BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

FILED[2]
FEB 13 2018
Missouri Public
Service Commission

DERALD MORGAN, RICK AND CINDY GRAVER, WILLIAM AND GLORIA PHIPPS, and DAVID LOTT,	)	
Complainants,	)	
v.	)	File No. WC-2017-0037
CARL RICHARD MILLS, CARRIAGE OAKS ESTATES, DISTINCTIVE DESIGNS, and CARING AMERICANS TRUST FOUNDATION, INC. (f/k/a Caring Americans Foundation, Inc.), CARRIAGE OAKS NOT-FOR-PROFIT WATER AND SEWER CORPORATION	)	
Respondents.	)	

Respondents' Exhibits for 2/6/2018 Hearing

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Michael Stalzer, P.E.
210 S. 3rd Street
Branson, MO 65616
417-334-8820

September 18, 2015

Carriage Oaks Estates
Homeowners Association
c/o Dick Mills
209 Falling Leaf Court
Branson West, MO 65737

RE: Water Distribution System Review

Mr. Mills:

As I understand, Phase One of the subdivision was completed approximately fifteen years ago. As part of the process of final plat approval, the developer would have been required by Stone County Planning and Zoning to obtain all necessary construction permits from the Missouri Department of Natural Resources. Typically, upon completion of the improvement or expiration of the construction permit the MDNR would inspect the permitted feature for compliance wherein any and all deficiencies would need to be corrected prior to the issuance of any operating permit. Currently both the water system and the wastewater treatment facility are operational and in compliance with applicable MDNR requirements.

That being said, most developments of this type construct needed infrastructure in phases to accommodate estimated build out rates. The development was platted in two phase resulting in a total of 33 lots. As of today there are 7 estate style homes constructed and occupied.

Prior to the recent water system upgrade, the system consisted of a deep well capable of delivering fifty five gallons per minute, five bladder tanks, necessary controls, well house, 4" PVC water main and necessary appurtenances. The system upgrade added a 30,000 gallon ground level storage tank, two 7.5 horse power high service pumps and necessary controls.

In order to answer your question as to the adequacy of the current system, my response is based on the recommendations of the Missouri Department of Natural Resources Design Guide for Community Water Systems, effective date August 29, 2003.

Exhibit No. 26
Date 2/6/18 Reporter MP
File No. WC-2017-0037

EXHIBIT
tabbies
P26

Domestic Demand:

33 lots x 3 persons/lot x 80 gallons a day/person = 7,920 gallons

Irrigation demand for estate style homes:

2 gallons per minute per connection. Assume each lot will irrigate for 60 minutes a day.

2 gpm/ lot x 33 lots x 60 min/lot = 3,960 gallons per day.

The ground level storage tank should be sized to accommodate one day water use.

One day water use = 7,920 + 3,960 = 11,880 gallons

Well Capacity:

The existing well pump can deliver 55 gallons per minute.

Hours of pump operation = 11,880 gallons / 55 gpm = 216 minutes

Based on the estimated demand the well pump will operate for 216 minutes or 3.6 hours per day.

Ground Level Storage Tank:

The ground level storage tank provided has a capacity of 30,000 gallons. This tank exceeds the Department of Natural Resources minimum recommendation 11,880 gallons.

Bladder Tanks:

The number of bladder tanks required to provide adequate system operating pressure is based on the estimated peak system demand.

$$\text{Peak Flow} = 12\ (\text{number of connections})^{0.515}$$
$$= 12\ (33)^{0.515}$$
$$= 72.64 \text{ gallons per minute}$$

Required number of bladder tanks.

72.64 gpm x 2 min = 145.29 gallons

145.28 gallons/31.86 gallons/tank = 4.5 tanks required – 5 provided

The number of bladder tanks required to provide adequate system operating pressure have been provided.

High Service Pumps:

The system has been upgraded to include a 7.5 horse power duplex pump package to create system pressure and deliver water to the users. The operation of the duplex high service pump system is controlled by a 40-60 pressure switch in an alternating fashion. When the system is in use and the operating pressure drops below 40 pounds per square inch a pump is activated, once the system pressure of 60 psi reached the pump is deactivated. Pumps of this type can deliver water to the distribution system at rates of up to 100 gallons per minute.

High service pumps capable of meeting system demand have been provided.

Based on the Missouri Department of Natural Resources Design Guide recommendations the water distribution system as constructed meets their minimum standard.

Although the existing system was capable of serving up to twelve homes, the system upgrade will improve system performance and extend its economic life.

If you have any questions please to call.

Respectfully,

Michael E. Stalzer, P.E.