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:

CLARIFICATIONS:

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:
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

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

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 E84, 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
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:
   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).
1. Products: Subject to compliance with requirements, provide one of the following:
   b. Eagle Bridges - Marathon Industries; 225.

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:
      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.

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:
      b. Eagle Bridges - Marathon Industries; 501.
      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.

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-resistant 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.

END OF SECTION
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.


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.


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.

8. 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)

BYSP 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

Copyright 2019 BYSP Architects
### Gas Fired Furnace/DX Split System Cooling Coil Schedule

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<th>Model Number</th>
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#### Cooling Coil Performance

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#### Electrical Characteristics

- Volts: 115V
- Phase: 1
- Hertz: 60Hz
- M.C.A.: 1
- MoCP: 1/50

### Gas Heat Performance

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#### Fan Schedule

- Type: Train
- Model: DFC-1
- Horsepower: 1/3 HP
- Rotation: Right
- Speed: 1125 RPM
- Voltage: 115V
- Phase: 1
- Hertz: 60Hz
- M.C.A.: 1
- MoCP: 1/50

### Dust Collection System

- Collector: Donaldson-Torit DFE3-6
- Model Number: 603208
- Size: 2

### Motor Schedule

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### Condensing Unit Data

- Model Number: TRANE 4TTB404914
- Capacity: 30 Tons
- SEER: 28
- EER: 19.9
- COP: 27.5
- Input: 105000 BTU | 105000 BTU |

### Air Device Schedule

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### Ductless DX Split System Schedule

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### Additional Notes

- **External Static Pressure:** Indicated in schedule includes cooling coil (wet), ductwork, balancing dampers, and air devices only and does not include filter or unit losses.

- **Supplies:** 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.

- **Ducts:** Provide 8x8 NFPA Meyer air lock on bottom of hopper.

- **Exhaust Air Devices:** Provide inline filter downstream of dust collector.

- **Controllor/Disconnect:** Refer to unit/silencer orientation.

- **Dust Collection:** Provide 4x4 dust collection.
POLE BASE DETAIL

STAND-ALONE OUTLET FOR BLOCK HEATER / GOLF CART CHARGER

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**NOTE:** CONTROLLER TO BALANCE PHASES

**DATE:** 01/10/2021

**PHASE 2 SCHEDULE**

**DESCRIPTION**

- RECEPTABLES
- SPACE FOR SGD
- DRAINAGE

**QUANTITY**

- 180

**TOTAL KVA**

- 180

**TOTALS**

- 180
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
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.
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.

   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.
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
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. **