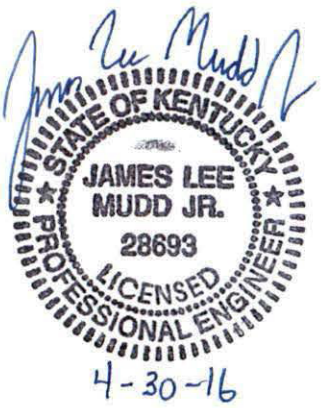
PRELIMINARY ENGINEERING REPORT
FOR THE
CUMBERLAND COUNTY WATER DISTRICT

SULPHUR CREEK ROAD
WATER SYSTEM IMPROVEMENTS

APRIL 2016

Monarch Engineering, Inc.



PRELIMINARY ENGINEERING REPORT
SULPHUR CREEK ROAD WATER SYSTEM IMPROVEMENTS
CUMBERLAND COUNTY WATER DISTRICT
CUMBERLAND COUNTY, KENTUCKY

I. GENERAL

This Preliminary Engineering Report is intended to analyze the proposed water system improvements that are being planned by the Cumberland County Water District. The improvements include the replacement of an aging and undersized water line located in southern Cumberland County, Kentucky

Rural Development "Kentucky Guide 7A" will be submitted at a later date and will serve as the Summary Addendum to this report. The Summary Addendum will further analyze the capability of the District to execute this project through an evaluation of its financial standing and overall system operation.

II. PROJECT PLANNING AREA

GENERAL

The proposed project area consists of a portion of the rural water system located in southern Cumberland County. Specifically, the project route will lie parallel and adjacent to Kentucky Highway 485 (Sulphur Creek Road). The new water main and appurtenances will be installed on state highway rights-of-way or on utility easements granted to the District. The topography of these areas is generally un-level, varying from gently rolling hills to narrow ridges with steep ravines. The land use in this area is mainly agricultural with intermittent areas of residential and recreational development. Both the topography and land use within the project area are typical for this region of Kentucky. Within the proposed project area there is only major commercial user, that being the Sulphur Creek Resort & Marina.

The area has experienced significant growth since the water system was first installed over forty years ago. Due to its close proximity to Dale Hollow Lake, it is anticipated that sustained residential and commercial growth will continue going forward. Implementation of the project will have a direct and substantial impact on those customers currently connected to the line to be replaced. In addition, the increased size of the proposed main will accommodate significant future demand growth.

Attached as a part of this report are location and topographic maps which depict the water main route and proposed connection points to existing system mains. The location of the major appurtenances proposed as part of this project (master meter vault and pressure reducing stations) is also shown.

POPULATION

According to data from the 2010 U.S. Census, Cumberland County, Kentucky had a total population of 6,856 distributed into 2,883 households. The Cumberland County Water District provides potable water service to 2,496 residential customers, of which all are located in Cumberland County. Accordingly, it is estimate that the District serves nearly 86.5% of the population in Cumberland County. This translates into a population of 5,935 Cumberland County residents being served by the District.

According to U.S. Census Bureau estimates the population of Cumberland County is decreasing by 0.25 % annually. This compares to an annualized decrease of nearly 0.4% between the 2000 and 2010 U.S. Census. However, the majority of this population decrease is attributed to losses within the City of Burkesville, which is the only area of the county which is not served by the District. Considering the above data, it is estimated that the overall population growth with the system is nearly flat.

It should be noted however, that the population trends within Cumberland County are difficult to quantify using U.S. Census data along. This is due to the large number of part-time residents which live in the area sporadically throughout the year. This phenomena is tied largely to the portions of the county near Dale Hollow Lake, but is also a factor in all portions of the system to some degree. The scenic beauty of the area, along with low land prices, contribute to area being selected as a second home for citizens from other areas. Although they are not permanent residents, the demand of these customers must be met when they are living in the area.

DEMAND

Considering the 2015 calendar year, the average daily demand for the Cumberland County Water District distribution system was 330,000 gallons. Over the same period, the maximum daily demand was 705,000 gallons, which occurred on 4/25/2015.

Considering the overall demand growth of the system, the previous 20 year period was examined, extending from the 1995 to 2015. The annual system demand for 1995 was 91,367,000 gallons. This increased to 120,453,000 in 2015. This represents an annualized demand growth of a nearly 1.6% over that period. Noting that the population gains in the area we're slightly negative or flat over this period, it is important to note that there is not a positive correlation between population and demand for the District's system.

As described above, this is due in large part to the high number of part-time residents in the area. These households are likely not included as part of the population statistics, but do however contribute the demand growth of the system. In addition, the area has become home to a large number of poultry producers over the last decade. These facilities are large water consumers and therefore share in the increased system demands.

The estimated useful life of the proposed water line is 60 years. Considering a demand growth of a 1.5% annually over that period, yields a projected annual system demand of 228,860,700. This corresponds to an average daily demand of nearly 627,000 gallons.

III. EXISTING FACILITIES

The Cumberland County Water District owns and operates a water distribution system which serves the rural population of Cumberland County, Kentucky. The District was formed as a result of a 1996 merger between the Marrowbone Water District and the South Cumberland Water District, both of which served the rural areas of Cumberland County. Both Water Districts were initially formed in the 1960's; with many of the systems initial components being constructed during that decade. The merger coincided with the completion of a major project that included an expansion of Marrowbone's existing water treatment plant and construction of the Jackson Hollow transmission main which linked the two Districts.

The recent completion of a new water treatment plant by the City of Burkesville along with construction of the District's Jackson Hollow Pump Station has allowed the District to shut down its aging and undersized water treatment plant. The District now purchases all water for resale from the City of Burkesville and the City of Albany. Currently, portions of the system north of the Cumberland River are supplied solely by the City of Burkesville via the Jackson Hollow Pump Station. The portions of the system south of Cumberland River are supplied through multiple connections with the City of Burkesville and the City of Albany. Water Purchase contracts with each supplier have recently been updated and at present, the District does not exceed the contracted amounts.

The water distribution system consists of a network of water supply and distribution mains along with a series of water tanks and pump stations. This includes various sized water lines ranging from 2-inch to 8-inch, six pumps stations, and five water storage tanks with a rated capacity of 650,000 gallons. The majority of the system has been in place for less than 50 years. Pipe material within the system consists of cast iron and asbestos cement for the older lines and plastic for the newer ones. Water loss within the system has remained excessively high for several decades. The rough terrain and generally sparse population distribution combine to create a situation where water loss is difficult to control.

The Company operates the water system through a Board of Commissioners, a General Manager, as well as office and field personnel. The Board of Commissioners consists of a chairperson and four commissioners, all of which are appointed by the Cumberland County Fiscal Court.

Additional information regarding the current rate structure, annual operating and maintenance data, a tabulation of monthly users and revenue, and a list of the outstanding bonds can be found in the summary addendum which will be submitted at a later date.

IV. NEED FOR THE PROJECT

The existing 4" water line serving Sulphur Creek Road was installed in the early 1970's and is of poor overall construction, lacking suitable bedding and cover. This issue is further compounded due to extremely rocky subsoil conditions. Accordingly, the line is subject to frequent breaks, leaks and other emergency repair situations. These repairs are generally cumbersome and costly due to the area's rough terrain. Additionally, the

existing line is undersized and struggles to meet system demands during periods of peak demand. The proposed project will improve service to approximately 100 existing customers including one large commercial user (Sulphur Creek Resort).

V. ALTERNATIVES CONSIDERED

Based on the need for potable water due to the continued demand for service and also the growth within the project area, the Cumberland County Water District must take the necessary steps to continue to provide service as required by the Kentucky Division of Water and the Kentucky Public Service Commission. The final project scope determination was centered on meeting existing and future customer demands without significantly burdening the District's ability to meet its current and future financial obligations.

Considering the unsuitable condition of the existing line scheduled to be replaced through this project, there are no other technically feasible alternatives to correct the situation. This district could take no action, this would however result in costly regular repairs and an unsuitable conditions for the existing residents being served by the line.

The primary alternative explored was the replacement of an additional section of problematic water line along Kentucky Highway 704 in northern Cumberland County. The inclusion of this additional line replacement would have incorporated the construction of an additional 12,000 L.F. of 6" water line and appurtenances into the project. Similar to the existing main on Sulphur Creek Road, the condition of the existing line on KY 704 is poor, primarily due to substandard construction practices during its original installation. Accordingly, the line is subject to frequent breaks, leaks and other emergency repair situations. It was determined that this additional work should be delayed so to decrease the debt service impact of project. However, all or a portion may be completed if the as-bid construction cost of the project are less than anticipated herein.

VI. PROPOSED PROJECT

In order to correct the above-described deficiencies, the project proposes the replacement of 15,500 LF of undersized 4" water line and appurtenances adjacent to Kentucky Highway 485 (Sulphur Creek Road) with new 6" PVC. In addition, two (2) existing pressure reducing stations will be replaced and a new master meter vault will be installed. As previously mentioned, the proposed project will improve service to approximately 100 existing customers including one large commercial user (Sulphur Creek Resort).
An itemized cost estimate is included in this report and outlines all of the individual construction items along with their associated estimated unit costs. A summary cost estimate recaps all of the project costs and outlines the funding scheme for the project, is also included in this report. The total cost of the expansion and improvements is estimated to be $1,000,000 with full funding being provided by USDA Rural Development loan and grant funds.

VII. OPERATION & MAINTENANCE COST COMPARISON

When considering the Operation and Maintenance (O&M) cost associated with the existing system and the proposed project, the analysis is being done based solely on the components being impacted by this project.

EXISTING SYSTEM

The existing 4" water line serving Sulphur Creek Road was installed in the early 1970's and is of poor overall construction. Accordingly, should the line continue to remain in service, frequent repairs will continue to be required on a regular basis. Based on data supplied by the District, the major repairs (i.e. significant leak) are required once per month on average. In addition, minor repairs (i.e. minor leak) are required about twice per month. The average cost for each repair category was determined considering the following costs: for man-hours, overtime, fuel, equipment, materials, water lost, water used for flushing and lab testing costs. It was determined that the cost are $3,500 and $500 respectively. Additional maintenance costs for the line are minimal, and are estimated to be approximately $1,000 per year. Accordingly, the total annual maintenance cost is approximately $54,000.

Like all water mains, the operational cost of the existing line is minimal. The operation of the line, aside from customer meter related tasks, includes primarily flushing and performing line locates. Flushing of the line is performed monthly, requiring roughly 540,000 gallons annually. This corresponds to a purchased water cost of $1,150. The existing line doesn't have tracer wire, so line locates are time and labor intensive. It is estimated that six line locates are required annually. When factoring in the labor and equipment cost, the approximate cost of each locate is nearly $350. The corresponding annual cost of all locates is therefore nearly $2,100. Accordingly, the annual average operational cost is approximately $3,250.

Considering the above data, it is estimated that the annual O&M cost of the existing 4" water line are approximately $57,250 per year.

PROPOSED PROJECT

The proposed project will replace the existing 4" line with an upgraded 6" main. The new line will be installed using superior and appropriate materials and construction standards. Accordingly, the line is expected to perform virtually leak free for the duration of its 60 year plus life cycle. Therefore, the anticipated annual number of repairs will be greatly reduced as compared to the existing line. It is estimated that this will be on the order of one major and two minor repairs annually. Using the same estimate cost per repair noted above, the total annual repair cost for the new line will be $4,500. Similar to the existing line, additional maintenance costs for the line will minimal, and are estimated to be roughly $1,000 per year. Accordingly, the total annual maintenance cost is approximately $5,500.

Similar to the existing line, the operational cost for the new line will include primarily flushing and performing line locates. Flushing of the new line will also be performed monthly. However, due to the increased line size flushing measures will require and

increased amount of water, being roughly 540,000 gallons annually. This corresponds to a purchased water cost of $2,250. The proposed line will be installed with a tracer wire, allowing line located to be performed by one man in just a few minutes. When factoring in the small labor cost, the approximate cost of each locate is will be on the order of $100. Considering six line locates per year, the corresponding annual cost of all locates will be about $600. Accordingly, the annual average operational cost will be approximately $2,850.

Considering the above data, it is estimated that the annual O&M cost of the proposed project are approximately $8,350 per year. This represents an annual cost savings of roughly $50,000 as compared to the existing line.

VIII. LIFE CYCLE COST ANALYSIS (LCCA)

CAPITAL COST

The total estimated construction cost for the proposed project $750,000 with a corresponding total project cost of **$1,000,000**.

DISCOUNT RATE

Per the current version of Appendix C of OMB Circular A-94, the real discount rates are as follows:

3-Year	5-Year	7-Year	10-Year	20-Year	30-Year
0.3	0.6	0.8	1.0	1.2	1.5

PLANNING PERIOD

As recommend by USDA Rural Development, this LCCA utilizes a **20 year** planning period to compare the alternatives.

USEFUL LIFE

The useful life of the components included in the project is estimated to be 60 years.

SPPW & USPW FACTORS

i	N	SPPW (P/F)	USPW (P/A)
0.012	20	0.78775	17.68729
0.015	30	0.63976	24.01583
0.015	40	0.55126	29.91584
0.015	50	0.47500	34.99968
0.015	60	0.40929	39.38026

UNIFORM SERIES PRESENT WORTH (USPW) O&M COSTS

Proposed Project:

Annual O&M Costs = $8,350/year (See above O&M cost calculation)

USPW Factor = 17.68729

17.68729 x $8,350 = **$147,689**

SINGLE PAYMENT PRESENT WORTH (SPPW) SALVAGE VALUE

Proposed Project:

Capital Costs = $1,000,000

Useful Life = 60 Years

Annual Depreciation = $1,000,000 / 60 years = $16,667

Salvage Value @ 20 years = $1,000,000 – (20 x $16,667) = $666,667

SPPW Factor = 0.40929

$666,667 x 0.40929 = **$272,860**

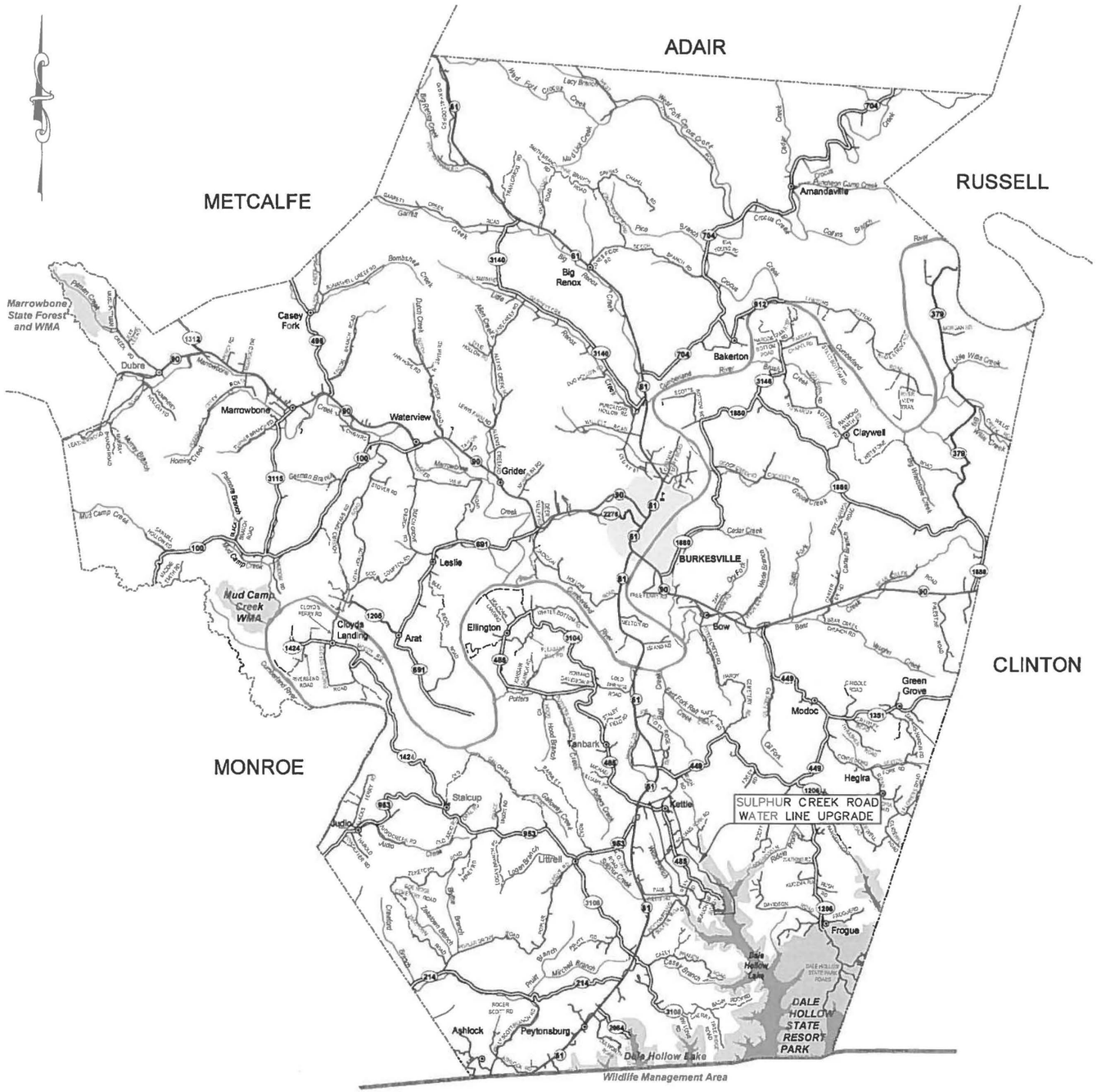
NET PRESENT WORTH CALCULATION

NPW = C + USPW(O&M) – SPPW(SV)

Option	Capital Cost	USPW (O&M)	SPPW (SV)	NPW
Proposed Project	$1,000,000	$147,689	$272,860	**$874,829**

IX. CONCLUSIONS AND RECOMMENDATIONS

Based on the need for the Cumberland County Water District to continue to supply their existing customers on Sulphur Creek Road with a sufficient and dependable potable water supply, it is recommended that the Cumberland County Water District pursue the financial assistance as outlined herein so that the proposed project can be implemented as soon as possible.



Monarch Engineering, Inc.
556 CARLTON DRIVE
LAWRENCEBURG, KY 40342

DESCRIPTION: LOCATION MAP
SULPHUR CREEK ROAD
WATER SYSTEM IMPROVEMENTS

CUSTOMER: CUMBERLAND COUNTY WATER DISTRICT
CUMBERLAND COUNTY, KENTUCKY

PROJECT NO.	1500
DATE:	APRIL 2016
DRAWN BY:	JLM
CHECKED BY:	DSB
CHECKED BY:	DMB
SCALE:	N.T.S.

SHEET: LM–1

STATE OF KENTUCKY
JAMES LEE MUDD JR.
28693
LICENSED PROFESSIONAL ENGINEER

FROGUE QUADRANGLE

EXISTING 6-INCH WATER LINE

BEGIN CONSTRUCTION CONNECT NEW 6-INCH W.L. TO EXISTING 6-INCH W.L.

PROPOSED MASTER METER VAULT

RECONNECT EXISTING 3-INCH WATER LINE (CHRISTIAN CHAPEL RD)

RECONNECT EXISTING 3-INCH WATER LINE (WILLIAMS CREEK RD)

PROPOSED 15,500 L.F. OF 6-INCH PVC SDR-17 WATER LINE

EXISTING 4-INCH WATER LINE (TO BE ABANDONED)

RECONNECT EXISTING 3-INCH WATER LINE (RYAN ROAD)

PROPOSED PRV VAULT

RECONNECT EXISTING 4-INCH WATER LINE (BEAUCHAMP ROAD)

SULPHUR CREEK RESORT CONNECTION POINT NO. 1

SULPHUR CREEK RESORT CONNECTION POINT NO. 2

SCALE: 1"=1000'

STATE OF KENTUCKY
JAMES LEE MUDD JR.
28693
LICENSED PROFESSIONAL ENGINEER

CUMBERLAND COUNTY WATER DISTRICT
CUMBERLAND COUNTY, KENTUCKY
SULPHUR CREEK ROAD UPGRADE

NOVEMBER 2015

Monarch Engineering, Inc.

PRELIMINARY COST ESTIMATE
SULPHUR CREEK ROAD UPGRADE
WATER SYSTEM IMPROVEMENTS
CUMBERLAND COUNTY WATER DISTRICT
NOVEMBER 2015

PROJECT COSTS	
DEVELOPMENT	$750,000
CONTINGENCY	75,000
ENGINEERING DESIGN	70,000
CONSTRUCTION INSPECTION	47,000
LEGAL & ADMINISTRATIVE	15,000.00
ENVIRONMENTAL ASSESSMENT	8,000.00
PRELIMINARY ENGINEERING REPORT	10,000.00
CONSTRUCTION INTEREST	25,000
TOTAL PROJECT COSTS	$1,000,000
PROJECT FINANCING	
USDA RURAL DEVELOPMENT LOAN	700,000
USDA RURAL DEVELOPMENT GRANT	300,000
TOTAL PROJECT FINANCING	$1,000,000

PRELIMINARY COST ESTIMATE
SULPHUR CREEK ROAD UPGRADE
WATER SYSTEM IMPROVEMENTS
CUMBERLAND COUNTY WATER DISTRICT
NOVEMBER 2015

ITEM NO.	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
1	6-Inch PVC SDR-17 Water Line	15,500 LF	$30.00	$465,000.00
2	4-Inch PVC SDR-17 Water Line	50 LF	20.00	1,000.00
3	3-Inch PVC SDR-17 Water Line	100 LF	20.00	2,000.00
4	Bore & Case for 6-Inch Water Line	80 LF	225.00	18,000.00
5	Bore & Case for 4-Inch Water Line	30 LF	200.00	6,000.00
6	Bore & Case for 3-Inch Water Line	50 LF	180.00	9,000.00
7	Free Bore & Case for 6-Inch Water Line	600 LF	120.00	72,000.00
8	Open Cut & Case for 6-Inch Water Line	100 LF	100.00	10,000.00
9	6-Inch Gate Valve	8 EA	1,200.00	9,600.00
10	4-Inch Gate Valve	1 EA	1,000.00	1,000.00
11	3-Inch Gate Valve	3 EA	800.00	2,400.00
12	Type II Connection	1 EA	3,000.00	3,000.00
13	Direct Connection	5 EA	2,000.00	10,000.00
14	3-Way Flush Hydrant	4 EA	3,500.00	14,000.00
15	Meter Reconnection	70 EA	700.00	49,000.00
16	3/4-Inch P.E. Service Tubing	1,800 LF	10.00	18,000.00
17	Master Meter Vault Assembly	1 EA	20,000.00	20,000.00
18	Pressure Reducing Station	2 EA	15,000.00	30,000.00
19	Exploration	50 HR	200.00	10,000.00
		Subtotal		$750,000.00
		Contingencies		75,000.00
		Total Construction		$825,000.00

CUMBERLAND COUNTY WATER DISTRICT
SULPHUR CREEK ROAD UPGRADE
WATER SYSTEM IMPROVMENTS

PROJECTED FINANCIAL IMPACT

NOVEMBER 2015

I. DEBT SERVICE EXPENSE

Loan Amount: $700,000

Interest Rate: 2.50%

Term: 40 Years

Annual Debt Service: $28,750

Annual Reserve Account Allowance: ($28,750 × 0.10) = $2,875

Total Annual Debt Payment: ($28,750+ $2,875) = $31,625

II. ASSOCIATED RATE INCREASE

Monthly Payment ($31,625/ 12) = $2,635.42

Number of Customers: 2,462

Average Increase per Customer: $2,635.42/ 2,462) = $1.07 per Customer per Month