



**ROCKFORD BOARD OF EDUCATION
INVITATION FOR BID ON SUPPLIES, MATERIALS, EQUIPMENT OR SERVICES
FOR SCHOOL DISTRICT NO. 205
ROCKFORD, ILLINOIS**

IFB No. **17-33 Fairview, Rolling Green and Nashold Elementary School Renovations**

DATE: **Wednesday, March 01, 2017**

RE: **ADDENDUM NO. 3**

To All Bidders:

Attached are modifications, clarifications and/or corrections for the Project Manual and are hereby made a part of the contract documents. Please attach this addendum to the Project Manual(s) in your possession. Please note the receipt of this addendum on the bid form. Bidders shall review changes to all portions of this work as changes to one portion may affect the work of another.

If you plan to hand deliver your IFB submission on the due date, please note you must check in on the 3rd floor prior to coming to the bid opening. Please allow time for this as late submission will not be accepted.

Refer all questions relative to the business aspect, Instructions to Bidders, Special Conditions, and questions concerning the technical aspect of the documents to the Purchasing Manager by email at tamara.pugh@rps205.com.

FAIRVIEW, ROLLING GREEN, AND NASHOLD SCHOOL RENOVATIONS
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

LARSON & DARBY GROUP

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ARCHITECTS-ENGINEERS-PLANNERS

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TO: ALL BIDDERS

RE: ADDENDUM #3

Changes to Bidding Documents Dated January 13, 2017

PROJECT: FAIRVIEW, ROLLING GREEN, AND NASHOLD SCHOOL RENOVATIONS
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

PROJECT NO.: 25110, 25111, 25112

DATE: March 1, 2017

Please attach this Addendum to the Project Manual and Drawings for the referenced project. Take the changes to the Project Manual and Drawings into consideration in preparing your Bid.

Bidders shall make note in writing on Bid Form that this Addendum has been taken into consideration. Failure to do so may be sufficient cause to reject the Bid.

LARSON & DARBY GROUP

By _____
Stephen M. Nelson

This Addendum consists of 3 pages, plus materials itemized herein.

I. GENERAL CLARIFICATIONS – All three schools

A. The following is clarified, added or modified:

a. Clarification: The following questions were raised:

1. M1.1 has a general insulation note for all three schools, does this include the new copper plumbing pipe installed by the school district's in-house plumber?
Yes. Provided it is within the Boiler room or tunnel areas indicated.
2. The district is removing all asbestos pipe insulation in the Boiler room and any tunnel areas indicated. This piping will need to be reinsulated under the base bid.

II. GENERAL CLARIFICATIONS – 25110 Fairview

A. The following is clarified, added or modified:

a. Clarification: The following questions were raised:

1. On sheet D1.2, general note 5, change from "window contractor to remove plywood" to **abatement** contractor to remove plywood." In the Project Manual, Section 011000 Summary, remove paragraph 1.1 C.1.a and change 1.1 D. 2. c. to say "Once the separate Environmental Demolition Contractor removes any of the weathertight seals, it will be the Window Contractor's responsibility to provide exterior and interior weathertight seals."
2. Sheet D2.1 on the North Elevation, two small windows one above the other are called out as Alternate 1. They are to be part of Base Bid.

FAIRVIEW, ROLLING GREEN, AND NASHOLD SCHOOL RENOVATIONS
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

3. Sheet D2.1, East Elevation the louvers are shown as Alternate #3. They are to be part of Base Bid.
4. No roller shades intended at window types W4, W5, W6, W9, W14, W16 and W17.

III. GENERAL CLARIFICATIONS – 25111 Rolling Green

- A. The following is clarified, added or modified:
 - a. Clarification: the following questions were raised.
 1. No roller shades intended at window types W6, W8, W10, W11, W14, W17, and W18.
 2. Does base bid at W4 curved wall receive roller shades? **Yes, provide roller shades mounted at top of the windows.**
 3. Does each segment of windows at W4 receive roller shades? **Yes.**
 4. At W1 are the narrow side lite windows to receive roller shades? **Yes.**

IV. GENERAL CLARIFICATIONS – 25112 Nashold

- A. The following is clarified, added or modified:
 - a. Clarification: the following questions were raised.
 1. Removal of existing window stools will be required at details S1 and S4 on sheet A2.1. See Section 06 40 23 – Interior Architectural Woodwork for solid surface window stools.
 2. No carpet tile is specified.
For rooms 105, 106 and 107, basis of design is Tandus Consequence II 24”x24” carpet tile, color by owner. For 103, basis of design is Tandus Abrasive Action II 24”x24” carpet tile, color by owner.
 3. A1.1 under General Notes, 18 to be in lieu of 19.
 4. Do you have the size of the current door panels per detail 11/A4.1?
No current size is available. Bidders may visit the site to measure openings.
 - b. Clarification: the following was added or modified.

Hardware products: ANSI Grade 1; match existing building standards and finishes.
Electrical work in connection with door hardware is part of the General Work Bid Package.
Coordinate with district's security contractor for cabling and security equipment installation.

105B

- Add closer
- Add automatic open button at Reception desk
- Add electric strike
- Add card reader in Vestibule 103
- Card reader releases electric strike and automatic opener
- Provide electric power and conduit

104B, right leaf

- Change exit device to electric latch retraction
- Add card reader
- Add electric hinge
- Card reader retracts latch of exit device
- Provide electric power and conduit

FAIRVIEW, ROLLING GREEN, AND NASHOLD SCHOOL RENOVATIONS
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

Existing Exterior Entrance Doors

- Southern-most leaf
- Add ADA automatic operator to mullion between the two pairs of doors
- Delete existing closer
- Add wall-mounted push plate switch
- Provide electric power and conduit

104A, left leaf

- Delete overhead closer
- Add ADA automatic operator
- Add wall-mounted push plate switches in Lobby 104
- Provide electric power and conduit

V. ADDITIONS OR CHANGES TO THE PROJECT MANUAL– 25110 Fairview

A. Section 23 53 13 – Boiler Feedwater System

- a. REPLACE section in its entirety with attached section 23 53 13R.

VI. ADDITIONS OR CHANGES TO THE PROJECT MANUAL– 25111 Rolling Green

A. Section 23 53 13 – Boiler Feedwater System

- a. REPLACE section in its entirety with attached section 23 53 13R.

VII. ADDITIONS OR CHANGES TO THE PROJECT MANUAL– 25112 Nashold

A. Section 23 52 33 – Water Tube Boilers

- a. DELETE section in its entirety.

B. Section 23 52 16 – Condensing Boilers

- a. ADD attached section to the project manual to replace deleted section 23 52 33.

C. Section 23 53 13 – Boiler Feedwater System

- a. DELETE paragraph 2.1.E.5.

VIII. ADDITIONS OR CHANGES TO DRAWINGS – 25111 Rolling Green

- A. Drawing A3.1 is re-issued.

END OF ADDENDUM #3

SECTION 235313R - BOILER FEEDWATER SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Feedwater pumps and tanks.

1.3 DEFINITION

- A. NPSH: Net-positive suction head.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacity, temperature and NPSH required, pump performance curves with selection points clearly indicated, and furnished specialties and accessories.
- B. Shop Drawings: Include plans, elevations, sections, details, dimensions, weights, loadings, required clearances, method of field assembly, and attachments to other work.
 - 1. Wiring Diagrams: Power, signal, and control wiring.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Fabricate and test unit according to ASME PTC 12.1, "Closed Feedwater Heaters."
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

FAIRVIEW EARLY CHILDHOOD CENTER
HVAC AND WINDOW REPLACEMENT
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

- C. ASME Compliance: ASME B31.9, "Building Services Piping," for systems equal to or less than 15 psig. Safety valves and pressure vessels shall bear the appropriate ASME label.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Shipping: Clean flanges and exposed-metal surfaces and treat with anticorrosion compound after assembly and testing. Protect flanges, pipe openings, and nozzles with wooden flange covers or with screwed-in plugs.
- B. Store units in dry location.
- C. Retain protective flange covers and machined-surface protective coatings during storage.
- D. Protect bearings and couplings against damage from sand, grit, and other foreign matter.
- E. Comply with manufacturer's written rigging instructions.

1.8 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

PART 2 - PRODUCTS

2.1 FEEDWATER UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bryan Boilers; Bryan Steam, LLC.
 - 2. Cleaver-Brooks; Div. of Aqua-Chem, Inc.
 - 3. Deaerating Designs; a division of Precision Boilers, Inc.
 - 4. Domestic Pump; a unit of ITT Fluid Technology.
 - 5. Hurst Boiler & Welding Company, Inc.
 - 6. Sellers Engineering Co.
 - 7. Skidmore.
 - 8. Superior Boiler Works, Inc.
- B. Description: Factory-assembled and -tested unit consisting of a receiver, triplex feedwater pumps, controls, and the following features and accessories:
 - 1. Triplex third pump shall be manually valved in and manually selected for boiler that need spare pump.
 - 2. Liquid-filled industrial thermometer graduated in Fahrenheit.
 - 3. Level gage glass, reflex flat type, with stops at top and bottom.
 - 4. Lifting eyes.
 - 5. Companion flanges.
 - 6. Pump, suction and discharge isolation valve, inlet strainer, discharge check valve, and liquid-filled pressure gage.

FAIRVIEW EARLY CHILDHOOD CENTER
HVAC AND WINDOW REPLACEMENT
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

7. Makeup Water Assembly: Float operated with integral valve; with inlet strainer and three-valve bypass.
 8. Feedwater Heater: Sparge tube, thermostat, and control valve.
 9. Factory-Installed Pipe, NPS 2-1/2 and Smaller: ASTM A 53/A 53M, Type S (seamless), Grade B; or ASTM A 106, Type S, Grade B, Schedule 40; with threaded joints and fittings.
 - a. Cast-Iron Threaded Fittings: ASME B16.4; Class 125.
 - b. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150.
 - c. Forged-Steel Fittings: ASME B16.11, Class 3000.
 - d. Malleable-Iron Unions: ASME B16.39; Class 150.
 - e. Forged-Steel Unions: MSS SP-83, Class 3000.
 10. Factory-Installed Pipe, NPS 3 and Larger: ASTM A 53/A 53M, Type E (electric-resistance welded), Grade B; or ASTM A 106, Type S, Grade B, Schedule 40; with welded joints and carbon-steel fittings and flanges.
 - a. Wrought-Steel Fittings: ASME B16.9, wall thickness to match adjoining pipe.
 - b. Wrought Cast- and Forged-Steel Flanges and Flanged Fittings: ASME B16.5, Class 150, including bolts, nuts, and gaskets.
- C. Receiver:
1. Material: Welded carbon steel galvanized after fabrication.
 2. Additional corrosion protection:
 - a. 0.07-inch thickness allowance.
 - b. Electrolytic corrosion-inhibitor anode.
 3. Finish: Primer.
 4. Mounting Arrangement: Floor mounted.
 5. Mounting Frame: Structural-steel stand to support receiver and pumps.
- D. Horizontal Feedwater Pump: Base-mounted, single-stage, radially split-case-design centrifugal pump; rated for 175-psig minimum working pressure and a continuous water temperature of at least 225 deg F; with the following features:
1. Impeller: Bronze.
 2. Coupling: Close.
 3. Seals: Mechanical.
 4. Motor: Open dripproof enclosure. Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."
- E. Control panel shall be unit mounted and factory wired and include the following:
1. NEMA 250, Type 1 enclosure.
 2. NEMA-rated motor controller for each motor, and include a hand-off-auto switch and overcurrent protection.
 - a. Alternating controls for duplex units with intermittent operation as indicated by control sequence.

FAIRVIEW EARLY CHILDHOOD CENTER
HVAC AND WINDOW REPLACEMENT
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

3. Terminal blocks with numbered and color-coded wiring to match wiring diagram.
4. Wiring outside of an enclosure in a metal raceway. Make connections to motor with liquidtight conduit.
5. Visual indication of status and alarm with momentary test push button.
6. Audible alarm and silence switch.
7. Visual indication of elapsed run time, graduated in hours.
8. Fused control-circuit transformer.
9. Microprocessor-based controller.

F. Feedwater Single-Pump Control Sequence:

1. Boiler water-level controller starts and stops pump to maintain boiler water-level set point.
2. Visual indication of pump on and off status.
3. Visual and audible alarm indication of pump failure.

G. Receiver Makeup Water Control Sequence:

1. Mechanical float operates integral valve to maintain water-level set point.
2. Visual and audible alarm indication of low and high receiver-water level.

H. Building Management System Interface: Factory install hardware to enable building management system to monitor and display points.

1. Hardwired Monitoring Points: On/off status for each pump, failure alarm for each pump, receiver low-water-level alarm, receiver high-water-level alarm, feedwater temperature.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before feedwater unit installation, examine roughing-in for concrete equipment bases, anchor-bolt sizes and locations, and piping and electrical connections to verify actual locations, sizes, and other conditions affecting feedwater unit performance, maintenance, and operations.
1. Final feedwater unit locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.
 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Equipment Mounting:

1. Install feedwater units on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033053 "Miscellaneous Cast-in-Place Concrete."

B. Install unit to permit access for maintenance.

C. Support piping independent of pumps.

FAIRVIEW EARLY CHILDHOOD CENTER
HVAC AND WINDOW REPLACEMENT
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

- D. Install base-mounted pumps on concrete bases with grouted base frames.
- E. Install parts and accessories shipped loose.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to machine to allow service and maintenance.
- C. Connect makeup water piping and cooling-water piping with reduced-pressure backflow preventers.
- D. Install overflow drain piping to nearest floor drain.
- E. Install vents and extend to outdoors; terminate with elbow turned down and an insect screen.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Perform tests and inspections and prepare test reports.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
 - 1. Inspect field-assembled components, equipment installation, and piping and electrical connections for compliance with manufacturer's written instructions.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 3. Check bearing lubrication.
 - 4. Verify proper motor rotation.
 - 5. Start up service.
 - 6. Report results in writing.
- D. Remove and replace malfunctioning units and retest as specified above.

3.5 ADJUSTING

- A. Adjust boiler water-level controls to properly stage unit.
- B. Set field-adjustable, makeup water and cooling-water controls.

FAIRVIEW EARLY CHILDHOOD CENTER
HVAC AND WINDOW REPLACEMENT
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

3.6 CLEANING

- A. Clean equipment internally; remove coatings applied for protection during shipping and storage, foreign material, and oily residue according to manufacturer's written instructions.
- B. Clean strainers.

3.7 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain feedwater units. Refer to Section 017900 "Demonstration and Training."

END OF SECTION 235313R

SECTION 235313R - BOILER FEEDWATER SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Feedwater pumps and tanks.

1.3 DEFINITION

- A. NPSH: Net-positive suction head.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacity, temperature and NPSH required, pump performance curves with selection points clearly indicated, and furnished specialties and accessories.
- B. Shop Drawings: Include plans, elevations, sections, details, dimensions, weights, loadings, required clearances, method of field assembly, and attachments to other work.
 - 1. Wiring Diagrams: Power, signal, and control wiring.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Fabricate and test unit according to ASME PTC 12.1, "Closed Feedwater Heaters."
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

ROLLING GREEN ELEMENTARY SCHOOL
HVAC AND WINDOW REPLACEMENT
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

- C. ASME Compliance: ASME B31.9, "Building Services Piping," for systems equal to or less than 15 psig. Safety valves and pressure vessels shall bear the appropriate ASME label.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Shipping: Clean flanges and exposed-metal surfaces and treat with anticorrosion compound after assembly and testing. Protect flanges, pipe openings, and nozzles with wooden flange covers or with screwed-in plugs.
- B. Store units in dry location.
- C. Retain protective flange covers and machined-surface protective coatings during storage.
- D. Protect bearings and couplings against damage from sand, grit, and other foreign matter.
- E. Comply with manufacturer's written rigging instructions.

1.8 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

PART 2 - PRODUCTS

2.1 FEEDWATER UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bryan Boilers; Bryan Steam, LLC.
 - 2. Cleaver-Brooks; Div. of Aqua-Chem, Inc.
 - 3. Deaerating Designs; a division of Precision Boilers, Inc.
 - 4. Domestic Pump; a unit of ITT Fluid Technology.
 - 5. Hurst Boiler & Welding Company, Inc.
 - 6. Sellers Engineering Co.
 - 7. Skidmore.
 - 8. Superior Boiler Works, Inc.
- B. Description: Factory-assembled and -tested unit consisting of a receiver, triplex feedwater pumps, controls, and the following features and accessories:
 - 1. Triplex third pump shall be manually valved in and manually selected for boiler that need spare pump.
 - 2. Liquid-filled industrial thermometer graduated in Fahrenheit.
 - 3. Level gage glass, reflex flat type, with stops at top and bottom.
 - 4. Lifting eyes.
 - 5. Companion flanges.
 - 6. Pump, suction and discharge isolation valve, inlet strainer, discharge check valve, and liquid-filled pressure gage.

ROLLING GREEN ELEMENTARY SCHOOL
HVAC AND WINDOW REPLACEMENT
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

7. Makeup Water Assembly: Float operated with integral valve; with inlet strainer and three-valve bypass.
 8. Feedwater Heater: Sparge tube, thermostat, and control valve.
 9. Factory-Installed Pipe, NPS 2-1/2 and Smaller: ASTM A 53/A 53M, Type S (seamless), Grade B; or ASTM A 106, Type S, Grade B, Schedule 40; with threaded joints and fittings.
 - a. Cast-Iron Threaded Fittings: ASME B16.4; Class 125.
 - b. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150.
 - c. Forged-Steel Fittings: ASME B16.11, Class 3000.
 - d. Malleable-Iron Unions: ASME B16.39; Class 150.
 - e. Forged-Steel Unions: MSS SP-83, Class 3000.
 10. Factory-Installed Pipe, NPS 3 and Larger: ASTM A 53/A 53M, Type E (electric-resistance welded), Grade B; or ASTM A 106, Type S, Grade B, Schedule 40; with welded joints and carbon-steel fittings and flanges.
 - a. Wrought-Steel Fittings: ASME B16.9, wall thickness to match adjoining pipe.
 - b. Wrought Cast- and Forged-Steel Flanges and Flanged Fittings: ASME B16.5, Class 150, including bolts, nuts, and gaskets.
- C. Receiver:
1. Material: Welded carbon steel galvanized after fabrication.
 2. Additional corrosion protection:
 - a. 0.07-inch thickness allowance.
 - b. Electrolytic corrosion-inhibitor anode.
 3. Finish: Primer.
 4. Mounting Arrangement: Floor mounted.
 5. Mounting Frame: Structural-steel stand to support receiver and pumps.
- D. Horizontal Feedwater Pump: Base-mounted, single-stage, radially split-case-design centrifugal pump; rated for 175-psig minimum working pressure and a continuous water temperature of at least 225 deg F; with the following features:
1. Impeller: Bronze.
 2. Coupling: Close.
 3. Seals: Mechanical.
 4. Motor: Open dripproof enclosure. Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."
- E. Control panel shall be unit mounted and factory wired and include the following:
1. NEMA 250, Type 1 enclosure.
 2. NEMA-rated motor controller for each motor, and include a hand-off-auto switch and overcurrent protection.
 - a. Alternating controls for duplex units with intermittent operation as indicated by control sequence.

ROLLING GREEN ELEMENTARY SCHOOL
HVAC AND WINDOW REPLACEMENT
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

3. Terminal blocks with numbered and color-coded wiring to match wiring diagram.
4. Wiring outside of an enclosure in a metal raceway. Make connections to motor with liquidtight conduit.
5. Visual indication of status and alarm with momentary test push button.
6. Audible alarm and silence switch.
7. Visual indication of elapsed run time, graduated in hours.
8. Fused control-circuit transformer.
9. Microprocessor-based controller.

F. Feedwater Single-Pump Control Sequence:

1. Boiler water-level controller starts and stops pump to maintain boiler water-level set point.
2. Visual indication of pump on and off status.
3. Visual and audible alarm indication of pump failure.

G. Receiver Makeup Water Control Sequence:

1. Mechanical float operates integral valve to maintain water-level set point.
2. Visual and audible alarm indication of low and high receiver-water level.

H. Building Management System Interface: Factory install hardware to enable building management system to monitor and display points.

1. Hardwired Monitoring Points: On/off status for each pump, failure alarm for each pump, receiver low-water-level alarm, receiver high-water-level alarm, feedwater temperature.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before feedwater unit installation, examine roughing-in for concrete equipment bases, anchor-bolt sizes and locations, and piping and electrical connections to verify actual locations, sizes, and other conditions affecting feedwater unit performance, maintenance, and operations.
1. Final feedwater unit locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.
 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Equipment Mounting:

1. Install feedwater units on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033053 "Miscellaneous Cast-in-Place Concrete."

B. Install unit to permit access for maintenance.

C. Support piping independent of pumps.

ROLLING GREEN ELEMENTARY SCHOOL
HVAC AND WINDOW REPLACEMENT
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

- D. Install base-mounted pumps on concrete bases with grouted base frames.
- E. Install parts and accessories shipped loose.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to machine to allow service and maintenance.
- C. Connect makeup water piping and cooling-water piping with reduced-pressure backflow preventers.
- D. Install overflow drain piping to nearest floor drain.
- E. Install vents and extend to outdoors; terminate with elbow turned down and an insect screen.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Perform tests and inspections and prepare test reports.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
 - 1. Inspect field-assembled components, equipment installation, and piping and electrical connections for compliance with manufacturer's written instructions.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 3. Check bearing lubrication.
 - 4. Verify proper motor rotation.
 - 5. Start up service.
 - 6. Report results in writing.
- D. Remove and replace malfunctioning units and retest as specified above.

3.5 ADJUSTING

- A. Adjust boiler water-level controls to properly stage unit.
- B. Set field-adjustable, makeup water and cooling-water controls.

ROLLING GREEN ELEMENTARY SCHOOL
HVAC AND WINDOW REPLACEMENT
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

3.6 CLEANING

- A. Clean equipment internally; remove coatings applied for protection during shipping and storage, foreign material, and oily residue according to manufacturer's written instructions.
- B. Clean strainers.

3.7 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain feedwater units. Refer to Section 017900 "Demonstration and Training."

END OF SECTION 235313R

SECTION 235216 - CONDENSING BOILERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes packaged, factory-fabricated and -assembled, gas-fired, water-tube condensing boilers, trim, and accessories for generating hot water.

1.3 ACTION SUBMITTALS

- A. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.
 - 1. Wiring Diagrams: Power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. ASME Compliance: Fabricate and label boilers to comply with ASME Boiler and Pressure Vessel Code.
- C. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."
- D. UL Compliance: Test boilers for compliance with UL 795, "Commercial-Industrial Gas Heating Equipment." Boilers shall be listed and labeled by a testing agency acceptable to authorities having jurisdiction.

NASHOLD ELEMENTARY SCHOOL RENOVATIONS
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of boilers that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Water-Tube Condensing Boilers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Lochinvar Corporation.
 - 2. AERCO International.
 - 3. Fulton Boiler Works Inc.
 - 4. Triangular Tube.

2.2 WATER-TUBE CONDENSING BOILERS

- A. Description: Factory-fabricated, -assembled, and -tested, water-tube 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. Water heating service only.
- B. Heat Exchanger: Finned-copper primary and stainless-steel secondary heat exchangers.
- C. Combustion Chamber: Stainless steel, sealed.
- D. Burner: Natural gas, forced draft drawing from gas premixing valve.
- E. Blower: Centrifugal fan to operate during each burner firing sequence and to prepurge and postpurge the combustion chamber.
 - 1. Motors: Comply with requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
 - a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- F. Gas Train: Combination gas valve with manual shutoff and pressure regulator.

NASHOLD ELEMENTARY SCHOOL RENOVATIONS
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

- G. Ignition: Silicone carbide hot-surface ignition that includes flame safety supervision and 100 percent main-valve shutoff.
- H. Integral Circulator: Cast-iron body and stainless-steel impeller sized for minimum flow required in heat exchanger.
- I. Casing:
 - 1. Jacket: Sheet metal, with snap-in or interlocking closures.
 - 2. Control Compartment Enclosures: NEMA 250, Type 1A.
 - 3. Finish: Textured epoxy.
 - 4. Insulation: Minimum 1-inch- thick, mineral-fiber insulation surrounding the heat exchanger.
 - 5. Combustion-Air Connections: Inlet and vent duct collars.
 - 6. Mounting base to secure boiler.

2.3 TRIM

- A. Aquastat Controllers: Operating, firing rate, and high limit.
- B. Safety Relief Valve: ASME rated.
- C. Pressure and Temperature Gage: Minimum 3-1/2-inch- diameter, combination water-pressure and -temperature gage. Gages shall have operating-pressure and -temperature ranges so normal operating range is about 50 percent of full range.
- D. Boiler Air Vent: Automatic.
- E. Drain Valve: Minimum NPS 3/4 hose-end gate valve.

2.4 CONTROLS

- A. Boiler operating controls shall include the following devices and features:
 - 1. Control transformer.
 - 2. Set-Point Adjust: Set points shall be adjustable.
 - 3. Sequence of Operation: Electric, factory-fabricated and field-installed panel to control burner firing rate to reset supply-water temperature inversely with outside-air temperature.
- B. Burner Operating Controls: To maintain safe operating conditions, burner safety controls limit burner operation.
 - 1. High Cutoff: Automatic reset stops burner if operating conditions rise above maximum boiler design temperature.
 - 2. Low-Water Cutoff Switch: Electronic probe shall prevent burner operation on low water. Cutoff switch shall be Automatic-reset type.
 - 3. Blocked Inlet Safety Switch: Manual-reset pressure switch field mounted on boiler combustion-air inlet.
 - 4. Audible Alarm: Factory mounted on control panel with silence switch; shall sound alarm for above conditions.

NASHOLD ELEMENTARY SCHOOL RENOVATIONS
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

- C. Building Automation System Interface: Factory install hardware and software to enable building automation system to monitor, control, and display boiler status and alarms.
 - 1. Hardwired Points:
 - a. Monitoring: On/off status, common trouble alarm and low water level alarm.
 - b. Control: On/off operation, and hot water supply temperature set-point adjustment.

2.5 ELECTRICAL POWER

- A. Single-Point Field Power Connection: Factory-installed and -wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point field power connection to boiler.
 - 1. House in NEMA 250, Type 1 enclosure.
 - 2. Wiring shall be numbered and color-coded to match wiring diagram.
 - 3. Install factory wiring outside of an enclosure in a metal raceway.
 - 4. Field power interface shall be to nonfused disconnect switch.
 - 5. Provide branch power circuit to each motor and to controls with a disconnect switch or circuit breaker.
 - 6. Provide each motor with overcurrent protection.

2.6 VENTING KITS

- A. Kit: Complete system, ASTM A 959, Type 29-4C stainless steel, pipe, vent terminal, thimble, indoor plate, vent adapter, condensate trap and dilution tank, and sealant.
- B. Combustion-Air Intake: Complete system, stainless steel, pipe, vent terminal with screen, inlet air coupling, and sealant.

2.7 SOURCE QUALITY CONTROL

- A. Burner and Hydrostatic Test: Factory adjust burner to eliminate excess oxygen, carbon dioxide, oxides of nitrogen emissions, and carbon monoxide in flue gas and to achieve combustion efficiency; perform hydrostatic test.
- B. Test and inspect factory-assembled boilers, before shipping, according to ASME Boiler and Pressure Vessel Code.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before boiler installation, examine roughing-in for concrete equipment bases, anchor-bolt sizes and locations, and piping and electrical connections to verify actual locations, sizes, and other conditions affecting boiler performance, maintenance, and operations.
 - 1. Final boiler locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.

NASHOLD ELEMENTARY SCHOOL RENOVATIONS
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

- B. Examine mechanical spaces for suitable conditions where boilers will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 BOILER INSTALLATION

- A. Equipment Mounting: Install boilers on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases specified in Section 033000 "Cast-in-Place Concrete."
 - 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 - 2. Construct bases to withstand, without damage to equipment, seismic force required by code.
 - 3. Construct concrete bases 4 inches high and extend base not less than 6 inches in all directions beyond the maximum dimensions of boiler unless otherwise indicated or unless required for seismic anchor support.
 - 4. Minimum Compressive Strength: 5000 psi at 28 days.
 - 5. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 - 6. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor into structural concrete floor.
 - 7. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 8. Install anchor bolts to elevations required for proper attachment to supported equipment.
- B. Install gas-fired boilers according to NFPA 54.
- C. Assemble and install boiler trim.
- D. Install electrical devices furnished with boiler but not specified to be factory mounted.
- E. Install control wiring to field-mounted electrical devices.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to boiler to allow service and maintenance.
- C. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.
- D. Connect piping to boilers, except safety relief valve connections, with flexible connectors of materials suitable for service. Flexible connectors and their installation are specified in Section 232113 "Hydronic Piping."
- E. Connect gas piping to boiler gas-train inlet with union. Piping shall be at least full size of gas train connection. Provide a reducer if required.
- F. Connect hot-water piping to supply- and return-boiler tappings with shutoff valve and union or flange at each connection.

NASHOLD ELEMENTARY SCHOOL RENOVATIONS
ROCKFORD PUBLIC SCHOOLS 205
ROCKFORD, ILLINOIS

- G. Install piping from safety relief valves to nearest floor drain.
- H. Boiler Venting:
 - 1. Install flue venting kit and combustion-air intake.
 - 2. Connect full size to boiler connections.
- I. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- J. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

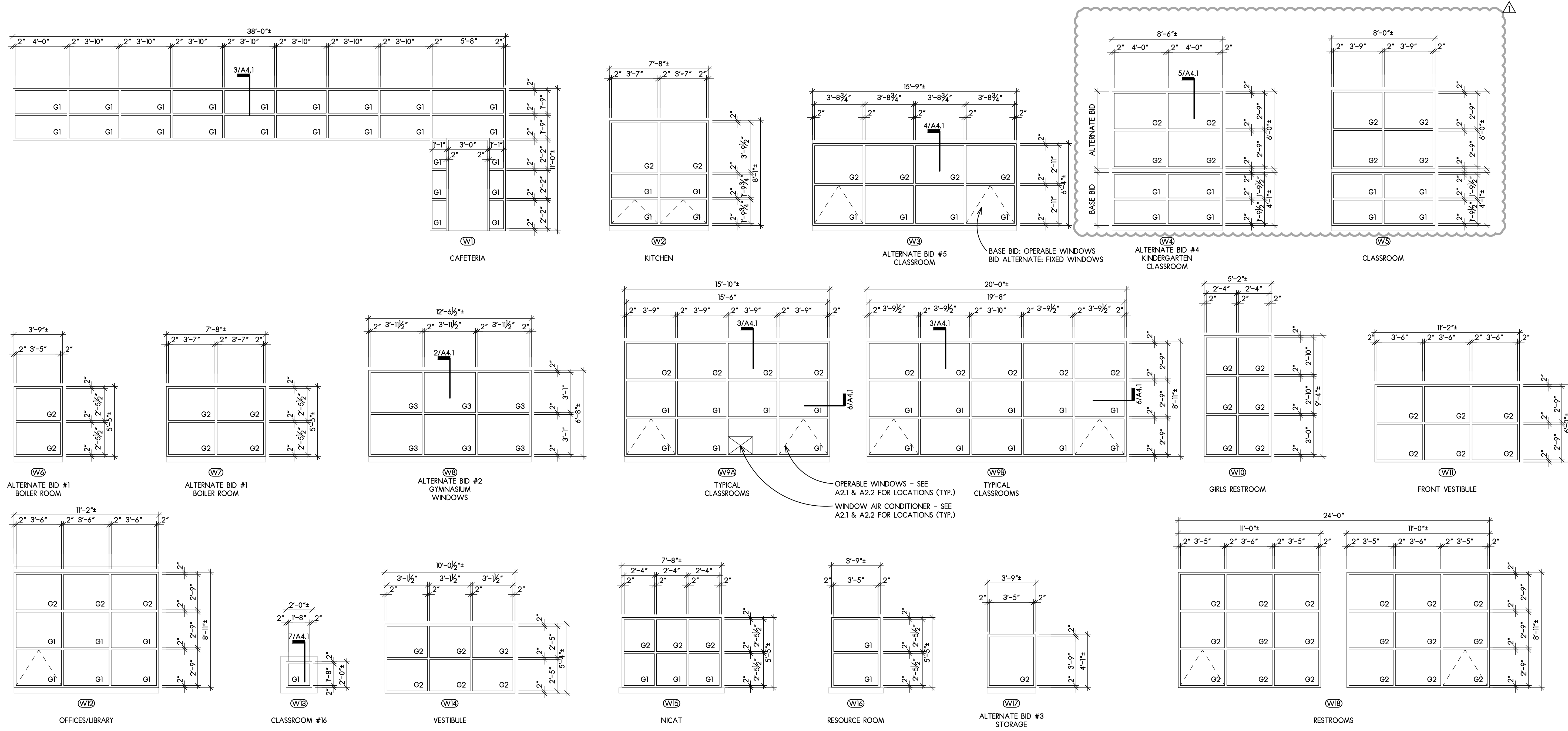
3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
 - 1. Perform installation and startup checks according to manufacturer's written instructions.
 - 2. Leak Test: Hydrostatic test. Repair leaks and retest until no leaks exist.
 - 3. Operational Test: Start units to confirm proper motor rotation and unit operation. Adjust air-fuel ratio and combustion.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - a. Check and adjust initial operating set points and high- and low-limit safety set points of fuel supply, water level and water temperature.
 - b. Set field-adjustable switches and circuit-breaker trip ranges as indicated.
- C. Remove and replace malfunctioning units and retest as specified above.
- D. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other than normal occupancy hours for this purpose.

3.5 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain boilers. Refer to Section 017900 "Demonstration and Training."

END OF SECTION 235216



1 WINDOW ELEVATIONS
SCALE: 1/4" = 1'-0"

GLASS TYPES :
 G1 - 1" CLEAR TEMPERED INSULATING GLASS
 G2 - 1" TRANSLUCENT TEMPERED INSULATING GLASS
 G3 - FIBERGLASS SANDWICH PANEL ASSEMBLY

OPERABLE WINDOWS - SEE A2.1 & A2.2 FOR LOCATIONS (TYP.)
 WINDOW AIR CONDITIONER - SEE A2.1 & A2.2 FOR LOCATIONS (TYP.)

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ISSUED FOR:	DATE:
DESIGN REVIEW	02-23-17
ADDENDUM 3	03-01-17
DRAWN	APPROVED
SAT	SMN

DATE: 10-7-2016
PROJECT NUMBER: 25111
SHEET NUMBER: A3.1