KINGSTON ELEMENTARY SCHOOL
Mechanical Equipment

100 SCHOOL STREET
KINGSTON, ILLINOIS 60145

2020

ARCHITECT’S PROJECT #C1891-5

HAGNEY ARCHITECTS, LLC
4615 E. State Street, Suite 206
Rockford, Illinois, 61108
Ph: 815/397-3330

O’Higgins and Arnold Sustainability, LLC
769 Heartland Dr., Unit A
Sugar Grove, Illinois 60554
Ph: 847/558-4066
larnold@oasllc.net
SECTION 00020 - INVITATION TO BIDDERS

SEALED BIDS ARE REQUESTED FOR THE FOLLOWING RTU EQUIPMENT ONLY:

PROJECT TITLE  KINGSTON ELEMENTARY MECHANICAL EQUIPMENT
100 School St, Kingston, Illinois 60145

OWNER  GENOA-KINGSTON CUSD #424

ENGINEER  O'Higgins and Arnold Sustainability, LLC
769 Heartland Dr., Unit A
Sugar Grove, Illinois 60554
Ph: 847-558-4066

ARCHITECT  Hagney Architects, LLC

BID TYPE  A Single Lump Sum Bid for RTU EQUIPMENT ONLY

BID DUE DATE  Tuesday, March 24, 2020 at 8:45am CST

SUBMIT BIDS TO  GENOA-KINGSTON CUSD #424 – Dr. Brad Shortridge, Assistant Superintendent
980 PARK AVE., GENOA, IL 60135
Bids to be mailed to the above address or dropped off in the district office at front reception desk before 8:45am on Tuesday, March 24, 2020. Bids will be read publicly in the Community Room at that time. Bids must include shop drawings of rooftop units.

BIDS  Bids Will Be Opened Publicly.

REJECTIONS OF BIDS  The GENOA-KINGSTON CUSD #424 Reserves the Right to Accept or Reject Any and All Proposals and to Waive Technicalities.

WITHDRAWAL OF BID  No Proposal May Be Withdrawn Within 14 Days After the Actual Date of the Opening Thereof.

END: 00020 - INVITATION TO BIDDERS
SECTION 00300 - BID FORM

TO:  

BID SUBMITTED BY:  

BIDDER:  

ADDRESS:  

PHONE NO:  

The Undersigned bidder, having reviewed the conditions affecting the cost of the equipment and the Contract Documents Specification prepared by Hagney Architects LLC & O'Higgins and Arnold Sustainability, LLC, hereby proposes to furnish all RTU equipment, to be delivered to Genoa-Kingston CUSD #424. Per the project specifications for the Contract Sum stated below. The Bid Bonds requirements are included in this bid. By signing this bid form, the undersigned bidder certifies that bid provided comply with the project specifications, that no unauthorized substitutions have been made, unless and that all provisions have been followed.

BASE BID

For complete RTU equipment as called for with-in the project specifications for the sum of:  

DOLLARS

($______________________________)

The Owner has the right to accept the Base Bid within thirty days from the Bid Due Date with no increase to the costs stated herein.

COMPLETION DATE

Bidder states that all RTU equipment will be delivered to Genoa-Kingston CUSD #424. The space below of the desired delivery date has been left blank for insertion of the contractor’s own desired delivery date, if he/she feels that the delivery date as stated cannot be met. Insertion of date by proposer does not change the specified delivery date unless the Owner’s choose to accept the proposer’s date when awarding the Contract.

1. Specified delivery date: July 3, 2020, 3:00 p.m.
2. Contractor’s desired delivery date: ____ / ____ / _______
The documents constituting component parts of the Bid Form are the following:

**GENOA SCHOOL DISTRICT REVIEW AND COMMENTS**

1. Invitation to Bidders (1 page)
2. Bid Forms (2 pages)
3. Detailed Specifications and RTU schedule (shop drawings need to be submitted with bid)

**SIGNATURE**

Date ___________________________ , 2020

Name ___________________________

Signature _________________________

Title ___________________________

END: 00300 - BID FORM
LATE BIDS CANNOT BE ACCEPTED!

SEALED BID PROPOSAL

OPENING DATE:      Tuesday, March 24, 2020

OPENING TIME:      9:00 A.M. CST

DESCRIPTION:       KINGSTON ELEMENTARY RTU’S

DATED MATERIAL – DELIVER IMMEDIATELY

PLEASE CUT OUT AND AFFIX THIS BID LABEL TO THE OUTERMOST ENVELOPE OF YOUR PROPOSAL TO HELP ENSURE PROPER DELIVERY!

LATE BIDS CANNOT BE ACCEPTED!
PART 1 - GENERAL

1.1 PRE-PURCHASED EQUIPMENT

A. Genoa-Kingston CUSD #424 elected to pre-bid and purchase the mechanical HVAC equipment called for in this section of the specifications.

B. Equipment will be shipped to Kingston Elementary School at 100 School Street, Kingston, Illinois and will be unloaded by the installing Mechanical Contractor.

C. The equipment manufacturer's representative shall be on site and present at the time of unloading at project site. The Owner's representative, Mechanical Contractor, and manufacturer's representative shall inspect the equipment for damage and/or missing components and identify such in writing.
   1. If there are damaged or missing components, the manufacturer's representative shall provide a written list to the Owner.
   2. A Mechanical Contractor shall inspect the equipment for damage and/or missing components and identify such in writing. If the contractor agrees the equipment is in proper condition, the manufacturer's representative shall obtain a written acceptance of the equipment from the contractor.

D. The equipment manufacturer's bid/proposal includes start-up services. The equipment manufacturer's bid/proposal includes operating manuals and warranty for parts and labor on equipment only. All other warranty services are by the installing contractor.
   1. Owner's schooling shall be provided under this section.

E. All bidding manufacturers must submit complete product data and shop drawings as outlined in sub-section 1.6 below with their bid/proposal, failure to complete submittals with bid/proposal will be grounds for disqualification.

1.2 SECTION INCLUDES

A. Delivery of equipment to the job site with a manufacturer's representative present.

B. Field start-up services and Owner training at the job site.

C. Parts and labor warranty.

D. Rooftop units and curbs.

E. Controls and control connections

F. Starters.

G. Electrical power connections.

1.3 ASSIGNMENT

A. Equipment will be assigned to the successful mechanical contractor as directed by Owner/Architect/Engineer.
1.4 WORK INCLUDED

A. Delivery of equipment to the job site with a manufacturer's representative present.
B. Parts and labor warranty on Rooftop Units from date of delivery.
C. Start-up and Owner's Training on equipment being provided.

1.5 REFERENCES

A. NFPA 90 A & B - Installation of Air Conditioning and Ventilation Systems and Installation of Warm Air Heating and Air Conditioning Systems.
C. ARI 360 - Commercial and Industrial Unitary Air Conditioning Equipment testing and rating standard.
G. California Energy Commission Administrative Code - Title 20/24 - Establishes the minimum efficiency requirements for HVAC equipment installed in new buildings in the State of California.
I. ARI 270 - Sound Rating of Outdoor Unitary Equipment.
J. ARI 370 - Sound Rating of Large Outdoor Refrigerating and Air Conditioning Equipment.

1.6 SUBMITTALS

A. Submit two (2) copies of unit performance data including capacity, nominal and operating performance.
B. Submit Mechanical Specifications for unit and accessories describing construction, components and options.
C. Submit shop drawings indicating overall dimensions as well as installation, operation and service clearances. Indicate lift points and recommendations and center of gravity. Indicate unit shipping, installation and operating weights including dimensions.
D. Submit data on electrical requirements and connection points. Include recommended wire and fuse sizes or MCA, sequence of operation, safety and start-up instructions.
1.7 OPERATION AND MAINTENANCE
   A. Submit two (2) copies of manufacturer installation instructions and operation and maintenance data to successful contractor for inclusion in project manual.
   B. Include manufacturer's descriptive literature, operating instructions, cleaning procedures, replacement parts list and maintenance and repair data to successful contractor for inclusion in project manual.

1.8 QUALITY ASSURANCE
   A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum ten years documented experience.

1.9 REGULATORY REQUIREMENTS
   A. Packaged rooftop units shall be certified in accordance with ANSI/AHRI Standard 340/360 performance rating of commercial and industrial unitary air-conditioning and heat pump equipment.
   B. Unit shall be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.
   C. Unit and refrigeration system shall comply with ASHRAE 15, Safety Standard for Mechanical Refrigeration.
   D. Unit shall be certified in accordance with ANSI Z21.47b/CSA 2.3b and ANSI Z83.8/CSA 2.6, Safety Standard Gas-Fired Furnaces.
   E. Unit Energy Efficiency Ratio (EER) shall be equal to or greater that prescribed by ASHRAE 90.1, Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.
   F. Unit shall be safety certified by ETL and ETL US listed. Unit nameplate shall include the ETL/ETL Canada label.

1.10 HANDLING
   A. Comply with manufacturer's installation instruction for rigging, unloading and transporting units.
   B. Protect units from physical damage. Leave factory shipping covers in place until installation.

1.11 WARRANTY
   A. Provide two (2) year manufacturer's non-prorated warranty on all parts and two (2) year on labor from Date of Delivery.
   B. Compressor warranty parts only Years 3rd through 5th.
C. Provide ten (10) year (parts only) heat exchanger limited warranty.

D. Warranty shall include all control components factory mounted on the unit.

1.12 VERIFICATION OF CAPACITY AND EFFICIENCY

A. All proposals for rooftop units performance must include an AHRI approved selection method. Verification of date and version of computer program selection or catalog is available through AHRI.

1.13 DELIVERY, HANDLING AND STORAGE

A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting rooftop units.

B. Rooftop units shall be capable of withstanding -40°F to 158°F storage temperatures for an indefinite period of time.

1.14 EXTRA MATERIAL

A. Provide two (2) sets of attic stock filters.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Products shall be provided by the following manufacturers:
   1.  1. AAON
   2.  2. Carrier
   3.  3. Daikin
   4.  4. Trane - Horizon
   5.  5. Equipment must include at a minimum:
      a.  a. R-410A refrigerant
      b.  b. Variable capacity compressor with 10-100% capacity control
      c.  c. Direct drive supply/return/exhaust fans
      d.  d. Double wall cabinet construction
      e.  e. Insulation with a minimum R-value of 13
      f.  f. Stainless steel drain pans

2.2 ROOFTOP UNITS

A. General Description
   1. Packaged rooftop unit shall include compressors, evaporator coils, filters, supply fans, dampers, air-cooled condenser coils, condenser fans, reheat coil, gas heaters, exhaust fans, energy recovery wheels, and unit controls.
2. Unit shall be factory assembled and tested including leak testing of the DX coils, pressure testing of the refrigeration circuit, and run testing of the completed unit. Run test report shall be supplied with the unit in the service compartment’s literature pocket.

3. Unit shall have decals and tags to indicate lifting and rigging, service areas and caution areas for safety and to assist service personnel.

4. Unit components shall be labeled, including refrigeration system components and electrical and controls components.

5. Estimated sound power levels (dB) shall be shown on the unit ratings sheet.

6. Installation, Operation, and Maintenance manual shall be supplied within the unit.

7. Laminated color-coded wiring diagram shall match factory installed wiring and shall be affixed to the interior of the control compartment’s hinged access door.

8. Unit nameplate shall be provided in two locations on the unit, affixed to the exterior of the unit and affixed to the interior of the control compartment’s hinged access door.

B. Construction

1. All cabinet walls, access doors, and roof shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.

2. Unit insulation shall have a minimum thermal resistance R-value of 13. Foam insulation shall have a minimum density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D1929-11 for a minimum flash ignition temperature of 610°F.

3. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break. Double wall construction with a thermal break prevents moisture accumulation on the insulation, provides a cleanable interior, prevents heat transfer through the panel, and prevents exterior condensation on the panel.

4. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI Standard 340/360. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.

5. Roof of the air tunnel shall be sloped to provide complete drainage. Cabinet shall have rain break overhangs above access doors.

6. Access to filters, dampers, cooling coils, reheat coil, heaters, energy recovery wheels, compressors, and electrical and controls components shall be through hinged access doors with quarter turn, zinc cast, lockable handles. Full length stainless-steel piano hinges shall be included on the doors.

7. Exterior paint finish shall be capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.

8. Units with cooling coils shall include double sloped 304 stainless steel drain pans.

9. Unit shall be provided with base discharge and return air openings. All openings through the base pan of the unit shall have upturned flanges of at least 1/2 inch in height around the opening.

10. Unit shall be provided with horizontal discharge and horizontal return air openings. All openings through the base pan of the unit shall have upturned flanges of at least 1/2 inch in height around the opening.
11. Unit shall include lifting lugs on the top of the unit.
12. Unit shall include factory installed, painted galvanized steel condenser coil guards on the face of the condenser coil.

C. Electrical
1. Unit shall be provided with factory installed and factory wired, non-fused disconnect switch.

D. Supply Fans
1. Unit shall include direct drive, unhoused, backward curved, plenum supply fans.
2. Blowers and motors shall be dynamically balance and mounted on rubber isolators.
3. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
4. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.

E. Exhaust Fans
1. Exhaust dampers shall be sized for 100% relief.
2. Fans and motors shall be dynamically balanced.
3. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
4. Access to exhaust fans shall be through double wall, hinged access doors with quarter turn lockable handles.
5. Unit shall include belt driven, unhoused, backward curved, plenum exhaust fans.
6. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.

F. Cooling Coils
1. Evaporator Coils
   a. Coils shall be designed for use with R-410A refrigerant and constructed of copper tubes with aluminum fins mechanically bonded to the tubes and galvanized steel end casings. Fin design shall be sine wave rippled.
   b. Coils shall be standard capacity.
   c. Coils shall have interlaced circuitry and shall be standard capacity.
   d. Coils shall be hydrogen or helium leak tested.
   e. Coils shall be furnished with factory installed expansion valves.

G. Refrigeration System
1. Unit shall be factory charged with R-410A refrigerant.
2. Compressors shall be scroll type with thermal overload protection and carry a 5-year non-prorated warranty, from the date of original equipment shipment from the factory.
3. Compressors shall be mounted in an isolated service compartment which can be accessed without affecting unit operation. Lockable hinged compressor access doors shall be fabricated of double wall, rigid polyurethane foam injected panels to prevent the transmission of noise outside the cabinet.
4. Compressors shall be isolated from the base pan with the compressor manufacturer’s recommended rubber vibration isolators, to reduce any transmission of noise from the compressors into the building area.

5. Each refrigeration circuit shall be equipped with expansion valve type refrigerant flow control.

6. Each refrigeration circuit shall be equipped with automatic reset low pressure and manual reset high pressure refrigerant safety controls, Schrader-type service fittings on both the high pressure and low pressure sides and a factory installed replaceable core liquid line filter driers.

7. Unit shall include a variable capacity scroll compressor on the refrigeration circuit which shall be capable of modulation from 10-100% of its capacity.

8. Unit shall include a variable capacity scroll compressor on the lead refrigeration circuit which shall be capable of modulation from 10-100% of its capacity.

9. Refrigeration circuit shall be provided with hot gas reheat coil, modulating valves, electronic controller, supply air temperature sensor and a control signal terminal which allow the unit to have a dehumidification mode of operation, which includes supply air temperature control to prevent supply air temperature swings and overcooling of the space.

10. Lead refrigeration circuit shall be provided with hot gas reheat coil, modulating valves, electronic controller, supply air temperature sensor and a control signal terminal which allow the unit to have a dehumidification mode of operation, which includes supply air temperature control to prevent supply air temperature swings and overcooling of the space.

11. Each refrigeration circuit shall be equipped with a liquid line sight glass.

H. Condensers

1. Air-Cooled Condenser
   a. Condenser fans shall be a vertical discharge, axial flow, direct drive fans.
   b. Coils shall be designed for use with R-410A refrigerant. Coils shall be multi-pass and fabricated from aluminum microchannel tubes.
   c. Coils shall be designed for a minimum of 10°F of refrigerant sub-cooling.
   d. Coils shall be hydrogen or helium leak tested.
   e. Condenser fans shall be high efficiency electrically commutated motor driven with factory installed head pressure control module. Condenser airflow shall continuously modulate based on head pressure and cooling operation shall be allowed down to 35°F with adjustable compressor lockout.
   f. Condenser fans shall be VFD driven variable speed for condenser head pressure control. Factory provided and factory programmed VFDs shall continuously modulate the fan air flow to maintain head pressure at acceptable levels. Cooling operation shall be allowed down to 35°F with adjustable compressor lockout.

I. Gas Heating

1. Stainless steel heat exchanger furnace shall carry a 25-year non-prorated warranty, from the date of original equipment shipment from the factory.

2. Gas furnace shall consist of stainless-steel heat exchangers with multiple concavities, an induced draft blower and an electronic pressure switch to lockout the gas valve until the combustion chamber is purged and combustion airflow is established.

3. Furnace shall include a gas ignition system consisting of an electronic igniter to a pilot system, which will be continuous when the heater is operating, but will shut off the pilot when heating is not required.
4. Unit shall include a single gas connection and have gas supply piping entrances in the unit base for through-the-curb gas piping and in the outside cabinet wall for across the roof gas piping.

5. High Turndown Modulating Natural Gas Furnace shall be equipped with modulating gas valves, adjustable speed combustion blowers, stainless steel tubular heat exchangers, and electronic controller. Combustion blowers and gas valves shall be capable of modulation. Electronic controller includes a factory wired, field installed supply air temperature sensor. Sensor shall be field installed in the supply air ductwork. Supply air temperature setpoint shall be adjustable on the electronic controller within the controls compartment. Gas heater shall be capable of capacity turndown ratio as shown on the unit rating sheet. Heat trace shall be included on the condensate drain.

J. Filters

1. Unit shall include 4-inch-thick, pleated panel filters with an ASHRAE MERV rating of 8, upstream of the cooling coil.

2. Unit shall include a clogged filter switch.

3. Provide two (2) sets of attic stock filters.

K. Outside Air/Economizer

1. Unit shall include 0-100% economizer consisting of a motor operated outside air damper and return air damper assembly constructed of extruded aluminum, hollow core, airfoil blades with rubber edge seals and aluminum end seals. Damper blades shall be gear driven and designed to have no more than 20 cfm of leakage per sq. ft. at 4 in. w.g. air pressure differential across the damper. Low leakage dampers shall be Class 2 AMCA certified, in accordance with AMCA Standard 511. Damper assembly shall be controlled by spring return actuator. Unit shall include outside air opening bird screen, outside air hood, and barometric relief dampers.

L. Energy Recovery

1. Unit shall contain a factory mounted and tested energy recovery wheel. The energy recovery wheel shall be mounted in a rigid frame containing the wheel drive motor, drive belt, wheel seals and bearings. Frame shall slide out for service and removal from the cabinet.

2. The energy recovery component shall incorporate a rotary wheel in an insulated cassette frame complete with seals, drive motor and drive belt.

3. The energy recovery cassette shall be an Underwriters Laboratories Recognized Component for electrical and fire safety. The wheel drive motor shall be an Underwriters Laboratory Recognized Component and shall be mounted in the cassette frame and supplied with a service connector or junction box. Thermal performance shall be certified by the manufacturer in accordance with ASHRAE Standard 84, Method of Testing Air-to-Air Heat Exchangers and AHRI Standard 1060, Rating Air-to-Air Energy Recovery Ventilation Equipment. Cassettes shall be listed in the AHRI Certified Products.

4. Unit shall include 2-inch-thick, pleated panel outside air filters with an ASHRAE MERV rating of 8, upstream of the wheels.

5. Hinged service access doors shall allow access to the wheel.
6. Unit shall include energy recovery wheel defrost control which includes an adjustable temperature sensor and timer wired to periodically stop the wheel rotation, which allows the warm exhaust air to defrost the wheel.
   a. Polymer Energy Recovery Wheels
      1) Shall be provided with removable energy transfer matrix. Wheel frame construction shall be a welded hub, spoke and rim assembly of stainless, plated and/or coated steel and shall be self-supporting without matrix segments in place. Segments shall be removable without the use of tools to facilitate maintenance and cleaning. Wheel bearings shall be selected to provide an L-10 life in excess of 400,000 hours. Rim shall be continuous rolled stainless steel and the wheel shall be connected to the shaft by means of taper locks.
      2) All diameter and perimeter seals shall be provided as part of the cassette assembly and shall be factory set. Drive belts of stretch urethane shall be provided for wheel rim drive.
      3) Total energy recovery wheels shall be coated with silica gel desiccant permanently bonded by a process without the use of binders or adhesives, which may degrade desiccant performance. The substrate shall be lightweight polymer and shall not degrade nor require additional coatings for application in marine or coastal environments. Coated segments shall be washable with detergent or alkaline coil cleaner and water. Desiccant shall not dissolve nor deliquesce in the presence of water or high humidity.
      4) Sensible energy recovery wheels shall be constructed of lightweight polymer and shall be provided without desiccant coating and shall not degrade nor require additional coatings for application in marine or coastal environments. Segments shall be washable with detergent or alkaline coil cleaner and water.

M. Controls
1. Factory Installed and Factory Provided Controller
   a. Unit controller shall be capable of controlling all features and options of the unit. Controller shall be factory installed in the unit controls compartment and factory tested. Controller shall be capable of stand-alone operation with unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling available without dependence on a building management system.
   b. Controller shall have an onboard clock and calendar functions that allow for occupancy scheduling.
   c. Controller shall include non-volatile memory to retain all programmed values without the use of a battery, in the event of a power failure.
   d. Single Zone VAV Controller
      1) Unit shall utilize a variable capacity compressor system and a variable speed fan system to modulate the cooling and airflow as required in meeting the space temperature needs and to save unit operating energy. Unit fan speed shall modulate based on space temperature, not supply air pressure.
      2) With modulating hot gas reheat, unit shall modulate cooling and hot gas reheat as efficiently as possible, to meet space humidity loads and prevent supply air temperature swings and overcooling of the space.
      3) Unit shall be provided with supply air temperature control. Mixing boxes and bypass ducts shall not be required for operation as a single zone VAV system.
e. Unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling shall be accomplished with connection to interface module with LCD screen and input keypad, interface module with touch screen, or with connection to PC with free configuration software. Controller shall be capable of connection with other factory installed and factory provided unit controllers with individual unit configuration, setpoint adjustment, sensor status viewing, and occupancy scheduling available from a single unit. Connection between unit controllers shall be with a modular cable. Controller shall be capable of communicating and integrating with a LonWorks or BACnet network.

N. Accessories
1. Unit shall be provided with a smoke detector sensing the return air of the unit, wired to shut off the unit’s control circuit.

2.3 CURBS
A. Vibration Curb: Solid bottom curb shall be factory assembled and fully lined with curb rated sound assembly fiberglass insulation and include a wood nailer strip. (Curb shall be adjustable up to 3/4 inch per foot to allow for sloped roof applications.)

2.4 SERVICE AND START-UP
A. Startup - Provide all labor and materials to perform startup. Startup shall be performed by a factory-trained technician from the original equipment manufacturer (OEM). Technician shall confirm that equipment has been correctly installed and passes specification checklist prior to equipment becoming operational and covered under OEM warranty. This shall be done in strict accordance with manufacturer's specifications and requirements. Third-party service agencies are not permitted.

B. A start-up log shall be furnished by the factory approved start-up technician to document the rooftop unit's start-up date and shall be signed by the owner or his authorized representative prior to commissioning the rooftop units.

C. Rooftop unit manufacturer shall furnish a factory trained service engineer without additional charge to start the units. Rooftop unit manufacturer shall maintain service capabilities to more than 100 miles from the jobsite.

D. The manufacturer shall furnish complete submittal wiring diagrams of the rooftop unit as applicable for field maintenance and service.

2.5 OWNER TRAINING BY EQUIPMENT MANUFACTURER
A. At the completion of the project, the equipment manufacturer shall provide training of Owner's staff. Training shall consist of on-site (hands-on) training which will show the location of all devices, operation of all controls, devices, motors, and maintenance and repair requirements. Prior to commencement of training, Equipment Manufacturer shall provide Architect with a schedule of dates, times and agenda for each training session. This Equipment Manufacturer shall provide a minimum of two (2) hours of training for equipment provided under this Section of the contract. Equipment Manufacturers shall furnish a minimum of two (2) equipment manuals, maintenance manuals and repair parts lists for all equipment and systems reviewed.

END OF SECTION 237413
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Date Issued</th>
<th>Due Date</th>
<th>Drawn By</th>
<th>Checked By</th>
<th>Approved By</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ISSUE FOR BID AND PERMIT</td>
<td>03-09-2020</td>
<td>XX-XX-XX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Heating and Cooling Room Schedules

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Date Issued</th>
<th>Due Date</th>
<th>Drawn By</th>
<th>Checked By</th>
<th>Approved By</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Heating and Cooling Room Schedules (continued)]

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Date Issued</th>
<th>Due Date</th>
<th>Drawn By</th>
<th>Checked By</th>
<th>Approved By</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>