



May 3, 2013

Brian Vogt  
Constructability Reviewer  
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701 S. Olive Ave, Suite 105  
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**RE: GSA VA Task Order #007**  
**Richard Goicoechea**  
**5 Hallview Drive,**  
**Simsbury, CT 06070**  
**Project No. 48KA3.01**

Renovations to veteran's 4800 square foot residence. The project consists of the replacement of a single forced hot air fuel oil furnace with air conditioner, 50 gallon fuel oil hot water heater with a two zone LP gas boiler. The new boiler will supply domestic hot water and two zones of hot water heating through a 3 ton and 5 ton air handler with air conditioning coils and condensers. The project will also add a 20KW LP fueled packaged stand-by generator with an automatic transfer switch configured to power priority circuits. Project also includes the installation and plumbing of a 1000 gallon underground LP tank.

## **OUTLINE OF MECHANICAL SYSTEMS**

### **PLUMBING**

Existing domestic hot water is supplied from a fuel oil-fired domestic hot water heater installed adjacent to the existing furnace in the basement utility room. The heater and associated domestic water piping shall be retained for re-use as an un-fired storage tank but all associated fuel oil piping, power and control wiring shall be removed.

All existing fuel-oil piping shall be removed and capped back at the fuel oil tank. The existing fuel oil tank shall be pumped out and abandoned in place.

An existing 100 lb propane storage tank and associated piping serving existing kitchen appliances shall be removed. The existing wall opening shall be re-used.

A new 1000 gallon propane tank shall be installed buried in the back yard of the property as shown on the Part Site Plan SI-1. The contractor shall coordinate the tank location with the existing adjacent leaching field.

**Loureiro Engineering Associates, Inc.**

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A new 1-1/2" diameter polyethylene main shall be routed buried from the new tank to the building with a minimum of 18" of cover. The main shall be routed to above grade at the building and into the building re-using the existing wall opening. A new carbon steel propane main shall be routed within the building as noted on the Part Site Plan SI-1 with valved carbon steel or CSST branches to serve each appliance. Exposed exterior propane piping shall be painted for corrosion protection.

A new propane fired hot water boiler will be installed in place of the existing furnace. A dedicated heating hot water supply and return branch shall serve the un-fired storage tank to provide domestic hot water to the building

A new 2" copper hot water heating supply and return boiler loop shall be installed with 1-1/4" copper branches to provide heat to each new air handling unit. A boiler loop circulator shall be provided along with separate zone pumps at each of the air handling units. All hot water heating piping shall be insulated.

All new equipment shall be installed per manufacturer's recommendations along with all local and State of Connecticut Building Codes.

## **HVAC**

The existing building is conditioned using a fuel oil-fired furnace located in a basement utility room with a supplemental refrigerant cooling coil connected to a remote mounted air-cooled condenser located on the south side of the building as shown on the Part Site Plan SI-1. Supply and return air distribution ductwork is routed from the furnace throughout the building. There are five existing zone dampers in the existing distribution ductwork serving one basement zone, two (east and west) zones on the first floor and two (east and west) zones on the second floor. The basement and first floor zones are fed by ductwork routed in the basement. The second floor is served by ductwork routed in the attic via a chase from the basement.

The existing oil-fired furnace will be removed along with the remote air-cooled condenser and all associated fuel oil piping, refrigerant piping, plus power and control wiring. The existing ductwork in the basement will be re-used, however, the zone dampers shall be removed and the central return air duct shall be modified to improve flow. The branch supply duct up in the chase to the attic will be cut off and capped back at the main.

A new Energy Star rated propane fired hot water condensing type boiler equal to a Burnham Alpine Series Model ALP210W will be installed in place of the existing furnace. Direct vented PVC intake and vent pipes will be routed from the new boiler within the ceiling space of the adjacent basement family room to the southeast corner of the building. The intake and vent pipes shall be terminated using a wall mounted concentric adapter. The minimum Code required separation distances shall be maintained between

the termination and all operable windows, doors and other openings into the building. New power and control wiring shall be installed to serve the new boiler.

Two, new, high efficiency, variable speed, air handling units shall be installed to condition the building with separate remote air-cooled condensers installed at grade on the south side of the building as shown on the Part Site Plan SI-1. Provide ultra-violet lights with the new air handlers to improve indoor air quality.

A 5-ton air handler equal to a First Co. VHBQB Series Model 60 with a remote 15 SEER condenser equal to an American Standard Model 4A7A5060E shall be installed within the basement utility room to serve the basement and first floors. The new basement unit shall be connected into the existing supply and return distribution ducts to be re-used. Refrigerant and hot water piping shall be piped between the condenser, boiler and air handling unit. All refrigerant piping and ductwork shall be insulated.

A 3-ton air handler equal to a First Co. EVBQ Series Model 36 with a remote 15 SEER condenser equal to an American Standard Model 4A7A5036E shall be installed high in the attic to serve the second floor. The new attic unit shall be connected into the existing supply branch ducts in the attic to be re-used. Refrigerant and hot water piping shall be piped between the condenser, boiler and air handling unit with piping be routed in the existing duct chase between the basement and the attic. All refrigerant piping and ductwork shall be insulated.

All existing registers and diffusers shall be re-used. The average air flow rate to the basement shall be approximately 0.70 cfm/sf, the first floor shall be 0.65 cfm/sf and the second floor shall be 0.76 cfm/sf.

All new equipment shall be installed per manufacturer's recommendations along with all local and State of Connecticut Building Codes.

## **HVAC AND PLUMBING CONTROLS**

One stage heating and cooling thermostats equal to First Co. Model T832 shall be installed in each zone to sense local conditions and wired back to the associated air handler. The boiler loop circulator shall be energized whenever the outside air temperature drops below 40 degrees F (adjustable). The boiler burner shall energize whenever the heating hot water return temperature drops below 140 degrees F (adjustable). The zone pump and associated air handler shall energize whenever there's a call for heat at the associated zone. The air-cooled condenser and associated air handler shall energize wherever there's a call for air conditioning at the associated zone.

## **OUTLINE OF ELECTRICAL SYSTEMS**

### **POWER DISTRIBUTION**

The contractor will provide a new pad mounted 20KW LP fueled packaged stand-by generator with compatible automatic transfer switch (ATS) / generator distribution panel(GDP). Contractor will include pad, excavation and grading. Service conductors from the generator will be routed to the new ATS/GDP as shown on site plan. Selected priority circuits will be wired from main distribution panel through the ATS and GDP. Contractor will provide all new breakers and branch circuits as required for a complete project using all copper conductors, conduit, flex liquid-tight conduit, armored cable and non-metallic cable where required. The service voltage will be 240/120 volts, 1-phase, 3 wire plus ground.

Wiring devices shall be specification grade with cover plates to match existing and tamper-resistant screws. Fusible and non-fusible switches shall be heavy-duty with NEMA type 1 enclosures for interior location and NEMA 3R enclosures for exterior locations.

### **ELECTRICAL BRANCH CIRCUIT WIRE SIZE FOR NEW EQUIPMENT**

Circuits to be removed from main distribution panel or repurposed; Air Conditioner, Water Heater and Furnace.

Based on the application of the National Electric Code branch circuit wire sizes:

Generator to ATS to main disconnect, 3 - #3AWG with #8AWG ground

Gas fired boiler with circulator, 2 - #12AWG with #12 Ground, 15A - SP breaker.

3 ton AC condenser, 2 - #10AWG with #10 Ground, 30A - 2P breaker

5 ton AC condenser, 2 - #6AWG with #10 Ground, 60A - 2P breaker

3 ton AHU with circulator - in attic, condenser, 2 - #12AWG with #12 Ground, 15A - 1P breaker.

5 ton AHU with circulator - in basement mechanical room, condenser, 2 - #12AWG with #12 Ground, 20A - 1P breaker.

Service convenience GFCI outlets must be installed within 25 feet of all equipment and non fused safety switches / disconnects at all equipment, type as required.

All equipment will be electrically installed according to manufacturer's recommendations and all state and local codes and all authorities having jurisdiction. Installation shall be complete and fully functional to the



satisfaction of the owner. All installed equipment shall have a full one year equipment and labor warranty .

Priority of generator circuits should be selected by the homeowner and should minimally include: water well pump, boiler and circulators, 3Ton AHU and 3Ton AC condenser, 5 Ton AHU and 5 Ton AC condenser, 1<sup>st</sup> floor 2<sup>nd</sup> floor and basement lighting and receptacle circuits.

Sincerely,

**LOUREIRO ENGINEERING ASSOCIATES, INC.**

Robert Sherman, CEA, CGD  
Project Manager