SCOPE OF WORK

(Document # JSD-002)

April 22, 2019

Jenkintown School District

BAS Upgrade

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1. PROPOSAL GUIDELINES

See RFP document for proposal schedule and submission information. E-mail any specific questions regarding schedule or scope by 5:00pm on May 2, 2019 to James Waechter of The Stone House Group at waechter@theshg.com. Responses to all questions received will be published to all RFP respondents by 5:00pm on May 3, 2019.

The person designated above shall be the only contact for all inquiries regarding any aspect of this Request for Proposal process and its requirements. Do not contact any other The Stone House Group employee regarding this RFP unless specifically indicated or instructed to do so in writing by the person designated above. If any Respondent attempts any unauthorized communication, The Stone House Group may, in its sole discretion, recommend to reject that Respondent's Proposal.

2. ANTICIPATED SCHEDULE

The anticipated schedule is provided in the RFP document. Final schedule is to be mutually agreed upon between The Stone House Group, Jenkintown School District, and the selected ESCo.

3. PROJECT SUMMARY & OVERVIEW

The Stone House Group was contracted by Jenkintown School District to perform a Technical Assessment and Level 1 Energy Audit with the intent of improving comfort by upgrading the District's Building Automation System (BAS) and simultaneously reducing energy consumption. The reports that have been completed provide a review of Jenkintown School District's facilities and identified several opportunities to reduce their energy consumption while upgrading some of their older infrastructure. The intent of this RFP is to secure an ESCo partner who will be able to execute the scope of work detailed herein using select subcontractors. It must be noted that qualifiactions will not only be evaluated on anticipated pricing but also on the contractors' ability to work with The Stone House Group and Jenkintown School District to deliver high quality solutions in a timely manner.

We look forward to working with each of our selected vendors on this diverse project, and we thank you in advance for your time and efforts.

4. SCOPES OF WORK

4.1. STANDARD SCOPE REQUIREMENTS

1) SUBCONTRACTOR will furnish and install the scopes of work in accordance with all current federal, state and local codes, publications and standards including, but not limited to ANSI, NFPA and OSHA.
2) SUBCONTRACTOR will provide the appropriate supervision in both the field and office to maintain and execute the work according to the schedule and contract documents.
3) SUBCONTRACTOR will furnish all labor, supervision, material, equipment, tools, hoisting, scaffolding, freight, unloading, traffic control, taxes, parking, material and labor escalation, overhead, clean-up, trash removal and other miscellaneous costs in order to provide a complete and working system.
4) SUBCONTRACTOR to provide all necessary costs for inspections, permits, licenses, plan checks, connection fees, etc. as required by authority having jurisdiction.
5) SUBCONTRACTOR shall remove and properly dispose of waste generated by this scope of work on a daily basis.
6) SUBCONTRACTOR to provide all material and equipment for temporary protection of existing facilities and surrounding work.
7) SUBCONTRACTOR is responsible for field verification of materials prior to installation or submittal of shop drawings.
8) SUBCONTRACTOR acknowledges that JSD has employed other contractors to work on the project.
9) SUBCONTRACTOR will coordinate with other contractors so the work can proceed in an orderly, productive, and continuous operation. Due to the nature of the work, multiple move-ins may be required and SUBCONTRACTOR shall include these in the cost of work.
10) SUBCONTRACTOR to provide all necessary penetrations as required for a complete working system.
11) SUBCONTRACTOR to provide all waterproofing, caulking, damp proofing, etc. for penetrations created to complete the work including all roof penetrations and repair.
12) SUBCONTRACTOR to provide all temporary heat, cooling, lighting and weather protection necessary to complete the work.
13) SUBCONTRACTOR to provide and install all necessary framing, hangars, inserts, racking, suspension systems, backing/blocking, bracing, sleeves, fasteners, caulking, firecaulking for a complete system.
14) SUBCONTRACTOR to provide miscellaneous patching and repair due to work.
15) If SUBCONTRACTOR disturbs an area that is suspected to be asbestos, SUBCONTRACTOR shall seal off the area, post hazard signs for the area, and contact JSD and the Owner.
16) SUBCONTRACTOR must provide 2 hard copies and two electronic (CD or DVD) copies of their IOM manuals that include product cut sheets of each unique piece of equipment. Included in the IOM manuals must be details on product warranties and procedures for warranty claims. Warranty must be a minimum of one year for all installed equipment and labor. Warranty shall include all labor and materials to execute warranty work.
17) SUBCONTRACTOR must provide a minimum of 8 hours of on-site training to key facility personnel. Training will be videotaped by SUBCONTRACTOR. Training syllabus must be approved by The Stone House Group prior to beginning training.
18) SUBCONTRACTOR must provide all locates (public and private) necessary for areas that will be impacted by their scope of work.

4.2.UPGRADE & CONSOLIDATE BAS

4.2.1. DESCRIPTION

Jenkintown School District requires an upgraded and modernized Building Automation System ("BAS"). The District has selected the BACnet-enabled Tridium Niagara N4 platform as the desired solution. A new BAS will deliver improved control of the HVAC systems, a new and intuitive graphical interface, web-enabled access, and energy savings. Energy savings will be achieved primarily through more appropriate scheduling of HVAC systems and more energy-efficient control.

DOCUMENTS INCLUDED IN SCOPE OF WORK
§230923 - DDC for HVAC.pdf
2008 Teletrol As-Builts.pdf

4.2.2. CONTRACTOR SCOPE OF WORK

4.2.2.1. MECHANICAL

1) NONE

4.2.2.2. ELECTRICAL

1) NONE

4.2.2.3. CONTROLS

1) Consolidate (2) two existing controls systems.
2) Install Niagara Framework, version 4.4 or newer, on a new vendor-provided server, minimizing the use of Java and implementing HTML5 wherever possible. Refer to *§230923 - DDC for HVAC.pdf* for more detailed information.
3) Migrate the existing Teletrol system architecture to the N4 platform. Refer to *2008 Teletrol As-Builts.pdf* for schematics of the existing system architecture. System schematics are not 100% accurate.
4) Replace existing Teletrol controllers with new BACnet TCP/IP or BACnet MS/TP Tridium-capable controllers.
   a) Where existing network wiring is in good condition, it may be reused.
   b) Where existing network wiring is in poor condition, furnish and install new network wiring.
5) Replace existing TCS Ubiquity controllers with new BACnet TCP/IP or BACnet MS/TP Tridium-capable controllers.
   a) The existing equipment known to be on the TCS Ubiquity system include the following:
      i) Chiller Plant
      ii) Boiler Plant
      iii) AHU-2
      iv) AHU-6
      v) AHU-7
      vi) EF-10
      vii) EF-11
      viii) AHU-19
      ix) UH-5
   b) Other equipment may also be controlled by this system and it all must migrate to the new BAS.
6) Wire controllers into new Tridium network.
   a) Where existing network wiring is in good condition, it may be reused.
   b) Where existing network wiring is in poor condition, furnish and install new network wiring.
7) Integrate all unit ventilators into graphics, including new ones added since 2006 renovation.

a) In classroom A107, unit ventilator closest to exterior door should be named as UV-9A in BAS.
b) AC-4 in Media Center/Library.

8) Implement Project Haystack tagging on all points throughout the system.
9) Intuitive graphics
   a) Use Room numbers according to door placards. Do not use room numbers from old drawings.
10) Optimum start
11) Scheduling
12) Integrate utility meters (PV, electric, gas)
13) AFDD, Alarms, Alarm Suppression
   a) Integrate boiler alarms
   b) Integrate chiller alarms
   c) Integrate unitary equipment alarms
   d) Send e-mail alarm notifications to responsible parties

4.2.2.4. ARCHITECTURAL

1) NONE

4.2.2.5. DEMOLITION

1) CONTRACTOR shall properly dispose of all waste generated during the execution of this scope.

4.3.MODIFY CONTROLS

4.3.1. DESCRIPTION

The Sequences of Operation for most equipment are not operating as intended and need modification to efficiently deliver comfort to their respective spaces. New best-in-class sequences of operation, in accordance with ASHRAE Guideline 36 where applicable, should be implemented for AHUs and VAV boxes. All other systems' sequences need to be best-in-class as well and interface with the ASHRAE Guideline 36 sequences wherever appropriate.

DOCUMENTS INCLUDED IN SCOPE OF WORK
ASHRAE Guideline 36, Public Review # 3

4.3.2. CONTRACTOR SCOPE OF WORK

4.3.2.1. MECHANICAL

1) AHU-15
   a) Furnish and install new 40"x20" RAD in horizontal RA ductwork in attic.
   b) Receive from CONTROLS and install new RAD actuator.
   c) Furnish and install new 20"x20" EAD in vertical exhaust ductwork in attic.
   d) Receive from CONTROLS and install new EAD actuator.
2) AHU-17
   a) Furnish and install new 40"x20" RAD in horizontal RA ductwork in attic.
   b) Receive from CONTROLS and install new RAD actuator.
   c) Furnish and install new 20"x20" EAD in vertical exhaust ductwork in attic.
   d) Receive from CONTROLS and install new EAD actuator.
3) FCU-2
   a) Furnish and install new __"x__" RAD in horizontal RA ductwork above ceiling.
   b) Receive from CONTROLS and install new RAD actuator.

4.3.2.2. ELECTRICAL

1) NONE

4.3.2.3. CONTROLS

1) Tune all PID loops – including those on unit ventilators – for proper stable, accurate, and reliable control.
   a) VFDs
   b) Dampers
   c) Valves
   d) Reset variables
2) Rewire freeze-stats to break power to the fan(s) enable relay and HW control valve. Integrate freeze-stats to BAS so the following happens upon a trip:
   a) Command HW valve open,
   b) Command fan(s) to stop,
   c) Indicate alarm trip in graphics.
3) Replace global OA humidity sensor.
4) HW Plant
   a) Interlock primary HWP with enable signal for respective boiler. Primary pump for lag boiler should be off when lag boiler is not enabled to run.
   b) Implement automated Lead/Lag boiler control.
   c) Monitor boiler status in BAS and aggregate run hours.
   d) Automatically rotate Lead boiler duty based on run hours every 14 days (adj.).
   e) Implement HWST reset based on building needs.
      i) Deliver maximum HWST during MWU.
   f) Configure HWP VFDs with the same parameters so they operate at the same speeds whe both are running.
   g) Implement Lead/Lag secondary HWP duty based on run hours.

h) Monitor secondary HWP status in BAS and aggregate run hours.
i) Automatically rotate Lead HWP duty based on run hours every 14 days (adj.).
j) Reset HWST using Trim & Respond logic based on ASHRAE Guideline 36.

5) CHW Plant
   a) Interlock primary HWP with enable signal for respective boiler. Primary pump for lag boiler should be off when lag boiler is not enabled to run.
   b) Implement automated Lead/Lag primary CHWP control.
   c) Monitor primary CHWP status in BAS and aggregate run hours.
   d) Automatically rotate Lead primary CHWP duty based on run hours every 14 days (adj.).
   e) Implement CHWST reset based on building needs.
      i) Deliver minimum CHWST during MCD.
   f) Configure CHWP VFDs with the same parameters so they operate at the same speeds when both are running.
   g) Implement Lead/Lag secondary CHWP duty based on run hours.
   h) Monitor secondary CHWP status in BAS and aggregate run hours.
   i) Automatically rotate Lead secondary CHWP duty based on run hours every 14 days (adj.).
   j) Reset CHWST using Trim & Respond logic based on ASHRAE Guideline 36.
6) Rewire existing freeze-stats to break power to the fan(s) enable relay and HW control valve. Wire all new freeze-stats to do the same. Integrate all freeze-stats to BAS so the following happens upon a trip:
   a) Command HW valve open;
   b) Command system fan(s) to stop;
   c) Indicate alarm trip in graphics.
7) AHU-01
   a) Relocate MAT sensor to MA plenum.
   b) Replace CO_2 sensor with new sensor that is able to be calibrated.
   c) Implement new control logic in accordance with ASHRAE Guideline 36.
8) AHU-03
   a) RAD does not respond to varying BAS commands. Troubleshoot or replace as required.
   b) Relocate MAT & RAT sensors into their separate airstreams.
   c) Properly install pneumatic tubing for dP switch across SF.
   d) Furnish & install new freeze-stat after heating coil.
9) AHU-06
   a) Relocate MAT sensor to MA plenum.
   b) Furnish & install new freeze-stat after heating coil.
   c) Wire existing EAD to controller.
   d) Replace CO_2 sensor with new sensor that is able to be calibrated.
   e) Furnish & install new AFMS in OA duct (shared with AHU-07).
   f) Interlock system with kitchen and dishwasher exhaust fans so the unit provides sufficient make-up air when these exhaust systems are operating.
   g) Implement new control logic based on ASHRAE Guideline 36.
10) AHU-07
   a) Replace RAH sensor.
   b) Relocate MAT sensor to MA plenum.
   c) Replace CO_2 sensor with new sensor that is able to be calibrated.
   d) Furnish & install new freeze-stat after heating coil.
   e) Implement new control logic in accordance with ASHRAE Guideline 36.
11) AHU-08
   a) Relocate MAT sensor to MA plenum.
   b) Replace CO_2 sensor with new sensor that is able to be calibrated.
   c) Furnish & install new freeze-stat after heating coil.
   d) Implement new control logic in accordance with ASHRAE Guideline 36.
12) AHU-09
   a) Relocate MAT sensor to MA plenum.

b) Replace CO_2 sensor with new sensor that is able to be calibrated.
c) Furnish & install new freeze-stat after heating coil.
d) Implement new control logic in accordance with ASHRAE Guideline 36.

13) AHU-10
a) Relocate MAT sensor to MA plenum.
b) Replace CO_2 sensor with new sensor that is able to be calibrated.
c) Furnish & install new freeze-stat after heating coil.
d) Implement new control logic in accordance with ASHRAE Guideline 36.

14) AHU-11
a) Relocate MAT sensor to MA plenum.
b) Replace CO_2 sensor with new sensor that is able to be calibrated.
c) Furnish & install new freeze-stat after heating coil.
d) Implement new control logic in accordance with ASHRAE Guideline 36.

15) AHU-12
a) Relocate MAT sensor to MA plenum.
b) Replace CO_2 sensor with new sensor that is able to be calibrated.
c) Furnish & install new freeze-stat after heating coil.
d) Implement new control logic in accordance with ASHRAE Guideline 36.

16) AHU-13
a) Furnish & install new freeze-stat after heating coil.
b) Implement new control logic in accordance with ASHRAE Guideline 36.

17) AUH-14
a) Furnish & install new RA CO_2 sensor that is able to be calibrated.
b) Implement new control logic in accordance with ASHRAE Guideline 36.

18) AHU-15
a) Furnish & install new RA CO_2 sensor that is able to be calibrated.
b) Troubleshoot starter relay wiring or replace as required.
c) Furnish to MECHANICAL new modulating damper actuator for RAD, controlled by 4-20mA signal from AHU controller.
d) Furnish to MECHANICAL new modulating damper actuator for EAD controlled by 4-20mA signal from AHU controller.
e) Relocate DAT sensor to after CHW coil.
f) Implement new control logic in accordance with ASHRAE Guideline 36.

19) AHU-16
a) Relocate MAT sensor to MA plenum.
b) Furnish & install new RA CO_2 sensor that is able to be calibrated.
c) Furnish and install new modulating damper actuator for RAD within mixing box, controlled by 4-20mA signal from AHU controller.
d) Implement new control logic in accordance with ASHRAE Guideline 36.

20) AHU-17
a) Furnish & install new RA CO_2 sensor that is able to be calibrated.
b) Troubleshoot freeze-stat wiring or replace as required.
c) Furnish to MECHANICAL new modulating damper actuator for RAD, controlled by 4-20mA signal from AHU controller.
d) Furnish to MECHANICAL new modulating damper actuator for EAD controlled by 4-20mA signal from AHU controller.
e) Relocate DAT sensor to after CHW coil.
f) Implement new control logic in accordance with ASHRAE Guideline 36.

21) AHU-18
a) Relocate MAT sensor to MA plenum.
b) Furnish and install new modulating damper actuator for RAD within mixing box, controlled by 4-20mA signal from AHU controller.
c) Implement new control logic in accordance with ASHRAE Guideline 36.

22) AHU-19
a) Relocate MAT sensor to ductwork with mixed airstream.
b) Properly install pneumatic tubing for dP switch across SF.

23) AHU-20

a) Troubleshoot operation of exhaust fan (EF-15) as it was not running despite its VFD being in hand at full speed.

24) ERU-1
   a) Troubleshoot RF contactor or replace as necessary.
   b) Furnish and install CTs to monitor status of:
      i) Supply Fan
      ii) Return Fan
      iii) Wheel
   c) Furnish and install dP transducer to monitor pressure drop across the wheel as a proxy for frost build-up.
      i) When dP increases to a pressure drop corresponding to 5% (adj.) or more blockage for a duration of 3 minutes (adj.), implement frost control mode.
      ii) When dP decreases to a pressure drop corresponding to 1% (adj.) or less blockage for a continuous duration of 10 minutes (adj.), return to normal operation.
      iii) Frost Control Mode
         (1) RF operates continuously.
         (2) Wheel operates continuously.
         (3) Cycle SF on for 2 minutes of continuous operation every 5 minutes.
         (4) Cycle RF off for 3 minutes every 5 minutes.
   d) Interlock operation with AHU-01 when energy recovery is desirable.
      i) OAT is 5°F (adj.) or more above or below RAT
   e) Disable when any of the following components are in alarm:
      i) Supply Fan
      ii) Return Fan
      iii) Wheel
25) FCU-1
   a) Furnish & install new RA CO_2 sensor that is able to be calibrated.
   b) Furnish & install new freeze-stat after heating coil.
   c) Implement new control logic in accordance with ASHRAE Guideline 36.
26) FCU-2
   a) Furnish & install new RA CO_2 sensor that is able to be calibrated.
   b) Furnish & install new freeze-stat after heating coil.
   c) Furnish to MECHANICAL new modulating damper actuator for RAD, controlled by 4-20mA signal from AHU controller.
   d) Implement new control logic in accordance with ASHRAE Guideline 36.
   e) Control this unit and the unit ventilator serving Music Room B118 using the same setpoints and space temperature sensor.
   f) Troubleshoot operation of exhaust fan (EF-21) as it was not running despite it being commanded on.
27) Troubleshoot EF operation as required. Replace components as required to restore full and proper operation.
28) Ensure all EFs are depicted in the BAS graphics with fan command, fan interlock (where applicable), status, and alarm.

4.3.2.4. ARCHITECTURAL

1) NONE

4.3.2.5. DEMOLITION

1) CONTRACTOR shall properly dispose of all waste generated during the execution of this scope.

4.4.HVAC REPAIR

4.4.1. DESCRIPTION

Certain mechanical components need troubleshooting, replacement, or installation. VAV-1210 has an incorrectly sized duct connection & flow rings; its damper is also bent around the damper shaft. Classroom D116 has no return air path back to its AHU. Many exhaust fans in the building do not operate. Several systems need to be rebalanced.

DOCUMENTS INCLUDED IN SCOPE OF WORK
§233616 - VAV Terminals.pdf
D116 RA sketch.pdf
§230593 - TAB for HVAC.pdf

4.4.2. CONTRACTOR SCOPE OF WORK

4.4.2.1. MECHANICAL

1) Replace VAV-1210 terminal box. See *§233616 - VAV Terminals.pdf* for additional requirements.
   a) Isolate HW coil.
   b) Disconnect and drain HW coil.
   c) Disconnect existing ductwork from terminal box.
   d) Remove medium pressure ductwork back to supply trunk.
   e) Remove terminal box & coil.
   f) Furnish and install new terminal box with HW reheat coil. Box shall have 5"ø inlet.
   g) Furnish and install new 5"ø spiral ductwork between trunk duct and terminal box inlet. Ensure minimum of 30" of straight duct leading into terminal box connection.
   h) Connect terminal box to existing low pressure ductwork. Furnish and install transition piece(s) as required.
   i) Insulate ductwork
      i) Low pressure ductwork to be lined with 1" thick blanket insulation to match existing.
      ii) Medium pressure ductwork to be wrapped with foil-faced 1" thick fiberglass batt.
   j) Connect existing HW piping to coil. Water shall be counter-flow to the airstream.
   k) Flush and fill coil and new piping.
   l) Purge air from coil before opening isolation valves.
   m) Balance new VAV box as part of Rebalancing scope (below).
2) Install return air path for D116. See *D116 RA sketch.pdf* for schematic.
   a) Cut hole for 10"ø duct between D116 & D115.
   b) Cut hole for 16"×16" register box in bottom of soffit in NE corner of D115.
   c) Cut hole for 10"ø duct between D116 & D118.
   d) Furnish and install 10"ø flexible transfer duct between D116 & D118, above ceiling grid in both spaces.
   e) Furnish and install 10"ø flexible transfer duct between D116 & D115, above ceiling grid in D116.
   f) Furnish and install two (2) 24"×24" perforated return grilles within a single 48"×24" ceiling grid rectangle in SE corner of D116. Titus 8R or equal, with white baked enamel finish.
   g) Furnish and install 24"×24" perforated return grille in SW corner of D116. Titus 8R or equal, with white baked enamel finish.
   h) Furnish and install 16"×16" register box for duct termination in bottom of soffit in D115.
   i) Furnish and install 16"×16" perforated return grille on register box in D115, Titus 8R or equal, with white baked enamel finish.
   j) Connect round ducts to grilles and register box as required.

3) Troubleshoot non-functioning exhaust fans listed in table below to restore proper operation.
   a) Grayed-out rows have been proven to operate.

TAG	LOCATION	SPACE SERVED	ASSOCIATED EQUIPMENT
EF-01	C-Roof	C123*	-
EF-02	C-Roof	C108*	-
EF-03	B-Roof	B121	Kitchen Hood
EF-04	B-Roof	B-Restrooms	-
EF-05	B-Roof	B121	Dishwasher
EF-06	B-Roof	B124	-
EF-07	B-Roof	B130	-
EF-08	B-Roof	B119/120	-
EF-09	B-Roof	Crawl	-
EF-10	B-PH	Cafeteria	AHU-6
EF-11	B-PH	Cafeteria	AHU-7
EF-12	A-Attic	A-Restrooms	-
EF-13	A-Crawl	A016*	elevator
EF-14	D-Roof	D106	AHU-12
EF-15	D-Roof	D100	AHU-20
EF-16	D-Roof	D206*	-
EF-17	E-Attic	E208	kiln hood
EF-18	E002*	E002*	elevator
EF-19	D-Attic	D213	fume hood
EF-20	D-Attic	D-Restrooms	-
EF-21	B-Roof	B118	FC-2
EF-22	D-Attic or F-Roof		-
EF-23	F-Roof		-
EF-24	F-Roof		-
EF-25	F-Roof		-
EF-26	D-Attic or F-Roof	D204	-
EF-27	F-Roof		-
EF-28	???		AHU-08
EF-29	???		AHU-09
EF-30	???		AHU-10
EF-31	???		AHU-11
???	B-Roof	A114/115	-
???	F-Roof	Boys Lockers	-
* room # taken from plans, which do not match door placards			

4) Close all UV relief dampers in elementary school attic.
5) Rebalance the following airside systems.
   a) See *§230593 - TAB for HVAC.pdf* for balancing requirements.
   b) New airflow setpoints for many systems will be provided by The Stone House Group prior to commencement of work.
   c) All VAVs
   d) AHU-01, RF-01, and ERU, including AFMSs.
   e) Cafeteria AHUs 6 & 7.
   f) AHU-12 and EF-15, including AFMSs
   g) AHU-14
   h) Theater AHUs 15 & 17
   i) AHU-16
   j) AHU-20
   k) FCU-1
   l) FCU-2

6) FCU-1 Filtration
   a) Furnish and install filter section for this unit. Filter section shall be the full size of the unit opening and capable of holding 2" pleated filters.

4.4.2.2. ELECTRICAL

1) NONE

4.4.2.3. CONTROLS

1) VAV-1210
   a) Disconnect control wiring from existing controller.
   b) If replacing VAV controllers (section 4.5 below),
      i) Disconnect wiring to existing HW valve actuator.
      ii) Disconnect and remove existing HW valve actuator, Belimo model # TR24-3-T, from valve body.
      iii) Furnish and install new HW valve actuator, Belimo model # TFRB24-SR on valve body.
   c) If <u>not</u> replacing VAV controllers (section 4.5 below),
      i) Disconnect VAV controller from existing box and install on new box.
   d) Reinstall wiring to VAV controller as required.
2) D116 Return Air Path
   a) NONE
3) Exhaust Fan Troubleshooting
   a) Integrate command (where applicable) and status of each EF to BAS graphics.
   b) Furnish and install relays/contactors as required.
   c) Furnish and install current transducers/switches as required.
   d) Support MECHANICAL as required, overriding fan commands, tracing wiring to locate fans, monitoring fan status, etc.
4) Close UV Relief
   a) NONE
5) Rebalancing
   a) Support MECHANICAL balancer as required to open & close dampers, report airflows & VFD speeds, record pressure drops & damper positions, and configure all parameters for new ASHRAE Guideline 36 sequences of operation.
6) FCU-1
   a) NONE

4.4.2.4. ARCHITECTURAL

1) NONE

4.4.2.5. DEMOLITION

1) CONTRACTOR shall properly dispose of all waste generated during the execution of this scope.

4.5.REPLACE VAV CONTROLLERS

4.5.1. DESCRIPTION

AHU-01 & AHU-12 are multi-zone VAV air handling units. Their combined twenty-six (26) terminal boxes have original Teletrol controllers, model *TLC i-VAV 01-333*, that require the Teletrol Edifice software to modify control logic. Additionally, each box has a HW reheat coil with floating point control. This measure will replace the VAV controllers and the HW valve actuators. The scope below is written for one terminal box, but is to be priced and completed for all of the VAV boxes served by AHU-01 and AHU-12.

DOCUMENTS INCLUDED IN SCOPE OF WORK
M5.1C – AREA "C" VENTILATION PLAN.pdf
M5.3D – AREA "D" ATTIC VENTILATION PLAN.pdf

4.5.2. CONTRACTOR SCOPE OF WORK

4.5.2.1. MECHANICAL

1) NONE

4.5.2.2. ELECTRICAL

1) NONE

4.5.2.3. CONTROLS

1) Disconnect all power, communication, and device wiring from existing terminal box controller.
   a) Where existing network wiring is in good condition, it may be reused.
   b) Where existing network wiring is in poor condition, furnish and install new network wiring.
2) Remove existing controller from terminal box.
3) Furnish and install new, BACnet compliant, Tridium N4 capable, VAV controller on terminal box.
4) Remove existing Belimo actuator from HW valve, model # TR24-3-T. Disconnect wiring from actuator as required.
5) Furnish & install new Belimo actuator on HW valve, model # TFRB24-SR. Reconnect wiring to actuator.
6) Integrate spare dry contact on lighting occupancy sensor, Watt Stopper model DT-200, to BAS.
   a) Implement vacant standby mode where zone setpoints relax 2°F (adj.) when occupancy is not detected for 15 continuous minutes (adj.).
   b) Restore zone to normal occupied mode when occupancy is detected continuously for one minute (adj.).
7) Where applicable, integrate FTR to VAV controller, using a single temperature sensor for the zone. This has been identified in the following rooms; it may also exist elsewhere.
   a) D101
   b) D102
   c) D103
   d) D104
8) Connect power, communication, and device wiring to new controller.
9) Ensure VAV box graphics display commanded (or estimated) damper position. If estimated, recalibrate damper position at least once a week.
10) Ensure VAV box graphics display commanded (or estimated) HW valve position. If estimated, recalibrate valve position at least once a week.
11) Implement new control logic based on ASHRAE Guideline 36.

4.5.2.4. ARCHITECTURAL

1) NONE

4.5.2.5. DEMOLITION

1) CONTRACTOR shall properly dispose of all waste generated during the execution of this scope.

4.6.ADD/ALT 1: VFDS FOR SINGLE-ZONE AHUS

4.6.1. DESCRIPTION

All single-zone AHUs operate at full speed whenever they are running, which is unnecessary and wasteful. This measure will install VFDs on select motors based on available funds.

DOCUMENTS INCLUDED IN SCOPE OF WORK
§262900 – VFDs.pdf

4.6.2. CONTRACTOR SCOPE OF WORK

4.6.2.1. MECHANICAL

1) NONE

4.6.2.2. ELECTRICAL

1) Provide "a la carte" pricing to receive from CONTROLS and install new 480V/3Φ VFD on motors with the following nameplate ratings:
   a) 3 hp
   b) 5 hp
   c) 7½ hp
   d) 10 hp
   e) 15 hp
2) See attached specification, *§262900 – VFDs.pdf*, for installation requirements.

4.6.2.3. CONTROLS

1) See attached specification, *§262900 – VFDs.pdf*, for additional requirements.
2) Provide "a la carte" pricing to furnish to ELECTRICAL new 480V/3Φ VFD on motors with the following nameplate ratings:
   a) 3 hp
   b) 5 hp
   c) 7½ hp
   d) 10 hp
   e) 15 hp
3) VFDs are to be ABB ACH500 series without bypass or a white-label version of the same.
4) Provide an additional line-item price to integrate VFD to BACnet network.

4.6.2.4. ARCHITECTURAL

1) NONE

4.6.2.5. DEMOLITION

1) CONTRACTOR shall properly dispose of all waste generated during the execution of this scope.

4.7.ADD/ALT 2: SOLAR PV DATA ACQUISITION

4.7.1. DESCRIPTION

Jenkintown School District has a __kW PV array installed on the roof of the "C" wing that had a monitoring system installed. The monitoring system is no longer supported. This scope will install a new monitoring system for integration to the BAS and existing dashboard display in the main vestibule.

DOCUMENTS INCLUDED IN SCOPE OF WORK
NONE

4.7.2. CONTRACTOR SCOPE OF WORK

4.7.2.1. MECHANICAL

1) NONE

4.7.2.2. ELECTRICAL

1) Furnish and install new solar PV DAS, Campbell Scientific Solar 200, or similar. Reuse any components of abandoned Fat Spaniel system
2) DAS shall provide graphics displaying real-time electric production and greenhouse gas emissions reductions.
3) System shall integrate to Tridium N4 building automation system via JACE or BACnet communication.

4.7.2.3. CONTROLS

1) Integrate Solar DAS to BAS as required.

4.7.2.4. ARCHITECTURAL

1) NONE

4.7.2.5. DEMOLITION

1) NONE

4.8.ADD / ALT 3: E.S. GYM RELIEF FAN REPLACEMENT

4.8.1. DESCRIPTION

The stage in the elementary school gym has a relief fan that needs to be replaced.

DOCUMENTS INCLUDED IN SCOPE OF WORK
NONE

4.8.2. CONTRACTOR SCOPE OF WORK

4.8.2.1. MECHANICAL

1) Remove existing 24"×24" thru-wall exhaust fan and barometric damper in the south wall of the elementary school gym stage.
2) Furnish and install new 24"×24" thru-wall exhaust fan and barometric damper in the south wall of the elementary school gym stage with one of similar airflow performance and motor size.
3) Furnish and install new hood over louver to protect the louvers of the barometric damper from impact. Paint to match existing brick wall.

4.8.2.2. ELECTRICAL

1) Disconnect power from existing thru-wall exhaust fan.
2) Connect power to new thru-wall exhaust fan.
3) If necessary, furnish and install 2-gang junction box and switch to serve as disconnect.

4.8.2.3. CONTROLS

1) Exhaust Fan Replacement
   a) Implement thermostatic control of fan when AHU-03 is running.
   b) Implement economizer relief functionality when AHU-03, AHU-04, or AHU-05 is running.

4.8.2.4. ARCHITECTURAL

1) NONE

4.8.2.5. DEMOLITION

1) CONTRACTOR shall properly dispose of all waste generated during the execution of this scope.

4.9.ADD / ALT 4: SCHEDULE EXTENSION

4.9.1. DESCRIPTION

Jenkintown School District is open to the possibility of extending the project schedule to October 31 if installation costs can be reduced by avoiding the majority of the summer construction season.

DOCUMENTS INCLUDED IN SCOPE OF WORK
NONE

4.9.2. CONTRACTOR SCOPE OF WORK

4.9.2.1. MECHANICAL

1) Provide a revised price for each previous scope to reflect an extended schedule as described above.

4.9.2.2. ELECTRICAL

1) Provide a revised price for each previous scope to reflect an extended schedule as described above.

4.9.2.3. CONTROLS

1) Provide a revised price for each previous scope to reflect an extended schedule as described above.

4.9.2.4. ARCHITECTURAL

1) NONE

4.9.2.5. DEMOLITION

1) NONE

5. GENERAL INFORMATION

5.1.PHASE 1 MECHANICAL DRAWINGS

See mechanical drawings from Phase 1 2006 HVAC renovation throughout building, dated May 26, 2006.

5.2.PHASE 2 MECHANICAL DRAWINGS

See mechanical drawings from Phase 2 2006 HVAC renovation throughout building, dated May 31, 2006.

5.3.PHASE 1 MECHANICAL SPECIFICATIONS

See Phase 1 mechanical specfications from 2006 HVAC renovation throughout building. Refer to these for additional information on products, equipment, or devices not addressed in the specification sections provided above.

5.4.PHASE 2 MECHANICAL SPECIFICATIONS

See Phase 2 mechanical specfications from 2006 HVAC renovation throughout building. Refer to these for additional information on products, equipment, or devices not addressed in the specification sections provided above.

6. ATTACHMENTS & EXHIBITS

6.1.SUPPORTING DOCUMENTS FOR 4.2

See specification §230923 - DDC for HVAC.pdf for additional requirements for DDC Building Automation System.

See 2008 Teletrol As-Builts.pdf for a mostly-accurate depiction of the existing BAS architecture. Additional details will be provided to the selected ESCo parter.

6.2.SUPPORTING DOCUMENTS FOR 4.3

See ASHRAE Guideline 36, Public Review # 3.pdf for the last public review version of the document. The final published version must be purchased from the ASHRAE Bookstore.

6.3.SUPPORTING DOCUMENTS FOR 4.4

See specification §233616 - VAV Terminals.pdf for additional requirements for VAV terminal boxes.

See D116 RA sketch.pdf for a layout of the proposed transfer air solution in D116.

See specification §230593 - TAB for HVAC.pdf for additional requirements for VAV terminal boxes.

6.4.SUPPORTING DOCUMENTS FOR 4.5

See M5.1C – AREA “C” VENTILATION PLAN.pdf for VAV box locations within the Administraiton offices.

See M5.3D – AREA “D” ATTIC VENTILATION PLAN.pdf for VAV box locations within the D-wing attic.

6.5.SUPPORTING DOCUMENTS FOR 4.6

See specification §262900 – VFDs.pdf for additional requirements for Variable Frequency Drives.