



Contracting Officer  
200 Ross Street, 7<sup>th</sup> Floor  
Pittsburgh, PA 15219  
(412) 456-5015  
www.hacp.org

November 9, 2011

**General Improvements of 5 Scattered Sites Homes**

**IFB#600-41-11**

**ADDENDUM NO.6**

This addendum issued November 9, 2011 becomes in its entirety a part of the Invitation to Bid IFB#600-41-11 as is fully set forth herein:

**Item 1: Q:** The HACP Section 3 representative Ms. Hayden stated at the pre-construction meeting that she had individuals in her Section 3 database who have current required HVAC, plumbing and electrical licenses required to perform HVAC, plumbing and electrical work in the City of Pittsburgh. If a contractor would choose Option 1, to hire a Section 3 listed individual, and no licensed candidate is available to be hired, does this fulfill the contractor's responsibility under Section 3?

**A:** If a contractor chose Tier 1 to fulfill his or her obligations by hiring a Section 3 employee but no one is available, the contractor automatically must make contribution to the HACP Education Fund to provide assistance to residents to obtain training for future opportunities.

**Item 2: Q:** Ms. Sunshine Eger, HACP Project Manager, stated that the general contractor is responsible for all hazardous material abatement and disposal to include lead based paint for all contracts. Is this a true statement?

**A:** Yes. The terms and conditions to the Project Manual remain unchanged. Please refer to Project Manual contract form document 00310 – Scope of work for General Construction and the technical specifications Section 011200 Part 1.4, C, 5 and the Hazardous Materials specifications.

**Item 3: Q:** It was stated that solicitation of 10 registered MBE and WBE firms for work on the project would demonstrate a good faith effort and would satisfy the MBE/WBE goals of the project. Is this a true statement?

**A:** The terms and conditions of the Project Manual remain unchanged. Please refer to Project Manual contract form document 00020 – Notice to Prospective Bidders.

**Item 4: Q:** Currently each prime contractor is responsible for removing their own debris from the project site. This may result in possibly four dumpsters located in a residential area. Is it possible to designate one contractor to provide a dumpster for all four

contractors to use so we do not congest a residential area with four dumpsters and quite frankly, it will reduce the overall cost to the HACP?

A: The terms and conditions to the Project Manual remain unchanged. Please refer to Project Manual technical specifications Section 011200 Part 1.4, C, 5; 017419 and the Hazardous Materials specifications.

**Item 5:** Q: Currently each prime contractor is responsible for its' own patching. Past projects have indicated that when four prime contractors do their own patching, the appearance of different patching technicians shows on the final product. I also understand that you do not want the three mechanical contractors just to make random and as many holes as they want. Is it acceptable to have the general contractor be responsible to patch 15 sq ft. for each mechanical contractor in each unit to achieve a uniform patch and limit the number of holes made by the mechanical contractors, in addition it would be less expensive to have one contractor hiring one plaster contractor instead of four contractors hiring four different plasterers, again saving HACP costs over the entire contracts?

A: The terms and conditions to the Project Manual remain unchanged. Please refer to Project Manual technical specifications Section 011200 Part 1.4A(3); 017329. The general contractor is responsible for finishes.

**Item 6:** Q: The HACP project manager stated that the HACP will provide, maintain and pay for all utility services at all sites at the pre-construction meeting. Is this a correct statement?

A: The terms and conditions to the Project Manual remain unchanged. Please refer to Project Manual technical specifications Section 011200 Part 1.4, D & E Part 1.5 B, Part 1.6, B Part 1.8 B; 024119 and the Hazardous Materials specifications.

**Item 7:** Q: 3757 Beechwood Blvd,  
The above mentioned address on drawing A3 third floor plan there is a type "C: fixture. My suppliers says that this fixture is discontinued. Another fixture will need to be picked.

A: Drawing A3 is revised to substitute light fixture C with Progress Lighting – Model Number P5032-30 or approved equal.

**Item 8:** Q: Does the HACP/Architect/Engineers certify that the plans and specifications comply with all applicable code requirements?

A: The specifications and drawings reflect conformance with code requirements. However, each prime is required to review the documents and visit the site prior to submitting a bid and if any code issues are identified, they shall be brought to HACP's attention to address in the form of an addendum prior to the bid due date.

**Item 9:** Q: Doest the HACP/Architect/Engineers certify that the plans show all of the necessary work required to accomplish the work under this contract without the need for change orders being required? If not, what work is required that is not shown?

A: Refer to answer to Item 8.

**Item 10: Q:** The previously related experience form requests change order information for previous projects, for which the form states, "HACP may rely on information provided...to determine the bidder's responsibility."

HUD General Conditions form HUD-5370 at page 10, para. 29. Changes para (A) states

"29. Changes

- (a) The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract including changes:
- (1) In the specifications (including drawings and designs);
  - (2) In the method or manner of performance of the work;
  - (3) PHA-furnished facilities, equipment, materials, services, or site; or,
  - (4) Directing the acceleration in the performance of the work.

I have been in this business for 32 years, and I have never received a change order which was not approved by the Contracting Officer. By the Contracting Officer approving the change order in accordance with para 29 above, the Contracting Officer is stating that the drawings or specifications are incorrect, the method or manner of work has been changed by the HACP, the PHA-furnished facilities, equipment, materials have changed from the bid or the HACP directed an acceleration.

Since the bidder has no control whatsoever on the above-listed items, how can or what are the objective criteria to be used by the HACP to determine a bidder's responsibility?

A: The terms and conditions remain unchanged. The requirement stands.

**Item 11: Clarification:** 6535 Rowan Street Pgh, PA, 15206

**Drawing A1** -- Add the following note to Second Floor Plan Bedrooms, Hall & Bath

G-7 Remove existing VCT flooring and rubber base. See finish schedule for new VCT replacement.

**Item 12: Clarification:** 207 Dunster Street Pgh, PA 15226

**Drawing A6 Room Finish Schedule Revisions: Floor Finish for Second Floor Bedrooms F-2** install new VCT flooring.

**Item 13: Clarification:** 1245 Crane Ave. Pgh, PA 15220

**Drawing A7** -- Add the following note to Kitchen and Bath, First Floor Plan

G-11 Remove existing VCT flooring and rubber base. See finish schedule for new VCT replacement.

**Drawing A7** -- Add the following note to all Bedrooms First Floor Plan

G-12 Sand -- Refinish existing hardwood flooring. Provide 4 coats of water-based polyurethane floor finish.

Drawing A8 -Finish Schedule Revisions -- Bedrooms F-3 Hardwood --Refinish

Add drawings SK-1, SK-2, SK-3 for below grade waterproofing Attachment A and specification Section 071326 Self-Adhering Sheet Waterproofing as Attachment B.

**Item 14: Clarification: 326 Wykcoff Avenue Pgh. PA. 15220**

Drawing A-9 – Add the following note to Second Floor Plan Bedrooms and Bath  
G-8 Remove existing carpet and VCT flooring and rubber base. See finish schedule for new VCT replacement.

Drawing A-9 Add the following note to First Floor Utility Closets (3)  
G-2 Remove existing VCT flooring and rubber base. See finish schedule for new VCT replacement.

Drawing A-9 Add the following note to existing Stairs  
G-8 Remove existing stairs treads and VCT flooring at landings. Install new rubber stairs treads and new VCT at landings

Drawing A10 Finish Schedule Revisions- New VCT flooring and rubber base in Utility Closets

**Item 15: Q:** Please provide the property notarial language is the Special Provisions Notice to All Prospective Bidders is to be notarized?

**A:** The notarization requirement is hereby removed.

**Item 16: Q:** Is the general contractor responsible for toilet facilities (Port a John) for use of his or her personnel or all construction personnel?

**A:** Yes. For personnel of all primes.

**Item 17: Q:** Is each contractor to have a waste management plan and coordinator?

**A:** Refer to Item 4 above.

**Item 18: Q:** Please clarify HVAC contractors role with spec 15486 for fuel fired water heaters.

**A:** No HVAC work, the plumbing contractor will supply and install water heaters.

**Item 19: Q:** Please provide a size for each furnace

**A:** No furnace sizing will be listed. Contractors can use existing furnaces as basis for their bids and survey all manufacturers listed in the specifications.

**Item 20: Q:** Please provide a spec for the condensing units and sizing.

**A:** No condensing units will be listed. Contractors must estimate existing conditions and review supplier recommendations as basis for their bids and survey all manufacturers listed in the specifications.

**Item 21: Q:** Is it permissible to utilize existing flue pipe openings?

**A:** Yes, existing flue pipe openings can be used per proper working conditions.

**Item 22: Q:** Please provide a boiler spec and sizing.

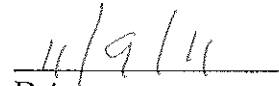
**A:** A general boiler specification is hereby provided as Attachment C to this addendum. Sizing is not listed. Contractors can use existing boiler as a basis for their bids.

**Item 23:** Q: Please provide a spec on danfoss thermostatic radiator valves.  
A: A general thermostatic specification is provided as part of the boiler specification in Attachment C.

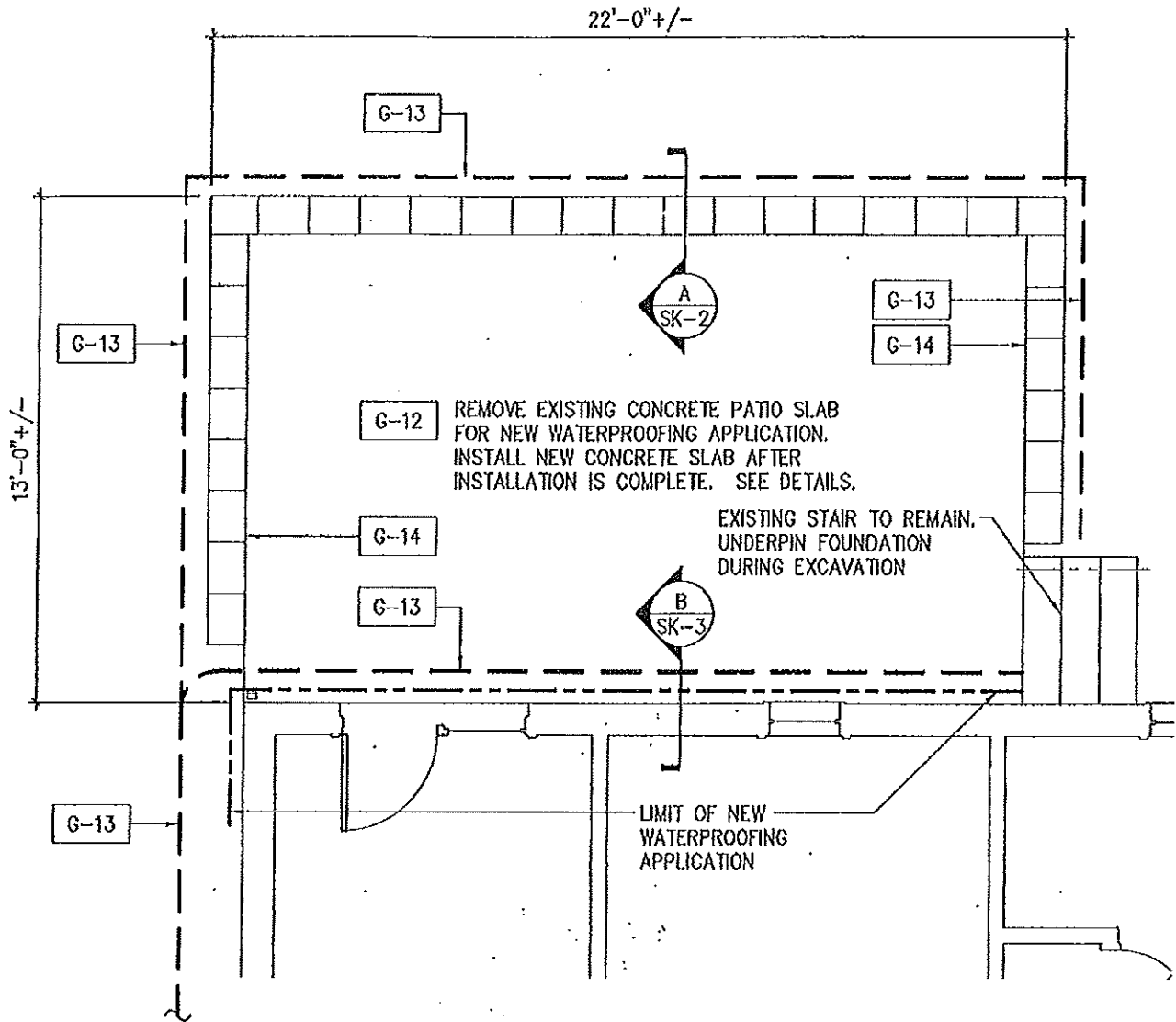
**Item 24:** The Bid due date, is revised to Thursday, November 17, 2011. The time and location, remain unchanged at 3:00 pm at the HACP Procurement Dept., 100 Ross St. 2<sup>nd</sup> Floor, Suite 200, Pittsburgh, PA 15219.

**END OF ADDENDUM NO. 6**

  
Clare Ann Fitzgerald  
Contracting Officer

  
Date

Attachment A  
Drawings: SK-1, SK-2, SK-3  
Below Grade Waterproofing

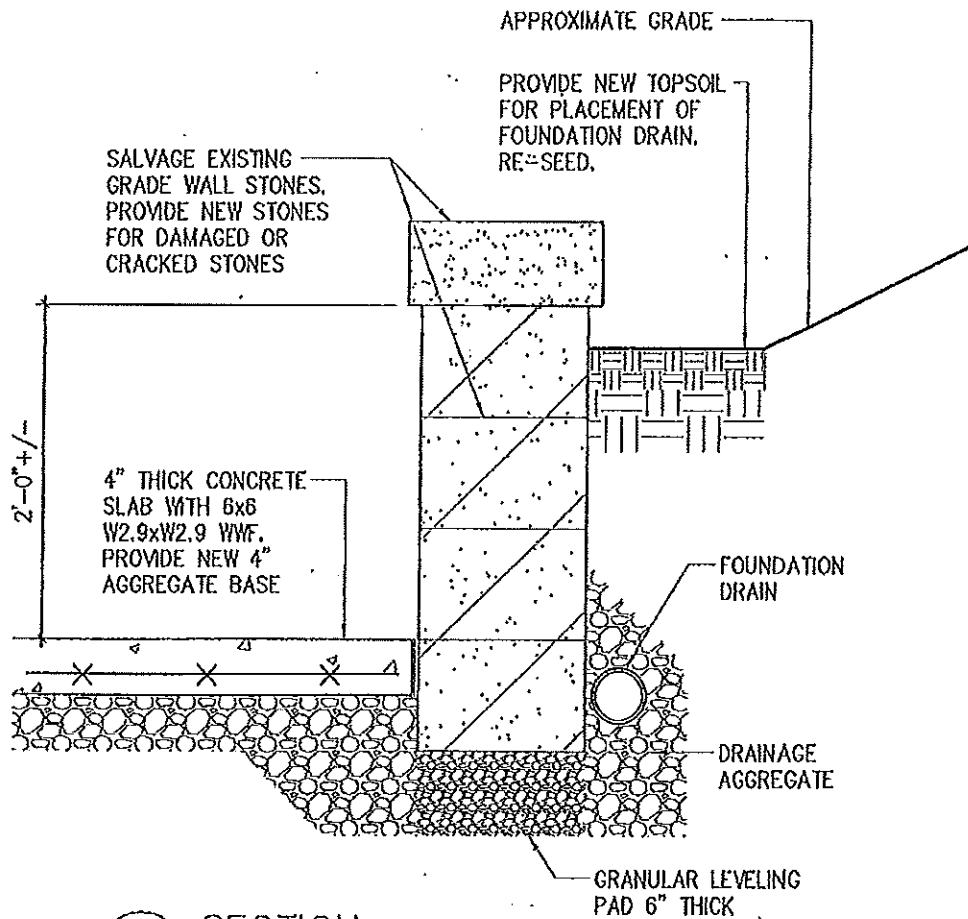


PARTIAL PLAN  
 NEW WATERPROOFING APPLICATION

SCALE: 1/4" = 1'-0"  
 GENERAL CONSTRUCTION WORK

- G-13** INSTALL NEW 4" DRAINAGE PIPE. REPLACE DISTURBED TOPSOIL AND RE-SEED.
- G-14** SALVAGE RETAINING WALL STONES FOR NEW WATERPROOFING APPLICATION. RE-INSTALL STONES AFTER AFTER NEW CONCRETE PATIO SLAB.

|  |       |
|--|-------|
| HOUSING AUTHORITY of the CITY OF PITTSBURGH<br><hr/> 100 ROSS STREET, PITTSBURGH, ALLEGHENY COUNTY, PA<br>LOFTUS ENGINEERS, LLC. MARVIN MILLER, ARCHITECT<br>1245 CRANE AVENUE, PITTSBURGH, PA 15220 | REV-1 |
|  | SK-1  |



A  
SK-2

SECTION

SCALE: 1" = 1'-0"

EXISTING GRADE WALL WITH NEW DRAIN PIPE  
GENERAL CONSTRUCTION WORK

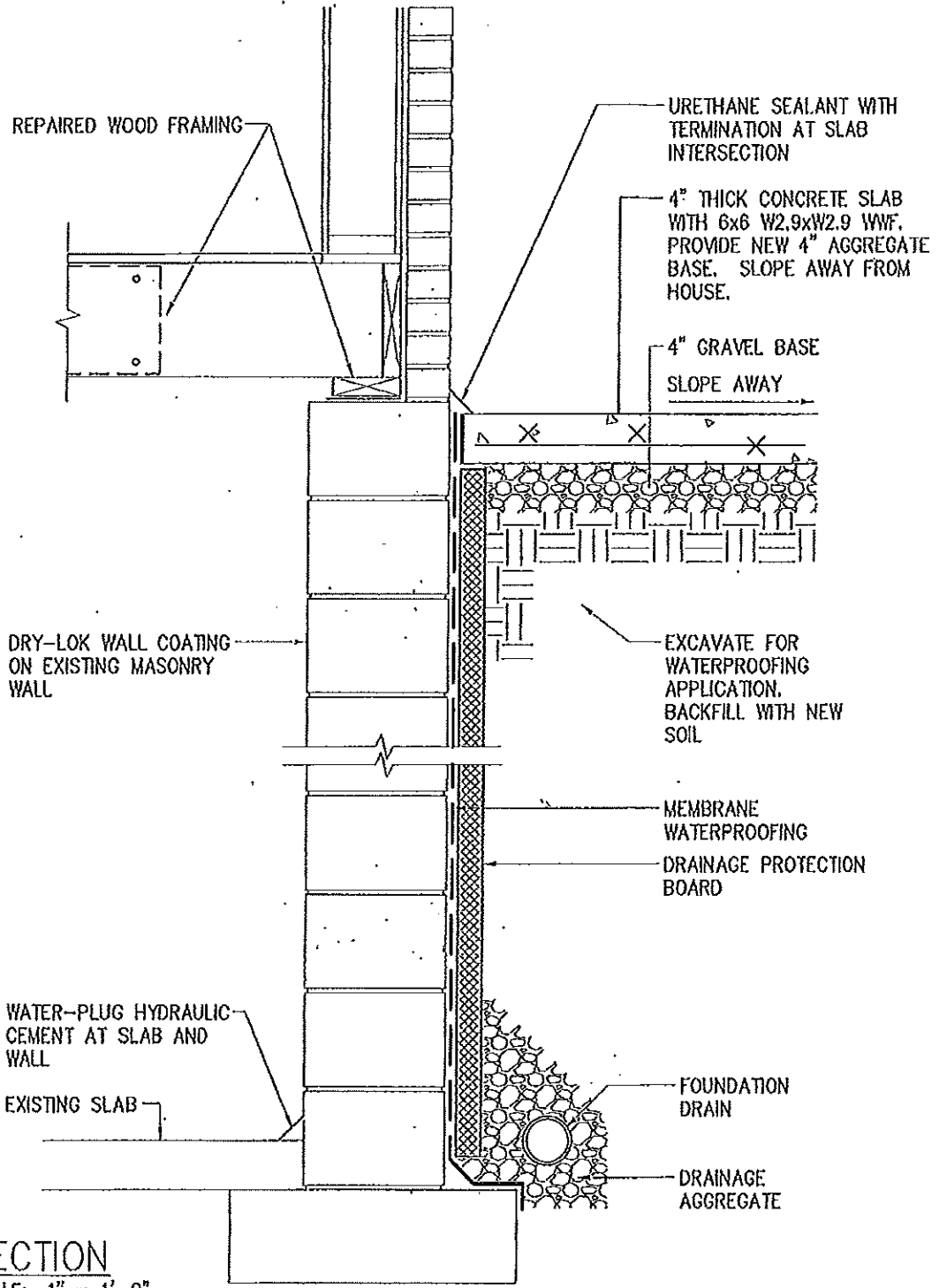
HOUSING AUTHORITY of the CITY OF PITTSBURGH

100 ROSS STREET, PITTSBURGH, ALLEGHENY COUNTY, PA  
LOFTUS ENGINEERS, LLC. MARVIN MILLER, ARCHITECT  
1245 CRANE AVENUE, PITTSBURGH, PA 15220

REV-1

SK-2





B SECTION  
SK-3 SCALE: 1" = 1'-0"  
 GENERAL CONSTRUCTION WORK

|   |   |
|---|---|
| HOUSING AUTHORITY of the CITY OF PITTSBURGH<br><hr/> 100 ROSS STREET, PITTSBURGH, ALLEGHENY COUNTY, PA<br>LOFTUS ENGINEERS, I.L.C.      MARVIN MILLER, ARCHITECT<br>1245 CRANE AVENUE, PITTSBURGH, PA 15220 | REV-1<br><br><span style="font-size: 2em; font-weight: bold;">SK-3</span> |
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Attachment B  
Section 071326 Self-Adhering Sheet Waterproofing

SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Modified bituminous sheet waterproofing.
  - 2. Insulation drainage panels

1.2 SUBMITTALS

- A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.
- B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that is acceptable to waterproofing manufacturer for installation of waterproofing required for this Project.
- B. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, and installation procedures, and inspection procedures, and protection and repairs.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1.5 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to replace waterproofing material that does not comply with requirements or that fails to remain watertight within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Modified Bituminous Sheet: Not less than 60-mil- thick, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated to a 4-mil- thick, polyethylene film with release liner on adhesive side and formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

- a. American Hydrotech, Inc.; VM 75.
- b. American Permaquik Inc.; PQ 7100.
- c. Carlisle Coatings & Waterproofing Inc.; CCW MiraDRI 860/861.
- d. CETCO Building Materials Group; Envirosheet.
- e. Grace, W. R. & Co.; Bituthene 3000.
- f. Henry Company; Blueskin WP 200.
- g. Meadows, W. R., Inc.; SealTight Mel-Rol.
- h. Nervastral, Inc.; BITU-MEM.
- i. Pecora Corporation; Duramem 700-SM.
- j. Polyguard Products; Polyguard 650.
- k. Progress Unlimited, Inc.; Plastiwrap 60.
- l. Tamko Roofing Products, Inc.; TW-60.

2. Physical Properties:

- a. Tensile Strength: 250 psi minimum; ASTM D 412, Die C, modified.
- b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
- c. Low-Temperature Flexibility: Pass at minus 20 deg F ; ASTM D 1970.
- d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C 836.
- e. Puncture Resistance: 40 lbf minimum; ASTM B 154.
- f. Hydrostatic-Head Resistance: 150 feet minimum; ASTM D 5385.
- g. Water Absorption: 0.15 percent weight-gain maximum after 48-hour immersion at 70 deg F ; ASTM D 570.
- h. Vapor Permeance: 0.05 perms ; ASTM E 96, Water Method.

2.2 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
- B. Primer: Liquid waterborne primer recommended for substrate by manufacturer of sheet waterproofing material.
- C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by manufacturer of sheet waterproofing material.
- D. Substrate Patching Membrane: Low-viscosity, two-component, asphalt-modified coating.

## General Improvements of 5 Scattered Sites Homes, PA – 22/39

- E. Sheet Strips: Self-adhering, rubberized-asphalt sheet strips of same material and thickness as sheet waterproofing.
- F. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.
- G. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch thick, predrilled at 9-inch centers.
- H. 4 inch flexible perforated drain pipe per ASTM F 405.
- I. Crushed stone # 3

### 2.3 INSULATION

- A. Unfaced Wall 2" Insulation Drainage Panels: Extruded-polystyrene board insulation complying with ASTM C 578, Type IV, 25-psi or Type VI, 40-psi minimum compressive strength; unfaced; fabricated with shi lap or channel edges and with 1 side having grooved drainage channels.

## PART 3 - EXECUTION

### 3.1 SURFACE PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- C. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.
- D. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
- E. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
- F. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

### 3.2 APPLICATION

- A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and according to recommendations in ASTM D 6135.
- B. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Re-prime areas exposed for more than 24 hours.

General Improvements of 5 Scattered Sites Homes, PA -- 22/39

- C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams and stagger end laps to ensure watertight installation.
- D. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.
- E. Correct deficiencies in or remove sheet waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

3.3 INSULATION INSTALLATION

- A. Install insulation drainage panels over waterproofed surfaces. Cut and fit to within 3/4 inch of projections and penetrations.
- B. Set insulation units in adhesive or tape applied according to manufacturer's written instructions.

3.4 PROTECTION AND CLEANING

- A. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 071326

Attachment C  
Section 235223 – Cast-Iron Boilers

SECTION 235223 - CAST-IRON BOILERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes packaged, factory-fabricated and -assembled, gas-fired, cast-iron boilers, trim, thermostatic radiator valves and accessories for generating hot water

1.2 SUBMITTALS

- A. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.
- B. Operation and maintenance data.
- C. Warranty: Special warranty specified in this Section.

1.3 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."

1.4 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace controls and heat exchangers of boilers that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period for Controls: Two years from date of Substantial Completion.
  - 2. Warranty Period for Heat Exchangers: 10 years from date of Substantial Completion.



PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Burnham Hydronics.
  2. Crown Boiler Co.
  3. Hydrotherm, Inc.; a division of Mestek, Inc.
  4. Lennox Industries Inc.
  5. Peerless Boilers.
  6. Slant/Fin Corp.
  7. Smith Cast Iron Boilers.
  8. Viessmann Manufacturing Co. (US) Inc.
  9. Weil-McLain; a United Dominion Company.

2.2 MANUFACTURED UNITS

- A. Description: Factory fabricated.
1. Cast-iron sections shall be sealed pressure tight and held together with tie rods set on an insulated steel base; including insulated jacket and flue-gas vent connection.
- B. Cast-Iron Section Design:
1. Configuration: Wet base.
  2. Number of Passes: Single.
  3. Sectional Joints: High-temperature sealant to seal flue-gas passages not in contact with heating medium, tapered cast-iron push nipples, and held together with tie rods.
  4. Drain and blowdown tappings.
  5. Return injection tube to equalize water flow to all sections.
  6. Crown inspection tappings with brass plugs.
  7. Built-in air separator.
- C. Combustion Chamber: Equipped with insulation and flame observation ports, front and back.
- D. Casing:
1. Jacket: sheet metal, with snap-in or interlocking closures and baked-enamel protective finish.
  2. Insulation: Minimum 1-inch- thick, mineral-fiber insulation surrounding the heat exchanger.
  3. Combustion Chamber Access: Refractory lined, hinged, front.
  4. Access: For cleaning between cast-iron sections.
  5. Draft Hood: Flue canopy and top flue connection shall be constructed of aluminized steel containing adjustable outlet damper assembly, with thermal flue damper.
  6. Control Cabinet: Sheet metal casing shall cover all controls, gas train, and burner.

General Improvements of 5 Scattered Sites Homes, PA – 22/39

2.3 BURNER

- A. Burner Tubes and Orifices: Stainless steel, for natural gas.
- B. Gas Train: Control devices and full-modulation on-off control sequence shall comply with requirements in ASME CSD-1.
- C. Gas Train: Combination gas valve with manual shutoff, pressure regulator, and pilot adjustment.
- D. Pilot: Intermittent-electric-spark pilot ignition with 100 percent main-valve and pilot-safety shutoff with electronic supervision of burner flame.
- E. Circulating Pump: Cast iron self-lubricating 1/25hp, 115v, 125max working pressure.

2.4 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.
- F. Radiator thermostatic control valves: Danfoss RA-2000 or approved equal by Honeywell (available thru Grainger).

2.5 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 maintain space temperature in response to thermostat with heat anticipator located in heated space.
- 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 Vent Safety Switch: Manual-reset switch factory mounted on draft diverter.

General Improvements of 5 Scattered Sites Homes, PA – 22/39

4. Rollout Safety Switch: Factory mounted on boiler combustion chamber.

2.6 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.

2.7 CAPACITIES AND CHARACTERISTICS

- A. Heating Medium: Hot water.
- B. Design Water Pressure Rating: 30 psig
- C. Minimum Efficiency AFUE: 80 percent.
- D. Electrical Characteristics:
  1. Volts: 115 V.
  2. Phase: Single.
  3. Hertz: 60.

PART 3 - EXECUTION

3.1 BOILER INSTALLATION

- A. Install boiler level on existing concrete floor.
- 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.

3.2 CONNECTIONS

- A. Install piping adjacent to boiler to allow service and maintenance.
- B. 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.
- C. Connect hot-water piping to supply- and return-boiler tappings with shutoff valve and union or flange at each connection.

General Improvements of 5 Scattered Sites Homes, PA – 22/39

- D. Install piping from safety relief valves to nearest floor drain.
- E. 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.
- F. Install flue-gas recirculation duct from vent to burner.
- G. Install thermostatic control valves at each existing radiators.

3.3 FIELD QUALITY CONTROL

A. 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. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 235223