FINAL ENGINEERING REPORT

TODD COUNTY WATER DISTRICT
KY HIGHWAY 181 LINE UPGRADE PROJECT

May 2017








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Final Engineering Report

prepared for the

Todd County Water District

KY Highway 181 Line Upgrade Project

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5/31/17

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1.0 INTRODUCTION

The Todd County Water District (TCWD) was chartered in 1971 to supply potable water to rural residents of Todd County, Kentucky. The District is governed by five board members, and is regulated by the Kentucky Public Service Commission. The Board includes three members from Todd County and two from Logan County because of the significant number of customers served by the TCWD in the Lake Malone area of Logan County. Todd County has authority to plan, design, finance, construct, operate, replace and maintain the distribution facilities within its service area.

The Todd County water system is comprised of nearly 450 miles of water distribution lines and four water storage tanks with an approximate total capacity of 1,378,000 gallons, all of which serves approximately 3,335 customers in rural Todd County and a small portion of northwestern Logan County and southeastern Christian County. As of Spring 2003, the Todd County Water District began to purchase all of its treated water from the Logan Todd Regional Water Commission (LTRWC). The Commission's water treatment facility is rated at 10 million gallons per day, and its distribution system consists of nearly 85 miles of pipeline and three storage tanks totaling 3,500,000 gallons in capacity. Per the Commission's 2013 records, the average daily wholesale water demand within the Todd County system was 530,000 gallons per day. Todd County has four meter stations with the Commission, two located in the southern parts of the county, one north of Elkton, and an inactive station at Allensville.

The TCWD is a relatively large water system covering approximately 90% of the Todd County area. With the exception of a few isolated locations in the west and southwest parts of the county, most of the roads within the county have water service, with only short extensions needed from time to time to accommodate new development.

The main problems that have plagued the District 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. Going online with the Logan Todd Regional system and recent USDA extension projects have resolved the majority of these problems. However, there are many original areas that are now strained due to the dramatic growth of the District. To initiate a solution to alleviating these "growing pains", the Todd County Water District has requested funding assistance to undertake their Highway 181 Waterline Upgrade Project.

The primary construction contract (Contract 1) involves construction of nearly 11 miles of water line upgrade and replacement along KY Highway 181. This corridor is the primary transmission line for the northern half of Todd County, and it links their feed from the Logan Todd Regional Water Commission at Allender's Hill north to the Clifty community.

The total cost of the proposed project is estimated to be $4,200,000, and construction is expected to begin the Summer 2017.

2.0 PROJECT PLANNING AREA

2.1 *Location*

The construction of the Todd County Water District's Contract 1 will be contained to one highway corridor. Nearly 11 miles of new waterline upgrade and replacement are proposed along KY Highway 181, between Elkton and the Clifty community. The KY Highway 181 section between Allender's Hill and the Highland Lick Road intersection will consist of 12" ductile iron piping, and the remaining section to Clifty will consist of 10" ductile iron piping.

If funds are available upon completion of the award of Contract 1, the District has also identified up to 36 other roadways (listed in Table 1) to extend waterlines and fulfill requests for water service. Additionally, the District wishes to make modifications to their KY Highway 181 booster pump station and install system-wide master meters with SCADA, all in an effort to improve operation efficiency.

The proposed project, excluding alternates, is illustrated on Exhibit 1.

Table 1

Project Road List

	Primary Roadways	Length (Miles)	Number of Houses	Line Size (Inches)
Ⓐ	KY Highway 181 (Allenders Hill to KY 507)	5.00	96	12
Ⓑ	KY Highway 181 (KY 507 to Clifty)	5.80	99	10
	SUBTOTAL - New Line Extensions	10.80	195	
	Alternate Roadways	**Length (Miles)**	**Number of Houses**	**Line Size (Inches)**
❶	Allensville-Daysville Road	0.75	0	4
❷	Antioch Church Road Creek Crossing Replacement	0.02	0	3
❸	B. White Road	0.93	3	6
❹	Banton Coots Road	2.14	3	4
❺	Blue-Gray Park Road	1.88	26	6
❻	Clay Cole Road	0.83	0	4
❼	Cliff Hill Road	0.39	1	3
❽	Clifty-Kirkmansville Road	1.06	2	3
❾	Crawford Road	0.68	1	3
❿	Curtis Boley Road	0.32	2	3
⓫	Hall-Latham Road	0.91	2	4
⓬	Hammacksville Road	1.06	1	4
⓭	KY Highway 102	0.95	4	4
⓮	KY Highway 848	2.71	11	6
⓯	Homer Powell Road	1.47	2	3
⓰	Johnson Mill Road	0.74	5	3
⓱	Lack Road	0.84	5	3
⓲	Latham Road	0.40	2	4
⓳	Lawson-Poindexter Road	0.94	2	4
⓴	Long Road	0.48	3	3
㉑	Lyons Road	0.90	2	3
㉒	Majors Lane	0.90	7	3
㉓	Maton Road	1.35	2	4
㉔	Morton Road	1.79	4	4
㉕	Mt. Sharon Road	0.53	2	4
㉖	Old Allensville Road Creek Crossing	0.23	0	4
㉗	Old Allensville Road	1.67	1	4
㉘	Old Railroad Lane	1.19	3	4
㉙	Paul Hurt Road	0.54	2	3
㉚	Pogue Road	0.13	1	3
㉛	Snead Road	0.89	3	3
㉜	Squire Grove Loop	0.41	0	4
㉝	Starnes Road	0.50	1	3
㉞	Stokes Chapel Road Creek Crossing	0.04	0	4
㉟	Tabernacle Road	1.02	1	3
㊱	Turner Road	0.19	1	3
	SUBTOTAL - Alternate Line Extensions	31.78	105	

2.2 *Land Use and Environmental Resources Present*

As stated earlier, the line portion of Contract 1 is contained entirely to a section of KY Highway 181, nearly 11 miles of roadway in the northern rural area of Todd County. The line work is proposed to be constructed within utility easements previously acquired or to be acquired by the Todd County Water District. The project will affect four main resources during construction: residential, agriculture, grazing and transportation. The general construction effect to the resources is the disturbances associated with building the facilities. No long-term impact is expected to any environmental resource.

An archeological investigation was not required for the Contract 1 area. The alternate roadways identified for a future construction contract will be submitted to the Kentucky Heritage Council for review. If an investigation is warranted, Dr. Jack Schock of Arrow Enterprises will conduct any necessary reviews with a report submitted to the State Historical Preservation Officer. Regardless, it is expected that no historical resource will be affected by the proposed project.

2.3 *Growth Areas and Population Trends*

The population history of Todd County is an important element in determining the growth patterns over the last 70 years. Analysis of the population history will assist in forming a reliable estimate of the future water needs of the project area.

According to historical records, Todd County's population has averaged around 12,000 persons for the past eight census collections. Table 2 provides the population history and projections of the county based on data obtained from the U.S. Bureau of the Census.

Table 2
Population History and Projections

		Historical								Projections				
	YEAR	1940	1950	1960	1970	1980	1990	2000	2010	2015	2020	2025	2030	2035
TODD	Elkton	1,214	1,312	1,448	1,612	1,815	1,789	1,984	2,062	2,107	2,144	2,175	2,200	2,215
	Guthrie	1,272	1,253	1,211	1,200	1,361	1,504	1,469	1,419	1,450	1,476	1,497	1,514	1,525
	Trenton	572	577	542	496	465	378	419	384	392	399	405	410	413
	Rural Areas	11,176	9,748	8,163	7,515	8,233	7,269	8,099	8,595	8,781	8,939	9,067	9,168	9,234
	Todd County	14,234	12,890	11,364	10,823	11,874	10,940	11,971	12,460	12,730	12,958	13,144	13,292	13,387
	% Change		-9.4%	-11.8%	-4.8%	9.7%	-7.9%	9.4%	4.1%	2.2%	1.8%	1.4%	1.1%	0.7%

Notes to Table 1: 1. Shaded areas have been calculated based on census and projection data.

Sources to Table 1: 1. Historical & Projections provided by the KY State Data Center and Census Bureau University of Louisville, State Data Center (http://cbpa.louisville.edu/ksdc/)

Analyzing Table 2 from 1940 to 2010 shows that Elkton and Guthrie have grown overall with some fluctuations, but Trenton and the rural areas have declined in population since 1940. The rural areas of Todd County show a growing trend, evident by the greater customer base of the Todd County Water District. The past

two censuses reveal growth in the county overall, and projections call for modest growth over the next 25 years.

Several factors influence the growth of a community, some of which include accessibility, technology, education, water infrastructure, sewer facilities, and jobs. In recent years, the community has experienced the benefit of the US Highway 68 four-lane project among others, which has increased the areas access to larger Kentucky cities such as Hopkinsville and Bowling Green plus improved access to Interstates 24 and 65. High speed internet and wireless technology is becoming more readily available to the communities, creating greater and easier contact to the rest of the world. The local school system is strong and provides a quality education. Over the past decade, the District and other communities within the county have worked together to secure a reliable source of potable water for the foreseeable future as the county went online with the Logan Todd Regional Water Commission in 2003.

Further analysis of these projections indicates Todd County's population is projected to grow modestly every five years, adding about 927 persons by 2035. It should be noted that population would be impacted by the availability or unavailability of water supply. An ample and readily available supply of water will promote growth while the lack thereof will limit growth. These factors must be considered when reviewing this report since many assumptions are dependent on these projections.

3.0 EXISTING FACILITIES

3.1 *History and Assets*

The Todd County Water District (TCWD) was formed by Todd County Court order in 1971 to supply potable water to rural residents of Todd County, Kentucky. There are four public water systems in Todd County, those being Elkton, Guthrie, Trenton and the TCWD. The Elkton and Guthrie systems serve the incorporated areas of those communities and only limited areas adjacent to town. The Trenton system serves the town's incorporated area, and a portion of the rural area south of town along Highway 104.

The TCWD water system is comprised of approximately 447 miles of water line and a total water storage capacity of 1,378,000 gallons. The existing distribution system consists of 10", 8", 6", 4", and 3" PVC lines. The general service area is depicted in Exhibit 2, which illustrates the general distribution layout. The existing transmission and distribution lines generally radiate from their decommissioned (2003) water treatment plant located near the Allegre community in northern Todd County. 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.

TCWD has four water storage structures to serve the water system and one primary pumping station that boosts water into the higher-pressure north zone. Only three of the four existing water storage tanks provide useful storage for the TCWD system. The newly constructed Coal Bank elevated water tank and the Clifty tank

provide 500,000 and 250,000 gallons of storage respectively to the northern pressure zone. The Hammacksville elevated tank has a storage capacity of 250,000 gallons and provides pressure to a small area in the southwestern part of the County. The fourth tank located on Allenders Hill acts as a pump tank for the Logan Todd Regional Water Commission's booster pump station at that location. Currently, the southern part of the county is served directly from an existing 1,500,000 gallon elevated tank owned by the LTRWC.

The Logan Todd Regional system supplies water to the TCWD system in three locations. The southern feed point is located at the base of the LTRWC tank described above, while the others are located at the Allender's Hill tank in northern Todd County and at Trenton for the Hammacksville tank area. Flow through each of these metering points is controlled by the LTRWC SCADA system. The northern pressure zone is controlled by water levels in the Clifty and Coal Bank Road tanks. The southern pressure zone is fed directly from the LTRWC tank, and the Trenton feed is controlled by the water level in the Hammacksville tank.

3.2 *Regulatory Compliance*

According to the Division of Water's remarks within the Clearinghouse Comments, the Todd County 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.

3.3 *Existing Financial Charges and Status*

3.3.1 *Rate Schedules*

All Meter Sizes *(Current Rates effective 3-1-14)*

First	2,000	Gallons @	$ 21.60	Minimum
Next	8,000	Gallons @	$ 11.30	per 1,000 Gallons
Next	10,000	Gallons @	$ 10.09	per 1,000 Gallons
Next	20,000	Gallons @	$ 8.87	per 1,000 Gallons
All Over	40,000	Gallons @	$ 7.39	per 1,000 Gallons

All Meter Sizes *(Previous Rates reflective in the 2013 Financial Statement)*

First	2,000	Gallons @	$ 21.40	Minimum
Next	8,000	Gallons @	$ 11.20	per 1,000 Gallons
Next	10,000	Gallons @	$ 9.99	per 1,000 Gallons
Next	20,000	Gallons @	$ 8.77	per 1,000 Gallons
All Over	40,000	Gallons @	$ 7.29	per 1,000 Gallons

3.3.2 *O&M Costs (FYE 12/31/15)*

Item No.	Expense Item	Amount
1	Payroll Expense	$ 378,114.00
2	Purchased Water	$ 906,357.00
3	Distribution Expense	$ 28,803.00
4	Contract & Professional Services	$ 53,245.00
5	Utilities	$ 41,432.00
6	Administrative Expense	$ 18,000.00
7	Office Expenses	$ 68,940.00
8	Depreciation	$ 505,256.00
9	Insurance	$ 29,872.00
10	Travel	$ 19,506.00
11	Bad Debts	$ 21,321.00
12	Miscellaneous	$ 2,604.00
	Total Utility Expense	**$ 2,073,450.00**

3.3.3 *Long Term Debts (as of 12/31/15)*

Date of Issue	Bond/Note Holder	Principal Balance	Maturity Date	Bond Type	Interest Rate
2005	Rural Dev	$ 990,000	2045	Revenue	4.125%
2008	Rural Dev	$ 1,689,500	2048	Revenue	4.125%
2011	Rural Dev	$ 966,500	2051	Revenue	3.000%
2012	KY Rural Water	$ 1,915,000	2033	Revenue	2.875%
Total		$ 5,561,000			

4.0 NEED FOR PROJECT

4.1 *Health and Safety*

Portions of the Todd County Water District are currently strained due to growth and recent expansion projects to serve unserved areas. For many utilities, this type of strain limits the utility's ability to deliver drinking water to all its customers at proper pressure and quantity as set forth by the Kentucky Division of Water (KDOW). The Ten State Standards require a minimum working pressure of 35 psi. Similarly, the District constantly battles line breaks of older pipelines as well as water loss within the system. Due to the vast area served, the Todd County Water District has methodically broken its system into mini zones to better monitor and locate leaks as they arise. Unfortunately, the attempts to solve the water loss problems also creates pressure problems as more flow is forced into fewer pipelines rather than multiple loops. Thus, the District constantly has to balance its effort to minimize water loss with its requirement to deliver proper pressure and flow.

4.2 *System O&M*

There is one primary reason for the District's proposed work along KY Highway 181, which is to reduce interruptions of service from older line breaks and improve its ability to supply stable pressures above the Ten States Standard threshold. The water system has experienced the majority of its growth in some of

the original constructed areas of the water system. During pipeline breaks on the primary distribution lines, the secondary feeder lines are incapable of providing adequate flows resulting in unacceptable pressures. Also, this problem has shown not only to be a nuisance to the maintenance crews in non-ideal conditions but also very costly to the District's finances due to material needs, overtime pay, and equipment costs.

If funds allow, an additional reason for the District's project is to extend water service along up to 36 roadways in Todd County plus provide some upgrades to existing pump and SCADA equipment. The District has identified nearly 32 miles of extension requested since the last expansion project, and the extensions have the potential of adding 105 new customers. This work would be accomplished via a second contract of work.

4.3 *Growth*

As mentioned earlier, the population of Todd County should grow by nearly 7.5% over the next 25 years based upon reliable census records and expected growth. The proposed project is necessary to provide continued and reliable water service to all its nearly 3,335 customers. The new infrastructure will insure the District's ability to properly serve the existing customer base plus future growth in the area.

5.0 ALTERNATIVES CONSIDERED

A resolution to the problems faced by the Todd County Water District is a relatively simple project with two alternatives.

5.1 *Alternative 1*

The first obvious alternative is to do nothing or a smaller variation of the project. However, the District would continue their current endurance of operation, maintenance and water flow problems. Therefore, the 'do nothing' alternative is not a viable option as it would only prolong the inevitable.

5.2 *Alternative 2*

The second alternative is one that offers several advantages and alleviates the growing pains to its primary transmission line in north Todd. The alternative replaces system-plaguing pipeline sections known for leaks, and the project upgrades this transmission line with larger diameter piping to better deliver sufficient quantity to the northern reaches of the county. The project adheres with the Commonwealth's drive to provide a reliable and potable water source to all families by the year 2020.

5.2.1 *Description*

The initial work of the project will include construction of nearly 11 miles of new waterline upgrade and replacement along KY Highway 181,

between Elkton and the Clifty community. The KY Highway 181 section between Allender's Hill and the Highland Lick Road intersection will consist of 12" piping, and the remaining section to Clifty will consist of 10" piping. Both PVC and ductile iron piping will be considered for the upgrades. These lines are being built to improve the hydraulic performance of the existing distribution system. Some of the lower pressure areas will be improved by the up-sizing and reconnection of branching lines.

The alternative is illustrated in Exhibit 1.

5.2.2 *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 replacement and upgrade is proposed for construction in existing pipeline easements where possible or in county/state right-of-way and new easements, as needed. As mentioned earlier, the project will affect four main 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.

5.2.3 *Construction Problems*

There are no severe construction problems foreseen for the project. The Todd County service area has varying soil conditions ranging from near ideal in some of the southern parts of the county, to sporadic instances of rock outcrops in the north. The entire pipeline route is very accessible, and there is little evidence of a high water table. Mobilization issues should be minimal since the work is contained along the same corridor throughout. However, portions of the waterline will require stream crossings, but none of which should be unmanageable or exceptionally costly.

5.2.4 *Cost Estimates*

The Todd County Water District's Project is estimated to have a total cost of $4,200,000. The project cost consists of construction, non-construction and contingency costs, which are approximately $3,412,800, approximately $540,500 and approximately $246,700 respectively. The project is anticipated to be funded in part by a $1,132,000 grant and $3,068,000 loan, all from Rural Development.

6.0 PROPOSED PROJECT

6.1 *Project Design*

6.1.1 *Water Supply*

The Logan Todd Regional Water Commission's plant will serve the proposed project. Based upon 2016 figures from LTRWC, the water treatment plant is producing just under 4,000,000 gallons per day, which is approximately 40% of the design capacity. Therefore, sufficient capacity exists to serve the Todd County project since no new customers are expected.

6.1.2 *Storage*

The proposed project will not include any additions to or modifications of the District's water storage facilities. Adequate storage volume exists at their Coal Bank and Clifty tank sites, which both presently serve the affected line route area of Contract 1.

6.1.3 *Distribution Layout*

The waterline construction of Contract 1 for the Todd County Water District's system upgrade project will be contained solely to an approximate 57,000 LF section of KY Highway 181 in northern Todd County. The line portion of the project involves upgrading with approximately 26,500 LF of 12" treated water line and 30,500 LF of 10" treated water line. Both PVC and ductile iron piping were considered, but the KY Highway 181 waterline will utilize DIP materials.

The proposed line upgrade is illustrated in Exhibit 1.

6.1.4 *Regulatory Compliance*

The proposed project has been submitted to the Kentucky State Clearinghouse for their comments. The clearinghouse review of the proposal indicated there were no identifiable conflicts with any state or local plan, goal, or objective. Furthermore, no notices have been received and none are expected to suggest that the water system is in or near a noncompliance status.

6.1.5 *Hydraulic Calculations*

For preliminary planning purposes, the computer hydraulic simulator, KYPIPE 2000, has been used to construct a system wide model to determine the hydraulic characteristics of the Todd County Water District system as it currently exists. The model includes all of the existing lines from the water supply connection with Logan Todd, plus the proposed line upgrades and other features of the project. The

modeling indicates that the waterlines may be constructed as proposed. Detailed model results are available upon request.

6.2 *Cost Estimate*

The as-bid itemized cost estimate of the of the Todd County Water District's Highway 181 Line Upgrade Project is shown in Table 3.

Table 3
As-Bid Project Cost Estimate

CONSTRUCTION		
Contract/Roads	**Planning Budget**	**As-Bid Budget***
Contract 1 - KY Highway 181 Waterline Upgrades & Replacements (Horsley)	$ 3,400,000	$ 2,037,804
Contract 2 - Extensions & Upgrades (Future)	$ -	$ 1,375,000
Total Construction Cost	**$ 3,400,000**	**$ 3,412,804**
NON-CONSTRUCTION		
Administrative	$ 20,000	$ 10,000
Land & Right-of-Way	$ -	$ -
Legal	$ 25,000	$ 25,000
Preliminary Engineering and Environmental Services	$ 25,000	$ 40,000
Surveys and Hydraulic Modeling	$ 17,000	$ 29,000
Design Engineering	$ 169,000	$ 190,000
Construction Phase Engineering Services	$ 72,000	$ 81,500
Construction Inspection	$ 132,000	$ 165,000
SUBTOTAL - Non-Construction	$ 460,000	$ 540,500
Contingency	$ 340,000	$ 246,696
TOTAL PROJECT COST	**$ 4,200,000**	**$ 4,200,000**

6.3 *Annual Operating Budget*

The proposed annual operating budget for the Todd County Water District's Highway 181 Line Upgrade Project is shown in Table 4.

Table 4
Proposed Operating Budget

Operating Income	Existing [1]	Extension Only	Future
Water Sales	$1,834,599.00	$0.00 [3]	$2,109,788.85 [9]
Late Charges	$34,734.00	$0.00	$34,734.00
Other Charges	$78,775.00	$0.00	$78,775.00
Total Operating Income	$1,948,108.00	$0.00	$2,223,297.85
Operating and Maintenance Expense			
Purchased Water	$738,591.00	$0.00 [3]	$756,280.00 [5]
Payroll Expense	$334,276.00	$10,030.00 [4]	$344,306.00
Distribution Expense	$53,975.00	$1,620.00 [4]	$55,595.00
Contract Services	$62,099.00	$1,860.00 [4]	$63,959.00
Utilities & Telephone	$39,097.00	$1,170.00 [4]	$40,267.00
Administrative Expense	$24,737.00	$740.00 [4]	$25,477.00
Office Expenses	$37,298.00	$1,120.00 [4]	$38,418.00
Insurance	$43,783.00	$1,310.00 [4]	$45,093.00
Travel	$29,593.00	$890.00 [4]	$30,483.00
Bad Debts	$23,297.00	$700.00 [4]	$23,997.00
Miscellaneous	$7,519.00	$230.00 [4]	$7,749.00
Total Operating Expenses	$1,394,265.00	$19,670.00	$1,431,624.00
Net Operating Income	$553,843.00	($19,670.00)	$791,673.85
Non-Operating Income (Expense)			
Interest Income	$9,604.00	$0.00	$9,604.00
RUS Interest (Bonds pre-2014)	($203,981.00)	$0.00	($197,674.00) [7]
RUS Principal (Bonds pre-2014)	($92,000.00)	$0.00	($154,000.00) [7]
RUS Interest (2015 Issue)	$0.00	($84,370.00) [6]	($84,370.00) [6]
RUS Principal (2015 Issue)	$0.00	($46,780.00) [6]	($46,780.00) [6]
Non-RUS Interest	$0.00	$0.00	$0.00
Non-RUS Principal	$0.00	$0.00	$0.00
Total Non-Operating Income & Debt	($286,377.00)	($131,150.00)	($473,220.00)
Net for Coverage & Depreciation	$267,466.00	($150,820.00)	$318,453.85
10% Debt Service Coverage	($29,598.00)	($13,115.00)	($48,282.00)
Subtotal	$237,868.00	($163,935.00)	$270,171.85
Short Lived Assets [2]	($33,840.00)	$0.00	($48,000.00)
Net for Depreciation	$204,028.00 [8]	($163,935.00)	$222,171.85

Notes:

1. Based on the December 31, 2013 Audit & PSC Report
2. The Short Lived Asset fund currently requires a contribution of $2,820/month. Proposed raise to $4,000/month.
3. Based on 0 new customers.
4. Based on 3% nominal increase due to anticipated annual cost increases.
5. Reflects 2013 total usage (193,423,000 gallons) @ current 2014 rate ($3.91/1,000 gallons)
6. Estimated Project Debt Service: Based on a **$3,068,000 RUS loan** at 2.75% and 38 payments
7. Debt Service per Amortization Schedules. 2015 Figures used for Future.
8. The 2013 Depreciation Expense was **$484,161** per the 2013 Audit
9. Approximate 15.0% rate increase (to the 2013 rates) required to maintain current Net for Depreciation

Based on the projections and assumptions outlined above, the commitment of a $1,132,000 Rural Development Grant and added revenues from the increased water rates is expected to produce an equivalent Net for Depreciation as depicted in the FYE2013 audit. Without securing the referenced Rural Development grant, it is estimated that an additional 3.5% increase to the proposed water rates would be required to offset the increase in debt service and maintain the equivalent Net for Depreciation.

Table 5 illustrates the project's rate schedule as included in the USDA's Letter of Conditions, issued June 11, 2015.

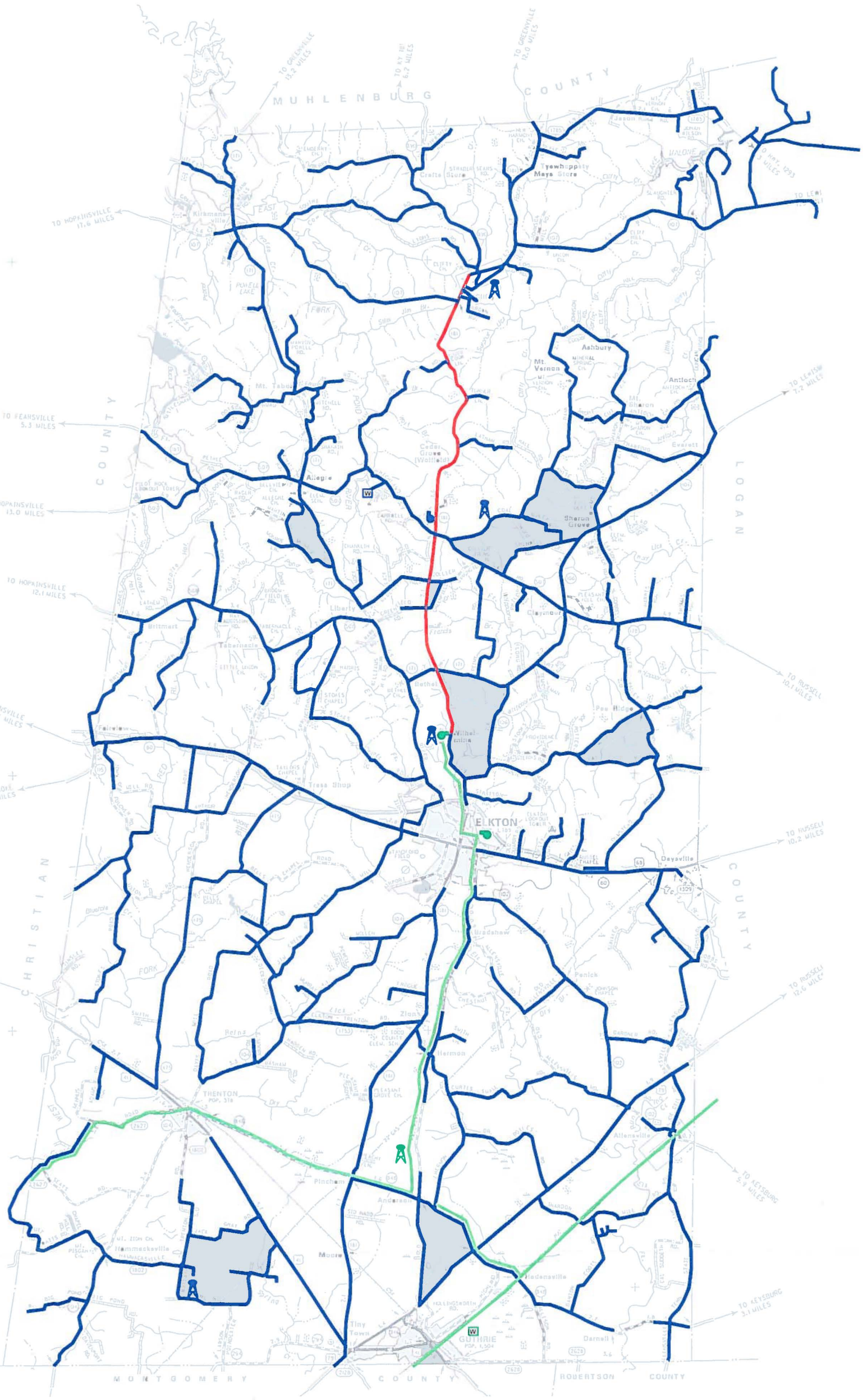
Table 5
Proposed Rate Schedule per USDA Letter of Conditions

First	2,000	Gallons @	$ 24.61	Minimum
Next	8,000	Gallons @	$ 12.88	per 1,000 Gallons
Next	10,000	Gallons @	$ 11.49	per 1,000 Gallons
Next	20,000	Gallons @	$ 10.09	per 1,000 Gallons
All Over	40,000	Gallons @	$ 8.38	per 1,000 Gallons

7.0 RECOMMENDED SOLUTION

In order to address the problems and needs of the water system, the Todd County Water District should do the following:

- Construct nearly 11 miles of upgraded waterline along KY Highway 181 to better serve the north Todd customer base improve the system's hydraulics and water quality.
- Finalize the application process for $1,132,000 in grant and $3,068,000 in loan from Rural Development.
- Initiate discussion among the District's Board of Directors concerning public awareness and implementation of raising water rates to fund the project if grant funds are unavailable.



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W E
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0 1 2 3 4

Scale in Miles

Background Map: KyDOT Todd County General Highway Map—1998

LEGEND

- Existing Water Line—TCWD
- Proposed Water Line Upgrade —TCWD
- Existing Water Line—LTRWC
- Existing Water Storage Tank
- Existing Pump Station

McGHEE ENGINEERING, INC.

Guthrie, Kentucky

Todd County Water District

Highway 181 Line Upgrade Project

OVERALL PROJECT LAYOUT

By:	Scale:	Date:	Page:
Wilcutt	As Noted	May 2017	E-1

Appendix A

Bid Tabulation

Todd County Water District

KY Highway 181 Waterline Upgrade & Replacement Project

TABULATION OF BIDS: Waterline Upgrade & Replacments

Bids Received: May 4, 2017 @ 11:00 a.m.

No.	BASE BID ITEMS - PVC OPTION	QUANTITY		*Bobby Luttrell & Sons Dundee, KY* UNIT $	TOTAL	*Horsley Construction Hudson, KY* UNIT $	TOTAL	*Stotts Construction Columbia, KY* UNIT $	TOTAL	*Cumberland Pipeline Russell Springs, KY* UNIT $	TOTAL	*Twin States Utilities Mount Hermon, KY* UNIT $	TOTAL	*Norris Brothers Crossville, TN* UNIT $	TOTAL
01	12-inch Class 200 PVC water line	26,405	LF	$ 17.65	$ 466,048.25	$ 17.90	$ 472,649.50	$ 21.90	$ 578,269.50	$ 21.00	$ 554,505.00	$ 27.00	$ 712,935.00	$ 31.04	$ 819,611.20
02	12-inch Class 200 PVC Yelomine-CL	120	LF	$ 42.00	$ 5,040.00	$ 40.00	$ 4,800.00	$ 19.20	$ 2,304.00	$ 41.39	$ 4,966.80	$ 115.00	$ 13,800.00	$ 43.65	$ 5,238.00
03	10-inch Class 200 PVC water line	30,485	LF	$ 14.50	$ 442,032.50	$ 14.50	$ 442,032.50	$ 18.50	$ 563,972.50	$ 17.77	$ 541,718.45	$ 23.00	$ 701,155.00	$ 29.10	$ 887,113.50
04	10-inch Class 200 PVC Yelomine-CL	40	LF	$ 39.00	$ 1,560.00	$ 100.00	$ 4,000.00	$ 78.20	$ 3,128.00	$ 38.01	$ 1,520.40	$ 89.00	$ 3,560.00	$ 41.71	$ 1,668.40
05	3-inch Class 200 PVC water line	100	LF	$ 8.00	$ 800.00	$ 10.00	$ 1,000.00	$ 11.20	$ 1,120.00	$ 10.26	$ 1,026.00	$ 16.00	$ 1,600.00	$ 27.16	$ 2,716.00
06	Final Cleanup	56,543	LF	$ 2.00	$ 113,086.00	$ 4.00	$ 226,172.00	$ 2.00	$ 113,086.00	$ 2.00	$ 113,086.00	$ 2.00	$ 113,086.00	$ 2.00	$ 113,086.00
07	Uncased driveway bore	729	LF	$ 75.00	$ 54,675.00	$ 40.00	$ 29,160.00	$ 40.00	$ 29,160.00	$ 100.00	$ 72,900.00	$ 25.00	$ 18,225.00	$ 97.00	$ 70,713.00
08	Steel, cased road bore; 20"cs/12"cr	170	LF	$ 150.00	$ 25,500.00	$ 150.00	$ 25,500.00	$ 170.00	$ 28,900.00	$ 212.97	$ 36,204.90	$ 146.00	$ 24,820.00	$ 388.00	$ 65,960.00
09	Steel, cased road bore; 18"cs/10"cr	160	LF	$ 150.00	$ 24,000.00	$ 150.00	$ 24,000.00	$ 170.00	$ 27,200.00	$ 223.16	$ 35,705.60	$ 146.00	$ 23,360.00	$ 368.60	$ 58,976.00
10	Steel, cased road bore; 8"cs/3"cr	40	LF	$ 80.00	$ 3,200.00	$ 75.00	$ 3,000.00	$ 110.00	$ 4,400.00	$ 135.00	$ 5,400.00	$ 100.00	$ 4,000.00	$ 194.00	$ 7,760.00
11	Cased, Open Cut Road Xing; 18"cs/10"cr	20	LF	$ 100.00	$ 2,000.00	$ 100.00	$ 2,000.00	$ 128.00	$ 2,560.00	$ 116.92	$ 2,338.40	$ 100.00	$ 2,000.00	$ 160.05	$ 3,201.00
12	Wide Stream Crossing: 20" casing	85	LF	$ 200.00	$ 17,000.00	$ 200.00	$ 17,000.00	$ 200.00	$ 17,000.00	$ 190.21	$ 16,167.85	$ 200.00	$ 17,000.00	$ 368.60	$ 31,331.00
13	Wide Stream Crossing: 18" casing	20	LF	$ 220.00	$ 4,400.00	$ 200.00	$ 4,000.00	$ 154.00	$ 3,080.00	$ 262.35	$ 5,247.00	$ 200.00	$ 4,000.00	$ 349.20	$ 6,984.00
14	Shallow Ditch/Creek Crossing; all sizes	115	LF	$ 50.00	$ 5,750.00	$ 21.00	$ 2,415.00	$ 80.00	$ 9,200.00	$ 63.50	$ 7,302.50	$ 90.00	$ 10,350.00	$ 9.70	$ 1,115.50
15	8"x8" tapping sleeve, valve & box	1	EA	$ 2,150.00	$ 2,150.00	$ 2,300.00	$ 2,300.00	$ 3,535.00	$ 3,535.00	$ 2,293.57	$ 2,293.57	$ 4,000.00	$ 4,000.00	$ 3,783.00	$ 3,783.00
16	10"x10" tapping sleeve, valve & box	1	EA	$ 3,300.00	$ 3,300.00	$ 3,300.00	$ 3,300.00	$ 4,630.00	$ 4,630.00	$ 3,390.64	$ 3,390.64	$ 4,600.00	$ 4,600.00	$ 4,365.00	$ 4,365.00
17	6"x6" tapping sleeve, valve & box	1	EA	$ 1,800.00	$ 1,800.00	$ 1,500.00	$ 1,500.00	$ 2,500.00	$ 2,500.00	$ 1,999.62	$ 1,999.62	$ 3,500.00	$ 3,500.00	$ 3,395.00	$ 3,395.00
18	12" Gate Valve & Box	6	EA	$ 2,400.00	$ 14,400.00	$ 2,900.00	$ 17,400.00	$ 3,070.00	$ 18,420.00	$ 2,189.19	$ 13,135.14	$ 2,600.00	$ 15,600.00	$ 2,910.00	$ 17,460.00
19	10" Gate Valve & Box	7	EA	$ 1,850.00	$ 12,950.00	$ 2,000.00	$ 14,000.00	$ 3,000.00	$ 21,000.00	$ 1,812.86	$ 12,690.02	$ 2,200.00	$ 15,400.00	$ 1,212.50	$ 8,487.50
20	6" Gate Valve and box	2	EA	$ 875.00	$ 1,750.00	$ 900.00	$ 1,800.00	$ 1,415.00	$ 2,830.00	$ 836.43	$ 1,672.86	$ 1,200.00	$ 2,400.00	$ 824.50	$ 1,649.00
21	Air Release Valve & Box	7	EA	$ 1,400.00	$ 9,800.00	$ 1,000.00	$ 7,000.00	$ 1,200.00	$ 8,400.00	$ 979.21	$ 6,854.47	$ 1,500.00	$ 10,500.00	$ 1,164.00	$ 8,148.00
22	Large Flush Hydrant + 6" Valve	10	EA	$ 4,000.00	$ 40,000.00	$ 3,900.00	$ 39,000.00	$ 6,000.00	$ 60,000.00	$ 3,992.75	$ 39,927.50	$ 4,500.00	$ 45,000.00	$ 3,104.00	$ 31,040.00
23	Connect to Existing 2" Waterline	2	EA	$ 1,350.00	$ 2,700.00	$ 3,500.00	$ 7,000.00	$ 2,600.00	$ 5,200.00	$ 1,904.00	$ 3,808.00	$ 3,500.00	$ 7,000.00	$ 1,455.00	$ 2,910.00
24	Connect to Existing 3" Waterline	5	EA	$ 2,250.00	$ 11,250.00	$ 3,000.00	$ 15,000.00	$ 2,700.00	$ 13,500.00	$ 3,158.00	$ 15,790.00	$ 3,500.00	$ 17,500.00	$ 1,455.00	$ 7,275.00
25	Connect to Existing 4" Waterline	2	EA	$ 2,300.00	$ 4,600.00	$ 3,000.00	$ 6,000.00	$ 2,700.00	$ 5,400.00	$ 2,886.00	$ 5,772.00	$ 3,500.00	$ 7,000.00	$ 1,455.00	$ 2,910.00
26	Connect to Existing 6" Waterline	4	EA	$ 2,350.00	$ 9,400.00	$ 4,000.00	$ 16,000.00	$ 3,000.00	$ 12,000.00	$ 2,879.00	$ 11,516.00	$ 3,800.00	$ 15,200.00	$ 2,134.00	$ 8,536.00
27	Connect to Existing 10" Waterline	1	EA	$ 2,400.00	$ 2,400.00	$ 3,000.00	$ 3,000.00	$ 5,000.00	$ 5,000.00	$ 2,398.00	$ 2,398.00	$ 4,900.00	$ 4,900.00	$ 2,910.00	$ 2,910.00
28	Plug & Cap Existing Waterlines; All	14	EA	$ 650.00	$ 9,100.00	$ 1,000.00	$ 14,000.00	$ 1,500.00	$ 21,000.00	$ 2,675.00	$ 37,450.00	$ 1,000.00	$ 14,000.00	$ 824.50	$ 11,543.00
29	Reconnect Existing Near Side Meter	76	EA	$ 350.00	$ 26,600.00	$ 375.00	$ 28,500.00	$ 700.00	$ 53,200.00	$ 591.42	$ 44,947.92	$ 585.00	$ 44,460.00	$ 664.45	$ 50,498.20
30	Reconnect Existing Far Side Meter	27	EA	$ 615.00	$ 16,605.00	$ 700.00	$ 18,900.00	$ 1,000.00	$ 27,000.00	$ 1,624.00	$ 43,848.00	$ 1,000.00	$ 27,000.00	$ 955.45	$ 25,797.15
31	Relocate & Reconnect Near Side Meter	94	EA	$ 775.00	$ 72,850.00	$ 1,000.00	$ 94,000.00	$ 800.00	$ 75,200.00	$ 883.80	$ 83,077.20	$ 1,100.00	$ 103,400.00	$ 955.45	$ 89,812.30
	Total Amount of Bid - PVC Option				*$ 1,406,746.75*		*$ 1,546,429.00*		*$ 1,722,195.00*		*$ 1,728,659.84*		*$ 1,991,351.00*		*$ 2,355,992.75*
No.	BASE BID ITEMS - DIP OPTION	QUANTITY		UNIT $	TOTAL	UNIT $	TOTAL	UNIT $	TOTAL	UNIT $	TOTAL	UNIT $	TOTAL	UNIT $	TOTAL
A01	12-inch Class 350 DIP water line	26,525	LF	$ 33.75	$ 895,218.75	$ 27.80	$ 737,395.00	$ 35.70	$ 946,942.50	$ 28.40	$ 753,310.00	$ 41.00	$ 1,087,525.00	$ 43.65	$ 1,157,816.25
A02	12-inch Restraining Gaskets (Class 350)	12	EA	$ 135.00	$ 1,620.00	$ 150.00	$ 1,800.00	$ 800.00	$ 9,600.00	$ 139.72	$ 1,676.64	$ 200.00	$ 2,400.00	$ 43.65	$ 523.80
A03	10-inch Class 350 DIP water line	30,525	LF	$ 28.60	$ 873,015.00	$ 22.27	$ 679,791.75	$ 30.00	$ 915,750.00	$ 26.69	$ 814,712.25	$ 34.00	$ 1,037,850.00	$ 41.71	$ 1,273,197.75
A04	10-inch Restraining Gaskets (Class 350)	18	EA	$ 125.00	$ 2,250.00	$ 120.00	$ 2,160.00	$ 350.00	$ 6,300.00	$ 123.65	$ 2,225.70	$ 185.00	$ 3,330.00	$ 38.80	$ 698.40
A05	3-inch Class 200 PVC water line	100	LF	$ 7.00	$ 700.00	$ 20.00	$ 2,000.00	$ 11.20	$ 1,120.00	$ 12.01	$ 1,201.00	$ 16.00	$ 1,600.00	$ 17.46	$ 1,746.00
A06	Final Cleanup	56,543	LF	$ 2.00	$ 113,086.00	$ 4.00	$ 226,172.00	$ 2.00	$ 113,086.00	$ 2.00	$ 113,086.00	$ 2.00	$ 113,086.00	$ 2.00	$ 113,086.00
A07	Uncased driveway bore	729	LF	$ 85.00	$ 61,965.00	$ 30.00	$ 21,870.00	$ 40.00	$ 29,160.00	$ 100.00	$ 72,900.00	$ 25.00	$ 18,225.00	$ 97.00	$ 70,713.00
A08	Steel, cased road bore; 20"cs/12"cr	170	LF	$ 150.00	$ 25,500.00	$ 150.00	$ 25,500.00	$ 170.00	$ 28,900.00	$ 212.97	$ 36,204.90	$ 146.00	$ 24,820.00	$ 388.00	$ 65,960.00
A09	Steel, cased road bore; 18"cs/10"cr	160	LF	$ 150.00	$ 24,000.00	$ 150.00	$ 24,000.00	$ 170.00	$ 27,200.00	$ 223.16	$ 35,705.60	$ 146.00	$ 23,360.00	$ 368.60	$ 58,976.00
A10	Steel, cased road bore; 8"cs/3"cr	40	LF	$ 80.00	$ 3,200.00	$ 75.00	$ 3,000.00	$ 110.00	$ 4,400.00	$ 135.00	$ 5,400.00	$ 100.00	$ 4,000.00	$ 194.00	$ 7,760.00
A11	Cased, Open Cut Road Xing; 18"cs/10"cr	20	LF	$ 100.00	$ 2,000.00	$ 100.00	$ 2,000.00	$ 128.00	$ 2,560.00	$ 116.92	$ 2,338.40	$ 100.00	$ 2,000.00	$ 160.05	$ 3,201.00
A12	Wide Stream Crossing: 20" casing	85	LF	$ 210.00	$ 17,850.00	$ 200.00	$ 17,000.00	$ 200.00	$ 17,000.00	$ 190.21	$ 16,167.85	$ 200.00	$ 17,000.00	$ 368.60	$ 31,331.00
A13	Wide Stream Crossing: 18" casing	20	LF	$ 230.00	$ 4,600.00	$ 200.00	$ 4,000.00	$ 154.00	$ 3,080.00	$ 262.35	$ 5,247.00	$ 200.00	$ 4,000.00	$ 349.20	$ 6,984.00
A14	Shallow Ditch/Creek Crossing; all sizes	115	LF	$ 65.00	$ 7,475.00	$ 21.00	$ 2,415.00	$ 80.00	$ 9,200.00	$ 63.50	$ 7,302.50	$ 90.00	$ 10,350.00	$ 9.70	$ 1,115.50
A15	8"x8" tapping sleeve, valve & box	1	EA	$ 2,150.00	$ 2,150.00	$ 2,300.00	$ 2,300.00	$ 3,535.00	$ 3,535.00	$ 2,304.03	$ 2,304.03	$ 4,000.00	$ 4,000.00	$ 3,783.00	$ 3,783.00
A16	10"x10" tapping sleeve, valve & box	1	EA	$ 3,300.00	$ 3,300.00	$ 3,300.00	$ 3,300.00	$ 4,630.00	$ 4,630.00	$ 3,354.29	$ 3,354.29	$ 4,600.00	$ 4,600.00	$ 4,365.00	$ 4,365.00
A17	6"x6" tapping sleeve, valve & box	1	EA	$ 1,800.00	$ 1,800.00	$ 1,500.00	$ 1,500.00	$ 2,500.00	$ 2,500.00	$ 1,999.62	$ 1,999.62	$ 3,500.00	$ 3,500.00	$ 3,395.00	$ 3,395.00
A18	12" Gate Valve & Box	6	EA	$ 2,400.00	$ 14,400.00	$ 2,900.00	$ 17,400.00	$ 3,070.00	$ 18,420.00	$ 2,189.19	$ 13,135.14	$ 2,600.00	$ 15,600.00	$ 2,910.00	$ 17,460.00
A19	10" Gate Valve & Box	7	EA	$ 1,850.00	$ 12,950.00	$ 2,000.00	$ 14,000.00	$ 3,000.00	$ 21,000.00	$ 1,812.86	$ 12,690.02	$ 2,200.00	$ 15,400.00	$ 1,212.50	$ 8,487.50
A20	6" Gate Valve and box	2	EA	$ 875.00	$ 1,750.00	$ 900.00	$ 1,800.00	$ 1,415.00	$ 2,830.00	$ 836.43	$ 1,672.86	$ 1,200.00	$ 2,400.00	$ 824.50	$ 1,649.00
A21	Air Release Valve & Box	7	EA	$ 1,400.00	$ 9,800.00	$ 1,000.00	$ 7,000.00	$ 1,200.00	$ 8,400.00	$ 1,016.77	$ 7,117.39	$ 1,500.00	$ 10,500.00	$ 1,164.00	$ 8,148.00
A22	Large Flush Hydrant + 6" Valve	10	EA	$ 4,000.00	$ 40,000.00	$ 3,900.00	$ 39,000.00	$ 6,000.00	$ 60,000.00	$ 3,940.47	$ 39,404.70	$ 4,500.00	$ 45,000.00	$ 3,104.00	$ 31,040.00
A23	Connect to Existing 2" Waterline	2	EA	$ 1,350.00	$ 2,700.00	$ 3,500.00	$ 7,000.00	$ 2,600.00	$ 5,200.00	$ 1,892.00	$ 3,784.00	$ 3,500.00	$ 7,000.00	$ 1,455.00	$ 2,910.00
A24	Connect to Existing 3" Waterline	5	EA	$ 2,250.00	$ 11,250.00	$ 3,000.00	$ 15,000.00	$ 2,700.00	$ 13,500.00	$ 3,098.96	$ 15,494.80	$ 3,500.00	$ 17,500.00	$ 1,455.00	$ 7,275.00
A25	Connect to Existing 4" Waterline	2	EA	$ 2,300.00	$ 4,600.00	$ 3,000.00	$ 6,000.00	$ 2,700.00	$ 5,400.00	$ 2,860.90	$ 5,721.80	$ 3,500.00	$ 7,000.00	$ 1,455.00	$ 2,910.00
A26	Connect to Existing 6" Waterline	4	EA	$ 2,350.00	$ 9,400.00	$ 4,000.00	$ 16,000.00	$ 3,000.00	$ 12,000.00	$ 2,838.95	$ 11,355.80	$ 3,800.00	$ 15,200.00	$ 2,134.00	$ 8,536.00
A27	Connect to Existing 10" Waterline	1	EA	$ 2,400.00	$ 2,400.00	$ 3,000.00	$ 3,000.00	$ 5,000.00	$ 5,000.00	$ 2,215.55	$ 2,215.55	$ 4,900.00	$ 4,900.00	$ 2,910.00	$ 2,910.00
A28	Plug & Cap Existing Waterlines; All	14	EA	$ 650.00	$ 9,100.00	$ 1,000.00	$ 14,000.00	$ 1,500.00	$ 21,000.00	$ 1,375.00	$ 19,250.00	$ 1,000.00	$ 14,000.00	$ 824.50	$ 11,543.00
A29	Reconnect Existing Near Side Meter	76	EA	$ 350.00	$ 26,600.00	$ 375.00	$ 28,500.00	$ 700.00	$ 53,200.00	$ 669.00	$ 50,844.00	$ 585.00	$ 44,460.00	$ 955.45	$ 72,614.20
A30	Reconnect Existing Far Side Meter	27	EA	$ 615.00	$ 16,605.00	$ 700.00	$ 18,900.00	$ 1,000.00	$ 27,000.00	$ 1,626.00	$ 43,902.00	$ 1,000.00	$ 27,000.00	$ 1,309.50	$ 35,356.50
A31	Relocate & Reconnect Near Side Meter	94	EA	$ 775.00	$ 72,850.00	$ 1,000.00	$ 94,000.00	$ 800.00	$ 75,200.00	$ 1,125.28	$ 105,776.32	$ 1,100.00	$ 103,400.00	$ 955.45	$ 89,812.30
	Total Amount of Bid - DIP Option				*$ 2,274,134.75*		*$ 2,037,803.75*		*$ 2,453,113.50*		*$ 2,207,500.16*		*$ 2,691,006.00*		*$ 3,105,303.20*
No.	SUPPLEMENTAL BID ITEM	QUANTITY		UNIT $	TOTAL	UNIT $	TOTAL	UNIT $	TOTAL	UNIT $	TOTAL	UNIT $	TOTAL	UNIT $	TOTAL
S01	Unclassified Undercut	1	CY	$ 10.00	$ 10.00	$ 100.00	$ 100.00	$ 25.00	$ 25.00	$ 100.00	$ 100.00	$ 50.00	$ 50.00	$ 29.10	$ 29.10
S03	Class 'B' Concrete Refill	1	CY	$ 250.00	$ 250.00	$ 150.00	$ 150.00	$ 200.00	$ 200.00	$ 150.00	$ 150.00	$ 250.00	$ 250.00	$ 116.40	$ 116.40
S04	Relocate & Reconnect; near with old parts	1	EA	$ 7,550.00	$ 7,550.00	$ 500.00	$ 500.00	$ 700.00	$ 700.00	$ 704.50	$ 704.50	$ 1,000.00	$ 1,000.00	$ 664.45	$ 664.45
S05	New Meter Service; near side	1	EA	$ 1,100.00	$ 1,100.00	$ 1,000.00	$ 1,000.00	$ 1,300.00	$ 1,300.00	$ 1,500.31	$ 1,500.31	$ 1,100.00	$ 1,100.00	$ 664.45	$ 664.45
S06	New Meter Service; far side	1	EA	$ 1,500.00	$ 1,500.00	$ 1,000.00	$ 1,000.00	$ 1,600.00	$ 1,600.00	$ 2,334.31	$ 2,334.31	$ 1,500.00	$ 1,500.00	$ 1,309.50	$ 1,309.50

Engineer:
McGhee Engineering, Inc.
P. O. Box 267
Guthrie, Kentucky 42234
(270) 483-9985

Owner:
Todd County Water District
PO Box 520
Elkton, Kentucky 42220
(270) 265-2229

Other Bidders	PVC Option	DIP Option
Charles Deweese Const.	$ 2,457,638.96	$ 3,198,451.63
Hubert Excavating	$ 2,550,000.00	$ 3,175,000.00
Cleary Construction	$ 2,578,346.00	$ 3,176,801.00
Dynamic Construction	$ 3,250,535.00	$ 3,905,214.50