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**FINAL ENGINEERING REPORT  
SOUTH LOGAN WATER ASSOCIATION**

**SYSTEM EXTENSION PROJECT**

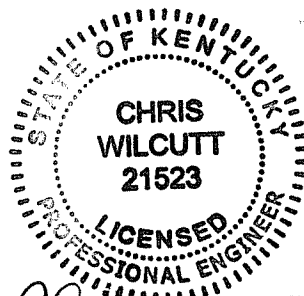
Logan County, Kentucky

prepared for the:

South Logan Water Association  
P.O. Box 277  
Adairville, KY 42202  
(270) 539-6730

prepared by:

*McGhee Engineering, Inc.*  
202 Ewing Street  
P.O. Box 267  
Guthrie, KY 42234  
(270) 483-9985



*Chris Wilcutt*  
7-14-05

July 2005

**Final Engineering Report**  
**Table of Contents**  
***South Logan Water Association System Extension Project***

		<u>Page</u>
1.0	INTRODUCTION	1
2.0	EXISTING FACILITIES	2
	2.1 History and Assets	2
	2.2 Regulatory Compliance	2
3.0	NEED FOR PROJECT	2
	3.1 Health and Safety	3
	3.2 System O&M	3
	3.3 Growth	3
4.0	ALTERNATIVES CONSIDERED	4
	4.1 Alternative 1	4
	4.2 Alternative 2	4
	4.2.1 Description	4
	4.2.2 Environmental Impacts and Land Requirements	5
	4.2.3 Construction Problems	5
	4.2.4 Cost Estimates	5
5.0	PROPOSED PROJECT	5
	5.1 Project Design	5
	5.1.1 Water Supply	6
	5.1.2 Storage	6
	5.1.3 Distribution Layout	6
	5.2 Cost Estimate	7
	5.3 Project Funding	8
	5.4 Annual Operating Budget	8
6.0	RECOMMENDED SOLUTION	9

Tables

		<u>Page</u>
1	Project Cost Estimate	7
2	Proposed Operating Budget	8
3	Current Rate Schedule	9
4	Proposed Rate Schedule	9

Exhibits

		<u>Page</u>
1	Location Map	10

Appendix

A	Bid Tabulation	
B	Engineer's Recommendation Letter to the District	
C	Drinking Water Branch – DOW's Approval of Plans and Specs	

## 1.0 INTRODUCTION

The South Logan Water Association (SLWA) was chartered in 1971 to supply potable water to residents of southern Logan County, Kentucky. The Association consists of six board members, and it is regulated by the Kentucky Public Service Commission. South Logan has authority to plan, design, finance, construct, operate, replace and maintain the distribution facilities within its service area.

The South Logan water system is comprised of over 180 miles of water distribution lines and four water storage tanks with a total capacity of 736,000 gallons, all of which serves approximately 1,540 customers in southern Logan County. As of the end of March 2003, the South Logan Water Association began to purchase all of their treated water from the recently completed water system of the Logan Todd Regional Water Commission (LTRWC). The Commission's water treatment facility is rated at 10 million gallons per day, and their distribution system consists of nearly 85 miles of pipeline and three storage tanks totaling 3,500,000 gallons in capacity. Since going online with the Commission, the average daily usage within the South Logan system has ranged from 330,000 to 460,000 gallons per day. South Logan has two meter stations with the Commission, one located in Russellville and the other near the Mortimer community.

The Association is a relatively large water system covering nearly a third of the Logan County area. Almost all roads within the Association boundary have water service, with only short extensions needed from time to time to accommodate new development.

The main problems that have plagued the Association were its long-term supply of treated water, low pressure in certain areas of the system, extending water service to unserved areas, and installing lines for improved hydraulic performance. The water supply issue has been resolved with their transition to the Logan Todd Regional system. The remaining problems will be alleviated by the intended system extension project.

The proposed project involves construction of nearly 19.4 miles of water line on eleven rural roadways. Some of these lines are being planned primarily to serve new customers in need of a safe supply of drinking water, while others are being built to improve hydraulic performance of the existing distribution system. The Schochoh area of southwestern Logan County experiences low pressure during high demand periods. Also, since the Association has gone online with the Commission, residents east of Adairville have experienced a drop in pressure because they are now being fed through undersized lines rather than directly off the nearby Adairville system. This problem will be corrected by the construction of a new 200,000-gallon elevated water tank. Other low-pressure areas will be assisted by building interconnecting lines to complete hydraulic circuits or "loops". The loops will also improve the water quality by cutting down on the stagnant water in dead-end lines. Also included in the project are the placement of master meter stations and an up-to-date telemetry system to allow for the monitoring and control of the system in greater detail.

## 2.0 EXISTING FACILITIES

### 2.1 History and Assets

The South Logan Water Association (SLWA) was formed by Logan County Court order in the early 1970's to supply potable water to residents within the southern portions of Logan County, Kentucky, between the cities of Adairville and Russellville. The water system is comprised of approximately 180 miles of water line and a total water storage capacity of 736,000 gallons. The existing distribution system consists of 8", 6", 4", 3" and 2" PVC lines. The general service area is depicted in Exhibit 1, which illustrates the general distribution layout. The existing transmission and distribution lines generally radiate from Adairville, its former water supplier, and from the Association's water storage tanks south of Russellville. The system is well laid out with many loops. However, there are some dead end and low-flow lines within the system that require frequent flushing.

SLWA has four water storage structures to serve the water system and one primary pumping station that has recently been removed from service. Three ground level tanks are located just south of Russellville, and the tanks have a total capacity of 636,000 gallons and an overflow elevation of 842 feet. The fourth tank is located in the Mortimer area. The Mortimer tank is an elevated water storage tank, and it has a capacity of 100,000 gallons and an overflow elevation of 746 feet

The Logan Todd Regional system initially supplies water to the SLWA system in two locations. The larger feed point is located at the base of the Association's ground level tanks in Russellville while the other is located near the Red River along US Highway 431 to serve the Mortimer tank. Flow through each of these metering points is controlled by the LTRWC SCADA system, and pressure is regulated as flow enters to match the existing tank overflows. System pressures are normally maintained by the level in the respective storage tanks.

### 2.2 Regulatory Compliance

According to the Division of Water's remarks within the Clearinghouse Comments, the South Logan water system is currently in compliance with appropriate regulatory agencies. No other remarks were given to suggest that the water system was in or near a noncompliance status. The comments of the Division of Water and other agencies are included in Appendix A.

## 3.0 NEED FOR PROJECT

### 3.1 Health and Safety

As stated earlier, the South Logan Water Association has many areas with dead end lines or areas of waterlines served with only one feeder line. The majority of the planned water line extensions are proposed as connectors or upgrades to loop areas of the distribution system to improve water quality, reduce the need for frequent flushing or eliminate known maintenance problems. The other water lines are proposed to bring water service to nearly half dozen residents that currently rely

on groundwater sources or hauled water. Providing water to these potential residences is consistent with Logan County's approved Water Supply Plan and state government's initiative to provide adequate and potable water to all homes by the year 2020.

The proposed elevated water storage tank will relieve the low pressure concerns experienced in the Schochoh community, located in the southeastern portion of the Association. This particular area is a fertile and prosperous agriculture district with many large farming operations that could easily be characterized on a corporate scale. The major farm operations in the area use a significant but seasonal amount of water for livestock, poultry, pork and row cropping applications. During the especially high demand events, residential pressures in this area drop to and below 30 psi, which is a minimum requirement according to the Ten State Standards. A new tank will place an ample amount of water storage at the point of these high demands, thus reducing the large head loss values which are currently creating the inadequate pressures.

### 3.2 System O&M

There are two primary reasons for the Association's proposed project. The first is to provide a reliable and potable water source to an approximate half dozen total residences as described in the preceding section. The second reason is to improve the operation and maintenance of the system. As previously stated, the water system consists of many dead end or low flow lines. Many of the proposed line extensions will connect dead end lines to loop water flow, which reduces the need for frequent flushing to rid stagnant water. Also, several areas of the system, particularly east of Adairville, consist of several miles of small (4" and 3") waterlines that are primarily fed with only one or two waterlines of the same size. During peak demand periods within these type areas, the feeder lines are incapable of providing adequate flows resulting in unacceptable pressures. In particular, the area east of Adairville is still being fed from the City of Adairville because their tanks' proximity and transmission line sizes are currently better suited to maintain ideal hydraulic conditions in the affected area. Consequently, the proposed Trimble Road and Riggins Road extensions as well as the tank addition in Schochoh will provide more entry points of flow and volume into this area east of Adairville plus eliminate the dependency of the Adairville system.

The project will also upgrade a known problem along the Schochoh Road. Based upon operator accounts, several leaks have been observed and fixed over the last few years. These problems have shown not only to be a nuisance to the maintenance crews in non-ideal conditions but also very costly to the Association's finances due to material needs, overtime pay, and equipment costs. Therefore, the proposed Schochoh Road upgrade should improve the operation and maintenance of this particular area.

### 3.3 Growth

As mentioned in the previous published Preliminary Engineering Report, the population of Logan County and the rural areas should grow by an average of 5% every five years over the next 30 years based upon reliable census records and

expected growth. The proposed project is necessary to provide water service to a half dozen new residences. More importantly, the proposed project is being designed to ultimately improve water service to their existing 1,540 customers. The new infrastructure will insure the Association's ability to properly serve the existing customer base plus future growth in the area.

#### 4.0 ALTERNATIVES CONSIDERED

A resolution to the problems faced by the South Logan Water Association is a relatively simple project with two alternatives.

##### 4.1 Alternative 1

The first obvious alternative is to do nothing or a smaller variation of the project. However, the Association would continue their current endurance of operation, maintenance and water quality problems plus leave some area residences unserved. Therefore, the 'do nothing' alternative is not a viable option as it would only prolong the inevitable.

##### 4.2 Alternative 2

The second alternative is one that offers several advantages and resolves the three critical deficiencies in the water system. The alternative provides water service to unserved residences; eliminates dead end lines that suffer with water quality problems and require frequent flushing; and provides a water storage structure in a high demand community, which will stabilize pressure conditions. The project adheres with the Commonwealth's drive to provide a reliable and potable water source to all families by the year 2020. Also, the project provides a solution to South Logan's inability to provide at least 30-psi pressure during all demand times.

###### 4.2.1 *Description*

The project involves construction of approximately 20 miles of water line on eleven rural roads in southern Logan County. Some of these lines are being built to serve new customers in need of a safe supply of drinking water, while the majority of the others are being built to improve the hydraulic performance of the existing distribution system. The Schochoh area of southeastern Logan County experiences low pressure during high demand periods. This will be corrected by the construction of a 200,000-gallon water storage tank (O.F. = ~800') and a booster pumping station for tank filling. Other low-pressure areas can be corrected by building interconnecting lines to complete hydraulic circuits or "loops". These loops will also improve the water quality by cutting down on the stagnant water in dead-end lines.

In a further attempt to improve service to customers, South Logan is also proposing to install at least three master metering stations and an up-to-date telemetry system to allow the operators to monitor the performance of the system in greater detail, and to identify problems earlier. The alternative is illustrated in Exhibit 1.

#### 4.2.2 *Environmental Impacts and Land Requirements*

The alternative has little to no impact upon the environment and land resources because the proposed construction will be done along existing easements and highways. The line extensions and upgrades are proposed for construction in existing pipeline easements where possible or in county/state right-of-way and easements as necessary. South Logan has secured a property in the Schochoh community for the proposed elevated water tank. The project will affect four main land resources during construction: residential, agriculture, grazing and transportation. The general construction effect to the resources is the disturbances associated with building the facilities. No other effect to the resources is expected after construction of the facilities is complete.

#### 4.2.3 *Construction Problems*

There are no severe construction problems foreseen for the project. The South Logan area is known for its ideal soil conditions with only sporadic instances of rock outcrops. The entire pipeline route and proposed tank site are very accessible, and there is little to no evidence of a high water table. However, mobilization will be significant during the project since all of the proposed water lines are spread out throughout the vast service area. Also, several of the waterline extensions will require creek crossings, but none of which should be unmanageable or costly.

#### 4.2.4 *Cost Estimates*

The South Logan Water Association's 2003 System Extension Project is estimated to have a total cost of \$1,650,000. The project cost consists of construction, non-construction and contingency costs, which are \$1,104,700, \$211,300 and \$334,000 respectively. The project is anticipated to be funded in part by a \$520,000 grant and \$780,000 loan from Rural Development as well as a \$350,000 grant through the Kentucky Infrastructure Authority.

### 5.0 PROPOSED PROJECT

#### 5.1 Project Design

##### 5.1.1 *Water Supply*

The Logan Todd Regional Water Commission's plant will serve the proposed project. Based upon figures from LTRWC, the newly completed plant is producing approximately 4,000,000 gallons per day, which is approximately 40% of the design capacity. Therefore, sufficient capacity exists to serve the South Logan project with its limited addition of new customers

### 5.1.2 Storage

The proposed project will involve the construction of a new 200,000-gallon elevated storage tank (OF = ~800'). This new tank will be constructed in the Schochoh community, which experiences periods of unacceptable low pressure during seasonal high demands. The new tank will place a sufficient water storage supply at the primary problem point producing a steady pressure environment of at least 50 psi in the higher elevations of the community. Overall, the water system's total storage capacity will increase to 936,000 gallons or nearly three times the current daily demand. The proposed tank site is illustrated in Exhibit 1.

### 5.1.3 Distribution Layout

The waterline construction of the South Logan Water Association's system extension project will be spread out along nearly 20 miles of rural roadways. The affected roadways are not clustered together as typical in most system upgrades, but they are rather "fill-in" lines to serve new customers and hydraulic improvements for water quality and flow. The line portion of the project involves the new construction of approximately 1,700 LF of 3" PVC treated water line, 39,800 LF of 4" PVC treated water line, and 54,000 LF of 6" PVC and DIP treated water line. In addition to the waterlines, a booster pumping station will be constructed to control the filling of the proposed water tank. Also, in an attempt to improve service to customers, South Logan will install a number of master metering stations and an up-to-date telemetry system to allow the operators to monitor the performance of the entire system in greater detail, and to identify problems earlier.

The proposed line extension and proposed booster pump station is illustrated in Exhibit 1.

## 5.2 Cost Estimate

The estimated project costs based upon the awarded bid prices are shown in Table 1. For the purposes of bidding, the project was divided into two contracts. Contract No. 1 consists of the water line extensions, upgrades, SCADA and booster pump station. Contract No. 2 consists of the water tank addition. Bids were received on June 17, 2005, for both contracts. A tabulation of the bids with complete itemized costs is included in this report as Appendix A.



Table 1  
Project Cost Estimate

<b>Construction</b>			
No.	Item	Bid Price	Total
1	Contract No. 1 - <i>Stotts Construction Co., Inc.</i>		\$749,610.30
	Water Line Extensions, SCADA & Pump	\$749,610.30	
2	Contract No. 2 - <i>Caldwell Tanks, Inc.</i>		\$355,100.00
	Water Tank Addition - 200,000 gal Elevated Tank	\$355,100.00	
	<b>Subtotal - Construction</b>		<b>\$1,104,710.30</b>
<b>Non-Construction</b>			
1	Administrative & Legal		\$20,000.00
2	Land & Right-of-way		\$10,000.00
3	Geotechnical & Archaeological Investigation		\$5,000.00
4	Preliminary Engineering & Environmental		\$18,300.00
5	Engineering Design		\$61,600.00
6	Construction Phase Engineering		\$26,400.00
7	Resident Inspection		\$50,000.00
8	Interest During Construction		\$20,000.00
	<b>Subtotal - Nonconstruction</b>		<b>\$211,300.00</b>
	Contingency		\$333,989.70
	<b>TOTAL ESTIMATED PROJECT COST</b>		<b>\$1,650,000.00</b>

### 5.3 Project Funding

The proposed project will be funded by two different funding agencies. The breakdown of funding is as follows:

Rural Development Grant	\$520,000.00
Rural Development Loan	\$780,000.00
KIA State Budget Allocation	<u>\$350,000.00</u>
 Total Project Cost	 \$1,650,000.00

## 5.4 Annual Operating Budget

The proposed annual operating budget for the South Logan Water Association's System Extension Project is shown in Table 2.

Table 2  
Proposed Operating Budget

	Existing <sup>(1)</sup>	Extension Only	Future
<b>Operating Income</b>			
Water Sales	\$820,778.00	\$3,200.00 <sup>(2)</sup>	\$990,000.00 <sup>(5)</sup>
Late Charges & Reconnection Fees	\$10,515.00	\$42.00 <sup>(3)</sup>	\$10,557.00
Other Income	\$16,876.00	\$68.00 <sup>(3)</sup>	\$16,944.00
<b>Total Operating Income</b>	<b>\$848,169.00</b>	<b>\$3,310.00</b>	<b>\$1,017,501.00</b>
<b>Operating and Maintenance Expense</b>			
Purchased Water	\$416,907.00	\$1,250.00 <sup>(6)</sup>	\$418,157.00
Salaries & Wages	\$32,848.00	\$0.00	\$65,696.00 <sup>(7)</sup>
Utility Expense	\$8,291.00	\$0.00	\$12,436.50 <sup>(7)</sup>
Operating Supplies & Expense	\$21,048.00	\$84.00 <sup>(3)</sup>	\$21,132.00
Professional Fees & Contractual Services	\$40,172.00	\$0.00	\$40,172.00
Repairs & Maintenance	\$61,273.00	\$245.00 <sup>(3)</sup>	\$61,518.00
Management Fees	\$0.00	\$0.00	\$0.00
Insurance	\$9,379.00	\$0.00	\$9,379.00
Taxes & Licenses	\$1,360.00	\$0.00	\$1,360.00
Bad Debts	\$5,462.00	\$0.00	\$5,462.00
Transmission & Distribution Expense	\$28,009.00	\$112.00 <sup>(3)</sup>	\$28,121.00
Water Tests	\$1,215.00	\$0.00	\$1,215.00
Miscellaneous	\$1,805.00	\$0.00	\$1,805.00
<b>Total Operating Expenses</b>	<b>\$627,769.00</b>	<b>\$1,691.00</b>	<b>\$666,453.50</b>
<b>Net Operating Income</b>	<b>\$220,400.00</b>	<b>\$1,619.00</b>	<b>\$351,047.50</b>
<b>Non-Operating Income (Expense)</b>			
Interest Income	\$4,739.00	\$0.00	\$4,739.00
LT RUS Interest	(\$46,263.00)	(\$32,200.00) <sup>(4)</sup>	(\$78,463.00) <sup>(8)</sup>
LT RUS Principal	(\$11,986.00)	(\$8,800.00) <sup>(4)</sup>	(\$20,786.00) <sup>(8)</sup>
LT Non-RUS Interest	(\$10,018.00)	\$0.00	(\$10,018.00) <sup>(8)</sup>
LT Non-RUS Principal	(\$33,227.00)	\$0.00	(\$33,227.00) <sup>(8)</sup>
<b>Total Non-Operating Income</b>	<b>(\$96,755.00)</b>	<b>(\$41,000.00)</b>	<b>(\$137,755.00)</b>
<b>Net for Coverage, Depreciation &amp; Reserves</b>	<b>\$123,645.00</b>	<b>(\$39,381.00)</b>	<b>\$213,292.50</b>
<b>Notes:</b>			
1. Based on the 2004 Financial Statement			
2. Based on ~6 new customers, 6,000 gallons/month average usage & current rates.			
3. Based on a 0.4% increase in water sales with current rates.			
4. Based on a \$350,000 KIA Grant, \$520,000 RUS Grant and \$780,000 RUS Loan at 4.125% & 38 yr term.			
5. Estimated Water Sales per Forecast with Existing Customer Base, Usage & Proposed PSC rates.			
6. Based on ~6 new customers, 6,000 gallons/month average usage & current LTRWC rates.			
7. Estimated Expense Adjustments due to Additional Staff and New Pump & SCADA.			
8. Estimated Debt Service for 2005.			

Based on these projections and assumptions, the commitment of a \$350,000 KIA Grant, \$520,000 Rural Development Grant and revenues from the proposed rates are expected to produce an adequate fund for coverage and depreciation. Table 3 illustrates the current rate schedule, and Table 4 illustrates the proposed

rate schedule. Note: In comparison of the two schedules, the new rates result in an approximate 6.4% increase to the typical 6,000 gallon residential user.

**Table 3**  
**Current Rate Schedule**

Customer Charges (Minimum Bill):

5/8" x 3/4" Meter:	\$4.65
1" Meter:	\$5.94
1-1/2" Meter:	\$9.59
2" Meter:	\$16.89
3" Meter:	\$24.19

Commodity Charge:

First	<u>2,000</u>	Gallons @	<u>\$ 6.70</u>	per 1,000 Gallons
Next	<u>8,000</u>	Gallons @	<u>\$ 6.44</u>	per 1,000 Gallons
Next	<u>40,000</u>	Gallons @	<u>\$ 6.18</u>	per 1,000 Gallons
Next	<u>50,000</u>	Gallons @	<u>\$ 5.93</u>	per 1,000 Gallons
All Over	<u>100,000</u>	Gallons @	<u>\$ 5.67</u>	per 1,000 Gallons

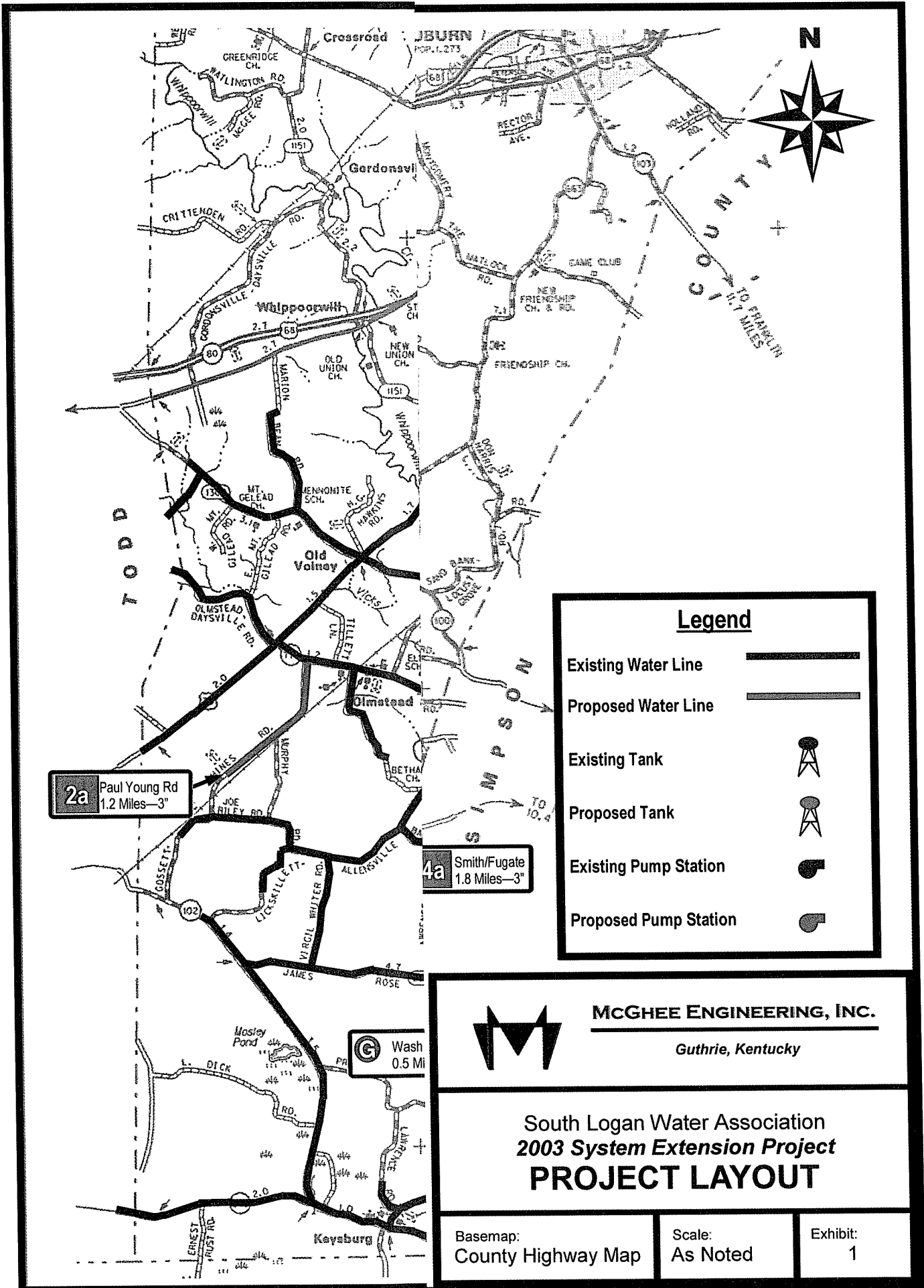
**Table 4**  
**Proposed Rate Schedule**

First	<u>2,000</u>	Gallons @	<u>\$ 19.80</u>	Minimum Bill	5/8 x 3/4"	<b>METER SIZE</b>
	<u>2,000</u>	Gallons @	<u>\$ 38.50</u>	Minimum Bill	1-Inch	
	<u>2,000</u>	Gallons @	<u>\$ 55.30</u>	Minimum Bill	1.5-Inch	
	<u>2,000</u>	Gallons @	<u>\$ 85.70</u>	Minimum Bill	2-Inch	
	<u>2,000</u>	Gallons @	<u>\$ 115.70</u>	Minimum Bill	3-Inch	
	<u>2,000</u>	Gallons @	<u>\$ 150.00</u>	Minimum Bill	4-Inch	
Next	<u>8,000</u>	Gallons @	<u>\$ 6.70</u>	per 1,000 Gallons	All	
Next	<u>40,000</u>	Gallons @	<u>\$ 6.44</u>	per 1,000 Gallons	All	
Next	<u>50,000</u>	Gallons @	<u>\$ 6.18</u>	per 1,000 Gallons	All	
All Over	<u>100,000</u>	Gallons @	<u>\$ 5.93</u>	per 1,000 Gallons	All	

## 6.0 RECOMMENDED SOLUTION

In order to address the problems and needs of the water system, the South Logan Water Association should do the following:

- Construct a 200,000-gallon elevated water storage tank (OF = ~800') to serve the Schochoh community.
- Construct approximately 20 miles of new waterline to serve an estimated half dozen residences plus improve the system's hydraulics and water quality.
- Construct a booster pumping station near the US Highway 431 and Halls Store Road intersection to control the flow and filling of the proposed Schochoh tank.
- Implement the Board endorsed rate increase upon PSC approval.



**2a** Paul Young Rd  
1.2 Miles—3"

**4a** Smith/Fugate  
1.8 Miles—3"

**Ⓢ** Wash  
0.5 Mi

**Legend**

Existing Water Line	
Proposed Water Line	
Existing Tank	
Proposed Tank	
Existing Pump Station	
Proposed Pump Station	

**MCGHEE ENGINEERING, INC.**  
Guthrie, Kentucky

South Logan Water Association  
**2003 System Extension Project**  
**PROJECT LAYOUT**

Basemap:  
County Highway Map

Scale:  
As Noted

Exhibit:  
1

**Appendix A**

*Bid Tabulation – June 17, 2005*

No. BASE BID ITEMS	QUANTITY		Stotts		Burgess & Associates Kirksey, KY		The Fishel Company Owensboro, KY	
			UNIT \$	TOTAL	UNIT \$	TOTAL		
01 265-gpm Booster Pump	1	LS	\$ 73,	121,870.86	\$ 121,870.86	\$ 81,321.01	\$ 81,321.01	
02 SCADA Telemetry System	1	LS	\$ 110,	149,740.07	\$ 149,740.07	\$ 195,389.50	\$ 195,389.50	
03 6-inch Class 200 PVC water line	53,609	LF	\$	6.50	\$ 348,458.50	\$ 6.66	\$ 357,035.94	
04 6-inch Class 350 DIP water line	400	LF	\$	18.64	\$ 7,456.00	\$ 17.18	\$ 6,872.00	
05 4-inch Class 200 PVC water line	39,753	LF	\$	4.98	\$ 197,969.94	\$ 4.84	\$ 192,404.52	
06 3-inch Class 200 PVC water line	1,697	LF	\$	4.57	\$ 7,755.29	\$ 3.73	\$ 6,329.81	
07 Steel, cased road bore; 12"cs/6"cr	30	LF	\$	129.18	\$ 3,875.40	\$ 129.95	\$ 3,898.50	
08 Steel, cased road bore; 10"cs/6"cr	155	LF	\$	111.41	\$ 17,268.55	\$ 126.76	\$ 19,647.80	
09 Steel, cased road bore; 8"cs/4"cr	200	LF	\$	103.58	\$ 20,716.00	\$ 120.89	\$ 24,178.00	
10 Steel, cased road bore; 8"cs/3"cr	30	LF	\$	117.04	\$ 3,511.20	\$ 122.09	\$ 3,662.70	
11 Open cut, cased road crossing; 10"cs/6"cr	115	LF	\$	68.32	\$ 7,856.80	\$ 127.83	\$ 14,700.45	
12 Open cut, cased road crossing; 8"cs/4"cr	25	LF	\$	58.63	\$ 1,465.75	\$ 121.85	\$ 3,046.25	
13 Uncased driveway bore	296	LF	\$	39.16	\$ 11,591.36	\$ 25.94	\$ 7,678.24	
14 River Crossing by directional bore	150	LF	\$	153.54	\$ 23,031.00	\$ 118.13	\$ 17,719.50	
15 Creek Crossing, all sizes	80	LF	\$	105.35	\$ 8,428.00	\$ 111.14	\$ 8,891.20	
16 8"x6" tapping sleeve, valve & box	1	EA	\$ 1,	2,307.04	\$ 2,307.04	\$ 1,401.01	\$ 1,401.01	
17 8"x4" tapping sleeve, valve & box	1	EA	\$ 1,	2,165.53	\$ 2,165.53	\$ 1,269.77	\$ 1,269.77	
18 6"x6" tapping sleeve, valve & box	3	EA	\$ 1,	2,319.82	\$ 6,959.46	\$ 1,420.74	\$ 4,262.22	
19 6"x4" tapping sleeve, valve & box	1	EA	\$ 1,	2,165.53	\$ 2,165.53	\$ 1,278.40	\$ 1,278.40	
20 4"x4" tapping sleeve, valve & box	3	EA	\$ 1,	2,088.39	\$ 6,265.17	\$ 1,139.51	\$ 3,418.53	
21 3"x3" tapping sleeve, valve & box	3	EA	\$	1,876.27	\$ 5,628.81	\$ 1,287.43	\$ 3,862.29	
22 Remove Blowoff & Connect to Exist. 6"	1	EA	\$	1,414.73	\$ 1,414.73	\$ 865.30	\$ 865.30	
23 Remove Blowoff & Connect to Exist. 4"	8	EA	\$	729.18	\$ 5,833.44	\$ 865.30	\$ 6,922.40	
24 Remove Blowoff & Connect to Exist. 3"	8	EA	\$	698.33	\$ 5,586.64	\$ 865.30	\$ 6,922.40	
25 Terminate Exist 6" w/ Blowoff	2	EA	\$	1,763.08	\$ 3,526.16	\$ 1,017.02	\$ 2,034.04	
26 Blowoff Assembly w/ valve	2	EA	\$	1,699.04	\$ 3,398.08	\$ 964.71	\$ 1,929.42	
27 6" Gate Valve and box	8	EA	\$	653.49	\$ 5,227.92	\$ 706.04	\$ 5,648.32	
28 4" Gate Valve and box	4	EA	\$	623.40	\$ 2,493.60	\$ 618.76	\$ 2,475.04	
29 3" Gate Valve and box	2	EA	\$	540.22	\$ 1,080.44	\$ 522.32	\$ 1,044.64	
30 Reinstall existing Flush Hydrant	1	EA	\$	1,900.60	\$ 1,900.60	\$ 1,265.63	\$ 1,265.63	
31 Meter Service, far side	1	EA	\$	922.50	\$ 922.50	\$ 1,136.96	\$ 1,136.96	
32 Meter Service, near side	1	EA	\$	796.13	\$ 796.13	\$ 504.15	\$ 504.15	
33 Reconnect Meter Service, far side	37	EA	\$	537.92	\$ 19,903.04	\$ 883.84	\$ 32,702.08	
34 Reconnect Meter Service, near side	25	EA	\$	537.92	\$ 13,448.00	\$ 377.59	\$ 9,439.75	
35 Remote Master Meters	3	EA	\$ 15,	6,680.05	\$ 20,040.15	\$ 4,203.21	\$ 12,609.63	
36 Air Release Valve	1	EA	\$	1,184.92	\$ 1,184.92	\$ 6,035.85	\$ 6,035.85	
37 Unclassified Undercut	100	CY	\$	35.29	\$ 3,529.00	\$ 6.33	\$ 633.00	
38 No. 57 Aggregate refill	50	Ton	\$	38.53	\$ 1,926.50	\$ 21.01	\$ 1,050.50	
39 Class "B" concrete refill	50	CY	\$	151.57	\$ 7,578.50	\$ 119.27	\$ 5,963.50	
<b>Total Amount of Bid</b>				\$ 1,056,276.61		\$ 1,057,450.25		
No. ALTERNATE BID ITEMS	QUANTITY		UNIT \$	TOTAL	UNIT \$	TOTAL		
A01 3-inch Class 200 PVC water line (P.Young)	5,730	LF	\$	5.50	\$ 31,515.00	\$ 3.80	\$ 21,774.00	

**TABULATION OF BIDS: Contract No. 2 - Water Association**  
 Bids Received: June 17, 2005 @ 10:00 a.m.

No. BIDDERS	QUANTITY		UNIT \$	TOTAL
01 Caldwell Tanks (Louisville, KY)	1	LS	\$ 355,	355.00
02 Pittsburg Tank & Tower (Sebree, KY)	1	LS	\$ 385,	385.00
03 Phoenix Fabricators (Avon, IN)	1	LS	\$ 599,	599.00

**Appendix B**

*Engineer's Recommendation Letter to the Water Association*

**Appendix C**

*Drinking Water Branch – DOW's Approval of Plans and Specs*





ERNIE FLETCHER  
GOVERNOR

**ENVIRONMENTAL AND PUBLIC PROTECTION CABINET**

DEPARTMENT FOR ENVIRONMENTAL PROTECTION

DIVISION OF WATER

14 REILLY ROAD

FRANKFORT, KENTUCKY 40601-1190

www.kentucky.gov

LAJUANA S. WILCHER  
SECRETARY

December 2, 2004

Thad E. Rogers, President  
South Logan Water Association  
114 S. Main Street  
Adairville, KY 42202

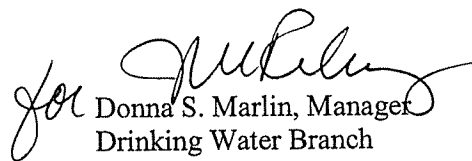
RE: Logan County  
AI No: 33994  
DW No: 0710707-04-001  
2003-2004 System Extension Project  
Contract #1: Water Line Extension, Booster Pump Station  
Contract #2: Water Storage Tank  
Activities ID: APE 20040001

Dear Mr. Rogers:

We have reviewed the plans and specifications for the above referenced project. The plans include the construction of approximately 7427 feet of 3-inch PVC, 35,167 feet of 4-inch PVC, 53,444 feet of 6-inch PVC, 400 feet of 6-inch DI and 165 feet of 6-inch PE water line. Also it consists of construction of a 200,000 gallons elevated water storage tank and a 265 gpm /45 TDH Booster Pump Station. This is to advise that plans and specifications for the above referenced project are APPROVED with respect to sanitary features of design, as of this date with the requirements contained in the attached construction permit.

If you have any questions concerning this project, please contact Solitha Dharman at (502) 564-2225, extension 572.

Sincerely,

  
Donna S. Marlin, Manager  
Drinking Water Branch  
Division of Water

DSM: SWD

Enclosures

C: Chris Wilcutt, P.E., McGhee Engineering Inc.  
Logan County Health Department  
Public Service Commission  
Division of Plumbing





COMMONWEALTH OF KENTUCKY  
**NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET**  
DEPARTMENT FOR ENVIRONMENTAL PROTECTION  
FRANKFORT OFFICE PARK  
14 REILLY RD  
FRANKFORT KY 40601

**General Certification--Nationwide Permit #12**  
**Utility Line Backfill and Bedding**

This General Certification is issued March 17, 2002, in conformity with the requirements of Section 401 of the Clean Water Act of 1977, as amended (33USC 1314), as well as Kentucky Statute KRS 224.16-070.

The Commonwealth of Kentucky hereby certifies under Section 401 of the Clean Water Act (CWA) that it has reasonable assurances that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 5, established pursuant to Sections 301, 302, 304, 306 and 307 of the CWA, will not be violated for the activity covered under 33 CFR Part 330 Appendix A (B) (12), namely utility line backfill and bedding provided that the following conditions are met:

1. This general Water Quality Certification is limited to the crossing of streams by utility lines. The length of a single utility stream crossing shall not exceed twice the width of the stream. This document does not authorize the installation of utility lines in a linear manner within the stream channel or below the top of the stream bank.
2. The provisions of 401 KAR 5:005 Section 8 are hereby incorporated into this General Water Quality Certification. Namely, "Sewer lines shall be located at least 50 feet away from a stream which appears as a blue line on a USGS 7 ½ minute topographic map except where the sewer alignment crosses the stream. The distance shall be measured from the top of the stream bank. The cabinet may allow construction within the 50' buffer if adequate methods are used to prevent soil from entering the stream.

Gravity sewer lines and force mains that cross streams shall be constructed by methods that maintain normal stream flow and allow for a dry excavation. Water pumped from the excavation shall be contained and allowed to settle prior to re-entering the stream. Excavation equipment and vehicles shall operate outside of the flowing portion of the stream. Spoil material from the sewer line excavation shall not be allowed to enter the flowing portion of the stream." The provisions of this condition shall apply to all types of utility line stream crossings.

3. Removal of riparian vegetation in the utility line right-of-way shall be limited to that necessary for equipment access. Effective erosion and sedimentation control measures must be employed at all times during the project to prevent degradation of waters of the Commonwealth. Site regarding and reseeded will be accomplished within 14 days after disturbance.



4. Utility line construction projects through jurisdictional wetlands shall not result in conversion of the area to non-wetland status.
5. This General Certification shall not apply to those waters of the Commonwealth identified as Outstanding State Resource Waters, Exceptional Waters or Cold Water Aquatic Habitat Waters, as designated by the Division of Water. An individual Water Quality Certification will be required for projects in these waters.

Non-compliance with the conditions of this general certification or violation of Kentucky state water quality standards may result in civil penalties.

This general certification will expire on March 19, 2007, or sooner if the COE makes significant changes to this nationwide permit.

**Distribution-Major Construction**  
 South Logan Water Association  
 Subject Item Inventory

Activity ID No.: APE20040001

**Subject Item Inventory:**

ID	Designation	Description
AIO033994		
PORT1	Water Line Extension	7427 feet of 3-inch PVC, 35,167 feet of 4-inch PVC, 53,444 feet of 6-inch PVC, 400 feet of 6-inch DI and 165 feet of PE
PORT2	Booster Pump Station	265 gpm / 45 TDH Pump Station
STOR1	Water Storage Tank	200,000 gallons Elevated Water Storage Tank

**Subject Item Groups:**

ID	Description	Components
GACT1	96,603 feet of Water Lines, 200,000 gallons Elevated Water Storage Tank and 265 gpm / 45 TDH Booster Pump Station	PORT2 265 gpm / 45 TDH Pump Station  STOR1 200,000 gallons Elevated Water Storage Tank
		PORT1 7427 feet of 3-inch PVC, 35,167 feet of 4-inch PVC, 53,444 feet of 6-inch PVC, 400 feet of 6-inch DI and 165 feet of PE

**KEY**

ACTV = Activity  
 AREA = Area  
 EQPT = Equipment  
 PERS = Personnel  
 STOR = Storage

AIOO = Agency Interest  
 COMB = Combustion  
 MNPT = Monitoring Point  
 PORT = Transport  
 STRC = Structure

## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

Page 1 of 21

### GACT1 (2003-04 System Ext Project) 96,603 feet of Water Lines, 200,000 gallons Elevated Water Storage Tank and 265 gpm / 45 TDH Booster Pump Station:

#### Monitoring Requirements:

Condition No.	Parameter	Condition
M-1	Coliform	The presence or absence of total Coliform monitored by sampling and analysis as needed shall be determined for the new or relocated water line(s). Take samples at connection points to existing lines, at 1 mile intervals, and at dead ends without omitting any branch of the new or relocated water line. Sample bottles shall be clearly identified as "special" construction tests. [401 KAR 8:100 Section 1(7), 401 KAR 8:150 Section 4, Recommended Standards for Water Works 8.5.6] This requirement is applicable during the following months: All Year. Statistical basis: Instantaneous determination.
M-2	Coliform	The presence or absence of total Coliform monitored by sampling and analysis as needed shall be determined for the new storage structure(s). With at least 1 sample taken at least 24 hours after the first construction complete sample(s), take 2 or more samples from the yard hydrant, the outlet piping from the storage structure, or a sample tap directly connected to the storage structure. Sample bottles shall be clearly identified as "special" construction tests. [Recommended Standards for Water Works 7.0.18, 401 KAR 8:150 Section 4] This requirement is applicable during the following months: All Year. Statistical basis: Instantaneous determination.
M-3	Coliform	The presence or absence of total Coliform monitored by sampling and analysis as needed shall be determined for the new pump(s). If the pump(s) are independent of (not directly connected to) the new or relocated lines, take at least 1 sample at the discharge side pitcock. Otherwise, no additional sampling beyond the sampling required for new or relocated lines shall be required in association with the pump(s). Sample bottles shall be clearly identified as "special" construction tests. [401 KAR 8:100 Section 1(7)] This requirement is applicable during the following months: All Year. Statistical basis: Instantaneous determination.

## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

### Submittal/Action Requirements:

#### Coliform:

Condition No.	Condition
S-1	Coliform For new construction projects, the distribution system, using the most expedient method, shall submit Coliform test results to the Cabinet: Due immediately following disinfection and flushing. [401 KAR 8:150 Section 4(2)]

Condition No.	Condition
---------------	-----------

S-2 For proposed changes to the approved plan, submit information: Due prior to any modification to the Cabinet for approval. Changes to the approved plan shall not be implemented without the prior written approval of the Cabinet. [401 KAR 8:100 Section 1(8)]

S-3 The person who presented the plans shall submit the professional engineer's certification: Due when construction is complete to the Division of Water. The certification shall be signed by a registered professional engineer and state that the water project has been constructed and tested in accordance with the approved plans, specifications, and requirements. [401 KAR 8:100 Section 1(8)]

### Narrative Requirements:

#### Additional Limitations:

Condition No.	Condition
T-1	Additional Limitations: Chlorinated water resulting from disinfection of project components shall be disposed in a manner which will not violate 401 KAR 5:031. [401 KAR 8:020 Section 2(20)]

**Distribution-Major Construction**

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

**Narrative Requirements:**

Condition No.	Condition
T-2	<p>This project has been permitted under the provisions of KRS Chapter 224 and regulations promulgated pursuant thereto. Issuance of this permit does not relieve the applicant from the responsibility of obtaining any other approvals, permits or licenses required by this Cabinet and other state, federal and local agencies. Further, this permit does not address the authority of the permittee to provide service to the area to be served. [401 KAR 8:100 Section 1(7)]</p>
T-3	<p>Unless construction of this project is begun within 1 year from the issuance date of this permit, the permit shall expire. If requested prior to the permit expiration, an official extension from the Division of Water may be granted. If this permit expires, the original plans and specifications may be resubmitted for a new comprehensive review. If you have any questions concerning this project, please contact the Drinking Water Branch at 502/564-3410. [401 KAR 8:100 Section 1(9)]</p>
T-4	<p>During construction, a set of approved plans and specification shall be available at the job site at all times. All work shall be performed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 1(7)(a)]</p>

## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

Page 4 of 21

**PORT1 (Water Line Extension) 7427 feet of 3-inch PVC, 35,167 feet of 4-inch PVC, 53,444 feet of 6-inch PVC, 400 feet of 6-inch DI and 165 feet of PE :**

### Limitation Requirements:

Condition No.	Parameter	Condition
L-1	Depth	A continuous and uniform bedding shall be provided in the trench for all buried pipe. Backfill material shall be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe. Stones found in the trench shall be removed for a Depth $\geq 6$ in below the bottom of the pipe. [Recommended Standards for Water Works 8.5.2] This requirement is applicable during the following months: All Year. Statistical basis: Not applicable.
L-2	Depth	All water lines shall be covered to a Depth $\geq 30$ in to prevent freezing. [Recommended Standards for Water Works 8.5.3, 401 KAR 8:100 Section 1(7)] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.
L-3	Diameter	All water lines shall have Diameter $\geq 3$ in. [Recommended Standards for Water Works 8.1.4] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.
L-4	Diameter	Water lines with Diameter $< 6$ in shall not have fire hydrants. [Recommended Standards for Water Works 8.1.5] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.
L-5	Diameter	All new and existing water lines serving fire hydrants or where fire protection is provided shall have Diameter $\geq 6$ in. [Recommended Standards for Water Works 8.1.2] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.
L-6	Distance	Water lines shall have a sufficient quantity of valves so that inconvenience and sanitary hazards will be minimized during repairs. A valve spacing Distance $\leq 800$ ft should be utilized in non-commercial districts. Commercial districts should utilize a valve spacing Distance $< \text{or} = 500$ ft. [Recommended Standards for Water Works 8.2] This requirement is applicable during the following months: All Year. Statistical basis: Not applicable.
L-7	Distance	Hydrant drains shall not be connected to sanitary sewers or storm drains and shall be located a Distance $> 10$ ft from sanitary sewers and storm drains. [Recommended Standards for Water Works 8.3.4] This requirement is applicable during the following months: All Year. Statistical basis: Not applicable.



## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

### Limitation Requirements:

Condition No.	Parameter	Condition
L-8	Distance	<p>Except when not practical, water lines shall be laid a horizontal Distance <math>\geq 10</math> ft from any existing or proposed sewer. The distance shall be measured edge to edge.</p> <p>In cases where it is not practical to maintain a 10 foot separation, water lines may be installed closer to a sewer provided that the water lines shall be laid in a separate trench or on an undisturbed shelf located on one side of the sewer at such an elevation that the bottom of the water line is at least 18 inches above the top of the sewer. [Recommended Standards for Water Works 8.6.2] This requirement is applicable during the following months: All Year. Statistical basis: Not applicable.</p>
L-9	Distance	<p>When water lines and sewers cross,</p> <ol style="list-style-type: none"><li>1) water lines shall be laid such that the bottom of the water line is a vertical Distance <math>\geq 18</math> in above the top of the sewer line,</li><li>2) 1 full length of the water pipe shall be located so that both joints of the water pipe will be as far from the sewer as possible, and</li><li>3) special structural support for the water and sewer pipes may be required. [Recommended Standards for Water Works 8.6.3] This requirement is applicable during the following months: All Year. Statistical basis: Not applicable.</li></ol>
L-10	Distance	<p>The open end of an air relief pipe from automatic valves shall be extended a Distance <math>\geq 1.0</math> ft above grade and provided with a screened, downward-facing elbow. The pipe from a manually operated valve shall be extended to the top of the pit. Use of manual air relief valves is recommended wherever possible. [Recommended Standards for Water Works 8.4.2] This requirement is applicable during the following months: All Year. Statistical basis: Not applicable.</p>
L-11	Pressure	<p>Pipes shall not be installed unless all points of the distribution system remain designed for ground level Pressure <math>\geq 20</math> psi under all conditions of flow. [Recommended Standards for Water Works 8.1.1] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.</p>
L-12	Pressure	<p>Pressure <math>\geq 30</math> psi must be available on the discharge side of all meters. [401 KAR 8:100 Section 4(2)] This requirement is applicable during the following months: All Year. Statistical basis: Instantaneous determination.</p>

## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

### Limitation Requirements:

Condition No.	Parameter	Condition
L-13	Residual Disinfection	New or relocated water lines shall be thoroughly disinfected (in accordance with AWWA Standard C651) upon completion of construction and before being placed into service. To disinfect the new or relocated lines use chlorine or chlorine compounds in such amounts as to produce an initial disinfectant concentration of at least 50 ppm and a Residual Disinfection $\geq$ 25 ppm at the end of 24 hours. Follow the line disinfection with thorough flushing and place the lines into service if, and only if, Coliform monitoring applicable to the line does not show the presence of Coliform. If Coliform is detected, repeat flushing of the line and Coliform monitoring. If Coliform is still detected, repeat disinfection and flushing as if the line has never been disinfected. Continue the described process until monitoring does not show the presence of Coliform. [401 KAR 8:150 Section 4(1), Recommended Standards for Water Works 8.5.6] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.
L-14	Velocity	Each fire or flush hydrant shall be sized so that Velocity $\geq$ 2.5 ft/sec can be achieved in the water main served by the hydrant during flushing. [Recommended Standards for Water Works 8.1.6.b, 401 KAR 8:100 Section 1(7)] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.

### Monitoring Requirements:

Condition No.	Parameter	Condition
M-1	leaks	The presence or absence of leaks monitored by physical testing as needed shall be determined in all types of installed pipe. Pressure testing and leakage testing shall be in accordance with the latest edition of AWWA Standard C600. [Recommended Standards for Water Works 8.5.5] This requirement is applicable during the following months: All Year. Statistical basis: Instantaneous determination.

## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

Page 7 of 21

### Narrative Requirements:

#### Additional Limitations:

Condition No.	Condition
T-1	<p>Additional Limitations: Water line installation shall be in accordance with AWWA standards or manufacturer recommendations. [Recommended Standards for Water Works 8.5.1]</p>
T-2	<p>Additional Limitations: Pipes, fittings, valves and fire hydrants shall conform to the latest standards issued by the AWWA or NSF (if such standards exist). PVC and PE piping used must be certified to ANSI/NSF Standard 61. [Recommended Standards for Water Works 8.0.1]</p>
T-3	<p>Additional Limitations: At high points in water lines, where air can accumulate, provisions shall be made to remove the air by means of hydrants or air relief valves. Automatic air relief valves shall not be used in situations where manhole or chamber flooding may occur. [Recommended Standards for Water Works 8.4.1]</p>
T-4	<p>Additional Limitations: All tees, bends, plugs and hydrants shall be provided with reaction blocking, tie rods or joints designed to prevent movement. [Recommended Standards for Water Works 8.5.4]</p>
T-5	<p>Additional Limitations: For lines that dead end, a fire hydrant shall be required at the end of each 6 inch or larger diameter line and a flush hydrant shall be required at the end of each line that is less than 6 inches in diameter. [Recommended Standards for Water Works 8.1.6]</p>
T-6	<p>Additional Limitations: For each fire or flush hydrant, auxiliary valves shall be installed in the hydrant lead pipe. [Recommended Standards for Water Works 8.3.3]</p>
T-7	<p>Additional Limitations: No flushing device, blow-off, or air relief valve shall be directly connected to any sewer. Chambers, pits or manholes containing valves, blow-offs, meters, or other such appurtenances shall not be directly connected to any storm drain or sanitary sewer. Such chambers, pits or manholes shall be drained to absorptions pits underground or to the surface of the ground where they are not subject to flooding by surface water. [Recommended Standards for Water Works 8.1.6, Recommended Standards for Water Works 8.4.3]</p>
T-8	<p>Additional Limitations: If water lines are installed or replaced in areas of organic contamination or in areas within 200 ft of underground or petroleum storage tanks, ductile iron or other nonpermeable materials shall be used in all portions of the water line installation or replacement. [401 KAR 8:100 Section 1(5)(d)6, Recommended Standards for Water Works 8.0.2]</p>

## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

Page 8 of 21

### Narrative Requirements:

#### Additional Limitations:

Condition No.	Condition
T-9	<p>Additional Limitations: No water pipe shall pass through or come in contact with any part of a sewer manhole. [Recommended Standards for Water Works 8.6.6]</p>
T-10	<p>Additional Limitations: If a fire sprinkler system is to be installed, a double check detector assembly approved for backflow prevention shall be utilized. The double check detector assembly of the system shall be accessible for testing. [401 KAR 8:100 Section 1(7)]</p>
T-11	<p>Additional Limitations: If water lines cross a stream or wetland, the provisions in the attached Water Quality Certification shall apply. If you have any questions please contact John Dovak of the Water Quality Branch at (502) 564-2225, extension 485. [401 KAR 8:100 Section 1(7)]</p>

#### Subfluvial Pipe Crossings:

Condition No.	Condition
T-12	<p>Subfluvial Pipe Crossings: For subfluvial pipe crossings, a floodplain construction permit will not be required pursuant to KRS 151.250 if the following requirements of 401 KAR 4:050 Section 2 are met.</p> <ol style="list-style-type: none"><li>1) No material may be placed in the stream or in the flood plain of the stream to form construction pads, coffer dams, access roads, etc. during construction of pipe crossings.</li><li>2) Crossing trenches shall be backfilled as closely as possible to the original contour.</li><li>3) All excess material resulting from construction displacement in a crossing trench shall be disposed of outside the flood plain.</li><li>4) For erodible channels, there shall be at least 30 inches of backfill on top of all pipe or conduit points in the crossing.</li><li>5) For nonerodible channels, pipes or conduits in the crossing shall be encased on all sides by at least 6 inches of concrete with all pipe or conduit points in the crossing at least 6 inches below the original contour of the channel. [401 KAR 8:100 Section 1(7)]</li></ol>

# Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

## Narrative Requirements:

### Subfluvial Pipe Crossings:

Condition No.	Condition
T-13	<p>Subfluvial Pipe Crossings: For subfluvial pipe crossings greater than 15 feet in width,</p> <ol style="list-style-type: none"><li>1) the pipe shall be of special construction, having flexible, restrained, or welded watertight joints, and</li><li>2) valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair.</li></ol> <p>Valves shall</p> <ol style="list-style-type: none"><li>a) be easily accessible,</li><li>b) not be subject to flooding, and</li><li>c) if closest to the supply source, be in a manhole with permanent taps made on each side of the valve to allow insertion of a small meter to determine leakage and for sampling purposes. [Recommended Standards for Water Works 8.7.2]</li></ol>

## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

Page 10 of 21

### PORT2 (Booster Pump Station) 265 gpm / 45 TDH Pump Station:

#### Limitation Requirements:

Condition No.	Parameter	Condition
L-1	Pressure	Pump stations shall be located or controlled so that intake Pressure $\geq 20$ psi is maintained during normal pump operation. [Recommended Standards for Water Works 6.4.b] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.
L-2	Pressure	Pump stations shall be located or controlled so that an automatic cutoff or a low pressure controller maintains a Pressure $\geq 10$ psi in the suction line under all operating conditions. [Recommended Standards for Water Works 6.4.c] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.
L-3	Residual Disinfection	New pumps shall be thoroughly disinfected (in accordance with AWWA Standard C651) upon completion of construction and before being placed into service. To disinfect new pumps use chlorine or chlorine compounds in such amounts as to produce an initial disinfectant concentration of at least 50 ppm and a Residual Disinfection $\geq 25$ ppm at the end of 24 hours. Follow the disinfection with thorough flushing and place each pump into service if, and only if, Coliform monitoring applicable to the pump does not show the presence of Coliform. If Coliform is detected, repeat flushing of the pump and Coliform monitoring. If Coliform is still detected, repeat disinfection and flushing as if the pump has never been disinfected. Continue the described process until monitoring does not show the presence of Coliform. [401 KAR 8:100 Section 1(7)] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.
L-4	Slope	Pumping facilities shall be located and designed to maintain the sanitary quality of pumped water. As part of this, all pump station floors shall have Slope $\geq 3$ in per 10 ft to a suitable drain. [Recommended Standards for Water Works 6.2.e, Recommended Standards for Water Works 6.0, Recommended Standards for Water Works 6.1] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.
L-5	Air Change Rate	Ventilation shall conform to existing local and/or state codes. At a minimum forced ventilation shall produce an Air Change Rate $\geq 6$ air change(s)/hr. [401 KAR 8:100 Section 1(7), Recommended Standards for Water Works 6.2.5] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.

## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

### Limitation Requirements:

Condition No.	Parameter	Condition
L-6	Height	<p>Pumping stations shall not be subject to flooding. To this end,</p> <ol style="list-style-type: none"><li>1) grading around stations shall lead surface drainage away and</li><li>2) stations shall be elevated or protected to a Height <math>\geq</math> 3 ft above the highest of the following:<ol style="list-style-type: none"><li>a) the 100-year flood elevation, or</li><li>b) the highest recorded flood elevation. [Recommended Standards for Water Works 6.1.1, Recommended Standards for Water Works 6.0] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.</li></ol></li></ol> <p>When a pump station has pits or compartments which must be entered, stairways or ladders shall be provided between all floors. Stairs shall have risers with a Height <math>\leq</math> 9 in, handrails on both sides, and treads with non-slip material wide enough for safety. [Recommended Standards for Water Works 6.2.3] This requirement is applicable during the following months: All Year. Statistical basis: Maximum.</p>
L-7	Height	

### Narrative Requirements:

#### Additional Limitations:

Condition No.	Condition
T-1	<p>Additional Limitations: Pumping stations shall be so located that the proposed site will meet the requirements for hydraulics of the system. [Recommended Standards for Water Works 6.1]</p>
T-2	<p>Additional Limitations: Pumping stations shall be readily accessible at all times for servicing and repairs. [Recommended Standards for Water Works 6.1.1.b, Recommended Standards for Water Works 6.4.3]</p>
T-3	<p>Additional Limitations: Pumping stations shall be designed to prevent vandalism and protect against entrance of animals or unauthorized persons. [Recommended Standards for Water Works 6.1.1.d]</p>
T-4	<p>Additional Limitations: Pumping stations shall be of durable construction with outward-opening doors. [Recommended Standards for Water Works 6.2.b]</p>

## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

Page 12 of 21

### Narrative Requirements:

#### Additional Limitations:

Condition No.	Condition
T-5	<p>Additional Limitations: Pumping stations shall be fire and weather resistant. [Recommended Standards for Water Works 6.2.b]</p>
T-6	<p>Additional Limitations: Pumping stations shall have suitable pump gland discharges so that drainage from the glands is not onto the floor. [Recommended Standards for Water Works 6.2.f]</p>
T-7	<p>Additional Limitations: If underground structures are present at pumping stations, they shall waterproofed. [Recommended Standards for Water Works 6.2.d]</p>
T-8	<p>Additional Limitations: Pumping stations shall have adequate space for the installation of additional pumps. [Recommended Standards for Water Works 6.2.a]</p>
T-9	<p>Additional Limitations: Pumping stations shall have adequate space for the safe servicing of all equipment. [Recommended Standards for Water Works 6.2.a]</p>
T-10	<p>Additional Limitations: Pump stations shall have crane-ways, hoist beams, eyebolts, or other adequate facilities for servicing or removal of pumps, motors or other heavy equipment. [Recommended Standards for Water Works 6.2.2.a]</p>
T-11	<p>Additional Limitations: Pump stations shall have openings as needed for removal of heavy or bulky equipment. [Recommended Standards for Water Works 6.2.2.b]</p>
T-12	<p>Additional Limitations: Pump stations shall have a convenient tool board, or other facilities as needed, for proper maintenance of equipment. [Recommended Standards for Water Works 6.2.2.c]</p>
T-13	<p>Additional Limitations: In areas where excess moisture could cause safety hazards or damage to equipment, dehumidification shall be provided. [401 KAR 8:100 Section 1(7), Recommended Standards for Water Works 6.2.6]</p>
T-14	<p>Additional Limitations: Electrical controls shall be located above grade. [Recommended Standards for Water Works 6.6.5]</p>



## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

Page 13 of 21

### Narrative Requirements:

#### Additional Limitations:

Condition No.	Condition
T-15	<p><b>Additional Limitations:</b> All electrical equipment and work shall conform with the applicable state and local electrical codes and the National Electrical Code. [Recommended Standards for Water Works 6.5, Recommended Standards for Water Works 6.2.7]</p>
T-16	<p><b>Additional Limitations:</b> Pump stations shall be adequately lighted throughout. [Recommended Standards for Water Works 6.2.7]</p>
T-17	<p><b>Additional Limitations:</b> All automatic pump stations shall be provided with automatic signaling apparatus which will report when the station is out of service. All remote controlled stations shall be electrically operated and controlled and shall have signaling apparatus of proven performance. [Recommended Standards for Water Works 6.5]</p>
T-18	<p><b>Additional Limitations:</b> Automatic or remote control pump stations shall be located or shall have control devices setup so that the range between start and cutoff pressure prevents excessive pump cycling. [Recommended Standards for Water Works 6.4.d]</p>
T-19	<p><b>Additional Limitations:</b> Equipment shall be provided or other arrangements made to prevent surge pressures from activating controls which switch on pumps or activate other equipment outside the normal design cycle of operation. [Recommended Standards for Water Works 6.6.5]</p>
T-20	<p><b>Additional Limitations:</b> Provisions shall be made to prevent energizing the motor in the event of a backspin cycle. [Recommended Standards for Water Works 6.6.5]</p>
T-21	<p><b>Additional Limitations:</b> Pump stations shall be provided with enough heat to prevent freezing of equipment or treatment processes. [Recommended Standards for Water Works 6.2.4]</p>
T-22	<p><b>Additional Limitations:</b> Pump stations shall have at least 2 pumps. Pumps shall be sized so that if any single pump is out of service, the remaining pump or pumps shall be capable of providing the peak demand on the station. [Recommended Standards for Water Works 6.3, Recommended Standards for Water Works 6.4.1]</p>
T-23	<p><b>Additional Limitations:</b> Provisions shall be made for pump alternation. [Recommended Standards for Water Works 6.6.5]</p>

## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

### Narrative Requirements:

#### Additional Limitations:

Condition No.	Condition
T-24	<p>Additional Limitations: Pumps shall</p> <ol style="list-style-type: none"><li>have ample capacity to supply the peak demand against the required distribution system pressure without dangerous overloading,</li><li>be driven by prime movers able to meet the maximum horsepower condition of the pumps,</li><li>be provided readily available spare parts and tools, and</li><li>be served by control equipment that is properly protected against temperatures to be encountered. [Recommended Standards for Water Works 6.3]</li></ol>
T-25	<p>Additional Limitations: Pumps, their prime movers and accessories shall be controlled in such a manner that they will operate at rated capacity without dangerous overload. [Recommended Standards for Water Works 6.5]</p>
T-26	<p>Additional Limitations: Pump stations shall be located or controlled so that a bypass is available. [Recommended Standards for Water Works 6.4.e]</p>
T-27	<p>Additional Limitations: Pump stations shall contain indicating and totalizing metering of the total water pumped. Each pump shall have</p> <ol style="list-style-type: none"><li>a standard pressure gauge on its discharge line and</li><li>a compound gauge on its suction line.</li></ol> <p>Each pump should have a means for measuring the instantaneous volume per time discharge. [401 KAR 8:100 Section 1(7), Recommended Standards for Water Works 6.4.2, Recommended Standards for Water Works 6.6.3]</p>
T-28	<p>Additional Limitations: Pumps shall be adequately valved to permit satisfactory operation, maintenance and repair of the equipment. Each pump shall have a positive-acting check valve on the discharge side between the pump and the shut-off valve. [Recommended Standards for Water Works 6.6.1]</p>
T-29	<p>Additional Limitations: Piping for pumps shall, in general,</p> <ol style="list-style-type: none"><li>be designed so that the friction losses will be minimized,</li><li>not be subject to contamination,</li><li>have watertight joints,</li><li>be protected against surge or water hammer,</li><li>be provided with restraints where necessary, and</li><li>a) be such that each pump has an individual suction line or</li><li>b) be manifolded such that the lines insure similar hydraulic and operating conditions. [Recommended Standards for Water Works 6.6.2]</li></ol>

**Distribution-Major Construction**

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

**Narrative Requirements:**

**Additional Limitations:**

Condition No.	Condition
T-30	<p data-bbox="557 1606 589 1858">Additional Limitations: To ensure continuous service when the primary power is interrupted, power supplied to pump stations shall be</p> <ul data-bbox="589 111 673 1858" style="list-style-type: none"><li data-bbox="589 1396 621 1858">a) from at least 2 independent sources or</li><li data-bbox="621 111 673 1858">b) from a primary source with a standby or auxiliary source provided.</li></ul> <p data-bbox="673 111 737 1858">If standby power is provided by onsite generators or engines, the fuel storage and fuel line must be designed to protect the water supply from contamination. [Recommended Standards for Water Works 6.6.6]</p>

**Distribution-Major Construction**  
 South Logan Water Association  
 Facility Requirements

Activity ID No.: APE20040001

**STOR1 (Water Storage Tank) 200,000 gallons Elevated Water Storage Tanks:**

**Limitation Requirements:**

Condition No.	Parameter	Condition
L-1	Depth	High and low level Depth $\geq$ 30 ft apart should not be allowed in storage structures providing pressure to a distribution system. [Recommended Standards for Water Works 7.3.2] This requirement is applicable during the following months: All Year. Statistical basis: Maximum.
L-2	Distance	To prevent excessive erosion of storage structure foundations, the overflow and main drain shall either a) discharge to concrete or other stable surfaces (splash pads) which extend a Distance $\geq$ 10 ft away from the base of the storage structure or b) discharge directly into a crushed stone pit that is at least 2' x 2' x 2' which is a Distance $\geq$ 10 ft away from the base of the storage structure. [401 KAR 8:100 Section 1(7)] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.
L-3	Height	Tanks shall have an overflow which is a) brought down to a Height $\geq$ 12 and $\leq$ 24 in above the ground surface, b) of sufficient diameter to permit waste of water in excess of the filling rate, c) open downward, d) screened with twenty-four mesh noncorrodible screen installed within the pipe at a location least susceptible to damage by vandalism, and e) when not internal, e) i) located on the outside of the tank so that any discharge is visible, when internal, e) ii) located in the access tube. [Recommended Standards for Water Works 7.0.7] This requirement is applicable during the following months: All Year. Statistical basis: Not applicable.
L-4	Height	Tanks shall have manholes that are a) framed a Height $\geq$ 4 in above the surface of the roof at the opening and b) fitted with a solid watertight cover which overlaps the framed opening and extends down around the frame at least 2 inches. Manholes should be hinged at one side and shall have a locking device. [Recommended Standards for Water Works 7.0.8] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.

## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

Page 17 of 21

### Narrative Requirements:

#### Additional Limitations:

Condition No.	Condition
T-1	<p><b>Additional Limitations:</b> The materials and designs used for storage structures shall provide stability and durability as well as protection for the quality of the stored water. Steel structures shall follow the AWWA standards wherever they are applicable. Other materials of construction are acceptable when properly designed to meet the requirements in this permit. [Recommended Standards for Water Works 7.0]</p>
T-2	<p><b>Additional Limitations:</b> The safety of employees must be considered in the design of any tank. The design of tanks shall</p> <ol style="list-style-type: none"><li>meet or exceed the minimum requirements of pertinent safety laws and regulations in the areas where the tanks are constructed,</li><li>include ladders, ladder guards and balcony railings (where applicable),</li><li>locate entrance hatches in safe places,</li><li>provide railings or handholds where persons must transfer from an access tube to the water compartment, and</li><li>consider confined space entry requirements.</li></ol> <p>Additionally, if tanks have riser pipes over 8 inches in diameter, the tanks shall have protective bars over the riser openings inside of the tank. [Recommended Standards for Water Works 7.0.12]</p>
T-3	<p><b>Additional Limitations:</b> Storage structures shall be designed with reasonably convenient access to the interior for cleaning and maintenance. Where space permits, at least 2 manholes shall be provided above the waterline at each water compartment. [Recommended Standards for Water Works 7.0.8]</p>
T-4	<p><b>Additional Limitations:</b> Fencing, locks on access manholes, and other necessary precautions shall be provided to prevent trespassing, vandalism, and sabotage. [Recommended Standards for Water Works 7.0.4]</p>
T-5	<p><b>Additional Limitations:</b> All storage structures and their appurtenances, especially the riser pipes, overflows, and vents, shall be designed to prevent freezing. [Recommended Standards for Water Works 7.0.13]</p>
T-6	<p><b>Additional Limitations:</b> Tanks shall be constructed with no openings except properly constructed vents, manholes, overflows, risers, drains, control ports, and piping for inflow and outflow. Any pipes running through the roof or sidewall must be welded or properly gasketed. [Recommended Standards for Water Works 7.0.10]</p>
T-7	<p><b>Additional Limitations:</b> All finished water storage structures shall have suitable watertight roofs and sidewalls which exclude birds, animals, insects, and excessive dust. [Recommended Standards for Water Works 7.0.3, Recommended Standards for Water Works 7.0.10]</p>

**Distribution-Major Construction**  
South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

**Narrative Requirements:**

**Additional Limitations:**

Condition No.	Condition
T-8	<p><b>Additional Limitations:</b> The roof of each storage structure shall be well drained. Downspout pipes shall not enter or pass through storage structures. Parapets or similar structures which would tend to hold water and snow on a storage structure roof shall not be approved unless adequate waterproofing and drainage are provided. [Recommended Standards for Water Works 7.0.11]</p>
T-9	<p><b>Additional Limitations:</b> Storage structures shall be designed so they can be isolated from the distribution system and drained for cleaning or maintenance without necessitating loss of pressure in the distribution system. [Recommended Standards for Water Works 7.3.2, Recommended Standards for Water Works 7.0.5]</p>
T-10	<p><b>Additional Limitations:</b> Storage structure drains shall discharge to the ground surface at a drainage structure inlet or splash plate. [Recommended Standards for Water Works 7.3.2, Recommended Standards for Water Works 7.0.7]</p>
T-11	<p><b>Additional Limitations:</b> No drain on a storage structure may have a direct connection to a sewer or storm drain. [Recommended Standards for Water Works 7.0.5, Recommended Standards for Water Works 7.0.7, Recommended Standards for Water Works 7.3.2]</p>
T-12	<p><b>Additional Limitations:</b> Main drains from storage structures shall have a twenty-four mesh noncorrodible screen installed within the drain pipe at a location least susceptible to damage by vandalism. [401 KAR 8:100 Section 1(7)]</p>
T-13	<p><b>Additional Limitations:</b> Storage structures shall be designed to facilitate turn over of water. [401 KAR 8:100 Section 1(7), Recommended Standards for Water Works 7.0.6]</p>
T-14	<p><b>Additional Limitations:</b> Storage structures shall have sufficient capacity, as determined from engineering studies, to meet domestic demands. Additionally, if fire protection is provided, capacity shall also be sufficient to meet fire flow demands. [401 KAR 8:100 Section 1(7), Recommended Standards for Water Works 7.0.1]</p>
T-15	<p><b>Additional Limitations:</b> Storage structure discharge pipes shall be located in a manner that will prevent the flow of sediment into the distribution system. Additionally, removable silt stops should be provided. [Recommended Standards for Water Works 7.0.15]</p>

**Distribution-Major Construction**  
 South Logan Water Association  
 Facility Requirements

Activity ID No.: APE20040001

**Narrative Requirements:**

**Additional Limitations:**

Condition No.	Condition
T-16	<p><b>Additional Limitations:</b>                      Appropriate sampling tap(s) shall be provided to facilitate collection of water samples for both bacteriologic and chemical analyses. [Recommended Standards for Water Works 7.0.19]</p>
T-17	<p><b>Additional Limitations:</b>                      Storage structures shall be vented. Overflows shall not be considered as vents. Open construction between the sidewall and roof is not permitted. Vents shall</p> <ul style="list-style-type: none"> <li>a) prevent the entrance of rainwater,</li> <li>b) exclude birds and animals, and</li> <li>c) exclude insects and dust (as much as compatible with effective venting).</li> </ul> <p>Vents may use four-mesh noncorrodible screen. [Recommended Standards for Water Works 7.0.9]</p>
T-18	<p><b>Additional Limitations:</b>                      Adequate controls shall be provided to maintain levels in storage structures. The level controls shall be acceptable to the Division of Water. Level indicating devices should be provided at a central location. Overflow and low-level warnings or alarms should be located at places in the community where they will be under responsible surveillance 24 hrs a day. [401 KAR 8:100 Section 1(7), Recommended Standards for Water Works 7.3.3]</p>
T-19	<p><b>Additional Limitations:</b>                      If storage structures have a catwalk over the water, the catwalk floor shall be solid with raised edges so that shoe scrapings and dirt will not fall into the water. [Recommended Standards for Water Works 7.0.14]</p>
T-20	<p><b>Additional Limitations:</b>                      Proper protection shall be given to metal surfaces by</p> <ul style="list-style-type: none"> <li>a) paints or other protective coatings and/or</li> <li>b) cathodic protective devices. [Recommended Standards for Water Works 7.0.17]</li> </ul>
T-21	<p><b>Additional Limitations:</b>                      If cathodic protection is utilized,</p> <ul style="list-style-type: none"> <li>a) competent technical personnel should design and install the protection and</li> <li>b) a maintenance contract should be provided. [Recommended Standards for Water Works 7.0.17]</li> </ul>
T-22	<p><b>Additional Limitations:</b>                      If the interior of the storage structure is coated or lined, the coating or lining shall be of a type approved by the Division of Water for use in contact with potable water. [401 KAR 8:020 Section 2(19)]</p>

## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

Page 20 of 21

### Narrative Requirements:

#### Additional Limitations:

Condition No.	Condition
T-23	<p>Additional Limitations: Paints and coatings</p> <ol style="list-style-type: none"><li>shall meet NSF standard 61,</li><li>shall be acceptable to the Division of Water,</li><li>shall be properly applied and cured, and</li><li>shall not transfer any substance to the water which will be toxic or cause tastes or odors (following curing).</li></ol> <p>Wax coatings shall not be used in any storage structure and must be completely removed before using other paints or coatings in an existing storage structure. [401 KAR 8:100 Section 1(7), Recommended Standards for Water Works 7.0.17]</p>
T-24	<p>Additional Limitations: New water storage structures shall be thoroughly disinfected (in accordance with AWWA Standard C652) upon completion of construction and before being placed into service. To disinfect new storage structures</p> <ol style="list-style-type: none"><li>remove all scaffolding, planks, tools, rags, and other items that are not part of the structural or operational facilities of the storage structure,</li><li>clean thoroughly by sweeping, scrubbing, using high-pressure water jets, or some equivalently effective means, and</li><li>use chlorine or chlorine compounds as subsequently described.</li></ol> <p>Finalize disinfection by</p> <ol style="list-style-type: none"><li>chlorination method 1, described in detail at AWWA Standard C652 Section 4.3.1,</li><li>chlorination method 2, described in detail at AWWA Standard C652 Section 4.3.2, or</li><li>chlorination method 3, described in detail at AWWA Standard C652 Section 4.3.3.</li></ol> <p>See the following conditions for abbreviated descriptions of the methods. Following the finalization of disinfection, place storage structures into service if, and only if, Coliform monitoring applicable to the storage structure does not show the presence of Coliform. If Coliform is detected, flush the tank and repeat Coliform monitoring. If Coliform is still detected, repeat disinfection and flushing as if the tank has never been disinfected. Continue the described process until monitoring does not show the presence of Coliform. [Recommended Standards for Water Works 7.0.18]</p>



## Distribution-Major Construction

South Logan Water Association  
Facility Requirements

Activity ID No.: APE20040001

Page 21 of 21

### Narrative Requirements:

Condition No.	Condition
T-25	<p>If applicable, chlorination method 1 generally requires</p> <ul style="list-style-type: none"><li>a) filling a storage structure to the overflow level with water providing a free chlorine Residual Disinfection <math>\geq 10</math> ppm and</li><li>b) i) completely draining the storage facility and refilling or</li><li>ii) otherwise reducing (in accordance with method 1) the free chlorine residual to a level appropriate for distribution. [Recommended Standards for Water Works 7.0.18]</li></ul>
T-26	<p>If applicable, chlorination method 2 generally requires</p> <ul style="list-style-type: none"><li>a) scrubbing or spraying the water-contact surfaces of a storage structure with a water solution having an available chlorine concentration = 200 ppm and</li><li>b) purging of the strong chlorine solution and filling to the overflow level. [Recommended Standards for Water Works 7.0.18]</li></ul>
T-27	<p>If applicable, chlorination method 3 generally requires</p> <ul style="list-style-type: none"><li>a) filling a storage structure to approximately 5% of the total storage volume with water having an available chlorine concentration of 50 ppm,</li><li>b) continued filling of the storage structure to the overflow level with normal potable water, and</li><li>c) purging the storage structure so that various disinfection by-products do not reach water consumers. [Recommended Standards for Water Works 7.0.18, 401 KAR 8:100 Section 1(7)]</li></ul>