

**Greensand Filtration:** A 24 feet by 24 feet water treatment building houses the chemical treatment, metering, sampling taps, laboratory, and greensand filtration, and electrical controls. Two greensand filtration units are provided, each unit is 42 inches in diameter with a maximum capacity of 28.86 gpm. At a maximum filtration rate of 3 gpm, the total filtration capacity is 57.7 gpm. The maximum backwash rate of one filter is 115 gpm for 12 gpm/ft<sup>2</sup>. The distribution storage tank provides filter backwash water. A backwash pump provides a minimum pressure of 30 psig during backwash as recommended by equipment manufacturer. A water meter is provided to monitor backwash flow rates. The following chemicals are injected via a metering pump prior to filtration in the following order: soda ash, sodium hypochlorite and potassium permanganate. A 2500-gallon contact tank is provided to assure adequate contact time for the chemicals to oxidize the dissolved iron and manganese. The chemical feed pump capacities are as follows:

Chemical Metering Pumps	Maximum Capacity-GPD
Potassium permanganate	22
Sodium hypochlorite	22
Soda ash	94

**Atmospheric Storage Tank:** Storage consists of a 20,000-gallon steel standpipe-type tank. The overflow elevation is 947.5 feet, high level pump-off elevation 947 feet and low level-pump-on elevation 942 feet. A float connected to a guide cable and target is used as a tank level indicator. Appurtenances include a screened vent, 4-inch drain and overflow pipe, a 30-inch roof access hatch with lockable hasp, ladder with safety cage, and 6-inch inlet and outlet gate valves. Level electrodes are used to control tank levels.

**Distribution System:** The distribution system consists of 3,675 feet of six-inch diameter line and associated appurtenances.

**Design Basis:** 2002 Waterworks Regulations  
Equivalent Residential Connection (ERC) = Water usage of 400 gpd

**Source Capacity:**

Well	Well Yield (gpm ÷ 0.5/ERC ERC x 400gpd/ERC)	Pump Capacity (gpm) (gpm x 1440 min/day)	Effective Capacity
Well No. 1 (30 gpm)	24,000	30 x 1440 = 43,200	24,000
Well No. 2 (21 gpm)	16,800	21 x 1440 = 30,240	16,800
Total Effective			40,800

Total effective source capacity— 40,800 gpd  
 $40,800 \text{ gpd} \div 400 \text{ gpd/ERC} = 102 \text{ ERCs}$

**Storage Capacity:**

	Gross Volume (gals)	Effective Volume (gals)
Atmospheric-Type	20,000	19,134

Critical Capacity ERC =  $19,134 \text{ gals} \div 200 \text{ gals/ERC} = 96 \text{ ERC}$  or 38,400 gpd

**Greensand Filtration:**

Two 42-inch diameter filters at 3 gpm/ft<sup>2</sup>  
 Each filter has 9.60 ft<sup>2</sup> of filter area  
 Capacity of each filter = 9.6 square feet x 3 gpm/ft<sup>2</sup> = 29 gpm  
 Total capacity of two filters = 29 x 2 = 58 gpm  
 58 gpm x (1440 min/day for backwash) = 82,070 gpd  
 Losses per day for backwash – (115 gpm x 15 min) ÷ (29 gpm x 10 min) = 2015 gal  
 Effective Treatment Production = 80,055 gpd or 200 ERCs

Therefore, based on the critical value above, this waterworks is permitted for a design capacity of 38,400 gpd or 96 ERCs.

RRD/amg