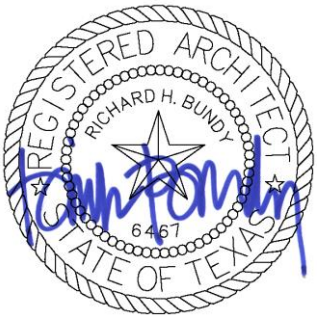
January 17, 2019 ADDENDUM NO. 2

A New Facilities Services Maintenance Building for:
Midwestern State University
Wichita Falls, Texas



BYSP PROJECT NO. 18002 *January 17, 2019*

TO: All Contract Bidders of Record

The following changes are hereby made a part of the Plans and Specifications the same as if written therein.

Acknowledge receipt of this addendum by inserting its number and date in the Contractor's Bid Proposal. Failure to do so may subject bidder to disqualification. This addendum forms a part of the Contract Documents and modifies them as follows:

CLARAFICATIONS:

Item No. 1:
Additive Alternate No. 5:
Alternate to include, complete design and installation of the fire suppression system, installation of the 6" fire line as shown on Civil drawings and any additional Fire Alarm System requirements necessary to meet code.

SPECIFICATIONS:

Item No. 2:
Section 230595 HVAC Controls:
Add specification 23 05 95 HVAC Controls attached to this addendum to the project specification manual.

Item No. 3:
Section 230713 Duct Insulation:
Replace specification 23 07 13 Duct Insulation issued 12/11/2018 with the attached specification 23 07 13 Duct insulation. Changes include modifications to section 230713.3.06 Duct Insulation Schedule, General

Item No. 4:
Section 323100 Steel Roll Gate System:
Change Gate Operator to Door King Model 9150 with 1 HP motor for gates with a maximum length of 45' and weight of 1,500 lbs in lieu of ½ HP operator.

SPECIFICATIONS CONT'D:

Item No. 5:
Section 283111 Digital, Addressable Fire Alarm System:
Contractor to provide design and installation of a Fire Alarm System for an un-sprinkled building as the Base Bid. Contractor shall also provide alternate pricing under Additive Alternate #5 for additional requirements of the Fire Alarm System required with the installation of the specified Fire Alarm System.

DRAWINGS:

Item No. 6:
Sheet C-1: Existing Site & Demolition Plan
See attached revised drawing C-1 showing demolition of the existing concrete alley paving, mark as Revision #2.

Item No. 7:
Sheet C-3: Utility Plan
Remove Sand Trap located at SW corner of building from the project.

Item No. 8:
Sheet SP101: Site Plan
Disregard three locations of Key Note 22 on the east side of the building. Refer Sheet E101 for locations and requirements of electrical outlets for golf cart charging stations.

Item No. 9:
Sheet SP102: Enlarged Plan
Remove Sand Trap located at SW corner of building from the project.

Item No. 10:
Sheet SP102: Enlarged Site Plan
Provide two 36" w x 17'-0" L x 8" thick concrete footings below fuel tank saddles as shown in revised drawing 2/SP102.1 attached to this addendum. Provide additional reinforcing of #4's and 12" O.C.E.W. for footings. Contractor to verify the footing locations with tank manufacturer prior to installation.

Item No. 11:
Sheet A101: Floor Plan
Provide two 4" dia. floor mounted steel bollards per Key Note 26 at interior side of OH door 101A similar to the layout of other OH doors.

Item No. 12:
Sheet M102: Mechanical Schedules
Replace drawing M102 issued 12/11/2018 with the attached drawing M102. Changes include modifications and additions to the Dust Collection System schedule.

Item No. 13:
Sheet M201: Ground Floor Mechanical Plan
Replace drawing M201 issued 12/11/2018 with the attached drawing M201.
Changes include:

1. Removal of relocated welding hood and associated ductwork and exhaust fan in Grounds M106.
2. Modifications to air flows in Grounds Storage M107
3. Duct size changes for dust collection system in Carpentry.
4. Re-arrange, modify Dust Collector orientation and ductwork requirements
5. Note added for doors in offices below Equipment Platforms to have the door undercut for return air.

Item No. 14:
Sheet M202: Mechanical Isometric
Replace drawing M202 issued 12/11/2018 with the attached drawing M202. Changes reflected on drawing M201 duplicated in riser.

Item No. 15:
Sheet M303: Mechanical Controls:
Replace note 4 in Sequence of Operations to read:

4. Temperature Control System: Andover Control System.

Item No. 16:
Sheet M401: Fuel Oil System
Delete Delegated Design Note on drawing M401. Replace note with the following: Provide and install two-2,000 gallon above ground UL 2085 Fireguard fuel oil tanks, single walled fuel oil piping from each above ground fuel tanks; one dual product, dual suction pump fuel dispenser similar to GASBOY Atlas 9853KXTW2; and all associated systems and items for a complete fuel system for dispensing of gasoline & diesel fuels.

Item No. 17:
Replace Electrical drawings issued 12/11/2018 with the attached drawings listed below and attached to this addendum. Revisions are clouded and mark as Revision # 2

1. E101
2. E301
3. E400
4. E501
5. E502
6. E503

END OF ADDENDUM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes insulating the following duct services:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in unconditioned space.
4. Indoor, exposed return located in unconditioned space.
5. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
6. Outdoor, concealed supply and return.
7. Outdoor, exposed supply and return.

B. Related Sections:

1. Section 233113 "Metal Ducts" for duct liners.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
3. Detail application at linkages of control devices.

1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

C. Field quality-control reports.

1.05 QUALITY ASSURANCE

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.07 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields.

B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.08 SCHEDULING

A. Schedule insulation application with other trades.

PART 2 PRODUCTS

2.01 INSULATION MATERIALS

A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSP jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; SoftTouch Duct Wrap.

b. Johns Manville; Microlite.

c. Knauf Insulation; Friendly Feel Duct Wrap.

d. Manson Insulation Inc.; Alley Wrap.

e. Owens Corning; SOFTR All-Service Duct Wrap.

2.02 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.Eagle Bridges - Marathon Industries; 225.

b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, provide one of the following:
    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
    b. Eagle Bridges - Marathon Industries; 225.
    c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50.Mon-Eco Industries, Inc.; 22-25.
2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.03 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.
1. Products: Subject to compliance with requirements, provide one of the following:
    a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
    b. Vimasco Corporation; 749.
2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.
1. Products: Subject to compliance with requirements, provide one of the following:
    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-30.
    b. Eagle Bridges - Marathon Industries; 501.
    c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-35.
    d. Mon-Eco Industries, Inc.; 55-10.
2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
3. Service Temperature Range: 0 to 180 deg F.
4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
5. Color: White.

2.04 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.05 SECUREMENTS

A. Insulation Pins and Hangers:

1. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

a. Products: Subject to compliance with requirements, provide one of the following:

1) AGM Industries, Inc.; Tactoo Perforated Base Insul-Hangers.

2) GEMCO; Perforated Base.

3) Midwest Fasteners, Inc.; Spindle.

b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.

c. Spindle: Copper- or zinc-coated, low-carbon steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.

d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

a. Products: Subject to compliance with requirements, provide one of the following:

1) AGM Industries, Inc.; RC-150.

2) GEMCO; R-150.

3) Midwest Fasteners, Inc.; WA-150.

4) Nelson Stud Welding; Speed Clips.

b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.

2. Verify that surfaces to be insulated are clean and dry.

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

3.02 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.03 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.

2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.

3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.

2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.

3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.

a. For below ambient services, apply vapor-barrier mastic over staples.

4. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.04 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.

2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.

3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.

4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.

2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.

3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.

4. Seal jacket to wall flashing with flashing sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.

1. Comply with requirements in Section 078413 "Penetration Firestopping" and fire-resistive joint sealers.

E. Insulation Installation at Floor Penetrations:

1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.

2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.05 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.

2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.

3. Install pins and speed washers on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.

b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.

c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.

d. Do not overcompress insulation during installation.

e. Impale insulation over pins and attach speed washers.

f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

   a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.

   b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.

6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.

7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.06 DUCT INSULATION SCHEDULE, GENERAL

A. Service: Round, supply-air ducts.

1. Material: Fibrous glass blanket
2. Thickness: 1-1/2 inch.
3. Number of Layers: One.
4. Vapor Retarder Required: Yes.

B. Service: Round, exhaust-air ducts.
1. Not required.

C. Service: Rectangular, supply-air ducts.

1. Material: Fibrous glass flexible liner.
2. Thickness: 1-1/2 inch.
3. Number of Layers: One.
4. Vapor Retarder Required: No.

D. Service: Rectangular, exhaust-air ducts.

1. Material: Fibrous glass flexible liner.
2. Thickness: 1 inch.
3. Number of Layers: One.
4. Vapor Retarder Required: No.

E. Service: Rectangular, return-air ducts.

1. Material: Fibrous glass flexible liner.
2. Thickness: 1 inch.
3. Number of Layers: One.
4. Vapor Retarder Required: No.
5.

END OF SECTION

SECTION **23 05 95** **HVAC CONTROLS**

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

1.1 SCOPE

A. Complete system of DDC/EMS control and automation shall be furnished and installed for the various systems in accordance with the plans and specification. The EMS system shall be an extension to and 100% compatible with owner's existing "Andover Controls" building automation system. Communication will be over the MSU area network. Provide all software available for the proposed system (must include animated graphics, DDC graphical programming, multipoint trending, scheduling and all configuration software and a software license. The operator's workstation, all building controllers, application controllers, and all input/output devices shall communicate using an open protocol. In other words, all workstations and controllers, including unitary controllers, shall be open protocol devices. No gateways shall be used for communication to controllers installed under this section.

B. Provide all necessary hardware and software to meet the system's functional specifications.

C. Prepare individual hardware layouts, interconnection drawings, and software configuration from project design data.

D. Implement the detailed design for all analog and binary objects, system databases, graphic displays, logs, and management reports based on control descriptions, logic drawings, configuration data, and bid documents.

E. Design, provide, and install all equipment cabinets, panels, data communication network cables needed, and all associated hardware.

F. Provide and install all interconnecting cables between supplied cabinets, application controllers, and input/output devices.

G. Provide and install all interconnecting cables between all operator's terminals and peripheral devices (such as printers, etc.) supplied under this section.

H. Provide complete manufacturer's specifications for all items that are supplied. Include vendor name of every item supplied.

I. Provide supervisory specialists and technicians at the job site to assist in all phases of system installation, startup, and commissioning.

J. Provide a comprehensive operator and technician training program as described herein.

K. Provide as-built documentation, operator's terminal software, diagrams, and all other associated project operational documentation (such as technical manuals) on approved media, the sum total of which accurately represents the final system.

L. Provide new sensors and controllers. No used components shall be used as any part or piece of installed system.

1.2 SYSTEM DESCRIPTION

A. A distributed logic control system complete with all software and hardware functions shall be provided and installed. System shall be completely based on an open protocol. This system is to control all mechanical equipment, including all unitary equipment such as rooftop units, heat pumps, fan coil units, and split AC units. The system should also control miscellaneous points such as lighting and cooler/freezer temperatures.

B. Proprietary equipment or systems (including gateways) shall not be acceptable and are specifically prohibited.

D. Building controllers shall include complete energy management software, including scheduling building control strategies and logging routines. All energy management software and firmware shall be resident in field hardware and shall not be dependent on the operator's terminal. Operator's terminal software is to be used for access to field-based energy management functions only. Provide zone-by-zone direct digital logic control of space temperature, scheduling, runtime accumulation, equipment alarm reporting, and override timers for after-hours usage.

E. All application controllers for every terminal unit (Split system) and any other piece of controlled equipment shall be fully programmable. Application controllers shall be mounted next to controlled equipment and communicate with building controller via LAN.

F. Room thermostats shall be provided with digital readout that allow the user to view and adjust the room setpoint within preset limits and set desired override time. User shall also be able to start and stop unit from the digital thermostat. Include all necessary wiring and firmware such that room sensor includes field service mode.

1.3 APPROVED MANUFACTURERS

A. Andover

1.4 QUALITY ASSURANCE

A. Responsibility: The supplier of the EMCS shall be responsible for inspection and Quality Assurance (QA) for all materials and workmanship furnished.

B. Component Testing: Maximum reliability shall be achieved through extensive use of high-quality, pre-tested components. Each and every controller, sensor, and all other DDC components shall be individually tested by the manufacturer prior to shipment.

C. Tools, Testing and Calibration Equipment: The EMCS supplier shall provide all tools, testing, and calibration equipment necessary to ensure reliability and accuracy of the system.

D. Control system shall be engineered, programmed, supported, and serviced completely by representative's local office that must be within 75 miles of project site.

1.5 REFERENCE STANDARDS

A. The latest edition of the following standards and codes in effect and amended as of supplier's proposal date, and any applicable subsections thereof, shall govern design and selection of equipment and material supplied:

1. Uniform Building Code (UBC), including local amendments.

2. UL 916 Underwriters Laboratories Standard for Energy Management Equipment. Canada and the US.

3. National Electrical Code (NEC).

4. FCC Part 15, Subpart J, Class A

5. EMC Directive 89/336/EEC (European CE Mark)

B. City, county, state, and federal regulations and codes in effect as of contract date.

C. Except as otherwise indicated the system supplier shall secure and pay for all permits, inspections, and certifications required for his work and arrange for necessary approvals by the governing authorities.

1.6 SUBMITTALS

A. Drawings

1. The system supplier shall submit engineered drawings, control sequence, and bill of materials for approval.

2. Drawings shall be submitted in the following standard sizes: 11” x 17” (ANSI B).

3. Eight complete sets (copies) of submittal drawings shall be provided.

4. Drawings shall be available on CD-ROM.

B. System Documentation

Include the following in submittal package:

1. System configuration diagrams in simplified block format.

2. All input/output object listings and an alarm point summary listing.

3. Electrical drawings that show all system internal and external connection points, terminal block layouts, and terminal identification.

4. Complete bill of materials, valve schedule and damper schedule.

5. Manufacturer's instructions and drawings for installation, maintenance, and operation of all purchased items.

6. Overall system operation and maintenance instructions—including preventive maintenance and troubleshooting instructions.

7. Provide complete description and documentation of any proprietary services and/or objects used in the system.

9. A list of all functions available and a sample of function block programming that shall be part of delivered system.

C. Scheduling

1. The vendor shall provide a detailed project design and installation schedule with time markings and details for hardware items and software development phases. Schedule shall show all the target dates for transmission of project information and

documents and shall indicate timing and dates for system installation, debugging, and commissioning.

1.7 WARRANTY

A. Warranty shall cover all costs for parts, labor, associated travel, and expenses for a period of one year from completion of system acceptance.

B. Hardware and software personnel supporting this warranty agreement shall provide on-site or off-site service in a timely manner after failure notification to the vendor. The maximum acceptable response time to provide this service at the site shall be 24 hours Monday through Friday, 48 hours on Saturday and Sunday.

C. This warranty shall apply equally to both hardware and software.

PART 2 - PRODUCTS

2.1 2.2 BUILDING CONTROLLER

A. General

1. All communication with operator workstation and all application controllers shall be via open protocol. Building controller shall incorporate as a minimum, the functions of a router. Controller shall route messages between the high-speed LAN (Ethernet 10/100MHz) and open protocol DDC controller and support an on-board modem.

2. Building controller shall be capable of providing global control strategies for the system based on information from any objects in the system regardless if the object is directly monitored by the controller or by another controller. The program that implements these strategies shall be completely flexible and user definable. Any systems utilizing factory pre-programmed global strategies that cannot be modified by field personnel on-site or downloaded via remote communications are not acceptable. Changing global strategies via firmware changes is also unacceptable.

3. Programming shall be object-oriented using control function blocks, supporting DDC functions. All flowcharts shall be generated and automatically downloaded to controller. Programming tool shall be resident on workstation and the same tool used for all controllers.

4. Provide means to graphically view inputs and outputs to each program block in real-time as program is executing. This function may be performed via the operator's workstation or field computer.

5. Building controller shall provide battery-backed real-time (hardware) clock functions.

6. Controller shall have a memory needed to ensure high performance and data reliability. Battery shall retain static RAM memory and real-time clock functions for a minimum of 1.5 years (cumulative).

7. Global control algorithms and automated control functions should execute via 32-bit processor.

8. Controller installation shall include memory-free gel-cell battery providing

ongoing power conditioning and noise filtering for operation data integrity. It shall provide up to 5 minutes of powerless operation for orderly shutdown and data backup.

B. Logging Capabilities

1. Each building controller shall log as minimum 1000 trendlogs. Any object in the system (real or calculated) may be logged. Sample time interval shall be adjustable at the operator's workstation.

2. Logs may be viewed either on-site or off-site via remote communication.

3. Building controller shall periodically upload trended data to networked operator's workstation for long term archiving if desired.

4. Archived data stored in database format shall be available for use in third-party spreadsheet or database programs.

C. Alarm Generation

1. Alarms may be generated within the system for any object change of value or state either real or calculated. This includes things such as analog object value changes, binary object state changes, and various controller communication failures.

2. Each alarm may be dialed out as noted in paragraph 2 above.

3. Alarm log shall be provided for alarm viewing. Log may be viewed on-site at the operator's terminal or off-site via remote communications.

2.3 TERMINAL UNIT APPLICATION CONTROLLERS (SPLIT SYSTEMS)

A. Provide one controller for each piece of unitary mechanical equipment that adequately covers all points specified for unit. Controllers shall include input, output and self-contained logic program as needed for complete control of unit.

B. Application controllers shall include universal inputs with 10-bit resolution that can accept 10K thermistors, 0–5 VDC, 4–20 mA, dry contact signals and a minimum of 3 pulse inputs. Any input on controller may be either analog or digital. Controller shall also include support and modifiable programming for interface to intelligent room sensor. Controller shall include binary outputs on board with analog outputs as needed.

C. All program sequences shall be stored on board controller in EEPROM. No batteries shall be needed to retain logic program. All program sequences shall be executed by controller 10 times per second and shall be capable of multiple PID loops for control of multiple devices. Programming of application controller shall be completely modifiable in the field over installed LANs or remotely via modem interface. Operator shall program logic sequences by graphically moving function blocks on screen and tying blocks together on screen. Application controller shall be programmed using same programming tools as building controller and as described in operator workstation section. All programming tools shall be provided and installed as part of system.

E. Application controller shall include support for intelligent room sensor (see Section 2.9.B.) Display on room sensor shall be programmable at controller and include an operating mode and a field service mode. All button functions and display data shall be programmable to show specific controller data in each mode based on which button

is pressed on the sensor. See sequence of operation for specific display requirements at intelligent room sensor.

D. All program sequences shall be stored on board application controller in EEPROM. No batteries shall be needed to retain logic program. All program sequences shall be executed by controller 10 times per second and shall be capable of multiple PID loops for control of multiple devices. Programming of application controller shall be completely modifiable in the field over installed LANs or remotely via modem interface. Operator shall program logic sequences by graphically moving function blocks on screen and tying blocks together on screen. Application controller shall be programmed using the same programming tool as Building Controller and as described in operator workstation section. All programming tools shall be provided as part of system.

E. Application controller shall include support for intelligent room sensor (see Section 2.9.B.) Display on room sensor shall be programmable at application controller and include an operating mode and a field service mode. All button functions and display data shall be programmable to show specific controller data in each mode based on which button is pressed on the sensor. See sequence for specific display requirements for intelligent room sensor.

F. Provide duct temperature sensor at discharge of each HP/RTU/Split system for reporting back to operator workstation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Notify the owners' representative in writing of conditions detrimental to the proper and timely completion of the work.

C. Do not begin work until all unsatisfactory conditions are resolved.

3.2 INSTALLATION (GENERAL)

A. Install in accordance with manufacturer's instructions.

B. Provide all miscellaneous devices, hardware, software, interconnections installation and programming required to ensure a complete operating system in accordance with the sequences of operation and point schedules.

3.3 LOCATION AND INSTALLATION OF COMPONENTS

A. Locate and install components for easy accessibility; in general, mount 48 inches above floor with minimum 3'-0" clear access space in front of units. Obtain approval on locations from owner’s representative prior to installation.

B. All instruments, switches, transmitters, etc., shall be suitably wired and mounted to protect them from vibration, moisture and high or low temperatures.

3.4 INTERLOCKING AND CONTROL WIRING

A. Provide all interlock and control wiring. All wiring shall be installed neatly and professionally, in accordance with Specification Division 16 and all national, state and local electrical codes.

B. Provide wiring as required by functions as specified and as recommended by equipment manufacturers, to serve specified control functions. Provide shielded low capacitance wire for all communications trunks.

C. Control wiring shall not be installed in power circuit raceways. Magnetic starters and disconnect switches shall not be used as junction boxes. Provide auxiliary junction boxes as required. Coordinate location and arrangement of all control equipment with the owner's representative prior to rough-in.

D. Provide power for all control components from nearest electrical control panel or as indicated on the electrical drawings—coordinate with electrical contractor.

E. All control wiring in the mechanical, electrical, telephone and boiler rooms to be installed in raceways. All other wiring to be installed neatly and inconspicuously per local code requirements. If local code allows, control wiring above accessible ceiling spaces may be run with plenum rated cable (without conduit).

3.5 DDC OBJECT TYPE SUMMARY

A. Provide all database generation.

B. Displays

1. System displays shall show all analog and binary object types within the system. They shall be logically laid out for easy use by the owner. Provide outside air temperature indication on all system displays associated with economizer cycles.

E. Database Save

1. Provide back-up database for all stand-alone application controllers on disk.

3.6 TRAINING

A. Provide application engineer to instruct owner in operation of systems and equipment.

B. Provide system operator’s training to include (but not limited to) such items as the following: modification of data displays, alarm and status descriptors, requesting data, and execution of commands and request of logs. Provide this training to a minimum of 2 persons.

C. Provide on-site training above as required, up to 8 hours as part of this contract.

3.7 DEMONSTRATION

A. Demonstrate complete operating system to owner's representative.

B. Provide certificate stating that control system has been tested and adjusted for proper operation.

PART 4 - SEQUENCE OF OPERATIONS

4.1 GENERAL

A. Provide a complete and operational temperature control and building automation system based on the following points and sequence of operation. The system shall be complete as to sequences and standard control practices. The determined point list is

the minimum amount of points that are to be provided. If additional points are required to meet the sequence of operation, they will be provided.

B. DDC control – Split system units

1. Each unit shall be started and stopped by the EMCS. Automatic override during low or high ambient temperatures shall be provided. Provide an indoor air space temperature sensor for every unit and be capable of remote resetting of space temperature by Owner.

4.2 SINGLE-ZONE DX SPLIT SYSTEMS:

A. Each unit shall be provided with heating, cooling and fan sections; conventional thermostat interface (CTI) board. The EMCS contractor shall provide a dedicated stand-alone DDC controller for each unit. The occupied/unoccupied mode of operation shall be defined by the EMCS optimum start/stop schedule.

B. Unoccupied Mode: In the unoccupied mode of operation, the supply fan shall cycle on and off with the units heating and cooling. The DDC controller shall energize the heating or cooling as required to maintain the unoccupied heating and cooling setpoints (initially 55°F heating, 85°F cooling) as sensed by a space temperature sensor. On a rise in space temperature above the unoccupied cooling setpoint, the DDC controller shall energize the mechanical cooling. On a drop in space temperature below the unoccupied heating setpoint, the DDC controller shall energize the gas heating. On a rise in space temperature above the unoccupied heating setpoint, the reverse shall occur. Whenever the space sensor pushbutton override is depressed, the unit shall operate in the unoccupied mode of operation for an adjustable period of time (initially 1 hour). After the override time period has expired, the unit shall revert back to unoccupied operation.

C. Occupied Mode: In the occupied mode of operation, the unit supply fan shall cycle with a call for heating or cooling. The DDC controller shall energize the heating and cooling as required to maintain the occupied heating and cooling setpoints (initially 70°F heating, 74°F cooling) as sensed by the space temperature sensor. Space setpoint shall be user adjustable within ±2°F. On a rise in space temperature above the occupied cooling setpoint, the DDC controller shall energize the mechanical cooling. On a drop in space temperature below the occupied heating setpoint, the DDC controller shall energize the gas heating. On a rise in space temperature above occupied heating setpoint, the reverse shall occur.

D. Monitoring: Supply air temperature sensors shall be mounted in the supply air ductwork of each unit to monitor the supply air temperature.

E. Where noted on plans provide and install CO2 sensors and demand control ventilation sequence that shall control EMCS contractor provided damper actuator. System shall maintain space CO2 maximum of 1,200 ppm.

F. During unoccupied operation “night setback” periods, outside air dampers shall remain closed.

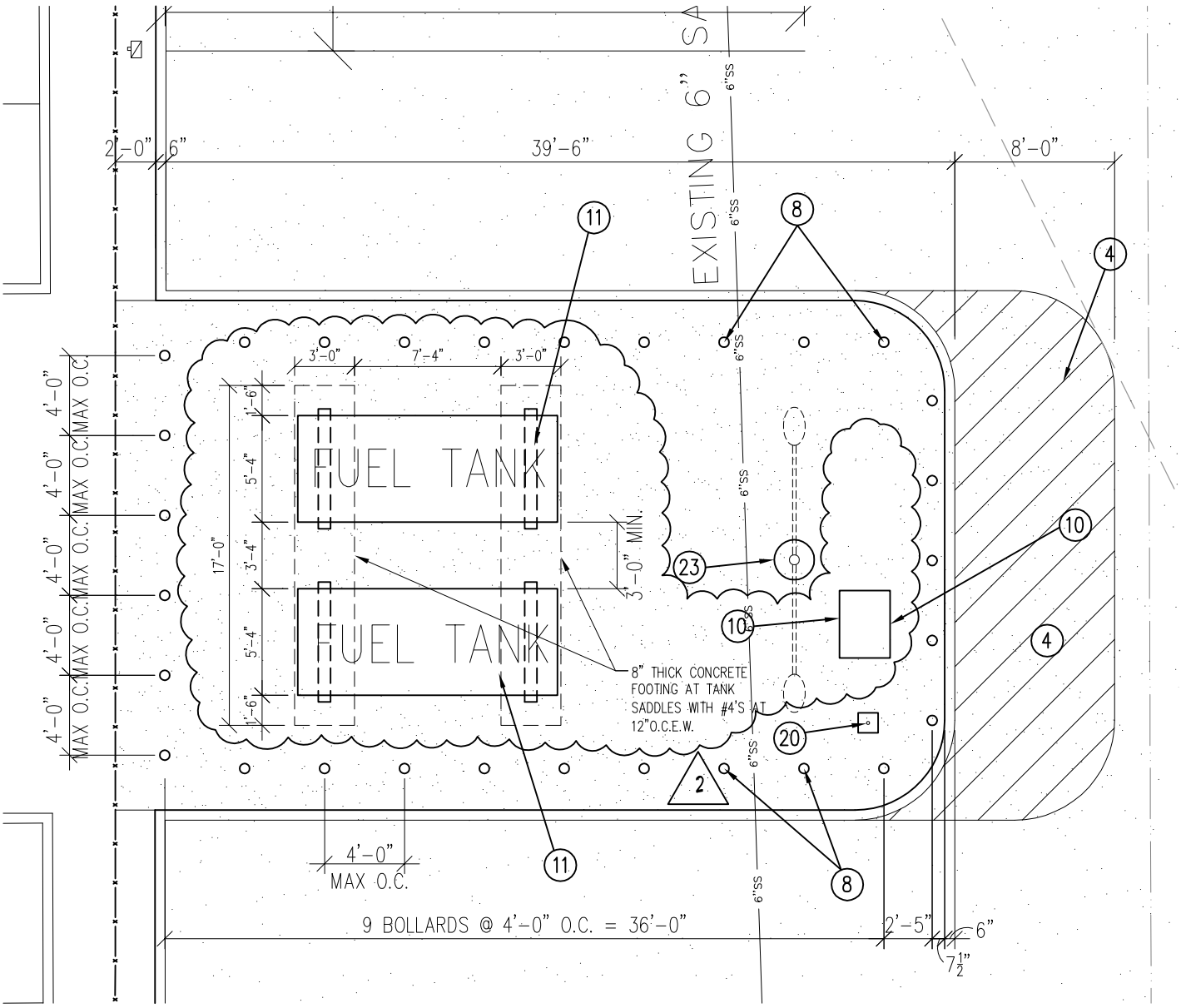
G. Provide 2% space humidity sensors for dehumidification process variable if applicable to unit options.

4.3 MISCELLANEOUS POINTS

A. Exhaust Fans: Provide DDC control and fan status (via current sensing relay) on exhaust fans noted to be controlled by the building automation system.

B. Outside Air Monitoring: Provide one outside air temperature and relative humidity sensor.

END OF SECTION



2 ENLARGED PLAN - FUELING STATION

SCALE: 1/8"=1'-0" (1/16" on 11x17)

0 5 10 20

2 01-17-19 REVISION PER ADDENDUM NO. 2

BYSParchitects

1005 Ninth Street - Suite 200 Wichita Falls, Texas 76301 (940) 761-2404
Member American Institute of Architects

NEW FACILITIES SERVICES MAINTENANCE BUILDING

MIDWESTERN STATE UNIVERSITY
WICHITA FALLS, TEXAS

PROJ. NO. 18002
DATE 01/14/19
DRAWING NO. SP102.1
ISSUED ADD. NO. 2

HAMPSTEAD LANE

REMOVE 459 SQ. FT. CONCRETE DRIVE APPROACH AND CURB

EXISTING PAVING TO REMAIN

SAW CUT LINE

15.0' SANITARY SEWER EASEMENT

REMOVE 26,355 SQ. FT. OF CONCRETE

LOT 2 BLOCK 46 HIGHLAND ADDITION

REMOVE 2084 SQ. FT. OF CONCRETE

REMOVE 550 SQ. FT. CONCRETE DRIVE APPROACH AND CURB

REMOVE 26,355 SQ. FT. OF CONCRETE

REMOVE 26,355 SQ. FT. OF CONCRETE

REMOVE 2,807 SQ. FT. OF CONCRETE ALLEY

2

BLOCK 46 HIGHLAND ADDITION

2 HANDICAPPED PARKING SPACES

ALLEY

12.0' UTILITY EASEMENT VOL. 568, PG. 345 W. C. D. R.

LOUIS J. RODRIGUEZ DRIVE

LOT 5 BLOCK 46 HIGHLAND ADDITION

APARTMENT SIGN

PIPE GUARDRAIL

PIPE GUARDRAIL

SCALE: 1" = 20'

LEGEND

GM	GAS METER
GM+R	GAS METER WITH RISER
LP	LIGHT POLE
MH	MANHOLE
PP	POWER POLE
CO	SEWER CLEANOUT
SV	SPRINKLER CONTROL VALVE
WM	WATER METER
WV	WATER VALVE
x	EXISTING FENCE
990	EXISTING INDEX CONTOUR
989	EXISTING INTERMEDIATE CONTOUR
	GUY WIRE
998.00	EXISTING SPOT ELEVATION
	EXISTING ASPHALT
	EXISTING CONCRETE
	EXISTING CONCRETE TO BE REMOVED
FND IR	PROPERTY CORNER (AS NOTED)

REV	DATE	DESCRIPTION
2	1/17/18	CONCRETE ALLEY TO BE REMOVED

STATE OF TEXAS REGISTERED DEVIN G. SMITH 6849 PROFESSIONAL LAND SURVEYOR 1/17/19

NEW FACILITIES SERVICES MAINTENANCE BUILDING

MSU TEXAS MIDWESTERN STATE UNIVERSITY

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DRAWN BY	WAT
CHECKED BY	DGS
DATE	DECEMBER, 2018
PROJECT NO.	33254

EXISTING SITE AND DEMOLITION PLAN

C 1

CORLETT, PROBST & BOYD, P.L.L.C.

TBPE F-279

4605 Old Jacksboro Highway Wichita Falls, Texas 76302

Telephone (940) 723-1455 Fax (940) 397-0549

C:\WALT\2018\33254\33254-DWG EXIST TOPO-DEMO C1 R-1/17/2019 10:50 AM S-1/17/2019 10:50 AM WALT

GAS FIRED FURNACE/DX SPLIT SYSTEM COOLING COIL SCHEDULE

MARK	NOMINAL SIZE (TONS)	SUPPLY AIRFLOW (ACFM)	OUTSIDE AIRFLOW (ACFM)	EXTERNAL STATIC PRESSURE (IN WC)	COOLING COIL PERFORMANCE							GAS HEAT PERFORMANCE				ELECTRICAL CHARACTERISTICS						MANUFACTURER MODEL NUMBER (AHU/COOLING COIL)	REMARKS
					T.C. (MBH)	S.C. (MBH)	ENTERING AIR		LEAVING AIR		MINIMUM EER/ SEER	ENTERING AIR (MAT) DB(°F)	MINIMUM CAPACITY (MBH)	INPUT (MBH)	OUTPUT (MBH)	INDOOR FAN HP	C/A FAN HP	VOLTS	PHASE	HZ	M.C.A.	MOCP		
							DB(°F)	WB(°F)	DB(°F)	WB(°F)														
AHU-1	4	1,600	400	0.7	39.7	30.5	82.3	65.6	59.0	55.7	13.0/15.5	59.4	57.9	100	92.1	3/4	1/20	115	1	60	13.5	20	TRANE, TUH2C120A94VA / 4TXCD063BC3HC	1 2 3 4
AHU-2	5	2,000	500	0.7	55.0	37.7	78.2	64.6	57.0	54.3	10.8/12.25	56.2	85	120	96	1/2	1/50	115	1	60	17	20	TRANE, TUH2C120A94VA / 4TXCD063BC3HC	1 2 3 4
AHU-3	5	2,000	500	0.7	55.0	37.7	78.2	64.6	57.0	54.3	10.8/12.25	56.2	85	120	96	1/2	1/50	115	1	60	17	20	TRANE, TUH2C120A94VA / 4TXCD063BC3HC	1 2 3 4
AHU-4	2.5	900	225	0.6	21.4	17.8	82.3	65.2	58.0	54.7	13.0/16.0	59.0	30.1	60	56	1/2	1/55	115	1	60	11.1	15	TRANE, TUH2B060A9V3VA / 4TXCC005CC3HC	1 2 3 4
AHU-5	3.5	1,240	300	0.6	38.7	28.7	81.1	65.9	58.0	56.1	12.5/15.0	57.4	59.4	100	92.1	3/4	1/25	115	1	60	12.4	15	TRANE, TUH1C100A9H41A / 4TXCD050BC3HC	1 2 3 4

1. EXTERNAL STATIC PRESSURE INDICATED IN SCHEDULE INCLUDES COOLING COIL (WET), DUCTWORK, BALANCING DAMPERS AND AIR DEVICES ONLYAND DOES NOT INCLUDE FILTER OR UNIT LOSSES
2. SIZE, ROUTE, INSULATE AND PROVIDE REQUIRED APPURTENANCES FOR DX PIPING SYSTEMS IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS
3. PROVIDE ALL EQUIPMENT AND ACCESSORIES, AND MAKE ALL NECESSARY CHANGES TO STANDARD EQUIPMENT, PER THE MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS FOR LONG REFRIGERANT LINE INSTALLATIONS.
4. PROVIDE WITH COMBUSTION-AIR INDUCER: CENTRIFUGAL FAN WITH THERMALLY PROTECTED MOTOR AND SLEEVE BEARINGS PREPURGES HEAT EXCHANGER AND VENTS COMBUSTION PRODUCTS; PRESSURE SWITCH PREVENTS FURNACE OPERATION IF COMBUSTION-AIR INLET OR FLUE OUTLET IS BLOCKED.

MOCP: MAXIMUM OVERCURRENT CIRCUIT PROTECTION

AIR COOLED CONDENSING UNIT SCHEDULE

MARK	SERVES	NOMINAL SIZE (TONS)	CONDENSING UNIT DATA							ELECTRICAL CHARACTERISTICS					MANUFACTURER MODEL NUMBER	REMARKS
			REFRIG TYPE	COMPRESSOR		COND. FANS		NO. REFR CIRC.	AMB. TEMP. (°F)	FAN DIA (IN)	VOLTS	PHASE	HZ	M.C.A.	M.O.C.P.	
				NO.	F.L. AMPS	NO.	HP EA.									
CU-1	AHU-1	4	R-410A	1	19.9	1	1/3	1	105	27.5	208	1	60	28	45	TRANE, 4TTB4049	1 2 3
CU-2	AHU-2	5	R-410A	1	21.9	1	1/2	1	105	27.5	208	1	60	31	45	TRANE, 4TTB4060	1 2 3
CU-3	AHU-3	5	R-410A	1	21.9	1	1/2	1	105	27.5	208	1	60	31	45	TRANE, 4TTB4060	1 2 3
CU-4	AHU-4	2.5	R-410A	1	9.1	1	1/5	1	105	27.5	208	1	60	12	20	TRANE, 4TTB4030	1 2 3
CU-5	AHU-5	3.5	R-410A	1	17.9	1	1/5	1	105	27.5	208	1	60	23	40	TRANE, 4TTB4042	1 2 3

1. SIZE, ROUTE, INSULATE AND PROVIDE REQUIRED APPURTENANCES FOR DX PIPING SYSTEMS IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS
2. PROVIDE CRANKCASE HEATER.
3. PROVIDE LOW-AMBIENT CONTROLS TO ALLOW OPERATION DOWN TO 35°F AMBIENT.

MOCP: MAXIMUM OVERCURRENT CIRCUIT PROTECTION

AIR DEVICE SCHEDULE

MARK	SERVES	TYPE	FACE SIZE	MOUNTING	MATERIAL	MANUFACTURER AND MODEL NUMBER	REMARKS
A	SUPPLY AIR	LOUVERED, UNIFORM FACE, FIXED / DIRECTIONAL DISCHARGE	24"x24"	LAY-IN	ALUMINUM	TITUS, MODEL TDC-AA	1 2 3 4
B	RETURN AIR	PERFORATED, FACE FLUSH W/ CEILING, 3/16"□ HOLES, 1/4" STAGGERED CTRS	24"x24"	LAY-IN	ALUMINUM	TITUS, MODEL PAR-AA	1 2 3 4
C	EXHAUST AIR	PERFORATED, FACE FLUSH W/ CEILING, 3/16"□ HOLES, 1/4" STAGGERED CTRS	24"x24"	DUCT	ALUMINUM	TITUS, MODEL PAR-AA	1 2 3 4
D	SUPPLY AIR	LOUVERED FACE, SURFACE MOUNT, 3/4" BLADE SPACING,35 DEG DEF.	16"X6"	DUCT	ALUMINUM	TITUS, MODEL 350RS-HD	1 2 3 4
E	RETURN AIR	LOUVERED FACE, SURFACE MOUNT, 3/4" BLADE SPACING,35 DEG DEF.	18"X14"	SURFACE	ALUMINUM	TITUS, MODEL 350RS	1 2 3 4

1. UNITS SHALL BE FURNISHED WITH APPROPRIATE FRAMES, ETC FOR MOUNTING IN RESPECTIVE CEILING TYPES AND CONDITIONS
2. OFF-WHITE BAKED ENAMEL
3. TRANSITION FROM BACK OF GRILLE OR SUPPLY PLENUM OPENING TO DUCT SIZE SHOWN ON THE FLOOR PLANS
4. SOUND VALUES SHALL NOT EXCEED NC 30 FOR ANY ROOM, UNLESS OTHERWISE NOTED.

FAN SCHEDULE

MARK	TYPE	SERVES	CFM	EXT SP IN. WG	DRIVE TRAIN	MOTOR DATA					MAX. SONES	MANUFACTURER AND MODEL NO.	REMARKS
						HP	RPM	VOLTS	PH	HZ			
EF-1	DOWNBLAST	VEHICLE MAINTENANCE	400	0.125	BELT	1/25	1050	120	1	60	5.1	LOREN COOK, MODEL ACE-D, 90C10DH	1 2 3 4 5 10 11
EF-2	DOWNBLAST	GROUNDS SHOP	400	0.125	BELT	1/25	1050	120	1	60	5.1	LOREN COOK, MODEL ACE-D, 90C10DH	1 2 3 4 6 10 11
EF-3	DOWNBLAST	WOOD SHOP	400	0.125	BELT	1/25	1050	120	1	60	5.1	LOREN COOK, MODEL ACE-D, 90C10DH	1 2 3 4 7 10 11
EF-4	DOWNBLAST	ELECTRIC SHOP	250	0.125	BELT	1/20	1050	120	1	60	5.2	LOREN COOK, MODEL ACE-D,70C15DH	1 2 3 4 8 10 11
EF-5	DOWNBLAST	RESTROOMS	560	0.25	BELT	1/8	1550	120	1	60	8.9	LOREN COOK, MODEL ACE-D, 90C15DH	1 2 3 4 9 10 11
SH-1	DOME	FRESH AIR	1925	0.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	LOREN COOK, MODEL PR	1 2 3 4 11

1. PROVIDE WITH INTEGRAL DISCONNECT, AUTO BACKDRAFT DAMPER AND SPEED CONTROLLER.
2. PROVIDE FLEXIBLE CONNECTION AT INLET OF FAN AND INTAKE HOOD
3. PROVIDE INSECT SCREEN AT DISCHARGE/INTAKE
4. PROVIDE INSULATED ALUM. FACTORY ROOF CURB WITH BUILT-IN KANT.
5. INTERLOCK OPERATION WITH OPERATION OF AHU-1
6. INTERLOCK OPERATION WITH OPERATION OF AHU-2
7. INTERLOCK OPERATION WITH OPERATION OF AHU-3
8. INTERLOCK OPERATION WITH OPERATION OF AHU-4
9. INTERLOCK OPERATION WITH OPERATION OF AHU-5
10. PROVIDE MOTORIZED DAMPER AT DISCHARGE INTERLOCKED WITH OPERATION OF FAN
11. OR EQUAL

UNIT HEATER SCHEDULE

MARK	LOCATION	TYPE	GAS HEAT PERFORMANCE			MOTOR DATA			MANUFACTURER AND MODEL NO.	REMARKS
			MINIMUM CAPACITY (MBH)	INPUT (MBH)	OUTPUT (MBH)	VOLTS	PHASE	HZ		
UH-1	ELEC M115	POWER VENT AXIAL FAN	20	30	24.6	115	1	60	REZNOR, UDAP-30	3 4 5
UH-2	SPRINKLER M129	POWER VENT AXIAL FAN	20	30	24.6	115	1	60	REZNOR, UDAP-30	3 4 5
UH-3	DUST M114	POWER VENT AXIAL FAN	20	30	24.6	115	1	60	REZNOR, UDAP-30	3 4 5

1. EXTEND GAS VENT THRU ROOF
2. PROVIDE UNIT MOUNTED THERMOSTAT
3. OR EQUAL

DUST COLLECTION SYSTEM

MARK	LOCATION	AIRFLOW CFM	TOTAL SP IN.WG	DRIVE	MOTOR DATA				MANUFACTURER AND MODEL NO.	REMARKS
					HP	VOLTS	PHASE	HZ		
DCS-1	DUST COLLECTION	4,000	10"	DIRECT	10	208	3	60	DONALDSON-TORIT DFE3-6 /1	1 2 3 4

1. PROVIDE WITH TOP MOUNT DONALDSON-TORIT BACKWARD INCLINED FAN TBI-10 AND MATCHING FAN MOTOR
2. PROVIDE ELECTRIC CONTROL PANEL, 208 VOLT, 3 PH., DELTA P PLUS CONTROLLER/DISCONNECT
3. PROVIDE WITH MATCHING FAN SILENCER, REFER TO TO UNIT/SILENCER ORIENTATION
4. PROVIDE NON-RETURN EXPLOSION PROOF VALVE UPSTREAM OF DUST COLLECTOR. DONALDSON-TORIT 14" BOSS NRV
5. PROVIDE 8x8 NFPA MEYER AIR LOCK ON BOTTOM OF HOPPER
6. PROVIDE INLINE FILTER DOWNSTREAM OF DUST COLLECTOR; 1x2 AUTOLOK SAFETY FILTER

DUCTLESS DX SPLIT SYSTEM SCHEDULE

MARK	AIR HANDLING UNIT					AIR COOLED CONDENSING UNIT	COOLING PERFORMANCE DATA							FCU / CU MODEL NUMBER	REMARKS
	ARRANGEMENT	UNIT CFM	O/A CFM	EXT. S.P.	HP	REFR. TYPE	POWER CONNECTION				CAPACITY (MBH		OD D.B. °F	MIN. SEER	
							VOLTS	PH	MCA	MOCP	TOT.	SENS			
FCU-1 / CU-1	WALL	512	N/A	0.1	1/10	R410A	208	1	12	20	16.5	12.9	105	18	LS180HEV1/LSU180HEV1	1, 2, 3, 4, 5, 6, 7, 8, 9

1. LG IS BASIS FOR DESIGN.
2. SIZE, ROUTE, INSULATE AND PROVIDE APPURTENANCES FOR DX PIPING SYSTEMS PER MANUFACTURER'S RECOMMENDATIONS
3. LISTED CAPACITIES ARE FOR THE AIR HANDLER UNIT AND THE CONDESENSER UNIT COMBINATION, UNITS SHALL PERFORM TO LISTED NET CAPACITIES.
4. FOR LONG DX RUNS, USE MANUFACTURER'S RECOMMENDED LONG LINE INSTALLATION GUIDELINES.
5. UNIT SHALL BE PROVIDED WITH TXV VALVES.
6. PROVIDE FACTORY CONDENSER COIL HAIL GUARDS.
7. REFER TO 6/M401 FOR UNIT SUPPORT CURB.
8. PROVIDE WITH INTERNAL CONDENSATE PUMP.
9. INDOOR UNIT IS POWERED THROUGH OUTDOOR UNIT CIRCUIT.

REV	DATE	DESCRIPTION
1	1/17/19	ADDENDUM No. 2

NEW FACILITIES SERVICES COMPLEX MAINTENANCE BLDG.

MSU TEXAS
MIDWESTERN STATE UNIVERSITY

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1105 Ninth Street - Suite 200 Wichita Falls, Texas 76301 (940) 761-2404
Member American Institute of Architects

DRAWN BY: DGM
CHECKED BY: DGM
DATE: 12/11/2018
PROJECT NO.: 18002

STATE OF TEXAS
DAVID G. MEIER
90657
LICENSED
PROFESSIONAL ENGINEER
3668
P18188
01/17/2019

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Office 817.878.4242
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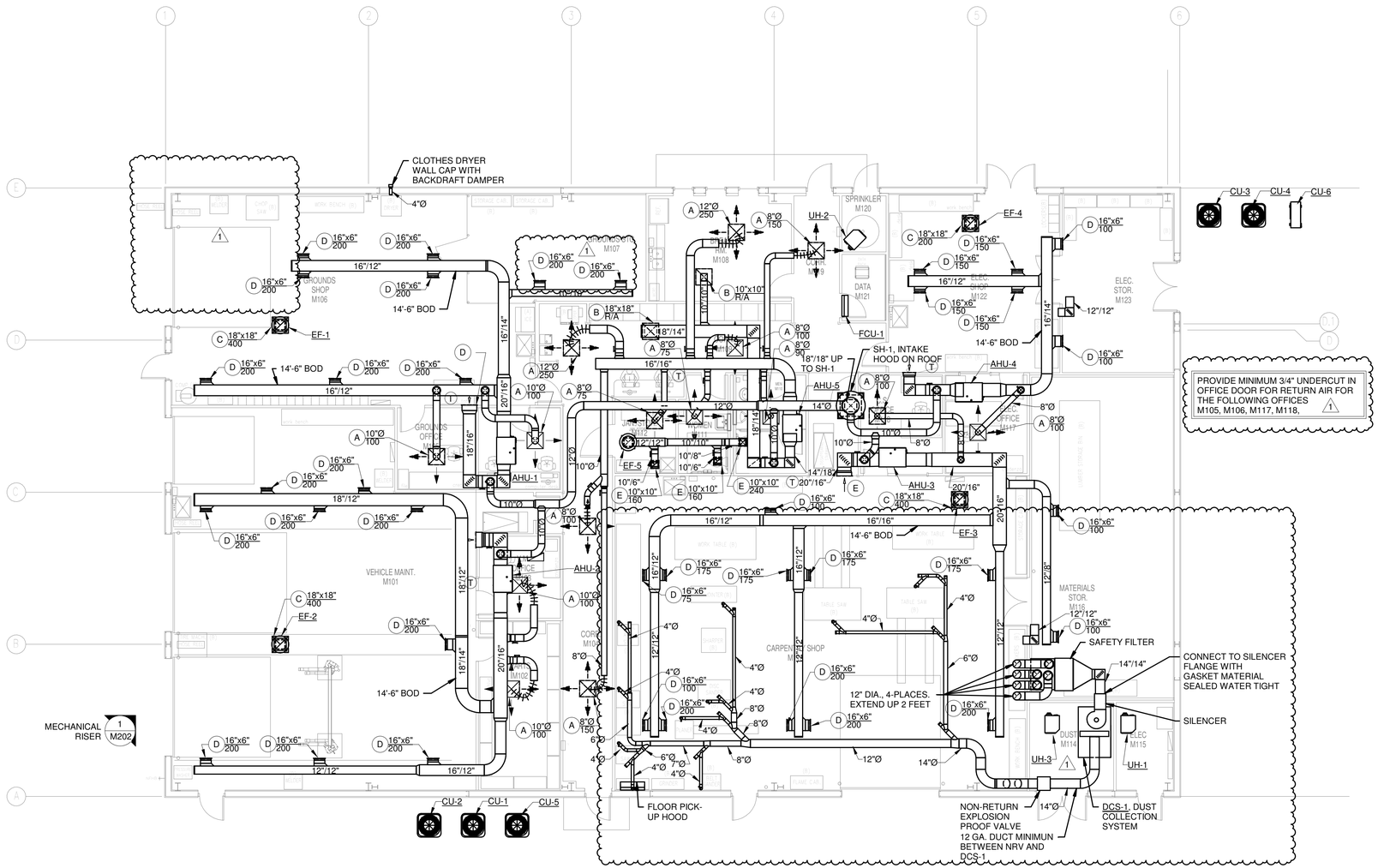
4144 N. Central Expwy
Suite 635
Dallas, Texas 75204
Office 214.420.9111

MECHANICAL SCHEDULES

M102



1 GROUND FLOOR MECHANICAL PLAN
1/8" = 1'-0"

REV	DATE	DESCRIPTION
1	1/17/19	ADDENDUM No. 2

NEW FACILITIES SERVICES COMPLEX MAINTENANCE BLDG.

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DRAWN BY: DGM
CHECKED BY: DGM
DATE: 12/11/2018
PROJECT NO. 18002

GROUND FLOOR MECHANICAL PLAN

M201

STATE OF TEXAS
DAVID G. MEIER
90657
LICENSED PROFESSIONAL ENGINEER
3668
P18188
01/17/2019

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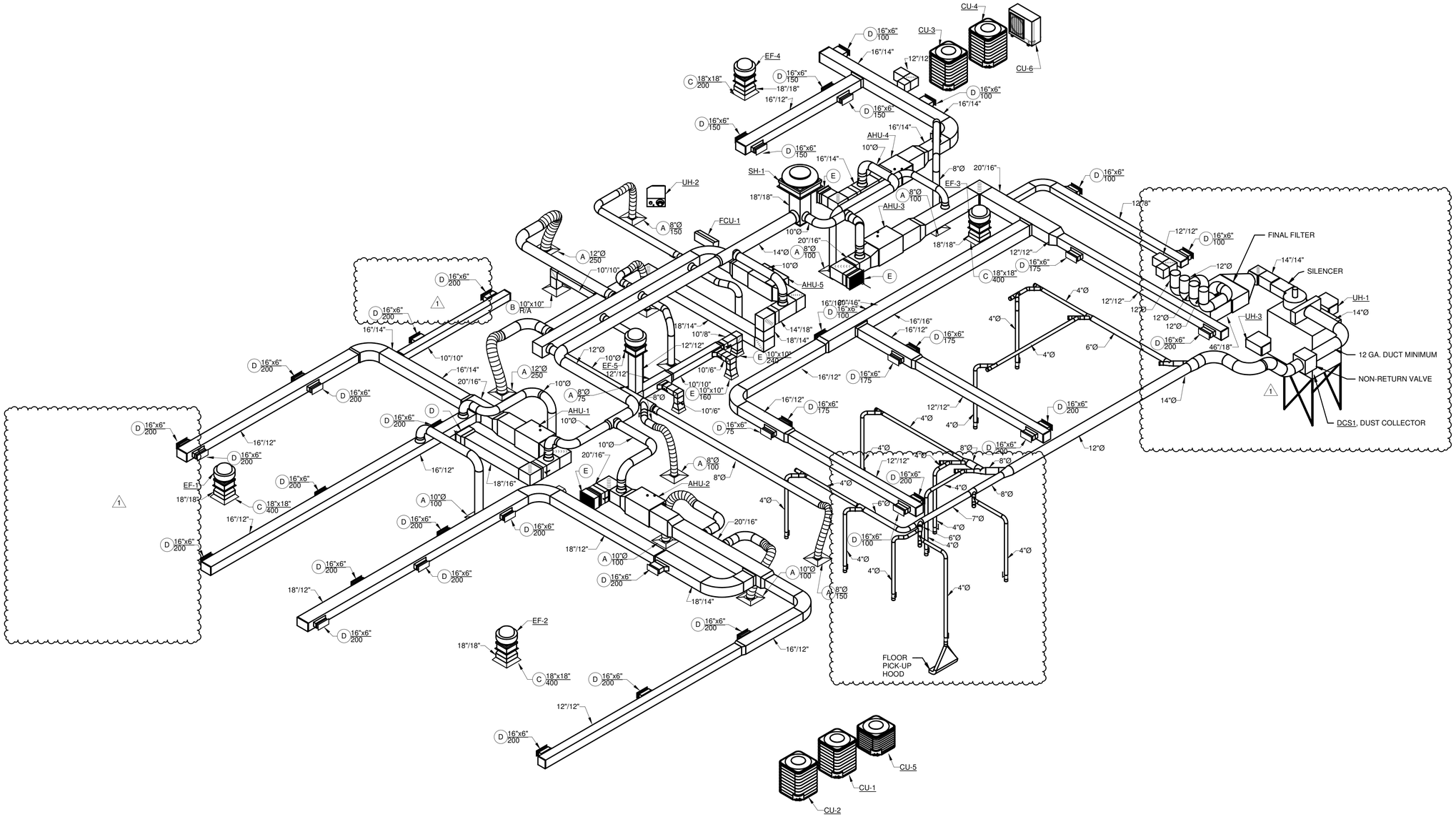
8' 0' 8' 16'
1/8" = 1'-0"



1 building riser

REV	DATE	DESCRIPTION
1	1/17/19	ADDENDUM No. 2

NEW FACILITIES SERVICES COMPLEX MAINTENANCE BLDG.

MSU TEXAS
MIDWESTERN STATE UNIVERSITY

BYSParchitects
1005 Ninth Street - Suite 200, Wichita Falls, Texas 76301 (940) 761-2404
Member American Institute of Architects

DRAWN BY	DGM
CHECKED BY	DGM
DATE	12/11/2018
PROJECT NO.	18002

STATE OF TEXAS
DAVID G. MEIER
90657
LICENSED
PROFESSIONAL ENGINEER
3668
P18188
01/17/2019

Summit
CONSULTANTS, INC.
Texas BPE Registration # F-207
1300 Summit Avenue
Suite 500
Fort Worth, Texas 76102
Office 817.878.4242
4144 N. Central Expwy
Suite 635
Dallas, Texas 75204
Office 214.420.9111
www.summitmep.com

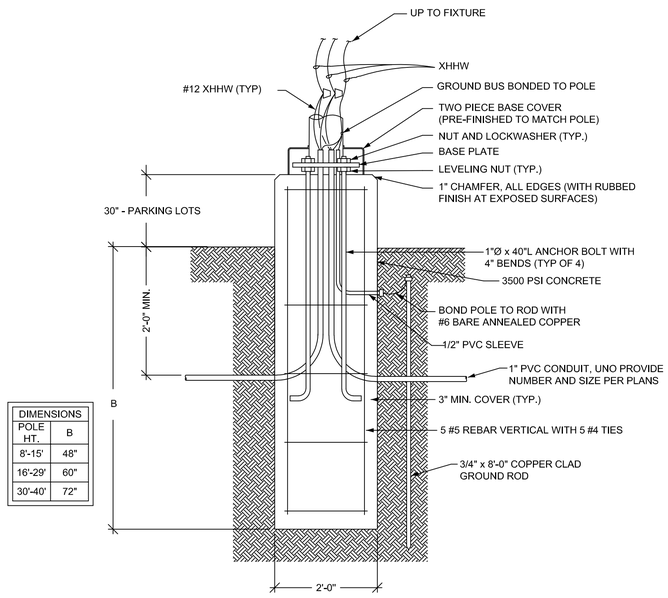
MECHANICAL
ISOMETRICS

M202

SITE GENERAL NOTES

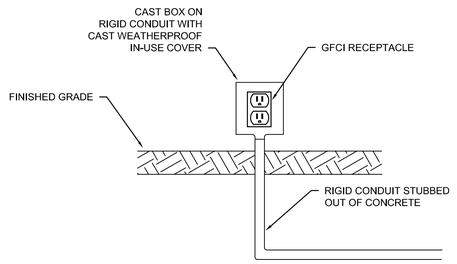
1. ALL EXTERIOR FIXTURES WILL BE CONTROLLED VIA NETWORK TIMECLOCK.

2. CONTRACTOR SHALL COORDINATE WITH ELECTRIC UTILITY FOR ALL DETAILS OF NEW ELECTRIC SERVICE. CONTRACTOR SHALL USE UTILITY'S DETAIL DRAWINGS FOR ALL TRENCHING, BACKFILL, PRIMARY CONDUIT ROUTING, RADIUSES TRANSFORMER PAD DETAILS, AND OTHER UTILITY SPECIFIC INFORMATION. PRIMARY CONDUIT ROUTING SHOWN IS CONCEPTUAL AND PRELIMINARY. EXACT DETAILS AND ROUTING SHALL BE PROVIDED BY ELECTRIC UTILITY AND CIVIL ENGINEER. ALL INSTALLATION SHALL BE IN ACCORDANCE WITH UTILITY REQUIREMENTS.
   COORDINATE WITH ANGELA FORRESTER OF ONCOR
   PHONE: (940) 766-5482
   EMAIL: angela.forrester@oncor.com

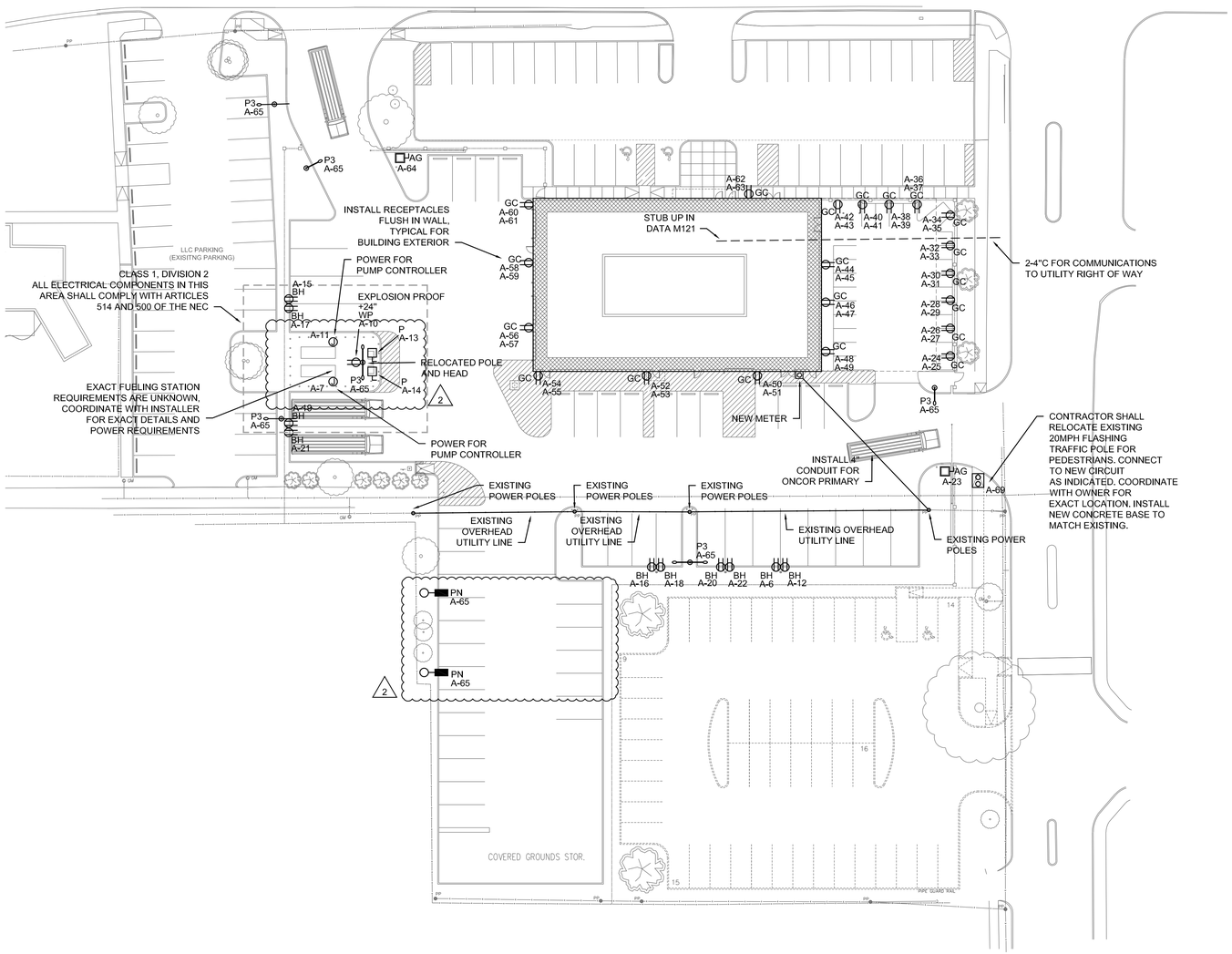


DIMENSIONS	
POLE HT.	B
8'-15'	48"
16'-29'	60"
30'-40'	72"

1 POLE BASE DETAIL
SCALE: N.T.S.



2 STAND-ALONE OUTLET FOR BLOCK HEATER / GOLF CART CHARGER
SCALE: N.T.S.



3 ELECTRICAL SITE PLAN
SCALE: 1" = 30'-0"

30' 0 30' 60'
1" = 30'

REV	DATE	DESCRIPTION
1	01-14-19	REVISION PER ADDENDUM NO. 1
2	01-17-19	REVISION PER ADDENDUM NO. 2

JAMES S. RUSE 102703 LICENSED PROFESSIONAL ENGINEER
12/11/2019
539.1.17.2019.18188

NEW FACILITIES SERVICES MAINTENANCE BUILDING
MSU TEXAS
MIDWESTERN STATE UNIVERSITY

BYSParchitects
1005 Ninth Street - Suite 200 Wichita Falls, Texas 76301 (940) 761-2404
Member American Institute of Architects

DRAWN BY
CHECKED BY
DATE 12/11/18
PROJECT NO. 18002

DESCRIPTION
ELECTRICAL SITE PLAN

E101

Summit CONSULTANTS, INC.
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1300 Summit Avenue Suite 500 Fort Worth, Texas 76102 Office 817 878 4242 Facsimile 817 878 4240
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EQUIPMENT ELECTRICAL CONNECTION SCHEDULE

SYMBOL	EQUIPMENT DESCRIPTION OR MODEL	VOLTAGE	PHASE	AMPS	WIRE SIZE	CIRCUIT NUMBER	CONNECTION TYPE (RECEPTACLE OR DISCONNECT)
TS1	TABLE SAW	208	3PH/4W	16	4#12,#12GND, 3/4" C	B-37,39,41	
TS2	TABLE SAW	208	3PH/4W	16	4#12,#12GND, 3/4" C	B-36,38,40	
JNTR	JOINTER	208	1PH/2W	16	2#12,#12GND, 3/4" C	B-31,33	
DS1	DISC SANDER	208	3PH/4W	16	4#12,#12GND, 3/4" C	B-23,25,27	
BELT	BELT SANDER	208	3PH/4W	16	4#12,#12GND, 3/4" C	B-13,15,17	
PLNR	PLANER	208	3PH/4W	16	4#12,#12GND, 3/4" C	B-20,22,24	
SHPR	SHAPER	208	3PH/4W	16	4#12,#12GND, 3/4" C	B-28,30,32	
DP	DRILL PRESS	120	1PH/2W	16	2#12,#12GND, 3/4" C	B-3	
RAS	RADIAL ARM SAW	208	3PH/4W	24	4#10,#10GND, 3/4" C	B-5,7,9	
CH1	CHOP SAW	120	1PH/2W	16	2#12,#12GND, 3/4" C	D-3	
BAND	BAND SAW	120	1PH/2W	16	2#12,#12GND, 3/4" C	B-8	
GR	GRINDER	208	3PH/4W	16	4#12,#12GND, 3/4" C	B-10,12,14	
CH2	CHOP SAW	120	1PH/2W	16	2#12,#12GND, 3/4" C	B-6	
W1	WELDER	208	1PH/2W	40	2#6,#10GND, 1" C	D-2,4	
W2	WELDER	208	1PH/2W	40	2#6,#10GND, 1" C	C-3,5	
W3	WELDER	208	1PH/2W	40	2#6,#10GND, 1" C	C-14,16	
ACP1	AIR COMPRESSOR	120	1PH/2W	16	2#12,#12GND, 3/4" C	D-24,26,28	
VH	VEHICLE LIFT	208	1PH/2W	24	2#10,#10GND, 3/4" C	C-6,8	

NOTES:

1. VERIFY WITH ARCHITECT FOR EXACT LOCATION AND MOUNTING HEIGHT OF EQUIPMENT CONNECTIONS

EQUIPMENT SCHEDULE BY SYMBOL

SYMBOL	INFORMATION PROVIDED (NAME)(LOAD)(VOLTAGE)	CONNECTION (DISCONNECT)(WIRE)(FEEDER AMPS)	CIRCUIT	SEE NOTES BELOW:
CU-1	(CONDENSING UNIT)(28MCA,45MOCP)(208/1)	(60/2/NF)(2#6,1#10G,1"C)	C-22,24	
CU-2	(CONDENSING UNIT)(31MCA,45MOCP)(208/1)	(60/2/NF)(2#6,1#10G,1"C)	C-23,25	
CU-3	(CONDENSING UNIT)(31MCA,45MOCP)(208/1)	(60/2/NF)(2#6,1#10G,1"C)	B-65,67	
CU-4	(CONDENSING UNIT)(12MCA,20MOCP)(208/1)	(30/2/NF)(2#12,1#12G,1/2"C)	B-66,68	
CU-5	(CONDENSING UNIT)(23MCA,40MOCP)(208/1)	(60/2/NF)(2#8,1#10G,1"C)	C-27,29	
CU-6	(CONDENSING UNIT)(12MCA,20MOCP)(208/1)	(30/2/NF)(2#12,1#12G,1/2"C)	B-70,72	
FCU-1	(FAN COIL UNIT)(208/1)			SERVED BY CU-6
AHU-1	(AIR HANDLING UNIT)(13.5MCA,20MOCP)(120/1)	(30/2/NF)(2#12,1#12G,1/2"C)	C-26	
AHU-2	(AIR HANDLING UNIT)(17MCA,20MOCP)(120/1)	(30/2/NF)(2#12,1#12G,1/2"C)	C-28	
AHU-3	(AIR HANDLING UNIT)(17MCA,20MOCP)(120/1)	(30/2/NF)(2#12,1#12G,1"C)	B-73	
AHU-4	(AIR HANDLING UNIT)(11.1MCA,15MOCP)(120/1)	(30/2/NF)(2#12,1#12G,1/2"C)	B-74	
AHU-5	(AIR HANDLING UNIT)(12.4MCA,15MOCP)(120/1)	(30/2/NF)(2#12,1#12G,1/2"C)	C-30	
WH1	(WATER HEATER)(5AMPS)(120/1)	(30/2/NF)(2#12,1#12G,1/2"C)	B-78	
CP1	(CIRC PUMP)(30VA)(120/1)	(30/2/NF)(2#12,1#12G,1/2"C)	B-64	
CP2	(CIRC PUMP)(30VA)(120/1)	(30/2/NF)(2#12,1#12G,1/2"C)	B-64	
DSC-1	(DUST COLLECTION)(10HP)(208/3)	(30/3/NF)(3#10,1#10G,3/4"C)	B-79,81,83	

2

GENERAL NOTES APPLY TO ALL:

VERIFY ALL MOUNTING REQUIREMENTS WITH EQUIPMENT PROVIDER.

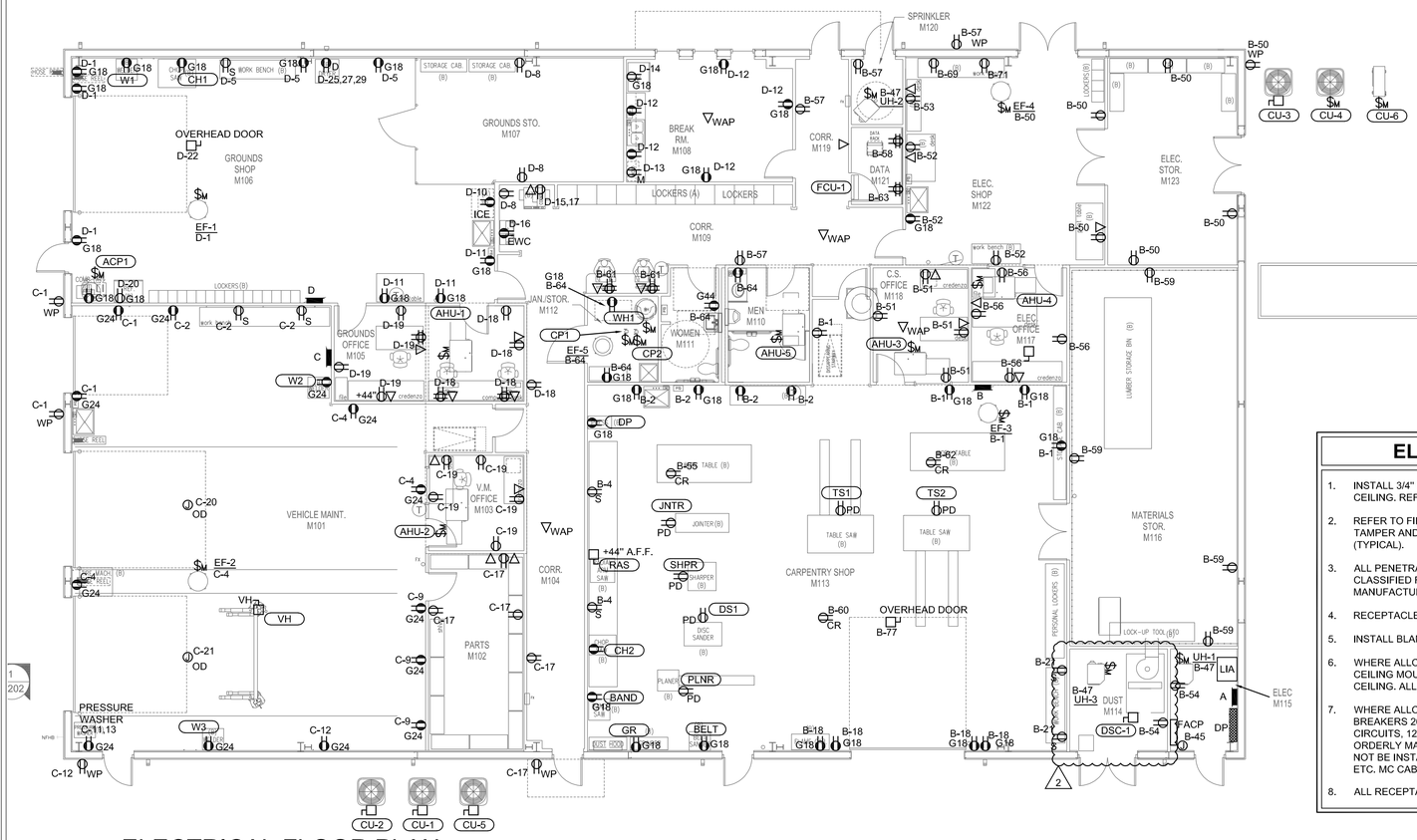
VERIFY ACTUAL EQUIPMENT LOADS AND CONNECTION REQUIREMENTS WITH EQUIPMENT BEING PROVIDED.

POWER DEVICE SCHEDULE

SYMBOL	DEVICE TYPE
	20A DUPLEX RECEPTACLE 24" A.F.F. UNLESS NOTED OTHERWISE
A	20A DUPLEX RECEPTACLE ABOVE COUNTER BACK SPLASH
F	20A GFCI DUPLEX RECEPTACLE FOR REFRIGERATOR MOUNTED AT 48" A.F.F. UNLESS OTHERWISE SPECIFIED
M	20A GFCI DUPLEX RECEPTACLE FOR MICROWAVE ABOVE COUNTER BACK SPLASH
WP	20A WEATHERPROOF GFCI DUPLEX RECEPTACLE
S	20A GFCI DUPLEX RECEPTACLE MOUNTED AT 48" A.F.F.
GC	20A WEATHERPROOF SINGLE RECEPTACLE FOR GOLF CART CHARGING STATION ON GFCI BREAKER. MOUNT AT 24" A.F.F. PROVIDE #10 THHN
BH	NEMA 3R GFCI RECEPTACLE FOR BLOCK HEATER.
CR	45' GFCI DUPLEX BOX REELCRAFT #L-4545-123-7SB CORD REEL OR APPROVED EQUAL. INSTALL ON UNISTRUT ABOVE FOR POWER TO EQUIPMENT. PROVIDE 2#10, #12G, 1/2"C CIRCUIT. COORDINATE FINAL LOCATION WITH OWNER
PD	POWER DROP FROM STRUCTURE FOR EQUIPMENT. INSTALL SO CABLE DOWN FOR CONNECTION OF EQUIPMENT. INSTALL WIRE MESH STRAIN RELIEF ON CABLE AT JUNCTION BOX
	20A SIMPLEX RECEPTACLE 24" AFF UNLESS NOTED OTHERWISE
	20A QUADDRAPLEX RECEPTACLE 24" AFF UNLESS NOTED OTHERWISE
	20A GFCI DUPLEX RECEPTACLE ABOVE COUNTER BACK SPLASH
DR	3#10, #10G, NEMA 14-30R RECEPTACLE, MOUNT AT 30" A.F.F., FEED FROM GFCI BREAKER
G18	20A GFCI DUPLEX RECEPTACLE MOUNTED AT 18" A.F.F. UNLESS OTHERWISE SPECIFIED
G24	20A GFCI DUPLEX RECEPTACLE MOUNTED AT 24" A.F.F. UNLESS OTHERWISE SPECIFIED
G44	20A GFCI DUPLEX RECEPTACLE MOUNTED AT 44" A.F.F. UNLESS OTHERWISE SPECIFIED
ICE	20A GFCI DUPLEX RECEPTACLE FOR ICE MACHINE MOUNTED AT 24" A.F.F.
EWC	20A GFCI DUPLEX RECEPTACLE FOR ELECTRIC WATER COOLER MOUNTED AT 24" A.F.F.
	SPECIAL PURPOSE RECEPTACLE AS NOTED IN PLAN VIEWS
	FLOOR RECEPTACLE
	JUNCTION BOX FOR DIRECT CONNECTION AS NOTED IN PLAN VIEWS
OD	POWER FOR OVERHEAD DOORS. VERIFY EXACT LOCATION AND MOUNTING HEIGHT WITH ARCHITECT
FT	NEMA 3R DISCONNECT SWITCH FOR FUEL TANKS. VERIFY EXACT LOCATION WITH ARCHITECT
P	NEMA 3R DISCONNECT SWITCH FOR FUEL PUMPS. VERIFY EXACT LOCATION WITH ARCHITECT
VH	DISCONNNECT SWITCH FOR VEHICLE LIFT. VERIFY EXACT LOCATION AND MOUNTING HEIGHT WITH ARCHITECT
AG	POWER FOR AUTOMATIC GATE. INSTALL 3/4" CONDUIT FOR COMMUNICATIONS
	CONTRACTOR SHALL INSTALL 1" CONDUIT TO 4"X4" BOX FOR COMMUNICATIONS OUTLET, WITH 2"X4" MUD RING. ROUTE CONDUIT TO ACCESSIBLE AREA OVERHEAD. CONTRACTOR SHALL PROVIDE, INSTALL, AND TERMINATE ONE CAT-6 CABLE FROM I.T. ROOM TO EACH BOX
WAP	WIRELESS ACCESS POINT TO BE INSTALLED BY OWNER. CONTRACTOR SHALL INSTALL ONE CAT-6 CABLE FROM I.T. ROOM TO WAP AND TERMINATE WITH 10' SLACK LOOP AT WAP
	MOTOR LOCATION AS NOTED IN PLAN VIEWS
	DISCONNECT SWITCH - (200/3/150) DENOTES (AMPS/POLE/FUSE); "NF" DENOTES NON-FUSED, NEMA 1 ENCLOSURE UNLESS NOTED OTHERWISE.
	COMBINATION STARTER DISCONNECT SWITCH - (200/3/150) DENOTES (AMPS/POLE/FUSE); "NF" DENOTES NON-FUSED, NEMA 1 ENCLOSURE UNLESS NOTED OTHERWISE. NEMA STARTER AS INDICATED IN PLAN VIEW
M	MOTOR RATED SWITCH. MANUAL MOTOR STARTER WITH THERMAL OVERLOAD
	PUSH BUTTON CONTROL AS NOTED IN PLAN VIEW
FP	FLOOR BOX WITH TWO DUPLEX POWER RECEPTACLES AND SEPARATE DATA COMPARTMENTS. FINISH TO BE SELECTED BY ARCHITECT. PROVIDE WIREMOLD #RFB4E-OG FOR SLAB ON-GRADE LOCATIONS AND #6ATC FOR ABOVE-GRADE POKE-THROUGH LOCATIONS. POKE THROUGH SHALL MATCH FLOOR FIRE RATINGS. PROVIDE 1-1/4"C FOR COMMUNICATIONS TO ACCESSIBLE AREA ABOVE CEILING.
FF	FLOOR BOX WITH FURNITURE FEED FOR POWER AND COMMUNICATIONS, FINISH TO BE SELECTED BY ARCHITECT. PROVIDE WIREMOLD #RFB4E-OG FOR SLAB ON-GRADE LOCATIONS AND #6ATCFF FOR ABOVE-GRADE POKE-THROUGH LOCATIONS. POKE THROUGH BOX SHALL MATCH FLOOR FIRE RATINGS. PROVIDE 1-1/4"C FOR COMMUNICATIONS TO ACCESSIBLE AREA ABOVE CEILING.
AV	HIGH CAPACITY FLOOR BOX WITH TWO INTERNAL RECESSED RECEPTACLES FOR POWER AND COMMUNICATIONS, FINISH TO BE SELECTED BY ARCHITECT. PROVIDE WIREMOLD #RFB6E-OG FOR SLAB ON GRADE AND #8ATC FOR ABOVE GRADE POKE THROUGH LOCATIONS. POKE THROUGH SHALL MATCH FLOOR FIRE RATINGS. PROVIDE TWO(2) 1-1/4"C FOR COMMUNICATIONS TO ACCESSIBLE AREA ABOVE CEILING.

GENERAL NOTES APPLY TO ALL DEVICES:

1. ALL DEVICES USED TO SUPPORT SPECIFIC EQUIPMENT PROVIDED BY OTHERS ARE TO BE COORDINATED WITH PROVIDER OF EQUIPMENT FOR NEMA PLUG CONFIGURATION AND WIRING.



1 ELECTRICAL FLOOR PLAN

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

ELECTRICAL GENERAL NOTES

1. INSTALL 3/4" CONDUIT FROM ALL THERMOSTATS TO ACCESSIBLE AREA ABOVE CEILING. REFER TO MECHANICAL FOR LOCATIONS OF THERMOSTATS.
2. REFER TO FIRE PROTECTION SHEETS FOR LOCATIONS OF FIRE SPRINKLER TAMPER AND FLOW SWITCHES TO BE INSTALLED BY FIRE ALARM CONTRACTOR (TYPICAL).
3. ALL PENETRATIONS THROUGH FIRE OR SMOKE WALLS SHALL BE MADE USING A UL CLASSIFIED FIRESTOP SLEEVE KIT OF THE APPROPRIATE SIZE (AS MANUFACTURED BY "SPECIFIED TECHNOLOGIES" www.stifirestop.com).
4. RECEPTACLES WITHIN 6'-0" OF SINKS SHALL BE GFCI TYPE.
5. INSTALL BLANK COVERPLATES ON ALL EMPTY JUNCTION BOXES.
6. WHERE ALLOWED BY CODE, ALL FIRE ALARM NOTIFICATIONS DEVICES SHALL BE CEILING MOUNTED, NOT WALL MOUNTED EXCEPT FOR THE LOBBY / BRIDGE CEILING. ALL DEVICES SHALL BE WHITE WITH RED LETTERING.
7. WHERE ALLOWED BY CODE, MC CABLE SHALL BE USED FOR CIRCUITS SERVED BY BREAKERS 20A AND BELOW. THIS INCLUDES LIGHTING AND RECEPTACLE CIRCUITS, 120V AND 277V. MC CABLE SHALL BE INSTALLED IN A NEAT AND ORDERLY MANNER, PROPERLY SUPPORTED FROM STRUCTURE. MC CABLE SHALL NOT BE INSTALLED ON TOP OF OR SUPPORTED BY CEILINGS, DUCTWORK, PIPING, ETC. MC CABLE SHALL BE INSTALLED AT RIGHT ANGLES TO BUILDING STRUCTURE.
8. ALL RECEPTACLES AND FACEPLATES ARE TO BE WHITE IN COLOR.

8' 0 8' 16'

1/8" = 1'-0"

REV	DATE	DESCRIPTION
1	01-14-19	REVISION PER ADDENDUM NO. 1
2	01-17-19	REVISION PER ADDENDUM NO. 2

Jonathan W. Rose
01/17/2019
JAMES S. RUSE
102703
LICENSED
PROFESSIONAL ENGINEER
539.1.17.2019.18188

NEW FACILITIES SERVICES MAINTENANCE BUILDING

MSU TEXAS
MIDWESTERN STATE UNIVERSITY

BYSParchitects
1005 Ninth Street - Suite 200 Wichita Falls, Texas 76301 (940) 761-2404
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DRAWN BY

CHECKED BY

DATE 12/11/18

PROJECT NO. 18002

DESCRIPTION
ELECTRICAL FLOOR PLAN

E301

Summit
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Office 214 420 9111 www.summitmep.com

S:\P\18188 Midwestern State\Elec\P18188 - E3.1 - ELECTRICAL LEVEL 1.dwg - E3.1 01/17/19 16:49:39 bkh
SHEET SIZE = ANSI D 22X34

PARTIAL ENERGY CODE REQUIREMENTS

GENERAL ENERGY CODE REQUIREMENTS :

ALL AREAS LISTED BELOW ARE TO HAVE OCCUPANCY SENSOR CONTROLS:
- CLASSROOMS/LECTURE/TRAINING ROOMS.
- CONFERENCE/MEETING/MULTIPURPOSE ROOMS
- COPY/PRINT ROOMS
- LOUNGES
- LUNCH AND BREAK ROOMS
- PRIVATE OFFICES
- RESTROOMS
- STORAGE ROOMS
- JANITORIAL CLOSETS
- LOCKER ROOMS
- OTHER ENCLOSED SPACES 300 SQ.FT. OR LESS
- WAREHOUSES (WAREHOUSE TO BE SENSORED BY AISLEWAY)

ALL SENSORS SHALL FUNCTION MANUAL ON AUTOMATIC OFF. AUTOMATIC ON MAY BE USED IF AUTO-ON LEVEL IS LESS THAN 50%. AUTO-ON TO 100% IS ALLOWED FOR PUBLIC CORRIDORS, STAIRS, RESTROOMS LOBBIES OR WHERE MANUAL-ON CONTROL WOULD ENDANGER OCCUPANTS.

AREAS NOT PROVIDED WITH OCCUPANCY SENSORS AS LISTED ABOVE SHALL BE CONTROLED BY TIME BASED SCHEDULE. TIME SWITCH CONTROLS SHALL PROVIDE MAXIMUM 2-HOUR OVERRIDE (MAXIMUM 5000SQ.FT EACH OVERRIDE) WITHIN SPACE CONTROLLED OR HAVE A PILOT LIGHT AND MAP OF LIGHTING CONTROLLED.

MALLS, ARCADES, AUDITORIUMS, SINGLE TENANT RETAIL, INDUSTRIAL FACILITIES AND ARENA ARE EXEMPT FROM THE 2-HOUR LIMIT ON OVERRIDE TIME AND MAY CONTROL SPACES UP TO 20,000 SQ.FT.

AREAS NOT EXEMPTED FROM TIME BASED CONTROLS SHALL HAVE REDUCTION CONTROLS LOCATED IN SPACE FOR MINIMUM 50% REDUCTION BY OCCUPANT. LIGHTING REDUCTION IS NOT REQUIRED FOR ROOMS WITH ONLY ONE LIGHT FIXTURE, ROOMS USING LESS THAN .6W/SQ.FT. CORRIDORS, EQUIPMENT ROOMS, PUBLIC LOBBIES.

TIME CONTROLS MUST BE CAPABLE OF 7-DAY CLOCK WITH DIFFERENT SCHEDULE EACH DAY, INCLUDE HOLIDAY SCHEDULING CAPABILITY AND 10 HOUR BACKUP FOR PROGRAMMING.

AREAS THAT HAVE SPECIAL EXEMPTIONS THAT MUST BE EVALUATED ON CASE BY CASE BASIS:
- SLEEPING AREAS RESIDENTIAL OR FIREMAN TYPE SLEEPING AREAS.
- PATIENT CARE AREAS.
- AREAS WHERE AUTOMATIC LIGHTING SHUTOFF WOULD ENDANGER LIFE SAFETY.
- DWELLING UNITS WITHIN COMMERCIAL BUILDINGS.
- WALK-IN COOLER AND FREEZERS.

EXTERIOR LIGHTING ENERGY CODE REQUIREMENTS:

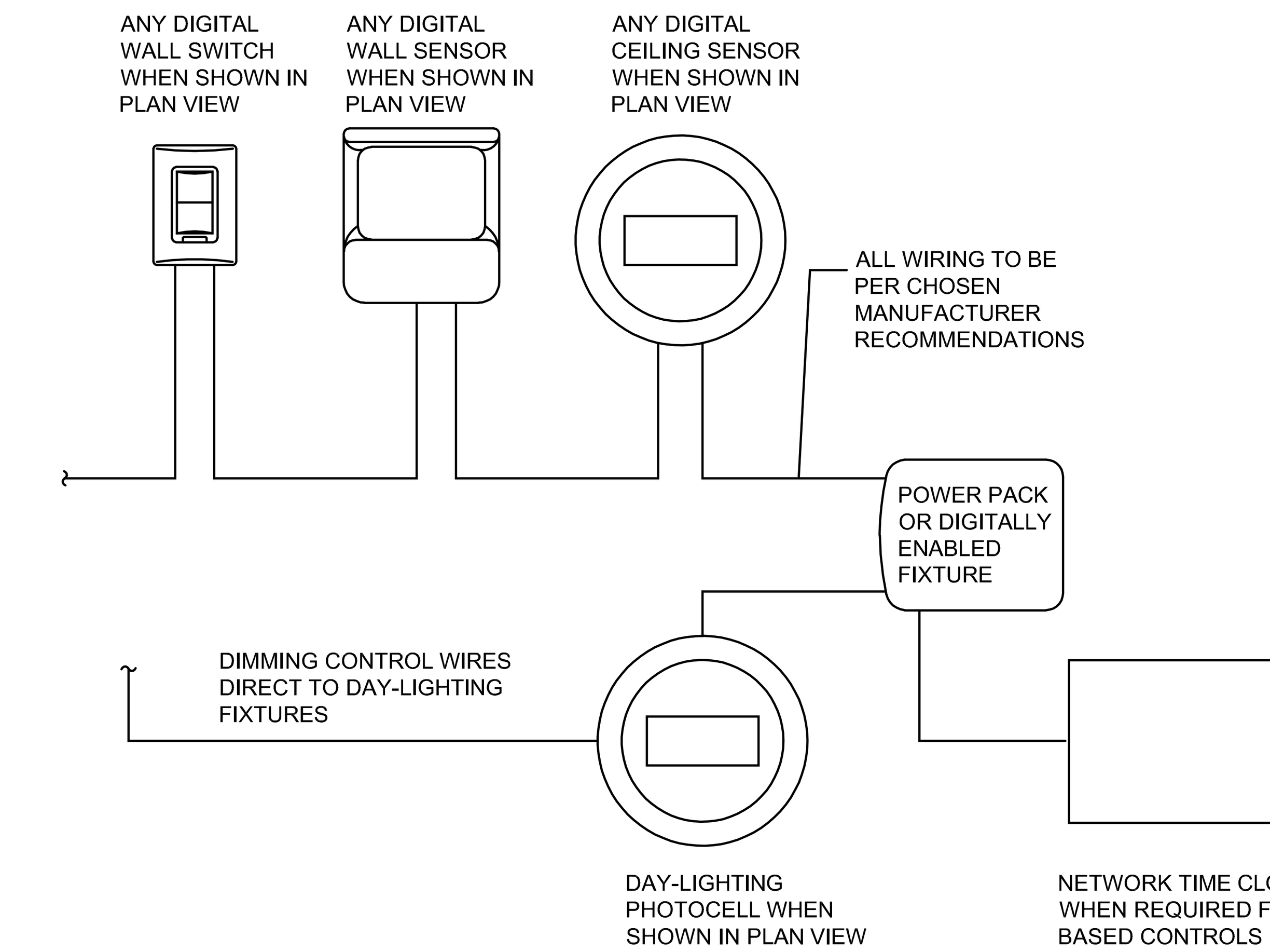
ALL EXTERIOR LIGHTING SHALL BE CONTROLLED AS A FUNCTION OF AVAILABLE LIGHT. LIGHTING SHALL BE REDUCED BY MINIMUM OF 30% AFTER MIDNIGHT AT THE LATEST TO 6AM. OR 1-HOUR AFTER CLOSING AND 1 HOUR BEFORE BUSINESS OPENING. OR ANYTIME OF INACTIVITY OF MORE THAN 15 MINUTES.

EXEMPTIONS TO EXTERIOR LIGHTING:
- EMERGENCY EGRESS LIGHTING
- COVERED VEHICLE ENTRANCES TO PARKING STRUCTURES.
- BUILDING FACADE(AFFECT LIGHTING) OR LANDSCAPE LIGHTING MAY BE PHOTOCELL ONLY.

AREAS DETERMINED TO BE SAFETY RELATED WHICH AUTOMATIC LIGHTING CONTROLS WOULD ENDANGER LIFE SAFETY OR ARE EXEMPT FOR EGRESS RELATED LIFE SAFETY CONCERNS ARE INDICATED IN THE ROOM BY THE FOLLOWING SYMBOL: (SR)

LIGHTING CONTROL DEVICE SCHEDULE

SYMBOL	TYPE OF CONTROL
$	LINE VOLTAGE TOGGLE SWITCH
$3	LINE VOLTAGE 3-WAY TOGGLE SWITCH
$4	LINE VOLTAGE 4-WAY TOGGLE SWITCH
$D	LINE VOLTAGE SLIDE DIMMER SWITCH WITH ON/OFF BUTTON.
$T	LINE VOLTAGE TIMER SWITCH
$O	WALL MOUNTED LINE VOLTAGE OCCUPANCY SENSOR, 3-BUTTON (ON/OFF,RAISE,LOWER) DIMMING SENSOR. PROGRAM TO AUTOMATIC 50% ON, AUTOMATIC OFF AFTER 30 MINUTES. DUAL TECHNOLOGY UNLESS OTHERWISE NOTED.
$V	WALL MOUNTED LINE VOLTAGE VACANCY SENSOR 1 BUTTON (ON/OFF). PROGRAM TO MANUAL 100% ON, AUTOMATIC OFF AFTER 30 MINUTES. DUAL TECHNOLOGY UNLESS OTHERWISE NOTED.
$F	WALL MOUNTED LINE VOLTAGE FULL ON OCCUPANCY 1 BUTTON (ON/OFF). PROGRAM TO AUTOMATIC 100% ON, AUTOMATIC OFF AFTER 30 MINUTES. DUAL TECHNOLOGY UNLESS OTHERWISE NOTED.
฿O	WALL MOUNTED LOW VOLTAGE DIGITAL BUTTON 3-BUTTON PER ZONE (ON/OFF,RAISE,LOWER). PROGRAM TO AUTOMATIC 50% ON, AUTOMATIC OFF AFTER 30 MINUTES. DUAL TECHNOLOGY OCCUPANCY SENSORS AS SHOWN IN PLAN VIEW. LOWER CASE LETTERS ADJACENT TO SWITCH INDICATES ZONES.
฿V	WALL MOUNTED LOW VOLTAGE DIGITAL 1 BUTTON PER ZONE (ON/OFF). PROGRAM TO MANUAL 100% ON, AUTOMATIC OFF AFTER 30 MINUTES. DUAL TECHNOLOGY VACANCY SENSORS AS SHOWN IN PLAN VIEW. LOWER CASE LETTERS ADJACENT TO SWITCH INDICATES ZONES.
฿F	WALL MOUNTED LOW VOLTAGE DIGITAL 1 BUTTON PER ZONE (ON/OFF). PROGRAM TO AUTOMATIC 100% ON, AUTOMATIC OFF AFTER 30 MINUTES. DUAL TECHNOLOGY OCCUPANCY SENSORS AS SHOWN IN PLAN VIEW. LOWER CASE LETTERS ADJACENT TO SWITCH INDICATES ZONES.
(DT) (PI) (US)	CEILING MOUNTED DIGITAL OCCUPANCY SENSORS COMPATIBLE WITH DIGITAL BUTTON CONTROL SHOWN. PI= PASSIVE INFRARED, US=ULTRASONIC, DT=DUAL TECH.
(DT) (PI) (US)	WALL MOUNTED DIGITAL OCCUPANCY SENSORS COMPATIBLE WITH DIGITAL BUTTON CONTROL SHOWN. PI= PASSIVE INFRARED, US=ULTRASONIC, DT=DUAL TECH.
฿T	NETWORK TIME BASED DIGITAL CONTROL, SCHEDULE PROGRAMMING PER OWNERS DIRECTIVE. WALL MOUNTED LOW VOLTAGE DIGITAL BUTTON PER ZONE (ON/OFF). ALL BUTTONS TO FUNCTION DURING OPERATIONAL TIME AS ON/OFF. AFTER HOURS BUTTONS ARE TO PROVIDE SAME FUNCTION BUT BE LIMITED TO 2-HOUR MAXIMUM ON.
(PC)	CEILING MOUNTED DIGITAL DAY-LIGHTING SENSOR. SENSOR TO AUTOMATICALLY DIM FIXTURES LOCATED WITHIN ZONE SHOWN IN RESPONSE TO AMBIENT LIGHT LEVELS. EXEMPT ZONES LESS THAN 150W PER SPACE ARE NOT SHOWN IN PLAN.
TCa / a	TIME CLOCK EXTERIOR CONTROLS. LOWER CASE LETTER INDICATES ASSOCIATED ZONE. EACH ZONE TO GET DEDICATED TIME CONTROL. TIME CLOCKS MAY BE COMBINED INTO SINGLE DEVICE WITH INDEPENDENT SCHEDULES, COMBINED DEVICES SHALL PROVIDE A MINIMUM 20% SPARES.



NOTES:
1. ALL POWER PACKS SHALL BE MOUNTED ABOVE CEILING NEAREST THE FIRST WALL SWITCH SERVING THE ASSOCIATED ROOM. PLAN VIEW SHOWS QUANTITY OF ZONES REQUIRED MANUFACTURER MAY COMBINE POWER PACKS WHERE POSSIBLE INTO MULTI ZONE POWER PACKS.
2. ALL EMERGENCY BATTERY PACK FIXTURES ARE TO TURN ON/OFF WITH ASSOCIATED ROOM, BUT OVERRIDE TO ON IF POWER IS LOST.
3. ALL EXIT LIGHTING AND BATTERY PACK ONLY FIXTURES ARE TO BE WIRED TO UN-SWITCHED LEG OF CIRCUITS SHOWN FOR CONSTANT POWER.
4. DETAIL IS GENERIC IN NATURE. PLAN VIEWS WILL INDICATE NUMBER OF ZONES WITH NUMBER/TYPE OF POWER PACK ZONES REQUIRED. PLAN VIEW WILL INDICATE LOCATION OF DIGITAL WALL SWITCHES WITH NUMBER OF BUTTONS REQUIRED. EACH MANUFACTURER IS DIFFERENT IN DEVICES AVAILABLE AND WIRING. ACCEPTABLE MANUFACTURERS ARE WATT STOPPER , LUTRON AND ACUITY CONTROLS. OTHERS WILL BE CONSIDERED WITH PRE-APPROVAL PRIOR TO BIDDING.
5. EMERGENCY LIGHTING SHALL OPERATE WITH NORMAL LIGHTING WHEN NORMAL POWER IS AVAILABLE BE FORCED ON IN THE EVENT OF NORMAL POWER LOSS.
6. SENSOR LOCATIONS ARE MINIMUMS, CONTRACTOR SHALL PROVIDE FOR A MINIMUM OF 10% ADDITIONAL DEVICES TO COVER DARK SPOTS DISCOVERED DURING CONSTRUCTION FROM FIELD INSTALLED OBSTRUCTIONS. CONTRACTOR SHALL ALSO ALLOW FOR A MOVE OF UP TO 5'-0" IN ANY DIRECTION FOR ALL SENSORS AT NO ADDITIONAL COST TO THE OWNER, TO ALLOW FOR FIELD ADJUSTMENT OF SENSOR PLACEMENTS TO ACHIEVE OPTIMUM PERFORMANCE.
7. CONTRACTOR SHALL PROVIDE A MINIMUM OF 2 SITE VISITS BY FACTORY TRAINED PERSONNEL TO ADJUST AND TRAIN THE OWNER ON USE AND MAINTENANCE OF ALL LIGHTING CONTROL COMPONENTS.

"DLC" SEQUENCE OF OPERATION:

1. SENSOR SHALL TURN LIGHTS OFF IF ROOM IS VACANT FOR MORE THAN 30 MIN.
2. SENSOR WILL TURN LIGHTS ON WHEN WALL SWITCH IS ACTIVATED.
3. EACH ZONE INDICATED REQUIRES 1 BUTTON FOR ON/OFF CONTROL.

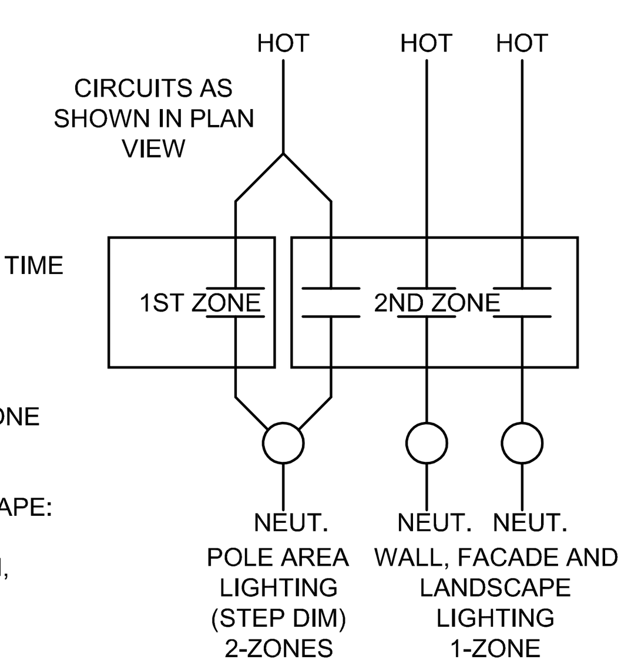
COMMISSIONING NOTES:

1. AFTER COMMISSIONING LIGHTING CONTROLS, CONTRACTOR SHALL PROVIDE A WRITTEN TEST REPORT INDICATING THAT ALL LIGHTING CONTROL SYSTEMS HAVE BEEN COMMISSIONED AND TESTED, AND FOUND TO BE FUNCTIONING IN ACCORDANCE WITH CONTRACT DOCUMENT AND CODE REQUIREMENTS. CONTRACTOR SHALL ENSURE THAT CONTROL HARDWARE AND SOFTWARE ARE MANUFACTURER'S INSTRUCTIONS AND CODE REQUIREMENTS. FUNCTIONAL TESTING SHALL BE IN ACCORDANCE WITH IECC SECTIONS C408.3.1.1 AND C408.3.1.2 FOR THE APPLICABLE CONTROL TYPES.

3 DIGITAL LIGHTING CONTROL DETAIL
SCALE: N.T.S.

EXTERIOR LIGHTING CONTROL:

1. PROVIDE TORK 2100 SERIES ASTRONOMIC TIME CONTROL WITH OVERRIDE ON/OFF AND MINIMUM 2 DAY PERMANENT SCHEDULE RETENTION.
2. PROVIDE ONE RELAY OR CONTACT PER ZONE REQUIRED.
3. FIXTURES LIGHTING FACADE AND LANDSCAPE:
4. TIME SCHEDULE TO BE ON DUSK TO DAWN, STEP DIMMING NOT REQUIRED.



2 EXTERIOR LIGHTING DETAIL
SCALE: N.T.S.

LIGHTING FIXTURE SCHEDULE

FIXTURE TYPE	DESCRIPTION MANUFACTURER: MODEL #	VOLTAGE	MOUNTING	WATTAGE	LUMENS	COLOR TEMP
A	2X4 LED TROFFER LITHONIA: 2BLT4-48LHE-ADP-EZ1-LP840	MVOLT	RECESSED	35	4,770	40K
AE	SAME AS TYPE 'A' FIXTURE BUT ON EMERGENCY CIRCUIT SEE ABOVE	MVOLT	RECESSED	35	4,770	40K
B	HIGH BAY LED (MOUNT BELOW DUCTWORK) LITHONIA: IBG-12000LM-HEF-AFL-WD-MVOLT-GZ10-40K-80CRI + IBAC120 M20	MVOLT	SUSPENDED	70	11,746	40K
B3	HIGH BAY LED (MOUNT BELOW DUCTWORK) LITHONIA: IBG-18000LM-HEF-AFL-WD-MVOLT-GZ10-40K-80CRI + IBAC120 M20	MVOLT	SUSPENDED	102	17,752	40K
EW	LED EMERGENCY EGRESS LIGHTING LITHONIA: ELM2-LED	MVOLT	WALL	3		40K
FL	LED FLOODLIGHT LITHONIA: CSXW LED-700-40K-T3M-DDBXD (COORDINATE EXACT MOUNTING HEIGHT WITH ARCHITECT)	MVOLT	WALL	69	7,973	40K
P3	EXISTING RELOCATED POLE MOUNTED LED FIXTURE (CONTRACTOR SHALL REMOVE EXISTING (BASE, THEN POUR NEW CONCRETE BASE. PROVIDE NEW CONDUIT AND WIRING) GE: ERS10F1X40DGRAY (EXISTING HEAD) KW: RTSU25-6.1-11-BRZ18S-BC (EXISTING POLE)	MVOLT	POLE	80		40K
PN	NEW POLE MOUNTED LED FIXTURE LITHONIA: DSX0 LED-P2-40K-T3M-MVOLT-RPA-BL30-HS-DNAXD (NEW HEAD) LITHONIA: RTS-6-6-6-6B-DM19-DDBXD	MVOLT	POLE	49	6,011	40K
S	LED STRIP LITHONIA: ZL1N-L48-5000LM-FST-MVOLT-40K-80CRI + HC36	MVOLT	SUSPENDED	34	4,585	40K
W	LED WALL PACK LITHONIA: TRW2 LED-P1-40K-MVOLT-DDBTXD (COORDINATE EXACT MOUNTING HEIGHT WITH ARCHITECT)	MVOLT	WALL	69	8,150	40K
WE	SAME AS TYPE 'W' BUT ON EMERGENCY CIRCUIT SEE ABOVE (COORDINATE EXACT MOUNTING HEIGHT WITH ARCHITECT)	MVOLT	WALL	69	8,150	40K
X	SINGLE-FACE EXIT SIGN (REFER TO PLAN VIEW FOR FACE LOCATIONS AND ARROW INDICATORS) LITHONIA: LQM-S-W-3-R-120/277 + MOUNTING	MVOLT	CEILING / WALL	1		
X2	DOUBLE-FACE EXIT SIGN (REFER TO PLAN VIEW FOR FACE LOCATIONS AND ARROW INDICATORS) LITHONIA: LQM-S-W-3-R-120/277 + MOUNTING	MVOLT	CEILING / WALL	1		

2

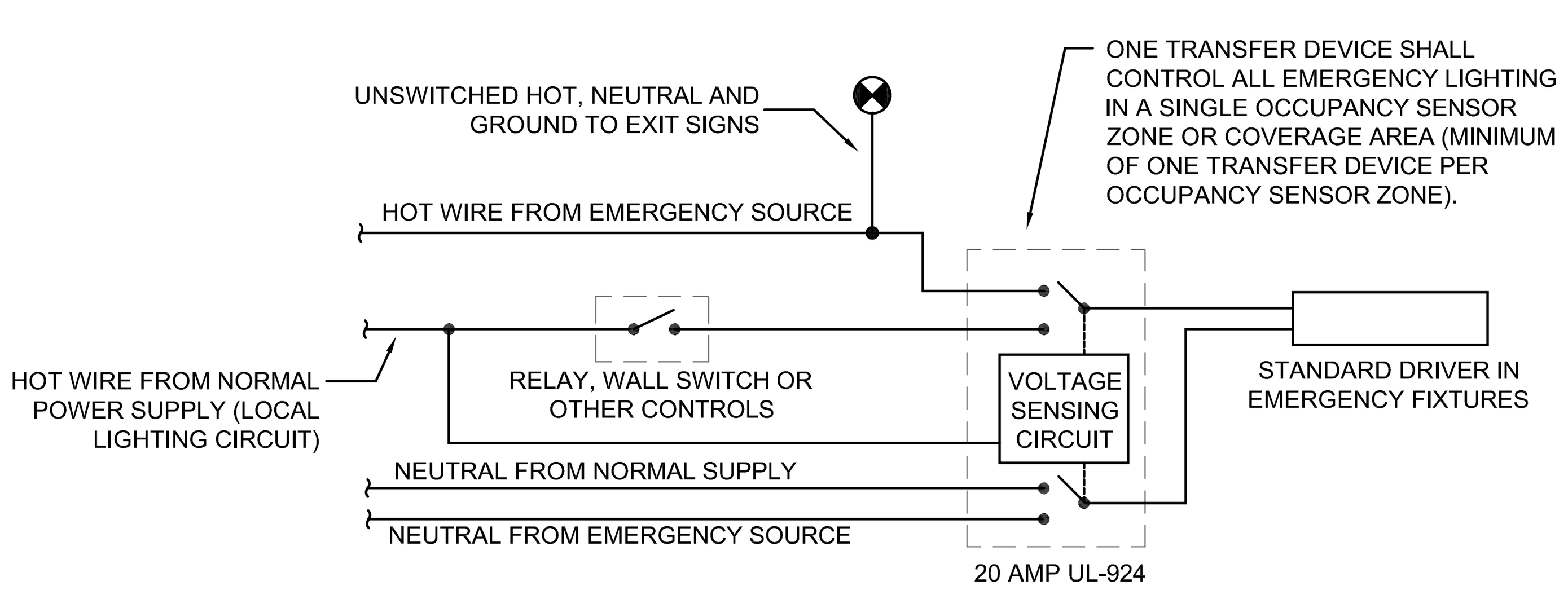
LIGHTING INVERTER SCHEDULE

INVERTER	VOLTAGE			RUNTIME	OUTPUT BREAKERS	
NAME	INPUT	OUTPUT	VA	(MINUTES)	QUANTITY	AMPS
LIA	120	120	1000	120	4	20

NOTES: 1/17/2019 17:01
1. MYERS POWER PRODUCTS "EM" SERIES IS BASIS OF DESIGN. CONTRACTOR SHALL PROVIDE MYERS "EM" INVERTER OR APPROVED EQUAL U.N.O.
2. OUTPUT BREAKERS SHALL BE 20A UNLESS NOTED OTHERWISE.

EMERGENCY LIGHTING CONTROL NOTES:

1. FOR 0-10V DIMMED FIXTURES, TRANSFER DEVICE SHALL HAVE ADDITIONAL INTERNAL RELAY TO BREAK 0-10V DIMMING SIGNAL TO ENSURE FIXTURES TURN ON WHEN NORMAL POWER FAILS. LVS LIGHTING CONTROLS MODEL "EPC-1-D" IS BASIS OF DESIGN FOR CIRCUITS WITH 0-10V DIMMING. http://www.lvscontrols.com
2. FOR FIXTURES WITHOUT DIMMING, BODINE 'BLCD-20B' IS THE BASIS OF DESIGN.



1 EMERGENCY LIGHTING CONTROL DETAIL
SCALE: N.T.S.

REV	DATE	DESCRIPTION
1	01-14-19	REVISION PER ADDENDUM NO. 1
2	01-17-19	REVISION PER ADDENDUM NO. 2

STATE OF TEXAS 12/11/2018 JAMES S. RUSE 102703 LICENSED PROFESSIONAL ENGINEER
539.1.17.2019.18188

NEW FACILITIES SERVICES MAINTENANCE BUILDING

MSU TEXAS
MIDWESTERN STATE UNIVERSITY

BYSParchitects
1005 North Street - Suite 200 Wichita Falls, Texas 76301 (940) 761-2404
Member American Institute of Architects

Summit
CONSULTANTS, INC.
Texas BPE Registration # F-207
1300 Summit Avenue Suite 500 Fort Worth, Texas 76102 Office 817 878 4242 Facsimile 817 878 4240
4144 N. Central Expwy Suite 635 Dallas, Texas 75204 Office 214 420 9111 www.summitmep.com

DRAWN BY
CHECKED BY
DATE 12/11/18
PROJECT NO. 18002
DESCRIPTION
LIGHTING DETAILS AND SCHEDULES

E400

PANEL [DP] SCHEDULE

			(VOLT-AMPS)							PHASE	(VOLT-AMPS)							AREA (SF):		
DESCRIPTION	P	AMP	LIGHT	RECEP	MOTOR	HEAT	KITCH	COOLING	OTHER	CIRCUIT	OTHER	COOLING	KITCH	HEAT	MOTOR	RECEP	LIGHT	P	AMP	DESCRIPTION
[A	3	300	2633	26467	667	6400	0	0	0	1 A 2	0	0	0	0	9200	25367	0	3	300	[B
[			2633	26467	667	6400	0	0	0	3 B 4	0	0	0	0	9200	25367	0			[
[			2633	26467	667	6400	0	0	0	5 C 6	0	0	0	0	9200	25367	0			[
[C	3	200	0	10167	7733	0	0	0	0	7 A 8	0	0	0	0	1867	10834	0	3	100	[D
[			0	10167	7733	0	0	0	0	9 B 10	0	0	0	0	1867	10834	0			[
[			0	10167	7733	0	0	0	0	11 C 12	0	0	0	0	1867	10834	0			[
SPARE	1	20	____	____	____	____	____	____	____	13 A 14	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	15 B 16	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	17 C 18	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	19 A 20	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	21 B 22	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	23 C 24	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	25 A 26	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	27 B 28	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	29 C 30	____	____	____	____	____	____	____	1	20	SPARE
TOTALS			7899	109902	25200	19200	0	0	0		0	0	0	0	33201	108603	0			TOTALS

LOAD SUMMARY	CON KVA	CON AMP	C W/SF	DEM. FAC	DEM KVA	DEM AMP	D W/SF
1.LIGHTING	7.9	21.9	0.0	1.25	9.9	27.5	0.0
2.RECEPTACLES	218.5	606.5	0.0	0.52	114.3	317.3	0.0
3.MOTORS	58.4	162.1	0.0	1.00	58.4	162.1	0.0
4.ELECTRIC HEAT	19.2	53.3	0.0	1.00	19.2	53.3	0.0
5.KITCHEN EQUIPMENT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
6.COOLING EQUIPMENT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
7.OTHER	0.0	0.0	0.0	1.00	0.0	0.0	0.0
8.SPARE	36.0			0.10	3.6	10.0	0.0
9.SPACE	0.0			0.10	0.0	0.0	0.0
TOTAL:	304	844	0		205	570	0

NOTES:
1. MINIMUM INTEGRATED EQUIPMENT RATING 35KAIC
2. PROVIDE FULL SIZE NEUTRAL AND GROUND BUS

JOB NM:

UPSTREAM O.C.P.D.

NOTE: CONTRACTOR TO BALANCE PHASES WITHIN +/- 10%

JOB #: P18188

SUMMARY

VOLTAGE:	208
MCB/MLO:	MCB
AMPS:	600
# POLES:	30
MOUNT:	
BY:	_
TIME:	4:34:36 PM
DATE:	01/17/19
SHEET NAME:	DP
FORM NO.	PNLSCHED.XLS

PANEL [A] SCHEDULE

				(VOLT-AMPS)						PHASE		(VOLT-AMPS)						AREA (SF):		
	DESCRIPTION	P	AMP	LIGHT	RECEP	MOTOR	HEAT	KITCH	COOLING	OTHER	CIRCUIT	OTHER	COOLING	KITCH	HEAT	MOTOR	RECEP	LIGHT	P	AMP	DESCRIPTION
	LIGHTING	1	20	1122	____	____	____	____	____	____	1 A 2	____	____	____	____	____	____	980	1	20	LIGHTING
	LIGHTING	1	20	1295	____	____	____	____	____	____	3 B 4	____	____	____	____	____	____	968	1	20	LIGHTING
	LIGHTING	1	20	812	____	____	____	____	____	____	5 C 6	____	____	____	1920	____	____	____	1	20	BLOCK HEATER
	FUEL PUMP CONT	1	20	____	1800	____	____	____	____	____	7 A 8	____	____	____	____	____	____	____	1	20	SPARE
	SPARE	1	20	____	____	____	____	____	____	____	9 B 10	____	____	____	____	____	1000	____	1	20	RECEPTACLE
	FUEL PUMP CONT	1	20	____	1800	____	____	____	____	____	11 C 12	____	____	____	1920	____	____	____	1	20	BLOCK HEATER
	FUEL PUMP	1	20	____	____	1000	____	____	____	____	13 A 14	____	____	____	____	1000	____	____	1	20	FUEL PUMP
2	BLOCK HEATER	1	20	____	____	____	1920	____	____	____	15 B 16	____	____	____	1920	____	____	____	1	20	BLOCK HEATER
	BLOCK HEATER	1	20	____	____	____	1920	____	____	____	17 C 18	____	____	____	1920	____	____	____	1	20	BLOCK HEATER
	BLOCK HEATER	1	20	____	____	____	1920	____	____	____	19 A 20	____	____	____	1920	____	____	____	1	20	BLOCK HEATER
	BLOCK HEATER	1	20	____	____	____	1920	____	____	____	21 B 22	____	____	____	1920	____	____	____	1	20	BLOCK HEATER
	GATE CONTROL	1	20	____	500	____	____	____	____	____	23 C 24	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	25 A 26	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	27 B 28	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	29 C 30	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	31 A 32	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	33 B 34	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	35 C 36	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	37 A 38	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	39 B 40	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	41 C 42	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	43 A 44	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	45 B 46	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	47 C 48	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	49 A 50	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	51 B 52	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	53 C 54	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	55 A 56	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	57 B 58	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	59 C 60	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	61 A 62	____	____	____	____	____	1600	____	1	20	CART CHARGER
	CART CHARGER	1	20	____	1800	____	____	____	____	____	63 B 64	____	____	____	____	____	500	____	1	20	GATE CONTROL
	SITE LIGHTING	1	20	738	____	____	____	____	____	____	65 C 66	____	____	____	____	____	____	690	1	20	LIGHTING
	LIGHTING	1	20	918	____	____	____	____	____	____	67 A 68	____	____	____	____	____	____	612	1	20	LIGHTING
	EXISTING SIGN	1	20	____	1800	____	____	____	____	____	69 B 70	____	____	____	____	____	____	____	1	20	SPARE
	SPARE	1	20	____	____	____	____	____	____	____	71 C 72	____	____	____	____	____	____	____	1	20	SPARE
	SPARE	1	20	____	____	____	____	____	____	____	73 A 74	____	____	____	____	____	____	____	1	20	SPARE
	SPARE	1	20	____	____	____	____	____	____	____	75 B 76	____	____	____	____	____	____	____	1	20	SPARE
	SPARE	1	20	____	____	____	____	____	____	____	77 C 78	____	____	____	____	____	____	____	1	20	SPARE
	SPARE	1	20	____	____	____	____	____	____	____	79 A 80	____	____	____	____	____	____	____	1	20	SPARE
	SPARE	1	20	____	____	____	____	____	____	____	81 B 82	____	____	____	____	____	____	____	1	20	SPARE
	SPARE	1	20	____	____	____	____	____	____	____	83 C 84	____	____	____	____	____	____	____	1	20	SPARE
	TOTALS			4685	41900	1000	7680	0	0	0		0	0	0	11520	1000	37500	3250			TOTALS

LOAD SUMMARY	CON KVA	CON AMP	C W/SF	DEM. FAC	DEM KVA	DEM AMP	D W/SF
1.LIGHTING	7.9	21.9	0.0	1.25	9.9	27.5	0.0
2.RECEPTACLES	79.4	220.4	0.0	0.56	44.7	124.1	0.0
3.MOTORS	2.0	5.6	0.0	1.00	2.0	5.6	0.0
4.ELECTRIC HEAT	19.2	53.3	0.0	1.00	19.2	53.3	0.0
5.KITCHEN EQUIPMENT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
6.COOLING EQUIPMENT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
7.OTHER	0.0	0.0	0.0	1.00	0.0	0.0	0.0
8.SPARE	34.0			0.10	3.4	9.4	0.0
9.SPACE	0.0			0.10	0.0	0.0	0.0
TOTAL:	109	301	0		79	220	0

NOTES:
1. MINIMUM INTEGRATED EQUIPMENT RATING 35KAIC
2. PROVIDE FULL SIZE NEUTRAL AND GROUND BUS

JOB NM:

UPSTREAM O.C.P.D.

NOTE: CONTRACTOR TO BALANCE PHASES WITHIN +/- 10%

JOB #: P18188

SUMMARY

VOLTAGE:	208
MCB/MLO:	MCB
AMPS:	300
# POLES:	84
MOUNT:	
BY:	_
TIME:	4:34:36 PM
DATE:	01/17/19
SHEET NAME:	L1
FORM NO.	PNLSCHED.XLS

2

RISER GENERAL NOTES

1. SERVICE EQUIPMENT SHALL BE MARKED WITH THE MAXIMUM AVAILABLE FAULT CURRENT IN ACCORDANCE WITH NEC 110.24.

TABLE 250.66

GROUNDING ELECTRODE CONDUCTOR SIZE	LARGEST SERVICE CONDUCTOR (TOTAL EQUIVALENT AREA)
#8	#2 OR SMALLER
#6	#1 OR #1/0
#4	#2/0 OR #3/0
#2	OVER 3/0 THROUGH 350 MCM
#1/0	OVER 350 THROUGH 600 MCM
#2/0	OVER 600 THROUGH 1100 MCM
#3/0	OVER 1100 MCM

BREAKER / FEEDER SCHEDULE

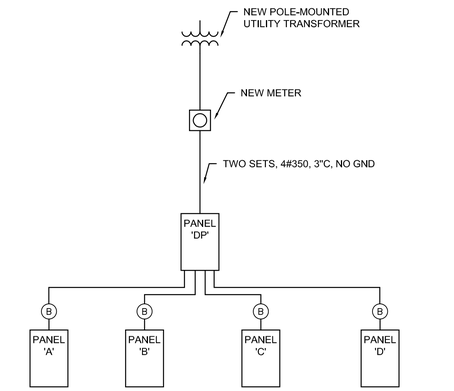
3 CONDUCTOR CODE	3 CONDUCTOR WIRES	3 CONDUCTOR CONDUIT	COPPER CONDUCTORS (B) AMPACITY	BRKR	DEG.	4 CONDUCTOR CODE	4 CONDUCTOR WIRES	4 CONDUCTOR CONDUIT
(45)	3 #12, 1 #12	3/4"	20	20A/3P	60 C	(67)	4 #12, 1 #12	3/4"
(46)	3 #10, 1 #10	3/4"	30	30A/3P		(68)	4 #10, 1 #10	3/4"
(47)	3 #8, 1 #10	3/4"	40	40A/3P		(69)	4 #8, 1 #10	1"
(48)	3 #6, 1 #10	1"	55	50A/3P		(70)	4 #6, 1 #10	1"
(49)	3 #4, 1 #8	1-1/4"	70	70A/3P		(71)	4 #4, 1 #8	1-1/4"
(50)	3 #3, 1 #8	1-1/4"	85	90A/3P		(72)	4 #3, 1 #8	1-1/4"
(51)	3 #2, 1 #8	1-1/4"	95	100A/3P		(73)	4 #2, 1 #8	1-1/2"
(52)	3 #1, 1 #6	1-1/2"	110	110A/3P		(74)	4 #1, 1 #6	2"
(53)	3 #2, 1 #6	1-1/4"	115		75 C	(75)	4 #2, 1 #6	1-1/2"
(54)	3 #1, 1 #6	1-1/2"	130	125A/3P		(76)	4 #1, 1 #6	2"
(55)	3 #1/0, 1 #6	1-1/2"	150	150A/3P		(77)	4 #1/0, 1 #6	2"
(56)	3 #2/0, 1 #6	2"	175	175A/3P		(78)	4 #2/0, 1 #6	2"
(57)	3 #3/0, 1 #6	2"	200	200A/3P		(79)	4 #3/0, 1 #6	2-1/2"
(58)	3 #4/0, 1 #4	2"	230	225A/3P		(80)	4 #4/0, 1 #4	2-1/2"
(59)	3 #250MCM, 1 #4	2-1/2"	255	250A/3P		(81)	4 #250MCM, 1 #4	3"
(60)	3 #300MCM, 1 #4	2-1/2"	285	275A/3P		(82)	4 #300MCM, 1 #4	3"
(61)	3 #350MCM, 1 #3	3"	310	300A/3P		(83)	4 #350MCM, 1 #3	3"
(62)	3 #400MCM, 1 #3	3"	335			(84)	4 #400MCM, 1 #3	3"
(63)	3 #500MCM, 1 #3	3"	380	350A/3P		(85)	4 #500MCM, 1 #3	4"
(64)	3 #600MCM, 1 #2	4"	420	400A/3P		(86)	4 #600MCM, 1 #2	4"
(65)	3 #700MCM, 1 #2	4"	460	450A/3P		(87)	4 #700MCM, 1 #2	4"
(66)	3 #750MCM, 1 #2	4"	475	500/3P		(88)	4 #750MCM, 1 #2	4"

FEEDER SCHEDULE NOTES:
1. TABLE 250.122 SHALL BE USED TO DETERMINE GROUND WIRE SIZE WHERE PARALLEL FEEDERS ARE RUN AND FOR MOTOR CIRCUITS. FOR PARALLEL FEEDERS, USE TOTAL EQUIVALENT AREA OF PARALLELED CONDUCTORS.
2. TABLE 250.66 SHALL BE USED TO DETERMINE THE SIZE OF THE GROUNDING ELECTRODE CONDUCTOR AT THE SERVICE TO A BUILDING OR AT A SEPARATELY DERIVED SYSTEM INCLUDING DRY-TYPE TRANSFORMERS.
3. FOR FEEDERS OVER 100 AMPS, USE COMPRESSION LUGS.
4. WHERE "(B)" SYMBOL IS SHOWN, FEEDER SHALL BE SIZED PER BREAKER COLUMN SHOWN ABOVE. FEEDER SHALL BE 4-CONDUCTOR PLUS GROUND UNLESS NOTED OTHERWISE.

TABLE 250.122

EQUIPMENT GROUNDING CONDUCTOR SIZE	MAXIMUM OVERCURRENT DEVICE AMP RATING
#12	20
#10	60
#8	100
#6	200
#4	300
#3	400
#2	500
#1	600
#1/0	800
#2/0	1000
#3/0	1200
#4/0	1600
#250MCM	2000
#350MCM	2500
#400MCM	3000
#500MCM	4000
#700MCM	5000
#800MCM	6000

FEEDER CODE:
G=* INDICATES NO. OF PARALLEL SETS
N=* INDICATES SIZE AND QUANTITY OF GROUNDING CONDUCTOR(S)
INDICATES SIZE AND QUANTITY OF GROUNDED CONDUCTOR(S)



1 ELECTRICAL SINGLE LINE DIAGRAM
SCALE: N.T.S.

FAULT CURRENT CALCULATION:

TRANSFORMER = 150 KVA, Z = 1.4%

$$I_{sc} = \frac{KVA \times 1000}{V \times \sqrt{3} \times Z}$$

$$I_{sc} = \frac{150 \times 1000}{208 \times \sqrt{3} \times 0.014}$$

MAXIMUM AVAILABLE 3ø FAULT = 29.7 KA

REV	DATE	DESCRIPTION
1	01-14-19	REVISION PER ADDENDUM NO. 1
2	01-17-19	REVISION PER ADDENDUM NO. 2

Jonathan W. Rose
01/17/2019
JAMES S. RUSE
102703
LICENSED
PROFESSIONAL ENGINEER
539.1.17.2019.18188

NEW FACILITIES SERVICES MAINTENANCE BUILDING

MSU TEXAS
MIDWESTERN STATE UNIVERSITY

BYSParchitects
1005 Ninth Street - Suite 200 Wichita Falls, Texas 76301 (940) 761-2404
Member American Institute of Architects

DRAWN BY

CHECKED BY

DATE 12/11/18

PROJECT NO. 18002

DESCRIPTION
ELECTRICAL SINGLE LINE AND PANELBOARD SCHEDULES

E501

Summit
CONSULTANTS, INC.
Texas BPE Registration # F-207
1300 Summit Avenue Suite 500 Fort Worth, Texas 76102 Office 817 878 4242 Facsimile 817 878 4240
4144 N. Central Expwy Suite 635 Dallas, Texas 75204 Office 214 420 9111 www.summitmep.com

PANEL [B] SCHEDULE

			(VOLT-AMPS)							PHASE	(VOLT-AMPS)							AREA (SF):		
DESCRIPTION	P	AMP	LIGHT	RECEP	MOTOR	HEAT	KITCH	COOLING	OTHER	CIRCUIT	OTHER	COOLING	KITCH	HEAT	MOTOR	RECEP	LIGHT	P	AMP	DESCRIPTION
RECEPTACLE	1	20	____	720	30	____	____	____	____	1 A 2	____	____	____	____	____	720	____	1	20	RECEPTACLE
DRILL PRESS	1	20	____	1920	____	____	____	____	____	3 B 4	____	____	____	____	____	360	____	1	20	RECEPTACLE
[RADIAL ARM SAW	3	30	____	2882	____	____	____	____	____	5 C 6	____	____	____	____	____	1920	____	1	20	CHOP SAW
[			____	2882	____	____	____	____	____	7 A 8	____	____	____	____	____	1920	____	1	20	BAND SAW
[			____	2882	____	____	____	____	____	9 B 10	____	____	____	____	____	1921	____	3	20	[GRINDER
[SPACE FOR GFCI			____	____	____	____	____	____	____	11 C 12	____	____	____	____	____	1921	____			[
[BELT SANDER	3	20	____	1921	____	____	____	____	____	13 A 14	____	____	____	____	____	1921	____			[
[			____	1921	____	____	____	____	____	15 B 16	____	____	____	____	____	____	____			[SPACE FOR GFCI
[			____	1921	____	____	____	____	____	17 C 18	____	____	____	____	____	720	____	1	20	RECEPTACLE
[SPACE FOR GFCI			____	____	____	____	____	____	____	19 A 20	____	____	____	____	____	1921	____	3	20	[PLANER
RECEPTACLE	1	20	____	360	____	____	____	____	____	21 B 22	____	____	____	____	____	1921	____			[
[DISC SANDER	3	20	____	1921	____	____	____	____	____	23 C 24	____	____	____	____	____	1921	____			[
[			____	1921	____	____	____	____	____	25 A 26	____	____	____	____	____	____	____			[SPACE FOR GFCI
[			____	1921	____	____	____	____	____	27 B 28	____	____	____	____	____	1921	____	3	20	[SHAPER
[SPACE FOR GFCI			____	____	____	____	____	____	____	29 C 30	____	____	____	____	____	1921	____			[
[JOINTER	2	20	____	1664	____	____	____	____	____	31 A 32	____	____	____	____	____	1921	____			[
[			____	1664	____	____	____	____	____	33 B 34	____	____	____	____	____	____	____			[SPACE FOR GFCI
[SPACE FOR GFCI			____	____	____	____	____	____	____	35 C 36	____	____	____	____	____	1921	____	3	20	[TABLE SAW
[TABLE SAW	3	20	____	1921	____	____	____	____	____	37 A 38	____	____	____	____	____	1921	____			[
[			____	1921	____	____	____	____	____	39 B 40	____	____	____	____	____	1921	____			[
[			____	1921	____	____	____	____	____	41 C 42	____	____	____	____	____	____	____			[SPACE FOR GFCI
[SPACE FOR GFCI			____	____	____	____	____	____	____	43 A 44	____	____	____	____	1864	____	____	3	20	[DSC-1
FACP	1	20	____	1000	____	____	____	____	____	45 B 46	____	____	____	____	1864	____	____			[
UH-1, UH-2, UH-3	1	20	____	540	____	____	____	____	____	47 C 48	____	____	____	____	1864	____	____			[
SPARE	1	20	____	____	____	____	____	____	____	49 A 50	____	____	____	____	38	1080	____	1	20	RECEPTACLE
RECEPTACLE	1	20	____	720	____	____	____	____	____	51 B 52	____	____	____	____	____	500	____	1	20	RECEPTACLE
RECEPTACLE	1	20	____	500	____	____	____	____	____	53 C 54	____	____	____	____	____	360	____	1	20	RECEPTACLE
RECEPTACLE	1	20	____	1000	____	____	____	____	____	55 A 56	____	____	____	____	____	720	____	1	20	RECEPTACLE
RECEPTACLE	1	20	____	720	____	____	____	____	____	57 B 58	____	____	____	____	____	500	____	1	20	RECEPTACLE
RECEPTACLE	1	20	____	720	____	____	____	____	____	59 C 60	____	____	____	____	____	1000	____	1	20	RECEPTACLE
RECEPTACLE	1	20	____	720	____	____	____	____	____	61 A 62	____	____	____	____	____	1000	____	1	20	RECEPTACLE
RECEPTACLE	1	20	____	500	____	____	____	____	____	63 B 64	____	____	____	____	154	720	____	1	20	RECEPTACLE
[CU-3	2	45	____	____	3224	____	____	____	____	65 C 66	____	____	____	____	1248	____	____	2	20	[CU-4
[			____	____	3224	____	____	____	____	67 A 68	____	____	____	____	1248	____	____			[
RECEPTACLE	1	20	____	500	____	____	____	____	____	69 B 70	____	____	____	____	720	____	____	2	20	[CU-6
RECEPTACLE	1	20	____	500	____	____	____	____	____	71 C 72	____	____	____	____	720	____	____			[
AHU-3	1	20	____	____	2040	____	____	____	____	73 A 74	____	____	____	____	1332	____	____	1	20	AHU-4
SPARE	1	20	____	____	____	____	____	____	____	75 B 76	____	____	____	____	____	____	____	1	20	SPARE
OVERHEAD DOOR	1	20	____	1800	____	____	____	____	____	77 C 78	____	____	____	____	600	____	____	1	20	WH1
[DSC-1	3	30	____	____	2485	____	____	____	____	79 A 80	____	____	____	____	____	____	____	1	20	SPARE
[			____	____	2485	____	____	____	____	81 B 82	____	____	____	____	____	____	____	1	20	SPARE
[			____	____	2485	____	____	____	____	83 C 84	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	85 A 86	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	87 B 88	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	89 C 90	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	91 A 92	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	93 B 94	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	95 C 96	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	97 A 98	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	99B100	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	101C102	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	103A104	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	105B106	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	107C108	____	____	____	____	____	____	____	1	20	SPARE
TOTALS			0	41483	15973	0	0	0	0		0	0	0	0	11652	34572	0			TOTALS

LOAD SUMMARY	CON KVA	CON AMP	C W/SF	DEM. FAC	DEM KVA	DEM AMP	D W/SF
1.LIGHTING	0.0	0.0	0.0	1.25	0.0	0.0	0.0
2.RECEPTACLES	76.1	211.2	0.0	0.57	43.1	119.6	0.0
3.MOTORS	27.6	76.6	0.0	1.00	27.6	76.6	0.0
4.ELECTRIC HEAT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
5.KITCHEN EQUIPMENT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
6.COOLING EQUIPMENT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
7.OTHER	0.0	0.0	0.0	1.00	0.0	0.0	0.0
8.SPARE	60.0			0.10	6.0	16.7	0.0
9.SPACE	18.0			0.10	1.8	5.0	0.0
TOTAL:	104	288	0		79	218	0

NOTES:
1. MINIMUM INTEGRATED EQUIPMENT RATING 18KAIC
2. PROVIDE FULL SIZE NEUTRAL AND GROUND BUS

JOB NM:

UPSTREAM O.C.P.D.

NOTE: CONTRACTOR TO BALANCE PHASES WITHIN +/- 10%

JOB #: P18188

SUMMARY	
VOLTAGE:	208
MCB/MLO:	MCB
AMPS:	300
# POLES:	108
MOUNT:	
BY:	-
TIME:	4:34:36 PM
DATE:	01/17/19
SHEET NAME:	BX
FORM NO.	PNLSCHED.XLS

REV	DATE	DESCRIPTION
1	01-14-19	REVISION PER ADDENDUM NO. 1
2	01-17-19	REVISION PER ADDENDUM NO. 2

539.1.17.2019.18188

NEW FACILITIES
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1005 Ninth Street - Suite 200, Wichita Falls, Texas 76301 (940) 761-2404
Member American Institute of Architects

DRAWN BY

CHECKED BY

DATE 12/11/18

PROJECT NO. 18002

DESCRIPTION
ELECTRICAL
PANELBOARD
SCHEDULES

E502

Summit
CONSULTANTS, INC.
Texas BPE Registration # F-207
1300 Summit Avenue
Suite 500
Fort Worth, Texas 76102
Office 817 878 4242
Facsimile 817 878 4240
4144 N. Central Expwy
Suite 635
Dallas, Texas 75204
Office 214 420 9111
www.summitmep.com

PANEL [C] SCHEDULE

			(VOLT-AMPS)							PHASE	(VOLT-AMPS)							AREA (SF):		
DESCRIPTION	P	AMP	LIGHT	RECEP	MOTOR	HEAT	KITCH	COOLING	OTHER	CIRCUIT	OTHER	COOLING	KITCH	HEAT	MOTOR	RECEP	LIGHT	P	AMP	DESCRIPTION
RECEPTACLE	1	20	____	720	____	____	____	____	____	1 A 2	____	____	____	____	____	540	____	1	20	RECEPTACLE
[WELDER	2	50	____	4160	____	____	____	____	____	3 B 4	____	____	____	____	30	540	____	1	20	RECEPTACLE
[			____	4160	____	____	____	____	____	5 C 6	____	____	____	____	____	2496	____	2	30	[VEHICLE LIFT
[SPACE FOR GFCI			____	____	____	____	____	____	____	7 A 8	____	____	____	____	____	2496	____			[
RECEPTACLE	1	20	____	540	____	____	____	____	____	9 B 10	____	____	____	____	____	____	____			[SPACE FOR GFCI
[PRESSURE	2	20	____	1664	____	____	____	____	____	11 C 12	____	____	____	____	____	360	____	1	20	RECEPTACLE
[WASHER			____	1664	____	____	____	____	____	13 A 14	____	____	____	____	____	4160	____	2	50	[WELDER
[SPACE FOR GFCI			____	____	____	____	____	____	____	15 B 16	____	____	____	____	____	4160	____			[
RECEPTACLE	1	20	____	900	____	____	____	____	____	17 C 18	____	____	____	____	____	____	____			[SPACE FOR GFCI
RECEPTACLE	1	20	____	900	____	____	____	____	____	19 A 20	____	____	____	____	____	1000	____	1	20	OVERHEAD DOOR
OVERHEAD DOOR	1	20	____	____	1000	____	____	____	____	21 B 22	____	____	____	____	2912	____	____	2	45	[CU-1
[CU-2	2	45	____	____	3224	____	____	____	____	23 C 24	____	____	____	____	2912	____	____			[
[			____	____	3224	____	____	____	____	25 A 26	____	____	____	____	1620	____	____	1	20	AHU-1
[CU-5	2	40	____	____	2392	____	____	____	____	27 B 28	____	____	____	____	2040	____	____	1	20	AHU-2
[			____	____	2392	____	____	____	____	29 C 30	____	____	____	____	1488	____	____	1	20	AHU-5
SPARE	1	20	____	____	____	____	____	____	____	31 A 32	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	33 B 34	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	35 C 36	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	37 A 38	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	39 B 40	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	41 C 42	____	____	____	____	____	____	____	1	20	SPARE
TOTALS			0	14708	12232	0	0	0	0		0	0	0	0	11002	15752	0			TOTALS

LOAD SUMMARY	CON KVA	CON AMP	C W/SF	DEM. FAC	DEM KVA	DEM AMP	D W/SF
1.LIGHTING	0.0	0.0	0.0	1.25	0.0	0.0	0.0
2.RECEPTACLES	30.5	84.7	0.0	0.67	20.3	56.3	0.0
3.MOTORS	23.2	64.4	0.0	1.00	23.2	64.4	0.0
4.ELECTRIC HEAT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
5.KITCHEN EQUIPMENT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
6.COOLING EQUIPMENT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
7.OTHER	0.0	0.0	0.0	1.00	0.0	0.0	0.0
8.SPARE	24.0			0.10	2.4	6.7	0.0
9.SPACE	8.0			0.10	0.8	2.2	0.0
TOTAL:	54	149	0		47	130	0

NOTES:
1.MINIMUM INTEGRATED EQUIPMENT RATING
10KAIC
2.PROVIDE FULL SIZE NEUTRAL AND GROUND BUS

JOB NM:

UPSTREAM O.C.P.D.

NOTE: CONTRACTOR TO BALANCE PHASES WITHIN +/- 10%

JOB #: P18188

SUMMARY

VOLTAGE:	208
MCB/MLO:	MCB
AMPS:	200
# POLES:	42
MOUNT:	
BY:	
TIME:	4:34:36 PM
DATE:	01/17/19
SHEET NAME:	L3
FORM NO.	PNLSCHED.XLS

2

PANEL [D] SCHEDULE

			(VOLT-AMPS)							PHASE	(VOLT-AMPS)							AREA (SF):		
DESCRIPTION	P	AMP	LIGHT	RECEP	MOTOR	HEAT	KITCH	COOLING	OTHER	CIRCUIT	OTHER	COOLING	KITCH	HEAT	MOTOR	RECEP	LIGHT	P	AMP	DESCRIPTION
RECEPTACLE	1	20	____	540	30	____	____	____	____	1 A 2	____	____	____	____	____	4160	____	2	50	[WELDER
CHOP SAW	1	20	____	1920	____	____	____	____	____	3 B 4	____	____	____	____	____	4160	____			[
RECEPTACLE	1	20	____	540	____	____	____	____	____	5 C 6	____	____	____	____	____	____	____			[SPACE FOR GFCI
SPARE	1	20	____	____	____	____	____	____	____	7 A 8	____	____	____	____	____	540	____	1	20	RECEPTACLE
SPARE	1	20	____	____	____	____	____	____	____	9 B 10	____	____	____	____	____	1000	____	1	20	ICE MAKER
RECEPTACLE	1	20	____	540	____	____	____	____	____	11 C 12	____	____	____	____	____	900	____	1	20	RECEPTACLE
MICROWAVE	1	20	____	1000	____	____	____	____	____	13 A 14	____	____	____	____	____	1000	____	1	20	REFRIGERATOR
[COPIER	2	20	____	1040	____	____	____	____	____	15 B 16	____	____	____	____	____	500	____	1	20	EWC
[			____	1040	____	____	____	____	____	17 C 18	____	____	____	____	____	1260	____	1	20	RECEPTACLE
RECEPTACLE	1	20	____	900	____	____	____	____	____	19 A 20	____	____	____	____	____	1000	____	1	20	REFRIGERATOR
SPARE	1	20	____	____	____	____	____	____	____	21 B 22	____	____	____	____	____	1800	____	1	20	OVERHEAD DOOR
SPARE	1	20	____	____	____	____	____	____	____	23 C 24	____	____	____	____	1864	____	____	3	20	[ACP1
[DRYER	3	30	____	2882	____	____	____	____	____	25 A 26	____	____	____	____	1864	____	____			[
[			____	2882	____	____	____	____	____	27 B 28	____	____	____	____	1864	____	____			[
[			____	2882	____	____	____	____	____	29 C 30	____	____	____	____	____	____	____			[SPACE FOR GFCI
[SPACE FOR GFCI			____	____	____	____	____	____	____	31 A 32	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	33 B 34	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	35 C 36	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	37 A 38	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	39 B 40	____	____	____	____	____	____	____	1	20	SPARE
SPARE	1	20	____	____	____	____	____	____	____	41 C 42	____	____	____	____	____	____	____	1	20	SPARE
TOTALS			0	16166	30	0	0	0	0		0	0	0	0	5592	16320	0			TOTALS

LOAD SUMMARY	CON KVA	CON AMP	C W/SF	DEM. FAC	DEM KVA	DEM AMP	D W/SF
1.LIGHTING	0.0	0.0	0.0	1.25	0.0	0.0	0.0
2.RECEPTACLES	32.5	90.2	0.0	0.66	21.3	59.1	0.0
3.MOTORS	5.6	15.5	0.0	1.00	5.6	15.5	0.0
4.ELECTRIC HEAT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
5.KITCHEN EQUIPMENT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
6.COOLING EQUIPMENT	0.0	0.0	0.0	1.00	0.0	0.0	0.0
7.OTHER	0.0	0.0	0.0	1.00	0.0	0.0	0.0
8.SPARE	30.0			0.10	3.0	8.3	0.0
9.SPACE	6.0			0.10	0.6	1.7	0.0
TOTAL:	38	106	0		31	85	0

NOTES:
1.MINIMUM INTEGRATED EQUIPMENT RATING
10KAIC
2.PROVIDE FULL SIZE NEUTRAL AND GROUND BUS

JOB NM:

UPSTREAM O.C.P.D.

NOTE: CONTRACTOR TO BALANCE PHASES WITHIN +/- 10%

JOB #: P18188

SUMMARY

VOLTAGE:	208
MCB/MLO:	MCB
AMPS:	100
# POLES:	42
MOUNT:	
BY:	
TIME:	4:34:36 PM
DATE:	01/17/19
SHEET NAME:	L4
FORM NO.	PNLSCHED.XLS

REV	DATE	DESCRIPTION
1	01-14-19	REVISION PER ADDENDUM NO. 1
2	01-17-19	REVISION PER ADDENDUM NO. 2

Jonathan S. Ruse
01/17/2019
JAMES S. RUSE
102703
LICENSED
PROFESSIONAL ENGINEER
539.1.17.2019.18188

NEW FACILITIES
SERVICES
MAINTENANCE
BUILDING

MSU TEXAS
MIDWESTERN STATE UNIVERSITY

BYSParchitects
1005 Ninth Street - Suite 200 Wichita Falls, Texas 76301 (940) 761-2404
Member American Institute of Architects

DRAWN BY

CHECKED BY

DATE 12/11/18

PROJECT NO. 18002

DESCRIPTION
ELECTRICAL
PANELBOARD
SCHEDULES

E503

Summit
CONSULTANTS, INC.
Texas BPE Registration # F-207
1300 Summit Avenue
Suite 500
Fort Worth, Texas 76102
Office 817 878 4242
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S:\P18188 Midwestern State\Elec\P18188 - E5.3 - ELECTRICAL PANELBOARD SCHEDULES.dwg - E0.1 01/17/19 16:53:26 bkh
SHEET SIZE = ANSI D 22x34

BYSParchitects

RFP#735-19-8212

Facilities Services New Maintenance Building

Questions from Vendors

Note:
Grayed out questions and responses were address in Addendum #1

January 7, 2019

1. I am contacting you today to ask for the project's estimated budget/cost if available. Bids are due on January 24 at 2:00 PM.
   Response: (KO) Construction Cost Limit is at most $2.046 MM.

2. Wood Fences
   a. Using a 15-degree ring shank are you requiring an Electro-Galv or Stainless Collated nail?
      Response: Stainless Collated Nails
   b. Thickness of 1x8 Red Cedar Board and Batten Planks?
      Response: Refer Addendum #1
   c. Thickness of 1x6 Red Cedar Board and Batten Planks?
      Response: Refer Addendum #1
   d. Stain Color? Product?
      Response: Refer Addendum #1
   e. 2.5" Galv. Metal Pole Schedule pipe 6' Fence? 8' Fence Add Alternate?
      Response: Refer Addendum #1

3. Spray Foam Insulation
   a. Is Intumescent coating required or 15-minute fire rated paint?
      Response: To Be Determined, will include in Addendum No. 2
   b. Or, Flat White Latex to seal from UV Exposure / Non-Fire rated?
      Response: Same as above

4. Please send via email a bidders/plan holders list for this project, and can you please confirm if the bid date remains the same. If you unable to email the bidders/plan holders list, it can also be faxed.
   Response: BYSP does not have a plan holders or GC list currently. We will start to develop a list at Pre-Bid meeting.

5. I noticed that in the specs for this project, there are two sections with the title of "Miscellaneous Specialties".
   Are both sections required? There were a few items in one of the sections (109000 Miscellaneous Building Specialties) that did not seem applicable to this project.
   Response: Refer Addendum #1

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Questions from Vendors

January 8, 2019

6. One of our subcontractors notified us that their salesman informed them that the Specified Airtight OC is no longer available. Airtight OC has not been around for approximately 10 years or discontinued. Appendix X is a 4min 12sec field test, 15min rating can only be achieved by DC-315 paint if left exposed. Will the attached product SWD QS-108YM TDS be an approved equal to use?
   Response: Refer Addendum #1

7. Are there specifications for the compressed air piping?
   Response: Refer Addendum #1

8. Is there any ducted return air for offices M103, M105, M118 and M117?
   Response: Refer Addendum #2

9. What is the duct liner thickness for the exposed supply air duct in shop areas? (1.5"?)
   Response: Refer Addendum #2

10. Is there a fire suppression sprinkler in the base bid? Or only as alternate #5.
    Response: Nothing in the base bid, the full Fire Suppression system is included in Additive Alternate #5

11. Do you have pictures of the welding hood table, hood and exhaust tube assembly, that shows on M201 to be relocated? Or can we have a look at what we are relocating.
    Response: Refer Addendum #2 for removal of items listed above from the project.

January 9, 2019

12. Mechanical – Furnace spec state that thermostats are to be provided by Alerton with a control system. Is this something the owner is providing? There are no control system specs.
    Response: Refer Addendum #2

January 10, 2019

13. Please clarify completion date for this project. During the pre-bid meeting a statement was made regarding a completion date after August 1, 2020 due to funding availability.
    Response: (KO) The completion date should be April 1, 2020 at the latest. The project cannot be completed prior to August 21, 2019 due to internal funding issues.

14. Does the owner pay costs for soils and concrete testing?
    Response: (KO) Yes.

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Questions from Vendors

15. Specification 083613 Sectional Doors lists OHD 422 Series as a basis of design. Reportedly, this model will not meet the Air Infiltration specification noted in paragraph 2.2.C. Please provide clarification.
    Response: Refer Addendum #1

16. Does this project have prevailing wage requirements?
    Response: (TN) Yes, per Uniform General Conditions for Construction Standards, Texas Gov't Code, Chapter 2258. Link is on page 9 of bid.

17. Sheet M401 has a note that notes a delegated design for fuel oils systems and equipment. During the pre-bid meeting a statement was made of relocating existing equipment. Please clarify scope.
    Response: Refer Addendum #2

18. Please clarify contractor scope regarding relocated equipment.
    Response: (KO) Contractor to disassemble it as necessary, move it to the new building, reinstall it, and ensure it operates in a similar manner prior to it being relocated. Refer Addendum #1 for list of items.

19. Specification 10400 mentions "MSUTX standard sign package". Please provide clarification.
    Response: Refer Addendum #1

20. Please provide clarification for installation detail at golf cart charging stations.
    Response: Refer Addendum #1

21. Are the lockers shown in CORR M109 the only ones that require a concrete base?
    Response: Yes, remaining lockers will not require wood or concrete bases.

22. Does keynote 21 apply to this project?
    Response: Key note 21 on sheet A101 would refer to the 3 sets of lockers in the shops. These units will be relocated by the owner and are not included in this contract.

23. Does the exposed steel structure paint?
    Response: The exposed steel columns (or rigid frames will paint up the knuckle (approx. 13' AFF) per key note 11 on A101. All exposed structure above that point including all roof framing will be left unpainted with only the primed finished from the PEMB manufacturer.

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Questions from Vendors

January 11, 2019

24. I see a fire alarm specification, but a fire alarm is not required for the building occupancy classification. The fire suppression system as an alternate would also lead to two different fire alarm designs. Do they want a fire alarm?
    Response: Refer Addendum #2

25. Is an outside Main Electrical Safety Switch for the power company going to be required for the electrical service on this Building?
    Response: A switch is not required per the NEC for this instance.

26. Paving Note 3. on Sheet C6, Paving Plan, of the drawings references "Geotechnical Report Prepared by Terradyne, Project No. D181061". I've not been able to find a copy of this report anywhere in the solicitation. Am I overlooking the report or if it's not present can you tell me how I might get a copy of the report?
    Response: Refer Addendum #1

January 16, 2019

27. How is the 6" fire line terminated if the fire suppression system described in Alternate 5 is not accepted?
    Response: 6" Fire Line shall be included with Additive Alternate #5, Based Bid will only require a 2" tap for the domestic line and meter.

28. Will the pre-bid meeting sign in sheet be made available?
    Response: Sheet has been posted to Purchasing website

29. Does the concrete alley demo shown on sheet SPD101 stop at LLC parking lot?
    Response: Refer Addendum #2

30. Sheet SP101 shows keynote 22 at 3 locations along east wall of building? Are these locations intended to be charging stations?
    Response: Refer Addendum #2

31. Sheet A101 door 101A does not have keynote 26 indicated. Are interior bollards intended at this location?
    Response: Refer Addendum #2

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Questions from Vendors

January 17, 2019

32. Specification 323100 Steel Roll Gate System Part 4 – Gate Operators; 4.01 Manufacturer Door King Model 9150 state the MAXIMUM Gate Length is 30 Feet. If my scaling measurements are correct, I am obtaining the following lengths for Gates which are both Longer than 30'; LJR Gate Length = ~32'-7" +/- & Hampstead Gate Length = ~35'-3" +/-
    Please advise or provide the required correct Gate Length.
    Response: Refer Addendum #2

33. Does Alternate 5 include the 6" fire line shown on C3?
    Response: Refer Addendum #2

34. Please confirm no soffit panels are to be installed at alternate 3 covered parking structure.
    Response: Correct, no soffit panels required for the Add. Alt. #3 covered parking structure.

35. Will Trane be the only acceptable manufacturer for the AHU's?
    Response: Trane is the basis of design, refer to the specifications for list of acceptable manufacturers.

** Please note the drawings had been reloaded to the proper size on website in December 29, 2018 at 12:10pm. The drawings currently on the website are the correct size. **