SECTION 00150
UPPER MISSOURI RIVER BREAKS NATIONAL MONUMNET INTERPRETIVE CENTER
BOILER REPLACEMENT

PART 1 – GENERAL

1.1 DESCRIPTION

A. LIST OF CONTRACT DRAWINGS:

DRAWING (FOR INFORMATION ONLY) – PDF OF MECHANICAL AND PLUMBING

B. LIST OF CONTRACT SPECIFICATIONS:

1. INDEX OF SPECIFICATIONS

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 000150	LIST OF DRAWINGS AND SPECIFICATIONS
SECTION 010150	GENERAL REQUIREMENTS
SECTION 010250	DEFINITION OF BID ITEMS AND MEASUREMENT AND PAYMENT
SECTION 014000	QUALITY REQUIREMENTS

DIVISION 23 – HVAC

SECTION 230593	TESTING, ADJUSTING & BALANCING FOR HVAC
SECTION 235216	CONDENSING BOILER

SECTION 010150
GENERAL REQUIREMENTS

PART 1 – SUMMARY OF WORK

1.1 DESCRIPTION

A. Work for this project requires the Contractor to be responsible for supplying all labor, materials, equipment, utilities, miscellaneous items, freight and delivery and all necessary valid licenses and permits for the following:

1. The existing hydronic system consists of a boiler, an air handling unit (AHU), six variable air volume (VAV) units and two inline pumps.

2. The removal and replacement of the existing Patterson Kelly MACH C-450 boiler. The removal and replacement of the existing flue using Stainless Steel. No PVC or CPVC is allowed for exhaust or combustion air venting. The exhaust and combustion air venting is to be sized per manufacture recommendations. Connect existing gas line and condensate drain to the new boiler. Supply environmental water treatment to condensate drain. Sample water within the hydronic system and adjust as required to meet the manufacture specification. Perform all manufacture performance testing after the installation of the boiler in the present of the authority having jurisdiction (AHJ). The AHJ on this project is the Government.

3. Contractor to provide 24 hour /365 day support during the warranty period for issues related to the new boiler install after project has been accepted by the Government.

4. Integrate the new boiler into the existing building automation system. The existing building automation system is a proprietary system. Integrate new boiler into Johnson Controls Building Solutions, LLC (JCBS) proprietary software system (Metasys). Contractor to utilize the graphic controls interface of Metasys to verify all control and reports points have been verified and no warnings or alarms are present within the complete HVAC system. The contractor to verify or correct programming to the hot water circulation pumps as lead/ lag operation. The contractor is to match the network control points in METASYS to the operation control points of the new boiler.

5. Complete testing and balance (TAB) for the hot water system by a certified third-party testing company.

B. Complete work in compliance with the most recent of the latest editions of the following:

1. NFPA 70 – National Electrical Code (2026 edition)

2. IMC – International Mechanical Code (2024 edition)
3. IPC- International Plumbing Code (2024 edition)
4. IFGC- International Fuel Gas Code (2024 edition)
5. ASHRAE 36 – High-Performance Sequences of Operation for HVAC Systems

1.2 LOCATION

A. This project is located at The Bureau of Land Management (BLM), Upper Missouri Breaks National Monument Interpretive Center is located at 701 7th Street, Fort Benton, Montana.

1.3 GENERAL SITE CONDITIONS AND WEATHER

A. The elevation of the site is approximately 2,651 feet above mean sea level. The project site is open year around.

1.4 USE OF PREMISES

A. Use of Site: Confine constructions operations to immediate area of work. Do not disturb portions of Project site beyond areas in which the Work is indicated.

B. Full Government Occupancy: Except as defined in "Work Restrictions" in this section, the government will occupy the site and buildings during entire construction period. Cooperate with Government during construction operations to minimize conflicts and facilitate Government usage. Perform the Work so as not to interfere with Government's day-to-day operations.

C. Driveways and Entrances: Keep driveways, parking areas, loading areas and entrances serving premises clear and available to Government, Government's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials unless specified herein. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Government.

1. Schedule deliveries to minimize use of driveways and entrances.
2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
3. Contractor shall keep areas clear for government deliveries and use when required for items such as snow removal.

1.5 WORK RESTRICTIONS

A. Nonsmoking Buildings: Smoking is not permitted within the buildings or within 25 feet (8 m) of entrances, operable windows, or outdoor air intakes.

B. Do not schedule work during holidays, Sundays, or between 5:00 PM to 7:00 AM without written approval from the Government.

C. Working hours for the Contractor shall be between 7:45 a.m. to 4:30 p.m. Monday through Friday.

D. Project Scheduling: Schedule work to minimize impacts to government.

E. Provide adequate signing and barricades and take necessary safety measures to protect the public, government property, and all persons in the facility always during construction operations. Minimize disturbance of all undisturbed areas.

F. Protect from any damage including but not limited to water, liquids, falling objects, scuffs contractors to take pictures before and shall be responsible for all damage during construction.

G. Protect all interior floors to prevent damage.

H. Contractors shall not move any government property without 48-hour notification to the government.

1.6 FIELD VERIFICATION

A. Field verify all new and existing dimensions affecting the work of this contract before ordering products.

1.7 PERMITS, INSPECTIONS, LICENSE

A. The Government will perform mechanical, electrical inspections prior to substantial completion.

B. The contractor shall submit and maintain a valid contractor license (electrical, mechanical / plumbing) from any state that can be transferred to the state of Montana if requested by the AHJ.

C. The property is owned by the Government and state permits are not required.

1.8 COMMISSIONING

A. The Contractor shall schedule with the authority having jurisdiction (AHJ) the commissioning of the new boiler. Including in commissioning leak testing, performance testing (combustion test on boiler per manufactures specifications), demonstration of the building automation software. Complete testing and balance of the hydronic system.

PART 2 – ACCIDENT PREVENTION

2.1 DESCRIPTION

A. This section consists of establishing an effective accident prevention plan and providing a safe environment for personnel and visitors.

2.2 SUBMITTALS

A. Accident Prevention Plan: Before on-site work begins, submit a company approved accident prevention plan. This plan will be posted in the contract file. Design the plan to address Federal, State, and Local Occupational Safety and Health requirements that apply to this project. Notice to proceed will not be issued by the Government until the plan is received, reviewed and accepted. As a minimum the plan shall include:

1. Name, position title and contact information of company executive responsible for approving the Accident Prevention Plan.
2. Name and contact information of supervisor responsible to carry out the plan.
3. Outline of each phase of the work, the hazards associated with each major phase, and the methods proposed to ensure property protection and safety of the public, government personnel, and the Contractor's employees. Identify the work included under each phase by reference to specification section or division numbers.
4. Contingency plans for emergency situations such as fall protection, medical, fire, hazard material spills and other contract assessed hazard prevention and abatement requirement needs that apply to this project.

B. Certificates: Provide certificates from a mechanic that all mechanical equipment has been inspected and meets OSHA requirements. Reference OSHA 1926.

C. Submit a copy of test reports, as required by OSHA, for personnel working with hazardous materials.

D. Submit a brief report of safety meetings and of inspections within 7 calendar days of the meeting or inspection. Include a list of attendees.

E. Upon request, submit proof of employees' qualifications to perform assigned duties in a safe manner.

2.3 ACCIDENT REPORTING

A. Accidents: Report accidents immediately to the Government and assist the Government and other officials as required in the investigation and documentation of the accident.

2.4 FIRST AID FACILITIES

A. Provide adequate facilities for the number of employees and the type of construction at the site.

2.5 PERSONNEL PROTECTIVE EQUIPMENT

A. Meet requirements of NIOSH and OSHA, where applicable, as well as ANSI.

2.6 EMERGENCY INSTRUCTIONS

A. Post telephone numbers and reporting instructions for ambulance, physician, hospital, fire department, and police in conspicuous locations at the work site.

2.7 PROTECTIVE EQUIPMENT

A. Inspect personal protective equipment daily and maintain in a serviceable condition. Clean, sanitize, and repair, as appropriate, personal items before issuing them to another individual.

B. Inspect and maintain other protective equipment and devices before use and on a periodic basis to ensure safe operation.

2.8 SAFETY MEETINGS

A. As a minimum, conduct weekly 15-minute "toolbox" safety meetings. These meetings shall be conducted by a foreman and attended by all construction personnel at the worksite.

2.9 HARD HATS AND PROTECTIVE EQUIPMENT AREAS

A. Designate and post a hard hat area.

B. It is the Contractor's responsibility to require all those working on or visiting the site to wear hard hats and other necessary protective equipment at all times. As a minimum, provide two hard hats and safety glasses for use by visitors. Change liners before reissuing hats.

2.10 TRAINING

A. First Aid: Provide adequate training to ensure prompt and efficient first aid. One member of the Contractors staff shall be CPR Certified.

B. Hazardous Material: Train and instruct each employee exposed to hazardous material in safe and approved methods of handling and storage. Hazardous materials are defined as explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful substances that could cause death or injury.

PART 3 – SUBMITTAL PROCEDURES

3.1 DESCRIPTION

A. This section includes administrative, procedural, and construction schedule requirements for submittals.

3.2 DEFINITIONS

A. Action Submittals: Written and graphic information that requires the Government responsive action.

B. Informational Submittals: Written information that does not require Government approval.

3.3 PROCEDURES

A. General: The following procedure requirements pertain to all submittals regardless of the method utilized for submission.

1. Contractor shall review each submittal and check for compliance with the Contract Documents as well as certify to its accuracy. Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
2. Government will not review submittals that do not bear Contractor's approval stamp and will return them without action.
3. Submittals not required by the Contract Documents will not be reviewed and may be discarded.
4. Use only final submittals with mark-indicating action taken by the Government in connection with construction.
5. The Contractor shall develop a submittal log and track each submittal. The submittal log shall be submitted on a weekly basis to the Government.

B. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence on Government's receipt of submittal.

1. Initial Review: Allow a minimum of 10 working days for initial review of each submittal. Allow additional time if processing must be delayed permitting coordination with subsequent submittals. Government will advise Contractor when a submittal being processed must be delayed for coordination.
2. If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Allow 10 calendar days for processing each re-submittal.
4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

C. Identification: Stamp each submittal with a uniform approval stamp. Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 2 by 3 inches on label or beside title block to record Contractor's review and approval markings and action taken by the Government.

3. Include the following information on label for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name and address of Contractor.
    d. Name of manufacturer.
    e. Unique identifier, including revision number.
    f. Number and title of appropriate Specification Section.
    g. Drawing number and detail references, as appropriate.
    h. Other necessary identification.

3.4 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections. Submit Action Submittals, except for Application for Payment, electronically via email to the Government.

B. Product Data: Collect and submit.... element of construction (by discipline, e.g. electrical, mechanical, plumbing, etc.) and type or product...information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's written recommendations.
    b. Manufacturer's product specifications.
    c. Manufacturer's installation instructions.
    d. Manufacturer's catalog cuts.
    e. Wiring diagrams showing factory-installed wiring.
    f. Compliance with recognized trade association standards.
    g. Compliance with recognized testing agency standards.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale in electronic format. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Include the following information, as applicable:

    a. Dimensions.
    b. Identification of products.
    c. Fabrication and installation drawings.
    d. Roughing-in and setting diagrams.

e. Wiring diagrams: Differentiate between manufacturer installed and field installed wiring. Show field-installed wiring, including power, signal, and control wiring.
f. Notation of dimensions established by field measurement.

D. Requests for Information (RFI's): Immediately on discovery of the need for additional information or interpretation of the Contract Documents, prepare and submit an RFI in electronic form.

1. RFI's submitted by entities other than the Contractor shall not be accepted.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of sub-Contractors.
3. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following at a minimum.

a. Project name.
b. Project number.
c. Date.
d. Name of Contractor and any affected sub-Contractors.
e. Name of Contracting Officer.
f. RFI number, numbered sequentially.
g. RFI subject.
h. Specification Section number and title and related paragraphs, as appropriate.
i. Drawing number and detail references, as appropriate.
j. Field dimensions and conditions, as appropriate.
k. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
l. Contractor's signature.
m. Attachments: Include sketches, descriptions, measurements, photos, product data, shop drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

1) Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

4. Government's Action: Government will review each RFI, determine action required, and respond. Allow at a minimum seven (7) working days for Government's response for each RFI. RFIs received by the Government after 1:00 p.m. (local time) will be considered as received the following working day.

a. Government's action may include a request for additional information, in which case the Government's time for response will date from time of receipt of additional information.

b. Government's action on RFIs that may result in a change to the Contract Time, scope of work, or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Contracting Section "Contract Modification Procedures."

1) If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify the Government in writing within 10 days of receipt of the RFI response.

5. On receipt of Government's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Government within seven days if Contractor disagrees with response.
6. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:

a. Project name.
b. Name and address of Contractor.
c. Name and address of Contracting Officer.
d. RFI number including RFIs that were dropped and not submitted.
e. RFI description.
f. Date the RFI was submitted.
g. Date CO's response was received.
h. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
i. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

E. Contractor Quality Control Submittals: Provide Quality Control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.

1. Certifications: Where other Sections of the Specifications require certification that a product, material or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.

a. Signature: Signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.

2. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 01 Section “Quality Requirements."

F. Contractor Quality Control Plan: Comply with requirements specified in Division 01 Section “Quality Requirements.” Provide in electronic format.

G. Application for Payment: Comply with requirements specified in the Contract Clauses and Division 01 Section "Definition of Items & Measurement and Payment". Provide in electronic format.

3.5 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections. Submit Informational Submittals to the Government.

1. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

B. Contractor's Quality Control Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at the site, and submit to the Government at weekly intervals:

1. List of sub-contractors at the site.
2. Approximate count of personnel at the site.
3. High and low temperatures, general weather conditions.
4. Accidents and unusual events.
5. Meetings and significant decisions.
6. Stoppages, delays, shortages, and losses.
7. Meter readings and similar recordings.
8. Emergency procedures.
9. Orders and requests of governing authorities.
10. Change Orders received, implemented.
11. Services connected, disconnected.
12. Equipment or system tests and startups.
13. Partial Completions, occupancies.
14. Substantial Completions authorized.

C. Cost Breakdown: Following award, provide a cost breakdown schedule listing main types of work with associated costs. Provide in electronic format.

D. Schedule of Values: Comply with requirements specified in the Contract Clauses. Provide in electronic format.

E. Accident Prevention Plan: Comply with requirements specified in Division 1 Section "Accident Prevention." Provide in electronic format.

F. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements. Provide in electronic format.

G. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements. Provide in electronic format.

H. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Provide in electronic format.

3.6 CONSTRUCTION SCHEDULE

A. General: This section includes preparation and submittal of Construction Schedules. Submit Construction Schedules electronically utilizing email to the Government.

B. Procedures:

1. Within ten calendar days after date of Notice to Proceed, submit a detailed Construction Schedule setting forth requirements for complete execution of the work. Provide schedules in electronic format.

   a. Include a written summary narrative to explain basis of approach to work.

2. With each Progress Payment Request, submit an Updated Construction Schedule reflecting work progress to the end of the Progress Payment Request period. On each Updated Construction Schedule indicate:

   a. Actual start dates for work items started during the report period.
   b. The percent complete on activities that have actual start dates.
   c. Actual completion dates for work items completed during report period.
   d. Estimated remaining duration for work items in progress.
   e. Estimated start dates for work items scheduled to start during month following report period.
   f. Changes in duration of work items.

C. Schedule Requirements:

1. Schedule contract work and monitor progress using a Critical Path Method (CPM) or similar type scheduling system. Break the schedule into sub-activities to include as a minimum major supplier, submittal approvals, and major trades.
2. Clearly indicate sequence of construction activities, grouped by base and optional items.

   a. For each base and contract awarded optional item show the start and completion of work items, their major components, and interim milestones.
   b. Identify and show activities for procurement, delivery, and installation of equipment and materials.

c. Identify interdependence of procurement and construction activities.
d. Identify dates for testing and inspections.

3. Prepare construction Schedule to complete the Work within the contract time requirement.

D. Reviews: The government will review and return the initial Construction Schedule submittal and subsequent schedules with comments. If revisions are noted or required, make revisions based upon comments and resubmit the Schedule.

PART 4 – TEMPORARY FACILITIES AND CONTROLS

4.1 DESCRIPTION

A. This section consists of requirements for temporary facilities and controls, including utilities, support facilities, and security and protection facilities.

4.2 UTILITIES

A. Water Service: Use of Government existing water service facilities will be permitted without metering and without payment of use charges, if facilities are cleaned and maintained in a condition acceptable to the Government. At Substantial Completion, restore these facilities to condition existing before initial use.

B. Sanitary Facilities: Use of Government sanitary facilities will be permitted, if facilities are cleaned and maintained in a condition acceptable to the Government. At Substantial Completion, (clean before final inspection) restore these facilities to condition existing before initial use.

C. Electric Power and Lighting Service: Use of Government's existing electric power and lighting service will be permitted without metering and without payment of use charges, as long as equipment is maintained in a condition acceptable to the Government.

D. Telephone Service: The Contractor is responsible for providing telephone service deemed necessary for the duration of the construction.

4.3 CONSTRUCTION WASTE DISPOSAL

A. Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste.

B. Cleanup construction debris at the completion of each day's work. Do not use existing on-site trash receptacles for disposal or interim storage of construction debris.

C. Contractor shall recycle items that can be recycled locally.

D. Burning of construction debris is not allowed on lands administered by the BLM.

E. Dispose construction debris at an established Sanitary Landfill. Schedule disposal frequency to ensure waste containers are not overflowing.

4.4 STAGING AND SUPPORT FACILITIES INSTALLATION

A. Staging: An area at the project site will be made available for use as a staging area. Coordinate size and location of staging area with the Government prior to storing materials. Security and clean-up of staging and support facilities is the responsibility of the Contractor.

B. Storage: Confine storage of materials to storage areas. Coordinate on-site storage requirements with the Government.

C. Field offices, recreational vehicle, and storage sheds: An area at the project site can be made available for locating a temporary field office, recreational vehicle parking, and storage sheds. The temporary facilities can remain on site during construction. Coordinate size and location of area with the Government prior to bringing in temporary facilities. Security and clean-up of temporary facility location is the responsibility of the Contractor.

4.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.

C. Fire Protection:

1. Store combustible materials in containers in fire-safe locations.
2. Maintain unobstructed access to fire extinguishers, fire hydrants, fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
3. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
4. The Contractor shall impose a fire watch for one hour after all construction activities has stopped for the day.

PART 5 – EXECUTION REQUIREMENTS

5.1 DESCRIPTION

A. This section consists of general procedural requirements governing execution of the Work including, but not limited to, the following:

1. General installation of products.
2. Progress cleaning.
3. Protection of installed construction.
4. Inspection, and testing reports.
5. Correction of the Work.

5.2 EXAMINATION

A. Existing Conditions: Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction items affecting the Work.

B. Acceptance of Existing Conditions: Examine areas, and conditions, with Installer. Record observations.

1. Examine roughing-in for electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

5.3 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly.

B. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information (RFI) to the Government. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

5.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

B. Comply with manufacturer's written instructions and recommendations for installing products.

C. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

5.5 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

D. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

5.6 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion and Final Completion and Acceptance.

5.7 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

PART 6 – OPERATIONS AND MAINTENANCE MANUALS

6.1 DESCRIPTION

A. This Section consists of administrative and procedural requirements for operation and maintenance manuals.

6.2 SUBMITTALS

A. Submit three paper copies and one PDF copy of manuals in final form at least 15 calendar days before final inspection. Manuals to include all inspection reports, and the completed TAB.

6.3 OPERATION AND MAINTENANCE MANUALS

A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data: Include emergency instructions and procedures, system and equipment descriptions, operating procedures, and sequence of operations.
2. Maintenance Data: Include manufacturer's information, list of spare parts, maintenance procedures, maintenance and service schedules for preventive and routine maintenance, and copies of warranties and bonds.

B. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain a title page, table of contents, and manual contents.

C. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Forest.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Cross-reference to related systems in other operation and maintenance manuals.

D. Table of Contents: List each product included in manual, identified by product name, indexed to content of volume, and cross-referenced to Specification Section.

E. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

F. Content: Include operation and maintenance data required in individual Specification Sections and equipment descriptions, operating standards, operating procedures, operating logs, wiring and control diagrams, and license requirements.

G. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Performance curves.
7. Engineering data and tests.
8. Complete nomenclature and number of replacement parts.

H. Source Information: For each product, list name, address, and telephone number of Installer or supplier.

I. Operating Procedures: Include startup, break-in, and control procedures; stopping and normal shutdown instructions; routine testing, normal, seasonal, and weekend operating instructions; and required sequences for electric or electronic systems, including all affected systems.

J. Systems and Equipment Controls: Describe sequence of operation, and diagram controls as installed.

K. Maintenance Procedures: For each system, subsystem, and piece of equipment not part of a system, include manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, drawings and diagrams for maintenance, nomenclature of parts and components, and recommended spare parts for each component part or piece of equipment.

L. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

M. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

PART 7 – CLOSEOUT PROCEDURES

7.1 DESCRIPTION

A. This section consists of administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Final Completion.
3. Project Record Documents.
4. Final cleaning.

7.2 SUBSTANTIAL COMPLETION

A. Definition of Substantial Completion: The Date certified by the Contracting Officer when construction is sufficiently complete, in accordance with the Contract Documents, so the Government can occupy or utilize the Work or designated portion thereof for the use for which it is intended, as expressed in the Contract Documents.

B. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete. Include the estimated date when the Work will be corrected.
2. Advise Contracting Officer (CO) of pending insurance changeover requirements.

3. Submit specific warranties, workmanship bonds, final certifications, and similar documents.
4. Obtain and submit releases permitting Government unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and photographic negatives, videos, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Government. Label with manufacturer's name and model number where applicable.
7. Complete startup testing of systems.
8. Complete final cleaning requirements, including touchup painting.
9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

C. Inspection: Submit a written request for inspection for Substantial Completion at least six (6) working days in advance. On receipt of request, the Government will either proceed with inspection or notify Contractor of unfulfilled requirements. The Government will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by the Government, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

7.3 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit certified copy of the Government's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by the Government. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
2. Instruct Government personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, the Government will either proceed with inspection or notify Contractor of unfulfilled requirements. The Government will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

7.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

7.5 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for CO's reference during normal working hours.

B. Submit record documents for review prior to request for final inspection.

C. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, Contractor, subcontractor, or similar entity, to prepare the marked-up Record Prints.

   a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
   b. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
4. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets. Provide three paper copies and one PDF copy.

7.6 FINAL CLEANING BEFORE FINAL INSPECTION

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

C. All cleaning materials shall be "GREEN or ECO-FRIENDLY) tracked by manufacture, brand, and quantity used and submitted to the Government.

D. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

1. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
2. Remove tools, construction equipment, machinery, and surplus material from Project site.
3. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

E. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Government property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 010150

SECTION 010250
DEFINITION OF BID ITEMS
AND
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

A. The intent of this section is to explain, in general; what is and what is not included in a bid item; the limits or cut-off points where one bid item ends and another begins; and method of measurements and basis of payment for work items listed in the Bid Item Schedule.

B. Work:

1. Furnishing all labor, materials, equipment, and other incidentals necessary to successfully complete the project or any portion of it and carrying out all duties and obligations imposed by the contract on the Contractor.
2. For each individual item listed here and in the Schedule of Items, payment shall be full compensation for all work related to the particular item in accordance with these specifications, as shown on the drawings, and as staked in the field.
3. Measurement and payment for contract work shall be made only for and under those pay items included in the Schedule of Items. All other work and materials shall be considered incidental or as included in the payment for items shown.

1.2 DETERMINATION OF QUANTITIES

A. The contractor shall perform, or cause to be performed, all measurement of quantities of materials incorporated into the work processes that are to be measured under the provisions of the contract.

B. Quantity Measurements:

1. The Contractor shall make all measurements for computation of quantities for all work items except those specified for payment by Lump Sum Quantity (LSQ).
2. The Contractor shall compute the quantities for periodic progress payments; the Government shall compute the quantities for the final payment based on measurements taken by the Contractor.
3. All Contractor measurements are subject to verification.
4. The Contractor shall submit all field notes, calculation sheets, and other data used to determine quantities.
5. The Contractor shall certify in writing as to the accuracy of the measurements and computations submitted.

1.3 UNITS OF MEASUREMENT

A. Lump Sum: Do not measure directly. The bid amount is complete payment for all work described in the contract and necessary to complete the work for that item.

PART 2 - METHOD OF MEASUREMENT

2.1 GENERAL

A. One of the following methods of measurement for determining final payment is designated on the Schedule of Items for each pay item:

B. LUMP SUM QUANTITIES (LSQ)

1. These quantities denote one complete unit of work as required by or described in the contract, including necessary materials, equipment, and labor to complete the job. They shall be measured complete and in-place.

PART 3 – DEFINITION OF BID ITEMS

3.1 SCHEDULE OF ITEMS

A. The project Schedule of Items includes several sections to organize the bid items into Base Bid Items and Optional Bid Items. When a pay item is described as a Base Bid Item, the description will be the same when that item or a similar item is included as an Optional Bid Item. Contractor shall provide item pricing for all items listed in the Schedule of Items. Contract award will be made for all Base Bid Items. Those items listed as Optional Bid Items will be awarded based on available project funding. The Optional Bid Items are not listed in priority order and may be awarded in any combination of individual items.

BASE BID ITEMS

Bid Item No. 1 – Mobilization and Bonding

a. Measurement: This item is measured as a lump sum quantity (LSQ).

b. Payment: The contract lump sum shown in the Schedule of Items shall include all materials, equipment, labor incidentals required to perform all operations necessary to prepare a detailed mobilization plan which will include project schedules, quality control plan, material submittals and mobilize all equipment to the site.

Bid Item No. 2 – Boiler Replacement

a. Measurement: This item is measured as a lump sum quantity (LSQ).

b. Payment: The contract lump sum price shown in the Schedule of Items shall include all materials, equipment, labor, and incidentals required to perform all operations necessary to complete the work as specified, to replace the boiler, which includes all electrical, mechanical, and plumbing installation, disposal of the old boiler, and commissioning.

Bid Item No. 3 – Metasys Control System

a. Measurement: This item is measured as a lump sum quantity (LSQ).

b. Payment: The contract lump sum price shown in the Schedule of Items shall include all materials, equipment, labor, and incidentals required to perform all operations necessary to complete the work as specified, to integrate the new boiler controls (inputs and outputs) into the existing building automation software. Perform training on the building automation system to Government.

Bid Item No. 4 – Testing and Balance (TAB)

a. Measurement: This item is measured as a lump sum quantity (LSQ).

b. Payment: The contract lump sum price shown in the Schedule of Items shall include all materials, equipment, labor, and incidentals required to perform all operations necessary to complete the work as specified, to balance the existing hydronic system and prepare the (TAB) report. Submit report to the Government for approval.

END OF SECTION 010250

SECTION 014000
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control including preparing and executing a quality control program.

1.2 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by the Government.

1.3 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to the Government for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum with reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to the Government for a decision before proceeding.

1.4 SUBMITTALS

A. As specified in Division 1 Section “Submittal Procedures”.

B. Testing Agencies Qualification Data: Submit proof of qualifications and experience in the form of a recent report on the inspection of the testing agency by a recognized authority.

C. Quality Control Plan: At the time of the proposal and preconstruction conference, submit for approval a written Contractor Quality Control (CQC) plan.

1. The plan shall include:

a. A list of personnel responsible for quality control and assigned duties. Include each person's qualifications.
b. A copy of a letter of direction to the Contractor's Quality Control Supervisor outlining assigned duties.
c. Names, qualifications, and descriptions of laboratories to perform sampling and testing, and samples of proposed report forms.
d. Methods of performing, documenting, and enforcing quality control of all work.
e. Methods of monitoring and controlling environmental pollution and contamination as required by regulations and laws.

2. If the plan requires any revisions or corrections, the Contractor shall resubmit the updated and corrected plan within 10 calendar days.
3. The Government reserves the right to require changes in the plan during the contract period as necessary to obtain the quality specified.
4. No change in the approved plan may be made without written concurrence by the Government.

D. Contractor's Quality Control Daily Reports:
1. Daily reports shall be provided for each day of the period of performance, starting with Notice to Proceed. All reports shall be dated and signed by the project manager.
   a. If no work was performed on a given day, then submit a daily report stating "No Work Performed"
2. Daily reports shall be completed by the Quality Control Supervisor.
3. Daily reports shall be a comprehensive report of the days activities. Work performed by the prime and each subcontractor shall be described in detail.
4. All three phase control activities shall be included in the report.
5. Use the provided template for daily reports at the end of this specification. Request template if not provided with contract documents. Fill out all sections of the template.
6. Daily reports shall include all inspections performed, how the work was inspected, the results of the inspections, and what corrective action is required, if any, and when it will or did occur.
7. Submit showing all inspections and tests on the first workday following the date covered by the report. Include results of these inspections and tests in the daily report, including if they are in compliance with contract requirements, and if not, corrective action plan.
8. If the CQC plan and Quality Control Daily Reports are not submitted as specified, the Contracting Officer may retain all payments until such time a plan is approved and implemented.
9. Weekly certified payrolls shall be submitted no later than on the first workday following the date covered by the report.

E. Test Reports:

1. Submit Daily Test Information Sheets with Quality Control Daily Reports.
2. Submit failing test results and proposed remedial actions within four hours of noted deficiency.

3. Submit three copies of complete test results not later than three calendar days after the test was performed.
4. Test Reports shall be certified by the quality control manager and include the following:

    a. Date of issue.
    b. Project title and number.
    c. Name, address, and telephone number of testing agency.
    d. Dates and locations of samples and tests or inspections.
    e. Names of individuals making tests and inspections.
    f. Description of the Work and test and inspection method.
    g. Identification of product and Specification Section.
    h. Complete test or inspection data.
    i. Test and inspection results and an interpretation of test results.
    j. Ambient conditions at time of sample taking and testing and inspecting.
    k. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
    l. Name and signature of laboratory inspector.
    m. Recommendations on retesting and reinspecting.

F. Off-Site Inspection Reports: Submit prior to shipment.

G. Permits, Licenses, and Certificates: For the Government's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE PROVIDER QUALIFICATIONS

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

E. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

F. Testing Laboratory and Equipment: All measuring devices, laboratory equipment, and instruments shall be calibrated at established intervals against certified standards in accordance with National Bureau of Standards (NBS) requirements. Upon request, measuring and testing devices shall be made available for use by the Government for verification tests.

1.6 QUALITY CONTROL

A. Designate a Quality Control Supervisor with the following responsibilities:

1. Quality Control Supervisor shall be on the project site whenever contract work is in progress. The Contractor's Quality Control Supervisor may also perform the duties of Project Superintendent,
2. Complete Quality Control Daily Reports.
3. Have all work inspected and tested often enough to ensure the quality of materials, workmanship, construction, finish, and functional performance is in compliance with applicable specifications and drawings.
4. Where testing services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
5. Notify testing agencies at least 72 hours in advance of time when Work that requires testing or inspecting will be performed. Notice excludes weekends, holidays, and non-government working days.
6. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
7. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
8. Cooperate with testing agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Provide the following:

    a. Access to the Work.
    b. Incidental labor and facilities necessary to facilitate tests and inspections.
    c. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
    d. Facilities for storage and field-curing of test samples.
    e. Preliminary design mix proposed for use for material mixes that require control by testing agency.
    f. Security and protection for samples and for testing and inspecting equipment at Project site.

B. Testing Agency Responsibilities: Cooperate with the Government and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify the Government and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
3. Retest and re-inspect corrected work.
4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
5. Do not perform any duties of Contractor.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

3.2 DOCUMENTATION

A. Maintain Quality Control Daily Reports and Daily Test Report Information Sheets (samples attached) of quality control activities, system tests and weekly certified payrolls.

B. Quality Control Daily Reports may not be substituted for other written reports required under clauses of the contract, such as Disputes, Differing Site Conditions, or Changes.

3.3 ENFORCEMENT

A. Stop work on any item or feature pending satisfactory correction of any deficiency noted by the quality control staff or the Government. The Government may designate locations of tests.

END OF SECTION 014000

CONTRACTOR'S QUALITY CONTROL DAILY REPORT

REPORT NO. SHEET 1 OF

PROJECT				CONTRACT NO.	DATE
DISTRICT				CONTRACTOR'S REPRESENTATIVE ON THE JOB	
WEATHER (Rain, Snow, Cloudy, Windy, etc.)	RAINFALL Inches	TEMPERATURE		GROUND CONDITIONS (Dry, Damp, Wet, Frozen, etc.)	
		MAX.	MIN.		

1. PRIME CONTRACTOR

NO. EMPLOYEES BY JOB CATEGORIES	Hours	HEAVY EQUIPMENT ON JOB	NO. UNITS	HRS. WORKING		
				YES	NO	Comments

WORK PERFORMED BY PRIME CONTRACTOR:

MATERIALS DELIVERED	OFFICIAL VISITORS TO SITE

2A. SUBCONTRACTOR, _____: (If more than one subcontractor use copies of following page.)

NO. EMPLOYEES BY JOB CATEGORIES	Hours	HEAVY EQUIPMENT ON JOB	NO. UNITS	HRS. WORKING		
				YES	NO	Comments

WORK PERFORMED BY SUBCONTRACTOR:

3. SPECIFIC INSPECTIONS: (Inspections performed, results, and corrective actions)

4. TESTING: ☐1 Check if any testing was performed today. (Complete and attach Test Report Information Sheets.)

Type and Location of Testing: _____

5. VERBAL INSTRUCTION RECEIVED FROM GOVERNMENT ON CONSTRUCTION DEFICIENCIES OR RE-TESTING REQUIRED:

6. REMARKS:

7. CERTIFICATION:

I certify that the above report is complete and correct and that I, or my authorized representative, have inspected all work performed this day by the prime contractor and each subcontractor and determined that all materials, equipment, and workmanship are in strict compliance with the plans and specifications except as may be noted above.

_____

Contractor's Quality Control Representative

SUBCONTRACTOR WORK CONTINUED:	CONTRACT NO.	REPORT NO. _____ SHEET ____ OF ____

2 SUBCONTRACTOR,

NO. EMPLOYEES BY JOB CATEGORIES	Hours	HEAVY EQUIPMENT ON JOB	NO. UNITS	HRS. WORKING		
				YES	NO	Comments

WORK PERFORMED BY SUBCONTRACTOR:

2 SUBCONTRACTOR,

NO. EMPLOYEES BY JOB CATEGORIES	Hours	HEAVY EQUIPMENT ON JOB	NO. UNITS	HRS. WORKING		
				YES	NO	Comments

WORK PERFORMED BY SUBCONTRACTOR:

2 SUBCONTRACTOR,

NO. EMPLOYEES BY JOB CATEGORIES	Hours	HEAVY EQUIPMENT ON JOB	NO. UNITS	HRS. WORKING		
				YES	NO	Comments

WORK PERFORMED BY SUBCONTRACTOR:

2 SUBCONTRACTOR,

NO. EMPLOYEES BY JOB CATEGORIES	Hours	HEAVY EQUIPMENT ON JOB	NO. UNITS	HRS. WORKING		
				YES	NO	COMMENTS

WORK PERFORMED BY SUBCONTRACTOR:

DAILY TEST REPORT INFORMATION SHEET

CONTRACT NO. REPORT NO. _____
SHEET _____ OF _____

1. Individual Making Inspection or Test:	
2. Testing Laboratory; Name:	Phone #:
Address:	
3. Description of Work and Test Method:	
4. Location of Samples and Tests or Inspections:	
5. Specification Section:	
6. Inspection or Test Data:	
7. Test Results and Interpretations of Test Results:	
8. Comments or Professional Opinion About Compliance of Inspected Work or Tested Work with contract Document Requirements:	
9. Recommendations:	
10. Corrective Actions Taken:	
CERTIFICATION: I certify that the above testing report is complete and correct and that all testing performed this day for this contract is in strict compliance with the plans and specifications except as noted above.	
	Signature of Inspector

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SECTION 230593
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Balancing Hydronic Piping Systems:

a. Constant-flow hydronic systems.
b. Variable-flow hydronic systems.

1.2 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TABB: Testing, Adjusting, and Balancing Bureau.

E. TAB Specialist: An entity engaged to perform TAB Work.

1.3 SUBMITTALS

A. Strategies and Procedures Plan: Within 30 calendar days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures.

B. Certified TAB reports.

1.4 QUALITY ASSURANCE

A. TAB Contractor Qualifications: Engage a TAB entity certified by TABB.

1. The Contractor shall obtain the services of a qualified testing, adjusting, and balancing (TAB) organization to test, adjust, and balance the hydronic system. The TAB contractor who performs these procedures must have up-to-date certification by the Associated Air Balance Council (AABC), the National Environmental Balancing Bureau (NEBB), or the Testing, Adjusting, and Balancing Bureau (TABB). The TAB organization shall be independent of the hydronic system installers or equipment suppliers for this project.

2. Balancing: Upon completion of the installation of the hydronic(boiler) system and after startup testing, test and adjust the hydronic system to provide the

flowrates as designed for this project. Correct any hydronic system performance deficiencies disclosed by the startup testing before balancing the hydronic system.

B. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

C. TAB Report Forms: Use standard TAB contractor's forms approved by Government.

D. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for the hydronic system and equipment.

D. Examine design data including hydronic system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about hydronic system and equipment controls.

E. Examine equipment performance data including pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of the hydronic equipment when installed under conditions different from the conditions used to rate equipment performance.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine test reports specified in individual system and equipment Sections.

H. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

I. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.

J. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

K. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

L. Examine system pumps to ensure absence of entrained air in the suction piping.

M. Examine operating safety interlocks and controls on the equipment equipment.

N. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Hydronic systems are filled, clean, and free of air.
3. Automatic temperature-control systems are operational.
4. Isolating and balancing valves are open and control valves are operational.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in ASHRAE 111 and in this Section.

B. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

C. Take and report testing and balancing measurements in inch-pound units.

3.4 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

A. Prepare test reports with pertinent design data, and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against the approved pump flow rate. Correct variations that exceed plus or minus 5 percent.

B. Prepare schematic diagrams of systems' "as-built" piping layouts.

C. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:

1. Open all manual valves for maximum flow.
2. Check liquid level in expansion tank.
3. Check makeup water-station pressure gage for adequate pressure for highest vent.
4. Check flow-control valves for specified sequence of operation, and set at indicated flow.
5. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type unless several terminal valves are kept open.
6. Set system controls so automatic valves are wide open to heat exchangers.
7. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.
8. Check air vents for a forceful liquid flow exiting from vents when manually operated.

3.5 PROCEDURES FOR CONSTANT-FLOW HYDRONIC SYSTEMS

A. Measure water flow at pumps. Use the following procedures except for positive-displacement pumps:

1. Verify impeller size by operating the pump with the discharge valve closed. Read pressure differential across the pump. Convert pressure to head and correct for differences in gage heights. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.

   a. If impeller sizes must be adjusted to achieve pump performance, obtain approval from [CO] [Government] [Construction Manager] [Commissioning Authority] and comply with requirements in Division 23 Section "Hydronic Pumps."

2. Check system resistance. With all valves open, read pressure differential across the pump and mark pump manufacturer's head-capacity curve. Adjust pump discharge valve until indicated water flow is achieved.

a. Monitor motor performance during procedures and do not operate motors in overload conditions.

3. Verify pump-motor brake horsepower. Calculate the intended brake horsepower for the system based on pump manufacturer's performance data. Compare calculated brake horsepower with nameplate data on the pump motor. Report conditions where actual amperage exceeds motor nameplate amperage.
4. Report flow rates that are not within plus or minus 10 percent of design.

B. Measure flow at all automatic flow control valves to verify that valves are functioning as designed.

C. Measure flow at all pressure-independent characterized control valves, with valves in fully open position, to verify that valves are functioning as designed.

D. Set calibrated balancing valves, if installed, at calculated presettings.

E. Measure flow at all stations and adjust, where necessary, to obtain first balance.

1. System components that have Cv rating or an accurately cataloged flow-pressure-drop relationship may be used as a flow-indicating device.

F. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than indicated flow.

G. Adjust balancing stations to within specified tolerances of indicated flow rate as follows:

1. Determine the balancing station with the highest percentage over indicated flow.
2. Adjust each station in turn, beginning with the station with the highest percentage over indicated flow and proceeding to the station with the lowest percentage over indicated flow.
3. Record settings and mark balancing devices.

H. Measure pump flow rate and make final measurements of pump amperage, voltage, rpm, pump heads, and systems' pressures and temperatures including outdoor-air temperature.

I. Measure the differential-pressure-control-valve settings existing at the conclusion of balancing.

J. Check settings and operation of each safety valve. Record settings.

3.6 PROCEDURES FOR VARIABLE-FLOW HYDRONIC SYSTEMS

A. Balance systems with automatic two- and three-way control valves by setting systems at maximum flow through heat-exchange terminals and proceed as specified above for hydronic systems.

3.7 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.8 PROCEDURES FOR BOILERS

A. Hydronic Boilers: Measure and record entering- and leaving-water temperatures and water flow.

3.9 PROCEDURES FOR HEAT-TRANSFER COILS

A. Measure, adjust, and record the following data for each water coil:

1. Entering- and leaving-water temperature.
2. Water flow rate.
3. Water pressure drop.
4. Dry-bulb temperature of entering and leaving air.
5. Wet-bulb temperature of entering and leaving air for cooling coils.
6. Airflow.
7. Air pressure drop.

3.10 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING EXISTING SYSTEMS

A. Before performing testing and balancing of existing systems, inspect existing equipment that is to remain and be reused to verify that existing equipment has been cleaned and refurbished. Verify the following:

1. New filters are installed.

2. Coils are clean and fins combed.
3. Drain pans are clean.
4. Fans are clean.
5. Bearings and other parts are properly lubricated.
6. Deficiencies noted in the preconstruction report are corrected.

B. Perform testing and balancing of existing systems to the extent that existing systems are affected by the renovation work.
   1. If calculations increase or decrease the water flow rates by more than 5 percent, make equipment adjustments to achieve the calculated rates. If increase or decrease is 5 percent or less, equipment adjustments are not required.

3.11 TOLERANCES

A. Set the hydronic water flow rates within the following tolerances:

   1. Heating-Water Flow Rate: Plus, or minus 5 percent.

3.12 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to hydronic system and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare weekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.13 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

   1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
   2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

   1. Pump curves.
   2. Manufacturers' test data.
   3. Field test reports prepared by system and equipment installers.

4. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Contracting Officier's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for pump performance forms including the following:

D. System Diagrams: Include schematic layouts for hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Water and steam flow rates.
2. Duct, outlet, and inlet sizes.
3. Pipe and valve sizes and locations.
4. Terminal units.
5. Balancing stations.
6. Position of balancing devices.

3.14 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions. Only to be performed if there are unusual conditions (i.e. areas that cannot maintain temperature / comfort).

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 230593

SECTION 235216
CONDENSING BOILERS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

B. ASME Compliance: Fabricate and label boilers to comply with ASME Boiler and Pressure Vessel Code.

C. Minimum Efficiency: Comply with ASHRAE/IES 90.1.

D. Warranties: Submit a written warranty executed by Contractor agreeing to repair or replace heat exchangers that fail in materials or workmanship within 10 years from date of Substantial Completion.

2.2 CONDENSING BOILERS

A. Description: Factory-fabricated, -assembled, and -tested, condensing boiler with heat exchanger sealed pressure-tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and controls.

B. Boiler Characteristics

1) Minimum boiler size: 500,000 btu.
2) Exhaust venting: Stainless Steel.
3) Combustion Air venting: steel.
4) Turn Down Ratio: 10 to 1.
5) Boiler Controls: compatible with Johnson Controls Building Solution (JCBS) Metasys system.
6) Boiler Efficiency: 97% or higher.
7) Alarm: Boiler to alarm on any failure.

8) High and Low gas pressure switches with manual reset.
9) Low water cut-off with manual reset.
10) Boiler cabinet width cannot exceed 24”.
11) Flue temperature sensor.
12) Fuel- Natural Gas.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install boilers level on and anchor to concrete base.

B. Install gas-fired boilers according to NFPA 54. Connect gas piping full size to boiler gas-train inlet with union.

C. Connect piping to supply and return boiler tappings, with shutoff valves.

D. Connect air intake and vent to boiler.

1. Stainless Steel Vent – AL29-4C

2. Combustion Air – Corrosion- resistant steel sized per SMACNA.

E. Integrate the new boiler into the existing building automation system. The existing building automation system is a proprietary system. Integrate new boiler into Johnson Controls Building Solutions, LLC (JCBS) proprietary software system (Metasys). Contractor to utilize the graphic controls interface of Metasys to verify all control and reports points have been verified and no warnings or alarms are present within the complete HVAC system. The contractor to verify or correct programming to the hot water circulation pumps as lead/ lag operation. The contractor is to match the network control points in METASYS to the operation control points of the new boiler.

END OF SECTION 235216