GENERAL NOTES

- CONTRACTOR SHALL PROTECT ANY TREES AND RESTORE LAWN/LANDSCAPING & SIDEWALKS IN DESIGNATED LAY-DOWN AREA AT PROJECT COMPLETION.
- LOADING DOCK IS AVAILABLE FOR USE AS NEEDED, BUT ACCESS MUST BE MAINTAINED AT ALL TIMES FOR ACTIVE SET DESIGN SHOP. USE FOR DELIVERIES SHALL BE COORDINATED WITH SET DESIGN SHOP & MSU PROJECT MANAGER.
- MSU PROMENADE IS CONSTRUCTED OF 6" REINFORCED CONCRRTE AND IS DRIVEABLE FOR DELIVERIES. ALL DELIVERIES SHALL BE COORIDNATED IN ADVANCE WITH MSU PROJECT MANAGER.
- DESIGNATED OVERFLOW PARKING LOTS ARE AS FOLLOWS: LOTS 21, 22, 23N, 23S, 24, 26, 27, 28, 28S, 29, 45, 46, 47, 48, 49, 60, 61 & CAR PARC DIEM. PLEASE NOTE, ALL VEHICLES MUST BE REGISTERED WITH MSU PARKING SERVICES.



254 WITHERSPOON STREET, PRINCETON, (T) 609 924 5004

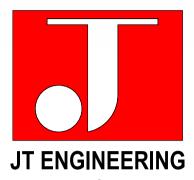
MECHANICAL/ ELECTRICAL/ PLUMBING/ FIRE PROTECTION

NEW JERSEY 08542

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10-23-2024 ADDENDUM 1

SEAL

STATE OF NEW JERSEY REGISTERED ARCHITECT MARK SULLIVAN NJ 13746

PROJECT NAME

VIRTUAL REALITY **CLASSROOM & DEVELOPMENT**

LAB AT L. HOWARD FOX STUDIO THEATRE
MONTCLAIR STATE UNIVERSITY

MSU PROJECT #PR24C009 DRAWING NAME

SITE LOGISTICS **DIAGRAMS**

12-22-2023 SCALE: 1 1/2" = 1'-0"

T3-1





- PROJECT LOCATION

MONTCLAIR STATE
UNIVERSITY

PLEASE NOTE: ALL VEHICLES MUST BE REGISTERED WITH MSU PARKING SERVICES

LEGEND:

OVERFLOW PARKING LOTS

- A) THE WORK TO BE DONE UNDER THESE SPECIFICATIONS AND THE DRAWINGS CONSISTS OF FURNISHING ALL EQUIPMENT, MATERIALS, LABOR AND SERVICES, AND PERFORMING ALL OPERATIONS TO COMPLETE THE MECHANICAL CONSTRUCTION WORK FOR THIS PROJECT. ANY WORK NOT SPECIFICALLY COVERED BY THESE SPECIFICATIONS OR INDICATED ON THE MECHANICAL/ELECTRICAL PLANS, BUT NECESSARY TO COMPLETE OR PERFECT ANY PART OF THIS INSTALLATION IN A SUBSTANTIAL MANNER, SHALL BE
- PROVIDED WITHOUT EXTRA COST TO OWNER. B) INSTALLATION AND COORDINATION OF HVAC REQUIREMENTS IS THE RESPONSIBILITY OF MECHANICAL CONTRACTOR. FINAL SYSTEM INSTALLATION TO MEET THE APPROVAL OF ARCHITECT & OWNER.
- C) THE TERM "FURNISH" SHALL MEAN TO OBTAIN AND SUPPLY TO THE JOB SITE. THE TERM "INSTALL" SHALL MEAN TO FIX IN POSITION AND CONNECT FOR USE. THE TERM "PROVIDE" SHALL MEAN TO FURNISH AND INSTALL. THE TERM "MECHANICAL WORK" OR "WORK" SHALL MEAN ALL LABOR, MATERIAL, EQUIPMENT. SCAFFOLDING, RIGGING, TOOLS, SUPERVISION SERVICES AND OTHER INCIDENTALS NECESSARY FOR
- D) THE DRAWINGS INDICATE DIAGRAMMATICALLY THE EXTENT, GENERAL CHARACTER AND LOCATION OF THE WORK INCLUDED. OFFSETS OR CHANGES IN DUCT SHAPE TO AVOID STRUCTURAL OR OTHER INTERFERENCES, AND WORK INDICATED BUT HAVING MINOR DETAILS OBVIOUSLY OMITTED SHALL BE
- PROVIDED WITHOUT EXTRA COST. ALL CONNECTIONS TO EQUIPMENT SHALL BE PROVIDED. E) CONTRACTOR SHALL VERIFY FIELD CONDITIONS AT THE SITE AND NOTIFY THE OWNER/ENGINEER OF ANY DISCREPANCIES PRIOR TO COMMENCING WITH THE WORK.
- F) ANY CHANGES AND/OR MODIFICATIONS MUST BE REVIEWED AND APPROVED BY THE CONSULTING ENGINEER OR OWNER'S REPRESENTATIVE PRIOR TO CONSTRUCTION
- G) REMOVE ALL TRASH, DEBRIS AND DEMOLITION MATERIAL FROM PREMISES AT THE END OF EACH WORK
- H) SCHEDULE ALL WORK, CUTTING AND BUILDING SERVICE INTERRUPTIONS WITH BUILDING OWNER AND CONSTRUCTION MANAGER, PRIOR TO COMPLETING WORK.

1.02 SUMMARY OF WORK

- A) PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY FOR THE INSTALLATION OF COMPLETE HVAC SYSTEM FOR THE GROUND FLOOR SPACE AS INDICATED.
- 1. PROVIDE NEW SPLIT SYSTEM SYSTEM THAT INCLUDES BUT NOT LIMITED TO INDOOR AC UNITS, OUTDOOR UNIT REFRIGERANT PIPING, CONDENSATE DRAIN, INSULATION, HANGERS, SUPPORTS, CONTROLS AND WIRING ETC. 2. PROVIDE TEMPERATURE CONTROLS INTERLOCKED WITH BMS SYSTEM. EACH AC UNIT SHALL HAVE ITS OWN THERMOSTAT. INCLUDE ALL CONTROL AND INTERLOCKING 120 VOLT AND LOW VOLTAGE WIRING
- WITH OWNER AND ENGINEER 3 PROVIDE ALL REFRIGERANT AND CONDENSATE DRAIN PIPING, HANGERS, SUPPORTS, INSULATION, ETC.

WHERE REQUIRED. PROVIDE CONTROL DEVICES AS REQUIRED AND INDICATED. COORDINATE ALL WORK

- AS INDICATED. PROVIDE ALL REFRIGERANT IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS 4. PROVIDE NEW VAV SYSTEM. THIS SHALL INCLUDE, BUT NOT LIMITED TO HOT WATER COIL, PIPING AND
- DUCTWORK AS INDICATED. PROVIDE TEMPERATURE CONTROL SYSTEM INTERLOCKED WITH BMS. 5. PROVIDE MANUFACTURER'S STARTUP AND FINAL TESTING AND BALANCING OF THE NEW MECHANICAL
- MODIFY THE EXISTING DUCTWORK TO ACCOMMODATE THE NEW MECHANICAL EQUIPMENT. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO, REMOVAL AND REINSTALLATION OF DUCT WORK AND AIR
- B) UPON COMPLETION OF WORK, THE CONTRACTOR SHALL BALANCE, ADJUST AND TEST ALL AIR DISTRIBUTION SYSTEMS, AND CONTROLS.
- C) CONTRACTOR SHALL COORDINATE ALL WORK WITH OTHER TRADES AND FIELD PRIOR TO INSTALLATION OF ANY WORK. REPORT ALL CONFLICTS IMMEDIATELY TO OWNER AND ENGINEER.
- D) ANY CHANGES AND/OR MODIFICATIONS MUST BE REVIEWED AND APPROVED BY THE ENGINEER OR OWNER'S REPRESENTATIVE PRIOR TO CONSTRUCTION.
- E) COORDINATE LOCATION OF NEW PIPING, AIR DEVICES AND EQUIPMENT WITH LIGHT FIXTURES, STRUCTURAL STEEL, CABLE TRAYS, EXISTING MECHANICAL SYSTEM COMPONENTS, PIPING, ETC
- F) THE CONTRACTOR SHALL FURNISH A SCHEDULE INDICATING TIME REQUIRED FROM RECEIPT OR ORDER G) THE DRAWINGS ARE DIAGRAMMATIC AND ALL SPECIALTIES AND APPURTENANCES ARE NOT SHOWN, BUT
- SHALL BE PROVIDED AS REQUIRED FOR A COMPLETE AND FULLY OPERATIONAL SYSTEM.
- A) IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY FIELD CONDITIONS AT THE SITE AND NOTIFY THE OWNER OF ANY DISCREPANCIES PRIOR TO AWARDING OF BID.
- B) ANY CHANGES AND/OR MODIFICATIONS MUST BE REVIEWED AND APPROVED BY ENGINEER PRIOR TO BID

1.04 CUTTING AND PATCHING

- A) CUTTING AND PATCHING OF ALL GENERAL BUILDING COMPONENTS SHALL BE PERFORMED BY THIS
- CONTRACTOR, UTILIZING WORKMEN SKILLED IN THE PARTICULAR TRADES INVOLVED. B) COORDINATE AND SCHEDULE WITH BUILDING OWNER AND CONSTRUCTION MANAGER THE CUTTING AND PATCHING OF BUILDING COMPONENTS TO ACCOMMODATE THE INSTALLATION OF MECHANICAL
- C) DO NOT ENDANGER OR DAMAGE INSTALLED WORK THROUGH PROCEDURES AND PROCESSES OF CUTTING
- D) ARRANGE FOR REPAIRS REQUIRED TO RESTORE OTHER WORK, BECAUSE OF DAMAGE CAUSED AS A
- RESULT OF MECHANICAL AND ELECTRICAL INSTALLATIONS. E) NO ADDITIONAL COMPENSATION WILL BE AUTHORIZED FOR CUTTING AND PATCHING WORK THAT IS NECESSITATED BY ILL-TIMED. DEFECTIVE. OR NON-CONFORMING INSTALLATIONS.
- F) PERFORM CUTTING, FITTING, AND PATCHING OF MECHANICAL AND ELECTRICAL EQUIPMENT AND
- MATERIALS REQUIRED OR INDICATED. G) EFFECTIVELY PROTECT ALL MATERIALS AND EQUIPMENT FROM DUST, DIRT AND DAMAGE UNTIL FINAL ACCEPTANCE. CLOSE ALL PIPE AND EQUIPMENT OPENINGS DURING CONSTRUCTION WITH SUITABLE PROTECTIVE COVERING FOR EQUIPMENT AND MATERIALS BEFORE, DURING AND FOLLOWING
- INSTALLATION. PROVIDE NEW MATERIALS AND EQUIPMENT TO REPLACE SIMILAR ITEMS DAMAGED BY MECHANICAL CONTRACTOR WITHOUT ADDITIONAL COST TO THE OWNER. H) PROTECT THE STRUCTURE, FURNISHINGS, FINISHES, AND ADJACENT MATERIALS NOT INDICATED OR
- SCHEDULED TO BE REMOVED. I) ALL NEW THROUGH PENETRATIONS SHALL BE FIRE-STOPPED IN ACCORDANCE WITH THE APPROPRIATE
- UL DETAIL FOR THE CONSTRUCTION TYPE. 1.05 REFERENCED STANDARDS AND DEFINITIONS
- A) ALL WORK SHALL MEET OR EXCEED THE LATEST REQUIREMENT OF THE UNIFORM CONSTRUCTION CODE OF THE STATE OF NEW JERSEY, NATIONAL ELECTRIC CODE AND THE NFPA CODE AND OTHER
- B) COMPLY WITH APPLICABLE UTILITY COMPANY RULES AND REGULATIONS.

AUTHORITIES EXERCISING JURISDICTION OF THE WORK OF THIS PROJECT

- C) COMPLY WITH OCCUPATIONS SAFETY AND HEALTH ACT (OSHA) REQUIREMENTS. D) SECURE ALL REQUIRED PERMITS AND INSPECTION CERTIFICATES AND TRANSMIT SAME TO THE OWNER AT
- THE COMPLETION OF THE WORK E) BUILDING STANDARDS FOR ALTERATION CONSTRUCTION (IF ANY).
- F) INTERNATIONAL BUILDING CODE INCLUDING ALL SEISMIC PROVISIONS (2018).

G) INTERNATIONAL MECHANICAL CODE AND NJ UNIFORM CONSTRUCTION CODE (2018). H) ALL UNIVERSITY DESIGN AND CONSTRUCTION STANDARDS.

1.06 WARRANTIES AND BONDS

- A) ALL MECHANICAL CONTRACTOR'S MATERIALS, EQUIPMENT AND WORKMANSHIP SHALL BE GUARANTEED IN WRITING FOR ONE (1) YEAR AFTER FINAL ACCEPTANCE BY OWNER.
- B) THE CONTRACTOR GUARANTEES, BY THEIR ACCEPTANCE OF THIS CONTRACT, THAT ALL WORK INSTALLED WILL BE FREE FROM ANY AND ALL DEFECTS IN WORKMANSHIP AND/OR MATERIALS; AND THAT ALL APPARATUS WILL DEVELOP CAPACITIES AND CHARACTERISTICS SPECIFIED. THE CONTRACTOR SHALL ALSO GUARANTEE THAT DURING A PERIOD OF ONE YEAR, OR AS OTHERWISE SPECIFIED FROM THE DATE OF CERTIFICATION OF COMPLETION AND ACCEPTANCE OF THE WORK, IF SUCH DEFECTS IN

WORKMANSHIP, MATERIALS OR APPEARANCE APPEAR, HE WILL, WITHOUT COST TO THE OWNER, REMEDY

SUCH DEFECTS WITHIN A REASONABLE TIME. 1.07 SUBMITTALS

- A) SHOP DRAWINGS: BEFORE ROUGHING-IN OR ORDERING ANY EQUIPMENT, MECHANICAL CONTRACTOR SHALL SUBMIT ELECTRONIC (PDF) COPIES OF SHOP DRAWINGS OF ALL EQUIPMENT, DUCTWORK, AND AUTOMATIC TEMPERATURE CONTROLS TO ENGINEER, AS WELL AS ELECTRONIC (PDF) COPIES OF OPERATING AND MAINTENANCE INSTRUCTIONS FOR ALL EQUIPMENT TO INCLUDE WIRING AND CONTROL DIAGRAMS, CUT SHEETS, SEQUENCE OF OPERATIONS, ETC. SHEET METAL SHOP DRAWINGS SHALL BE DRAWN AT 3/8" = 1'-0" SCALE AND IN LATEST AUTOCAD VERSION AND SHALL SHOW CLEARANCE
- INFORMATION WITH RESPECT TO STRUCTURAL STEEL, LIGHTING, SPRINKLERS, ETC. B) FURNISH COPIES OF SHOP DRAWINGS TO ENGINEER FOR APPROVAL BEFORE SHIPMENT OF APPARATUS, INCLUDING HVAC EQUIPMENT, GRILLES, DIFFUSERS AND DUCTWORK LAYOUT.
- C) APPROVAL OF SHOP DRAWING SHALL COVER GENERAL DESIGN AND ARRANGEMENT ONLY. SUCH APPROVAL SHALL NEITHER RELIEVE THIS CONTRACTOR FROM THEIR RESPONSIBILITIES FOR PROPER CONSTRUCTION OR ACCURACY OF MEASUREMENTS, NOR FROM THE NECESSITY OF FURNISHING LABOR
- AND MATERIALS REQUIRED BUT NOT SHOWN ON SAID SHOP DRAWINGS WHEN APPROVED. D) CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING OF PROPOSED EQUIPMENT PRIOR TO SUBMITTING TO ARCHITECT/ENGINEER. THE CAUSE OF ANY RE-DESIGNING CAUSED BY A SUBSTITUTION OR LACK OF COORDINATION SHALL BE BORNE BY THE CONTRACTOR.
- E) ENGINEER SHALL REVIEW A LIMIT OF TWO SUBMITTALS PER EQUIPMENT OR DEVICE. COSTS TO ENGINEER FOR REVIEW OF ADDITIONAL SUBMITTALS SHALL BE BORNE BY CONTRACTOR.
- F) UNLESS OTHERWISE NOTED, THE CONTRACTOR MAY SUBMIT ANOTHER EQUAL TYPE OR MANUFACTURER OTHER THAN SPECIFIED. WHERE SUCH SUBSTITUTION IS ALLOWED, AND THEY ALTER THE DESIGN OR SPACE REQUIREMENTS, THE CONTRACTOR SHALL PAY FOR ALL COSTS INVOLVED SUCH AS ARCHITECTS AND ENGINEER'S REDESIGN FEES AND ANY ADDITIONAL CONSTRUCTION COSTS FOR THEIR OWN WORK AND THAT OF OTHER DIVISIONS. EQUIPMENT SHALL NOT BE PURCHASED, OR WORK STARTED UNTIL SHOP
- G) DURING CONSTRUCTION, THE CONTRACTOR WILL MAINTAIN A RECORD SET OF INSTALLATION PRINTS. HE WILL RECORD ON THESE PRINTS ALL DEVIATIONS FROM THE CONTRACT DRAWINGS IN SIZES. LOCATIONS AND DETAILS. AT THE COMPLETION OF THE WORK, THE CONTRACTOR SHALL RETURN THE MARKED PRINTS AND PREPARE AND SUBMIT A SET OF VELLUM DRAWINGS WITH ALL INFORMATION MAINTAINED DURING THE CONSTRUCTION PROCESS TO THE ENGINEER FOR SUBMISSION TO THE OWNER.

1.08 BASIC MECHANICAL REQUIREMENTS

- A) ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS
- FOR THE TYPE AND CAPACITY OF EACH PIECE OF EQUIPMENT USED. B) SEQUENCE, COORDINATE, AND INTEGRATE INSTALLATION OF MECHANICAL MATERIALS AND EQUIPMENT FOR EFFICIENT FLOW OF THE WORK.
- C) MOUNT ALL THERMOSTATS, CONTROLLERS, ETC., 4'-0" ABOVE FINISHED FLOOR. COORDINATE FINAL
- D) ALL DUCTS SHALL HAVE FIRE DAMPERS, SMOKE DAMPERS, OR COMBINATION FIRE/SMOKE DAMPERS WHEN WHEN PASSING THOUGH RATED PARTITIONS AS REQUIRED BY CODE AND WHETHER INDICATED ON THE PLANS OR NOT. E) SUBSTITUTION OF ANY PRODUCT AS "EQUAL OR BETTER" THAN A SPECIFIED PRODUCT MUST BE
- APPROVED IN WRITING BY THE ENGINEER. F) COORDINATE MECHANICAL AND ELECTRICAL EQUIPMENT AND MATERIALS INSTALLATION WITH OTHER
- BUILDING COMPONENTS. G) COORDINATE WITH GENERAL CONTRACTOR FOR ALL CHASES, SLOTS, AND OPENINGS IN OTHER BUILDING COMPONENTS TO ALLOW FOR MECHANICAL AND ELECTRICAL INSTALLATIONS.
- H) ARRANGE FOR CHASES, SLOTS, AND OPENINGS IN BUILDING COMPONENTS TO ALLOW FOR MECHANICAL AND ELECTRICAL INSTALLATIONS. PATCH TO ORIGINAL INTEGRITY.
- I) COORDINATE THE INSTALLATION OF REQUIRED SUPPORTING DEVICES AS REQUIRED, SUCH AS RE-ENFORCING STEEL, TRAPEZE HANGERS, ANCHORS, ETC. J) ALL DUCTS SHALL HAVE FIRE RATED SLEEVES AND/OR FIRE RATED DAMPERS, WHEN PASSING THROUGH
- FIRE RATED CONSTRUCTION K) DIELECTRIC FITTINGS SHALL BE USED WHERE DISSIMILAR METALS ARE JOINED.
- L) PROVIDE ALL REQUIRED MISCELLANEOUS STEEL TUBES, ANGLES, MISCELLANEOUS PIECES, ANCHORS, RE-ENFORCING STEEL, TRAPEZE HANGERS, ANCHORS, ETC. FOR THE HANGING AND SUPPORT OF ALL NEW MECHANICAL EQUIPMENT, DUCTWORK, PIPING, ETC. ALL SUPPORTING MATERIALS AND FASTENERS LOCATED WITHIN THE GREENHOUSE ENVIRONMENT SHALL BE STAINLESS STEEL.

1.09 MECHANICAL IDENTIFICATION

- A) ALL PIPING, AND DUCTWORK SHALL BE IDENTIFIED WITH PLASTIC, SELF ADHESIVE, PIPE MARKERS AND PLASTIC DUCT MARKERS CONFORMING TO ANSI A13.1. SERVICE COLOR AND LETTERING SHALL BE IN ACCORDANCE WITH THE UNIVERSITY STANDARDS. PIPE AND DUCT MARKERS SHALL BE APPLIED EVERY 15 FEET OF HORIZONTAL RUN OR LESS AND EVERY EIGHT FEET OF VERTICAL RISE AND SHALL INDICATE
- B) ALL EQUIPMENT SHALL BE IDENTIFIED WITH PHENOLIC PLASTIC ENGRAVED EQUIPMENT NAMEPLATES. NAMEPLATES SHALL BE MINIMUM 3" x 1" AND INDICATE THE UNIQUE EQUIPMENT ID FROM THE PROJECT DRAWINGS. NAMEPLATES SHALL BE MINIMUM 1/16" THICK WITH BLACK TEXT ON WHITE BACKGROUND AND SHALL BE ATTACHED WITH ADHESIVE AND FASTENERS. OUTDOOR TAGS SHALL BE SUITABLE FOR SUCH USE AND SHALL BE UV RESISTANT.

2.01 AIR OUTLETS AND INLETS

- A) TEST AND RATE REGISTERS, GRILLES, AND DIFFUSERS IN ACCORDANCE WITH ADC EQUIPMENT TEST CODE 1062, PROVIDE CERTIFIED RATINGS SEAL ON EACH UNIT. CONSTRUCT AND INSTALL AIR OUTLETS AND INLETS IN ACCORDANCE WITH NFPA 90A, AND 90B.
- B) CEILING AIR DIFFUSERS, SUPPLY AND RETURN REGISTERS: EXCEPT AS OTHERWISE INDICATED, PROVIDE CEILING AIR DIFFUSERS, SUPPLY AND RETURN REGISTERS WHERE SHOWN, OF SIZE, SHAPE, CAPACITY AND TYPE AS INDICATED ON THE DRAWINGS. ALL DIFFUSERS AND REGISTERS SHALL HAVE OPPOSED BLADE
- C) CEILING COMPATIBILITY: PROVIDE DIFFUSERS, SUPPLY AND RETURN REGISTERS WITH BORDER STYLES THAT ARE COMPATIBLE WITH ADJACENT CONSTRUCTION.
- D) AIR OUTLETS & INLETS FRAMES SHALL MATCH CEILING SYSTEM TYPE, MECHANICAL CONTRACTOR SHALL VERIFY WITH GENERAL CONTRACTOR TYPE OF CEILING TO BE INSTALLED.
- E) FINISHES: UNLESS OTHERWISE NOTED, ALL AIR DEVICES SHALL BE PROVIDED WITH BAKED WHITE ENAMEL
- F) ACCEPTABLE MANUFACTURERS: TITUS, OR EQUIVALENT BY CARNES, TUTTLE & BAILEY, E. H. PRICE OR NAILOR INDUSTRIES.

2.02 PIPING- HOT WATER

- A) PIPE AND PIPE FITTINGS FOR HVAC SYSTEMS SUBMITTALS SUBMIT COMPLETE PIPING LAYOUT DRAWING FOR EACH SYSTEM FOR APPROVAL, PRIOR TO FABRICATION OR INSTALLATION. B) ALL PIPE AND FITTINGS SHALL BE RATED FOR THE SYSTEM OPERATING PRESSURE, MINIMUM CLASS 150.
- 1. PIPE SHALL BE NEW, FREE FROM SCALE OR RUST, AND OF MATERIAL AND WEIGHT SPECIFIED UNDER THE VARIOUS SERVICES. EACH LENGTH OF PIPE SHALL BE PROPERLY MARKED AT THE MILL FOR
- PROPER IDENTIFICATION WITH NAME OR SYMBOL OF MANUFACTURER. D) STEEL PIPE SHALL BE MADE FROM WELDABLE QUALITY STEEL MADE BY OPEN-HEARTH, ELECTRIC FURNACE OR ACID-BESSEMER PROCESS. STEEL PIPE 2" AND SMALLER SHALL BE SCREWED ENDS AND 2-1/2" AND LARGER SHALL BE WELDED ENDS. STEEL PIPING SHALL BE SEAMLESS, STANDARD OR EXTRA-HEAVY WEIGHT,
- IN CONFORMANCE WITH THE ASTM DESIGNATION A-53, AS MANUFACTURED BY NATIONAL TUBE DIVISION, REPUBLIC STEEL CORPORATION OR BETHLEHEM STEEL CORPORATION. E) COPPER TUBING SHALL BE OF WEIGHT AS REQUIRED FOR SERVICE SPECIFIED IN CONFORMANCE WITH ASTM DESIGNATION B-88 FOR SERVICE TYPE "L" OR TYPE "K" TUBING AS MANUFACTURED BY CHASE, ANACONDA, OR REVERE. TUBING AND FITTINGS TO BE THOROUGHLY CLEANED WITH SAND CLOTH AND TREATED WITH AN
- APPROVED FLUX BEFORE SOLDER IS APPLIED. F) PIPE FITTINGS 1. EACH PIPE FITTING SHALL HAVE CAST, STAMPED, OR INDELIBLY MARKED ON IT THE MARKER'S NAME OR MARK, WEIGHT, AND QUALITY OF THE PRODUCT WHEN SUCH MARKING IS REQUIRED BY THE APPROVED
- STANDARD. G) FITTING MATERIAL SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
- 1. STEEL WELDING FITTINGS ASTM A-105
- 2. SOLDER FITTINGS ASTM B-88 H) WELDING FITTINGS SHALL BE OF SAME MATERIAL AND SCHEDULE AS PIPE TO WHICH THEY ARE WELDED. WELDING FITTINGS INCLUDING LATERALS SHALL BE APPROVED FACTORY REINFORCED TO DEVELOP FULL WORKING PRESSURE OF CONNECTING PIPING MAIN. WELDING FITTINGS SHALL BE OF TUBE-TURN OR WALWORTH MANUFACTURE OR APPROVED EQUAL. TO CONFORM TO ASTM-A-234 SPECIFICATIONS. NIPPLES SHALL BE EXTRA HEAVY SHOULDER TYPE OF SAME MATERIAL AS PIPE, CLOSE NIPPLES ARE NOT

ACCEPTABLE. I) UNIONS, COUPLINGS AND FLANGES

- 1. UNIONS SHALL BE OF SAME WEIGHT (W.S.P.) AS FITTINGS AND VALVES IN EACH SERVICE CATEGORY. UNIONS 2" AND SMALLER SHALL BE SCREWED; 2-1/2" LARGER SHALL BE FLANGED. SCREWED UNIONS ON STEEL AND WROUGHT IRON PIPE SHALL BE OF MALLEABLE IRON WITH BRONZE GROUND SEATS, 250 POUNDS WSP. SCREWED UNIONS ON BRASS PIPE SHALL BE CAST IRON, GASKET TYPE, SUITABLE FOR 125 LBS. S.W.P. OR 250 LBS. S.W.P. AS REQUIRED. UNIONS ON COPPER TUBING 2 INCHES IN DIAMETER AND SMALLER SHALL BE CAST BRASS WITH SOLDER ENDS. UNIONS ON COPPER TUBING 2-1/2 INCHES AND ABOVE, SHALL BE CAST BRASS FLANGED UNIONS WITH GASKET. UNIONS SHALL BE AS MANUFACTURED BY CRANE OR WALWORTH OR
- APPROVED EQUAL. J) FLANGES SHALL BE OF SAME WEIGHT AS THE FITTINGS AND VALVES IN EACH SERVICE CATEGORY. WELDING NECK FLANGES SHALL BE USED WITH FLANGED VALVES, EQUIPMENT, ETC., ON WELDED LINES. GALVANIZED SCREWED FLANGES SHALL BE USED ON GALVANIZED SCREWED LINES. FLANGES SHALL BE DRILLED IN CONFORMANCE WITH 150 LBS. OR 300 LBS. STANDARD AND SHALL BE FACED AND SPOT-FACED. SCREWED AND LOOSE FLANGES ON BRASS PIPING SHALL BE BRASS. LAPS SHALL BE MACHINED ON FRONT, BACK AND EDGE. SCREWED FLANGES SHALL HAVE FACES PERPENDICULAR TO ADJOINING PIPE.
- K) DISSIMILAR METALS 1. ALL PIPE, FITTINGS, HANGERS, ETC., OF DISSIMILAR METALS SHALL BE INSULATED AGAINST DIRECT CONTACT ONE WITH THE OTHER, BY USING A HIGH QUALITY OR GRADE OF DIELECTRIC MATERIAL SUCH AS TEFLON. PROVIDE INSULATING FLANGES, COUPLINGS OR UNIONS WHERE BRASS OR COPPER PIPE
- CONNECTS TO GALVANIZED, BLACK IRON, STEEL OR CAST IRON PIPE. L) FLANGED CONNECTIONS SHALL BE MADE WITH GASKETS, SLEEVES AND WASHERS OF DIELECTRIC MATERIAL FOR COMPLETE INSULATION BETWEEN FLANGES, BOLTS, NUTS AND WASHERS. STRAINERS
- M) PIPE EXPANSION JOINTS, ANCHORS AND GUIDES 1. PROVISION FOR EXPANSION SHALL BE MADE IN ALL PIPING BY MEANS OF LOOPS, BENDS, OR OFFSETS. WHERE PIPE LINES JOIN OR WHERE BRANCHES OCCUR, PROVISIONS SHALL BE MADE FOR THE EXPANSION OF BOTH LINES.

N) STANDARD MATERIALS

UNLESS OTHERWISE NOTED, PIPES FOR VARIOUS SERVICES SHALL BE:

SERVICE SCHEDULEDESIGNATION HOT WATER STEEL 40 GRADE B A-53

O) FITTINGS FOR VARIOUS SERVICES SHALL BE AS FOLLOWS:

SIZE MATERIAL WEIGHT TYPE HOT WATER 2-1/2"&BELOW STEEL SCH. 40

P) FOR PIPE SIZES SMALLER - 3/4 INCH MINIMUM. ALL BLOW-OFFS SHALL BE PIPED TO SUITABLE FLOOR DRAINS. Q) PIPE AND FITTING INSULATION: INSULATE ALL PIPING WITH JOHNS-MANVILLE FLAME-SAFE FIBERGLASS PIPE INSULATION, FIBERGLAS OR CGB. THE INSULATION AVERAGE THERMAL CONDUCTIVITY SHALL NOT TO EXCEED 0.22 BTU PER INCH, PER SQUARE FOOT PER DEGREES F. PER HOUR AT A MEAN TEMPERATURE OF 75 DEGREES F.

R) THICKNESS SHALL CONFORM TO FOLLOWING TABLE:

PIPING SYSTEM PIPE SIZE INSULATION THICKNESS

1-1/2" OR SMALLER 1-1/2"

S) PIPING SPECIALTIES

PRESSURE GAGES. ASME B40.1, UL 404 WITH BOURDON TUBE, ROTARY BRASS MOVEMENT, BRASS SOCKET, FRONT CALIBRATION ADJUSTMENT, BLACK SCALE ON WHITE BACKGROUND.

BOURDON TUBE: BRASS.

DIAL SIZE: 4-1/2 INCH (114 MM) AND 8-1/2 INCH (216 MM)] DIAMETER.

MID-SCALE ACCURACY: ONE PERCENT. SCALE: BOTH PSI AND KPA.

PRESSURE GAGE TAPS.

NEEDLE VALVE: BRASS, 1/4 INCH (6 MM) NPT FOR MINIMUM 300 PSI (2070 KPA).

BALL VALVE: STAINLESS STEEL, 1/8 INCH (3 MM) NPT FOR 250 PSI (1720 KPA) PULSATION DAMPER: PRESSURE SNUBBER, BRASS WITH 1/4 INCH (6 MM) NPT CONNECTIONS.

SIPHON: STEEL, SCHEDULE 40, 1/4 INCH (6 MM) NPT ANGLE OR STRAIGHT PATTERN. SCALE RANGES SHALL BE: 0 PSI TO (2 X OPERATING PRESSURE) PSI (MINIMUM 0 PSI TO 30 PSI)

MANUFACTURERS: SUBJECT TO THE REQUIREMENT OF THE SPECIFICATION, THE FOLLOWING ARE MANUFACTURER'S PRODUCTS THAT MAY BE INCORPORATED INTO THE PROJECT:

SUBSTITUTIONS: SECTION 01 60 00 - PRODUCT REQUIREMENTS.

THERMOMETER: ASTM E1, ADJUSTABLE ANGLE, RED APPEARING MERCURY, LENS FRONT TUBE, CAST ALUMINUM CASE WITH ENAMEL FINISH, CAST ALUMINUM ADJUSTABLE JOINT WITH POSITIVE LOCKING DEVICE.

SIZE: 9 INCH (229 MM) SCALE WINDOW: CLEAR [GLASS] [LEXAN].

STEM: BRASS, 3-1/2 INCH (89 MM) LONG

ACCURACY: ASTM E77 2 PERCENT. CALIBRATION: BOTH DEGREES F AND DEGREES C.

SCALE RANGES SHOULD BE AS FOLLOWS: HOT WATER - 30F TO 240F

THERMOMETER SUPPORTS. SOCKET: BRASS SEPARABLE SOCKETS FOR THERMOMETER STEMS WITH OR WITHOUT EXTENSIONS[, AND

WITH CAP AND CHAIN]. FLANGE: 3 INCH (76 MM) OUTSIDE DIAMETER REVERSIBLE FLANGE, DESIGNED TO FASTEN TO SHEET METAL AIR DUCTS, WITH BRASS PERFORATED STEM.

1/4 INCH (6 MM) NPT OR 1/2 INCH (13 MM) NPT BRASS FITTING AND CAP FOR RECEIVING 1/8 INCH (3 MM) OUTSIDE DIAMETER PRESSURE OR TEMPERATURE PROBE WITH:

NEOPRENE CORE FOR TEMPERATURES UP TO 200 DEGREES F (93 DEGREES C).

NORDEL CORE FOR TEMPERATURES UP TO 350 DEGREES F (176 DEGREES C). VITON CORE FOR TEMPERATURES UP TO 400 DEGREES F (204 DEGREES C).

CARRYING CASE, INTERNALLY PADDED AND FITTED CONTAINING: TWO 3-1/2 INCH (89 MM) DIAMETER PRESSURE GAGES

ONE GAGE ADAPTERS WITH 1/8 INCH (3 MM) PROBES. TWO 1-1/2 INCH (38 MM) DIAL THERMOMETERS.

SCALE RANGE: 0 TO 200 DEGREES F (93 DEGREES C).

- MANUAL TYPE: SHORT VERTICAL SECTIONS OF 2 INCH (50 MM) DIAMETER PIPE TO FORM AIR CHAMBER, WITH 1/8 INCH (3 MM) BRASS NEEDLE VALVE AT TOP OF CHAMBER.
- BRASS OR SEMI-STEEL BODY, COPPER, POLYPROPYLENE, OR SOLID NON-METALLIC FLOAT, STAINLESS STEEL VALVE AND VALVE SEAT; SUITABLE FOR SYSTEM OPERATING TEMPERATURE AND PRESSURE; WITH ISOLATING
- WHERE THE HOT AND COLD WATER SYSTEM IS TRAPPED AND AIR IS LIABLE TO BE POCKETED, FURNISH AND INSTALL A MANUAL VENT TO PROPERLY RELIEVE THE SYSTEM OF AIR. THE DISCHARGE FROM THESE VENTS SHALL BE PIPED WITH COPPER TUBING TO THE NEAREST SLOP SINK, FLOOR DRAIN OR TO A LOCATION EASILY ACCESSIBLE FROM THE FLOOR.

2.03 AIR TERMINAL UNITS

- A) SINGLE DUCT VARIABLE AIR VOLUME TERMINAL UNITS (VAV) MANUFACTURERS: THE FOLLOWING ARE MANUFACTURER'S PRODUCTS THAT MAY BE INCORPORATED INTO THE
- 1. TITUS NAILOR.
- 3. ANEMOSTAT AIR PRODUCTS. B) PRODUCT DESCRIPTION: VARIABLE AIR VOLUME TERMINAL UNITS FOR CONNECTION TO CENTRAL AIR SYSTEMS,
- WITH ELECTRONIC/DDC CONTROLS, AND WITH HEATING COILS. IDENTIFICATION: FURNISH EACH AIR TERMINAL UNIT WITH IDENTIFICATION LABEL AND AIRFLOW INDICATOR. INCLUDE UNIT NOMINAL AIRFLOW, MAXIMUM FACTORY-SET AIRFLOW AND MINIMUM FACTORY-SET AIRFLOW AND

COIL TYPE. BASIC ASSEMBLY:

CASINGS: MINIMUM 22 GAGE (0.8 MM) GALVANIZED STEEL. LINING: MINIMUM 1/2 INCH (13 MM) THICK FIBER-FREE INSULATION, 1.5 LB./CU FT (24 G/L) DENSITY,

MEETING NFPA 90A REQUIREMENTS AND UL 181 EROSION REQUIREMENTS. MINIMIZE MOLD

GROWTH TO MEET ASTM G21/22. BASIC UNIT: CONFIGURATION: AIR VOLUME DAMPER ASSEMBLY INSIDE UNIT CASING. LOCATE CONTROL COMPONENTS INSIDE

- PROTECTIVE METAL SHROUD. VOLUME DAMPER: CONSTRUCT OF GALVANIZED STEEL WITH PERIPHERAL GASKET AND SELF-LUBRICATING BEARINGS; MAXIMUM DAMPER LEAKAGE: 2 PERCENT OF DESIGN AIR FLOW AT 3 INCHES (0.75 KPA) RATED INLET
- STATIC PRESSURE.
- MOUNT DAMPER OPERATOR TO POSITION DAMPER NORMALLY OPEN.
- **HEATING COIL:** HOT WATER COIL: 1. CONSTRUCTION: 1/2 INCH (13 MM) COPPER TUBE MECHANICALLY EXPANDED INTO ALUMINUM PLATE FINS, LEAK
- TESTED UNDER WATER TO 1.3 OPERATING PRESSURE, 200 PSIG MINIMUM. 2. CAPACITY: AS INDICATED ON DRAWINGS AND BASED ON TESTS RUN IN ACCORDANCE WITH ARI STANDARD 410. AUTOMATIC DAMPER OPERATOR:
- C) VAV BOXES SHALL BE COMPLETE WITH 24 VOLT ELECTRIC MOTOR DRIVE AND DDC MODULES FURNISHED AND INSTALLED AT THE FACTORY BY THE VAV BOX MANUFACTURER. THEY SHALL BE MOUNTED IN AN EASILY ACCESSIBLE ENCLOSURE, AND COMPLETELY WIRED REQUIRING ONLY POWER, SIGNAL AND ROOM TEMPERATURE SENSOR CONNECTION. AN AUTOMATIC AIR MEASURING DEVICE SHALL INDICATE CFM OF EACH BOX INSTANTANEOUSLY ON THE PORTABLE FIELD CONSOLE. THE VAV BOX MANUFACTURER SHALL PIPE THE CONTROLLER'S TRANSDUCERS TO THE BOX FLOW SENSOR. THE VAV BOX MANUFACTURER WILL COORDINATE WITH THE MANUFACTURER OF THE DDC MODULES TO INSURE THAT THE ACTUATORS POSITIVELY LOCK ON THE VAV BOX SHAFT/LINKAGE. THE VAV MANUFACTURER MUST MOUNT THE DDC CONTROLLERS TO THE VAV BOXES. IN ADDITION, THE VAV TERMINAL BOX MANUFACTURER SHALL COORDINATE WITH ATC CONTRACTOR FOR INITIAL DAMPER SET-UP AND ADJUSTMENTS. PROVIDE LINE VOLTAGE TO 24V TRANSFORMER FOR DAMPER / CONTROL
- D) VAV BOXES SHALL BE PRESSURE INDEPENDENT AND SHALL RESET PRIMARY AIR VOLUME AS DETERMINED BY THE SPACE THERMOSTAT REGARDLESS OF CHANGES IN SYSTEM AIR PRESSURE. THE PRIMARY AIR SHALL BE NORMALLY OPEN ON LOSS OF POWER UNLESS OTHERWISE SPECIFIED. VAV BOXES SHALL HAVE TEST PORTS FOR MANUAL VERIFICATION AND CALIBRATION OF THE AIR FLOW MEASURING DEVICE. VAV BOX CONTROLLERS SHALL INCLUDE PROVISION FOR AUTOMATIC CALIBRATION OF AIR FLOW MEASURING DEVICE. 1. VELOCITY RESET CONTROLLER AND SENSOR:
- a. ELECTRIC: 24 VOLT. b. CALIBRATION PRESSURE TAPS FOR PRESSURE INDEPENDENT CONTROL TO COMPENSATE FOR VARYING INLET
- c. MINIMUM AND MAXIMUM LIMITS SET AT RESET DEVICE.
- d. MAINTAIN AIRFLOW TO WITHIN 5 PERCENT OF SET POINT WITH INLET STATIC PRESSURE VARIATIONS UP TO 4 INCHES (1.0 KPA).
- LEAKAGE RATE: MAXIMUM 1%

1. INSTALLATION

a. INSTALL CEILING ACCESS DOORS OR LOCATE UNITS ABOVE EASILY REMOVABLE CEILING COMPONENTS. b. SUPPORT UNITS INDIVIDUALLY FROM STRUCTURE. DO NOT SUPPORT FROM ADJACENT DUCTWORK. ALL UNIT

SUPPORTS SHALL CLEAR THE ACCESS PANELS ON THE BOXES. INTERFACING WITH AUTOMATIC TEMPERATURE CONTROLS (ATC) VENDOR - AUTOMATED LOGIC

1. CONTRACTOR SHALL EXCHANGE INFORMATION AND COORDINATE THE FOLLOWING SET POINTS WITH THE ATC

CONTRACTOR FOR EACH BOX.

a. MAXIMUM PRIMARY AIR VELOCITY OR CFM SET POINT. b. MINIMUM PRIMARY AIR VELOCITY OR CFM SET POINT.

c. COOLING SET POINT. d. HEATING SET POINT. TERMINAL UNIT DISCHARGE AIR VOLUME (CFM).

2.04 MECHANICAL INSULATION A) REFRIGERANT PIPING INSULATION SHALL BE FLEXIBLE ELASTOMERIC PIPE INSULATION, 1" THICK. INSULATE LIQUID AND SUCTION LINES FOR HEAT PUMP APPLICATIONS. PROVIDE CONTINUOUS VAPOR BARRIER AND SEAL WITH THE MANUFACTURER'S RECOMMENDED ADHESIVE. INSULATION SHALL BE 25/50 FLAME SPREAD / SMOKE DEVELOPED.

1. INSULATE ALL REFRIGERANT LINES (LIQUID AND SUCTION) FOR HEAT PUMP APPLICATIONS B) CONDENSATE DRAIN PIPING INSULATION SHALL BE PRE-FORMED, MINERAL FIBER PIPE INSULATION, 1" THICK. PROVIDE 25/50 PVC FITTING COVERS AND SEAL ALL JOINTS AND SEAMS WITH VAPOR BARRIER MASTIC SEALANT TO FORM A CONTINUOUS VAPOR BARRIER. PROVIDE PVC JACKETING OVER INSULATION FOR PIPING LOCATED BELOW SUSPENDED CEILINGS.

- C) PROVIDE PROTECTIVE ALUMINUM JACKETING OVER ALL EXTERIOR PIPING. D) CONDENSATE DRAIN PIPING INSULATION SHALL BE PRE-FORMED, MINERAL FIBER PIPE INSULATION, 1" THICK. E) DUCTWORK WITH INTERNAL LINING SHALL NOT BE INSULATED. REFER TO PLANS FOR LOCATIONS OF INTERNAL LINING.
- F) FIBROUS GLASS DUCT INSULATION SHALL BE: 1. CONCEALED AIR DUCTS - BLANKET INSULATION: DENSITY OF 1.5 PCF, ASTM C-553, THERMAL CONDUCTIVITY (K VALUE AT 75 DEG. F) OF 0.26 WITH A METAL FOIL SCRIM JACKET.
- 2. INSULATE LOUVER PLENUMS WITH SAME INSULATION PROPERTIES DESCRIBED ABOVE, BUT UTILIZE RIGID FIBERGLASS BOARD IN LIEU OF BLANKET INSULATION G) INSULATE ALL UNLINED DUCTWORK WITH FIBROUS GLASS INSULATION, AS SPECIFIED, SEAL JOINTS IN THE INSULATION
- VAPOR BARRIER TO FORM A CONTINUOUS SHIELD AS RECOMMENDED BY THE INSULATION MANUFACTURER. H) INSTALL MINIMUM 1-1/2" THICK BLANKET TYPE INSULATION FOR DUCTWORK. PROVIDE WIRE BANDING STRAPS ON 24" CENTERS TO SECURE INSULATION TO DUCTWORK.

RETURN AND EXHAUST DUCTS IN FAN ROOM SHALL BE INSULATED.

2.05 REFRIGERANT PIPING A) SUBMIT COMPLETE PIPING LAYOUT DRAWING FOR EACH SYSTEM FOR APPROVAL. PRIOR TO FABRICATION OR INSTALLATION. B) PIPE SHALL BE NEW, FREE FROM SCALE OR RUST, AND OF MATERIAL AND WEIGHT SPECIFIED UNDER THE VARIOUS

I) ALL SUPPLY, RETURN, EXHAUST (IN UNCONDITIONED SPACE) AND OUTDOOR AIR DUCTS SHALL BE INSULATED. ALL SUPPLY,

- C) COPPER TUBING SHALL BE OF WEIGHT AS REQUIRED FOR SERVICE SPECIFIED. TUBING AND FITTINGS TO BE THOROUGHLY
- CLEANED WITH SAND CLOTH AND TREATED WITH AN APPROVED FLUX BEFORE BRAZING D) ALL PIPE, FITTINGS, HANGERS, ETC., OF DISSIMILAR METALS SHALL BE INSULATED AGAINST DIRECT CONTACT ONE WITH THE OTHER, BY USING A HIGH QUALITY OR GRADE OF DIELECTRIC MATERIAL SUCH AS TEFLON E) REFRIGERANT PIPING AND FITTINGS SHALL BE CONSTRUCTED OF COPPER, SCHEDULE "ACR", WITH DESIGNATION ASTM B-88.
- USE SILVER BRAZING JOINTS UNDER N₂ PURGE ONLY. PRESSURE TEST REFRIGERANT PIPING AT 1.5 TIMES THE OPERATION PRESSURE WITHOUT LEAK FOR 2 HOURS F) REAM PIPES AND TUBES. CLEAN OFF SCALE AND DIRT, INSIDE AND OUTSIDE, BEFORE ASSEMBLY. REMOVE WELDING SLAG OR OTHER FOREIGN MATERIAL FROM PIPING.
- G) CONDENSATE DRAIN PIPING SHALL BE TYPE 'L' COPPER WITH WROUGHT COPPER FITTINGS WITH SOLDER JOINTS SHALL BE CLEANED BRIGHT AND PROPERLY FLUXED BEFORE APPLYING SOLDER. SOLDER SHOULD BE 95-5 TIN-ANTIMONY. FLUX SHALL BE NON-CORROSIVE AS APPROVED
- H) PROVIDE A CLEANOUT IN CONDENSATE DRAIN LINE PIPING AT EVERY CHANGE IN DIRECTION. I) ARRANGE PIPING TO EQUIPMENT TO PERMIT SERVICING OR REMOVAL WITHOUT DISMANTLING PIPE BRANCHES. J) PROVIDE FOR THE EXPANSION AND CONTRACTION OF PIPING SYSTEMS. PIPE SUPPORTS AND HANGERS.
- K) ALL SUPPORTS AND PARTS SHALL CONFORM TO THE LATEST REQUIREMENTS OF ANSI B 31.9 AS APPLICABLE FOR PRESSURE PIPING AND MSS STANDARD PRACTICE SP-58 SP-69. L) DO NOT HANG PIPING FROM OTHER PIPING. IN NO CASE SHALL HANGERS BE SUPPORTED BY MEANS OF VERTICAL EXPANSION BOLTS.
- M) IF REMOVAL OF EXISTING FIREPROOFING IS REQUIRED FOR INSTALLATION PURPOSES, SUCH REMOVAL SHALL BE PERFORMED BY THE CONTRACTOR AND SHALL BE KEPT TO A MINIMUM. THE CONTRACTOR SHALL REPLACE ALL REMOVED FIREPROOFING WITH NEW FIREPROOFING TO THE SATISFACTION OF THE ENGINEER AND AT NO ADDITIONAL COST TO THE

N) SUPPORT HANGERS FROM BUILDING STEEL FRAMING WITH AN APPROVED TYPE CLAMP INSERT. PROVIDE ANY ADDITIONAL

STEEL SUPPORTS BETWEEN EXISTING FRAMING MEMBERS AS MAY BE REQUIRED. NO HANGERS SHALL BE SUPPORTED FROM METAL DECK FLOOR. WELDING TO THE BUILDING STRUCTURE MEMBERS WILL NOT BE PERMITTED UNLESS APPROVED BY THE 1. PIPE HANGERS, RODS, INSERTS AND CLAMPS SHALL BE UL APPROVED FOR THEIR RESPECTIVE USES.

2. UNLESS OTHERWISE SPECIFICALLY APPROVED, HANGER SIZE AND SPACING SHALL BE AS FOLLOWS: MAX. HANGER SPACING

- PIPE SIZE MIN. ROD SIZE 1/2" TO 3/8" 5 FT. O.C. 3. THE ABOVE HANGER SPACING APPLY TO STRAIGHT RUNS OF PIPE ONLY. AT POINTS WHERE VALVES, SPECIALTIES OR BRANCH CONNECTIONS ARE LOCATED, ADDITIONAL HANGERS, OR SUPPORTS SHALL BE USED TO PROPERLY SUPPORT
- A) COMPLY WITH NFPA STANDARDS 90A, 90B AND 91, EXCEPT AS INDICATED OTHERWISE. B) ALL DUCTWORK SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF SMACNA GUIDE AND
- DATA BOOK. C) SHEET METAL MATERIALS, GENERAL: PROVIDE THE FOLLOWING MATERIALS, PACKAGE AND MARK SHEET METAL MATERIALS AS
- SPECIFIED IN ASTM A-700. 1. GALVANIZED SHEET STEEL: LOCK-FORMING QUALITY, ASTM A-527, COATING DESIGNATION G 90, MILL PHOSPHATIZED FINISH FOR EXPOSED SURFACES OF DUCTS.
- 2. STAINLESS STEEL SHEET: ASTM A-480/A-480M, TYPE 304 OR 316, COLD ROLLED, ANNEALED SHEET. D) REINFORCEMENT SHAPES AND PLATES: UNLESS OTHERWISE INDICATED, PROVIDE GALVANIZED STEEL REINFORCING WHERE INSTALLED ON GALVANIZED SHEET METAL DUCTS AND STAINLESS STEEL FOR STAINLESS STEEL METAL DUCTS. E) JOINT AND SEAM TAPE: 2 INCHES WIDE, GLASS-FIBER-FABRIC REINFORCED. SEALANT SHALL BE ONE PART BUTYL SEALANT. F) FIRE-RESISTANT SEALANT: PROVIDE ONE-PART ELASTOMERIC SEALANT FORMULATED FOR USE IN A THROUGH-PENETRATION

FIRE-STOP SYSTEM FOR FILLING OPENINGS AROUND DUCT PENETRATIONS THROUGH WALLS AND FLOORS, HAVING

- FIRE-RESISTANCE RATINGS INDICATED AS ESTABLISHED BY TESTING IDENTICAL ASSEMBLIES PER ASTM E-184 BY UNDERWRITERS LABORATORY, INC. OR OTHER TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. COMPLY WITH UL1479 REQUIREMENTS FOR FIRE STOPPINGS. G) RECTANGULAR DUCT FABRICATION: EXCEPT AS OTHERWISE INDICATED, FABRICATE RECTANGULAR DUCTS WITH GALVANIZED SHEET STEEL, IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS," CONFORM TO THE REQUIREMENTS IN
- THE REFERENCED STANDARD FOR METAL THICKNESS, REINFORCING TYPES AND INTERVALS, TIE ROD APPLICATIONS, AND JOINT TYPES AND INTERVALS. ALL LOW PRESSURE DUCTWORK SHALL BE CONSTRUCTED TO SMACNA STATIC PRESSURE CLASSIFICATION OF +2" W.C. AND SEAL CLASS OF "A". DUCT SIZES SHOWN ARE INSIDE FREE AREA DIMENSIONS.
- H) RECTANGULAR DUCT FITTINGS: FABRICATE ELBOWS, TRANSITIONS, OFFSETS, BRANCH CONNECTIONS, AND OTHER DUCT CONSTRUCTION IN ACCORDANCE WITH SMACNA "HVAC METAL DUCT CONSTRUCTION STANDARD," I) INSTALL DUCTS WITH THE FEWEST POSSIBLE JOINTS. USE FABRICATED FITTINGS FOR ALL CHANGE IN DIRECTIONS, CHANGES IN SIZE AND SHAPE, AND CONNECTIONS.

J) COORDINATE DUCTWORK LAYOUT WITH STRUCTURAL STEEL, LIGHTING LAYOUTS, PIPING, ELECTRICAL CONDUITS AND SIMILAR

- FINISHED WORK. SUBMIT 3/8" = 1' SCALE SHEET METAL SHOP DRAWINGS. K) FOR RECTANGULAR DUCTS, ALL SEAMS, JOINTS, ELBOWS, STIFFENING AND METHOD OF SUPPORTING SHALL BE THE SAME AS SPECIFIED FOR SMACNA 3" WG SYSTEM PRESSURE, EXCEPT THAT ALL SEAMS AND JOINTS SHALL BE SOLDERED. ROUND DUCTS SHALL HAVE 2-INCH SLIP JOINTS UP TO 10-INCH DIAMETER AND 4-INCH SLIP JOINT ABOVE 11-INCH DIAMETER, WITH ALL SEAMS
- AND JOINTS SOLDERED. WALLETBOWS SUPPORTS AND WORKWANSHIP SHALL BE THE SAME AS SPECIFIED FOR SMASOWAS WHO. M) ALL EXPOSED DUCTWORK SHALL BE PROVIDED WITH FLEXIBLE ELASTOMERIC INTERNAL LINING, 1" THICK, R-6 MINIMUM,

ARMACELL ARMAFLEX AP OR SIMILAR.

REQUIREMENTS

ACOUSTIC LINING.

THE LOAD.

2.06 METAL DUCTWORK

A) INSTALL ARMACELL AMRAFLEX AP OR SIMILAR DUCT LINER IN DUCTWORK, UPSTREAM AND DOWNSTREAM OF AC UNIT(S) AND EXHAUST FAN(S), IN ALL DIRECTION, RETURN DUCTS FROM CENTRAL AIR HANDLING UNITS AND ELSEWHERE WHERE SHOWN ON THE DRAWINGS SUITABLE FOR VELOCITIES UP TO 5000 F.P.M. AND WITH DURABLE ANTI-MICROBIAL PROTECTION OF THE AIRSTREAM SURFACE AGAINST THE POTENTIAL GROWTH OF BACTERIA, MOLD AND FUNGUS. LINER TO BE MANVILLE CO., PERMACOTE, "LINACOUSTIC" OR APPROVED EQUAL, MEETING ASTM C1071 AND ASTM G21/G22.. PROVIDE METAL NOSING AT ALL EXPOSED EDGES. DUCT LINER THICKNESS SHALL BE 1" WITH MINIMUM RATING OF R-6. DUCT SIZES SHOWN ARE CLEAR INTERNAL DIMENSIONS.

B) APPLY TO ALL SURFACES WITH 100% COVERAGE, OF ADHESIVE MEETING ASTING 919.

C) IN ADDITION, ON HORIZONTAL RUNS THE UPPER SURFACES OF DUCTS OVER 12" IN WIDTH AND ON DUCT SIDES OVER 16" IN HEIGHT AND ON VERTICAL RUNS ON ALL DUCT DIMENSIONS OVER 12" SECURE LINER WITH WELDED PINS AND SPEED CLIPS AT A MAXIMUM SPACING OF 15" O.C. INSTALL PINS WITHIN 2" OF LEADING EDGE OF EACH LINER SECTION AND WITHIN 3" OF LEADING EDGE OF CROSS JOINTS IN ALL DUCTS

SECTIONS D) COAT ALL EXPOSED EDGES AND BUTT JOINTS OF THE LINER WITH BENJAMIN-FOSTER 30-26 OR APPROVED EQUAL. ALL EXPOSED EDGES SHALL BE PROTECTED WITH SHEET METAL OR PERFORATED ALUMINUM NOSING. E) LINING, ADHESIVES AND MASTICS SHALL HAVE A COMPOSITE FIRE AND SMOKE HAZARD RATINGS IN ACCORDANCE WITH

DEVELOPED OF 50 WITH MEA NO. FOR NYC INSTALLATION. F) WHERE ACOUSTIC LINING IS PROVIDED. EXTERNAL INSULATION IS NOT REQUIRED. UNLESS OTHERWISE NOTED. G) ALL ADHESIVES' VOLATILE ORGANIC COMPOUND (VOC) CONTENT SHALL CONFORM TO THE LIMITS SET BY THE CURRENT SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD) RULE #1168 AND SHALL BE NO MORE THAN THE LATEST LEED

H) DUCT DIMENSIONS SHOWN ARE CLEAR INTERIOR DUCT DIMENSIONS. INCREASE DUCT DIMENSIONS TO ACCOMMODATE

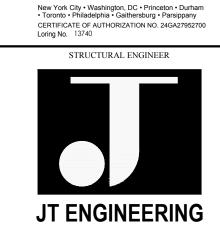
TESTING PROCEDURES OF ASTM E-84, NFPA 255 AND U.L. 273 NOT EXCEEDING A FLAME SPREAD OF 25 AND SMOKE

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JOSHUA ZINDER ARCHITECTURE + DESIGN. LLC

Vincent Farese, PE

N.J. Professional Engineer No. 43960

PROJECT NAME

VIRTUAL REALITY **CLASSROOM &**

DEVELOPMENT

LAB AT L. HOWARD FOX STUDIO THEATRE MONTCLAIR STATE UNIVERSITY

MECHANICAL: SPECIFICATIONS

SHEET 1 OF 2

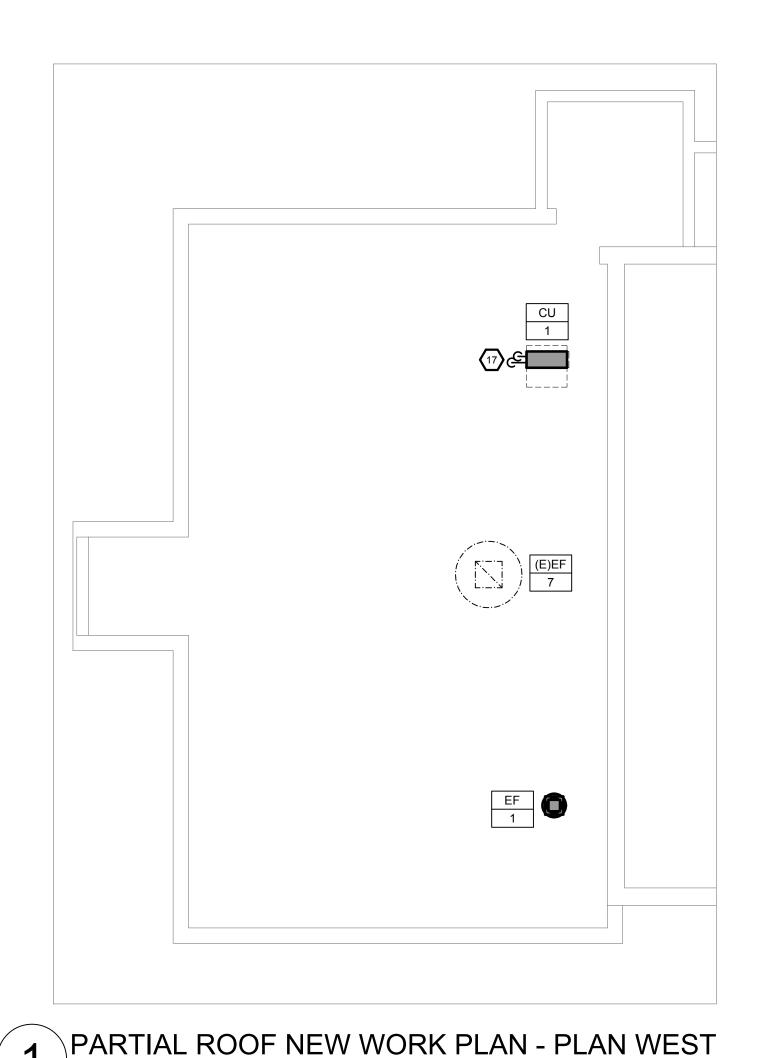
DRAWING NAME

PROJECT NO.: 22322

02-06-2024

SHEET NUMBER

SCALE: AS NOTED



- (E)20X24 R/A DUCT DN. - (E)20X25 S/A DUCT DN. (E)10X18 E/A DUCT DN - (E)2-1/2" HWS/R DN. — (E)1/2" HWS/R DN. - (E)12X12 UP THRU ROOF TO (E) EXH. FAN 1 VAV 3-2 (E)FTR — (E)HWS/R TO (E)

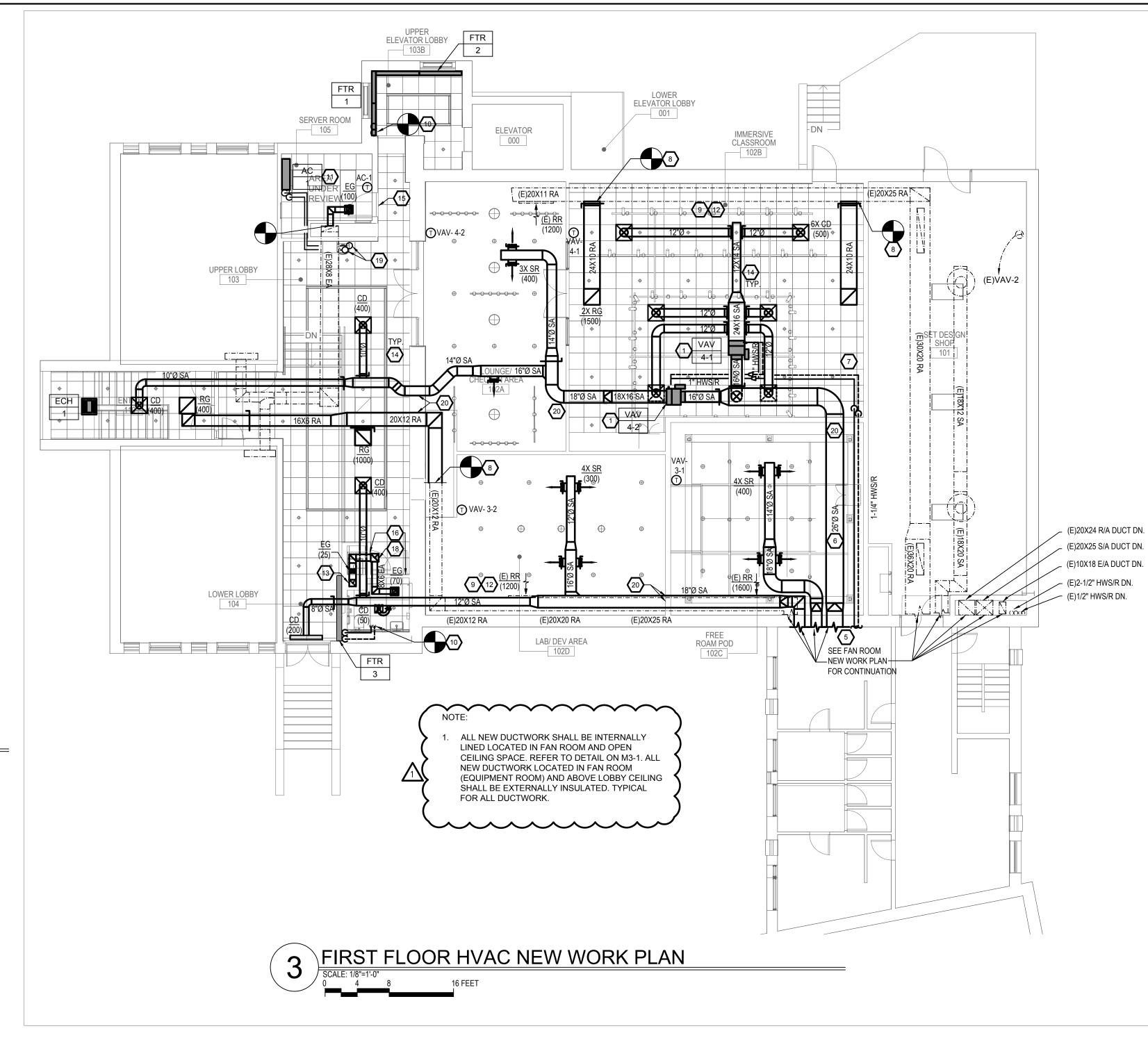


(E)E/A DUCT AND (E)

(E)CHWS/R TO

(E) RTU-1

FAN ON ROOF



KEYED NOTES

- NEW STRUCTURE MOUNTED TERMINAL VAV BOX WITH HOT WATER COIL. INSTALL UNIT WITH CLEARANCE PER MANUFACTURER'S RECOMMENDATIONS. REFER TO DETAIL SHEET AND WIRING DIAGRAM FOR MORE DETAIL.
- CONNECT NEW SUPPLY AIR DUCT PER INDICATED SIZES AND CONNECT TO EXISTING RTU-1 SUPPLY DUCT LOCATED IN EXISTING FAN ROOM. PROVIDE TRANSITIONS AND DUCTWORK. PROVIDE MINIMUM OF 1-1/2" THICK DUCT WRAP FOR NEW DUCTWORK RUNNING IN FAN ROOM AND ABOVE CEILING. TYPICAL FOR ALL NEW
- PROVIDE INDICATED SIZED SPIRAL GALVANIZED DUCT COVERED WITH 1" DUCT WRAP AND CONNECT TO NEW VAV BOXES INLET. REFER TO DETAIL SHEET FOR MORE DETAIL.
- CONTRACTOR TO FIELD VERIFY EXISTING HOT WATER SUPPLY AND RETURN PIPE. PROVIDE NEW HOT WATER SUPPLY AND RETURN PIPE TO VAV HOT WATER COILS AND CONNECT TO EXISTING HOT WATER SUPPLY AND RETURN AS INDICATED.
- CONTRACTOR TO USE EXISTING DUCT OPENING THRU WALL. ADJUST EXISTING OPENING AS REQUIRED TO RUN DUCTWORK THRU FAN ROOM WALL. PROVIDE NEW OPENING AS REQUIRED. CONTRACTOR TO PROVIDE ACOUSTICAL SEALING OF DUCT PENETRATING WALLS. REFER TO DETAIL SHEET FOR MORE DETAIL. TYPICAL FOR ALL FULL HEIGHT WALL PENETRATION.
- 6 NEW 26"Ø SUPPLY DUCT FROM EXISTING RTU-1 SUPPLY DUCT CONNECTING TO NEW VAV BOXES LOCATED ABOVE IMMERSIVE CLASS ROOM CEILING.
- NEW 1-1/4" INSULATED HOT WATER SUPPLY AND RETURN CONNECTING TO NEW VAV BOX HOT WATER COIL LOCATED ABOVE IMMERSIVE CLASS ROOM CEILING.

- PROVIDE RETURN DUCT WORK AS INDICATED ON PLAN. CONNECT NEW DUCTWORK TO EXISTING DUCTWORK AIR TIGHT. MATCH NEW DUCTWORK TO EXISTING DUCTWORK FINISH. REFER TO ARCHITECT PLAN FOR DUCT, DIFFUSER AND GRILLE FINISH.
- 4) ALL EXISTING TO REMAIN DUCT, DIFFUSERS AND GRILLES TO BE CLEANED DUST FREE. RE-BALANCE DIFFUSERS/ GRILLES FOR INDICATED CFMS. PROVIDE NEW GRILLES IF EXISTING IN BAD CONDITION. TYPICAL FOR ALL EXISTING TO REMAIN DUCT, DIFFUSERS AND GRILLES.
- 3/4" HOT WATER SUPPLY AND RETURN TO NEW HOT WATER FIN-TUBE RADIATIONS.
- WALL MOUNTED AC-1 INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE CONDENSATE PUMP AND PIPING.
- EXISTING TO REMAIN.
- 13 10"X10" BATHROOM EXHAUST DUCT DOWN BELOW FIRST FLOOR SLAB. CONNECT NEW BATHROOM EXHAUST DUCT TO EXISTING BASEMENT BATHROOM EXHAUST DUCT.
- PROVIDE MINIMUM OF 1-1/2" DUCT INSULATION FOR ALL DUCT RUNNING IN FAN ROOM AND DUCT WORK ABOVE CEILING SPACE. TYPICAL FOR ALL DUCT.
- architectural door louver with 0.4 sq.ft net free area. REFER TO ARCHITECT PLAN.
- 1" UNDERCUT DOOR FOR RESTROOM AND JANITOR CLOSET.

- CU-1 REFRIGERANT PIPE RS & RL DOWN TO AC-1 IN SERVER ROOM. PROVIDE REFRIGERANT PIPE SIZE AND INSTALLATION PER MANUFACTURER'S RECOMMENDATION.
- 18 12"X12" EXHAUST DUCT UP TO EF-1 ON ROOF.
- 19 REFRIGERANT PIPE RS & RL UP TO CU-1 ON ROOF.
- REFER TO STRUCTURAL PLAN FOR DUCT PENETRATION LOCATION. CONTRACTOR TO PROVIDE ACOUSTICAL SEALING OF DUCT PENETRATING WALLS. REFER TO DETAIL SHEET FOR MORE DETAIL. TYPICAL FOR ALL FULL HEIGHT WALL PENETRATION.

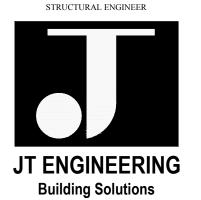
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DATE

Vincent Farese, PE N.J. Professional Engineer No. 43960

PROJECT NAME

VIRTUAL REALITY CLASSROOM & DEVELOPMENT

LAB

AT L. HOWARD FOX STUDIO **THEATRE** MONTCLAIR STATE UNIVERSITY

DRAWING NAME

MECHANICAL: NEW WORK PLANS

PROJECT NO.: 22322 02-06-2024 SCALE: AS NOTED

VAV								TEF	RMINAL (JNIT SCH	HEDULE							BASIS OF DE	ESIGN: NAILOR
				AIRFLOW							Н	OT WATER CO	OIL				ELECTRICAL		
UNIT ID	MODEL NO.	TYPE	MAXIMUM (CFM)	MINIMUM (CFM)	HEATING (CFM)	MINIMUM INLET S.P. (IN. W.G.)	UNIT SIZE / INLET CONN. SIZE (IN.)	TOTAL (MBH)	ROWS / FPI	EDB (°F)	LAT (°F)	APD (IN. W.G.)	EWT (°F)	LWT (°F)	GPM	WPD (FT)	VOLT/PHASE	SUPPLIED BY	AREA SERVED
VAV3-1	SDR-WC-14	SINGLE DUCT	1600	800	900	1.0	14 / 14	42.77	2	55.0	104.3	0.22	180.0	140.0	2.5	2.0	120 / 1	(E) RTU-1	POD
VAV3-2	SDR-WC-14	SINGLE DUCT	1800	900	1000	1.0	14 / 14	50.03	2	55.0	106.2	0.26	180.0	140.0	2.5	2.0	120 / 1	(E) RTU-1	LAB
VAV4-1	SDR-WC-16	SINGLE DUCT	3000	1200	1500	1.0	16 / 16	64.7	2	55.0	104.7	0.45	180.0	140.0	3.0	2.0	120 / 1	(E) RTU-1	CLASSROOM
VAV4-2	SDR-WC-16	SINGLE DUCT	2000	1080	1400	1.0	16 / 16	59.77	2	55.0	106	0.23	180.0	140.0	3.0	2.0	120 / 1	(E) RTU-1	LOUNGE/ CORRIDOR

- 1. FURNISH WITH 22-GAUGE GALVANIZED CASING, HEAVY GAUGE OPPOSED BLADE VOLUME DAMPER WITH CELCON BEARINGS, MULTI-POINT CENTER AVERAGING AIRFLOW SENSOR WITH TAPS, INTEGRAL HW REHEAT COIL, BOTTOM ACCESS DOOR, AND DISCONNECT SWITCH.
- 2. FURNISH CONFIGURED FOR DDC CONTROLS. CONTROLS TO BE FIELD SUPPLIED FOR INTEGRATION INTO THE CAMPUS SIEMENS BAS. COORDINATE REQUIREMENTS WITH SIEMENS PRIOR TO FABRICATION OF TERMINAL UNITS. 3. PROVIDE NEW SPACE SENSOR LOCATED IN SAME LOCATION AS EXISTING SENSOR FROM VAV (TO BE REMOVED). INTEGRATE NEW SENSOR INTO BAS SYSTEM AND INTERLOCK WITH TERMINAL UNIT OPERATION.

EF - EX	(HAUST FAN						FAN S	SCHED	ULE						BASIS	OF DESIGN:	GREENHECK
FAN		AREA OR SYSTEM			EXTERNAL STATIC	NOMINAL	MAX. OUTLET	FAN	FAN		1	MOTOR DATA		EMERG.	WEIGHT	MODEL	
NO.	LOCATION	SERVED	FAN TYPE	CFM	PRESS (IN. WG)	WHEEL DIA.(IN)	VELOCITY (FPM)		BHP	DRIVE	HP	V/PH	MCA	POWER (YES OR NO)	(LBS)	NO.	NOTES
FF-1	ROOF	1ST /LOWER LEVEL BATHROOM	ROOF	600	0.8		667	1 435	0.15	DIRECT	1/4	115/1	4.8	NO	38	G-100-VG	1

NOTES:

- a.PROVIDE NEMA-1 DISCONNECT SWITCH.
- b. PROVIDE SPRING BASE MOUNT.
- c. PROVIDE BOLTED ACCESS DOOR. d.UL/cUL 507 LISTED - ELECTRIC FAN.

e.PROVIDE MOTOR WITH THERMAL OVER LOAD
f. SOLID STATE SPEED CONTROL.
g.MOTORIZED DAMPER. BIRD SCREEN.

				HOT WA	TER FIN-T	UBE RAD	IATION SO	CHEDUL	.E					BASIS OF DESIGN: STERLING
					ELEMENT	DIMENSIONAL	. DATA			ELEMENT	PERFORMAI	NCE DATA		
UNIT ID	MANUF.	MODEL NO.	SERVICE	LENGTH	TUBE SIZE	FIN SIZE	FINS / FT.	ROWS	TOTAL BTUH/FT	EAT	EWT (°F)	LWT (°F)	GPM	NOTES
FTR - 1	STERLING	JVB VB - ARPM	ELEV. AREA	6'-0"	3/4"	4.25" X 3.625"	40	1	980	65°	180	160	1.0	1,2,3,4,5,6,7
FTR - 2	STERLING	JVB VB - ARPM	ELEV. AREA	8'-0"	3/4"	4.25" X 3.625"	40	1	980	65°	180	160	1.0	1,2,3,4,5,6,7
FTR - 3	STERLING	JVB VB - ARPM	ENTRY. AREA	8'-0"	3/4"	4.25" X 3.625"	40	1	980	65°	180	160	1.0	1,3,4,5,6,7,8

- 1. FURNISH UNIT WITH FULL BACKPLATE SUPPORT, FULL BACKPLATE, ENCLOSURE, ELEMENT, BRACKETS, CRADLES, ETC. PROVIDE REQUIRED MOUNTING HARDWARE.
- 2. BASEBOARD ENCLOSURE SHALL BE "WALL TO WALL" AS INDICATED ON THE PLAN. THE CONTRACTOR SHALL FIELD MEASURE THE REQUIRED ENCLOSURE LENGTHS. 3. PROVIDE VALVE ACCESS COMPARTMENTS FOR ACCESS TO AIR, BALANCING, CONTROL, AND ISOLATION VALVES.
- 4. PROVIDE ALL REQUIRED CORNER PIECES, AND CAPS WALL SLEEVES, ETC REQUIRED FOR A COMPLETE INSTALLATION.
- 5. PERFORMANCE DATA LISTED IS BASED ON 190°F AVERAGE WATER TEMPERATURE ELEMENT LENGTHS HAVE BEEN CALCULATED BASED ON ACTUAL AVERAGE WATER TEMPERATURES.
- 6. PROVIDE TWO-WAY, MOTORIZED CONTROL VALVE INTERLOCKED WITH WALL MOUNTED TEMPERATURE SENSOR, AUTOMATED LOGIC AND BUILDING AUTOMATION SYSTEM.
- 7. PROVIDE COLOR CHART. COLOR TO BE SELECTED BY ARCHITECT.
- 8. BASEBOARD ENCLOSURE SHALL BE 8'-0" FOR ENTRY AREA FIN-TUBE.

				F	AIR CON	IDITION	VING UNIT	SCHEDU	JLE							
TAG	LOCATION	TYPE	BASIC OF DESIGN	MODEL	AIRFLOW		REFRIDGERAN		OLING CAP	ACITY	HEATING CAPACITY	EL	ECTRIC.	AL	WEIGHT	REMARKS
	200		MANUFACTUR ER			(IN. WG)	T TYPE	NOMINAL CAPACITY (MBH)	TOTAL CAPACITY (MBH)	EER/SEER	TOTAL CAPACITY (MBH)	POWER SUPPLY (V/PH/HZ)	MCA	MOCP	(LBS)	
AC-1	SERVER RM.	WALL	MITSUBISHI	PKA-AK36NL	705	N/A	R-454b	36	36	10.8/19.4	36	208/1/60	1.0	OUTDOOR	46	1, 2, 3, 4

- 1. PROVIDE WITH TOUCH MA CONTROLLER WITH BACNET INTERFACE. INTERLOCK WITH BUILDING MANAGEMENT SYSTEM BY ENTOUCH.
- 2. COOLING PERFORMANCE BASED UPON 80°F DB / 67°F WB / 95°F AMBIENT.
- 3. CONTRACTOR SHALL CHOOSE SCHEDULED UNIT OR ENGINEERED APPROVED ALTERNATE OF EQUAL PERFORMANCE. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY REQUIRED DESIGN
- CHANGES RESULTING FROM VARIATION IN UNIT SIZE, WEIGHT, AND/OR POWER REQUIREMENTS.
- 4. PROVIDE BLUE DIAMOND CONDENSATE PUMP WITH RESERVOIR AND SENSOR.

	_	_	_		CONDENS	ING UNI	T SCHE	DULE	÷					
			BASIC OF				OLING CAPA	ACITY	HEATING CAPACITY		ELECTRICAL	-		
TAG	LOCATION	TYPE	DESIGN MANUFACTURE R	MODEL	REFRIDGERAN T TYPE	CAPACITY (MBH)	RATED CAPACITY (MBH)	SEER	TOTAL CAPACITY (MBH)	POWER SUPPLY (V/PH/HZ)	MCA	MOCP	WEIGHT (LBS)	REMARKS
CU-1	ROOF	AIR COOLED	MITSUBISHI/TRANE	PUYA-AK36NL	R-454b	36	36	19.4	38	208/1/60	34	56	251	1 TO 5

1. PROVIDE WITH SIMPLE MA CONTROLLER. PROVIDE PAC-SJ95MA-E M-NET CONVERTER. CONNECT TO CENTRAL CONTROLLER FOR CONNECTION WITH BUILDING MANAGEMENT SYSTEM BY

- ENTOUCH.
- 2. COOLING PERFORMANCE BASED UPON 95°F DB AMBIENT.
- 3. CONTRACTOR SHALL CHOOSE SCHEDULED UNIT OR ENGINEERED APPROVED ALTERNATE OF EQUAL PERFORMANCE. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY REQUIRED DESIGN
- CHANGES RESULTING FROM VARIATION IN UNIT SIZE, WEIGHT, AND/OR POWER REQUIREMENTS. 4. PROVIDE WITH WIND BAFFLES FOR LOW AMBIENT COOLING. (REFER TO WIND BAFFLE DOCUMENTATION FOR REQUIREMENTS.)
- 5. PROVIDE MOUNTING PAD SECURED TO ROOF. PROVIDE 12" HIGH STAND SECURED TO MOUNTING PAD.

						_	— • , — •			CHANICA		<i>.</i> ———	····			
ZONE & AREA	OCCUPANCY CATEGORY	NET AREA FT2	AREA OUTDOOR AIR RATE	CODE REQ'D BASED ON SQ_FT	ACT. OCC. LOAD	PEOPLE OUTDOOR AIR RATE CFM/PERSON	CODE REQ'D BASED ON PEOPLE CFM	TOTAL OA REQ'D BY CODE CFM (Vbz)	DISTR.	ZONE OA REQ'D BY CODE	OA PROVIDE D CFM	Vpz MAX SUPPLY (CFM)	PRIMARY OA AIR FRACTION (Zpz)	AIRFLOW	EXHAUST REQ'D BY CODE CFM	EXHAUST PROVIDED CFM
mmersive Classroom	Education - Lecture Classroom	1,218	0.06	74	27	7.5	203	277	1	277	280	3,000	0.09	1	-	_
Free room demo	Education - Multiuse assembly	615	0.06	37	10	7.5	75	112	1	112	115	1,600	0.07	-	-	-
Lab / Dev Area	Education - Computer Lab	595	0.12	72	15	10	150	222	1	222	225	1,900	0.12	-	-	-
Lounge/ Check-in I	Education - Multiuse assembly	622	0.06	38	15	7.5	113	151	1	151	155	1,000	0.15	-	-	-
Corridor	Education - Corridors	900	-	-	15	7.5	113	113	1	113	115	900	0.13	-	-	-
Restroom/ Jen.C	Bathrooms/toilet	100	-	-	0		-	-	1	-	-	-	-	-	75	95
TOTALS		4,050			82			874			890	8,400				95

26	SYSTEM POPULATION
26	ZONE POPULATION
1.00	OCCUPANT DIVERSITY
0	UNCORRECTED OUTDOOR AIR INTAKE
0.104	AVERAGE OUTDOOR AIR FRACTION
0.23	ZONE PRIMARY OUTDOOR AIR FRACTION (MAX)
0.874	SYSTEM VENTILATION EFFICIENCY
8,400	ZONE PRIMARY AIRFLOW
874	CODE REQUIRED OUTDOOR AIRFLOW RATE, CFM
890	DESIGN OUTDOOR AIRFLOW RATE, CFM

DESCRIPTION

	ECH		E	LECTRIC	HEATE	R SCHED	ULE			BASIS OF DES	IGN: QMARK
Ī	UNIT	LOCATION AND	ELE	CTRICAL DATA	Ą		ENCLOS	URE DATA			
	TYPE	AREA SERVED	TOTAL WATTS	VOLTS PHASE	AMPS	TYPE	HEIGHT (IN.)	DEPTH (IN.)	LENGTH (IN.)	MODEL NO.	REMARKS
ſ	ECH-1	ENTRY VESTIBULE	3000	208/1	14.4	CEILING	7.0	23.25	23.25	CDF-548-RE	1

VALUE

SYMBOL

Zp (max)

SVpz

COLOR SELECTED BY ARCHITECT

2. PROVIDE RIB RELAY AND CONTRACTOR TO CONTROL THE LINE VOLTAGE TO THE HEATERS VIA ENTOUCH

SCHE		GRILLES, F DIFFUSERS		BASIS OF DESIGN: TITUS
_	IBOL / NATION	NOMINAL FACE SIZE	MODEL NO.	REMARKS
	EG	12"X12"	350 RL	1,2,3,4,6
	RG	24"X24"	350 RL	1,2,3,4,6
	SR	18"X8"	S300 FS	1,2,3,4,5,6
	LSD	48"X4"	ML39 / MPI39	1 SLOT. 1" SLOT SPACE. 8" INLET. 1,2,3,6
	CD	24"X24"	OMNI-AA	1,2,3,4,6

- 1. MAXIMUM NOISE CRITERION RATING <NC 25 IN GENERAL AREAS.
- 2. PROVIDE WITH BAKED ENAMEL FINISH. COLOR TO BE SELECTED BY ARCHITECT.
- 3. MOUNTING FRAME SHALL BE COORDINATED WITH CEILING AND/OR WALL CONSTRUCTION TYPE. COORDINATE WITH THE ARCHITECTURAL DRAWINGS.
- 4. PROVIDE OPPOSED BLADE VOLUME DAMPER.
- PROVIDE VOLUME EXTRACTOR. 6. PROVIDE SIZE UNLESS OTHERWISE INDICATED.

ARCHITEC	Γ
JZA	(+D
JOSHUA ZINDER ARCHITI	ECTURE + DESIGN
254 WITHERSPOON STREET PRINCETON,	NEW JERSEY 08542

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10-23-2024 | ADDENDUM 1 | **1** 09-19-2024 |ISSUED FOR BID 03-29-2024 OWNER REVIEW 02-23-2024 85% CD EXCHANGE 02-09-2024 | 50% CD EXCHANGE 12-22-2023 | 100% DD 12-08-2023 | 50% DD EXCHANGE DATE

Vincent Farese, PE

N.J. Professional Engineer No. 43960

PROJECT NAME

VIRTUAL REALITY **CLASSROOM & DEVELOPMENT**

LAB

AT L. HOWARD FOX STUDIO MONTCLAIR STATE UNIVERSITY

DRAWING NAME

MECHANICAL: SCHEDULES

02-06-2024

DEMOLITION NOTES:

- 1. NOTES AND GRAPHIC REPRESENTATIONS SHALL NOT LIMIT THE EXTENT OF DEMOLITION REQUIRED. CONTRACTOR SHALL VISIT THE SITE, CAREFULLY EXAMINE EXISTING CONDITIONS AND SHALL PERFORM ALL DEMOLITION REQUIRED TO ACHIEVE THE FINAL DESIGN INTENT AS REQUIRED BY THE CONTRACT DOCUMENTS. EXTENT OF ALL DEMOLITION WORK SHALL BE COORDINATED WITH THE ARCHITECT AND CONSTRUCTION MANAGER.
- 2. EQUIPMENT AND WIRING TO BE REMOVED SHALL BE DE-ENERGIZED PRIOR TO ANY DEMOLITION WORK.
- 3. UNLESS OTHERWISE NOTED, DISCONNECT AND REMOVE ALL FIXTURE RECEPTACLES, OUTLETS AND OTHER ELECTRICAL DEVICES ALONG WITH ASSOCIATED WIRING, CONDUIT RACEWAYS, BOXES AND SUPPORTS IN AREA OF WORK. EXISTING ELECTRICAL DEVICES SHALL INCLUDE, BUT NOT LIMITED TO, TEL/DATA OUTLETS, LIGHTING SWITCHES, RECEPTACLES, ETC.
- 4. WHERE SPECIFIC DEVICES ARE INDICATED: 'EX' - DENOTES EXISTING TO REMAIN. 'ER' - DENOTES EXISTING TO BE REMOVED. 'RR' - EXISTING TO BE REMOVED AND RELOCATED. 'R' - RELOCATED EXISTING.
- 5. UNLESS OTHERWISE INDICATED, EXISTING SERVICES, SYSTEMS AND WIRING SERVING EXISTING AREAS OUTSIDE OF DEMOLITION AREA SHALL REMAIN OR BE RELOCATED AS REQUIRED TO MAINTAIN OPERATION OF EXISTING SYSTEMS AND AVOID CONFLICT WITH NEW CONSTRUCTION.
- 6. IN PROCESS OF REMOVING WIRING DEVICES, LIGHTING FIXTURES AND OTHER ELECTRICAL EQUIPMENT AND MATERIALS, THIS CONTRACTOR SHALL EXERCISE EXTREME CAUTION TO PREVENT DAMAGE TO THE ARCHITECTURAL SURFACES AND MATERIALS WHICH ARE TO REMAIN, INCLUDING WALLS, FLOORS, CEILINGS WINDOWS, DOORS, MOLDINGS, STRUCTURAL MEMBERS, ETC. THE COST TO REPAIR OR ANY MATERIAL DEEMED BY THE ARCHITECT TO HAVE BEEN UNDULY DAMAGED BY THIS CONTRACTOR DURING DEMOLITION OR CONSTRUCTION SHALL BE PAID BY THIS CONTRACTOR AT THIS ADDITIONAL COST TO THE OWNER.
- 7. FEEDERS AND BRANCH CIRCUITS TO BE REMOVED WIRING, CONDUIT AND SUPPORTS SHALL BE REMOVED TO THE PANEL OF ORIGIN.
- 8. PROVIDE TEMPORARY SUPPORTS FOR ALL DEVICES, EQUIPMENT, AND CABLING THAT ARE TO REMAIN. COORDINATE ALL WORK WITH BUILDING OPERATING PERSONNEL AND BUILDING'S FIRE ALARM, SECURITY AND TELECOM CONTRACTORS.
- 9. ALL WORK SHALL BE PROPERLY IDENTIFIED AFTER DEMOLITION.
- 10. PROVIDE BLANK PLATES AT ALL OPEN BOXES WHERE DEVICES ARE REMOVED AND SURFACE IS NOT SCHEDULED TO BE PATCHED AND RE-FINISHED.
- 11. COORDINATE WITH ARCHITECT AND CONSTRUCTION MANAGER WHICH FIXTURES, DEVICES AND EQUIPMENT, IF ANY, ARE TO BE REMOVED, KEPT INTACT AND RETURNED TO THE OWNER. IN GENERAL, ALL DEVICES, WIRING, RACEWAYS, BOXES, SUPPORTS AND OTHER EQUIPMENT WHICH ARE TO BE REMOVED FROM SITE SHALL BE PROPERLY DISPOSED OF.
- 12. WHERE PORTIONS OF AN EXISTING BRANCH CIRCUIT ARE REMOVED, WIRING TO REMAIN DEVICES ON THE CIRCUIT SHALL BE RECONNECTED OR MODIFIED IN AN APPROVED MANNER AS REQUIRED TO MAINTAIN CONTINUITY OF THE AFFECTED BRANCH CIRCUIT AND OPERATION OF THE REMAINING DEVICES.
- 13. EQUIPMENT INDICATED TO BE REMOVED SHALL BE TAKEN FROM THE SITE AND DISPOSED OF IN ACCORDANCE WITH APPLICABLE LAWS AND ENVIRONMENTAL REGULATIONS. EQUIPMENT REQUIRED TO BE TURNED OVER TO THE OWNER SHALL BE PLACED IN A MUTUALLY ACCEPTABLE LOCATION.

GENERAL NOTES

- 1. REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL ELECTRICAL REQUIREMENTS AND LIGHTING FIXTURE SCHEDULE.
- 2. CONTRACTOR SHALL VISIT THE JOB SITE, REVIEW THE ARCHITECTURAL DRAWINGS AND BE RESPONSIBLE FOR REVIEWING A FULL SET OF BID DOCUMENTS TO MAKE HIMSELF AWARE OF THE TOTAL JOB BEFORE SUBMITTING HIS PRICE.
- 3. VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND INCLUDE IN BID THE PRICE OF ALL WORK REQUIRED TO ACCOMMODATE THE EXISTING INSTALLATION.
- 4. ALL WORK SHALL BE INSTALLED CONCEALED, UNLESS OTHERWISE NOTED, BRANCH WIRING SHALL BE CONCEALED IN WALLS AND ABOVE HUNG CEILING, U.O.N.
- 5. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS OF FINISHED CONSTRUCTION PRIOR TO FABRICATION AND INSTALLATION OF FIXTURES AND EQUIPMENT.
- 6. CONTRACTOR SHALL SUBMIT SAMPLES OF RECEPTACLES AND PLATES TO THE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION.
- 7. CIRCUIT NUMBERS INDICATED ON POWER AND LIGHTING PLANS ARE FOR IDENTIFICATION PURPOSES ONLY. CONTRACTOR SHALL VERIFY THE EXACT CIRCUIT NUMBER IN THE FIELD WHEN BRANCH CIRCUITS ARE INDICATED TO BE CONNECTED TO EXISTING PANELBOARDS.
- 8. LIGHTING FIXTURES IN ACCESSIBLE CEILINGS SHALL BE FURNISHED WITH FLEXIBLE CONDUIT CONNECTIONS TO SEPARATELY MOUNTED JUNCTION BOXES. ONE (1) JUNCTION BOX SHALL SERVE A MAXIMUM OF FOUR (4) FIXTURES. MAXIMUM LENGTH OF FLEXIBLE CONNECTION SHALL BE 6'-0".
- 9. WIRING IN AIR PLENUM HUNG CEILINGS INSTALLED WITHOUT CONDUIT OR EMT SHALL BE PLENUM RATED.
- 10. DETERMINE THE EXACT LOCATION OF EQUIPMENT TO BE INSTALLED BY OTHER TRADES BEFORE STARTING CONDUIT WORK.
- 11. CONTRACTOR SHALL PROVIDE AND CONNECT ALL RACEWAYS AND WIRING FROM EQUIPMENT AND DEVICES TO THEIR SOURCE OF POWER. PROVIDE ALL REQUIRED CONDUITS, WIRING AND JUNCTION BOXES TO ENERGIZE EQUIPMENT AS INDICATED.
- 12. CONTRACTOR SHALL RELOCATE AND/OR MODIFY EXISTING ELECTRICAL WORK AS SHOWN AND AS REQUIRED TO SUIT THE NEW WORK.
- 13. AFTER HIS WORK IS COMPLETED, CONTRACTOR SHALL TEST THE ELECTRICAL DISTRIBUTION SYSTEM FOR SHORT CIRCUITS, LOOSE WIRING, ETC., TO THE SATISFACTION OF THE OWNER. ALL COSTS FOR THIS TEST SHALL BE BORNE BY THE CONTRACTOR.
- 14. FOR WIRING IN METAL PARTITIONS WHERE EMT IS IMPRACTICAL, FLEXIBLE STEEL CONDUIT GALVANIZED, MINIMUM $\frac{3}{4}$ " SHALL BE USED.
- 15. FOR EXACT LOCATIONS AND MOUNTING HEIGHTS OF ALL ELECTRICAL OUTLETS, SWITCHES AND LIGHTING FIXTURES SEE ARCHITECTURAL FLOOR AND REFLECTED CEILING PLANS, DETAILS AND ELEVATIONS.
- 16. CONTRACTOR SHALL COORDINATE ON SITE AND WITH THE ARCHITECT THE EXACT LOCATION OF ALL FLOOR MOUNTED DEVICES REQUIRING CORE DRILLING PRIOR TO THE START OF ANY SUCH WORK.
- 17. MOUNTING HEIGHTS OF EQUIPMENT AND DEVICES SHALL BE AS INDICATED ON THE ARCHITECTURAL DRAWINGS. WHERE MOUNTING HEIGHTS ARE NOT GIVEN ON THE ARCHITECTURAL DRAWINGS, UTILIZE THE FOLLOWING MOUNTING HEIGHTS UNLESS OTHERWISE NOTED (ALL DIMENSIONS TO CENTERLINE OF BOX):
- A. RECEPTACLES (WALL MOUNTED) 18" A.F.F.
- B. TELEPHONE/DATA OUTLETS SAME AS RECEPTACLES
- LIGHTING SWITCHES AND CONTROLS 48" A.F.F. TO TOP OF HANDLE
- MANUAL FIRE ALARM STATIONS 48" A.F.F. TO TOP FIRE ALARM HORN AND STROBE UNITS - 80" A.F.F. OR 6" BELOW THE CEILING
- CARD READERS 48" A.F.F. TO TOP
- G. PANELBOARDS AND CABINETS 78" TO TOP OF ENCLOSURE.
- 18. MINIMUM RACEWAY SIZE SHALL BE 3/4" AND SHALL BE RUN PARALLEL TO BUILDING STRUCTURAL LINES. RACEWAYS SHALL NOT BE RUN HORIZONTALLY BELOW 8'-0" IN PARTITIONS. ALL EMPTY RACEWAYS SHALL BE FURNISHED WITH A 200 LB. TEST NYLON DRAG LINE.
- 19. WHERE EQUIPMENT, LIGHTING FIXTURES AND WIRING DEVICES ARE SHOWN WITH CIRCUIT NUMBERS ONLY. THE MINIMUM BRANCH CIRCUITING REQUIREMENTS SHALL BE AS FOLLOWS, U.O.N.:
- A. LIGHTING FIXTURES 2#12, 1#12 GRD-3/4"C.
- RECEPTACLES 2#12, 1#12 GRD-3/4"C. HOMERUNS TO PANELBOARDS SHALL CONTAIN NO MORE THAN (3) CIRCUITS. PROVIDE DEDICATED NEUTRAL FOR ALL LIGHTING AND OFFICE POWER CIRCUITS. NEUTRAL CONDUCTOR FOR MULTI-POLE CIRCUITS FEEDING FURNITURE SYSTEMS SHALL BE SIZED ONE TRADE SIZE LARGER THAN PHASE CONDUCTORS, MINIMUM #10 AWG (EXAMPLE: 3#12, 1#10N, 1#12GRD-3/"C) AND UTILIZE MULTI-POLE
- CIRCUIT BREAKERS TO DISCONNECT ALL PHASE CONDUCTORS. D. WHERE LIGHTING SWITCH INDICATIONS ARE NOT SHOWN, SWITCHES SHALL BE CONNECTED TO CONTROL ALL SWITCHED FIXTURES WITHIN THE CORRESPONDING SPACE.
- 18. WIRE SIZES SHALL BE INCREASED TO COMPENSATE FOR VOLTAGE DROP AS FOLLOW:
- A. 120V CIRCUITS LONGER THAN 50' SHALL UTILIZE MIN. #10 AWG. B. 120V CIRCUITS LONGER THAN 110' SHALL UTILIZE MIN. #8 AWG.
- 19. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY LIGHT AND POWER TO INSURE THE SAFETY OF PERSONNEL AND POWER REQUIREMENTS OF THE VARIOUS TRADES. PROVIDE TEMPORARY LIGHT AND POWER FOR GENERAL BUILDING ACCESS.
- 20. BARRIER FREE REQUIREMENTS OF NJAC 5:23-7.2 APPLY TO THIS INSTALLATION.

MONTCLAIR STATE UNIVERSITY FIRE ALARM VENDOR -AUTOMATIC SUPPRESSION & ALARM CONTACT: BRIAN ZIEMBA 201-825-8855

POWER CONDUIT RUN CONCEALED IN HUNG CEILING SPACE AND WALLS. CONDUIT TURNING UP CONDUIT TURNING DOWN DISTRIBUTION PANEL FLUSH TYPE PANELBOARD SURFACE TYPE PANELBOARD FUSED DISCONNECT SWITCH WITH EQUIPMENT CONNECTION. HORSEPOWER RATING AS REQUIRED BY MOTOR LOAD. SWITCH RATING SAME AS, OR NEXT STANDARD SIZE HIGHER THAN UPSTREAM CIRCUIT PROTECTIVE DEVICE AND FUSE RATING SAME AS UPSTREAM CIRCUIT PROTECTIVE DEVICE U.O.N. 'WP' INDICATES WEATHERPROOF ENCLOSURE, OTHERWISE ENCLOSURE IS NEMA-1. UNFUSED DISCONNECT SWITCH WITH EQUIPMENT CONNECTION. HORSEPOWER RATING AS REQUIRED BY MOTOR LOAD. RATING SAME AS, OR NEXT STANDARD SIZE HIGHER THAN UPSTREAM CIRCUIT PROTECTIVE DEVICE U.O.N. 'WP' INDICATES WEATHERPROOF ENCLOSURE, OTHERWISE ENCLOSURE IS NEMA-1. VARIABLE FREQUENCY DRIVE WITH INTEGRAL FUSED DISCONNECT SWITCH WITH EQUIPMENT CONNECTION. HORSEPOWER RATING AS REQUIRED BY MOTOR LOAD. RATING SAME OR HIGHER THAN UPSTREAM CIRCUIT PROTECTIVE DEVICE U.O.N. 'WP' INDICATES WEATHERPROOF ENCLOSURE, OTHERWISE ENCLOSURE IS NEMA-1. WIRING DEVICES DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W, GROUNDED NEMA CONFIG. 5-20R DUPLEX GFI TYPE RECEPTACLE, 20A, 125V, 2P, 3W, GROUNDED NEMA CONFIG. 5-20R DUPLEX RECEPTACLE 20A, 125V, 2P, 3W, GROUNDED NEMA CONFIG. 5-20R (DEDICATED CIRCUIT) DOUBLE DUPLEX RECEPTACLE IN 2 GANG BOX, 20A, 125V, 2P, 3W GROUNDED NEMA CONFIG. 5-20R FLOOR, CEILING MOUNTED RECEPTACLE, 20A, 125V, 2P, 3W, GROUNDED NEMA CONFIG. 5-20R SPECIAL PURPOSE SINGLE RECEPTACLE. TYPE, NEMA RATING AS SHOWN ON PLANS. NUMERAL INDICATES CIRCUIT NUMBER. CEILING MOUNTED JUNCTION / SPLICE BOX WITH EQUIPMENT CONNECTION, SIZE AS FLOOR MOUNTED JUNCTION / SPLICE BOX WITH EQUIPMENT CONNECTION, SIZE AS REQUIRED WALL MOUNTED JUNCTION/SPLICE BOX WITH EQUIPMENT CONNECTION, SIZE AS REQUIRED JUNCTION/SPLICE BOX WITH CONNECTION TO EACH FIRE/SMOKE DAMPER (FSD) POWER / TEL / DATA SURFACE MOUNTED DIVIDED METAL RACEWAY SPECIFICATION: WIREMOLD SERIES AS NOTED ON PLANS LOCATION, COLOR AND FINISH BY ARCHITECT MANUAL MOTOR STARTER SWITCH RECESSED 4-GANG WALL BOX FOR TV WITH PROVISIONS FOR POWER AND A/V. COORDINATE MOUNTING HEIGHT WITH ARCHITECTURAL ELEVATIONS. SIMILAR TO EGRAND EFSB4 SERIES. TELECOMMUNICATIONS SYSTEM WALL MOUNTED COMBINATION TELEPHONE/DATA OUTLET IN DOUBLE GANG BOX WITH SINGLE GANG REDUCER PLATE AND 1" EMPTY CONDUIT WITH DRAG WIRE STUBBED 6" ABOVE ACCESSIBLE SECURE HUNG CEILING AND TERMINATED WITH BUSHING. REFER TO IT DRAWINGS FOR EXACT REQUIREMENTS. WALL MOUNTED DATA OUTLET BOX WITH 1" EMPTY CONDUIT WITH DRAG WIRE STUBBED 6" ABOVE ACCESSIBLE SECURE HUNG CEILING AND TERMINATED WITH BUSHING. REFER TO IT DRAWINGS FOR EXACT REQUIREMENTS. WALL MOUNTED TELEPHONE OUTLET BOX WITH 1" EMPTY CONDUIT WITH DRAG WIRE STUBBED 6" ABOVE ACCESSIBLE SECURE HUNG CEILING AND TERMINATED WITH BUSHING. HEIGHT BY ARCHITECT. REFER TO IT DRAWINGS FOR EXACT REQUIREMENTS. WALL MOUNTED SM FIBER OUTLET BOX WITH 1" EMPTY CONDUIT STUB-UP TO NEAREST ACCESSIBLE CEILING. REFER TO IT DRAWINGS FOR EXACT REQUIREMENTS. FLUSH CEILING MOUNTED OUTLET. PROVIDE 5" SQUARE BOX WITH SINGLE GANG REDUCER PLATE AND 1"C TO THE TELECOM TERMINATED WITH BUSHING AND DRAG LINE. U.O.N. REFER TO IT DRAWINGS FOR EXACT REQUIREMENTS. WIRELESS ACCESS POINT LOCATION. PROVIDE 1" C TO THE NEAREST TELECOM CONSOLIDATION POINT AT CEILING AND TERMINATE WITH BUSHING AND DRAG LINE. U.O.N. REFER TO IT DRAWINGS FOR EXACT REQUIREMENTS. MULTI-GANG FLUSH MOUNTED CAST FLOOR BOX PROVIDE COMBINATION/TYPE OF RECEPTACLES AND/OR TELECOMMUNICATIONS OUTLETS AS INDICATED BY SYMBOLS. PROVIDE 3/4"C FOR POWER. RUN WIRES IN-SLAB FROM FLUSH FLOOR MOUNTED DEVICES TO NEAREST WALL OR FURRED OUT COLUMN AND STUBBED 6" ABOVE ACCESSIBLE HUNG CEILING AND TERMINATED WITH BUSHING. REFER TO IT DRAWING FOR EXACT REQUIREMENT FOR DATA. SPECIFICATION: WIREMOLD TELECOMMUNICATIONS GROUND BAR - 1/4" x 4" x 1", HOLE CENTERS MATCH NEMA DOUBLE LUG CONFIGURATION. PROVIDE INSULATORS, LOCKWASHERS AND WALL MOUNTING BRACKET.

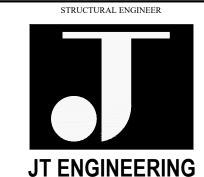
	ELECTRICAL SYMBOLS LIST		
	MISC.		ABBREVIATIONS
[CR]	CARD READER - PROVIDE EMPTY BACKBOX AND 1" CONDUIT UP THRU WALL TO	+	SPECIAL HEIGHT - REFER TO ARCHITECTURAL DRAWINGS
	NEAREST ACCESSIBLE CEILING.	A AC	AMPERE(S) ABOVE COUNTER / ALTERNATING CURRENT
ES	ELECTRIC STRIKE - PROVIDE EMPTY BACKBOX AND 1" CONDUIT UP THRU WALL TO NEAREST ACCESSIBLE CEILING.	AFF	ABOVE FINISHED FLOOR
ML	MAGNETIC LOCK	AFG	ABOVE FINISHED GRADE
	INFRARED DOOR RELEASE SENSOR - PROVIDE EMPTY BACKBOX AND 1" CONDUIT UP	AIC ATC	AMPERES INTERRUPTING CURRENT AUTOMATIC TEMPERATURE CONTROL
IR	THRU WALL TO NEAREST ACCESSIBLE CEILING.	ATS	AUTOMATIC TRANSFER SWITCH
KP	SECURITY KEY PAD - PROVIDE EMPTY BACKBOX AND 1" CONDUIT UP THRU WALL TO NEAREST ACCESSIBLE CEILING.	BAS, BMS BFG	BUILDING AUTOMATION SYSTEM, BUILDING MANAGEMENT SYSTEM BELOW FINISHED GRADE
<u> </u>	CEILING MOUNTED SPEAKER	BLDG	BUILDING
	WALL / CEILING MOUNTED AUDIOVISUAL 5" SQUARE JUNCTION BOX WITH SINGLE	С	CONDUIT
\bigoplus \bigotimes _C	GANG REDUCER PLATE. PROVIDE 1-1/2" CONDUIT WITH DRAG WIRE TO JUNCTION	CB &	CIRCUIT BREAKER CENTERLINE
	BOX BEHIND AV CREDENZA.	CATV	CABLE TELEVISION
AV	WALL FLUSH MOUNTED AUDIOVISUAL 12"x12"x4" NEMA 1 JUNCTION BOX	CCTV	CLOSED CIRCUIT TV
	LIGHTING	CLG	CEILING COUNTER HEIGHT
а <u> </u>		CKT(S)	CIRCUIT(S)
a A 2	OUTLET BOX AND LIGHTING FIXTURE: `A' - DENOTES FIXTURE TYPE.	CU D	COPPER DIMMER SWITCH
В	`2' - DENOTES CIRCUIT NUMBER `a' - DENOTES SWITCH CONTROL	DIA	DIAMETER
2(NL)	`NL' - DENOTES UNSWITCHED NIGHT LIGHT 'EM' - EMERGENCY FIXTURE WITH INTEGRAL OR REMOTE EMERGENCY BATTERY	DP	DISTRIBUTION PANELBOARD
\mathcal{I}	PACK	DWG	DISHWASHER DRAWING
t ⊕ t Ø	CEILING, WALL EXIT LIGHT WITH INTEGRAL BATTERY PACK - DIRECTIONAL ARROWS AS INDICATED	EC	EMPTY CONDUIT
·•· Ψ	- SHADED AREA DENOTES FACE(S) UPON WHICH 'EXIT' APPEARS	E/EM EMT	EMERGENCY ELECTRICAL METALLIC TUBING
EM	SELF CONTAINED EMERGENCY LIGHTING BATTERY PACK WITH SEALED BEAM HEADS	ER	EXISTING TO BE REMOVED
	CONTROL SWITCH:	EX	EXISTING TO REMAIN
S ₃ ^a	a = DENOTES SWITCH CONTROL 3 = DENOTES 3-WAY SWITCH 'D' - DENOTES DIMMER SWITCH	F EWC	ELECTRICAL WATER COOLER FUSE/DEGREES FAHRENHEIT
	K = DENOTES KEY OPERATED SWITCH	FA	FIRE ALARM
S _{VC}	COMBINATION WALL MOUNTED VACANCY AND MANUAL SWITCH	FL GEC	FLOOR GROUNDING ELECTRODE CONDUCTOR
	ETC ECHO E-VAC CEILING MOUNTED VACANCY SENSOR WITH APPROPRIATE SWITCH	G/GRD/GND	GROUND GROUND
⟨vc⟩	PACK. THREE (3) SENSORS PER SWITCH PACK.	GFI HC	GROUND FAULT INTERRUPTER HUNG CEILING
	a = DENOTES SWITCH DESIGNATION LIGHTING CONTROL SYSTEM 0-10V, RELAY CONTROLLER. ETC ECHO #EDLD-G2 (FOR	HD	HAND DRYER
	DUAL ZONE) AND ETC ECHO ELD-G2 (FOR SINGLE ZONE). PROVIDE ALL LOW VOLTAGE WIRING, CONNECTIONS AND PROGRAMMING FOR CONTROL DEVICES	HP HZ	HORSE POWER HERTZ
PP a	WITHIN LIGHTING CONTROL ZONE INDICATED.	ICCB	INSULATED CASE CIRCUIT BREAKER
	a = DENOTES CONTROL ZONE (SINGLE ZONE) a,b = DENOTES CONTROL ZONE (DUAL ZONE).	IG	ISOLATED GROUND
	D = DENOTES PHASE-ADAPTIVE DIMMER CONTROLLER (ETC ECHO #ELVD-G2).	J/JB IMC	JUNCTION BOX INTERMEDIATE METALLIC CONDUIT
	ETC ECHO ERMCT4-G2 4-ZONE ROOM CONTROLLER 0-10V DIMMING OUTPUT WITH	KAIC	KILO AMPS INTERRUPTING CURRENT
RC	TIMECLOCK. PROVIDE ALL LOW VOLTAGE WIRING, CONNECTIONS AND PROGRAMMING FOR CONTROL DEVICES WITHIN LIGHTING CONTROL ZONE.	KCMIL	THOUSAND CIRCULAR MILS KILOVOLTS
		KVA	KILOVOLT-AMPERES
S ^a LV	ETC ECHO E1004 INSPIRE STATION FOUR BUTTON. WIRE AS PER MANUFACTURER'S INSTRUCTIONS.	KW LP	KILOWATTS LIGHTING PANELBOARD
~~~	2 = DENOTES SWITCH DESIGNATION	LTG	LIGHTING
	FIRE ALARM	LV LVRC	LOW-VOLTAGE LOW-VOLTAGE RELAY CONTROL
F	MANUAL PULL STATION	MCB MCCB	MAIN CIRCUIT BREAKER MOLDED CASE CIRCUIT BREAKER
~	WALL MOUNTED VISUAL FIRE ALARM STROBE. COVERPLATE SHALL BE WHITE WITH	MER	MECHANICAL EQUIPMENT ROOM
Ę	RED LETTERS. MAXIMUM 80 INCHES ABOVE FINISHED FLOOR OR 6 INCHES BELOW CEILING WHICHEVER IS LOWER.	MH MI O	MANHALIOS ONLY
F	COMBINATION WALL MOUNTED AUDIO/VISUAL FIRE ALARM DEVICE. COVERPLATE	MLO MSB	MAIN LUGS ONLY MAIN SWITCHBOARD
<u>.</u> 7	SHALL BE WHITE WITH RED LETTERS. MAXIMUM 80 INCHES ABOVE FINISHED FLOOR OR 6 INCHES BELOW CEILING WHICHEVER IS LOWER.	MSSB	MAIN SERVICE SWITCHBOARD
(s)	CEILING MOUNTED AREA SMOKE DETECTOR	MTD MV	MOUNTED MEDIUM VOLTAGE
		MVA	MEGA VOLT-AMPERES
		MW	MEGA WATTS
		N N.C.	NEUTRAL NORMALLY CLOSED
	LEGEND	NIC	NOT IN CONTRACT
	LLOLIND	NL N.O.	NIGHT LIGHT (UNSWITCHED) NORMALLY OPEN
	EVICTING TO DEVICE	NTS	NOT TO SCALE
. , , , , , , , , , , , , , , , , , , ,	EXISTING TO REMOVE	OC P	ON CENTER POLE(S)
	NEW ELECTRICAL WORK / DEVICES	PB	PULL BOX
	EXISTING TO REMAIN	PH	PHASE DANIEL
		PNL PP	PANEL POWER PANEL
		R	RELOCATED
		RC RP	REMOTE CONTROL RECEPTACLE PANELBOARD
ELI	ECTRICAL DRAWING LIST:	RR	EXISTING TO BE REMOVED AND RELOCATED
E0-1	1 GENERAL NOTES, SYMBOL LIST & ABBREVIATIONS	SS STB	SERVICE SWITCH SHORTING TERMINAL BLOCK
E0-2		STD	STANDARD STANDARD
ED1		SWRD	SWITCH SWITCHROADD
E1-1		SWBD T/XFMR	SWITCHBOARD TRANSFORMER
E1-1		TEL	TELEPHONE
		TEL/COM TYP	TELECOMMUNICATIONS TYPICAL
E2-1		TV	TELEVISION
E3-1	1 DIAGRAMS & SCHEDULES	UNF/SW UON	UNFUSED SWITCH UNLESS OTHERWISE NOTED
		V	VOLTS VOLTS
		VA	VOLT-AMPERES
		WP	WIRE, WATTS WEATHERPROOF
		1	•



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DATE

Vincent Farese, PE N.J. Professional Engineer No. 43960 PROJECT NAME

VIRTUAL REALITY **CLASSROOM & DEVELOPMENT**

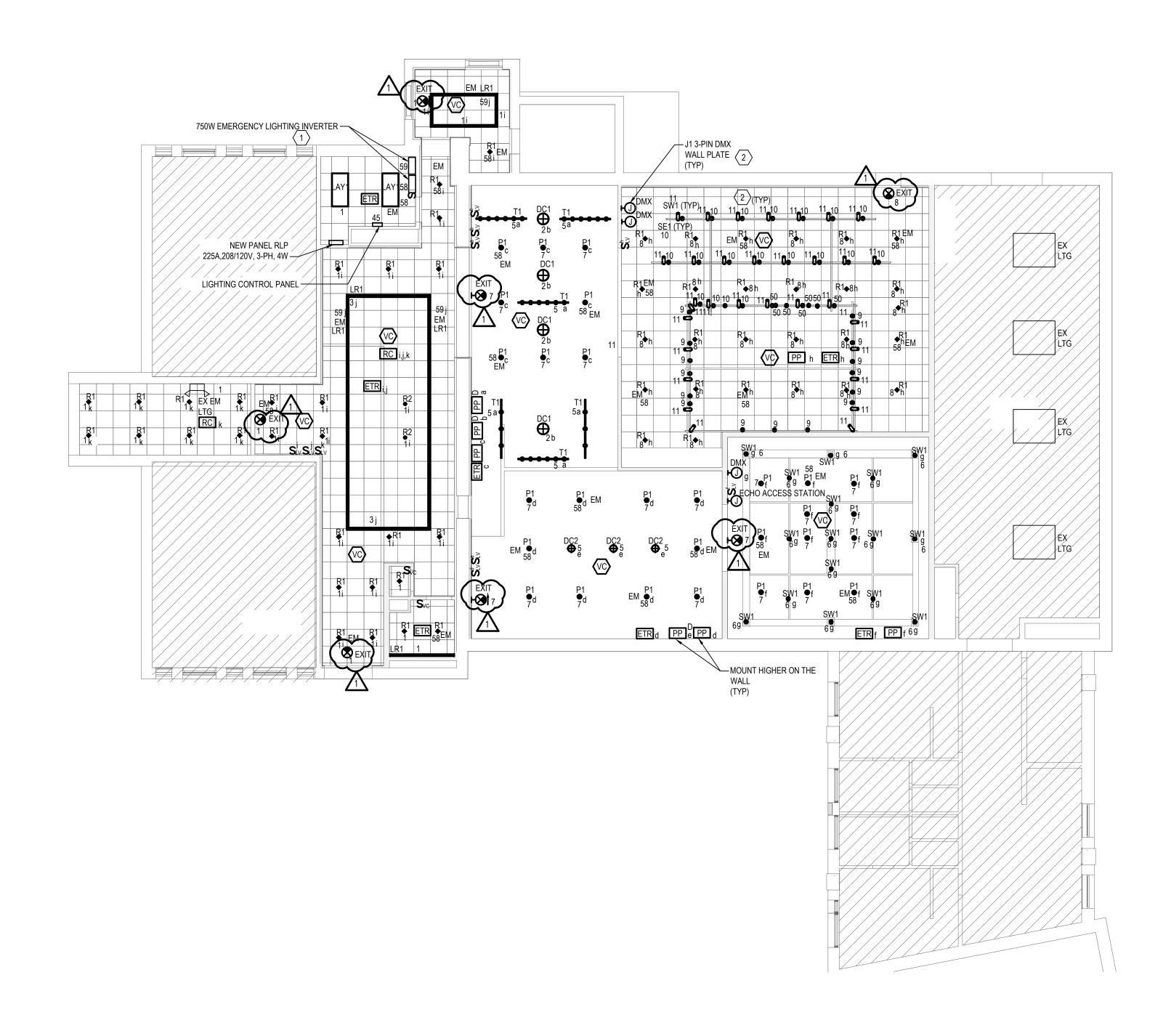
LAB AT L. HOWARD FOX STUDIO **THEATRE** MONTCLAIR STATE UNIVERSITY

DRAWING NAME

ELECTRICAL: GENERAL NOTES **SYMBOL LIST & ABBREVIATIONS**

PROJECT NO.: 22322 02-06-2024 SCALE:

SHEET NUMBER





GENERAL NOTES

- 1. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS AND MOUNTING HEIGHTS OF ALL LIGHTING FIXTURES AND LIGHTING CONTROL
- 2. BASIS OF DESIGN FOR LIGHTING CONTROLS IS ECHO BY ETC, INC. ALL LIGHTING CONTROLS SHOWN SHALL BE INTEGRATED INTO THE SYSTEM. COORDINATE ALL REQUIRED PROGRAMMING WITH OWNER REQUIREMENTS. 3. ALL LIGHTING WITHIN THIS AREA SHALL BE WIRED TO NEW PANEL 'RLP' U.O.N.
- 4. ALL FIXTURES LABELED 'EM' SHALL BE WIRED TO EMERGENCY LIGHTING INVERTERS VIA EMERGENCY TRANSFER RELAY. FIXTURES SHALL BE NORMALLY CONTROLLED BY LOCAL LIGHTING CONTROLS AND SWITCH TO FULL BRIGHTNESS IN THE EVENT OF A POWER OUTAGE.

KEY NOTES

- 1. PROVIDE TWO IOTA IIS 750 LED 750W EMERGENCY WALL MOUNTED LIGHTING INVERTER TO SERVE EMERGENCY LIGHTING LABELED 'EM'. PROVIDE ALL REQUIRED SUPPORTS AND ACCESSORIES FOR MOUNTING. PROVIDE ALL WIRING AS REQUIRED FOR CONTROL OF FIXTURES BY LIGHTING MANAGEMENT
- 2. LIGHTING FIXTURES 'SW1' AND 'SE1' SHALL BE CONTROLLED BY 3-PIN DMX WALL PLATE AND ECHO EDMXC CONTROLLER.



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Vincent Farese, PE N.J. Professional Engineer No. 43960 PROJECT NAME

VIRTUAL REALITY **CLASSROOM & DEVELOPMENT**

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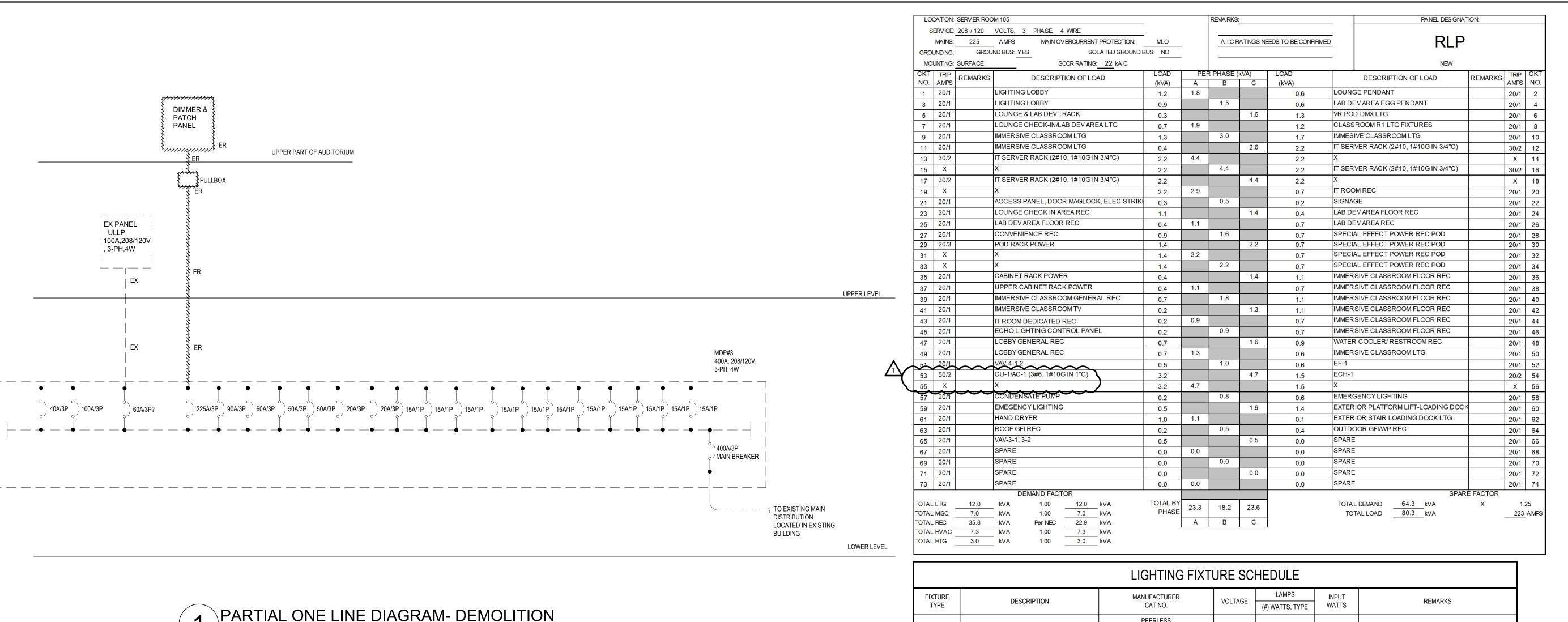
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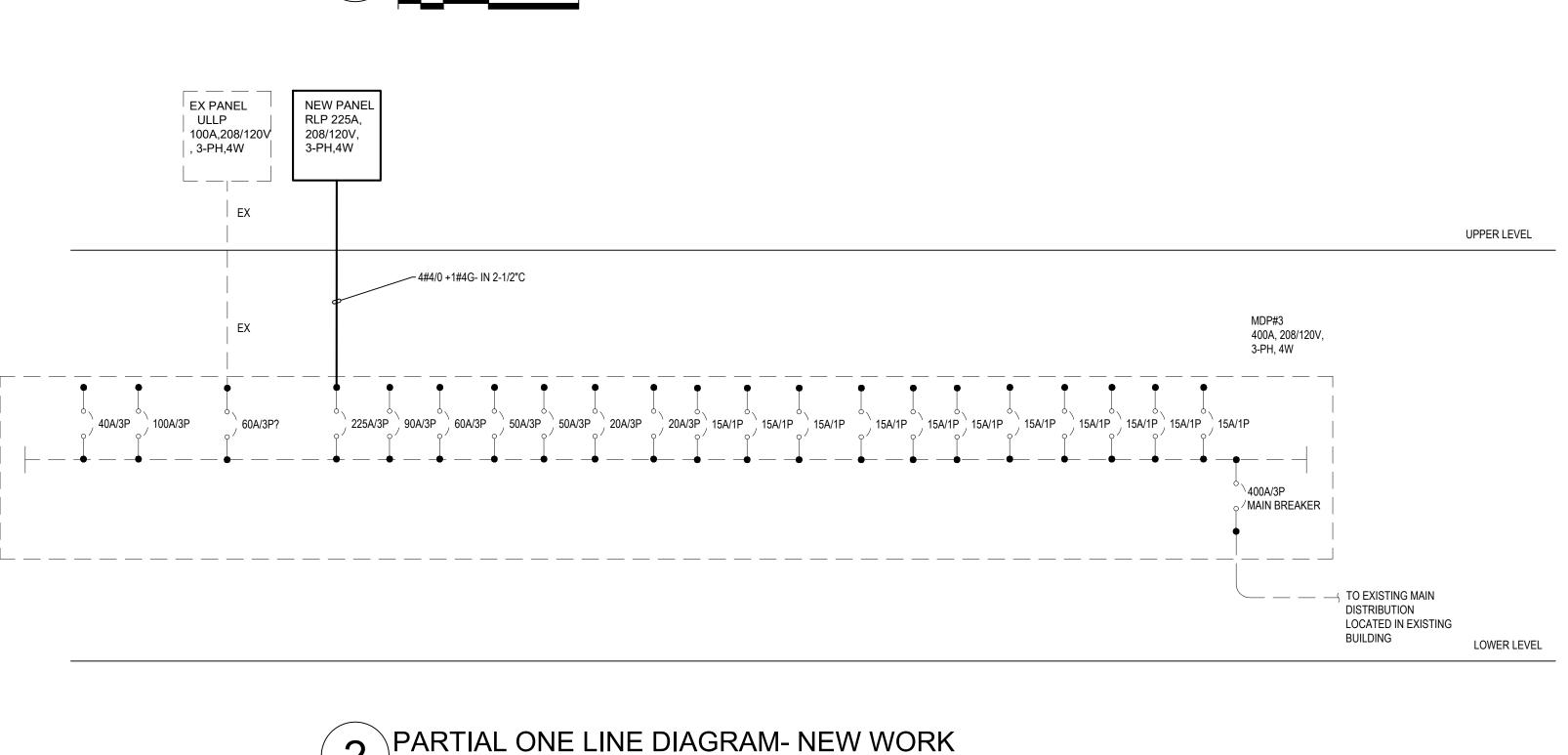
DRAWING NAME

ELECTRICAL: LIGHTING PLAN

PROJECT NO.: 22322 SCALE: AS NOTED 02-06-2024

E2-1





GENERAL NOTES:

CONTRACTOR SHALL FIELD VERIFY THAT THE AREAS NOT WITHIN THE SCOPE ARE

NOT AFFECTED BY NEW WORK AND POWER IS MAINTAINED. IF THE NOT IN SCOPE AREAS POWER IS AFFECTED, PROVIDE NEW FEED FROM LOWER LEVEL MDP#3 AVAILABLE SPACE TO THE AFFECTED AREA PANEL. MATCH THE WIRE AND

BREAKER SIZE WITH THAT OF THE EXISTING TO BE DEMOED.

LIGHTING FIXTURE SCHEDULE						
FIXTURE TYPE	DESCRIPTION	MANUFACTURER CAT NO.	VOLTAGE	LAMPS (#) WATTS, TYPE	INPUT WATTS	REMARKS
LR1	RECESSED LED	PEERLESS OPRS-G-LOP-90CRI-30KLMF-MIN1-Z T-120V-SCT-C041	120	LED	-	LENGTH PER THE DRAWING. CONFIRM WITH ARCHITECT FOR EXACT SELECTION.
P1	PENDANT DOWNLIGHT	RAB LIGHTING CDLED-6"-PC-20W_80D-930-K	120	LED	20	-
R1	RECESSED DOWNLIGHT	LITHONIA LBR6 NCHLM-30K-WR-TRW-WD-120V-UG Z1	120	LED	-	CONFIRM WITH ARCHITECT FOR EXACT SELECTION.
R2	RECESSED DOWNLIGHT	LITHONIA LBR6WW NCHLM-30K-WR-TRW-WD-120V-UG Z1	120	LED	-	CONFIRM WITH ARCHITECT FOR EXACT SELECTION.
LAY 1	2'x4' LAY-IN LIGHTING FIXTURE	RAB EZPAN-2X4W-Y-D10	120	LED	-	CONFIRM WITH ARCHITECT FOR EXACT SELECTION.
DC1	16" DECORATIVE PENDANT	BARN LIGHT LOMA PENDANT BLE-C-DBL16-105-615-SBK-105-E26 LAMP -GREEN CREATIVE 36554-9A19DIM/927/R-60W-9-2700K-80 0 LUMENS-89 LPW-120V-230 BEAM ANGLE-92-DIM-0.7 PF-E26-ENCLOSED	120	LED	60	-
DC2	10" DECORATIVE PENDANT	BARN LIGHT EGG PENDANT BLE-C-DBE10-105-615-SBK-105 LAMP -GREEN CREATIVE 36554-9A19DIM/927/R-60W-9-2700K-80 0 LUMENS-89 LPW-120V-230 BEAM ANGLE-92-DIM-0.7 PF-E26-ENCLOSED	120	LED	60	-
SE1	SOURCE FOUR MINI LED 4" ENTERTAINMENT LIGHT	ETC 4ML-30-90-120-P	120	LED	14	FIXTURE FURNISHED BY VR VENDOR INSTALLED BY G.C.
SW1	8" THEATRICAL LIGHT	ELATION SIXPAR 100	120	LED	89	FIXTURE FURNISHED BY VR VENDOR INSTALLED BY G.C.
S1	LED STEP LIGHT	LITHONIA LIGHTING	MVOLT	LED	9	-
T1	TRACK	H TRACK-2010-930-BK-LENS-11-SPR- LENS-11P-CRL-BK	120	LED	10	-
TT1	H TRACK	WAC LIGHTING HT6-BK	120			120V SINGLE CIRCUIT TRACK SYSTEM
EXIT	EXIT SIGN	LITHONIA LRP LED EDGE LIT WITH INTEGRAL BATTERY BACKUP	120	LED	3	

1. LIGHTING FIXTURE SCHEDULE SHOWN ON ENGINEER'S DRAWINGS ARE FOR INFORMATION PURPOSES ONLY. LIGHTING FIXTURES SHOWN ARE THOSE SELECTED BY ARCHITECT AND DSL. ENGINEER SHALL NOT BE RESPONSIBLE FOR INFORMATION SHOWN RELATED TO FIXTURE SELECTION AND OVERALL LIGHTING DESIGN. ARCHITECT SHALL CONFIRM EXACT STYLES, COLORS, FINISHES AND MODEL NUMBERS OF ALL LIGHT FIXTURES.

2. COORDINATE LOCATION OF REMOTE DRIVERS IN FIELD. LOCATE DRIVERS WITHIN ACCESSIBLE CEILINGS.



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VIRTUAL REALITY **CLASSROOM & DEVELOPMENT**

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DRAWING NAME

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> **ELECTRICAL**: DIAGRAMS &

SCHEDULES

PROJECT NO.: 22322 02-06-2024 SCALE: