



COUNTY OF ROANOKE

FINANCE DEPARTMENT

PURCHASING DIVISION

Kari Sutphin, Buyer
5204 Bernard Drive, Suite 300F
Roanoke, VA 24018
Phone: (540) 283-8151
Fax: (540) 283-6736
ksutphin@roanokecountyva.gov

February 6, 2018

INVITATION FOR BID

#2018-068

Chiller Replacement at Roanoke County
Administration Building

Sealed Bids Due:

March 9, 2018
2:00 PM
(Local Prevailing Time)
One (1) unbound original
Three (3) complete copies
One electronic copy (USB preferred)

There will be a mandatory pre-bid meeting held on Thursday February 22, 2018 at 10:00 a.m. The meeting will be held at Roanoke County Administration Building, 5204 Bernard Dr, Roanoke, VA 24018. PLEASE NOTE THAT ATTENDANCE FOR THIS PRE-BID MEETING IS MANDATORY. ONLY BIDS RECEIVED FROM ATTENDEES OF THIS MEETING WILL BE CONSIDERED.

**IFB # 2018-068 CHILLER REPLACEMENT at ROANOKE COUNTY
ADMINISTRATION BUILDING**

GENERAL INFORMATION

The County of Roanoke, Virginia, is requesting sealed bids from qualified companies to replace the existing water-cooled chiller at the Roanoke County Administration Building. The County of Roanoke invites any qualified Bidder to respond to this IFB by submitting a Bid for such work, service, and/or items consistent with the terms and conditions herein set forth.

PRE-BID MEETING

There will be a mandatory pre-bid meeting held on Thursday February 22, 2018 at 10:00 a.m. The meeting will be held at Roanoke County Administration Building, 5204 Bernard Dr, Roanoke, VA 24018. PLEASE NOTE THAT ATTENDANCE FOR THIS PRE-BID MEETING IS MANDATORY. ONLY BIDS RECEIVED FROM ATTENDEES OF THIS MEETING WILL BE CONSIDERED.

SCOPE OF WORK:

The Scope of Work includes demolition and removal of the existing water-cooled chiller. All work necessary to remove existing and install new chiller should be considered part of this project.

Temporary cooling to the building is required and to be considered part of the scope for this project. Location of temporary chiller will be determined once bid option is confirmed.

PHASING:

No phasing is expected. However, chilled water must be provided to the building during normal working hours. During times of tie-ins of new to existing systems, coordination must be established with General Services prior to stopping the chilled water system.

SPECIFICATIONS:

PLEASE SEE ATTACHMENT B FOR ALL SPECIFICATIONS

ALTERNATES:

Bid option to provide an air-cooled chilled water system as described in Attachment B.

SCHEDULE:

Final Completion of installation should be within 60 days after chiller is delivered to successful bidder. Depending on which option is selected, preliminary work could begin within 2 weeks after NOTICE TO PROCEED.

CONTRACTOR USE OF FACILITIES:

Contractor parking will be in the rear of the parking lot at the Administration Center. Any other parking needs, including unloading of material should be coordinated with General Services.

The County will provide limited staging and material storage. All staging, storage and delivery needs shall be coordinated with, submitted to and approved by the County. The Contractor shall, on a daily basis, keep the premises and surrounding area free from accumulation of materials and debris. All work areas must be cleaned up prior to beginning work on the following work area. All work areas must be cleaned up prior to the end of the work shift. Temporary restrooms should be provided by the winning bidder and maintained in proper manner.

INSTRUCTIONS TO BIDDERS

A. GENERAL

1. The intent of the drawings and specifications is that the Successful Bidder shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the work in accordance with the Contract Documents and all incidental work necessary to complete the project in an acceptable manner, ready for use, occupancy or operation by the County of Roanoke (County).
2. Any item that is shown on the plans but not mentioned in the specifications, or mentioned in the specifications but not shown on the plans, shall be considered as being both shown on the plans and mentioned in the specifications.
3. The entire work provided for in the specifications and shown on the plans is to be accomplished even though every item and minor detail for the proper installation and successful operation of the entire work is not mentioned in the specifications or shown on the plans.
4. The cost of any item whatsoever not listed in the Bid Form, yet, which is mentioned in the specifications or shown on the plans, shall be considered to be included in the cost of some other item of Bid in the Bid Form.
5. "Contract Documents" shall include the Invitation to Bid, the Instructions to Bidders, the Bid Form, the Contract Forms, the Bonds, the General and Special Conditions, the Technical Specifications, any Addenda or Change Orders, any Detailed Drawings and the Construction Plans.
6. Should there be any questions concerning the Invitation for Bid, the prospective Bidder shall bring the same to the attention of the County in writing. Should the prospective Bidder fail to do so before submitting a bid, the Bidder shall accept the resolution of any question provided by the County.
7. Any permits obtained by the County or Successful Bidder shall be made part of and attached to the Contract Documents.

8. The Successful Bidder is responsible for compliance with all Federal, State, and local laws, ordinances, and licenses required for this project.

B. QUALIFICATIONS OF BIDDERS

1. The County of Roanoke may conduct an investigation, as it deems necessary, to determine the ability of the Bidder to perform the work in accordance with the time schedule included in the Invitation for Bid, and, if such an investigation is performed, the Bidder shall furnish the County all information and data requested by the County. The County reserves the right to reject any bid if the evidence submitted by, or the investigation of, such Bidder fails to satisfy the County that such Bidder is properly qualified to carry out the obligation of the Invitation for Bid and to complete the work contemplated therein in accordance with established completion schedule.
2. Bidders shall, when requested by the County, be prepared to furnish, in writing, the following information within three (3) working days after receipt of such request:
 - a. The permanent business address of the Bidder.
 - b. Whether the Bidder has plant and equipment adequate to perform the work properly and expeditiously, and if so, a list of the plant and equipment available for this work.
 - c. Whether the Bidder has appropriate technical experience, and if so, a description of the projects which Bidder has carried out, together with the names and addresses of the engineers in charge of the work. A financial statement, under oath, showing the assets, obligations and net worth of the Bidder, and the name of banking connections, said statement to be current to the month within which the bid was submitted.

C. INTERPRETATION OF INVITATION FOR BID

All questions concerning the meaning or intent of this Invitation for Bid shall be submitted in writing to the County in care of Kari Sutphin, Buyer. Replies will be issued by addenda mailed or delivered to all parties recorded by the buyer on record as having received the Invitation for Bid. Questions received less than five (5) days prior to the date for opening of the Bids will not be answered. Only questions answered by formal written addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

D. ADDENDA

Addenda will be mailed or delivered to all who are known by the Purchasing Division to have received a copy of the Invitation for Bid.

E. PREPARATION OF BIDS

1. Each Bidder is urged to examine carefully the Invitation for Bid for the work. The County of Roanoke will assume that the Bidder has considered the character, quality, and quantities of work to be performed, the materials to be furnished and the requirements of the Invitation for Bid. The submission of a Bid shall be

considered evidence that the Bidder has made such examination.

2. Bids must be submitted upon the blank Bid Form provided in the Invitation for Bid. Except as may be otherwise noted, the blank spaces in the Bid Form must be filled in and no changes shall be made in the phraseology of the Bid Form.
3. A Bid Form that contains any omissions, erasures, alterations, items not called for or irregularities of any kind, at the discretion of Roanoke County, may be rejected as informal.
4. The Bid Form shall specify the Base Bid, written with ink or typed in both words and figures, for which the work will be performed according to the Invitation for Bid. In the event of discrepancy between the two expressed Base Bids, the word amount shall govern. Any unit prices for separate items or any Additives as called for in the Bid Form shall be written with ink or typed in figures in the appropriate blanks.

F. Each Bidder shall comply with all applicable Roanoke County Ordinances and State of Virginia Laws. Each Bidder is required, under Chapter 7 of the Virginia Code of 1950, as amended, to show evidence of a Certificate of Registration before a Bid can be received and considered. Each Bidder will place Bidder's State Registration Number in the appropriate blank on the Bid Form.

G. **SUBMISSION OF BIDS**

1. The Bid Form, the Bid Security, and any other Document required to be submitted as the Bid shall be enclosed in a sealed envelope and addressed as follows:

County of Roanoke Purchasing Division
c/o Kari Sutphin
5204 Bernard Drive SW, Suite 300F
Roanoke VA 24018-0798

Place in the lower left-hand corner of the envelope the project title and solicitation number as indicated at the top of the Invitation for Bid. Place in the upper left-hand corner of the envelope the Bidder's name and mailing address.

2. The Bidder is responsible for the timely delivery at the location designated for receipt of Bids.
3. Bids shall be delivered to the designated location prior to the time and date for receipt of Bids indicated in the Invitation for Bid. Bids received after that time and date will be returned unopened.
4. Each Bid must be accompanied by a Bid Security in an amount equal to five percent (5%) of the Base Bid. The Bid Security shall be in the form of Cash, Letter of Credit issued by a Banking Institution, Certified Check or Bid Bond payable to the County of Roanoke. The Bid Bonds shall be duly executed by the Bidder as Principal and a Corporate Surety authorized to do business in the State of Virginia.

H. WITHDRAWAL OF BIDS

1. Bids may be withdrawn at any time prior to the time and date of the Opening of Bids.
2. After the opening of the Bids, Bidders may only withdraw Bids that were substantially lower than other Bids because of clerical error. The Bidder must give to the County of Roanoke notice in writing of Bidder's request to withdraw the Bid within two (2) business days after the conclusion of the Opening of Bids.

I. OPENING OF BIDS

1. No responsibility will be attached to the County of Roanoke for the premature opening of Bids not properly addressed and identified, as stipulated in Paragraph F (1).
2. Bids will be opened and read aloud at the time, date and place stipulated in the Invitation for Bid and the contents made public for the information of the Bidders and other interested persons.

J. REJECTION OF BIDS

1. The County of Roanoke reserves the right to waive any informalities in the Bids and to reject any or all Bids, should it be deemed in the best interest of the County of Roanoke.
2. Reasonable grounds for believing that any Bidder is interested in more than one Bid for the same Contract shall cause the rejection of all Bids in which that Bidder is interested.
3. The Bid security will be promptly returned to all Bidders of rejected bids after the County of Roanoke and the Accepted Bidder have executed the Contract.
4. Should no award or written "Notice of Bid Acceptance" be made by the County of Roanoke within ninety (90) consecutive calendar days after the Opening of Bids, the Bidder may obtain the Bid Security from the Purchasing Division.
5. The County reserves the right to negotiate with the low bidder if the low bidder is greater than the budget for the project.

K. ACCEPTANCE OF BIDS

1. The County of Roanoke reserves the right to accept additives in any order or combination or to award the Contract to a Bidder other than the low Bidder, should it be deemed in the best interest of the County of Roanoke.
2. Within ninety (90) consecutive calendar days after the Bid Opening date, the County of Roanoke may give written "Notice of Award." The successful Bidder shall be required to execute the Contract and furnish the County of Roanoke a Performance Bond and a Labor and Material Payment Bond each in the amount of One Hundred percent (100%) of the Contract amount, all of which shall be completed on blank forms provided in the Contract Documents, with a surety on each Bond provided by

a Security Company authorized to transact business in the State of Virginia. Attorneys-in-fact who execute Contract Bonds must file with each bond a certified copy of their Power of Attorney dated the same date as the Bonds are executed. (See General & Supplemental General Conditions, Section 22 & 29 – Attachment A to this IFB).

3. Within ten (10) consecutive calendar days from the receipt of written notice from the Roanoke County Purchasing Office, the successful Bidder shall execute the Contract with and furnish to the County of Roanoke the required bonds.
4. Upon the execution of the Contract and approval of the Bonds, the Bid Security shall be returned to the successful Bidder. Should the successful Bidder fail or refuse to execute the Contract or furnish the required Bonds within the stipulated time, the Bid Security shall be forfeited to the County of Roanoke as liquidated damages.
5. Work shall commence only upon the receipt of a written "Notice to Proceed" from the County. The consecutive calendar days for completion shall start from the date stipulated in the written "Notice to Proceed."
6. The Successful Bidder shall be required to furnish a schedule for the timely completion of the project prior to beginning work and from time to time during construction submit on the same schedule the actual work completed. For projects exceeding 90 days the Contractor shall furnish a cost loaded Critical Path Method (CPM) schedule. The schedule shall be updated monthly.

L. EVALUATION OF BIDS

To determine the lowest responsive and responsible Bidder with respect to this Bid, the following factors, among such others as will protect and preserve the interest of the County may be considered:

- Company background, staffing and experience: The character, integrity, reputation, judgment, experience and efficiency of the Bidder.
- The quality of performance of previous contracts, products and/or services.
- Company financial status: The sufficiency of the financial resources and the ability of the Bidder to perform the contract.
- Bid Submission completeness and compliance with the specifications.
- The ability, capacity and skill of the Bidder to perform or provide the service.
- The ability of the Bidder to provide future maintenance and/or service.
- Price
- The previous and existing compliance by the Bidder with laws and policies relating to the contract.
- The quality, availability and adaptability of the goods and services.
- The ability of the Bidder to respond promptly to problems and concerns.

TIME OF PERFORMANCE

The Successful Bidder shall start performance of any resultant Contract as fixed by a notice to proceed given by the County to the Successful Bidder and fully and completely

perform the Contract within sixty (60) consecutive calendar days after such date, all in accordance with the Contract provisions.

SUBMISSION OF THE BID

One (1) original, three (3) complete copies and, one (1) electronic copy (USB preferred), of the sealed bid will be received at and until **2:00 p.m. (local prevailing time), on March 9, 2018**, only in the Roanoke County Purchasing Office at 5204 Bernard Drive, Suite 300-F, Roanoke VA 24018, at which time they will be opened and publicly read aloud. Any response received after that time and/or date will be returned to the bidder unopened. Your response and pricing should be submitted in a sealed envelope/package, clearly marked as follows **"IFB # 2018-068 CHILLER REPLACEMENT at ROANOKE COUNTY ADMINISTRATION BUILDING"**. Once bids are received, a committee will review the responses.

As this is a formal request for bid, no faxed bid will be accepted. Once an award has been made, all bids will become public information. If your bid contains proprietary information, please list that information on the Notice of Proprietary Information section contained in this bid document.

GENERAL TERMS, CONDITIONS, AND INSTRUCTIONS –IFB (Revised Jan/2014)

READ CAREFULLY - FAILURE TO COMPLY WITH EACH AND EVERY PROVISION OF THIS INVITATION AND THE SPECIFICATIONS ARE GROUNDS TO DISQUALIFY A BIDDER

Wherever the term Roanoke County, County or Roanoke County Board of Supervisors is used, it is understood to include the Roanoke County School Board, in addition, any contract awarded from this solicitation may be used by Roanoke County Public Schools and any other public entity for which the County of Roanoke acts as a fiscal or purchasing agent.

Individuals with disabilities, who require assistance or special arrangements in order to participate in bidding, please contact (540) 772-2061. We require that you provide at least 48 hour notice so that reasonable efforts may be made to provide the proper arrangements. You may be requested to specify the nature of any accommodations or assistance, which may be required for your participation.

SUBMISSION AND RECEIPT OF BIDS:

- (a) To be considered, all bids must be delivered in a sealed envelope, clearly marked with the words "BID DOCUMENTS", bid number and the name of the item being bid and received in the Roanoke County Finance Department/Purchasing Division no later than the specified date and time for the bid opening. Failure to timely submit such bid shall disqualify the Bidder and such bid will be returned to the Bidder unopened. NO FAXED BIDS WILL BE ACCEPTED.
- (b) Unless otherwise specified, Bidders must use the invitation for bid form furnished by the County. Failure to do so shall be grounds for rejection of the bid.
- (c) Bids having any erasures or corrections must be initialed in ink by the Bidder. An

authorized officer of the company must sign bids in ink. Such authorization shall be a part of the bid document. All bids must either be typewritten or printed in ink.

(d) The original copy of the bid must not be permanently bound and one (1) electronic copy is preferred.

ADDENDUMS, BIDS, RFPs, TABULATIONS AND NOTICES OF AWARD:

All vendors interested in notifications for bids, proposals, addendums, bid tabulations, and awards must sign up in "**Notify Me**" on our website at

www.RoanokeCountyVA.gov/purchasing. This system requires only an email and/or phone number for text messages (if your phone is capable) and your choice of commodity/service categories.

Although **Notify Me** will be the only way to receive automatic notification, all BIDS/RFP Information will continue to be posted on our website and can be picked up at the Purchasing Division, 5204 Bernard Drive, Suite 300F, Roanoke, VA 24018. Phone # (540) 772-2061, Ext. 311.

PRICES TO BE FIRM:

The Bidder warrants, by virtue of bidding, that the prices, terms and conditions quoted in his bid will be firm for a period of 60 days from the date of the bid opening.

NET 30 (excluding prepayment discounts) after receipt of invoice. Price should include shipping.

DELIVERY POINT:

Unless otherwise indicated, all items shall be delivered F.O.B. with destination and delivery charges included in the bid price. F.O.B. destination is interpreted to mean unloading and placing in the building or area as directed by the County.

CASH DISCOUNTS:

In determining the award of a bid, cash discounts for prompt payment may be considered. Discount time period computation shall commence from and after complete delivery, in satisfactory condition, and receipt of a properly documented invoice.

QUALITY:

All materials used for the manufacture or construction of any supplies, materials, or equipment covered by this bid shall be of the best quality available.

ACCEPTANCE OF MATERIAL:

Until such time as all the conditions in the contract are fulfilled, the County reserves the right to refuse and return material, at the seller's expense.

WARRANTY/RETURNS:
Clearly specify your warranty of product and handling of returns, including turnaround time on faulty equipment. Warranties and other technical data are to be included.

DELIVERY:

Time is of the essence for delivery of any items, products or service procured as a result of this bid. If delivery is not made at the time specified on the Invitation for Bid form, the County reserves the right to call in any and all bonds or other security given for

performance, to cancel the order, or any part thereof, without obligation, to declare the seller in default, and to disqualify the seller from bidding on future County contracts.

DEFAULT PROVISION:

In case of default by the Contractor, the County shall have the sole discretion to procure the articles or services from other sources. The defaulting Contractor shall be liable for any and all costs in excess of the contract price occasioned by or resulting from such default whether directly or indirectly, which sums may be paid or credited from any forfeited bond or other security.

PRICING:

In the event of discrepancy between the total pricing and unit prices, the County in its sole discretion, shall determine the bid price.

Negotiation with lowest responsible Bidder: The County of Roanoke reserves the right to negotiate with the lowest responsible Bidder if the low bid exceeds available funds. This provision will be used in accordance with County Code Chapter 17 (Ord. No. 3350, S2-30, 12-14-82). State Code 2.2.4318.

COPYRIGHTS OR PATENT RIGHTS:

The Bidder warrants that there have been no violations of copyrights or patent rights in the manufacture, production or sale of the goods shipped or ordered as a result of this bid. The Bidder agrees that the County of Roanoke shall be indemnified and held harmless from any and all liability or expense occasioned by any such violations.

FEES INCLUDED IN BID PRICE:

Submitted bids shall include in the price, the cost of any Business and/or Professional licenses, permits or fees as required by law.

TAX EXEMPTION:

The County of Roanoke is exempt from any taxes imposed by State and/or Federal Government. Upon notification, the County will furnish a certificate of tax exemption.

CERTIFICATION AND ABILITY:

The County of Roanoke reserves the right to request from the Bidder, a separate manufacturer's certification of all statements made in the bid. The County may request any or all Bidders to furnish proof of experience, ability and financial standing.

SIGNED BID CONSIDERED AN OFFER:

THIS INVITATION FOR BID MUST BE SIGNED AS HEREIN PROVIDED. Submission of this signed invitation shall be considered an offer by the Bidder or Contractor to sell the items or services as required in the specifications. All bids are subject to approval by the County Board of Supervisors. In the case of default by the Bidder or Contractor after acceptance of a bid, the County of Roanoke may take such action, as it deems appropriate, including forfeiture of any and all bonds or other security and legal action for damages or specific performance.

NO BID:

To insure that your name remains on our bid listing, should you desire not to bid on a

particular project, return the completed bid package marked with the words "NO BID". Failure to return to the County a bid or "NO BID" may cause your name to be removed from our listing.

COMPLIANCE WITH LAWS:

The Bidder is responsible for compliance with all Local, State and/or Federal laws and regulations. The County of Roanoke shall be held harmless from anyliability.

AUTHORITY TO TRANSACT BUSINESS IN VIRGINIA:

A Contractor organized as a stock or non-stock corporation, limited liability company, business trust, or limited partnership or registered as a registered limited liability partnership shall be authorized to transact business in the Commonwealth as a domestic or foreign business entity if so required by Title 13.1 or Title 50 of the Code of Virginia or as otherwise required by law. Any business entity described herein that enters into a Contract with the County pursuant to the Virginia Public Procurement Act 2.2-4300 et seq. shall not allow its existence to lapse or its certificate of authority or registration to transact business in the Commonwealth, if so required under Title 13.1 or Title 50 of the Code of Virginia, to be revoked or cancelled at any time during the term of the Contract. The County may void any Contract with a business entity if the business entity fails to remain in compliance with the provisions of this section. All corporations, LLC's and LLP's shall be registered with the State Corporation Commission. To determine whether your firm should register, please contact the SCC.

By my signature on this solicitation, I certify compliance with federal, state, and local laws and regulations applicable to the performance of the services described herein.

ACCEPTANCE OR REJECTION OF BIDS:

The County of Roanoke reserves the right to accept or reject any or all bids/offers. The County also reserves the right to award the contract for any such materials, goods or services the County deems will best serve its interests. It further reserves the right to award the contract on a split order basis, lump sum or individual basis, or such combinations as shall best serve the interest of the County. Roanoke County reserves the right to make a site visit to the facility prior to bid award.

RULING LAW:

This invitation for bid and any contract executed pursuant hereto of which this invitation shall be an internal part shall be governed, controlled and interpreted in accordance with the laws of the Commonwealth of Virginia without reference to its conflict of law principles. Each party to such contract shall thereby submit to the exclusive jurisdiction of the Circuit Court of the County of Roanoke or, in the event that jurisdiction is authorized, to the United States District Court for the Western District of Virginia, sitting at Roanoke, Virginia.

NONDISCRIMINATION PROVISIONS:

During the performance of this contract, the Contractor will not discriminate against any employee or applicant for employment because of age, race, religion, color, sex or national origin, except where religion, sex or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants

for employment, notices setting forth the provisions of this nondiscrimination clause. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

Questions should be directed to:

Kari Sutphin, Buyer
5204 Bernard Dr., SW, Suite 300F
Roanoke VA 24018
Telephone: 540-283-8151
Fax: 540-283-6736
Email: ksutphin@roanokecountyva.gov

Contact by a vendor of any other Roanoke County personnel regarding this IFB 2018-068 may be grounds for disqualification from participation in the bidding process.

SPECIAL INSTRUCTIONS:

ANTITRUST:

By entering into a contract, the Bidder conveys, sells, assigns, and transfers to Roanoke County all rights, title, and interest in and to all causes of the action it may now or hereafter acquire under the antitrust laws of the United States and the Commonwealth of Virginia, relating to the particular goods or services purchased or acquired by Roanoke County under said contract.

ASSIGNMENT OF CONTRACT:

A contract shall not be assignable by the Contractor in whole or in part without the written consent of Roanoke County.

AVAILABILITY OF FUNDS:

It is understood and agreed between the parties herein that Roanoke County shall be bound hereunder only to the extent of the funds available or which may hereafter become available for the purpose of this contract.

ANTI-COLLUSION CERTIFICATION:

By my signature on the face of this bid, I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm or person submitting a bid for the same materials, supplies, equipment, or services, and is in all respects fair and without collusion or fraud. I understand collusive bidding is a violation of the Virginia Governmental Frauds Act and Federal Law and can result in fines, prison sentences, and civil damage awards. I agree to abide by all conditions of this bid and certify that I am authorized to sign this bid for the Bidder.

KICKBACKS:

I certify and warrant that by my signature on this solicitation, neither I nor the Bidder for whom I am authorized to act has offered or received any kickback from any other Bidder, supplier, manufacturer, or Subcontractor in connection with bid on this contract, Subcontractor in order, in the form of any payment, loan, subscription, advance, deposit of money, services or anything, present or promised, unless consideration of substantially equal or greater value is exchanged. Further, no person shall demand or receive any

payment, loan, subscription, advance, deposit of money, service, or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value is exchanged.

DEBARMENT:

By my signature on this solicitation, I certify that this person/firm/corporation is not currently barred from bidding on contracts by any agency of the Commonwealth of Virginia or the federal government of the United States of America, nor is this person/firm/corporation a part of any firm/corporation that is currently barred from bidding on contracts by any agency of the Commonwealth of Virginia or the federal government of the United States of America. I have attached an explanation of the previous debarment(s) and copies of notice(s) of reinstatement(s).

The County cannot legally agree to any clause indemnifying the Contractor from any damages arising out of the contract or holding the Contractor harmless. The submission of a bid or proposal means that the Contractor agrees not to request such language in the resulting contract.

CONTRACT:

Any contract resulting from his bid shall consist of the following documents: the General Terms and Conditions and the Specifications, both of which are contained in the Invitation for Bid, together with the Bidders response, which consists of this document, the Price Schedule and other bid documents attached hereto or submitted with this document.

DRUG-FREE WORKPLACE:

During the performance of this contract, the Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in violation of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each Subcontractor or Vendor.

For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a Contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

DATA ON CONVICTIONS FOR CERTAIN CRIMES AND CHILD ABUSE AND NEGLECT:

The contractor certifies that none of the persons who will provide services on school property or requiring direct contact with students has been convicted of any of the following felony or misdemeanor offenses: felony sex or violence offenses, other felony offenses or misdemeanor sex offenses within the past ten years.

The contractor further understands and acknowledges (1) that if he makes a materially false statement regarding any of the above offenses, he will be guilty of a Class 1

misdemeanor and may forfeit profits derived from the contract. Further, the contractor understands and acknowledges that before any person is permitted to provide such services subsequent to this certification, he must complete a new certification regarding such person in a form satisfactory to the School Board.

JOB SITE APPEARANCE:

The Contractor expressly undertakes, either directly or through its subcontractor(s), to clean up frequently all refuse, rubbish, scrap material, and debris caused by its operations, to the end that at all times the jobsite shall present a neat, orderly, and workmanlike appearance. No such refuse, rubbish, scrap material, and debris shall be left within the completed Work nor buried on site, but shall be properly protected and removed from the site and properly disposed of in a licensed landfill or otherwise as required by law or otherwise required by the Contract.

PROTECTION ON SITE:

The Contractor expressly undertakes, both directly and through its subcontractor, to take every reasonable precaution at all times for the protection of all persons and property which may come on the jobsite or be affected by the Contractor's operation in connection with the Work.

SAFETY AND HEALTH PRECAUTIONS:

The Contractor shall be solely responsible for initiating, maintaining, and supervising all safety and health precautions and programs in connection with the Work, including but not limited to provision of appropriate sanitation facilities, if applicable.

PROTECTING THE WORK AND ADJACENT PROPERTY:

The Contractor shall continuously maintain adequate protection of all its work from damage and shall protect the County's property and the property where the Work is being done from injury or loss arising in connection with any resultant Contract. The Contractor shall adequately protect adjacent property to prevent any damage to it or its loss of use. Contractor shall provide and maintain all passageways, guard fences, lights, and other facilities for protection required by any public authority, local conditions, any of the Contract Documents, or erected for the fulfillment of its obligations for the protection of persons and property.

DAMAGE TO THE WORK:

The Contractor shall have charge of and be solely responsible for the entire Work and be liable for all damages to the Work including, but not limited to any property in the vicinity of the Work, until Contractor completes the Work and it is approved and accepted by the County.

DAMAGE TO EXISTING STRUCTURES:

Damage caused by Contractor or its subcontractors to concrete curbs, gutters, sidewalks, or any existing facility, structure, or building that may occur during the Work shall be repaired or replaced by the Contractor, at its sole expense, as directed by and to the satisfaction of the County.

DEFECTIVE WORK:

The Contractor agrees it shall repair or replace, at Contractor's sole expense, and to the satisfaction of the County, any work, material, equipment, or part that is found, by the County, to be defective and/or not in accordance with any resultant Contract.

CORRECTION OF DEFECTS:

If the Contractor, after notice, fails to proceed promptly to correct any defects or defective Work, the County may have the defects or defective Work corrected by the County or another entity and the Contractor shall be liable for all costs and expenses incurred in doing so.

PROPRIETARY INFORMATION:

Ownership of all data, materials, and documentation originated and prepared for the County of Roanoke pursuant to the INVITATION FOR BID shall belong exclusively to the County and be subject to public inspection in accordance with the Virginia Freedom of Information Act. Trade secrets or proprietary information submitted by a Bidder shall not be subject to public disclosure under the Virginia Freedom of Information Act; however, the Bidder must invoke the protections of Section 2.2-4342F of the Code of Virginia, in writing, either before or at the time the data or other material is submitted.

The Bidder must specifically identify the data or materials to be protected and state the reasons why protection is necessary on the "Notice of Proprietary Information Form" below. In addition, the proprietary or trade secret material submitted must be identified by some distinct method such as highlighting or underlining in the Bid and must indicate only the specific words, figures, or paragraphs that constitute trade secret or proprietary information.

The classification of an entire bid document, line item prices, and/or total bid prices as proprietary or trade secrets is not acceptable and may result in rejection of the bid.

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK.

NOTICE OF PROPRIETARY INFORMATION FORM
IFB # 2018-068 CHILLER REPLACEMENT at ROANOKE
COUNTY ADMINISTRATION BUILDING

Confidentiality References Protection in Accordance with the Code of Virginia, Section 2.2-4342

Section Title	Page Number	Reason(s) for Withholding from Disclosure

INSTRUCTIONS: Identify the data or other materials to be protected and state the reasons by using the codes listed below. Indicate the specific words, figures, or paragraphs that constitute trade secrets or proprietary materials. The classification of an entire bid or proposal document, line item prices, and/or total bid or proposal prices as proprietary or trade secret is not acceptable and will result in rejection of the bid or proposal.

- A) This page contains information relating to "trade secrets", and "proprietary information" including processes. Operations, style of work, or apparatus. Identify confidential statistical data. Amount or source of any income...of any person (or) partnership. See Virginia Public Procurement Act. Section 2.2-4342. Unauthorized disclosure of such information would violate the Trade Secrets Act 18 U.S.C. 1905.
- B) This page contains proprietary information including confidential, commercial or financial information, which was provided to the Government on a voluntary basis and is of the type that would not customarily release to the public. See Virginia Public Procurement Act, Section 2.2-4342; 5 U.S.C. 552 (b) (4); 12 C.F.R. 309.5(c) (4).
- C) This page contains proprietary information including confidential, commercial or financial information. The disclosure of such information would cause substantial harm to competitive position and impair the Government's ability to obtain necessary information from Contractors in the future. 5 U.S.C. See Virginia Public Procurement Act. Section 2.2-4342; 552 (b) (4); 12 C.F.R. 309.5(c) (4).

BID FORM
IFB # 2018-068 CHILLER REPLACEMENT at ROANOKE
COUNTY ADMINISTRATION BUILDING

NOTE: All pages of the Bid Form are to be included in the completed bid. Also, Bids containing any conditions, omissions, unexplained erasures, alterations or items not called for in the Bid, or irregularities of any kind, may be rejected by the County as being non-responsive. No changes are to be made to the Bid Form. Any changes to a bid must be initialed by the authorized person signing the Bid Form.

The undersigned hereby proposes and agrees, if this bid is accepted by the County of Roanoke, to enter into a Contract with the County of Roanoke, Virginia for a chiller replacement located at the Roanoke County Administration Building for this Invitation for Bid # 2018-068.

Base Bid in accordance with the specifications listed in IFB #2018-068:

DOLLARS (\$)

Bid Option in accordance with the specifications listed in IFB #2018-068:

DOLLARS (\$)

SIGNATURE PAGE
IFB # 2018-068 CHILLER REPLACEMENT at ROANOKE
COUNTY ADMINISTRATION BUILDING

The County of Roanoke invites qualified Bidders to submit a bid. The County will review each bid and may elect to issue separate awards to the lowest responsive and responsible Bidders for such items on a per site basis or any combination thereof that might be in the best interest of the County. A Bidder may submit a bid for one or more or all locations listed on the Bid Form. The County of Roanoke invites any qualified Bidder to respond to this IFB by submitting a Bid for such work, service, and/or items consistent with the terms and conditions herein set forth. My signature certifies that the bid as submitted complies with all Terms and Conditions as set forth in IFB # 2018-068.

My signature also certifies that the accompanying bid is not the result of, or affected by, any unlawful act of collusion with another person or company engaged in the same line of business or commerce, or any act of fraud punishable under Title 18.2, Chapter 12, Article 1.1 of the *Code of Virginia*, 1950 as amended. Furthermore, I understand that fraud and unlawful collusion are crimes under the Virginia Governmental Frauds Act, the Virginia Government Bid Rigging Act, and Virginia Antitrust Act and Federal Law, and can result in fines, prison sentences, and civil damage awards.

My signature also certifies that this firm has no business or personal relationships with any other companies or persons that could be considered as a conflict of interest or potential conflict of interest to the County of Roanoke, and that there are no principals, officers, agents, employees, or representatives of this firm that have any business or personal relationships with any other companies or persons that could be considered as a conflict of interest or a potential conflict of interest to the County of Roanoke, pertaining to any and all work or services to be performed as a result of this request and any resulting contract with the County of Roanoke.

I hereby certify that I am authorized to sign as a Representative for the Firm:

Firm Name _____

Address _____

FEIN _____ PHONE _____

FAX _____ EMAIL _____

VA Contractor License # (if applicable) _____

State Corporation Commission# _____

Roanoke County Business License# _____

Authorized Signature _____

Name/Title (please type or print) _____

ATTACHMENT A TO
IFB # 2018-068 CHILLER REPLACEMENT at ROANOKE
COUNTY ADMINISTRATION BUILDING

GENERAL & SUPPLEMENTAL GENERAL CONDITIONS

1. Definitions.....	GC-20
2. Additional Instructions and Detail Drawings	GC-21
3. Schedules, Reports, and Records	GC-22
4. Drawings and Specifications.....	GC-22
5. Shop Drawings.....	GC-22
6. Materials, Services, and Facilities	GC-23
7. Inspection and Testing.....	GC-23
8. Substitutions.....	GC-24
9. Patents	GC-24
10. Surveys, Permits, Regulations.....	GC-25
11. Protection of Work, Property, Persons	GC-25
12. Supervision by Contractor.....	GC-26
13. Changes in the Work	GC-26
14. Changes in Contract Price.....	GC-26
15. Time for Completion and Liquidated Damages	GC-27
16. Correction of Work	GC-27
17. Subsurface Conditions.....	GC-27
18. Suspension of Work, Termination and Delay.....	GC-28
19. Payments to Contractor.....	GC-29
20. Acceptance of Final Payment as Release.....	GC-30
21. Insurance	GC-30
22. Contract Security.....	GC-32
23. Assignments	GC-32
24. Indemnification	GC-32
25. Separate Contracts	GC-32
26. Subcontracting	GC-33
27. Engineer's Authority	GC-33
28. Land and Right-of-Ways	GC-34
29. Guaranty.....	GC-34
30. Taxes	GC-34
31. Clean Up on Completion of Project	GC-34
32. Work Hours	GC-34
33. Project Identification Signboard	GC-34
34. Supplemental Conditions	GC-34
35. Nondiscrimination Provisions.....	GC-35
36. Immigration and Control Act of 1986.....	GC-35

GENERAL CONDITIONS

1. DEFINITIONS

- 1.1 Wherever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicate which shall be applicable to both the singular and plural thereof:
- 1.2 ADDENDA - Written or graphic instruments issued prior to the execution of the Agreement, which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS, and SPECIFICATIONS, by additions, clarifications or corrections.
- 1.3 BID - The offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed.
- 1.4 BIDDER - Any person, firm, or corporation submitting a BID for the WORK.
- 1.5 BONDS - Bid, Performance, and Payment Bonds and other instruments of security, furnished by the CONTRACTOR and his surety in accordance with the CONTRACT DOCUMENTS.
- 1.6 CHANGE ORDER - A written order to the CONTRACTOR authorizing an addition, deletion, or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.
- 1.7 CONTRACT DOCUMENTS - The contract, including Advertisement for Bids, Information for Bidders, General Conditions, Supplemental General Conditions, BID, Technical Specifications and Special Conditions, Bid Bond, Agreement, Payment Bond, Performance Bond, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, and ADDENDA.
- 1.8 CONTRACT PRICE - The total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.
- 1.9 CONTRACT TIME - The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.
- 1.10 CONTRACTOR - The persons, firm, or corporation with whom the OWNER has executed the Agreement.
- 1.11 DRAWINGS - The part of the CONTRACT DOCUMENTS, which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.
- 1.12 ENGINEER - The Roanoke County Engineer or person, firm, or corporation designated by the OWNER to supervise the WORK and/or administer the CONTRACT DOCUMENTS.
- 1.13 FIELD ORDER - A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the ENGINEER to the CONTRACTOR during construction.
- 1.14 FINAL COMPLETION - The date as certified by the ENGINEER that the WORK has been completed in accordance with the CONTRACT DOCUMENTS and that final payment can be made. FINAL COMPLETIONS includes: 1) submission of Operation & Maintenance Manuals and 2) Record Documents and 3) completion of all punch list items.
- 1.15 NOTICE OF AWARD - The written notice of the acceptance of the BID from the OWNER to the successful BIDDER.

1.16 **NOTICE TO PROCEED** - Written communication issued by the OWNER or authorized agent to the CONTRACTOR authorizing the Contractor to proceed with the WORK and establishing the date of commencement of the WORK.

1.17 **OWNER** - The Board of County Supervisors for Roanoke County, Virginia, or their authorized agent.

1.18 **PROJECT** - The undertaking to be performed as provided in the CONTRACT DOCUMENTS.

1.19 **RESIDENT PROJECT REPRESENTATIVE** - The authorized representative of the OWNER who is assigned to the project site or any part thereof.

1.20 **SHOP DRAWINGS** - All drawings, diagrams, illustrations, brochures, schedules, and other data, which are prepared by the CONTRACTOR, a SUBCONTRACTOR, manufacturer, SUPPLIER, or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.

1.21 **SPECIFICATIONS** - A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

1.22 **SUBCONTRACTOR** - An individual, firm, or corporation having a direct contract with the CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.

1.23 **SUBSTANTIAL COMPLETION** - That date as certified by the ENGINEER when the construction of the PROJECT or a specified part thereof is sufficiently completed, in accordance with the CONTRACT DOCUMENTS, so that the PROJECT or specified part can be utilized for the purposes for which it is intended. SUBSTANTIAL COMPLETION includes: 1) a Certificate of Occupancy from the Building Official / Authority Having Jurisdiction, 2) delivery of extra stock materials, 3) OWNER training & demonstrations, 4) submittal of CONTRACTOR's internal punch list with identification of incomplete items.

1.24 **SUPPLEMENTAL GENERAL CONDITIONS** - Modifications to General Conditions required for the PROJECT, or such requirements that may be imposed by applicable state laws, or required to clarify or amplify the General Conditions.

1.25 **SUPPLIER** - Any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.

1.26 **WORK** - All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated or to be incorporated in the PROJECT.

1.27 **WRITTEN NOTICE** - Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at their last given address, or delivered in person to said party or their authorized representative on the Project. Email notification is an acceptable form of WRITTEN NOTICE.

2. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

2.1 The CONTRACTOR may be furnished additional instructions and detail drawings, by the ENGINEER, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

2.2 The additional drawings and instruction thus supplied will become a part of the CONTRACT DOCUMENTS. CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

3. SCHEDULES, REPORTS, AND RECORDS

- 3.1 The CONTRACTOR shall submit to the OWNER such schedule of quantities and costs, progress schedule, payrolls, reports, estimates, records, and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.
- 3.2 Prior to beginning work the CONTRACTOR shall submit a construction progress schedules showing the order in which the CONTRACTOR proposes to carry out the WORK, including dates at which the CONTRACTOR will start the various parts of the WORK, estimated date of completion of each part, and, as applicable:
 - 3.2.1 The dates at which special detail drawings will be required; and
 - 3.2.2 Respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.
 - 3.2.3 For projects exceeding 90 days the CONTRACTOR shall submit a cost loaded Critical Path Method (CPM) schedule. The cost loaded CPM schedule shall be updated and submitted on a monthly basis in conjunction with the CONTRACTOR's payment applications.
- 3.3 CONTRACTOR shall also submit a schedule of payments anticipated to be earned during course of WORK.

4. DRAWINGS AND SPECIFICATIONS

- 4.1 The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by the OWNER.
- 4.2 In case of conflict between DRAWINGS and SPECIFICATIONS, the most stringent shall govern. Figure dimensions on DRAWINGS shall govern over scale dimensions, and detailed DRAWINGS shall govern over general DRAWINGS.
- 4.3 Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to the ENGINEER, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after his discovery of such discrepancies, inconsistencies, or ambiguities shall be done at the CONTRACTOR'S risk.

5. SHOP DRAWINGS

- 5.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER shall promptly review all SHOP DRAWINGS. The ENGINEER'S approval of any SHOP DRAWING shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS. The approval of any SHOP DRAWING which substantially deviates from the requirement of the CONTRACT DOCUMENTS shall be evidenced by a CHANGE ORDER. SHOP DRAWINGS, catalog cuts, samples, schedules, etc. shall be submitted for all materials and equipment. On initial submittals, three copies of each item shall be required. Once the review is complete and all corrections made, five copies of the final SHOP DRAWINGS shall be submitted for approval and distribution to all parties. Electronic copies of SHOP DRAWINGS is acceptable and preferred.

- 5.2 When submitted for the ENGINEER'S REVIEW, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked, and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.
- 5.3 Portions of the WORK requiring a SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been approved by the ENGINEER. A copy of each approved SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.

6. MATERIALS, SERVICES, AND FACILITIES

- 6.1 It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time.
- 6.2 Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located so as to facilitate prompt inspection. All equipment, including but not limited to motors, drives, gear reducers, electrical switch gear, heating, ventilation and air conditioning equipment, communication and instrumentation shall be stored in a secure, heated, ventilated and dry space. Storage must be approved by the ENGINEER. The ENGINEER'S approval of the storage plan shall not release the CONTRACTOR from responsibility for the equipment. Equipment that is not suitably stored shall not be paid for until storage requirements are met. The CONTRACTOR shall be required to comply with the manufacturers' requirements concerning lubrication, oil changes, and other special conditions during the storage period and until the equipment is installed, start-up of the equipment is instituted, and the equipment is finally accepted or determined as substantially completed.
- 6.3 Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.
- 6.4 Materials, supplies, and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ENGINEER.
- 6.5 Materials, supplies, or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.
- 6.6 Materials, supplies, or equipment to be included into the WORK shall be new and unused.

7. INSPECTION AND TESTING

- 7.1 All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.
- 7.2 The OWNER shall provide all inspection and testing services not required by the CONTRACT DOCUMENTS. The CONTRACTOR shall notify the OWNER of the work schedule planned in order that adequate inspection can be made. No work may be performed in any day on which it was not scheduled. A minimum of 12 hours' notice of change in work schedule must be given to OWNER by CONTRACTOR. If CONTRACTOR does not work on a scheduled day, the CONTRACTOR will be charged the cost incurred by the OWNER for the lost work of the inspector.
- 7.3 The CONTRACTOR shall provide at his expense the testing and inspection services required by the CONTRACT DOCUMENTS.

- 7.4 If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction require any WORK to specifically be inspected, tested, or approved by someone other than the CONTRACTOR, the CONTRACTOR will give the ENGINEER timely notice of readiness.
- 7.5 Inspections, tests, or approvals by the ENGINEER or others shall not relieve the CONTRACTOR from his obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.
- 7.6 The ENGINEER and other OWNER representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all WORK, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The CONTRACTOR will provide facilities for such access and observation of the WORK and also for any inspection, or testing thereof.
- 7.7 If any WORK is covered contrary to the written instructions of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for observation and replaced at the CONTRACTOR'S expense.
- 7.8 If the ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request, will uncover, expose, or otherwise make available for observation, inspection, or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such WORK is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction. If, however, such WORK is not found to be defective, the CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, and reconstruction and an appropriate CHANGE ORDER shall be issued.

8. SUBSTITUTIONS

- 8.1 Whenever a material, article, or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue number, it shall be understood that the first brand name listed in the SPECIFICATIONS is that around which the DRAWINGS have been prepared. Should the second or another brand name be utilized in preparing the BID, the CONTRACTOR shall be responsible for assuring that the costs of all changes, including costs of changes to the CONTRACT DOCUMENTS, required by such use are also included in the BID. The CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue cut, if piece of equipment is of equal substance and function to that specified, the ENGINEER may approve its substitution and use by the CONTRACTOR. Any cost differential shall be deductible from the CONTRACT PRICE and the CONTRACT DOCUMENTS shall be appropriately modified by CHANGE ORDER. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.
- 8.2 The ENGINEER and OWNER shall have final authority in reviewing and determining if any proposed substitution is an acceptable equal product.

9. PATENTS

- 9.1 The CONTRACTOR shall pay all applicable royalties and license fees. The CONTRACTOR

shall defend all suits or claims for infringement of patent rights and save the OWNER harmless from loss on account thereof, except that the OWNER shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified, however, if the CONTRACTOR has reason to believe that the design, process, or product specified is an infringement of a patent, CONTRACTOR shall be responsible for such loss unless CONTRACTOR promptly gives such information to the ENGINEER.

10. SURVEYS, PERMITS, REGULATIONS

- 10.1 The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pile locations, and other working points, lines, elevations, and cutsheets.
- 10.2 The CONTRACTOR shall carefully preserve benchmarks, reference points, and stakes; and, in case of willful or careless destruction, CONTRACTOR shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.
- 10.3 Permits and licenses for the prosecution of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the SUPPLEMENTAL GENERAL CONDITIONS. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules, and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS are at variance therewith, CONTRACTOR shall promptly notify the ENGINEER in writing, and any necessary changes shall be adjusted as provided in Section 13, CHANGES IN THE WORK.

11. PROTECTION OF WORK, PROPERTY, AND PERSONS

- 11.1 The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR will take all necessary precautions for the safety of, and will protect the persons who may be affected thereby, protect all the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and protect other property at the site adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.
- 11.2 The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction. The CONTRACTOR will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. The CONTRACTOR will notify owners of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR will remedy all damage, injury, or loss to any property caused, directly or indirectly, in whole or in part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of the OWNER or the ENGINEER or anyone employed by either or them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.
- 11.3 In emergencies affecting safety of persons or the WORK or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER or OWNER, shall act to prevent threatened damage, injury, or loss. CONTRACTOR will give OWNER prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and a CHANGE ORDER shall thereupon be issued covering the changes and deviations involved.

12. SUPERVISION BY CONTRACTOR

12.1 CONTRACTOR shall supervise and direct the WORK. CONTRACTOR shall be solely responsible for means, methods, techniques, sequences, and procedures of construction. CONTRACTOR shall employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated in writing by CONTRACTOR as CONTRACTOR'S representative at the site. Supervisor shall have full authority to act on behalf of CONTRACTOR and all communications given to the supervisor shall be as binding as if given to CONTRACTOR. Supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

13. CHANGES IN THE WORK

13.1 The OWNER may at any time, as the need arises, order changes within the scope of the WORK without invalidating the Agreement. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGEORDER.

13.2 The ENGINEER, also, may at any time, by issuing a FIELD ORDER, make changes in the details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ENGINEER unless the CONTRACTOR believes that such FIELD ORDER entitles him to a change in CONTRACT PRICE or TIME or both, in which event he shall give the ENGINEER WRITTEN NOTICE thereof within seven (7) days after the receipt of the ordered change. Thereafter, the CONTRACTOR shall document the basis for the change in CONTRACT PRICE or TIME within thirty (30) days. The CONTRACTOR shall not execute such changes pending the receipt of an executed CHANGE ORDER or further instruction from the OWNER.

14. CHANGES IN CONTRACT PRICE

14.1 The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any WORK covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

14.1.1 Unit prices previously approved. Under this method, it is understood that addition to or deletion of quantities of WORK in excess of 25 percent may be cause for review of the agreed unit price.

14.1.2 An agreed lump sum. For the negotiation of the agreed lump sum amount, the CONTRACTOR shall furnish the ENGINEER a breakdown of all labor, materials, supplies, and equipment utilizing the costing principles described under 14.1.3.

14.1.3 The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the WORK. In addition, there shall be added an amount to be agreed upon but not to exceed 15 percent of the actual cost of the WORK to cover the cost of general conditions, overhead and profit. To amplify the items described under 14.1.3, labor shall include the crew foreman but not supervisory, office, or administrative personnel, labor costs shall include taxes, insurance, and actual fringe benefits paid; and, rental rates for equipment owned by the CONTRACTOR shall not exceed 75 percent of Associated Equipment Distributors book rental monthly rates. To costs incurred by SUBCONTRACTORS for changes in the WORK, there shall be an added amount not to exceed 10 percent of the subcontract to cover the cost of general conditions, overhead and profit.

14.2 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

The date of beginning and the time for completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a dated specified in the NOTICE TO PROCEED.

- 14.3 The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.
- 14.4 If the CONTRACTOR shall fail to complete the WORK within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR will pay to the OWNER the amount of \$200.00 per day for liquidated damages as specified in the BID for each calendar day that the CONTRACTOR shall be in default after the time stipulated in the CONTRACT DOCUMENTS.
- 14.5 The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following, and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER or ENGINEER.
 - 14.5.1 To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather.
 - 14.5.2 To any delays of SUBCONTRACTORS occasioned by any of the causes specified in paragraphs 15.4.1 and 15.4.2 of this article.

15. CORRECTION OF WORK

- 15.1 The CONTRACTOR shall promptly remove from the premises all WORK rejected by the ENGINEER for failure to comply with the CONTRACT DOCUMENTS, whether incorporated in the construction or not, and the CONTRACTOR shall promptly replace and re-execute the WORK in accordance with the CONTRACT DOCUMENTS and without expense to the OWNER and shall bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.
- 15.2 All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the OWNER may remove such WORK and store the materials at the expense of the CONTRACTOR.

16. SUBSURFACE CONDITIONS

- 16.1 The CONTRACTOR shall promptly, and before such conditions are disturbed, except in the event of any emergency, notify the OWNER by WRITTEN NOTICE of:
 - 16.1.1 Subsurface or latent physical conditions at the site differing materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the CONTRACT DOCUMENTS.
 - 16.1.2 Unknown physical conditions at the site, of unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the CONTRACT DOCUMENTS.

16.2 The OWNER shall promptly investigate the conditions, and if the OWNER finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the WORK, an equitable adjustment shall be made and the CONTRACT DOCUMENTS shall be modified by a CHANGE ORDER. Any claim of the CONTRACTOR for adjustment hereunder shall not be allowed unless he has given the required WRITTEN NOTICE; provided that the OWNER may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

17. SUSPENSION OF WORK, TERMINATION AND DELAY

17.1 The OWNER may suspend the WORK or any portion thereof for a period of not more than ninety (90) days or such further time as agreed upon by the CONTRACTOR, by WRITTEN NOTICE to the CONTRACTOR and the ENGINEER which notice shall fix the date on which WORK shall be resumed. The CONTRACTOR will resume that WORK on the date so fixed. The CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to any suspension.

17.2 If the CONTRACTOR is adjudged a bankrupt or insolvent; or if the CONTRACTOR makes a general assignment for the benefit of CONTRACTOR'S creditors; or if a trustee or receiver is appointed for the CONTRACTOR or for any of the CONTRACTOR'S property; or if the CONTRACTOR'S files a petition to take advantage of any debtor's act; or to reorganize under the bankruptcy or applicable laws; or if the CONTRACTOR repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment; or if the CONTRACTOR repeatedly fails to make prompt payments to SUBCONTRACTORS or for labor, materials, or equipment; or if the CONTRACTOR disregards laws, ordinances, rules, regulations, or orders of any public body having jurisdiction of the WORK; or if the CONTRACTOR disregards the authority of the ENGINEER; or if the CONTRACTOR otherwise violates any provision of the CONTRACT DOCUMENTS, then the OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and his surety a minimum of ten (10) days from delivery of a WRITTEN NOTICE, terminate the services of the CONTRACTOR and take possession of the PROJECT and of all materials, equipment, tools, construction equipment, and machinery thereon owned by the CONTRACTOR, and finish the WORK by whatever method the OWNER may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the CONTRACT PRICE exceeds the direct and indirect costs of completing the PROJECT, including compensation for additional professional services, such excess SHALL BE PAID TO THE CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR will pay the difference to the OWNER. Such costs incurred by the OWNER will be determined by the ENGINEER and incorporated in a CHANGE ORDER.

17.3 Where the CONTRACTOR'S services have been so terminated by the OWNER, said termination shall not affect any right of the OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies by the OWNER due the CONTRACTOR will not release the CONTRACTOR from compliance with the CONTRACT DOCUMENTS.

17.4 After ten (10) days from delivery of a WRITTEN NOTICE to the CONTRACTOR and the ENGINEER, the OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the PROJECT and terminate the CONTRACT. In such case, the CONTRACTOR shall be paid for all WORK executed and any expense sustained plus reasonable profit.

17.5 If, through no act or fault of the CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by the OWNER; or under any order of court or other public authority; or the ENGINEER fails to act on any request for payment within thirty (30) days after it is submitted; or the OWNER fails to pay the CONTRACTOR substantially the sum approved by the ENGINEER or awarded by arbitrators within thirty (30) days of its approval and presentation, then the CONTRACTOR may, after ten (10) days from delivery of a WRITTEN NOTICE to the OWNER and

the ENGINEER, terminate the CONTRACT and recover from the OWNER payment for all WORK executed and all expenses sustained. In addition and in lieu of terminating the CONTRACT, if the ENGINEER has failed to act on a request for payment or if the OWNER has failed to make any payment as aforesaid, the CONTRACTOR may upon ten (10) days WRITTEN NOTICE to the OWNER and the ENGINEER stop the WORK until he has paid all amounts then due, in which event and upon resumption of the WORK, CHANGE ORDERS shall be issued for adjusting the CONTRACT PRICE or extending the CONTRACT TIME or both to compensate for the costs and delays attributable to the stoppage of the WORK.

- 17.6 If the performance of all or any portion of the WORK is suspended, delayed, or interrupted as a result of a failure of the OWNER or ENGINEER to act within the time specified in the CONTRACT DOCUMENTS, or if no time is specified, within a reasonable time, an adjustment in the CONTRACT shall be made to compensate the CONTRACTOR for the costs and delays necessarily caused by the failure of the OWNER or ENGINEER.

18. PAYMENTS TO CONTRACTOR

- 18.1 At least ten (10) days before the first pay application the CONTRACTOR shall submit a Schedule of Values for approval by the ENGINEER.
- 18.2 At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ENGINEER an updated project schedule. For projects expected to exceed 90 days this shall be a cost loaded CPM schedule.
- 18.3 At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ENGINEER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require. As approved in advance by the OWNER if payment is requested on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER'S title to the material and equipment and protect his interest therein, including applicable insurance. The ENGINEER will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing his reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within twenty (20) days of presentation to him of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate.
- 18.4 If approved in advance by the OWNER the request for payment may also include an allowance for the cost of such major materials and equipment, which are suitably stored either at or near the site.
- 18.5 Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or SUBSTANTIALLY COMPLETED portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.
- 18.6 The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.
- 18.7 Upon completion and acceptance of the WORK, the ENGINEER shall issue a certificate attached to the final payment request that the WORK has been accepted by him under the

conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the CONTRACTOR within thirty (30) days of the completion and acceptance of the WORK.

18.8 The CONTRACTOR will indemnify and save the OWNER or the OWNER'S agents harmless from all claims growing out of the lawful demands of SUBCONTRACTORS, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall, at the OWNER'S request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so, the OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonable sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed, in accordance with the terms of the CONTRACT DOCUMENTS, but in no event shall the provisions of this sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, his Surety, or any third party.

In paying any unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

18.9 If the OWNER fails to make payment thirty (30) days after approval by the ENGINEER, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at the maximum legal rate commencing on the first day after said payment is due and continuing until the payment is received by the CONTRACTOR.

19. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

19.1 The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER of all claims and liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with this WORK and for every act and neglect of the OWNER and others relating to or arising out of this WORK. Any payment, however, final or otherwise shall not release the CONTRACTOR or his sureties from any obligations under the CONTRACT DOCUMENTS or the PERFORMANCE BOND and PAYMENT BONDS.

20. INSURANCE

20.1 The CONTRACTOR shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the CONTRACTOR'S execution of the WORK, whether such execution be by himself or by any SUBCONTRACTOR or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- 20.1.1 Claims under workmen's compensation, disability benefit and other similar employee benefit acts; and
- 20.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees; and
- 20.1.3 Claims for damages because of bodily injury, sickness liability coverage which are sustained
 - (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the CONTRACTOR, or (2) by any other person; and

- 20.1.4 Claims for damages because of bodily injury, sickness, or disease, or death of any person other than his employees; and
- 20.1.5 Claims for damages because of injury in or destruction of tangible property, including loss of use resulting therefrom.

20.2 Certificates of insurance acceptable to the OWNER shall be filed with the OWNER prior to commencement of the WORK. These certificates shall contain a provision that coverages afforded under the policies will not be canceled unless at least fifteen (15) days prior WRITTEN NOTICE has been given to the OWNER.

20.3 The CONTRACTOR shall procure and maintain, at his own expense, during the CONTRACT TIME, liability insurance as hereinafter specified:

- 20.3.1 CONTRACTOR'S General Public Liability and Property Damage Insurance including vehicle coverage issued to the CONTRACTOR and protecting him from all claims for personal injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any operations under the CONTRACT DOCUMENTS, whether such operations be by himself or by any SUBCONTRACTOR under him, or anyone directly or indirectly employed by the CONTRACTOR or by a SUBCONTRACTOR under him. Insurance shall be written with a limit of liability of not less than \$1,000,000 for all damages arising out of bodily injury, including death, at any time resulting there from, sustained by any one person in any one accident; and a limit of liability of not less than \$1,000,000 aggregate for any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than \$1,000,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than \$1,000,000 aggregate for any such damage sustained by two or more persons in any one accident.
- 20.3.2 The CONTRACTOR shall acquire and maintain Fire and Extended Coverage insurance upon the PROJECT to the full insurable value thereof for the benefit of the OWNER, the CONTRACTOR, and the SUBCONTRACTORS as their interest may appear. This provision shall in no way release the CONTRACTOR or CONTRACTOR'S surety from obligations under the CONTRACT DOCUMENTS to fully complete the PROJECT.
- 20.3.3 The CONTRACTOR shall acquire and maintain such special insurance coverage as required by the railroad crossing license/permit

20.4 The CONTRACTOR shall procure and maintain, at his own expense, during the CONTRACT TIME, in accordance with the provisions of the laws of the state in which the WORK is performed. Workmen's Compensation Insurance, including occupational disease provisions, for all of his employees at the site of the PROJECT and in case any WORK is sublet, the CONTRACTOR shall require each SUBCONTRACTOR similarly to provide Workmen's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. In case any class of employees engaged in hazardous WORK under this CONTRACT at the site of the PROJECT is not protected under Workmen's Compensation statute, the CONTRACTOR shall provide, and shall cause each SUBCONTRACTOR to provide, adequate and suitable insurance for the protection of his employees not otherwise protected.

20.5 The CONTRACTOR shall secure "All Risk" type Builder's Risk Insurance for WORK to be performed. Unless specifically authorized by the OWNER, the amount of such insurance shall not be less than the CONTRACT PRICE totaled in the BID. The policy shall cover not less than the losses due to fire, explosion, hail, lightening, vandalism, malicious mischief, wind, flood, collapse, riot, aircraft, and smoke during the CONTRACT TIME, and until the WORK is

accepted by the OWNER. The policy shall name as the insured the CONTRACTOR, the ENGINEER, and the OWNER.

21. CONTRACT SECURITY

21.1 The CONTRACTOR shall within ten (10) days after the receipt of the NOTICE OF AWARD furnish the OWNER with a Performance Bond and Payment Bond in penal sums equal to the amount of the CONTRACT PRICE, conditioned upon the performance by the CONTRACTOR of all undertakings, covenants, terms, conditions, and agreements of the CONTRACT DOCUMENTS, and upon the prompt payment by the CONTRACTOR to all persons supplying labor and materials in the prosecution of the WORK provided by the CONTRACT DOCUMENTS. Such BONDS shall be executed by the CONTRACTOR and a corporate bonding company licensed to transact such business in the State of Virginia and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these BONDS shall be borne by the CONTRACTOR. If at any time a surety on any such BOND is declared a bankrupt or loses its right to do business in Virginia or is removed from the list of Surety Companies accepted on Federal BONDS, CONTRACTOR shall within ten (10) days after notice from the OWNER to do so, substitute an acceptable BOND (or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable BOND to the OWNER. The Performance Bond shall remain in full force and effect through the guarantee period.

22. ASSIGNMENTS

22.1 Neither the CONTRACTOR nor the OWNER shall sell, transfer, assign, or otherwise dispose of the CONTRACT or any portion thereof, or of their right, title, or interest therein, or their obligations thereunder, without written consent of the other party.

23. INDEMNIFICATION

23.1 The CONTRACTOR will indemnify and hold harmless the OWNER and the ENGINEER and their agents and employees from and against all claims, damages, losses, and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that such claims, damage, loss, or expense is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property including the loss of use resulting there from; and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

23.2 In any and all claims against the OWNER or the ENGINEER, or any of their agents or employees, by any employee 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, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefits acts.

23.3 The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ENGINEER or ENGINEER'S employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs or SPECIFICATIONS.

24. SEPARATE CONTRACTS

24.1 The OWNER reserves the right to let other contracts in connection with this PROJECT. 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 the CONTRACTOR'S WORK with theirs. If the proper execution or results of

any part of the CONTRACTOR'S WORK depends upon the WORK of any other CONTRACTOR, the CONTRACTOR shall inspect and promptly report to the ENGINEER any defects in such WORK that render it unsuitable for such proper execution and results.

- 24.2 The OWNER may perform additional WORK related to the PROJECT, or OWNER may let other contracts containing provisions similar to these. The CONTRACTOR will afford the other CONTRACTORS who are parties to such Contracts (or the OWNER, if the CONTRACTOR is performing the additional WORK), reasonable opportunity for the introduction and storage of materials and equipment and the execution of WORK, and shall properly connect and coordinate the CONTRACTOR'S WORK with theirs.
- 24.3 If the performance of additional WORK by other CONTRACTORS or the OWNER is not noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, WRITTEN NOTICE thereof shall be given to the CONTRACTOR prior to starting any such additional WORK. If the CONTRACTOR believes that the performance of such additional WORK by the OWNER or others involves the CONTRACTOR in additional expense or entitles the CONTRACTOR to an extension of the CONTRACT TIME, the CONTRACTOR may make a claim therefore as provided in Sections 13 and 14.

25. SUBCONTRACTING

- 25.1 The CONTRACTOR may utilize the services of specialty SUBCONTRACTORS on those parts of the WORK which, under normal contracting practices, are performed by specialty CONTRACTORS.
- 25.2 The CONTRACTOR shall be fully responsible to the OWNER for the acts and omissions of any SUBCONTRACTORS, and of persons either directly or indirectly employed by them, as the CONTRACTOR is for the acts and omissions of persons directly employed by the CONTRACTOR.
- 25.3 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the WORK to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the CONTRACT DOCUMENTS insofar as applicable to the WORK of SUBCONTRACTORS and to give the CONTRACTOR the same power as regards terminating any subcontract that the OWNER may exercise over the CONTRACTOR under any provision of the CONTRACT DOCUMENTS.
- 25.4 Nothing contained in the CONTRACT shall create any contractual relation between any SUBCONTRACTOR and the OWNER.

26. ENGINEER'S AUTHORITY

- 26.1 The ENGINEER shall act as the OWNER'S representative during the construction period. The ENGINEER shall decide questions, which may arise as to quality and acceptability of materials furnished and WORK performed. The ENGINEER shall interpret the intent of the CONTRACT DOCUMENTS in a fair and unbiased manner. The ENGINEER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.
- 26.2 The CONTRACTOR will be held strictly to the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship and execution of the WORK. Inspections may be made at the factory or fabrication plant of the source of material supply at the ENGINEER'S discretion.
- 26.3 The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.
- 26.4 The ENGINEER shall promptly make decisions relative to interpretation of the CONTRACT DOCUMENTS.

27. LAND AND RIGHT-OF-WAYS

- 27.1 Prior to issuance of NOTICE TO PROCEED, the OWNER shall obtain all land and right-of-ways necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS, unless otherwise mutually agreed.
- 27.2 The OWNER shall provide to the CONTRACTOR information, which delineates and describes the lands owned and right-of-ways acquired.
- 27.3 The CONTRACTOR shall provide at CONTRACTOR'S own expense and without liability to the OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials.

28. GUARANTY

- 28.1 Unless noted otherwise in the CONTRACT DOCUMENTS the CONTRACTOR shall guarantee all materials and equipment furnished and WORK performed for a period of one (1) year from the date of FINAL ACCEPTANCE. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of FINAL ACCEPTANCE of the system that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects.

The OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The PERFORMANCE BOND shall remain in full force and effect through the guarantee period.

29. TAXES

- 29.1 The CONTRACTOR will pay all sales, consumer, use, and other similar taxes required by the law of the place where the WORK is performed.

30. CLEAN UP ON COMPLETION OF PROJECT

- 30.1 On completion of the WORK covered by any of the sections of this PROJECT, the CONTRACTOR for said section shall clean up the entire premises occupied by his operations, and this area shall be left neat and clean of trash, debris, piles of earth, waste materials or equipment. All surplus materials and equipment, trash, debris, and other foreign matter shall be disposed of as directed by the ENGINEER or OWNER. The entire project or sections thereof shall be made ready for the OWNER'S use, and the CONTRACTOR shall assist as may be necessary in placing any equipment furnished under the contract in proper operating condition.

31. WORK HOURS

- 31.1 Monday through Friday from 7:00 am to 4:30 pm and other hours if approved in advance by the OWNER.

32. PROJECT IDENTIFICATION SIGNBOARD

Not required for this project.

33. SUPPLEMENTAL CONDITIONS

- 33.1 The following additions to, substitutions for, or explanation of the GENERAL CONDITIONS, if any, shall be included as part of these CONTRACT DOCUMENTS. The number utilized refer to those contained in the GENERAL CONDITIONS.

34. NONDISCRIMINATION PROVISIONS

- 34.1 The successful CONTRACTOR agrees not to discriminate against any employee or applicant for employment because of age, race, religion, color, sex or national origin, except where religion, sex or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provision of the nondiscrimination clause.
- 34.2 The CONTRACTOR, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that the Contractor is an equal opportunity employer. Notices, advertisements, and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.
- 34.3 The CONTRACTOR will include the provision of the foregoing paragraph in every subcontract or purchase order over ten thousand dollars (\$10,000.) so that the provisions will be binding upon each subcontractor or vendor.

35. IMMIGRATION AND CONTROL ACT OF 1986

- 35.1 CONTRACTOR is aware of and understands the Immigration Reform and Control Act of 1986 (IRCA) and is in compliance with IRCA; that it acknowledges its responsibility to complete I-9 Employment Eligibility Verification forms for all of its employees assigned to work on County contracts who are not authorized to work in the United States; and that it agrees to defend and indemnify the county for any liability arising out of claims that the contractor's employees are not authorized to work in the United States or any other claims based upon any alleged violations of IRCA by the contractor.

ATTACHMENT B TO
**IFB # 2018-068 CHILLER REPLACEMENT at ROANOKE
COUNTY ADMINISTRATION BUILDING**

SPECIFICATIONS

PART 1 – GENERAL

1.01 SUMMARY:

A. **BASE BID:** Demolish existing water-cooled chiller. Provide new, packaged water-cooled chiller in accordance with this specification. Below summaries are provided for reference only. Provide all work to complete replacement of chiller.

1. Mechanical Work Summary: Adjust existing piping to connect into new water-cooled chiller. Clean and re-use existing piping accessories such as isolation valves, balancing valves, and strainers. Provide new thermometers and pressure gauges. Provide testing and balancing in accordance with industry recognized standards (NEBB, AABC, or TABB) of new chiller and existing pumps to provide design flow rates through the evaporator and condenser. Provide mineral fiber insulation (ASTM C547, Types I, II or III) with manufacturer's recommended factory-applied jacket and vapor barrier for new chilled water piping. Provide connection to existing Trane Tracer SC control panel. Update graphics in Trane Tracer SC to include new chiller.
2. Install new chilled water and condenser water pump near existing pumps. Tie into existing pipe systems adding new isolation valves to allow maintenance or repairs to be performed on one pump and allow the system to continue running.
3. Electrical Work Summary: Provide new wiring and conduit to match existing from existing main panelboard to the new chiller. All wiring and conduit shall comply with the NEC. Electrical products shall be listed and labeled by a nationally recognized testing agency. Equipment and devices shall have lugs rated at 75 degree C.
4. General Work Summary: Adjust existing concrete pad to have sufficient dimensions to provide concrete beneath full footprint of new chiller with 6" of space around the footprint.

B. **BID OPTION:** Demolish existing water-cooled chiller, cooling tower, condenser water pumps, condenser water treatment system, and condenser water piping. Provide design-build services to provide new, packaged air-cooled chiller in accordance with this specification in the space occupied by the existing cooling tower. Below summaries are provided for reference only. Provide all work to complete replacement of chiller.

1. Mechanical Work Summary: Adjust existing piping to connect into new air-cooled chiller. Provide new piping accessories such as isolation valves, balancing valves, and strainers. Provide new thermometers and pressure gauges. Provide testing and balancing in accordance with industry recognized standards (NEBB, AABC, or TABB) of new chiller and existing pump to provide design flow rates through the evaporator. Provide new pump for redundancy with isolation valves as necessary for maintenance/repair to be made and allow chilled water system to operate. Provide mineral fiber insulation (ASTM C547, Types I, II or III) with manufacturer's recommended factory-applied jacket and vapor barrier for new chilled water piping. Exterior chilled water piping shall be heat

traced to protect the piping to an ambient of minus 20 degrees F. Exterior piping penetrations shall be sealed to minimize air and water penetration through building envelope. Provide connection to existing Trane Tracer SC control building envelope. Provide connection to existing Trane Tracer SC control panel. Update graphics in Trane Tracer SC to include new chiller.

2. Electrical Work Summary: Remove the existing 225A fuses from the 400A fusible switch in main panelboard (MP), which feeds the existing chiller. Replace with 400A fuses in the same 400A fusible switch. Remove the existing conduit and wiring from the panelboard to the chiller. Replace with 3#500 and 1#3 ground in 3" conduit. All materials and workmanship shall comply with the NEC. Electrical products shall be listed and labeled by a nationally recognized testing agency. Equipment and devices shall have lugs rated at 75 degree C. Comply with all OSHA and applicable local standards for lockout and tag out procedures.
3. General Work Summary: Provide exterior concrete pad with sufficient dimensions to provide concrete beneath full footprint of new chiller with 6" of space around the footprint.

1.02 REFERENCES:

- A. Applicable Standards (Latest Edition):
 1. Air-Conditioning, Heating, & Refrigeration Institute (AHRI):
 - a. AHRI 370 - Sound Rating of Large Outdoor Refrigerating and Air-Conditioning Equipment.
 - b. AHRI 550/590 - Water Chilling Packages Using the Vapor Compression Cycle.
 - c. AHRI 575 - Method of Measuring Machinery Sound within an Equipment Space.
 2. American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI):
 - a. ASCE/SEI 7 - Minimum Design Loads for Buildings and Other Structures.
 3. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
 - a. ASHRAE 15 - Safety Standard for Refrigeration Systems.
 - b. ASHRAE 34 - Designation and Safety Classification of Refrigerants (ANSI).
 - c. ASHRAE 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks (ANSI).
 - d. ASHRAE 147 - Reducing the Release of Halogenated Refrigerants from Refrigerating and Air-Conditioning Equipment and Systems (ANSI).
 4. American Society of Heating, Refrigerating and Air-Conditioning Engineers/Illuminating Engineering Society of North America (ASHRAE/IESNA):
 - a. ASHRAE/IESNA 90.1 - Energy Standard for Buildings except Low-Rise Residential Buildings (ANSI).
 5. ASME International (ASME):
 - a. ASME B16.5 - Pipe Flanges and Flanged Fittings, NPS 1/2 to NPS 24.

- b. ASME Boiler and Pressure Vessel Code: Section VIII, "Pressure Vessels," Division 01.
- 6. ASTM International (ASTM):
 - a. ASTM C534 - Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
- 7. International Electrotechnical Commission (IEC):
 - a. IEC 60947-4-1 - Part 4 - "Contactors and Motor Starters"; Section 1, "Electromechanical Contactors and Motor Starters."
- 8. National Electrical Manufacturers Association (NEMA):
 - a. NEMA 250 - Enclosures for Electrical Equipment (1,000V Maximum).
 - b. NEMA AB 1 - Molded-Case Circuit Breakers, Molded Case Switches, and Circuit-Breaker Enclosures.
 - c. NEMA ICS 2 - (Addendum/Errata to Part 2 - 2003) - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated 600V.
 - d. NEMA ICS 6 - Industrial Control and Systems: Enclosures.
 - e. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600V Maximum).
- 9. NFPA:
 - a. NFPA 70 - National Electrical Code.
- 10. Underwriters Laboratories, Inc. (UL):
 - a. UL 1995 - Heating and Cooling Equipment.
- 11. Virginia Construction Code (VCC).

1.03 DEFINITIONS:

- A. **BAS:** Building automation system.
- B. **EER:** Energy-efficiency ratio. The ratio of the cooling capacity given in terms of Btu/hr. to the total power input given in terms of watts at any given set of rating conditions.
- C. **kW/Ton:** The ratio of total power input of the chiller in kilowatts to the net refrigerating capacity in tons (kW) at any given set of rating conditions.
- D. **NPLV:** Nonstandard part-load value. A single-number part-load efficiency figure of merit calculated per the method defined by AHRI 550/590 and intended for operating conditions other than AHRI standard rating conditions.

1.04 PERFORMANCE REQUIREMENTS:

- A. Condenser Fluid Temperature Performance:
 1. Startup Condenser Fluid Temperature: Water-Cooled chiller shall be capable of starting with an entering condenser fluid temperature of 40°F and providing stable operation until the system temperature is elevated to the minimum operating entering condenser fluid temperature.
 2. Minimum Operating Condenser Fluid Temperature: Chiller shall be capable of continuous operation over the entire capacity range indicated with an entering condenser fluid temperature of 55°F.
 3. Make factory modifications to standard chiller design if necessary to comply with performance indicated.

1.05 ACTION SUBMITTALS:

- A. Product Data: For each type of product indicated. Include refrigerant, rated capacities, operating characteristics, furnished specialties, and accessories.
 - 1. Performance at AHRI standard conditions and at conditions indicated.
 - 2. Performance at AHRI standard unloading conditions.
 - 3. Minimum evaporator flow rate.
 - 4. Refrigerant capacity of chiller.
 - 5. Oil capacity of chiller.
 - 6. Fluid capacity of evaporator.
 - 7. Characteristics of safety relief valves.
 - 8. Fluid capacity of condenser.
 - 9. Minimum entering condenser fluid temperature.
 - 10. Performance at varying capacities with design entering condenser fluid temperature.
 - 11. Minimum entering condenser air temperature.
 - 12. Maximum entering condenser air temperature.
 - 13. Performance at varying capacities with constant design entering condenser air temperature.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, load distribution, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Wiring Diagrams: For power, signal, and control wiring.

1.06 INFORMATIONAL SUBMITTALS:

- A. Coordination Drawings: Floor plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
 - 1. Structural supports.
 - 2. Piping roughing-in requirements.
 - 3. Wiring roughing-in requirements, including spaces reserved for electrical equipment.
 - 4. Access requirements, including working clearances for mechanical controls and electrical equipment, and tube pull and service clearances.
- B. Certificates: For certification required in "Quality Assurance" Article.
- C. Source quality control reports.
- D. Startup service reports.
- E. Warranty: Sample of special warranty.

1.07 CLOSEOUT SUBMITTALS:

- A. Operation and Maintenance Data: For each chiller to include in emergency, operation, and maintenance manuals.

1.08 QUALITY ASSURANCE:

- A. AHRI Certification: Certify chiller according to AHRI 550 or AHRI 590 certification programs.

- B. AHRI Rating: Rate chiller performance according to requirements in AHRI 550/590.
- C. ASHRAE Compliance:
 - 1. ASHRAE 15 for safety code for mechanical refrigeration.
 - 2. ASHRAE 147 for refrigerant leaks, recovery, and handling and storage requirements.
- D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.
- E. ASME Compliance: Fabricate and label chiller to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 01, and include an ASME U-stamp and nameplate certifying compliance.
- F. Comply with NFPA 70.
- G. Comply with Virginia Construction Code
- H. Comply with requirements of UL and UL Canada and include label by a qualified testing agency showing compliance.

1.09 DELIVERY, STORAGE, AND HANDLING:

- A. Ship chillers from the factory fully charged with refrigerant.
- B. Ship each oil-lubricated chiller with a full charge of oil.
 - 1. Ship oil factory installed in chiller.

1.10 COORDINATION:

- A. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor bolt inserts into bases.

1.11 WARRANTY:

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of chillers that fail in materials or workmanship within specified warranty period.
 - 1. Extended warranties include, but are not limited to, the following:
 - a. Complete chiller including refrigerant and oil charge.
 - b. Parts and labor.
 - c. Loss of refrigerant charge for any reason.
 - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PACKAGED CHILLERS:

- A. Unless necessary for delivery purposes, units must be assembled, leak-tested, charged (refrigerant and oil), and adjusted at the factory. Parts weighing 50 pounds or more which must be removed for inspection, cleaning, or repair, such as motors, gear boxes, cylinder heads, casing tops, condenser, and cooler heads, must have lifting eyes or lugs. Chiller must be provided with a single point wiring connection for incoming power supply. Chiller's condenser and water cooler must be provided with standard water boxes with grooved mechanical or flanged connections.
- B. Scroll, Rotary Screw, or Centrifugal Type
 - 1. Chiller must be certified for performance per AHRI 550/590 I-P. If specified performance is outside of the Application Rating Conditions of AHRI 550/590 I-P, Table 2 then the chiller's

performance must be rated in accordance with AHRI 550/590 I-P. Chiller must conform to ANSI/ASHRAE 15 & 34. As a minimum, chiller must include the following components as defined in paragraph CHILLER COMPONENTS.

- a. Refrigerant and oil
- b. Structural base
- c. Chiller refrigerant circuit
- d. Controls package
- e. Scroll, reciprocating, rotary screw, or centrifugal compressor
- f. Compressor driver, electric motor
- g. Compressor driver connection
- h. Water cooler (evaporator)
- i. Base Bid: Water-cooled condenser coil
- j. Bid Option: Air-cooled condenser coil

2.02 CHILLER COMPONENTS

- A. Refrigerant and Oil
 - 1. Refrigerants must be one of the fluorocarbon gases. Refrigerants must have number designations and safety classifications in accordance with ANSI/ASHRAE 15 & 34. Refrigerants classified by the EPA as Class 2 must not be allowed with the exception of R-123. The ODP must be in accordance with the "Montreal Protocol On Substances That Deplete The Ozone Layer," September 1987, as amended through 2000, sponsored by the United Nations Environment Programme.
- B. Structural Base
 - 1. Chiller and individual chiller components must be provided with a factory-mounted structural steel base (welded or bolted) or support legs. Chiller and individual chiller components must be isolated from the building structure by means of molded neoprene isolation pads.
- C. Chiller Refrigerant Circuit
 - 1. Chiller refrigerant circuit must be completely piped and factory leak tested in accordance with ANSI/ASHRAE 15 & 34. For multicompressor units, not less than 2 independent refrigerant circuits must be provided. Circuit must include as a minimum a replaceable-core combination filter and drier, combination sight glass and moisture indicator, an electronic or thermostatic expansion valve with external equalizer or float valve, charging ports, compressor service valves for field-serviceable compressors, and superheat adjustment.
- D. Controls Package
 - 1. Provide chillers with a complete factory-mounted, microprocessor based operating and safety control system. Controls package must contain as a minimum a digital display, an on-auto-off switch, motor starters or variable frequency motor controller, disconnect switches, power wiring, and control wiring. Controls package must provide operating controls, monitoring capabilities, programmable setpoints, safety controls, and BAS interfaces as defined below.
- E. Operating Controls
 - 1. Chiller must be provided with the following adjustable operating controls as a minimum.

- a. Leaving chilled water temperature control
- b. Adjustable timer or automated controls to prevent a compressor from short cycling
- c. Automatic lead/lag controls (adjustable) for multi-compressor units
- d. Load limiting
- e. System capacity control to adjust the unit capacity in accordance with the system load and the programmable setpoints. Controls must automatically re-cycle the chiller on power interruption.
- f. Startup and head pressure controls to allow system operation at all ambient temperatures down to 15 degrees F.
- g. Fan sequencing for air-cooled condenser

F. Monitoring Capabilities

1. During normal operations, the control system must be capable of monitoring and displaying the following operating parameters. Access and operation of display must not require opening or removing any panels or doors.
 - a. Entering and leaving chilled water temperatures
 - b. Chilled water flow
 - c. Entering and leaving condenser water temperatures (Water-Cooled Only)
 - d. Condenser water flow (Water-Cooled Only)
 - e. Self diagnostic
 - f. Operation status
 - g. Operating hours
 - h. Number of starts
 - i. Compressor status (on or off)
 - j. Compressor load (percent)
 - k. Refrigerant discharge and suction pressures
 - l. Magnetic bearing levitation status (if applicable)
 - m. Magnetic bearing temperatures (if applicable)
 - n. Oil pressure (if applicable)
 - o. Number of purge cycles over the last 7 days (if applicable)

G. Configurable Setpoints

1. The control system must be capable of being configured directly at the unit's interface panel. No parameters may be capable of being changed without first entering a security access code. The programmable setpoints must include the following as a minimum:
 - a. Leaving Chilled Water Temperature
 - b. Leaving Condenser Water Temperature (Water-Cooled Only)
 - c. Time Clock/Calendar Date

H. Safety Controls with Manual Reset

1. Chiller must be provided with the following safety controls which automatically shutdown the chiller and which require manual reset.
 - a. Low chilled water temperature protection
 - b. High condenser refrigerant discharge pressure protection
 - c. Low evaporator pressure protection
 - d. Chilled water flow detection
 - e. High motor winding temperature protection

- f. Low oil flow protection if applicable
 - g. Magnetic bearing controller (MBC), Internal fault (if applicable)
 - h. MBC, High bearing temperature (if applicable)
 - i. MBC, Communication fault (if applicable)
 - j. MBC, Power supply fault (if applicable)
 - k. Motor current overload and phase loss protection
- I. Safety Controls with Automatic Reset
 - 1. Chiller must be provided with the following safety controls which automatically shutdown the chiller and which provide automatic reset.
 - a. Over/under voltage protection
 - b. Chilled water flow interlock
 - c. MBC, Vibration (if applicable)
 - d. MBC, No levitation (if applicable)
 - e. Phase reversal protection
- J. Building Automation System Interface
 - 1. Provide a Building Automation System (BAS) interface meeting the requirements of BACnet/ASHRAE 135. The interface must provide all system operating conditions, capacity controls, and safety shutdown conditions as network points. In addition, the following points must be overridable via the network interface:
 - a. Unit Start/Stop
 - b. Leaving Chilled Water Temperature Setpoint
 - c. Leaving Condenser Water Temperature Setpoint (Water-Cooled Only)
- K. Compressor(s)
 - 1. Scroll Compressor(s)
 - a. Compressors must be of the hermetically sealed design. Compressors must be mounted on vibration isolators to minimize vibration and noise. Rotating parts must be statically and dynamically balanced at the factory to minimize vibration. Lubrication system must be centrifugal pump type equipped with a means for determining oil level and an oil charging valve. Crankcase oil heater must be provided. Provide continuous compressor unloading to 15 percent of full-load capacity by way of variable speed compressor motor controller or variable unloading of the scroll.
 - 2. Rotary Screw Compressor(s)
 - a. Compressors must operate stably for indefinite time periods to at least 25 percent capacity reduction without gas bypass external to the compressor. Provision must be made to insure proper lubrication of bearings and shaft seals on shutdown with or without electric power supply. Rotary screw compressors must include:
 - (1) An open or hermetic, positive displacement, oil-injected design directly driven by the compressor driver. Allow access to internal compressor components for repairs, inspection, and replacement of parts.
 - (2) Rotors must be solid steel, possessing sufficient rigidity for proper operation.

- (3) A maximum rotor operating speed no greater than 3600 RPM. Provide cast iron rotor housing.
- (4) Casings of cast iron, precision machined for minimal clearance about periphery of rotors with minimal clearance at rotor tops and rotor ends.
- (5) A lubrication system of the forced-feed type that provides oil at the proper pressure to all parts requiring lubrication.
- (6) Bearing housing must be conservatively loaded and rated for an L(10) life of not less than 200,000 hours. Shaft main bearings of the sleeve type with heavy duty bushings or rolling element type in accordance with ABMA 9 or ABMA 11.
- (7) A differential oil pressure or flow cutout to allow the compressor to operate only when the required oil pressure or flow is provided to the bearings.
- (8) A temperature- or pressure-initiated, hydraulically actuated, single-slide-valve, capacity-control system to provide minimum automatic capacity modulation from 100 percent to 15 percent or use a Variable Frequency Drive (VFD) to modulate capacity modulation from 100 percent to 15 percent.
- (9) An oil separator and oil return system to remove oil entrained in the refrigerant gas and automatically return the oil to the compressor.
- (10) Crankcase oil heaters must be provided.

3. Centrifugal Compressor(s)

- a. Centrifugal compressors may be either single or multistage, having dynamically balanced impellers, either direct or gear driven by the compressor driver. Impellers must be over-speed tested at 1.2 times the impeller-shaft speed. Impeller shaft must be steel with sufficient rigidity for proper operation at any required operating speed. Compressors must be capable of variable speed operation and may have either oil-free bearing drives or oil-lubricated bearing drives. Centrifugal compressors must include:
 - (1) Shaft main bearings that are either oil lubricated, oil free ceramic or magnetic levitated. The oil lubricated bearings must be the rolling element type in accordance with ABMA 9 or ABMA 11, journal type with bronze or babbitt liners, or of the aluminum-alloy one-piece insert type. Oil lubricated or oil free ceramic bearings must be rated for an L(10) life of not less than 200,000 hours. Magnetic levitated main shaft bearings must be in accordance with ISO 14839-1, ISO 14839-2, ISO 14839-3, ISO 14839-4, and provided with radial and axial magnetic levitated bearings (combination permanent and electro magnets) to levitate the shaft thereby eliminating metal to metal contact and thus eliminating the need for oil. The active magnetic bearings must be equipped with an automatic vibration reduction and balancing system. Each bearing position

must be sensed by position sensors and provide real time positioning of the rotor shaft, controlled by on-board digital electronics. In the event of a power failure, the magnetic bearings will remain in operation throughout the compressor coast-down using a reserve power supply. Provide mechanical bearings designed for emergency touchdowns, as a backup to the magnetic bearings.

- (2) Casing of cast iron, aluminum, or steel plate with split sections gasketed and bolted or clamped together.
- (3) Lubrication system of the forced-feed type that provides oil at the proper pressure to all parts requiring lubrication.
- (4) Provisions to ensure proper lubrication of bearings and shaft seals prior to starting and upon stopping with or without electric power supply (if applicable). On units providing forced-feed lubrication prior to starting, a differential oil pressure cutout interlocked with the compressor starting equipment must allow the compressor to operate only when the required oil pressure is provided to the bearings (if applicable).
- (5) Oil sump heaters controlled as recommended by the manufacturer.
- (6) Temperature-or pressure-actuated prerotation vane, variable geometry diffuser or suction damper to provide automatic capacity modulation from 100 percent capacity to 25 percent capacity. If operation to 25 percent capacity cannot be achieved without providing gas bypass external to the compressor, then the Contractor must indicate in the equipment submittal the load percent at which external hot gas bypass is required to prevent surge and to provide the specified capacity reduction and its impact on performance.

L. Compressor Driver, Electric Motor

1. Motor starter or variable frequency drive must be unit mounted as indicated with starter or variable frequency drive type, wiring, and accessories coordinated with the chiller manufacturer.

M. Compressor Driver Connections

1. Each compressor must be driven by a V-belt drive or direct connected through a flexible coupling, except that flexible coupling is not required on hermetic units. V-belt drives must be designed for not less than 150 percent of the driving motor capacity. Flexible couplings must be of the type that does not require lubrication. Each machine driven through speed-increasing gears must be so designed as to assure self-alignment, interchangeable parts, proper lubrication system, and minimum unbalanced forces. Bearings must be of the sleeve or roller type. Gear cases must be oil tight. Shaft extensions must be provided with seals to retain oil and exclude all dust.

N. Water Cooler (Evaporator)

1. Cooler must be of the shell-and-coil, shell-and-tube type design, or brazed plate heat exchanger.

2. Shell-and-coil/shell-and-tube type designs:
 - a. Cooler shell must be constructed of seamless or welded steel. Coil bundles must be totally removable and arranged to drain completely. Tubes must be seamless copper, plain, integrally finned with smooth bore or integrally finned with enhanced bore. Each tube must be individually replaceable.
 - b. Tubes must be installed into carbon mild steel tube sheets by rolling. Tube baffles must be properly spaced to provide adequate tube support and cross flow. Performance must be based on a water velocity not less than 3 fps nor more than 12 fps and a fouling factor per AHRI 550/590 I-P.
3. Brazed Plate Heat Exchanger:
 - a. Brazed plate heat exchanger must be constructed of 304 or 316 stainless steel, designed to a refrigerant-side working pressure of 430 psig and a waterside working pressure of 150 psig. Evaporator must be factory tested at 1.1 times maximum allowable refrigerant side working pressure and 1.5 times maximum allowable water side working pressure.
4. Provide air-cooled chillers with cooler heaters to protect the evaporator to an ambient of minus 20 degrees F.
5. Provide cooler with factory-installed flow switches. All water connections must use either flanged or grooved-pipe connections. Factory insulate all cold surfaces.

O. Air-Cooled Condenser Coil

1. Condenser coil must be of the extended-surface fin-and-tube type or microchannel heat exchanger (MCHX) type. Fin-and-tube type must be constructed of seamless copper or aluminum tubes with compatible copper or aluminum fins. Fins must be soldered or mechanically bonded to the tubes and installed in a metal casing. Coils must be circuited and sized for a minimum of 5 degrees F subcooling and full pumpdown capacity. Coil must be factory leak and pressure tested after assembly in accordance with ANSI/ASHRAE 15 & 34. MCHX type must consist of a series of flat tubes containing a series of multiple, parallel flow microchannels layered between the refrigerant manifolds in a two-pass arrangement. Provide coils constructed of aluminum alloys for fins, tubes, and manifolds. Coil must be factory leak and pressure tested after assembly in accordance with ANSI/ASHRAE 15 & 34.

P. Water-Cooled Condenser Coil

1. Condenser must be of the shell-and-coil or shell-and-tube type design. Condenser's refrigerant side must be designed and factory pressure tested to comply with ANSI/ASHRAE 15 & 34. Condenser's water side must be designed and factory pressure tested for not less than 150psi. Condensers must be complete with refrigerant relief valve/rupture disc assembly, water drain connections, and refrigerant charging valve. Low pressure refrigerant condenser must be provided with a purging device to purge non-condensables trapped in the condenser while keeping refrigerant emissions below requirements of ASHRAE Std 147. Purge units must be certified per AHRI 580. Condenser shell must

be constructed of seamless or welded steel. Coil bundles must be totally removable and arranged to drain completely. Tubes must be seamless copper, plain, integrally finned with smooth bore or integrally finned with enhanced bore. Each tube must be individually replaceable, except for the coaxial tubes. Tube baffles must be properly spaced to provide adequate tube support and cross flow. Performance must be based on water velocities not less than 3 fps nor more than 12 fps and a fouling factor per AHRI 550/590 I-P. Water-cooled condensers may be used for refrigerant storage in lieu of a separate liquid receiver, if the condenser storage capacity is 5 percent in excess of the fully charged system for single packaged systems

Q. Electrical Power:

1. Factory-installed and -wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point, field-power connection to chiller.
2. House in a unit-mounted, NEMA 250, Type 1 enclosure with hinged access door.
3. Wiring shall be numbered to match wiring diagram.
4. Install factory wiring outside of an enclosure in a raceway.
5. Field-power interface shall be to NEMA KS 1, heavy-duty, nonfused disconnect switch.
 - a. Disconnect means shall be interlocked with door operation.
 - b. Minimum withstand rating shall be as required by electrical power distribution system, but not less than 65,000 A.
6. Provide branch power circuit to each motor and to controls with one of the following disconnecting means:
 - a. NEMA KS 1, heavy-duty, fusible switch with rejection-type fuse clips rated for fuses. Select and size fuses to provide Type 2 protection according to IEC 60947 4 1.
 - b. NEMA AB 1, motor-circuit protector (circuit breaker) with field-adjustable, short-circuit-trip set point.
7. Provide each motor with overcurrent protection.
8. Overload relay sized according to UL 1995 or an integral component of chiller control microprocessor.
9. Phase Failure and Undervoltage Relays: Solid-state sensing with adjustable settings.
10. Control Transformer: Unit-mounted transformer with primary and secondary fuses and sized with enough capacity to operate electrical load plus spare capacity.
11. Control Relays: Auxiliary and adjustable time-delay relays.

R. Insulation:

1. Material: Closed-cell, flexible elastomeric, thermal insulation complying with ASTM C534, Type I for tubular materials and Type II for sheet materials.
2. Thickness: 3/4 inch.
3. Adhesive: As recommended by insulation manufacturer and applied to 100% of insulation contact surface. Seal seams and joints.
4. Factory-applied insulation over cold surfaces of chiller capable of forming condensation. Components shall include, but not be limited

to, evaporator shell and end tube sheets, evaporator water boxes including nozzles, refrigerant suction pipe from evaporator to compressor, cold surfaces of compressor, refrigerant-cooled motor, and auxiliary piping.

- a. Before insulating steel surfaces, prepare surfaces for paint, prime and paint as indicated for other painted components. Do not insulate unpainted steel surfaces.
- b. Seal seams and joints to provide a vapor barrier.
- c. After adhesive has fully cured, paint exposed surfaces of insulation to match other painted parts.

S. Finish:

1. Paint chiller, using manufacturer's standard procedures, except comply with the following minimum requirements:
 - a. Provide at least one coat of primer.
 - b. Provide finish coat of alkyd-modified, vinyl enamel.
 - c. Paint surfaces that are to be insulated before applying the insulation.
 - d. Paint installed insulation to match adjacent uninsulated surfaces.

2.03 BASE BID: WATER-COOLED CHILLER SCHEDULE:

- A. Capacity: 143 tons
- B. Full-Load Efficiency (Power Input/Cooling Output):
 1. Positive Displacement: 0.718 kW/ton Maximum.
 2. Centrifugal: 0.639 kW/ton Maximum.
- C. Part-Load Efficiency (NPLV):
 1. Positive Displacement: 0.54 kW/ton Maximum.
 2. Centrifugal: 0.45 kW/ton Maximum.
- D. Evaporator:
 1. Pressure Rating: 150 psig.
 2. Fluid Type: Water.
 3. Design Fluid Flow Rate: 345 gpm.
 4. Entering-Fluid Temperature: 55 °F.
 5. Leaving-Fluid Temperature: 45 °F.
 6. Fluid Pressure Drop: 15 ft. of head.
 7. Fouling Factor: 0.0001 ft.² by hr. by °F/Btu.
- E. Water-Cooled Condenser:
 1. Pressure Rating: 150 psig.
 2. Fluid Type: Water.
 3. Design Fluid Flow Rate: 450 gpm.
 4. Entering-Fluid Temperature: 85 °F.
 5. Leaving-Fluid Temperature: 95 °F.
 6. Fluid Pressure Drop: 15 ft. of head.
 7. Fouling Factor: 0.00025 ft.² by hr. by °F/Btu.
- F. Chiller Electrical Requirements:
 1. Minimum Circuit Ampacity (Maximum allowable): 183 A.
 2. Maximum Overcurrent Protection Device: 225 A.
 3. Volts: 480.
 4. Phase: Three.
 5. Hertz: 60.

2.04 BID OPTION: AIR-COOLED CHILLER SCHEDULE

- A. Capacity: 143 tons
- B. Full-Load Efficiency (EER): 9.562 Minimum.
- C. Part-Load Efficiency (NPLV): 12.75 Minimum.
- D. Low Ambient Operation: Chiller designed for operation to 30°F.
- E. Evaporator:
 - 1. Configuration: Integral to chiller.
 - 2. Pressure Rating: 150 psig (kPa).
 - 3. Fluid Type: Water.
 - 4. Design Fluid Flow Rate: 345 gpm.
 - 5. Entering-Fluid Temperature: 55 °F.
 - 6. Leaving-Fluid Temperature: 45 °F.
 - 7. Fluid Pressure Drop: 15 ft. of head.
 - 8. Fouling Factor: 0.0001 ft.² by hr. by °F/Btu.
- F. Condenser Entering-Air Temperature: 95 °F.
- G. Condenser Fan External Static Pressure: 0.0 inches w.g..
- H. Chiller Electrical Requirements:
 - 1. Minimum Circuit Ampacity (Maximum allowable): 315 A.
 - 2. Maximum Overcurrent Protection Device: 400 A.
 - 3. Volts: 480.
 - 4. Phase: Three.
 - 5. Hertz: 60.
- I. Dimensions:
 - 1. Maximum Unit Width: 9 feet.
 - 2. Maximum Unit Length: 20 feet.
 - 3. Minimum distance to solid wall: 8 feet

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Examine chillers before installation. Reject chillers that are damaged.
- B. Examine roughing-in for equipment support, anchor bolt sizes and locations, piping, and electrical connections to verify actual locations, sizes, and other conditions affecting chiller performance, maintenance, and operations before equipment installation.
 - 1. Final chiller locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 CHILLER INSTALLATION:

- A. Installation shall comply with requirements in Virginia Construction Code.
- B. Equipment Mounting: Install chiller on concrete bases using elastomeric pads.
 - 1. Minimum Deflection: 1/4 inch.

3.03 CONNECTIONS:

- A. Comply with requirements for piping in Virginia Construction Code. Survey existing conditions for arrangement of piping, fittings, and specialties.

- B. Install piping adjacent to chiller to allow service and maintenance.
- C. Evaporator Fluid Connections: Connect to evaporator inlet with shutoff valve, strainer, flexible connector, thermometer, and plugged tee with pressure gage. Connect to evaporator outlet with shutoff valve, balancing valve, flexible connector, flow switch, thermometer, plugged tee with shutoff valve and pressure gage, and drain connection with valve. Make connections to chiller with a flange or mechanical coupling.
- D. Condenser Fluid Connections (Water-Cooled Only): Connect to condenser inlet with shutoff valve, strainer, flexible connector, thermometer, and plugged tee with pressure gage. Connect to condenser outlet with shutoff valve, balancing valve, flexible connector, flow switch, thermometer, plugged tee with shutoff valve and pressure gage, and drain connection with valve. Make connections to chiller with a flange or mechanical coupling.
- E. Refrigerant Pressure Relief Device Connections: For chillers installed indoors, extend vent piping to the outdoors without valves or restrictions. Comply with ASHRAE 15. Connect vent to chiller pressure relief device with flexible connector and dirt leg with drain valve.
- F. Connect each chiller drain connection with a union and drain pipe, and extend pipe, full size of connection, to floor drain. Provide a shutoff valve at each connection.

3.04 STARTUP SERVICE:

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Verify that refrigerant charge is sufficient and chiller has been leak tested.
 - 3. Verify that pumps are installed and functional.
 - 4. Verify that thermometers and gages are installed.
 - 5. Operate chiller for run-in period.
 - 6. Check bearing lubrication and oil levels.
 - 7. For chillers installed indoors, verify that refrigerant pressure relief device is vented outdoors.
 - 8. Verify proper motor rotation.
 - 9. Verify static deflection of vibration isolators, including deflection during chiller startup and shutdown.
 - 10. Verify and record performance of chiller protection devices.
 - 11. Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.
- B. Inspect field-assembled components, equipment installation, and piping and electrical connections for proper assembly, installation, and connection.
- C. Prepare test and inspection startup reports.

3.05 DEMONSTRATION:

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain chillers.

**IFB # 2018-068 CHILLER REPLACEMENT at ROANOKE COUNTY
ADMINISTRATION BUILDING**

Attachment C

Special Terms & Conditions

SPECIAL TERMS AND CONDITIONS

Jobsite Appearance

The Contractor expressly undertakes, either directly or through its subcontractor(s), to clean up frequently all refuse, rubbish, scrap material, and debris caused by its operations, to the end that at all times the jobsite shall present a neat, orderly, and workmanlike appearance. No such refuse, rubbish, scrap material, and debris shall be left within the completed Work nor buried on site, but shall be properly protected and removed from the site and properly disposed of by a licensed landfill or otherwise as required by law or otherwise required by the Contract.

Final Cleaning

The Contractor expressly undertakes, either directly or through its subcontractor(s), before final payment, to remove all surplus material, false work, temporary structures, and debris of every nature resulting from its operations and to put the site in a neat, orderly condition. If Contractor fails to clean up at the completion of the Project, the County may do so and charge all the costs thereof to the Contractor.

Protection On Site

The Contractor expressly undertakes, both directly and through its subcontractor, to take every reasonable precaution at all times for the protection of all persons and property which may come on the jobsite or be affected by the Contractor's operation in connection with the Work.

Damage to the Work

The Contractor shall have charge of and be solely responsible for the entire Work and be liable for all damages to the Work including, but not limited to any property in the vicinity of the Work until Contractor complete the Work and it is approved and accepted by the County.

Damage to Existing Structures

Damage caused by Contractor or its subcontractors to concrete curbs, gutters, sidewalks, or any existing facility, structure, or building that may occur during the Work shall be repaired or replaced by the Contractor, at its sole expense, as directed by and to the satisfaction of the County.

Defective Work

The Contractor agrees it shall repair or replace, at Contractor's sole expense, and to the satisfaction of the County, any work, material, equipment, or part that is found, by the County, to be defective and/or not in accordance with the Contract.

Correction of Defects

If the Contractor, after notice, fails to proceed promptly to correct any defects or defective Work, the County may have defects or defective Work corrected by the County or another entity and the Contractor shall be liable for all costs and expenses incurred in doing so.