## PART 1 – GENERAL

### 1.1 GENERAL

A. The Work contemplated under this contract with Dallas School District (DSD), (also referred to as the Owner or the District), includes all labor, materials, transportation, equipment and services necessary for, and reasonably incidental to, the completion of all Work in connection with the project described in the bidding documents.

B. A brief summary of the Work to be completed for the District in the facility is as follows:

1. The work consists of: The decommissioning, removal, and disposing per state regulatory standards of two existing RTU's. Awarded contractor will prepare existing curbs to accommodate one new 26 ton RTU and one 50 ton RTU. Contractor will need to coordinate with the controls contractor to be sure the new units are designed to accept the existing control system being used by the district. Dallas School District will hire the TAB contractor and Commissioning Agent independently, however awarded contractor will be expected to coordinate with all parties before the completion of the project. The awarded contractor will be responsible for following the specifications set forth within Div 23 (Basic HVAC Requirements) provided in the bid packet. The District will be accepting one Bid Alternate on the project for contractor supplied equipment per part 2 of Div 23 specs line 2.01-2.09. No other equipment will be considered due to extensive structural engineering already performed. The schedule on this project has a tight timeline so the awarded contractor will be expected to complete the project within the district's timeline. The anticipated project start date is the last full week of June 2020 and substantial completion by July 31, 2020.

### 1.2 EXAMINATION OF SITE AND CONDITIONS

A. Prior to submitting a bid, the bidder shall examine the District facility to ascertain all of the physical conditions in relation thereto. The bidder shall also make a careful examination of the drawings, specifications and other contract documents and shall fully inform himself as to the quantity of materials and the sources of supply of the materials. Failure to make these precautions will not release the successful bidder from entering into a contract, or excuse him from performing the Work in strict accordance with the terms of the contract.

B. The Owner will not be responsible for any loss or any unanticipated costs that may be suffered by the successful bidder as a result of such bidder's failure to fully inform himself in advance with regard to all conditions pertaining to the Work and the character of the Work required. No statement made by any officer, agent or employee of the Owner in relation to the physical conditions pertaining to the site of the Work will be binding on the Owner.

### 1.3 INTERPRETATION OF CONTRACT DOCUMENTS

A. If any person contemplating submitting a bid for the proposed contract finds discrepancies in, or omission from, or is in doubt as to the true meaning of any part of the drawings, specifications or form of contract documents, he may submit to the Project Manager a written request for an interpretation thereof to be received in the office of the Project Manager no later than **February 10, 2020, before 4:00 PM** local

time. The person submitting the request will be responsible for its delivery prior to the time of closing.

B. Any official interpretation of the drawings, specifications, and conditions of the contract or forms of contract documents will be made only by subsequent addenda issued by the Project Manager. The Owner will not be responsible for any other explanation or interpretation of the proposed documents.

## 1.4 SPECIFIED PRODUCTS AND SUBSTITUTIONS

A. Bids must be based upon the use of items and manufacturers named in the specifications, or, approved equals issued by addenda during the bidding period. In certain cases, specific items and manufacturers have been named because of operational or maintenance considerations or ability to meet the requirements of the SB 1149 Energy Program. Approval of equals or substitutions must not be assumed.

## 1.5 PRE-BID MEETING

A. A **MANDATORY** pre-bid meeting will be held **February 4, 2020** at the **Dallas High School located at 1250 SE Holman Ave. Dallas OR 97338, at 1:00 PM local time.** Representatives of the Contractors will meet with the Owner and Project Manager at these sites for review of the project specifications and site walk of the facility.

B. Contractors intending to submit bids for this project must attend this pre-bid meeting. No other meeting will be held.

## 1.6 GENERAL STATUTORY PROVISIONS CONCERNING PUBLIC CONTRACTS

A. In accordance with the provisions of Oregon Revised Statues (ORS) 279C.530, it is agreed that the Contractor shall make prompt payment, as due, to all person supplying to the contractor labor or materials for the prosecution of the Work provided for herein, pay all contributions or amounts due the State Industrial Accident Fund from the Contractor incurred in the performance of the contract herein, not permit any lien or claims to be file or prosecuted against the District on account of any labor or material furnished, and to pay the State Tax Commission all sums withheld from employees pursuant to ORS 316.169, ORS 316.189 and ORS 316.167.

B. Pursuant to ORS 279C.515, it is agreed that if the Contractor fails, neglects or refuses to make prompt payment on any claim for labor or services furnished to the Contractor by any persons in connection with this agreement as such claim becomes due, the proper officer of officers representing the District may pay such claim to the person furnishing the labor or service and charge the amount of the payment against the Contractor. The payment of a claim in the manner authorized in this paragraph shall not relieve the Contractor or his surety from obligation with respect to any unpaid claims.

C. Pursuant to ORS 279C.520, it is a condition of this agreement that no person shall be employed by the Contractor for more than eight (8) hours in any one (1) day, or forty hours in any one (1) week, except in cases of necessity, emergency or where the public policy absolutely requires it, and in such cases, the person shall be paid at least time and one-half pay for all overtime in excess of eight (8) hours in any one (1) day and for Work performed on Saturdays and legal holidays.

D. Pursuant to ORS 279C.525 the Contractor shall comply with the provisions of all federal, state and local statues, ordinances and regulations dealing with the prevention of environmental pollution and the preservation of natural resources that affect the project.

E. Pursuant to ORS 279C.530, it is an express condition of this agreement that the Contractor shall, promptly, as due, make payment to any person, co-partnership, association or corporation furnishing medical, surgical and hospital care or other needed care and attention, incident to sickness or injury, to the employees of such Contractor, or all sums which the Contractor may or shall have deducted from their wages of his employees for such services pursuant to the terms of ORS 279B.230, and any contract entered into pursuant thereto, or collected or deducted from the wages of its employees pursuant to any law, contract or agreement for the purposes of providing or paying for such service.

F. The hourly rate of wage to be paid by the Contractor (and incorporated in his subcontracts) shall not be less than provided in ORS 279C.800 to ORS 279C.870, and as hereinafter included in Section 00830-BOLI Wage Rate Requirements.

G. Pursuant to ORS 645.001 et seq. OAR Chapter 437, Div. 3 and OAR Chapter 437-002-0320 through OAR Chapter 437-002-0325, the Contractor shall comply with the following conditions under any contract to provide the District with goods or services.

1. Contractors and their employees shall comply with the requirements of the above cited Laws, Rules, Policies and Regulations

2. The Contractor shall review the Safety Data Sheets filed by the District to determine if there are any chemicals stored at the site of Work which the Contractor or any subcontractors will use, or could be exposed to in an emergency

3. Workers shall inform the executive officer at the location where services are being performed of all hazardous chemicals which they or their sub-contractors bring upon school property, and upon request, provide the District with S.D.S. for such chemicals

H. Each bid shall identify whether the bidder is an Oregon resident bidder, as defined in ORS 279A.120.

I. Pursuant to ORS 279C.830 (3), the contractor and every subcontractor must have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836 (4), (7), (8) or (9).

**1.7 BID SECURITY**

A. No bid will be considered unless accompanied by a cashier's check or bid bond executed in favor of the District and associated facility for an amount equal to at least ten percent (10%) of the base bid and shall accompany the bid as evidence of good faith and as guarantee that if awarded the contract the bidder will execute the contract and provide a performance bond and payment bond as required. The successful bidder's check or bid bond will be retained until he has entered into a satisfactory contract and furnished a 100% performance bond and payment bond. The Owner reserves the right to hold the bid security as hereinafter noted.

B. The bid bond shall be furnished by a bonding company licensed to do business in the State of Oregon.

C. Should the successful bidder fail to execute and deliver the signed agreement and a satisfactory payment bond and performance bond within ten (10) days after the bid has been accepted by the Owner, the cashiers check or bid bond may be forfeited as liquidated damages at the option of the Owner. The date of acceptance of the bid and the award of the contract as contemplated by the contract documents shall mean the day on which the Owner takes official action in making the award.

**1.8 EXECUTION OF THE BID FORM**

A. The bid form invites bids on definite drawings and specifications. Only the amounts and information asked for on the bid form furnished will be considered as the bid. Each bidder shall bid upon the Work exactly as specified and provided in the bid form. The bidder shall include in a sum to cover the cost of all items contemplated by the bidding documents.

B. The bid form included in the project manual as Document 00410 is the official bid form that will be used in submitting a bid. Only the official bid form may be used in submitting a bid.

C. All blank spaces in the official bid form shall be filled and numbers shall be stated both in writing and in figures. If the bid is made by a partnership, it shall contain the names of each partner and shall be signed in the firm name, followed by the signature of the partner signing for the firm. The address of the bidder shall be typed or printed on the bid form.

D. Bids which are incomplete, or which are conditioned in any way, or which contain erasures or alterations may be rejected.

**1.9 SUBMISSION OF BID**

A. The bid proposal shall be sealed in an opaque envelope, addressed as follows:

DALLAS SCHOOL DISTRICT
111 SW Ash St.
DALLAS, OR 97338
Attn: Bob Archer, Facilities Director

B. Bids will be received up to **2:00** PM, local time, **February 18, 2020** at the address listed above.

C. Any bid submitted after the scheduled closing time will be returned to the bidder unopened.

**1.10 OPENING OF BIDS**

A. A public bid opening will be held immediately following the scheduled closing. Each and every bid received prior to the closing time will be publicly opened and read aloud irrespective of any irregularities or informalities contained in such bids.

## 1.11 DURATION OF BID PROPOSALS

A. The base bid shall be irrevocable for a period of thirty (30) days from the date and time of bid opening.

B. The base bid may be adjusted for alternate prices and / or unit prices for a period of sixty (60) days from the date and time of bid opening.

## 1.12 CONTRACT AND BOND

A. Within ten (10) days after receipt of Notice of Award, any bidder to whom a contract is awarded shall execute a formal written contract and shall furnish corporate surety bonds with a surety company satisfactory to the District in an amount equal to the full contract sum based upon the estimated quantities of items covered by the contract for the faithful performance of said contract and all provisions thereof; provided, the formation of said contract shall not be completed and the District shall not be liable thereon until said formal written contract has been executed both by the successful bidder and by the District and a performance bond and a payment bond, properly executed, has been delivered and accepted by the District.

B. The cashiers check or bid bond of the bidder with whom a contract is entered into will be returned when said contract has been properly executed by the bidder and said performance and payment bond, properly executed, has been delivered to and accepted by the District. The cashiers check or bid bond to each bidder who was not awarded a contract will be returned promptly after the contract and bond of the successful bidder, properly executed, has been delivered to and accepted by the District.

C. Any bidder to whom a contract is awarded and who shall default in executing said formal written contract or in furnishing a satisfactory performance and payment bond within the time and in the manner required by these specifications shall be liable to the District for whatever damages, including expenses and attorney's fees as may be incurred by the District in recovering to another bidder whether by a single action or by successive actions, shall not operate to release any defaulting bidder from said liability. The parties agree that the cashiers check or bid bond amount is fair determination of the amount of damages which the District would incur as a result of any such failure on the part of the bidder and the full amount will be forfeited as liquidated damages and will not constitute a penalty. In the event competent tribunal finds that this amount does not properly represent an award of liquidated damages, expenses and attorney’s fees incurred by the District as a result of the bidder’s default, then the final determination of the tribunal shall be deemed to represent the damages, expenses and attorney fees incurred by the District as a result of the bidder’s default.

## 1.13 SUBSTANTIAL COMPLETION AND LIQUIDATED DAMAGES

A. The following deadlines and restrictions are applicable to the project:

(1) Substantial Completion date of **July 31, 2020**

B Should the building not be ready for occupancy by the time and date listed above, liquidated damages to be paid by the Contractor to the Owner for each calendar day of delay, shall be included in the terms of any contract awarded hereunder in lieu of a penalty. The amount of liquidated damages shall be $200.00 per day.

**1.14 DISTRICT PERSONNEL EXCLUDED FROM THE CONTRACT**

A. No officer, agent or employee of the District shall be permitted any interest in the contract.

**1.15 RESERVATIONS**

A. The Board of Directors of Dallas School District, expressly reserves the following rights:

1. To reject all bids

2. To waive any or all irregularities in bids submitted

3. To consider the responsibility and competency of bidders in making any award

4. In the event two or more bids shall be for the same amount for the same Work, to award the contract by lot or otherwise as it deems appropriate

5. To award contract to one Contractor with the aggregate low bid

6. To reject any bid or bids not in compliance with prescribed bidding procedures and requirements

7. To reject any bid or bids not meeting the specifications set forth herein

8. In the event any bidder to whom a contract is awarded shall default in executing said formal contract or in furnishing a satisfactory performance and payment bond within the time and in the manner herein before specified, to re-award the contract to another bidder

**1.16 ACCEPTANCE OF CONDITIONS**

A. Each bidder by submission of a bid assents to each and every term and condition set forth anywhere in these contract documents and agrees to be bound thereby.

**1.17 INTERPRETATION UPON CONTRACT DOCUMENTS**

A. Only the Board of Directors of DSD as represented by the Project Manager has authority to place any interpretation upon the foregoing or annexed contract documents. Any interpretation, either verbal or written, attempted to be placed thereon by any other person will not be binding upon the District.

**1.18 EQUAL EMPLOYMENT**

A. All bidders shall comply with the Provision of Executive Order 1246 (30 F.R. 12319-25) regarding Equal Employment Opportunity.

## 1.19 IMMIGRATION REFORM AND CONTROL ACT

A. All bidders shall comply with the provisions of the Immigration Reform and Control Act of 1986 regarding the verification of employment eligibility.

## 1.20 REFERENCES REQUIREMENTS

A. All bidders shall provide a list of three different project references for projects that the Contractor worked on within the last three years of comparable size and scope.

**B. References must be included with the Official Bid Form**

C. Bidders shall use their own form to supply their list of references. The list of project references shall include the following information:

1. Name of the Project
2. Project description
3. Project location
4. Project date
5. Dollar value of the Project
6. Name of the project contact person
7. Telephone number for contact person
8. Fax number for contact person

D. The references will be checked to determine if they are supportive of the bidder's ability to meet the requirements of this Advertisement for Bids.

E. The bidder must provide references that can be contacted regarding the quality of workmanship, level of service provided, timeliness of completion, and adherence to specifications.

F. The DSD reserves the right to choose and investigate any reference whether or not furnished by the bidder, and to investigate past performance of any bidder with respect to its successful performance on similar projects, its completion or delivery of service on schedule, and its lawful payment of suppliers, Subcontractors, and employees.

G. The DSD may postpone the award or execution of the Contract after the announcement of the apparent successful Contractor in order to complete any investigation. The DSD may reject a bid if, in the opinion of the DSD the overall reference responses indicate inadequate performance of the Contractor.

H. The DSD representative will make three attempts to contact the references from the list provided by the Contractor. If the reference is not contacted after three attempts that reference will be removed from the list and the bid rejected as non-responsive.

I. Each reference contacted shall be asked the same questions, including but not limited to: (1) quality of service; (2) delivery; (3) responsiveness to reported problems, including orders and billing; (4) how well the Contractor met the terms of the contract; and (5) whether or not the reference would choose to hire the Contractor again.

## 1.21 CRIMINAL HISTORY CHECK / PHOTO ID

A. The names of all Contractor and all Subcontractor employees who will be on the job site for more than one day must be submitted to the District. These employees shall fill out a criminal history form provided by the District. Criminal history checks will be run through the Oregon State Police as provided for in ORS 326.603. The District shall bear the cost of processing such Criminal history checks.

1. Through the signature on the criminal history form, authorization is also given to the Dallas School District and its representative to investigate this information. Further, with this signature, consent is given to all governmental agencies, public or private companies and individuals to release information regarding the individual to the Dallas School District and to their representative. The District shall bear the cost of processing such Criminal history checks.

B. In accordance with ORS 326.603(8) the District is required to terminate the employment or contract status of any individual who refuses to consent to a criminal history check of to be fingerprinted or falsely swears to the non-conviction of any crime.

C. In accordance with ORS 326.603(7)(a) no individual found to have been convicted of any crime listed in ORS 342.143 or of an attempt to commit one of the listed crimes shall be allowed to work on any District site.

1. It is vital that employees are instructed to accurately complete criminal history forms. Crimes listed in ORS 342.143 which automatically bar an individual from employment with or contracting with the District are primarily crimes of violence, crimes against children, and sex related crimes. However, falsely swearing that you have not been convicted of a crime obligates the District to terminate employment or contract status even if the crime is not listed in ORS 342.143.

D. All employees working on site for five or more days shall wear a Name and Photo Identification Badge. Any employee on site for five or fewer days shall wear a visitor badge. The district shall provide all Visitor badges. The Photo ID badge shall be the responsibility of the Contractor to provide. Badge shall state the Dallas School District, name of the project, employee name, and company they represent.

## 1.22 TOBACCO FREE SCHOOLS

A. All bidders shall comply with OAR 581.021.0110 and ORS 326.051 regarding Tobacco Use on School Grounds.

B. For the purpose of this rule “tobacco” is defined to include any lighted or unlighted cigarette, cigar, pipe, bidi, clove cigarette, vape pen and any other smoking product, and spit tobacco, also known as smokeless, dip, chew, and snuff, in any form.

C. No employee, sub-contractor, material supplier, or project visitor is permitted to smoke, inhale, vape, dip, chew or sell tobacco at any time, including non-school hours.

1. In any building, facility; or

2. On school grounds, athletic grounds, or parking lots.

**END OF SECTION**

**DATE**:_____

**LEGAL NAME OF BIDDER**:_____

The bid proposal shall be sealed in an opaque envelope, addressed as follows:

DALLAS SCHOOL DISTRTICT
111 SW Ash St.
SALEM, OR 97338
Attn: Mr. BOB ARCHER, FACILITIES DIRECTOR

Bids will be received up to **2:00** PM, local time, **February 18, 2020** at the address listed above.

The Undersigned, having examined the Contract Documents, including the Bidding and Contract Requirements, the General Requirements, the Technical Specifications entitled:

**Dallas High School RTU Replacement**

As prepared by Dallas School District as well as the premises and conditions affecting the Work, hereby proposes and agrees to perform, within the time stipulated, the Work, including all its component parts, and everything required to be performed, and to provide and furnish all labor, material, tools, expendable equipment, transportation and all other services required to perform the Work and complete in a workmanlike manner ready for use, all as required by and in strict accordance with the Contract Documents for the sums computed as follows:

**BASE BID:**

1. Provide all required labor and materials to install the RTU's per project specifications. The price shall include full compensation for the cost of labor, materials, equipment, overhead, profit, and any additional costs associated with the alternate price bid.

_____ DOLLARS ($_____)
**TOTAL BASE BID**

**ADDITIVE ALTERNATE BIDS:**

**1. Contractor supplied 26 ton Aaon unit per specifications**

_____ DOLLARS ($_____)

**2. Contractor supplied 50 ton Aaon unit per specifications**

_____ DOLLARS ($_____)

which lump sums are hereby designated as ADDITIVE ALTERNATE BIDS,

The price shall include full compensation for the cost of labor, materials, equipment, overhead, profit, and any additional costs associated with the alternate price bid.

**TIME OF COMPLETION**

The Undersigned agrees if awarded the Contract to complete all the Work in an acceptable manner in conformance with the Contract Documents and within the time specified within the contract.

**ADDITIONAL REQUIREMENTS**

1. The Undersigned agrees that the enclosed Bid Guarantee (bid bond, certified or cashier's check) in the amount of ten percent (10%) of the Basic Bid sum made payable to the Owner, shall be kept in escrow with the Owner; that its amount shall be a measure of liquidated damages the Owner will sustain by failure of the Undersigned to execute agreement and furnish bond, and that if the Undersigned fails to deliver the prescribed bond within ten (10) calendar days after receipt of the written notice of award, then the Bid Guarantee shall become the property of the Owner.

2. Should this proposal not be accepted within thirty (30) calendar days after the date and time of bid opening, or if the Undersigned executes Agreement and delivers bond, the Bid Guarantee shall be returned.

3. Contractor's State of Oregon Contractors' License Registration Number.

   _____

4. Contractor's State of Oregon Electrical Contractors' License Registration Number.

   _____

5. Receipt of Addenda numbered _____ is hereby acknowledged.

6. The undersigned certifies that the Bidder is a _____ Bidder as defined in ORS 279A.120. ("Resident" or "Non-Resident", to be filled in by Bidder)

7. References are to be submitted with Bid Form as per Section 00100, 1.20.

**SIGNATURES**

_____
Legal Name of Bidder's Firm

By:_____ Title:_____

Address:_____ Telephone:_____

_____

State of Incorporation, if Corporation:_____

Names of Partners, if Partnership: _____

Signed By_____ _____
Printed Name of Bidder / Firm Submitting Bid

**END OF SECTION**

**Bids which are submitted by Bid Closing, but for which a required disclosure submittal has not been made by the specified Disclosure Deadline, are not responsive and shall not be considered for Contract award.**

**AGENCY SUPPLIED INFORMATION**:

PROJECT NAME: **DALLAS HIGH SCHOOL RTU REPLACEMENT**
BID #: _____N/A_____ BID CLOSING: Date: **February 11, 2020** Time: **2:00 PM**
REQUIRED DISCLOSURE DEADLINE: Date: **February 11, 2020** Time: **4:00 PM**
Deliver Form To (Agency): Dallas School District #2
Designated Recipient (Person): Bob Archer, Facilities Director
Agency's Address: 111 SW Ash Street
Dallas, Oregon 97338
Phone #: 503.623.5594
Fax #: 503.623.5597

**INSTRUCTIONS:**

The contracting agency will insert "N/A" below if the contract value is not anticipated to exceed $100,000. Otherwise, this form must be submitted either with the bid or within **TWO (2)** working hours after the advertised bid closing date and time;

**FAILURE TO SUBMIT THIS FORM BY THE DISCLOSURE DEADLINE WILL RESULT IN A NON-RESPONSIVE BID. A NON-RESPONSIVE BID WILL NOT BE CONSIDERED FOR AWARD.**

It is the responsibility of bidders to submit this disclosure form and any additional sheets, with the bid number and project name clearly marked, and must be submitted at the location specified in the Invitation to Bid on the advertised bid closing date and within two (2) working hours after the advertised bid closing time at the location indicated by the specified disclosure deadline. See "Instructions to Bidders".

List below the name of each subcontractor that will be furnishing labor or materials and that is required to be disclosed, the category of work that the subcontractor will be performing and the dollar value of the subcontract. Enter" NONE" if there are no subcontractors that need to be disclosed. (ATTACH ADDITIONAL SHEETS IF NEEDED).

**BIDDER DISCLOSURE**:

| SUBCONTRACTOR NAME | DOLLAR VALUE | CATEGORY OF WORK |
|---|---|---|
| 1) | | |
| 2) | | |
| 3) | | |
| 4) | | |
| 5) | | |

| | | |
|---|---|---|
| 6) | | |
| 7) | | |
| 8) | | |
| 9) | | |
| 10) | | |
| 11) | | |
| 12) | | |
| 13) | | |
| 14) | | |
| 15) | | |
| 16) | | |

The above listed first-tier subcontractor(s) are providing labor, or labor and material, with a Dollar Value equal to or greater than:

a) Five percent (5%) of the total Contract Price, but at least $15,000. (If the Dollar Value is less than $15,000, do not list the subcontractor above);

or

b) $350,000 regardless of the percentage of the total Contract Price.

Form Submitted By (Bidder Name): _____

Contact Name: _____

Phone #: _____

**END OF SECTION**

## SECTION 23 00 00 - BASIC HVAC REQUIREMENTS

### PART 1 GENERAL

### 1.01 DESCRIPTION OF WORK

A. This Section specifies the basic requirements for all Contractor installed equipment. It applies to all sections included in Division 23.

B. Provide all materials, labor and equipment required to install complete and fully operational HVAC systems as indicated by the contract drawings and this specification.

C. Obtain and pay for all permits, licenses, fees and taxes applicable to this project as required by law.

D. Cooperate with other trades in furnishing material and information required for installation and operation of mechanical items.

E. Requirements for the following are included:
   1. Related work (other Contract Documents and specification sections) that must be combined with the requirements of this Section.
   2. Delivery, storage, and handling.
   3. Quality assurance and standards.
   4. Submittals.
   5. Product quality, basic type, and finishes.
   6. Equipment identification.
   7. Installation.
   8. Mounting and shimming.
   9. Inspection.
   10. Safety considerations.
   11. Cleaning, startup, and adjustments.

### 1.02 RELATED WORK

A. This general section shall be used in conjunction with the following other specifications and related Contract Documents to establish the total requirements for the project equipment and systems:
   1. Division 1 sections included in this Project specifications.
   2. The Contract.
   3. General and specific mechanical specifications and drawings included in the project.

### 1.03 DEFINITIONS

A. “Indicated”: Refers to graphic representations, notes or schedules in the Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents.
   1. Terms such as “shown”, “noted”, “scheduled”, and “specified”, are used to notify or help the user to locate reference. Location is not limited.

B. “Directed”: Terms such as “directed”, Requested”, “authorized”, “selected”, “approved”, “required”, and “permitted” mean directed by Architect/Engineer, approved by Architect/Engineer and similar phrases.

C. “Approved”: When used in conjunction with Architect/Engineer's action on contract submittals, applications, requests, is limited to Architect/Engineer's duties and responsibilities as stated in the Conditions of the Contract.

D. “Regulations”: Includes laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction industry that control performance of Work.

E. “Furnish”: Means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation and similar operations.

F. “Install”: Describes operations at Project site including actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, supporting, isolating, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.

G. “Provide”: Means to furnish and install.

H. “Installer”: A contractor, or another entity engaged by the contractor, either as an employee, subcontractor, or contractor of a lower tier, to perform a particular construction activity including installation, erection, application or similar operations.
   1. Installers are required to be experienced in operations they are engaged to perform.
   2. The term “experience” means having successfully completed a minimum of three previous projects similar in scope and size to this Project and within the time frame indicated in the “Quality Assurance” section of the Specifications. In addition, in means being familiar with special requirements indicated and having complied with requirements of authorities having jurisdiction.

I. “Project Site”: Is defined as the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project.

**1.04 DESIGN PERFORMANCE**

A. Compliance by the Contractor and/or Vendor with the provisions of this Specification does not relieve him of the responsibilities of furnishing related equipment and materials of proper design, mechanically suited to meet operating guarantees at the specified service conditions.

**1.05 SUBMITTALS**

A. Product Data: Submit complete sets of manufacturer's product data in .PDF format for approval. All submittals are to be received in no more than (3) three packages. See Division 1 for further information regarding submittal requirements. Literature submitted shall clearly indicate the model number, capacity, rated operating conditions, noise levels, size, weight, support requirements, rough-in data and dimensions, electrical power requirements, wiring diagrams, utility (fuel, air, cooling water, etc.) requirements, and options furnished. Submittals shall include, but are not necessarily limited to the following;
   1. HVAC: Ducting; supports and anchors; controls and the like.

B. Air Balancing Report: Provide .PDF reports stating the design flow requirements and the final adjusted airflow volume for the same.

**1.06 QUALITY ASSURANCE**

A. Codes and Standards: Comply with the provisions of the following codes, standards and specifications, except where more stringent requirements are shown or specified:
   1. State of Oregon "IBC".
   2. State of Oregon "IMC".
   3. State of Oregon "UPC".
   4. State of Oregon "IFC".
   5. NEBB - “Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems.”
   6. SMACNA - "HVAC Duct Construction Standards".
   7. NFPA - Section 90B.

B. Drawings: All drawings are diagrammatic and show general design, arrangement, and extent of the systems. Do not scale drawings for rough-in dimensions, nor use as shop drawings.

C. Installer Qualifications: Company specializing in performing the work required with a minimum of five years documented experience.

D. Contractor shall furnish and install all work in accordance with manufacturers' recommendations and instructions.

**1.07 DELIVERY, STORAGE AND PROTECTION**

A. Delivery: Dallas School District will accept delivery of the roof top air handlers.

B. Handling: Avoid damage. Comply with manufacturer's installation instruction requirements for rigging, unloading and transporting units.

C. Storage: Dallas School District.

## 1.08 PROJECT CONDITIONS

A. General: Provide products which are compatible with other portions of the work and provide products with the proper power characteristics and similar adaptations for the project.

B. Coordination: Where several elements of the work must be sequenced and positioned in order to fit the available space, prepare shop drawings showing the actual physical dimensions (at accurate scale) required for installation and submit prior to purchase/fabrication/installation of any of the elements involved in the coordination.

## 1.09 STANDARDS

A. General: Provide all new materials and equipment, identical to apparatus or equipment in successful operation for a minimum of five years. Provide materials of comparable quality omitted here but necessary to complete the work. Maximum allowable variation from stated capacities, minus 5% to plus 10% as approved in each case.

B. Governing Standards: The following are typical standards generally referenced in these specifications and identified by their acronym. Federal Specifications (FS), American Society for Testing Materials (ASTM), American National Standards Institute (ANSI), Manufacturer's Standardization Society of the Valve and Fitting Industry, Standard Practice (MSS SP-69), Cast Iron Soil Pipe Institute (CISPI), Underwriters Laboratory (UL) numbers are given.

# PART 2 PRODUCTS (NOT USED)

# PART 3 EXECUTION

## 3.01 LAYOUT AND COORDINATION

A. Site Examination: Before starting work, carefully examine site and all Contract Drawings. Become thoroughly familiar with conditions governing work on this project. Verify all indicated elevations, building measurements, rough-in dimensions and equipment locations before proceeding with any work.

B. Utility Locations: The location of all utilities, wires, conduits, pipes, ducts, or other service facilities are shown in a general way only on the drawings and in some instances are taken from existing drawings. Ascertain whether any additional facilities other than those shown on the plans may be present and determine the exact location and elevations of all utilities prior to commencing installation.

C. Discrepancies: Any error, conflict or discrepancy in Drawings, Specifications and/or existing conditions shall be reported immediately. Do not proceed with any questionable items of work until clarification of same has been made. Should rearrangement or re-routing of ductwork be necessary, provide for approval the simplest layout possible for that particular portion of the work. Under no circumstances shall beams, girders, footings or columns be cut for mechanical items.

D. The Contractor shall cooperate with others to avoid interferences and delays in the construction work.

E. Interference as a result of poor coordination or lack of cooperation with other trades shall be corrected at the Contractor's expense.

## 3.02 CONTINUITY OF EXISTING SERVICES

A. Existing water, power, heat, ventilation, air conditioning and other services shall remain in service during new construction work. Coordinate any interruption in service during new construction work. Coordinate any interruption of these services with the Owner's representative a minimum of twenty-four (24) hours in advance.

B. Protect from damage active utilities existing and evident by reasonable inspection of the site whether shown or not on the Drawings. Protect, relocate or abandon utilities encountered in the work which were not shown on the Drawings or evident by inspection of the work as directed by the Architect. Maintain continuity of all utility services to existing buildings.

### 3.03 CUTTING AND PATCHING

A. Protection: During cutting and patching, protect adjacent installations. Provide temporary barriers to prevent the spread of dust and dirt outside of the immediate work area.

B. Repair: Patch finished surfaces and building components using new materials to match the existing.

C. Inspection: Upon written direction from the owner's representative, uncover and restore work to provide for observation of concealed work.

### 3.04 EQUIPMENT REMOVAL

A. All removed equipment is the property of the Contractor unless indicated otherwise. Disconnect and remove all such equipment from the property. Cap all piping in walls, below floors, and/or above ceilings in finished rooms.

### 3.05 MECHANICAL EQUIPMENT WIRING

A. Provide all motor starters, control devices, and wiring complete from power source indicated on Drawings.

B. Equipment and systems shown on the Drawings and/or specifications, are based upon requirements of specific manufacturers which are intended as somewhat typical of several makes which may be approved. Provide all field wiring and/or devices necessary for a complete and operable system controls for the actual selected equipment/system.

### 3.06 INSTALLATION

A. Locating and Positioning Equipment: Observe all Codes and Regulations and good common practice in locating and installing mechanical equipment and material so that completed installation presents the least possible hazard. Maintain recommended clearances for repair and service to all equipment.

B. Anchorage: Anchor and/or brace all mechanical equipment to resist displacement due to seismic action, include snubbers on equipment mounted on spring isolators.

C. Install systems, materials and equipment giving right of way to systems required to be installed at a specific slope or operation by gravity.

D. Provide condensate drain piping to over nearest drain for all coils.

E. Installation shall be in accordance with the requirements of the equipment manufacturer, including special requirements for seismic restraints.

F. Equipment Manufacturer's Responsibility and Services:
   1. A manufacturer's representative for major equipment and operating systems shall be provided as necessary to assist the Contractor during installation, and to provide written certification that the equipment has been installed as specified and in accordance with the manufacturer's representative.
   2. The manufacturer's representative shall provide the initial startup of equipment in the presence of the Owner.
      a. Provide a pre-start check of all piping, valves, control devices, control panels, and equipment.
      b. Calibrate and adjust equipment and controls for operation at the specified design and conditions.
      c. Provide a record of all startup events noting problems and their resolution.
      d. Provide a record of all set points for operational controls and devices.
   3. Upon the completion of the equipment startup, provide instructional time with the Owner's personnel to review the operations and maintenance manuals and perform each step necessary for startup, shutdown, troubleshooting, and routine maintenance. The instructional time shall be scheduled through the Owner.
   4. Upon completion of the inspections, startup, testing, and checkout procedures, the equipment manufacturer shall submit written notice to the Owner that the units are ready for use by the Owner. Provide a certificate of calibration for all equipment.

### 3.07 MOUNTING AND SHIMMING

A. Mount equipment as recommended by the manufacturer.

### 3.08 INSPECTION

A. The Contractor shall inspect his work to ensure the installation and workmanship is in accordance with these specifications and acceptable industry standards for the work being done.

B. All materials, equipment, and workmanship shall be subject to inspection at any time by the Owner. Contractor shall correct any work, materials, or equipment not in accordance with the Contract Documents.

### 3.09 SAFETY CONSIDERATIONS

A. All equipment shall be installed with suitable access clearances that satisfy OSHA and code requirements for maintenance or removal of replaceable parts and components, and with necessary unions or flanges to perform the maintenance or removal without removing the connecting appurtenances.

### 3.10 CLEANING, START-UP, AND ADJUSTING

A. The Contractors shall be responsible for proper operation of all systems, minor subsystems, and services provided under this section. He shall coordinate start-up procedures, calibration, and system checkout with all project managers. Any system operational problems shall be diagnosed; all correctional procedures shall be initiated as required to bring out the system into compliance with the design, and the problem then shall be rechecked to verify that the system operates normally.

B. Thoroughly clean all parts of the installation at the completion of the work. The Contractor shall clean up and remove from the premises all refuse material, crates, and rubbish arising from his work. Remove, clean, and reinstall all filters. Belt-drive tensions and alignments shall be checked. All motors and bearings shall be lubricated in accordance with the manufacturer's service manuals prior to equipment start-up. Provide a lubrication schedule for every item of equipment furnished under this section. The schedule shall include the type of lubricant and the application frequency.

**END OF SECTION 23 00 00**

## SECTION 23 05 53 - IDENTIFICATION FOR HVAC EQUIPMENT

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

A. Nameplates.

#### 1.02 RELATED REQUIREMENTS

#### 1.03 REFERENCE STANDARDS

A. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

#### 1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

D. Product Data: Provide manufacturers catalog literature for each product required.

E. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

F. Project Record Documents: Record actual locations of tagged valves.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

A. Brady Corporation: www.bradycorp.com.

B. Safety Sign Company: www.safetysignco.com.

C. Seton Identification Products: www.seton.com/aec.

D. Substitutions: Not permitted.

#### 2.02 NAMEPLATES

A. Description: Laminated three-layer plastic with engraved letters.
   1. Letter Color: Black.
   2. Letter Height: 1/2 inch.
   3. Background Color: Yellow.
   4. Plastic: Conform to ASTM D709.

### PART 3 EXECUTION

#### 3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

#### 3.02 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, and adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Identify air handling units with 8 x 4 inch plastic nameplates.

C. Identify circuit breakers with 5 x 3 inch plastic nameplates.

**END OF SECTION 23 05 53**

## SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

A. Testing, adjustment, and balancing of air systems.

B. Measurement of final operating condition of HVAC systems.

#### 1.02 REFERENCE STANDARDS

A. AABC MN-1 - AABC National Standards for Total System Balance; 2002.

B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008.

#### 1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.

C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
   1. Include certification that the plan developer has reviewed the contract documents, the equipment and systems, and the control system with the Owner/Engineer and other installers to sufficiently understand the design intent for each system.
   2. Include at least the following in the plan:
      a. Preface: An explanation of the intended use of the control system.
      b. List of all air flow measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
      c. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
      d. Identification and types of measurement instruments to be used and their most recent calibration date.
      e. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
      f. Final test report forms to be used.
      g. Detailed step-by-step procedures for TAB work for each system and issue, including:
         1) Total flow calculations.
         2) Rechecking.
         3) Diversity issues.
      h. Expected problems and solutions, etc.
      i. Criteria for using air flow straighteners or relocating flow stations and sensors; analogous explanations for the water side.
      j. Details of how TOTAL flow will be determined; for example:
         1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
      k. Specific procedures that will ensure that air is operating at the lowest possible pressures and methods to verify this.
      l. Confirmation of understanding of the outside air ventilation criteria under all conditions.
      m. Method of verifying and setting minimum outside air flow rate will be verified and set.
      n. Method of checking building static and exhaust fan and/or relief damper capacity.
      o. Time schedule for deferred or seasonal TAB work, if specified.
      p. Exhaust fan balancing and capacity verifications, including any required room pressure differentials.

D. Field Logs: Submit at least once a week to Commissioning Authority and Construction Manager.

E. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation.

F. Progress Reports.

G. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
   1. Submit to the Commissioning Authority, Construction Manager, and HVAC controls contractor within two weeks after completion of testing, adjusting, and balancing.
   2. Revise TAB plan to reflect actual procedures and submit as part of final report.
   3. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
   4. Provide reports in 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
   5. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
   6. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
   7. Units of Measure: Report data in I-P (inch-pound) units only.
   8. Include the following on the title page of each report:
      a. Name of Testing, Adjusting, and Balancing Agency.
      b. Address of Testing, Adjusting, and Balancing Agency.
      c. Telephone number of Testing, Adjusting, and Balancing Agency.
      d. Project name.
      e. Project location.
      f. Project Owner.
      g. Project Engineer.
      h. Project Contractor.
      i. Project altitude.
      j. Report date.

H. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 GENERAL REQUIREMENTS**

A. Perform total system balance in accordance with one of the following:
   1. AABC MN-1, AABC National Standards for Total System Balance.
   2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.

D. TAB Agency Qualifications:
   1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
   2. Having minimum of three years documented experience.

E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

F. TAB Supervisor Qualifications: Professional Engineer licensed in Oregon.

## 3.02 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
   1. Systems are started and operating in a safe and normal condition.
   2. Temperature control systems are installed complete and operable.
   3. Proper thermal overload protection is in place for electrical equipment.
   4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
   5. Duct systems are clean of debris.
   6. Fans are rotating correctly.
   7. Fire and volume dampers are in place and open.
   8. Air coil fins are cleaned and combed.
   9. Access doors are closed and duct end caps are in place.

B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

C. Beginning of work means acceptance of existing conditions.

## 3.03 PREPARATION

A. Hold a pre-balancing meeting at least one week prior to starting TAB work.
   1. Require attendance by all installers whose work will be tested, adjusted, or balanced.

B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.

C. Provide additional balancing devices as required.

## 3.04 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

## 3.05 RECORDING AND ADJUSTING

A. Field Logs: Maintain written logs including:
   1. Running log of events and issues.
   2. Discrepancies, deficient or uncompleted work by others.
   3. Contract interpretation requests.
   4. Lists of completed tests.

B. Ensure recorded data represents actual measured or observed conditions.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.

E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

F. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

G. Check and adjust systems approximately six months after final acceptance and submit report.

## 3.06 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

D. Vary total system air quantities by adjustment of fan speeds.

E. Provide system schematic with required and actual air quantities recorded at each operating condition.

F. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

G. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions at each operating condition.

H. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

I. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating and 100% economizer.

J. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.03 inches positive static pressure near the building entries.

K. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

**3.07 SCOPE**

A. Test, adjust, and balance the following:
   1. Packaged Roof Top Heating/Cooling Units

**3.08 MINIMUM DATA TO BE REPORTED**

A. Electric Motors:
   1. Manufacturer
   2. Model/Frame
   3. HP/BHP
   4. Phase, voltage, amperage; nameplate, actual, no load
   5. RPM
   6. Service factor
   7. Starter size, rating, heater elements
   8. Sheave Make/Size/Bore

B. Air Moving Equipment:
   1. Location
   2. Manufacturer
   3. Model number
   4. Serial number
   5. Arrangement/Class/Discharge
   6. Air flow, specified and actual
   7. Return air flow, specified and actual
   8. Outside air flow, specified and actual
   9. Total static pressure (total external), specified and actual
   10. Inlet pressure
   11. Discharge pressure
   12. Fan RPM and VFD Hz at design.

C. Return Air/Outside Air:
   1. Identification/location
   2. Design air flow

3. Actual air flow
4. Design return air flow
5. Actual return air flow
6. Design outside air flow
7. Actual outside air flow
8. Return air temperature
9. Outside air temperature
10. Required mixed air temperature
11. Actual mixed air temperature
12. Design outside/return air ratio
13. Actual outside/return air ratio

**END OF SECTION 23 05 93**

## SECTION 23 08 00 - COMMISSIONING OF HVAC

### PART 1 GENERAL

### 1.01 SUMMARY

A. This section covers the Contractor's responsibilities for commissioning; each subcontractor or installer responsible for the installation of a particular system or equipment item to be commissioned is responsible for the commissioning activities relating to that system or equipment item.

B. The Commissioning Authority (CA) directs and coordinates all commissioning activities and provides Prefunctional Checklists and Functional Test Procedures for Contractor's use.

C. The entire HVAC systemrelated to replacement of rooftop HVAC units AC-1F and AC-1B is to be commissioned, including commissioning activities for the following specific items:
   1. Control system.
   2. Major and minor equipment items.
   3. Ductwork and accessories.
   4. Terminal units (as directed by Owner).
   5. Variable frequency drives.
   6. Special Ventilation (as directed by Owner):
      a. Fume hoods.
      b. Laboratory pressurization.
      c. Specialty fans.
   7. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
   8. Indoor Air Quality Procedures: The Commissioning Authority will coordinate; Contractor will execute; see Section 01 57 19.

D. The Prefunctional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

### 1.02 RELATED REQUIREMENTS

A. Section 23 09 13 - Instrumentation and Control Devices for HVAC.

B. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

C. Direct digital controls under contract by Owner.

### 1.03 REFERENCE STANDARDS

A. ASHRAE Guideline 1.1 - The HVAC&R Technical Requirements for the Commissioning Process; 2007, with Errata (2012).

### 1.04 SUBMITTALS

A. HVAC Control System Documentation: Submit detailed sequences of operation, control system drawings, and points list.
   1. Submittals prepared for other sections may be used in preparation of this documentation.

B. Updated Submittals: Keep the Commissioning Authority informed of all changes to control system documentation made during programming and setup; revise and resubmit when substantial changes are made.

C. DRAFT Prefunctional Checklists and Functional Test Procedures for Control System: Detailed written plan indicating the procedures to be followed to test, checkout and adjust the control system prior to full system Functional Testing; include at least the following for each type of equipment controlled:
   1. System name.
   2. List of devices.
   3. Step-by-step procedures for testing each controller after installation, including:
      a. Process of verifying proper hardware and wiring installation.
      b. Process of downloading programs to local controllers and verifying that they are addressed correctly.

c. Process of performing operational checks of each controlled component.
d. Plan and process for calibrating valve and damper actuators and all sensors.
e. Description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected values.

4. Copy of proposed log and field checkout sheets to be used to document the process; include space for initial and final read values during calibration of each point and space to specifically indicate when a sensor or controller has “passed” and is operating within the contract parameters.
5. Description of the instrumentation required for testing.
6. Indicate what tests on what systems should be completed prior to TAB using the control system for TAB work. Coordinate with the Commissioning Authority and TAB contractor for this determination.

D. Startup Reports, Prefunctional Checklists, and Trend Logs: Submit for approval of Commissioning Authority.

E. HVAC Control System O&M Manual Requirements. In addition to documentation specified elsewhere, compile and organize at minimum the following data on the control system:
1. Specific step-by-step instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of this system. Provide an index and clear table of contents. Include the detailed technical manual for programming and customizing control loops and algorithms.
2. Full as-built set of control drawings.
3. Full as-built sequence of operations for AC-1B and AC-1F.
4. Full points list; in addition to the information on the original points list submittal, include a listing of all rooms with the following information for each room (as required by the Owner):
   a. Floor.
   b. Room number.
   c. Room name.
   d. Air handler unit ID.
   e. Reference drawing number.
   f. Air terminal unit tag ID.
   g. Heating and/or cooling valve tag ID.
   h. Minimum air flow rate.
   i. Maximum air flow rate.
5. Full print out of all schedules and set points after testing and acceptance of the system.
6. Full as-built print out of software program.
7. Electronic copy on disk of the entire program for this facility.
8. Marking of all system sensors and thermostats on the as-built floor plan and HVAC drawings with their control system designations.
9. Maintenance instructions, including sensor calibration requirements and methods by sensor type, etc.
10. Control equipment component submittals, parts lists, etc.
11. Warranty requirements.
12. Copies of all checkout tests and calibrations performed by the Contractor (not commissioning tests).
13. Organize and subdivide the manual with permanently labeled tabs for each of the following data in the given order:
    a. Sequences of operation.
    b. Control drawings.
    c. Points lists.
    d. Controller and/or module data.
    e. Thermostats and timers.
    f. Sensors and DP switches.
    g. Valves and valve actuators.
    h. Dampers and damper actuators.

i. Program setups (software program printouts).

F. Project Record Documents:
1. Submit updated version of control system documentation, for inclusion with operation and maintenance data.
2. Show actual locations of all static and differential pressure sensors (air and building pressure) and air-flow stations on project record drawings.

G. Draft Training Plan:
1. Follow the recommendations of ASHRAE Guideline 1.
2. Control system manufacturer's recommended training.
3. Demonstration and instruction on function and overrides of any local packaged controls not controlled by the HVAC control system.

H. Training Manuals:
1. Provide three extra copies of the controls training manuals in a separate manual from the O&M manuals.

**PART 2 PRODUCTS**

**2.01 TEST EQUIPMENT**

A. Provide all standard testing equipment required to perform startup and initial checkout and required functional performance testing; unless otherwise noted such testing equipment will NOT become the property of Owner.

B. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

**PART 3 EXECUTION**

**3.01 PREPARATION**

A. Cooperate with the Commissioning Authority in development of the Prefunctional Checklists and Functional Test Procedures.

B. Furnish additional information requested by the Commissioning Authority.

C. Prepare a preliminary schedule for HVAC duct system testing, cleaning, equipment start-up and testing, adjusting, and balancing start and completion for use by the Commissioning Authority; update the schedule as appropriate.

D. Notify the Commissioning Authority when duct system testing, cleaning, startup of each piece of equipment and testing, adjusting, and balancing will occur; when commissioning activities not yet performed or not yet scheduled will delay construction notify ahead of time and be proactive in seeing that the Commissioning Authority has the scheduling information needed to efficiently execute the commissioning process.

E. Put all HVAC equipment and systems into operation and continue operation during each working day of testing, adjusting, and balancing and commissioning, as required.
1. Include cost of sheaves and belts that may be required for testing, adjusting, and balancing.

F. Provide test holes in ducts and plenums where directed to allow air measurements and air balancing; close with an approved plug.

G. Provide temperature and pressure taps in accordance with the contract documents.
1. Provide a pressure/temperature plug at each water sensor that is an input point to the control system.

**3.02 INSPECTING AND TESTING - GENERAL**

A. Submit startup plans, startup reports, and Prefunctional Checklists for each item of equipment or other assembly to be commissioned.

B. Perform the Functional Tests directed by the Commissioning Authority for each item of equipment or other assembly to be commissioned.

C. Provide two-way radios for use during the testing.

D. Valve/Damper Stroke Setup and Check:
   1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
   2. Set pump/fan to normal operating mode.
   3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
   4. Command valve/damper open; verify position is full open and adjust output signal as required.
   5. Command valve/damper to a few intermediate positions.
   6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).
   7. Closure for Cooling Coil Valves - Normally Closed:
      a. Set cooling setpoint 20 degrees F above room temperature.
      b. Observe the valve close.
      c. Remove control air or power from the valve and verify that the valve stem and actuator position do not change.
      d. Restore to normal.
      e. Set cooling setpoint to 20 degrees F below room temperature.
      f. Observe valve open.
      g. Restore to normal.

E. Isolation Valve or System Valve Leak Check: For valves not by coils.
   1. With full pressure in the system, command valve closed.
   2. Use an ultra-sonic flow meter to detect flow or leakage.

F. Deficiencies: Report deficiencies and re-inspect or re-test, as applicable.

**3.03 TAB COORDINATION**

A. TAB: Testing, adjusting, and balancing of HVAC.

B. Coordinate commissioning schedule with TAB schedule.

C. Review the TAB plan to determine the capabilities of the control system toward completing TAB.

D. Provide all necessary unique instruments and instruct the TAB technicians in their use; such as handheld control system interface for setting terminal unit boxes, etc.

E. Have all required Prefunctional Checklists, calibrations, startup and component Functional Tests of the system completed and approved by the Commissioning Authority prior to starting TAB.

F. Provide a qualified control system technician to operate the controls to assist the TAB technicians or provide sufficient training for the TAB technicians to operate the system without assistance.

**3.04 CONTROL SYSTEM FUNCTIONAL TESTING**

A. Prefunctional Checklists for control system components will require a signed and dated certification that all system programming is complete as required to accomplish the requirements of the Contract Documents and the detailed Sequences of Operation documentation submittal.

B. Do not start Functional Testing until all controlled components have themselves been successfully Functionally Tested in accordance with the contract documents.

C. Using a skilled technician who is familiar with this building, execute the Functional Testing of the control system as required by the Commissioning Authority.

D. Functional Testing of the control system constitutes demonstration and trend logging of control points monitored by the control system.

1. The scope of trend logging is partially specified; trend log up to 20 percent more points than specified at no extra cost to Owner.
2. Perform all trend logging specified in Prefunctional Checklists and Functional Test procedures.

E. Functionally Test integral or stand-alone controls in conjunction with the Functional Tests of the equipment they are attached to, including any interlocks with other equipment or systems; further testing during control system Functional Test is not required unless specifically indicated below.

F. Demonstrate the following to the Commissioning Authority during testing of controlled equipment; coordinate with commissioning of equipment.
1. Setpoint changing features and functions.
2. Sensor calibrations.

G. Demonstrate to the Commissioning Authority:
1. That all specified functions and features are set up, debugged and fully operable.
2. That scheduling features are fully functional and setup, including holidays.
3. That all graphic screens and value readouts are completed.
4. Correct date and time setting in central computer.
5. That field panels read the same time as the central computer; sample 10 percent of field panels; if any of those fail, sample another 10 percent; if any of those fail test all remaining units at no extra cost to Owner.
6. Functionality of field panels using local operator keypads and local ports (plug-ins) using portable computer/keypad; demonstrate 100 percent of panels and 10 percent of ports; if any ports fail, sample another 10 percent; if any of those fail, test all remaining units at no extra cost to Owner.
7. Power failure and battery backup and power-up restart functions.
8. Global commands features.
9. Security and access codes.
10. Occupant over-rides (manual, telephone, key, keypad, etc.).
11. O&M schedules and alarms.
12. Occupancy sensors and controls.
13. “After hours” use tracking and billing.
14. Communications to remote sites.
15. Fire alarm interlocks and response.
16. Fire protection and suppression systems interfaces.
17. Security system interlocks.
18. That points that are monitored only, having no control function, are reporting properly to the control system.
19. All control strategies and sequences not tested during controlled equipment testing.
20. Trend logging and graphing features that are specified.
21. Other integrated tests specified in the contract documents
22. That control system features that are included but not specified to be setup are actually installed.

H. Perform and submit trend logging on the following using the control system, for minimum period of 5 days including one weekend, if the control points are monitored by the control system:
1. Duty cycling, if specified.
2. Demand limiting, including over-ride of limiting.
3. Sequential staging ON of equipment; optionally demonstrate manually.
4. Optimum start-stop functions.
5. Miscellaneous equipment current or status for duty cycling and demand limiting.
6. Equipment or building kW or current for demand limiting.
7. Equipment optimum start/stop functions.

I. If the control system, integral control components, or related equipment do not respond to changing conditions and parameters appropriately as expected, as specified and according to

acceptable operating practice, under any of the conditions, sequences, or modes tested, correct all systems, equipment, components, and software required at no additional cost to Owner.

### 3.05 OPERATION AND MAINTENANCE MANUALS

A. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.

B. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.

C. Commissioning Authority will add commissioning records to manuals after submission to Owner.

### 3.06 DEMONSTRATION AND TRAINING

A. Demonstrate operation and maintenance of HVAC system to Owner' personnel; if during any demonstration, the system fails to perform in accordance with the information included in the O&M manual, stop demonstration, repair or adjust, and repeat demonstration. Demonstrations may be combined with training sessions if appropriate.

B. These demonstrations are in addition to, and not a substitute for, Prefunctional Checklists and demonstrations to the Commissioning Authority during Functional Testing.

C. Provide classroom and hands-on training of Owner's designated personnel on operation and maintenance of the HVAC system, control system, and all equipment items indicated to be commissioned. Provide the following minimum durations of training:

D. Provide the services of manufacturer representatives to assist instructors where necessary.

E. Provide the services of the HVAC controls instructor at other training sessions, when requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.

**END OF SECTION 23 08 00**

## SECTION 23 74 13 - PACKAGED OUTDOOR CENTRAL-STATION ROOFTOP UNITS (PRE-PURCHASE)

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

A. Packaged roof top unit.

B. Unit controls.

#### 1.02 PROJECT SCOPE

A. This specification establishes the performance requirements for pre-purchase of two packaged roof-top units by Dallas School District (Owner) for:

Dallas High School

1250 SE Holman Ave.

Dallas, OR 97338

B. The Owner's representatives are:
1. Mr. Bob Archer; bob.archer@dsd2.org.
2. Mr. Gordon Gentry; gordan.gentry@dsd2.org.

C. The equipment vendor is to supply new rooftop units, controls, and adaptor curbs for the following:
1. Unit AC-1F: Trane Model SXHFC 4040E47 VEAD 3007 AKLT 8.
2. Unit AC-1B: Trane Model SXCFC 2540 E4805 ED 3001 GAKLT 8.

#### 1.03 RELATED REQUIREMENTS - NOT APPLICABLE

#### 1.04 REFERENCE STANDARDS

A. ANSI/AMCA Standard 500-D-07, "Laboratory Methods of Testing Dampers for Rating."

B. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; American Society for Testing and Materials.

#### 1.05 SUBMITTALS

A. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.

B. Shop Drawings: Indicate capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.

C. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start-up instructions.

D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

E. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

#### 1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum 10 years of documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver equipment to Dallas High School to the attention of the Owner's representative.

#### 1.08 WARRANTY

A. Provide a five year warranty to include coverage for refrigeration compressors.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Aaon, Inc.
   1. Unit AC-1F Model RN-050-3-0-EA09-000: BNHH-E0A-QFM-00A-00FCKB5-00-00000C00B.
   2. Unit AC-1B Model RN-026-3-0-EA09-000: BNHF-E0A-NFL-00A-00FAKB5-00-00000C00B.

### 2.02 AIR CONDITIONING UNITS

A. General: Roof mounted units with electric refrigeration.

B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, return fan, controls, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.

C. Electrical Characteristics:
   1. Refer to model number designation.

D. Disconnect Switch: Factory mounted, non-fused type, interlocked with access door, accessible from outside unit, with power lockout capability.

### 2.03 FABRICATION

A. Cabinet: Galvanized steel with baked enamel finish, including access panels with screwdriver operated flush cam type fasteners. Structural members shall be minimum 18 gage, with access doors or panels of minimum 20 gage.

B. Insulation: 2 inch thick neoprene coated glass fiber with edges protected from erosion.

C. Supply Fan: Forward curved centrifugal type, spring isolated, and direct drive. Provide with factory VFD.

D. Exhaust Fans: Twin axial flow, isolated and direct drive. Provide with factory VFD.

E. Supply Fan Modulation:
   1. Controlled from duct static pressure by unit mounted controller. Static pressure sensed by duct mounted sensor.
   2. Furnish field adjustable duct high limit safety control to protect duct work from excessive duct pressure.

F. Air Filters: 2 inch thick glass fiber disposable media in metal frames.
   1. Filter Section:
      a. Location: Upstream of fan section.
      b. Furnish section with integral galvanized steel filter staggered rack contained within unit.
      c. Disposable filters: Frame mounted 2 inch thick 30 percent efficient based on ASHRAE 52.
      d. Cartridge filters: 12 inch deep, 90 to 95 percent efficient, based on ASHRAE 52. Furnish with 2 inch thick pre-filters.

G. Wall insulation and 1" pan insulation. 22" high for AC-1B and 33" high for AC-1F. Curbs shall be seismically rated per Oregon Code requirements. Thybar Retro-Mate.

### 2.04 BURNER

A. Not Applicable.

### 2.05 EVAPORATOR COIL

A. Provide copper tube aluminum fin coil assembly with galvanized drain pan and connection.

B. Provide thermostatic expansion valves and alternate row circuiting.

### 2.06 COMPRESSOR

A. Provide hermetic compressors, 3600 rpm maximum, resiliently mounted with positive lubrication, crankcase heater, high and low pressure safety controls, motor overload protection, suction and discharge service valves and gage ports, and filter drier.

B. Five minute timed off circuit to delay compressor start.

C. Outdoor thermostat to energize compressor above 35 degrees F ambient.

D. Provide step capacity control by cycling multi-speed compressors.

**2.07 CONDENSER COIL**

A. Provide copper tube aluminum or copper fin coil assembly with subcooling rows and coil guard.

B. Provide direct drive propeller fans, resiliently mounted with fan guard, motor overload protection, wired to operate with compressor. Provide high efficiency fan motors.

C. Provide refrigerant pressure switches to cycle condenser fans.

**2.08 MIXED AIR CASING**

A. Mixed Air Controls: Maintain selected supply air temperature and return dampers to minimum position on call for heating and above 75 degrees F ambient, or when ambient air enthalpy exceeds return air enthalpy.

B. Dampers: Low leak meeting Oregon Energy Code.

**2.09 OPERATING CONTROLS**

A. Provide with factory terminal strip for field controls by others.

**PART 3 EXECUTION**

**3.01 MANUFACTURER'S FIELD SERVICES**

A. Furnish initial start-up and shutdown during first year of operation, including routine servicing and checkout.

B. Furnish services of factory trained representative for minimum of one day to leak test, refrigerant pressure test, evacuate, dehydrate, charge, start-up, calibrate controls, and instruct Owner on operation and maintenance.

**3.02 DEMONSTRATION**

A. Furnish services of manufacturer's technical representative for one 8 hour day to instruct Owner's personnel in operation and maintenance of units. Schedule training with Owner, provide at least 7 days notice to Architect/Engineer of training date.

**END OF SECTION 23 74 13**

**Dallas School District Facilities**

www.dallas.k12.or.us

Phone: 503.623.5594 • Fax: 503.623.5597 • Address: 111 SW Ash Street • Dallas, Oregon 97338

DALLAS SCHOOL DISTRICT

## AAON Unit Specifications

Scope of Supply:

- 1 50 Ton (18,000 CFM) AAON Packaged Rooftop Unit Cooling Only
- 1 26 Ton (10,000 CFM) AAON Packaged Rooftop Unit Cooling Only
- 2" Double Wall Polyurethane Foam Panel Cabinet
- Corrosion Resistant Exterior Polyurethane Paint Exceeds 2,500-hour salt spray
- (2) VCC Compressors, (2) On/Off Compressors
    - VFD's on Condenser Fans-Head Pressure Control
    - Sight Glass and Compressor Isolation Valves
- Direct Drive Plenum Supply Fans w/VFD's and Shaft Grounding
- Economizer w/Power Exhaust Fans w/VFD's and Shaft Grounding
- SA and EA VFD's to be Yaskawa
- 2" MERV 8 Unit Filters
    - Clogged Filter Switch
- 460V/3PH/60Hz Power
    - Non-Fused Disconnect
- Phase and Brownout Protection
- RA Smoke Detectors
- Field Powered 115V GFCI Outlet
- Terminal Strip for DDC Control (Coordinate with JCI)
- Seismically Rated Curb Adapters (Spring Isolated)
    - Seismic Calculations for unit to curb Only (Curb to Structure Calculations by Others )
- 2-Day Startup / 1 Day Owner Training
- Include Warranty Options- Parts/Labor. Any Option for Extended Warranty