

ADDENDUM #1
September 14, 2017
CONTRACT DOCUMENTS
Fishersville WWTF HVAC Improvements

General:

1. The attached minutes of the Pre-Bid Conference held on 12 September 2017 are an integral part of the Contract Documents.
2. Bidders are reminded that the following items are required for a valid bid:
 - a) Addenda acknowledged (on the bid form)
 - b) Bid Form properly filled out
 - c) Evidence of authority to do business in the state
 - d) Bid Bond

Bidder Qualification Statement and Contractor's Environmental Requirements forms may be submitted with the bid, but are not required. If requested, the completed Bidder Qualification Statement shall be provided within 48 hours of the bid opening. The completed Contractor Environmental Requirements form shall be provided prior to the Notice of Award and the signing of the Agreement.

3. As indicated in the attached Pre-Bid Conference minutes, purchase of Bidding Documents is not required to place a bid. Digital (PDF) versions of the Bidding Documents may be found on the ACSA website at <http://www.acsawater.com/bids>. Addenda will be posted to the same site. Addenda will also be emailed to the email addresses on the Pre-Bid Conference attendance list. Potential Bidders may be added to the distribution list for Addenda by emailing Keith Lane at keith@peed-bortz.com. Bidders are solely responsible for confirming that they have received and acknowledged all Addenda prior to submitting their bid.
4. The Bidder's Total Base Bid Price on the Bid Form (Section 00410, Article 5) shall be inclusive of a \$2,500 allowance for roof repairs. These repairs are indicated on Note 10 on Sheet M2.0. Actual payment by the Owner will be equivalent to the actual invoiced cost of the repairs by the Owner-approved roofing subcontractor. The Final Contract Price will be adjusted by Change Order to reflect the difference between the \$2,500 allowance value and the actual invoiced cost of the roofing repair work. The Contractor shall be responsible for scheduling and coordination of the work at no additional cost to the Owner. Selection of a roofing subcontractor shall be subject to Owner concurrence.

The existing Stressply Mineral and Weatherking roof is currently under warranty by The Garland Company. Any repairs or work done to the roof system shall be completed by an approved roofing contractor of The Garland Company. Roofer must provide documentation that all repairs are completed in compliance with the roof warranty, and that the repairs are also warranted under the existing warranty. Repairs to the roof were recently completed by TeamCraft Roofing in Woodstock, VA, 540-295-7134.

5. Sheet E2.0 (prior to this Addendum) indicates that fan starters are to be installed on the Owner-installed railing at parapet. Bidders shall bid the project based on installing new Unistrut framing to mount electrical equipment as part of the bid. See "Changes to the Plan Sheets" Item #1 below.

Changes to the Contract Documents:

1. Revise Section 00200 – Instructions to Bidders Article 2, Item 2.02 to read:
 - 2.02 Complete ~~original~~ sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents. ~~Documents obtained on line shall not be used for bidding.~~
2. Add Section 230514 – Adjustable Frequency Motor Drives (AFD'S), attached.

Changes to the Plan Sheets:

1. Revise Note 1 on Sheet E2.0 to read as follows:

1. INSTALL EXHAUST FAN STARTERS ON ~~RAILING TO BE INSTALLED BY THE OWNER ALONG PARAPET~~ NEW UNISTRUT FRAMING PROVIDED AND INSTALLED BY THE CONTRACTOR.

2. Revise Note 10 on Sheet M2.0 to read as follows:

1. INSTALL NEW UNIT ON ADAPTER-CURB. REPAIR ROOF AROUND EXISTING CURB BEFORE SETTING NEW UNIT. ADAPTER-CURB SHALL OFFSET AWAY FROM BUILDING EDGE. **SEE ADDENDUM #1 GENERAL ITEM #4 FOR ADDITIONAL INFORMATION REGARDING ROOF REPAIR.**

Questions & Answers:

1. Verify that this project is not a wage scale project.

This project does not include wage scale or prevailing wage requirements.

2. PP-HA2 Circuit #22 AHU-600 indicated as existing 100a frame circuit breaker. Rework panel schedule for PP-HA2 AHU-600 indicates installing 225a frame breaker in space 22. 225a frame circuit breaker will not fit in same space as the 100a frame breaker. GE has told me 150a frame breaker will fit in 100a space. Is it acceptable to provide & install 150a frame 125 AT to serve AHU-600?

A 150A frame 125AT breaker is acceptable.

3. New VFD is not indicated for EF-600. Will the existing VFD be utilized for the new EF-600?

See attached VFD specification for new VFD. Install VFD at location of existing VFD. VFD to be supplied by mechanical contractor (Division 23) and installed by electrical contractor (Division 26).

4. Please provide information for the Existing Fire Alarm System. Fire Alarm Contractor that Augusta Co. Service Authority presently uses at the facility.

The building does not currently have a central fire alarm system. Smoke detectors shall tie-in to the unit controls to disable the HVAC equipment when products of combustion are detected.

PREBID CONFERENCE MINUTES
September 12, 2017 10:00 A.M.
Fishersville WWTF HVAC Improvements
Augusta County Service Authority

Order of Business

- Review of Agenda Items
- Questions and Comments
- Site Visit

Attendance List:

<i>Name:</i>	<i>Representing:</i>	<i>Phone #</i>	<i>Email</i>
<i>Ted Humphries</i>	<i>Waco Inc.</i>	<i>540-598-1088(c)</i> <i>540-962-5161(o)</i>	<i>thumphries@wacoinc.net</i>
<i>Hayden Rice</i>	<i>Waco Inc.</i>	<i>540-494-5655(c)</i> <i>540-962-5161(o)</i>	<i>hrice@wacoinc.net</i>
<i>John Neff</i>	<i>Platinum Heating and Air</i>	<i>540-890-3434(o)</i> <i>434-660-4155(c)</i>	<i>Johnneff.platinum@gmail.com</i>
<i>Chris Beverly</i>	<i>Master Engineers</i>	<i>434-848-1350</i>	<i>cbeverly@masterengineersinc.com</i>
<i>David Flick</i>	<i>Blauch Brothers Inc.</i>	<i>540-434-2589</i>	<i>dflick@blauchbrothers.com</i>
<i>Bruce Delawder</i>	<i>Allen Yoho Electric</i>	<i>540-949-6782</i>	<i>Bruce.delawder@allenyoho.com</i>
<i>Jesse Roach</i>	<i>Augusta County Service Authority</i>	<i>540-245-5670</i>	<i>jroach@co.augusta.va.us</i>
<i>Tony Morse</i>	<i>Augusta County Service Authority</i>	<i>540-245-5670</i>	<i>tmorse@co.augusta.va.us</i>
<i>Keith Lane</i>	<i>Peed & Bortz, LLC</i>	<i>540-394-3214(o)</i> <i>540-250-8379(c)</i>	<i>keith@peed-bortz.com</i>

1. Introduction:

- a. Sign-up sheet.
- b. Agenda distribution.
- c. Identification of Owner and Engineer.

Owner: Augusta County Service Authority (540-245-5670)
Casey McCracken, Jesse Roach

Engineer: Master Engineers & Designers, Inc. (434-846-1350)
Chris Beverly, PE

Bidding Administrator: Peed & Bortz, LLC (540-394-3214)
Keith Lane, PE

Bidders are asked to send all questions (technical or contract/bid-related) in writing (via email) to Keith Lane at keith@peed-bortz.com.

2. Scope of Work:

Replacement and upgrade of the HVAC equipment and systems at the primary operations/laboratory building at the Fishersville Wastewater Treatment Facility.

3. Scheduling:

- a. Bid Opening: Sealed Bids will be received by ACSA, 18 Government Center Lane, Verona, VA 24482 until **2:00 P.M. (local standard time), Thursday September 21, 2017**, and then publicly opened and read aloud at the said office, same address as above.
- b. Award of Contract: ACSA expects to make an award as soon as practical. It is anticipated that the Notice to Proceed will be issued in **October 2017**.
- c. Construction Time: The Work will be substantially completed within **150 days** after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within **180 days** after the date when the Contract Times commence to run.
- d. Bid form is located in the Contract Documents (lump sum).

4. Qualification Statement:

To demonstrate qualifications to perform the work, each bidder must be prepared to submit within 48 hours of Owner's request written evidence, such as financial data, previous experience, present commitments and other such data as may be called for in these Contract Documents. Each Bid must contain evidence of Bidder's qualification to do business in the state where the project is located or covenant to obtain such qualification prior to award of the contract. Please see Section 00450 of the Contract Documents for the required information.

5. Insurance and Bonds:

- a. Bid Bond – Each Bid must be accompanied by Bid security made payable to the Owner in an amount of five percent of the Bidder's maximum Bid Price and in the form of a certified or bank check or a Bid Bond (on form attached or similar form) issued by a surety meeting the requirement of Article 8 of the Instructions to Bidders.
- b. Bonds – Article 5 of the General Conditions. When the successful Bidder delivers the executed Conditions and the Supplementary Conditions set forth Owner's requirements as to Agreement to Owner, it must be accompanied by the required performance and payment Bonds.
- c. Insurance Required – Section 00800 of the Contract Documents outlines the insurance requirements for this project.
- d. Bidders Obtain Complete Sets of Documents – Copies of the Contract Documents may be obtained at the office of Peed & Bortz, LLC, located at 20 Midway Plaza Drive, Suite 100, Christiansburg, VA, 24073 upon payment of \$300.00 for each set. Any plan holder, upon returning the Contract Documents in good condition, within ten (10) days of bid opening will be refunded 50% (\$150) of the payment.

Purchase of Bidding/Contract Documents is not required in order to place a bid. Article 2.02 of the Instructions to Bidders will be modified by Addendum to remove the statement prohibiting bid based on documents obtained online.

6. Property, Permits

- a. Property- All of the work is within the Fishersville WWTF plant site, owned and operated by the ACSA. **Please note that this building/lab will be occupied by the Owner during the construction period. Contractor will be required to plan and stage work in a way that avoids/minimizes disruption to ACSA activities. See additional notes regarding work hours and coordination below.**
 - 1.) Bidders who wish to access the site during normal working hours may contact Jesse Roach (jroach@co.augusta.va.us) at least 36 hours prior to visitation.
- b. Permits - The Contractor is responsible for applying for and obtaining necessary building permit(s) for the project.

7. Inspection / Construction Administration

- a. The Owner may furnish an Inspector to inspect the project for the Owner.
- b. The Engineer will attend monthly progress meetings, review shop drawing submittals and payment applications, and respond to Contractor's RFIs.

Inspection frequency will be at the Owner's discretion. ACSA will also likely have a Safety Manager that may also periodically visit the site.

8. Environmental Requirements

- a. Successful contractor will be required to provide a completed certification form prior to **Notice of Award**. The form is located in Appendix A of the Contract Documents.

The signed Contractor's Environmental Requirements form may be submitted with the Bid. If not, the apparent low bidder will be notified following bid opening and requested to provide the signed form prior to NOA.

9. Owner/Engineer Items & Contractor Questions:

- a) *Work Hours: ACSA operators staff the Fishersville WWTF 7 days per week. Standard ACSA work hours are 8:00AM – 4:30PM. Extended contractor work hours should be possible through use of multiple locks on the main gate. The Contractor should coordinate work hours with ACSA.*
- b) *Considerable coordination will be required in order to accommodate the work and minimize disruption to existing lab operations. It may be practical/necessary to schedule certain portions of the work over weekends to minimize issues with lab operations. (Typical lab operations are Monday-Friday.)*
- c) *The existing pneumatic control system must remain in operation until the new electric system is online.*
- d) *The existing fiberglass fans on the fume hoods are not being replaced by the project. Required balancing activities should still include these fans.*
- e) *A couple of the existing fume hoods are currently not in operation. Required lab activities can occur in the existing operable fume hoods for now, allowing work to begin on the currently non-operable units. Once these units are up and running, the Contractor can then coordinate with the Owner to switch over usage to the upgraded fume hoods – allowing work to take place on the*

existing hoods. A reasonable period of time will be required to allow the lab technicians to make switchovers to other fume hoods.

- f) Fall protection and job safety are very important. The Contractor will be fully responsible for complying with all applicable OSHA regulations. ACSA's Safety Manager will likely periodically inspect the site.*
- g) ACSA is currently working to add handrail on the roof, but this work may not occur prior to the completion of this project. The Contract Documents currently call for some electrical equipment to be installed on this owner-installed handrail. Addendum #1 will modify this to require Unistrut mounting since the handrail may not be in place.*
- h) Note 10 on Sheet M2.0 calls for roof repair around the existing curb. The Owner and Engineer will discuss this item and consider providing additional information and/or consider an allowance to better define the scope of this portion of the work. Any change will be indicated by Addendum.*

SECTION 230514

ADJUSTABLE FREQUENCY MOTOR DRIVES (AFD'S)

PART 1 - GENERAL

1.1 MECHANICAL GENERAL PROVISIONS

A. Provisions of Division 260000 shall be made an integral part of this section.

1.2 This section specifies AFD's shown on the drawings individually mounted or provided integral to a piece of mechanical equipment.

1.3 REFERENCES

A. IEE519 Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems.

B. NEMA Standards Publications

1. ICS 1 General Standards for Industrial Controls and Systems.
2. ICS 2 Standards for Industrial Control Devices, Controllers, and Assemblies.
3. ICS 6 Enclosures for Industrial Controls and Systems.
4. MG 1 Motors and Generators.
5. MG 2 Safety Standard for Construction and Guide for Selection, Installation, and Use of Electric Motors and Generators.
6. MG 13 Frame Assignments for Alternating-current Integral-horsepower Induction Motors.

1.4 When motors are supplied with characteristics different from those indicated on the drawings, drives, feeders, overloads, disconnects, and associated devices of the correct size, type, and rating shall be provided.

1.5 LOAD

A. For each drive required, drive output current rating, load and speed range requirements shall match the motor which they serve.

B. Drive selection shall be determined by motor type, full load motor current and special requirements (if any).

C. The motor shall operate over a frequency range of 0 to 60 HZ, reaching rated nameplate horsepower (hp) at 60 HZ.

1.6 **MOTOR OPERATION:** The adjustable frequency drive shall be capable of generating a controlled adjustable frequency / adjustable voltage output at suitable power levels to operate the motor served.

1.7 The drives shall be built to applicable NEMA standards and be suitable for use as a component to meet NEC requirements. Drive is to be listed by Underwriters Laboratories (UL).

1.8 **SUBMITTALS:** Submit the following to the Engineer:

A. Master drawing index.

- B. Dimensioned outline drawing.
- C. Schematic diagram.
- D. Component list.
- E. Conduit entry / exit locations.
- F. Assembly rating, including:
 - 1. Short circuit rating.
 - 2. Voltage
 - 3. Continuous current.
- G. Cable terminal sizes.
- H. Total voltage harmonic distortion calculation.
- I. Descriptive bulletins.
- J. Product sheets.

1.9 OPERATION AND MAINTENANCE MANUALS:

- A. Prior to project closeout, submit ten (10) copies of the equipment operation and maintenance manuals.
- B. Operation and maintenance manuals shall include the following information:
 - 1. Instruction books and / or leaflets.
 - 2. Recommended renewal parts list.
 - 3. Drawings and information required by Section 1.06.

1.10 SPARE PARTS: Recommended spare parts list and prices shall be provided.

PART 2 - PRODUCTS

2.1 ADJUSTABLE FREQUENCY DRIVES (AFD)

- A. The AFD's shall provide microprocessor-based speed adjustment of three-phase motors. The variable frequency and voltage output shall provide constant volts per hertz excitation for the motor up to 60 hertz. As a minimum, the full load output current of the drives shall be 125% of the equivalent motor horsepower as listed by National Electric Code.
- B. The AFD's shall be of the Pulse Width Modulated (PWM) design converting the utility input voltage and frequency to a variable voltage and frequency output via a two-step operation. Adjustable Current Source AFD's are not acceptable. Transistors shall be used in the inverter section. GTO's and SCR's are not acceptable.
- C. The AFD's shall have an efficiency that exceeds 96% at 100% speed and load. The efficiency shall exceed 80% at 50% speed and load.
- D. The AFD's shall maintain the line side displacement power factor no less than 0.95 regardless of speed and load.

- E. The AFD's shall have a one (1) minute overload current rating of 110% for variable torque loads and 150% for constant torque loads.
- F. The AFD's shall be capable of operating any NEMA B squirrel cage induction motor, regardless of manufacturer, with a load rating within the capacity of the AFD's.
- G. Power line considerations
1. The AFD's shall be provided such that they will operate to specifications in an environment with up to 10% total harmonic distortion of the voltage (THD) as defined in IEEE-519-1992. The point of common coupling shall be the panelboard from which the drives are served.
 2. The AFD manufacturer shall perform a harmonic analysis of the electrical system at the building service entrance switchboard bus to define that full compliance to IEEE-519-1992, General Category, 5% maximum THD, and all other requirements, is attained. The analysis shall be computer generated which performs the Fourier analysis of the system. The results shall list the % voltage and current harmonic amplitudes and current amperes of all harmonics up to the 49th at the defined points of common coupling. A summary of all harmonics shall detail the % total THD, % total TDD, total power factor, and RMS line current.
 3. The contractor shall provide the required data for the AFD manufacturer to complete the harmonic analysis. Information shall include the utility short circuit amperes capability; the distribution transformer kVA and impedance; the length, size, and number of wires per phase to the motor control centers feeding the AFD's; the wire data to the AFD's from the motor control centers; the wire data to the motors from the AFD's; and all motor nameplate data. Electrical one lines shall be provided by the manufacturer which include the kVA and impedance for each transformer, the resistance and impedance of each wire run, and configuration of the electrical system used to perform the harmonic analysis.
 4. The AFD manufacturer shall verify compliance to IEEE-519-1992 in the field after all equipment is placed in operation by instrument measurement of the THD and TDD.
 5. Throughout the entire warranty period the AFD manufacturer shall be responsible for the cost of all equipment required to meet IEEE-519-1992, General or Dedicated Category, at no additional cost to the Owner. Equipment may include input isolation transformers, input reactors, DC bus reactors, output reactors, output filters, common mode filters, etc.
- H. Starting a Spinning Motor:
1. The AFD's shall be able to start into a spinning motor. The AFD's shall be able to determine the motor speed in any direction and resume operation without tripping. If the motor is spinning in the reverse direction, the AFD's shall start into the motor in the reverse direction, bring the motor to a controlled stop, and then accelerate the motor in the preset method of starting; or,
 2. AFD shall have sensing and logic that will prevent the drive from attempting to energize a spinning motor.
- I. Standard Operating Conditions:
1. Incoming Power: Nominal voltage stated above +10% to -10%, and 50 / 60 hertz (+/- 2 hertz) power to a fixed potential DC bus level.
 2. Frequency stability of +/- 0.5% for 24 hours with voltage regulation of +/-2% of maximum rated output voltage.
 3. Motor slip dependent speed regulation of 3%.

4. Five cycle carry-over during utility loss.
5. Insensitive to input line rotation.
6. Humidity: 0 to 95% (noncondensing and noncorrosive).
7. Altitude: 0 to 3,300 feet above sea level.
8. Ambient Temperature: 0 to 40 degrees C.

J. Control Functions:

1. All AFD programmable parameters shall be adjustable from a digital operator keypad located on the front door of the AFD. Parameters shall include:
 - a. Programmable frequency command (keypad, remote).
 - b. Programmable start command (keypad, remote).
 - c. Forward or reverse start, stop, and digital speed control via digital operator keypad.
 - d. Programmable maximum and minimum frequency limits.
 - e. Programmable acceleration and deceleration times.
 - f. Programmable carrier frequencies, V / Hz, and critical frequency avoidance lockout zones.
 - g. Programmable electronic overload and torque limits.
 - h. Programmable multiple attempt restart.
 - i. Programmable jog and preset speeds.
 - j. Programmable dwell time at start to maximize motor starting torque.
 - k. Programmable "Catch a Spinning Motor" function, if applicable.
2. The AFD's shall be equipped with the following door-mounted devices:
 - a. Digital or potentiometer speed control.
 - b. Hand-Off-Auto control selector switch.
 - c. Local-remote speed control selector switch.
 - d. Status lights for run, fault alarm and drive-ready stati.

K. The AFD's shall have the following system interfaces:

1. Inputs:
 - a. Process control speed reference interface to receive either a 0-10 Vdc, 4-20 mA_{dc} or speed potentiometer signal. See drawings for type to be used for this project.
 - b. Remote mode start contact.
2. Outputs:
 - a. Run relay with an isolated set of Form C contacts.
 - b. Dry contact output to indicate protective function trip.
 - c. Analog output signal proportional to output frequency.

L. Monitoring and Displays: The AFD's shall have at least an LED or LCD display indicating monitored functions as described in the following:

1. Output current.
2. Output frequency.
3. Motor rpm.
4. Trip cause.

M. Protection Functions: The AFD shall include the following protective features:

1. AC input line current limiting fuses rated 200,000 AIC for fault current protection of AC to DC converter section.
2. Overcurrent protection.
3. Overvoltage protection.

4. Undervoltage protection.
5. Overfrequency protection.
6. Phase loss and phase reversal protection.
7. Overtemperature protection.
8. Ground fault protection.
9. Adjustable current limit.
10. Line-to-line and line-to-ground output short circuit protection.
11. Variable torque overload capability shall be 125% of the motor FLA based on the NEC ratings for 60 seconds.
12. After shutdown due to overvoltage / undervoltage, phase loss or phase reversal, drive shall restart after voltage(s) have returned to within limits.

N. Enclosures shall have the following features:

1. Front accessibility with easily removable assemblies.
2. NEMA 1 rating.
3. Forced ventilation where required to dissipate heat assuming maximum ambient temperature of 40 degrees C.
4. 16-gauge steel, 30 HP and above.
6. Surfaces thoroughly cleaned and phosphatized prior to painting. They shall be primed with a corrosion-resisting coating, ANSI 61 gray finish paint.
6. Doors shall include knock-outs for mounting up to 6 operator devices. Factory mounted operator devices shall be wired at the factory.
7. Safety switch type disconnect.

O. Accessories

1. 120 vac, 3-wire control to all AFD to interface with remote dry contacts up to 500 feet away.
2. Auxiliary drive status relay with two, Form C relay pairs, rated 2 amps resistance at 120 vac.

2.2 ACCEPTABLE MANUFACTURERS

- A. ABB
- B. Danfoss/Graham
- C. Siemens
- D. Square D

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install in accordance with manufacturer's printed instructions.
- B. Mounting of AFD's not packaged in mechanical equipment.
 1. AFD's 66 inches high and less:
 - a. Bolt to wall
 - (1) Install so that top of enclosure is 72 inches above finished floor.
 - (2) If wall is an exterior wall or other wall subject to condensation, install stand-off channels on wall and bolt enclosure thereto.

- (3) Or,
 - b. Mount on floor-mounted channel frame such that top of enclosure is 72 inches above finished floor.
 - 2. AFD's greater than 66 inches high:
 - a. 24 inches deep or greater: Install on 4-inch high concrete housekeeping pad having chamfered edges.
 - b. Less than 24 inches deep: Install on 4-inch high concrete housekeeping pad having chamfered edges and bolt to wall for stability.
- C. WARNING SIGNAGE conforming to NFPA 70E shall be installed on the equipment.

3.2 FIELD QUALITY CONTROL

- A. Provide the services of a qualified factory-trained manufacturer's representative to assist the Contractor in installation and start-up of the equipment specified under this Section. The manufacturer's representative shall provide technical direction and assistance to the Contractor in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained herein.
- B. The following minimum work shall be performed by the Contractor under the technical direction of the manufacturer's service representative.
 - 1. Inspection and final adjustments.
 - 2. Operational and functional checks of AFD's and spare parts.
- C. The Contractor shall provide three (3) copies of the manufacturer's field start-up report before final payment is made.

3.3 MANUFACTURER'S CERTIFICATION:

- A. A qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted, and tested in accordance with the manufacturer's recommendations.
- B. The Contractor shall provide three (3) copies of the manufacturer's representative's certification before final payment is made.

3.4 TRAINING

- A. The Contractor shall provide a training session for up to three Owner's representatives for one normal workday at a jobsite.
- B. The training session shall be conducted by a manufacturer's qualified representative.

END OF SECTION