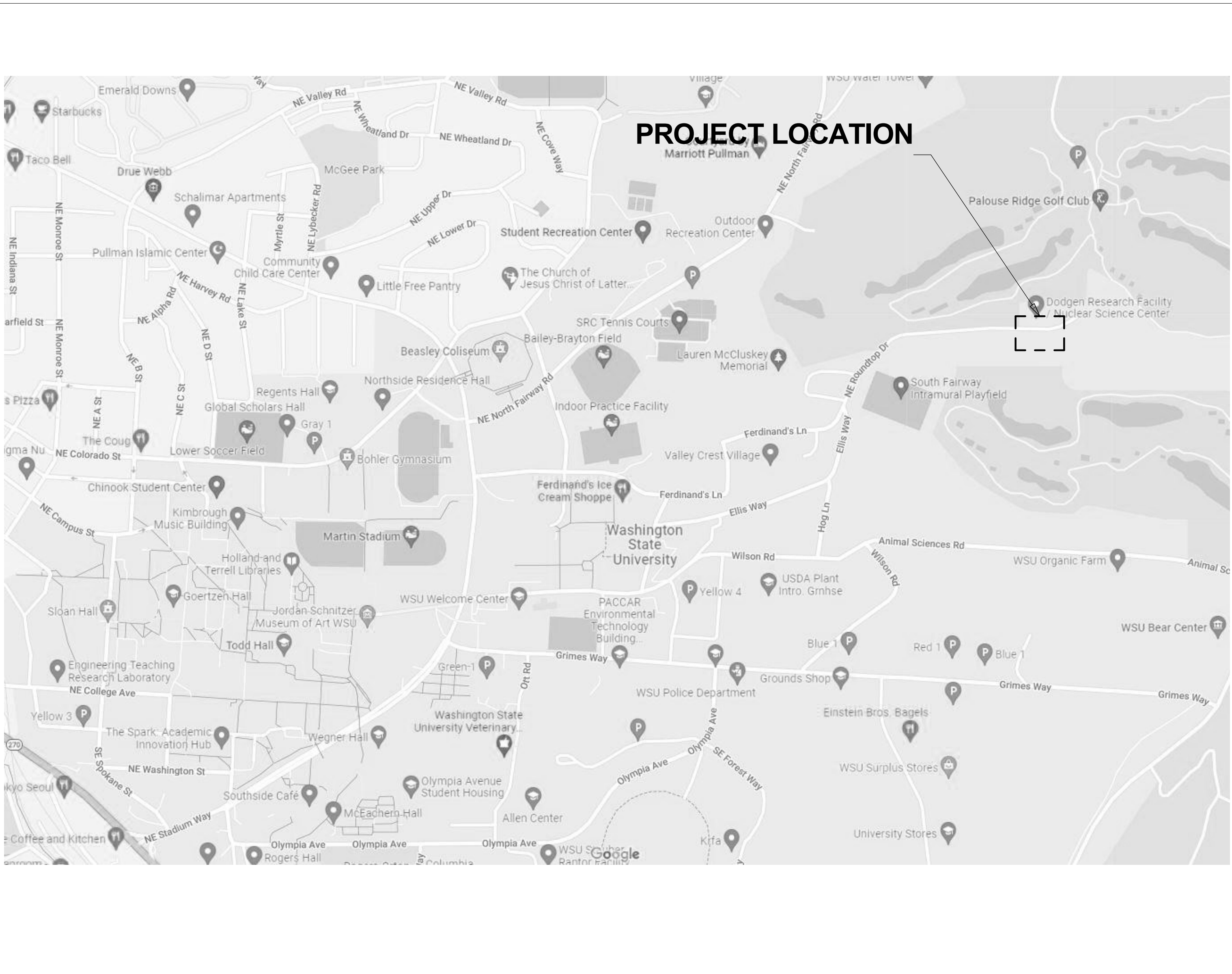


RE-BID - DODGEN RESEARCH FACILITY

NUCLEAR SCIENCE CENTER HVAC RENEWAL

PROJECT 1687-2022

Washington State University



PROJECT LOCATION MAP

SCALE: N.T.S.

GENERAL NOTES

- NOTE THAT THIS IS A SECURE FACILITY AND THAT IT IS GOVERNED AND MANAGED UNDER STRICT REGULATIONS. WASHINGTON STATE UNIVERSITY FACILITIES SERVICES AND THE NUCLEAR SCIENCE CENTER DEPARTMENT WILL PROVIDE ACCESS IN REFERENCE TO THE REQUIRED SYSTEM AND EQUIPMENT REPLACEMENT TO FACILITATE A REVISED DESIGN OF THE POOL ROOM HVAC, CONTROL AND ANNUNCIATOR SYSTEMS. ACCESS WILL BE LIMITED TO THOSE AREAS AND WILL BE SUPERVISED BASED UPON GUIDANCE BY THE NUCLEAR SCIENCE CENTER DEPARTMENT.
- THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO EXECUTING ANY WORK AND SHALL NOTIFY THE DEPARTMENT OF FACILITIES OPERATIONS IN WRITING OF ANYTHING DIFFERING FROM THAT SHOWN ON THE DRAWINGS. FAILURE TO DO SO WILL CONSTITUTE THE CONTRACTOR'S ACCEPTANCE OF THE WORK AS SHOWN.
- COMPLY WITH ALL CODES, ORDINANCES AND REQUIREMENTS.
- DO NOT SCALE DRAWINGS; WRITTEN DIMENSIONS PREVAIL.
- THE CONTRACTOR SHALL OBTAIN ALL PERMITS REQUIRED PRIOR TO ANY PHASE OF CONSTRUCTION. FEES AND ANY RELATED COSTS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
- EXISTING BUILDINGS, UTILITIES, ETC. OR PORTIONS THEREOF, WHICH ARE DAMAGED BY CONSTRUCTION OPERATIONS SHALL BE REPAIRED OR REPLACED TO THEIR ORIGINAL CONDITION, UNLESS OTHERWISE NOTED TO BE REMODELED PER THE CONTRACT DOCUMENTS.
- EXACT LOCATIONS OF EXISTING UTILITIES ARE TO BE VERIFIED BY THE CONTRACTOR.
- THE DUTIES OF THE OWNER/WASHINGTON STATE UNIVERSITY, ITS ENGINEER, AND ITS DESIGNATED CONSULTING ENGINEER DOES NOT INCLUDE DESIGN AND CONSTRUCTION REVIEW SERVICES RELATING TO THE CONTRACTORS SAFETY PRECAUTIONS OR TO THE MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES REQUIRED FOR THE CONTRACTOR TO PERFORM HIS WORK.
- SEE THE PROJECT CONTACTS LIST. ADDITIONALLY THE WSU FACILITIES, LIFE AND SAFETY SHOP MAY BE CONTACTED AT (509) 335-9000 AS NEEDED DURING THE CONSTRUCTION PHASE.
- THE PLANS ARE DIAGRAMMATIC AND DO NOT ATTEMPT TO SHOW ALL DETAILS OF CONSTRUCTION.
- THE CONTRACTOR SHALL THOROUGHLY EXAMINE THE PROJECT SITE TO BECOME FAMILIAR WITH THE EXISTING CONDITIONS, CONNECTION POINTS, ACCESS LIMITATIONS, AND OVERALL CONDITION OF THE EXISTING SYSTEMS PRIOR TO COMMENCEMENT OF WORK.
- CONTRACTOR SHALL COORDINATE AND COMMUNICATE THEIR WORK WITH THE OCCUPANTS AND WSU PROJECT MANAGER WITH REGARD TO SCHEDULE
- COORDINATE SHUT DOWN OF UTILITIES WITH THE OWNER A MINIMUM OF 14 DAYS IN ADVANCE.
- ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES AND STANDARDS.
- ALL MATERIALS REMOVED DURING DEMOLITION SHALL BE SALVAGED TO SURPLUS OR PROPERLY DISPOSED UNLESS OTHERWISE NOTED.
- COORDINATE WITH SPECIFICATIONS. IN CASE OF CONFLICT BETWEEN SPECIFICATIONS AND DRAWINGS THE MORE STRINGENT SHALL APPLY.

INDEX of DRAWINGS

| SHEET # | SHEET TITLE |
|---------|---|
| T-001 | PROJECT COVER SHEET |
| M-001 | LEGENDS, ABBREVIATIONS, GENERAL NOTES AND MECH. SPECS |
| M-002 | MECHANICAL EQUIPMENT SCHEDULES |
| M-101 | GROUND LEVEL - HVAC - DEMO |
| M-102 | PENTHOUSE LEVEL- HVAC - DEMO |
| M-103 | PENTHOUSE LEVEL - PIPING - DEMO |
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| M-202 | PENTHOUSE LEVEL - HVAC - NEW |
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| M-301 | MECHANICAL SECTIONS |
| M-401 | MECHANICAL DETAILS |
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| E-001 | LEGENDS, ABBREVIATIONS, GENERAL NOTES |
| E-101 | PENTHOUSE LEVEL - POWER - DEMO |
| E-201 | BASEMENT & GROUND LEVEL - POWER - NEW |
| E-202 | 2ND FLOOR LEVEL - POWER - NEW |
| E-203 | PENTHOUSE LEVEL - POWER - NEW |
| E-204 | ROOF PLAN - POWER - NEW |
| E-401 | ELECTRICAL ONE-LINE AND DETAILS |
| E-402 | ELECTRICAL SCHEDULES AND DETAILS |
| E-601 | CONTROL SCHEMATIC - RELAY PANEL 'RP-1' |
| E-602 | CONTROL SCHEMATIC - CONSOLE GRAPHIC |
| E-603 | SEQUENCE OF OPERATION AND 'CP-1' SCHEMATIC |

PROJECT CONTACTS

| | |
|--|--|
| WSU FACILITIES SERVICES PHIL JOHNSON 509-335-9029 PHILRJOHNSON@WSU.EDU | WSU EH&S SHAWN RINGO 509-335-6251 SRINGO@WSU.EDU |
| DODGEN FACILITY COREY HINES 509-335-8317 CCHINES@WSU.EDU | MSI ENGINEERS AARON DONNELLY, PE MECHANICAL 509-624-1050 AARON@MSI-ENGINEERS.COM |
| | BEN JENNINGS, PE ELECTRICAL 509-624-1050 BEN@MSI-ENGINEERS.COM |

BUILDING INFORMATION

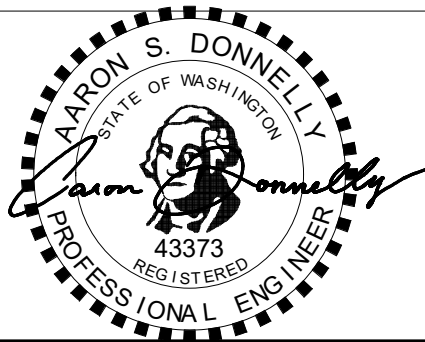
| | |
|--|--|
| ADDRESS 2480 NE ROUNDTOP, PULLMAN, WA | APPLICABLE BUILDING CODES: 2018 INTERNATIONAL BUILDING CODE 2018 NATIONAL ELECTRICAL CODE 2018 WASHINGTON STATE ENERGY CODE 2018 INTERNATIONAL EXISTING BUILDING CODE 2018 INTERNATIONAL MECHANICAL CODE 2018 UNIFORM PLUMBING CODE |
| CODE SUMMARY CONSTRUCTION TYPE: II-B OCCUPANCY GROUP: B - RESEARCH FULLY SPRINKLED: NO | |

DESIGN FIRM:



CONSULTANTS:

PROVISIONAL STAMP:



Facilities Services PH 509-335-5571
2425 E. Grimes Way FAX 509-335-9304
Pullman, Wa. 99164-1150

RE-BID - DODGEN
RESEARCH FACILITY
(0074)

NUCLEAR SCIENCE CENTER HVAC
RENEWAL

1687-2022

| MARK | DATE | DESCRIPTION |
|------|--------|-------------|
| | 8/1/23 | RE-BID SET |

CAD DWG FILE:

DESIGNED BY: ASD

DRAWN BY: RID

PROJECT No. 1687-2022

COPYRIGHT: WASHINGTON STATE UNIVERSITY

SHEET TITLE

PROJECT TITLE SHEET

T-001

SHEET

OF

SHEETS

U

D

C

B

A

| HVAC CLIMATE DESIGN CRITERIA | | |
|---|--|------------|
| PROJECT LOCATION | PULLMAN, WA | |
| ASHRAE WEATHER DATA | PULLMAN, WA | SEE NOTE 1 |
| DESIGN ALTITUDE | 2,365 FT | |
| CLIMATE ZONE | 5B | SEE NOTE 2 |
| OUTDOOR DESIGN TEMPS: | HEATING: 4°F DB COOLING: 92°F DB/65°F WB | SEE NOTE 3 |
| INDOOR DESIGN TEMPS: | HEATING: 72°F DB COOLING: 75°F DB/67°F WB | SEE NOTE 4 |
| NOTES: 1. CLIMATE DATA PROVIDED BY ASHRAE. 2. PER 2018 WSEC, TABLE C301.1. 3. OUTDOOR DESIGN TEMPS PER 2018 WSEC, C302.2 APPDX C. 4. INDOOR DESIGN TEMPS PER 2018 WSEC, C302.1. | | |

| GENERAL NOTES | |
|---------------|---|
| 1. | THE MECHANICAL SYSTEMS SHALL CONSIST OF ALL WORK SHOWN ON THE MECHANICAL DRAWINGS, DIAGRAMS AND AS DESCRIBED IN ASSOCIATED TECHNICAL SPECIFICATIONS. |
| 2. | REFER TO SPECIFICATIONS AND ALL OTHER DIVISION DOCUMENTS FOR ADDITIONAL REQUIREMENTS. COORDINATE WORK SHOWN ON THE DRAWINGS WITH THE SPECIFICATIONS. IN CASE OF DISCREPANCY BETWEEN SPECIFICATIONS AND DRAWINGS REFER TO THE GENERAL CONDITIONS AND NOTIFY THE A/E FOR DIRECTION. |
| 3. | MECHANICAL CONTRACTOR SHALL COORDINATE WORK WITH ALL OTHER TRADES. |
| 4. | MECHANICAL CONTRACTOR SHALL ARRANGE ALL INSPECTIONS AND PAY ALL FEES. SUBMIT COPIES OF INSPECTIONS TO OWNER. |
| 5. | MODEL NUMBERS OF EQUIPMENT SHOWN ON THE SCHEDULES AND THROUGHOUT THE DRAWINGS AND SPECIFICATIONS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MFR/MODEL ALONE. REVIEW THE COMPLETE DESCRIPTION, LOCATION AND ARRANGEMENT ON THE DRAWINGS, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL, CONFIGURATION AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS OF DESIGN. |
| 6. | WHEN & WHERE APPLICABLE, THE NEW MECHANICAL EQUIPMENT MAY NOT BE USED FOR TEMPORARY VENTILATION, HEATING, COOLING OR SERVICE UNLESS SPECIFICALLY NOTED OTHERWISE FOR PHASED CONSTRUCTION OR OCCUPANCY. |

| LOCATIONS & COORDINATION | |
|--------------------------|---|
| 1. | THE MECHANICAL PLANS ARE DIAGRAMMATIC IN NATURE AND DO NOT ATTEMPT TO SHOW ALL REQUIRED OFFSETS AND FITTINGS. PROVIDE ALL NECESSARY OFFSETS, TRANSITIONS AND FITTINGS REQUIRED FOR A COMPLETE SYSTEM. |
| 2. | INSTALL ALL MECHANICAL WORK AS HIGH AS POSSIBLE, TIGHT TO STRUCTURE ABOVE, UNLESS NOTED OTHERWISE. |
| 3. | COORDINATE ALL EXPOSED MECHANICAL SYSTEMS, PIPING AND DUCTWORK SO THAT LOCATIONS AND ROUTING ARE INTEGRATED WITH THE OTHER BUILDING ELEMENTS (WALLS, ROOFS, JOISTS, LIGHTS, ETC.). GENERALLY RUN SYSTEMS PARALLEL OR PERPENDICULAR TO BUILDING ELEMENTS AND RUN IN A MANNER TO CONCEAL OR BLEND WITH BUILDING LINES. |
| 4. | PROVIDE NEC CODE MINIMUM HORIZONTAL AND VERTICAL WORKING CLEARANCES FOR ALL ELECTRICAL PANELS AND EQUIPMENT. OFFSET MECHANICAL WORK AS REQUIRED. |
| 5. | COORDINATE ALL MECHANICAL WORK WITH THAT OF OTHER TRADES TO ENSURE PROPER INTERFACE, ADEQUATE CLEARANCES, AND TO AVOID CONFLICTS. PROVIDE FIELD COORDINATION AND/OR DRAWINGS PRIOR TO FABRICATION AND/OR INSTALLATION. CONFLICTS AND INTERFERENCES THAT COULD HAVE BEEN AVOIDED BY PROPER PRE-PLANNING AND COORDINATION SHALL BE REMOVED AND CORRECTED AT NO COST TO THE OWNER. |
| 6. | FIELD LOCATE ALL ROOF, FLOOR AND WALL PENETRATIONS AND ADJUST TO AVOID CONFLICT WITH STRUCTURAL ELEMENTS, BEAMS, CROSS-BRACING, ARCHITECTURAL ELEMENTS. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR LOCATING AND COORDINATING ALL SAW CUTTING AND DRILLING REQUIRED FOR MECHANICAL SYSTEM OPENINGS. |

| SYSTEMS SUPPORTS & BASES | |
|--------------------------|---|
| 1. | HANGERS, SUPPORTS AND ANCHORS FOR MECHANICAL SYSTEMS AND EQUIPMENT ARE NOT NECESSARILY DESIGNED OR SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY SUPPORT MEMBERS, HANGERS, BRACKETS, HARDWARE, CLEVIS HANGERS, RODS, ETC. TO SECURELY HANG, BRACE AND SUPPORT MECHANICAL SYSTEMS, DUCTWORK, PIPING, EQUIPMENT AND OTHER DEVICES. ANCHOR SUPPORTS TO BUILDING STRUCTURE OR OTHER APPROPRIATE BUILDING ELEMENTS. SEE TYPICAL MECHANICAL DETAILS, ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR ADDITIONAL INFORMATION, LIMITATIONS AND DETAILS. |
| 2. | DO NOT ANCHOR TO OR SUSPEND MECHANICAL SYSTEMS DIRECTLY OFF OF BARE METAL ROOF DECKING. |
| 3. | ROOF CURBS: ROOF CURBS SHALL BE MOUNTED PLUMB AND LEVEL ON PITCHED ROOFS. PROVIDE FACTORY CURBS WITH CORRECT SLOPE OR PROVIDE FIELD INSTALLED BLOCKING AND SHIMS BELOW CURB. ALL WOOD PRODUCTS SHALL BE PRESSURE TREATED LUMBER. |

| MECHANICAL & ELECTRICAL COORDINATION | |
|--------------------------------------|--|
| 1. | COORDINATION BETWEEN MECHANICAL AND ELECTRICAL SCOPE IS PARTICULARLY CRITICAL ON THIS PROJECT. UNLESS OTHERWISE NOTED, ITEMS SHOWN ON THE MECHANICAL DRAWINGS ARE INTENDED TO BE PROVIDED BY THE DIVISION 23 CONTRACTOR. |
| 2. | INFORMATION LISTED SCHEDULES IS BASED ON THE EQUIPMENT AS SELECTED BY THE ENGINEER DURING THE DESIGN. THE ACTUAL EQUIPMENT SELECTED BY THE CONTRACTOR MAY BE DIFFERENT AND HAVE DIFFERING ELECTRICAL CHARACTERISTICS. PRIOR TO ROUGH-IN OR ORDERING EQUIPMENT, COORDINATE WITH THE ELECTRICAL CONTRACTOR TO ESTABLISH ACTUAL ELECTRICAL CHARACTERISTICS, ELECTRICAL LOAD, VOLTAGE, OVERCURRENT PROTECTION REQUIREMENTS FOR EACH PIECE OF EQUIPMENT, TO ASSURE PROPER ELECTRICAL CONNECTIONS AND SERVICES ARE PROVIDED. |
| 3. | COORDINATE THE EXACT LOCATION OF ALL ROOM THERMOSTATS AND/OR ROOM TEMPERATURE/CO2 SENSORS WITH ELECTRICAL PLANS & ROOM ELEVATIONS. PRIOR TO INSTALLATION, SO AS TO AVOID CONFLICT WITH CASEWORK, MARKER BOARDS, WALL SWITCHES, ETC. |
| 4. | COORDINATE THE FURNISHING AND INSTALLATION OF ALL ELECTRICAL DISCONNECT SWITCHES, STARTERS, VFDS, ETC., IN ORDER TO ASSURE THAT ALL ENERGIZED MECHANICAL IS PROVIDED WITH THE REQUIRED CIRCUIT PROTECTION METHODS AND CONTROL DEVICES. WHERE DRAWINGS NOTES, SCHEDULES AND EQUIPMENT SPECIFICATIONS ARE SILENT OR UNCLEAR AS TO WHICH DIVISION (22-PLBG, 23-HVAC, OR 26-ELECTRICAL) IS TO PROVIDE THESE DEVICES, THE CONTRACTOR SHALL CONTACT THE ENGINEER, PRIOR TO BID, FOR DIRECTION. |

| DUCTWORK & AIR DISTRIBUTION | |
|-----------------------------|--|
| 1. | ALL DUCTWORK SIZES SHOWN ARE OUTSIDE DIMENSIONS, UNLESS SPECIFICALLY NOTED ON PLANS. DUCT LINER HAS BEEN ACCOUNTED FOR ON LINED DUCT. ADDITIONAL CLEARANCE WILL NEED TO BE ACCOUNTED FOR FOR EXTERNALLY INSULATED DUCT. |
| 2. | PROVIDE 1" THICK DUCT LINER WHERE LINER IS INDICATED. |
| 3. | TURNING VANES: ALL RECTANGULAR DUCT ELBOWS SHALL BE PROVIDED WITH TURNING VANES, WHETHER OR NOT SPECIFICALLY SHOWN ON THE DUCTWORK DRAWING PLANS AND SECTIONS. |
| 4. | RADIUS ELBOWS (NO VANES): UTILIZE RADIUS ELBOWS ON ALL MATERIAL HANDLING TYPE DUCTWORK, KITCHEN HOOD EXHAUST DUCTS (BOTH TYPE I & II), LOCKER ROOM (LINT) EXHAUST, PATIENT ROOM (LINT) EXHAUST, AND ELSEWHERE AS INDICATED. CONTRACTOR'S OPTION TO UTILIZE RADIUS ELBOWS (WHERE SPACE ALLOWS) IN LIEU OF RECTANGULAR VANED ELBOWS. |
| 5. | PROVIDE TRANSITIONS AS REQUIRED TO TO CONNECT DUCTWORK TO TERMINAL UNITS, FANS, AIR HANDLERS CONNECTIONS, ETC. |
| 6. | PROVIDE FLEXIBLE DUCT FITTINGS ON CONNECTIONS TO ALL ENERGIZED AIR MOVING EQUIPMENT (FANS, AIR HANDLERS, ETC.). |

| PIPING & HYDRONICS | |
|--------------------|---|
| 1. | PLENUMS: PIPES AND WIRING IN PLENUMS SHALL BE RATED FOR PLENUM USE. PVC, ABS, PLASTIC PIPING IS NOT ACCEPTABLE IN PLENUM APPLICATIONS UNLESS INSULATED AND WRAPPED IN APPROVED FIRE RATED JACKETING. |
| 2. | SMALL PIPING OR COMPONENTS: PIPING PLANS DO NOT NECESSARILY SHOW ALL SMALL PIPING OR COMPONENTS. INSTRUMENT TAPS OR DRAINS. PROVIDE ALL PIPING, VALVES, SPECIALTY ITEMS, INSTRUMENTATION, ETC. AS INDICATED ON THE PIPING FLOW DIAGRAMS, PIPING/EQUIPMENT DETAILS. |
| 3. | SIZES FOR SUPPLY AND RETURN PIPING CONNECTIONS TO EQUIPMENT, COILS, ETC. SHALL EQUAL TO THE FULL BRANCH RUN-OUT SIZES INDICATED ON THE DRAWINGS. PROVIDE REDUCERS AT EQUIPMENT CONNECTIONS AND BEFORE AND AFTER CONTROL VALVES, BALANCE VALVES, ETC. WHEN NECESSARY. ALL NEAR-COIL/EQUIPMENT PIPING SHALL BE FULL BRANCH LINE SIZE, INCLUDING BYPASS LINES, ETC. AND SHALL ONLY BE REDUCED FOR SMALLER DIAMETER CONTROL VALVES OR COIL/EQUIPMENT CONNECTIONS. |
| 4. | INSTALL UNIONS, IN PIPING 2" AND SMALLER, AT FINAL CONNECTIONS TO EACH PIECE OF EQUIPMENT, ON EACH SIDE OF CONTROL VALVES AND ELSEWHERE AS INDICATED. |
| 5. | INSTALL FLANGES, IN PIPING 2 1/2" AND LARGER, AT FIRST CONNECTIONS TO EQUIPMENT AND AT ALL FLANGED VALVES AND DEVICES. |

| TESTING, BALANCING AND COMMISSIONING | |
|--------------------------------------|---|
| 1. | HVAC SYSTEMS SHALL BE BALANCED IN ACCORDANCE WITH THE 2018 WA STATE ENERGY CODE, THE PROJECT SPECIFICATIONS AND GENERALLY ACCEPTED ENGINEERING STANDARDS TO ENSURE AT A MINIMUM THAT AIR AND WATER FLOW RATES ARE MEASURED AND ADJUSTED TO DELIVER THE DESIGN RATES WITHIN SPECIFIED TOLERANCES. |
| 2. | MECHANICAL AND ELECTRICAL COMMISSIONING WILL BE LEAD BY A 3RD PARTY CERTIFIED COMMISSIONING PROFESSIONAL CONTRACTED DIRECTLY TO WSU IN ACCORDANCE WITH ALL REQUIREMENTS OF SECTION 408 OF THE 2018 WA STATE ENERGY CODE. CONTRACTORS SHALL PROVIDE ALL TIME AND MATERIALS NEEDED TO SUPPORT THIS PROCESS. |

| MECHANICAL ABBREVIATIONS | | | |
|--------------------------|--------------------------------------|-------|---------------------------------------|
| AAV | AUTOMATIC AIR VENT | HX | HEAT EXCHANGER |
| ABV | ABOVE | HZ | HERTZ |
| AD | ACCESS DOOR | ID | INSIDE DIAMETER |
| AFS | AIR FLOW SWITCH | INV | INVERT |
| AFF | ABOVE FINISHED FLOOR | I.E. | INVERT ELEVATION |
| AG | ABOVE GROUND | INSUL | INSULATION |
| AHU | AIR HANDLING UNIT | IND | INDIRECT |
| AL | ACOUSTICALLY LINED | KW | KILOWATT |
| ALUM | ALUMINUM | KWH | KILOWATT HOUR |
| APD | AIR PRESSURE DROP | L | LENGTH OR LOUVER |
| ARCH | ARCHITECT | LAT | LEAVING AIR TEMPERATURE |
| AVG | AVERAGE | LBS | POUNDS |
| AWT | AVERAGE WATER TEMPERATURE | LDB | LEAVING DRY BULB |
| BAS | BUILDING AUTOMATION SYSTEM | LF | LINEAR FOOT |
| BDD | BACKDRAFT DAMPER | LWT | LEAVING WATER TEMPERATURE |
| BFF | BELOW FINISHED FLOOR | LG | LONG OR LENGTH |
| BFP | BACKFLOW PREVENTER | L/P | LOW POINT |
| BG | BELOW GROUND | LWB | LEAVING WET BULB |
| BHP | BRAKE HORSEPOWER | LWG | LOW WALL GRILLE |
| BLDG | BUILDING | LWT | LEAVING WATER TEMPERATURE |
| BTU | BRITISH THERMAL UNIT | LVG | LEAVING |
| BTUH | BRITISH THERMAL UNITS PER HOUR | MCA | MINIMUM CIRCUIT AMPACITY |
| BOD | BOTTOM OF DUCT | MCCP | MAXIMUM OVERCURRENT PROTECTION |
| BOP | BOTTOM OF PIPE | MBH | THOUSAND (1000) BTU PER HOUR |
| BSMT | BASEMENT | MCC | MOTOR CONTROL CENTER |
| BV | BALANCING VALVE | MFR | MANUFACTURER |
| C | CELSIUS | MS | MOTOR STARTER |
| CA | COMBUSTION AIR | MTD | MOUNTED |
| CAP | CAPACITY | MTG | MOUNTING |
| CC | CENTER TO CENTER OR COOLING COIL | MAU | MAKE-UP AIR UNIT |
| CD | CEILING DIFFUSER | NC | NORMALLY CLOSED |
| CFM | CUBIC FEET PER MINUTE | NO | NORMALLY OPEN |
| CG | CEILING GRILLE | MOD | MOTOR-OPERATED DAMPER |
| CJ | CAST IRON | NIC | NOT IN CONTRACT |
| CLG | CLEAN OUT | NPT | NATIONAL PIPE THREAD |
| COG | CLEAN OUT TO GRADE | NTS | NOT TO SCALE |
| CO | CLEAN OUT | OA | OUTDOOR AIR |
| COMB | COMBUSTION | OB | OPPOSED BLADE DAMPER |
| COND | CONDENSATE OR CONDENSER | OD | OUTSIDE DIAMETER |
| CONC | CONCRETE | OSA | OUTSIDE AIR |
| CONST | CONSTRUCTION | OAT | OUTSIDE AIR TEMPERATURE |
| COP | COEFFICIENT OF PERFORMANCE | OF | OVERFLOW |
| CU | COPPER | OFCL | OWNER FURNISHED, CONTRACTOR INSTALLED |
| CUH | CABINET UNIT HEATER | PD | PRESSURE DROP |
| CW | COLD WATER | PH | PHASE |
| CU | CONDENSING UNIT | PIAC | PRESSURE INDEPENDENT AIR CONTROLLER |
| CR | CONDENSATE RETURN | PG | PROPYLENE GLYCOL |
| CL | CENTER LINE | PLBG | PLUMBING |
| D | DEEP OR DEPTH | POC | POINT OF CONNECTION |
| DB | DRY BULB OR DECIBEL | PRV | PRESSURE REDUCING VALVE |
| DBA | A-WEIGHTED DECIBELS | PSI | POUNDS PER SQUARE INCH |
| DDC | DIRECT DIGITAL CONTROLS | PSIG | POUNDS PER SQUARE INCH GAUGE |
| DEMO | DEMOLITION | PT | PRESSURE & TEMPERATURE |
| DN | DOWN | RA | RETURN AIR |
| DIA. | DIAMETER Ø | RAG | RETURN AIR GRILLE |
| DPS | DIFFERENTIAL PRESSURE SWITCH | RAT | RETURN AIR TEMPERATURE |
| DP | DROP | RD | ROOF DRAIN |
| DPR | DAMPER | RET | RETURN |
| DWG | DRAWING | REV | REVISION |
| (E) | EXISTING | RF | RETURN FAN |
| EA | EACH OR EXHAUST AIR | RPM | REVOLUTIONS PER MINUTE |
| EAT | ENTERING AIR TEMPERATURE | RHW | RECIRCULATING HOT WATER |
| EDB | ENTERING DRY BULB | RTU | ROOF TOP UNIT |
| EEF | ENERGY EFFICIENCY RATIO | S | SINK |
| EF | EXHAUST FAN | SA | SUPPLY AIR |
| EFF | EFFICIENCY | SAT | SUPPLY AIR TEMPERATURE |
| EG | EXHAUST GRILLE | SEER | SEASONAL ENERGY EFFICIENT RATIO |
| ELEC | ELECTRIC OR ELECTRICAL | SENS | SENSIBLE |
| ELEV | ELEVATION | SD | SMOKE DETECTOR OR DAMPER |
| EMCS | ENERGY MANAGEMENT AND CONTROL SYSTEM | SF | SUPPLY FAN |
| ENCL | ENCLOSURE | SFD | SMOKE-FIRE DAMPER |
| EQUIP | EQUIPMENT | SHT | SHEET |
| ESP | EXTERNAL STATIC PRESSURE | SP | STATIC PRESSURE |
| EST | ESTIMATE(D) | SQ | SQUARE |
| EWB | ENTERING WET BULB | SQ | FT SQUARE FOOT |
| EWT | ENTERING WATER TEMPERATURE | SS | STAINLESS STEEL |
| EXH | EXHAUST | STD | STANDARD |
| F | FARENHEIT | TA | TRANSFER AIR |
| FCU | FAN COIL UNIT | TEMP | TEMPERATURE |
| FD | FIRE DAMPER OR FLOOR DRAIN | TH | THICK OR THICKNESS |
| FF | FINAL FILTER | TOD | TOP OF DUCT |
| FLA | FULL LOAD AMPS | TOP | TOP OF PIPE |
| FLR | FLOOR | TP | TRAP PRIMER |
| FLEX | FLEXIBLE | TU | TERMINAL UNIT |
| FOB | FLAT ON BOTTOM | TYP | TYPICAL |
| FOT | FLAT ON TOP | UF | UNDER FLOOR |
| FPM | FEET PER MINUTE | UG | UNDERGROUND |
| FPI | FINS PER INCH | UH | UNIT HEATER |
| FPS | FEET PER SECOND | UR | URINAL |
| FP | FIRE PROTECTION | US | UNDER SLAB |
| FS | FLOOR SINK | V | VENT OR VOLT |
| FT | FEET/FOOT OR FINNED TUBE | VAC | VACUUM |
| FA | FACE VELOCITY | VAV | VARIABLE AIR VOLUME |
| G | GAS (NATURAL) | VEL | VELOCITY |
| GA | GAUGE OR GAGE | VFD | VARIABLE FREQUENCY DRIVE |
| GAL | GALLONS | VTR | VENT THRU ROOF |
| GPM | GALLONS PER MINUTE | VD | VOLUME DAMPER |
| GPH | GALLONS PER HOUR | W | WIDE OR WIDTH |
| GYP | GYPSUM WALL BOARD | WB | WET BULB |
| H | HIGH OR HEIGHT | WC | WATER CLOSET |
| HB | HOSE BIBB | WCO | WALL CLEAN OUT |
| HC | HEATING COIL | WH | WATER HEATER |
| HD | HEAD | WG | WATER GAUGE |
| HGBP | HOT GAS BYPASS | WPD | WATER PRESSURE DROP |
| HL | HIGH LIMIT | WT | WEIGHT |
| HP | HORSEPOWER OR HIGH POINT | | |
| HTG | HEATING | | |
| HUM | HUMIDIFIER | | |
| HW | HOT WATER | | |

| HVAC PIPING LEGEND | |
|--------------------|-------------------------|
| — HWS — | HEATED WATER SUPPLY |
| — HWR — | HEATED WATER RETURN |
| — CWS — | CHILLED WATER SUPPLY |
| — CWR — | CHILLED WATER RETURN |
| — LPS — | LOW PRESSURE STEAM |
| — CR — | STEAM CONDENSATE RETURN |
| — D — | DRAIN |
| — PC — | PUMPED CONDENSATE |
| — RL — | REFRIGERANT LIQUID |
| — RS — | REFRIGERANT SUCTION |
| — REF — | REFRIGERANT LINE SET |
| — G — | NATURAL GAS |

| GENERAL PIPING SYMBOLS | |
|------------------------|-----------------------------|
| | PIPE PITCH DIRECTION (DOWN) |
| | DIRECTION OF FLOW |
| | ANCHOR |
| | REDUCER OR INCREASER |
| | ECCENTRIC REDUCER |
| | TOP CONNECTION |
| | BOTTOM CONNECTION |
| | SIDE CONNECTION |
| | CAPPED OUTLET |
| | RISE OR DROP IN PIPE |
| | UNION |
| | PIPE UP |
| | PIPE DOWN |

| VALVE SYMBOLS | |
|---------------|--|
| | GENERIC VALVE (AS SPECIFIED) |
| | GATE VALVE |
| | GLOBE VALVE |
| | BUTTERFLY VALVE |
| | BALL VALVE |
| | CHECK VALVE |
| | INDICATES FLANGED VALVE (USE ON OVER 2" SIZES) |
| | WYE STRAINER (WITH BALL VALVE & QUICK COUPLE HOSE CONNECTOR) |
| | FLEXIBLE CONNECTION |
| | ANGLE GLOBE VALVE |
| | MODULATING CONTROL VALVE |
| | MODULATING CONTROL BUTTERFLY VALVE |
| | TWO POSITION CONTROL VALVE |
| | THREE-WAY MODULATING CONTROL VALVE |
| | THREE-WAY TWO POSITION CONTROL VALVE |
| | PRESSURE REGULATING VALVE |
| | PRESSURE SAFETY RELIEF VALVE |
| | AUTOMATIC BALANCING VALVE |
| | WATER BALANCE DEVICE |
| | CIRCUIT SETTER VALVE |
| | PLUG VALVE |
| | PRESSURE REDUCING VALVE (PRV) |
| | THERMOMETER |
| | PRESSURE GAGE |
| | TEST PLUG (PRESSURE/TEMPERATURE) |
| | AUTOMATIC AIR VENT |
| | MANUAL AIR VENT |
| | QUICK-COUPLE HOSE CONNECTOR |
| | PLANT COMPRESSED AIR OUTLET QUICK CONNECT |
| | PUMP |

NOTE: SYMBOLS AND ABBREVIATIONS ON THE DRAWINGS ARE TO BE INTERPRETED IN ACCORDANCE WITH THE LEGENDS ON THIS SHEET. NOT ALL SYMBOLS AND ABBREVIATIONS INDICATED ON THIS SHEET ARE NECESSARILY USED FOR THIS PROJECT.

| HVAC SYMBOLS | |
|--------------|--|
| | RECT. DUCT SIZE (INCHES) (FACING SIDE LISTED FIRST) |
| | CIRCULAR DUCT DIAMETER (INCHES) |
| | FLAT OVAL DUCT SIZE (INCHES)(FACING SIDE LISTED FIRST) |
| | ACOUSTICALLY LINED DUCT, 1" THICK UNLESS NOTED OTHERWISE, DUCT SIZE INCLUDES ALLOWANCE FOR LINER |
| | FIRE OR FIRE/SMOKE DAMPER (# INDICATES TYPE) |
| | TURNING VANES |
| | HIGH EFFICIENCY BRANCH TAP |
| | FLEXIBLE DUCT CONNECTOR |
| | VOLUME CONTROL DAMPER (SEE GENERAL NOTES) |
| | MOTORIZED DAMPER & ACTUATOR |
| | SUPPLY/OISA DUCT TURNED UP |
| | SUPPLY/OISA DUCT TURNED DOWN |
| | RETURN AIR DUCT TURNED UP |
| | RETURN AIR DUCT TURNED DOWN |
| | EXHAUST/RELIEF DUCT TURNED UP |
| | EXHAUST/RELIEF DUCT TURNED DOWN |
| | FLEXIBLE DUCT |
| | SIDEWALL DIFFUSER/GRILLE |
| | LINEAR SLOT DIFFUSER |
| | AIR OUTLET (SUPPLY) |
| | AIR INLET (RETURN/RELIEF) |
| | AIR INLET (EXHAUST) |
| | LOUVER |
| | THERMOSTAT OR TEMPERATURE SENSOR (SUBSCRIPT A=AVERAGING, G=PROTECTIVE GAURD, C=CO2 SENSOR) |
| | HUMIDISTAT OR HUMIDITY SENSOR |
| | CARBON DIOXIDE SENSOR |
| | SMOKE DETECTOR |

| GENERAL SYMBOLS | |
|-----------------|--|
| | SECTION IDENTIFYING NUMBER |
| | CROSS-SECTION SYMBOL |
| | SHEET WHERE SECTION IS SHOWN |
| | DETAIL IDENTIFYING NUMBER |
| | DETAIL SYMBOL |
| | SHEET WHERE DETAIL IS SHOWN |
| | POINT OF CONNECTION (POC) SYMBOL |
| | EQUIP. TYPE-NUMBER (SEE SCHEDULES) |
| | EQUIPMENT IDENTIFIER (OPTIONAL TAG STYLE) |
| | SIZE # CFM DIFFUSER OR REGISTER/GRILLE TAG |
| | CFM VALUE |
| | DIFFUSER TYPE (SEE SCHEDULES) |
| | DIFFUSER SIZE |
| | REVISION CLOUD AND REVISION NUMBER |

| LINEWEIGHT LEGEND | |
|--|---|
| | LIGHT SOLID LINES INDICATES EXISTING ITEMS TO REMAIN |
| | LIGHT DASHED LINES GENERALLY INDICATE HIDDEN OR UNDERGROUND PIPING OR EQUIPMENT |
| | DARK LINE INDICATES NEW PIPING & EQUIPMENT |
| | DARK DASHED LINES INDICATE EXISTING PIPING & EQUIPMENT TO BE REMOVED (FLOOR PLANS & SECTIONS) |
| NOTE: LINEWEIGHTS ARE GENERAL GUIDES ONLY. REFER TO DRAWING NOTES AND WORK PHASES (DEMO OR NEW) FOR ADDITIONAL DISTINCTIONS. | |

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| LEGENDS, ABBREVIATIONS, GENERAL NOTES | | |
| M-001 | | |
| SHEET | OF | SHEETS |

SUPPLY FAN SCHEDULE

| # | MFR | MODEL | TYPE | SERVICE | CFM | OSA | SUPPLY FAN | | | | | HEATING | | | | COOLING | | | | | | | | WEIGHT (LBS) | ELECTRICAL | | | NOTES | | | | |
|--|-----|-------|-------------------|----------------|------|------|------------|-------------|------|-----|----------|---------------------------------------|-----|-----------|-----|---------|--------------|------------|-------------|----------|-----------|----------|----------|--------------|------------|----------|-------------|-------|-----------|------|-----|------|
| | | | | | | | DRIVE | ESP (IN.WC) | RPM | BHP | MOTOR HP | TYPE | MBH | ROWS/ FPI | EAT | LAT | STEAM LBS/HR | STEAM PSIG | APD (IN.WC) | TYPE | TOTAL MBH | SENS MBH | EAT (DB) | | EAT (WB) | LAT (DB) | APD (IN.WC) | | ROWS/ FPI | V/PH | MCA | MOCP |
| F-4 | JCI | XTI | AIR HANDLING UNIT | POOL RM SUPPLY | 4350 | 100% | DIRECT | 1.5 | 1976 | 3.7 | 7.5 | VERTICAL TUBE INTEGRAL F&B STEAM COIL | 400 | 4/9 | 0 | 90 | 422 | 15 | - | SPLIT DX | 113 | 112 | 100 | 68 | 74 | 0.16 | 2/9 | 2,900 | 208/3 | 24 | 50 | ① |
| NOTES: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ① PROVIDE WITH THE FOLLOWING FEATURES, OPTIONS AND ACCESSORIES: <ul style="list-style-type: none">- VFD WITH EXTERNAL BYPASS. VFD AND ENCLOSURE TO BE SHIPPED LOOSE. ENCLOSURE TO BE LOCKABLE AND VENTILATED. VFD IS FOR SOFT START AND SPEED ADJUSTMENTS FOR TAB ONLY.- MERV 8 PREFILTER WITH MERV 13 FINAL FILTER SECTIONS- COPPER HEADER ON F&B COIL- ELECTRIC 2-10V ACTUATOR ON F&B COIL- 2" INSULATED DOUBLE WALLED CASING- COIL CONNECTION LEFT/RIGHT HAND AS SHOWN ON THE PLANS. COORDINATE WITH CONTRACTOR.- DETAILS AND CONFIGURATIONS AS SHOWN ON DETAIL 1/M-401.- PROVIDE WITH SPARE VFD IN ORIGINAL MANUFACTURERS PACKAGING.- SHIPPING SPLIT IN CASING AT APPROX MIDPOINT TO ACCOMMODATE INSTALTION THROUGH ROOF OPENING. COORDINATE WITH CONTRACTOR.- PEIZO RING FACTORY INSTALLED. TRANSDUCER BY THE DDC CONTROL CONTRACTOR. SEE M-601. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

OWNER FURNISHED,
CONTRACTOR INSTALLED
(OFCI)

CONDENSING UNIT SCHEDULE

| # | MFR | MODEL | UNIT SERVED | COOLING | | | | REFRIG | WEIGHT (LBS) | ELECTRICAL | | | NOTES |
|---|-----|----------------|------------------------------|-----------|---------|------------------|-----------|--------|--------------|------------|-----|------|-------|
| | | | | TOTAL MBH | NET MBH | AMBIANT TEMP. °F | SEER/EER | | | V/PH | MCA | MOCP | |
| CU-4 | JCI | 12.5 TON J12YD | SUPPLY FAN F-4 SPLIT DX COIL | 120 | 120 | 105 | 11.0/12.4 | R410A | 500 | 208/3 | 62 | 80 | ① |
| NOTES: ① PROVIDE WITH THE FOLLOWING FEATURES, OPTIONS AND ACCESSORIES: <ul style="list-style-type: none"> - WIND BAFFLES - FACTORY PRE-CHARGED, INSULATED REFRIGERANT LINE SET. - SINGLE POINT POWER CONNECTION WITH FACTORY DISCONNECT. - 5KA SCCR. - TO BE MOUNTED ON ROOFTOP EQUIPMENT PLATFORM. SEE DETAIL 2/M-401. - BACNET MSTP INTERFACE | | | | | | | | | | | | | |

OFCI →

EXHAUST FAN SCHEDULE

| # | MFR | MODEL/SIZE | TYPE | SERVICE | CFM | DRIVE | ESP (") | FAN RPM | WEIGHT (LBS) | ELECTRICAL | | NOTES |
|-----|-----------|------------|----------------------------------|---------------------------|------|--------|---------|---------|--------------|------------|-----|-------|
| | | | | | | | | | | V/PH | HP | |
| F-1 | TWIN CITY | DSI 165A | SQUARE INLINE DIRECT DRIVE | POOL RM EXHAUST | 4500 | DIRECT | 1.5 | 1750 | 160 | 208/3 | 3.0 | ① |
| F-2 | TWIN CITY | DSI 165ANE | SQUARE INLINE DIRECT DRIVE | BEAM RM EXHAUST | 2000 | DIRECT | 2.0 | 1681 | 150 | 208/3 | 2.0 | ① |
| F-3 | TWIN CITY | DSI 165ANE | SQUARE INLINE DIRECT DRIVE | DILUTE MODE EXHAUST | 2000 | DIRECT | 2.0 | 1681 | 150 | 208/3 | 2.0 | ① |

NOTES:

① PROVIDE WITH THE FOLLOWING FEATURES, OPTIONS AND ACCESSORIES:

- EC MOTOR WITH MOTOR MOUNTED SPEED ADJUSTMENT DIAL.
- INLET/OUTLET CONFIGURATION AS INDICATED ON THE PLANS
- PIEZO RING FACTORY INSTALLED. TRANSDUCER BY CONTROL CONTRACTOR. SEE M-601.
- FACTORY DISCONNECT.
- INTEGRAL GRAVITY BACK DRAFT DAMPER
- QTY 1 SPARE EC MOTOR FOR EACH FAN
- PROVIDE WITH SUPPORT BRACKETS SUITABLE FOR HANGING FROM OVERHEAD STRUCTURE.
- SEE PLANS AND SECTIONS FOR FAN INLET AND OUTLET ARRANGEMENTS. CONFIRM WITH CONTRACTOR PRIOR TO ORDERING.

HEPA FILTER HOUSING

| # | MFR | MODEL/SIZE | TYPE | SERVICE | CFM | FILTERS | DIMENSIONS | NOTES |
|---|--------|--|---------------------|-------------------------------|------|-------------------------|-----------------|-------|
| HEPA-1 | CAMFIL | CAMCONTAIN GB HOUSING CF-2X1-012 | BAG-IN / BAG-OUT | BEAM RM EXHAUST FAN F-2 | 2000 | HEPA QTY(2) 24X24X12 | 60H X 27L X 26D | ① |
| NOTES: ① PROVIDE WITH THE FOLLOWING FEATURES, OPTIONS AND ACCESSORIES: - STAINLESS STEEL HOUSING - 12" DEEP PARTICULATE FILTER - GASKET SEAL BAG-IN BAG-OUT - SINGLE ACCESS DOOR, RIGHT/LEFT SIDE AS SHOWN ON PLANS. COORDINATE WITH CONTRACTOR. - PROVIDE ONE SPARE SET OF FILTERS. | | | | | | | | |

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MECHANICAL EQUIPMENT SCHEDULES

M-002

SHEET

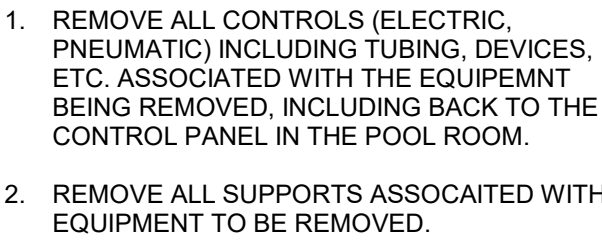
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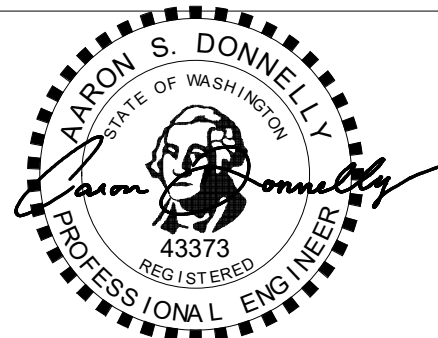
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SHEET TITLE

PENTHOUSE LEVEL - HVAC - DEMO

M-102

SHEET

OF

SHEETS

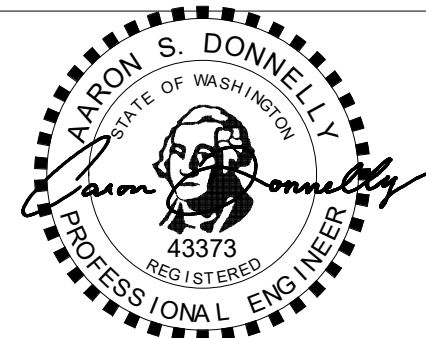


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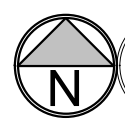
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SHEET TITLE

PENTHOUSE LEVEL - PIPING - DEMO

M-103

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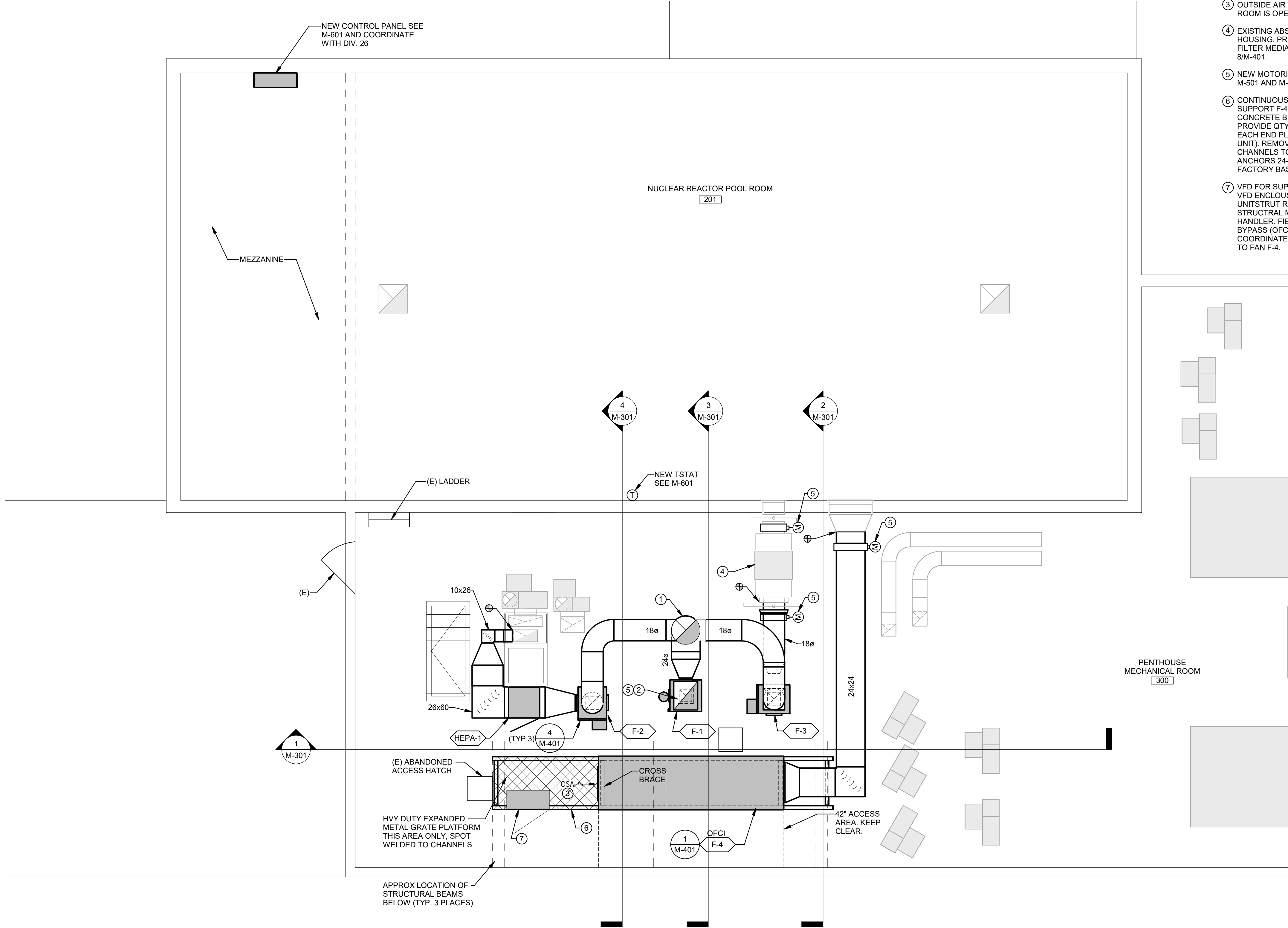


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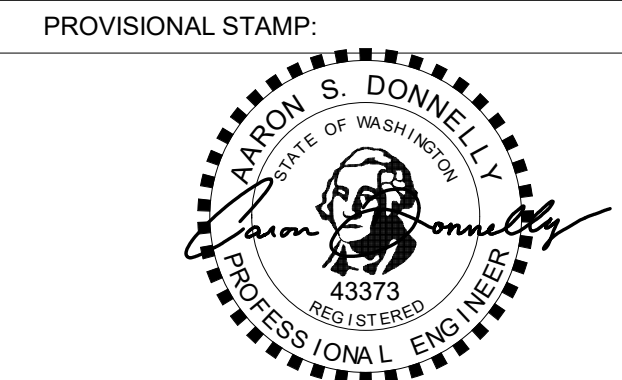
SHEET OF SHEETS

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KEY NOTES

- 1 RECONSTRUCT 24"Ø EXHAUST STACK. SEE SECTIONS AND DETAIL 7/M-501.
- 2 24x12 POOL ROOM EXHAUST DUCT FROM ROOF LEVEL ABOVE.
- 3 OUTSIDE AIR INTAKE OPEN TO THE ROOM. THE ROOM IS OPEN TO THE OUTDOORS.
- 4 EXISTING ABSOLUTE FILTER BAG-IN BAG-OUT HOUSING. PROVIDE NEW 24x24x11.5 HEPA FILTER MEDIA (QTY 2). REFER TO DETAIL 8/M-401.
- 5 NEW MOTORIZED DAMPER. SEE DIAGRAMS ON M-501 AND M-601.
- 6 CONTINUOUS STEEL CHANNELS (C12X20.7) TO SUPPORT F-4 AND SPAN ACCROSS THREE CONCRETE BEAMS/WALLS UNDER FLOOR. PROVIDE QTY.4 CROSS MEMBERS (ONE AT EACH END PLUS ONE AT EACH END OF THE UNIT). REMOVE FLOOR FINISHES AND SECURE CHANNELS TO CONCRETE WITH SHALLOW ANCHORS 24-INCHES OC. ANCHOR F-4 FACTORY BASE RAIL TO CHANNELS.
- 7 VFD FOR SUPPLY FAN F-4 IN 36"x16"x60" TALL VFD ENCLOSURE (OFCL) MOUNTED ON UNIT/STRUT RACK/FRAME SUPPORTED FROM STRUCTURAL MEMBERS SUPPORTING THE AIR HANDLER. FIELD MOUNT VFD (OFCL) AND BYPASS (OFCL) WITHIN ENCLOSURE. COORDINATE WITH ELECTRICAL TO CONNECT TO FAN F-4.



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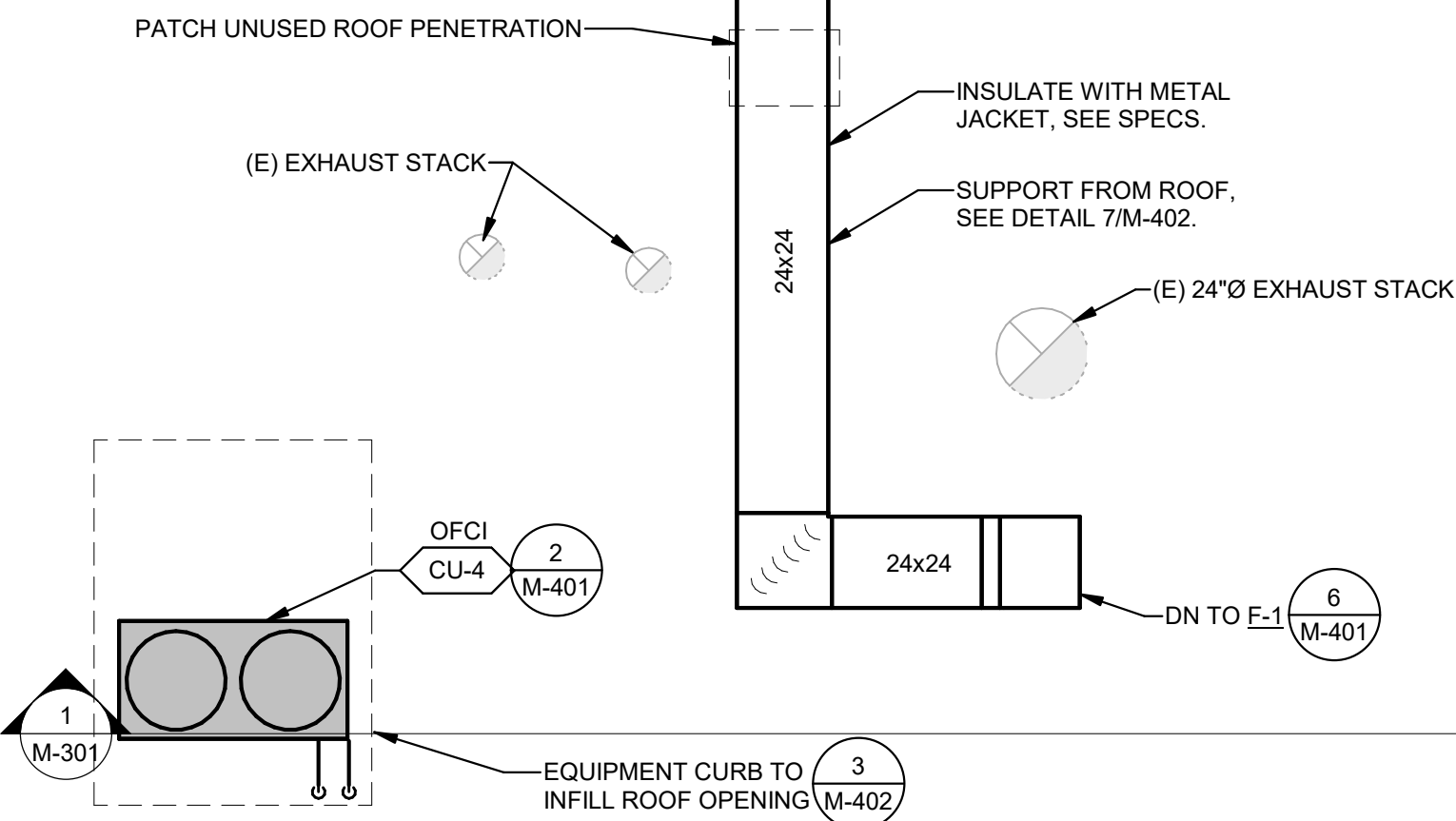
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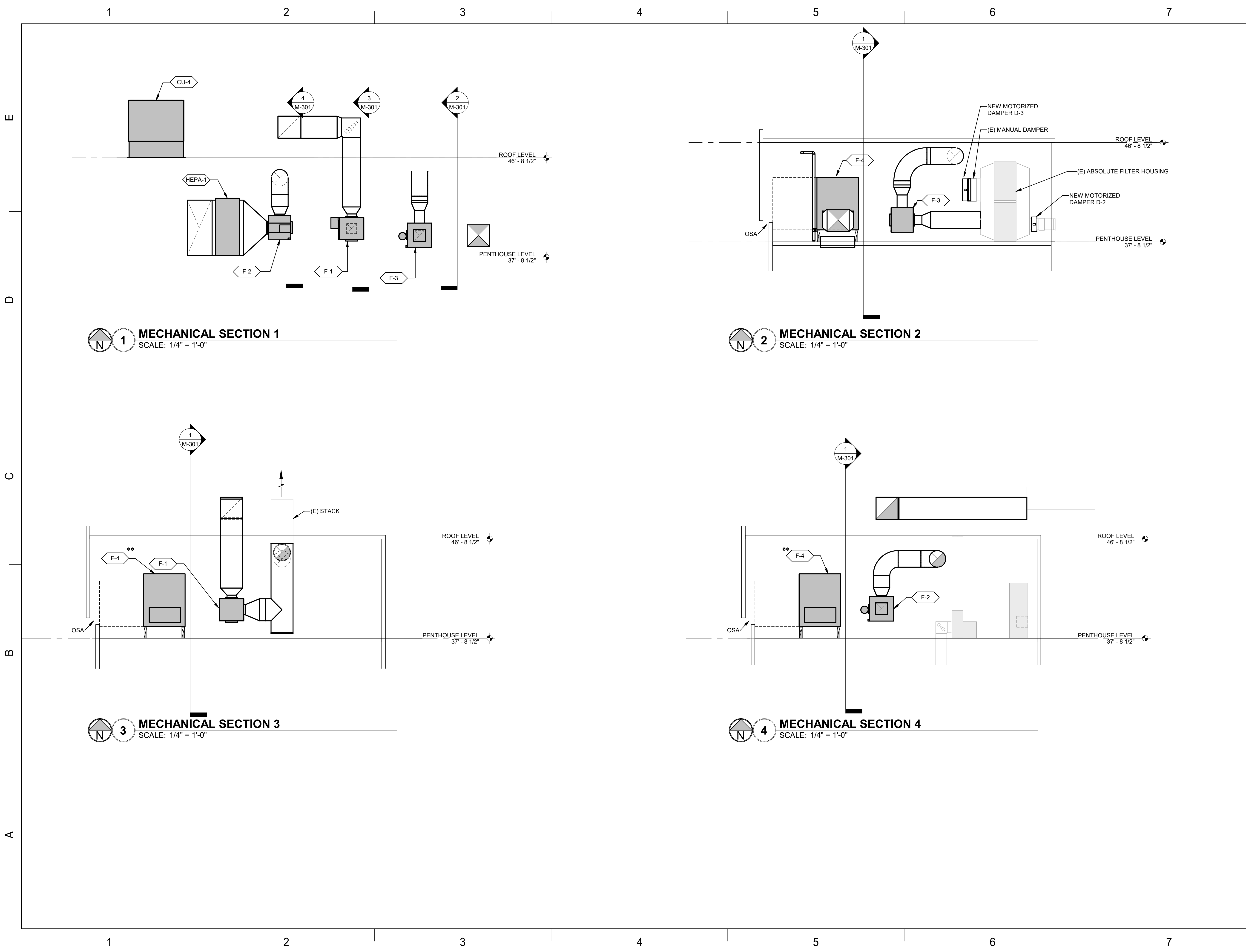
M-202



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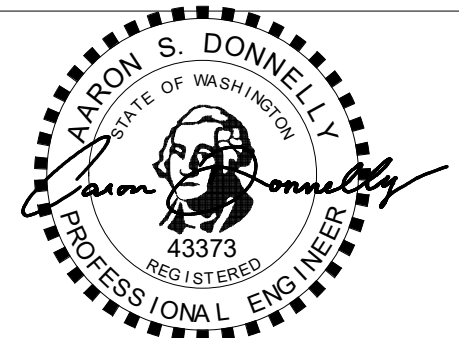


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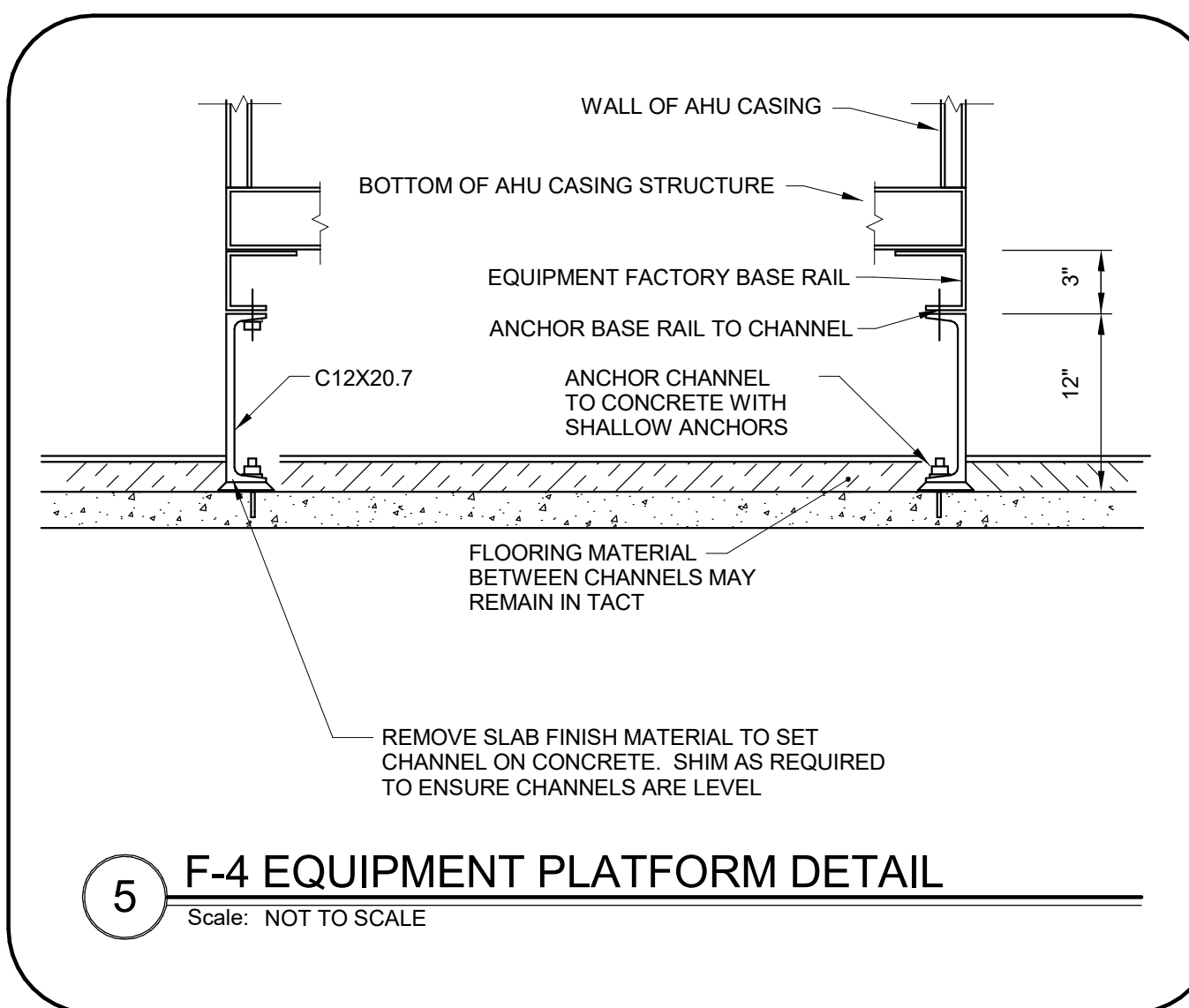
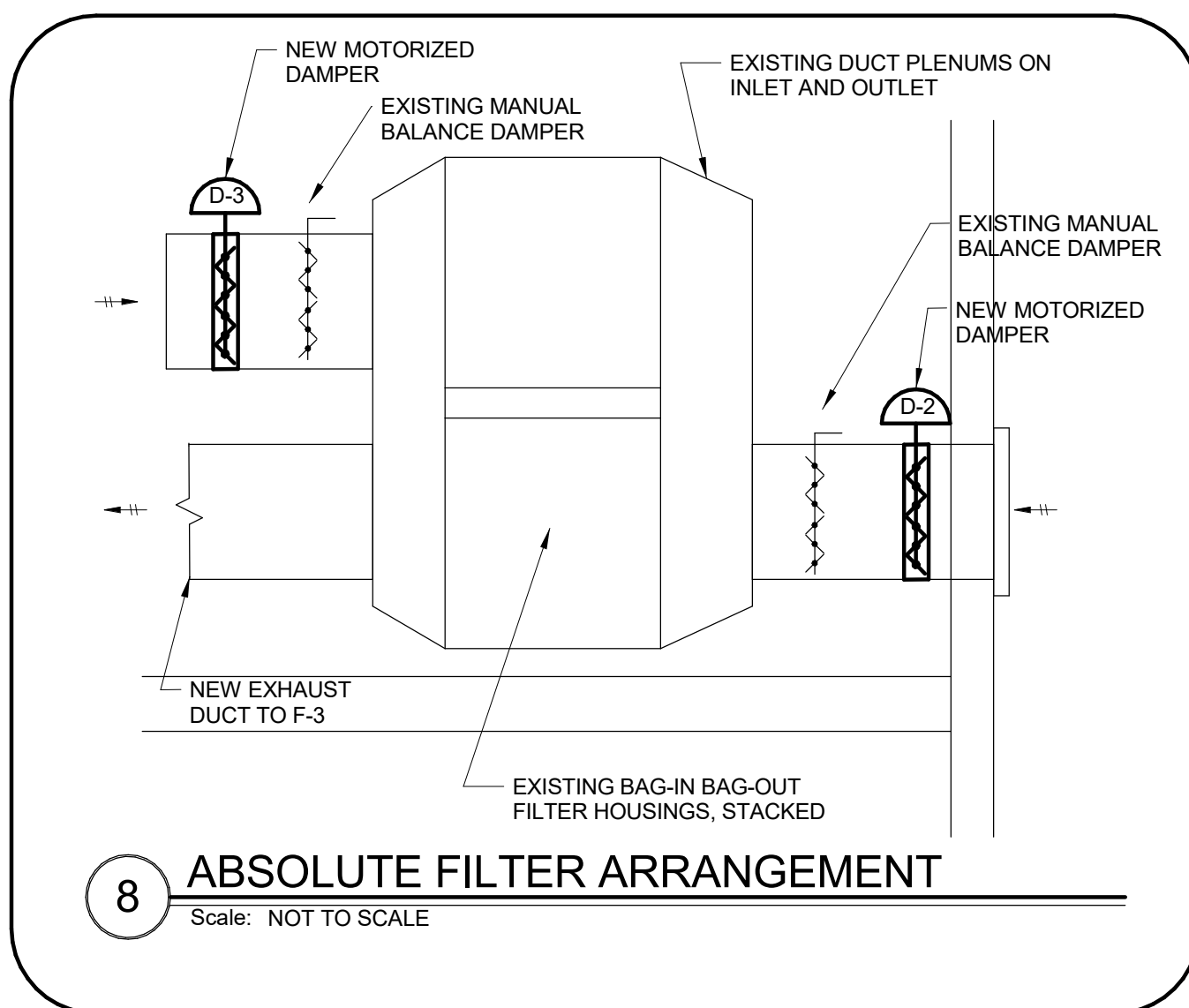
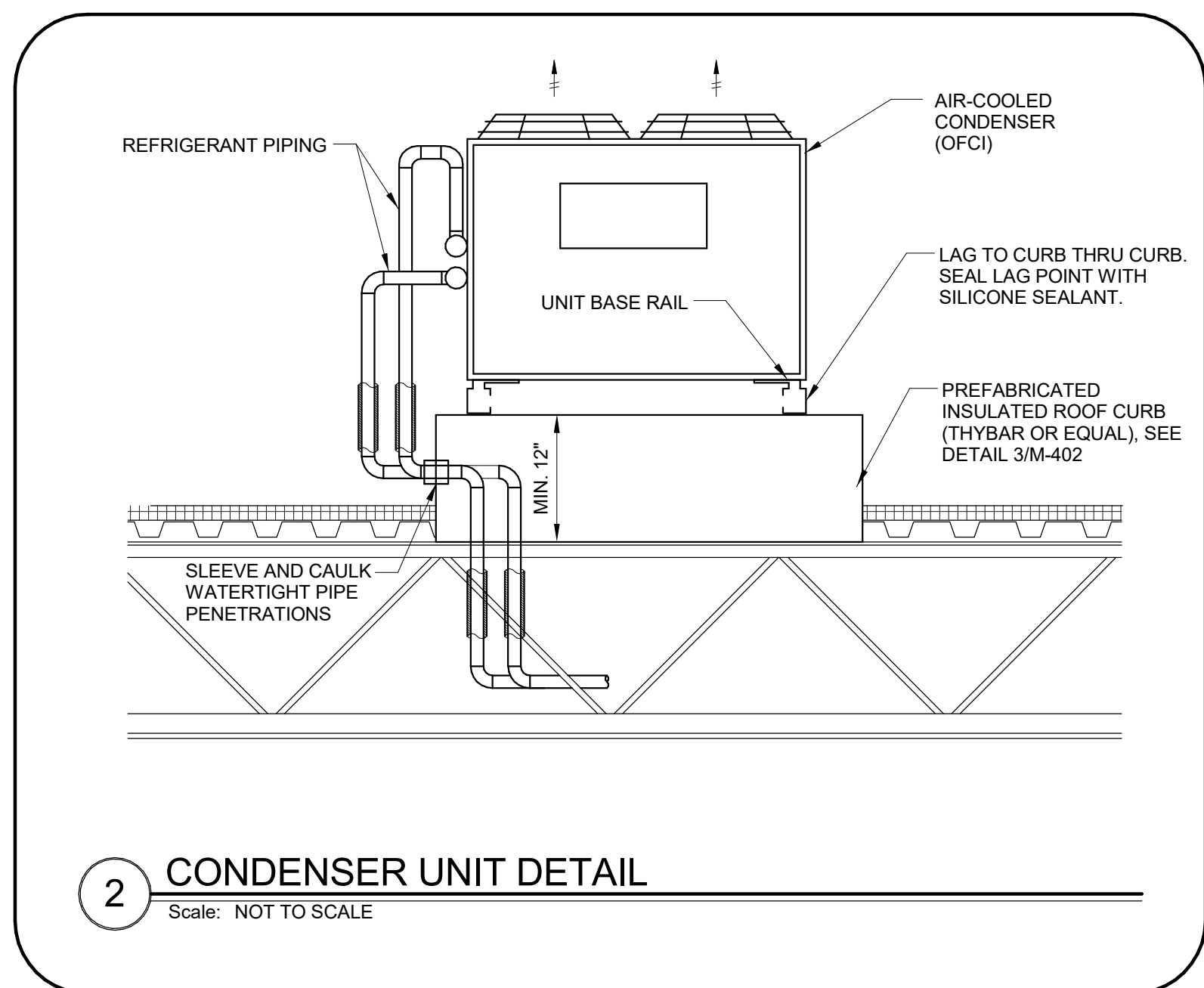
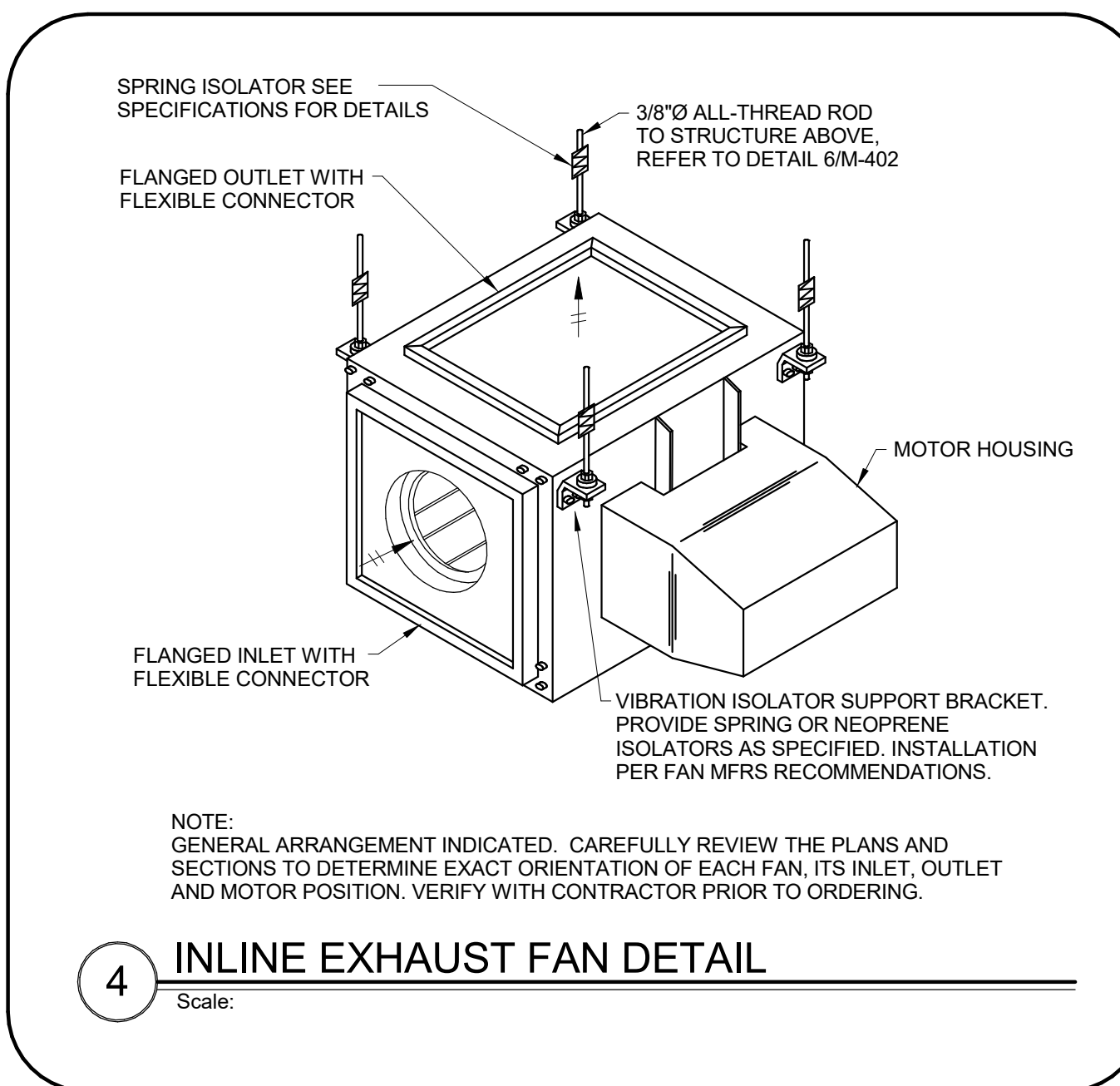
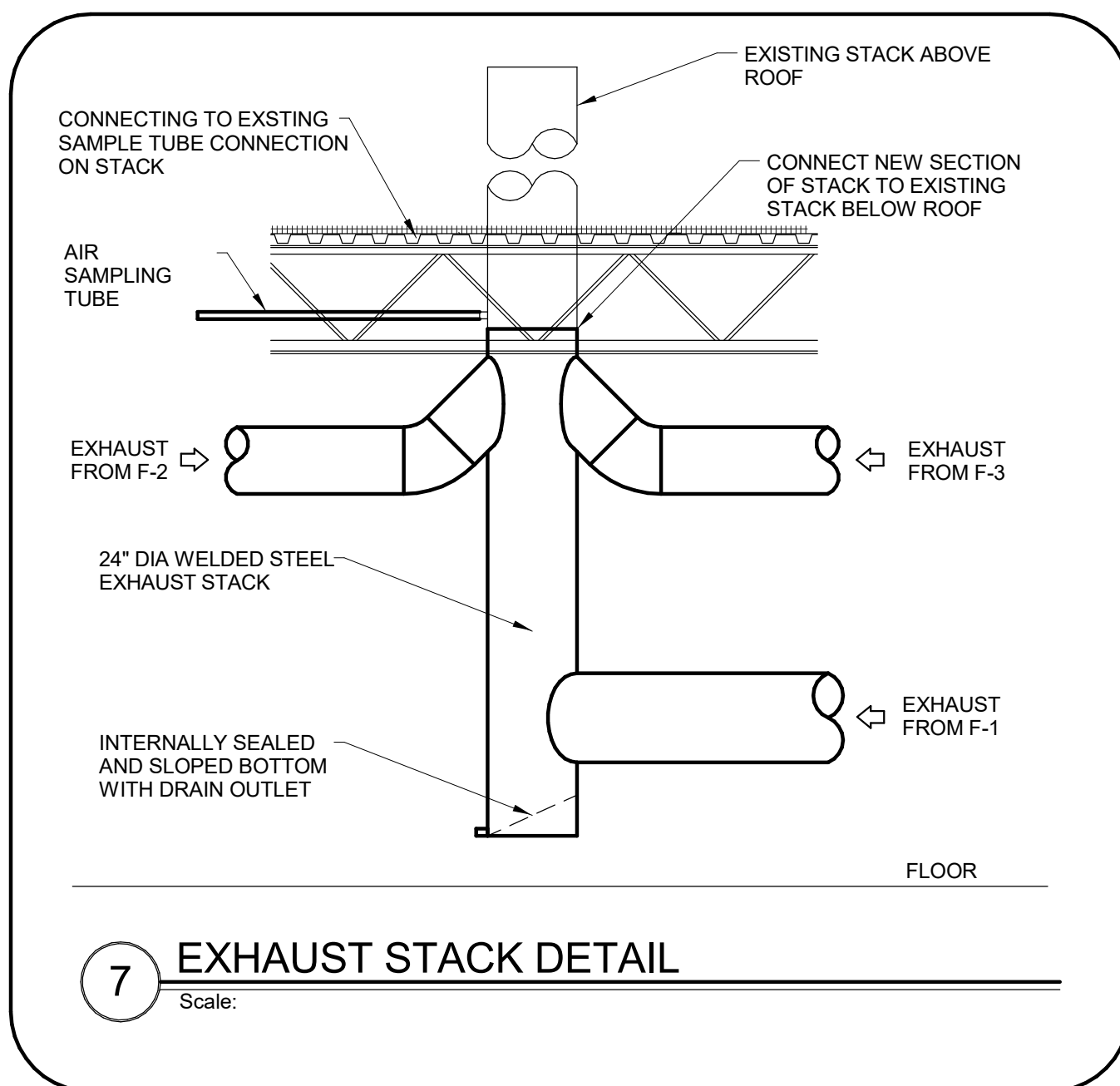
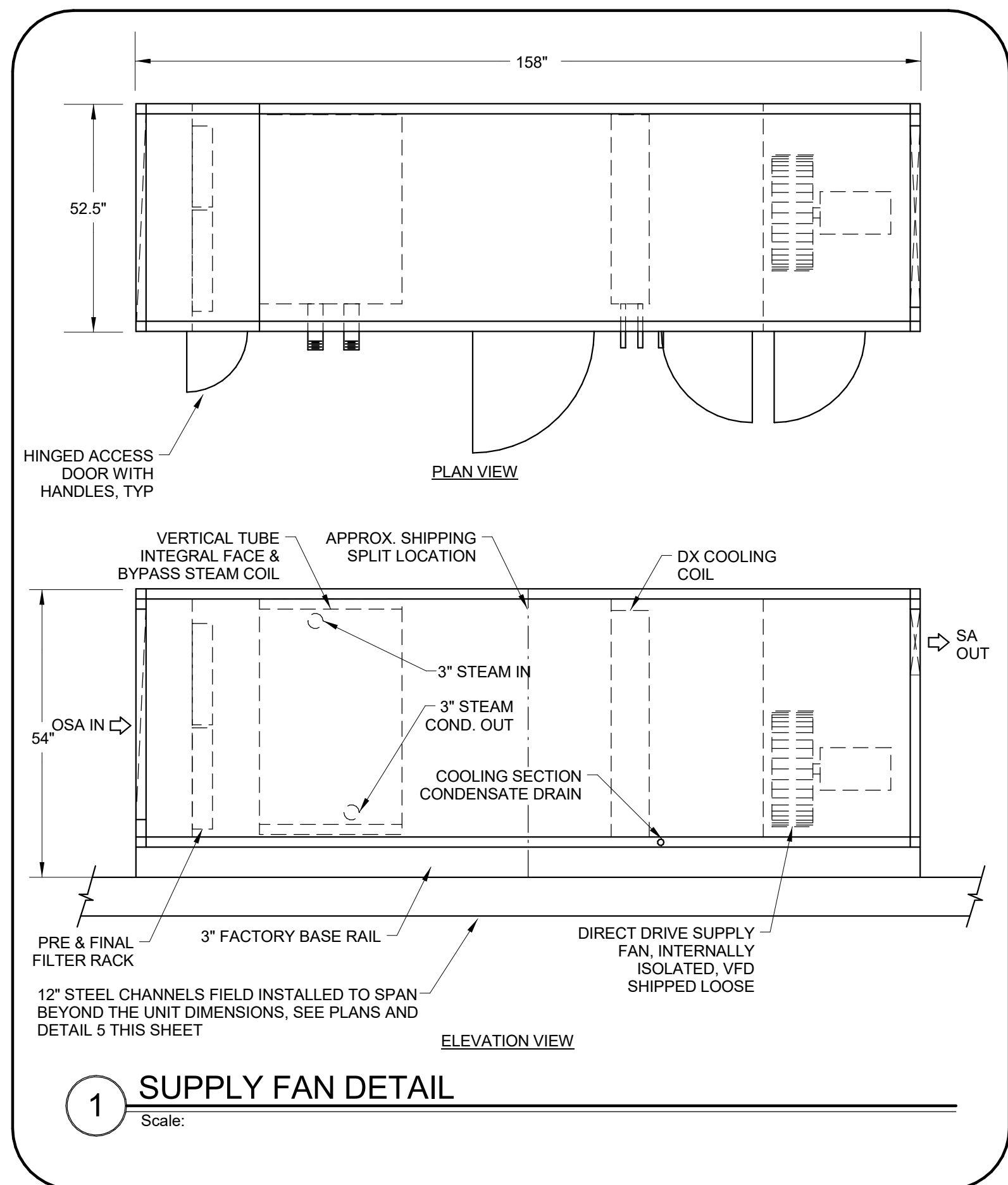
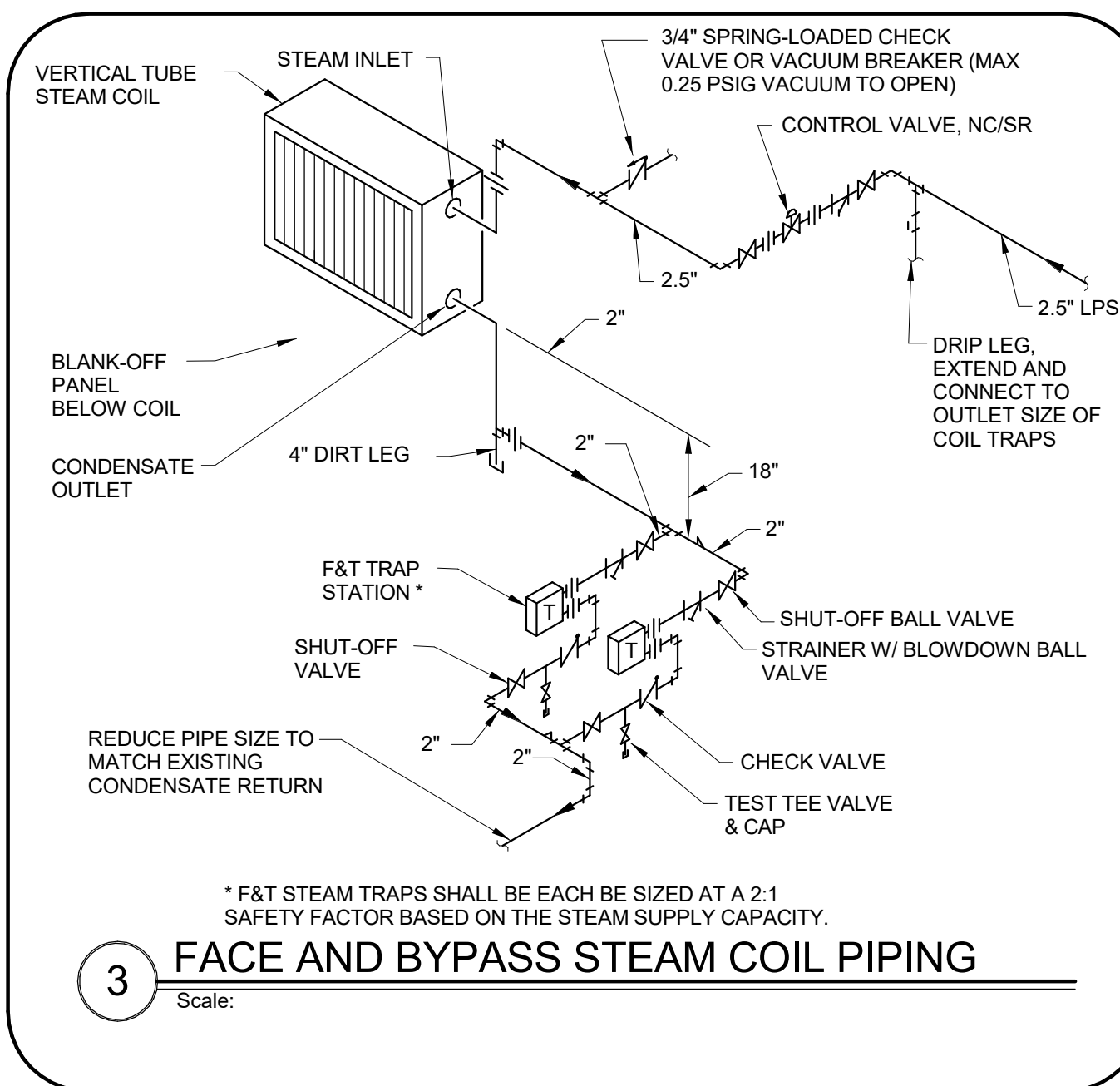
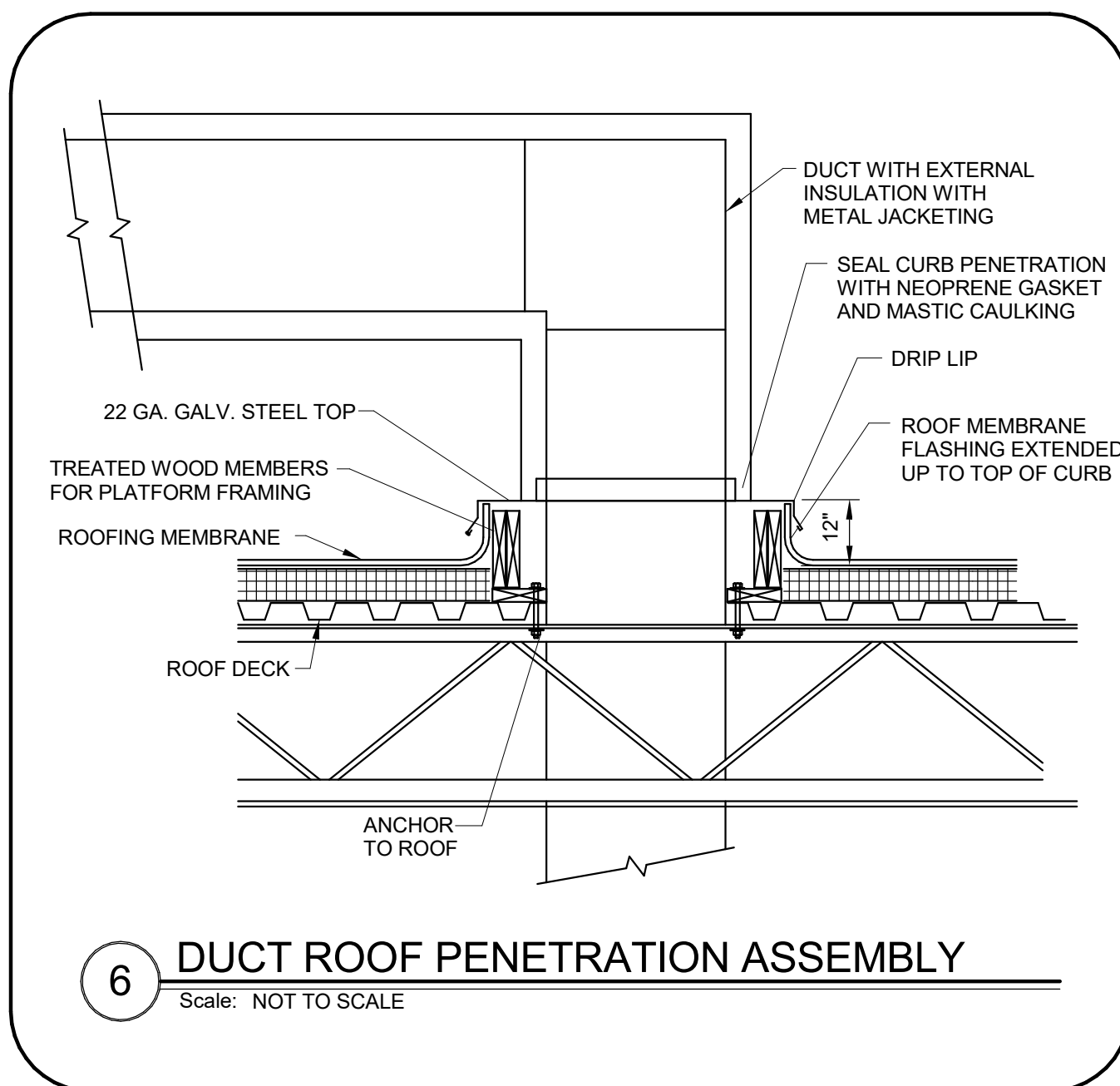
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SHEET TITLE
MECHANICAL SECTIONS

M-301
SHEET OF SHEETS





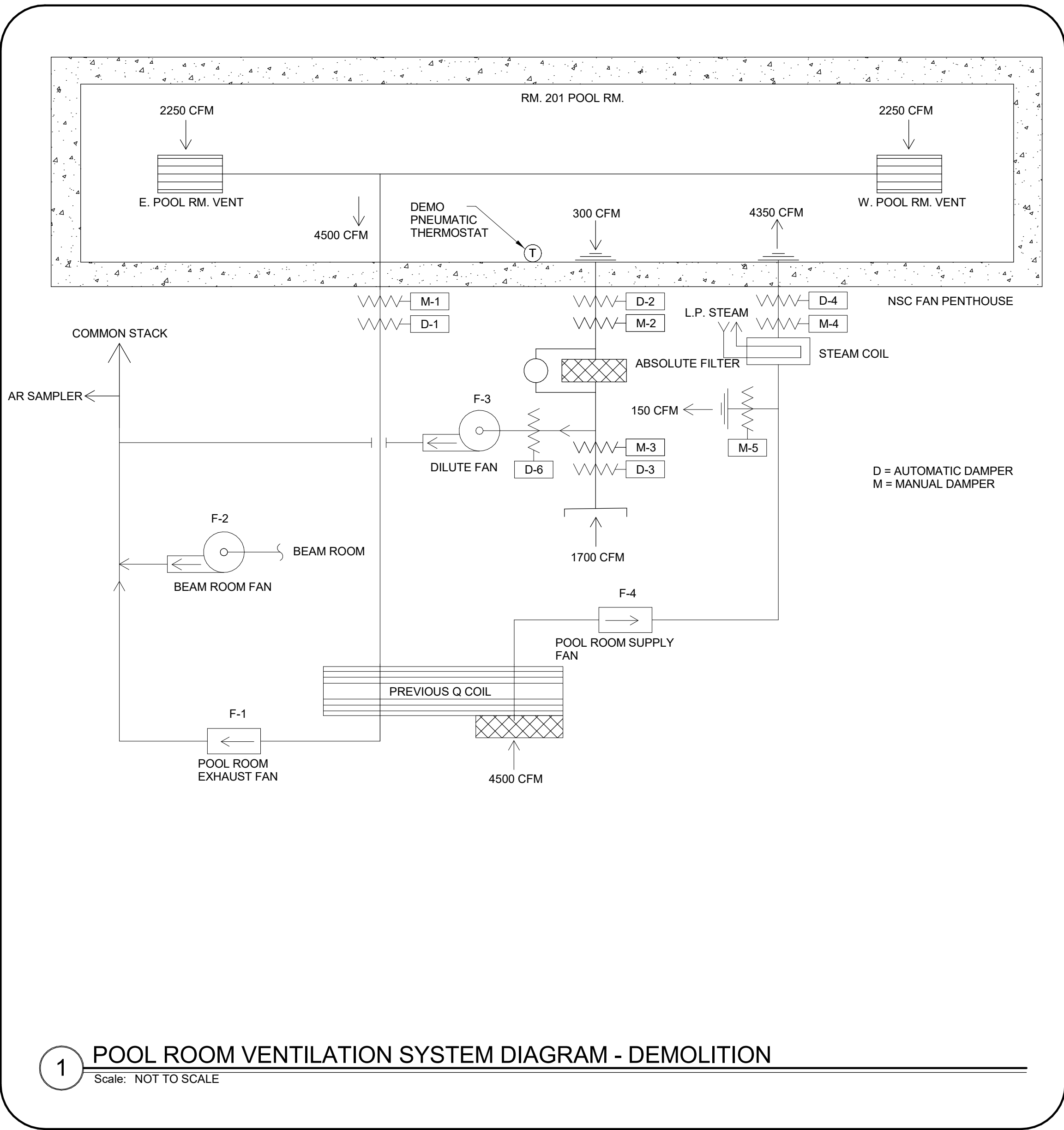
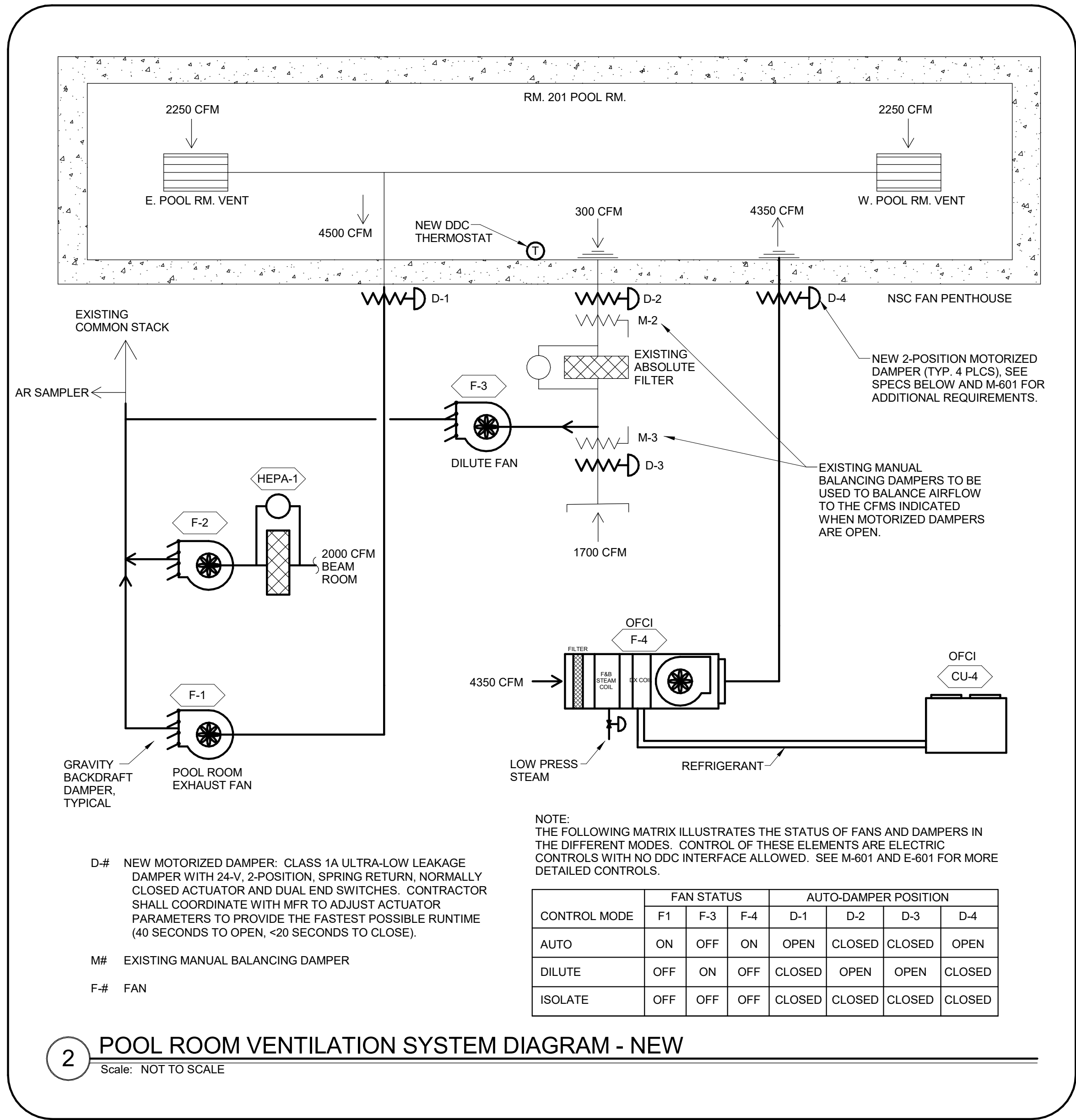
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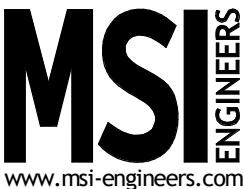
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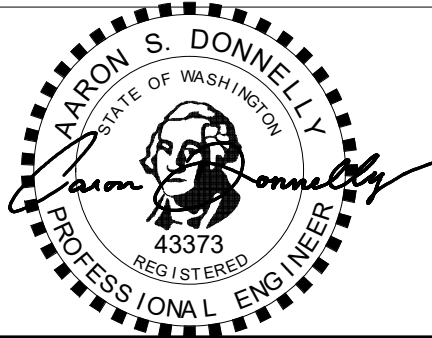


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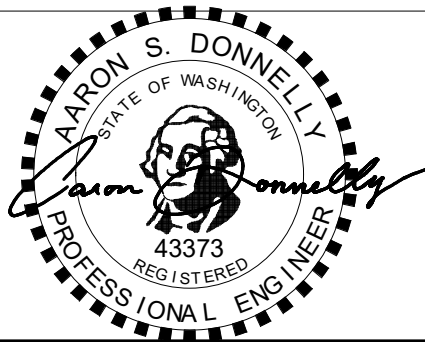
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SYSTEM DIAGRAMS

M-501

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CONTROL DIAGRAMS

M-601

SHEETS

DDC AND ELECTRICAL CONTROL CONTRACTORS SHALL REVIEW BOTH MECHANICAL AND ELECTRICAL DRAWINGS AND COORDINATE CLOSELY TO ENSURE A THOROUGH UNDERSTANDING OF WHAT ELEMENTS ARE CONTROLLED BY DDC (HEATING AND COOLING FUNCTIONS ONLY) AND WHICH ARE ELECTRICALLY CONTROLLED (FANS AND DAMPERS).

① ELECTRICAL CONTROL/FEEDBACK SIGNALS, NO DDC
INTERFACE ALLOWED. SEE E-601 THRU E-603 FOR
ELECTRICAL CONTROLS.

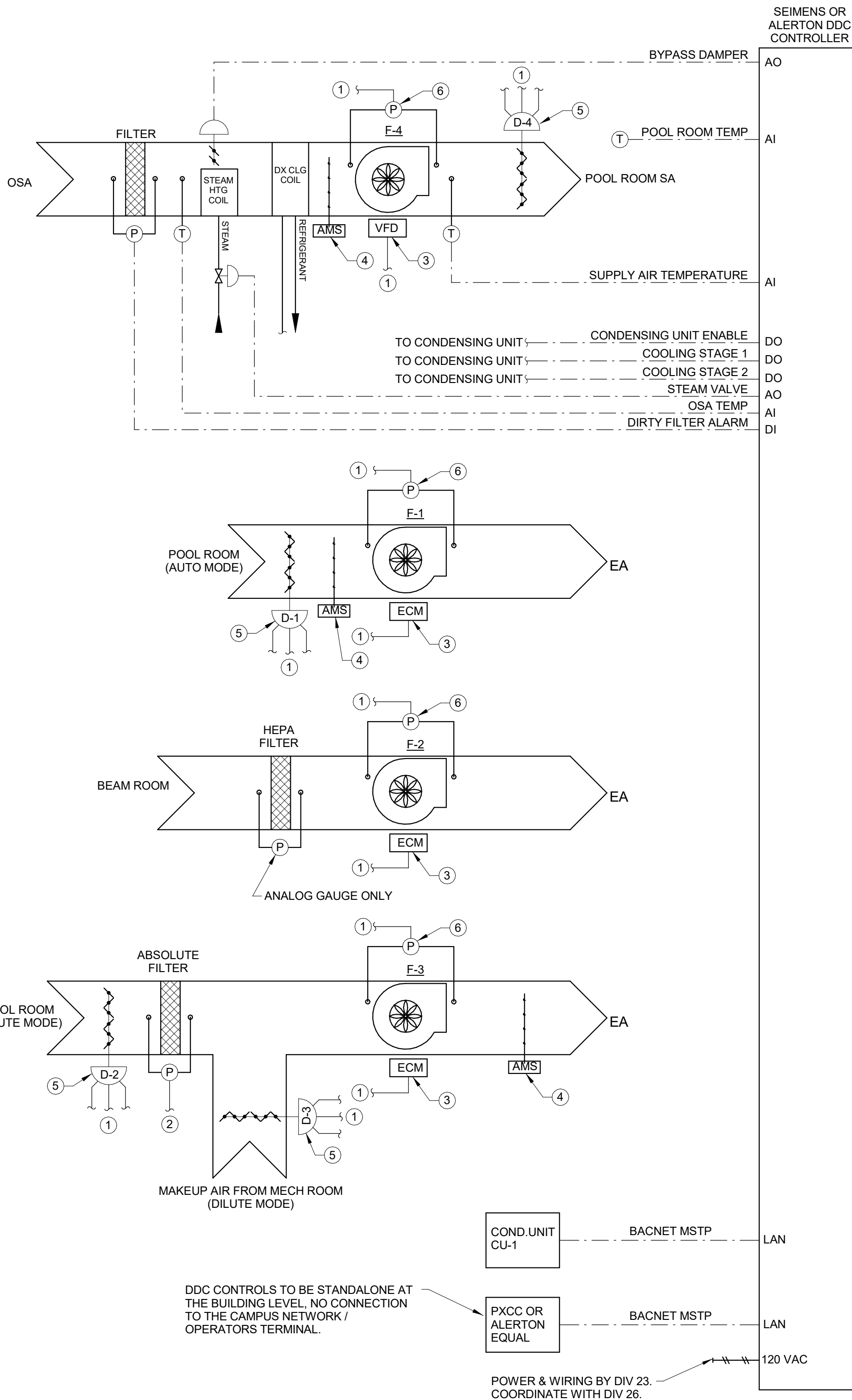
- ② RECONNECT EXISTING PNEUMATIC DIFFERENTIAL PRESSURE FEEDBACK TO GAUGE IN CONSOLE ROOM CONTROL PANEL.
- ③ VERIFY/ECM IN LOCKABLE ENCLOSURE FOR LOCAL MANUAL START/STOP INSTANT ONLY. NO DDC CONTROL INTERFACE ALLOWED. SEE ELECTRICAL PLANS FOR START/STOP CONTROL.
- ④ PROVIDE TRANSDUCER AND AIRFLOW CFM DISPLAY FOR FACTORY PIEZO RING. AIRFLOW MEASUREMENT IS FOR LOCAL MONITORING PURPOSES ONLY. READOUT / DISPLAY TO BE LOCATED BEHIND NORMALLY CLOSED / LOCKABLE ENCLOSURE. NO DDC INTERFACE ALLOWED.
- ⑤ 2-POSITION ULTRA LOW LEAKAGE DAMPER WITH NORMALLY CLOSED / SPRING RETURN 24V FAST ACTING ACTUATOR WITH DUAL END SWITCHES. SEE E-601 THRU E-603 FOR ELECTRICAL CONTROLS INCLUDING CONTROL OF DAMPER POSITION AND END-SWITCH FEEDBACK. NO DDC INTERFACE ALLOWED.
- ⑥ DIFFERENTIAL AIR PRESSURE SWITCH FOR FAN PROOF. OUTPUT TO THE ELECTRICAL CONTROL SYSTEM. NO DDC INTERFACE ALLOWED.

DDC CONTROLS SHALL BE LIMITED TO TEMPERATURE CONTROL OF THE POOL ROOM ONLY. ALL OTHER FAN AND DAMPER CONTROL SHALL BE THROUGH THE ELECTRIC CONTROL SYSTEM WITH NO DDC INTERFACE ALLOWED. SEE ELECTRICAL DRAWINGS E-601, E-602 AND E-603 FOR BOTH ELECTRICAL CONTROL DIAGRAMS AND DETAILS ON THE DIFFERENT MODES OF OPERATIONS AND HOW EACH MODE IS ENGAGED.

UPON A CALL FOR HEAT FROM THE SPACE, THE STEAM COIL VALVE SHALL MODULATE TO MAINTAIN SPACE TEMP AT SETPOINT (65 DEGREES, OR AS SET) AND THE BYPASS DAMPER SHALL BE OPEN TO THE COILS. IF THE OUTDOOR AIR TEMP FALLS BELOW 42 DEGREES, THE STEAM VALVE SHALL BE 100% OPEN AND THE FACE DAMPER SHALL MODULATE TO MAINTAIN SPACE TEMP.

IF THE SUPPLY AIR TEMP FALLS BELOW 50 DEGREES (ADJ), A LOW TEMP ALARM SHALL BE GENERATED, THE BYPASS DAMPER SHALL OPEN TO BYPASS THE COIL. AND THE STEAM VALVE SHALL OPEN 100%.

UPON A CALL FOR COOLING, THE CONDENSING UNIT SHALL BE ENABLED. COOLING SHALL BE STAGED TO MAINTAIN ROOM TEMP AT SETPOINT (80-DEGREES, OR AS SET).



1 POOL ROOM HVAC SYSTEM CONTROL DIAGRAM

Scale: NOT TO SCALE

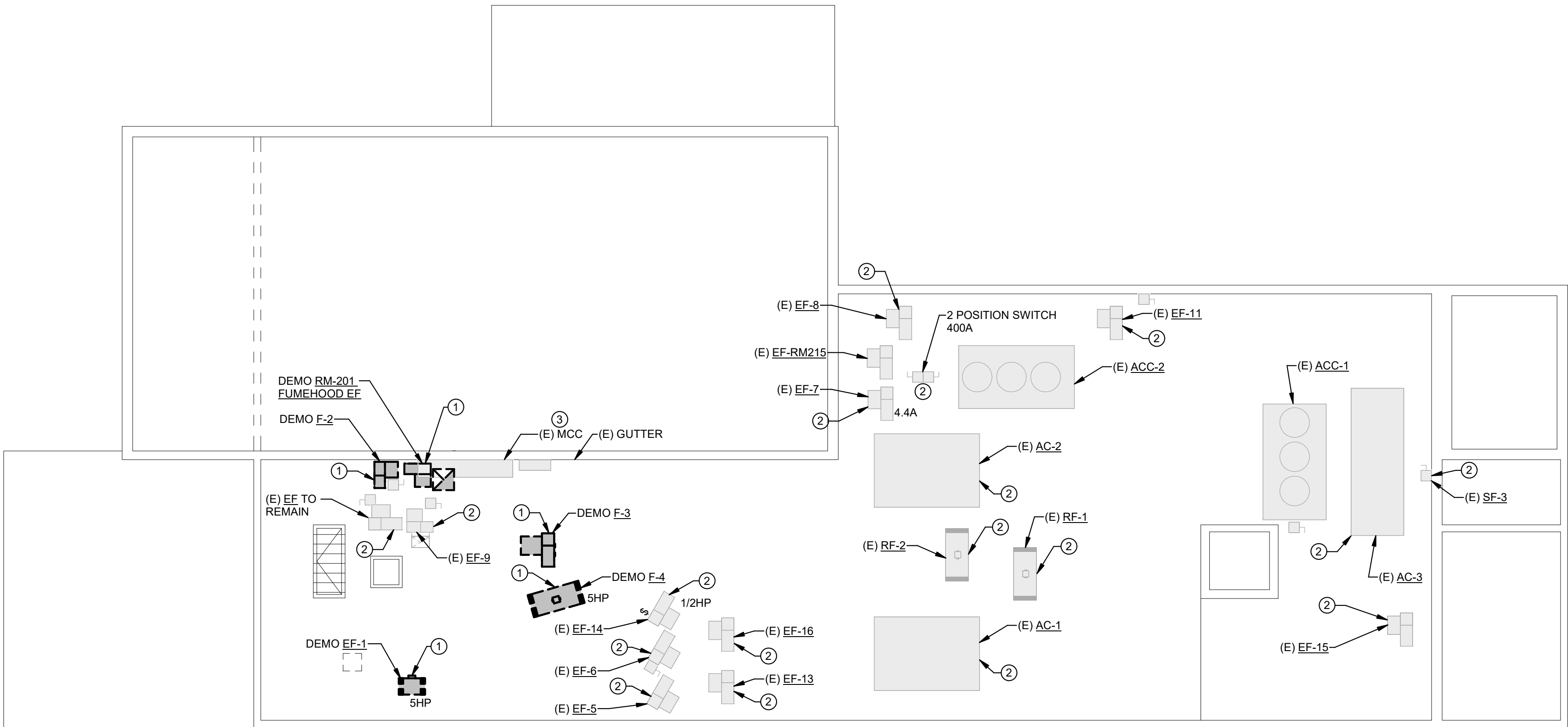
E

D

C

B

A



 **1 PENTHOUSE LEVEL - ELECTRICAL - DEMO**
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OF ALL ELECTRICAL EQUIPMENT UNLESS NOTED OTHERWISE.
2. REMOVE CONDUCTORS BACK TO OVERCURRENT PROTECTIVE DEVICE OR TO UPSTREAM DEVICE TO REMAIN. MAINTAIN CIRCUITING/CONTINUITY TO EXISTING TO REMAIN DEVICES NOT AFFECTED BY DEMOLITION. CONCEALED CONDUIT MAY REMAIN AND BE ABANDONED IN PLACE. SURFACE/EXPOSED CONDUIT TO BE REMOVED IF NO LONGER UTILIZED.
3. PROVIDE CUTTING AND PATCHING AS REQUIRED.
4. IF A PIECE OF EQUIPMENT OR DEVICE IS TO BE REPLACED, CONTRACTOR SHALL RECONNECT ALL EXISTING CONNECTIONS.

KEY NOTES

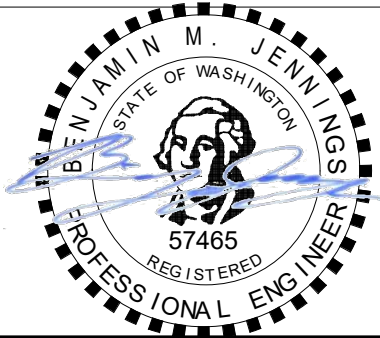
- ① EXISTING MECHANICAL UNIT TO BE REMOVED. DISCONNECT AND REMOVE ALL ASSOCIATE WIRING, CONDUIT, DISCONNECTS, ETC.
- ② EXISTING TO REMAIN EQUIPMENT TO BE RE-FED FROM (E) MCC TO NEW PANEL 'M1'. CONTRACTOR TO REMOVE/DEMOLISH ALL CONDUIT/CONDUCTORS ONCE SWITCH OVER IS COMPLETE IF NOT REUSED. SEE E-202.
- ③ EXISTING 'MCC' TO BE REMOVED ONCE ALL LOADS HAVE BEEN SWITCHED OVER TO NEW PANEL 'M1'.

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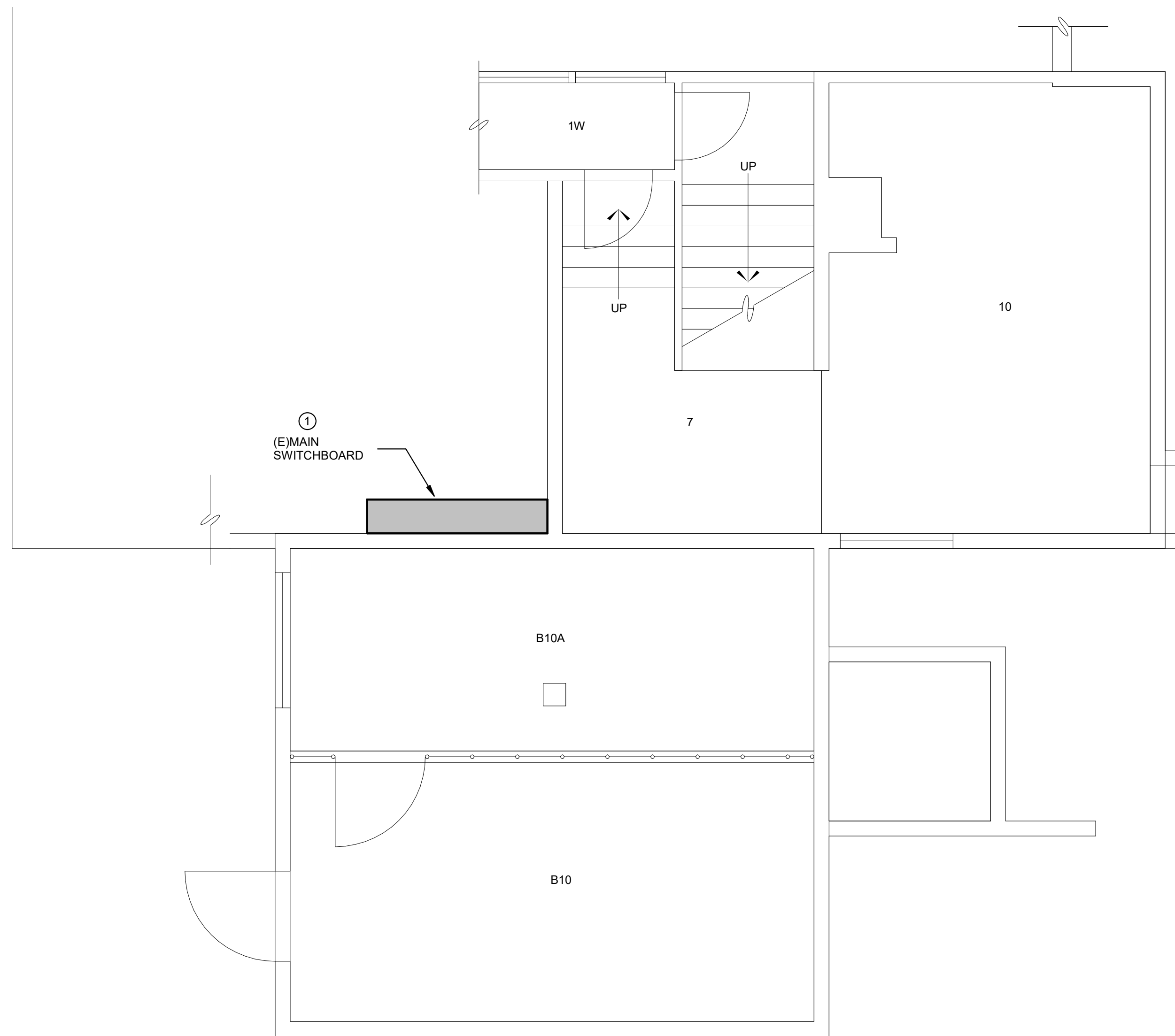
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SHEET TITLE

**PENTHOUSE LEVEL -
POWER - DEMO**

E-101

SHEET OF SHEETS



① RE-USE EXISTING 500A 3-POLE BREAKER IN EXISTING SWITCHBOARD 'MSB'. RE:E-401

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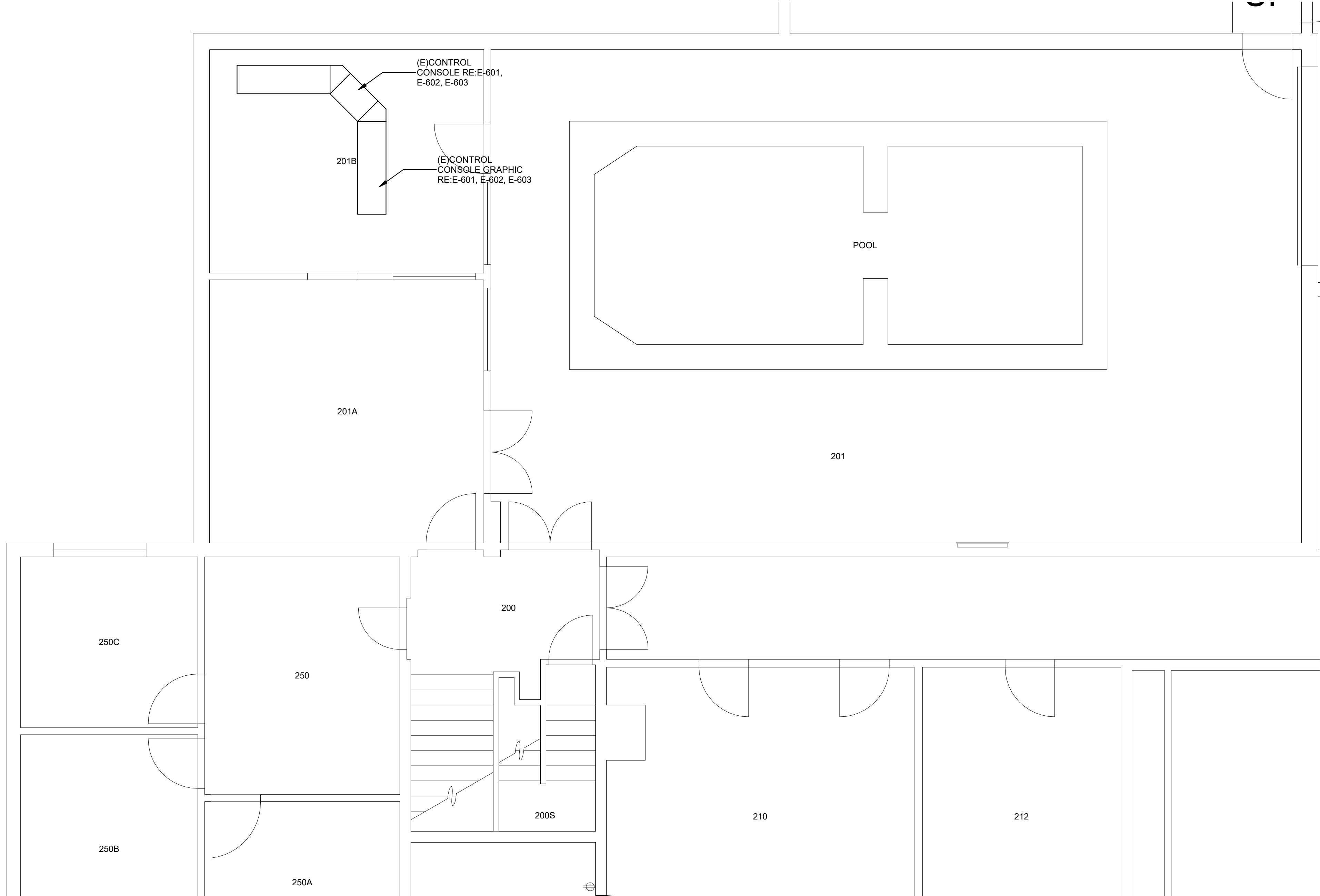
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BASEMENT & GROUND
LEVEL - POWER - NEW

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 **2 BASEMENT LEVEL - ELECTRICAL - EXISTING**
SCALE: 1/4" = 1'-0"

 **1** **2ND FLOOR LEVEL**
SCALE: 1/4" = 1'-0"

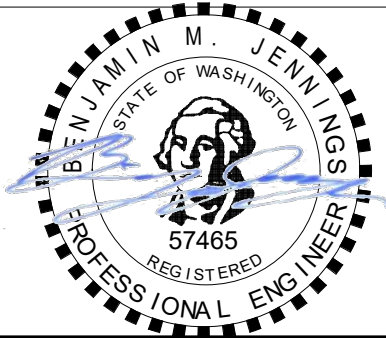


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**2ND FLOOR LEVEL -
POWER - NEW**

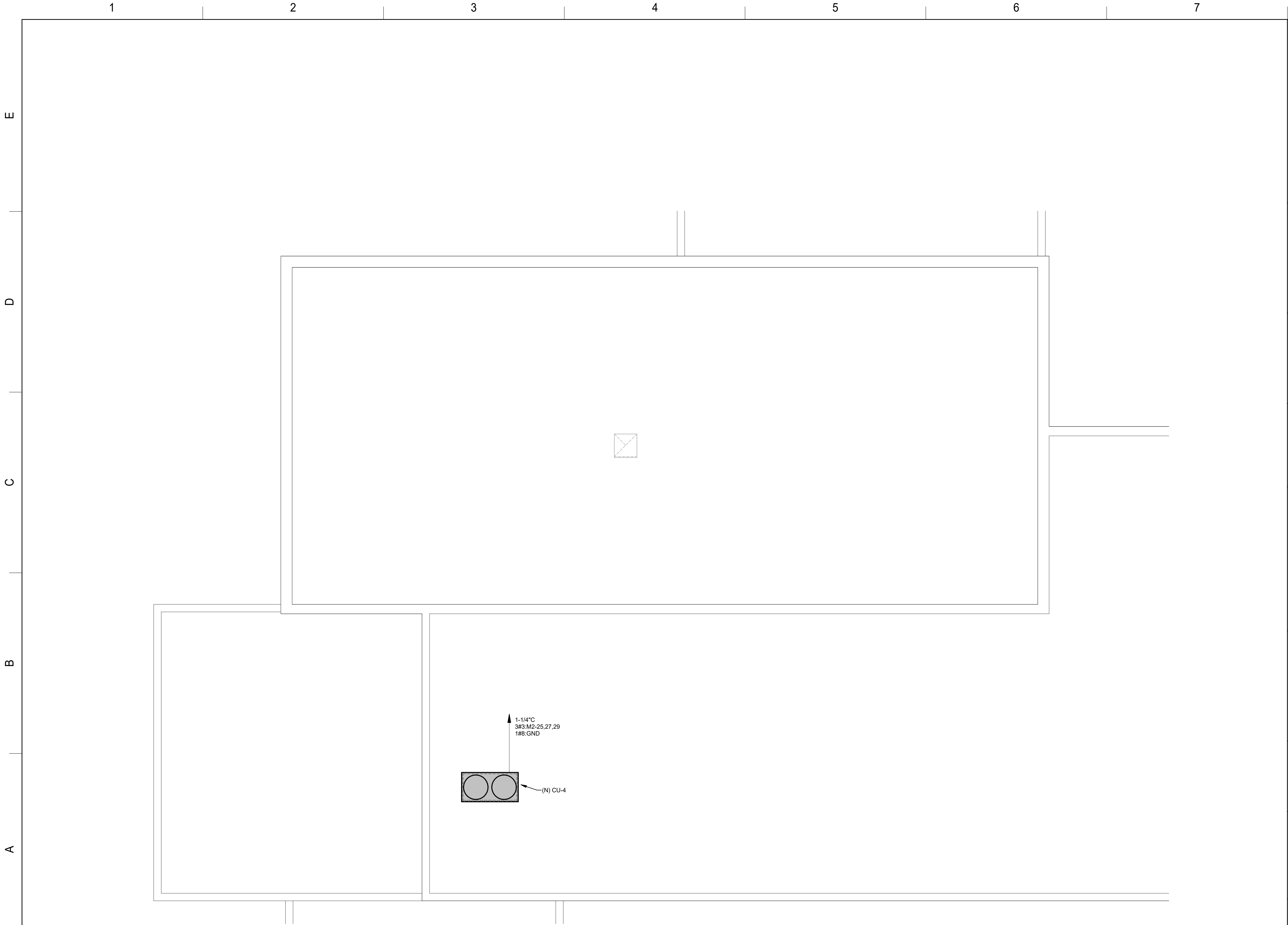
E-202

SHEET OF SHEETS



- ① PROVIDE NEW NEMA 1/30/3 LOCAL MOTOR DISCONNECT WITH LOCK OUT / TAG OUT PROVISIONS.
- ② PROVIDE NEW NEMA 1/60/3 LOCAL MOTOR DISCONNECT WITH LOCK OUT / TAG OUT PROVISIONS.
- ③ ROUTE THROUGH NEW STARTER LOCATED ON NEW RACK. PROVIDE NEMA SIZE 0 STARTER. RE: E-401-1,2
- ④ ROUTE THROUGH NEW STARTER LOCATED ON NEW RACK. PROVIDE NEMA SIZE 1 STARTER. RE: E-401-1,2
- ⑤ ROUTE THROUGH NEW STARTER LOCATED ON NEW RACK. PROVIDE NEMA SIZE 2 STARTER. RE: E-401-1,2
- ⑥ EF-X LOAD TO BE FIELD VERIFIED. LOAD IS ASSUMED TO BE 1 HP. CONTRACTOR TO NOTIFY ECR IF LOAD IS LARGER.
- ⑦ PULL BACK EXISTING MCC FEEDER TO EXISTING J-BUS. INTERCEPT AND EXTEND EXISTING 500A FEEDER TO NEW PANEL(S) M1 & M2 ONCE ALL LOADS HAVE BEEN TRANSITIONED OFF OF EXISTING MCC TO NEW PANEL(S) M1* AND M2*. PROVIDE NEW SPLICE BOX ABOVE EXISTING J-BUS.
- ⑧ VFD IS OWNER FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR TO MAKE FINAL CONNECTION(S).
- ⑨ PROVIDE BELDEN #29505 BETWEEN VFD AND MOTOR.

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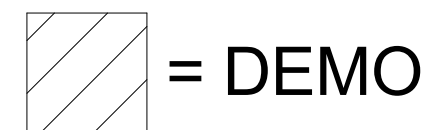
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SHEET TITLE

ROOF PLAN - POWER -
NEW

E-204

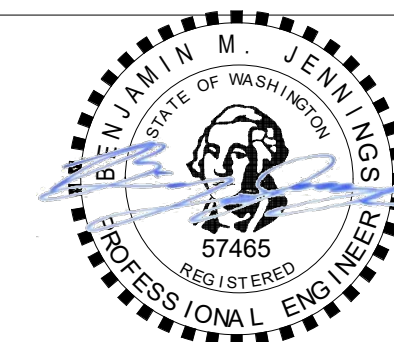
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SHEET TITLE

ELECTRICAL ONE-LINE AND DETAILS

E-401

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SHEET TITLE

ELECTRICAL SCHEDULES AND DETAILS

E-402

SHEET

OF

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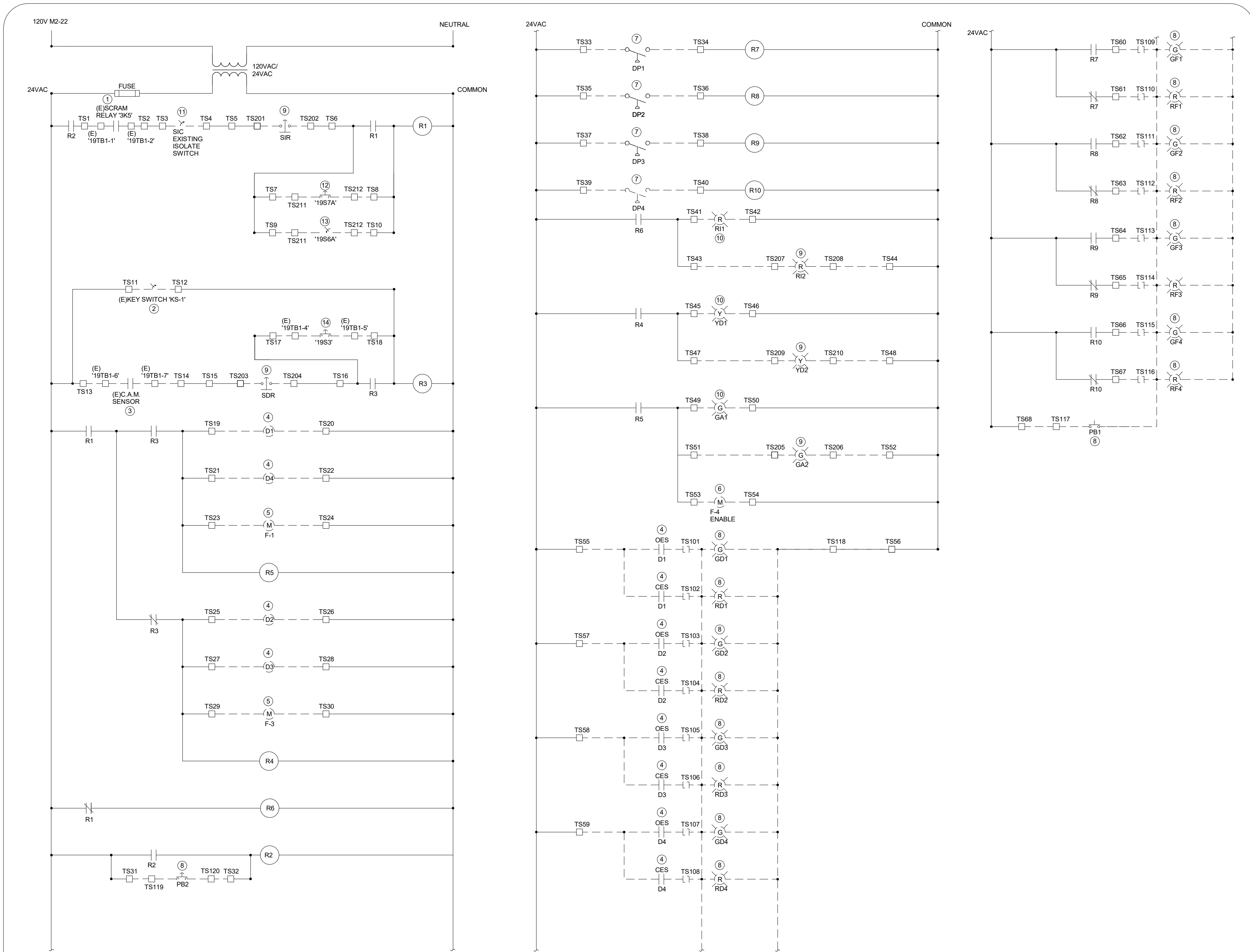
CONTROL SCHEMATIC - RELAY PANEL 'RP-1'

E-601

SHEET

OF

SHEETS



1 POOL ROOM VENTILATION SYSTEM RELAY PANEL 'RP-1' SCHEMATIC
Scale: NOT TO SCALE

GENERAL NOTES

1. CONTRACTOR PROVIDE AND INSTALL ALL VOLTAGE WIRING/CABLING, CONTROL PANEL(S), POWER SUPPLIES, TERMINATIONS, CONDUIT, INDICATION, RELAYS, ETC. FOR A COMPLETE AND OPERATIONAL SYSTEM.
2. VERY CLOSE COORDINATION WITH SITE OPERATIONS PERSONNEL WILL BE REQUIRED TO IDENTIFY EXISTING SYSTEM(S) AND LOCATIONS.
3. PANELS AND WIRING SCHEMATICS ARE MEANT TO COVER OVERALL DESIGN INTENT AND DON'T INDICATE ALL PARTIES/PIECES REQUIRED FOR A FULLY OPERATIONAL SYSTEM. CONTRACTOR TO PROVIDE DETAILED SHOP DRAWINGS OF ALL PANELS AND COMPONENTS REQUIRED FOR A FULLY OPERATION SYSTEM.
4. REFER TO SHEET E-601, E-602, AND E-603 FOR ADDITIONAL CONTROL SYMBOLS/REQUIREMENTS.
5. REFER TO SHEET E-603 FOR SEQUENCE OF OPERATION, CONTROL SYMBOL LEGEND, AND NEW POOL VENTILATION SYSTEM CONTROL MATERIAL.

KEYED NOTES

- 1 INTERCEPT AND EXTEND EXISTING SCRAM RELAY CONTACTS. EXISTING TERMINALS UTILIZED ARE "197B1-1" AND "197B1-2". TERMINALS ARE LOCATED IN EXISTING POOL ROOM CONSOLE PANEL.
- 2 EXISTING SCRAM RELAY CONTACTS AS INDICATING TO NEW PANEL RP-1 AS INDICATED. UPON SCRAM ALARM RELAY RY1 TO LOSE POWER AND INITIATE C.A.M. MESSAGE. EXISTING EXO-CRUMS CABLEING TO BE VERIFIED/COORDINATE WITH SITE PERSONNEL PRIOR TO ANY WORK BEING COMPLETED.
- 3 INTERCEPT AND EXTEND EXISTING KEY SWITCH KS-1 CONDUCTORS IN EXISTING POOL ROOM CONSOLE. NEW RELAY TERMINALS AS INDICATED, WHEN KEY IS INSERTED AND TURNED SWITCH IS OPEN.
- 4 INTERCEPT AND EXTEND EXISTING C.M. RELAY CONTACT CABLEING. TERMINALS UTILIZED ARE "197B1-1" "197B1-2". TERMINALS ARE LOCATED IN EXISTING POOL ROOM CONSOLE PANEL.
- 5 EXISTING EXISTING C.A.M. CONTACT CABLEING TO NEW PANEL RP-1 AS INDICATED. UPON C.A.M. ALARM, RELAY RY3 TO LOSE POWER AND INITIATE "DILUTE" MODE. EXIST EXISTING C.A.M. CABLEING TO BE VERIFIED/COORDINATED WITH SITE PERSONNEL PRIOR TO ANY WORK BEING COMPLETED.
- 6 DAMPER AND DAMPER END SWITCHES LOCATED ON MECHANICAL MEZZANINE. VERIFY EXACT LOCATION WITH DIV 23.
- 7 STARTER LOCATED ON MECHANICAL MEZZANINE. RE-2022
- 8 CONNECT TO F-4" VFD ENABLE. RE-2022
- 9 DIFFERENTIAL PRESSURE SWITCH LOCATED ON MECHANICAL MEZZANINE. VERIFY EXACT LOCATION WITH DIV 23.
- 10 LOCATED IN POOL ROOM VENTILATION SYSTEM DISPLAY. RE-6022
- 11 LOCATED IN REMOTE CONTROL PANEL "CP-1" IN LOBBY. RE-201-1 E-603
- 12 DISCONNECT AND REUSE EXISTING TO REMAIN INDICATION LIGHT LOCATED IN POOL ROOM CONSOLE. DISCONNECT AND RECONNECT TO RELAY PANEL RP-1 AS INDICATED.
- 13 SWITCH IS EXISTING AND IS LOCATED IN POOL ROOM CONSOLE. EXISTING SWITCH TO BE DISCONNECTED AND RECONNECTED TO RP-1 AS INDICATED.
- 14 EXISTING ISOLATE RESET SWITCH "195B7A" LOCATED IN POOL ROOM CONSOLE. RE-201-1 E-202
- 15 EXISTING ISOLATE RESET KEY SWITCH "195B6A" LOCATED IN REMOTE CONTROL PANEL "CP-1" IN LOBBY. RE-201-1, E-603
- 16 EXISTING DILUTE RESET SWITCH LOCATED IN EXISTING POOL ROOM CONSOLE. INTERCEPT AND EXTEND EXISTING SWITCH CONDUCTOR TO NEW RELAY PANEL AS INDICATED.

1. CONTRACTOR PROVIDE AND INSTALL ALL VOLTAGE WIRING/CABLING, CONTROL PANEL(S), POWER SUPPLIES, TERMINATIONS, CONDUIT, INDICATION, REMOVALS, ETC. FOR A COMPLETE AND OPERATIONAL SYSTEM.
2. VERY CLOSE COORDINATION WITH SITE OPERATIONS PERSONNEL WILL BE REQUIRED TO IDENTIFY EXISTING SYSTEM(S) AND LOCATIONS.
3. PANELS AND WIRING SCHEMATICS ARE MEANT TO CONVEY OVERALL DESIGN INTENT AND DONT INDICATE ALL PART/PICES REQUIRED FOR A FULLY OPERATIONAL SYSTEM. CONTRACTOR TO PROVIDE DETAIL SHOP DRAWINGS OF ALL PANEL(S) AND COMPONENTS REQUIRED FOR A FULLY OPERATION SYSTEM.
4. REFER TO SHEET E-601, E-602, AND E-603 FOR ADDITIONAL CONTROL SCHEMATICS/REQUIREMENTS.
5. REFER TO SHEET E-603 FOR SEQUENCE OF OPERATION, CONTROL SYMBOL LEGEND, AND NEW POOL ROOM VENTILATION SYSTEM CONTROL MIX.

- ① EXISTING ARGON PUMP INDICATION CABLING TO BE DISCONNECTED FROM EXISTING CONSOLE GRAPHIC AND RECONNECTED TO NEW CONSOLE GRAPHIC INDICATION LIGHTS. COORDINATE EXACT EXISTING CABLING LOCATION(S) WITH SITE PERSONNEL.
- ② EXISTING FILTER GAUGE TO BE REMOVED FROM EXISTING DISPLAY GRAPHIC AND RE-INSTALLED IN NEW DISPLAY GRAPHIC.

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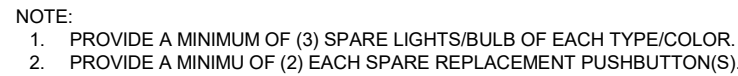
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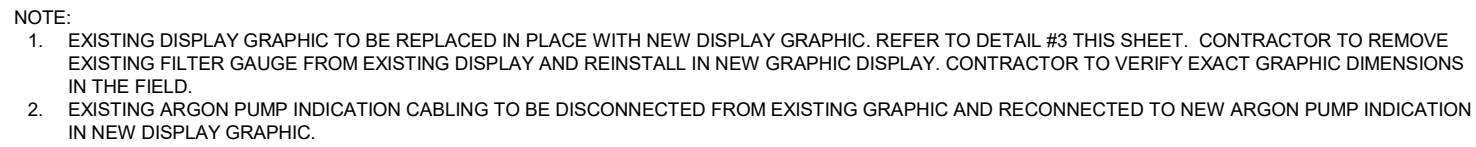
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CONTROL SCHEMATIC - CONSOLE GRAPHIC

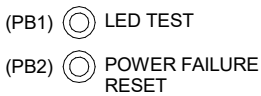
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SEQUENCE OF OPERATION

ISOLATION MODE:
SWITCH 'SIC', SWITCH 'SIR', RELAY 'R2' NORMALLY OPEN CONTACTS, OR 'SCRAM' RELAY CONTACT IS OPENED.

- RELAY 'R1' LOSES POWER, RELAY 'R1' NORMALLY CLOSED CONTACT CLOSES AND INDICATOR LIGHTS 'R1' AND 'R2' TURN ON. RELAY 'R1' NORMALLY OPEN CONTACT OPENS WHICH INTERRUPTS POWER TO RELAY 'R3' NORMALLY OPEN AND NORMALLY CLOSED CONTACTS.
- DAMPERS 'D1', 'D2', 'D3', 'D4' SPRING TO CLOSE POSITION.
 - INDICATOR LIGHTS 'RD1', 'RD2', 'RD3' AND 'RD4' TURN ON WHEN ASSOCIATED DAMPERS ENGAGE DAMPER CLOSE END SWITCHES.
- STARTERS FOR 'F-1' AND 'F-3' ARE DISENGAGED AND SHUTS DOWN FANS 'F-1' AND 'F-2'. ENABLE SIGNAL TO 'F-4' VFD IS REMOVED AND 'F-4' SHUTS DOWN.
 - INDICATOR LIGHTS 'RF1', 'RF3', AND 'RF4' TURN ON WHEN ASSOCIATED DIFFERENTIAL PRESSURE SWITCHES OPEN.
- ISOLATION MODE RESET - RELAY 'R1' MUST BE RESET VIA '19S7A' OR '19S6A' IF ISOLATION MODE IS ENGAGED FOR ANY REASON OR IF UTILITY POWER IS LOST.

DILUTE MODE:
SWITCH 'SIC', SWITCH 'SIR', RELAY 'R2' NORMALLY OPEN CONTACTS, AND 'SCRAM' RELAY CONTACT ARE CLOSED. EXISTING KEY SWITCH 'KS-1' IN CONSOLE IS IN OPEN POSITION. EXISTING CAM SENSOR RELAY IS OPEN OR SWITCH 'SDR' IS OPENED. INDICATOR LIGHTS 'YD1' AND 'YD2' TURN ON.

- RELAY 'R3' LOSES POWER, RELAY 'R3' NORMALLY OPEN CONTACT OPENS AND RELAY 'R3' NORMALLY CLOSED CONTACT CLOSES.
 - DAMPERS 'D2' AND 'D3' OPEN. DAMPERS 'D1' AND 'D4' SPRING CLOSE.
 - INDICATOR LIGHTS 'GD2' AND 'GD3' TURN ON WHEN ASSOCIATED DAMPERS ENGAGE DAMPER OPEN END SWITCHES.
 - INDICATOR LIGHTS 'RD1' AND 'RD2' TURN ON WHEN ASSOCIATED DAMPER ENGAGE DAMPER CLOSED END SWITCHES.
 - STARTER FOR 'F-3' IS ENGAGED AND STARTS FAN 'F-3'. STARTER 'F-1' IS DISENGAGED AND SHUTS DOWN FAN 'F-1'. ENABLE SIGNAL TO 'F-4' VFD IS REMOVED AND 'F-4' SHUTS DOWN.
 - INDICATOR LIGHTS 'RF1', 'RF4' TURN ON WHEN ASSOCIATED PRESSURE SWITCHES OPEN.
 - INDICATOR LIGHTS 'GF3' TURN ON WHEN ASSOCIATED PRESSURE SWITCHES CLOSE.
 - RELAY 'R4' IS POWERED AND RELAY 'R4' NORMALLY OPEN CONTACTS CLOSE.
 - INDICATOR LIGHTS 'YD1' AND 'YD2' TURN ON.
- DILUTE MODE RESET - RELAY 'R3' MUST BE RESET VIA '19S2' IF DILUTE MODE IS ENGAGED FOR ANY REASON OR IF UTILITY POWER IS LOST.
- IF KEY SWITCH 'KS-1' IS CLOSED THEN SYSTEM CANNOT GO INTO 'DILUTE MODE' AND REMAINS IN 'AUTO MODE' UNLESS IN 'ISOLATION MODE'.

AUTO MODE:
SWITCH 'SIC', SWITCH 'SIR', RELAY 'R2' NORMALLY OPEN CONTACTS, AND 'SCRAM' RELAY CONTACT ARE CLOSED. EXISTING KEY SWITCH 'KS-1' IN CONSOLE IS OPEN OR CLOSED. EXISTING CAM SENSOR RELAY AND SWITCH 'SDR' IS CLOSED.

- RELAY 'R3' IS ENGAGED AND HAS POWER, RELAY 'R3' NORMALLY OPEN CONTACT CLOSES AND RELAY 'R3' NORMALLY CLOSED CONTACT OPENS.
 - DAMPERS 'D1' AND 'D4' OPEN. DAMPERS 'D2' AND 'D3' SPRING CLOSE.
 - INDICATOR LIGHTS 'GD1' AND 'GD4' TURN ON WHEN ASSOCIATED DAMPERS ENGAGE DAMPER OPEN END SWITCHES.
 - INDICATOR LIGHTS 'RD2' AND 'RD3' TURN ON WHEN ASSOCIATED DAMPER ENGAGE DAMPER CLOSED END SWITCHES.
 - STARTER SIGNAL FOR 'F-1' IS ENGAGED AND STARTS FAN 'F-1'. STARTER SIGNAL FOR 'F-3' IS DISENGAGED AND SHUTS DOWN FAN 'F-3'. ENABLE SIGNAL TO 'F-4' VFD IS ENGAGED AND ALLOWS 'F-4' TO OPERATE NORMALLY.
 - INDICATOR LIGHTS 'RF3' TURN ON WHEN ASSOCIATED PRESSURE SWITCHES OPEN.
 - INDICATOR LIGHTS 'GF1' AND 'GF4' TURN ON WHEN ASSOCIATED PRESSURE SWITCHES CLOSE.
 - RELAY 'R5' IS ENGAGED AND HAS POWER. RELAY 'R5' NORMALLY OPEN CONTACT IS CLOSED.
 - ENABLE SIGNAL TO 'F-4' VFD IS ENGAGED AND ALLOWS 'F-4' TO OPERATE NORMALLY.
 - INDICATOR LIGHTS 'GA1' AND 'GA2' TURN ON.

EXISTING CONSOLE KEY SWITCH:
IF SWITCH IS CLOSED SYSTEM 'DILUTE MODE' IS OVERRIDDEN TO NOT OPERATE. AUTO MODE IS ONLY ALLOWED UNLESS 'ISOLATION MODE' IS ENGAGED.

RESET AFTER UTILITY POWER LOSS:
SYSTEM TO BE RESET EACH TIME UTILITY POWER LOSS OCCURS. UPON LOSS OF POWER RELAY 'R2' (2) NORMALLY OPEN CONTACTS OPEN. RELAY 'R1' LOSES POWER AND SYSTEM IS PLACED IN ISOLATION MODE. RELAY 'R2' CAN BE RESET BY PRESSING PUSHBUTTON '19S2' WHICH RE-ENGAGES RELAY 'R2', CLOSING 'R2' NORMALLY OPEN CONTACTS, AND ALLOWING POWER TO 'R1' WHICH IN TURN ALLOWS FOR SYSTEM TO SWITCH OUT OF 'ISOLATION MODE'.

CONTROL SYMBOL LEGEND

NEW POOL ROOM VENTILATION SYSTEM CONTROL MATRIX

POOL ROOM VENTILATION SYSTEM

ISOLATE

DILUTE

AUTO

ISOLATE

DILUTE

AUTO

ISOLATE

DILUTE

AUTO

REMOTE CONTROL PANEL 'CP-1' FRONT

Scale: NOT TO SCALE

TS201

TS202

TS203

TS204

TS205

TS206

TS207

TS208

TS209

TS210

TS9

TS211

TS212

TS10

REMOTE CONTROL PANEL 'CP-1' FRONT

Scale: NOT TO SCALE

EXISTING ISOLATE RESET KEY SWITCH

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DESIGN FIRM:

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RE-BID - DODGEN RESEARCH FACILITY (0074)
NUCLEAR SCIENCE CENTER HVAC RENEWAL

1687-2022

8/1/23

RE-BID SET

CAD DWG FILE:

DESIGNED BY: BMJ

DRAWN BY: RID

CHECKED BY: BMJ

PROJECT No. 1687-2022

FILE No: 17-M-035

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SHEET TITLE

SEQUENCE OF OPERATIONS & 'CP-1' SCHEMATIC

E-603

SHEET OF SHEETS