DIVISION 12 - HEATING & AIR CONDITIONING (SUBJECT TO DIVISION 1)

12.A. GENERAL

1. Gas fired, forced air furnace shall be of sufficient size to maintain an indoor temperature of 70° Fahrenheit at a sitting level 30" above floor throughout the structure, when the external temperature is at -5° Fahrenheit. Installation shall comply with NFPA Standard No. 54, and the ASHRAE guide or applicable manual of the Warm Air Heating and Air Conditioning Association, as modified by local codes.

2. Existing duct work may be used with approval of the Rehab Office and the Building Inspector, provided all of the following are met:

   a. A combination shut-off and controllable register is provided to each supply outlet in all rooms.

   b. All duct work is in operable condition.

   c. Return air from any living unit shall not be recirculated and delivered to any other living unit.

   d. Supply ducts shall be on exterior walls where possible.

   e. Insulate supply ducts in unheated attic spaces, ventilated crawl spaces, on cold side of stud spaces in exterior walls, and other exposed locations to prevent excessive heat loss.

   f. If existing ductwork is covered with asbestos, it shall be removed by a contractor who is licensed for such removal. See Exhibit 5.

3. All piping and electrical hook-ups shall be included in the price quote.

4. All furnaces shall be equipped with thermostat location on any inside wall, responsive to changes in outside temperatures, and properly sealed behind to prohibit drafts through interior wall.

5. All line voltage electrical connections shall be made directly to the electrical panel. All low voltage wire shall be not less than #16 gauge.

6. Gas piping shall be steel or wrought iron piping with malleable screw type fittings. It shall conform to all local codes and ordinances, and utility requirements and restrictions. Gas line shall be properly supported with approved hangers, and be of sufficient size to feed supply lines.

7. If central air conditioning is not installed, adapt bonnet to accept future air conditioning coils.

12.B. MATERIALS

1. Warm Air Furnace (manufacturer shall be chosen by the owner) with heating capacity and air delivery as required below. Entire unit to be A.G.A. and U.L. approved and labeled. Furnace shall have a minimum of 78% efficiency. Higher rated furnaces may be approved with the consent of the owner and rehab office. Any rebate shall come to the rehab office.

2. Forced Water and Steam Boilers: Shall be HB Smith, Utica, American Standard, or approved equal, with heating capacity as sufficient to heat the house properly. All boilers to be ASME labeled. An approved backflow prevention device must be installed on one makeup water supply for all boiler replacements.

3. Duct Work: Shall be of galvanized steel with all duct work being designed in complete accordance with SMACNA (Sheet Metal Construction for Ventilation and Air Conditioning Contractors National Association, Inc.) Duct Manual, Sections 1 and 2. Duct work in unheated spaces shall be insulated using 2" Fiberglass, foil spaces shall be insulated using 2" Fiberglass, foil lines, blankets and with all joints fully taped. Duct work in basements shall not be insulated.

4. Steam Piping System: Shall be of schedule 40 black steel with malleable iron screw type fittings.

5. Gas Piping: Shall be schedule 40 black or galvanized steel with malleable iron screw type fittings.

6. Water Piping: Shall be type "M" or "L" copper with wrought copper fittings.

7. Circulating Pumps: Shall be as manufactured by Bell and Gosset in line pump, or approved equal. Pump is to be designed for total head and G.P.M. delivery required.

8. Expansion Tank: Shall be ASTM approved, and shall have a capacity to fit heating system output design.

9. Radiation (Water System): Shall be copper finned tube radiation, sized for heat loss of each room served. Radiation shall be as manufactured by Trane or approved equal, complete with cover and air vent.

10. Supply Registers and Diffusers (wall and baseboard type): Shall be as manufactured by Atlas or approved equal. Registers and diffusers shall come with balancing dampers.

11. Radiators (Steam): Shall be of cast iron of an acceptable manufacturer, and shall be sized for the heat loss of each room in which they are to be installed.

12. Oil Tank: Shall be minimum 275 gallon capacity by acceptable manufacturer. Tank shall include vent alarm gauge, fuel oil filter, and oil tank valve. Fuel oil vent and fill box shall be provided at exterior in an acceptable location.

13. Unit Heaters: Shall be manufactured by Singer, Trane, or approved equal, and shall be sized for heat loss of room in which they are to be installed.

14. Prefab Chimney: Shall be as manufactured by Van-Packer or approved equal. Chimney shall be refractory lined/thermosyphon of size required, and shall be Underwriter Laboratory approved.

15. Air Conditioning Units: Manufacturer shall be chosen by owner and shall be compatible with new or existing furnace with a minimum SEER rating of 10.

Note: Additional equipment and materials required may be noted under Bid Document.

12.C. INSTALLATION OF HEATING

1. Installation of complete heating system, including furnace, heat distribution system, temperature control system, fuel system, and all required accessories to provide a

minimum indoor temperature of 70° Fahrenheit when the outdoor temperature is -5° Fahrenheit. All equipment shall be sized in accordance with ASHRAE, City, and utility standards.

2. Controls such as thermostats, water cut-offs, low voltage and control wiring, accessory equipment, and a fused disconnect located within six (6) feet of the furnace, shall be supplied and installed by this contractor.

3. Testing: Contractor is to do all necessary testing, balancing, performance tests, and adjusting for all equipment furnished and installed by him.

4. Connections such as water, gas, and other system connections are to be installed complete with all necessary shut-off valves, check valves, and couplings to assure proper shutdown of components of all systems for easy removal and/or maintenance.

5. Breaching of flue to chimney is to be of galvanized steel with automatic flue damper. Chimney is to be cleaned and renovated into working condition as required by code, and acceptable to local utility company.

6. Repairs and patching of floors, walls and ceilings where cutting through of same was required by the installation of the heating system shall be done by this contractor. Contractor shall remove from the premises at the end of each work day all unnecessary piping, equipment, and debris that was caused by the installation of the heating system.

7. Warm Air System Furnace (Gas): Shall be supplied complete for use with natural gas. Furnace shall have heating capacity as determined by design requirements above. Furnace shall come complete with centrifugal blower, filters and filter housing, heat exchanger, and aluminized steel tapered burners. Furnace shall come equipped with electronic ignition. Unit shall be U.L. approved and labeled.

8. Warm Air System Furnace (Oil): Shall be supplied complete for use with number 2 fuel oil. Furnace shall have heating capacity as determined by above design requirements. Furnace shall come complete with centrifugal blower, filters and filter housing, stainless steel combustion chamber, steel slip stream heat exchanger, atomizing type burner. Furnace shall include limit controls to deactivate the furnace in case of power, mechanical, or reduced air supply failure. Also to be included are reset and primary control to shut down furnace if oil fails to ignite; transformer for low voltage thermostat and fuel pump controls. Unit shall be U.L. approved and labeled.

9. Ductwork, metal gauges, reinforcing, fittings, connection plenums, access panels, and other accessories shall be in accordance with the Uniform Mechanical Code. All ducts above the basement shall be concealed. Each room shall be supplied with a supply air register and/or diffuser with balancing damper. Each floor level shall be provided with return air register. Return air register shall be set as high as possible, and preferably on an interior wall, with the topmost return duct being of a size equivalent to one standard stud space of 3" x 14" for each floor above the first floor. All supply registers shall be located in the exterior walls where possible. When wall outlets are not possible, baseboard type diffusers supplied from the floor shall be used.

10. Furnace ([Hot water, steam] [gas fired, oil fired] select type required): Boiler shall be installed in accordance with manufacturer's recommendation and shall be ASME labeled. Boiler output to be equal to heating requirements as determined above. Boiler to be of cast iron with insulated steel jacket, complete with accessories such as thermostat, relief valve, blow down valve, low-water cutoff, drain cock water connections, gas connections, and all necessary appurtenances for a complete operating heating unit. Unit shall be IBR rated and U.L. approved and labeled. Boiler to be installed in existing location and

reconnected to existing pipe systems. All heating equipment shall be tested to assure safety of operations. Where hot water system is used, an aquastat shall start the circulators when water temperature is reached. An automatic air vent shall be provided at a high point in the piping system.

11. Base Board Fin Radiation where required shall be sized for the heat loss of each room in which they are to be installed. Baseboard shall be IBR rated of 640 BTU per foot at 190° Fahrenheit temperature drop. All fittings and accessories for a complete job shall be supplied, including a manual air vent on each section.

12. Radiators (steam) where required shall be of cast iron and sized for the heat loss of each room in which they are to be installed. Radiators are to come complete with valves and air vents and shall be provided with all necessary fittings for a complete installation.

13. Circulating Pumps where required shall be supplied and installed as per manufacturer's recommendation. The pump capacity shall be selected for the total head and GPM needed for the system, and shall be of such horsepower rating that the motor shall not be overloaded at any time.

14. Zoning: Where called for, a separate circulating pump shall be added to the system to heat bedroom wing separate from living areas and basement. A wall-type thermostat shall be added to the bedroom wing to operate circulator. Installation of circulator shall be complete with all necessary piping, accessories, and fittings for a complete separate operation zone.

15. Chimney (prefabricated): Where called for shall be installed in complete accordance with manufacturer's direction. Assembly shall consist of all necessary fittings, fire stop spacers, flashing and storm collars, stack top, and all accessories required for a complete system. Installation shall meet all code requirements.

16. Bathroom and/or Kitchen Exhaust Fan: Where called for shall be installed in accordance with manufacturer's direction. Where required, installation shall include all necessary exhaust grills, duct, exhaust fan, switch and necessary electrical work for a complete operating installation.

12.D. INSTALLATION OF CENTRAL AIR

Central air conditioning is only to be installed when there is a medical necessity and specifically called for in the Bid Document.

Furnish and install complete central air conditioning equipment, size as noted in Bid Document. This to include coils, condenser with approved base, thermostat, control relay, and all other material for a complete working unit. Unit shall be a minimum of 10 SEER rating.

The contractor shall be required to test and properly balance the system, and guarantee the entire system against faulty materials and workmanship for one year following completion and acceptance.

12.E. INSTALLATION OF ELECTRIC WALL HEATER

1. Furnish and install 1250 watt wall heater bearing UL or equivalent label.

2. The label voltage shall be within 5% of the service voltage provided.

3. Unless otherwise indicated, installation recommendations contained in the ASHRAE Guide and those of the manufacturer shall be followed.

4. Thermostatic control shall be provided in each heated room or built into unit.

5. Bathroom wall insert heaters and switches shall be located as far as practical from plumbing fixtures, but at least 60 inches from the tub and/or shower.

6. Operating devices such as timers, switches, etc., which are not tested as an integral part of an appliance, shall be separately listed by UL or equivalent. All work shall conform to all applicable codes.

12.F. REPLACE ELECTRIC FURNACE MOTOR

Replace existing electric motor on furnace with new 110-120 volt, CO-C, AC motor having an automatic reset overload protector.

HP of motor shall be as set forth in Bid Document. Installation shall be in accord with manufacturer's directions and shall be complete with all electrical connections as required by code.

12.G. INSTALL NEW THERMOSTAT

Provide and install a new thermostat to replace existing, including all wiring from furnace to thermostat, and new transfer. All work shall conform to code.

12.H. INSTALL NEW DUCT WORK

Install new duct work from plenum to register, including all necessary duct, damper, register, register cover and hardware. All work shall conform to local Mechanical Code.

12.I. REPAIR DUCT WORK

Furnish and install all new necessary material to replace deteriorated portions of existing duct work. If existing ducts are wrapped in asbestos, the Contractor shall obtain a mitigator who is licensed through the State of Iowa to dispose of this product.

12.J. REGISTER COVER

Provide and install new register cover to match existing in house. A salvaged cover may be used upon approval by the Rehab Office.

12.K. REPAIR HUMIDIFIER

Furnish and install all labor and materials necessary to assure that humidifier is in good working order. All rusted and non-functioning parts shall be replaced. Contractor shall warranty work for one year.

12.L. REWIRE FURNACE

Furnish and install all labor and materials necessary to run new wiring to new or existing furnace. All wiring shall conform to the National Electrical Code and be switched and fused to the furnace specifications.