 41 | 20 | SPARE | | | | | | | | | | 0.00 | | | | SPARE | | | 20 | 42 | | |
| | | | | | | | | | | 1.44 | 1.78 | 2.38 | | | | | | | | | | |

| PLUMBING LEGENDS | |
|------------------|------------------------------|
| SYMBOL | DESCRIPTION |
| ————— | SANITARY WASTE (ABOVE FLOOR) |
| ————— | SANITARY SEWER (UNDER FLOOR) |
| ----- | VENT PIPING |
| ----- | COLD WATER |
| ----- | HOT WATER |
| ----- | HOT WATER RETURN |
| -----○ | P-TRAP |
| -----○ | PIPE DROP |
| -----○ | PIPE UP |
| -----□ | BALANCING VALVE |
| -----□ | CHECK VALVE |
| -----□ | WATER HAMMER ARRESTOR |
| -----□ | SHUT OFF VALVE |
| ● | POINT OF NEW CONNECTION |

PLUMBING ABBREVIATIONS

| | |
|---------|-----------------------|
| CO | CLEANOUT |
| FCO | FLOOR CLEANOUT |
| CW | COLD WATER |
| HW | HOT WATER |
| HWR | HOT WATER RETURN |
| SAN | SANITARY |
| S | SOIL |
| ST | STORM |
| V | VENT |
| W | WASTE |
| LAV | LAVATORY |
| WC | WATER CLOSET |
| TYP. | TYPICAL |
| DN | DOWN |
| EXIST. | EXISTING |
| FD | FLOOR DRAIN |
| SQ. FT. | SQUARE FEET |
| BFP | BACK FLOW PREVENTER |
| WH | WATER HEATER |
| EW | ELECTRIC WATER COOLER |
| WCO | WALL CLEANOUT |

PLUMBING DRAWING LIST

- P-001 PLUMBING SYMBOLS, NOTES, ABBREVIATIONS & SPECIFICATIONS
- P-100 PLUMBING FLOOR PLAN
- P-101 PLUMBING ROOF PLAN
- P-500 PLUMBING DETAILS
- P-600 PLUMBING SCHEDULES
- P-601 PLUMBING RISER DIAGRAMS

CODE COMPLIANCE

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

- INTERNATIONAL BUILDING CODE 2015
- INTERNATIONAL MECHANICAL CODE 2015
- INTERNATIONAL PLUMBING CODE 2015
- NATIONAL ELECTRICAL CODE 2023
- INTERNATIONAL ENERGY CONSERVATION CODE 2015
- INTERNATIONAL FUEL GAS CODE 2015

PLUMBING NOTES

- ALL PLUMBING SYSTEMS (SANITARY, WASTE, VENT, WATER, GAS) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 2015 INTERNATIONAL PLUMBING CODE, 2015 INTERNATIONAL FUEL GAS CODE & 2015 INTERNATIONAL ENERGY CONSERVATION CODE
- INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 702.2
- PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION PC 305.
- TRENCHING, EXCAVATION AND BACKFILL AS PER SECTION PC 306.
- MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 303, PC 605, PC 702, PC 902,PC 1102.
- EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTERS 4, 5, 6, 7 AND 9.
- DEEP SEAL TRAPS FOR FLOOR DRAINS SHALL BE PROVIDED AS PER PC 1002, AND CLEAN-OUTS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 708
- DRAINAGE PIPE CLEANOUTS AS PER SECTION PC 708.
- VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 308
- WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION PC 601-603, 604, 606, 607, 608, 610
- THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 SECTION PC 701, 704, 705, 706, 707, 708, 711.
- VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SECTIONS PC 901 THROUGH PC 912 THROUGH PC 917
- INSPECTION AND TESTING OF PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION 108, 312.
- GAS PIPING INSTALLATION SHALL BE IN ACCORDANCE WITH 2015 INTERNATIONAL FUEL GAS CODE CHAPTER 4.

PLUMBING SPECIFICATIONS

- BASIC PLUMBING REQUIREMENTS, MATERIALS AND METHODS
 - SCOPE
- PROVIDE ALL MATERIAL, TOOLS, SUPERVISION AND LABOR INCLUDING ALL MISCELLANEOUS AND INCIDENTAL ITEMS REQUIRED FOR COMPLETE AND OPERABLE PLUMBING INSTALLATIONS AS SHOWN OR DESCRIBED ON THE DRAWINGS AND IN THESE SPECIFICATIONS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING AND NEW CONDITIONS AND MATERIALS WITHIN THE CONSTRUCTION AREA. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED TO THE OWNER'S SATISFACTION.
- OBTAIN ALL PERMITS, PAY ALL PERMIT FEES AND SCHEDULE ALL REQUIRED INSPECTIONS. COPIES OF ALL PERMITS AND INSPECTION CERTIFICATES SHALL BE FORWARDED TO THE OWNER FOR RECORD.
- THE GENERAL CONDITIONS OF THE CONTRACT AND ALL DIVISIONAL REQUIREMENTS APPLY TO THE WORK OF THIS SECTION.
- THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO DETERMINE CONDITIONS AND THE EXTENT OF THE WORK. BY COMMENCING WORK, THE CONTRACTOR ACKNOWLEDGES HIS CONFIRMATION OF ALL CONDITIONS AS ACCEPTABLE WITH REFERENCE TO HIS CONTRACT, SCOPE OF WORK AND BID PRICE SUCH THAT NO ADDITIONAL COMPENSATION SHALL BE FORTHCOMING FOR UNFORESEEN EXISTING CONDITIONS.
- ALL AREAS SUBJECT TO FREEZING CONDITIONS, THE CONTRACTOR SHALL PROVIDE FREEZE PROTECTION FOR ALL DOMESTIC WATER PIPING INSTALLED UNDER HIS CONTRACT.
- ALL ELECTRICAL REQUIREMENTS SHALL BE COORDINATED WITH THE CONTRACTOR FOR ELECTRICAL WORK. THIS CONTRACTOR IS RESPONSIBLE FOR ALL LOW VOLTAGE WIRING FOR EQUIPMENT INSTALLED UNDER HIS CONTRACT. THE CONTRACTOR FOR ELECTRICAL WORK IS RESPONSIBLE FOR LINE VOLTAGE POWER WIRING ONLY.
- COLOR AND FINISH SELECTIONS FOR ALL MATERIALS, INCLUDING PAINTING OF PIPING, SHALL BE AS DIRECTED AND/OR APPROVED BY THE ARCHITECT.
- MINOR DETAILS NOT SHOWN OR SPECIFIED, BUT NECESSARY FOR THE PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE ENGINEER SHALL BE INCLUDED AS IF SPECIFIED OR INDICATED ON THE DRAWINGS.
- THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS FOR THE INSTALLATION, CONNECTION, EXTENSION OR MODIFICATION TO ALL UTILITY SERVICES WITH RESPECTIVE PROVIDERS INCLUDING PAYMENT OF ALL ASSOCIATED FEES.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL PAINTING ASSOCIATED WITH CUTTING AND PATCHING, ALL PAINTING IN AREAS WITH COMPLETE FINISH RENOVATIONS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR.
- SUBMITTALS
 - PIPE AND FITTINGS
 - VALVES
 - HANGERS AND SUPPORTS
 - PLUMBING PIPING LAYOUT
 - TESTS
 - PLUMBING FIXTURES
 - WATER HEATERS & ACCESSORIES
 - FLOOR DRAINS
 - MIXING VALVES
 - ALL SCHEDULED PLUMBING EQUIPMENT
- SUBMITTALS FROM SUPPLIERS OR MANUFACTURERS WHICH DO NOT BEAR THE STAMP OF THE SUBMITTING CONTRACTOR INDICATING THAT THE CONTRACTOR HAS REVIEWED THE SUBMITTAL FOR CONFORMANCE WITH THE PROJECT REQUIREMENTS WILL BE RETURNED REJECTED.
- THE ENGINEER'S REVIEW OF SUBMITTALS IS A COURTESY WHICH DOES NOT RELIEVE THE CONTRACTOR FROM CONFORMING WITH THE CONSTRUCTION DOCUMENTS, REGARDLESS OF THE ACTION INDICATED BY THE SHOP DRAWINGS STAMP.
- SUBMIT PROOF OF APPROVAL AND/OR CONFIRMATION OF SATISFACTORY TEST RESULTS TO THE OWNER AND THE ARCHITECT.
- SUBMIT TO THE OWNER'S MAINTENANCE PERSONNEL OPERATION AND MAINTENANCE DATA FOR ALL SYSTEM COMPONENTS, SERVICING REQUIREMENTS, INSPECTION DATA, REPLACEMENT PART NUMBERS AND AVAILABILITY AND CONTACT INFORMATION FOR SERVICE/SUPPLY COMPANY.
- FOR ALL BELOW GRADE PIPING WHERE ACTUAL INSTALLATION DEVIATES FROM CONSTRUCTION DRAWINGS, THE CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS INDICATING BELOW GRADE PIPE LOCATIONS DIMENSIONED TO NEAREST COLUMN LINES.
- RECORD AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE OWNER/TENANT AFTER COMPLETION OF THE WORK SHOWING ANY ALTERATIONS, ADDITIONS AND/OR DELETIONS TO THE SYSTEM(S) INSTALLED.
- SUBSTITUTIONS
 - ALL EQUIPMENT SHALL BE PRODUCTS OF THE SPECIFIED MANUFACTURER OR MANUFACTURERS. ALL BIDS SHALL BE BASED ON THE SPECIFIED MANUFACTURER OR MANUFACTURER'S EQUIPMENT. FOR SUBSTITUTIONS OF OTHER MANUFACTURER'S EQUIPMENT TO BE CONSIDERED, THE SUBSTITUTION MUST BE INDICATED PRIOR TO BIDDING WITH THE REASON FOR THE PROPOSED SUBSTITUTION IDENTIFIED, AND THE PROPOSED CREDIT TO THE OWNER INDICATED. THE ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF ANY PROPOSED SUBSTITUTIONS.
 - THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR COORDINATING THE WORK OF OTHER TRADES WHICH MAY BE AFFECTED BY SUBSTITUTIONS, INCLUDING ALL RELATED COSTS.

1.04 DEFINITIONS

- FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER, COMPLETE WITH RELATED ACCESSORIES.
 - INSTALL: TO ERECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.
 - PROVIDE: TO FURNISH AND INSTALL.
 - PLUMBING CONTRACTOR, THE CONTRACTOR, THIS CONTRACTOR: THE CONTRACTOR FOR PLUMBING WORK WHICH IS SPECIFIED HEREIN AND SHOWN ON THESE DRAWINGS.
 - REFER TO THE 2015 INTERNATIONAL PLUMBING CODE FOR ADDITIONAL DEFINITIONS.
- #### 1.04 DRAWINGS
- THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO ILLUSTRATE THE GENERAL ARRANGEMENT AND ROUTING OF PIPING AND GENERAL LOCATIONS OF EQUIPMENT. PRECISE LOCATIONS OF EQUIPMENT, RISERS AND STACKS, AND ROUTING AND ELEVATION OF ALL PIPING SYSTEMS SHALL BE COORDINATED IN THE FIELD WITH THE ARCHITECT, ARCHITECTURAL DRAWINGS, THE WORK OF OTHER TRADES, EXISTING AND NEW BUILDING CONDITIONS AND/OR THE PREFERENCES OF THE OWNER/TENANT AS CONSTRUCTION PROCEEDS. ALL PIPING SHALL BE INSTALLED CONCEALED IN FINISHED SPACES, UNLESS NOTED OTHERWISE.
 - PROVIDE ALL NECESSARY INCIDENTAL MATERIALS AND ACCESSORIES REQUIRED TO MAKE THE WORK COMPLETE IN ALL RESPECTS, EVEN IF NOT PARTICULARLY SHOWN OR SPECIFIED.
 - REFER TO PLUMBING EQUIPMENT/FIXTURE SCHEDULE ON THE DRAWINGS FOR ALL FIXTURE AND EQUIPMENT SPECIFICATIONS.
 - REFER TO FIXTURE CONNECTION SIZE SCHEDULE FOR ALL FIXTURE ROUGHING SIZE REQUIREMENTS.
 - VERIFY ALL INDICATED CONDITIONS BEFORE STARTING WORK AND REPORT ANY DISCREPANCIES. THE DRAWINGS REFLECT CONDITIONS WHICH CAN BE REASONABLY INTERPRETED FROM THE EXISTING VISIBLE CONDITIONS OR FROM DRAWINGS AND INFORMATION FURNISHED BY THE OWNER.
 - LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.

1.05 PRODUCTS

A. SANITARY AND VENT PIPING:

- ABOVE GRADE/ UNDERGROUND PIPING SHALL BE CAST IRON PIPE WHICH SHOULD COMPLY WITH ASTM A74 STANDARD/CSP1 301.
- SLOPE OF DRAINAGE SYSTEM SHALL BE 1/8" PER FOOT OF RUN FOR PIPE OVER 3" (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER (I.D.).
- PVC OR OTHER COMBUSTIBLE PLASTIC PIPING SHALL NOT BE INSTALLED IN CEILING PLUMBING SPACES.
- ALL CAST IRON SOIL PIPE AND FITTINGS SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE. (CISPI) AND BE LISTED BY NSF INTERNATIONAL.

B. DOMESTIC WATER PIPING:

- ABOVE GRADE WATER PIPING SHALL BE TYPE "L" HARD-DRAWN COPPER TUBE.
 - FITTINGS IN DOMESTIC WATER PIPING SHALL BE COPPER OR COPPER ALLOY.
 - JOINTS SHALL BE MADE WITH LEAD-FREE SOLDER.
 - THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.
 - COMPLY WITH NSF 61 FOR MATERIALS FOR WATER-SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.
 - 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 2015 INTERNATIONAL ENERGY CONSERVATION CODE. REFER BELOW TABLE C403.2.10 FOR MINIMUM PIPE INSULATION THICKNESS.
- | MINIMUM PIPE INSULATION THICKNESS | | | | | | |
|--|----------------------------------|-----------------------------|------------------------------------|-----------|-----------|---------|
| FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F) | INSULATION CONDUCTIVITY | | NOMINAL PIPE OR TUBE SIZE (INCHES) | | | |
| | CONDUCTIVITY BTU.IN./ (H.FT2.°F) | MEAN RATING TEMPERATURE, °F | <1 | 1 to < 1½ | 1½ to < 4 | 4 to >8 |
| 105-140 | 0.21-0.28 | 100 | 1.0 | 1.0 | 1.5 | 1.5 |
| 40-60 | 0.21-0.27 | 75 | 0.5 | 0.5 | 1.0 | 1.0 |
- AS PER 2015 INTERNATIONAL ENERGY CONSERVATION CODE, C404.7 WATER DISTRIBUTION SYSTEM HAVING ONE OR MORE RECIRCULATION PUMPS THAT PUMP WATER FROM A HEATED-WATER SUPPLY PIPE BACK TO THE HEATED-WATER SOURCE THROUGH A COLD-WATER SUPPLY PIPE SHALL BE A DEMAND RECIRCULATION WATER SYSTEM.PUMPS SHALL HAVE CONTROLS THAT COMPLY WITH BOTH OF THE FOLLOWING:
 - THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE,SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE.
 - THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD-WATER PIPING TO 104°F(40°C).
 - HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2015 C404.6.1, 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 FIXTURES |
| ½" | 2' | 43' |
| ¾" | 0.5' | 21' |
| 1" | 0.5' | 13' |
| 1½" | 0.5' | 8' |
| 1½" | 0.5' | 6' |
| 2" OR LARGER | 0.5' | 4' |

- AS PER IECC 2015, C404.6.1, CONTROLS ARE INSTALLED THAT LIMIT OPERATION OF A RECIRCULATION PUMP INSTALLED TO MAINTAIN TEMPERATURE OF A STORAGE TANK. SYSTEM RETURN PIPE IS A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE. AUTOMATIC TIME SWITCHES INSTALLED TO AUTOMATICALLY SWITCH OFF THE RE-CIRCULATING HOT WATER SYSTEM OR HEAT TRACE.

C. ELECTRIC WATER HEATER

- TANK SHALL 119 GALLON CAPACITY AND SHALL HAVE 150 PSI WORKING PRESSURE AND BE EQUIPPED WITH EXTRUDED HIGH DENSITY ANODE.
- ALL INTERNAL SURFACES OF THE HEATER EXPOSED TO WATER SHALL BE GLASS-LINED WITH AN ALKALINE BORO SILICATE COMPOSITION THAT HAS BEEN FUSED-TO-STEEL BY FIRING AT A TEMPERATURE RANGE OF 1400°F TO 1600°F.
- ELECTRIC HEATING ELEMENTS SHALL BE LOW WATT DENSITY GOLDENROD 1" SCREW-IN TYPE.
- EACH ELEMENT SHALL BE CONTROLLED BY AN INDIVIDUALLY MOUNTED THERMOSTAT AND HIGH TEMPERATURE CUT-OFF SWITCH. ALL INTERNAL CIRCUITS SHALL BE FUSED. THE OUTER JACKET SHALL BE OF BAKED ENAMEL FINISH AND SHALL BE PROVIDED WITH FULL SIZE CONTROL COMPARTMENT FOR PERFORMANCE OF SERVICE AND MAINTENANCE THROUGH HINGED FRONT PANEL AND SHALL ENCLOSE THE TANK WITH FOAM INSULATION. ELECTRICAL JUNCTION BOX WITH HEAVY DUTY TERMINAL BLOCK SHALL BE PROVIDED. THE DRAIN VALVE SHALL BE LOCATED IN THE FRONT FOR EASE OF SERVICING.

D. GAS PIPING:

- ALL GAS PIPING WORK SHALL COMPLY WITH INTERNATIONAL FUEL GAS CODE 2015 AND LOCAL UTILITY GAS REQUIREMENTS.
- FURNISH AND INSTALL ALL NECESSARY GAS PIPING TO ALL EQUIPMENT REQUIRING GAS SUPPLY INCLUDING RECONNECTION TO EXISTING ACTIVE GAS BURNING EQUIPMENT
- PROVIDE A LUBRICATED GAS VALVE AT ALL CONNECTIONS TO EQUIPMENT.
- ALL GAS PIPING AND INSTALLATION SHALL BE IN ACCORDANCE WITH RULES AND REGULATIONS OF LOCAL UTILITY GAS COMPANY AND OTHER AUTHORITIES HAVING JURISDICTION.
- PROVIDE ADEQUATE SUPPORT FOR ALL PIPING.
- GAS PIPING SHALL BE STEEL SCHEDULE 40 THREADED PIPE CONFORMING TO ANSI B36.10, 10M, OR ASTM A 106.
- FITTINGS SHALL BE MALLEABLE IRON.
- VALVES SHALL BE NORDSTROM IRON PLUG VALVES FIG. 142.
- PIPING UNDERGROUND BENEATH BUILDING SHALL COMPLY WITH INTERNATIONAL FUEL GAS CODE 2015 EDITION..

E. MIXING VALVES

- VALVE BODY SHALL BE MADE OF CAST BRASS. THE INTERNAL COMPONENTS SHALL BE MADE OF BRASS OR STAINLESS STEEL.
- TYPES A, C & D VALVES: VALVE SHUTS OFF IN FULL COLD POSITION AND MUST PASS THROUGH COLD RANGE BEFORE DELIVERING WARM AND/OR HOT WATER. TEMPERATURE LIMIT SET AT 105°F MAXIMUM DELIVERY TEMPERATURE. IF ONE SUPPLY SHOULD FAIL, THE OTHER WILL AUTOMATICALLY AND INSTANTLY SHUT DOWN. DELIVERY CAPACITY IS 5 GPM @ 45 PSIG DIFFERENTIAL.
- TYPES OF VALVES: TYPE A- THERMOSTATICALLY OPERATED BY MEANS OF BI-METALLIC STRIP, OR EXPANSION BELLOW. TYPE B- SINGLE HANDLE MECHANICAL MIXER, OR INDIVIDUAL HOT AND COLD CONTROL VALVES; TYPE C- PRESSURE BALANCING SHOWER VALVE/PISTON OPERATED MIXING VALVE; TYPE D- BALANCED PRESSURE OPERATION, WITH INTEGRAL DIAL THERMOMETER INDICATING DELIVERED WATER TEMPERATURE.
- EACH ELEMENT SHALL BE CONTROLLED BY AN INDIVIDUALLY MOUNTED THERMOSTAT AND HIGH TEMPERATURE CUT-OFF SWITCH. ALL INTERNAL CIRCUITS SHALL BE FUSED. THE OUTER JACKET SHALL BE OF BAKED ENAMEL FINISH AND SHALL BE PROVIDED WITH FULL SIZE CONTROL COMPARTMENT FOR PERFORMANCE OF SERVICE AND MAINTENANCE THROUGH HINGED FRONT PANEL AND SHALL ENCLOSE THE TANK WITH FOAM INSULATION. ELECTRICAL JUNCTION BOX WITH HEAVY DUTY TERMINAL BLOCK SHALL BE PROVIDED. THE DRAIN VALVE SHALL BE LOCATED IN THE FRONT FOR EASE OF SERVICING.

F. HANGERS AND SUPPORTS:

- HANGERS SHALL BE STANDARD STEEL, MALLEABLE OR WROUGHT IRON, AS MANUFACTURED BY GRINNELL OR APPROVED EQUAL, SUITABLE FOR THE TYPE OF CONSTRUCTION. PIPING SHALL NOT BE HUNG FROM OTHER PIPE.
- SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.
- ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED SUPPORTS..
- SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.

G. VALVES:

- PROVIDE GATE VALVES, BUTTERFLY OR BALL VALVES FOR SHUT-OFF DUTY ON MAIN AND BRANCH SUPPLY LINES. FOR ALL PIPE RUNS 2" AND SMALLER, PROVIDE BALL FOR ALL PIPE RUNS LARGER THAN 2" AND SMALLER THAN 4", PROVIDE GATE VALVES. PIPING 4" AND LARGER, PROVIDE BUTTERFLY VALVES FOR SHUT-OFF DUTY.
- ALL FIXTURES WITH THE EXCEPTION OF FLUSHMETER-EQUIPPED WATER CLOSETS AND URINALS SHALL HAVE STOP VALVES TO CONTROL SUPPLY TO THE FIXTURE, WHERE SUPPLIES ARE EXPOSED PROVIDE CHROME-PLATED STOPS WITH CHROME-PLATED ESCUTCHEON ON PIPING PENETRATIONS.
- ALL PLUMBING FIXTURES AND EQUIPMENT TO HAVE SHUT-OFF VALVES ON SUPPLY LINES.
- ALL BRANCH LINES TO HAVE SHUT-OFF VALVES.
- ALL VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.
- PROVIDE GLOBE VALVES FOR THROTTLING/BALANCING OF THE HOT WATER CIRCULATING SYSTEM.

H. SLEEVES AND ESCUTCHEONS:

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

I. DRAINAGE ACCESSORIES

1. GENERAL:

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

2. DEVICES:

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

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

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

- CLEANOUT WALL PLATE

- IT SHOULD BE ROUND, STAINLESS STEEL OR POLISHED CHROME PLATED BRONZE COVER PLATE WITH STAINLESS STEEL VANDAL RESISTANT FASTENER. THREADED HEIGHT ADJUSTMENT CAST IRON HEAD GAS TIGHT CLEANOUT PLUG, AND CONNECTION TO MATCH PIPING OPTION SELECTED.

- CLEANOUT DECK PLATE

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

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

- PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.

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

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

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

- PROVIDE ANCHOR GUIDES AND EXPANSION JOINTS OR LOOPS IN ALL HOT WATER AND HOT WATER CIRCULATING MAIN SUPPLY PIPING AND SEGMENTS OF SUCH PIPE THAT EXCEED 30'-0" IN LENGTH.

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

- INSTALL VALVES WITH STEMS UPRIGHT OR HORIZONTAL. REMOVE PROTECTIVE COATINGS PRIOR TO INSTALLATION.

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

- ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL BE STEEL SLEEVED AND SEALED WITH 2M BRAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL.

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

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

- ALL PIPING INSTALLED ON THE ROOF SHALL BE SUPPORTED BY "PILLOW BLOCK" PIPE STANDS AS MANUFACTURED BY MIRO INDUSTRIES, OR APPROVED EQUAL. WOOD PIPE SUPPORTS SHALL NOT BE ACCEPTABLE. PROVIDE TRAFFIC/WALK PADS BELOW ALL PIPE STANDS.

- INSTALL SLEEVES FOR ALL PIPES WHICH PASS THROUGH WALLS, FLOORS, AND CEILINGS. WHERE PIPES ARE TO BE INSULATED, THE SLEEVE SHALL BE LARGE ENOUGH TO ACCOMMODATE INSULATION. SLEEVES SHALL BE FLUSH WITH FINISHED SURFACES AT BOTH ENDS. ON FINISHED SURFACES IN EXPOSED AREAS PROVIDE ESCUTCHEONS COMPATIBLE WITH FINISH.

- PROVIDE WATER HAMMER ARRESTORS ON SUPPLY PIPING TO ALL FLUSHMETER VALVES AND QUICK-CLOSING VALVES.

- UNLESS OTHERWISE INDICATED, TRAPS SEALS AT ALL FLOOR DRAINS SHALL BE MAINTAINED BY AN APPROVED TRAP PRIMING DEVICE OR BARRIER TYPE TRAP SEAL PROTECTION DEVICE AS PER CODE APPLICABLE.

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

- MAINTAIN MINIMUM 10'-0" CLEARANCE BETWEEN ALL PLUMBING V.T.R.S AND ALL OUTDOOR AIR VENT EXHAUSTS. PROVIDE TRAP SEALS AT ALL VENTS F AND AS REQUIRED BELOW ROOF TO MAINTAIN SUCH CLEARANCE WHETHER OR NOT SUCH OFFSET IS INDICATED ON THE DRAWINGS. PROVIDE ALL REQUIRED SEISMIC SUPPORTS.

2. INSTALLATION

2.01 GENERAL

- ALL WORK WHICH REQUIRES DISRUPTION OF THE ROOFING SHALL BE DONE BY A CONTRACTOR CERTIFIED BY THE ROOFING MANUFACTURER AS REQUIRED TO MAINTAIN ANY EXISTING ROOF WARRANTIES.
- EXTERIOR INSTALLATIONS TO BE WEATHER PROOF IN ALL RESPECTS.
- EXTERIOR MATERIALS AND EQUIPMENT SHALL BE PAINTED TO PREVENT CORROSION, COLOR PER ARCHITECT.
- COORDINATE THE PLUMBING WORK WITH ALL OTHER AFFECTED WORK AND THE CONSTRUCTION SCHEDULE.
- REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN AND FERROUS END PIPE.
- REMOVE SCALE AND FOREIGN MATERIAL, FROM INSIDE AND OUTSIDE, BEFORE ASSEMBLY.
- PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES AND UNIONS.
- COORDINATION WITH THE WORK OF OTHER TRADES IS REQUIRED. PROVIDE OFFSETS IN PIPING SYSTEMS OR MINOR DEVIATIONS TO THE INDICATED PIPE ROUTING IN ORDER TO COORDINATE THE PLUMBING WORK WITH THE WORK OF ALL OTHER TRADES AND THE GENERAL BUILDING CONDITIONS.
- NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN UNHEATED SPACES.
- PRIOR TO DISCONNECTING AND CONNECTING NEW WORK TO EXISTING SYSTEMS, THE PLUMBING CONTRACTOR SHALL NOTIFY THE PROPERTY MANAGER AND OFFER A PROPOSED SCHEDULE OF WORK. ESB WILL AUTHORIZE CONNECTIONS AND COORDINATE NECESSARY SHUT DOWNS AND DRAIN DOWNS AS REQUIRED. SHUT DOWNS AND DRAIN DOWNS MAY BE PERFORMED BY THE PLUMBING CONTRACTOR ONLY AFTER RECEIVING ESB AUTHORIZATION, AND SHOULD BE PERFORMED UNDER SUPERVISION OF ESB PERSONNEL. THREE (3) DAYS ADVANCE NOTICE TO THE PROPERTY MANAGER IS REQUIRED.

- THE PLUMBING CONTRACTOR IS ADVISED THAT DUE TO THE NATURE OF THE OPERATIONS AND TENANT REQUIREMENTS, CONNECTIONS TO EXISTING SYSTEMS MAY HAVE TO BE MADE WITH REGULAR WORKING HOURS. THE PROPERTY MANAGER WILL ADVISE THE PLUMBING CONTRACTOR OF THE TIME CONSTRAINTS UPON RECEIPT AND APPROVAL OF THE PLUMBING CONTRACTOR'S REQUEST FOR SHUT DOWN AND CONNECTION TO EXISTING SYSTEMS.

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

2.02 ABOVE GRADE

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

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

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

2.03 INSULATION

- COVER ALL HOT WATER AND HOT WATER RE-CIRCULATION PIPE WITH 1/2" THICK FOR PIPE SIZE UP TO 1/2" AND 2" THICK FOR PIPE SIZE GREATER THAN 1/2". INSTALL ALL INSULATION AS PER MANUFACTURERS RECOMMENDATIONS. ALL PIPE INSULATION SHALL COMPLY WITH INTERNATIONAL ENERGY CONSERVATION CODE 2015 EDITION.

3. TESTING

- AT THE COMPLETION OF THE PLUMBING WORK, COMPLETELY TEST THE ENTIRE INSTALLATION OF ALL SYSTEMS FOR PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND LOCAL REQUIREMENTS. CORRECT ALL DEFICIENCIES FOUND.
- TESTING OF THE INSTALLED SYSTEMS SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER.
- THE CONTRACTOR SHALL NOT COVER UP OR PERMANENTLY CONCEAL ANY PORTION OF NEWLY CONSTRUCTED PLUMBING SYSTEM(S) UNTIL SUCH SYSTEM, OR PORTION OF THE SYSTEM, HAS BEEN TESTED IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER AND INSPECTED BY THE LOCAL INSPECTOR AND APPROVED IN WRITING, EXCEPT PIPING PASSING THROUGH FLOORS, WALLS, PARTITIONS, OR BEAMS, FOR DISTANCES EQUAL TO THE THICKNESS OF SUCH FLOOR, WALL, PARTITION OR BEAM.
- THIS CONTRACTOR SHALL NOTIFY THE VARIOUS DEPARTMENTS, BUREAUS AND INDIVIDUALS AT LEAST TWO WEEKS IN ADVANCE OF THE TIME THAT THE TESTS ARE TO BE CONDUCTED.
- ALL DEFECTIVE PARTS SHALL BE REPLACED OR CORRECTED BY THIS CONTRACTOR AND AN EXTRA TEST OR TESTS SHALL BE MADE UNTIL THE OPERATION IS SATISFACTORY, ALL ARRANGEMENTS AND EXPENSES NECESSARY TO CONDUCT ALL TESTS REQUIRED BY THESE SPECIFICATIONS AND THE VARIOUS AGENCIES HAVING JURISDICTION OVER THE WORK INSTALLED UNDER THIS CONTRACT SHALL BE MADE BY THIS CONTRACTOR. NO EXTRA COMPENSATION WILL BE ALLOWED FOR THESE TESTS, THE COST THEREOF BEING INCLUDED IN THE LUMP SUM BID FOR THIS CONTRACT.

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

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

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

- ALL EQUIPMENT WILL BE FACTORY TESTED.

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

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

- TESTING REQUIREMENTS
 - ALL TESTS SHALL BE PERFORMED AS PER IPC 2015 SECTION 312 TESTS AND INSPECTION.
 - TESTS SHALL BE WITNESSED BY THE BUILDING ENGINEER.
- THE PLUMBING CONTRACTOR WILL BE HELD RESPONSIBLE FOR ALL DAMAGE DUE TO TEST FAILURES AND LEAKAGE IN THE TEST AREA AND ADJACENT TENANT OR ESB SPACES.

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

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

4. WARRANTY

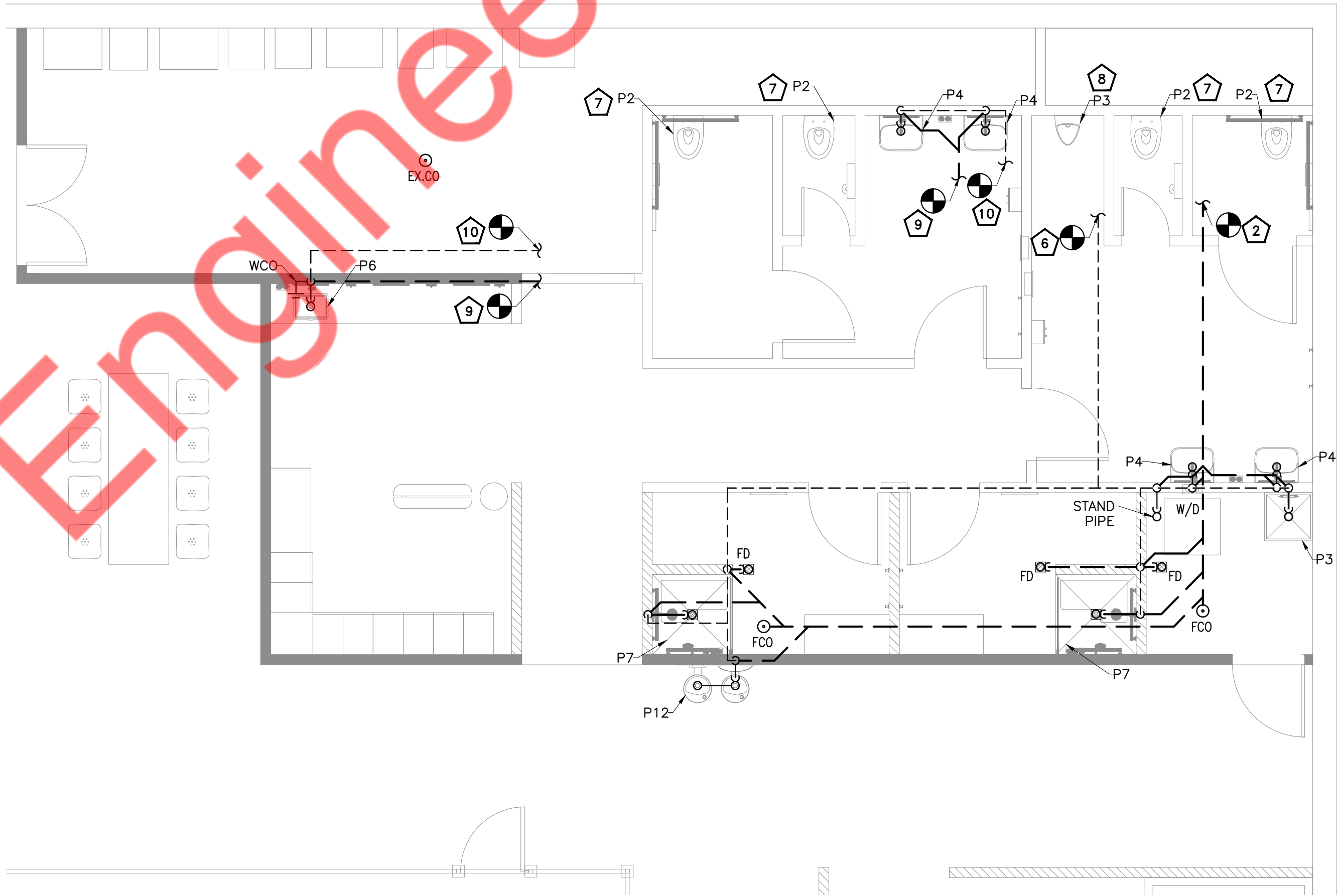


1 PLUMBING FLOOR PLAN
SCALE: 1/8" = 1'-0"

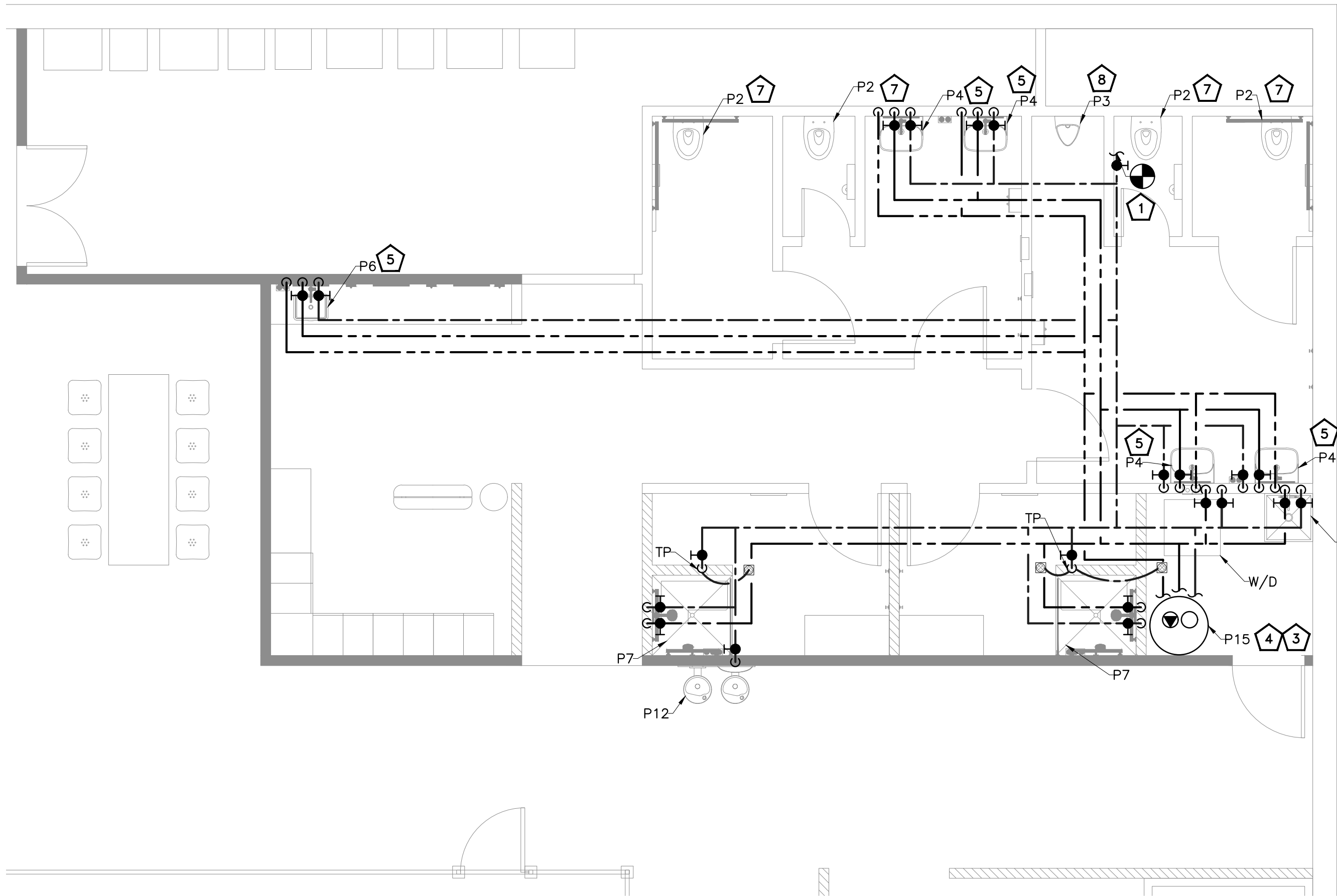
2 3
P-100 P-100

- WATER AND SANITARY PIPING GENERAL NOTES:
1. CW/HW PIPING TO BE PROVIDED WITH INSULATION AS PER INTERNATIONAL ENERGY CODE 2015 (REFER SHEET P-001)
 2. UNLESS OTHERWISE NOTED, SLOPE OF DRAINAGE SYSTEM TO BE 1/8" PER FOOT OF RUN FOR PIPE 3" OR LARGER AND 1/4" PER FOOT FOR PIPE SMALLER THAN 3".
 3. PROVIDE BRANCH PRV IF PRESSURE EXCEEDS 80 PSI.
 4. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
 5. PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
 6. ANY UNUSED PLUMBING PIPING MUST BE COMPLETELY REMOVED OR CAPPED. DO NOT ABANDON IN PLACE.
 7. ANY ROOF PENETRATION SHALL BE PERFORMED BY LANDLORD'S ROOFERS AT LANDLORD OPTION, A BONDED ROOFER APPROVED IN ADVANCE BY LANDLORD.
 8. PROVIDE TRAP PRIMER/ SEAL IN FLOOR DRAIN AS PER LOCAL JURISDICTION.
 9. ALL MATERIAL INDICATED AND IMPLIED ON THESE DRAWINGS SHALL BE NEW UNLESS OTHERWISE NOTED.

- PLUMBING KEYED NOTES:
1. EXTEND AND CONNECT NEW 1" CW PIPING WITH SHUT OFF VALVE TO EXISTING CW LINE IN SPACE. CONTRACTOR TO FIELD VERIFY THE EXACT LOCATION AND SIZE OF THE EXISTING CW LINE. CONTRACTOR TO FIELD VERIFY THE AVAILABILITY OF WATER METER AND BFP, PROVIDE NEW IF NOT EXISTING.
 2. EXTEND AND CONNECT NEW 4" SANITARY PIPE TO EXISTING SANITARY PIPE. CONTRACTOR TO FIELD VERIFY EXISTING SANITARY PIPE SIZE, LOCATION, INVERT AND REROUTE PIPE ACCORDINGLY.
 3. ROUTE CONDENSATE DRAIN FROM PROPOSED WATER HEATER TO THE NEAREST FLOOR DRAIN WITH APPROVED AIR GAP.
 4. PROVIDE NEW WATER HEATER (#P15) WITH RE-CIRCULATION PUMP (RCP-1) THERMOSTATIC MIXING VALVE (TMV-1) THERMAL EXPANSION TANK (ET-1). CONTRACTOR TO INSTALL WATER HEATER AS PER INSTALLATION GUIDELINE. PROVIDE CLEARANCE AS REQUIRED.
 5. PROVIDE ASSE 1070 OR SIMILAR THERMOSTATIC MIXING VALVE AT ALL HAND SINK AND LAVATORIES IF NOT ALREADY PROVIDED WITH THEM. SET AT 110°F MAXIMUM.
 6. CONNECT NEW 3" VENT LINE TO EXISTING VENT LINE. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND SIZE OF EXISTING VENT LINE.
 7. EXISTING WATER CLOSET WITH EXISTING SANITARY, VENT, WATER PIPING AND ACCESSORIES TO REMAIN. CONTRACTOR TO FIELD VERIFY THE CONDITION OF THE EXISTING PIPING AND REPLACE IF REQUIRED.
 8. EXISTING URINAL TO BE REPLACE IN KIND WITH NEW URINAL AT SAME LOCATION. RECONNECT NEW SANITARY, VENT, AND WATER PIPING OF NEW URINAL TO THE EXISTING PIPING. CONTRACTOR TO FIELD VERIFY THE CONDITION OF THE EXISTING PIPING AND REPLACE IF REQUIRED.
 9. EXTEND AND CONNECT NEW 2" SANITARY PIPE TO EXISTING SANITARY PIPE. CONTRACTOR TO FIELD VERIFY EXISTING SANITARY PIPE SIZE, LOCATION, INVERT AND REROUTE PIPE ACCORDINGLY.
 10. CONNECT NEW 2" VENT LINE TO EXISTING VENT LINE. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND SIZE OF EXISTING VENT LINE.



3 ENLARGED PLUMBING SANITARY SUPPLY PLAN
SCALE: 1/4" = 1'-0"



2 ENLARGED PLUMBING WATER SUPPLY PLAN
SCALE: 1/4" = 1'-0"

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PLUMBING FLOOR PLAN

P-100



PLUMBING KEYED NOTES:

1 EXISTING RTU TO REMAIN WITH EXISTING GAS PIPING. CONTRACTOR TO FIELD VERIFY AND ENSURE THE GAS PIPING FOR EXISTING RTU IS IN A GOOD WORKING CONDITION, REPAIR AND REPLACE IF REQUIRED.

2 CONTRACTOR TO MAKE SURE THAT SUFFICIENT GAS PRESSURE SHOULD BE PROVIDED TO GAS ALL RTU'S. PROVIDE PRESSURE REGULATOR IF REQUIRED AT AN ACCESSIBLE LOCATION.

RTU-1(E)

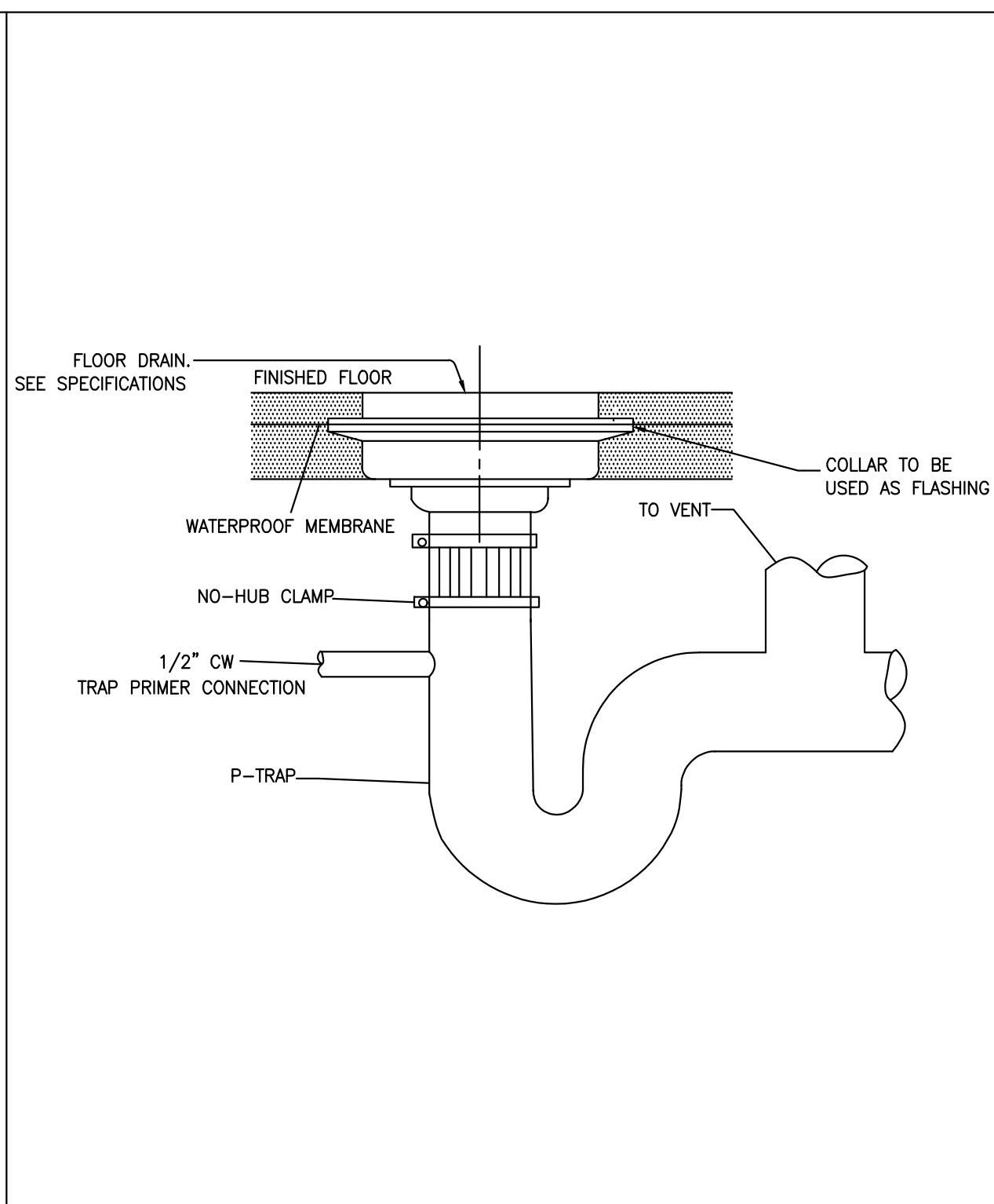
RTU-2(E)

RTU-3(E)

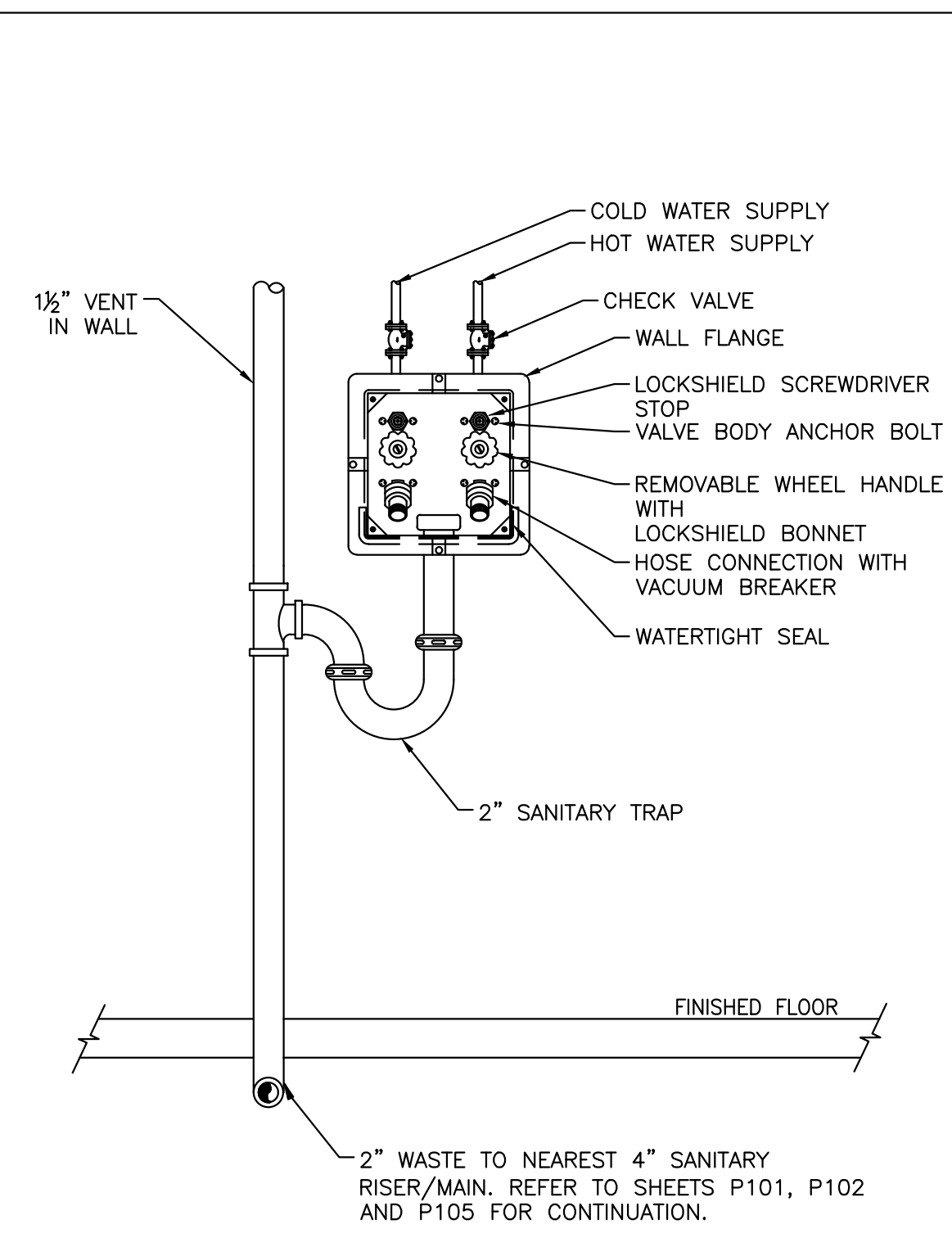
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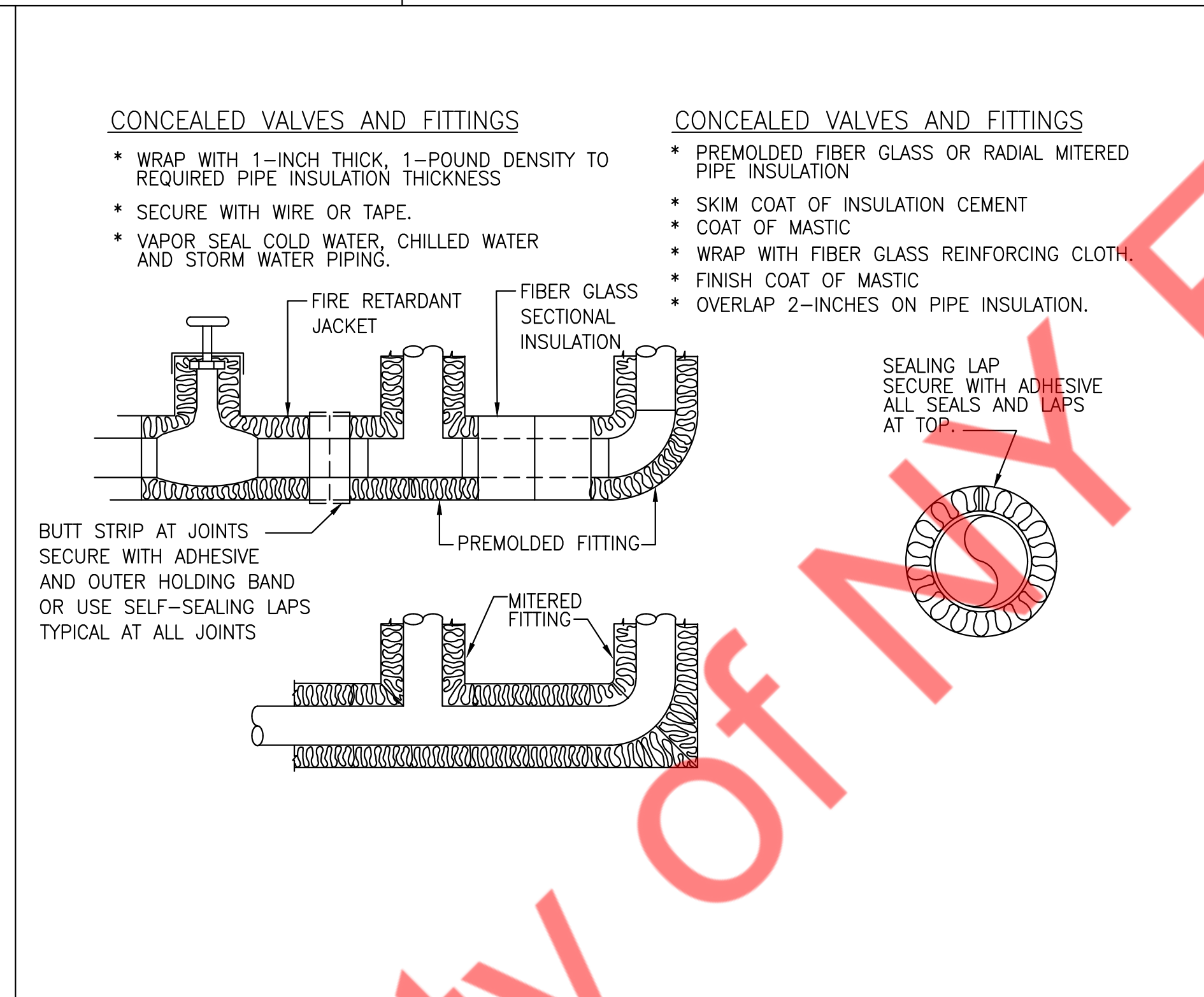
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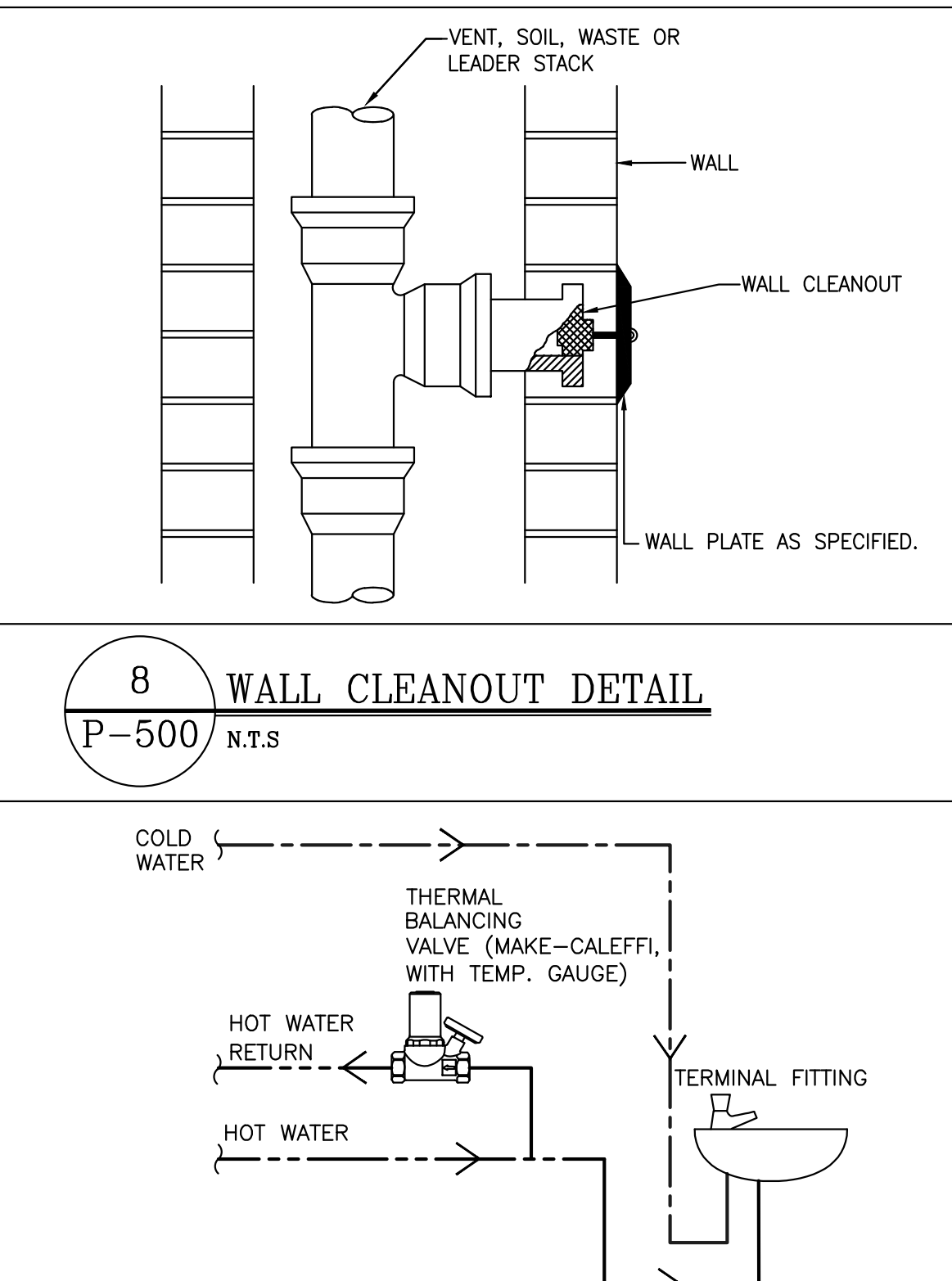
2 FLOOR DRAIN DETAILS
P-500 N.T.S



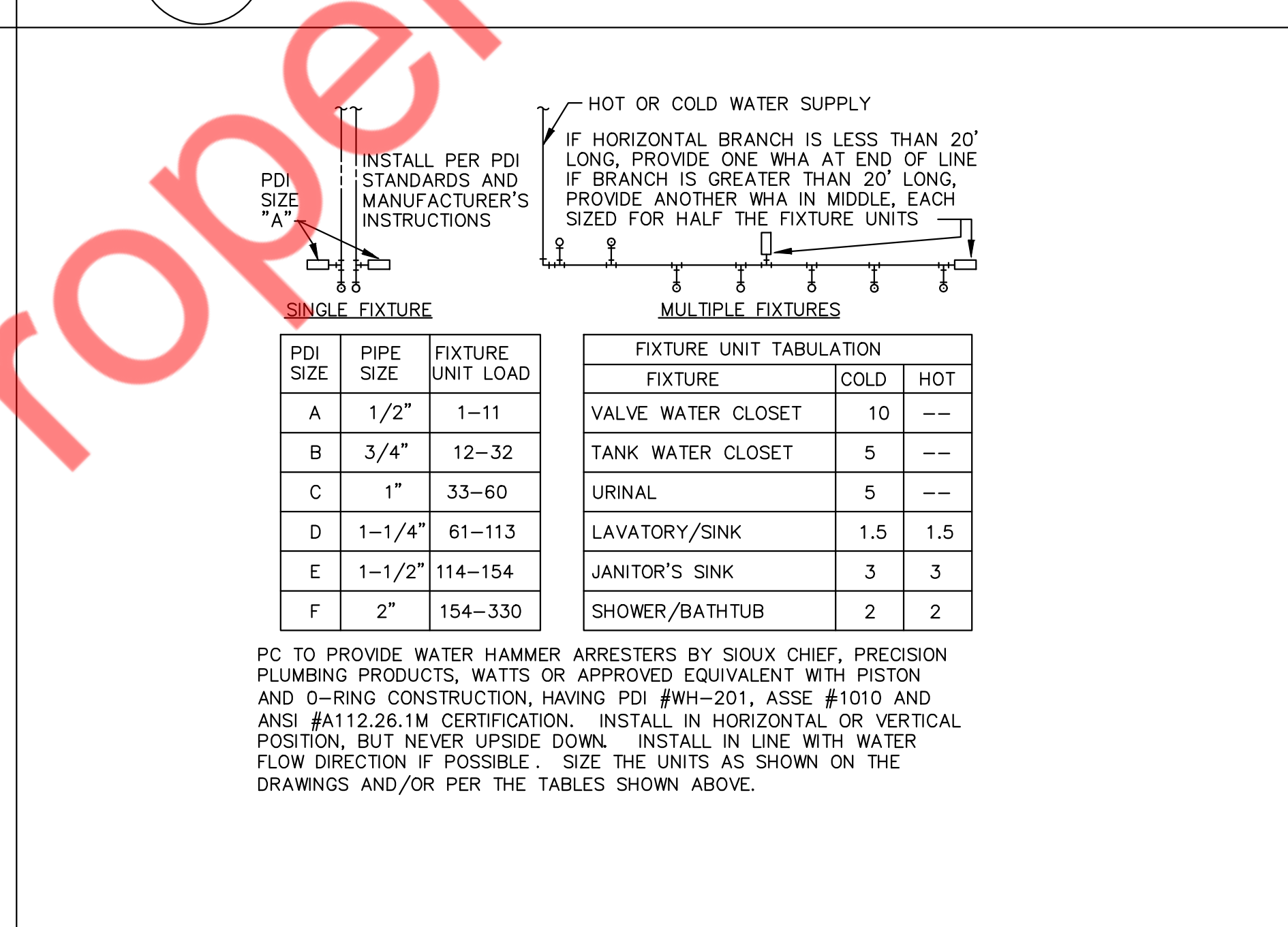
4 WASHER SUPPLY/ DRAIN BOX DETAIL
P-500 N.T.S



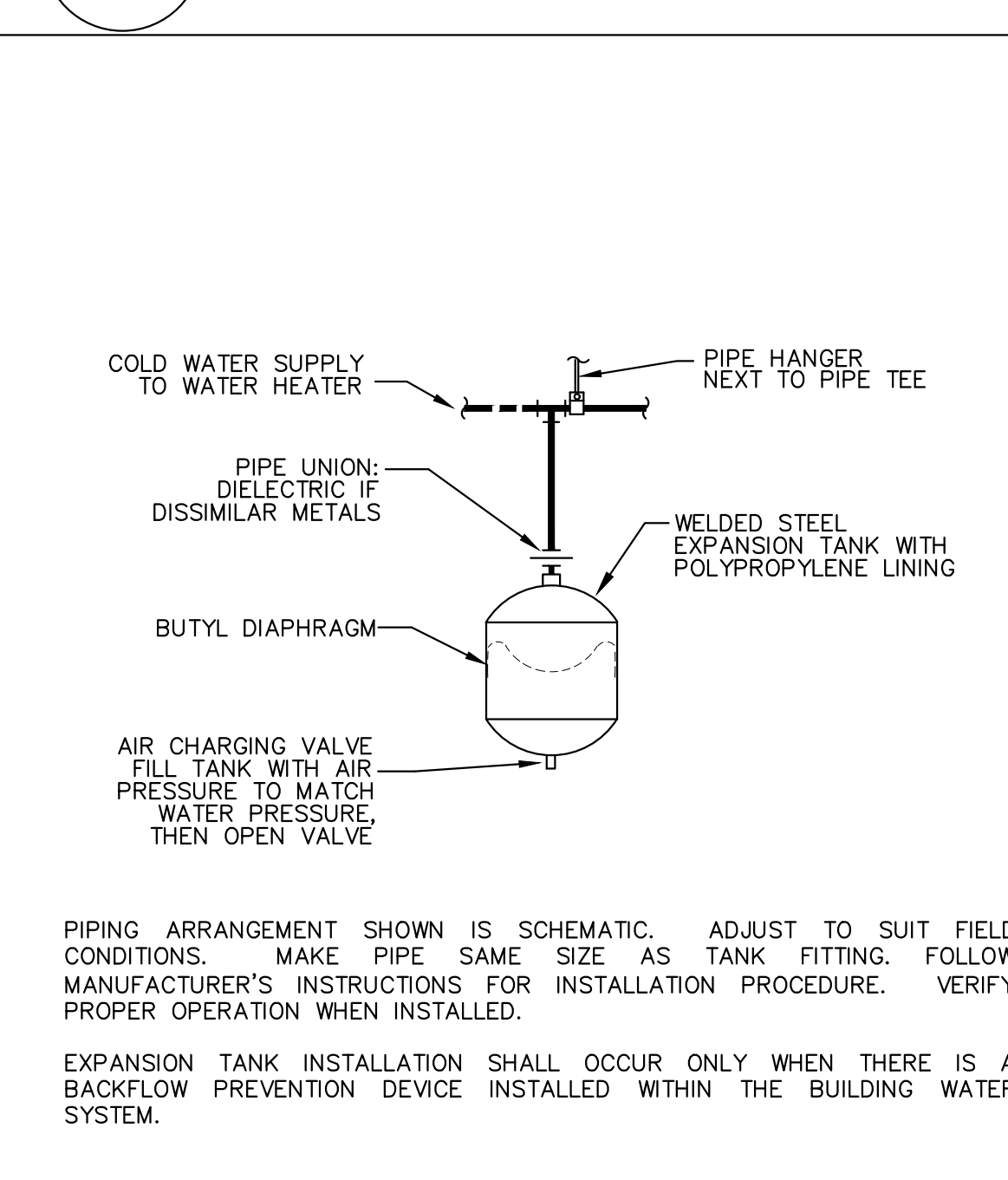
6 P-500 INSULATION OF PIPING, VALVES AND FITTINGSFOR EXPOSED AND CONCEALED LOCATIONS



9
P-500



11 WATER HAMMER ARRESTORS
P-500 N.T.S



| | |
|-------|----------------|
| 13 | EXPANSION TANK |
| P-500 | N.T.S |



P-500

| PLUMBING FIXTURE SCHEDULE | | | | | | | | |
|---------------------------|-----------------------|--------------------------|------------|------|------------|-----------|---------------------------|--------------------|
| LEGEND | PLUMBING FIXTURE | CONNECTION SIZE - INCHES | | | | | | REMARKS |
| | | TRAP | SOIL/WASTE | VENT | COLD WATER | HOT WATER | THERMOSTATIC MIXING VALVE | |
| P2 | EXISTING WATER CLOSET | — | E | E | E | — | — | EXISTING TO REMAIN |
| P3 | EXISTING URINAL | — | 2" | 1½" | ¾" | — | — | FLUSH VALVE |
| P4 | SINK — WALL MOUNT | 1½" | 1½" | 1½" | ½" | ½" | PROVIDE | P—TRAP |
| P5 | SINK — UNDERMOUNT | 1½" | 1½" | 1½" | ½" | ½" | PROVIDE | P—TRAP |
| P7 | SHOWERHEAD | 2" | 2" | 1½" | ¾" | ¾" | PROVIDE | P—TRAP |
| P12 | DRINKING FOUNTAIN | 2" | 2" | 1½" | ½" | — | — | P—TRAP |
| P13 | MOP SINK | 3" | 3" | 2" | ¾" | ¾" | — | P—TRAP |
| TP | TRAP PRIMER | — | — | — | ½" | — | — | — |
| FD | FLOOR DRAIN | 3" | 3" | 2" | — | — | — | P—TRAP |

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

| THERMOSTATIC MIXING VALVE | | | | | | | | | | | |
|---|------------|----------|-----------|----------------|---------------------|--------------------|--------------|----------|------------------|------------------|---|
| ITEM | LOCATION | QUANTITY | SERVICE | CAPACITY (GPM) | PRESSURE DROP (PSI) | MINIMUM FLOW (GPM) | MAKE | CW INLET | HIGH TEMP. INLET | LOW TEMP. OUTLET | REMARKS |
| TMV-1 | REFER PLAN | 1 | HOT WATER | 30 | 5 | 0.1 | ACRON MV17-3 | 1" | 1-1/4" (140°F) | 1" (120°F) | -BRONZE BODY CONSTRUCTION AND LEAD FREE CONSTRUCTION -ASSE CERTIFIED |
| NOTES:1. PROVIDE ABOVE MENTIONED TMV NEAR TO THE WATER HEATER 2. PROVIDE TMV FOR LAVATORY & SHOWERS MODEL NO. MV17-1 | | | | | | | | | | | |

| EXPANSION TANK | | | | | | | | | | | |
|--|----------|-----------------------------|-----------|-------------------|------------------------|-----------------------|-----------------|---------------|------------------------|----------|-------|
| UNIT | QUANTITY | MANUFACTURER & MODEL NUMBER | SERVICE | TANK VOLUME (GAL) | MAX. ACCEPTANCE FACTOR | PRESSURE RATING (PSI) | DIMENSIONS | | OPERATING WEIGHT (LBS) | MOUNTING | NOTES |
| | | | | | | | DIAMETER (INCH) | HEIGHT (INCH) | | | |
| ET-1 | 1 | AMTROL | ST-12C-DD | 6.4 | 0.5 | 150 | 12 | 24 | 26 | NEAR P15 | 1,2 |
| GENERAL NOTES: 1. SET THE TANK PRESSURE TO EQUAL THE SYSTEM OPERATING PRESSURE. TANK MUST BE DRAINED BEFORE ADJUSTING SET PRESSURE. 2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS ON INCOMING COLD WATER LINE. | | | | | | | | | | | |

| DOMESTIC WATER HEATER SCHEDULE (ELECTRIC) | | | | | | | | | | | | | |
|---|--------------|----------|-----------------|----------|-----------------------|----------------------------|-----------------------|------------|-------|-------|----------|--|---|
| TAG No. | LOCATION | QUANTITY | NO. OF ELEMENTS | SERVING | RATED STORAGE GALLONS | RECOVERY CAP. (GPM @ RISE) | TYPE | ELECTRICAL | | | | MANUFACTURER & MODEL NO. | REMARKS |
| | | | | | | | | VOLTS | PHASE | HERTZ | INPUT KW | | |
| P-15 | UTILITY ROOM | 1 | 3 | SEE PLAN | 119 | 77 GPH @ 80°F | ELECTRIC STORAGE TYPE | 208 | 3 | 60 | 15 | A O SMITH DVE-120-15 (ELECTRIC WATER HEATER) | -DIMENSIONS 29.5" DIA X 62.25"H -HEATERS SHALL HAVE 150PSI WORKING PRESSURE. |
| NOTES: 1. PROVIDE NECESSARY ACCESSORIES AS PER THE MANUFACTURE GUIDE LINE | | | | | | | | | | | | | |

| DRAIN ACCESSORIES & SCHEDULE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|----------|-----------------|------|-------|-------|-----------|------------|------------|-----------------|-----------------|------------|------------------|---------------|-----------------|-----------|------------|------------|----------------------------|---------------|-----------------|--------------------|-----------------|--------------|---------------|-----------|------------|----------|------|------------|----------------------------|------------|------------|------------|--------------|--------------------|-------------|
| BODY | | | | | | | | | | | | | | | STRAINER | | | | | | | | | | | | REMARKS | | | | | | | | | |
| DESIGNATION | REQUIRED | SERIES NO. | | | | CAST IRON | GALVANIZED | ALL BRONZE | SECONDARY CLAMP | CLAMPING DEVICE | DECK CLAMP | BACK WATER VALVE | SUMP RECEIVER | FLASHING COLLAR | CAST IRON | GALVANIZED | ALL BRONZE | NICKEL BRONZE (ADJUSTABLE) | CHROME PLATED | SEDIMENT BUCKET | SECONDARY STRAINER | POLISHED FINISH | SATIN FINISH | TRACTOR GRATE | ST. STEEL | FUNNEL TOP | FLAT TOP | DOME | RAISED LIP | EXTENSION (WHERE REQUIRED) | LESS GRATE | BRONZE TOP | IRON GRATE | POLYETHYLENE | SOLID HINGED COVER | LOCATION |
| | | ZURN | WADE | SMITH | JCSAM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FD/AD | • | Z504-C-Y-DG 12" | | | | • | | | | • | | | | | | | | | | • | | | | | | | | | | | | | | | | REFER PLANS |

1. ALL FLOOR DRAINS IN FINISHED AREAS AND ALL ROOF DRAINS SHALL BE LOCATED AS PER THE ARCHITECTURAL DRAWINGS.
2. ALL FLOOR DRAINS IN MECHANICAL EQUIPMENT, ETC., SHALL BE LOCATED IN COORDINATION WITH THE MECHANICAL CONTRACTOR.
3. THE CONTRACTOR SHALL VERIFY THE COMPATIBILITY OF THE DRAINS WITH THE APPROVED ROOFING AND/OR WATER PROOFING SYSTEMS PRIOR TO SUBMITTING SHOP DRAWINGS.
4. THE TOP OF ALL FLOOR DRAINS SHALL BE FLUSH WITH THE ADJACENT FINISHED FLOOR.
5. PROVIDE ELECTRONIC TRAP PRIMER FOR BIKE ROOM/TRASH COMP. ROOM/MECH. ROOM FLOOR DRAINS.
PROVIDE FLOW CONTROL TRAP PRIMER FOR BATHROOM/WATER METER ROOM FLOOR DRAINS.

| PUMP SCHEDULE | | | | | | | | | | | | | | |
|---------------|-----|---------------------|----------------|------------------|-------------------------|------------------------|------------------------|-----------------|-----------------|----------|------|----------|-----------------------------|---|
| TAG | QTY | SERVICE | LOCATION | PERFORMANCE DATA | | | PUMP CONSTRUCTION DATA | | MOTOR DATA | | | | MFR MODEL | REMARKS |
| | | | | GPM PER PUMP | TDH PER PUMP (FT) | WATER TEMP. (°F) | PUMP TYPE | MHP PER PUMP | STARTER TYPE | V/PH/HZ | RPM | ROTATION | | |
| RCP-1 | 1 | HWR CIRC. SYSTEM | REFER PLANS | 2 | 10 | 120 | INLINE,NORYL | 39 WATTS | AQUA STAT | 115/1/60 | 2800 | PER MFG | BELL & GOSSETT NBF 8S/LW | -INLINE ON HW RETURN LINE AT WATER HEATER NEMA 1 RATED MOTOR -PUMP SHOULD BE LEAD FREE |

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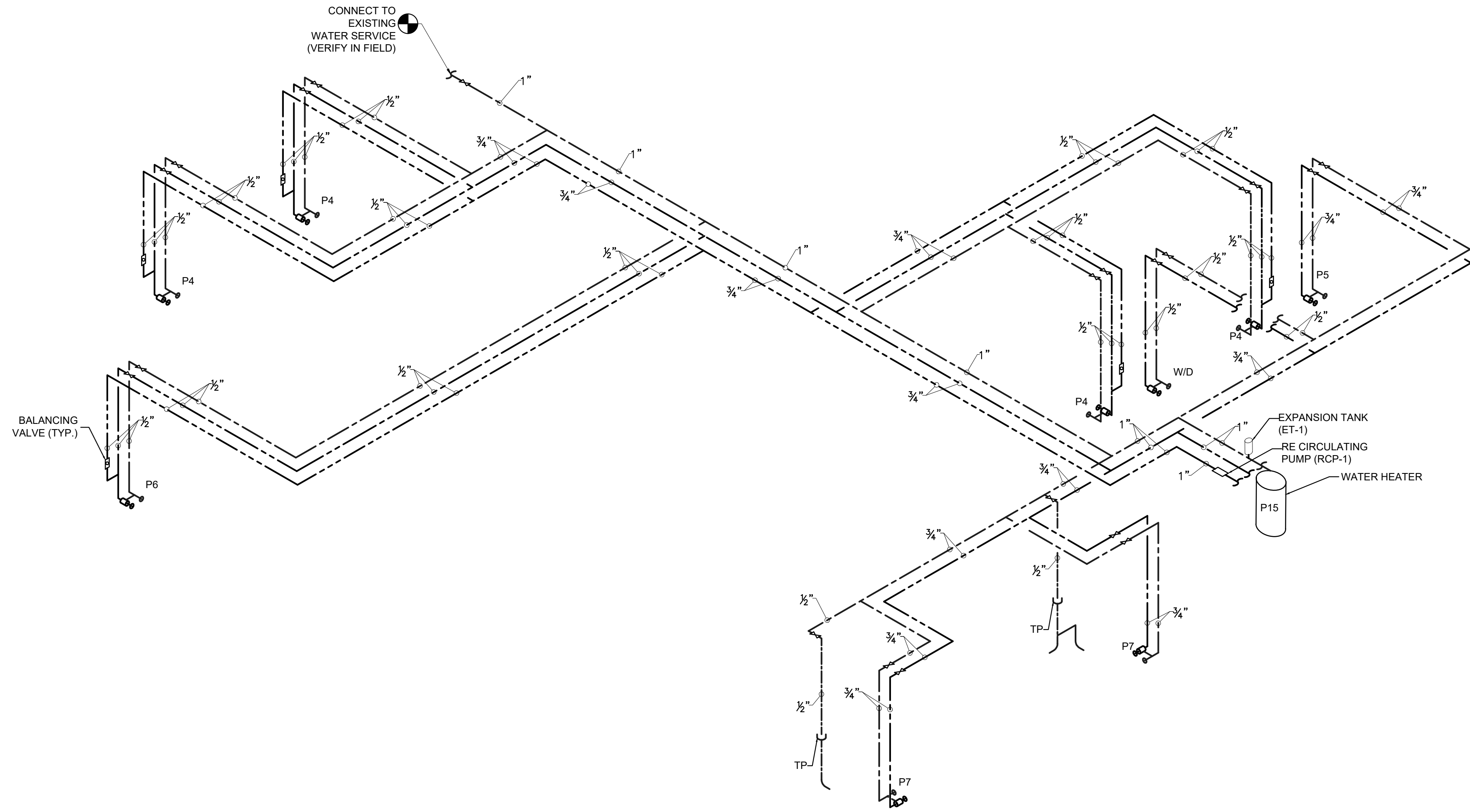


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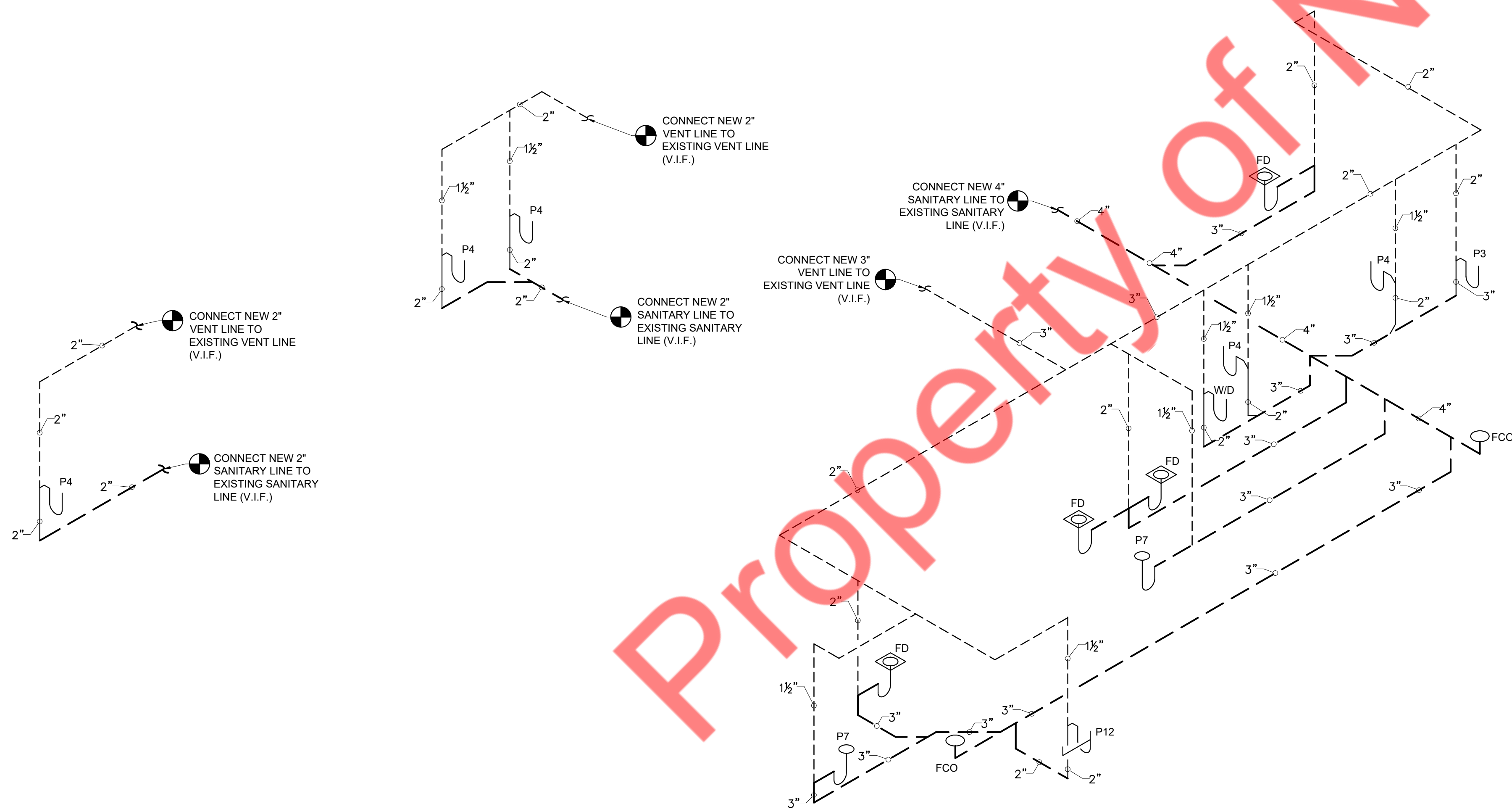
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PLUMBING
SCHEDULES

P-600



1 PLUMBING WATER SUPPLY RISER DIAGRAM
SCALE: NTS



2 PLUMBING SANITARY RISER DIAGRAM
SCALE: NTS

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PLUMBING RISER
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