

**VIRGINIA DEPARTMENT OF HEALTH
ENGINEERING DESCRIPTION SHEET**

Date: September 12, 2005

Certified Class: VI

WATERWORKS NAME: Highland Lake Subdivision **TYPE:** Community

COUNTY/CITY: Franklin

LOCATION: Located at the southwest corner of the intersection of Routes 663 and 1101

OWNER: Petrus Environmental Services, Inc.
1807 Murry Road, Unit O
P. O. Box 21173
Roanoke, VA 24018
(540) 344-9800

OPERATOR: Same as above

PERMIT NUMBER: 5067320

DATE OF ISSUE: October 10, 2001 Amended
September 12, 2005

TYPE OF TREATMENT: Addition of a polyphosphate for the purpose of sequestering iron and manganese

SOURCE: Two drilled wells

DESIGN CAPACITY: 119 equivalent residential connections or 47,600 gpd

DESCRIPTION OF SYSTEM

This waterworks consists of two drilled wells, a chemical addition system, a 22,559-gallon steel standpipe, a 9,240-gallon hydropneumatic tank and distribution system. Well No. 1 was permanently abandoned in August 2001.

Well No. 2: This well was drilled July 4 through July 7, 1975. The well bore is 358 feet deep with cement grout extending from the surface to 123 feet. The galvanized steel casing is 6 inches in diameter and extends to a total depth of 125 feet. The well is equipped with a submersible pump rated at 25 gpm at 326 TDH and driven by a 5-HP motor. The pump intake is set at 300 feet. The well has a tested yield of 60 gpm over a 48-hour period from August 5-7, 1975 with the water level dropping from 60 feet (static condition) to 136 feet (dynamic condition). The well is controlled by a pressure control switch on the atmospheric storage tank. The well is equipped with a sample tap, water meter, blow-off, pressure control switch, drawdown gauge, check valve, and gate valve.

Well No. 3: This well was drilled February 29 through March 6, 1984. The well bore is 350 feet deep with cement grout extending from the surface to 51 ½ feet. The galvanized steel casing is 6 inches in diameter and extends into bedrock to a total depth of 51 ½ feet. The well is equipped with a submersible pump rated at 11 gpm at 350 TDH and driven by a 3-HP motor. The pump intake is set at 285 feet. The well has a tested yield of 10 gpm over a 48-hour period from April 9 through April 11, 1984 with the water level dropping from 46 (static condition) to 88 feet (dynamic condition). The well is used primarily as a back-up source and is controlled by a timer. The well is equipped with a sample tap, water meter, blow-off, pressure control switch, pressure gauge, check valve, and gate valve.

Atmospheric-Type Storage Tank: A 22,559-gallon steel atmospheric tank is located adjacent to Well No. 2. The tank is 8 feet in diameter and 60 feet high. The effective storage volume of 20,867 gallons is based on the overflow height of 59 feet 6 inches and the inlet/outlet height of 4 feet. Appurtenances include a screened vent, drain, roof access hatch, one side access manway, water level indicator, screened overflow, and a ladder with a safety climb device terminating 7 feet above the ground.

Hydropneumatic Storage Tank: A 9,240-gallon hydropneumatic storage tank is located at Well No. 3. The end containing the tank controls and appurtenances is located within the Well No. 3 structure. The tank has an effective volume of 3,080 gallons. Appurtenances provided include a pressure gauge, pressure relief valve, vacuum relief valve, water level sight glass gauge, drain, sample tap, and air/volume controller. The air/volume controller is configured so that the tank water level is based on the levels in the atmospheric storage tank. Piping is provided for removing the tank from service and maintaining Well No. 3 in operation.

Treatment: One treatment system is located within each well enclosure. Each 3-gpd metering pump adds polyphosphate for the purpose of sequestering iron and manganese. The polyphosphate chemical is fed from 50-gallon solution tanks. The chemical pumps are controlled by the operation of the well pumps. Appurtenances to each chemical feed system include a foot valve, calibration chamber, back pressure/pressure relief, and anti-siphon valves.

The distribution system consists of 2-, 3-, and 4-inch diameter waterlines.

EVALUATION OF SYSTEM

Design Basis: Commonwealth of Virginia *Waterworks Regulations*
One Equivalent Residential Connection (ERC) = 400 gpd

Source Capacity:

Well Yield:	Well No. 2 -	60 gpm
	Well No. 3 -	10 gpm
	Total Yield	70 gpm

70 gpm/0.5 gpm/ERC = 140 ERCs or 56,000 gpd

Well Pump:

Well No. 2 -	55 gpm
Well No. 3 -	10 gpm
Total Yield	65 gpm

65 gpm x 1,440/400 = 234 ERCs or 93,600 gpd

Storage Capacity:

	<u>Gross Volume</u>	<u>Effective Volume</u>
Hydropneumatic	9,240 gallons	3,080 gallons
Atmospheric Type	22,559 gallons	20,867 gallons

23,947 gallons/200 gals/ERC=119 ERCs or 47,600 gpd

Therefore, based on the critical value above, the waterworks is permitted for a design capacity of 119 equivalent residential connections or 47,600 gpd.

RLP:jk



COMMONWEALTH OF VIRGINIA

DEPARTMENT OF HEALTH
OFFICE OF DRINKING WATER

WATERWORKS OPERATION PERMIT

Petrus Environmental Services, Inc. Is Hereby Granted Permission To Operate A Class VI Community Waterworks Having A Design Capacity Of 119 Existing Equivalent Residential Connections Or 47,600 GPD At Highland Lake Subdivision Located In Franklin County In Accordance With The Provisions Of Title 32.1, Chapter 6, Article 2, Section 32.1 - 173 Code Of Virginia, As Amended, And § 12 VAC 5-590-260 Of The *Waterworks Regulations* Of The Virginia Department Of Health, As Amended. This Permit Is Issued In Accordance With Previously Issued Permits; Operation Permit No. 5067320 Issued October 10, 2001 And With The Understanding That This Owner Will Operate The Waterworks In Accordance With Part II, "Operation Regulations For Waterworks", Of The *Waterworks Regulations* Of The Virginia Department Of Health And Any Variances And/Or Exemptions Noted Below.

Variances And/Or Exemptions Granted (☒) None () See Attached

An Engineering Description Sheet Is Attached Dated September 12, 2005

PERMIT NO. 5067320

EFFECTIVE DATE September 12, 2005

APPROVED *W. A. Lach* P.E.
Director, Office of Drinking Water
for the State Health Commissioner pursuant to VA Code § 2.2-604

(REV 07/05)