

# A Successful Business Model for Waterworks

BY ANTHONY HESS, SUSTAINABILITY COORDINATOR, VDH-OFFICE OF DRINKING WATER

**IN 1959,** A small town in Virginia received a government grant to build a water treatment plant and install waterlines to serve all of the residents in town. They are proud that their water rates are the lowest in the area. These rates are sufficient to pay for their operations and the waterworks has remained in compliance with the Virginia Department of Health's (VDH) regulatory requirements.

Lately, they have had a run of bad luck. They have to repair more waterline breaks every year. These repairs are expensive. They include not only the cost of parts and equipment, but also the extra cost of overtime wages for their staff. Then the longest cold stretch in many years occurs, resulting in enough leakage to drain their storage tanks. The Health Department issues a notice that the town's customers have to boil their water before drinking. Their small quiet town is on the evening news for weeks as they try to locate and repair enough leaks so that the storage tanks will once again remain full.

Mr. Dan Althouse is the operator and manager for High Knob Utilities, Inc. (HKUI), a public waterworks in Warren County, Virginia. Mr. Althouse was facing increasing system problems caused by an aging infrastructure, and he realized that the utility needed to implement a better business model to address them. When he assumed operation of this waterworks, they were buying water from the nearby town of Front Royal, and hauling it in a plastic tank on the back of a dump truck to supplement production from the wells. This water would soon exit the tank through the same leaky water pipes that caused it to empty in the first place. He knew that the first order of business was to repair leaks to save water, as "water is money." Needless to say, customers were extremely unhappy, and the system's water woes were even profiled in an article in *The Washington Post*.

As the next step, Mr. Althouse completed a cost/benefit analysis that compared the



cost of replacing ageing water lines to the cost of continuing with "business as usual." The analysis put a very bright spotlight on the high cost of overtime and labor involved in repairing emergency water line breaks. After reviewing Mr. Althouse's analysis, the HKUI Board gave the green light for him to develop a plan to replace the oldest sections of the system.

HKUI turned to the VDH Drinking Water State Revolving Fund (DWSRF) program for funds to commission a Preliminary Engineering Report. This report became the foundation of an engineering plan that not only documented the existing system but laid out a plan for bringing the system up to operational standards. With an engineering plan in hand and the Board's approval, an application was made to the DWSRF for a subsidized low interest rate loan to replace the

leakiest sections of pipe in the distribution system, and to add more storage in critical areas of the system. Water rates had to be raised significantly to cover the additional cost of the associated debt payment, but customers were willing to pay to obtain dependable water service. The project eventually took four years, but resulted in returning HKUI to a normal state of operations.

With the project complete and with the leakage crisis averted, HKUI went back to the "pay as you go" business model. However, the completed upgrade project replaced only 38% of the infrastructure, meaning that nearly two-thirds of the remaining system would need to be replaced in the near future. HKUI was covering the cost of their operations and debt service, but not setting aside sufficient money needed for replacing piping and

other infrastructure, when they reached the end of their useful life. Furthermore, since the initial rate increase, water rates literally remained the same for the better part of a decade. The static water rates put the board's financial strategy in a race with inflation. The HKUI service area was also fast approaching "build-out," meaning few or no new customers, thus ending any income from connection fees.

Fast-forward to the summer of 2012. Mr. Althouse attended one of the sustainability classes sponsored by the

Virginia Department of Health. This class, *Establishing a Successful and Sustainable Waterworks* (ESSW), reinforced what he already knew: *planning and savings* are the keys to long term sustainability of a waterworks. If HKUI did not start saving to replace the 62% of pipes and other infrastructure that were nearing the end of their useful life, the utility would be back in emergency mode as they were 12 years earlier. HKUI had to develop a reserve savings fund that could be used to replace system infrastructure when needed.

Using some tools taught in the ESSW course, Mr. Althouse began building a case to present to the HKUI Board. He started by creating an asset inventory — an Excel spreadsheet that listed all major infrastructure components (sections of pipe, valves, tanks, wells, pumps, etc.), along with their expected useful life, the year they were put into service, the remaining years of service expected, and replacement cost in today's dollars. This effectively quantified the scope and requirements of future capital repair and replacement efforts, providing not only a valuable document for the Board's consideration, but an extremely useful maintenance planning aid as well. Next, he constructed an inflation chart using readily available statistics, showing the actual inflation of purchasing waterworks parts now, versus in 2000, as well as a few commodities such as bread and gasoline to further underscore the increase. This showed inflation of purchasing waterworks parts of several hundred percent compared to a 9% increase in water rates over that same period.

To set the stage for the Board's annual budget meeting, the HKUI board members attended a webinar, *Setting Rates*, put on by the Environmental Finance Network. Mr. Althouse also talked with each member individually prior to the meeting in order to understand and address their concerns. After his presentation, the Board agreed that it was clear that the water rates had significantly lagged behind inflation and they needed to add a line item to the budget for *future* capital renewal and replacement. They also decided to raise the water rates by 5% per year for the next few years, which would increase the capital improvement fund. The HKUI board is currently closely monitoring its water rates, using the following formula:

$$(\text{Operation \& Maintenance Expenses} + \text{Debt Payments} + \text{Capital Replacement Reserves}) = \text{RATES}$$

The Virginia Department of Health, Office of Drinking Water, Capacity Development Program, annually offers *Establishing a Successful and Sustainable Waterworks* as well as *Money, Management, and Methods*. These courses

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HKUI		Asset Management and Capital Budget											
Distribution Main				As of 2014				2013 Dollars					
Location	Road Location	Description	Each or Install Feet Pipe Year	Age Years	Condition	Estimated Life Years	Replacement Cost Each or Per Foot	Replacement \$ as of 2013	Rem Life Years	Required Replacement next 5 Years			
<b>Mountain Top System</b>													
	Mountain Top Road	2" PVC Sched 40 Glued	1500	1975	39 good	35	\$17.00	\$25,500.00	-4				
	Mountain Top Road	2" Ball Valves	4	1975	39 good	35	\$251.00	\$1,004.00	-4				
	Chestnut Lane	4" C-900 Pvc Gasketed	2000	2003	11 excellent	50	\$24.00	\$48,000.00	39				
	Chestnut Lane	4" Gate Valves	2	2003	11 excellent	50	\$560.10	\$1,120.20	39				
	Chestnut Lane	2" PVC Sched 40 Glued	220	1975	39 good	35	\$17.00	\$3,740.00	-4				
	Chestnut Lane	2" Valves	2	1975	39 POOR	35	\$251.00	\$502.00	-4	\$502.00			
	Alpine Drive between Alpine Reservoir and Mt Top Reservoir	2" and 4" PVC Schedule 40 Glued (reduced at valves off road U's)	2050	1975	39 Fair no Known Issues	35	\$24.00	\$49,200.00	-4				
	Alpine Drive between Alpine Reservoir and Mt Top Reservoir	2" Valves Ball and Gate	3	1975	39 2 Poor	35	\$251.00	\$753.00	-4				
	Alpine Extended	4" C-900 Pvc Gasketed	1200	2003	11 Excellent	50	\$24.00	\$28,800.00	39				
	Alpine Extended	4" Gate Valves	2	2003	11 Excellent	50	\$560.10	\$1,120.20	39				
	Mt. Top Reservoir Down Thru Woods to Shenandoah Rd	6" C-900 PVC Pipe Gasketed	450	2003	11 Excellent	50	\$28.00	\$12,600.00	39				
	"	6" Gate Valves	2	2003	11 excellent	50	\$714.74	\$1,429.48	39				
	"	Fire Hydrant	1	2003	11 excellent	50	\$2,140.61	\$2,140.61	39				
	"	2" Ball Valves	1	2003	11 excellent	50	\$251.00	\$251.00	39				
	Shenandoah Rd to Short Piece (where system ends)	2" PVC Sched 40 Glued	2700	1980	34 Fair	35	\$17.00	\$45,900.00	1				
		2" Ball Valves	3	1980	34 good	50	\$251.00	\$753.00	16				
		4" PVC Schedule 40 Glued	100	2003	11 good	35	\$24.00	\$2,400.00	24				
		2" Pressure Reducing Valve	1	1980	34 good	35	\$1,144.00	\$1,144.00	1				
		4" Gate Valves	2	2008	6 excellent	50	\$560.10	\$1,120.20	44				
								<b>Sub Total</b>	<b>\$227,477.69</b>				

are aimed at helping Virginia's waterworks become more sustainable. In addition to these courses, Sustainability Coordinators are available throughout the state to assist

waterworks with the types of issues covered in this article. To have one of the Sustainability Coordinators assist you, contact the Capacity Development Program

Manager, Barry Matthews, at 804 864-7515, by email at [barry.matthews@vdh.virginia.gov](mailto:barry.matthews@vdh.virginia.gov), or contact your VDH Office of Drinking Water Regional Field Office. ♠

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