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ADDENDUM 2

TO: Document Holders

FROM: Short Elliott Hendrickson, Inc.
400 Locust Avenue, Suite 2
Charlottesville, Virginia 22902

DATE: September 26, 2025

RE: Lynchburg Fire Station 9 at Liberty University
SEH No. LIBUN 178342

DOCUMENT HOLDERS on the above-named project are hereby notified that this document shall be appended to, take precedence over and become part of the original bidding documents dated August 28, 2025. Bids submitted for the construction of this work shall conform to this document.

All manufacturers / contractors / suppliers and products accepted as a substitution by this addendum shall meet or exceed any and all standards set forth within the specifications. Any costs attributed to re-engineering the contract documents due to the accepted substitutions is the responsibility of the Contractor.

PROJECT MANUAL REVISIONS AND CLARIFICATIONS

A. STRUCTURAL

Drawing revisions and clarifications

1. Sheet S001
    a. Sheet name updated.
2. Sheet S002
    a. Typical bond beam detail added to sheet.
    b. Base plan clarification note added to detail.
3. Sheet S003
    a. Typical Braced Wall Detail modified.
4. Sheet S004
    a. Drawing notes modified.
5. Sheet S100
    a. Drawing notes modified.

b. Foundation plan modified.

6. Sheet S200
    a. Dimensions added to Mezzanine Framing Plan.
7. Sheet S300
    a. Low Roof Framing Plan modified.
8. Sheet S301
    a. Section details modified.
9. Sheet S401
    a. Section details modified.
10. Sheet S500
    a. Elevation titles updated.

B. ARCHITECTURAL

Specification revisions and clarifications

1. Section 074113
    a. Metal Roofing Systems has been added as an acceptable manufacturer
        i. MRS System 2500, MRS Flush Seam

Drawing revisions and clarifications

1. Sheet A311
    a. Wall sections notes updated
2. Sheet A611
    a. Wall finish indicated for mezzanine space
    b. The room finish schedule lists (2) walls to receive vinyl wall graphics. The West wall of Lobby (103), which is the party wall to Training (112). And the North wall of Dayroom (121), which is the party wall to Training (112). The vinyl wall covering should be considered to run the full height and length of the wall visible from the occupiable space.

C. PLUMBING

Drawing revisions and clarifications

1. Sheet P201
    a. Sanitary pipe sizes clarified.
2. Sheet P401
    a. Gas shutoff note added to Kitchen.

D. MECHANICAL

Drawing revisions and clarifications

1. Sheet M101
    a. Vehicle exhaust plan locations and notes updated.
2. Sheet M201
    a. Vehicle Exhaust Fan Schedule updated.
3. Sheet M401
    a. Controls General Notes added to sheet.
4. Sheet M402
    a. Controls notes modified.

E. ELECTRICAL

Specification revisions and clarifications

1. Section 263213.13
    a. Specification section updated.
2. Section 263600
    a. Specification section updated.

Drawing revisions and clarifications

1. Sheet E001
    a. Notes modified.
2. Sheet E101
    a. Exterior lighting modified.
3. Sheet E103
    a. Engine / Generator Detail added to sheet.
    b. Notes added to Site Plan – Power and Lighting
    c. Schedule and construction notes modified.
4. Sheet E201
    a. Cord reels added.
5. Sheet E202
    a. Electrical roof plan modified.
6. Sheet E301
    a. One-Line diagram modified.

7. Sheet E302
    a. Schedules modified.
8. Sheet E303
    a. Schedules modified.
9. Sheet E401
    a. Detail added to sheet.

END OF ADDENDUM 2

SECTION 263213.13 - DIESEL-ENGINE-DRIVEN GENERATOR SETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Diesel engine.
2. Diesel fuel-oil system.
3. Control and monitoring.
4. Generator overcurrent and fault protection.
5. Generator, exciter, and voltage regulator.
6. Outdoor engine generator enclosure.
7. Vibration isolation devices.

B. Related Requirements:

1. Section 263600 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine generators.

1.3 DEFINITIONS

A. EPS: Emergency power supply.

B. EPSS: Emergency power supply system.

C. VAC: Volts, alternating current.

D. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
2. Include thermal damage curve for generator.
3. Include time-current characteristic curves for generator protective device.

4. Include fuel consumption in gallons per hour at 0.8 power factor at 0.5, 0.75, and 1.0 times generator capacity.
5. Include generator efficiency at 0.8 power factor at 0.5, 0.75, and 1.0 times generator capacity.
6. Include airflow requirements for cooling and combustion air in cubic feet per minute at 0.8 power factor, with air-supply temperature of 95, 80, 70, and 50 deg F. Provide Drawings indicating requirements and limitations for location of air intake and exhausts.
7. Include generator characteristics, including, but not limited to, kilowatt rating, efficiency, reactances, and short-circuit current capability.

B. Shop Drawings:

1. Include plans and elevations for engine generator and other components specified. Indicate access requirements affected by height of subbase fuel tank.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Identify fluid drain ports and clearance requirements for proper fluid drain.
4. Design calculations for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
5. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include base weights.
6. Include diagrams for power, signal, and control wiring. Complete schematic, wiring, and interconnection diagrams showing terminal markings for engine generators and functional relationship between all electrical components.

1.5 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Warranty: For special warranty.

C. Qualification Data: For manufacturer.

D. Seismic Qualification Data: Certificates, for engine generator, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: With engine and generator mounted on rails, identify center of gravity and total weight, including full fuel tank, supplied enclosure, and each piece of equipment not integral to the engine generator, and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.
b. Operating instructions laminated and mounted adjacent to generator location.
c. Training plan.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Testing Agency Qualifications: Accredited by NETA.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: The basis-of-design product is the Rehlko 200REOZJF. Subject to compliance with requirements, an equal substitution may be made from one of the following other manufacturers:

1. Cummins Power Generation.
2. Caterpillar
3. Generac

B. Source Limitations: Obtain packaged engine generators and auxiliary components from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Engine generator housing, subbase fuel tank, engine generator, batteries, battery racks, silencers, sound attenuating equipment, accessories, and components shall withstand the effects of earthquake motions determined according to ASCE/SEI 7-22.

1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
2. Shake-table testing shall comply with ICC-ES AC156. Testing shall be performed with all fluids at worst-case normal levels. Water shall be substituted for diesel fuel in fuel tank during test.

B. NFPA Compliance:

1. Comply with NFPA 37.
2. Comply with NFPA 70.
3. Comply with NFPA 110 requirements for Level 1 EPSS.

C. UL Compliance: Comply with UL 2200.

D. Engine Exhaust Emissions: Comply with current EPA requirements and applicable state and local government requirements.

E. Environmental Conditions: Engine generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: 5 to 104 deg F.
2. Relative Humidity: Zero to 95 percent.
3. Altitude: Sea level to 1000 feet.

2.3 ENGINE GENERATOR ASSEMBLY DESCRIPTION

A. Factory-assembled and -tested, water-cooled engine, with brushless generator and accessories.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

C. Power Rating: Standby.

D. Capacity: 200 kW.

E. Power Factor: 0.8, lagging.

F. Frequency: 60 Hz.

G. Voltage: 480-V ac.

H. Phase: Three-phase, four wire, wye.

I. Governor: Adjustable isochronous, with speed sensing.

J. Mounting Frame: Structural steel framework to maintain alignment of mounted components without depending on concrete foundation. Provide lifting attachments sized and spaced to prevent deflection of base during lifting and moving.

1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and engine generator center of gravity.

K. Capacities and Characteristics:

1. Power Output Ratings: Nominal ratings as indicated at 0.8 power factor excluding power required for the continued and repeated operation of the unit and auxiliaries.
2. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

L. Engine Generator Performance for Sensitive Loads:

1. Oversizing generator compared with the rated power output of the engine is permissible to meet specified performance.

a. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.

2. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.
3. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 second.
4. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.
5. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
6. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.
7. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
8. Sustained Short-Circuit Current: For a three-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or other generator system components.
9. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.

a. Provide permanent magnet excitation for power source to voltage regulator.

10. Start Time:

    a. Comply with NFPA 110, Type 10 system requirements.

2.4 DIESEL ENGINE

A. Fuel: ASTM D975, diesel fuel oil, Grade 2-D S15.

B. Rated Engine Speed: 1800 rpm.

C. Lubrication System: Engine or skid-mounted.

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

D. Jacket Coolant Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with UL 499. Must operate at 277 VAC.

E. Integral Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine generator set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
3. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
4. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, UV-, and abrasion-resistant fabric.

    a. Rating: 50-psig maximum working pressure with coolant at 180 deg F, and noncollapsible under vacuum.
    b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

F. Muffler/Silencer:

1. Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

    a. Minimum sound attenuation of 25 dB at 500 Hz.
    b. Sound level measured at a distance of 25 feet from exhaust discharge after installation is complete shall be 78 dBA or less.

G. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

H. Starting System: electric, with negative ground.

1. Components: Sized so they are not damaged during a full engine-cranking cycle with ambient temperature at maximum specified in "Performance Requirements" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.
4. Battery: Lead acid, with capacity within ambient temperature range specified in "Performance Requirements" Article to provide specified cranking cycle at least twice without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 50 deg F regardless of external ambient temperature within range specified in "Performance Requirements" Article. Include accessories required to support and fasten batteries in place. Provide ventilation to exhaust battery gases.
7. Battery Stand: Factory-fabricated, two-tier metal with acid-resistant finish designed to hold the quantity of battery cells required and to maintain the arrangement to minimize lengths of battery interconnections.
8. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
9. Battery Charger: Current-limiting, automatic-equalizing, and float-charging type designed for lead-acid batteries. Unit shall comply with UL 1236 and include the following features:

    a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
    b. Input voltage: 277 VAC, single-phase.
    c. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 to 140 deg F to prevent overcharging at high temperatures and undercharging at low temperatures.
    d. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
    e. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
    f. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
    g. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.5 DIESEL FUEL-OIL SYSTEM

A. Comply with NFPA 37.

B. Piping: Fuel-oil piping shall be Schedule 40 black steel. Cast iron, aluminum, copper, and galvanized steel shall not be used in the fuel-oil system.

C. Main Fuel Pump: Mounted on engine to provide primary fuel flow under starting and load conditions.

D. Fuel Filtering: Remove water and contaminants larger than 1 micron.

E. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

F. Subbase-Mounted, Double-Wall, Fuel-Oil Tank: Factory installed and piped, complying with UL 142 fuel-oil tank. Features include the following:

1. Tank level indicator.
2. Fuel-Tank Capacity: Minimum 133 percent of total fuel required for planned operation plus fuel for periodic maintenance operations between fuel refills.
3. Leak detection in interstitial space.
4. Vandal-resistant fill cap.
5. Capacity of fuel tank shall allow for 48 hours of operation of the generator at 100% nameplate load.
6. Containment Provisions: Comply with requirements of authorities having jurisdiction.

2.6 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of engine generator. When mode-selector switch is switched to the on position, engine generator starts. The off position of same switch initiates engine generator shutdown. When engine generator is running, specified system or equipment failures or derangements automatically shut down engine generator and initiate alarms.

B. Provide minimum run time control set for 15 minutes with override only by operation of a remote emergency-stop switch.

C. Comply with UL 508A.

D. Configuration:

1. Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common wall-mounted control and monitoring panel. Panel shall be powered from the engine generator battery.

E. Control and Monitoring Panel:

1. Digital engine generator controller with integrated LCD display, controls, and microprocessor, capable of local and remote control, monitoring, and programming, with battery backup.
2. Instruments: Located on the control and monitoring panel and viewable during operation.

    a. Engine lubricating-oil pressure gage.
    b. Engine-coolant temperature gage.
    c. DC voltmeter (alternator battery charging).
    d. Running-time meter.
    e. AC voltmeter, for each phase.
    f. AC ammeter, for each phase.
    g. AC frequency meter.
    h. Generator-voltage adjusting rheostat.

3. Controls and Protective Devices: Controls, shutdown devices, and common alarm indication, including the following:

    a. Cranking control equipment.
    b. Run-Off-Auto switch.
    c. Control switch not in automatic position alarm.
    d. Overcrank alarm.
    e. Overcrank shutdown device.
    f. Low-water temperature alarm.
    g. High engine temperature prealarm.
    h. High engine temperature.
    i. High engine temperature shutdown device.
    j. Overspeed alarm.
    k. Overspeed shutdown device.
    l. Low fuel main tank.

        1) Low-fuel-level alarm shall be initiated when the level falls below that required for operation for duration required for the indicated EPSS class.

    m. Coolant low-level alarm.
    n. Coolant high-temperature alarm.
    o. Coolant low-temperature alarm.
    p. Coolant high-temperature shutdown device.
    q. EPS load indicator.
    r. Battery high-voltage alarm.
    s. Low cranking voltage alarm.
    t. Battery-charger malfunction alarm.
    u. Battery low-voltage alarm.
    v. Lamp test.
    w. Contacts for local and remote common alarm.
    x. Hours of operation.
    y. Engine generator metering, including voltage, current, hertz, kilowatt, kilovolt ampere, and power factor.

F. Connection to Datalink:

1. A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication.
2. Provide connections for datalink transmission of indications to remote data terminals via ModBus RTU. Coordinate with requirements in Section 230923, “Direct Digital Control (DDC) System for HVAC”.

G. Common Remote Panel with Common Audible Alarm: Include necessary contacts and terminals in control and monitoring panel. Remote panel shall be powered from the engine generator battery.

H. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator unless otherwise indicated.

2.7 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Overcurrent protective devices shall be coordinated to optimize selective tripping when a short circuit occurs.

1. Overcurrent protective devices for the entire EPSS shall be coordinated to optimize selective tripping when a short circuit occurs. Coordination of protective devices shall consider both utility and EPSS as the voltage source.
2. Overcurrent protective devices for the EPSS shall be accessible only to authorized personnel.

B. Generator Overcurrent Protective Device:

1. Molded-case circuit breaker, electronic-trip type; 100 percent rated; complying with UL 489:

a. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
b. Trip Settings: Selected to coordinate with generator thermal damage curve.
c. Shunt Trip: Connected to trip breaker when engine generator is shut down by other protective devices.
d. Mounting: Adjacent to, or integrated with, control and monitoring panel.

C. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground fault.

1. Indicate ground fault with other engine generator alarm indications.
2. Trip generator protective device on ground fault.

2.8 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Provide Rehlko 4UA13 alternator, or equivalent by Caterpillar, Cummins or Generac. Alternator is oversized by 2 sizes for harmonics mitigation.

C. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

D. Electrical Insulation: Class H.

E. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required. Provide 12-lead alternator.

F. Range: Provide broad range of output voltage by adjusting the excitation level.

G. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

H. Enclosure: Dripproof.

I. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified and as required by NFPA 110.

1. Adjusting Rheostat on Control and Monitoring Panel: Provide plus or minus 5 percent adjustment of output-voltage operating band.
2. Maintain voltage within 15 percent on one step, full load.
3. Provide anti-hunt provision to stabilize voltage.
4. Maintain frequency within 5 percent and stabilize at rated frequency within 2 seconds.
5. 2:1 slope.

J. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

K. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

L. Subtransient Reactance: 12 percent, maximum.

2.9 OUTDOOR ENGINE GENERATOR ENCLOSURE

A. Description:

1. Vandal-resistant, sound-attenuating, weatherproof steel housing; wind resistant up to 100 mph. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.

a. Sound Attenuation Level: 74 dBA at 23 feet from the enclosure.

B. Structural Design and Anchorage: Comply with ASCE/SEI 7-22 for wind loads up to 100 mph.

C. Seismic Design: Comply with seismic requirements in Section 260548 "Vibration and Seismic Controls for Electrical Systems.

D. Hinged Doors: With padlocking provisions.

E. Space Heater: Thermostatically controlled and sized to prevent condensation, 277 VAC.

F. Lighting: Provide weather-resistant LED lighting, 277 VAC

G. Thermal Insulation: Manufacturer's standard materials and thickness selected in coordination with space heater to maintain winter interior temperature within operating limits required by engine generator components.

H. Muffler Location: Within enclosure.

I. Engine-Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for two hours with ambient temperature at top of range specified in system service conditions.

1. Louvers: Fixed-engine, cooling-air inlet and discharge. Stormproof and drainable louvers prevent entry of rain and snow.

2.10 VIBRATION ISOLATION DEVICES

A. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment-mounting and -leveling bolt that acts as blocking during installation.
2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Minimum Deflection: 1 inch (25 mm).

B. Vibration isolation devices shall not be used to accommodate misalignments or to make bends.

2.11 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine generator performance.

B. Examine roughing-in for piping systems and electrical connections. Verify actual locations of connections before packaged engine generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify Construction Manager no fewer than 14 working days in advance of proposed interruption of electrical service. Depending on the timing of the generator installation, it may be necessary for all interruptions to normal service to be on weekends only.
2. Do not proceed with interruption of electrical service without Construction Manager's written permission.

3.3 INSTALLATION

A. Comply with NECA 1 and NECA 404.

B. Comply with packaged engine generator manufacturers' written installation and alignment instructions and with NFPA 110.

C. Equipment Mounting:

1. Install packaged engine generators on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
2. Coordinate size and location of concrete bases for packaged engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
1. Install packaged engine generator with restrained spring isolators having a minimum deflection of 1 inch (25 mm) on 4-inch- (100-mm-) high concrete base. Secure enclosure to anchor bolts installed in concrete bases. Concrete base construction is specified in Section 260548 "Vibration and Seismic Controls for Electrical Systems."

D. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

E. Cooling System: Install Schedule 40 black steel piping with welded joints for cooling water piping between engine generator and heat exchanger. Piping materials and installation requirements are specified in Section 232113 "Hydronic Piping."

1. Install isolating thimbles where exhaust piping penetrates combustible surfaces. Provide a minimum of 9 inches of clearance from combustibles.
2. Insulate cooling-system piping and components according to requirements in Section 230719 "HVAC Piping Insulation."

F. Exhaust System: Install Schedule 40 black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet.

1. Piping materials and installation requirements are specified in Section 232113 "Hydronic Piping."
2. Install flexible connectors and steel piping materials according to requirements in Section 232116 "Hydronic Piping Specialties."
3. Insulate muffler/silencer and exhaust system components according to requirements in Section 230719 "HVAC Piping Insulation."

G. Drain Piping: Install condensate drain piping to muffler drain outlet full size of drain connection with a shutoff valve, stainless-steel flexible connector, and Schedule 40 black steel pipe with welded joints.

1. Piping materials and installation requirements are specified in Section 232113 "Hydronic Piping."
2. Drain piping valves, connectors, and installation requirements are specified in Section 232116 "Hydronic Piping Specialties."

H. Fuel Piping:

1. Diesel storage tanks, tank accessories, piping, valves, and specialties for fuel systems are specified in Section 231113 "Facility Fuel-Oil Piping."
2. Copper and galvanized steel shall not be used in the fuel-oil piping system.

I. Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.4 CONNECTIONS

A. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow space for service and maintenance.

B. Connect cooling-system water piping to engine generator and heat exchanger with flexible connectors.

C. Connect engine exhaust pipe to engine with flexible connector.

D. Connect fuel piping to engines with a gate valve and union and flexible connector.

E. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

F. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Provide a minimum of one 90-degree bend in flexible conduit routed to the engine generator from a stationary element.

G. Balance single-phase loads to obtain a maximum of 10 percent unbalance between any two phases.

3.5 IDENTIFICATION

A. Identify system components according to Section 260553 "Identification for Electrical Systems."

B. Install a sign indicating the generator neutral is bonded to the main service neutral at the main service location.

3.6 FIELD QUALITY CONTROL

A. Testing Agency:

1. Owner will engage a qualified testing agency to perform tests and inspections.
2. Engage a qualified testing agency to perform tests and inspections.
3. Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
4. Perform tests and inspections with the assistance of a factory-authorized service representative.

B. Tests and Inspections:

1. Perform tests recommended by manufacturer and each visual and mechanical inspection and electrical and mechanical test listed in first two subparagraphs below, as specified in NETA ATS. Certify compliance with test parameters.

    a. Visual and Mechanical Inspection:

        1) Compare equipment nameplate data with Drawings and the Specifications.
        2) Inspect physical and mechanical condition.
        3) Inspect anchorage, alignment, and grounding.
        4) Verify that the unit is clean.

    b. Electrical and Mechanical Tests:

        1) Perform insulation-resistance tests according to IEEE 43.

            a) Machines Larger Than 200 hp: Test duration shall be 10 minutes. Calculate polarization index.
            b) Machines 200 hp or Less: Test duration shall be one minute. Calculate the dielectric-absorption ratio.

        2) Test protective relay devices.
        3) Verify phase rotation, phasing, and synchronized operation as required by the application.
        4) Functionally test engine shutdown for low oil pressure, overtemperature, overspeed, and other protection features as applicable.
        5) Perform vibration test for each main bearing cap.
        6) Verify correct functioning of the governor and regulator.

2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here, including, but not limited to, single-step full-load pickup test.
3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

    a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    c. Verify acceptance of charge for each element of the battery after discharge.
    d. Verify that measurements are within manufacturer's specifications.

4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine generator system before and during system operation. Check for air, exhaust, and fluid leaks.
6. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
7. Harmonic-Content Tests: Measure harmonic content of output voltage at 25 and 100 percent of rated linear load. Verify that harmonic content is within specified limits.
8. Noise Level Tests: Measure A-weighted level of noise emanating from engine generator installation, including engine exhaust and cooling-air intake and discharge, at four locations 25 feet from edge of the generator enclosure and on the property line, and compare measured levels with required values.

C. Coordinate tests with tests for transfer switches and run them concurrently.

D. Test instruments shall have been calibrated within the past 12 months, traceable to NIST Calibration Services, and adequate for making positive observation of test results. Make calibration records available for examination on request.

E. Leak Test: After installation, charge exhaust, coolant, and fuel systems and test for leaks. Repair leaks and retest until no leaks exist.

F. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation for generator and associated equipment.

G. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

H. Remove and replace malfunctioning units and retest as specified above.

I. Retest: Correct deficiencies identified by tests and observations, and retest until specified requirements are met.

J. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

K. Infrared Scanning: After Substantial Completion, but not more than 60 days after final acceptance, perform an infrared scan of each power wiring termination and each bus connection while running with maximum load. Remove all access panels so terminations and connections are accessible to portable scanner.

1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
2. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

END OF SECTION 263213.13

SECTION 263600 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Contactor-type automatic transfer switches.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Contactor-type automatic transfer switches.

B. Product Data Submittals: For each product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for transfer switches.
2. Include rated capacities, operating characteristics, electrical characteristics, and accessories.

C. Shop Drawings:

1. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
2. Include material lists for each switch specified.
3. Single-Line Diagram: Show connections between transfer switch,power sources, and load; and show interlocking provisions for each combined transfer switch and bypass/isolation switch.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Seismic Qualification Data: Certificates, for transfer switches, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. Features and operating sequences, both automatic and manual.
b. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. Member company of NETA.

a. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.6 FIELD CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:

1. Notify Construction Manager no fewer than 14 days in advance of proposed interruption of electrical service. Note that it may be necessary to perform outage during weekend hours.
2. Do not proceed with interruption of electrical service without Construction Manager's written permission.

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 18 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA ICS 1.

C. Comply with NFPA 110.

D. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.

E. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.
2. Short-time withstand capability for three cycles.

F. Repetitive Accuracy of Solid-State Controls: All settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

G. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

H. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.

I. Neutral Terminal: Solid and fully rated unless otherwise indicated.

J. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable with printed markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification for Electrical Systems."

1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
4. Accessible via front access.

K. Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.2 CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB, Electrification Business.

2. ASCO, Owned by Schneider Electric
3. Caterpillar, Inc.; Electric Power Division.
4. Cummins Power Generation.
5. Eaton.
6. Generac.
7. Hubbell Utility Solutions; Hubbell Incorporated.
8. Kohler Power Systems.
9. Rolls-Royce Solutions America Inc.
10. Russelectric, Inc.
11. Vertiv; Vertiv Holdings Co.

B. Comply with Level 1 equipment according to NFPA 110.

C. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are unacceptable.
2. Switch Action: Double throw; mechanically held in both directions.
3. Contacts: Silver composition or silver alloy for load-current switching. Contactor-style automatic transfer-switch units, rated 600 A and higher, shall have separate arcing contacts.
4. Conductor Connectors: Suitable for use with conductor material and sizes.
5. Material: Tin-plated aluminum.
6. Main and Neutral Lugs: Mechanical type.
7. Ground Lugs and Bus-Configured Terminators: Mechanical type.
8. Ground bar.
9. Connectors shall be marked for conductor size and type according to UL 1008.

D. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.

1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.

E. Digital Communication Interface: Matched to capability of remote annunciator or annunciator and control panel.

F. Capacity: Switches shall be sized to switch the full capacity of its intended load.

G. WCR rating: 42,000 amperes. Short time withstand capability for three cycles.

H. Transfer switches shall be front-access only, as shown on the drawings. Emergency conduits shall be bottom entry. Normal and load conduits shall be top entry.

I. Automatic Transfer-Switch Controller Features:

1. Controller operates through a period of loss of control power.

2. Undervoltage Sensing for Each Phase of Normal/Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.

    a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
    b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."

8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine Shutdown Contacts:

    a. Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.

12. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:

    a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
    b. Push-button programming control with digital display of settings.
    c. Integral battery operation of time switch when normal control power is unavailable.

2.3 TRANSFER SWITCH ACCESSORIES

A. Bypass/Isolation Switches:

1. Source Limitations: Same manufacturer as transfer switch in which installed.
2. Comply with requirements for Level 1 equipment according to NFPA 110.
3. Description: Manual type, arranged to select and connect either source of power directly to load, isolating transfer switch from load and from both power sources. Include the following features for each combined automatic transfer switch and bypass/isolation switch:

    a. Means to lock bypass/isolation switch in the position that isolates transfer switch with an arrangement that permits complete electrical testing of transfer switch while isolated. Interlocks shall prevent transfer-switch operation, except for testing or maintenance, while automatic transfer switch is isolated.
    b. Provide means to make power available to transfer-switch control circuit for testing and maintenance purposes.
    c. Drawout Arrangement for Transfer Switch: Provide physical separation from live parts and accessibility for testing and maintenance operations. Transfer switch and bypass/isolation switch shall be in isolated compartments.
    d. Transition:

        1) Provide closed-transition operation when transferring from main transfer switch to bypass/isolation switch on the same power source.
        2) Provide open-transition operation when transferring between power sources.

    e. Bypass/Isolation Switch Current, Voltage, Closing, and Short-Circuit Withstand Ratings: Equal to or greater than those of associated automatic transfer switch, and with same phase arrangement and number of poles.
    f. Contact temperatures of bypass/isolation switches shall not exceed those of automatic transfer-switch contacts when they are carrying rated load.
    g. Manual Control: Constructed so load bypass and transfer-switch isolation can be performed by one person in no more than two operations in 15 seconds or less. Operating handles shall be externally operated.
    h. Automatic and Nonautomatic Control: Automatic transfer-switch controller shall also control the bypass/isolation switch.
    i. Legend: Manufacturer's standard legend for control labels and instruction signs shall describe operating instructions.
    j. Maintainability: Fabricate to allow convenient removal of major components from front without removing other parts or main power conductors.

2.4 SOURCE QUALITY CONTROL

A. Factory Tests: Test and inspect components, assembled switches, and associated equipment according to UL 1008. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Floor-Mounting Switch: Anchor to floor by bolting.

1. Install transfer switches on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
2. Comply with requirements for seismic control devices specified in Section 260548 "Vibration Seismic Controls for Electrical Systems."
3. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
4. Provide workspace and clearances required by NFPA 70.

B. Annunciator and Control Panel Mounting: Flush in wall unless otherwise indicated.

C. Identify components according to Section 260553 "Identification for Electrical Systems."

D. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

E. Comply with NECA 1.

F. Identify components according to Section 260553 "Identification for Electrical Systems."

G. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

H. Comply with NECA 1.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to generator sets,control, and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.

B. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.

1. Comply with requirements for raceways specified in Section 260533.13 "Conduits for Electrical Systems."

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

F. Connect twisted pair cable according to Section 260523 "Control-Voltage Electrical Power Cables."

G. Route and brace conductors according to manufacturer's written instructions and Section 260529 "Hangers and Supports for Electrical Systems." Do not obscure manufacturer's markings and labels.

H. Brace and support equipment according to Section 260548 "Vibration and Seismic Controls for Electrical Systems."

I. Final connections to equipment shall be made with liquidtight, flexible metallic conduit no more than 18 inches in length.

3.3 FIELD QUALITY CONTROL

A. Administrant for Tests and Inspections:

1. Engage qualified testing agency to administer and perform tests and inspections.

B. Tests and Inspections:

1. After installing equipment, test for compliance with requirements according to NETA ATS.
2. Visual and Mechanical Inspection:

a. Compare equipment nameplate data with Drawings and Specifications.
b. Inspect physical and mechanical condition.
c. Inspect anchorage, alignment, grounding, and required clearances.
d. Verify that the unit is clean.
e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
f. Verify that manual transfer warnings are attached and visible.
g. Verify tightness of all control connections.
h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:

1) Use of low-resistance ohmmeter.
2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.

i. Perform manual transfer operation.
j. Verify positive mechanical interlocking between normal and alternate sources.
k. Perform visual and mechanical inspection of surge arresters.
l. Inspect control power transformers.

1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.

3) Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.

3. Electrical Tests:

a. Perform insulation-resistance tests on all control wiring with respect to ground.
b. Perform a contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.
c. Verify settings and operation of control devices.
d. Calibrate and set all relays and timers.
e. Verify phase rotation, phasing, and synchronized operation.
f. Perform automatic transfer tests.
g. Verify correct operation and timing of the following functions:

1) Normal source voltage-sensing and frequency-sensing relays.
2) Engine start sequence.
3) Time delay on transfer.
4) Alternative source voltage-sensing and frequency-sensing relays.
5) Automatic transfer operation.
6) Interlocks and limit switch function.
7) Time delay and retransfer on normal power restoration.
8) Engine cool-down and shutdown feature.

4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

a. Check for electrical continuity of circuits and for short circuits.
b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
c. Verify that manual transfer warnings are properly placed.
d. Perform manual transfer operation.

5. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.

a. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.
b. Verify time-delay settings.
c. Verify pickup and dropout voltages by data readout or inspection of control settings.
d. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

C. Coordinate tests with tests of generator and run them concurrently.

D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

E. Transfer switches will be considered defective if they do not pass tests and inspections.

F. Remove and replace malfunctioning units and retest as specified above.

G. Prepare test and inspection reports.

H. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.

1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.4 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.

B. Training shall include testing ground-fault protective devices and instructions to determine when the ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.

C. Coordinate this training with that for generator equipment.

END OF SECTION 263600

STRUCTURAL NOTES

1. GENERAL REQUIREMENTS

A. THE STRUCTURE HAS BEEN DESIGNED TO RESIST LOADS ONLY AS A COMPLETED STRUCTURE. APPLICATION OF CONSTRUCTION LOADS TO THE PARTIALLY COMPLETED STRUCTURE SHALL BE CONSIDERED BY THE CONTRACTOR AND INCLUDED IN THE DESIGN OF SHORING, BRACING, FORMWORK, AND OTHER SUPPORTING ELEMENTS PROVIDED FOR THE CONSTRUCTION OF THE STRUCTURE.

B. CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS, REPORTING ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK. SHOP DRAWINGS SHALL REFLECT FIELD VERIFIED DIMENSIONS BEFORE SUBMITTING TO THE ENGINEER.

C. ORDER OF PRESEDENCE FOR CONFLICTING INFORMATION SHALL BE AS FOLLOWS:
   a. THE PLANS/DETAILS IN THE DRAWINGS.
   b. THESE GENERAL NOTES.
   c. WRITTEN SPECIFICATIONS.

2. APPLICABLE CODES AND STANDARDS

A. "VIRGINIA CONSTRUCTION CODE" (2021 INTERNATIONAL BUILDING CODE).
B. ACI 318, "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE".
C. AISC, "MANUAL OF STEEL CONSTRUCTIONS - ALLOWABLE STRESS DESIGN".
D. ANSI SJI-K-2010, "STANDARD SPECIFICATION FOR OPEN WEB JOISTS, K-SERIES".
E. STRUCTURAL WELDING CODE, AWS D1.1.
F. "DESIGN MANUAL FOR COMPOSITE DECKS, FORM DECKS, ROOF DECKS, AND CELLULAR METAL FLOOR DECK WITH ELECTRICAL DISTRIBUTION", SDI-27, STEEL DECK INSTITUTE.
G. AISI S100, "NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STTRUCTURAL MEMBERS."

3. DESIGN LOADS

A. LIVE LOAD

a.	ROOF	20 PSF
b.	MEZZANINE FLOOR	100 PSF

B. WIND LOAD

a.	ULTIMATE WIND SPEED, V_{ULT}	122 MPH
b.	RISK CATEGORY	IV
c.	EXPOSURE CATEGORY	C

C. SNOW LOAD

a.	ULTIMATE GROUND SNOW LOAD, Pg	60 PSF
b.	ULTIMATE ROOF DESIGN SNOW LOAD	47.5 PSF
c.	EXPOSURE FACTOR, Ce	1.0
d.	THERMAL FACTOR, C_t,	1.13
e.	SNOW FACTOR	1.10
f.	NO SLIPPERY SURFACES	

D. SEISMIC LOAD

a.	RISK CATEGORY	IV
b.	IMPORTANCE FACTOR	1.5
c.	Ss	0.19
d.	S1	0.062
e.	SITE CLASS	D
f.	S_{DS}	0.153
g.	S_{D1}	0.088
h.	DESIGN CATEGORY	C
i.	BASIC FORCE RESISTING SYSTEM	LIGHT FRAME WALLS WITH SHEAR PANELS
j.	DESIGN BASE SHEAR	0.092W
k.	RESPONSE COEFFICIENT, Cs	0.092
l.	RESPONSE MOD FACTOR, R	2.5
m.	ANALYSIS PROCEDURE	EQUIVALENT LATERAL FORCE

E. C. TORNADO WIND LOAD

a.	TORNADO WIND SPEED, V_t	65 MPH
b.	AREA EFFECTIVE, A_e	40,000 SQFT
c.	RISK CATEGORY	IV
d.	EXPOSURE CATEGORY	C
e.	TORNADO WIND LOADS DESIGNED IN ACCORDANCE WITH ASCE 7-22 CHAPTER 32 DO NOT GOVERN.	

4. SOIL BEARING CAPACITY

A. THE SOIL BEARING CAPACITY IS 2,500 PSF FOR COLUMN AND WALL FOOTINGS IN ACCORDANCE WITH THE GEOTECHNICAL REPORT BY FROEHLING & ROBERTSON, INC, DATED NOVEMBER 26, 2024.

B. ENGINEERED FILL SHALL BE AN APPROVED MATERIAL PLACED IN HORIZONTAL LAYERS WITH A MAXIMUM LOOSE THICKNESS OF 8". EACH LAYER SHALL BE COMPACTED TO A DRY DENSITY OF 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 698 (STANDARD PROCTOR METHOD). FULL TIME DENSITY TESTS SHALL BE PERFORMED TO VERIFY COMPACTION REQUIREMENTS ARE MET.

C. PREPARE FOUNDATIONS IN ACCORDANCE WITH THE GEOTECHNICAL REPORT RECOMMENDATIONS.

5. MATERIALS

A. CONCRETE (COMPRESSIVE STRENGTH AT 28 DAYS)

a.	FOOTING	3,000 PSI
b.	SLABS ON GRADE	4,000 PSI
c.	ELEVATED SLABS	4,000 PSI
d.	WALLS	4,000 PSI
e.	GROUT UNDER BASE PLATES	5,000 PSI

B. REINFORCING STEEL

a.	REINFORCING BARS	ASTM A615, GRADE 60
b.	WELDED WIRE FABRIC	ASTM A1064

C. STRUCTURAL STEEL

a.	PLATE, ANGLE, CHANNEL	ASTM A36
b.	W SHAPE	ASTM A992
c.	STRUCTURAL BOLTS	ASTM F3125, GRADE A325
d.	PIPE	ASTM A53, TYPE S, GRADE B
e.	TUBE STEEL	ASTM A500, GRADE B
f.	ANCHOR BOLTS	ASTM F1554
g.	WELDING ELECTRODES	E70XX

D. STEEL JOIST
   a. STEEL JOISTS SHALL BE THE SIZE SPECIFIED ON THE PLANS AND SHALL BE ABLE TO ACCOMODATE A MAXIMUM POINT LOAD UPTO 100 LBS BETWEEN PANEL POINTS.
   b. NET UPLIFT (SERVICE LOAD) ON ROOF JOISTS IS 25 PSF.
   c. BRIDGING SHALL BE PROVIDED IN ACCORDANCE WITH STEEL JOIST INSTITUTE.
   d. AT COLUMNS, AS APPLICABLE, EXTEND BOTTOM CHORD AND CONNECT TO COLUMN.

E. METAL FORM DECK
   a. DECK SHALL CONFORM TO ASTM A653, GRADE 60. GALVANIZING SHALL BE CLASS G-60. DECK PROPERTIES SHALL MEET THE FOLLOWING (MINIMUM):
      - DETPH 9/16"
      - THICKNESS 22 GAGE
      - I_x 0.024 IN^4/FT
      - S_x .070 IN^3/FT
      - S_n .070 IN^3/FT
      - F_y 60 KSI
   b. CONNECTION SHALL BE A 30/4 PATTERN (WELD OR SCREW) W/(2) SIDE LAP FASTENERS.

F. METAL ROOF DECK
   a. DECK SHALL CONFORM TO ASTM A653, GRADE 33. ROOF DECK SHALL BE TYPE B (WIDE RIB) WITH THE FOLLOWING MINIMUM PROPERTIES:
      - DEPTH 1 1/2"
      - THICKNESS 20 GAGE
      - I_x 0.212 IN^4/FT
      - S_p 0.234 IN^3/FT
      - S_n 0.247 IN^3/FT
      - F_y 33 KSI
   b. CONNECTION SHALL BE 5/8" PUDDLE WELD WITH 36/5 PATTERN AND (4) #10 TEK SIDELAP FASTENERS.

G. POST INSTALLED ANCHORS
   a. POST INSTALLED ANCHORS SHALL BE AS NOTED ON THE PLANS, OR APPROVED EQUAL. ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND BY A MANUFACTURER'S CERTIFIED INSTALLER.

H. COLD FORMED STEEL
   a. METAL TRACK, STUD SHAPES, ANGLES, PLATES & BRACE STRAPS SHALL BE:
      - FOR 18 GAGE & THINNER ASTM A653, GRADE 33
      - FOR 16 GAGE & THICKER ASTM A653, GRADE 50
   b. HEADERS FOR OPENINGS IN EXTERIOR CURTAIN WALLS SHALL BE (2) 600S162-54 W/ 600T125-54 TOP AND BOTTOM TRACK, UNLESS OTHERWISE NOTED. SEE DETAIL ON S003 FOR ASSEMBLY REQUIREMENTS.
   c. INSTALL STUDS WITH TOP AND BOTTOM OF STUD TIGHT TO TO AND BOTTOM TRACK TO ACHIEVE POSITIVE BEARING. ATTACH TRACK TO STUDS WITH (1) #10 SCREW ON EACH SIDE, MINIMUM, OR AS SPECIFIED ON OTHER DRAWINGS.
   d. ATTACH BOTTOM TRACK TO CONCRETE WITH (1) HILTI X-ZF (PAF) SPACED 16" OC, MINIMUM, OR AS SPECIFIED ON OTHER DRAWINGS.
   e. INSTALL TRACK BETWEEN LINTEL AND SUPPORTING STUDS ON ALL LINTELS.
   f. TIE MULTIPLE STUDS SUPPORTING LINTELS OR BEAMS TOGETHER WITH 16 GAGE PLATES SPACED 4'-0" OC MAXIMUM, ON BOTH SIDES OF STUDS. ATTACH PLATES TO EVERY OTHER STUD WITH (2) #10 SCREWS MINIMUM, OR AS SPECIFIED ON OTHER DRAWINGS.
   g. PROVIDE MECHANICALLY FASTENED BRIDGING AT 4'-0" OC, MAXIMUM, OR AS SPECIFIED ON OTHER DRAWINGS.

I. SELF DRILLING SCREWS
   a. AISI 1022

J. POWDER ACTUATED FASTENERS (PAF)
   a. HILTI X-ZF, HILTI X-U, OR HILTI X-EDNI, OR EQUAL, AS APPLICABLE.

K. METAL STAIRS & SHIPS LADDERS - DELEGATED DESIGN
   a. FABRICATE STAIR ASSEMBLY TO SUPPORT A UNIFORM LOAD OF 100 PSF AND A CONCENTRATED LOAD OF 300 LB. DEFLECTION OF STRINGER AND LANDING FRAMING SHALL NOT EXCEED 1/360 OF THE SPAN.
   b. HANDRAIL ASSEMBLIES, GUARDS, AND ATTACHMENTS SHALL BE DESIGNED TO RESIST A LOAD OF 50 PLF APPLIED AT THE TOP IN ANY DIRECTION, OR A 200 LB CONCENTRATED LOAD APPLIED IN ANY DIRECTION AND AT ANY POINT ALONG THE TOP. ATTACHMENT DEVICES SHALL TRANSFER THIS LOADING TO APPROPRIATE STRUCTURAL ELEMENTS OF THE BUILDING.
   c. INTERMEDIATE RAILS (ALL OTHERS EXCEPT THE HANDRAIL & GUARDRAIL) SHALL BE DESIGNED TO WITHSTAND A HORIZONTALLY APPLIED NORMAL LOAD OF 50 LB OVER AN AREA EQUAL TO 1 SQUARE FOOT.

L. MASONRY

a.	CONCRETE MASONRY UNIT	f'm=1,500 PSI
b.	MORTAR (TYPE S OR M)	f'm=1,900 PSI
c.	GROUT	f'm=2,000 PSI

   d. PROVIDE A BOND BEAM WITH (2) #5 BARS CONTINUOUS, AT EACH FLOOR AND AT THE TOP OF WALL.
   e. LOCATE DOWELS INTO CONCRETE FOOTING TO MATCH VERTICAL WALL REINFORCING SIZE AND SPACING.
   f. PROVIDE STANDARD DUR-O-WALL, OR EQUAL, AT 16" VERTICALLY IN MASONRY WALLS.

M. MASONRY LINTELS
   a. MISCELLANEOUS OPENINGS NOT SHOWN ON PLAN DRAWINGS:
      - CLEAR OPENINGS 3'-4" WIDE OR LESS SHALL BE REINFORCED MASONRY LINTELS WITH L3 1/2x3 1/2x5/16 BRICK ANGLE WHERE APPLICABLE.
      - CLEAR OPENINGS 8'-0" WIDE OR LESS, BUT GREATER THAN 3'-4" SHALL BE REINFORCED MASONRY LINTELS WITH L6x3 1/2x5/16 (LLV) BRICK ANGLE WHERE APPLICABLE.
   b. FOR OPENINGS OVER 12'-0" WIDE, PROVIDE SOLID OR GROUT FILLED MASONRY JAMBS, FULL HEIGHT OF THE OPENING BY 1'-4" LENGTH.
   c. A MINIMUM BEARING OF 8" ON EACH END SHALL BE PROVIDED FOR ALL LINTELS, OR AS SPECIFIED ON OTHER DRAWINGS.

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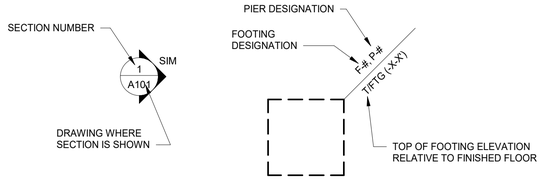
REBAR DEVELOPMENT LENGTH

REBAR SIZE	STRAIGHT	WITH HOOK	LAP
#4	22"	6"	29"
#5	28"	8"	37"
#6	32"	10"	42"

LEGEND



ABBREVIATIONS

ABV	ABOVE	LB	POUND
AFF	ABOVE FINISHED FLOOR	LBS	POUNDS
ARCH	ARCHITECT	LG	LONG
B	BOTTOM	LL	LIVE LOAD
BM	BEAM	LLH	LONG LEG HORIZONTAL
BRG	BEARING	LLV	LONG LEG VERTICAL
CFMS	COLD FORM METAL STUD	LW	LONG WAY
CJ	CONTROL/ CONSTRUCTION JOINT	MAX	MAXIMUM
		MTL	METAL
CLG	CEILING	MFG	MANUFACTURER
CLR	CLEAR	MIN	MINIMUM
CMU	CONCRETE MASONRY UNIT	NTS	NOT TO SCALE
CONC	CONCRETE	OC	ON CENTER
CONT	CONTINUOUS	OPG	OPENING
CYD	CUBIC YARDS	PL	PLATE
DL	DEAD LOAD	PSF	POUNDS PER SQUARE FOOT
DN	DOWN	PSI	POUNDS PER SQUARE INCH
EA	EACH	P-#	PIER DESIGNATION
EL	ELEVATION	STL	STEEL
EMBED	EMBEDMENT	SW	SHORT WAY
EW	EACH WAY	T	TOP
EXIST	EXISTING	TYP	TYPICAL
F FL	FINISHED FLOOR	VIF	VERIFY IN FIELD
FTG	FOOTING	VERT	VERTICAL
F-#	FOOTING DESIGNATION	WWF	WELDED WIRE FABRIC
GWB	GYPSUM WALL BOARD	W/	WITH
HORIZ	HORIZONTAL		
K	KIP = 1,000 POUNDS		

MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919

SEH

COMMONWEALTH OF VIRGINIA
JEREMY L. LUCAS
Lic. No. 44991
9/25/2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	JLL
Drawn By	JKK

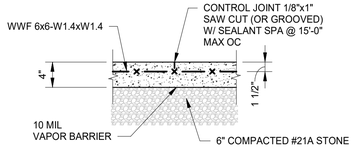
Project Status	**Issue Date**
CONSTRUCTION DOCUMENTS	8/28/2025

REVISION SCHEDULE

REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

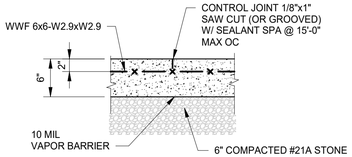
GENERAL NOTES
1

S001



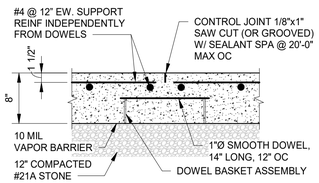
4" SLAB-ON-GRADE

SCALE: 1" = 1'-0"



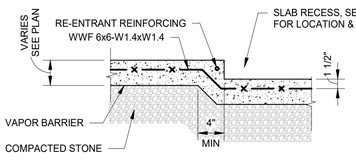
6" SLAB-ON-GRADE

SCALE: 1" = 1'-0"



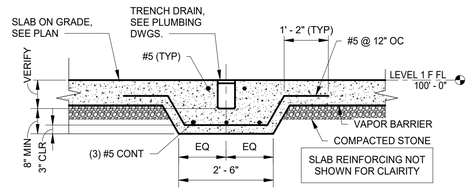
8" SLAB-ON-GRADE

SCALE: 1" = 1'-0"



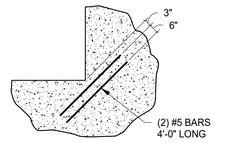
SLAB ON GRADE RECESS

SCALE: 1" = 1'-0"



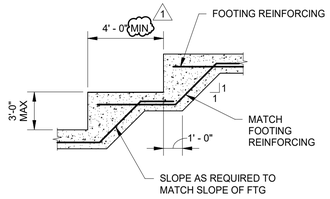
TYPICAL TRENCH DRAIN SECTION

SCALE: 1/2" = 1'-0"



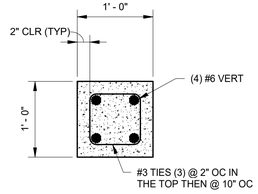
RE-ENTRANT REINFORCING DETAIL

NOT TO SCALE



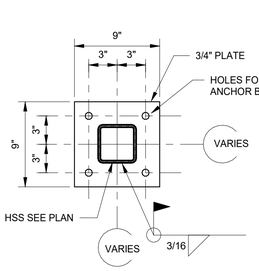
STEP FOOTING DETAIL

SCALE: 1/4" = 1'-0"



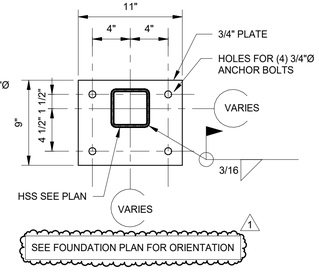
CONCRETE PIER DETAIL

SCALE: 1" = 1'-0"



BASE PLATE 'BP1'

SCALE: 1 1/2" = 1'-0"

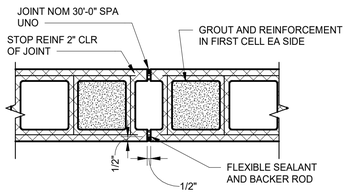


BASE PLATE 'BP2'

SCALE: 1 1/2" = 1'-0"

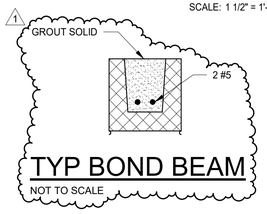
STANDARD HOOK FOR PRIMARY REINFORCEMENT				
BAR SIZE, d_b	INSIDE BEND DIAMETER, D	180° HOOKS		90° HOOKS
		A OR G	J	A OR G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	24"
#14	18 1/4"	27"	21 3/4"	31"
#18	24"	36"	28 1/2"	41"

STANDARD HOOK FOR STIRRUP, TIE, AND HOOP REINFORCEMENT				
BAR SIZE, d_b	INSIDE BEND DIAMETER, D	90° HOOKS	135° HOOKS	
		A OR G	A OR G	H (APPROX)
#3	1 1/2"	4"	4 1/4"	3"
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"
#7	5 1/4"	14"	9"	5 1/4"
#8	6"	16"	10 1/2"	6"



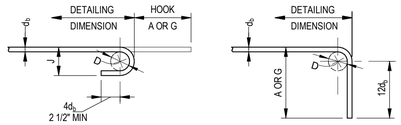
CMU CONTROL JOINT DETAIL

NOT TO SCALE

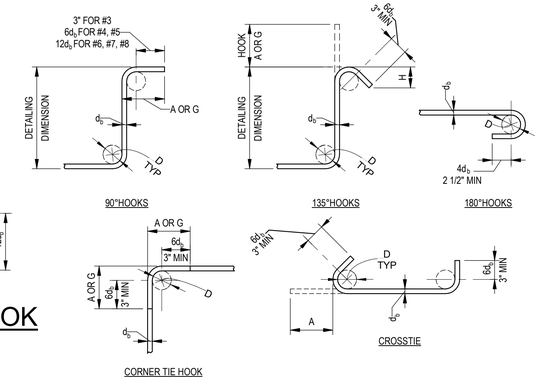


TYP BOND BEAM

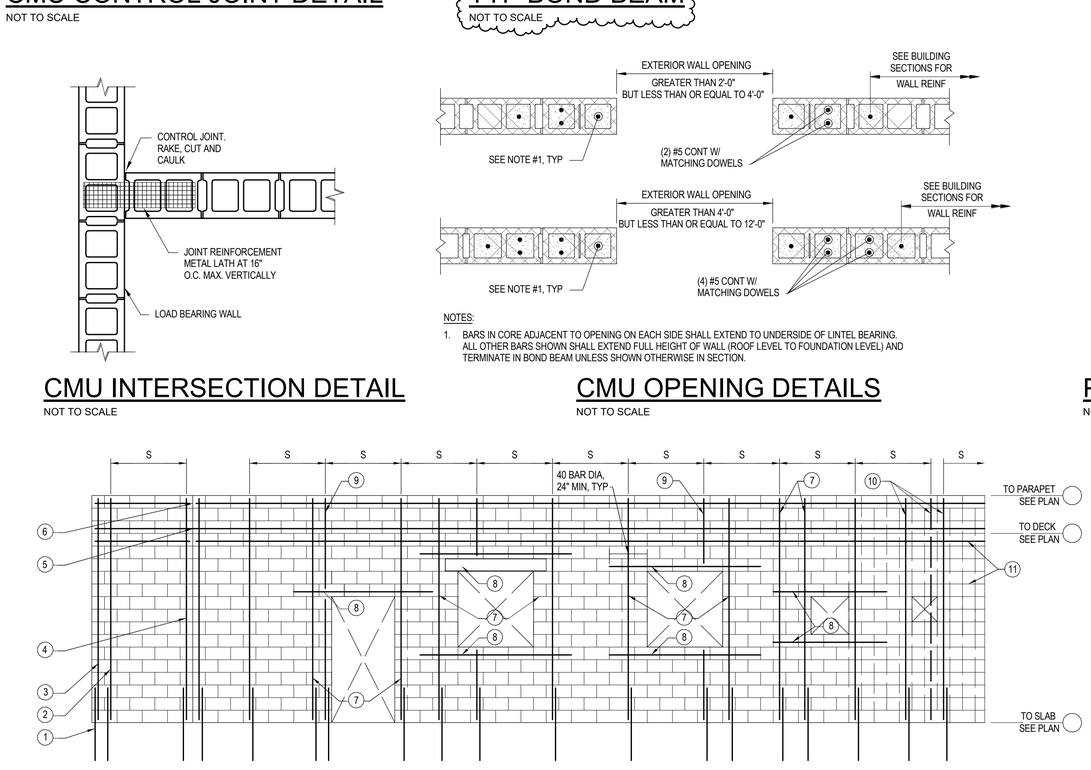
NOT TO SCALE



TYPICAL STANDARD END HOOK FOR PRIMARY REINF DETAIL



TYPICAL STANDARD HOOK FOR STIRRUP, TIE, & HOOP REINF DETAIL



TYPICAL REINFORCING AROUND CMU OPENINGS

NOT TO SCALE

CMU INTERSECTION DETAIL

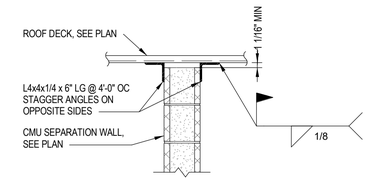
NOT TO SCALE

NOTES:

1. BARS IN CORE ADJACENT TO OPENING ON EACH SIDE SHALL EXTEND TO UNDERSIDE OF LINTEL BEARING. ALL OTHER BARS SHOWN SHALL EXTEND FULL HEIGHT OF WALL (ROOF LEVEL TO FOUNDATION LEVEL) AND TERMINATE IN BOND BEAM UNLESS SHOWN OTHERWISE IN SECTION.

CMU OPENING DETAILS

NOT TO SCALE



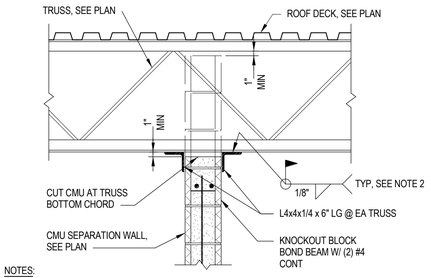
PARTITION WALL BRACE - ROOF

NOT TO SCALE

NOTES	
MARK	DESCRIPTION
1	DOWELS TO MATCH SIZE AND SPACING OF WALL REINFORCEMENT.
2	TYPICAL REINFORCEMENT, SEE SECTIONS FOR SIZE AND SPACING, S.
3	PROVIDE REINFORCEMENT AT WALL CORNER AND WITHIN 8" OF END OF WALL.
4	PROVIDE REINFORCEMENT WITHIN 8" OF EACH SIDE OF CONTROL/MOVEMENT JOINT.
5	PROVIDE CONTINUOUS REINFORCEMENT AT STRUCTURALLY CONNECTED ROOF AND FLOOR LEVELS.
6	PROVIDE REINFORCEMENT WITHIN 16 INCHES OF THE TOP OF WALL, DISCONTINUE AT CONTROL/MOVEMENT JOINT.
7	PROVIDE REINFORCEMENT WITHIN 16 INCHES OF EACH SIDE OF OPENING.
8	PROVIDE REINFORCEMENT AT TOP AND BOTTOM OF OPENINGS.
9	TYPICAL REINFORCEMENT INTERRUPTED BY OPENING.
10	PROVIDE REINFORCEMENT WITHIN 4 INCHES OF EACH SIDE OF OPENING IF TYPICAL REINFORCEMENT IS INTERRUPTED BY OPENING. OTHERWISE REINFORCEMENT IS NOT REQUIRED.
11	PROVIDE W1.7 (9 GAGE) JOINT REINFORCEMENT (LADDER TYPE) AT 8 INCHES ON CENTER OR #4 BAR AT 5 FEET ON CENTER.

DRAWING NOTES

1. FOR STRUCTURAL NOTES AND MATERIAL SPECIFICATIONS SEE DRAWING S001.



NOTES:

1. PROVIDE 1" MINIMUM GAP BETWEEN BEAM/ TRUSS AND MASONRY ALL AROUND. FILL GAP WITHFIRE-SAFING AS SPECIFIED.
2. CONTRACTOR TO VERIFY THAT TRUSS BOTTOM CHORD FRAMING IS 18 GAGE OR THICKER PRIOR TO WELDING. IF GAGE IS THINNER THAN 18 GAGE, NOTIFY ENGINEER IMMEDIATELY FOR ALTERNATE FASTENING REQUIREMENTS.

CMU PARTITION WALL BRACE - JOIST

NOT TO SCALE

MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919

SEH

COMMONWEALTH OF VIRGINIA
JEREMY L. LUCAS
Lic. No. 44991
9/25/2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	JLL
Drawn By	JKK

Project Status	**Issue Date**
CONSTRUCTION DOCUMENTS	8/28/2025

REVISION SCHEDULE

REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

TYPICAL DETAILS

S002

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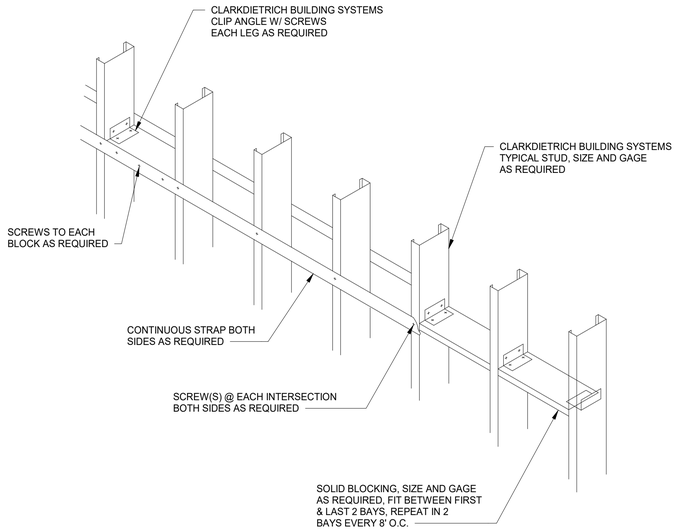
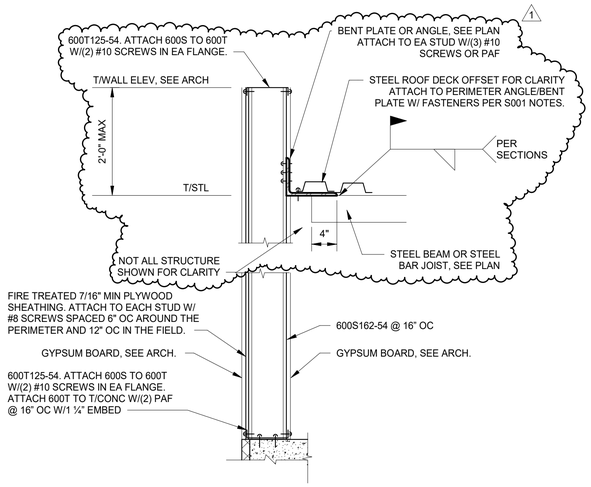


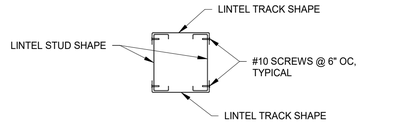
TYP CFS WALL FRAMING

SCALE: 1" = 1'-0"



TYP BRACED WALL DETAIL

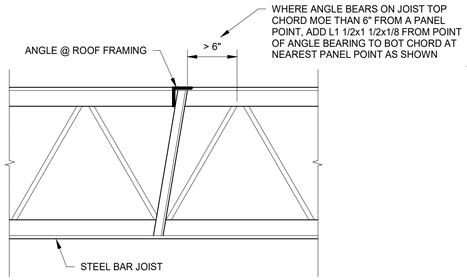
SCALE: 1" = 1'-0"



NOTE:
ELEMENTS ARE SHOWN OFFSET FOR CLARITY. ALL ELEMENTS SHALL BE INSTALLED WITH POSITIVE BEARING.

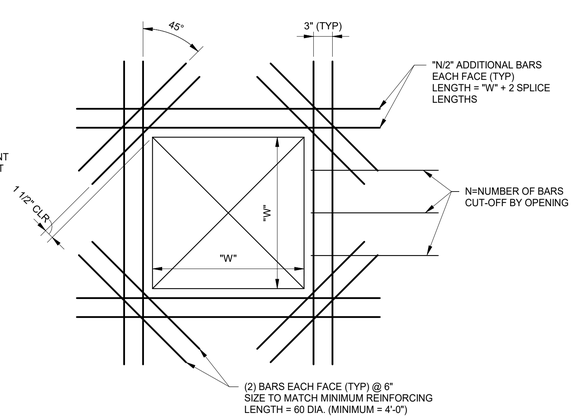
CFS LINTEL DETAIL

SCALE: 1 1/2" = 1'-0"



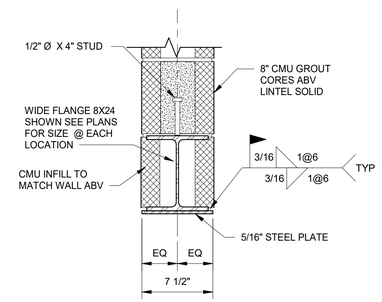
ROOF JOIST REINF. ELEVATION

SCALE: 1" = 1'-0"



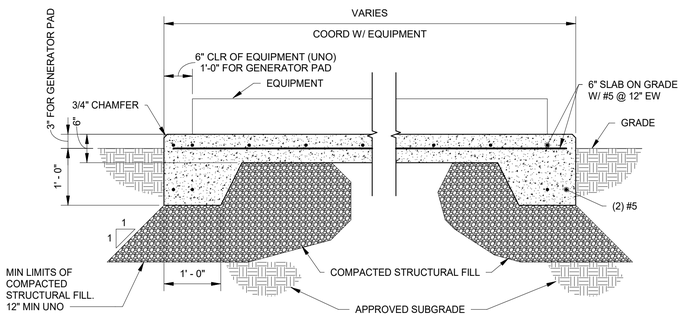
TYP FLOOR OPENING FRAMING BETWEEN JOIST

SCALE: 1" = 1'-0"



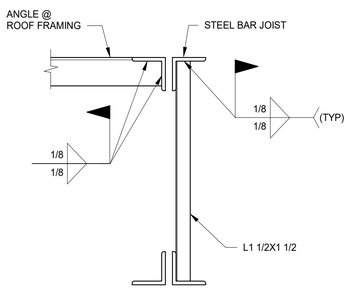
TYP WIDE FLANGE LINTEL DETAIL

SCALE: 1 1/2" = 1'-0"



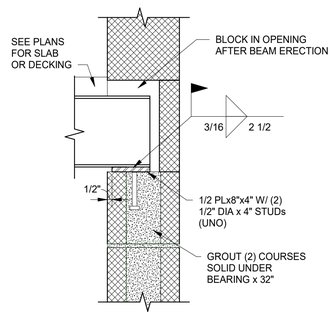
EXTERIOR CONCRETE EQUIPMENT PAD DETAIL

SCALE: 3/4" = 1'-0"



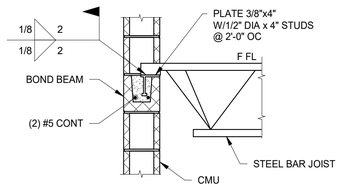
ROOF JOIST REINF. SECTION

SCALE: 1 1/2" = 1'-0"



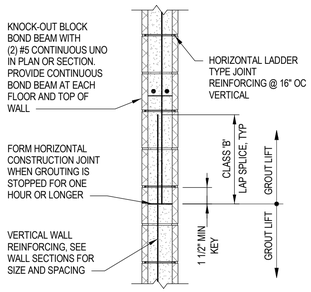
TYPICAL BEAM BEARING DETAIL

SCALE: 1 1/2" = 1'-0"



TYPICAL JOIST BEARING DETAIL

SCALE: 3/4" = 1'-0"



VERTICAL CMU WALL DETAIL

SCALE: 12" = 1'-0"

DRAWING NOTES

1. FOR STRUCTURAL NOTES AND MATERIAL SPECIFICATIONS SEE DRAWING S001.
2. DIMENSIONS ARE TO FACE OF STUD OR FACE OF CMU UNLESS NOTED OTHERWISE.

MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919

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SEH

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LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
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REVISION SCHEDULE

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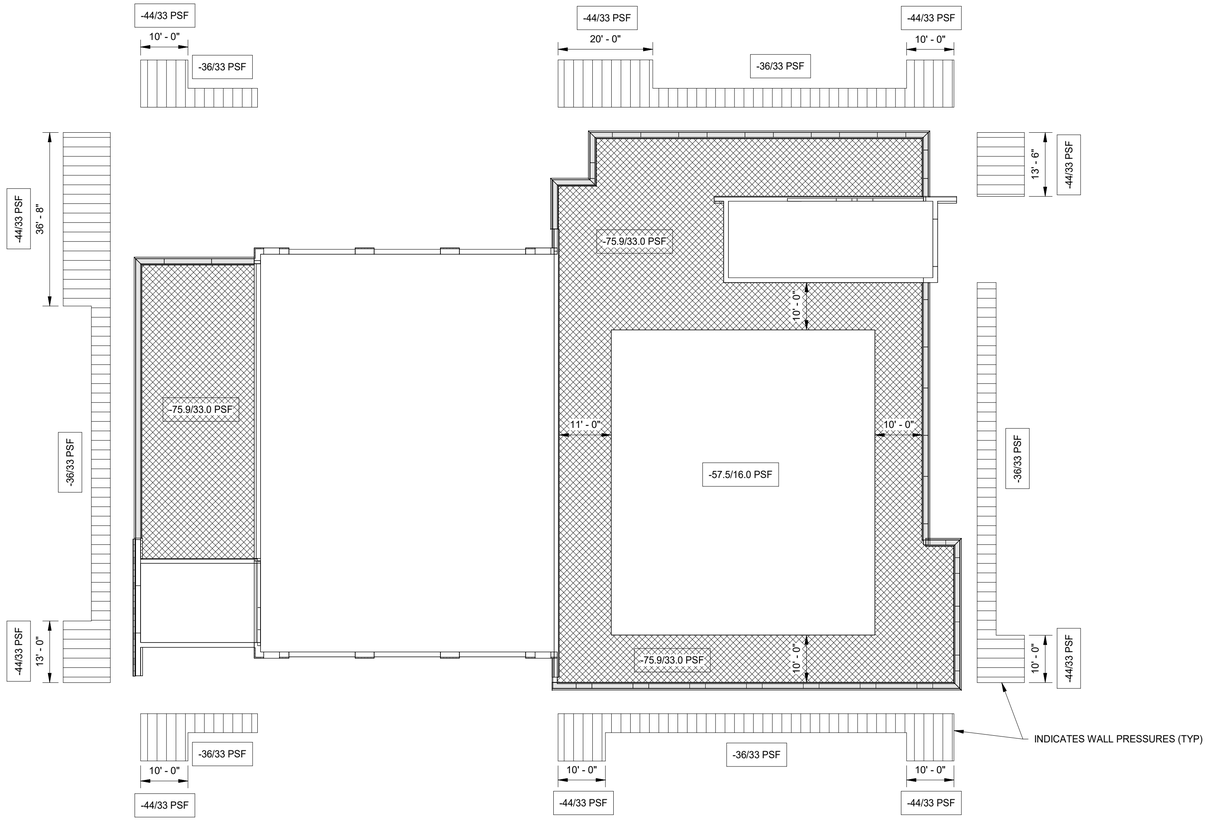
1	ADDENDUM #2	9/26/2025

TYPICAL DETAILS

S003

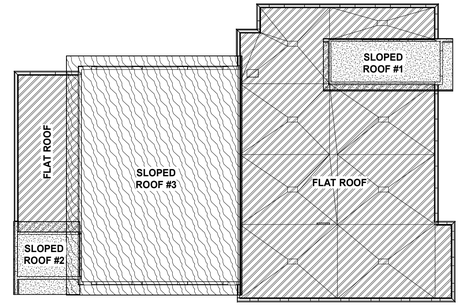


WIND PRESSURES - LOW ROOF

SCALE: 1/16" = 1'-0"

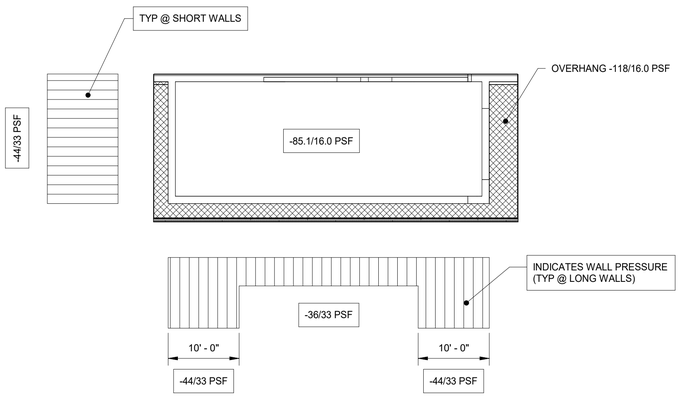
DRAWING NOTES

1. FOR STRUCTURAL NOTES AND MATERIAL SPECIFICATIONS SEE DRAWING S001.
2. COMPONENTS AND CLADDING PRESSURES ARE SHOWN UNFACTORED ULTIMATE PRESSURES.
   (+) = TOWARD BUILDING
   (-) = SUCTION



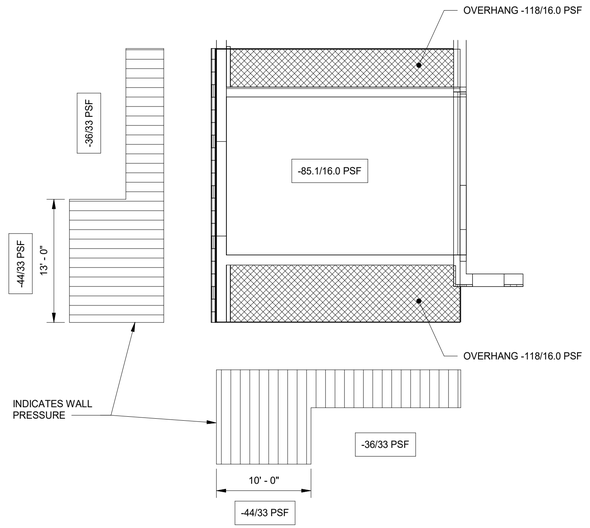
KEY PLAN - COMPONENETS & CLADDING

SCALE: 1" = 30'-0"



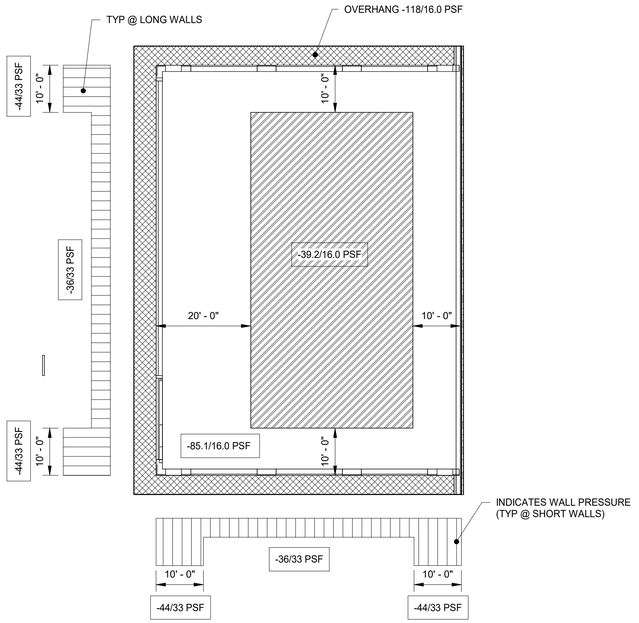
WIND PRESSURES - SLOPED ROOF #1

SCALE: 3/32" = 1'-0"



WIND PRESSURES - SLOPED ROOF #2

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



WIND PRESSURES - SLOPED ROOF #3

SCALE: 1/16" = 1'-0"

9/26/2025 5:35:33 PM

SEH

COMMONWEALTH OF VIRGINIA
JEREMY L. LUCAS
Lic. No. 44991
9/25/2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	JLL
Drawn By	JKK

Project Status	**Issue Date**
CONSTRUCTION DOCUMENTS	8/28/2025

REVISION SCHEDULE

REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

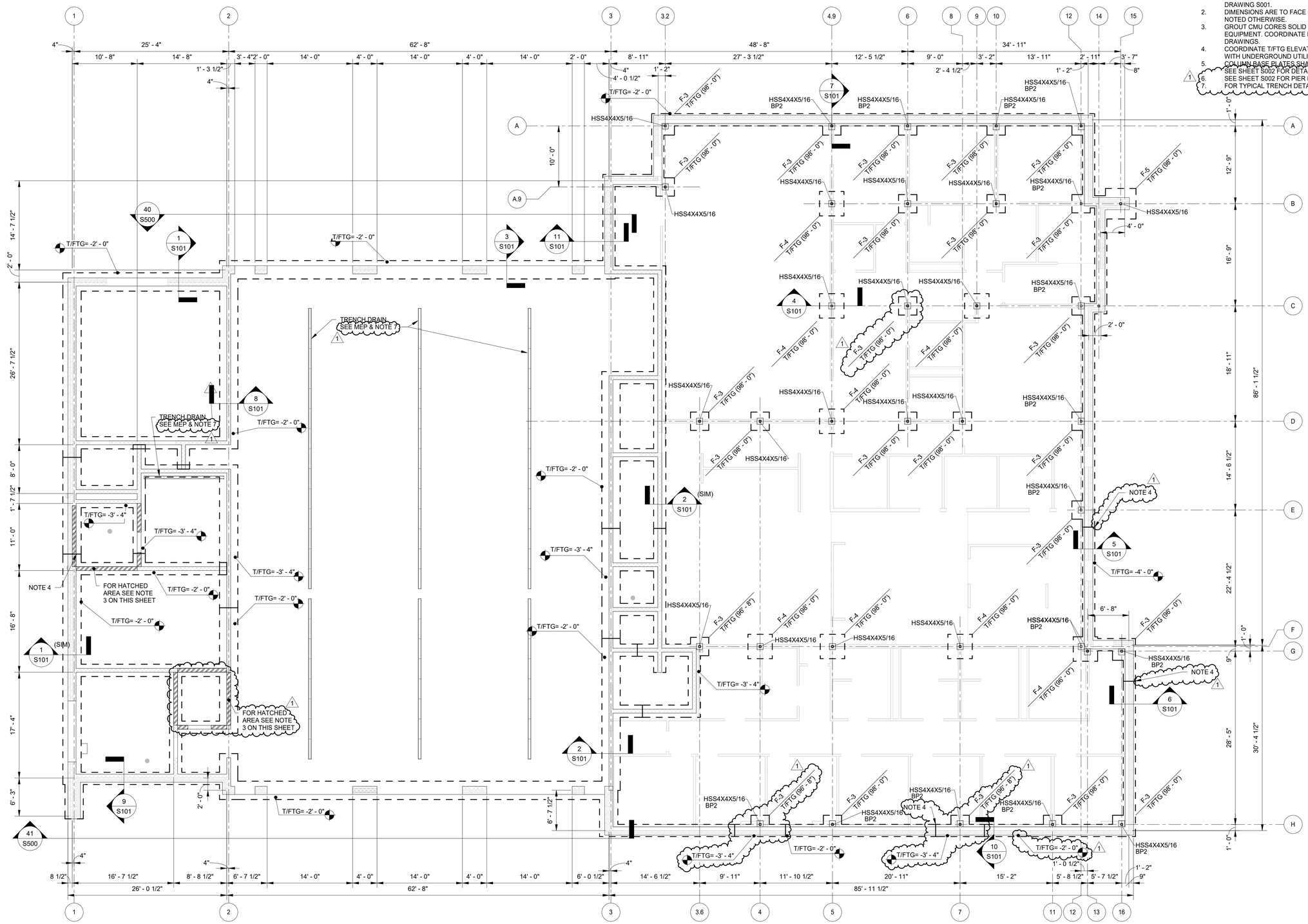
COMPONENTS AND CLADDING WIND PRESSURES

S004

MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919

DRAWING NOTES

1. FOR STRUCTURAL NOTES AND MATERIAL SPECIFICATIONS SEE DRAWING S001.
2. DIMENSIONS ARE TO FACE OF STUD OR FACE OF CMU UNLESS NOTED OTHERWISE.
3. GROUT CMU CORES SOLID FOR SUPPPORT OF ELECTRICAL EQUIPMENT. COORDINATE EXENTS WITH ELECTRICAL DRAWINGS.
4. COORDINATE T/FTG ELEVATION & STEP FOOTING LOCATION WITH UNDERGROUND UTILITIES.
5. COLUMN BASE PLATES SHALL BE TYPE BP1 UNLESS NOTED. SEE SHEET S002 FOR DETAILS.
6. SEE SHEET S002 FOR PIER DETAIL.
7. FOR TYPICAL TRENCH DETAIL, SEE SHEET S002.



1 S100 FOUNDATION PLAN
1/8" = 1'-0"

FOOTING SCHEDULE

ID MARK	LENGTH	WIDTH	THICKNESS	DESCRIPTION
F-3	3' - 0"	3' - 0"	1' - 0"	(3) #5 EW
F-4	4' - 0"	4' - 0"	1' - 0"	(4) #5 EW
F-5	5' - 0"	5' - 0"	1' - 0"	(5) #5 EW

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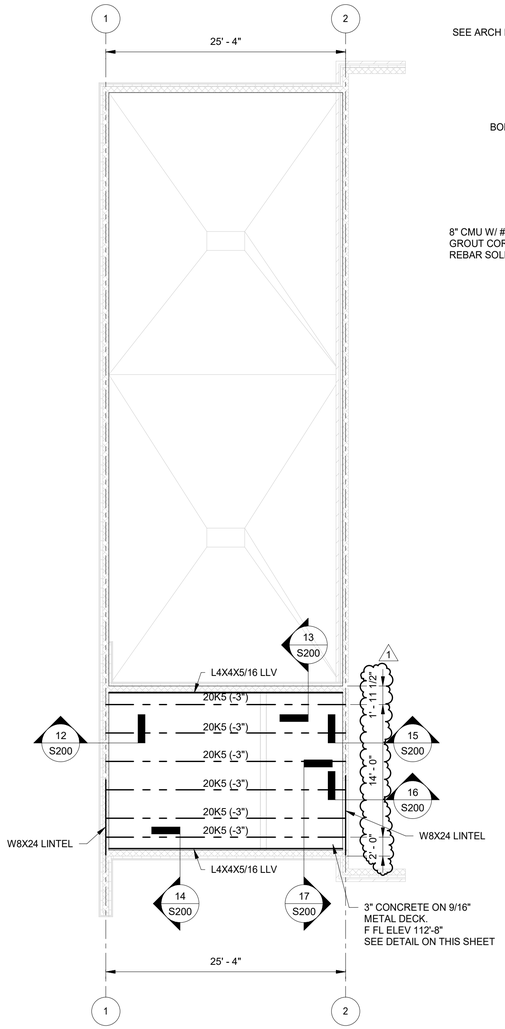
FOUNDATION PLAN

S100

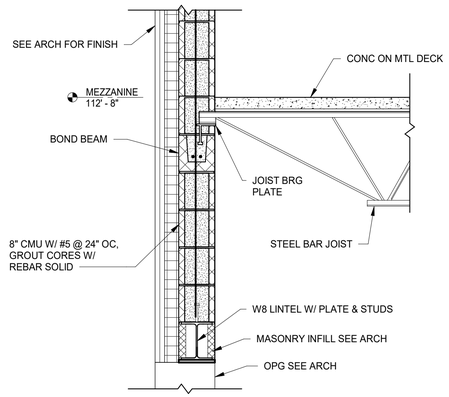
9/26/2025 5:35:35 PM

DRAWING NOTES

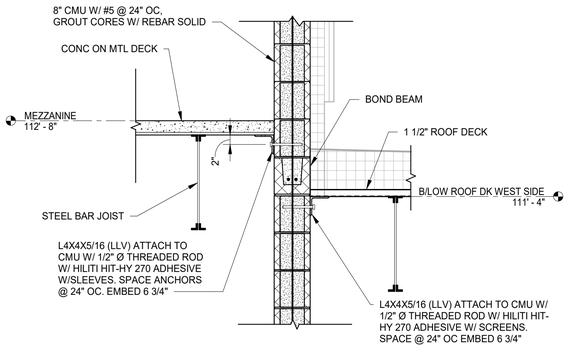
1. FOR STRUCTURAL NOTES AND MATERIAL SPECIFICATIONS SEE DRAWING S001.
2. DIMENSIONS ARE TO FACE OF STUD OR FACE OF CMU UNLESS NOTED OTHERWISE.



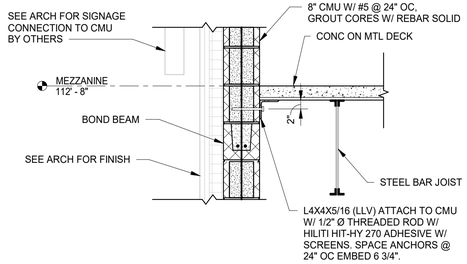
1 S200 MEZZANINE FRAMING PLAN
1/8" = 1'-0"



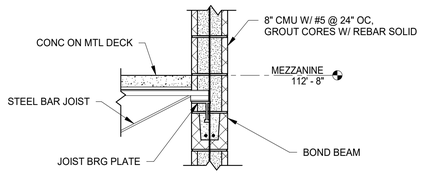
SECTION 12 S200
SCALE: 3/4" = 1'-0"



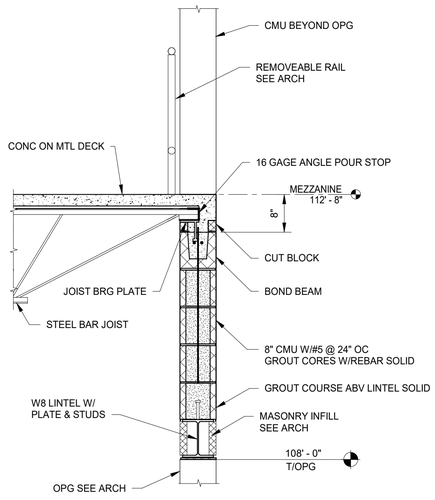
SECTION 13 S200
SCALE: 3/4" = 1'-0"



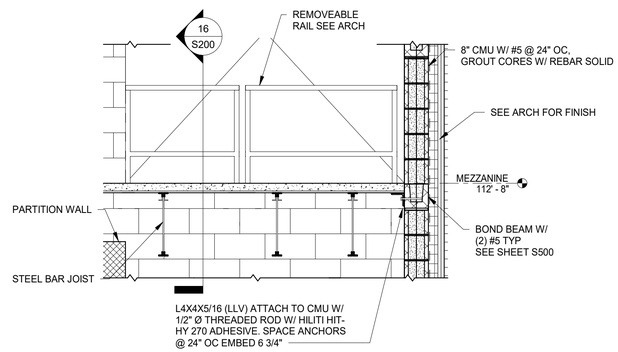
SECTION 14 S200
SCALE: 3/4" = 1'-0"



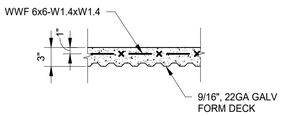
SECTION 15 S200
SCALE: 3/4" = 1'-0"



SECTION 16 S200
SCALE: 3/4" = 1'-0"



SECTION 17 S200
SCALE: 1/2" = 1'-0"



3" SLAB ON DECK DETAIL
SCALE: 1" = 1'-0"

9/26/2025 5:35:38 PM

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904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
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COMMONWEALTH OF VIRGINIA
JEREMY L. LUCAS
Lic. No. 44991
9/25/2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	JLL
Drawn By	JKK

Project Status	**Issue Date**
CONSTRUCTION DOCUMENTS	8/28/2025

REVISION SCHEDULE

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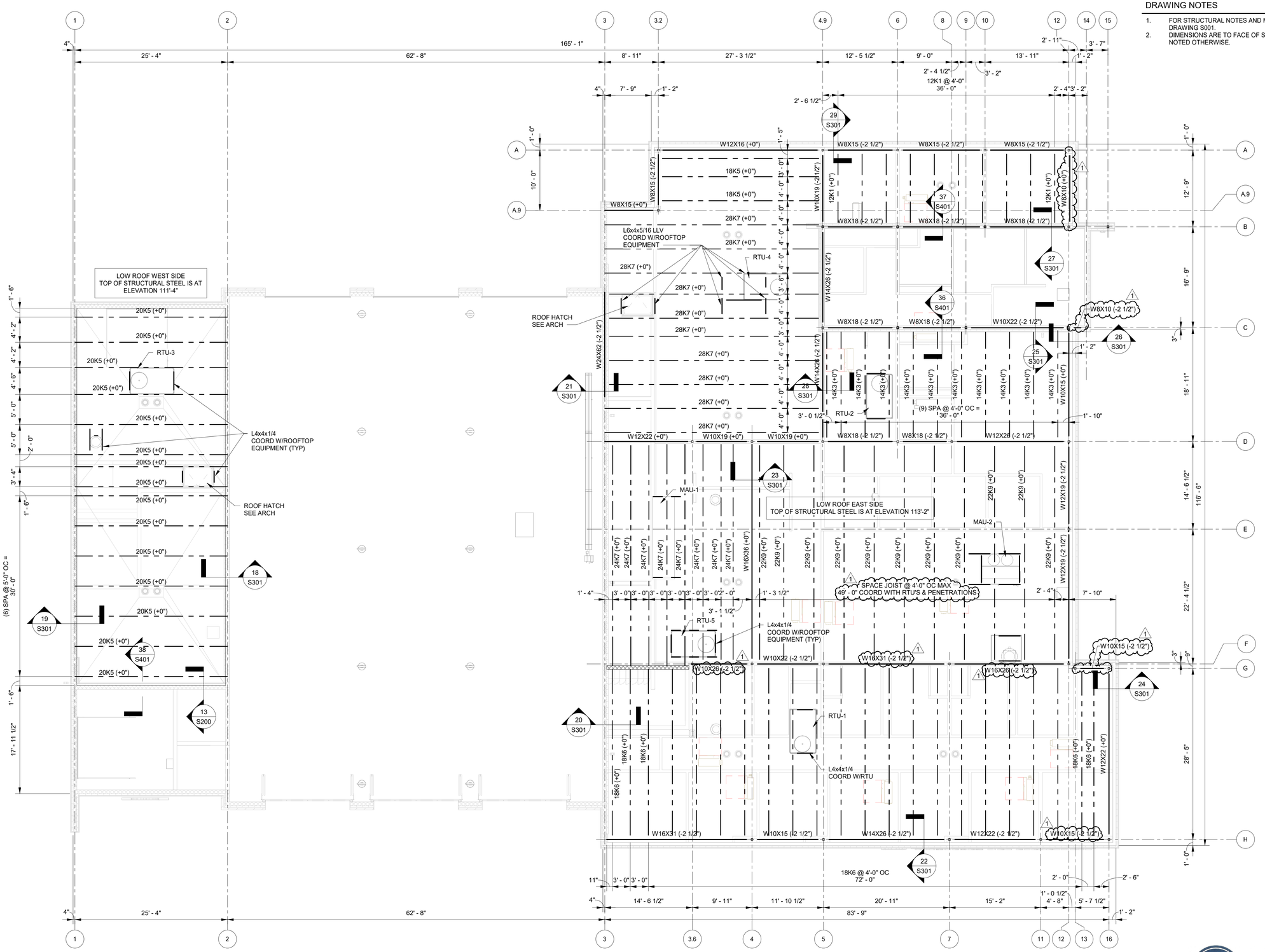
1	ADDENDUM #2	9/26/2025

MEZZANINE FRAMING PLAN & DETAILS

S200

DRAWING NOTES

1. FOR STRUCTURAL NOTES AND MATERIAL SPECIFICATIONS SEE DRAWING S001.
2. DIMENSIONS ARE TO FACE OF STUD OR FACE OF CMU UNLESS NOTED OTHERWISE.



1 S300 LOW ROOF FRAMING PLAN
1/8" = 1'-0"

9/26/2025 5:35:40 PM

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LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

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LOW ROOF FRAMING PLAN

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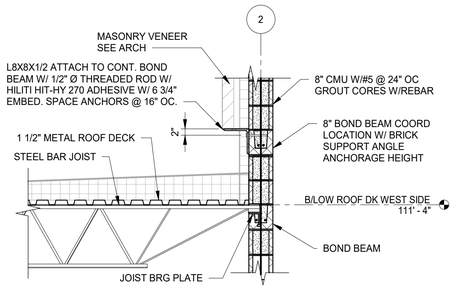
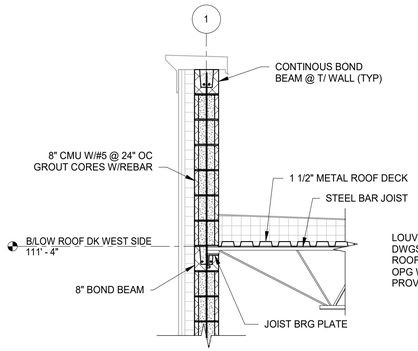
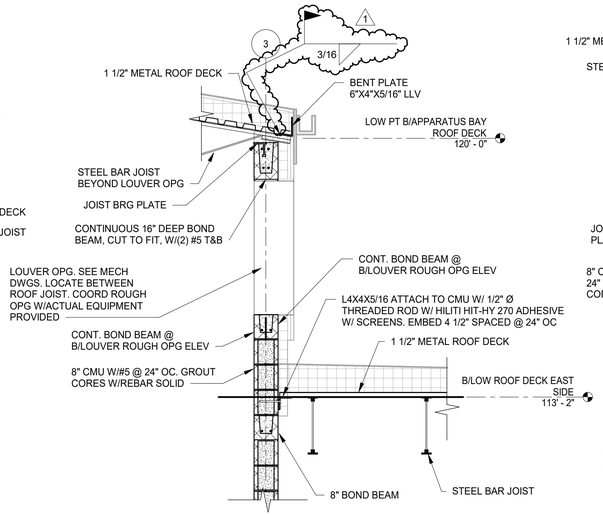
S300



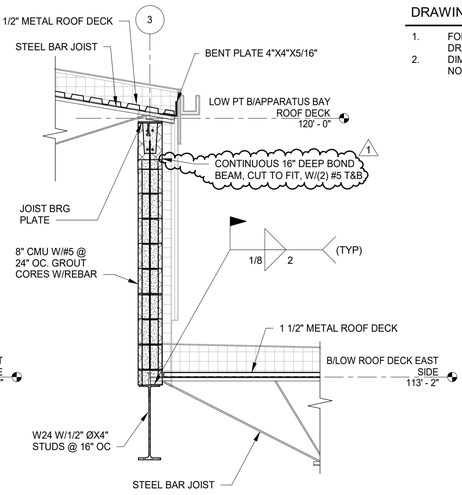
SECTION
SCALE: 1/2" = 1'-0"
18 S300



SECTION
SCALE: 1/2" = 1'-0"
19 S300



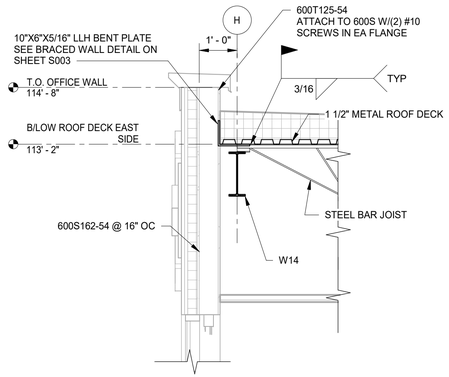
SECTION
SCALE: 1/2" = 1'-0"
20 S300



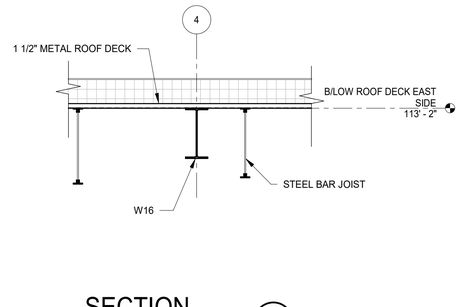
SECTION
SCALE: 1/2" = 1'-0"
21 S300

DRAWING NOTES

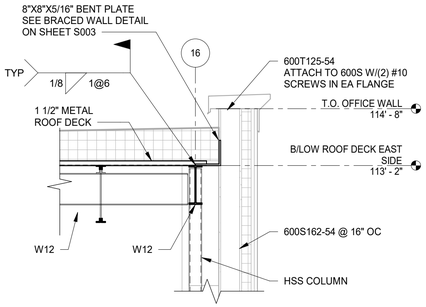
1. FOR STRUCTURAL NOTES AND MATERIAL SPECIFICATIONS SEE DRAWING S001.
2. DIMENSIONS ARE TO FACE OF STUD OR FACE OF CMU UNLESS NOTED OTHERWISE.



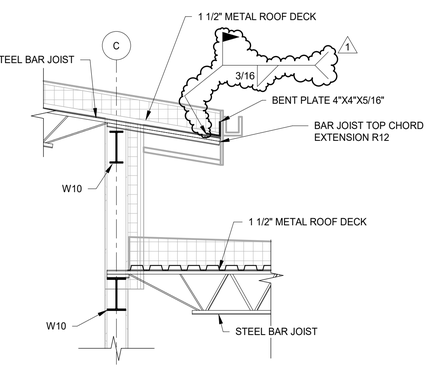
SECTION
SCALE: 1/2" = 1'-0"
22 S300



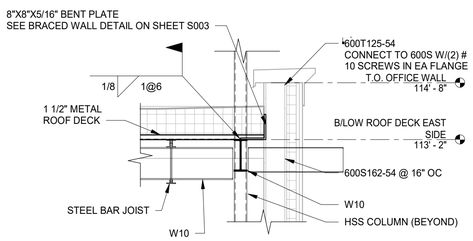
SECTION
SCALE: 1/2" = 1'-0"
23 S300



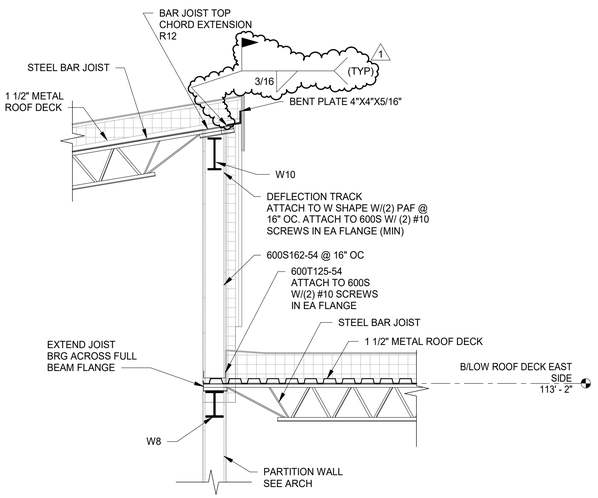
SECTION
SCALE: 1/2" = 1'-0"
24 S300



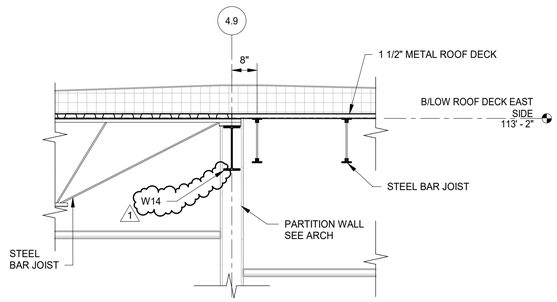
SECTION
SCALE: 1/2" = 1'-0"
25 S300



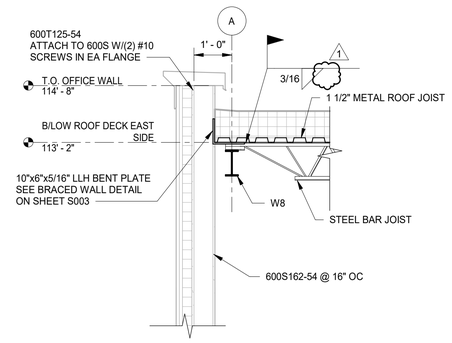
SECTION
SCALE: 1/2" = 1'-0"
26 S300



SECTION
SCALE: 1/2" = 1'-0"
27 S300



SECTION
SCALE: 1/2" = 1'-0"
28 S300



SECTION
SCALE: 1/2" = 1'-0"
29 S300

9/26/2025 5:35:42 PM

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434-846-1350 Fax: 434-846-1351
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COMMONWEALTH OF VIRGINIA
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9/25/2025
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Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
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Project Status	**Issue Date**
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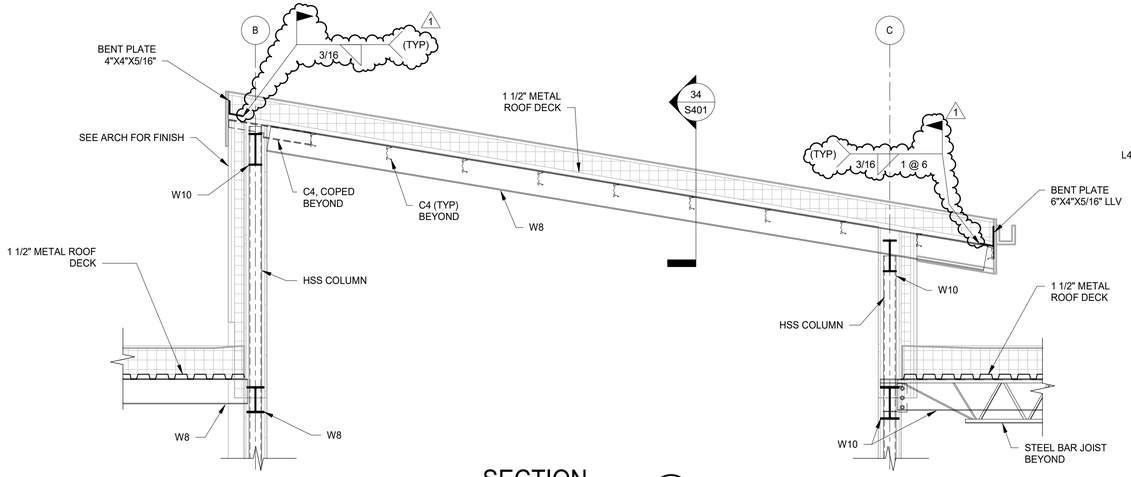
REVISION SCHEDULE

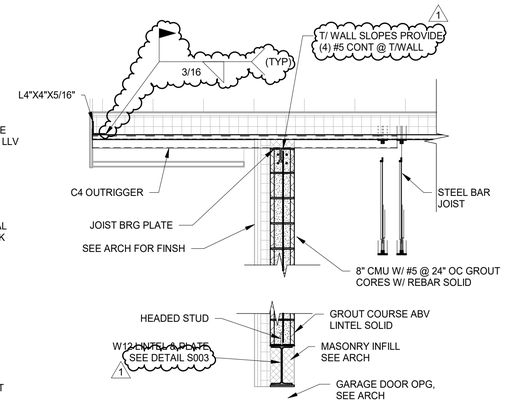
REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

LOW ROOF FRAMING PLAN DETAILS

S301



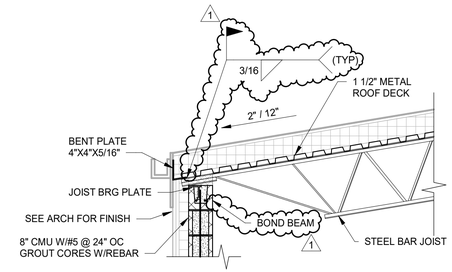
SECTION 30 S400
SCALE: 1/2" = 1'-0"



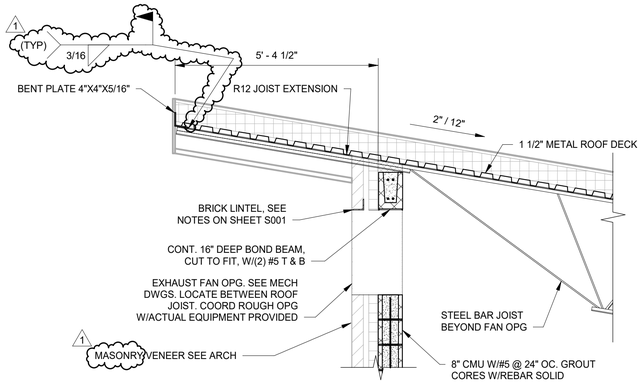
SECTION 31 S400
SCALE: 1/2" = 1'-0"

DRAWING NOTES

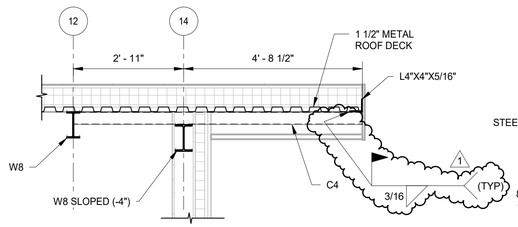
1. FOR STRUCTURAL NOTES AND MATERIAL SPECIFICATIONS SEE DRAWING S001.
2. DIMENSIONS ARE TO FACE OF STUD OR FACE OF CMU UNLESS NOTED OTHERWISE.



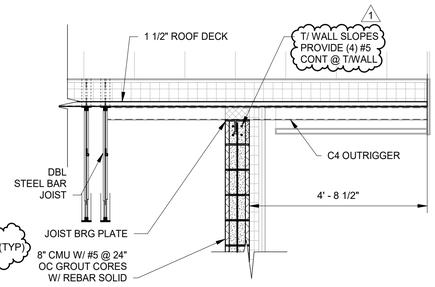
SECTION 32 S400
SCALE: 1/2" = 1'-0"



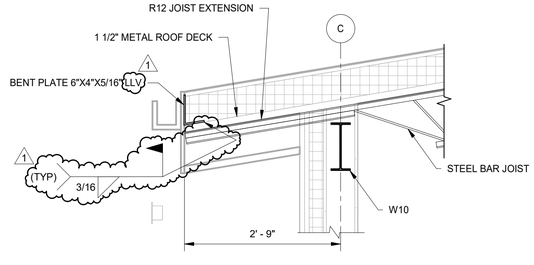
SECTION 33 S400
SCALE: 1/2" = 1'-0"



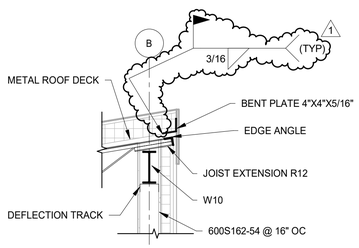
SECTION 34 S400
SCALE: 1/2" = 1'-0"



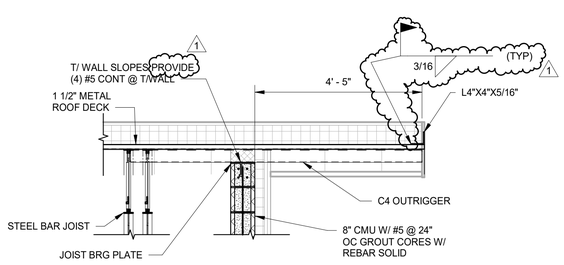
SECTION 35 S400
SCALE: 1/2" = 1'-0"



SECTION 36 S300
SCALE: 3/4" = 1'-0"



SECTION 37 S300
SCALE: 1/2" = 1'-0"



SECTION 38 S300
SCALE: 1/2" = 1'-0"

9/26/2025 5:35:44 PM

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LIBERTY MOUNTAIN DRIVE

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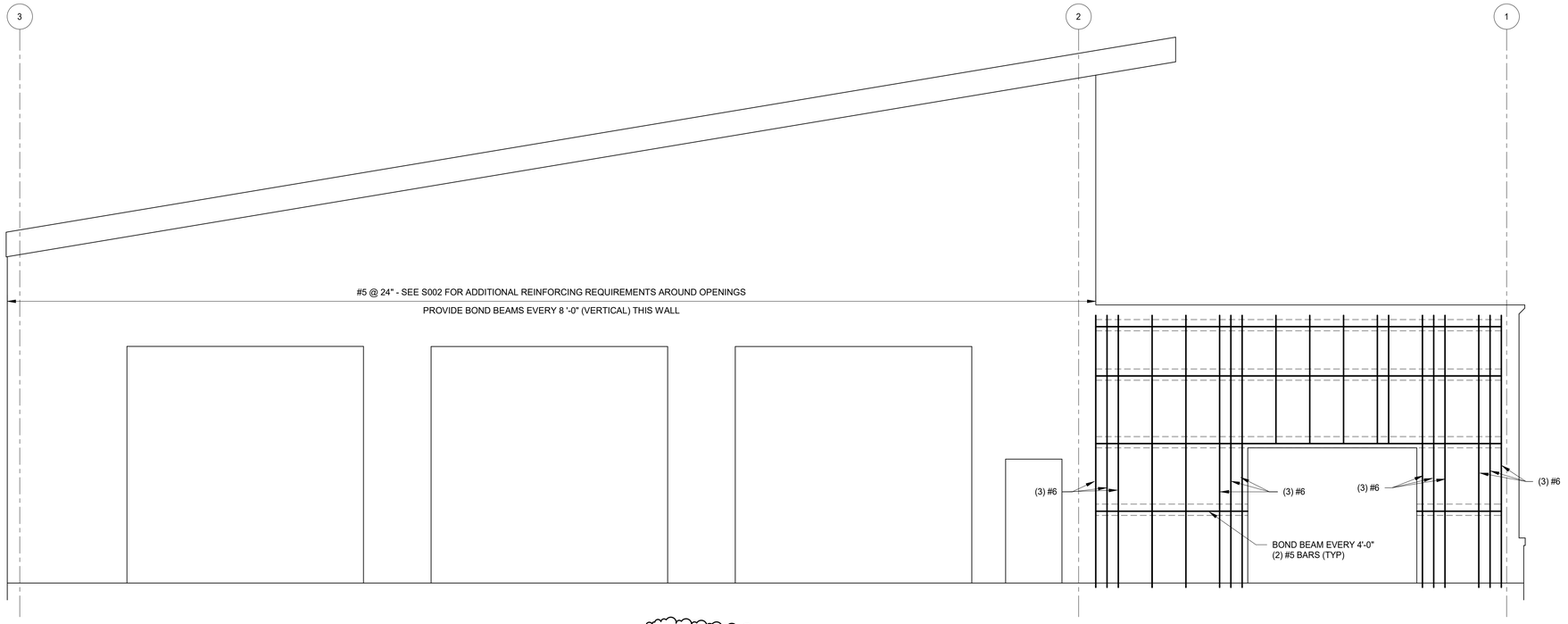
REVISION SCHEDULE

REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

HIGH ROOF FRAMING PLAN DETAIL

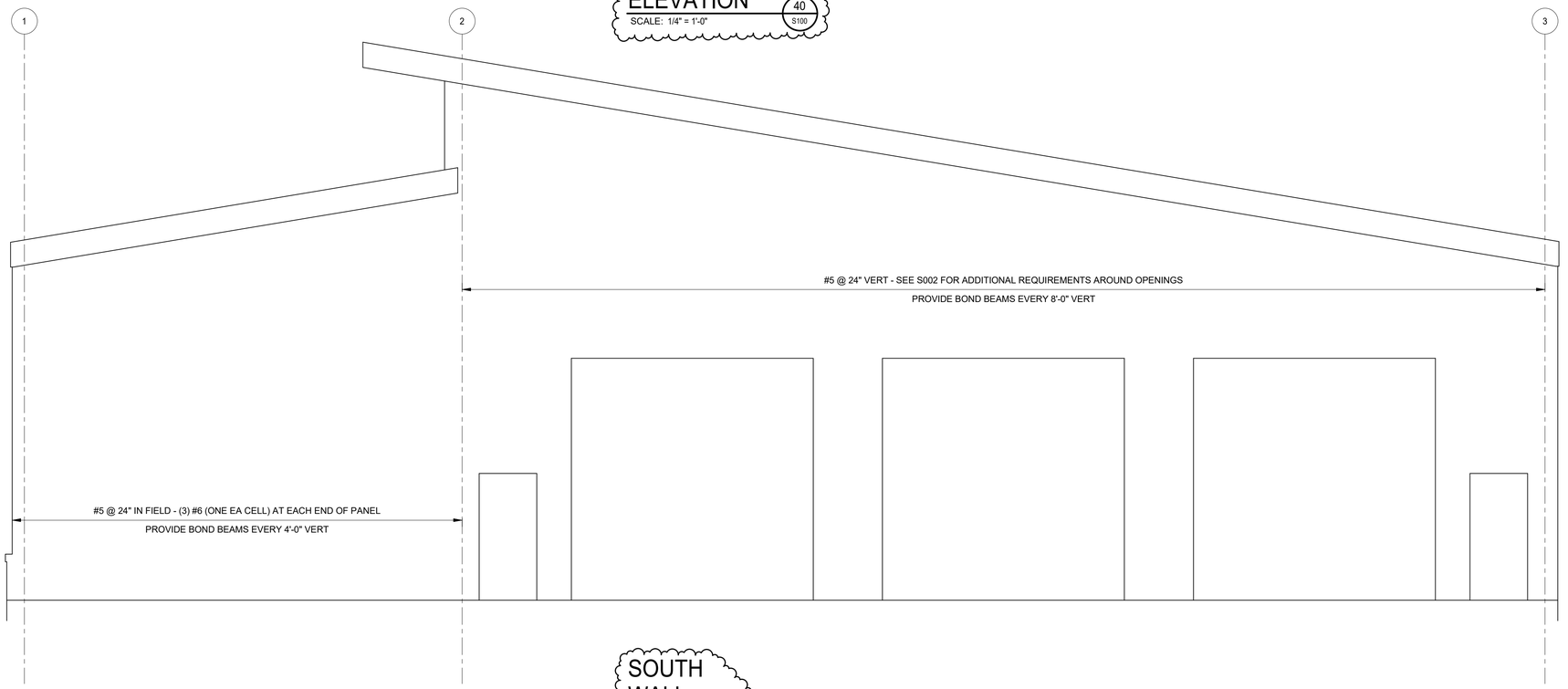
S401



NORTH WALL ELEVATION

SCALE: 1/4" = 1'-0"

40 S100



SOUTH WALL ELEVATION

SCALE: 1/4" = 1'-0"

41 S100

TOP OF STRUCTURAL STEEL VARIES WITH ROOF SLOPE.

9/26/2025 5:35:44 PM

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WALL ELEVATIONS

S500

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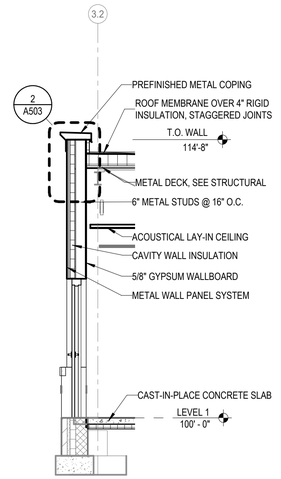
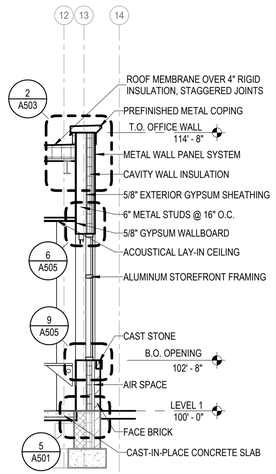
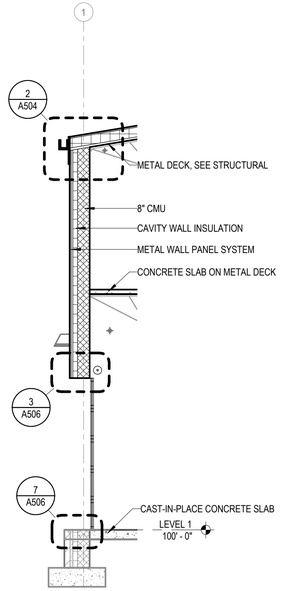
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919



1 A311 WALL SECTION 1/4" = 1'-0"



2 A311 WALL SECTION 1/4" = 1'-0"



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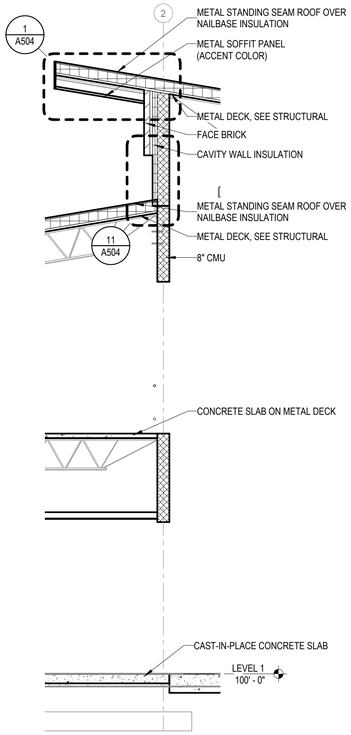

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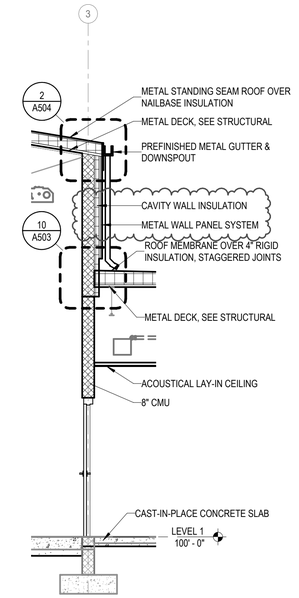

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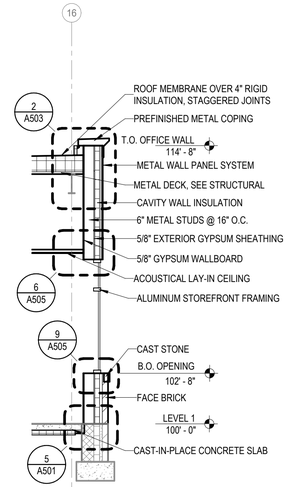
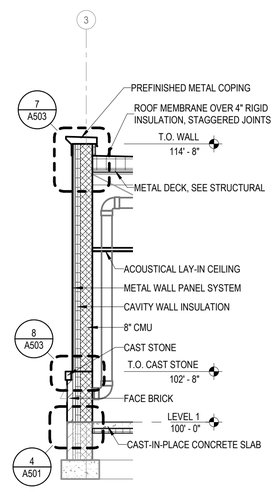


11 A311 WALL SECTION 1/4" = 1'-0"



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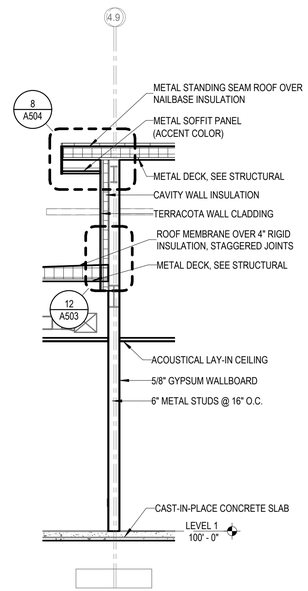
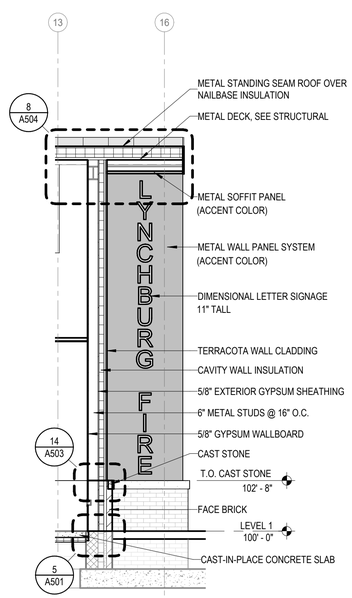


5 A311 WALL SECTION 1/4" = 1'-0"



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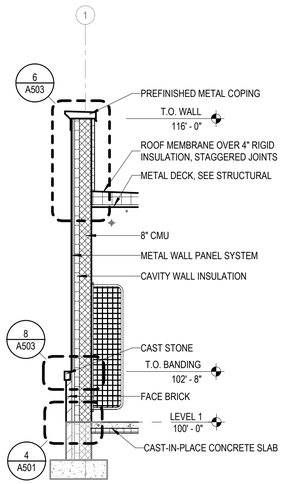
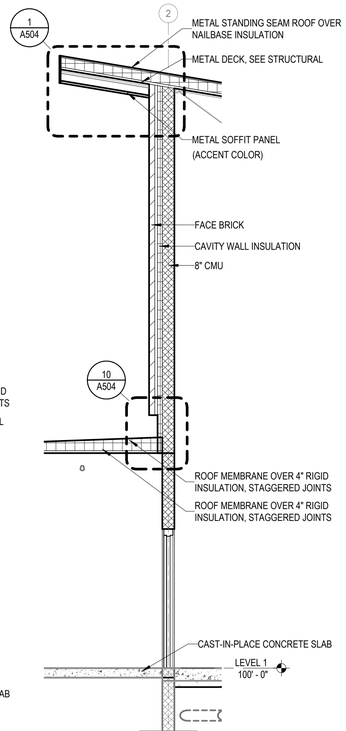


2456 A311 WALL SECTION 1/4" = 1'-0"



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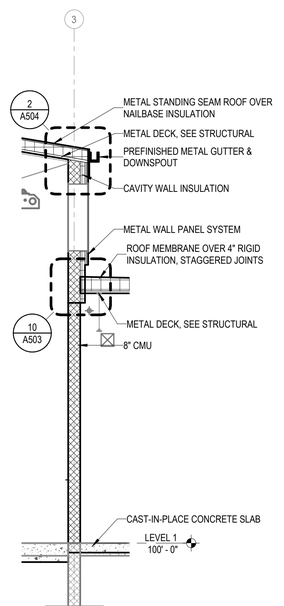
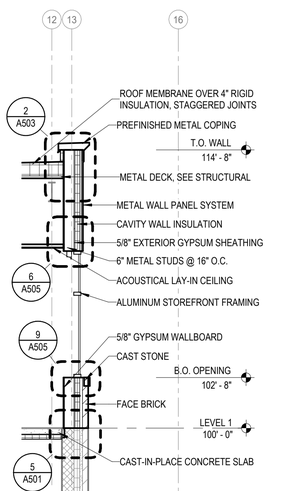


12 A311 WALL SECTION 1/4" = 1'-0"



13 A311 WALL SECTION 1/4" = 1'-0"

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SEH

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	Checked By
Drawn By	Drawn By
Project Status	**Issue Date**
CONSTRUCTION DOCUMENTS	8/28/2025

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WALL SECTIONS

A311

LEGEND

ACT	=	ACOUSTIC CEILING TILE
CPT	=	CARPET
GYP	=	GYPSUM BOARD
PT	=	PAINT
RB	=	RUBBER BASE
CT	=	CERAMIC TILE
ST	=	WOOD STAIN

ROOM FINISHES

CARPET
- CPT1 SHAW CONTRACT, STEPPING OUT-WELCOME II 5T031, STERLING 31557, 24x24 QUARTER TURN INSTALL
- CPT2 SHAW CONTRACT, COLOR AT WORK II, SATURATE 5T109, SCARLET 07854, 9x36 ASHLAR INSTALL
- CPT3 SHAW CONTRACT, COLOR AT WORK, CHROMATONE 5T444, SCARLET CHARCOAL 07854, 18x36 ASHLAR INSTALL
- CPT4 SHAW CONTRACT, COLOR AT WORK, CHROMATONE 5T444, SILVER CHARCOAL 07555, 18x36 ASHLAR INSTALL
- CPT5 SHAW CONTRACT, COLOR AT WORK, CHROMATONE 5T444, INDIGO CHARCOAL 07485, 18x36 ASHLAR INSTALL
- CPT6 SHAW CONTRACT, COLOR AT WORK II, SATURATE 5T109, INDIGO 07485, 9x36 ASHLAR INSTALL

LUXURY VINYL PLANK
- LVP1 SHAW CONTRACT, SOLITUDE 0648V, COTTONWOOD 48120, 6x48 PLANKS
- LVP2 SHAW CONTRACT, SOLITUDE 0648V, SMOKE 48506, 6x48 PLANKS

CERAMIC TILE
- CT1 DALTILE, DIGNITARY, EMINENCE GREY DR10, MATTE, 12x24, ASHLAR INSTALL GROUT TO MATCH LATICRETE 60 DUSTY GREY
- CT2 DALTILE, DIGNITARY, EMINENCE GREY ABSTRACT DR10, MATTE GROUT TO MATCH LATICRETE 60 DUSTY GREY
- CTB1 DALTILE, DIGNITARY, EMINENCE GREY DR10, MATTE, 6x24 ASHLAR INSTALL GROUT TO MATCH LATICRETE 78 STERLING SILVER
- CTW1 DALTILE, DIGNITARY, EMINENCE GREY DR10, MATTE, 12x24 ASHLAR INSTALL GROUT TO MATCH LATICRETE 78 STERLING SILVER
- CTW2 DALTILE, DIGNITARY, EMINENCE GREY DR10, MATTE, 6x24 ASHLAR INSTALL GROUT TO MATCH LATICRETE 78 STERLING SILVER
- CTW3 CROSSVILLE TILE, COLOR BY NUMBERS, EDGE OF SEVENTEEN, GLOSS, 4x8 ASHLAR INSTALL GROUT TO MATCH LATICRETE 09 FROSTY
- CTW4 CROSSVILLE TILE, COLOR BY NUMBERS, CARBON-14, GLOSS, 4x8, ASHLAR INSTALL GROUT TO MATCH LATICRETE 09 FROSTY
- CTW5 CROSSVILLE TILE, COLOR BY NUMBERS, RED/MAROON, GLOSS, 1/2x12, ASHLAR INSTALL GROUT TO MATCH LATICRETE 09 FROSTY

RUBBER
- RB1 ECOSURFACES, ECO FIT, RED HOTS 20 620, 48" WIDE ROLL

CONCRETE
- SC SEALED CONCRETE

RESINOUS FLOORING
- EPOX1 STONHARD, STONCLAD SEDONA SNOW LARGE FLAKE
- EPOX2 STONHARD, STONCLAD GS W/ STONKOTE GS4 TOPCOAT, 1/4" SYSTEM THICKNESS, COLOR:TBD

PAINT
- PT1 SHERWIN WILLIAMS, SW7064 PASSIVE
- PT2 SHERWIN WILLIAMS, SW7066 GRAY MATTERS
- PT3 SHERWIN WILLIAMS, SW6594 POINSETTA
- PT4 SHERWIN WILLIAMS, SW7076 CYBERSPACE
- PT5 SHERWIN WILLIAMS, SW6902 DECISIVE YELLOW

VINYL BASE
- VB1 JOHNSONITE, BEDROCK TA6

SOLID SURFACE
- SS1 WILSONART, COASTAL Q4036
- SS2 WILSONART, BLUESTONE 9074EA

PLASTIC LAMINATE
- PL1 WILSONART, STEEL MESH 4879-38, FINE VELVET FINISH
- PL2 WILSONART, STERLING ASH 7995-38, FINE VELVET FINISH

METAL CASEWORK
- MF1 MOTT MANUFACTURING, DOVE GRAY 601008

WOOD DOORS
- WD1 CUSTOM TO MATCH WILSONART STERLING ASH 7995-38

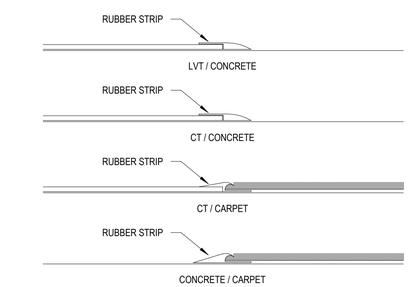
LAY-IN CEILING TILES
- ACT1 MINERAL FIBER ACOUSTIC TILE
- ACT2 VINYL FACED GYPSUM TILE

ROOM FINISH SCHEDULE

ROOM NUMBER	ROOM NAME	FLOOR	BASE	WALL FINISH				CEILINGS	REMARKS
				NORTH	SOUTH	EAST	WEST	MATERIAL	
101	VESTIBULE	CPT1	VB1	PT1	PT1	PT1	PT1	ACT1	
102	TRIAGE	LVP2	VB1	PT1	PT1	PT1	PT1	ACT1	
103	LOBBY	LVP1 / LVP2	VB1	PT1	PT1	PT1	WG1	ACT1	5
104	ENSUITE	LVP1	VB1	PT1	PT1	PT1	PT1	ACT1	
105	OFFICE	CPT3	VB1	PT1	PT1	PT1	PT3	ACT1	
106	OFFICE	CPT3	VB1	PT1	PT1	PT3	PT1	ACT1	
107	SHOWER	CT1 / CT2	CTB1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	ACT2 / CT2	6
108	OFFICE	CPT3	VB1	PT1	PT1	PT3	PT1	ACT1	
109	N.M.R.	LVP1	VB1	PT1	PT1	PT1	PT1	ACT1	
110	TOILET	CT1	CTB1	PT1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	PT1	ACT1	
111	TOILET	CT1	CTB1	CTW1 / CTW2 / PT1	PT1	CTW1 / CTW2 / PT1	PT1	ACT1	
112	TRAINING / EOC	CPT2 / CPT3 / CPT4 / CPT5 / CPT6	VB1	PT1	CTW3 / CTW4 / CTW5 / PT1	PT2	PT1	ACT1	
113	TABLE STORAGE	CPT2	VB1	PT1	PT1	PT1	PT1	ACT1	
114	IT	LVP2	VB1	PT1	PT1	PT1	PT1	ACT1	
115	LINE OFFICERS	LVP1 / LVP2	VB1	PT1	PT2	PT1	PT1	ACT1	
116	KITCHEN	EPOX1	VB1	PT1	CTW3 / CTW4 / CTW5 / PT1	PT1	PT1	ACT1	2, 3, 4
117	PANTRY	EPOX1	VB1	PT1	PT1	PT1	PT1	ACT1	
118	PANTRY	EPOX1	VB1	PT1	PT1	PT1	PT1	ACT1	
119	PANTRY	EPOX1	VB1	PT1	PT1	PT1	PT1	ACT1	
120	DINING	EPOX1	VB1	PT1	PT1	---	---	ACT1	
121	DAYROOM	EPOX1	VB1	WG2	PT1	PT1	PT2	ACT1	5, 8
122	AIRLOCK	CPT1	VB1	PT1	PT1	PT1	PT1	ACT1	
123	EMS STORAGE	SC	VB1	PT2	PT2	PT2	PT2	PT1	
124	AIRLOCK	CPT1	VB1	PT1	PT1	PT1	PT1	ACT1	
125	CORRIDOR	LVP2	VB1	PT1	PT1	PT1	PT1	ACT1	
126	ELECTRICAL	LVP2	VB1	PT1	PT1	PT1	PT1	ACT1	
127	SHOWER	CT1 / CT2	CTB1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	ACT2 / CT2	6
128	SHOWER	CT1 / CT2	CTB1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	ACT2 / CT2	6
129	SHOWER	CT1 / CT2	CTB1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	CTW1 / CTW2 / PT1	ACT2 / CT2	6
130	BUNK	CPT3 / CPT4	VB1	PT1	PT1	PT1	PT3	ACT1	
131	BUNK	CPT3 / CPT4	VB1	PT1	PT1	PT1	PT3	ACT1	
132	BUNK	CPT3 / CPT4	VB1	PT1	PT1	PT1	PT3	ACT1	
133	BUNK	CPT3 / CPT4	VB1	PT1	PT1	PT1	PT3	ACT1	
134	BUNK	CPT3 / CPT4	VB1	PT1	PT1	PT1	PT3	ACT1	
135	BUNK	CPT3 / CPT4	VB1	PT1	PT1	PT1	PT3	ACT1	
136	LAUNDRY	LVP2	VB1	PT1	PT1	PT1	PT1	ACT1	
137	BUNK	CPT3 / CPT4	VB1	PT1	PT1	PT1	PT3	ACT1	
138	OIC BUNK	CPT3 / CPT4	VB1	PT1	PT1	PT1	PT3	ACT1	
139	AIRLOCK	CPT1	VB1	PT1	PT1	PT1	PT1	ACT1	
140	APPARATUS BAYS	EPOX2	EPOX2	PT1 / PT2 / PT3 / PT5	PT1 / PT2 / PT3 / PT5	PT1 / PT2 / PT3 / PT5	PT1 / PT2 / PT3 / PT5	PT1	7
141	HOSE	EPOX2	EPOX2	PT1 / PT2 / PT3 / PT5	PT1 / PT2 / PT3 / PT5	PT1 / PT2 / PT3 / PT5	PT1 / PT2 / PT3 / PT5	PT1	7
142	WATER HEATER	EPOX2	EPOX2	PT2	PT2	PT2	PT2	PT1	
143	DECON	EPOX2	EPOX2	PT1	PT1	PT1	PT1	ACT2	EPOXY PAINT
144	SHOP	EPOX2	EPOX2	PT2	PT2	PT2	PT2	PT1	
145	ELECTRICAL	EPOX2	EPOX2	PT2	PT2	PT2	PT2	PT1	
146	TURNOUT GEAR	EPOX2	EPOX2	PT2	PT2	PT2	PT2	PT1	EXTRACTOR, TUB SINK
147	TURNOUT LAUNDRY	EPOX2	EPOX2	PT2	PT2	PT2	PT2	PT1	
148	WATER	SC	---	PT2	PT2	PT2	PT2	PT1	
149	EXERCISE	RB1	VB1	PT1	PT1	PT1	PT1	PT1	5
150	TOILET	SC	VB1	PT1	PT1	PT1	PT1	ACT1	EPOXY PAINT
201	MEZZANINE	SC	---	PT1	PT1	PT1	PT1	PT1	

GENERAL NOTES - ROOM FINISH SCHEDULE

1. CTW2 6x12 TILE (2) TILE HIGH STACKED, START AT COUNTER HEIGHT AND UP (1) ADDITIONAL TILE
2. PATTERN CONSISTS OF 80% CTW3 & 20% CTW4 RANDOMLY PLACED THROUGHOUT THE HORIZONTAL PART OF INSTALL ABOVE BORDER ACCENT
3. CTW3 (1) TILE HORIZONTALLY START AT TOP OF COUNTER
4. CTW5 ACCENT HORIZONTAL BAND TO BE (4) TILE HIGH JUST ABOVE CTW3 HORIZONTAL SINGLE TILE BAND
5. WG1, WG2, & WG3 POSSIBLE WALL GRAPHIC, NEED LEVEL 5 FINISH ON THIS WALL TO ACCEPT A VINYL WALL COVERING
6. CT2 FLOOR IN SHOWER AREA
7. WEST WALL DIAMOND PLATE A.F.F. TO 42", 2' STRIPE OF PT3, 8" BAND OF PT5, 3' STRIPE OF PT3 AND THEN UPPER WALL PT1
8. CABINETRY WALL WRAPPED IN PT3



1 / A611 FLOOR TRANSITIONS

3" = 1'-0"

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SEH

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	Checked By
Drawn By	Drawn By

Project Status	**Issue Date**
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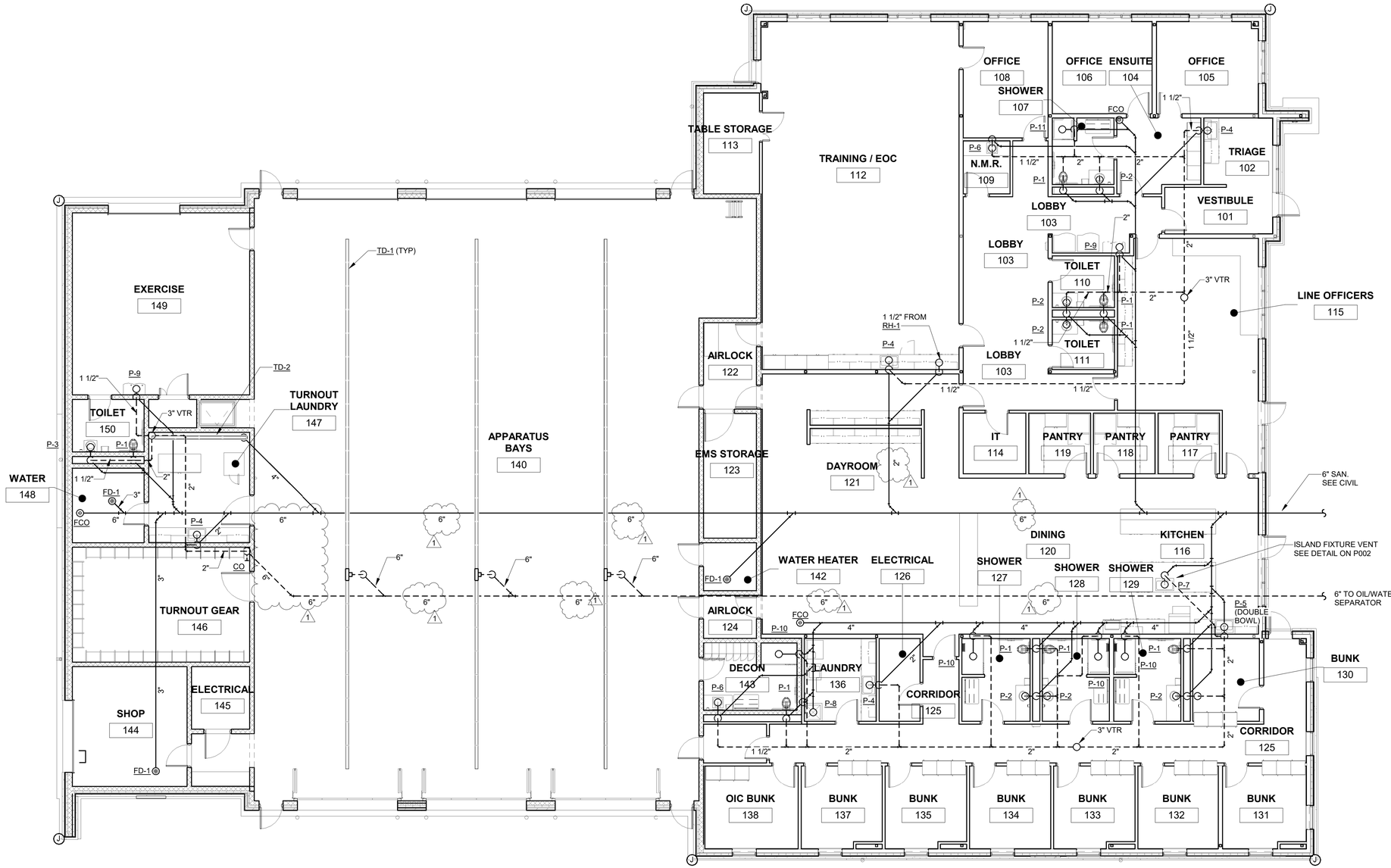
ROOM FINISH SCHEDULE

A611



1 P201 SANITARY & VENT FIRST FLOOR PLAN

1/8" = 1'-0"

1/8" = 1'-0"

0' 4' 8' 16' 32'

PROJECT NORTH

MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919

SEH

COMMONWEALTH OF VIRGINIA
CHRISTOPHER L. SNYDER
Lic. No. 046584
8-28-2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	CLS
Drawn By	WJC

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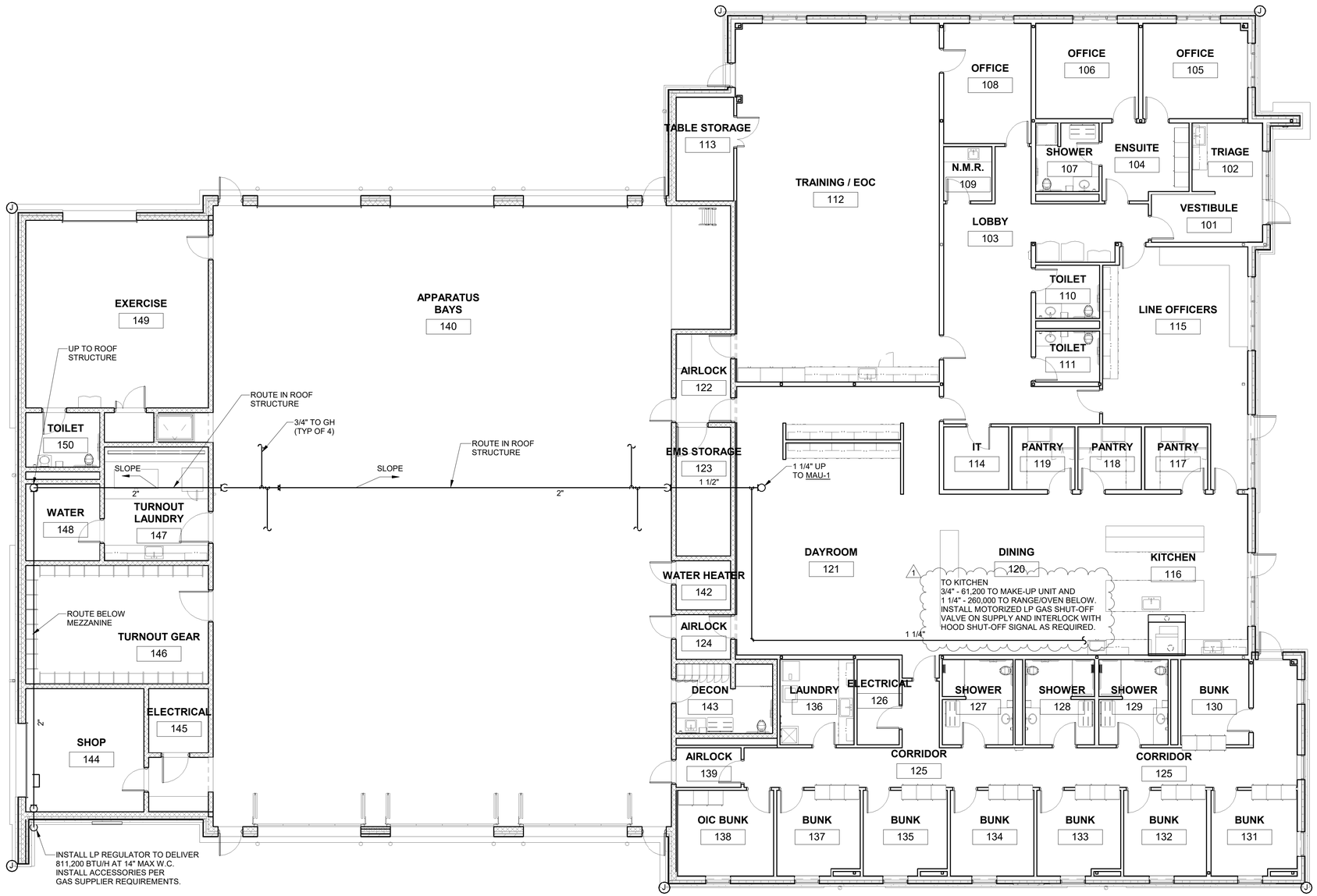
SANITARY & VENT FIRST FLOOR PLAN

P201



1 P401 GAS PIPING FIRST FLOOR PLAN

1/8" = 1'-0"

PROJECT NORTH

1/8" = 1'-0"

0' 4' 8' 16' 32'

MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919

SEH

COMMONWEALTH OF VIRGINIA
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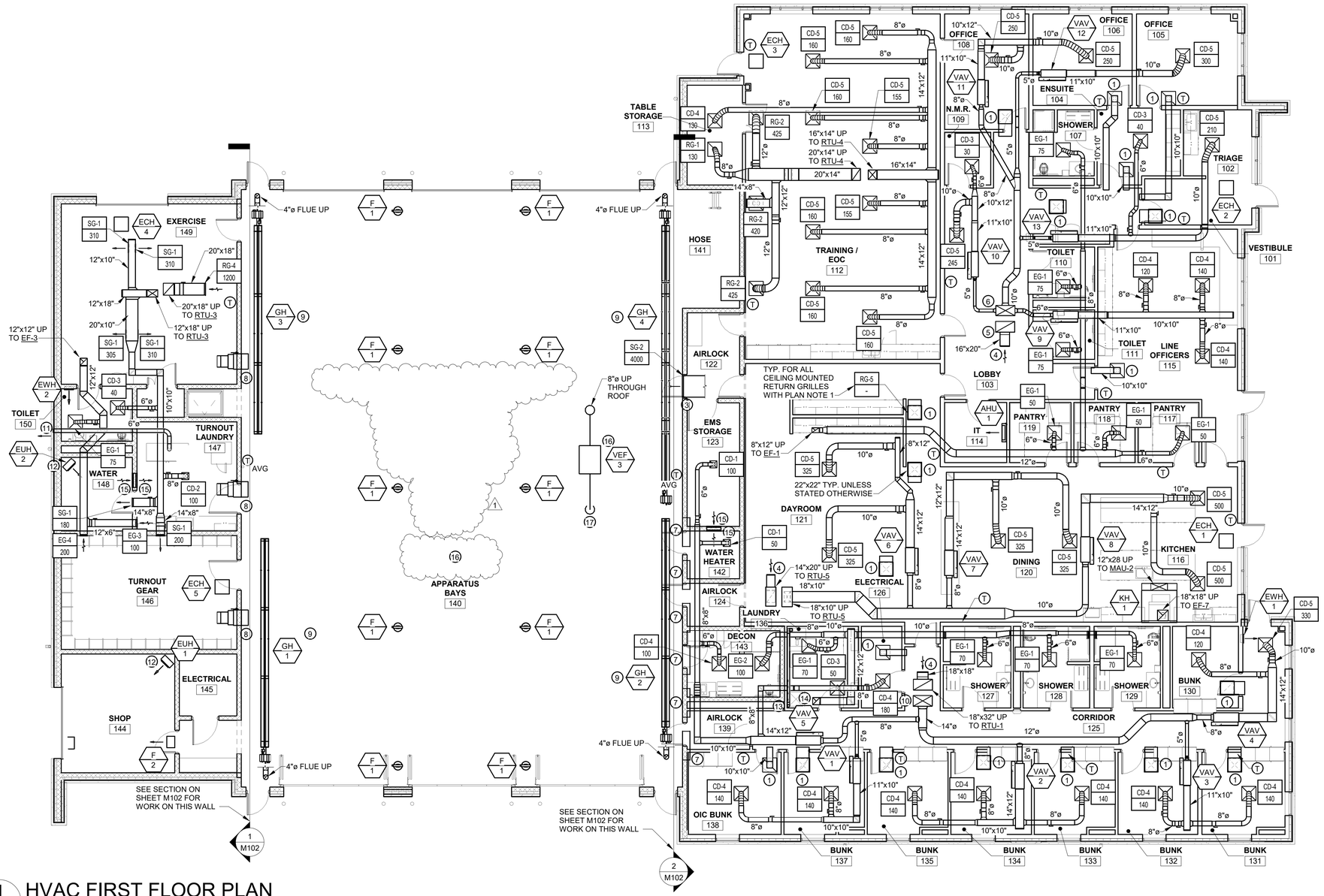
GAS PIPING FIRST FLOOR PLAN

P401



1 M101 HVAC FIRST FLOOR PLAN

1/8" = 1'-0"

PLAN NOTES

1. INSTALL LINED ELBOW (SEE DETAIL) (TYP).
2. MOUNT EUH ON WALL BRACKET AT 12' AFF.
3. 24"x24" TO MAU-1. SEE ROOF PLAN ON SHEET M103.
4. COVER OPENING WITH WMS. SEE DETAIL.
5. 18"x32" UP TO RTU-2.
6. 18"x32" UP TO RTU-2. TRANSITION IN VERTICAL TO DISCHARGE OPENING SIZE.
7. LOUVER ABOVE ROOF. SEE SECTION 2 ON SHEET M102.
8. WALL-MOUNTED EF ABOVE ROOF. SEE SECTION 1 ON SHEET M102.
9. MOUNT GAS-TUBE HEATER ON 45-DEGREE DOWNDRAFT ANGLE AWAY FROM WALL.
10. 18"x32" UP TO RTU-1.
11. PROVIDE 6"ø WALL CAP AND BACKDRAFT DAMPER FOR EXHAUST FROM DRYING CABINET IN TURNOUT LAUNDRY 147. WALL CAP SHALL BE EQUAL TO SEIHO MODEL SFX. COORDINATE FINAL LOCATION OF WALL CAP WITH ARCHITECT.
12. MOUNT EUH 7' AFF.
13. ROUTE 4"ø DRYER EXHAUST DUCT UP THROUGH ROOF AND TERMINATE WITH DRYERJACK ROOF VENT. SEE HVAC ROOF PLAN ON SHEET M103 FOR ROOF VENT MODEL AND INSTALLATION INSTRUCTIONS.
14. 12"x12" UP TO EF-2.
15. MOUNT TG-1 9' AFF. SEE AIR DISTRIBUTION SCHEDULE ON SHEET M201.
16. COORDINATE AND INSTALL VEHICLE EXHAUST EXTRACTION SYSTEM THAT IS TO BE DESIGNED BY THE EQUIPMENT SUPPLIER AS A DELEGATED DESIGN. DESIGN IS TO INCLUDE STRUCTURAL SUPPORT ROOF PENETRATION(S), POWER SUPPLY, AND CONTROLS.

PROJECT NORTH

1/8" = 1'-0"
0' 4' 8' 16' 32'

SEH

COMMONWEALTH OF VIRGINIA
CHRISTOPHER L. SNYDER
Lic. No. 046584
8-28-2025
PROFESSIONAL ENGINEER

Project Owner

MASTER ENGINEERS & DESIGNERS
558-1919
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
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Drawn By	ETO/JZP

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HVAC FIRST FLOOR PLAN

M101

ROOFTOP UNIT SCHEDULE

MARK	MODEL	SUPPLY CFM	OA CFM	FAN DRIVE	FAN HP	FAN EXT S.P. IN. W.G.	NOM COOLING TONS	NET COOLING SEN MBH	COOLING EAT db/wb	COOLING LAT db/wb	HEATER KW	HEATING EAT/LAT	V/Ph/Hz	REMARKS
RTU-1	THK072	2035	580	DIRECT	3.0	1.5	6	51.3	79.4/66.8	55.9/54.5	9	49.7/63.4	460/3/60	1,2,3,5
RTU-2	THK060	1725	425	DIRECT	3.0	1.5	5	56.9	79/65.8	55.2/53.8	6	45/55.7	460/3/60	1,2,3,5
RTU-3	THK060	1750	550	DIRECT	3.0	0.75	5	41.7	79.8/67.2	56.1/55.1	27	48.3/96	460/3/60	1,2,4,5,6
RTU-4	THK048	1400	500	DIRECT	3.0	0.75	4	34.1	78.7/65.5	54.7/53.5	18	45/84.6	460/3/60	1,2,4,5,6
RTU-5	THK072	2300	450	DIRECT	3.0	1.5	6	57.0	78.1/65.3	55.7/54.3	9	43/55.1	460/3/60	1,2,3,5

REMARKS:

1. MODEL NUMBER BASED ON TRANE.
2. PROVIDE UNIT WITH DISCONNECT, COMPARATIVE ENTHALPY ECONOMIZER, POWER EXHAUST FAN, AND SINGLE POINT POWER CONNECTION.
3. UNIT TO BE CONTROLLED USING VAV CONTROL SEQUENCE. SEE CONTROLS DRAWINGS. ELECTRIC HEATER SHALL BE CAPABLE OF SUPPLY AIR TEMPERING OPERATION.
4. UNIT TO BE CONTROLLED USING SINGLE-ZONE VAV CONTROL SEQUENCE. SEE CONTROLS DRAWINGS.
5. PROVIDE WITH MINIMUM 14FT HIGH INSULATED ROOF CURB. COORDINATE FINAL CURB HEIGHT WITH ROOF INSULATION TO ALLOW 10" BETWEEN TOP OF INSULATION AND TOP OF CURB.
6. PROVIDE WITH MODULATING HOT GAS REHEAT.

VAV BOX SCHEDULE

MARK	MODEL NUMBER	SIZE	MAX AIRFLOW (CFM)	MIN COOLING AIRFLOW (CFM)	HEATING AIRFLOW (CFM)	A.P.D. (IN W.G.)	HEATING EAT/LAT	HEATER kW	HEATER V/Ph/Hz	REMARKS
VAV-1	VCEF05	5" Ø	280	85	140	0.02	55.0/88.7	1.5	277/1/60	1,2
VAV-2	VCEF08	8" Ø	420	125	210	0.03	55.0/92.47	2.5	277/1/60	1,2
VAV-3	VCEF05	5" Ø	280	85	140	0.02	55.0/88.7	1.5	277/1/60	1,2
VAV-4	VCEF08	8" Ø	450	135	225	0.03	55.0/89.97	2.5	277/1/60	1,2
VAV-5	VCEF08	8" Ø	605	180	305	0.05	55.0/91.12	3.5	277/1/60	1,2
VAV-6	VCEF08	8" Ø	650	195	325	0.06	55.0/93.7	4.0	277/1/60	1,2
VAV-7	VCEF08	8" Ø	650	195	325	0.06	55.0/93.7	4.0	277/1/60	1,2
VAV-8	VCEF10	10" Ø	1000	300	500	0.03	55.0/95.9	6.5	277/1/60	1,2
VAV-9	VCEF06	6" Ø	400	120	200	0.14	55.0/94.3	2.5	277/1/60	1,2
VAV-10	VCEF05	5" Ø	275	85	140	0.02	55.0/88.7	1.5	277/1/60	1,2
VAV-11	VCEF08	8" Ø	500	150	250	0.04	55.0/92.7	3.0	277/1/60	1,2
VAV-12	VCEF05	5" Ø	300	90	150	0.02	55.0/86.4	1.5	277/1/60	1,2
VAV-13	VCEF05	5" Ø	250	75	125	0.02	55.0/92.4	1.5	277/1/60	1,2

REMARKS:

1. MODEL NUMBER BASED ON TRANE.
2. PROVIDE 1-INCH FOIL-FACED INSULATION, DISCONNECT, POWER FUSES, AND SCR HEAT CONTROLLER.

AIR DISTRIBUTION SCHEDULE

MARK	MODEL	NECK SIZE	MOUNTING	MATERIAL	COLOR	MAX NC	REMARKS
CD-1	SCD	6"ø	DUCT	ALUMINUM	WHITE	25	1
CD-2	SCD	8"ø	DUCT	ALUMINUM	WHITE	25	1
CD-3	SCD	6"ø	LAY-IN	ALUMINUM	WHITE	25	1,2
CD-4	SCD	8"ø	LAY-IN	ALUMINUM	WHITE	25	1,2
CD-5	SCD	10"ø	LAY-IN	ALUMINUM	WHITE	25	1,2
EG-1	PDDR	6"ø	LAY-IN	ALUMINUM	WHITE	25	1,2
EG-2	PDDR	8"ø	LAY-IN	ALUMINUM	WHITE	25	1,2
EG-3	630	12"x6"	WALL/DUCT	ALUMINUM	WHITE	25	1,3
EG-4	630	12"x12"	WALL	ALUMINUM	WHITE	25	1,3
RG-1	PDDR	8"ø	LAY-IN	ALUMINUM	WHITE	25	1,2
RG-2	PDDR	12"ø	LAY-IN	ALUMINUM	WHITE	25	1,2
RG-3	PDDR	10"x10"	LAY-IN	ALUMINUM	WHITE	25	1,2
RG-4	530	20"x18"	DUCT	ALUMINUM	WHITE	25	1,3
RG-5	PDDR	22"x22"	LAY-IN	ALUMINUM	WHITE	25	1,2
SG-1	510	14"x8"	DUCT	ALUMINUM	WHITE	25	1,3
SG-2	150	36"x24"	WALL	ALUMINUM	WHITE	25	1,4,5
TG-1	ATG1	24"x10"	WALL	ALUMINUM	WHITE	25	1

REMARKS:
1. MODEL NUMBER BASED ON PRICE INDUSTRIES.
2. WITH 24"x24" GRILLE OR DIFFUSER.
3. PROVIDE WITH OPPOSED BLADE DAMPER.
4. PROVIDE WITH HEAVT DUTY COATED STELL OPPOSED BLADE DAMPER.
5. ADJUST GRILLE TO 45-DEGREE DOWNTURN ANGLE.

MAKE-UP AIR UNIT SCHEDULE

MARK	MODEL	SUPPLY CFM	OA CFM	FAN DRIVE	FAN HP	FAN EXT S.P. IN. W.G.	HEATING INPUT MBH	HEATING OUTPUT MBH	HEATING EAT/LAT	NOM COOLING TONS	COOLING SEN MBH	COOLING EAT db/wb	COOLING LAT db/wb	LP GAS PRESSURE (IN. W.G.)	V/Ph/Hz	REMARKS
MAU-1	GRAA250	4000	4000	BELT	3 HP	0.5	250	200	10.0/56.0	-	-	-	-	11 - 14	460/3/60	1,2,3
MAU-2	CAS-HVAC1-I.75-18-3T-MPU	720	720	DIRECT	1 HP	0.5	61.2	49.6	-	3.2	14.6	80.1/75.1	60.6/59.7	11 - 14	460/3/60	4

REMARKS:

1. MODEL NUMBER BASED ON TRANE.
2. PROVIDE WITH DISCONNECT, 409 STAINLESS STEEL HEAT EXCHANGE, 2 POSITION OA DAMPER, 2 STAGE LP GAS VALVE, AND FAU CONTACTOR.
3. PROVIDE WITH MINIMUM 14 FT HIGH INSULATED ROOF CURB. COORDINATE FINAL CURB HEIGHT WITH ROOF INSULATION TO ALLOW 10" BETWEEN TOP OF INSULATION AND TOP OF CURB.
4. MODEL NUMBER BASED ON CAPTIVEAIR.

LOUVER SCHEDULE

MARK	MODEL	DUTY	AIRFLOW	SIZE	PRESSURE DROP IN W.C.	REMARKS
L-1	EACA-601	AS APPLIES, SEE SEQUENCE	4000	84"x36"	0.022	1,2

REMARKS:

1. MODEL NUMBER BASED ON GREENHECK.
2. PROVIDE WITH 24V MOTORIZED DAMPER, INSECT SCREEN, AND DRAINABLE BLADES.
3. MANUFACTURER'S STANDARD FINISH. COLOR TO BE SELECTED BY ARCHITECT.

KITCHEN HOOD SCHEDULE

MARK	MODEL	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S) WIDTH	LENGTH	HEIGHT	DIA	CFM	VELOCITY (FPM)	S.P. IN. W.G.	TOTAL SUPPLY CFM	HOOD CONSTRUCTION	HOOD CONFIGURATION END TO END	HOOD CONFIGURATION ROW	REMARKS
KH-1	5424 ND-2-PSP-F	4'-0"	600 DEG	I	HEAVY	225	900	-	-	4"	10"	900	1650	-0.551	780	430 SS WHERE EXPOSED	ALONE	ALONE	1,2,3,4

REMARKS:

1. MODEL NUMBER BASED ON CAPTIVEAIRE.
2. WITH TWO (2), 20" X 20", 85% EFFICIENT CAPATRATE SOLO FILTERS.
3. WITH ONE (1) LIGHT TO BE RECESSED ROUND AND WITH NO WIRE GUARD.
4. WITH RIGHT SIDE, 12" X 54" X 24" UTILITY CABINET, INCLUDING A SIZE 4.0 TYPE TANK FS FIRE SYSTEM.

FAN SCHEDULE

MARK	MODEL NUMBER	CFM	SP in Wg	WATTS/HP	SONES	DRIVE	RPM	V/Ph/Hz	REMARKS
EF-1	G-090-VG	375	0.5	1/10 HP	7.9	DIRECT	1590	277/1/60	1,2,5
EF-2	G-090-VG	380	0.5	1/6 HP	8.6	DIRECT	1683	277/1/60	1,2,5
EF-3	G-099-VG	375	0.5	1/4 HP	8.2	DIRECT	1323	277/1/60	1,2,5
EF-4	AER-30-VGD	4000	0.15	3/4 HP	13.2	DIRECT	766	460/3/60	1,3
EF-5	AER-30-VGD	4000	0.15	3/4 HP	13.2	DIRECT	766	460/3/60	1,3
EF-6	AER-30-VGD	4000	0.15	3/4 HP	13.2	DIRECT	766	460/3/60	1,3
EF-7	DU85HFA	900	0.750	3/4 HP	6.4	DIRECT	1016	230/1/60	7

REMARKS:

1. MODEL NUMBERS BASED ON GREENHECK.
2. PROVIDE WITH INSULATED ROOF CURB, BACKDRAFT DAMPER, PREWIRED DISCONNECT SWITCH, AND UNIT MOUNTED SPEED CONTROLLER.
3. PROVIDE WITH WALL SLEEVE, 0-10 VDC CONTROL INPUT, DISCONNECT SWITCH, ALUMINUM 45 DEGREE WEATHERHOOD WITH BIRDSCREEN, AND 24V ISOLATION DAMPER.
4. PROVIDE WITH WALL BRACKET.
5. PROVIDE WITH MINIMUM 14FT HIGH INSULATED ROOF CURB. COORDINATE FINAL CURB HEIGHT WITH ROOF INSULATION TO ALLOW 10" BETWEEN TOP OF INSULATION AND TOP OF CURB.
6. F-1 QUANTITY IS TEN FANS. COORDINATE FINAL LOCATION WITH OVERHEAD DEVICES AND OWNER.
7. MODEL NUMBER BASED ON CAPTIVEAIR.

ELECTRIC UNIT HEATER SCHEDULE

MARK	MODEL	CFM	WATTS	V/Ph/Hz	REMARKS
EUH-1	GIG5103N	400	3300	277/1/60	1,2
EUH-2	GIG5103N	400	3300	277/1/60	1,2

REMARKS:

1. MODEL NUMBER BASED ON MARKEL.
2. PROVIDE DISCONNECT, LINE VOLTAGE THERMOSTAT, AND WALL BRACKET.

ELECTRIC WALL HEATER SCHEDULE

MARK	MODEL	CFM	WATTS	V/Ph/Hz	REMARKS
EWH-1	G3422T	245	2000 W	277/1/60	1,2
EWH-2	G3422T	245	2000 W	277/1/60	1,2

REMARKS:

1. MODEL NUMBER BASED ON MARKEL.
2. PROVIDE INTEGRAL THERMOSTAT, DISCONNECT, AND SURFACE MOUNTED WALL BOX.

AIR HANDLING UNIT SCHEDULE

MARK	AREA SERVED	MODEL NUMBER	FAN CFM	FAN W/HP	NOM COOLING TONS	COOLING SEN MBH	COOLING EAT db/wb	V/Ph/Hz	REMARKS
AHU-1	IT 114	MSY-GX09NL	256	30 W	0.75	6.9	80/67	208-230/1/60	1,2,3

REMARKS:

1. MODEL NUMBER BASED ON MITSUBISHI.
2. PROVIDE WITH CONDENSATE PUMP AND ROUTE CONDENSATE TO SPLASHBLOCK IN APPROVED LOCATION BY ARCHITECT.
3. UNIT WAS SELECTED BASED ON PRELIMINARY KNOWLEDGE OF EQUIPMENT IN IT 114. ONCE EQUIPMENT SERVING IT 114 IS FINALIZED AND PROVIDED, UNIT SHALL BE RESELECTED BY MASTER ENGINEERS & DESIGNERS.

VEHICLE EXHAUST FAN SCHEDULE

1

MARK	MODEL NUMBER	CFM	SP in Wg	WATTS/HP	SONES	DRIVE	RPM	V/Ph/Hz	REMARKS
VEF-3									1

REMARKS:

1. VEHICLE EXHAUST EQUIPMENT SHALL BE SELECTED ONCE SUFFICIENT DATA HAS BEEN PROVIDED. PLANS SHOW ROUGH LOCATION OF FANS AND THEIR EXHAUST DUCT TERMINATIONS. IF NO SUFFICIENT DATA CAN BE PROVIDED, DESIGN OF VEHICLE EXHAUST SHALL BE DONE THROUGH DELEGATED DESIGN.

ELECTRIC CEILING HEATER SCHEDULE

MARK	MODEL	CFM	WATTS	V/Ph/Hz	REMARKS
ECH-1	CP702	-	250	277/1/60	1,2
ECH-2	CP702	-	250	277/1/60	1,2
ECH-3	CP702	-	250	277/1/60	1,2
ECH-4	CP702	-	250	277/1/60	1,2
ECH-5	CP702	-	250	277/1/60	1,2

REMARKS:

1. MODEL NUMBER BASED ON MARKEL.
2. CEILING HEATER TO MOUNT IN NOMINAL 2X2 CEILING GRID.

INFRARED HEATER SCHEDULE

MARK	MODEL	BTUH	V/Ph/Hz	REMARKS
GH-1	LTS-60	60000	115/1/60	1,2
GH-2	LTS-60	60000	115/1/60	1,2
GH-2	LTS-60	60000	115/1/60	1,2
GH-3	LTS-60	60000	115/1/60	1,2
GH-4	LTS-60	60000	115/1/60	1,2

REMARKS:

1. MODEL NUMBER BASED ON SPACE RAY.
2. PROVIDE WITH DIRECT VENT KIT, HANGING CHAINS, 2 STAGE CONTROL VALVE, AND FLUE TERMINATION.

HEAT PUMP SCHEDULE

MARK	MODEL NUMBER	NOM COOLING TONS	SYSTEM SERVED	V/Ph/Hz	REMARKS
HP-1	MUY-GX09NL	0.75	AHU-1	208-230/1/60	1,2,3,4

REMARKS:

1. MODEL NUMBER BASED ON MITSUBISHI.
2. PROVIDE LOW AMBIENT COOLING KIT FOR OPERATION DOWN TO 0 DEG. F.
3. PROVIDE HAIL GUARD.
4. PROVIDE WITH ZERO PENETRATION EQUIPMENT SUPPORT.

SEH

COMMONWEALTH OF VIRGINIA
CHRISTOPHER L. SNYDER
Lic. No. 046584
8-28-2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	CLS
Drawn By	ETO/JZP

Project Status	Issue Date
CONSTRUCTION DOCUMENTS	8/28/2025

REVISION SCHEDULE

REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

HVAC SCHEDULES

MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919

M201

CONTROLS LEGEND

SYMBOLS

AI	ANALOG INPUT (0-10, 1-5V, 4-20 mA OR THE LIKE)
AO	ANALOG OUTPUT (0-10, 1-5V, 4-20 mA OR THE LIKE)
DI	DIGITAL INPUT (2-STATE, ON/OFF)
DO	DIGITAL OUTPUT (2-STATE, ON/OFF)
JS	MOTOR STARTER
RH	RELATIVE HUMIDITY
VFD	VARIABLE FREQUENCY DRIVE
SP	STATIC PRESSURE SENSOR
CSS	CURRENT SENSING SWITCH
EH	ELECTRIC HEAT
M	MOTORIZED ACTUATOR
M	MOTOR
TT	TEMPERATURE TRANSMITTER
SD	SMOKE DETECTOR
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
SCR	SILICON CONTROLLED RECTIFIER

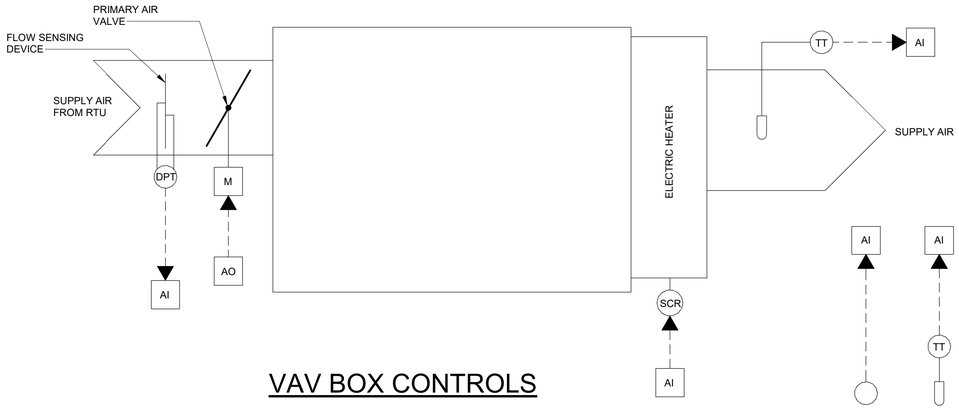
ABBREVIATIONS

(ADJ)	ADJUSTABLE
ASC	APPLICATION SPECIFIC CONTROLLER
DEG. F	DEGREES FAHRENHEIT
DX	DIRECT EXPANSION
FA	FIRE ALARM
NSB	NIGHT SET BACK
RH	RELATIVE HUMIDITY
S/S	START/STOP
TEMP	TEMPERATURE

CONTROLS GENERAL NOTES

1. WHERE SEQUENCE OF OPERATION INDICATE OCCUPIED AND UNOCCUPIED MODES OF OPERATION, IT IS ONLY TO INDICATE THAT CAPABILITY IS TO BE INCLUDED EVEN THOUGH IT IS ANTICIPATED THAT THE ENTIRE BUILDING COULD BE OCCUPIED IN ALL AREAS AT ALL TIMES.

1



VAV BOX CONTROLS

SEQUENCE OF OPERATION

OCCUPIED MODE:

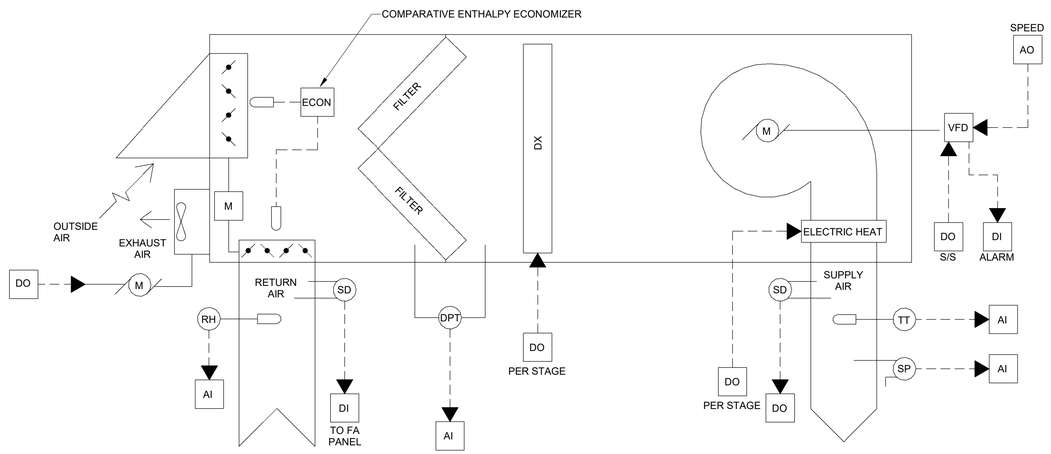
THE ASC SHALL MODULATE THE PRIMARY AIR VALVE TO MAINTAIN COOLING SETPOINT. AS TEMPERATURE IN THE SPACE AS SENSED BY THE SPACE TEMPERATURE ELEMENT CONTINUES TO DROP, THE ASC SHALL MODULATE THE PRIMARY AIR VALVE TO THE HEATING SETPOINT AND ENABLE THE ELECTRIC HEATING COIL. THE ELECTRIC HEATING COIL SCR SHALL MODULATE THE OUTPUT OF THE HEATING COIL TO MAINTAIN THE SPACE TEMPERATURE AT THE HEATING SETPOINT.

SETPOINTS:
COOLING = 75°F (ADJ)
HEATING = 70°F (ADJ)

UNOCCUPIED MODE:

SPACE OCCUPANTS MAY OVERRIDE UNOCCUPIED MODE BY DEPRESSING THE OVERRIDE PUSHBUTTON ON EACH SPACE TEMPERATURE SENSOR. WHEN DEPRESSED, THE VAV BOX SHALL CHANGE TO OCCUPIED MODE. IF COOLING IS REQUIRED, THE DDC SYSTEM SHALL START THE ASSOCIATED RTU IN UNOCCUPIED MODE. WHEN ENABLED IN UNOCCUPIED COOLING MODE, ALL ASSOCIATED VAV BOXES SHALL OPEN TO 100% UNTIL ALL ZONES FALL BELOW THE UNOCCUPIED COOLING SETPOINT MINUS 3 DEG. F. (ADJ). WHEN ENABLED IN UNOCCUPIED HEATING MODE, ALL ASSOCIATED VAV BOXES SHALL OPEN TO 100% UNTIL ALL ZONES RISE ABOVE THE UNOCCUPIED HEATING SETPOINT PLUS 3 DEG. F. (ADJ). CHANGE TO UNOCCUPIED MODE SHALL OCCUR AFTER ADJUSTABLE TIME PERIOD. INITIAL SETPOINT = 1 HOURS (ADJ).

SETPOINTS:
COOLING = 82°F (ADJ)
HEATING = 64°F (ADJ)



RTU-1, 2 AND 5 CONTROLS

SEQUENCE OF OPERATION

ALL MODES:

ALL CONTROL FUNCTIONS INDICATED IN THIS SEQUENCE OF OPERATION SHALL BE ACCOMPLISHED BY AN APPLICATION SPECIFIC CONTROLLER WHICH IS CONNECTED TO THE DDC CONTROL SYSTEM. COMMUNICATION POINTS ARE LISTED AT THE END OF THIS SEQUENCE OF OPERATION.

OCCUPIED MODE:

RTUS SHALL BE OCCUPIED BASED ON A USER-DEFINED SCHEDULE, EXCEPT RTU-1 WHICH SHALL OPERATE CONTINUOUSLY. PROVIDE OPTIMUM START AND OPTIMUM STOP CONTROLS. THE ASC SHALL COMMAND THE RTU TO START IN THE OCCUPIED MODE. THE RTU CONTROLLER SHALL COMMAND THE SUPPLY FAN TO RUN. THE ASC SHALL COMMAND THE ZONE-RELATED EXHAUST FANS TO RUN BASED ON THE SAME USER PROGRAMMABLE OCCUPANCY SCHEDULE. WHEN OCCUPIED, THE UNIT SUPPLY FAN SHALL RUN CONTINUOUSLY. THE SUPPLY FAN SPEED SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR STATIC PRESSURE AT THE STATIC PRESSURE SETPOINT OF 0.75" (ADJ).

THE ASC SHALL ENABLE STAGES OF COOLING AND ENABLE STAGES OF ELECTRIC HEATING TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT 55 DEG. F. (ADJ). THE ASC SHALL MONITOR THE SPACE TEMPERATURE AND POSITION OF EACH AIR VALVE CONNECTED TO THE RTU. WHEN IN COOLING MODE, THE ASC SHALL RESET THE RTU LEAVING AIR TEMPERATURE TO MAINTAIN THE MOST-OPEN AIR VALVE ASSOCIATED WITH THE RTU TO BETWEEN 90-100% OPEN, TO A MAXIMUM OF 60 DEGREES F LEAVING AIR TEMPERATURE (ADJ).

UNOCCUPIED MODE:

THE ASC SHALL DISABLE THE RTU BASED ON A USER PROGRAMMABLE OCCUPANCY SCHEDULE. WHEN IN UNOCCUPIED MODE, THE UNIT MOUNTED CONTROLLER SHALL DISABLE THE SUPPLY FAN AND ALL ASSOCIATED EXHAUST FANS IN THE SPACE, AND SHALL CLOSE THE OUTSIDE AIR DAMPER.

WHEN ENABLED, BASED ON THE ASSOCIATED ZONE TEMPERATURE SENSORS, THE ASC SHALL COMMAND THE RTU TO START IN THE UNOCCUPIED MODE. THE RTU CONTROLLER SHALL COMMAND THE SUPPLY FAN TO RUN. THE ZONE-RELATED EXHAUST SHALL REMAIN DISABLED IN THE UNOCCUPIED MODE. WHEN ENABLED, THE UNIT SUPPLY FAN SHALL RUN CONTINUOUSLY. THE SUPPLY FAN SPEED SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR STATIC PRESSURE AT THE STATIC PRESSURE SETPOINT OF 0.75" (ADJ).

THE ASC SHALL ENABLE STAGES OF COOLING AND ENABLE THE ELECTRIC HEAT TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT 55 DEG. F. (ADJ) IN COOLING MODE, AND 90 DEG. F. (ADJ) IN HEATING MODE. THE UNIT OUTSIDE AIR DAMPER SHALL REMAIN CLOSED IN THE UNOCCUPIED MODE.

ALL MODES:

THE ASC SHALL ANNUNCIATE THE FILTER CHANGE STATUS BASED ON THE FILTER PRESSURE DROP COMPARED TO A PRE-PROGRAMMED SETPOINT (ADJ).

POINTS COMMUNICATED TO/FROM THE DDC SYSTEM:

ENABLE/DISABLE	DO
DISCHARGE TEMPERATURE	AI
COMPRESSOR ENABLE (PER STAGE)	DO
ALARM	DI
DIRTY FILTERS	AI
ELECTRIC HEAT	DO
EXHAUST FAN	DO
RETURN AIR HUMIDITY	AI
SUPPLY FAN VFD SPEED	AO
SUPPLY FAN VFD ALARM	DI
SUPPLY FAN START/STOP	DO

ECONOMIZER:

A UNIT-MOUNTED CONTROLLER SHALL CONTINOUSLY MONITOR THE RETURN AIR AND OUTSIDE AIR ENTHALPY CONDITIONS. WHEN CONDITIONS ARE APPROPRIATE (AS DETERMINED BY THE CONTROLLER) THE CONTROLLER SHALL OPEN THE OUTSIDE AIR DAMPER AND CLOSE THE RETURN AIR DAMPER TO MAINTAIN THE DISCHARGE AIR SETPOINT. WHEN THE OUTSIDE AIR DAMPER IS OPEN GREATER THAN 30% (ADJ), THE EXHAUST FAN SHALL START AND OPERATE CONTINUOUSLY.

558-1919
MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351

SEH

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Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
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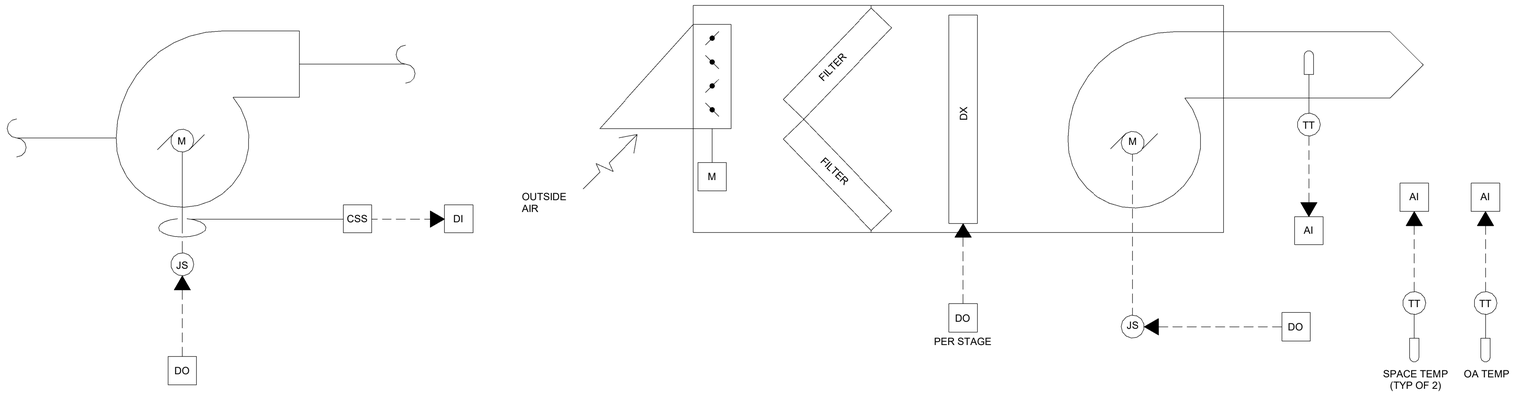
Project Status	Issue Date
CONSTRUCTION DOCUMENTS	8/28/2025

REVISION SCHEDULE

REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

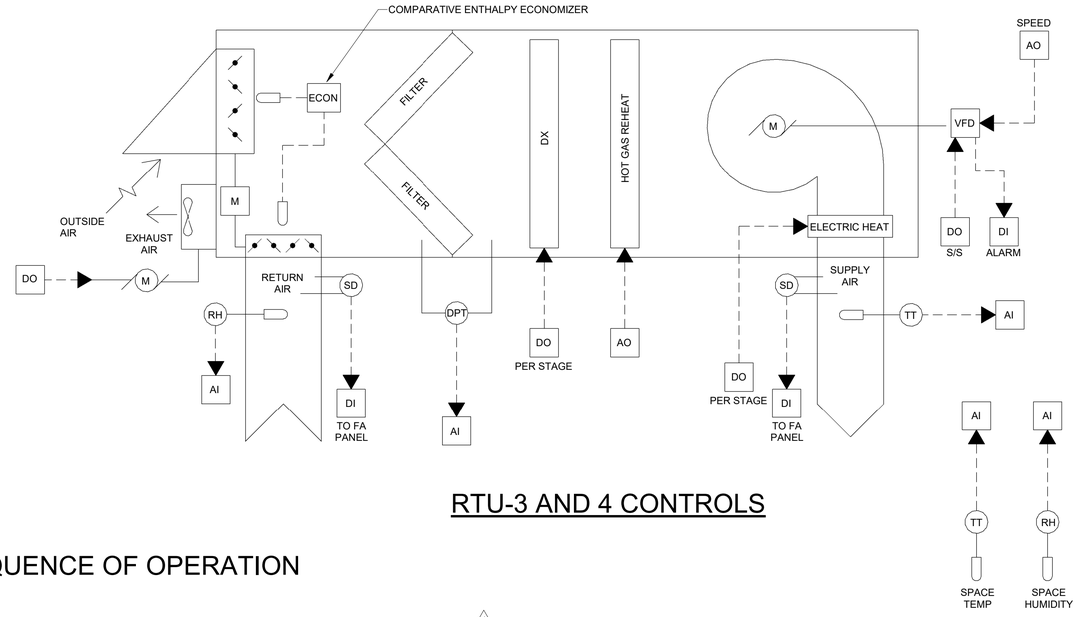
HVAC CONTROLS PART 1

M401



EF CONTROLS

MAU-1 CONTROLS



RTU-3 AND 4 CONTROLS

SEQUENCE OF OPERATION

THE BUILDING EXHAUST FANS SHALL BE CONTROLLED BY THE DDC SYSTEM. BASED ON THE OWNER-SPECIFIED OCCUPANCY SCHEDULE, ALL EXHAUST FANS SHALL BE ENABLED IN THE OCCUPIED MODE.

WHEN UNOCCUPIED, THE DDC SYSTEM SHALL DISABLE THE BUILDING EXHAUST FANS. WHEN OCCUPIED, THE DDC SYSTEM SHALL ENABLE AND MONITOR THE OPERATION OF THE FANS THROUGH CURRENT SENSING SWITCHES. IF A FAN IS ENABLED AND THE CURRENT SENSING SWITCH IS NOT ACTIVATED, THE DDC SYSTEM SHALL ANNUNCIATE AN ALARM AT THE OPERATOR'S WORKSTATION.

APPARATUS BAY CONTROL:

THE CONTROLS FOR THE APPARATUS BAY SHALL BE ENABLED CONTINUOUSLY.

MAU-1 SHALL BE ENABLED CONTINUOUSLY. WHEN ENABLED, THE MAU-1 SUPPLY FAN SHALL START AND OPERATE CONTINOUSLY. MAU-1 SHALL ENABLE GAS HEATING OPERATION BASED ON THE SPACE TEMPERATURE OF THE APPARATUS BAY, AS MEASURED THROUGH TWO AVERAGING TEMPERATURE SENSORS. WHEN THE AVERAGE SPACE TEMPERATURE FALLS BELOW THE ACTIVE HEATING SETPOINT OF 55 DEGREES F (ADJ), MAU-1 SHALL START AND ENABLE THE STAGES OF THE LP HEATING SECTION TO MAINTAIN THE SPACE AT SETPOINT. WHEN THE LP HEATING SECTION OF MAU-1 IS ENABLED, THE DESTRATIFICATION FANS (F-1) SHALL BE ENABLED. ON A FURTHER FALL IN THE AVERAGE SPACE TEMPERATURE BELOW THE ACTIVE HEATING SETPOINT, THE FOUR RADIANT TUBE HEATERS SHALL BE ENABLED, IN SEQUENCE, AT LOW FIRE. ON A FURTHER FALL IN SPACE TEMPERATURE BELOW SETPOINT, THE FOUR RADIANT TUBE HEATERS SHALL BE SWITCHED TO HIGH FIRE, IN SEQUENCE. THE REVERSE ACTIONS SHALL OCCUR ON A RISE IN THE AVERAGE SPACE TEMPERATURE ABOVE THE ACTIVE HEATING SETPOINT. THE INTAKE LOUVERS SHALL MODULATE TO MAINTAIN 0.05"/WG (ADJ) IN THE BAY WHEN MAU-1 IS OPERATING TO SERVE AS RELIEF AIR PATH DURING HEATING MODE AND THE SIDEWALL EXHAUST FANS SHALL REMAIN DISABLED DURING HEATING MODE.

ON A RISE IN THE AVERAGE SPACE TEMPERATURE ABOVE THE ACTIVE COOLING SETPOINT OF 80 DEGREES F (ADJ), THE SIDEWALL EXHAUST FANS SHALL BE ENABLED, IN SEQUENCE. UPON THE ACTIVATION OF A SIDEWALL EXHAUST FAN, ALL LOUVERS IN THE OPPOSITE SIDEWALL SHALL BE FULLY OPENED. DURING COOLING MODE, THE MAU-1 LP HEATER, ALL DESTRATIFICATION FANS, AND ALL RADIANT TUBE HEATERS SHALL BE DISABLED.

1

SEQUENCE OF OPERATION

ALL MODES:

ALL CONTROL FUNCTIONS INDICATED IN THIS SEQUENCE OF OPERATION SHALL BE ACCOMPLISHED BY AN APPLICATION SPECIFIC CONTROLLER WHICH IS CONNECTED TO THE DDC CONTROL SYSTEM. COMMUNICATION POINTS ARE LISTED AT THE END OF THIS SEQUENCE OF OPERATION.

OCCUPIED MODE:

RTUS SHALL BE OCCUPIED BASED ON A USER-DEFINED SCHEDULE. PROVIDE OPTIMUM START AND OPTIMUM STOP CONTROLS. THE ASC SHALL COMMAND THE RTU TO START IN THE OCCUPIED MODE. THE RTU CONTROLLER SHALL COMMAND THE SUPPLY FAN TO RUN. THE ASC SHALL COMMAND THE ZONE-RELATED EXHAUST FANS TO RUN BASED ON THE SAME USER PROGRAMMABLE OCCUPANCY SCHEDULE. WHEN OCCUPIED, THE UNIT SUPPLY FAN SHALL RUN CONTINUOUSLY. THE SUPPLY FAN SPEED SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE AT SETPOINT.

THE ASC SHALL ENABLE STAGES OF COOLING AND ENABLE THE ELECTRIC HEAT AS REQUIRED TO MAINTAIN THE SPACE AT THE OCCUIED HEATING AND COOLING SETPOINTS OF 70 DEG. F. (ADJ) HEATING AND 75 DEG. F. (ADJ) COOLING IN THE ASSOCIATED VAV BOXES.

WHEN NOT IN HEATING MODE, IF THE ASC SENSES THAT THE SPACE HUMIDITY IS ABOVE THE ACTIVE HUMIDITY SETPOINT OF 60% (ADJ), THE ASC SHALL ENABLE THE UNIT COMPRESSOR AND SHALL MODULATE THE HOT GAS REHEAT VALVE TO MAINTAIN THE SPACE TEMPERATURE AT SETPOINT. THIS DEHUMIDIFICATION MODE SHALL BE TERMINATED WHEN THE SPACE HUMIDITY FALLS BELOW 55% (ADJ).

UNOCCUPIED MODE:

1

THE ASC SHALL DISABLE RTU-4 BASED ON A USER PROGRAMMABLE OCCUPANCY SCHEDULE. WHEN IN UNOCCUPIED MODE, THE UNIT MOUNTED CONTROLLER SHALL DISABLE THE SUPPLY FAN AND ALL ASSOCIATED EXHAUST FANS IN THE SPACE, AND SHALL CLOSE THE OUTSIDE AIR DAMPER.

WHEN ENABLED, BASED ON THE ASSOCIATED ZONE TEMPERATURE SENSORS, THE ASC SHALL COMMAND THE RTU TO START IN THE UNOCCUPIED MODE. THE RTU CONTROLLER SHALL COMMAND THE SUPPLY FAN TO RUN. THE ZONE-RELATED EXHAUST FANS SHALL REMAIN DISABLED IN THE UNOCCUPIED MODE. THE SUPPLY FAN SPEED SHALL MODULATE TO FULL DESIGN AIRFLOW.

THE ASC SHALL ENABLE STAGES OF COOLING AND ENABLE THE ELECTRIC HEAT TO MAINTAIN THE SPACE TEMPERATURE AT 65 DEG. F. (ADJ) IN HEATING MODE, AND 80 DEG. F. (ADJ) IN COOLING MODE. THE UNIT OUTSIDE AIR DAMPER SHALL REMAIN CLOSED IN THE UNOCCUPIED MODE.

RTU-3 AND EF-3 SHALL OPERATE IN OCCUPIED MODE AT ALL TIMES.

1

ALL MODES:

THE ASC SHALL ANNUNCIATE THE FILTER CHANGE STATUS BASED ON THE FILTER PRESSURE DROP COMPARED TO A PRE-PROGRAMMED SETPOINT (ADJ).

POINTS COMMUNICATED TO/FROM THE DDC SYSTEM:

ENABLE/DISABLE	DO
DISCHARGE TEMPERATURE	AI
COMPRESSOR ENABLE (PER STAGE)	DO
ALARM	DI
DIRTY FILTERS	AI
ELECTRIC HEAT (PER STAGE)	DO
EXHAUST FAN	DO
RETURN AIR HUMIDITY	AI
SUPPLY FAN VFD SPEED	AO
SUPPLY FAN VFD ALARM	DI
SUPPLY FAN START/STOP	DO

ECONOMIZER:

A UNIT-MOUNTED CONTROLLER SHALL CONTINOUSLY MONITOR THE RETURN AIR AND OUTSIDE AIR ENTHALPY CONDITIONS. WHEN CONDITIONS ARE APPROPRIATE (AS DETERMINED BY THE CONTROLLER) THE CONTROLLER SHALL OPEN THE OUTSIDE AIR DAMPER AND CLOSE THE RETURN AIR DAMPER TO MAINTAIN THE DISCHARGE AIR SETPOINT. WHEN THE OUTSIDE AIR DAMPER IS OPEN GREATER THAN 30% (ADJ), THE EXHAUST FAN SHALL START AND OPERATE CONTINUOUSLY.

MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919

SEH

COMMONWEALTH OF VIRGINIA
CHRISTOPHER L. SNYDER
Lic. No. 046584
8-28-2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	CLS
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HVAC CONTROLS PART 2

M402

RACEWAY

- CONDUIT RUN EXPOSED.
- CONDUIT RUN CONCEALED ABOVE CEILINGS OR IN WALLS
- CONDUIT RUN CONCEALED BENEATH FLOORS, IN WALLS OR, IF OUTDOORS, BELOW GRADE
- CONDUIT TURNING UP
- CONDUIT TURNING DOWN
- HOMERUN
- (J) JUNCTION BOX

OVERCURRENT DEVICES

- F SAFETY SWITCH, FUSIBLE, NON-FUSIBLE (NEMA 1 INDOORS, NEMA 3R OUTDOORS)

MOTOR STARTERS

- STARTER, COMBINATION MAGNETIC, FUSIBLE
- M STARTER, MANUAL (NEMA 1 INDOORS, NEMA 3R OUTDOORS)

WIRING DEVICES

- RECEPTACLE, SINGLE, NEMA 5-20R
- RECEPTACLE, DUPLEX, NEMA 5-20R
- RECEPTACLE, DUPLEX, NEMA 5-20R, GFI
- RECEPTACLE, SPECIAL
- TV BOX
- FLOOR BOX, DUPLEX NEMA 5-20R RECEPTACLE AND DATA (NOTE 2)
- CR CORD REEL

LIGHTING (NOTE 4)

- A FIXTURE, SUSPENDED OR RECESSED LAY-IN
- A FIXTURE, BRACKET MOUNTED
- A FIXTURE, RECESSED CAN OR PENDANT
- A FIXTURE, WALL MOUNTED
- X X EXIT SIGN, UNSWITCHED, SINGLE-FACED, DOUBLE-FACED. ARROWS AS INDICATED ON DRAWING. (NOTE 3)

LIGHTING CONTROL DEVICES (NOTE 1)

- OSDT MS-A102-WH DUAL TECHNOLOGY SENSOR SWITCH
- P2 PJ2-2B-GWH-LO1 (CW-1-WH) 2-BUTTON PICO WIRELESS CONTROL
- P3 PJ2-3BRL-GWH-LO1 (CW-1-WH) 3-BUTTON PICO WIRELESS CONTROL
- P4 PJ2-4B-GWH-L31 (CW-1-WH) 4-BUTTON PICO WIRELESS CONTROL
- DL LRF2-DCRB CEILING DAYLIGHT SENSOR
- OS VS LRF2-OCR2B-P CEILING OCCUPANCY/ VACANCY SENSOR
- OS VS LRF2-OKLB-P CORNER OCCUPANCY/VACANCY SENSOR
- 1T FCJS-010 WIRELESS POWERPAK WIRELESS FIXTURE CONTROL 0-10V BALLAST/DRIVERS
- HUB HJS-1-FM VIVE WIRELESS HUB
- 8DS MRF2S-8SD010-WH WIRELESS SWITCH
- 8SS MRF2S-8SS-WH
- 16S RMJS-16R DV-B POWERPAK RELAY MODULE
- 8TN RMJS-8TN-DV-B POWERPAK DIMMING MODULE

DATA / TELEPHONE

- T TELEPHONE / DATA (NOTE 2)
- TV TELEVISION / DATA (NOTE 2)
- DATA BOX/CONDUIT FOR DISPATCH NOTIFICATION SYSTEM (NOTE 2)

FIRE DETECTION AND ALARM

- F MANUAL PULL STATION, 48" AFF
- FS SMOKE DETECTOR, CEILING
- FH HEAT DETECTOR
- FF SPRINKLER FLOW SWITCH
- FV SPRINKLER VALVE SUPERVISORY SWITCH
- F EVACUATION NOTIFICATION DEVICE, COMBINATION AUDIBLE / VISUAL
- F EVACUATION NOTIFICATION DEVICE, VISUAL ONLY
- FACM ADDRESSABLE CONTROL MODULE
- FACP FIRE ALARM CONTROL PANEL
- FAA FIRE ALARM ANNUNCIATOR

MISCELLANEOUS

- M MOTOR
- HP PHOTOCELL, BUTTON-TYPE, WALL MOUNT AT 10' AFF. TO BE INTERFACED WITH LIGHTING CONTROLLER
- M OVERHEAD DOOR OPERATOR PUSHBUTTON STATION
- M GENERATOR BATTERY CHARGER
- BC GENERATOR JACKET WATER HEATER
- JWH GENERATOR REMOTE MONITORING PANEL
- GRMP CARD READER
- EPO EMERGENCY POWER OFF BUTTON. INSTALL IN A NEMA 4X ENCLOSURE.
- VIDEO SURVEILANCE SYSTEM CAMERA LOCATION (NOTE 2)
- DD DISPATCH DEVICE LOCATION (NOTE 2)

1

GROUNDING

- GROUND ROD, 3/4" DIA X 10'-0" COPPER-CLAD STEEL
- B BOND TO INDICATED OBJECT
- G G GROUNDING ELECTRODE CONDUCTOR

ABBREVIATIONS

A	AMPERE
AF	AMP FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AIC	AMPERES INTERRUPTING CURRENT
AMPS	AMPERES
AT	AMPERE TRIP
BCSD	BARE COPPER SOFT DRAWN
C	CONDUIT
CH	COUNTER HEIGHT + ENOUGH TO CLEAR BACKSPLASH
CONN	CONNECTED
CU	CONDENSING UNIT
EF	EXHAUST FAN
EGC	EQUIPMENT GROUNDING CONDUCTOR
EM	EMERGENCY
EMT	ELECTRICAL METALLIC THINWALL
EWC	ELECTRIC WATER COOLER
FACP	FIRE ALARM CONTROL PANEL
FDAS	FIRE DETECTION AND ALARM SYSTEM
FHP	FRACTIONAL HORSEPOWER
FPEM	FUSE PER EQUIPMENT MANUFACTURER
GEC	GROUNDING ELECTRODE CONDUCTOR
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
HP	HORSEPOWER OR HEAT PUMP
KCMIL	THOUSAND CIRCULAR MILLS
KVA	KILOVOLT-AMPS
KW	KILOWATTS
MC	METAL CLAD CABLE
MH	MOUNTING HEIGHT
MIN	MINIMUM
N, NEUT	NEUTRAL
N/A	NOT APPLICABLE
NTS	NOT TO SCALE
P	POLE
PVC	POLYVINYL CHLORIDE CONDUIT
REC	RECEPTACLE
RMS	ROOT MEAN SQUARE
RSC	RIGID STEEL CONDUIT
RTU	ROOFTOP UNIT
SOO	SEQUENCE OF OPERATION
SPD	SURGE PROTECTIVE DEVICE
SYM	SYMMETRICAL
TYP	TYPICAL
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
W/	WITH
WP	WEATHERPROOF

NOTES (PLAN LEGEND)

1. LIGHTING CONTROL DEVICE MODEL NMBERS ARE BASED ON LUTRON SPECIFICATIONS. PROVIDE TYPE (TECHNOLOGY) AND QUANTITY OF SENSORS REQUIRED FOR PROPER OPERATION CONSIDERING LOCATION OF FURNITURE.
2. UON, INSTALL SINGLE-GANG OUTLET BOX. FROM DEVICE OUTLET BOX, RUN EMPTY 3/4" EMT UP IN WALL, TURN OUT IN CEILING PLENUM AND TERMINATE WITH BUSHING. INSTALL PULL STRING.
3. EXIT SIGNS SHALL BE UNSWITCHED.
4. ALL LIGHT FIXTURES ARE POWERED FROM LIFE SAFETY CIRCUITS, POWERED BY GENERATOR.
5. COORDINATION WITH OTHER TRADES: EXECUTE THE WORK IN FULL COOPERATION WITH OTHER CONSTRUCTION TRADES. PRIOR TO STARTING WORK, EXAMINE A COMPLETE SET OF CONSTRUCTION DOCUMENTS FOR ALL TRADES TO VERIFY COORDINATION, CHECK FOR INTERFERENCES, AND DETERMINE POINTS OF CONNECTIONS FOR EQUIPMENT. DUE TO STRUCTURAL CONDITIONS, MECHANICAL DUCT OR PIPING INTERFERENCE, OR OTHER REASONS, THE CONTRACTOR MAY DESIRE TO INSTALL THE WORK IN AN ALTERNATE MANNER FROM THAT SHOWN. SUCH CHANGES SHALL BE PRESENTED TO THE OWNER 'S REPRESENTATIVE FOR APPROVAL BEFORE PROCEEDING.
6. COORDINATE THE MOUNTING HEIGHT AND LOCATIONS OF THE ELECTRICAL DEVICES WITH ARCHITECTURAL ELEVATIONS AND GENERAL TRADES CONTRACTOR PRIOR TO ROUGH-IN. RECEPTACLES LOCATED WITHIN SIX (6) FEET OF SINK SHALL BE GROUND FAULT CIRCUIT INTERRUPTER (GFCI) TYPE RECEPTACLES. REPTACLES NOT READILY ACCESSIBLE THAT REQUIRE GFCI PROTECTION SHALL BE SO AT THE CIRCUIT BREAKER.
7. COORDINATE THE FINAL LOCATION OF THE MECHANICAL EQUIPMENT. COORDINATE FINAL WIRING REQUIREMENTS WITH MECHANICAL CONTRACTOR. ANY ADJUSTMENTS IN WIRE OR BREAKER SIZE DUE TO SUBSTITUTION OF HVAC EQUIPMENT SHALL BE MADE AT NO COST TO OWNER.
8. BECAUSE EQUIPMENT SUPPLIED MAY HAVE CONNECTION POINTS DIFFERENT THAN SHOWN ON THE DRAWINGS, LOCATE CONDUIT RUNS AND LOCATIONS OF DISCONNECTS, CONTROL STATIONS AND THE LIKE BASED UPON SHOP DRAWINGS OF THE ASSOCIATED EQUIPMENT.
9. COORDINATE LOCATION OF CONDUITS, OUTLETS AND JUNCTION BOXES WITH MECHANICAL EQUIPMENT SO THAT OUTLETS AND JUNCTION BOXES ARE ACCESSIBLE FOR SERVICING AND HVAC DUCTWORK CAN BE CONNECTED DIRECTLY TO DIFFUSERS.
10. PERFORM ALL WORK IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE (NEC).
11. FOR RECORD DRAWING REQUIREMENTS, REFER TO THE GENERAL CONDITIONS. MAINTAIN A DEDICATED SET OF DRAWINGS ON THE JOBSITE AND MARK ALL VARIATIONS TAKEN TO THE CONTRACT DRAWINGS.
12. DUE TO THE SMALL SCALE OF THE DRAWINGS, AND TO UNFORESEEN JOB CONDITIONS, ALL REQUIRED OFFSETS AND FITTINGS MAY NOT BE SHOWN BUT SHALL BE PROVIDED AT NO CHANGE IN CONTRACT PRICE.
13. CLEARANCES ARE MAINTAINED. WHERE THIS IS NOT POSSIBLE, CONSULT ENGINEER.
14. ELECTRICIAN SHALL BECOME FAMILIAR WITH HVAC SYSTEM SEQUENCE OF OPERATIONS DRAWINGS AND COORDINATE WITH MECHANICAL CONTRACTOR TO PROVIDE ALL NECESSARY COMPONENTS AND WIRING FOR A FULLY OPERATIONAL SYSTEM.

ELECTRICAL DRAWING LIST

MASTER ENGINEERS & DESIGNERS
558-1919
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351

SEH

COMMONWEALTH OF VIRGINIA
MICHAEL G. BEASLEY JR
Lic. No. 057808
8/28/2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

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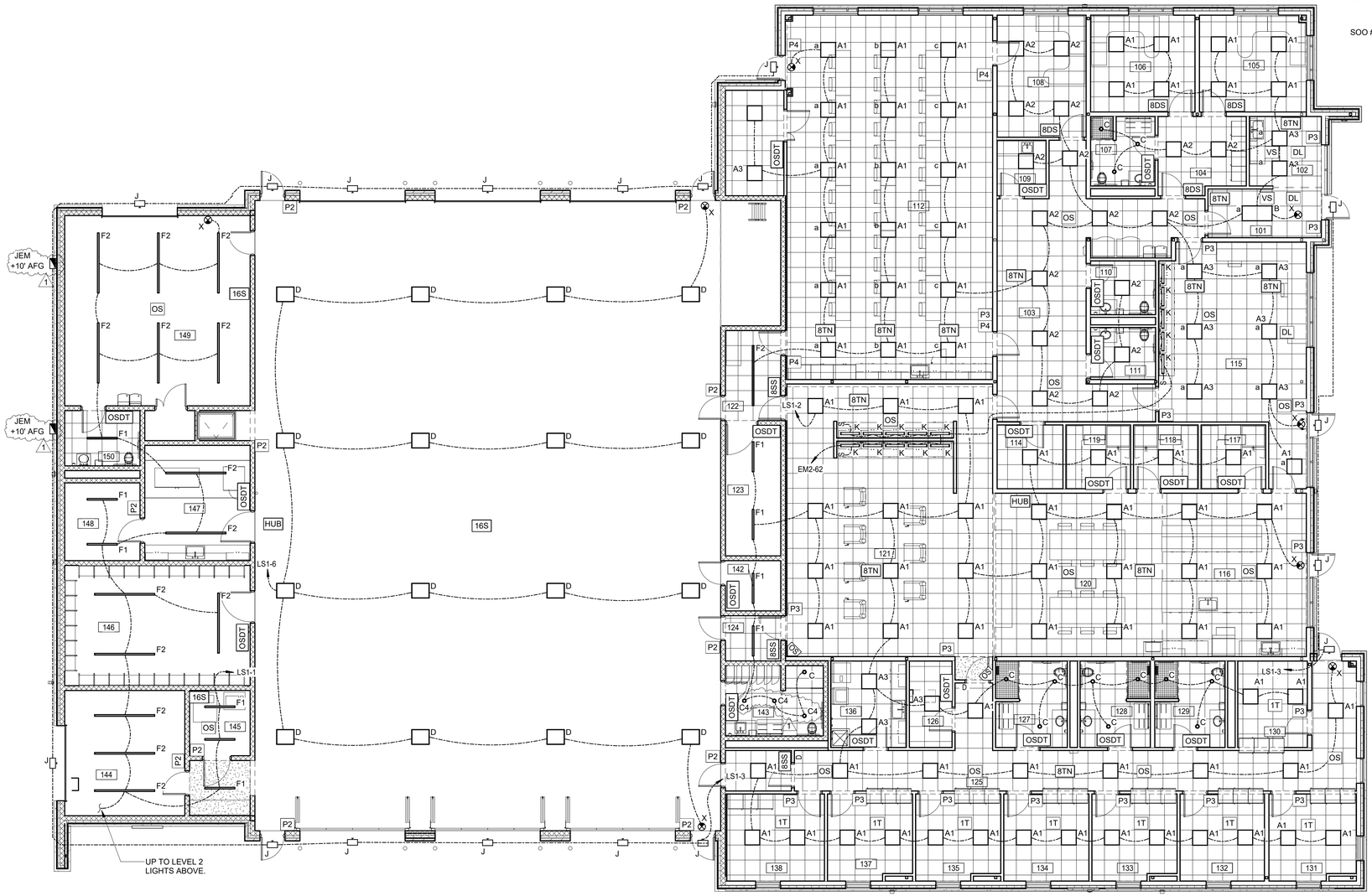
LEGENDS, NOTES, & ABBREVIATIONS

E001



1 E101 LIGHTING LEVEL 1
1/8" = 1'-0"

1/8" = 1'-0"
0' 4' 8' 16' 32'

NOTES (SHEET E101)

1. FIXTURES MARKED WITH "a" SHALL BE CONTROLLED BY DAYLIGHTING CONTROLS.

LIGHTING SOO NOTES

INTERIOR LIGHTS SHALL FOLLOW THE SOO NOTED BELOW, AS SCHEDULED PER SPACE.

SOO #1: OCCUPANTS SHALL MANUALLY SWITCH LIGHTS ON AND OFF VIA LOCAL SWITCH(ES).

SOO #2: OCCUPANCY SENSOR(S) SHALL ENERGIZE LIGHTS UPON SENSING OCCUPANCY. SENSOR(S) SHALL TURN OFF LIGHTS AFTER 20 MINUTES OF UNOCCUPANCY.

SOO #3: OCCUPANCY SENSEROS SHALL ENERGIZE LIGHTS AT 50% BRIGHTNESS AND BE USER-ADJUSTABLE THEREAFTER. SENSOR(S) SHALL TURN OFF LIGHTS AFTER 20 MINUTES OF UNOCCUPANCY.

SOO #4: OCCUPANTS SHALL MANUALLY TURN ON LIGHTS AND LIGHTS SHALL ENERGIZE AT 50% BRIGHTNESS AND BE USER-ADJUSTABLE THEREAFTER. VACANCY SENSOR(S) SHALL TURN OFF LIGHTS AFTER 20 MINUTES OF UNOCCUPANCY.

SOO #5: OCCUPANTS SHALL MANUALLY CONTROL LIGHTS USING LOCAL SCENE SELECTORS. ZONING SHALL BE AS INDICATED ON DRAWINGS AND LEVELS SHALL BE SET DURING COMMISSIONING. VACANCY SENSOR(S) SHALL TURN OFF LIGHTS AFTER 20 MINUTES OF UNOCCUPANCY.

SOO #6: OCCUPANTS SHALL MANUALLY TURN ON LIGHTS. VACANCY SENSOR(S) SHALL TURN OFF LIGHTS AFTER 20 MINUTES OF UNOCCUPANCY. DAYLIGHT SENSORS SHALL CONTINUOUSLY DIM INDICATED LIGHTS IN RESPONSE TO DAYLIGHT.

SOO #7: OCCUPANCY SENSOR(S) SHALL ENERGIZE LIGHTS UPON SENSING OCCUPANCY. OCCUPANTS SHALL ADJUST LIGHTING VIA LOCAL SCENE SELECTOR IN A SINGLE ZONE. SENSOR(S) SHALL TURN OFF LIGHTS AFTER 20 MINUTES OF UNOCCUPANCY.

LIGHTING CONTROLS SOO

ROOM NUMBER	ROOM NAME	SSO NO.
101	VESTIBULE	6
102	TRIAGE	6
103	LOBBY	2
104	ENSUITE	3
105	OFFICE	4
106	OFFICE	4
107	SHOWER	2
108	OFFICE	4
109	N.M.R.	2
110	TOILET	2
111	TOILET	2
112	TRAINING / EOC	5
113	TABLE STORAGE	2
114	IT	1
115	LINE OFFICERS	6
116	KITCHEN	7
117	PANTRY	2
118	PANTRY	2
119	PANTRY	2
120	DINING	7
121	DAYROOM	7
122	AIRLOCK	2
123	EMS STORAGE	2
124	AIRLOCK	2
125	CORRIDOR	2
126	ELECTRICAL	1
127	SHOWER	2
128	SHOWER	2
129	SHOWER	2
130	BUNK	4
131	BUNK	4
132	BUNK	4
133	BUNK	4
134	BUNK	4
135	BUNK	4
136	LAUNDRY	2
137	BUNK	4
138	OIC BUNK	4
139	AIRLOCK	2
140	APPARATUS BAYS	1
142	WATER HEATER	2
143	DECON	2
144	SHOP	1
145	ELECTRICAL	8
146	TURNOUT GEAR	2
147	TURNOUT LAUNDRY	2
148	WATER	1
149	EXERCISE	2
150	TOILET	2

PROJECT NORTH

SEH

COMMONWEALTH OF VIRGINIA
MICHAEL G. BEASLEY JR
Lic. No. 057808
8/28/2025
PROFESSIONAL ENGINEER

Project Owner

MASTER ENGINEERS & DESIGNERS
558-1919
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351

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LIGHTING PLAN LEVEL 1

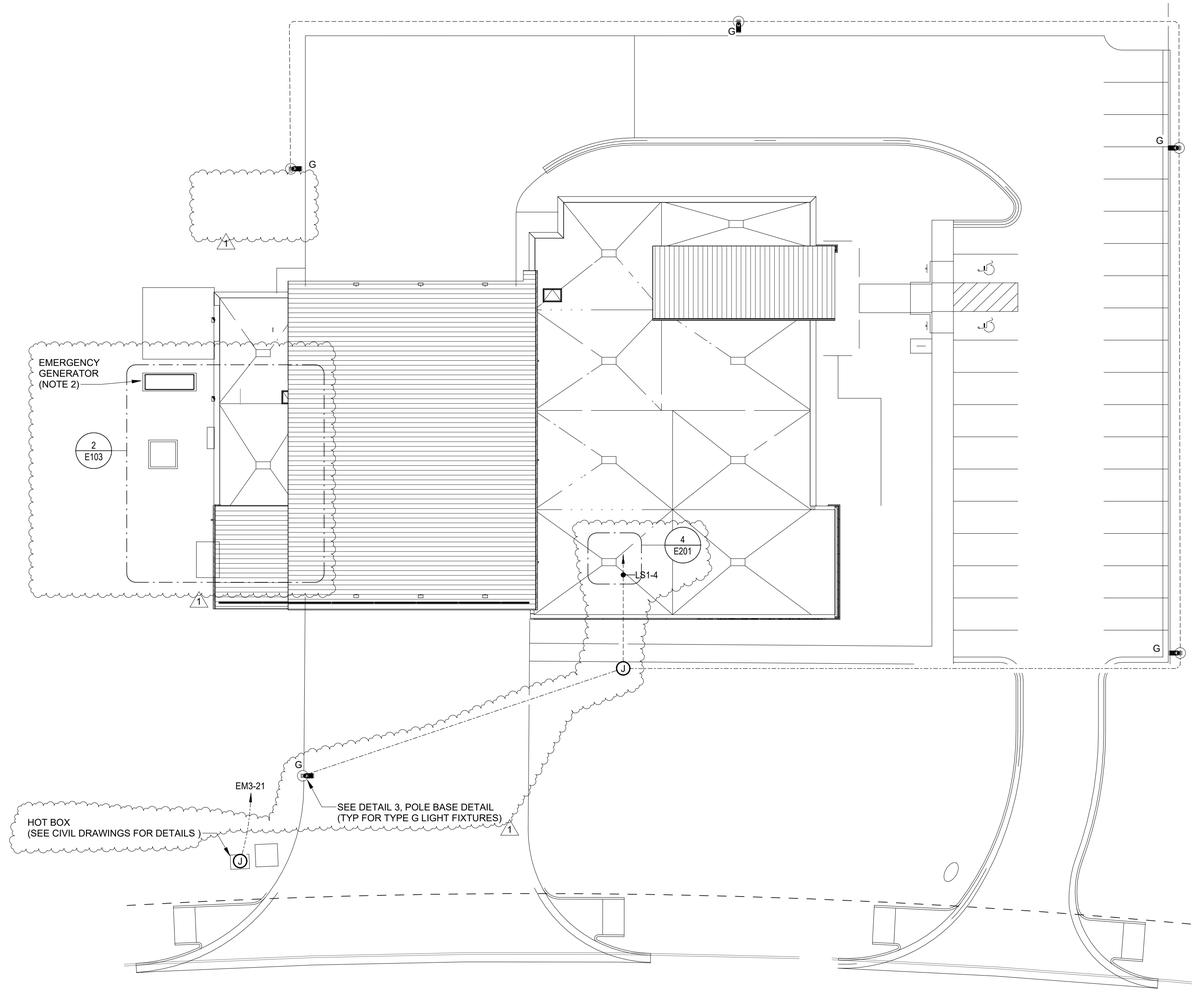
E101

LUMINAIRE SCHEDULE

TYPE	MANUFACTURER	CATALOG NUMBER #	VOLTAGE	VOLT-AMPERES (MAXIMUM)	LUMENS (MINIMUM)	DRIVER	FIXTURE DESCRIPTION
A1	DAY-BRITE	2EVG38L830-2-R-UNV-DIM	277	31.6	3990	0-10V LED	2X2 RECESSED TROFFER
A2	DAY-BRITE	2EVGH45L830-2-R-UNV-DIM	277	37.7	4695	0-10V LED	2X2 RECESSED TROFFER
A3	DAY-BRITE	2EVGH45L830-2-R-UNV-DIM	277	48.0	4695	0-10V LED	2X2 RECESSED TROFFER
B	DAY-BRITE	2EVG74L830-4-R-UNV-DIM	277	67.9	3990	0-10V LED	2X4 RECESSED TROFFER
C	LIGHTOLIER	4RN P4R SL 20 930 M CC Z10 U	277	16.2	2000	0-10V LED	RECESSED CAN LIGHT
C4	LIGHTOLIER	4RN P4R SL 40 930 M CC Z10 U	277	34.6	4000	0-10V LED	RECESSED CAN LIGHT
D	DAY-BRITE	FBZ24L830-R-UNV--SWZCSH	277	150.8	30000	0-10V LED	HIGH BAY
F1	DAY-BRITE	FLP440L840R-N-UNV-DIM	277	27.0	4000	0-10V LED	48" SUSPENDED / SURFACE LINEAR LED
F2	DAY-BRITE	FLP880L840-R-UNV-DIM	277	53.7	4000	0-10V LED	96" SUSPENDED / SURFACE LINEAR LED
G	AMERICAN ELECTRIC LIGHTING	ATB2 P603 R4 4K HSS	277	233.0	25676	LED	ROADWAY TYPE V AREA LIGHT . 30' SQUARE STRAIGHT STEEL POLE
HL	LUMINII	VSW-R-68-10-30-F-*--*-010S	277	816.0	70312	0-10V LED	68' UPPER SOFFIT RECESSED LED LINEAR ACCENT LIGHT, FROSTED LENS, WET RATED (NOTE 2)
HU	LUMINII	VSW-R-24-10-30-F-*--*-010S	277	288.0	24816	0-10V LED	24' LOWER SOFFIT RECESSED LED LINEAR ACCENT LIGHT, FROSTED LENS, WET RATED (NOTE 2)
HW	LUMINII	VSW-R-16-10-30-F-*--*-010S	277	192.0	16544	0-10V LED	16' VERTICAL WALL RECESSED LED LINEAR ACCENT LIGHT, FROSTED LENS, WET RATED (NOTE 2)
J	LITHONIA	WST LED P2 40K VW	277	25.0	3000	LED	EXTERIOR WALL MOUNT LED ARCHITECTURAL WALL SCONCE
JEM	LITHONIA	WST LED P2 40K VW E7WC	277	25.0	3000	LED	EXTERIOR WALL MOUNT LED ARCHITECTURAL WALL SCONCE, EMERGENCY BATTERY BACKUP
K	JUNO	UPLD 30IN SSW4 90CRI	277	15.0	79	LED	30" LED UNDERCABINET LIGHT
X	CHLORIDE	VERW	277	20.0	0	0-10V LED	EMERGENCY EXIT SIGN, MOUNTING, FACES AND ARROWS AS INDICATED ON DRAWING

LIGHT POLE		
MANUFACTURER	TYPE	DESCRIPTION
AQUITY BRANDS	SSS 30' 6G 6"7g(0.179")	6" SQUARE, STRAIGHT, STEEL, 30' TALL LIGHT POLE. (SEE POLE BASE DETAIL, THIS SHEET)

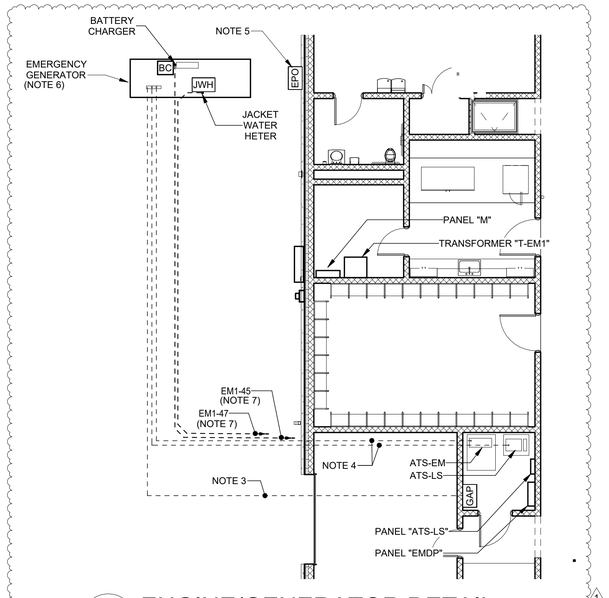
TYPE "A1", "A2", "A3" | TYPE "B" | TYPE "C" | TYPE "D" | TYPE "F1" | TYPE "F2" | TYPE "G" | TYPE "H" | TYPE "J" | TYPE "K" | TYPE "X"



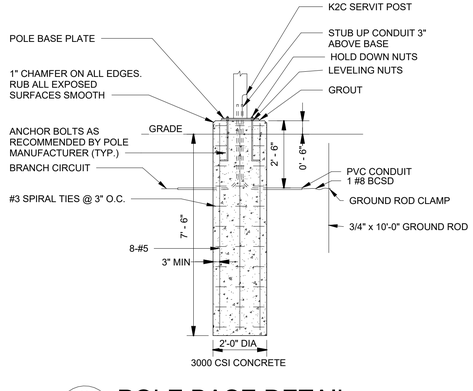
1 E103 SITE PLAN - POWER AND LIGHTING
1" = 20'-0"

NOTES (E103)

1. ALL EXTERIOR LIGHTS SHALL BE CONTROLLED BY PHOTOCELL. LOCATE PHOTOCELL ON NORTH SIDE OF BUILDING.
2. PROVIDE POWER FOR ALL GENERATOR ACCESSORIES. POWER MUST BE PROVIDED FROM AN EMERGENCY SOURCE AND IS NOT SHOW ON SCHEDULE . PROVIDE CONTROL WIRING FROM ATS. COORDINATE REQUIREMENTS WITH GENERATOR SUPPLIER.
3. PROVIDE (1) 1" SCH 40 PVC CONDUIT (WITH 1/2" MULE TAPE) FOR GENERATOR ANNUNCIATOR PANEL (GAP) CABLING WITH ROUTING AS SHOWN. PROVIDE AND INSTALL GAP COMMUNICATIONS CABLING AS REQUIRED FROM THE GENERATOR CONTROLLER TO THE GAP WITH ROUTING AS SHOWN. INSTALL GAP CABLING FURNISHED WITH E/G.
4. PROVIDE (1) 1" SCH 40 PVC CONDUIT (WITH 1/2" MULE TAPE) FOR AUTOMATIC TRANSFER SWITCH (ATS) CONTROL CABLING WITH ROUTING AS SHOWN. (MIN 18" BURIAL DEPTH). PROVIDE AND INSTALL RS485 (2 WIRE) CABLE OR OTHER CONTROL CABLE AS REQUIRED FROM THE GENERATOR CONTROLLER TO THE ATS WITH ROUTING AS SHOWN. TRANSITION TO NEW 1" EMT CONDUCT ONCE INSIDE BUILDING.
5. PROVIDE (1) 1" SCH 40 PVC CONDUIT (WITH 1/2" MULE TAPE) FOR SHUTDOWN OF ENGINE/GENERATOR. PROVIDE AND INSTALL RS485 (2 WIRE) CABLE OR OTHER CONTROL CABLE AS REQUIRED FROM THE GENERATOR CONTROLLER T THE WALL MOUNTED EMERGENCY SHUTDOWN PUSHBUTTON WITH ROUTING AS SHOWN.
6. GENERAL CONTRACTOR TO PROVIDE THE CONCRETE EQUIPMENT PAD FOR THE ENGINE/GENERATOR. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL ENGINE/GENERATOR MANUFACTURER CONCRETE PAD REQUIREMENTS (INCLUDING TEMPLATE FOR EXACT UNDERGROUND CONCRETE STUB-UP LOCATIONS, ETC) ELECTRICAL CONTRACTOR SHALL FIELD COORDINATE ALL WORK WITH GC.
7. ROUTE CONDUIT THROUGH BUILDING TO STORAGE SPACE 126, PANEL EM1.



2 E103 ENGINEER/GENERATOR DETAIL
1/8" = 1'-0"



3 E103 POLE BASE DETAIL
3/8" = 1'-0"

PROJECT NORTH

MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919

SEH

COMMONWEALTH OF VIRGINIA
MICHAEL G. BEASLEY JR.
Lic. No. 057808
8/28/2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

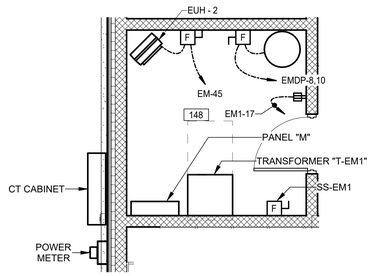
SEH Project	LIBUN 178342
Checked By	MGB
Drawn By	JHR
Project Status: CONSTRUCTION DOCUMENTS	Issue Date: 8/28/2025

REVISION SCHEDULE

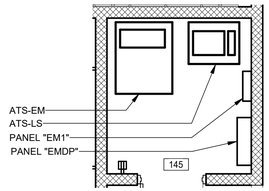
REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

ELECTRICAL SITE PLAN, LIGHT FIXTURE SCHEDULE & DETAILS

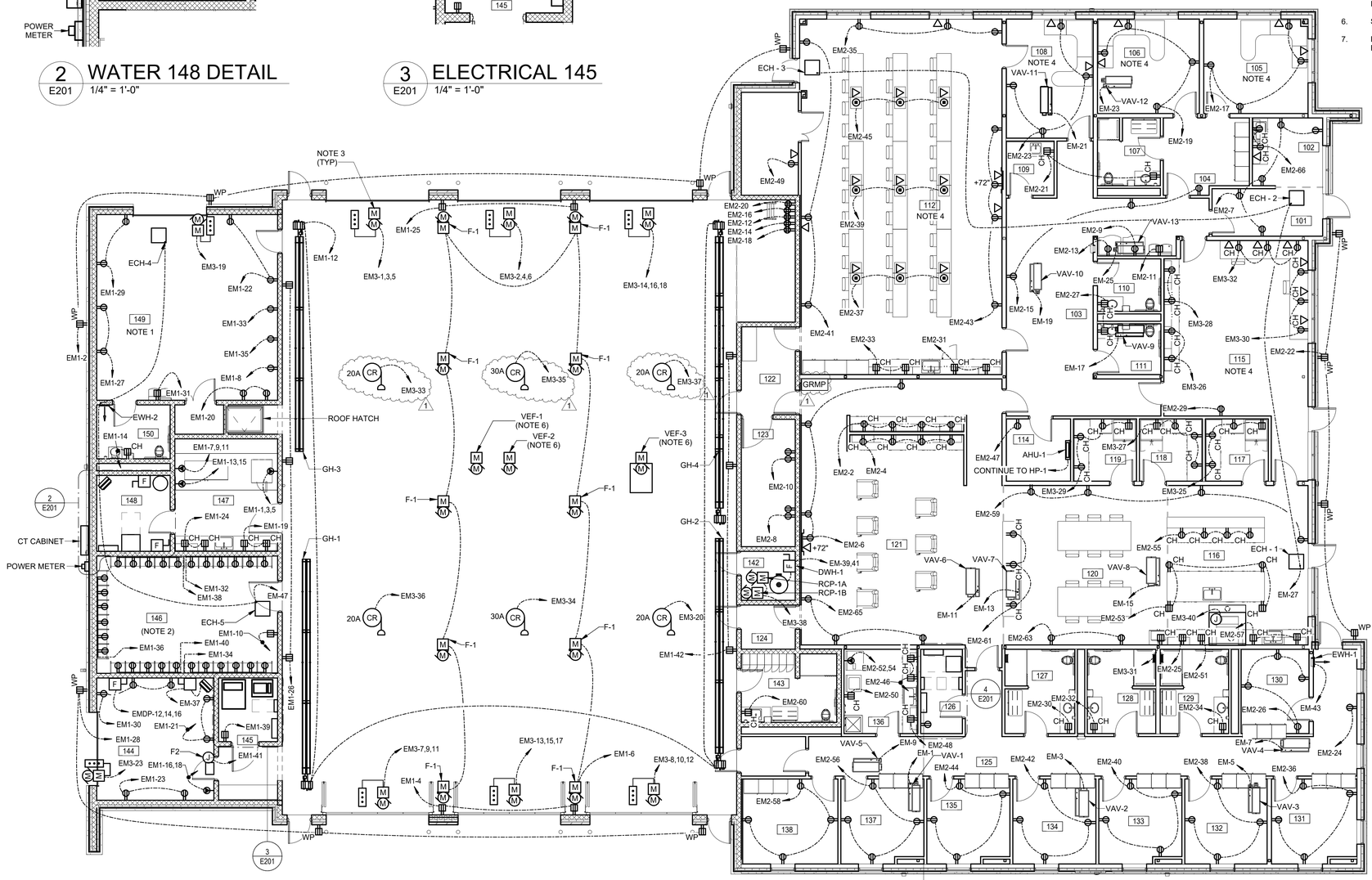
E103



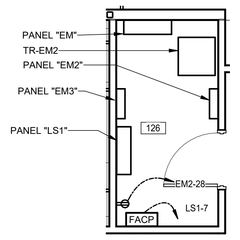
2 WATER 148 DETAIL
E201 — 1/4" = 1'-0"



3 ELECTRICAL 145
E201 — 1/4" = 1'-0"



1 POWER LEVEL 1
E201 — 1/8" = 1'-0"



4 STORAGE 126 DETAIL
E201 — 1/4" = 1'-0"

NOTES (SHEET E201)

1. COORDINATE FINAL ELECTRICAL REQUIREMENTS AND LOCATIONS OF EXERCISE EQUIPMENT IN THIS SPACE WITH OWNER.
2. PROVIDE AND INSTALL DUPLEX RECEPTACLE IN EACH TURNOUT GEAR LOCKER. INSTALL WIRING IN WIREWAY PROVIDED WITH LOCKERS AND HOMERUN RECEPTACLE CIRCUIT GROUPS BACK TO ASSOCIATED PANEL. COORDINATE LOCKER POWER POINT LOCATIONS WITH LOCKER INSTALLER.
3. DOOR MOTOR AND OPERATOR PUSHBUTTON STATION. COORDINATE LOCATION POWER REQUIREMENTS AND INSTALLATION REQUIREMENTS WITH DOOR INSTALLER. ELECTRICIAN TO BE RESPONSIBLE FOR PROVIDING WIRING AND CONDUIT TO THE FOLLOWING ELEMENTS, ALL PROVIDED BY THE DOOR VENDOR: CONTROL PANEL, PHOTOSENSORS ON EITHER SIDE OF DOOR, OPERATOR STATION, DOOR MOTOR, LIMIT SWITCH AND PRESENCE SENSOR. ELECTRICIAN TO PROVIDE AND INSTALL INTERIOR AND EXTERIOR FLOOR LOOP WIRING AND CONNECT TO DOOR CONTROL PANEL. COORDINATE WITH DOOR VENDOR FOR FINAL REQUIREMENTS.
4. CONTRACTOR SHALL PROVIDE CONTROLLED RECEPTACLES IN THE INDICATED SPACES. 50% OF THE RECEPTACLES SHALL BE CONTROLLED. ALL RECEPTACLES IN THE SPACE SHALL HAVE SPLIT-CIRCUITRY SUCH THAT THE TOP RECEPTACLE IS NOT CONTROLLED AND THE BOTTOM RECEPTACLE IS CONTROLLED. INTERFACE WITH LIGHTING CONTROLS SUCH THAT BOTTOM RECEPTACLES ARE DE-ENERGIZED WHEN SPACE IS UNOCCUPIED. CONTROLLED RECEPTACLES SHALL BE LABELED.
5. FOR ALL CIRCUITS TO EF'S CONTRACTOR SHALL PROVIDE STARTER IN ELECTRICAL ROOM FOR INTERFACE WITH DDC SYSTEM.
6. SOURCE CAPTURE VEHICLE EXHAUST FAN. COORDINATE FINAL LOCATION WITH VENDOR.
7. REFER TO SPECIFICATION SECTION 260533.16 SECTION 2.5 FOR OUTDOOR RECEPTACLE HOOD REQUIREMENTS.

1/8" = 1'-0"
0' 4' 8' 16' 32'

PROJECT NORTH

MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919

SEH

COMMONWEALTH OF VIRGINIA
MICHAEL G. BEASLEY JR
Lic. No. 057808
8/26/2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	MGB
Drawn By	JHR/TBC

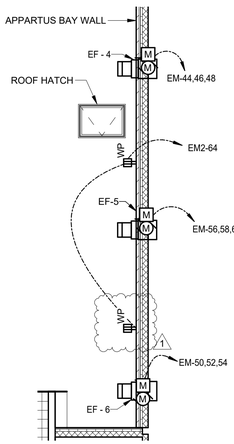
Project Status	**Issue Date**
CONSTRUCTION DOCUMENTS	8/28/2025

REVISION SCHEDULE

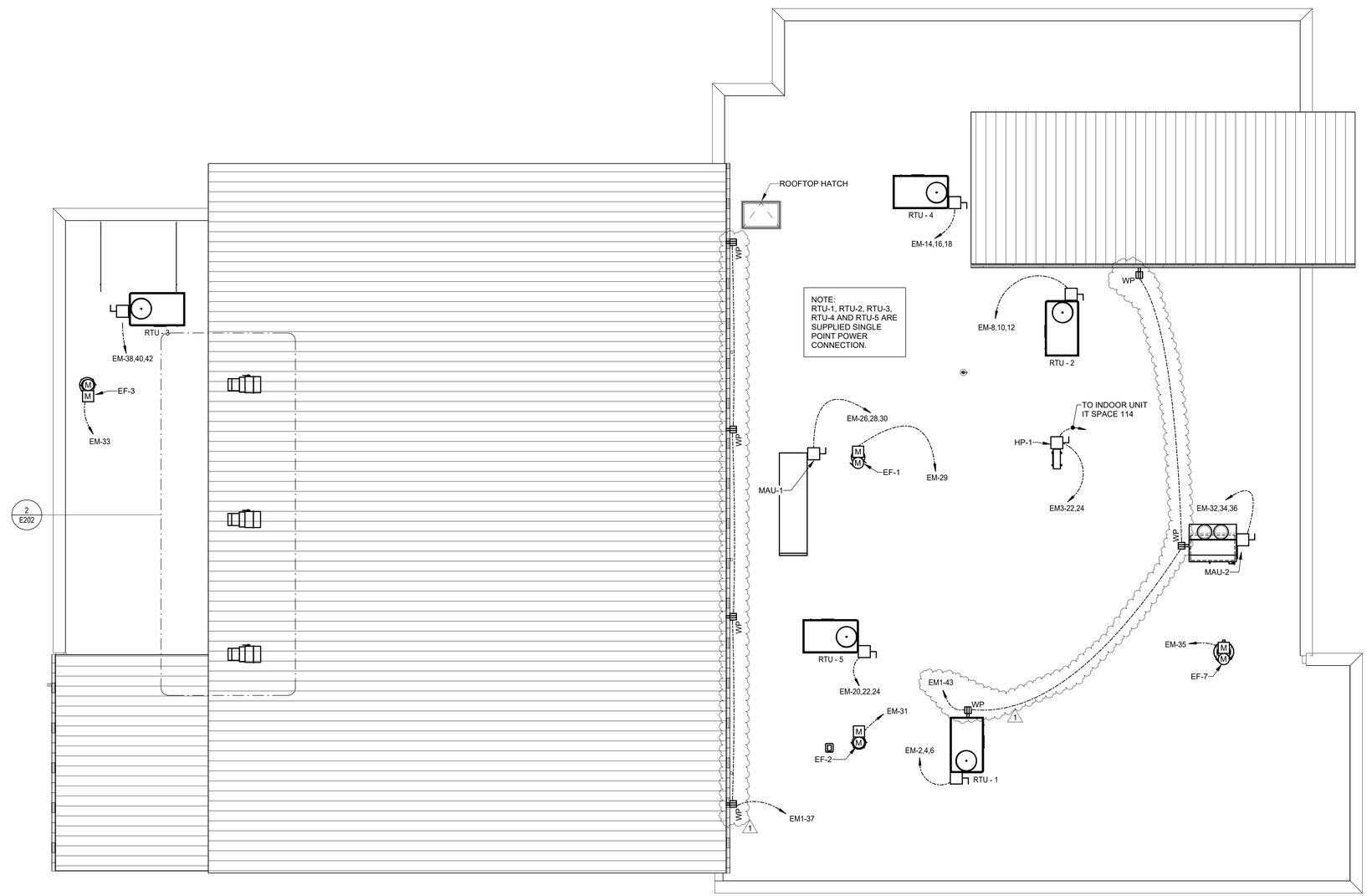
REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

POWER PLAN LEVEL 1

E201



2 DETAIL
E202 1/8" = 1'-0"



1 ELECTRICAL ROOF PLAN
E202 1/8" = 1'-0"

PROJECT NORTH

1/8" = 1'-0"
0' 4' 8' 16' 32'

MASTER ENGINEERS & DESIGNERS
558-1919
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351

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Project Status
CONSTRUCTION DOCUMENTS

Issue Date
8/28/2025

REVISION SCHEDULE

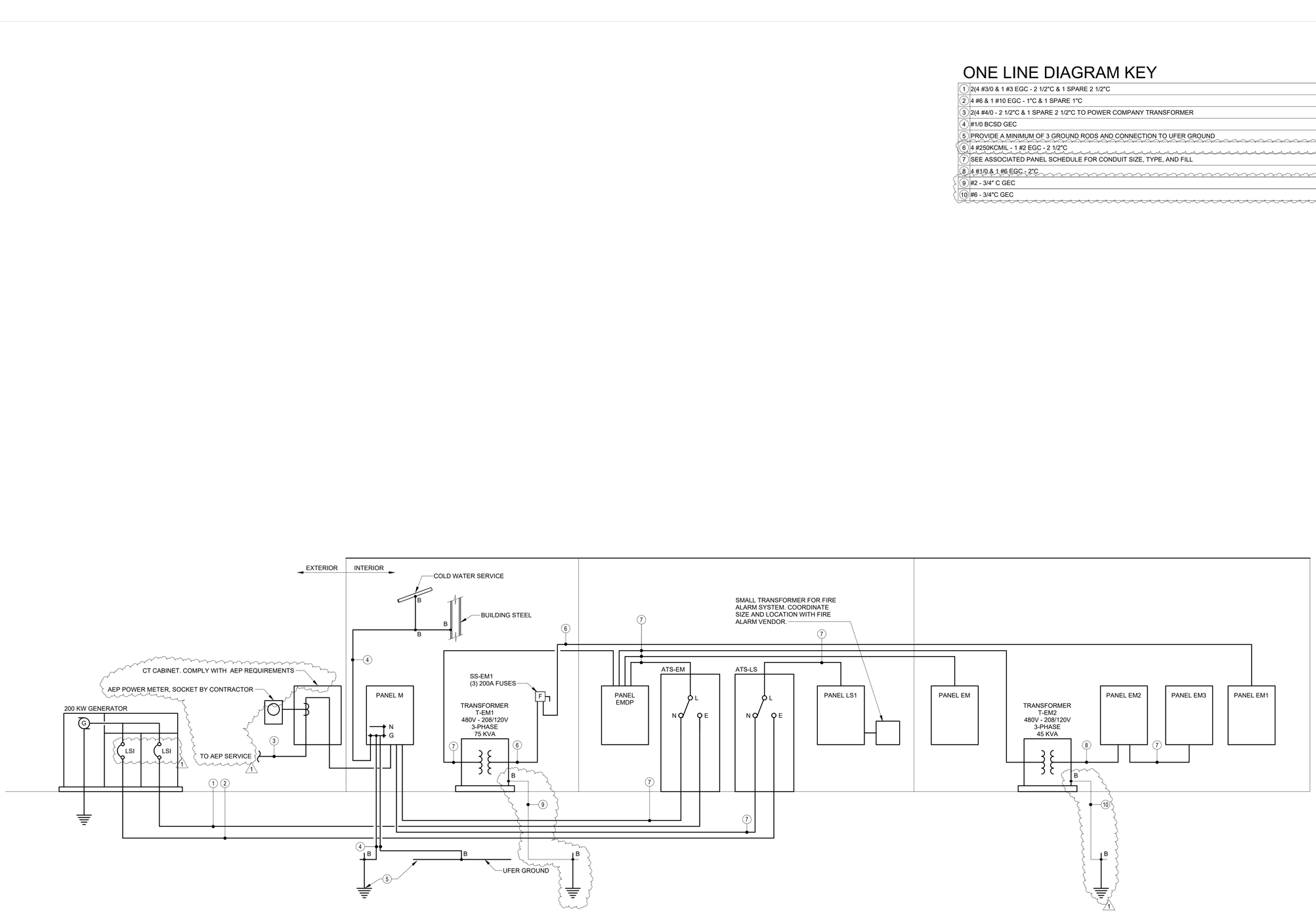
REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

POWER ROOF PLAN

E202

ONE LINE DIAGRAM KEY

1	2(4 #3/0 & 1 #3 EGC - 2 1/2"C & 1 SPARE 2 1/2"C
2	4 #6 & 1 #10 EGC - 1"C & 1 SPARE 1"C
3	2(4 #4/0 - 2 1/2"C & 1 SPARE 2 1/2"C TO POWER COMPANY TRANSFORMER
4	#1/0 BCSD GEC
5	PROVIDE A MINIMUM OF 3 GROUND RODS AND CONNECTION TO UFER GROUND
6	4 #250KCMIL - 1 #2 EGC - 2 1/2"C
7	SEE ASSOCIATED PANEL SCHEDULE FOR CONDUIT SIZE, TYPE, AND FILL
8	4 #1/0 & 1 #6 EGC - 2"C
9	#2 - 3/4" C GEC
10	#6 - 3/4"C GEC



ONE LINE DIAGRAM

NOT TO SCALE

MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919

SEH

COMMONWEALTH OF VIRGINIA
MICHAEL G. BEASLEY JR
Lic. No. 057808
8/28/2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	MCB
Drawn By	JHR/TBC

Project Status	**Issue Date**
CONSTRUCTION DOCUMENTS	8/28/2025

REVISION SCHEDULE

REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

ONE LINE DIAGRAM

E301

BRANCH PANEL: M

VOLTS: 480/277 Wye
PHASES: 3
WIRES: 4
FED FROM: SERVICE

A.I.C. RATING: 65 KAIC
MAINS TYPE: MCB
MAINS RATING: 600A MCB LSI
BUS: RATING: 600A

1

NOTES:

CKT	LOAD NAME	P	AF	AT	LINE	NEUT	EGC	COND SIZE	CONN KVA	A	B	C	A	B	C	CONN KVA	COND SIZE	EGC	NEUT	LINE	AT	AF	P	LOAD NAME	CKT
1										12.4			424.4												2
3	ATS-LS	3	100	60	#6	#6	#10	1"	12.82		21.0			459.3		359.73	(2) 2"	#3	(2) #3/0	(2) #3/0	400	400	3	ATS-EM	4
5												14.0			416.9											6
7	SPACE & BUS ONLY	1	--	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--	1	SPACE & BUS ONLY	8
9	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			--		--	--	--	--	--	--	--	1	SPACE & BUS ONLY	10
11	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--	--	1	SPACE & BUS ONLY	12
13	SPACE & BUS ONLY	1	--	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--	1	SPACE & BUS ONLY	14
15	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			--		--	--	--	--	--	--	--	1	SPACE & BUS ONLY	16
17	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--	--	1	SPACE & BUS ONLY	18
								TOTAL KVA:	372.55	**A**	**B**	**C**												
								TOTAL AMPS:		436.6	479.9	430.1													

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC	192231.1 VA	100.00%	192231.1 VA		
LIGHTS	11079.8 VA	125.00%	13849.8 VA	**TOTAL CONN. LOAD:**	372550.8 VA
REC	150625.0 VA	53.32%	80312.5 VA	**TOTAL EST. DEMAND:**	304992.4 VA
WATER HEATER	12204.0 VA	100.00%	12204.0 VA	**TOTAL CONN.:**	448 A
OVERHEAD DOOR	6480.0 VA	100.00%	6480.0 VA	**TOTAL EST. DEMAND:**	367 A

1

BRANCH PANEL: LS1

VOLTS: 480/277 Wye
PHASES: 3
WIRES: 4
FED FROM: ATS-LS

A.I.C. RATING: 35 KAIC
MAINS TYPE: MCB
MAINS RATING: 60A MCB LSI
BUS: RATING: 125A

1

NOTES:

CKT	LOAD NAME	P	AF	AT	LINE	NEUT	EGC	COND SIZE	CONN KVA	A	B	C	A	B	C	CONN KVA	COND SIZE	EGC	NEUT	LINE	AT	AF	P	LOAD NAME	CKT
1	LIGHTS 150, 144, MEZZ OVER SHOP	1	100	20	#12	#12	#12	3/4"	1.09	4.0			8.0			2.21	3/4"	#12	#12	#12	20	100	1	LIGHTS 120, 116, 124 (AFCI...	2
3	LIGHTS EXTERIOR BLDG. WALL	1	100	20	#12	#12	#12	3/4"	0.48		1.7			11.1		3.09	3/4"	#10	#10	#10	20	100	1	EXTERIOR POLE LIGHTS	4
5	LIGHTS EXTERIOR LINEAR	1	100	20	#12	#12	#12	3/4"	1.30			4.7			9.4	2.35	3/4"	#12	#12	#12	20	100	1	LIGHTS APPARATUS BAY 140	6
7	FACP ELECTRICAL 126	1	100	20	#12	#12	#12	3/4"	0.12	0.4			--			--	--	--	--	--	--	--	1	SPACE & BUS ONLY	8
9	INTERIOR LIGHTS	1	100	20	#12	#12	#12	3/4"	2.20		7.9			--		--	--	--	--	--	--	--	1	SPACE & BUS ONLY	10
11	SPARE	1	--	--	--	--	--	--	--			0.0			--	--	--	--	--	--	--	--	1	SPACE & BUS ONLY	12
13	SPARE	1	--	--	--	--	--	--	--	0.0			--			--	--	--	--	--	--	--	1	SPACE & BUS ONLY	14
15	SPARE	1	--	--	--	--	--	--	--		0.0			--		--	--	--	--	--	--	--	1	SPACE & BUS ONLY	16
17	SPARE	1	--	--	--	--	--	--	--			0.0			--	--	--	--	--	--	--	--	1	SPACE & BUS ONLY	18
19	SPARE	1	--	--	--	--	--	--	--	0.0			--			--	--	--	--	--	--	--	1	SPACE & BUS ONLY	20
21	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			--		--	--	--	--	--	--	--	1	SPACE & BUS ONLY	22
23	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--	--	1	SPACE & BUS ONLY	24
25	SPACE & BUS ONLY	1	--	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--	1	SPACE & BUS ONLY	26
27	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			--		--	--	--	--	--	--	--	1	SPACE & BUS ONLY	28
29	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--	--	1	SPACE & BUS ONLY	30
								TOTAL KVA:	12.88	**A**	**B**	**C**												
								TOTAL AMPS:		12.4	21.0	14.0													

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC	0.0 VA	0.00%	0.0 VA		
LIGHTS	10856.3 VA	125.00%	13570.4 VA	**TOTAL CONN. LOAD:**	12884.8 VA
REC	2040.0 VA	100.00%	2040.0 VA	**TOTAL EST. DEMAND:**	15598.5 VA
WATER HEATER	0.0 VA	0.00%	0.0 VA	**TOTAL CONN.:**	15 A
OVERHEAD DOOR	0.0 VA	0.00%	0.0 VA	**TOTAL EST. DEMAND:**	19 A

BRANCH PANEL: EM

VOLTS: 480/277 Wye
PHASES: 3
WIRES: 4
FED FROM: PANEL EMDP

A.I.C. RATING: 35 KAIC
MAINS TYPE: MCB
MAINS RATING: 400A MCB
BUS: RATING: 400A

1

NOTES:

CKT	LOAD NAME	P	AF	AT	LINE	NEUT	EGC	COND SIZE	CONN KVA	A	B	C	A	B	C	CONN KVA	COND SIZE	EGC	NEUT	LINE	AT	AF	P	LOAD NAME	CKT
1	VAV-1	1	100	20	#12	#12	#12	3/4"	1.50	5.4			25.0												2
3	VAV-2	1	100	20	#12	#12	#12	3/4"	2.50		9.0			25.0		20.79	3/4"	#10	#10	#10	25	100	3	RTU-1	4
5	VAV-3	1	100	20	#12	#12	#12	3/4"	1.50			5.4			25.0										6
7	VAV-4	1	100	20	#12	#12	#12	3/4"	2.50	9.0			21.0												8
9	VAV-5	1	100	20	#12	#12	#12	3/4"	3.00		10.8			21.0		17.43	3/4"	#10	#10	#10	25	100	3	RTU-2	10
11	VAV-6	1	100	25	#12	#12	#12	3/4"	4.00			14.4			21.0										12
13	VAV-7	1	100	25	#12	#12	#12	3/4"	4.00	14.4			39.0												14
15	VAV-8	1	100	30	#10	#10	#10	3/4"	6.50		23.5			39.0		32.42	1"	#8	#6	#6	40	100	3	RTU-4	16
17	VAV-9	1	100	20	#12	#12	#12	3/4"	2.50			9.0			39.0										18
19	VAV-10	1	100	20	#12	#12	#12	3/4"	1.50	5.4			25.0												20
21	VAV-11	1	100	20	#12	#12	#12	3/4"	3.00		10.8			25.0		20.79	3/4"	#10	#10	#10	25	100	3	RTU-5	22
23	VAV-12	1	100	20	#12	#12	#12	3/4"	1.50			5.4			25.0										24
25	VAV-13	1	100	20	#12	#12	#12	3/4"	1.50	5.4			6.5												26
27	ECH-1, ECH-2, ECH-3	1	100	20	#12	#12	#12	3/4"	0.75		2.7			6.5		5.37	3/4"	#12	#12	#12	20	100	3	MAU-1	28
29	EF-1	1	100	20	#12	#12	#12	3/4"	0.07			0.3			6.5										30
31	EF-2	1	100	20	#12	#12	#12	3/4"	0.12	0.4			10.2												32
33	EF-3	1	100	20	#12	#12	#12	3/4"	0.19		0.7			10.2		8.48	3/4"	#12	#12	#12	20	100	3	MAU-2	34
35	EF-7	1	100	20	#12	#12	#12	3/4"	0.56			2.0			10.2										36
37	EUH-1	1	100	20	#12	#12	#12	3/4"	3.30	11.9			39.0												38
39	DWH-1	2	100	40	#8	#8	#8	3/4"	6.10		12.7			39.0		32.42	3/4"	#10	#8	#8	40	100	3	RTU-3	40
41												12.7			39.0										42
43	EWH-1	1	100	20	#12	#12	#12	3/4"	2.00	7.2			0.7												44
45	EUH-2	1	100	20	#12	#12	#12	3/4"	3.30		11.9			0.7		0.60	3/4"	#12	#12	#12	20	100	3	EF-4 APARATUS BAY SIDEWALL	46
47	ECH-4, EWH-2, ECH-5	1	100	20	#12	#12	#12	3/4"	2.50			9.0			0.7										48
49	SPARE	1	--	--	--	--	--	--	--	0.0			0.7												50
51	SPARE	1	--	--	--	--	--	--	--		0.0			0.7		0.60	3/4"	#12	#12	#12	20	100	3	EF-5 APPARATUS BAY SIDE WALL	52
53	SPARE	1	--	--	--	--	--	--	--			0.0			0.7										54
55	SPARE	1	--	--	--	--	--	--	--	0.0			0.7												56
57	SPARE	1	--	--	--	--	--	--	--		0.0			0.7		0.60	3/4"	#12	#12	#12	20	100	3	EF-6 APARATUS BAY SIDEWALL	58
59	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			0.7										60
61	SPACE & BUS ONLY	1	--	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--	1	SPACE & BUS ONLY	62
63	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			--		--	--	--	--	--	--	--	1	SPACE & BUS ONLY	64
65	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--	--	1	SPACE & BUS ONLY	66
								TOTAL KVA:	193.90	**A**	**B**	**C**												
								TOTAL AMPS:		227.6	248.7	224.5													

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC	187797.1 VA	100.00%	187797.1 VA		
LIGHTS	0.0 VA	0.00%	0.0 VA	**TOTAL CONN. LOAD:**	193897.1 VA
REC	0.0 VA	0.00%	0.0 VA	**TOTAL EST. DEMAND:**	193897.1 VA
WATER HEATER	6100.0 VA	100.00%	6100.0 VA	**TOTAL CONN.:**	233 A
OVERHEAD DOOR	0.0 VA	0.00%	0.0 VA	**TOTAL EST. DEMAND:**	233 A

BRANCH PANEL: EMDP

VOLTS: 480/277 Wye
PHASES: 3
WIRES: 4
FED FROM: ATS-EM

A.I.C. RATING: 65 KAIC
MAINS TYPE: MCB
MAINS RATING: 600A MCB LSI
BUS: RATING: 600A

1

NOTES:

CKT	LOAD NAME	P	AF	AT	LINE	NEUT	EGC	COND SIZE	CONN KVA	A	B	C	A	B	C	CONN KVA	COND SIZE	EGC	NEUT	LINE	AT	AF	P	LOAD NAME	CKT
1	PANEL EM-1 VIA SS-EM1 AND TRANSFORMER T-EM1	3	200	150	#1	#1	#6	1 1/2"	57.35	64.5			227.6			193.90	3"	#4	#350	#350	300	400	3	PANEL EM	2
3											74.9			248.7											4
5												68.7			224.5										6
7	EM-2 VIA TRANSFORMER T-EM2	3	100	90	#4	#4	#8	1"	69.25	80.9			12.5			6.00	3/4"	#10	#8	#8	40	100	2	DWH-2	8
9											85.3			12.5											10
11												84.9			40.0										12
13	SPACE & BUS ONLY	1	--	--	--	--	--	--	--	--			40.0			33.23	3/4"	#10	#8	#8	50	100	3	BREATHING AIR COMPRESSOR	14
15	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			40.0											16
17	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--	--	1	SPACE & BUS ONLY	18
19	SPACE & BUS ONLY	1	--	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--	1	SPACE & BUS ONLY	20
21	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			--		--	--	--	--	--	--	--	1	SPACE & BUS ONLY	22
23	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--	--	1	SPACE & BUS ONLY	24
								TOTAL KVA:	359.73	**A**	**B**	**C**												
								TOTAL AMPS:		424.4	459.3	416.9													

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC	192231.1 VA	100.00%	192231.1 VA		
LIGHTS	225.0 VA	125.00%	281.3 VA	**TOTAL CONN. LOAD:**	359725.1 VA
REC	148585.0 VA	53.37%	79292.5 VA	**TOTAL EST. DEMAND:**	290488.9 VA
WATER HEATER	12204.0 VA	100.00%	12204.0 VA	**TOTAL CONN.:**	433 A
OVERHEAD DOOR	6480.0 VA	100.00%	6480.0 VA	**TOTAL EST. DEMAND:**	349 A

558-1919
MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351

SEH

COMMONWEALTH OF VIRGINIA
MICHAEL G. BEASLEY JR.
Lic. No. 057808
8/28/2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	MGB
Drawn By	TBC

Project Status	**Issue Date**
CONSTRUCTION DOCUMENTS	8/28/2025

REVISION SCHEDULE

REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

PANEL SCHEDULES (1 0F 2)

E302

BRANCH PANEL: EM1

VOLTS: 120/208 Wye
PHASES: 3
WIRES: 4
FED FROM: TRANSFORMER T-EM1 VIA SS-EM1

A.I.C. RATING: 22 KAIC
MAINS TYPE: MCB
MAINS RATING: 225A MCB
BUS: RATING: 225A

1

NOTES:

CKT	LOAD NAME	P	AF	AT	LINE	NEUT	EGC	COND SIZE	CONN KVA	A	B	C	A	B	C	CONN KVA	COND SIZE	EGC	NEUT	LINE	AT	AF	P	LOAD NAME	CKT
1										20.0			6.0			0.72	3/4"	#12	#12	#12	20	100	1	REC EXTERIOR	2
3	EXTRACTOR TURNOUT GEAR 149	3	100	25	#12	#12	#12	3/4"	7.20		20.0			3.0		0.36	3/4"	#12	#12	#12	20	100	1	REC APPARATUS BAYS 141	4
5												20.0			6.2	0.75	3/4"	#12	#12	#12	20	100	1	F-1 (10) APPARATUS BAY 141	6
7										35.0			15.0			1.80	3/4"	#12	#12	#12	20	100	1	ELLIPTICAL EXERCISE 145	8
9	GEAR DRYER TURNOUT GEAR 149	3	100	45	#8	#8	#10	3/4"	12.60		35.0			1.5		0.18	3/4"	#12	#12	#12	20	100	1	REC TURNOUT GEAR 149	10
11												35.0			10.4	1.25	3/4"	#12	#12	#12	20	100	1	GH-1,2,3,4 APPARATUS BAYS 141	12
13										30.0			1.5			0.18	3/4"	#12	#12	#12	20	100	1	REC TOILET 146	14
15	DRYER LAUNDRY 147	2	100	50	#8	#8	#10	3/4"	6.24		30.0			40.0		8.32	3/4"	#10	#8	#8	50	100	2	AIR COMPRESSOR SHOP 151	16
17	REC WATER 148	1	100	20	#12	#12	#12	3/4"	0.18			1.5			40.0										18
19	REC LAUNDRY 147	1	100	20	#12	#12	#12	3/4"	0.36	3.0			3.0			0.36	3/4"	#12	#12	#12	20	100	1	REC EXERCISE 145	20
21	REC SHOP 151	1	100	20	#12	#12	#12	3/4"	0.36		3.0			3.0		0.36	3/4"	#12	#12	#12	20	100	1	REC EXERCISE 145	22
23	REC SHOP 151	1	100	20	#12	#12	#12	3/4"	0.36			3.0			3.0	0.36	3/4"	#12	#12	#12	20	100	1	REC LAUNDRY 147	24
25	REC APPARATUS BAYS 141	1	100	20	#12	#12	#12	3/4"	0.36	3.0			4.5			0.54	3/4"	#12	#12	#12	20	100	1	REC APPARATUS BAYS 141	26
27	REC EXERCISE 145	1	100	20	#12	#12	#12	3/4"	0.36		3.0			4.5		0.54	3/4"	#12	#12	#12	20	100	1	REC EXTERIOR	28
29	REC EXERCISE 145	1	100	20	#12	#12	#12	3/4"	0.36			3.0			4.5	0.54	3/4"	#12	#12	#12	20	100	1	REC SHOP 151	30
31	REC EXERCISE 145 BOTTLE FILLER	1	100	20	#12	#12	#12	3/4"	0.60	5.0			9.0			1.08	3/4"	#12	#12	#12	#12	100	1	REC TURNOUT GEAR 146 LOCKER...	32
33	STAIR STEPPER EXERCISE 145	1	100	20	#12	#12	#12	3/4"	0.60		5.0			9.0		1.08	3/4"	#12	#12	#12	#12	100	1	REC TURNOUT GEAR 146 LOCKER...	34
35	STATIONARY BIKE EXERCISE 145	1	100	20	#12	#12	#12	3/4"	0.60			5.0			9.0	1.08	3/4"	#12	#12	#12	#12	100	1	REC TURNOUT GEAR 146 LOCKER...	36
37	REC ROOFTOP	1	100	20	#12	#12	#12	3/4"	0.72	6.0			7.5			0.90	3/4"	#12	#12	#12	#12	100	1	REC TURNOUT GEAR 146 LOCKER...	38
39	REC HOSE 150	1	100	20	#12	#12	#12	3/4"	0.18		1.5			7.5		0.90	3/4"	#12	#12	#12	#12	100	1	REC TURNOUT GEAR 146 LOCKER...	40
41	F-2 SHOP 151	1	100	20	#12	#12	#12	3/4"	0.30			2.5			4.5	0.54	3/4"	#12	#12	#12	20	100	1	REC APPARATUS BAYS 141	42
43	REC ROOFTOP	1	100	20	#12	#12	#12	3/4"	0.54	4.5			0.0			--	--	--	--	--	--	--	1	SPARE	44
45	GEN BATTERY CHARGER	1	100	20	#12	#12	#12	3/4"	1.80		15.0			0.0		--	--	--	--	--	--	--	1	SPARE	46
47	GEN JACKET WATER HEATER	1	100	20	#12	#12	#12	3/4"	1.80			15.0			--	--	--	--	--	--	--	--	1	SPACE & BUS ONLY	48
49	SPARE	1	--	--	--	--	--	--	--	0.0			--			--	--	--	--	--	--	--	1	SPACE & BUS ONLY	50
51	SPARE	1	--	--	--	--	--	--	--		0.0			--		--	--	--	--	--	--	--	1	SPACE & BUS ONLY	52
53	SPARE	1	--	--	--	--	--	--	--			0.0			--	--	--	--	--	--	--	--	1	SPACE & BUS ONLY	54
								TOTAL KVA:	57.35	**A**	**B**	**C**												
								TOTAL AMPS:		149.0	172.9	158.6													

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC	2294.0 VA	100.00%	2294.0 VA		
LIGHTS	0.0 VA	0.00%	0.0 VA	**TOTAL CONN. LOAD:**	57354.0 VA
REC	55060.0 VA	59.08%	32530.0 VA	**TOTAL EST. DEMAND:**	34824.0 VA
WATER HEATER	0.0 VA	0.00%	0.0 VA	**TOTAL CONN.:**	159 A
OVERHEAD DOOR	0.0 VA	0.00%	0.0 VA	**TOTAL EST. DEMAND:**	97 A

1

BRANCH PANEL: EM3

VOLTS: 120/208 Wye
PHASES: 3
WIRES: 4
FED FROM: PANEL EM2

A.I.C. RATING: 22 KACI
MAINS TYPE: MLO
MAINS RATING: 100A MLO
BUS: RATING: 100A

1

NOTES:

CKT	LOAD NAME	P	AF	AT	LINE	NEUT	EGC	COND SIZE	CONN KVA	A	B	C	A	B	C	CONN KVA	COND SIZE	EGC	NEUT	LINE	AT	AF	P	LOAD NAME	CKT
1										3.0			3.0												2
3	OVERHEAD DOOR APPARATUS BAYS 140	3	100	20	#12	#12	#12	3/4"	1.08		3.0			3.0		1.08	3/4"	#12	#12	#12	20	100	3	OVERHEAD DOOR APPARATUS BAYS 140	4
5												3.0			3.0										6
7	OVERHEAD DOOR APPARATUS BAYS 140	3	100	20	#12	#12	#12	3/4"	1.08	3.0			3.0			1.08	3/4"	#12	#12	#12	20	100	3	OVERHEAD DOOR APPARATUS BAYS 140	8
9											3.0			3.0											10
11												3.0			3.0										12
13	OVERHEAD DOOR APPARATUS BAYS 140	3	100	20	#12	#12	#12	3/4"	1.08	3.0			3.0			1.08	3/4"	#12	#12	#12	20	100	3	OVERHEAD DOOR APPARATUS BAYS 140	14
15											3.0			3.0											16
17												3.0			3.0										18
19	REC EXERCISE 149	1	100	20	#12	#12	#12	3/4"	1.92	16.0			16.0			1.92	3/4"	#12	#12	#12	20	100	1	CORD REEL APPARATUS BAYS 140	20
21	HOT BOX	1	100	20	#12	#12	#12	3/4"	1.92		16.0			10.0		2.08	3/4"	#12	#12	#12	20	100	2	HP-1 ROOTOP & FCU-1 IT 114	22
23	REC SHOP 144	1	100	20	#12	#12	#12	3/4"	1.92			16.0			10.0										24
25	REC PANTRY 117	1	100	20	#12	#12	#12	3/4"	0.72	6.0			3.0			0.36	3/4"	#12	#12	#12	20	100	1	REC LINE OFFICERS 115	26
27	REC PANTRY 118	1	100	20	#12	#12	#12	3/4"	0.72		6.0			3.0		0.36	3/4"	#12	#12	#12	20	100	1	REC LINE OFFICERS 115	28
29	REC PANTRY 119	1	100	20	#12	#12	#12	3/4"	0.72			6.0			4.5	0.54	3/4"	#12	#12	#12	20	100	1	REC LINE OFFICERS 115	30
31	REC DINING 120	1	100	20	#12	#12	#12	3/4"	0.18	1.5			4.5			0.54	3/4"	#12	#12	#12	20	100	1	REC LINE OFFICERS 115	32
33	REC APPARATUS BAYS 140	1	100	20	#12	#12	#12	3/4"	1.92		16.0			24.0		2.88	3/4"	#10	#10	#10	30	100	1	CORD REEL APPARATUS BAYS 140	34
35	REC APPARATUS BAYS 140	1	100	20	#12	#12	#12	3/4"	2.88			24.0			16.0	1.92	3/4"	#12	#12	#12	20	100	1	CORD REEL APPARATUS BAYS 140	36
37	REC APPARATUS BAYS 140	1	100	20	#12	#12	#12	3/4"	1.92	16.0			0.9			0.10	3/4"	#12	#12	#12	20	100	1	WATER HEATER WATER HEATER 142	38
39	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			0.5		0.06	3/4"	#12	#12	#12	20	100	1	HOOD CONTROL POWER	40
41	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			0.0	--	--	--	--	--	--	--	1	SPARE	42
43	SPACE & BUS ONLY	1	--	--	--	--	--	--	--	--			0.0			--	--	--	--	--	--	--	1	SPARE	44
45	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			0.0		--	--	--	--	--	--	--	1	SPARE	46
47	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			0.0	--	--	--	--	--	--	--	1	SPARE	48
49	SPACE & BUS ONLY	1	--	--	--	--	--	--	--	--			0.0			--	--	--	--	--	--	--	1	SPARE	50
51	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			0.0		--	--	--	--	--	--	--	1	SPARE	52
53	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			0.0	--	--	--	--	--	--	--	1	SPARE	54
								TOTAL KVA:	32.06	**A**	**B**	**C**												
								TOTAL AMPS:		81.9	93.8	94.8													

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC	2140.0 VA	100.00%	2140.0 VA		
LIGHTS	0.0 VA	0.00%	0.0 VA	**TOTAL CONN. LOAD:**	32064.0 VA
REC	23340.0 VA	71.42%	16670.0 VA	**TOTAL EST. DEMAND:**	25394.0 VA
WATER HEATER	104.0 VA	100.00%	104.0 VA	**TOTAL CONN.:**	89 A
OVERHEAD DOOR	6480.0 VA	100.00%	6480.0 VA	**TOTAL EST. DEMAND:**	70 A

1

BRANCH PANEL: EM2

VOLTS: 120/208 Wye
PHASES: 3
WIRES: 4
FED FROM: TRANSFORMER T-EM2

A.I.C. RATING: 22 KAIC
MAINS TYPE: MCB
MAINS RATING: 150A MCB
BUS: RATING: 225A

1

NOTES:

CKT	LOAD NAME	P	AF	AT	LINE	NEUT	EGC	COND SIZE	CONN KVA	A	B	C	A	B	C	CONN KVA	COND SIZE	EGC	NEUT	LINE	AT	AF	P	LOAD NAME	CKT
1										81.9			6.0			0.72	3/4"	#12	#12	#12	20	100	1	REC DAYROOM 121	2
3	PANEL EM3	3	100	100	#3	#3	#8	1 1/4"	32.06		93.8			6.0		0.72	3/4"	#12	#12	#12	20	100	1	REC DAYROOM 121	4
5												94.8			6.0	0.72	3/4"	#12	#12	#12	20	100	1	REC DAYROOM 121	6
7	REC ROOMS 102, 101	1	100	20	#12	#12	#12	3/4"	0.90	7.5			3.0			0.36	3/4"	#12	#12	#12	20	100	1	REC EMS STORAGE 123	8
9	REC LOBBY 103	1	100	20	#12	#12	#12	3/4"	1.20		10.0			3.0		0.36	3/4"	#12	#12	#12	20	100	1	REC EMS STORAGE 123	10
11	REC LOBBY 103	1	100	20	#12	#12	#12	3/4"	0.60			5.0			1.5	0.18	3/4"	#12	#12	#12	20	100	1	REC RADIO CHARGING	12
13	REC LOBBY 103	1	100	20	#12	#12	#12	3/4"	1.20	10.0			1.5			0.18	3/4"	#12	#12	#12	20	100	1	REC RADIO CHARGING	14
15	REC ROOMS 104, 103	1	100	20	#12	#12	#12	3/4"	0.54		4.5			1.5		0.18	3/4"	#12	#12	#12	20	100	1	REC RADIO CHARGING	16
17	REC OFFICE 105	1	100	20	#12	#12	#12	3/4"	0.72			6.0			1.5	0.18	3/4"	#12	#12	#12	20	100	1	REC RADIO CHARGING	18
19	REC OFFICE 106	1	100	20	#12	#12	#12	3/4"	0.72	6.0			1.5			0.18	3/4"	#12	#12	#12	20	100	1	REC RADIO CHARGING	20
21	REC SHOWER 107	1	100	20	#12	#12	#12	3/4"	0.36		3.0			6.0		0.72	3/4"	#12	#12	#12	20	100	1	REC RADIO CHARGING	22
23	REC OFFICE 108	1	100	20	#12	#12	#12	3/4"	0.72			6.0			1.5	0.18	3/4"	#12	#12	#12	20	100	1	REC CORRIDOR 125 (AFCI BREAKER)	24
25	REC KITCHEN MICROWAVE	1	100	20	#12	#12	#12	3/4"	0.18	1.5			6.0			0.72	3/4"	#12	#12	#12	20	100	1	REC BUNK 130 (AFCI BREAKER)	26
27	REC TOILET 110	1	100	20	#12	#12	#12	3/4"	0.36		3.0			1.5		0.18	3/4"	#12	#12	#12	20	100	1	REC ELECTRICAL 126	28
29	REC LINE OFFICERS 115	1	100	20	#12	#12	#12	3/4"	0.18			1.5			1.5	0.18	3/4"	#12	#12	#12	20	100	1	REC SHOWER 127	30
31	REC TRAINING / EOC 112	1	100	20	#12	#12	#12	3/4"	0.36	3.0			1.5			0.18	3/4"	#12	#12	#12	20	100	1	REC SHOWER 128	32
33	REC TRAINING / EOC 112	1	100	20	#12	#12	#12	3/4"	0.36		3.0			1.5		0.18	3/4"	#12	#12	#12	20	100	1	REC SHOWER 129	34
35	REC TRAINING / EOC 112	1	100	20	#12	#12	#12	3/4"	0.54			4.5			6.0	0.72	3/4"	#12	#12	#12	20	100	1	REC BUNK 131 (AFCI BREAKER)	36
37	REC TRAINING / EOC 112	1	100	20	#12	#12	#12	3/4"	0.54	4.5			6.0			0.72	3/4"	#12	#12	#12	20	100	1	REC BUNK 132 (AFCI BREAKER)	38
39	REC TRAINING / EOC 112	1	100	20	#12	#12	#12	3/4"	0.54		4.5			6.0		0.72	3/4"	#12	#12	#12	20	100	1	REC BUNK 133 (AFCI BREAKER)	40
41	REC TRAINING / EOC 112	1	100	20	#12	#12	#12	3/4"	0.54			4.5			6.0	0.72	3/4"	#12	#12	#12	20	100	1	REC BUNK 134 (AFCI BREAKER)	42
43	REC TRAINING / EOC 112	1	100	20	#12	#12	#12	3/4"	0.72	6.0			6.0			0.72	+	#12	#12	#12	20	100	1	REC BUNK 135 (AFCI BREAKER)	44
45	REC TRAINING / EOC 112	1	100	20	#12	#12	#12	3/4"	0.54		4.5			3.0		0.36	3/4"	#12	#12	#12	20	100	1	REC LAUNDRY 136	46
47	REC IT 114	1	100	20	#12	#12	#12	3/4"	0.18			1.5			1.5	0.18	3/4"	#12	#12	#12	20	100	1	REC LAUNDRY 136	48
49	REC TABLE STORAGE 113	1	100	20	#12	#12	#12	3/4"	0.18	1.5			15.0			1.80	3/4"	#12	#12	#12	25	100	1	REC LAUNDRY 136	50
51	REC KITCHEN 116	1	100	20	#12	#12	#12	3/4"	0.18		1.5			30.0											52
53	REC KITCHEN 116	1	100	20	#12	#12	#12	3/4"	0.72			6.0			30.0	6.24	3/4"	#10	#8	#8	50	100	2	REC LAUNDRY 136	54
55	REC KITCHEN 116	1	100	20	#12	#12	#12	3/4"	0.72	6.0			6.0			0.72	3/4"	#12	#12	#12	20	100	1	REC BUNK 137 (AFCI BREAKER)	56
57	REC KITCHEN 116	1	100	20	#12	#12	#12	3/4"	0.36		3.0			6.0		0.72	3/4"	#12	#12	#12	20	100	1	REC OIC BUNK 138 (AFCI BREAKER)	58
59	REC ROOMS 120, 116	1	100	20	#12	#12	#12	3/4"	0.72			6.0			1.5	0.18	3/4"	#12	#12	#12	20	100	1	REC DECON 143	60
61	REC DINING 120	1	100	20	#12	#12	#12	3/4"	0.54	4.5			1.9			0.23	3/4"	#12	#12	#12	20	100	1	LIGHTS DAYROOM 121	62
63	REC DINING 120	1	100	20	#12	#12	#12	3/4"	0.36		3.0			3.0		0.36	3/4"	#12	#12	#12	20	100	1	REC ROOFTOP	64
65	REC DAYROOM 121	1	100	20	#12	#12	#12	3/4"	0.54			4.5			3.0	0.36	3/4"	#12	#12	#12	20	100	1	REC TRIAGE 102	66
67	SPACE & BUS ONLY	1	--	--	--	--	--	--	--	--			0.0			--	--	--	--	--	--	--	1	SPARE	68
69	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			0.0		--	--	--	--	--	--	--	1	SPARE	70
71	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			0.0	--	--	--	--	--	--	--	1	SPARE	72
73	SPACE & BUS ONLY	1	--	--	--	--	--	--	--	--			0.0			--	--	--	--	--	--	--	1	SPARE	74
75	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			0.0		--	--	--	--	--	--	--	1	SPARE	76
77	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			0.0	--	--	--	--	--	--	--	1	SPARE	78
79	SPACE & BUS ONLY	1	--	--	--	--	--	--	--	--			0.0			--	--	--	--	--	--	--	1	SPARE	80
81	SPACE & BUS ONLY	1	--	--	--	--	--	--	--		--			0.0		--	--	--	--	--	--	--	1	SPARE	82
83	SPACE & BUS ONLY	1	--	--	--	--	--	--	--			--			0.0	--	--	--	--	--	--	--	1	SPARE	84
								TOTAL KVA:	69.25	**A**	**B**	**C**												
								TOTAL AMPS:		186.7	196.9	195.9													

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC	2140.0 VA	100.00%	2140.0 VA		
LIGHTS	225.0 VA	125.00%	281.3 VA	**TOTAL CONN. LOAD:**	69249.0 VA
REC	60300.0 VA	58.29%	35150.0 VA	**TOTAL EST. DEMAND:**	44155.3 VA
WATER HEATER	104.0 VA	100.00%	104.0 VA	**TOTAL CONN.:**	192 A
OVERHEAD DOOR	6480.0 VA	100.00%	6480.0 VA	**TOTAL EST. DEMAND:**	123 A

1

SEH

MICHAEL G. BEASLEY JR
Lic. No. 057808
8/28/2025

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

SEH Project	LIBUN 178342
Checked By	MGB
Drawn By	TBC

Project Status	**Issue Date**
CONSTRUCTION DOCUMENTS	8/28/2025

REVISION SCHEDULE

REV. #	DESCRIPTION	DATE
1	ADDENDUM #2	9/26/2025

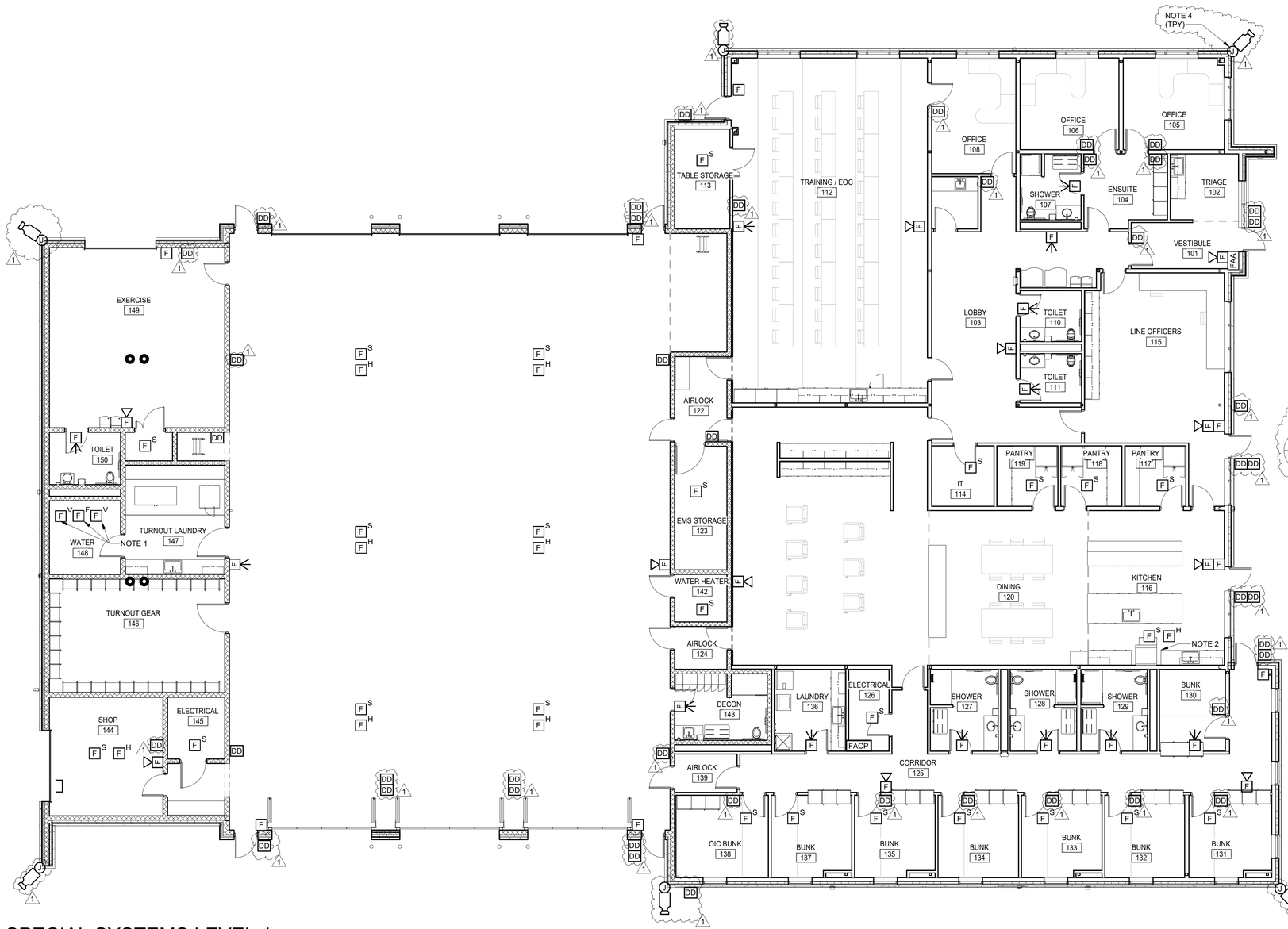
PANEL SCHEDULES (2 OF 2)

MASTER ENGINEERS & DESIGNERS
558-1919
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351

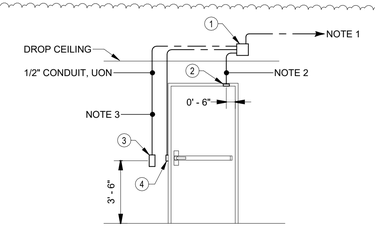
E303

NOTES (SHEET E401)

1. PROVIDE FOR EACH FIRE SPRINKLER ZONE.
2. PROVIDE INTERFACE WITH GAS SUPPLY TO STOVE SUCH THAT SUPPLY IS SHUT OF IN EVENT OF FIRE ALARM SYSTEM ACTIVIATION.
3. CONTRACTOR SHALL SUPPLY AND INSTALL DUCT SMOKE DETECTORS IN SUPPLY AND RETURN DUCT FOR RTU-1 AND RTU-5.
4. VIDEO SURVEILANCE SYSTEM CAMERA LOCATION. INSTALL SINGLE-GANG OUTLET BOX. FROM DEVICE OUTLET BOX, RUN EMPTY 3/4" EMT IN WALL, TURN OUT IN CEILING PLENUM AND TERMINATE WITH BUSHING. INSTALL PULL STRING. VIDEO SYSTEM BY SECURITY VENDOR.
5. DISPATCH DEVICE LOCATION. INSTALL SINGLE-GANG OUTLET BOX. FROM DEVICE OUTLET BOX, RUN EMPTY 3/4" EMT IN WALL, TURN OUT IN CEILING PLENUM AND TERMINATE WITH BUSHING. INSTALL PULL STRING. EMS DISPATCH SYSTEM BY EMS VENDOR.



1 E401 SPECIAL SYSTEMS LEVEL 1
1/8" = 1'-0"



1. PROVIDE JUNCTION BOX AND COVER PLATE FLUSH MOUNTED IN CEILING.
2. STUB CONDUIT INTO HEAD OF DOOR FRAME FOR CONCEALED DOOR POSITION SWITCH.
3. PROVIDE 4" X 4" X 2 1/8" DEEP BOX WITH SINGLE GANG DEVICE RING FLUSH MOUNTED FOR CARD READER.
4. ROUGH-IN FOR ELECTRIC STRIKE. COORDINATE WITH DOOR VENDOR.

NOTE:
DETAIL REPRESENTS TYPICAL BACKBOX AND CONDUIT REQUIREMENTS. EXACT DEVICE REQUIREMENTS AND LOCATIONS MAY DIFFER. COORDINATE FINAL REQUIREMENTS WITH OWNERS SECURITY VENDOR.

2 E401 Access Control
1/4" = 1'-0"

1/8" = 1'-0"
0' 4' 8' 16' 32'

PROJECT NORTH

MASTER ENGINEERS & DESIGNERS
904 Lakeside Drive, Lynchburg, VA 24501
434-846-1350 Fax: 434-846-1351
558-1919

SEH

COMMONWEALTH OF VIRGINIA
MICHAEL G. BEASLEY JR
Lic. No. 057808
8/28/2025
PROFESSIONAL ENGINEER

Project Owner

LYNCHBURG FIRE STATION 9 AT LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE

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SPECIAL SYSTEMS PLAN LEVEL 1

E401