

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
EQUIPMENT AND PROCUREMENT DIVISION
BID INVITATION**

Bid Number: M-17-029P

BID OPENING LOCATION:
AHTD Equipment and
Procurement Division
11302 West Baseline Road
Little Rock, AR 72209

MAIL TO:
AHTD Equipment and
Procurement Division
P.O. Box 2261
Little Rock, AR 72203

DELIVER TO:
AHTD Equipment and
Procurement Division
11302 West Baseline Road
Little Rock, AR 72209

Bid Opening Date: February 22, 2017 Time: 11:00 a.m.

Sealed bids for furnishing the commodities and/or services described below, subject to the Conditions on page 2 of this Bid Invitation will be received at the above-noted mail and delivery locations until the above-noted bid opening date and time, and then publicly opened at the above-noted bid opening location. **Bids must be submitted on this form, with attachments when appropriate, or bids will be rejected. Late bids and unsigned bids will not be considered.**

In compliance with this Bid Invitation and subject to all the Conditions thereof, the undersigned offers and agrees to furnish any and all items upon which prices are quoted, at the price set opposite each item.

Company Name: _____

Name (Type or Print): _____

Address: _____

Title: _____

Phone: _____ Fax: _____

City: _____ State: _____ Zip: _____

E-mail Address: _____

Federal Tax ID or Social Security No.: _____

Signature: _____

Signature must be legible, original (not photocopied) and in ink.
Unsigned bids will be rejected.

Item No.	Description	Quantity	Unit	Unit Price	Amount
	<p>District 3 Headquarters Administration Office HVAC Replacement located at Arkansas State Highway and Transportation Department, 2911 Hwy. 29 North, Hope, Arkansas (Job #3-39)</p> <p align="center">LUMP SUM _____</p> <p>A mandatory pre-bid meeting is scheduled for all potential bidders on February 14, 2017. Contact Phillip Watkins for time and location.</p> <p>Contact Person: Phillip Watkins, Project Coordinator (501-569-2627)</p> <p>To meet the requirements of Arkansas State Highway and Transportation Department Specifications and Drawings G1.1, M1.1 & M1.2 attached to and made a part of this bid.</p> <p>Bid price shall include all labor, materials, and equipment necessary to perform the work as specified, and shall further include all licenses, fees, permits, royalties, and <u>all taxes</u>. Bid price shall represent full compensation for completion of the work. This provision supersedes Condition 4 on page 2 of this Bid Invitation. Payment will be made in accordance with Arkansas State Highway & Transportation Department Standard Specifications and Applicable Special Provisions.</p> <p>Subsections 105.04, 108.07, 109.01 and 109.02 of the Arkansas State Highway and Transportation Department Standard Specifications for Highway Construction, Edition of 2014, will be in effect. (Specifications are accessible on our web site at www.arkansashighways.com.)</p> <p>Bid Bond in the amount of 5% of total bid price required of all bidders at time of bid opening or bid will be rejected. Personal and company checks are not acceptable as Bid Bonds. See Condition 3 on page 2 of this Bid Invitation.</p> <p>Performance Bond <u>only</u> (no checks of any kind allowed) in the amount of 100% of total bid price will be required of successful bidder prior to providing goods/services. See Condition 3 on page 2 of this Bid Invitation.</p> <p>The successful bidder will be required to complete within 120 calendar days after award.</p> <p>Arkansas Contractor's License No. _____.</p> <p>Current Arkansas Contractor's License Number must be listed or bid will be rejected (A.C.A. ¶17-25-101 <i>et seq.</i>).</p> <p>Bids and Specifications are available on-line by going to the AHTD Web Site – www.arkansashighways.com and clicking on "Commodities and Services Bids/Contracts Information". Tabulations will also be available at this site after award of bid/contract. If you have any questions, call this office at 501-569-2667.</p>				
	(33-0652) 63-00			TOTAL BID	

STANDARD BID CONDITIONS

M-17-029P

1. **ACCEPTANCE AND REJECTION:** The Arkansas State Highway and Transportation Department (AHTD) reserves the right to reject any or all bids, to accept bids in whole or in part (unless otherwise indicated by bidder), to waive any informalities in bids received, to accept bids on materials or equipment with variations from specifications where efficiency of operation will not be impaired, and to award bids to best serve the interest of the State.
2. **PRICES:** Unless otherwise stated in the Bid Invitation, the following will apply: (1) unit prices shall be bid, (2) prices should be stated in units of quantity specified (feet, each, lbs., etc.), (3) prices must be F.O.B. destination specified in bid, (4) prices must be firm and not subject to escalation, (5) bid must be firm for acceptance for 30 days from bid opening date. In case of errors in extension, unit prices shall govern. Discounts from bid price will not be considered in making awards.
3. **BID BONDS AND PERFORMANCE BONDS:** If required, a **Bid Bond** in the form of a cashier's check, certified check, or surety bond issued by a surety company, in an amount stated in the Bid Invitation, must accompany bid. Personal and company checks are not acceptable as Bid Bonds. Failure to submit a Bid Bond as required will cause a bid to be rejected. The Bid Bond will be forfeited as liquidated damages if the successful bidder fails to provide a required Performance Bond within the period stipulated by AHTD or fails to honor their bid. When a bidder claims and can show clear and convincing evidence that a material mistake was made in the bid and was not the bid intended, the bidder may be permitted to withdraw their bid prior to award without forfeiture of bid bond. Cashier's checks and certified checks submitted as Bid Bonds will be returned to unsuccessful bidders; surety bonds will be retained. The successful bidder will be required to furnish a **Performance Bond** in an amount stated in the Bid Invitation and in the form of a cashier's check, certified check, or surety bond issued by a surety company, unless otherwise stated in the Bid Invitation, as a guarantee of delivery of goods/services in accordance with the specifications and within the time established in the bid. Personal and company checks are not acceptable as Performance Bonds. In some cases, a cashier's check or certified check submitted as a Bid Bond will be held as the Performance Bond of the successful bidder. Cashier's checks or certified checks submitted as Performance Bonds will be refunded shortly after payment has been made to the successful bidder for completion of all terms of the bid; surety bonds will be retained. Surety bonds must be issued by a surety company authorized to do business in Arkansas, and must be signed by a Resident Local Agent licensed by the Arkansas State Insurance Commissioner to represent that surety company. Resident Agent's Power-of-Attorney must accompany the surety bond. Certain bids involving labor will require Performance Bonds in the form of surety bonds only (no checks of any kind allowed). These bonds shall not only serve to guarantee the completion of the work, but also to guarantee the excellence of both workmanship and material until the work is finally accepted and the provisions of the Plans, Specifications, and Special Provisions fulfilled. In such cases, the company issuing the surety bond must comply with all stipulations herein and must be named in the U. S. Treasury listing of companies holding Certificates of Authority as acceptable sureties on Federal Bonds and as acceptable reinsuring companies. Any excess between the face amount of the bond and the underwriting limitation of the bonding company shall be protected by reinsurance provided by an acceptable reinsuring company. Annual Bid and Performance Bonds on file with E & P Division must have sufficient unencumbered funds to meet current bonding requirements, or the bid will be rejected, unless the balance is submitted as set forth above, prior to bid opening.
4. **TAXES:** The AHTD is not exempt from Arkansas State Sales and Use Taxes, or local option city/county sales taxes, when applicable, and bidders are responsible to the State Revenue Department for such taxes. These taxes should not be included in bid prices, but where required by law, will be paid by the AHTD as an addition thereto, and should be added to the billing to the AHTD. The AHTD is exempt from Federal Excise Taxes on all commodities except motor fuels; and excise taxes should not be included in bid prices except for motor fuels. Where applicable, tax exemption certificates will be furnished by the AHTD.
5. **"ALL OR NONE" BIDS:** Bidders who wish to bid "All or None" on two or more items shall so stipulate on the face of bid sheet; otherwise, bid may be awarded on an individual item basis.
6. **SPECIFICATIONS:** Complete specifications should be attached for any substitution or alternate offered, or where amplification is necessary. Bidder's name must be placed on all attachments to the bid.
7. **EXCEPTIONS TO SPECIFICATIONS:** Any exceptions to the bid specifications must be stated in the bid. Any exceptions to manufacturer's published literature must be stated in the bid, or it will be assumed that bidder is bidding exactly as stated in the literature.
8. **BRAND NAME REFERENCES:** All brand name references in bid specifications refer to that commodity or its equivalent, unless otherwise stated in Bid Invitation. Bidder should state brand or trade name of item being bid, if such name exists.
9. **FREIGHT:** All freight charges should be included in bid price. Any change in common carrier rates authorized by the Interstate Commerce Commission will be adjusted if such change occurs after the bid opening date. Receipted common carrier bills that reflect ICC authorized rate changes must be furnished.
10. **SAMPLES, LITERATURE, DEMONSTRATIONS:** Samples and technical literature must be provided free of any charge within 14 days of AHTD request, and free demonstrations within 30 days, unless AHTD extends time. Failure to provide as requested within this period may cause bid to be rejected. Samples, literature and demonstrations must be substantially the same as the item(s) being bid, unless otherwise agreed to by AHTD. Samples that are not destroyed will be returned upon request at bidders expense. Samples from successful bidders may be retained for comparison with items actually furnished.
11. **GUARANTY:** Unless otherwise indicated in Bid Invitation, it is understood and agreed that any item offered or shipped on this bid shall be newly manufactured, latest model and design, and in first class condition; and that all containers shall be new, suitable for storage or shipment and in compliance with all applicable laws relating to construction, packaging, labeling and registration.
12. **BACKORDERS OR DELAY IN DELIVERY:** Backorders or failure to deliver within the time required may constitute default. Vendor must give written notice to the AHTD, as soon as possible, of the reason for any delay and the expected delivery date. The AHTD has the right to extend delivery if reasons appear valid. If reason or delivery date is not acceptable, vendor is in default.
13. **DEFAULT:** All commodities furnished will be subject to inspection and acceptance by AHTD after delivery. Default in promised delivery or failure to meet specifications authorizes the AHTD to cancel award or any portion of same, to reasonably purchase commodities or services elsewhere and to charge full increase, if any, in cost and handling to defaulting vendor. Applicable bonds may be forfeited.
14. **ETHICS:** *"It shall be a breach of ethical standards for a person to be retained, or to retain a person, to solicit or secure a State contract upon an agreement of understanding for a commission, percentage, brokerage, or contingent fee, except for retention of bona fide employees or bona fide established commercial selling agencies maintained by the contractor for the purpose of securing business."* (Arkansas Code, Annotated, Section 19-11-708).

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT NOTICE OF NONDISCRIMINATION

The Arkansas State Highway and Transportation Department (Department) complies with all civil rights provisions of federal statutes and related authorities that prohibit discrimination in programs and activities receiving federal financial assistance. Therefore, the Department does not discriminate on the basis of race, sex, color, age, national origin, religion (not applicable as a protected group under the Federal Motor Carrier Safety Administration Title VI Program), disability, Limited English Proficiency (LEP), or low-income status in the admission, access to and treatment in the Department's programs and activities, as well as the Department's hiring or employment practices. Complaints of alleged discrimination and inquiries regarding the Department's nondiscrimination policies may be directed to Joanna P. McFadden Section Head – EEO/DBE (ADA/504/Title VI Coordinator), P. O. Box 2261, Little Rock, AR 72203, (501)569-2298, (Voice/TTY 711), or the following email address: joanna.mcfadden@ahtd.ar.gov

Free language assistance for Limited English Proficient individuals is available upon request.

This notice is available from the ADA/504/Title VI Coordinator in large print, on audiotape and in Braille.

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DESCRIPTION

The removal of existing HVAC and installation of the new Variable Refrigerant Volume (VRV) Air Conditioning System at the District 3 Headquarters Building, located at 2911 Hwy 29 North, Hope, Arkansas is to be completed as indicated on the Plans, as called for in these Specifications, or as directed by the Engineer. These Specifications and the Plans cover the furnishing of all materials, labor, tools, equipment, machinery drayage, rigging, fees, permits and any and all incidental items required to provide a complete, in place and operating Administration Facility.

SPECIAL PROVISIONS

The successful bidder of this contract will be expected to coordinate with the General Contractor during the complete demolition of existing HVAC and installation of the new VRV HVAC systems and components during the renovation of the District 3 Headquarters Building.

GENERAL CONDITIONS

The applicable portions of the General Provisions of the Arkansas State Highway and Transportation Department Standard Specifications for Highway Construction, Edition of 2014, as amended by Supplemental Specifications, together with applicable Special Provisions, shall govern where appropriate.

DEFINITIONS

- A. Wherever the term "Department" is used in these Specifications, it shall refer to the Arkansas State Highway and Transportation Department. All papers required for delivery to the Department shall be delivered to the attention of the Facilities Management Project Coordinator, Arkansas State Highway and Transportation Department Building, 10324 Interstate 30, Little Rock, Arkansas 72209. Other than bid, submittal data and other documents and correspondence should be submitted to the Facilities Management Project Coordinator. The Arkansas State Highway and Transportation Department and the Contractor are treated throughout the Contract Documents as if each were of the singular number and masculine gender.

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- B. The term "Project" includes the HVAC work in building structure, together with all related appurtenances such as excavations, utilities, etc.
- C. The term "Subcontractor", as employed herein, includes only those having a direct contract with the Contractor and it includes one who furnished material worked to a special design according to the Plans or Specifications of this work.
- D. Written notice shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered mail to the last business address known to him who gives the notice.
- E. The laws of the place of building shall govern the construction of this Contract

LOCAL CONDITIONS

Bidders are required to visit the site prior to submission of proposal to familiarize themselves with local conditions, including general characteristics of the site and accessibility of the work.

PRE-BID MEETING

A mandatory pre-bid meeting will be scheduled one week prior to the scheduled bid date. Bidders shall be notified by the Department of time, date and location.

PROGRESS SCHEDULE

Immediately after being awarded the Contract, the Contractor shall prepare an estimated Progress Schedule and submit same to the Department. It shall indicate the dates for the starting and completion of the various stages of construction.

SHOP DRAWINGS AND SAMPLES

The Contractor shall submit to the Department such shop and setting drawings and schedules as are required by the Specifications or that are requested by the Department. Shop Drawings submitted by the Contractor shall be prepared by a person thoroughly competent and qualified to prepare such Shop Drawings. Incomplete or poorly prepared Shop Drawings will be returned to the Contractor to be redrawn.

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By submitting a Shop Drawing or Drawings, the Contractor represents and certifies that the above requirements have been complied with and that, in the review of the drawing or drawings by the Department, the Contractor will hold the Department harmless against claims for losses or injury caused by errors or omissions on the Shop Drawings made by the person, persons or company preparing these particular Shop Drawings.

The Contractor shall furnish for review, within two weeks, all submittals/samples required. The Department shall review such submittals/samples, with reasonable promptness, only for conformance with the design concept of the Project. The work shall be in accordance with selected submittals/samples.

MATERIALS, APPLIANCES, EMPLOYEES

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, tools, equipment, transportation, sanitary and other facilities necessary for the execution and completion of the work.

Unless otherwise specified, all materials shall be new and both the result of the Contractor's workmanship and materials used shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

ROYALTIES AND PATENTS

The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Department harmless from loss of account thereof, including costs and attorney's fees.

PERMITS, INSPECTIONS, AND TAXES

The Contractor shall give all necessary notices; obtain and pay for all permits, licenses, certificates, inspection and other legal fees required and other costs in connection with his work, both permanent and temporary, including utility taps and/or connections; file all necessary plans; prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; and obtain required certificates of inspection for his work and deliver same to the Department.

The Contractor shall include in the work, without extra cost to the Department, all labor, materials, services, apparatus, drawings, and related items in order to comply with all laws, ordinances, rules and regulations, whether or not shown on the Plans and/or in these Specifications.

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The Contractor shall include in his bid all State Sales Tax, Social Security Taxes, State Unemployment Compensation Insurance, and all other such items of like nature. It is the intent that the bid shall represent the total cost to the Department of all work included in this Contract.

INDEMNIFICATION

The Contractor shall indemnify and hold harmless the Department and his agents and employees from and against all claims, damages, losses and expenses including attorneys' fees arising out of or resulting from the performance of the work, provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting therefrom, and (b) is caused in whole or in part by a negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified thereunder.

The obligations of the Contractor shall not extend to the liability of the Department, his agents or employees arising out of (a) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or Specifications, or (b) the giving of or the failure to give directions or instructions by the Department, his agents or employees provided such giving or failure to give is the primary cause of the injury or damage.

ACCIDENT PREVENTION

Precaution shall be exercised at all times for the protection of persons and property. The safety provisions of applicable laws and building and construction codes shall be observed. Machinery, equipment and other hazards shall be guarded in accordance with safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable laws. The Contractor shall be responsible for any damage which may be caused by workers during the performance of the work.

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SUPERINTENDENT: SUPERVISION

The Contractor shall furnish during progress of the work, a competent Superintendent acceptable to the Department and any necessary assistants. The Superintendent shall not be changed except with the consent of the Department, unless the Superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employ. The Superintendent shall represent the Contractor in his absence and all directions given to him shall be as binding as if given to the Contractor. The Department shall not be responsible for the acts or omissions of the Superintendent or his assistants.

ACCESS TO THE WORK

The Engineer or his representatives shall have access to the work at all times, shall be permitted to approach, enter or examine all stages or phases of the work as it progresses and shall have the authority to reject work which is defective in workmanship or material.

CHANGES IN THE WORK

The Department, without invalidating the Contract, may order extra work or make changes by altering, adding to or deducting from the work, the Contract Sum being adjusted accordingly. All such work shall be executed under the Conditions of the original Contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change.

Except in an emergency endangering life or property, no extra work or change shall be made by the Contractor unless in pursuance of a written order from the Department and no claim for an addition to the Contract Sum shall be valid unless so ordered.

The value of any such extra work or change shall be determined in one (1) or more of the following ways:

- A. By estimate and acceptance in a lump sum. The Contractor shall be required, if called upon, to furnish the original bills and payrolls and support the statement with proper affidavits. The burden of proof of the costs rests upon the Contractor.
- B. By unit prices named in the Contract or subsequently agreed upon.
- C. By cost and percentage or by cost and a fixed fee, to be computed according to above formula.

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DEDUCTIONS FOR UNCORRECTED WORK

If the Department deems it inexpedient to correct work injured or done not in accordance with the Contract, an equitable deduction from the Contract price shall be made therefore.

CORRECTION OF WORK BEFORE FINAL PAYMENT

The Contractor shall remove from the premises all work condemned by the Department as failing to conform to the Contract, whether incorporated or not, and the Contractor shall replace and re-execute his own work in accordance with the Contract and without expense to the Department and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.

WARRANTY

All materials and workmanship shall be guaranteed for a period of one (1) year from the date of the semi-final inspection by the Department. Final acceptance and processing of the final estimate will be made after the one (1) year Warranty period is complete. The Contractor's Performance Bond will be held until the Warranty period is complete.

The Contractor may provide a Maintenance Bond for 50% of the full amount of the Contract in order to release the Performance Bond during the Warranty period. The Maintenance Bond must be furnished prior to the semi-final inspection and extend to the termination of the Warranty period.

THE DEPARTMENT'S RIGHT TO DO WORK

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the Department, after seven (7) days written notice to the Contractor, may without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.

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PAYMENTS WITHHELD

In addition to other appropriate justification therefore as authorized by law, the Department may withhold, or on account of subsequently discovered evidence, nullify the whole or a part of any certificate to such extent as may be necessary in his reasonable opinion to protect himself from loss on account of:

- A. Defective work not remedied.
- B. Claims filed or reasonable evidence indicating probable filing of claims.
- C. Failure of the Contractor to make payments properly to subcontractors or for material or labor.
- D. A reasonable doubt that the Contract can be completed for the balance then unpaid.
- E. Damage to another contractor.

DAMAGES

Should either party to this Contract suffer Damages because of any wrongful act or neglect of the other party or of anyone employed by him, claim shall be made in writing to the party liable within a reasonable time of the first observance of such damage and not later than the final payment, except as expressly stipulated otherwise in the case of faulty work or materials, and shall be adjusted by agreement or arbitration.

LIENS

The satisfaction of all Liens (including but not limited to labor, material, worker's compensation and otherwise) arising out of this Contract and incurred by the Contractor or his Subcontractor shall be exclusive responsibility of the Contractor and/or the Contractor's bonding company and the Department shall have the right to withhold payment to the Contractor or recover from the Contractor and/or the Contractor's bonding company all damages, including costs and attorney's fees, as a result of liens being filed or asserted as a result of the performance of this Contract.

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ASSIGNMENT

Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due or to become due to him thereunder, without the previous written consent of the Department.

SEPARATE CONTRACTS

The Department reserves the right to let other contracts in connection with this work under similar General Conditions. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs.

If any part of the Contractor's work depends for proper execution or results upon the work of any other contractor, the Contractor shall inspect and determine any defects in such work that render it unsuitable for such proper execution and results. His failure to so inspect and determine shall constitute an acceptance of the other contractor's work as fit and proper for the reception of this work, except as to defects which may develop in the other contractor's work after the execution of this work.

SUBCONTRACTS

The Contractor agrees that he is as fully responsible to the Department for the acts and omissions of his Subcontractors and suppliers and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by himself.

Nothing contained in the Contract Documents shall create any contractual relation between any Subcontractor and the Department.

USE OF PREMISES

The Contractor shall confine his apparatus, the storage of materials and the operations of his workers to limits indicated by the Engineer, and shall not unreasonably encumber the premises with his materials.

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CUTTING, PATCHING

The Contractor shall do all cutting, fitting or patching of his work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors shown upon, or reasonably implied by, the Plans and Specifications for the completed structure.

QUALITY OF MATERIAL

All material, appliances or appurtenances furnished under these Specifications shall be new and unused and shall be free from defects and imperfections. Any material, appliance or appurtenance thereto found to be defective shall be replaced by the Contractor at no cost to the Arkansas Highway and Transportation Department. All material shall comply with the requirements and applicable provisions of the Arkansas State Highway and Transportation Department Standard Specifications for Highway Construction, Edition of 2014, as amended by Supplemental Specifications, and these Specifications. Any material not covered in the Specifications above shall be approved by the Engineer.

SUBSTITUTION OF MATERIAL

Where a definite material is specified, it is not the intent to discriminate against any equal product of another manufacturer. It is the intent to set a definite standard. Open competition is expected, but in all cases, complete data must be submitted on all proposed substitutions and samples shall be submitted for comparison and testing when requested.

No substitution shall be made unless authorized in writing by the Department. If the Contractor intends to substitute an equal product, he shall make this fact known, in writing, to the Department within thirty (30) days after the award of the Contract. Otherwise, the Contractor will be required to furnish materials and specialties of the brands named in the Specifications. Should a substitution be accepted and should the substituted material prove defective or otherwise unsatisfactory for the service intended and within the guaranty period, the Contractor shall replace this material or equipment with the material or equipment specified by name at no cost to the Department.

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PLANS AND SPECIFICATIONS

Titles to Sections and Paragraphs in these Contract Documents are introduced merely for convenience and shall not be taken as a correct or complete segregation of the several units of materials and labor. No responsibility, either direct or implied, is assumed by the Department for omissions or duplications by the Contractor, or his Subcontractor, due to real or alleged error in arrangement or matter in these Contract Documents.

The Contractor is cautioned to examine the Plans before submitting his bid, and in all cases large scale details shall take precedence over small scale general drawings. In cases where floor elevations are shown, they are to be checked back carefully against detailed sections, and the Contractor will be responsible for all heights shown or marked on small scale drawings.

PROPOSALS

All Bids shall be based upon the conditions at the site, the Specifications and the Plans for the Department's Job No. 3-39, and entitled "District 3 Headquarters Administration Office HVAC Replacement", Arkansas State Highway and Transportation Department. All bids shall include all general construction, plumbing and site improvement work required to remodel the existing Building. The unit bids shall include all work shown on the Plans and called for in the Specifications.

MEASUREMENTS

Before ordering any material or doing any work, the Contractor shall verify all Measurements at the building and shall be responsible for the correctness of same. No extra charge or compensation will be allowed on account of differences between architectural dimensions and the Measurements indicated on the drawings; any difference which may be found shall be submitted to the Department for consideration before proceeding with the work.

CLEANING UP

The Contractor shall at the completion of the work, remove all his rubbish from and about the building and all his tools, scaffolding and surplus materials and shall leave his work "broom-clean" or its equivalent.

All glass shall be cleaned free of paint or stains, then washed and left clean.

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CONDITION OF BIDDING

The Contractor represents, as a Condition of Bidding and Contracting for the Project, that he is thoroughly familiar with all of the processes and methods necessary to safely construct and complete the Project according to the Plans and Specifications, including all necessary safety measures to protect property and persons from injury and loss. Such representation includes, but is not limited to, the use of and methods required for all materials specified, soil test information, scaffolding, bracing, shoring, etc.

CONSTRUCTION PLANS

The Department will furnish five (5) sets of Contract Plans and Specifications, without cost, to the General Contractor for his use in constructing the work.

The General Contractor is to supply all Contract Plans and Specifications to his Subcontractors or material suppliers. Additional sets or portions of Contract Plans and Specifications, beyond the five (5) sets furnished by the Department, that are requested by the General Contractor, will be furnished for the actual cost of printing at the General Contractor's expense.

FILE DRAWINGS

At the completion of this project, the General Contractor shall furnish to the Department a complete file of the final copies of all shop drawings used in the construction of this project.

COORDINATION OF WORK

As the work under this Contract includes the usual mechanical piping, ducts and grilles and electrical fixtures, the General Contractor shall give special attention to Coordination of Work by the various trades to provide uniform and symmetrical layout and spacing of the exposed components which will affect the finished architectural design and appearance. Where spacing and related locations are not specifically shown on the Plans, or where in doubt, the Contractor's Superintendent shall consult the Department's representative prior to installation of that part of the work. The location of electrical, telephone and radio control wiring outlets shall be verified with the Department prior to installation.

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AS-BUILT DRAWINGS

The Contractor shall, during the progress of the work, keep an accurate record of all changes and corrections from the layouts shown on the Plans. Record of changes may be kept by accurately making all changes on a set of prints during the progress of the job. Exact location of all underground utility service entrances and their connections to utility mains as well as valves, etc., which will be concealed in the finished work, shall be accurately indicated on the Plans by measured distances. Upon completion of the work and prior to final payment, the Contractor shall furnish to the Department two (2) set of "As-Built" prints legibly and accurately marked to indicate all changes, additions, deletions, etc., from the Contract Plans.

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**Daikin North America LLC
HVAC Guide Specifications
Multiple Evaporator, Direct Expansion (DX), Air-Cooled, Variable Capacity, Split
System**

Mechanical HVAC

Size Range: 34 tons nominal

Daikin Model Number:

REYQ408TYDN (1x REYQ96TYDN + 1x REYQ144TYDN + 1x REYQ168TYDN)

Part 1 - GENERAL

**VARIABLE REFRIGERANT VOLUME (VRV IV) AIR CONDITIONING
SPECIFICATION – Three Pipe Heat Recovery**

1.01 SYSTEM DESCRIPTION

The variable capacity, heat recovery air conditioning system shall be a Daikin Variable Refrigerant Volume Series (heat and cool model) split system as specified. The system shall consist of multiple evaporators, branch selector boxes, REFNET™ joints and headers, a three pipe refrigeration distribution system using PID control and Daikin VRV® condenser unit. The condenser shall be a direct expansion (DX), air-cooled heat recovery, multi-zone air-conditioning system with variable speed inverter driven compressors using R-410A refrigerant. The condensing unit may connect an indoor evaporator capacity up to 200% of the condensing unit capacity. All zones are each capable of operating separately with individual temperature control. A dedicated hot gas pipe shall be required to ensure optimum heating operation performance. Two-pipe, heat recovery systems utilizing a lower temperature mixed liquid/gas refrigerant to perform heat recovery are not acceptable due to reduced heating capabilities.

The Daikin condensing unit shall be interconnected to indoor unit models FXFQ, FXHQ, FXMQ, FXLQ, FXNQ, FXTQ, FXDQ, FXZQ, FXAQ, FXMQ_MF and FXUQ and shall range in capacity from 7,500 Btu/h to 96,000 Btu/h in accordance with Daikin's engineering data book detailing each available indoor unit. The indoor units shall be connected to the condensing unit utilizing Daikin's REFNET™ specified piping joints and

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headers to ensure correct refrigerant flow and balancing. T style joints are not acceptable for a variable refrigerant system.

Operation of the system shall permit either individual cooling or heating of each indoor unit simultaneously or all of the indoor units associated with each branch of the cool/heat selector box (BSQ_T / BS_Q54T). Each indoor unit or group of indoor units shall be able to provide set temperature independently via a local remote controller, an Intelligent Controller, an Intelligent Manager or a BMS interface.

Branch selector boxes shall be located as shown on the drawing. The branch selector boxes shall have the capacity to control up to 290 MBH (cooling) downstream of the branch selector box. Each branch of the branch selector box shall consist of three electronic expansion valves, refrigerant control piping and electronics to facilitate communications between the box and main processor and between the box and indoor units. The branch selector box shall control the operational mode of the subordinate indoor units. The use of three EEV's ensures continuous heating during defrost (multiple condenser systems), no heating impact during changeover and reduced sound levels. The use of solenoid valves for changeover and pressure equalization shall not be acceptable due to refrigerant noise.

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The REYQ_T condensing unit model numbers and the associated number of connectable indoor units per REYQ_T condensing unit is indicated in the following table. Each indoor unit or group of indoor units shall be independently controlled.

Model Number	Nominal Capacity (Tons)	Number of Connectable Indoor Units
REYQ72TYDN	6	12
REYQ96TYDN	8	16
REYQ120TYDN	10	20
REYQ144TYDN	12	25
REYQ168TYDN	14	29
REYQ192TYDN	16	33
REYQ216TYDN	18	37
REYQ240TYDN	20	41
REYQ264TYDN	22	45
REYQ288TYDN	24	49
REYQ312TYDN	26	54
REYQ336TYDN	28	58
REYQ360TYDN	30	64
REYQ384TYDN	32	64
REYQ408TYDN	34	64
REYQ432TYDN	36	64
REYQ456TYDN	38	64

1.02 VRV IV FEATURES AND BENEFITS

- A. Voltage Platform –Heat recovery condensing units shall be available with a 460V/3/60 power supply.
- B. Advanced Zoning – A single system shall provide for up to 64 zones.
- C. Independent Control – Each indoor unit shall use a dedicated electronic expansion valve with 2000 positions for independent control.
- D. VFD Inverter Control and Variable Refrigerant Temperature – Each condensing unit shall use high efficiency, variable speed all “inverter” compressor(s) coupled with inverter fan motors to optimize part load performance. The system capacity and refrigerant temperatures shall be modulated automatically to set suction and condensing pressures while varying the refrigerant volume for the needs of the cooling or heating loads. The control will be automatic and customizable depending on load and weather conditions.
Indoor units shall use PID to control superheat to deliver a comfortable room temperature condition and optimize efficiency.

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- E. Configurator software – Each system shall be available with configurator software package to allow for remote configuration of operational settings and also for assessment of operational data and error codes. If this software is not provided by an alternate manufacturer, for each individual outdoor unit the contractor shall do the settings manually and keep detailed records for future maintenance purposes.
- F. Autocharging – Each system shall have a refrigerant auto-charging function.
- G. Defrost Heating – Multiple condenser VRV systems shall maintain continuous heating during defrost operation. Reverse cycle (cooling mode) defrost operation shall not be permitted due to the potential reduction in space temperature.
- H. Oil Return Heating – Multiple condenser VRV systems shall maintain continuous heating during oil return operation. Reverse cycle (cooling mode) oil return during heating operation shall not be permitted due to the potential reduction in space temperature.
- I. Low Ambient Cooling – Each system shall be capable of low ambient cooling operation to -4°F DB.
- J. Independent Control – Each indoor unit shall use a dedicated electronic expansion valve for independent control.
- K. Flexible Design –
 - 1. Systems shall be capable of up to 540ft (623ft equivalent) of linear piping between the condensing unit and furthest located indoor unit.
 - 2. Systems shall be capable of up to 3,280ft total “one-way” piping in the piping network.
 - 3. Systems shall have a vertical (height) separation of up to 295ft between the condensing unit and the indoor units.
 - 4. Systems shall be capable of up to 295ft from the first REFNET™ / branch point.
 - 5. The condensing unit shall have the ability to connect an indoor unit evaporator capacity of up to 200% of the condensing unit capacity.
 - 6. Systems shall be capable of 98ft vertical separation between indoor units.
 - 7. Condensing units shall be supported with a fan motor ESP up to 0.32” WG as standard to allow connection of discharge ductwork and to prevent discharge air short circuiting.
- L. Oil Return – Each system shall be furnished with a centrifugal oil separator and active oil recovery cycle
- M. Simple Wiring – Systems shall use 16/18 AWG, 2 wire, multi-stranded, non-shielded and non-polarized daisy chain control wiring.
- N. Outside Air – Systems shall provide outside air capability.
- O. Space Saving – Each system shall have a condensing unit module footprint as small as 36-5/8” x 30-1/8”.

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- P. Advanced Diagnostics – Systems shall include a self diagnostic, auto-check function to detect a malfunction and display the type and location.
- Q. Each condensing unit shall incorporate contacts for electrical demand shedding with optional 3 stage demand control with 12 customizable demand settings.
- R. Advanced Controls – Each system shall have at least one remote controller capable of controlling up to 16 indoor units.
- S. Each system shall be capable of integrating with open protocol BACnet and LonWorks building management systems.
- T. Low Sound Levels – Each system shall use indoor and condensing units with quiet operation as low as 27 dB(A).

1.03 QUALITY ASSURANCE

- A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995 – Heating and Cooling Equipment and bear the Listed Mark.
- B. All wiring shall be in accordance with the National Electric Code (NEC).
- C. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.
- D. Mechanical equipment for wind-born debris regions shall be designed in accordance with ASCE 7-2010 and installed to resist the wind pressures on the equipment and the supports.
- E. The condensing unit will be factory charged with R-410A.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be stored and handled according to the manufacturer's recommendations.

Part 2 - WARRANTY

2.01 STANDARD LIMITED WARRANTY

Daikin North America LLC warrants original owner of the non-residential building, multifamily residence or residence in which the Daikin products are installed that under normal use and maintenance for comfort cooling and conditioning applications such products (the "Products") will be free from defects in material and workmanship. This warranty applies to compressor and all parts and is limited in duration to **ten (10) years** starting from the "installation date" which is one of the two dates below:

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- a. The installation date is the date that the unit is originally commissioned, but no later than 18 months after the manufacture date noted on the unit's rating plate.
- b. If the date the unit is originally commissioned cannot be verified, the installation date is three months after the manufacture date.

Complete warranty details available from your local Daikin representative or at www.daikincomfort.com –

Part 3 - PERFORMANCE

3.01 The VRV IV REYQ_T system shall perform as shown on the project drawings schedule

3.02 OPERATING RANGE

The operating range in cooling or cooling dominant simultaneous cooling/heating will be (-4°F) 23°F DB ~ 122°F DB.

Each system as standard shall be capable of onsite reprogramming to allow low ambient cooling operation down to -4°F DB

The operating range in heating or heating dominant simultaneous cooling/heating will be -13°F WB – 60°F WB.

If an alternate equipment manufacturer is selected, the mechanical contractor shall provide, at their own risk and cost, all additional material and labor to meet low ambient operating condition and performance.

Cooling mode indoor room temperature range will be 57°F-77°F WB.

Heating mode indoor room temperature range will be 59°F-80°F DB.

3.03 REFRIGERANT PIPING

The system shall be capable of refrigerant piping up to 540 actual feet or 623 equivalent feet from the condensing unit to the furthest indoor unit, a total combined liquid line length of 3,280 feet of piping between the condensing and indoor units with 295 feet maximum vertical difference, without any oil traps.

REFNET™ piping joints and headers shall be used to ensure proper refrigerant balance and flow for optimum system capacity and performance. T style joints shall not be acceptable as this will negatively impact proper refrigerant balance and flow for optimum system capacity and performance.

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3.04 DESIGN BASIS

The HVAC equipment basis of design is Daikin North America. All bidders shall furnish the minimum system standards as defined by the base bid model numbers, model families or as otherwise specified herein (see Key General Specifications Alternate Supplier Checklist). In any event, the contractor shall be responsible for all specified items and intents of this document without further compensation.

Part 4 – PRODUCTS

4.01 CONDENSING UNIT

- A. General: The condensing unit is designed specifically for use with VRV IV series components.
1. The condensing unit shall be factory assembled in the USA and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of Daikin inverter scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports, liquid receiver and suction accumulator. High/low pressure gas line, liquid and suction lines must be individually insulated between the condensing and indoor units.
 2. The condensing unit can be wired and piped with access from the left, right, rear or bottom.
 3. The connection ratio of indoor units to condensing unit shall be permitted up to 200%.
 4. Each condensing system shall be able to support the connection of up to 64 indoor units dependent on the model of the condensing unit.
 5. The sound pressure level standard shall be that value as listed in the Daikin engineering manual for the specified models at 3 feet from the front of the unit. The condensing unit shall be capable of operating automatically at further reduced noise during night time or via an external input.
 6. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for reprogramming.
 7. The unit shall incorporate an auto-charging feature. Manual changing should be support with a minimum of 2 hours of system operation data to ensure correct operation.

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8. The condensing unit shall be modular in design and should allow for side-by-side installation with minimum spacing.
9. The following safety devices shall be included on the condensing unit; high pressure sensor and switch, low pressure sensor, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
10. To ensure the liquid refrigerant does not flash when supplying to the various indoor units, the circuit shall be provided with a sub-cooling feature.
11. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation. Each system shall maintain continuous heating during oil return operation.
12. The condensing unit shall be capable of heating operation at 13°F wet bulb ambient temperature without additional low ambient controls or an auxiliary heat source.
13. The multiple condenser VRV systems shall continue to provide heat to the indoor units in heating operation while in the defrost mode.

B. Unit Cabinet:

1. The condensing unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.

C. Fan:

1. The condensing unit shall consist of one or more propeller type, direct-drive 350 or 750 W fan motors that have multiple speed operation via a DC (digitally commutating) inverter.
2. The condensing unit fan motor shall have multiple speed operation of the DC (digitally commutating) inverter type, and be of high external static pressure and shall be factory set as standard at 0.12 in. WG. A field setting switch to a maximum 0.32 in. WG pressure is available to accommodate field applied duct for indoor mounting of condensing units.
3. The fan shall be a vertical discharge configuration with a nominal airflow maximum range of 5,544 CFM to 24,684 CFM dependent on model specified.
4. Nominal sound pressure levels shall be as shown below.

REYQ408TYDN	69

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5. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted.
6. The fan motor shall be provided with a fan guard to prevent contact with moving parts.
7. Night setback control of the fan motor for low noise operation by way of automatically limiting the maximum speed shall be a standard feature. Operation sound level shall be selectable from 3 steps as shown below.

Operation Sound dB(A)	Night Mode Sound Pressure Level dB(A)
Step 1 max.	55
Step 2 max.	50
Step 3 max.	45

D. Condenser Coil:

1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.
3. The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube with N-shape internal grooves mechanically bonded on to aluminum fins to an e-Pass Design.
4. The fins are to be covered with an anti-corrosion Ultra Gold coating as standard with a salt spray test rating of 1000hr (ASTM B117 & Blister Rating:10), Acetic acid salt spray test: 500hr (ASTM G85 & Blister Rating:10)
5. The pipe plates shall be treated with powdered polyester resin for corrosion prevention. The thickness of the coating must be between 2.0 to 3.0 microns.
6. The outdoor coil shall have three-circuit heat exchanger design eliminating the need for bottom plate heater. The lower part of the coil shall be used for inverter cooling and be on or off during heating operation enhancing the defrost operation.
7. The condensing unit shall be factory equipped with condenser coil guards on all sides.

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E. Compressor:

1. The Daikin inverter scroll compressors shall be variable speed (PVM inverter) controlled which is capable of changing the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity (INV frequency) shall be controlled to eliminate deviation from target value. Non inverter-driven compressors, which may cause starting motor current to exceed the nominal motor current (RLA) and require larger wire sizing, shall not be allowed.
2. The inverter driven compressor in each condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed scroll "G-type" or "J-type".
3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.
4. The capacity control range shall be as low as 3% to 100%.
5. The compressors' motors shall have a cooling system using discharge gas, to avoid sudden changes in temperature resulting in significant stresses on winding and bearings.
6. Each compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.
7. Oil separators shall be standard with the equipment together with an intelligent oil management system.
8. The compressor shall be spring mounted to avoid the transmission of vibration eliminating the standard need for spring insulation.
9. Compressor
10. In the event of compressor failure the remaining compressors shall continue to operate and provide heating or cooling as required at a proportionally reduced capacity. The microprocessor and associated controls shall be designed to specifically address this condition.
11. In the case of multiple condenser modules, conjoined operation hours of the compressors shall be balanced by means of the Duty Cycling Function, ensuring sequential starting of each module at each start/stop cycle, completion of oil return, completion of defrost

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or every 8 hours and extending the operating life of the system. When connected to a central control system, sequential start is activated for all system on each DIII network.

F. Electrical:

1. The power supply to the condensing unit shall be 460 volts, 3 phase, 60 hertz +/- 10%.
2. The control voltage between the indoor and condensing unit shall be 16VDC non-shielded, stranded 2 conductor cable.
3. The control wiring shall be a two-wire multiplex transmission system, making it possible to connect multiple indoor units to one condensing unit with one 2-cable wire, thus simplifying the wiring installation.
4. The control wiring lengths shall be as shown below.

	Condenser to Indoor Unit	Condenser to Central Controller	Indoor Unit to Remote Control
Control Wiring Length	6,665 ft	3,330 ft	1,665 ft
Wire Type	16/18 AWG, 2 wire, non-polarity, non-shielded, stranded		

4.02 BS(4/6/8/10/12)Q_T BRANCH SELECTOR BOX FOR VRV IV HEAT RECOVERY SYSTEM

- A. General:** The BSQ36TVJ, BSQ60TVJ, BSQ96TVJ, BS4Q54TVJ, BS6Q54TVJ, BS8Q54TVJ, BS10Q54TVJ and BS12Q54TVJ branch selector boxes are designed specifically for use with VRV IV series heat recovery system components.
1. These selector boxes shall be factory assembled, wired, and piped.
 2. These BSQ_T / BS(4/6/8/10/12)Q54T branch controllers must be run tested at the factory.
 3. These selector boxes must be mounted indoors.
 4. When simultaneously heating and cooling, the units in heating mode shall energize their subcooling electronic expansion valve.
 5. The number of connectable indoor units shall be in accordance with the table below:

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Model Number	Maximum Connectable Cooling Capacity	Maximum Number of Connectable Indoor Units Per Branch
BSQ36TVJ	36,000 Btu/h	4
BSQ60TVJ	60,000 Btu/h	8
BSQ96TVJ	96,000 Btu/h	8
BS4Q54TVJ	144,000 Btu/h	5
BS6Q54TVJ	216,000 Btu/h	5
BS8Q54TVJ	290,000 Btu/h	5
BS10Q54TVJ	290,000 Btu/h	5
BS12Q54TVJ	290,000 Btu/h	5

B. Unit Cabinet:

1. These units shall have a galvanized steel plate casing.
2. Each cabinet shall house 3 electronic expansion valves for refrigerant control per branch.
3. The cabinet shall contain one subcooling heat exchanger per branch.
4. The unit shall have sound absorption thermal insulation material made of flame and heat resistant foamed polyethylene.
5. Nominal sound pressure levels must be measured and published on the submittals by the manufacturer. These sound levels must not exceed the values below.

Model Number	Sound Level dB(A) Operating	Sound Level dB(A) Max
BSQ36TVJ	42	32
BSQ60TVJ	43	32
BSQ96TVJ	44	34
BS4Q54TVJ	38	45
BS6Q54TVJ	39	47
BS8Q54TVJ	39	47
BS10Q54TVJ	40	48
BS12Q54TVJ	40	48

If an alternate manufacturer is selected, the mechanical contractor shall provide, at their own cost and expense, any additional material and labor to meet the published sound levels above.

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C. Dimensions:

1. Each BSQ_T unit shall be no larger than 8-1/8" x 15-1/4" x 12-13/16".
2. Each BS4Q_T shall be no larger than 11-3/4" x 14-9/16" x 18-15/16".
3. Each BS(6/8)Q_T shall be no larger than 11-3/4" x 22-13/16" x 18-15/16".
4. Each BS(10/12)Q_T shall be no larger than 11-3/4" x 32-5/16" x 18-15/16".

D. Refrigerant Valves:

1. The unit shall be furnished with 3 electronic expansion valves per branch to control the direction of refrigerant flow. The use of solenoid valves for changeover and pressure equalization shall not be acceptable due to refrigerant noise.
2. The refrigerant connections must be of the braze type.
3. In multi-port units, each port shall have its own electronic expansion valves. If common expansion/solenoid valves are used, redundancy must be provided.
4. Each circuit shall have at least one (36,000 Btu/h indoor unit or smaller for the BSQ36TVJ, 54,000 Btu/h indoor unit or smaller for the BS(4/6/8/10/12)Q54TVJ, 60,000 Btu/h indoor unit or smaller for the BSQ60TVJ and 96,000 Btu/h indoor unit or smaller for the BSQ96TVJ) branch selector box.
5. Multiple indoor units may be connected to a branch selector box with the use of a REFNET™ joint provided they are within the capacity range of the branch selector.
6. Field provided refrigerant service valves shall be installed at the inlet of each branch selector box for future servicing.

E. Condensate Removal:

1. The unit shall not require provisions for condensate removal. A safety device or secondary drain pan shall be installed by the mechanical contractor to comply with the applicable mechanical code, if an alternate manufacturer is selected.

F. Electrical:

1. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.
2. The unit shall be capable of operation within the limits of 187 volts to 255 volts.
3. The minimum circuit amps (MCA) shall be 0.1 and the maximum overcurrent protection amps (MOP) shall be 15.
4. The control voltage between the indoor and condensing unit shall be 16VDC non-shielded 2 conductor cable.

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- 4.02 FXFQ_T – ROUND FLOW SENSING CEILING CASSETTE UNIT
- A. General: Daikin indoor unit model FXFQ_T shall be a round flow ceiling cassette fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, direct drive DC (ECM) type fan, for installation into the ceiling cavity equipped with an air panel grill. It shall be available in capacities from 7,500 Btu/h to 48,000 Btu/h. Model numbers are FXFQ07TVJU, FXFQ09TVJU, FXFQ12TVJU, FXFQ15TVJU, FXFQ18TVJU, FXFQ24TVJU, FXFQ30TVJU, FXFQ36TVJU, FXFQ48TVJU to be connected to outdoor unit model RXYQ / RXYMQ / RWEYQ heat pump and REYQ / RWEYQ heat recovery model. It shall be a round flow air distribution type, fresh white, impact resistant decoration panel, or optional self-cleaning filter panel. The supply air is distributed via four individually motorized louvers. To save energy and optimize occupancy comfort, the indoor unit shall be equipped with built in occupancy sensor and surface temperature sensor. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E72, BRC1E73, BRC2A71 and BRC1E52B7. The indoor units sound pressure shall range from 30 dB(A) to 45 dB(A) at High speed measured at 5 feet below the unit.
- B. Performance: Each unit's performance is based on nominal operating conditions:
- C. Indoor Unit:
1. The Daikin indoor unit FXFQ_T shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate drain pump, condensate safety shutoff and alarm, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.
 2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
 3. Both refrigerant lines shall be insulated from the outdoor unit.
 4. The round flow supply air flow can be field modified to 23 different airflow patterns to accommodate various installation configurations including corner installations.

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5. Return air shall be through the concentric panel, which includes a resin net, mold resistant, antibacterial filter.
6. The indoor units shall be equipped with a condensate pan with antibacterial treatment and condensate pump. The condensate pump provides up to 33-1/2" of lift from bottom of unit to top of drain piping and has a built in safety shutoff and alarm.
7. The indoor units shall be equipped with a return air thermistor.
8. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
9. The voltage range will be 253 volts maximum and 187 volts minimum.
10. To save energy and optimize occupancy comfort, the indoor unit shall be equipped with built in occupancy sensor and surface temperature sensor.
11. Supplied air shall be directed automatically by four individually controlled louvers.

D. Unit Cabinet:

1. The cabinet shall be space saving and shall be located into the ceiling.
2. Four auto-adjusted louvers shall be available to choose, which include standard, draft prevention and ceiling stain prevention.
3. The airflow of the unit shall have the ability to shut down outlets with multiple patterns allowing for simpler installation in irregular spaces.
4. Fresh air intake shall be possible by way of Daikin's optional fresh air intake kit.
5. A branch duct knockout shall exist for branch ducting of supply air.
6. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
7. Optional high efficiency air filters are available for each model unit.

A. Fan:

1. The fan shall be direct-drive DC (ECM) type fan, statically and dynamically balanced impeller with three fan speeds available.
2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range from 0.08 to 0.16 HP.
3. The airflow rate shall be available in three manual settings.
4. The DC fan shall be able to automatically adjust the fan speed in 5 speeds based on the space load.

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5. The fan motor shall be equipped as standard with adjustable external static pressure (ESP) settings to allow operation with the high efficiency air filter options.
 6. The fan motor shall be thermally protected.
- B. Filter:
1. The return air shall be filtered by means of a washable long-life filter with mildew proof resin and antibacterial treatment.
 2. Optional high efficiency disposable air filters shall be available.
 3. Optional Self-Cleaning Filter Panel, which performs automatic filter cleaning up to once a day, with dust collection box that indicates when to be emptied.
- C. Coil:
1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
 2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
 3. The coil shall be a 2, or 3-row cross fin copper evaporator coil with up to 21 FPI design completely factory tested.
 4. The refrigerant connections shall be flare connections and the condensate will be 1 -1/4 inch outside diameter PVC.
 5. A condensate pan with antibacterial treatment shall be located under the coil.
 6. A thermistor will be located on the liquid and gas line.
- D. Electrical:
1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
 2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
 3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.
- E. Control:
1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.
 2. The unit shall be compatible with interfacing with a BMS system via optional LonWorks or BACnet gateways.
 3. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.
 4. For the Sensing functions and the optional Self-Cleaning Filter functions, Remote controller BRC1E73/BRC1E52B7 shall be used. Consult with Daikin prior to applying controls.

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F. Optional Accessories Available:

1. Supply Duct Connection Kit

4.02 FXZQ – 4 WAY CEILING CASSETTE UNIT (2'x2')

- A. General: Daikin indoor unit model FXZQ shall be a ceiling cassette fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, for installation into the ceiling cavity equipped with an air panel grill. It shall be available in capacities from 7,500 Btu/h to 18,000 Btu/h. Model numbers are FXZQ07MVJU9, FXZQ09MVJU9, FXZQ12MVJU9, FXZQ15MVJU9, FXZQ18MVJU9 to be connected to outdoor unit model RXYQ / RXYMQ / RWEYQ heat pump and REYQ / RWEYQ heat recovery model. It shall be a four-way air distribution type, white (RAL9010), impact resistant with a washable decoration panel. The supply air is distributed via motorized louvers which can be horizontally and vertically adjusted from 0° to 90°. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E72, BRC1E73 and BRC2A71. The indoor units sound pressure shall range from 29 dB(A) to 34 dB(A) at low speed measured at 5 feet below the unit.
- B. Performance: Each unit's performance is based on nominal operating conditions:
- C. Indoor Unit:
1. The Daikin indoor unit FXZQ shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate drain pump, condensate safety shutoff and alarm, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.
 2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
 3. Both refrigerant lines shall be insulated from the outdoor unit.
 4. The 4-way supply air flow can be field modified to 3-way and 2-way airflow to accommodate various installation configurations including corner installations.
 5. Return air shall be through the concentric panel, which includes a resin net mold resistant filter.

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6. The indoor units shall be equipped with a condensate pan and condensate pump. The condensate pump provides up to 21" of lift and has a built in safety shutoff and alarm.
 7. The indoor units shall be equipped with a return air thermistor.
 8. All electrical components are reached through the decoration panel, which reduces the required side service access.
 9. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
 10. The voltage range will be 253 volts maximum and 187 volts minimum.
- D. Unit Cabinet:
1. The cabinet shall be space saving and shall be located into the ceiling.
 2. Three auto-swing positions shall be available to choose, which include standard, draft prevention and ceiling stain prevention.
 3. The airflow of the unit shall have the ability to shut down one or two sides allowing for simpler corner installation.
 4. Fresh air intake shall be possible by way of direct duct installation to the side of the indoor unit cabinet.
 5. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
- E. Fan:
1. The fan shall be direct-drive turbo fan type with statically and dynamically balanced impeller with high and low fan speeds available.
 2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range from 0.06 to 0.12 HP.
 3. The airflow rate shall be available in high and low settings.
 4. The fan motor shall be thermally protected.
- F. Filter:
1. The return air shall be filtered by means of a washable long-life filter with mildew proof resin.
- G. Coil:
1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
 2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.

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3. The coil shall be a 2-row cross fin copper evaporator coil with 17 FPI design completely factory tested.
 4. The refrigerant connections shall be flare connections and the condensate will be 1 -1/32 inch outside diameter PVC.
 5. A condensate pan shall be located under the coil.
 6. A condensate pump with a 21 inch lift shall be located below the coil in the condensate pan with a built in safety alarm.
 7. A thermistor will be located on the liquid and gas line.
- H. Electrical:
1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
 2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
 3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.
- I. Control:
1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.
 2. The unit shall be compatible with interfacing with a BMS system via optional LonWorks or BACnet gateways.
 3. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.
- J. Optional Accessories Available:
1. Direct fresh air intake kit (KDDQ44X60).
 2. Supply air duct connections.
- 4.06 FXDQ – SLIM DUCT CONCEALED CEILING UNIT
- A. General: Daikin indoor unit model FXDQ shall be a Slim, built-in ceiling concealed fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, for installation into the ceiling cavity. The unit shall be constructed of a galvanized steel casing. It shall be available in capacities from 7,000 Btu/h to 24,000 Btu/h. Model numbers are FXDQ07MVJU, FXDQ09MVJU, FXDQ12MVJU, FXDQ18MVJU, and FXDQ24MVJU to be connected to outdoor unit model RXYQ / RXYMQ / RWEYQ heat pump and REYQ / RWEYQ heat recovery model. It shall be a horizontal discharge air with horizontal return air or bottom return air configuration. All models feature a very low height (7-7/8") making them applicable to ceiling pockets that tend to be shallow. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying

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mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E72, BRC1E73 and BRC2A71. Included as standard equipment, a long-life filter that is mold resistant and a condensate drain pan and drain pump kit that pumps to 23-5/8" from the drain pipe opening. The indoor units sound pressure level shall range from 29 dB(A) to 32 dB(A) at low speed and 33 dB(A) to 36 dB(A) at high speed 5 feet below the suction grille.

- B. Performance: Each unit's performance is based on nominal operating conditions:
- C. Indoor Unit:
1. The Daikin indoor unit FXDQ shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate drain pump, condensate safety shutoff and alarm, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall have adjustable external static pressure capabilities.
 2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
 3. Both refrigerant lines shall be insulated from the outdoor unit.
 4. Return air shall be through a resin net mold resistant filter.
 5. The indoor units shall be equipped with a condensate pan and condensate pump. The condensate pump provides up to 23-5/8" of lift from the center of the drain outlet and has a built in safety shutoff and alarm.
 6. The indoor units shall be equipped with a return air thermistor.
 7. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
 8. The voltage range will be 253 volts maximum and 187 volts minimum.
 9. Switch box shall be reached from the side or bottom for ease of service and maintenance.
- D. Unit Cabinet:
1. The cabinet shall be located into the ceiling and ducted to the supply and return openings.
 2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

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E. Fan:

1. The fan shall be direct-drive Sirocco type fan, statically and dynamically balanced impeller with high and low fan speeds available.
2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range from 62W to 130W.
3. The airflow rate shall be available in high and low settings.
4. The fan motor shall be thermally protected.
5. The fan motor shall be equipped as standard with adjustable external static pressure (ESP) settings.
6. Fan motor external static pressure range for nominal airflow:

F. Filter:

1. The return air shall be filtered by means of a washable long-life filter with mildew proof resin.

G. Coil:

1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
3. The coil shall be a 2 or 3-row cross fin copper evaporator coil with 14 FPI design completely factory tested.
4. The refrigerant connections shall be flare connections and the condensate will be 1-1/32" outside diameter PVC.
5. A condensate pan shall be located under the coil.
6. A condensate pump with a 23-5/8" lift shall be located below the coil in the condensate pan with a built in safety alarm.
7. A thermistor will be located on the liquid and gas line.

H. Electrical:

1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

I. Control:

1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.
2. The unit shall be compatible with interfacing with a BMS system via optional LonWorks or BACnet gateways.

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3. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.

4.08 FXAQ – WALL MOUNTED UNIT

- A. General: Daikin indoor unit FXAQ shall be a wall mounted fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation onto a wall within a conditioned space. This compact design with finished white casing shall be available in capacities from 7,500 Btu/h to 24,000 Btu/h. Model numbers are FXAQ07PVJU, FXAQ09PVJU, FXAQ12PVJU, FXAQ18PVJU and FXAQ24PVJU to be connected to outdoor unit model RXYQ / RXYMQ / RWEYQ heat pump and REYQ / RWEYQ heat recovery model. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E72, BRC1E73 and BRC2A71. A mildew-proof, polystyrene condensate drain pan and resin net mold resistant filter shall be included as standard equipment. The indoor units sound pressure shall range from 31 dB(A) to 41 dB(A) at low speed measured at 3.3 feet below and from the unit.
- B. Performance: Each unit's performance is based on nominal operating conditions:
- C. Indoor Unit:
 1. The Daikin indoor unit FXAQ shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall have an auto-swing louver which ensures efficient air distribution, which closes automatically when the unit stops. The remote controller shall be able to set five (5) steps of discharge angle. The front grille shall be easily removed for washing. The discharge angle shall automatically set at the same angle as the previous operation upon restart. The drain pipe can be fitted to from either left or right sides.
 2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
 3. Both refrigerant lines shall be insulated from the outdoor unit.
 4. Return air shall be through a resin net mold resistant filter.
 5. The indoor units shall be equipped with a condensate pan.
 6. The indoor units shall be equipped with a return air thermistor.

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7. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
 8. The voltage range will be 253 volts maximum and 187 volts minimum.
- D. Unit Cabinet:
1. The cabinet shall be affixed to a factory supplied wall mounting template and located in the conditioned space.
 2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
- E. Fan:
1. The fan shall be a direct-drive cross-flow fan, statically and dynamically balanced impeller with high and low fan speeds available.
 2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range 0.054 to 0.058 HP.
 3. The airflow rate shall be available in high and low settings.
 4. The fan motor shall be thermally protected.
- F. Coil:
1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
 2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
 3. The coil shall be a 2-row cross fin copper evaporator coil with 14 fpi design completely factory tested.
 4. The refrigerant connections shall be flare connections and the condensate will be 11/16 inch outside diameter PVC.
 5. A thermistor will be located on the liquid and gas line.
 6. A condensate pan shall be located in the unit.
- G. Electrical:
1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
 2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
 3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.
- H. Control:
1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.
 2. The unit shall be compatible with interfacing with a BMS system via optional LonWorks or BACnet gateways.

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3. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.
- I. Optional Accessories Available:
 1. A condensate pump (DACA-CP3-1)

Part 5 - HVAC EQUIPMENT ALTERNATE (GENERAL INFORMATION)

- 5.01 The alternate equipment supplier shall provide to the bidding mechanical contractor a complete equipment data package. This package shall include, but is not limited to, equipment capacities at the design condition, power requirements, indoor units CFM/static pressures, fan curves, installation requirements, and physical dimensions. Nominal performance data is not acceptable.

The mechanical contractor shall request and receive the equipment data package 15 days prior to bid date and submit this package with the alternate bid.

The mechanical contractor shall list the equipment supplier and submit the required data package with the bid detailing a complete comparison of the proposed alternate equipment to the specified equipment and the associated cost reduction of the alternate equipment. The contractor bids an alternate manufacturer with full knowledge that the manufacturer's product may not be acceptable or approved.

All equipment must have visible and permanent label clearly identifying the original manufacturer of the equipment. These labels shall have original manufacturer's name and contact information and be located both inside and outside the equipment and on all equipment-related literature. Submittals shall include the above statement as confirmation by supplier that all conditions are agreed to and complied to. Failure to comply with these requirements shall be sufficient cause for rejection of the submittal and product with no further consideration.

- 5.02 The drawing format shall be .dxf or equivalent, on 30"x42" sheets. The HVAC and electrical series design documents will be made available in electronic format for use by the equipment supplier in preparing their drawings. The alternate equipment supplier shall prepare the following drawings:

- XXX HVAC Floor Plan
- XXX HVAC Refrigerant Piping Plan

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XXX HVAC Refrigerant Piping/Controls Details
XXX HVAC Details
XXX HVAC Schedules

The alternate equipment supplier shall draft all piping circuits, components, overall building control schematic, detailed control wiring diagrams, system details and schedules for their system. The drawings shall convey all requirements to successfully install the alternate equipment suppliers system.

Provide (2) drawing package sets plotted on 20 lb. vellum. Provide (1) drawing package in electronic format (.dxf files) on CD.

The submitted documents shall be complete system designs and show no less information than the HVAC equipment/controls contract bid documents.

- 5.03 The equipment supplier shall submit as part of the equipment data package condensing unit data sheets. Data sheets to include the following:

Capacities at project design conditions: Cooling
Cooling (Btu/h)

Cooling Input Power – ducted (kW)
Cooling Input Power – ductless (kW)
Cooling Input Power – mixed (kW)

Part Load IEER – ducted
Part Load IEER – ductless
Part Load IEER – mixed

SCHE

Full Load EER – ducted
Full Load EER – ductless
Full Load EER - mixed

Capacities at project design conditions: Heating
Heating (Btu/h)

Heating Input Power – ducted (kW)
Heating Input Power – ductless (kW)
Heating Input Power – mixed (kW)

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Full Load COP@47F – ducted
Full Load COP@47F – ductless
Full Load COP@47F – mixed

Full Load COP@17F – ducted
Full Load COP@17F – ductless
Full Load COP@17F – mixed

The submitted capacity and efficiency performance must meet or exceed the listed performance on the schedule at the designed space conditions including de-rate factors for defrost if applicable and refrigerant piping losses.

Operating Temperature Range:
Cooling
Heating

Power Supply:
Maximum Circuit Amps (MCA)
Maximum Overcurrent Protection Amps (MOP)
Maximum Starting Current (MSC)
Condenser Fan Motor

Refrigerant:
Refrigerant Type/Charge
Control

Unit Data:
Max. Number of Indoor Units
Sound Pressure Level at 3ft. dB(A)
Weight (lbs)
Dimensions

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- 5.04 The equipment supplier shall guarantee the performance of their system and all published data submitted. Performance shall be based on the design criteria below.

Room Temperature (Cooling): _____
Room Temperature (Heating): _____
Ambient Temperature (Summer): _____
Ambient Temperature (Winter): _____
Defrost De-rate Factor: _____
Refrigerant Piping Loss: _____

- 5.05 The alternate equipment supplier shall submit with bid, indoor unit data sheets. Data sheets to include the following:

Capacities at project design conditions:

Cooling (Btu/h)
Cooling Input Power (kW)
Part Load IEER
SCHE
Full Load EER
Heating (Btu/h)
Heating Input Power (kW)
Full Load COP@47F
Full Load COP@17F
Air Flow (CFM)

External Static Pressure (ESP)
Electrical Data (MCA, MOP, MSC, RLA)
Weight (lbs)
Dimensions

- 5.06 The equipment supplier shall provide a certificate which states that the equipment has a minimum salt spray resistance of 1000 hours.
- 5.07 The equipment supplier shall submit the warranty certificate to the mechanical contractor.

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General Guide Specifications

VK-OA™

(Vertical Floor Mounted Outside-Air A/C's)

Part 1 - General

1.01 Summary

These specifications describe the requirements for a 0 to 100% Outside Air horizontal ceiling mounted air conditioner.

These specifications describe the requirements for an Outside Air vertical floor mounted split air conditioner.

The air conditioning manufacturer shall design and furnish all equipment in the quantities and configurations shown on the project plans and specifications.

The system shall be provided by AboveAir Technologies in Frederick, Maryland, USA. The system shall be approved and labeled as such by Intertek (ETL) to comply with UL 1995. The system shall be New York City MEA229-06-E and Chicago Code Approved. The system model number shall be _____.

1.02 Design Requirements

The system shall be an AboveAiR Technologies VK-OA™ brand factory assembled and factory tested. The system shall be designed for indoor installation.

See equipment schedule for performance

1.03 Submittals

Submittals shall be provided after manufacturer's receipt of a written purchase order and shall include: Detailed Performance and Electrical Data; Guide Specifications; and Dimensional Drawings.

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1.04 Quality Assurance

The system shall be factory run tested prior to shipment. Testing shall include, but shall not be limited to: "HiPot" Test (2 times rated voltage plus 1000 volts, per UL 1995 testing requirements). The system shall be designed and manufactured according to world class quality standards.

Part 2 - Products

2.01 Standard Features / All Systems

2.02 Cabinet - (1" Armaflex Lined Evap)

The cabinet chassis and access panels shall be powder-coat painted heavy gauge galvanized steel for decor matching and corrosion resistance. Cabinet access panels shall rest in recessed pockets designed for minimum air leakage. The cabinet and access panels shall be lined with a 1" closed-cell neoprene 2 lb/ft² high density sound and thermal insulation and sealed with self-extinguishing gasketing conforming to NFPA 90A and 90B.

2.03 Service Access

The unit shall be designed for ease of service access thru front & side access panels with quick-release quarter-turn fasteners.

2.04 Electrical System

General:

The electrical system shall conform to National Electric Code (NEC) requirements according to UL 1995. The control circuit shall be a 24 VAC low voltage circuit.

The electrical system shall include, but not be limited to the following factory installed items: main power distribution block; grounding lug; 24 VAC control transformer; terminal connections; and motor controllers with start protection and circuit breakers for blower motors, compressors and each electric heater stage (if applicable).

Split DX Systems: (separate power)

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Split systems shall require separate main power supplies to the evaporator and condenser unit sections. The evaporator and condenser unit sections shall be electrically interlocked by a field wired 24 volt control signal.

Overflow Safety Float Switches:

The system shall be provided with a factory installed float type condensate overflow safety switches. The circuit shall be designed to shut down all system water producing operations in the event of a overflow condition.

2.05 Air Distribution

The system air distribution shall be configured for a draw-through air pattern to provide even air distribution and maximum coil performance.

2.06 Blowers / Motors

The blower shall be the belt-driven centrifugal type, double width double inlet (DWDI), and statically and dynamically balanced to a minimum vibration level. The shaft shall be heavy duty steel with self-aligning ball bearings sized for an average 100,000 hours of service life.

The blower motor shall be ____ Hp at 1725 RPM (or 3450 RPM) and mounted on an adjustable base. Belts shall be sized for 200% of the motor horsepower rating. Motors shall have overload protection and a minimum NEMA service factor of 1.15.

2.07 Air Patterns

Top Evap Air Discharge: (standard)

The evaporator shall be designed for free or ducted rear-unit return air inlet and top ducted air discharge. Air inlet and outlet connections shall include factory provided turned-out duct flanges for each of field duct connection.

2.08 Air Filtration

The filter(s) shall be 4 inch thick pleated and rated for 30% dust spot efficiency (based on ASHRAE 52.1). The filter(s) shall be serviceable through a side access without shutting down the system.

2.09 Direct Expansion Systems

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2.10 DX - Evaporator Coils

The DX evaporator coil shall be specifically designed for the deep and wide range cooling requirements of 100% outside-air A/C applications. The coil shall be constructed of copper tubes and aluminum fins. The system shall be designed for a draw-through air pattern for maximum heat transfer. Coil end-plates shall be hot dipped galvanized. The evaporator coil shall be mounted in an insulated stainless steel condensate drain pan.

2.11 Scroll Compressors

Each compressor shall be the high efficiency, low sound Scroll type mounted on vibration isolators and located in a separate compartment out of the evaporator air stream to facilitate servicing while equipment is operating. Each compressor shall be complete with reversible positive oil pump, charging and service ports, internal spring isolation, and discharge gas vibration eliminator. Compressor shall be a copeland digital scroll compressor for capacity modulation.

2.12 DX - Refrigeration Circuits

Each refrigeration circuit shall be pre-piped with refrigerant copper tubing. The refrigeration system shall include, but not be limited to: expansion valve with external equalizer; sight glass; refrigerant filter-drier; schrader service valves and high & low refrigerant pressure safety switches.

2.13 Suction-Line Accumulators

Each refrigerant circuit shall be provided with a factory installed Suction-Line Accumulator to prevent liquid slugging of the compressor and excessive refrigerant dilution of the compressor oil during low load conditions. The accumulator shall return refrigerant and oil to the compressor at a sufficient rate to maintain both system operating efficiency and proper oil level. The accumulators shall be wrapped with a 1/2" closed-cell neoprene insulation to prevent sweating.

2.14 Modulating Variable Spd Fan Head Press. Control

Modulating Variable fan speed head pressure controls shall be factory installed within the propeller fan condenser. Each refrigerant circuit shall be included factory installed liquid refrigerant receiver, compressor cold start time delay relay and crankcase heater

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2.15 Standard Features / Individual Systems

2.16 DX - Air Cooled (Split Evaporator Systems)

The system shall be a split dx, vertical floor mounted evaporator section for connection to a remote air cooled condenser. The compressor(s) shall be located in the evaporator section. The evaporator shall include, but not be limited to: evaporator coil; centrifugal belt-driven blower and blower motor; thermal expansion valve with rapid bleed port, shraeder service valves; compressor(s), refrigerant filter-drier and sight-glass; main power distribution block; grounding lug; 24 Vac control transformer; individual blower motor contactors; and terminal strip.

The system shall require only single point main power supply and ship from the factory with a dry-nitrogen holding charge for field sweat (copper) connection and refrigerant (R410A) charging.

2.17 DX - Air Cooled Remote Condenser

The system shall be an outdoor mounted remote air cooled direct-driven propeller fan(s) condenser. The remote condensing unit shall include, but not be limited to: condenser coil; direct drive propeller fan(s) and fan motor(s); close-meshed steel wire with vinyl coating fan guards; shraeder service valves; main power distribution block; grounding lug; dry-contact interlock for evaporator 24 Vac control signal; fan motor starters/contactors; and terminal strip.

The condenser shall be sized for full heat of rejection at 95°F ambient and be capable of operation to ____ °F low ambient air temperature.

The condenser shall ship from the factory with a dry-nitrogen holding charge for field sweat (copper) connection.

2.18 Options

2.19 CONTROL OPTIONS

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2.20 MC-3000™, Advanced Microprocessor Dew Pt Controller w/ Alarms

The system shall be provided with a MC-3000™ advanced microprocessor based controller with 100% outside air dew point temperature control algorithm logic. The controller shall also include free-economizer cooling and proportional analog (0-10Vdc) reheat/heat control.

Select Features/Benefits:

- 4x20 Character Liquid Crystal Alpha-numerical Display
- User Configurable
- Run-Time Hours
- Current Unit Mode Status
- Alarm Status
- Digital & Analog Inputs / Outputs
- Temperature Anticipation
- Remote Stop / Start Contact
- Summary Alarm Contact
- Automatic or Manual (selectable) Restart After Power Loss
- Sequential Load After Restart
- Recovery Delay
- Compressor Short Cycle Timers
- Cold Start Time Delay
- Security Password Access
- Self-Diagnostics
- Service Mode

Unit Status Display

The control system shall display current unit functions and room status (if applicable):

- Current Dry Bulb Temp Set Point
- Current Relative Humidity Set Point
- System ON/OFF
- Cooling
- Heating
- Humidifying
- Dehumidifying
- Reheating
- Actual Room DB Temperature
- Actual Room Relative Humidity

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Alarm Conditions:

Alarm conditions activate an audible and visual indicator plus close a summary alarm dry contact connection. The control system shall alert to the following alarm conditions (if applicable):

- High Temperature • High Head Press
- Low Temperature • Smoke Detection
- High Humidity • Firestat
- Low Humidity • Leak Detection
- Sensor Failure • Sensor Failure
- Summary Failure • Loss of Power
- Loss of Air Flow (optional)
- Dirty filter (optional)

2.21 BacNet Over IP RS485 Connection

An RS485 Serial Port and field installed Ethernet / EIA485 Interface shall be provided for remote BacNet over IP communications.

2.22 REHEAT / HEAT OPTIONS

2.23 Hot Gas Reheat

The system shall be provided with a hot gas reheat coil with modulating 3-way control valve. The hot gas reheat coil shall be sized to provide free-energy space neutral leaving air temperature by offsetting the sensible cooling during dx compressor operation.

2.24 SCR Fired Electric Heater

The electric heat shall be controlled through a “zero firing” silicon control rectifier (SCR) with an extruded aluminum heat sink and solid state logic system to provide close dry bulb temperature control of the leaving conditioned air temperature.

2.25 Heat Pump Option

The system shall include a factory installed heat pump heating cycle including reversing valve, automatic defrost cycle (if applicable) and remote wall mounted temperature controller with auxiliary heating control capability.

2.26 Accessories

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2.27 Main Power, Non-Fused Disconnect

A main power non-fused disconnect shall be factory provided for field installation. The disconnect shall be NEMA rated for indoor or outdoor installation as required.

SECTION A – PLUMBING WORK

GENERAL CONDITIONS

The provisions of the "General Conditions" Section or any other pertinent documents issued by the Department, whether attached hereto or not, shall be made a part of this Section.

DRAWINGS

The Plumbing Drawings show the general arrangement of all piping, and shall be followed as closely as actual building construction and work of other trades will permit. The Plumbing Work shall conform to the requirements shown on all the Drawings. General and Structural Drawings shall take precedence over Plumbing Drawings, as it is not possible to indicate all offsets, fittings, valves and accessories which may be required. The Contractor shall investigate the structural and finish conditions affecting the work and shall arrange his work accordingly, providing such offsets, fittings, valves and accessories as may be required to meet such conditions.

CODES AND STANDARDS

All material and workmanship shall comply with these Specifications and all applicable codes, local ordinances, industry standards and utility company regulations. In case of differences between Specifications, building codes, state laws, local ordinances, industry standards and utility company regulations and Contract Documents, the most stringent shall govern.

NON COMPLIANCE: Should the Contractor perform any work that does not comply with the requirements of the applicable building codes, state laws, local ordinances, industry standards and utility company regulations, he shall bear all costs arising in correcting the deficiencies.

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Applicable codes and standards shall include all state laws, local ordinances, utility company regulations, and the applicable requirements of the following nationally accepted codes and standards:

BUILDING CODES:

- (1) 2012 Arkansas Fire Prevention Code
- (2) 2006 Arkansas Plumbing Code

INDUSTRY STANDARDS, CODES AND SPECIFICATIONS:

- (1) AASHTO -American Association of State Highway and Transportation Officials
- (2) ASTM - American Society of Testing Materials
- (3) AWWA - American Water Works Association
- (4) NFPA - National Fire Protection Association

COORDINATION OF WORK

The Contractor shall compare the Plumbing Drawings and Specifications with the Drawings and Specifications for other trades and shall report any discrepancies between them to the Department and shall obtain written instructions for changes necessary in the Plumbing Work. The Plumbing Work shall be installed in cooperation with other trades installing inter-related work. Before installation, the Contractor shall make proper provision to avoid interferences. All changes required in the work of the Contractor caused by his neglect to do so shall be made by him at his own expense.

Anchor bolts, sleeves, inserts and supports that may be required for the Plumbing Work shall be furnished under the same Section of the Specifications as the respective items to be supported, and they shall be installed, except as otherwise specified, by the trade furnishing and installing the material in which they are to be located. Location of anchor bolts, sleeves, inserts and supports shall be directed by the trade requiring them, which trade shall also insure that they are properly installed. Any expense resulting from the improper location or installation of anchor bolts, sleeves, inserts and supports shall be paid for by the Contractor under the Section of the Specifications for the trade with the responsibility for directing their proper location.

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Slots, chases, openings and recesses through floors, walls, ceilings and roofs as specified will be provided by the various trades and the trade requiring them shall see that they are properly located and shall do any cutting and patching caused by the neglect to do so. Slots, chases, openings and recesses in existing structure shall be cut by the trade requiring them and patched and repaired by that trade.

Locations of pipes, ducts, electrical raceways, switches, panels, equipment, fixtures, etc., shall be adjusted to accommodate the work to interferences anticipated and encountered.

The Contractor shall determine the exact route and location of each pipe, duct and electrical raceway prior to fabrication.

- A. RIGHT-OF-WAY - Lines which pitch shall have the right-of-way over those which do not pitch. For example: steam, condensate and plumbing drains shall normally have right-of-way. Lines whose elevations cannot be changed shall have the right-of-way over lines whose elevations can be changed.
- B. OFFSETS - Transitions and changes in direction in pipes shall be made as required to maintain proper head room and pitch of sloping lines whether or not indicated on the Drawings. The Contractor shall furnish and install all traps, air vents, sanitary vents, etc. as required to affect these offsets, transitions and changes in direction.
- C. INSTALLATION AND ARRANGEMENT - The Contractor shall arrange pipes, ducts, raceways and equipment to permit ready access to valves, cocks, traps, and to clear the openings of swinging and overhead doors and of access panels.
- D. DRAWINGS BY CONTRACTOR - When directed by the Department, the Contractor shall submit for approval by the Department, drawings clearly showing the Plumbing Work and its relation to the work of other trades before commencing shop fabrication or erection in the field.

FEES, PERMITS, AND INSPECTIONS

All required fees, permits and inspections shall be obtained and paid for by the Contractor under the Section of the Specifications for which they are required.

CERTIFICATE OF FINAL INSPECTION - Under each applicable Section of the Specifications, the Contractor shall, upon completion of the work under that Section, furnish a Certificate of Final Inspection to the Department from the inspection department having jurisdiction.

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MATERIALS

All materials shall be new and shall bear the manufacturer's name, trade name and the UL label in every case where a standard has been established for the particular material. The equipment to be furnished under each Section of the Specifications shall be essentially the standard product of a manufacturer regularly engaged in the production of the required type of equipment, and shall be the manufacturer's latest approved design.

DELIVERY AND STORAGE - Fixtures and materials shall be delivered to the site and stored in the original containers, suitably sheltered from the elements. A-1 items subject to moisture damage (such as controls) shall be stored in dry, heated spaces. Equipment and materials of the same general type shall be of the same make throughout the work to provide uniform appearance, operation and maintenance.

PROTECTION – Fixtures and materials shall be tightly covered and protected against dirt, water and chemical or mechanical injury and theft. At the completion of the work, fixtures, equipment and materials shall be cleaned and polished thoroughly. Damage or defects developing before acceptance of the work shall be made good at the Contractor's expense.

DIMENSIONS - It shall be the responsibility of the Contractor to insure that items to be furnished fit the space available. The Contractor shall make the necessary field measurements to ascertain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the Plans and Specifications.

Manufacturer's directions shall be followed completely in the delivery, storage, protection and installation of all equipment and materials. Should the Contractor perform any work that does not comply with the manufacturer's directions, he shall bear all costs arising in correcting the deficiencies.

ACCESSORIES

The Contractor shall furnish and install all fixtures, accessories, connections and incidental items necessary to fully complete the work, ready for use, occupancy and operation by the Department.

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CUTTING AND PATCHING

Under each Section of the Specifications, the Contractor shall be responsible for all required digging, cutting, etc., incident to his work under that Section, and shall make all satisfactory repairs, but in no case shall the Contractor cut into any major structural element, beam or column.

Each trade shall bear the expense of all cutting, patching, repairing or replacing of the work of other trades required because of his fault, error or tardiness or because of any damage done by him.

EXCAVATION AND TRENCHING FOR PIPING

The Contractor shall perform all excavation of every description and of whatever substances encountered, to the depths indicated on the Plans or as otherwise specified.

- A. TRENCH EXCAVATION - Trenches shall be of necessary width for the proper laying of the pipe, and the banks shall be as nearly vertical as practicable. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along its entire length. Except where rock is encountered, care shall be taken not to excavate below the depths indicated. Where rock excavations are required, the rock shall be excavated to a minimum overdepth of 4" below the trench depths indicated on the Plans or specified. Overdepths in the rock excavation and unauthorized overdepths shall be backfilled with loose, granular, moist earth, thoroughly tamped. Whenever wet or otherwise unstable soil that is incapable of properly supporting the pipe is encountered in the bottom of the trench, such soil shall be removed to the depth required and the trench backfilled to the proper grade with coarse sand, fine gravel or other suitable material, as hereinafter specified.
- B. DEPTH OF COVER - Trenches for utilities shall be of a depth required for the governing code from existing grade or from indicated finish grade, whichever is lower, unless otherwise specifically shown.
- C. PROTECTION OF EXISTING UTILITIES - Existing utility lines to be retained that are shown on the Plans or the locations of which are made known to the Contractor prior to excavation, as well as all utility lines uncovered during excavation operations, shall be protected from damage during excavation and backfilling, and if damaged, shall be repaired by the Contractor, at his expense.

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D. FIELD LINES - Installation for field lines, and sanitary sewer, shall be as shown on the Plans.

PLATES - Spring clamp plates (escutcheons) shall be provided where pipes are exposed in finish locations of the building and run through walls, floors or ceiling. Plates shall be chrome plated, spun brass or plain pattern and shall be set tight on the pipe and to the building surface.

PROTECTION - All open ends of pipes and equipment shall be properly capped or plugged to keep dirt and other foreign materials out of the system. Plugs of rags, wool, cotton, waste or similar materials may not be used in plugging. All pipes not otherwise specified shall be uncoated.

HANGERS AND SUPPORTS - The use of pipe hooks, chains or perforated iron for pipe support will not be permitted.

All the different service pipes, valves, fittings, etc., running parallel with each other and near together shall be in line with each other and shall be kept a sufficient distance from each other and the other work to permit finished covering not less than 1/2" between finished coverings on the different services.

Individual hangers for overhead piping shall generally have adjustable swivel pipe rings with suspended rods of ample strength, equal to Grinnell #107 or #104. Such service pipes as are practicable shall be placed at the same elevation and the various trades shall cooperate with each other and install multiple trapeze hangers wherever possible.

Piping near floor shall be supported from side wall or floor by approved wrought iron or pipe brackets, stanchions or hangers, in such manner as to maintain its alignment, while making suitable provisions for necessary expansion.

VERTICAL PIPING - Riser clamps shall be placed at each floor or ceiling level and at each coupling or fitting. Clamps shall be securely supported by structural members which in turn are supported directly from the building structure. Clamps for copper tubing shall be copper plated.

PIPE IDENTIFICATION - Stenciled legend identifying the fluid conveyed shall be painted on pipe in all exposed locations by the trade furnishing and installing the pipe, at intervals not to exceed 20 feet and in addition, at each valve, branch, takeoff, point where a pipe leaves or enters a wall, major change in direction, expansion joint and anchor. Letters shall be sized in accordance with the following:

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<u>Outside Diameter of Pipe or Covering</u>	<u>Height of Legend Letters</u>
Up to 1-1/4"	1/2"
1-1/2" to 2"	3/4"
2-1/2" to 6"	1-1/2"
Over 6"	2"

EQUIPMENT START-UP AND TESTING

The Contractor shall instruct the Department's operating personnel during start-up and separate operating tests of each major item of equipment.

SITE VISIT

This Contractor shall visit the site of the building before submitting a proposal on this work, and shall thoroughly familiarize himself with the existing conditions and operations. Failure on his part to do this will not be cause for extras after the Contract is signed by reason of unforeseen conditions. Any existing electric wiring and conduit encountered within the building area shall be relocated or removed where required by this Contractor at no extra cost to the Department.

SHOP DRAWINGS

The Contractor shall submit four (4) copies of "Shop Drawings" to the Department for approval, including a list of the equipment he proposes to furnish, together with descriptive literature, capacities, manufacturer's names, approximate delivery date and any other pertinent facts concerning the various items. The submittal shall consist of a tabulation of all items included, followed by catalog and data sheets, wiring diagrams, etc., all bound in one (1) folder.

Wherever the substituted equipment, actually furnished under these Specifications, require the use of larger or more connections, or if they are different arrangement than those shown on Plans or specified under these Specifications, such additional or larger connections shall be installed to the complete satisfaction of the Department without added cost to the Department.

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SECTION B - PLUMBING

GENERAL CONDITIONS

The General Conditions for Mechanical and Electrical Work and any other pertinent documents issued by the Department shall apply to all work in this Section whether attached hereto or not.

EXTENT OF WORK

The work under this Section includes all labor and materials required for the installation of complete refrigerant and drain piping.

LAYING OUT WORK

Contractor shall carefully lay out his own work on the premises and make proper provisions for the work of other contractors. Offsets shall be made wherever it is necessary to clear finished rooms, structural members or other obstructions, with no additional costs.

LOCATION OF OUTLETS

The location of all pipe, outlets, appliances, etc., shown on the Plans is approximate only and understood to be subject to such revisions as may be found necessary or desirable at the time the work is installed.

LABOR

All labor shall be performed in the best and most workmanlike manner by mechanics skilled in their respective trades. The standards of work required throughout shall be of such grade as will bring results of the first class only. Mechanics whose work is unsatisfactory to the Department are considered by the Department to be unskilled or otherwise objectionable shall be instantly dismissed from the work upon notice from the Department.

MANUFACTURER'S DIRECTIONS

All manufactured articles, material and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturers, unless herein specified to the contrary.

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PRECEDENCE

The mechanical piping and equipment, consisting of all heating, plumbing and ventilation shall have precedence over the various wiring systems.

TRANSPORTATION, SCAFFOLDING, ETC.

Contractor shall furnish all necessary scaffolding, tackle, tools and appurtenances of all kinds, and all labor required for the safe and expeditious execution of the Contract.

UNIONS

- A. All union connections on piping 2" and smaller in diameter shall be ground joint brass union, having brass taper seat and both screw ends hexagonal and shall be designed for a steam working pressure up to 125 pounds.
- B. All union connections on similar piping 2-1/2" and larger in diameter shall be made with cast iron gasket type flange unions.

VALVES

- A. All valves shall have the name or trademark of the manufacturer and the guaranteed working pressure cast or stamped on the body. Adapters shall be provided for all valves on copper lines.
- B. All stop valves used on this work, unless otherwise specified or required, shall be of the gate pattern, suitable for steam working pressure up to 125 pounds.
- C. Gate valves 2" and smaller shall be made of the best brass of screwed pattern of the solid wedge type, double seat, non-rising stem, with gland stuffing box and iron wheel, Crane No. 438, or approved equivalent. Gate valves 2-1/2" and larger shall be iron body, brass trimmed, flanged ends and otherwise of same type as smaller valves, Crane No. 461, or approved equivalent.
- D. Globe valves 2" and smaller shall be made of the best grade brass, screwed pattern, removal disc suitable for the fluid to be controlled, with gland stuffing box and iron wheel, Crane No. 7, or approved equivalents. Globe valves 2-1/2" and larger shall be iron body, brass trimmed, flanged ends and otherwise same type as smaller valves, Crane No. 359, or approved equivalents.

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- E. Check valves 2" and smaller shall be made of the best grade brass, screwed pattern, swing check, Crane No. 34 for hot water and Crane No. 34-1/2 for cold water, or approved equivalents. Check valves 2-1/2" and larger shall be iron body and brass trimmed, flanged ends, swing check, Crane No. 373 for hot water and Crane No. 373 with leather faced disc for cold water, or approved equivalents.

SOIL, WASTE, VENT, SANITARY AND DRAINAGE PIPING

- A. Waste arms for lavatories and urinals shall be DWV copper with cast brass adapters and wrought copper fittings. All soil, roof drainage, waste and vent piping inside of building shall be standard weight cast iron soil pipe and fittings. All cast iron soil pipe and fittings shall be coated inside and outside with coal tar varnish and shall conform to the ASTM "Standard Specifications for Cast Iron Soil Pipe and Fittings".
- B. Soil, waste, drain and vent piping must be of sizes noted and run as indicated on the Plans and shall be given a uniform grade of 1/4" per foot wherever possible, but in no case less than 1/8" per foot unless otherwise noted. Each riser extending through the roof shall project 10" above roof line and shall be thoroughly flashed. Where so shown, connect vents below roof.

CLEANOUTS

- A. Cleanouts shall be provided at the ends and at points in change of direction of all drain, soil and waste pipes and branches thereof, at the foot of each riser, at all offsets, in all horizontal runs at approximately 50 foot intervals, and at other points where indicated on the Plans, or where required.
- B. All cleanouts in connection with cast iron pipe, except the traps and fittings on horizontal branches, shall have tapped "Y" fittings of same size as pipe up to 4", and 4" for all larger pipe, closed with screw plugs. All other cleanouts in connection with cast iron pipe, except those that occur in finished floors and walls, shall have heavy cast iron ferrules same size as pipe up to 4", and 4" for all larger pipe, caulked into hub, and closed with a screw plug.
- C. All cleanouts in finished floors shall be as scheduled on the Plans, or approved equivalent, with membrane anchorage pan and clamping collar, scoriated nickel-bronze access cover and adjustable frame. Cleanout plug shall be straight threaded with tapered shoulder that seals against caulked seat in body.
- D. All cleanouts on exterior piping of building shall be brought within 6" of grades in unpaved areas and flush with paving in other areas, with countersunk nut.

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SECTION C - DUCTS

- A. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip galvanized coating.
 - 1. Galvanized Coating Designation: **G60**
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- B. Stainless Steel: ASTM A 480/A 480M, [**Type 316**] [**Type 304**], with a No. 2D finish for concealed ducts and No. 4 finish for exposed ducts.
- C. Fibrous-Glass Duct Board: Comply with UL 181, Class 1, **1-inch- (25-mm-)** thick, fibrous glass with fire-resistant, reinforced foil-scrim-kraft barrier, and having the air-side surface treated to prevent erosion.
- D. Joint and Seam Tape, and Sealant: Comply with UL 181A.
- E. Rectangular Metal Duct Fabrication: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- F. Fibrous-Glass Duct Fabrication: Comply with SMACNA's "Fibrous Glass Duct Construction Standard."
- G. Fibrous-Glass Liner: Comply with NFPA 90A or NFPA 90B and with NAIMA AH124.
 - 1. Thickness: **1 inch**
 - 2. Airstream surface coated with an antimicrobial erosion-resistant coating.
 - 3. Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
 - 4. Mechanical Fasteners: Galvanized steel suitable for adhesive attachment, mechanical attachment, or welding attachment.

ACCESSORIES

- A. Volume Dampers and Control Dampers: Single-blade and multiple opposed-blade dampers, standard leakage rating, and suitable for horizontal or vertical applications; factory fabricated and complete with required hardware and accessories.
- B. Fire Dampers: Rated and labeled according to UL 555 by an NRTL; factory fabricated and complete with required hardware and accessories.

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C. Ceiling Fire Dampers: Labeled according to UL 555C by an NRTL and complying with construction details for tested floor- and roof-ceiling assemblies as indicated in UL's "Fire

FINALLY

It is the intention that this Section shall provide a complete installation except as herein before specifically excepted. All accessory construction and apparatus necessary or advantageous in the operation and testing of the work shall be included. The omission of specific reference to any part of the work necessary for such complete installation shall not be interpreted as relieving this Contractor from furnishing and installing such parts.

GENERAL

All materials and workmanship, which are a part of this Contract, shall be warranted against defects and imperfections for a period of one (1) year from date of acceptance by the Arkansas State Highway and Transportation Department.

METHOD OF MEASUREMENT

District 3 Headquarters Administration Office HVAC Renovations (Hope) complete and in place, as indicated on the Plans, as called for in these Specifications, or as directed by the Engineer and accepted, will be measured for payment by the "Lump Sum".

BASIS OF PAYMENT

Work completed and accepted and measured as provided above, will be paid for at the lump sum price bid for " District 3 Headquarters Administration Office HVAC Renovations (Hope) ", which shall be full compensation for all materials, labor, tools, equipment, machinery, drayage, rigging, fees, permits, clean-up, guarantees and any and all incidental items required to complete the work.

PAY ITEM

PAY UNIT

District 3 Headquarters Administration Renovations (Hope)

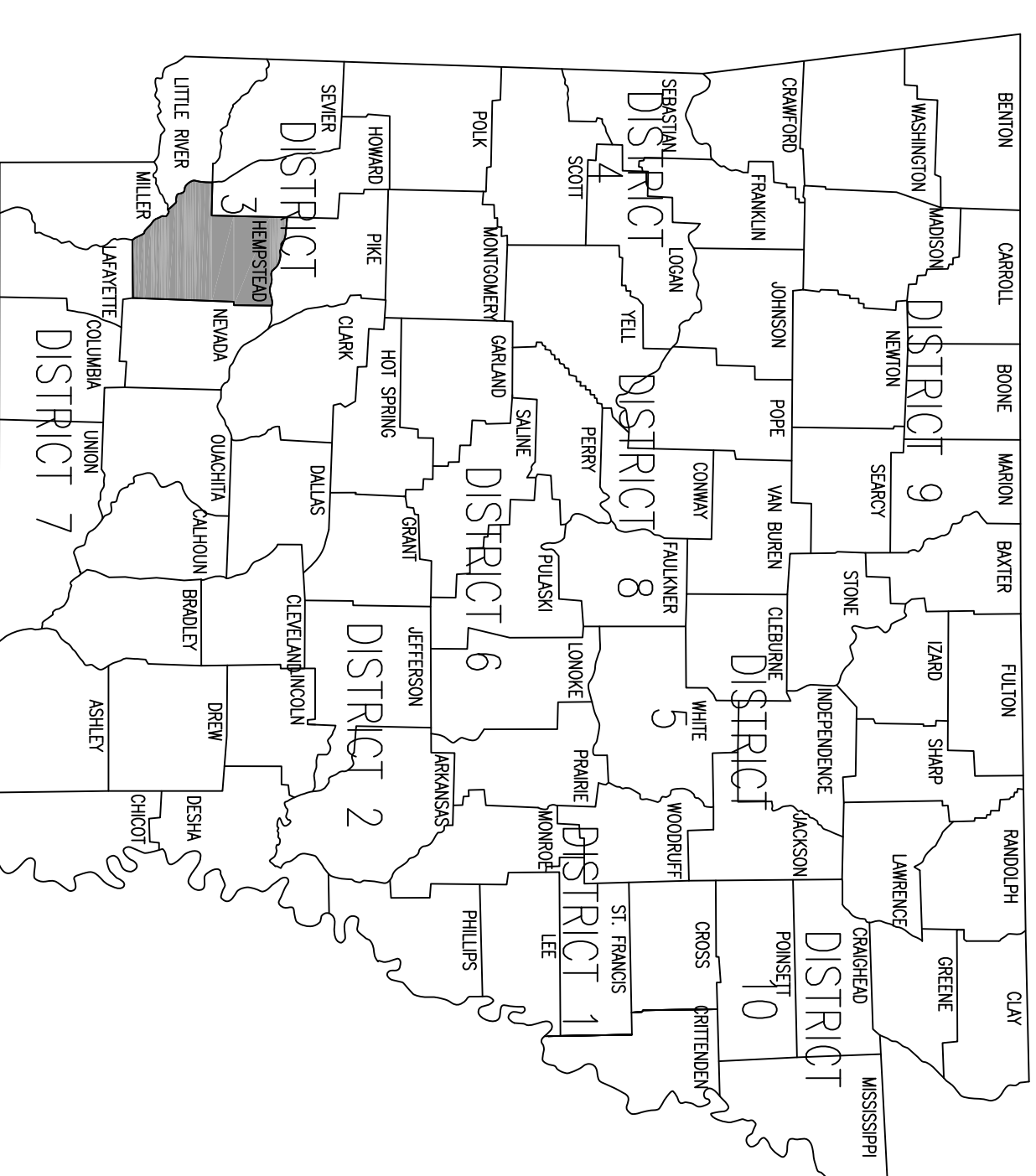
Lump Sum

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

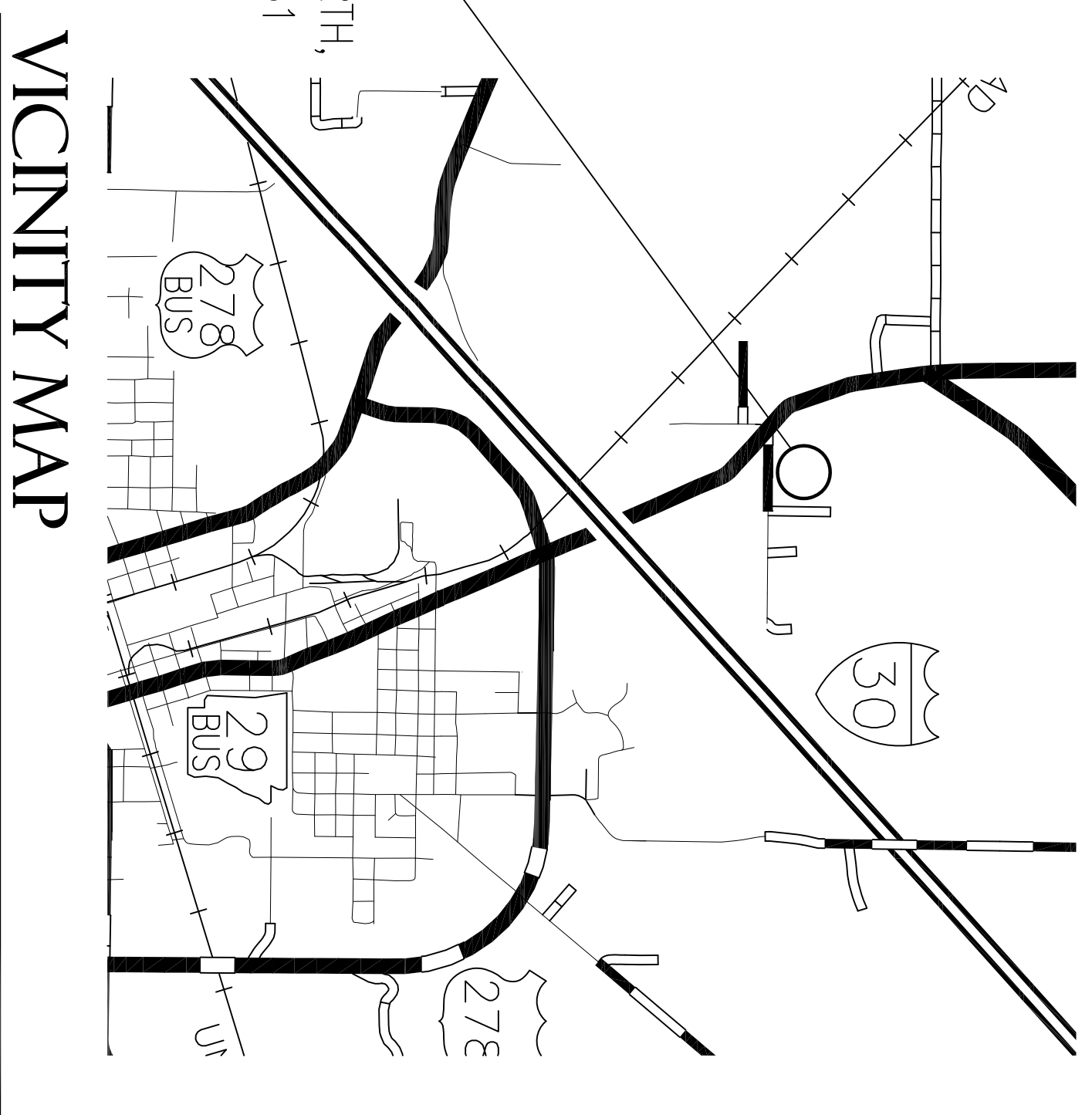
CONSTRUCTION PLANS FOR:

**DISTRICT 3 HEADQUARTERS
ADMINISTRATION
OFFICE HVAC REPLACEMENT
HOPE, ARKANSAS
HEMPSTEAD COUNTY**

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PROJECT LOCATION
911 ADDRESS:
2911 HIGHWAY 29 NORTH,
INTERSTATE 30 EXIT #31
HOPE, AR 71802



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- G1.1 TITLE PAGE
- M1.1 HVAC FLOOR PLAN AREA ONE
- M1.2 HVAC FLOOR PLAN AREA TWO,
EQUIPMENT SCHEDULE AND LEGENDS

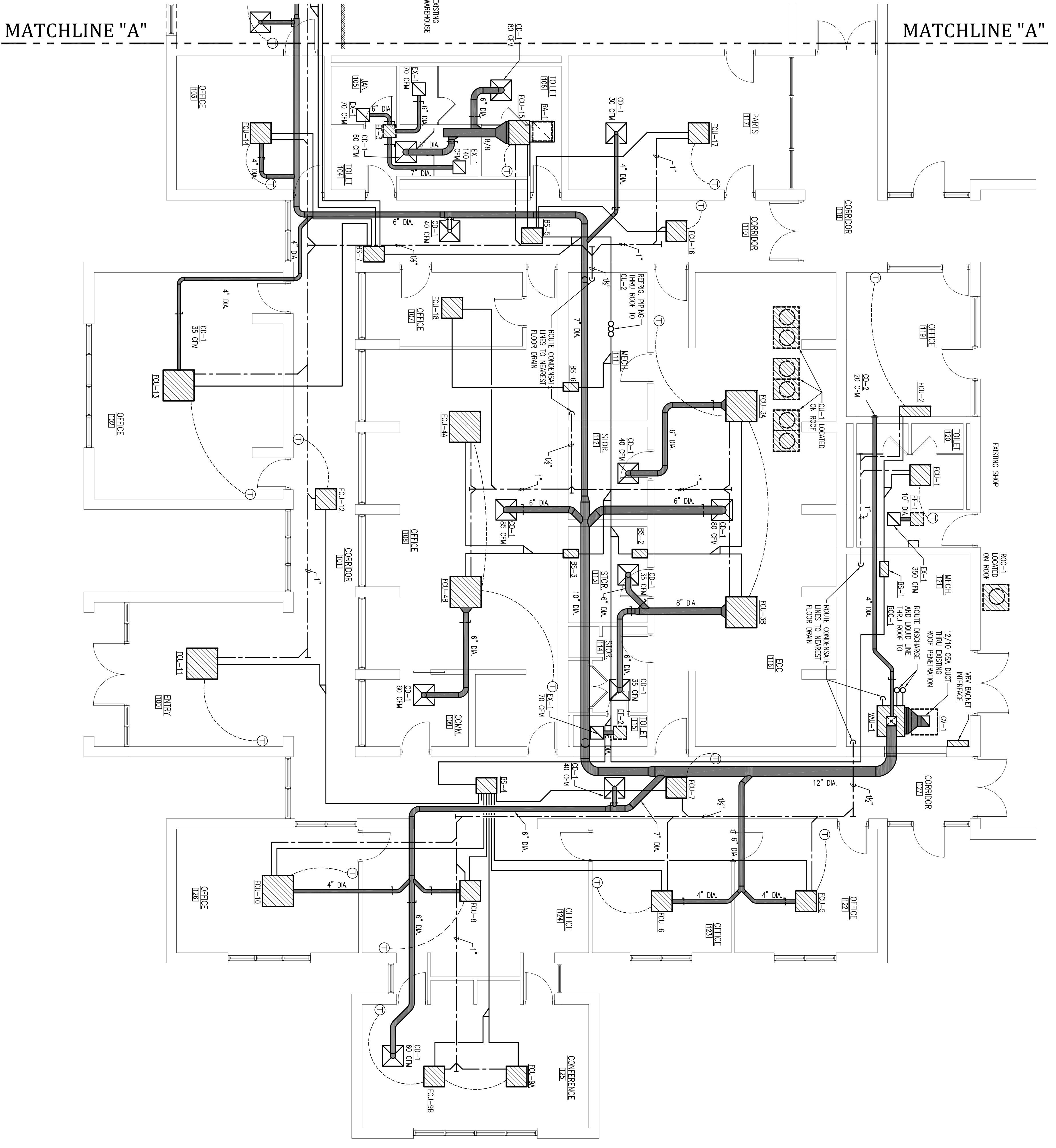


**DISTRICT 3 HEADQUARTERS
ADMINISTRATION
OFFICE RENOVATIONS**
Hope, Arkansas
Hempstead County



DATE: NOV. 10, 2016
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DRAWN BY: KB
REVISIONS:

G1.1
1 OF 3



1 HVAC PLAN AREA ONE
 MILL SCALE: 3/8" = 1'-0"



**DISTRICT 3 HEADQUARTERS
 ADMINISTRATION
 OFFICE RENOVATIONS**
 Hope, Arkansas
 Hepmstead County

DATE: NOV. 10, 2016
 JOB NO.: 3-39
 DRAWN BY: KB
 REVISIONS:



**DISTRICT 3 HEADQUARTERS
ADMINISTRATION
OFFICE RENOVATIONS**
Hope, Arkansas
Hepmstead County

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DRAWN BY: KB
REVISIONS:

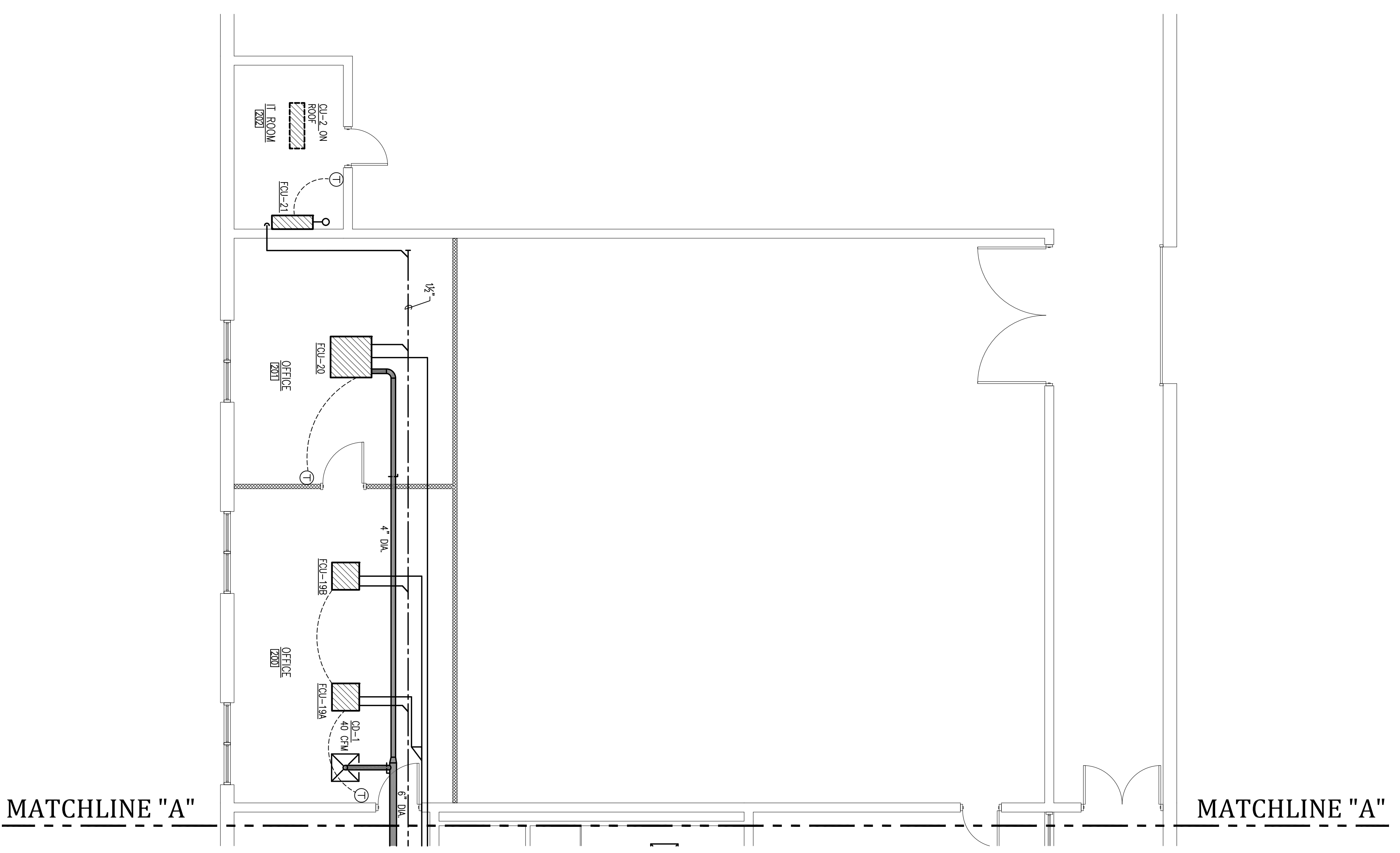
M1.2
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MECHANICAL EQUIPMENT SCHEDULE

MARK	MANUFACTURER	MODEL	REMARKS
EQ-1	DAKIN	RQ24618TON, *RQ101818TON, *RQ101441TON, *RQ101441TON	PROVIDE ENTIRE SYSTEM WITH FACTORY 10 YEAR PARTS INCLUDING COMPRESSOR WARRANTY, HEAT RECOVERY, AND BRACKET INTERFACE
EQ-2	DAKIN	RK120MMU19	PROVIDE LOW AMBIENT WIND BATTLE
ROE-1	ABOVE AIR TECHNOLOGIES	XP1	HEAD PRESSURE CONTROL
VAL-1	ABOVE AIR TECHNOLOGIES	WE	100% CO2 AIR WITH DIGITAL COMPRESSOR, SUPPLY FAN VFD, AND BRACKET INTERFACE
EQ-1	DAKIN	FZ2007MMU19	PROVIDE WIRED WALL CONTROLLER
EQ-2	DAKIN	PK40187DU	PROVIDE WIRED WALL CONTROLLER AND CONDENSATE PUMP
EQ-3A	DAKIN	FK3207DU	PROVIDE WIRED WALL CONTROLLER AND KOP2558B0/150 BRANCH DUCT CONNECTOR
EQ-3B	DAKIN	FK3207DU	PROVIDE KOP2558B0/150 BRANCH DUCT CONNECTOR
EQ-4A	DAKIN	FK32187DU	PROVIDE WIRED WALL CONTROLLER AND KOP2558B0/150 BRANCH DUCT CONNECTOR
EQ-4B	DAKIN	FK32187DU	PROVIDE KOP2558B0/150 BRANCH DUCT CONNECTOR
EQ-5	DAKIN	FZ2019MMU19	PROVIDE WIRED WALL CONTROLLER AND KOP255816B02 FRESH AIR DUCT CONNECTION 20 CFM
EQ-6	DAKIN	FZ2019MMU19	PROVIDE WIRED WALL CONTROLLER AND KOP255816B02 FRESH AIR DUCT CONNECTION 20 CFM
EQ-7	DAKIN	FZ2019MMU19	PROVIDE WIRED WALL CONTROLLER
EQ-8	DAKIN	FZ2019MMU19	PROVIDE WIRED WALL CONTROLLER AND KOP255816B02 FRESH AIR DUCT CONNECTION 30 CFM
EQ-9A	DAKIN	FZ2019MMU19	PROVIDE WIRED WALL CONTROLLER
EQ-9B	DAKIN	FZ2019MMU19	PROVIDE WIRED WALL CONTROLLER
EQ-10	DAKIN	FK2424DU	PROVIDE WIRED WALL CONTROLLER
EQ-11	DAKIN	FK2424DU	PROVIDE WIRED WALL CONTROLLER
EQ-12	DAKIN	FZ2019MMU19	PROVIDE WIRED WALL CONTROLLER
EQ-13	DAKIN	FK24287DU	PROVIDE WIRED WALL CONTROLLER
EQ-14	DAKIN	FZ2019MMU19	PROVIDE WIRED WALL CONTROLLER AND KOP255816B02 FRESH AIR DUCT CONNECTION 30 CFM
EQ-15	DAKIN	FK0207MMU19	PROVIDE WIRED WALL CONTROLLER
EQ-16	DAKIN	FZ2019MMU19	PROVIDE WIRED WALL CONTROLLER
EQ-17	DAKIN	FZ2019MMU19	PROVIDE WIRED WALL CONTROLLER
EQ-18	DAKIN	FZ2007MMU19	PROVIDE WIRED WALL CONTROLLER
EQ-19A	DAKIN	FZ2019MMU19	PROVIDE WIRED WALL CONTROLLER
EQ-19B	DAKIN	FZ2019MMU19	PROVIDE WIRED WALL CONTROLLER
EQ-20	DAKIN	FK2424DU	PROVIDE WIRED WALL CONTROLLER
EQ-21	DAKIN	FK1012MMU19	PROVIDE WIRED WALL CONTROLLER AND BGS INTERLOCK
BS-1	DAKIN	BS0319VU	SINGLE PORT BRANCH SELECTOR, PROVIDE RETRIG. SERVICE VALVES AT PIPING INLET
BS-2	DAKIN	BS0607VU	SINGLE PORT BRANCH SELECTOR, PROVIDE RETRIG. SERVICE VALVES AT PIPING INLET
BS-3	DAKIN	BS0319VU	SINGLE PORT BRANCH SELECTOR, PROVIDE RETRIG. SERVICE VALVES AT PIPING INLET
BS-4	DAKIN	BS0547VU	FOUR PORT BRANCH SELECTOR, PROVIDE RETRIG. SERVICE VALVES AT PIPING INLET
BS-5	DAKIN	BS10547VU	FOUR PORT BRANCH SELECTOR, PROVIDE RETRIG. SERVICE VALVES AT PIPING INLET
BS-6	DAKIN	BS0319VU	SINGLE PORT BRANCH SELECTOR, PROVIDE RETRIG. SERVICE VALVES AT PIPING INLET
BS-7	DAKIN	BS40547VU	FOUR PORT BRANCH SELECTOR, PROVIDE RETRIG. SERVICE VALVES AT PIPING INLET
FE-1	GREENHECK	G-085-D	REUSE EXISTING ROOF CURB PROVIDE CURB ADAPTER AS REQUIRED
FE-2	GREENHECK	G-097-B	REUSE EXISTING ROOF CURB PROVIDE CURB ADAPTER AS REQUIRED
FE-3	GREENHECK	G-080-D	REUSE EXISTING ROOF CURB PROVIDE CURB ADAPTER AS REQUIRED
EQ-1	GREENHECK	WH	REUSE EXISTING ROOF CURB PROVIDE CURB ADAPTER AS REQUIRED
EQ-1	PRICE	SD	
BA-1	PRICE	BOFF	
EX-1	PRICE	80	

PIPING LEGEND

SYMBOL	DESCRIPTION
---	REFRIGERANT PIPING
---	CONDENSATE PIPING



1 HVAC PLAN AREA TWO
SCALE : 3/8" = 1'-0"

MATCHLINE "A"

MATCHLINE "A"