ATTACHMENT B

Original Well and Well Pump Specifications
(For Reference Only)

1. Provide a well capable of providing 500 gpm at 185 feet of head. This capacity is based on the sprinkler system layout as shown. The actual capacity may vary due to actual characteristics of the aquifer. The well shall be complete in all respects including well casing, screen, gravel pack, pump motor and control panel. The well shall be drilled and fully developed before the final design and layout of the sprinkler system so that the system can be modified slightly to match water supply. The pump and motor shall have a three year warranty covering material and labor. The well shall be constructed to conform to Nebraska Administrative Code, Regulations Governing Public Water Supply Systems, Title 179 Nebraska Administrative Code, Chapter 2, including amendments.

2. Drilling method: The well shall be constructed by using the reverse circulation rotary drilling method to provide a clean, straight hole. The downward velocity of the drilling shall be kept at one foot per second or less to prevent wall erosion.

3. The well casing shall be 16" diameter, 0.219" thick carbon steel.

4. The well screen shall be perforated casing the same material as the casing. The perforated casing shall have machine cut slots, 0.125" wide and 2.875" long to provide a total of 22.5 square inches of opening per linear foot of screen.

5. Gravel Pack: The well shall be gravel packed for the entire length of the perforated casing. The gravel pack shall be clean and be compatible with the local aquifer material.

6. Grout: The water well shall be grouted and sealed to prevent well and aquifer contamination. Fill the annular space between the outside of the casing and the inside of the bore hole wall with a cement or bentonite grout mixture. The cement slurry shall be a mixture of portland cement and water. Mixture shall be 5.4 gallons of water per 94 lb sack of cement. The grout shall be placed in one continuous operation. The grout shall be placed using a grout pipe at the bottom of the space to be grouted.

7. Well Development: The well shall be fully developed to correct damage from drilling, remove fines from the aquifer, increase local permeability, stabilize the formation and to create a filter pack. The well shall be developed by introducing alternate reversals of flow through the screen openings to rearrange the formation particles. Alternately reverse the flow to surge the well. Repeat the surging until an insignificant amount of sand can be pumped.

8. Well Disinfecting: The well shall be disinfected by using a chlorine solution. The chlorine solution shall be thoroughly agitated into the well by surging action. The chlorine solution should stand for several hours before being flushed from the system.

9. Pump: The pump shall be a turbine pump capable of pumping 500 gpm at 185 feet of head at the discharge of the well. The pump base shall be Class 30 cast iron, 30,000 psi tensile strength. The pump column shall be electric resistance welded pipe, 0.188" thick, hydrostatically tested at 500 psi. The column flanges shall be Class 80-55-60 modular cast iron, 80,000 psi tensile strength, 55,000 psi yield strength. Bolts shall be zinc plated. The oil tube shall be schedule 80 extra strength black pipe. Bearings shall be S.A.E. 660 bronze bearing, 44,000 psi tensile strength, placed every five (5) feet. The shafting shall be 1045 cold rolled steel, turned, ground, and polished with rolled threads. Bowl shafting shall be #416 stainless steel, turned, ground, and polished. Turbine pump bowl shall be class 30 gray iron. The turbine impeller shall be cast red brass, 85-5-5-5 balanced to 1/2 inch-ounce. Pump efficiency shall be 83%.

10. Motor: The motor shall be vertical type open drip proof, weather protected, 480 volt, three-phase, 40 horsepower, high power factor, 1.15 service factor, 115 degree C temperature rise, Class F insulation.

11. Control Panel: The control panel shall consist of an across the line motor starter with a fusible main disconnect. The motor starter shall be complete with overloads, coil, control power transformer, reset button and selector switches. Provide NEMA 3R enclosure. Refer to Division 16, Electrical. Provide interface to start the well by a signal from the sprinkler system control panel.

12. Testing: Pumping tests shall be performed to determine the performance characteristics of the well and the hydraulic parameters of the aquifer. A multiple-step drawdown test shall be performed on the well. Measurements shall be taken at various flow rates of 250 gpm, 500 gpm, 750 gpm, and 1,000 gpm. The testing shall start at 250 gpm and shall continue until a constant pumping level is established. The drawdown and pumping water level shall be recorded. At the conclusion of the first step, the pump shall be turned off and the water levels in the well shall recover for one hour. Resume pumping at the next higher rate and repeat the procedures for the first step. The pumping test shall be witnessed by the Engineer. All data taken during the pumping test shall be recorded on the Well Test Data form at the end of this section and submitted to the COR.

13. Well and Pump Data: Provide a detailed report of the well and pump data for permanent records. The data included shall be as indicated on the Well Pump Data form included at the end of this section. This form shall be completed and five-copies submitted to the COR at the completion of the project and before final payment will be made.