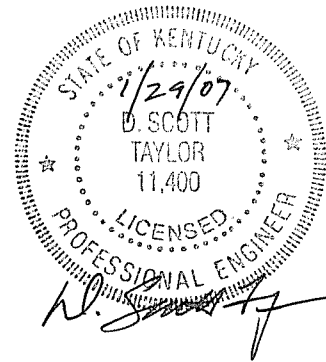


2007-48

**Knott County Water and Sewer District  
Preliminary Engineering Report  
For the  
Carr Creek Lake Water Treatment Plant Project**

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Knott County Water and Sewer District  
Preliminary Engineering Report  
for the  
Carr Creek Lake Water Treatment Plant Project  
Summary Addendum Narrative

**I. GENERAL**

The Knott County Fiscal Court commissioned a Regional Water Supply Study for Knott County that included portions of surrounding Floyd, Perry and Letcher Counties as well. The study reviewed previous studies including the Upper Kentucky River Basin Water Resources Reconnaissance Survey by the Corps of Engineers, Kentucky River ADD Water Plan and considered the alternatives for water supply and sources in the area, projected water demands for the planning area and proposed a new water treatment plant adjacent to the existing Carr Creek Lake in southern Knott County. The Carr Creek Water Commission was created to organize the parties to commit to service, plan their water needs and to help negotiate water purchase contracts. The Commission could only wholesale water to existing distributors and not serve any individual customers. The Commission turned the project over to the Knott County Water District to acquire funding, own and operate the facilities.

This Summary / Addendum Narrative updates the existing planning document to include any changes in the scope of work, phases of the development and summarizes the financial information for the operation of the proposed facilities by the existing Knott County Water and Sewer District in a format consistent with Rural Development guidelines.

**II. PROJECT PLANNING AREA**

The planning area included all of Knott County and portions of surrounding Floyd, Perry and Letcher Counties as well. It included an inventory of the facilities of Blacoy Municipal Water, Caney Creek Water District, City of Jenkins, Fleming Neon Water & Sewer, Hazard Water system, Hindman, Vicco and Whitesburg Municipal Water.

**A. Location:**

See detailed planning maps in Appendix D showing the extents of the planning area.

**B. Environmental Resources Present:**

See the detailed maps submitted for State Clearinghouse review showing the areas being served initially and in the future. The maps include flood plain maps and show the various planned sites for the complete development.

**C. Growth Areas and Populations:**

Population and water demand projections are contained in the main body of the report and include pages 4 through 11, tables 1 through 6 and figure 1. Table 6 shows the demands for all of the considered purchasers and individual Knott County residents planned for service. The project will initially serve a portion of Knott County identified by the Office of Surface Mines for Abandoned Mine Lands for water supply replacement. The AML project identifies 720 potential customers in the western half of the county and has allocated \$5 million for transmission and distribution

mains, pumps and tanks for the service. No commitments from wholesale suppliers have been made to date and the project is designed to initially serve the Knott County Water and Sewer service area only and expand to pick up the satellite suppliers as the demands grow and as purchase points and facility details can be planned, funded and implemented.

### **III. EXISTING FACILITIES**

The existing Knott County Water and Sewer District facilities include water treatment and distribution facilities and sewer treatment and collection mains primarily for the service of the Alice Lloyd College in Pippa Passes.

#### **A. Location Map**

The existing service area is identified in Figure 6 of the Regional Water Study as Pippa Passes. The facility characteristics for both the Water and Sewer facilities are itemized in the enclosed Summary / Addendum - Kentucky Guide 7 on pages 2, 3 and 4.

#### **B. Condition of Facilities:**

The facilities are in acceptable condition for continued use. The existing water treatment plant and source are not adequate for expansion into the county as a regional supply. These facilities will eventually be replaced by the proposed new water treatment plant on Carr Creek Lake. The proposed project does not initially tie into the existing Knott County Water and Sewer District facilities.

#### **C. Financial Status of Operating Central Facilities:**

The existing water and sewer operations are financially troubled and the District has a pending rate increase before the Public Service Commission at the time of this writing. It is anticipated that the increase will be granted as proposed. The operating expenses and revenues are shown for the existing operations of the sewer and water systems in the Summary / Addendum - Kentucky Guide 7 on pages 28 and 31 respectively. The affect of the anticipated rate increases can best be seen in the sewer operation since no new users are proposed herein to generate additional revenues. The existing operation shows a loss of \$1,151 before coverage and depreciation whereas the proposed operation after the rate increase show a balance of \$26,099 available for coverage and depreciation.

### **IV. NEED FOR THE PROJECT**

The inventory of existing water suppliers and the area's projected demands show the need for additional water sources in the area of the Kentucky River ADD. The service routes surveyed for the AML study and other areas as shown on Summary/Addendum Map 1 contain users as dense as 30 customers per mile with no service. Knott County has one of the small percentages of populations currently served with public supplied potable water in the state.

#### **A. Health and Safety:**

The proposed customers of the area to be served currently derive their drinking water from wells, cisterns, and surface streams and tributaries. The State has discontinued their monitoring program on domestic supplies, but provided data on prior testing in the region.

As stated in the Standard Handbook for Civil Engineers on the subject of wells and the proximity of septic tanks, "lots with less than 10 feet of soil above a rock foundation are not suitable for construction of both sewage systems and well-water supplies, because of contamination hazards." The geology and terrain of the service area are such that this condition occurs throughout the area. The handbook continues that "the fields should be more than 100 feet away from any source of water supply" which cannot be accomplished in many instances due to the limitation of lot sizes and suitable housing sites. The standard above is found repeated in many County Health regulations and US Public Health Service publication Manual of Septic Tank Practice, Publication No. 526. This standard cannot be followed by many of the proposed customers utilizing their wells as their primary water source.

For proper development of a groundwater source, disinfection is used before and after installation of the pumping facilities. "The Ten State Standards" outline the requirements for the micro biological quality in Section 3.2.2 and describe the location of wells under 3.2.3. These standards and those for general well construction (3.2.5) are violated by the majority of well users in the service area. Other construction requirements are addressed by the American Water Works Association Standards.

Contamination of groundwater and/or surface waters from nearby sewage sources is detected by the presence of coliform bacteria. The Public and Semi-Public Water Supply Regulations (401 KAR 6-015) set limitations to and sampling methods for the coliform analyses. USPHS (US Public Health /service) standard states that no water supply shall contain more than 1 coliform per 100 ml of water. The Handbook of Water Resources and Pollution Control states that the "detection of these organisms is significant from the public health standpoint in regard to the presence of waterborne pathogenic organisms which are also inhabitants of the intestinal tract." It further lists them as the bacterium causing typhoid fever, dysentery, and infectious hepatitis. It is estimated that the majority of private sources in this region exhibit coliform contamination. The project will allow the residents to eliminate their domestic sources by providing a potable water supply source and treatment feeding a distribution system free of cross-connections and contaminations. The proposed facilities are designed to meet water quality standards and maintain the operation pressures in areas above the state requirements (807 KAR 5:00 6E Section 6) in the water quality problem areas. The entire project is needed to alleviate the health and sanitary hazards in the project area.

#### **B. System O&M:**

The existing system operation and maintenance is considered adequate for the existing operation. Water loss is currently maintained at 9% which is considered good by the industry standard of 15% allowable. The new treatment plant and AML project water mains will add a substantial operational expense requiring additional operation and maintenance employees and management/administrative staffing and duties.

#### **C. Growth:**

The proposed new water treatment plant and distribution mains will be designed to meet the needs of the proposed projected new users and allow for additional individual service growth and the addition of wholesale purchasers and described population and demand projection section.

The tremendous lengths of high density rural service routes will provide for years of expansion opportunities to allow for strengthening the revenues base and support financing for future extensions.

## **V. ALTERNATIVES CONSIDERED**

The Regional Water Study considered alternatives proposed in the existing regional studies prepared by the Corps of Engineers and various planning documents prepared by the Kentucky River Area Development District. The area is in critical need for development of a reliable adequate high quality water source as concluded by each study. The existing Knott County water supply facilities are the City of Hindman wells and the Knott County Water and Sewer District system in Pippa Passes. Since completion of a recent CDBG water project in Hindman, the operation of the wells has improved to the point that they have enough water for their supply and can reduce their purchases from neighboring Southern Water. Southern Water's recent expansion included 18 miles of 12" water mains into Knott County and it only has capacity of 70,000 gallons per day for service. The Knott County Water and Sewer District will own and operate the main in four years according to interlocal agreement.

## **VI. PROPOSED PROJECT**

The proposed project will build a new water treatment plant, raw water main and intake facilities at the Carr Creek Lake. They are more fully described in the following:

### **A. Project design:**

1. **Water Supply.** The new source being developed is Carr Creek Lake, a Corps of Engineers facility located in southern Knott County. The Corps of Engineers prepared an analysis of withdrawals and their related storage allowing withdrawals up to 6.5 MGD. A summary of the various withdrawal capacities, their lake storage and allocation of cost for the storage is found in Table 15 on page 42. The design capacity of 2 MGD was selected for this project and the costs associated with the withdrawals are included in the project cost estimate.
2. **Treatment.** Based on the treated water quality criteria required by Federal and State regulatory agencies, conventional water treatment, consisting of coagulation, flocculation, sedimentation and filtration, is recommended for the new Water Treatment Plant. Proposed coagulation and flocculation will condition the particulate matter suspended in raw water by particle destabilization and the formation of floc. The floc will be subsequently removed in the sedimentation and filtration processes. Sedimentation will decrease the overall solids loading on the filters, thereby improving treatment efficiency and increasing filter run times. The sedimentation process also will reduce the load on the filters resulting from nuisance organisms such as algae and from iron and manganese components. The proposed facilities will be designed to treat water by conventional treatment with chemical coagulation, flocculation, sedimentation and filtration to reduce turbidity to less than 0.5 NTU's. The plant will utilize caustic soda, alum and polymers for pH adjustment and coagulation. Potassium permanganate and activated carbon will be used to control algae, taste and odors and to remove undesirable organics. Disinfection will be accomplished by chlorination. Fluoride will be added in accordance with State law. Caustic soda will be used for final pH adjustment and corrosion control..

New processes for improved coagulation (eg. polymers), accelerated sedimentation (eg. Actiflo) and filtration will be considered during the final design taking into account lab results from source water analysis to optimize the treatment process. New promising techniques will be analyzed. A schematic diagram of the basic treatment processes is shown in Figure 2. An approximate site layout is depicted in Figure 3. Typical site photos are shown in Figures 4 and 5.

3. **Storage.** The new plant will feed into a new distribution system being constructed from AML funds as described earlier. The distribution system is being designed to meet the storage requirements of the state regulations. The tanks will be located at local high points selected to coordinate with the pumping to isolate the system into pressure zones for steadier service, reliability and to allow for multiple lifts to traverse the large elevation differences found in this region.
4. **Pumping Stations.** The only pumping station per se in this proposed project are the Water Treatment Plant high service pumps designed at 1400 gpm to produce a maximum through rate of 2 MGD. Additional booster pumps will be included in the distribution projects associated with the development of the county wide service system.
5. **Distribution Layout.** The distribution system being built by other projects is shown in Summary Addendum Map 1. The various routes which will be constructed over time using AML, CDBG and local funds total 168 miles and would make water available to 3352 customers. That averages 20 customers per mile and many stretches run 25 to 30 customers per mile. CDBG requires at least 4 per mile, award grants to many that run 7 and 8 per mile and would rank 25 to 30 per mile at the top of the priority for that area. Also, with densities in that range, the customer base will support a sizeable loan on its own. The map for locations of pumps, tanks and for line locations and sizes proposed for the future distribution system.
6. **Hydraulic Calculations.** The hydraulic parameters and calculations are contained in Appendix B for selected routes of the AML and CDBG distribution project for review. This project proposed no new water mains. The appendix contains hydraulic profiles showing the pressures created by the required pumps, tanks and control valves.

**B. Cost Estimate.** The project costs are developed beginning on page 29 and concluded on page 50. Tables 7 through 21 develop the costs for the water treatment plant, the raw water main, lake intake structure and distribution mains. The project costs include construction, engineering, land and rights, legal, contingencies and an initial operation and maintenance fund to start the plant prior to being revenue producing. The plant costs are shown for various phases of development and expansion. The selected treatment plant project cost is shown in Table 21 and is fully developed in the Summary / Addendum - Kentucky Guide 7 page 35. The project cost is \$6,869,000 and the requested funding includes RD in the amount of \$2,500,000.

**C. Annual Operating Budget.** The annual operating and maintenance cost are developed under the cost estimate section of the report and summarized in Table 18 for the plant operation. The total operational costs are calculated and shown in the Summary / Addendum - Kentucky Guide 7 page 31, 32 and 33 showing the changes in operation anticipated from today's operation of the Knott County Water and Sewer District small system to the post Carr Creek plant construction operations.

1. **Income.** The projected income for the project is based upon the existing users analysis less 10% for a conservative approach. The existing income is based upon 143 users averaging 6,679 gallons per month per customer and producing \$52,026 annual revenues using the existing District water rates. The PSC Annual Report shows \$52,644 revenues. The proposed revenues are based upon 588 users averaging 5,955 gallons per month per customer generating \$268,715 annual revenues. As mentioned earlier, the District is waiting on approval of proposed rates before the PSC. The proposed rates are the rates used in generating the project revenues herein. See Summary / Addendum - Kentucky Guide 7 page 7 for the existing rates, page 14 for the proposed rates. The billings analysis used to produce the revenues for the existing and proposed operations are shown on pages 22 and 25 respectively.
2. **Operation and Maintenance Costs.** The operation and maintenance costs are shown in Summary / Addendum - Kentucky Guide 7 pages 31, 32 and 33 for the existing and proposed operations. The new plant operation costs were estimated based upon operations of similar facilities as reported in annual reports submitted to the PSC. Several operations were normalized to 1 MGD operation and compared. A weighted average for the operational expenses was used. The expenses include Wages, Directors Wages, Employee Benefits, Purchased Water, Power, Chemicals, Materials & Supplies, Engineering Services, Accounting Services, Legal, Other Contract Services, Rent, Equipment, Transportation, Vehicle Insurance, General Liability, Workers Compensation, Other Insurance, Advertising, Rate Case Expenses, Bad Debt and other miscellaneous expenses.
3. **Capitol Improvements.** The Knott County Water and Sewer District will treat all of the water needed for its operations and no purchase contracts are anticipated.
4. **Debt Repayment.** The project financing is fully described and itemized in the Summary / Addendum - Kentucky Guide 7 page 35. The debt payment schedules are included and coverage of 10% was used in the projections of expenses and revenues. The rates without RD grant were computed and result in a bill for 4000 gallons that would cost \$41.62 per month which is clearly out of range for the income levels of the proposed customers in the region. The requested RD grant will allow for reduction in the rates to \$26.50 for 4000 gallons per month.
5. **Reserve.** The financial analysis allows for a 10% coverage over the debt service which will provide for the State statute requirements.

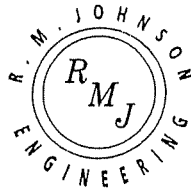
## **VII. CONCLUSIONS AND RECOMMENDATIONS**

The region is in need of development of an additional water supply source. The large Corps of Engineers reservoir, Carr Creek Lake, is located in the south central portion of Knott County and available for use by public entities. A new water treatment plant is needed to serve a proposed AML distribution project and a Southern Water project extended into Knott County. The Knott County Water and Sewer District can be expanded to own and operate the new facilities and provide for potable water through the planning region. It is recommended that the District pursue all avenues of public facility financing to secure sufficient funds to complete the anticipated works. The project will need the support and coordination of RD, EDA, CDBG, DOW, PSC and the KIA and DLG.



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P.O. Box 444  
Hindman, Kentucky 41822

March 03, 2003

Mr. Kenneth Slone  
State Director  
USDA Rural Development  
771 Corporate Drive, Suite 200  
Lexington, Kentucky 40503-5477

RE: Knott County Water and Sewer District  
Carr Creek Lake Water Treatment Plant  
MSE Project No. 8259-11

The Knott County Water and Sewer District is seeking funding for the above referenced project. We understand that in order to be eligible for 5% loan money and since the family income levels are below the required level, the Department for Natural Resources and Environmental Protection must confirm that the proposed facilities will eliminate a health or sanitary area.

The proposed customers of the area to be served currently derive their drinking water from wells, cisterns, and surface streams and tributaries. The State has discontinued their monitoring program on domestic supplies, but provided data on prior testing in the region.

As stated in the Standard Handbook for Civil Engineers on the subject of wells and the proximity of septic tanks, "lots with less than 10 feet of soil above a rock foundation are not suitable for construction of both sewage systems and well-water supplies, because of contamination hazards." The geology and terrain of the service area are such that this condition occurs throughout the area. The handbook continues that "the fields should be more than 100 feet away from any source of water supply" which cannot be accomplished in many instances due to the limitation of lot sizes and suitable housing sites. The standard above is found repeated in many County Health regulations and US Public Health Service publication Manual of Septic Tank Practice, Publication No. 526. This standard cannot be followed by many of the proposed customers utilizing their wells as their primary water source.

For proper development of a groundwater source, disinfection is used before and after installation of the pumping facilities. "The Ten State Standards" outline the requirements for the micro biological quality in Section 3.2.2 and describe the location of wells under 3.2.3. These

Tom Fern  
Page 2

standards and those for general well construction (3.2.5) are violated by the majority of well users in the service area. Other construction requirements are addressed by the American Water Works Association Standards.

Contamination of groundwater and/or surface waters from nearby sewage sources is detected by the presence of coliform bacteria. The Public and Semi-Public Water Supply Regulations (401 KAR 6-015) set limitations to and sampling methods for the coliform analyses. USPHS (US Public Health /service) standard states that no water supply shall contain more than 1 coliform per 100 ml of water. The Handbook of Water Resources and Pollution Control states that the "detection of these organisms is significant from the public health standpoint in regard to the presence of waterborne pathogenic organisms which are also inhabitants of the intestinal tract." It further lists them as the bacterium causing typhoid fever, dysentary, and infectious hepatitis. It is estimated that the majority of private sources in this region exhibit coliform contamination.

The project will allow the residents to eliminate their domestic sources by providing a potable water supply source and treatment feeding a distribution system free of cross-connections and contaminations. The proposed facilities are designed to meet water quality standards and maintain the operation pressures in areas above the state requirements (807 KAR 5:00 6E Section 6) in the water quality problem areas. The entire project is needed to alleviate the health and sanitary hazards in the project area.

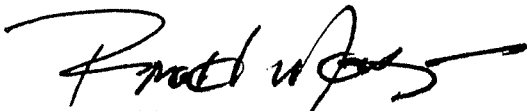
If you have any questions regarding this request or any facet of the project, please contact us.

Sincerely,

Mayes, Sudderth & Etheredge, Inc.

D. Scott Taylor, P.E.  
Project Engineer

R.M. Johnson Engineering, Inc.



Ronald M. Johnson, P.E.  
Principal Engineer

SUMMARY ADDENDUM  
TO  
PRELIMINARY ENGINEERING REPORT

DATED February 25, 2003

FOR

Knott County Water & Sewer District – Carr Creek Lake Water Plant  
(Name of Project)

APPLICANT CONTACT PERSON Ron Johnson

APPLICANT PHONE NUMBER 1-606-785-5926

APPLICANT TAX IDENTIFICATION NUMBER (TIN) 61-0719881

***ITEMS IN BOLD ITALIC PRINT ARE APPLICABLE TO SEWER SYSTEMS.***

In order to avoid unnecessary delays in application processing, the applicant and its consulting engineer should prepare a summary of the preliminary report in accordance with this Guide.

Please complete the applicable sections of the Summary Addendum. ***Please note, if water and sewer revenue will both be taken as security for the loan, all user information and characteristics of both utility systems will be needed even though the project will benefit only one utility.***

Feasibility reviews and grant determinations may be processed more accurately and more rapidly if the Summary/Addendum is submitted simultaneously with the preliminary engineering report, or as soon thereafter as possible.

I. GENERAL

- A. Proposed Project: Provide a brief description of the proposed project. In addition to this summary, the applicant/engineer should submit a project map of the service area.

This project will construct a new water treatment plant, raw water main and intake facilities at Carr Creek Lake for supply to existing and future Knott County Water & Sewer District customers and become a regional source for portions of Knott, Letcher, Perry and Pike Counties.

II. FACILITY CHARACTERISTICS OF EXISTING SEWER SYSTEM

A. *Sewage Treatment:*

1. Type Extended Aeration

2. Method of Sludge Disposal Drying Beds/Waste to Landfill

3. Cost per 1,000 gallons if sewage treatment is contracted:

\$ \_\_\_\_\_

4. Date Constructed \_\_\_\_\_

B. Treatment Capacity of Sewage Treatment Plant 100,000 gpd

C. Type of Sewage Collector System (Describe) Gravity

D. Number and Capacity of Sewage Lift Stations N/A

Only Lift Station is at the WWTP

E. Sewage Collection System:

Lineal Feet of Collector Lines, by size 6" \_\_\_\_\_ 8" ± 5 miles

10" \_\_\_\_\_ 12" \_\_\_\_\_, Larger \_\_\_\_\_

Date(s) Constructed Early 1970's

F. Conditions of Existing System: Briefly describe the conditions and suitability for continued use of facility now owned by the applicant. Include any major renovation that will be needed within five to ten years.

The system experiences major problems due to inflow and infiltration. Major

renovation will need to include I & I Elimination Project.

III. FACILITY CHARACTERISTICS OF EXISTING WATER SYSTEM

A. Water Source: Describe adequacy of source (quality and quantity). Include an explanation of raw water source, raw water intake structure, treatment plant capacity, and current level of production (WTP). Also describe the adequacy of Water Purchase Contract if applicable.

The sources of raw water are five (5) groundwater wells, ranging from 15 gpm to 80 gpm; the plant capacity is 144,000 gpd with current capacity @ 106,000 gpd.

If the applicant purchases water:

Seller(s):

1. N/A
2. \_\_\_\_\_
3. \_\_\_\_\_

Price/1,000 gallons:

1. N/A
2. \_\_\_\_\_
3. \_\_\_\_\_

Present Estimated Market Value of Existing System: \$ \_\_\_\_\_

B. Water Storage:

Type: Ground Storage Tank 2 Elevated Tank \_\_\_\_\_  
Standpipe \_\_\_\_\_ Other \_\_\_\_\_  
Number of Storage Structures 2  
Total Storage Volume Capacity ± 200K  
Date Storage Tank(s) Constructed Early 1970's and mid 1980's

C. Water Distribution System:

Pipe Material PVC

Miles of Pipe:	3" Diameter	4"	5500
	<u>± 5 miles</u>	8"	8000
	10"	12"	

Date(s) Water Lines Constructed Early 1970's  
Number and Capacity of Pump Station(s) 5 groundwater wells,  
pumps range from 15 gpm to 80 gpm.

D. Condition of Existing Water System:

Briefly describe the condition and suitability for continued use of facility now owned by the applicant. Include any major renovation that will be needed within five to ten years.

The plant will eventually be taken off line due to raw water quantity and quality problems.

E. Percentage of Water Loss Existing System ± 30%

IV. EXISTING LONG-TERM INDEBTEDNESS

A. List of Bonds and Notes:

<u>Date of Issue</u>	<u>Bond/Note Holder</u>	<u>Principal Balance</u>	<u>Payment Date</u>	<u>Bond Type</u> <u>Water-Sewer*</u>	<u>Amount on Deposit in Reserve Account</u>
20 Issue	RD	\$ 34,625	7/03	100 %	%
20 Issue		\$		%	%
20 Issue		\$		%	%
20 Issue		\$		%	%
20 Issue		\$		%	%

\* If a combined issue, show attributable portion to each system.

B. Principal and Interest Payments: (Begin with Next Fiscal Year Payment)

<u>Date of Issue</u>	<u>Bond/Note Holder</u>	<u>Payment Year</u>		<u>Payment Year</u>		<u>Payment Year</u>	
		<u>2003</u>	<u>2004</u>	<u>2004</u>	<u>2005</u>	<u>2005</u>	<u>2006</u>
		<u>Principal Payment</u>	<u>Interest Payment</u>	<u>Principal Payment</u>	<u>Interest Payment</u>	<u>Principal Payment</u>	<u>Interest Payment</u>
20 Issue	RD	\$ 4,367	\$ 1,428	\$ 4,283	\$ 1,513	\$ 4,497	\$ 1,299
20 Issue							
20 Issue							
20 Issue							
20 Issue							
20 Issue							

V. EXISTING SHORT-TERM INDEBTEDNESS

A. List of All Sort Term Debts: (Do Not Show Any Debt Listed in Paragraph IV Above)

<u>Lender or Lessor</u>	<u>Date of Issue (Month &amp; Year)</u>	<u>Principal Balance</u>	<u>Purpose (Water and/ or Sewer)</u>	<u>Payment Date</u>	<u>Principal &amp; Interest Payment (P&amp;I)</u>	<u>Date to Be Paid In Full</u>

VI. LAND AND RIGHTS - EXISTING SYSTEM(S)

Number of Treatment Plant Sites:	Water	<u>1</u>	Sewer	<u>1</u>
Number of Storage Tank Sites	Water	<u> </u>	Sewer	<u> </u>
Number of Pump Stations:	Water	<u> </u>	Sewer	<u> </u>
Total Acreage:	Water	<u>Acres</u>	Sewer	<u>Acres</u>
Purchase Price:	Water	<u> </u>	Sewer	<u> </u>

VII. NUMBER OF EXISTING USERS

	<u>Water</u>	<u>Sewer</u>
Residential (In Town)*	<u>143</u>	<u>122</u>
Residential (Out of Town)*	<u> </u>	<u> </u>
Non-Residential (In Town)	<u>1</u>	<u>1</u>
Non-Residential (Out of Town)	<u> </u>	<u> </u>
Total	<u> </u>	<u> </u>
Number to Total Potential Users Living in the Service Area	<u>150</u>	<u>122</u>

Note: Residential Users: Classify by type of user regardless of quantity of water used. This classification should include those meters serving individual rural residence.



VII. CURRENT WATER AND SEWER CONNECTION FEES FOR EACH SIZE WATER METER CONNECTION

<u>Meter Size</u>	<u>Water Connection Fee</u>	<u>Sewer Connection Fee</u>
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____

IX. SEWER RATES - EXISTING SYSTEM

Percentage of Water Bill N/A %      Minimum Charge \$ \_\_\_\_\_

Other: (If Charge Not Based on Water Bill) \_\_\_\_\_

*See sewer rates below with water*

Date This Rate Went Into Effect \_\_\_\_\_

X. WATER RATES - EXISTING SYSTEM

Existing Rate Schedule:

				Water	Sewer	
First	<u>2,000</u>	Gallons	@	\$ <u>12.65</u>	<u>6.65</u>	Minimum
Next	<u>8,000</u>	Gallons	@	\$ <u>3.90</u>	<u>2.10</u>	per 1,000 Gallons.
Next	_____	Gallons	@	\$ _____	_____	per 1,000 Gallons.
Next	_____	Gallons	@	\$ _____	_____	per 1,000 Gallons.
Next	_____	Gallons	@	\$ _____	_____	per 1,000 Gallons.
Next	_____	Gallons	@	\$ _____	_____	per 1,000 Gallons.
All Over	<u>10,000</u>	Gallons	@	\$ <u>3.15</u>	<u>1.65</u>	per 1,000 Gallons.

Date This Rate Went Into Effect \_\_\_\_\_

If More Than One Rate Schedule, Please Include All Schedules.

Knott County Water & Sewer District  
Existing Sewer Rates  
Billing Analysis

Monthly Water Usage	Average	No. of Bills	Usage	Average Rate	Income
0 - 2,000	1,000	206	206,000	56.65	\$1,369.90
2,000 - 3,000	2,500	175	437,500	7.70	1,347.50
3,000 - 4,000	3,500	192	672,000	9.80	1,881.60
4,000 - 5,000	4,500	179	805,500	11.90	2,130.10
5,000 - 6,000	5,500	168	924,000	14.00	2,352.00
6,000 - 7,000	6,500	117	760,500	16.10	1,883.70
7,000 - 8,000	7,500	83	622,500	18.20	1,510.60
8,000 - 9,000	8,500	75	637,500	20.30	1,522.50
9,000 - 10,000	9,500	63	598,500	22.40	1,411.20
10,000 - 11,000	10,500	45	472,500	24.28	1,092.38
11,000 - 12,000	11,500	26	299,000	25.93	674.05
12,000 - 13,000	12,500	18	225,000	27.58	496.35
13,000 - 14,000	13,500	12	171,500	29.23	379.93
14,000 - 15,000	14,500	11	159,500	30.88	339.63
15,000 - 16,000	15,500	9	139,500	32.53	292.73
16,000 - 17,000	16,500	7	115,500	34.18	239.23
17,000 - 18,000	17,500	6	105,000	35.83	214.95
18,000 - 19,000	18,500	6	111,000	37.48	224.85
19,000 - 20,000	19,500	5	97,500	39.13	195.63
20,000 - 25,000	22,500	5	112,500	44.08	220.38
25,000 - 30,000	27,500	5	137,500	52.33	261.63
30,000 - 35,000	32,500	5	162,500	60.58	302.88
35,000 - 40,000	37,500	4	150,000	68.83	275.30
40,000 - 45,000	42,500	4	170,000	77.08	308.30
45,000 - 50,000	47,500	4	190,000	85.33	341.30
50,000 - 60,000	55,000	3	165,000	97.70	293.10
60,000 - 70,000	65,000	3	195,000	114.20	342.60
70,000 - 80,000	75,000	1	75,000	130.70	130.70
80,000 - 90,000	85,000	1	85,000	147.20	147.20
90,000 - 100,000	95,000	1	95,000	163.70	163.70
<b>Sub-total</b>	<b>120</b>	<b>1,440</b>	<b>9,101,500</b>		<b>\$22,345.88</b>
					<b>\$22,514.00</b>
	<b>Avg Usage/Customer</b>		<b>6,320</b>		
	<b>Avg Revenue/Customer</b>				<b>\$15.52</b>
	<b>Number of Customers</b>		<b>120</b>		
<b>LARGE USERS</b>					
Comm/Ind	70,000	12	840,000	122.45	1,469.40
<b>Sub-total</b>	<b>2</b>	<b>24</b>	<b>2,040,000</b>		<b>\$3,532.80</b>
	<b>Avg Usage/Customer</b>		<b>85,000</b>		
	<b>Avg Revenue/Customer</b>				<b>\$147.20</b>

XIX. ANALYSIS OF ACTUAL WATER USAGE - EXISTING SYSTEM - 12 MONTH PERIOD SEE ATTACHED

For Period _____		to _____						
All Meter				<u>Non-Residential</u>				
<u>Sizes</u>	<u>Monthly Water Usage</u>			<u>Average</u>	<u>Residential</u>			
					No. of	Usage	No. of	Usage
					Users	(1000)	Users	(1000)
	0 -	2,000	Gallons	1,000	_____	_____	_____	_____
	2,000 -	3,000	Gallons	2,500	_____	_____	_____	_____
	3,000 -	4,000	Gallons	3,500	_____	_____	_____	_____
	4,000 -	5,000	Gallons	4,500	_____	_____	_____	_____
	5,000 -	6,000	Gallons	5,500	_____	_____	_____	_____
	6,000 -	7,000	Gallons	6,500	_____	_____	_____	_____
	7,000 -	8,000	Gallons	7,500	_____	_____	_____	_____
	8,000 -	9,000	Gallons	8,500	_____	_____	_____	_____
	9,000 -	10,000	Gallons	9,500	_____	_____	_____	_____
	10,000 -	11,000	Gallons	10,500	_____	_____	_____	_____
	11,000 -	12,000	Gallons	11,500	_____	_____	_____	_____
	12,000 -	13,000	Gallons	12,500	_____	_____	_____	_____
	13,000 -	14,000	Gallons	13,500	_____	_____	_____	_____
	14,000 -	15,000	Gallons	14,500	_____	_____	_____	_____
	15,000 -	16,000	Gallons	15,500	_____	_____	_____	_____
	16,000 -	17,000	Gallons	16,500	_____	_____	_____	_____
	17,000 -	18,000	Gallons	17,500	_____	_____	_____	_____
	19,000 -	20,000	Gallons	19,500	_____	_____	_____	_____
	_____ -	_____	Gallons	_____	_____	_____	_____	_____
	_____ -	_____	Gallons	_____	_____	_____	_____	_____
	_____ -	_____	Gallons	_____	_____	_____	_____	_____
				<b>Total</b>	( )	( )	( )	( )
				<b>Average Usage</b>		( )		( )
Total Water Purchased and/or Produced					_____	_____	_____	_____
Total Water Sold					_____	_____	_____	_____

Knott County Water & Sewer District  
Existing Water Rates  
Billing Analysis

Monthly Water Usage	Average	No. of Bills	Usage	Average Rate	Income
0 - 2,000	1,000	217	217,000	512.65	\$2,745.05
2,000 - 3,000	2,500	204	510,000	14.60	2,978.40
3,000 - 4,000	3,500	224	784,000	18.50	4,144.00
4,000 - 5,000	4,500	209	940,500	22.40	4,681.60
5,000 - 6,000	5,500	196	1,078,000	26.30	5,154.80
6,000 - 7,000	6,500	136	884,000	30.20	4,107.20
7,000 - 8,000	7,500	97	727,500	34.10	3,307.70
8,000 - 9,000	8,500	88	748,000	38.00	3,344.00
9,000 - 10,000	9,500	73	693,500	41.90	3,058.70
10,000 - 11,000	10,500	63	661,500	45.43	2,861.78
11,000 - 12,000	11,500	31	356,500	48.58	1,505.83
12,000 - 13,000	12,500	21	262,500	51.73	1,086.23
13,000 - 14,000	13,500	16	216,000	54.88	878.00
14,000 - 15,000	14,500	11	159,500	58.03	638.28
15,000 - 16,000	15,500	14	217,000	61.18	856.45
16,000 - 17,000	16,500	13	214,500	64.33	836.23
17,000 - 18,000	17,500	12	210,000	67.48	809.70
18,000 - 19,000	18,500	11	203,500	70.63	776.88
19,000 - 20,000	19,500	11	214,500	73.78	811.53
20,000 - 25,000	22,500	11	247,500	83.23	915.48
25,000 - 30,000	27,500	11	302,500	98.98	1,088.73
30,000 - 35,000	32,500	10	325,000	114.73	1,147.25
35,000 - 40,000	37,500	9	337,500	130.48	1,174.28
40,000 - 45,000	42,500	7	297,500	146.23	1,023.58
45,000 - 50,000	47,500	3	142,500	161.98	485.93
50,000 - 60,000	55,000	2	110,000	185.60	371.20
60,000 - 70,000	65,000	1	65,000	217.10	217.10
70,000 - 80,000	75,000	1	75,000	248.60	248.60
80,000 - 90,000	85,000	1	85,000	280.10	280.10
90,000 - 100,000	95,000	1	95,000	311.60	311.60
Sub-total		<u>1,704</u>	<u>11,380,500</u>		<u>\$51,846.15</u>
Avg Usage/Customer			6,679		
Avg Revenue/Customer					\$30.43
Number of Customers			142		
LARGE USERS					
Comm Ind	2,600	<u>12</u>	<u>31,200</u>	\$14.99	<u>\$179.88</u>
Sub-total	1	12	31,200		\$179.88
Avg Usage/Customer			2,600		
Avg Revenue/Customer					\$14.99
TOTAL FOR ALL USERS		143	1,716	11,411,700	\$52,026.03

**XIII. FACILITY CHARACTERISTICS OF PROPOSED SEWER SYSTEM**  
**NO SEWER CHANGES PROPOSED**

**A. Sewage Treatment:**

1. Type \_\_\_\_\_

2. Method of Sludge Disposal \_\_\_\_\_  
\_\_\_\_\_

3. Cost per 1,000 gallons if sewage treatment is contracted:

\$ \_\_\_\_\_

**B. Treatment Capacity of Sewage Treatment Plant** \_\_\_\_\_

**C. Type of Sewage Collector System (Describe)** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**D. Number and Capacity of Sewage Lift Stations** \_\_\_\_\_  
\_\_\_\_\_

**E. Sewage Collection System:**

Lineal Feet of Collector Lines, by size 6" \_\_\_\_\_ 8" \_\_\_\_\_

10" \_\_\_\_\_ 12" \_\_\_\_\_, Larger \_\_\_\_\_

**XIV. LAND AND RIGHTS - PROPOSED SEWER SYSTEM**

**Number of Treatment Plant Sites** \_\_\_\_\_

**Number of Pump Sites** \_\_\_\_\_

**Number of Other Sites** \_\_\_\_\_

**Total Acreage** \_\_\_\_\_ **Acres**

**Purchase Price** \$ \_\_\_\_\_

**XV. FACILITY CHARACTERISTICS OF PROPOSED WATER SYSTEM**

A. Water Source: Describe adequacy of source (quality and quantity). Include an explanation of raw water source, raw water intake structure, treatment plant capacity, and current level of production (WTP). Also describe the adequacy of Water Purchase Contract if applicable.

The new raw water source is Carr Creek Lake permitted for 2 MGD. Project  
proposes a new 2 MGD plant.

B. Water Storage: N/A

Type: Ground Storage Tank 0 Elevated Tank 0  
Standpipe \_\_\_\_\_ Other \_\_\_\_\_

Number of Storage Structures \_\_\_\_\_

Total Storage Volume Capacity \_\_\_\_\_

C. Water Distribution System: N/A

Pipe Material \_\_\_\_\_

Miles of Pipe: 3" Diameter \_\_\_\_\_ 4" \_\_\_\_\_  
6" \_\_\_\_\_ 8" \_\_\_\_\_  
10" \_\_\_\_\_ 12" \_\_\_\_\_

Number and Capacity of Pump Station(s) \_\_\_\_\_

**XVI. LAND AND RIGHTS - PROPOSED WATER SYSTEM**

Number of Treatment Plant Sites	<u>1</u>
Number of Pump Sites	<u>1</u>
Number of Other Sites	<u>1</u>
Total Acreage	<u>5</u> Acres
Purchase Price	<u>\$100,000</u>

**XVII. NUMBER OF NEW SEWER USERS N/A**

<i>Residential (In Town)*</i>	0
<i>Residential (Out of Town)*</i>	0
<i>Non-Residential (In Town)</i>	0
<i>Non-Residential (Out of Town)</i>	0
<i>Total</i>	0
<i>Number to Total Potential Users in the Service Area</i>	

**\*Note:** *Residential Users: Classify by type of user regardless of quantity of water used. This classification should include those meters serving individual rural residences.*

**XVIII. PROPOSED SEWER CONNECTION FEES FOR EACH SIZE WATER METER CONNECTION**

<u>Meter Size</u>	<u>Connection Fee</u>
<u>5/8" x 3/4"</u>	\$ _____
<u>1 Inch</u>	\$ _____
<u>1½ Inch</u>	\$ _____
<u>2 Inch</u>	\$ _____
<u>3 Inch</u>	\$ _____
<u>4 Inch</u>	\$ _____
<u>5 Inch</u>	\$ _____
<u>6 Inch</u>	\$ _____

XIX. NUMBER OF NEW WATER USERS

Residential (In Town)*	_____
Residential (Out of Town)*	444
Non-Residential (In Town)	_____
Non-Residential (Out of Town)	_____
Total	444
Number to Total Potential Users in the Service Area	720

\*Note: Residential Users: Classify by type of user regardless of quantity of water used. This classification should include those meters serving individual rural residences.

XX. PROPOSED WATER CONNECTION FEES FOR EACH SIZE WATER METER CONNECTION

<u>Meter Size</u>	<u>Connection Fee</u>
<u>5/8" x 3/4"</u>	\$ _____
<u>1 Inch</u>	\$ _____
<u>1½ Inch</u>	\$ _____
<u>2 Inch</u>	\$ _____
<u>3 Inch</u>	\$ _____
<u>4 Inch</u>	\$ _____
<u>5 Inch</u>	\$ _____
<u>6 Inch</u>	\$ _____





# NOTICE

## TO: ALL CUSTOMERS OF KNOTT COUNTY WATER & SEWER DISTRICT

Knott County Water & Sewer District proposes to make the following revisions to its schedule of charges. The proposed effective date for the change is September 1, 2002.

CURRENT RATES		PROPOSED RATES		% Increase
<u>WATER (3/4" meter)</u>		<u>WATER (5/8" &amp; 1" Meters)</u>		
Min Bill (2,000 gallons)	\$12.65	Min Bill (2,000 gallons)	\$15.50	22.5%
Next 8,000 gallons	\$3.90	Over 2,000 gallons	\$5.50	41.0%
Over 10,000 gallons	\$3.15			
Flat Rate	\$12.80			
<u>WATER (2" meter)</u>		<u>WATER (2" &amp; Larger)</u>		
Min Bill (15,000 gallons)	\$59.60	Min Bill (15,000 gal)	\$75.00	25.8%
Over 15,000 gallons	\$3.15	Over 15,000 gallons	\$5.00	58.7%
<u>WATER (3" meter)</u>				
Min Bill (30,000 gallons)	\$106.85			
Over 30,000 gallons	\$3.15			
<u>SEWER (3/4" meter)</u>		<u>SEWER (5/8" &amp; 1" meters)</u>		
Min Bill (2000 gallons)	\$6.65	Min Bill (2,000 gallons)	\$12.50	88.0%
Next 8000 gallons	\$2.10	Over 2,000 gallons	\$4.00	90.5%
Over 10,000 gallons	\$1.65			
Flat Rate	\$12.80			
<u>SEWER (2" meter)</u>		<u>SEWER (2" &amp; Larger)</u>		
Min Bill (15,000 gallons)	\$31.70	Min Bill (15,000 gal)	\$58.00	83.0%
Over 15,000 gallons	\$1.65	Over 15,000 gallons	\$4.00	142.4%
<u>SEWER (3" meter)</u>				
Min Bill (30,000 gallons)	\$56.45			
Over 30,000 gallons	\$1.65			
<u>SEWER ONLY CUST</u>	\$12.65	<u>SEWER ONLY CUST</u>	\$20.00	58.1%

The charges/rates contained in this notice are the charges/rates proposed by the Knott County Water & Sewer District. However, the Public Service Commission may order charges/rates to be charged that differ from these proposed charges/rates. Such action may result in charges/rates for consumers other than the charges/rates in this notice.

Any corporation, association, body politic, or person may, by motion within thirty (30) days after publication of this fee change, request leave to intervene; and the motion shall be submitted to the Public Service Commission, Post Office Box 615, Frankfort, KY 40602, and shall set forth the grounds for the request, including the status and interest of the party.

Intervenors may obtain copies of the application and related filings by contacting the water and sewer district at (806) 785-5584 or (806) 377-9296.

The Knott County Water & Sewer District has available for inspection at its office the proposed changes to its Rules & Regulations. The office is located at 90 May Street, PO Box 884, Hindman, KY 41822. A copy of the proposed changes may also be obtained at the office of US Filter located at 245 KY Route 680, McDowell, KY 41647.

This notice is provided pursuant to 807 KAR 5:011-Tariffs.

XXII. WATER RATES - PROPOSED

A. Proposed Rate Schedule without RUS Grant:

First	<u>2,000</u>	Gallons	@	\$ <u>24.34</u>	Minimum.
Next	<u>          </u>	Gallons	@	\$ <u>          </u>	per 1,000 Gallons.
Next	<u>          </u>	Gallons	@	\$ <u>          </u>	per 1,000 Gallons.
Next	<u>          </u>	Gallons	@	\$ <u>          </u>	per 1,000 Gallons.
Next	<u>          </u>	Gallons	@	\$ <u>          </u>	per 1,000 Gallons.
Next	<u>          </u>	Gallons	@	\$ <u>          </u>	per 1,000 Gallons.
All Over	<u>2,000</u>	Gallons	@	\$ <u>8.64</u>	per 1,000 Gallons.

The above proposed rate, without RUS grant, must be completed for each grant. If the applicant/engineer desires, there is no objection to recommending a proposed rate with an estimated RUS grant in the Table below. However, the preparer should remember that the Table (A) above must be completed prior to Table (B).

B. Recommended Rate Schedule with RUS Grant:

First	<u>2,000</u>	Gallons	@	\$ <u>15.50</u>	Minimum.
Next	<u>          </u>	Gallons	@	\$ <u>          </u>	per 1,000 Gallons.
Next	<u>          </u>	Gallons	@	\$ <u>          </u>	per 1,000 Gallons.
Next	<u>          </u>	Gallons	@	\$ <u>          </u>	per 1,000 Gallons.
Next	<u>          </u>	Gallons	@	\$ <u>          </u>	per 1,000 Gallons.
Next	<u>          </u>	Gallons	@	\$ <u>          </u>	per 1,000 Gallons.
All Over	<u>2,000</u>	Gallons	@	\$ <u>5.50</u>	per 1,000 Gallons.

If more than one rate, use additional sheets.

*See Attached Schedule.*

# NOTICE

**TO: ALL CUSTOMERS OF KNOTT COUNTY WATER & SEWER DISTRICT**

Knott County Water & Sewer District proposes to make the following revisions to its schedule of charges. The proposed effective date for the change is September 1, 2002.

CURRENT RATES		PROPOSED RATES		%
				Increase
<u>WATER (3/4" meter)</u>		<u>WATER (5/8" &amp; 1" Meters)</u>		
Min Bill (2,000 gallons)	\$12.65	Min Bill (2,000 gallons)	\$15.50	22.5%
Next 8,000 gallons	\$3.90	Over 2,000 gallons	\$5.50	41.0%
Over 10,000 gallons	\$3.15			
Flat Rate	\$12.80			
<u>WATER (2" meter)</u>		<u>WATER (2" &amp; Larger)</u>		
Min Bill (15,000 gallons)	\$59.60	Min Bill (15,000 gal)	\$75.00	25.8%
Over 15,000 gallons	\$3.15	Over 15,000 gallons	\$5.00	58.7%
<u>WATER (3" meter)</u>				
Min Bill (30,000 gallons)	\$106.85			
Over 30,000 gallons	\$3.15			
<u>SEWER (3/4" meter)</u>		<u>SEWER (5/8" &amp; 1" meters)</u>		
Min Bill (2000 gallons)	\$6.65	Min Bill (2,000 gallons)	\$12.50	88.0%
Next 8000 gallons	\$2.10	Over 2,000 gallons	\$4.00	90.5%
Over 10,000 gallons	\$1.65			
Flat Rate	\$12.80			
<u>SEWER (2" meter)</u>		<u>SEWER (2" &amp; Larger)</u>		
Min Bill (15,000 gallons)	\$31.70	Min Bill (15,000 gal)	\$58.00	83.0%
Over 15,000 gallons	\$1.65	Over 15,000 gallons	\$4.00	142.4%
<u>SEWER (3" meter)</u>				
Min Bill (30,000 gallons)	\$56.45			
Over 30,000 gallons	\$1.65			
<u>SEWER ONLY CUST</u>	\$12.65	<u>SEWER ONLY CUST</u>	\$20.00	58.1%

The charges/rates contained in this notice are the charges/rates proposed by the Knott County Water & Sewer District. However, the Public Service Commission may order charges/rates to be charged that differ from these proposed charges/rates. Such action may result in charges/rates for consumers other than the charges/rates in this notice.

Any corporation, association, body politic, or person may, by motion within thirty (30) days after publication of this fee change, request leave to intervene; and the motion shall be submitted to the Public Service Commission, Post Office Box 615, Frankfort, KY 40602, and shall set forth the grounds for the request, including the status and interest of the party.

Intervenors may obtain copies of the application and related filings by contacting the water and sewer district at (606) 785-5584 or (606) 377-9296.

The Knott County Water & Sewer District has available for inspection at its office the proposed changes to its Rules & Regulations. The office is located at 90 May Street, PO Box 884, Hindman, KY 41822. A copy of the proposed changes may also be obtained at the office of US Filter located at 245 KY Route 680, McDowell, KY 41647.

This notice is provided pursuant to 807 KAR 5:011-Tariffs.

KNOTT COUNTY WATER & SEWER DISTRICT

**XXIII. FORECAST OF SEWER USAGE - INCOME - EXISTING SYSTEM - EXISTING USERS**  
**SEE ATTACHED**

Meter Size*	Monthly Sewer Usage	Average	Average Rate	Residential			Non-Residential		
				No. of Users**	Usage (1000)	Income	No. of Users	Usage (1000)	Income
	0 - 2,000 Gallons	1,000	_____	_____	_____	_____	_____	_____	_____
	2,000 - 3,000 Gallons	2,500	_____	_____	_____	_____	_____	_____	_____
	3,000 - 4,000 Gallons	3,500	_____	_____	_____	_____	_____	_____	_____
	4,000 - 5,000 Gallons	4,500	_____	_____	_____	_____	_____	_____	_____
	5,000 - 6,000 Gallons	5,500	_____	_____	_____	_____	_____	_____	_____
	6,000 - 7,000 Gallons	6,500	_____	_____	_____	_____	_____	_____	_____
	7,000 - 8,000 Gallons	7,500	_____	_____	_____	_____	_____	_____	_____
	8,000 - 9,000 Gallons	8,500	_____	_____	_____	_____	_____	_____	_____
	9,000 - 10,000 Gallons	9,500	_____	_____	_____	_____	_____	_____	_____
5/8 x	10,000 - 11,000 Gallons	10,500	_____	_____	_____	_____	_____	_____	_____
	11,000 - 12,000 Gallons	11,500	_____	_____	_____	_____	_____	_____	_____
3/4 Inch	12,000 - 13,000 Gallons	12,500	_____	_____	_____	_____	_____	_____	_____
	13,000 - 14,000 Gallons	13,500	_____	_____	_____	_____	_____	_____	_____
	14,000 - 15,000 Gallons	14,500	_____	_____	_____	_____	_____	_____	_____
	15,000 - 16,000 Gallons	15,500	_____	_____	_____	_____	_____	_____	_____
	16,000 - 17,000 Gallons	16,500	_____	_____	_____	_____	_____	_____	_____
	17,000 - 18,000 Gallons	17,500	_____	_____	_____	_____	_____	_____	_____
	18,000 - 19,000 Gallons	18,500	_____	_____	_____	_____	_____	_____	_____
	19,000 - 20,000 Gallons	19,500	_____	_____	_____	_____	_____	_____	_____
_____ - _____ Gallons	_____	_____	_____	_____	_____	_____	_____	_____	
_____ - _____ Gallons	_____	_____	_____	_____	_____	_____	_____	_____	
_____ - _____ Gallons	_____	_____	_____	_____	_____	_____	_____	_____	
	<b>Sub-Total</b>			( )	( )	( )	( )	( )	( )
	<b>Average Monthly Rate</b>		( )						
	<b>Average Monthly Usage</b>			( )		( )			

• Breakdown of meter size usage is not required unless different sewer rates are charged based on size of water meter.

\*\* Number of users should reflect the actual number of "meter settings".

Knott County Water & Sewer District  
Existing Sewer Rates  
Billing Analysis

Monthly Water Usage	Average	No. of Bills	Usage	Average Rate	Income
0 - 2,000	1,000	206	206,000	\$6.65	\$1,369.90
2,000 - 3,000	2,500	175	437,500	7.70	1,347.50
3,000 - 4,000	3,500	192	672,000	9.80	1,881.60
4,000 - 5,000	4,500	179	805,500	11.90	2,130.10
5,000 - 6,000	5,500	168	924,000	14.00	2,352.00
6,000 - 7,000	6,500	117	760,500	16.10	1,883.70
7,000 - 8,000	7,500	83	622,500	18.20	1,510.60
8,000 - 9,000	8,500	75	637,500	20.30	1,522.50
9,000 - 10,000	9,500	63	598,500	22.40	1,411.20
10,000 - 11,000	10,500	45	472,500	24.28	1,092.38
11,000 - 12,000	11,500	26	299,000	25.93	674.05
12,000 - 13,000	12,500	18	225,000	27.58	496.35
13,000 - 14,000	13,500	12	171,500	29.23	379.93
14,000 - 15,000	14,500	11	159,500	30.88	339.63
15,000 - 16,000	15,500	9	139,500	32.53	292.73
16,000 - 17,000	16,500	7	115,500	34.18	239.23
17,000 - 18,000	17,500	6	105,000	35.83	214.95
18,000 - 19,000	18,500	6	111,000	37.48	224.85
19,000 - 20,000	19,500	5	97,500	39.13	195.63
20,000 - 25,000	22,500	5	112,500	44.08	220.38
25,000 - 30,000	27,500	5	137,500	52.33	261.63
30,000 - 35,000	32,500	5	162,500	60.58	302.88
35,000 - 40,000	37,500	4	150,000	68.83	275.30
40,000 - 45,000	42,500	4	170,000	77.08	308.30
45,000 - 50,000	47,500	4	190,000	85.33	341.30
50,000 - 60,000	55,000	3	165,000	97.70	293.10
60,000 - 70,000	65,000	3	195,000	114.20	342.60
70,000 - 80,000	75,000	1	75,000	130.70	130.70
80,000 - 90,000	85,000	1	85,000	147.20	147.20
90,000 - 100,000	95,000	1	95,000	163.70	163.70

Sub-total	120	<u>1,440</u>	<u>9,101,500</u>	<u>\$22,345.88</u>
				\$22,514.00

Avg Usage/Customer	6,320		
Avg Revenue/Customer			\$15.52
Number of Customers		120	

**LARGE USERS**

Comm/Ind	70,000	12	840,000	122.45	1,469.40
Sub-total	2	24	2,040,000		\$3,532.80

Avg Usage/Customer	85,000.		
Avg Revenue/Customer			\$147.20

1 Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
				<b>Sub-Total</b>		( )	( )	( )	( )	( )

1½ Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
				<b>Sub-Total</b>		( )	( )	( )	( )	( )

2 Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
				<b>Sub-Total</b>		( )	( )	( )	( )	( )

3 Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
				<b>Sub-Total</b>		( )	( )	( )	( )	( )

4 Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
				<b>Sub-Total</b>		( )	( )	( )	( )	( )

- Breakdown of meter size usage is not required unless different sewer rates are charged based on size of water meter.
- \*\* Number of users should reflect the actual number of "meter settings".

	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
<b>5 Inch</b>	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
			<b>Sub-Total</b>		( )	( )	( )	( )	( )	( )
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
<b>6 Inch</b>	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
			<b>Sub-Total</b>		( )	( )	( )	( )	( )	( )
			<b>TOTALS</b>		( )	( )	( )	( )	( )	( )

**MULTI-FAMILY AND APARTMENT USER ANALYSIS**

*If billed as a typical user, the information should be included in the residential information above. If not billed as a typical residential user, please explain below.*

<u>Name of Unit</u>	<u>Number of Units</u>	<u>Number of Meters</u>	<u>Revenue Calculations</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

- Breakdown of meter size usage is not required unless different sewer rates are charged based on size of water meter.

\*\* Number of users should reflect the actual number of "meter settings".



**XXIV. FORECAST OF SEWER USAGE - INCOME - NEW USERS - EXTENSION ONLY**  
**SEE ATTACHED**

<u>Meter Size*</u>	<u>Monthly Sewer Usage</u>	<u>Average</u>	<u>Rate</u>	<u>Residential</u>			<u>Non-Residential</u>		
				<u>No. of Users**</u>	<u>Usage (1000)</u>	<u>Income</u>	<u>No. of Users</u>	<u>Usage (1000)</u>	<u>Income</u>
	0 - 2,000 Gallons	1,000	_____	_____	_____	_____	_____	_____	_____
	2,000 - 3,000 Gallons	2,500	_____	_____	_____	_____	_____	_____	_____
	3,000 - 4,000 Gallons	3,500	_____	_____	_____	_____	_____	_____	_____
	4,000 - 5,000 Gallons	4,500	_____	_____	_____	_____	_____	_____	_____
	5,000 - 6,000 Gallons	5,500	_____	_____	_____	_____	_____	_____	_____
	6,000 - 7,000 Gallons	6,500	_____	_____	_____	_____	_____	_____	_____
	7,000 - 8,000 Gallons	7,500	_____	_____	_____	_____	_____	_____	_____
	8,000 - 9,000 Gallons	8,500	_____	_____	_____	_____	_____	_____	_____
	9,000 - 10,000 Gallons	9,500	_____	_____	_____	_____	_____	_____	_____
5/8 x	10,000 - 11,000 Gallons	10,500	_____	_____	_____	_____	_____	_____	_____
	11,000 - 12,000 Gallons	11,500	_____	_____	_____	_____	_____	_____	_____
3/4 Inch	12,000 - 13,000 Gallons	12,500	_____	_____	_____	_____	_____	_____	_____
	13,000 - 14,000 Gallons	13,500	_____	_____	_____	_____	_____	_____	_____
	14,000 - 15,000 Gallons	14,500	_____	_____	_____	_____	_____	_____	_____
	15,000 - 16,000 Gallons	15,500	_____	_____	_____	_____	_____	_____	_____
	16,000 - 17,000 Gallons	16,500	_____	_____	_____	_____	_____	_____	_____
	17,000 - 18,000 Gallons	17,500	_____	_____	_____	_____	_____	_____	_____
	18,000 - 19,000 Gallons	18,500	_____	_____	_____	_____	_____	_____	_____
	19,000 - 20,000 Gallons	19,500	_____	_____	_____	_____	_____	_____	_____
	_____ - _____ Gallons	_____	_____	_____	_____	_____	_____	_____	_____
	_____ - _____ Gallons	_____	_____	_____	_____	_____	_____	_____	_____
_____ - _____ Gallons	_____	_____	_____	_____	_____	_____	_____	_____	
	<b>Sub-Total</b>			( )	( )	( )	( )	( )	( )
	<b>Average Monthly Rate</b>		( )						
	<b>Average Monthly Usage</b>			( )			( )		

• Breakdown of meter size usage is not required unless different sewer rates are charged based on size of water meter.

\*\* Number of users should reflect the actual number of "meter settings".

Knott County Water & Sewer District  
Proposed Sewer Rates  
Billing Analysis

Monthly Water Usage	Average	No. of Bills	Usage	Average Rate	Income
0 - 2,000	1,000	206	206,000	\$12.50	\$2,575.00
2,000 - 3,000	2,500	175	437,500	14.50	2,537.50
3,000 - 4,000	3,500	192	672,000	18.50	3,552.00
4,000 - 5,000	4,500	179	805,500	22.50	4,027.50
5,000 - 6,000	5,500	168	924,000	26.50	4,452.00
6,000 - 7,000	6,500	117	760,500	30.50	3,568.50
7,000 - 8,000	7,500	83	622,500	34.50	2,863.50
8,000 - 9,000	8,500	75	637,500	38.50	2,887.50
9,000 - 10,000	9,500	63	598,500	42.50	2,677.50
10,000 - 11,000	10,500	45	472,500	46.50	2,092.50
11,000 - 12,000	11,500	26	299,000	50.50	1,313.00
12,000 - 13,000	12,500	18	225,000	54.50	981.00
13,000 - 14,000	13,500	13	175,500	58.50	760.50
14,000 - 15,000	14,500	11	159,500	62.50	687.50
15,000 - 16,000	15,500	9	139,500	66.50	598.50
16,000 - 17,000	16,500	7	115,500	70.50	493.50
17,000 - 18,000	17,500	6	105,000	74.50	447.00
18,000 - 19,000	18,500	6	111,000	78.50	471.00
19,000 - 20,000	19,500	5	97,500	82.50	412.50
20,000 - 25,000	22,500	5	112,500	94.50	472.50
25,000 - 30,000	27,500	5	137,500	114.50	572.50
30,000 - 35,000	32,500	5	162,500	134.50	672.50
35,000 - 40,000	37,500	4	150,000	154.50	618.00
40,000 - 45,000	42,500	4	170,000	174.50	698.00
45,000 - 50,000	47,500	4	190,000	194.50	778.00
50,000 - 60,000	55,000	3	165,000	224.50	673.50
60,000 - 70,000	65,000	3	195,000	264.50	793.50
70,000 - 80,000	75,000	1	75,000	304.50	304.50
80,000 - 90,000	85,000	1	85,000	344.50	344.50
90,000 - 100,000	95,000	1	95,000	384.50	384.50
		0			
<b>Sub-total</b>	<b>120</b>	<b>1,440</b>	<b>9,101,500</b>		<b>\$43,710.00</b>
	<b>Avg Usage/Customer</b>		<b>6,320</b>		
	<b>Avg Revenue/Customer</b>				<b>\$30.35</b>
	<b>Number of Customers</b>		<b>120</b>		
<b>LARGE USERS</b>					
Comm/Ind	70,000	12	840,000	284.50	3,414.00
<b>Sub-total</b>	<b>2</b>	<b>24</b>	<b>2,040,000</b>		<b>\$8,268.00</b>
	<b>Avg Usage/Customer</b>		<b>85,000</b>		
	<b>Avg Revenue/Customer</b>				<b>\$344.50</b>
<b>TOTAL FOR ALL USERS</b>	<b>122</b>	<b>1,464</b>	<b>11,141,500</b>		<b>\$51,978.00</b>

1 Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
				<b>Sub-Total</b>		( )	( )	( )	( )	( )	( )

1½ Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
				<b>Sub-Total</b>		( )	( )	( )	( )	( )	( )

2 Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
				<b>Sub-Total</b>		( )	( )	( )	( )	( )	( )

3 Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
				<b>Sub-Total</b>		( )	( )	( )	( )	( )	( )

4 Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
				<b>Sub-Total</b>		( )	( )	( )	( )	( )	( )

• Breakdown of meter size usage is not required unless different sewer rates are charged based on size of water meter.

\*\* Number of users should reflect the actual number of "meter settings".

	-	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	Gallons	_____	_____	_____	_____	_____	_____	_____
5 Inch	-	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	<b>Sub-Total</b>			( )	( )	( )	( )	( )
	-	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	Gallons	_____	_____	_____	_____	_____	_____	_____
6 Inch	-	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	<b>Sub-Total</b>			( )	( )	( )	( )	( )
	-	<b>TOTALS</b>			( )	( )	( )	( )	( )

**MULTI-FAMILY AND APARTMENT USER ANALYSIS**

*If billed as a typical user, the information should be included in the residential information above. If not billed as a typical residential user, please explain below.*

<u>Name of Unit</u>	<u>Number of Units</u>	<u>Number of Meters</u>	<u>Revenue Calculations</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

- Breakdown of meter size usage is not required unless different sewer rates are charged based on size of water meter.
- \*\* Number of users should reflect the actual number of "meter settings".

XXV. FORECAST OF WATER USAGE - INCOME - EXISTING SYSTEM - EXISTING USERS  
 SEE ATTACHED

Meter Size*	Monthly Sewer Usage	Average	Average Rate	Residential			Non-Residential		
				No. of Users**	Usage (1000)	Income	No. of Users	Usage (1000)	Income
	0 - 2,000 Gallons	1,000	_____	_____	_____	_____	_____	_____	_____
	2,000 - 3,000 Gallons	2,500	_____	_____	_____	_____	_____	_____	_____
	3,000 - 4,000 Gallons	3,500	_____	_____	_____	_____	_____	_____	_____
	4,000 - 5,000 Gallons	4,500	_____	_____	_____	_____	_____	_____	_____
	5,000 - 6,000 Gallons	5,500	_____	_____	_____	_____	_____	_____	_____
	6,000 - 7,000 Gallons	6,500	_____	_____	_____	_____	_____	_____	_____
	7,000 - 8,000 Gallons	7,500	_____	_____	_____	_____	_____	_____	_____
	8,000 - 9,000 Gallons	8,500	_____	_____	_____	_____	_____	_____	_____
	9,000 - 10,000 Gallons	9,500	_____	_____	_____	_____	_____	_____	_____
5/8 x	10,000 - 11,000 Gallons	10,500	_____	_____	_____	_____	_____	_____	_____
	11,000 - 12,000 Gallons	11,500	_____	_____	_____	_____	_____	_____	_____
3/4 Inch	12,000 - 13,000 Gallons	12,500	_____	_____	_____	_____	_____	_____	_____
	13,000 - 14,000 Gallons	13,500	_____	_____	_____	_____	_____	_____	_____
	14,000 - 15,000 Gallons	14,500	_____	_____	_____	_____	_____	_____	_____
	15,000 - 16,000 Gallons	15,500	_____	_____	_____	_____	_____	_____	_____
	16,000 - 17,000 Gallons	16,500	_____	_____	_____	_____	_____	_____	_____
	17,000 - 18,000 Gallons	17,500	_____	_____	_____	_____	_____	_____	_____
	18,000 - 19,000 Gallons	18,500	_____	_____	_____	_____	_____	_____	_____
	19,000 - 20,000 Gallons	19,500	_____	_____	_____	_____	_____	_____	_____
	_____ - _____ Gallons	_____	_____	_____	_____	_____	_____	_____	_____
	_____ - _____ Gallons	_____	_____	_____	_____	_____	_____	_____	_____
	_____ - _____ Gallons	_____	_____	_____	_____	_____	_____	_____	_____
		Sub-Total		( )	( )	( )	( )	( )	( )
		Average Monthly Rate	( )						
		Average Monthly Usage		( )		( )			

• Breakdown of meter size usage is not required unless different sewer rates are charged based on size of water meter.

\*\* Number of users should reflect the actual number of "meter settings".

Knott County Water & Sewer District  
Existing Water Rates  
Billing Analysis

Monthly Water Usage	Average	No. of Bills	Usage	Average Rate	Income
0 - 2,000	1,000	217	217,000	512.65	\$2,745.05
2,000 - 3,000	2,500	204	510,000	14.60	2,978.40
3,000 - 4,000	3,500	224	784,000	18.50	4,144.00
4,000 - 5,000	4,500	209	940,500	22.40	4,681.60
5,000 - 6,000	5,500	196	1,078,000	26.30	5,154.80
6,000 - 7,000	6,500	136	884,000	30.20	4,107.20
7,000 - 8,000	7,500	97	727,500	34.10	3,307.70
8,000 - 9,000	8,500	88	748,000	38.00	3,344.00
9,000 - 10,000	9,500	73	693,500	41.90	3,058.70
10,000 - 11,000	10,500	63	661,500	45.43	2,861.78
11,000 - 12,000	11,500	31	356,500	48.58	1,505.83
12,000 - 13,000	12,500	21	262,500	51.73	1,086.23
13,000 - 14,000	13,500	16	216,000	54.88	878.00
14,000 - 15,000	14,500	11	159,500	58.03	638.28
15,000 - 16,000	15,500	14	217,000	61.18	856.45
16,000 - 17,000	16,500	13	214,500	64.33	836.23
17,000 - 18,000	17,500	12	210,000	67.48	809.70
18,000 - 19,000	18,500	11	203,500	70.63	776.88
19,000 - 20,000	19,500	11	214,500	73.78	811.53
20,000 - 25,000	22,500	11	247,500	83.23	915.48
25,000 - 30,000	27,500	11	302,500	98.98	1,088.73
30,000 - 35,000	32,500	10	325,000	114.73	1,147.25
35,000 - 40,000	37,500	9	337,500	130.48	1,174.28
40,000 - 45,000	42,500	7	297,500	146.23	1,023.58
45,000 - 50,000	47,500	3	142,500	161.98	485.93
50,000 - 60,000	55,000	2	110,000	185.60	371.20
60,000 - 70,000	65,000	1	65,000	217.10	217.10
70,000 - 80,000	75,000	1	75,000	248.60	248.60
80,000 - 90,000	85,000	1	85,000	280.10	280.10
90,000 - 100,000	95,000	1	95,000	311.60	311.60
Sub-total		<u>1,704</u>	<u>11,380,500</u>		<u>\$51,846.15</u>
Avg Usage/Customer			6,679		
Avg Revenue/Customer					\$30.43
Number of Customers			142		
LARGE USERS					
Comm. Ind	2,600	<u>12</u>	<u>31,200</u>	\$14.99	<u>\$179.88</u>
Sub-total	1	12	31,200		\$179.88
Avg Usage/Customer			2,600		
Avg Revenue/Customer					\$14.99
TOTAL FOR ALL USERS		143	11,411,700		\$52,026.03

1 Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
				Sub-Total		( )	( )	( )	( )	( )

1½ Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
				Sub-Total		( )	( )	( )	( )	( )

2 Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
				Sub-Total		( )	( )	( )	( )	( )

3 Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
				Sub-Total		( )	( )	( )	( )	( )

4 Inch	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	_____	-	_____	Gallons	_____	_____	_____	_____	_____	_____
				Sub-Total		( )	( )	( )	( )	( )

- Breakdown of meter size usage is not required unless different sewer rates are charged based on size of water meter.

\*\* Number of users should reflect the actual number of "meter settings".

	-	Gallons							
	-	Gallons							
5 Inch	-	Gallons							
	-	Gallons							
	-	Gallons							
	-	Gallons							
	-	Gallons							
		Sub-Total		( )	( )	( )	( )	( )	( )
	-	Gallons							
	-	Gallons							
6 Inch	-	Gallons							
	-	Gallons							
	-	Gallons							
	-	Gallons							
	-	Gallons							
		Sub-Total		( )	( )	( )	( )	( )	( )
		TOTALS		( )	( )	( )	( )	( )	( )

**MULTI-FAMILY AND APARTMENT USER ANALYSIS**

If billed as a typical user, the information should be included in the residential information above. If not billed as a typical residential user, please explain below.

<u>Name of Unit</u>	<u>Number of Units</u>	<u>Number of Meters</u>	<u>Revenue Calculations</u>

- Breakdown of meter size usage is not required unless different sewer rates are charged based on size of water meter.

\*\* Number of users should reflect the actual number of "meter settings".



XXVI. FORECAST OF WATER USAGE - INCOME - NEW USERS - EXTENSION ONLY  
SEE ATTACHED

Meter Size*	Monthly Sewer Usage	Average	Average	Residential			Non-Residential		
			Rate	No. of Users**	Usage (1000)	Income	No. of Users	Usage (1000)	Income
	0 - 2,000 Gallons	1,000	_____	_____	_____	_____	_____	_____	_____
	2,000 - 3,000 Gallons	2,500	_____	_____	_____	_____	_____	_____	_____
	3,000 - 4,000 Gallons	3,500	_____	_____	_____	_____	_____	_____	_____
	4,000 - 5,000 Gallons	4,500	_____	_____	_____	_____	_____	_____	_____
	5,000 - 6,000 Gallons	5,500	_____	_____	_____	_____	_____	_____	_____
	6,000 - 7,000 Gallons	6,500	_____	_____	_____	_____	_____	_____	_____
	7,000 - 8,000 Gallons	7,500	_____	_____	_____	_____	_____	_____	_____
	8,000 - 9,000 Gallons	8,500	_____	_____	_____	_____	_____	_____	_____
	9,000 - 10,000 Gallons	9,500	_____	_____	_____	_____	_____	_____	_____
5/8 x	10,000 - 11,000 Gallons	10,500	_____	_____	_____	_____	_____	_____	_____
	11,000 - 12,000 Gallons	11,500	_____	_____	_____	_____	_____	_____	_____
3/4 Inch	12,000 - 13,000 Gallons	12,500	_____	_____	_____	_____	_____	_____	_____
	13,000 - 14,000 Gallons	13,500	_____	_____	_____	_____	_____	_____	_____
	14,000 - 15,000 Gallons	14,500	_____	_____	_____	_____	_____	_____	_____
	15,000 - 16,000 Gallons	15,500	_____	_____	_____	_____	_____	_____	_____
	16,000 - 17,000 Gallons	16,500	_____	_____	_____	_____	_____	_____	_____
	17,000 - 18,000 Gallons	17,500	_____	_____	_____	_____	_____	_____	_____
	18,000 - 19,000 Gallons	18,500	_____	_____	_____	_____	_____	_____	_____
	19,000 - 20,000 Gallons	19,500	_____	_____	_____	_____	_____	_____	_____
	_____ - _____ Gallons	_____	_____	_____	_____	_____	_____	_____	_____
	_____ - _____ Gallons	_____	_____	_____	_____	_____	_____	_____	_____
	_____ - _____ Gallons	_____	_____	_____	_____	_____	_____	_____	_____
		Sub-Total		( )	( )	( )	( )	( )	( )
		Average Monthly Rate	( )						
		Average Monthly Usage		( )		( )			

• Breakdown of meter size usage is not required unless different sewer rates are charged based on size of water meter.

\*\* Number of users should reflect the actual number of "meter settings".

Knott County Water & Sewer District  
Proposed Water Rates  
Billing Analysis

Monthly Water Usage	Average	No. of Bills	Usage	Average Rate	Income
0 - 2,000	1,000	1058	1,058,000	\$15.50	\$16,399.00
2,000 - 3,000	2,500	857	2,142,500	18.25	15,640.25
3,000 - 4,000	3,500	938	3,283,000	23.75	22,277.50
4,000 - 5,000	4,500	877	3,946,500	29.25	25,652.25
5,000 - 6,000	5,500	823	4,526,500	34.75	28,599.25
6,000 - 7,000	6,500	571	3,711,500	40.25	22,982.75
7,000 - 8,000	7,500	408	3,060,000	45.75	18,666.00
8,000 - 9,000	8,500	367	3,119,500	51.25	18,808.75
9,000 - 10,000	9,500	306	2,907,000	56.75	17,365.50
10,000 - 11,000	10,500	222	2,331,000	62.25	13,819.50
11,000 - 12,000	11,500	129	1,483,500	67.75	8,739.75
12,000 - 13,000	12,500	90	1,125,000	73.25	6,592.50
13,000 - 14,000	13,500	65	877,500	78.75	5,118.75
14,000 - 15,000	14,500	45	652,500	84.25	3,791.25
15,000 - 16,000	15,500	39	604,500	89.75	3,500.25
16,000 - 17,000	16,500	35	577,500	95.25	3,333.75
17,000 - 18,000	17,500	31	542,500	100.75	3,123.25
18,000 - 19,000	18,500	27	499,500	106.25	2,868.75
19,000 - 20,000	19,500	24	468,000	111.75	2,682.00
20,000 - 25,000	22,500	22	495,000	128.25	2,821.50
25,000 - 30,000	27,500	20	550,000	155.75	3,115.00
30,000 - 35,000	32,500	18	585,000	183.25	3,298.50
35,000 - 40,000	37,500	16	600,000	210.75	3,372.00
40,000 - 45,000	42,500	14	595,000	238.25	3,335.50
45,000 - 50,000	47,500	12	570,000	265.75	3,189.00
50,000 - 60,000	55,000	10	550,000	307.00	3,070.00
60,000 - 70,000	65,000	6	390,000	362.00	2,172.00
70,000 - 80,000	75,000	4	300,000	417.00	1,668.00
80,000 - 90,000	85,000	2	170,000	472.00	944.00
90,000 - 100,000	95,000	2	190,000	527.00	1,054.00

<b>Sub-total</b>	587	<u>7,038</u>	<u>41,911,000</u>	<u>\$268,000.50</u>
------------------	-----	--------------	-------------------	---------------------

Avg Usage/Customer	5,955	
Avg Revenue/Customer		\$38.08
Number of Customers	587	

<b>LARGE USERS</b>				
<b>Sub-total</b>	1	12	120,000	\$714.00

Avg Usage/Customer	10,000	
Avg Revenue/Customer		\$59.50

1 Inch	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Sub-Total		( )	( )	( )	( )	( )	( )

1½ Inch	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Sub-Total		( )	( )	( )	( )	( )	( )

2 Inch	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Sub-Total		( )	( )	( )	( )	( )	( )

3 Inch	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Sub-Total		( )	( )	( )	( )	( )	( )

4 Inch	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____	_____
	-	_____	Sub-Total		( )	( )	( )	( )	( )	( )

• Breakdown of meter size usage is not required unless different sewer rates are charged based on size of water meter.

\*\* Number of users should reflect the actual number of "meter settings".

5 Inch	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____
			Sub-Total		( )	( )	( )	( )	( )
6 Inch	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____
	-	_____	Gallons	_____	_____	_____	_____	_____	_____
			Sub-Total		( )	( )	( )	( )	( )
			TOTALS		( )	( )	( )	( )	( )

**MULTI-FAMILY AND APARTMENT USER ANALYSIS**

If billed as a typical user, the information should be included in the residential information above. If not billed as a typical residential user, please explain below.

<u>Name of Unit</u>	<u>Number of Units</u>	<u>Number of Meters</u>	<u>Revenue Calculations</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

- Breakdown of meter size usage is not required unless different sewer rates are charged based on size of water meter.

\*\* Number of users should reflect the actual number of "meter settings".

**XXVII. CURRENT OPERATING BUDGET - (SEWER SYSTEM)**

           (As of the last full operating year.)

**A. Operating Income:**

<i>Sewer Revenue</i>	\$	<u>25,879</u>
<i>Late Charge Fees</i>		<u>325</u>
<i>Other (Describe)</i>		<u>          </u>
<i>Less Allowances and Deductions</i>		<u>(          )</u>
<b>Total Operating Income</b>	\$	<u>26,204</u>

**B. Operation and Maintenance Expenses:**

*(Based on Uniform System of Accounts prescribed by National Association of Regulatory Utility Commissioners)*

<i>Operation Expense</i>	\$	<u>13,797</u>
<i>Maintenance Expense</i>		<u>1,787</u>
<i>Customer Accounts Expense</i>		<u>0</u>
<i>Administrative and General Expense</i>		<u>13,743</u>
<b>Total Operating and Maintenance Expenses</b>	\$	<u>29,327</u>
<b>Net Operating Income</b>	\$	<u>(3,123)</u>

**C. Non-Operating Income:**

<i>Interest on Deposits</i>	\$	<u>2,442</u>
<i>Other (Identify)</i>		<u>0</u>
<b>Total Non-Operating Income</b>	\$	<u>2,442</u>
		<u>(681)</u>

**D. Net Income**

\$

**E. Debt Repayment:**

<i>RUS Interest</i>	\$	<u>0</u>
<i>RUS Principal</i>		<u>0</u>
<i>Non-RUS Interest</i>		<u>470</u>
<i>Non-RUS Principal</i>		<u>0</u>
<b>Total Debt Repayment</b>	\$	<u>470</u>
		<u>(1,151)</u>

**F. Balance Available for Coverage**

\$

**XXVIII. PROPOSED OPERATING BUDGET - (SEWER SYSTEM) - EXISTING SYSTEM AND NEW  
USERS (1<sup>st</sup> Full Year of Operation) Year Ending \_\_\_\_\_**

<b>A. Operating Income:</b>	
<i>Sewer Revenue</i>	\$ <u>51,978</u>
<i>Late Charge Fees</i>	<u>325</u>
<i>Other (Describe)</i>	<u>                    </u>
<i>Less Allowances and Deductions</i>	<u>(                    )</u>
<b>Total Operating Income</b>	<b>\$ <u>52,303</u></b>
<b>B. Operation and Maintenance Expenses:</b>	
<i>(Based on Uniform System of Accounts prescribed by National Association of Regulatory Utility Commissioners)</i>	
<i>Operation Expense</i>	\$ <u>13,797</u>
<i>Maintenance Expense</i>	<u>1,787</u>
<i>Customer Accounts Expense</i>	<u>0</u>
<i>Administrative and General Expense</i>	<u>13,743</u>
<b>Total Operating and Maintenance Expenses</b>	<b>\$ <u>29,327</u></b>
<b>Net Operating Income</b>	<b>\$ <u>22,976</u></b>
<b>C. Non-Operating Income:</b>	
<i>Interest on Deposits</i>	\$ <u>2,442</u>
<i>Other (Identify)</i>	<u>0</u>
<b>Total Non-Operating Income</b>	<b>\$ <u>2,442</u></b>
<b>D. Net Income</b>	<b>\$ <u>25,418</u></b>
<b>E. Debt Repayment:</b>	
<i>RUS Interest</i>	\$ <u>                    </u>
<i>RUS Principal</i>	<u>                    </u>
<i>Non-RUS Interest</i>	<u>470</u>
<i>Non-RUS Principal</i>	<u>                    </u>
<b>Total Debt Repayment</b>	<b>\$ <u>470</u></b>
<b>F. Balance Available for Coverage</b>	<b>\$ <u>24,948</u></b>

**XXIX. PROPOSED OPERATING BUDGET - (SEWER SYSTEM) - RATE INCREASE - EXTENSION ONLY (1<sup>st</sup> Full Year of Operation) Year Ending \_\_\_\_\_**

**A. Operating Income:**

<i>Sewer Revenue</i>	\$	<u>26,099</u>
<i>Late Charge Fees</i>		_____
<i>Other (Describe)</i>		_____
<i>Less Allowances and Deductions</i>	(	_____)
<b>Total Operating Income</b>	\$	<u>26,099</u>

**B. Operation and Maintenance Expenses:**

*(Based on Uniform System of Accounts prescribed by National Association of Regulatory Utility Commissioners)*

<i>Operation Expense</i>	\$	<u>0</u>
<i>Maintenance Expense</i>		_____
<i>Customer Accounts Expense</i>		_____
<i>Administrative and General Expense</i>		_____
<b>Total Operating and Maintenance Expenses</b>	\$	<u>0</u>
<b>Net Operating Income</b>	\$	<u>26,099</u>

**C. Non-Operating Income:**

<i>Interest on Deposits</i>	\$	<u>0</u>
<i>Other (Identify)</i>		_____
<b>Total Non-Operating Income</b>	\$	<u>0</u>
		<u>26,099</u>

**D. Net Income**

\$

**E. Debt Repayment:**

<i>RUS Interest</i>	\$	<u>0</u>
<i>RUS Principal</i>		<u>0</u>
<i>Non-RUS Interest</i>		<u>0</u>
<i>Non-RUS Principal</i>		<u>0</u>
<b>Total Debt Repayment</b>	\$	<u>0</u>

**F. Balance Available for Coverage**

\$ 26,099

XXX. CURRENT OPERATING BUDGET - (WATER SYSTEM)  
 (As of the last full operating year.)

A. Operating Income:		
Water Sales	\$	<u>52,026</u>
Disconnect/Reconnect/Late Charge Fees		<u>                    </u>
Other (Describe)		<u>622</u>
Less Allowances and Deductions		<u>(                    )</u>
Total Operating Income	\$	<u>52,648</u>
B. Operation and Maintenance Expenses:		
(Based on Uniform System of Accounts prescribed by National Association of Regulatory Utility Commissioners)		
Source of Supply Expense	\$	<u>                    </u>
Pumping Expense		<u>                    </u>
Water Treatment Expense		<u>45,000</u>
Transmission and Distribution Expense		<u>20,000</u>
Customer Accounts Expense		<u>5,646</u>
Administrative and General Expense		<u>2,691</u>
Total Operating Expenses	\$	<u>73,337</u>
Net Operating Income	\$	<u>(20,689)</u>
C. Non-Operating Income:		
Interest on Deposits	\$	<u>2,505</u>
Other (Identify)		<u>0</u>
Total Non-Operating Income	\$	<u>2,505</u>
D. Net Income	\$	<u>(18,184)</u>
E. Debt Repayment:		
RUS Interest	\$	<u>0</u>
RUS Principal		<u>0</u>
Non-RUS Interest		<u>1,230</u>
Non-RUS Principal		<u>4,400</u>
Total Debt Repayment	\$	<u>5,630</u>
F. Balance Available for Coverage	\$	<u>(23,814)</u>
	coverage	<u>563</u>
	depreciation	<u>\$ 36,415</u>
	Balance	<u>\$ (60,792)</u>



XXXI. PROPOSED OPERATING BUDGET - (WATER SYSTEM) - EXISTING SYSTEM AND NEW  
USERS (1<sup>st</sup> Full Year of Operation) Year Ending \_\_\_\_\_

A. Operating Income:	
Water Sales	\$ <u>268,715</u>
Disconnect/Reconnect/Late Charge Fees	<u>0</u>
Other (Describe)	<u>622</u>
Less Allowances and Deductions	<u>( )</u>
Total Operating Income	\$ <u>269,337</u>
B. Operation and Maintenance Expenses:	
(Based on Uniform System of Accounts prescribed by National Association of Regulatory Utility Commissioners)	
Source of Supply Expense	\$ _____
Pumping Expense	<u>54,750</u>
Water Treatment Expense	<u>47,307</u>
Transmission and Distribution Expense	<u>21,592</u>
Customer Accounts Expense	<u>26,201</u>
Administrative and General Expense	<u>2,691</u>
Total Operating Expenses	\$ <u>152,541</u>
Net Operating Income	\$ <u>116,796</u>
C. Non-Operating Income:	
Interest on Deposits	\$ <u>2,505</u>
Other (Identify)	<u>0</u>
Total Non-Operating Income	\$ <u>2,505</u>
D. Net Income	\$ <u>119,301</u>
E. Debt Repayment:	
RUS Interest	\$ <u>0</u>
RUS Principal	<u>0</u>
Non-RUS Interest	<u>1,230</u>
Non-RUS Principal	<u>4,400</u>
Total Debt Repayment	\$ <u>5,630</u>
F. Balance Available for Coverage	\$ <u>113,670</u>
	coverage \$ <u>563</u>
	depreciation \$ <u>174,358</u>
	Balance \$ <u>(60,688)</u>

XXXII. PROPOSED OPERATING BUDGET - (WATER SYSTEM) - NEW USERS - EXTENSION ONLY (1<sup>st</sup> Full Year of Operation) Year Ending \_\_\_\_\_

A. Operating Income:		
Water Sales	\$	<u>216,688</u>
Disconnect/Reconnect/Late Charge Fees		<u>                    </u>
Other (Describe)		<u>                    </u>
Less Allowances and Deductions		<u>(                    )</u>
Total Operating Income	\$	<u>216,688</u>
B. Operation and Maintenance Expenses:		
(Based on Uniform System of Accounts prescribed by National Association of Regulatory Utility Commissioners)		
Source of Supply Expense	\$	<u>                    </u>
Pumping Expense		<u>54,750</u>
Water Treatment Expense		<u>2,307</u>
Transmission and Distribution Expense		<u>1,592</u>
Customer Accounts Expense		<u>20,555</u>
Administrative and General Expense		<u>0</u>
Total Operating Expenses	\$	<u>79,204</u>
Net Operating Income	\$	<u>137,484</u>
C. Non-Operating Income:		
Interest on Deposits	\$	<u>0</u>
Other (Identify)		<u>0</u>
Total Non-Operating Income	\$	<u>0</u>
D. Net Income	\$	<u>137,484</u>
E. Debt Repayment:		
RUS Interest	\$	<u>0</u>
RUS Principal		<u>                    </u>
Non-RUS Interest		<u>                    </u>
Non-RUS Principal		<u>                    </u>
Total Debt Repayment	\$	<u>0</u>
F. Balance Available for Coverage	\$	<u>137,484</u>
	coverage	\$ <u>0</u>
	depreciation	\$ <u>137,380</u>
	Balance	\$ <u>104</u>

**XXXIII. ESTIMATED PROJECT COST - SEWER**  
*(Round to nearest \$100)*

**NO SEWER PROJECT**

	<u>Collection</u>	<u>Treatment</u>	<u>Total</u>
<i>Development</i>	_____	_____	_____
<i>Land and Rights</i>	_____	_____	_____
<i>Legal</i>	_____	_____	_____
<i>Engineering</i>	_____	_____	_____
<i>Interest</i>	_____	_____	_____
<i>Contingencies</i>	_____	_____	_____
<i>Initial Operating and Maintenance</i>	_____	_____	_____
<i>Other</i>	_____	_____	_____
<b>TOTAL</b>	_____	_____	_____

**XXXIV. PROPOSED PROJECT FUNDING - SEWER**

	<u>Collection</u>	<u>Treatment</u>	<u>Total</u>
<i>Applicant - User Contribution Fees</i>	_____	_____	_____
<i>Other - Applicant Contribution</i>	_____	_____	_____
<i>RUS Loan</i>	_____	_____	_____
<i>RUS Grant</i>	_____	_____	_____
<i>ARC Grant (If applicable)</i>	_____	_____	_____
<i>CDBG (If applicable)</i>	_____	_____	_____
<i>Other (Specify)</i>	_____	_____	_____
<i>Other (Specify)</i>	_____	_____	_____

**XXXV. ESTIMATED PROJECT COST - WATER**

Development	\$ <u>5,434,400</u>
Land and Rights	<u>200,000</u>
Legal	<u>25,000</u>
Engineering	<u>566,200</u>
Interest	<u>0</u>
Contingencies	<u>543,400</u>
Initial Operating and Maintenance	<u>100,000</u>
Other	<u>                    </u>
<b>TOTAL</b>	<b>\$ <u>6,869,000</u></b>

**XXXVI. PROPOSED PROJECT FUNDING**

Applicant - User Connection Fees	\$ <u>0</u>
Other Applicant Contribution	<u>0</u>
RUS Loan	<u>0</u>
RUS Grant	<u>2,500,000</u>
ARC Grant (If applicable)	<u>500,000</u>
CDBG (If applicable)	<u>2,000,000</u>
Other (Specify)	<u>869,000</u>
Other (Specify)	<u>1,000,000</u>
<b>TOTAL</b>	<b>\$ <u>6,869,000</u></b>

# **REGIONAL WATER STUDY**

**GENERATED FOR  
KNOTT COUNTY FISCAL COURT  
1999**

# **REGIONAL WATER SUPPLY FEASIBILITY STUDY**

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## **Introduction**

### **Existing Water Suppliers Inventory**

- Blackey**
- Caney Creek**
- Fleming-Neon**
- Jenkins**
- Hazard**
- Hindman**
- Vicco**
- Whitesburg**

### **Population and Water Demand Projections**

- Residential/Commercial**
- Industrial/Special**

### **Water Treatment**

- Requirements**
- Proposed Facilities**
- Future Capacity Expansion to 5 MGD**
- Operation, Maintenance, and Equipment Replacement**

### **Transmission and Distribution Facilities**

- Water Line Sizing and Hydraulics**
- Route Alternatives**
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### **Project Financing and Costs**

- Capital Costs**
- Lake Allocation Costs**
- O & M Costs**
- Financing Considerations**
- Rates and Charges**

### **Recommendations and Conclusions**

### **Appendix**

- A - Authority for Joint Operation of Water Sources**
- B - Hydraulic Profiles**
- C - Corps of Engineers Data and Calculations RE: Carr Creek Lake Allocation**
- D - WRDC Water Service Area by County and ADD**

## **INTRODUCTION**

In order to meet the growing needs for water supply in the Upper Kentucky River Basin, the Corps of Engineers prepared a reconnaissance study considering regional water supply for Knott, Letcher and Perry Counties located adjacent to their Carr Creek Lake. The study proposed a 5 MGD water treatment plant initially at a cost of \$11.2 million and \$37.1 million in transmission mains with the expanded plant and county distribution mains estimated to cost an additional \$5.2 million and \$112 million respectively.

Since the date of the Corp study, three of the studied water service providers have begun the process of creating a Regional Water Authority under KRS 74.4 and desire to consider service from Carr Creek Lake. The regulations allow for the addition of new water suppliers to the authority as desired. The current water suppliers forming the Authority are: City of Hindman, and the City of Pippa Passes in Knott County and the City of Vicco in Letcher County. This report considers the initial service to these suppliers and proposed growth and development in Knott County with future services to adjacent areas including rural Letcher and Perry Counties.

Several studies have been conducted in the area which provided a significant amount of background data, preliminary cost estimates and Carr Creek Lake hydrologic and hydraulic data and cost allocation information. The reports include: Upper Kentucky River Basin Water Resources Reconnaissance Study by the Corps of Engineers, Area Development District Water Plan by the Kentucky River ADD, and the Comprehensive Water/Sewer Program by the Kentucky River ADD.

## **EXISTING WATER SUPPLIER'S INVENTORY**

The following review of the area's water suppliers indicates the need for a solution to water supply needs. The inventory was taken from existing studies coupled with interviews with suppliers.

### **Blackey Municipal Water**

The City of Blackey completed a 300,000 GPD treatment plant in 1998. It withdraws from the North Fork of the Kentucky River and currently serves only 265 customers requiring 30,000 GPD. The condition of the facilities is good to excellent and the plant usage is actually too low for optimum efficiency for treatment or financing.

### **Caney Creek Water District**

The Caney Creek groundwater treatment plant was constructed in 1970 and remodeled in 1985. It draws its water from nine wells located on Caney Creek and the plant capacity is estimated to be 0.10 mgd. The average daily plant output is 0.064 mgd and the monthly peak demand is 0.098 mgd. The condition of the treatment plant is good. The water distribution facilities have no known deficiencies. The current service area is the community of Pippa Passes.

### **City of Jenkins Water System**

The City of Jenkins owns and operates its treatment plant constructed in 1988. The principal water source is Jenkins Reservoir on Little Elkhorn Creek, and secondary sources are an underground mine and Elkhorn Creek. The plant capacity is estimated to be 1.0 mgd while the average daily plant output is 0.525 mgd and the average monthly peak demand output is 0.75 mgd. The condition of the treatment plant is "good" except for poor hydraulics between the raw water trough and the clarifier. Many of the water mains and distribution lines are old dating back to 1916, and the water loss is tremendous equaling approximately 66% of the plant output.

### **Fleming-Neon Water & Sewer**

The Fleming-Neon groundwater treatment plant was constructed in 1985 and draws its water from an abandoned coal mine. The source of the water is from a combination of ground water, surface water, and ponded water. The plant capacity is estimated to be 0.30 mgd while the average daily plant output is 0.195 mgd and the average monthly peak demand output is 0.269 mgd. The condition of the treatment plant has a rating of "good" and the current condition of the water distribution system is rated as "excellent" with no known deficiencies.



## **Hazard Water System**

The City of Hazard owns and operates a surface water treatment plant that was constructed in 1957 and renovated in the 1970's. The raw water source is the North Fork Kentucky River. The estimated plant design capacity is 2.5 mgd. The average daily plant output is under 2 mgd and the monthly peak demand output is 2.15 mgd. The treatment plant settling basins are undersized. The current condition of the water distribution system is adequate, while some of the water mains are undersized and many of the mains and distribution lines are old.

## **Hindman**

The City owns and operates a groundwater treatment plant that withdraws water from 2 wells located within the City limits. The design capacity of the pressure filters at 3 gpm/sq. ft. is 485,000 GPD. The two wells capacities are estimated at 150 gpm each while the high service pump capacity is 250 gpm or 360,000 GPD. The average production is 150,000 GPD and peak service has been approximately 230,000 GPD. The system serves the City and rural areas of Knott County. Customers north of the Garner on Jones Fork are served by the City of Hindman system purchasing water from Beaver Elkhorn Water District. The City serves approximately 392 customers.

## **Vicco**

Vicco currently purchases its water from the City of Hazard in Perry County. Water demands average near 200,000 GPD and the peak demand is 250,000 GPD. The distribution system is comprised of new PVC and older asbestos-cement pipe. The City serves 750 customers inside and outside the City.

## **Whitesburg Municipal Water**

The Whitesburg water treatment plant draws its water from the North Fork Kentucky River and was built in 1965. The plant capacity is estimated to be 0.385 mgd while the average daily plant output is 0.35 mgd and the highest monthly peak demand output is 0.45 mgd. The condition of the treatment plant is "adequate". As with many small communities, some of the water mains are undersized and many of the mains and distribution lines are old.

## POPULATION AND WATER DEMAND PROJECTIONS

The population in the counties has varied over the years much like the balance of eastern Kentucky counties. The coal industry is responsible for a surge in population in the '40s, '50s and '60s. The peak population for Letcher and Perry counties occurred in the '40s while Knott County has grown to beyond its former peak. See the changes in the counties and their incorporated Cities in Table 1. Graphs of the population statistics show the variability of the data and the linear regression line for the data since 1890 shows a positive growth. However, the data available for several of the incorporated communities shows a general decline in population over the last 5 years. The overall growth in the counties for the last 5 years is very comparable to the average growth rate for the counties since 1890.

The water demand projection for Knott, Letcher, Perry and Floyd counties are shown in Tables 2, 3, 4 and 5 respectively. Table 6 uses the population projections of Table 1 to estimate the anticipated water demand growth.

In addition to the growth in the cities and rural areas, the plans for a prison and industrial park on Highway 80 in Knott County will demand additional water. The preliminary indications are that the prison will initially house 900 inmates and expand to 2,000 ultimately. The usage was estimated based upon Eddyville's average of 290 gallons per inmate per day.

The demands for an industrial park are not easily assessed. The park authority will set guidelines for the type of industries it hopes to attract but no assurance can be given as to the water demands. The state's regional parks are being designed with a guide of 500,000 to 1,000,000 GPD. It may be assumed that county parks will provide for those up to that level and the proposed park was estimated to need 500,000 GPD in the future. A summary of the projected demands for the Phase I suppliers is given in Table 6.

Table 1  
Population of the State of Kentucky and  
Knott, Letcher and Perry Counties and their Communities

Date	State	Knott County			Letcher				Perry			Floyd	
		Knott	Hindman	Pippa Passes	Letcher	Blackey	Fleming Neon	Jenkins	Whitesburg	Perry	Hazard	Vicco	Floyd
1890	1,858,635	5,438			6,920				6,331			11,256	
1900	2,147,174	8,704			9,172				8,276			15,552	
1910	2,289,905	10,791			10,623				11,255			18,623	
1920	2,416,630	11,655			24,467				26,042			27,427	
1930	2,614,589	15,230			35,702				42,186			41,942	
1940	2,845,681	20,007			40,592				47,828			52,986	
1950	2,944,851	20,320			39,522				46,566			53,500	
1960	3,038,156	17,362			30,102				34,961			41,642	
1970	3,220,711	14,698			23,165				26,259			35,889	
1980	3,660,777	17,940			30,687				33,763			48,764	
1990	3,685,296	17,906	790	195	26,998	207	759	1,631	30,283	5,411	245	43,586	3,595
1991	3,720,281	18,077	806	189	27,077	208	758	1,707	30,751	5,503	244	53,470	3,680
1992	3,755,266	18,213	841	199	26,999	207	754	1,714	30,942	5,631	243	53,821	3,679
1993	3,790,251	18,157	815	210	26,922	206	750	1,671	30,902	5,622	212	54,173	3,664
1994	3,825,236	18,337	928	211	26,991	207	749	1,667	31,140	5,730	221	54,524	3,634
1995	3,860,219	18,418	922	217	26,957	206	746	1,688	31,268	5,807	221	54,875	3,593
2000	3,898,236	18,892	1,064	243	27,031	205	732	1,707	30,431	6,185	221	56,631	3,606
2005	3,989,590	19,363	1,207	270	27,014	204	718	1,725	30,617	6,564	221	58,387	3,583
2010	4,080,943	19,834	1,349	296	26,997	203	704	1,743	30,804	6,942	221	60,142	3,559
2015	4,172,297	20,305	1,492	323	26,980	202	690	1,761	30,990	7,321	221	61,898	3,536
2020	4,263,650	20,776	1,634	349	26,964	201	676	1,779	31,177	7,699	221	63,654	3,513
2025	4,355,003	21,247	1,777	376	26,947	200	662	1,797	31,363	8,078	221	65,410	3,489
2030	4,446,357	21,718	1,919	402	26,862	199	648	1,815	32,296	8,456	221	67,166	3,466

Source: US Census Data  
State population for 1991-1995 are interpolated.  
Projections for years 2000-2030 by extended linear regression of data since 1890 to 1995.

**Figure 1**  
**Population Data and Best Fit Line**  
**for**  
**Knott, Letcher, Perry & Floyd Counties**

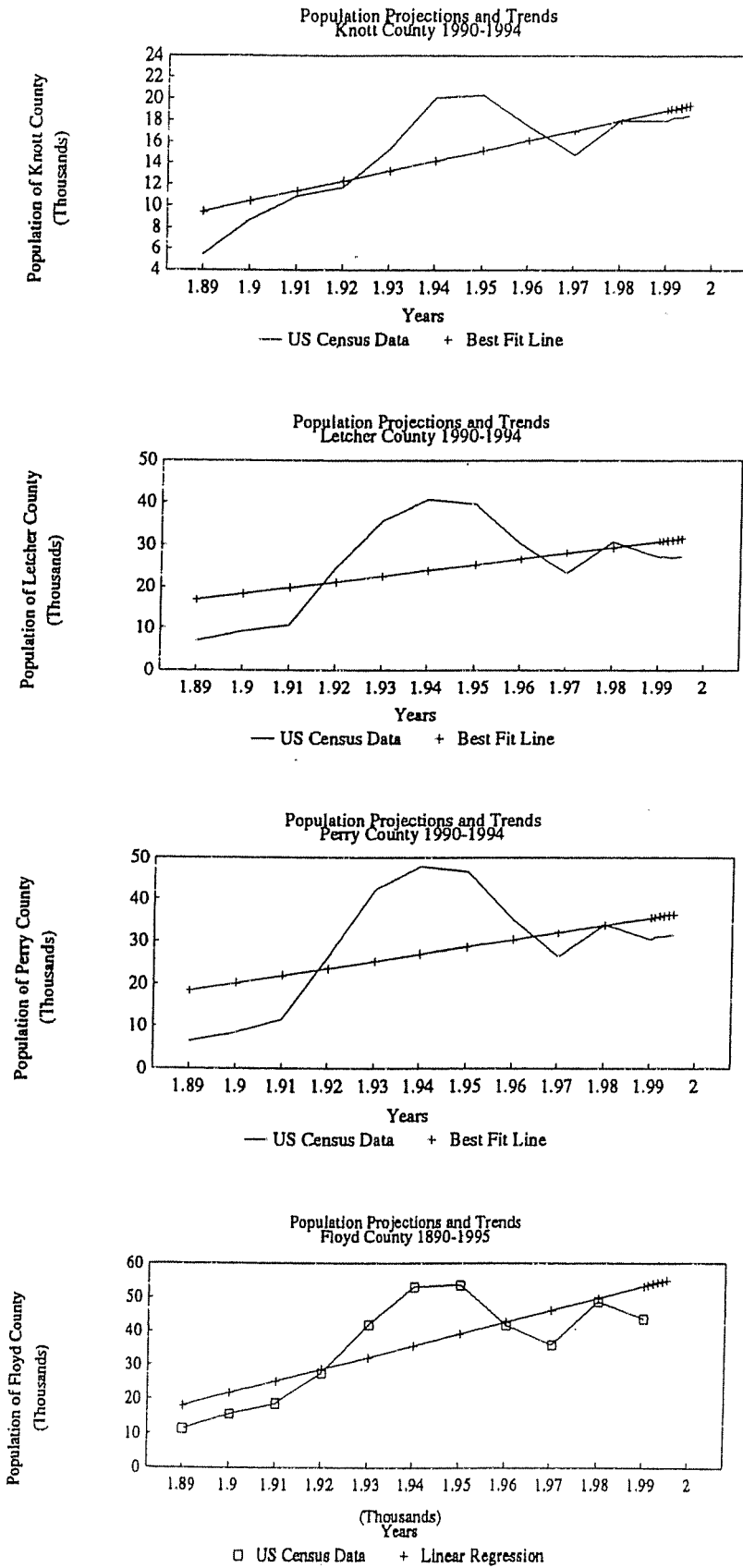


Table 2  
Knott County  
Water Customer and Demand Projections

	Year	Knott	Hindman	Pippa Passes	Rural Knott	Total
Population	2000	18,892	1,064	243	17,584	
% Served			100%	100%	10%	
Population Served			1,064	243	1,758	3,066
Source Demand (GPD)			136,800	31,269	226,085	394,154
Population	2010	19,834	1,349	296	18,188	
% Served			100%	100%	16%	
Population Served			1,349	296	2,910	4,555
Source Demand (GPD)			173,443	38,083	374,161	585,687
Population	2020	20,776	1,634	349	18,792	
% Served			100%	100%	24%	
Population Served			1,634	349	4,510	6,493
Source Demand (GPD)			210,086	44,897	579,880	834,863
Population	2030	21,718	1,919	402	19,396	
% Served			100%	100%	30%	
Population Served			1,919	402	5,819	8,140
Source Demand (GPD)			246,729	51,711	748,147	1,046,587

Knott County  
Water Source Demand Projections

Year	Population Served	Customers <sup>1.</sup>	WTP Supply Demands <sup>2.</sup>	Water Loss <sup>3.</sup>	Peak Demand <sup>4.</sup>
2000	3,066	1,095	219,000	262,800	394,200 Gallons/Day
2010	4,555	1,627	325,400	390,480	585,720
2020	6,493	2,319	463,800	556,560	834,840
2030	8,140	2,907	581,400	697,680	1,046,520

- 1.) Number of Customers based upon 2.8 persons per household.
- 2.) Demands are projected at 200 Gallons per customer per day.
- 3.) Unaccounted for water is projected at 20 % losses.
- 4.) WTP peak factor is 1.5

Table 3  
Letcher County  
Water Customer and Demand Projections

	Year	Letcher	Blackey	Fleming -Neon	Jenkins	Whitesburg	Rural Letcher	Total
Population	2000	27,031	205	732	2,636	1,707	21,751	
% Served			100%	100%	100%	100%	10%	
Population Served			205	732	2,636	1,707	2,175	7,455
Source Demand (GPD)			26,409	94,063	338,914	219,446	279,661	958,492
Population	2010	26,997	203	704	2,532	1,743	21,816	
% Served			100%	100%	100%	100%	16%	
Population Served			203	704	2,532	1,743	3,490	8,672
Source Demand (GPD)			26,151	90,463	325,543	224,074	448,778	1,115,009
Population	2020	26,964	201	676	2,428	1,779	21,880	
% Served			100%	100%	100%	100%	24%	
Population Served			201	676	2,428	1,779	5,251	10,335
Source Demand (GPD)			25,894	86,863	312,171	228,703	675,148	1,328,780
Population	2030	26,862	199	648	2,324	1,815	21,876	
% Served			100%	100%	100%	100%	30%	
Population Served			199	648	2,324	1,815	6,563	11,549
Source Demand (GPD)			25,637	83,263	298,800	233,331	843,804	1,484,835

Letcher County  
Water Source Demand Projections

Year	Population Served	Customers <sup>1.</sup>	WTP Supply Demands <sup>2.</sup>	Water Loss <sup>3.</sup>	Peak Demand <sup>4.</sup>
2000	7,455	2,662	532,400	638,880	958,320 Gallons/Day
2010	8,672	3,097	619,400	743,280	1,114,920
2020	10,335	3,691	738,200	885,840	1,328,760
2030	11,549	4,125	825,000	990,000	1,485,000

- 1.) Number of Customers based upon 2.8 persons per household.
- 2.) Demands are projected at 200 Gallons per customer per day.
- 3.) Unaccounted for water is projected at 20 % losses.
- 4.) WTP peak factor is 1.5

Table 4  
Perry County  
Water Customer and Demand Projections

	Year	Perry	Hazard	Vicco	Rural Perry	Total
Population	2000	30,431	6,185	221	24,025	
% Served			100%	100%	10%	
Population Served			6,185	221	2,402	8,808
Source Demand (GPD)			795,214	28,414	308,888	1,132,516
Population	2010	30,804	6,942	221	23,641	
% Served			100%	100%	16%	
Population Served			6,942	221	3,782	10,945
Source Demand (GPD)			892,543	28,414	486,321	1,407,278
Population	2020	31,177	7,699	221	23,257	
% Served			100%	100%	24%	
Population Served			7,699	221	5,582	13,502
Source Demand (GPD)			989,871	28,414	717,632	1,735,918
Population	2030	32,296	8,456	221	23,619	
% Served			100%	100%	30%	
Population Served			8,456	221	7,086	15,763
Source Demand (GPD)			1,087,200	28,414	911,003	2,026,617

Perry County  
Water Source Demand Projections

Year	Population Served	Customers <sup>1.</sup>	WTP Supply Demands <sup>2.</sup>	Water Loss <sup>3.</sup>	Peak Demand <sup>4.</sup>	Gallons/Day
2000	8,808	3,146	629,200	755,040	1,132,560	
2010	10,945	3,909	781,800	938,160	1,407,240	
2020	13,502	4,822	964,400	1,157,280	1,735,920	
2030	15,763	5,629	1,125,800	1,350,960	2,026,440	

- 1.) Number of Customers based upon 2.8 persons per household.
- 2.) Demands are projected at 200 Gallons per customer per day.
- 3.) Unaccounted for water is projected at 20 % losses.
- 4.) WTP peak factor is 1.5

Table 5  
Floyd County  
Water Customer and Demand Projections

	Year	Floyd	Prestonsburg	Other	Rural Floyd	Total
Population	2000	56,631	3,606	1,551	51,474	
% Served			100%	100%	10%	
Population Served			3,606	1,551	5,147	10,304
Source Demand (GPD)			463,616	199,355	661,812	1,324,783
Population	2010	60,142	3,559	1,531	55,052	
% Served			100%	100%	16%	
Population Served			3,559	1,531	8,808	13,898
Source Demand (GPD)			457,629	196,780	1,132,509	1,786,917
Population	2020	63,654	3,513	1,510	58,631	
% Served			100%	100%	24%	
Population Served			3,513	1,510	14,071	19,095
Source Demand (GPD)			451,641	194,206	1,809,178	2,455,024
Population	2030	67,166	3,466	1,490	62,209	
% Served			100%	100%	30%	
Population Served			3,466	1,490	18,663	23,619
Source Demand (GPD)			445,653	191,631	2,399,491	3,036,775

Perry County  
Water Source Demand Projections

Year	Population Served	Customers <sup>1.</sup>	WTP Supply Demands <sup>2.</sup>	Water Loss <sup>3.</sup>	Peak Demand <sup>4.</sup>
2000	10,304	3,680	736,000	883,200	1,324,800
2010	13,898	4,964	992,800	1,191,360	1,787,040
2020	19,095	6,820	1,364,000	1,636,800	2,455,200
2030	23,619	8,435	1,687,000	2,024,400	3,036,600

- 1.) Number of Customers based upon 2.8 persons per household.
- 2.) Demands are projected at 200 Gallons per customer per day.
- 3.) Unaccounted for water is projected at 20 % losses.
- 4.) WTP peak factor is 1.5



Table 6  
Regional Water Supply Analysis  
Initial Suppliers Demand Projections

City	Projection Year			
	2000	2010	2020	2030
Hindman	136,800	173,443	210,086	246,729
PippaPasses	31,269	38,083	44,897	51,711
Knott Co	226,085	374,161	579,880	748,147
Vicco <sup>1</sup>	250,000	253,064	256,129	265,322
Letcher County	279,661	448,778	675,148	843,804
Floyd County <sup>2</sup>	264,957	357,383	491,005	607,355
 Res/Com Total	 1,188,771	 1,644,913	 2,257,144	 2,763,068
 Industrial Park	 200,000	 300,000	 400,000	 500,000
Prison	270,000	600,000	600,000	600,000
Industrial Total	470,000	900,000	1,000,000	1,100,000
 Total Demands	 1,658,771	 2,544,913	 3,257,144	 3,863,068
County Service %	10%	16%	24%	30%

1. Includes served areas of rural Perry County  
2. Assumes partial service for Beaver-Elkhorn

Water Supplier	2030 GPD	24 hr gpm	12 hr gpm	Design Rate
Hindman	246,729	171	343	200
PippaPasses	51,711	36	72	50
Knott Co	748,147	520	1,039	550
Vicco <sup>1</sup>	265,322	184	369	200
Letcher County	843,804	586	1,172	600
Floyd County <sup>2</sup>	607,355	422	844	430
Prison / Ind Park	1,100,000	764	1,528	770
Total	3,863,068	2,683	5,365	2,800

Carr Creek Lake Allocation		5.500 MGD
WTP Use	15%	0.825 MGD
WTP Net Production		4.675 MGD
Unaccounted for Water Loss	15%	0.701 MGD
Total Water Available fro Sales		3.974 MGD

## **WATER TREATMENT REQUIREMENTS**

### **Turbidity**

Evaluation of plant data indicates that turbidity is the principal constituent requiring treatment. Turbidity values in the raw water fluctuate widely as the result of runoff caused by snow or rain. USEPA MCL for treated water turbidity requires a design for 0.5 NTU. Conventional treatment with chemical coagulation, flocculation, sedimentation and filtration will reduce turbidity to less than the stated MCL. The infrequent occurrence and short duration of high turbidity does not justify incorporation of a presedimentation basin in the design of the new facilities. More difficulty is experienced in removing low levels of turbidity in "clear" water. The "sludge blanket" treatment process incorporated in the existing upflow clarifiers should be retained to address this treatment problem.

### **Trihalomethanes**

Trihalomethanes, or THM's are formed by the reaction of free chlorine with precursor materials (primarily humic and fulvic acids) in the raw water. The THM precursor compounds in the raw water result primarily from decay of natural vegetation. The USEPA has amended the Safe Drinking Water Act to include an MCL of 0.10 mg/l for total THM compounds. THM's are suspected carcinogens.

- Moving the point of initial chlorine application to as late in the treatment process as practical so that most precursors are removed before chlorination.
- Use of an adsorbent, either powdered activated carbon or granular activated carbon, to remove precursors before chlorination or to remove THM following chlorination.
- Use of an alternative disinfectant which does not form THM's, such as chlorine dioxide, ozone, or combined chlorine (chloramine).
- Oxidation of precursors with potassium permanganate, chlorine dioxide, or ozone prior to chlorination.
- Removal of THM after formation.

Presently, there is no proven cost-effective and reliable method for removal of THM after formation. Therefore, the best approach is to use a combination of the first four alternatives previously listed. This will result in the reduction of THM formation by removal of precursors or the use of disinfectants and oxidants other than chlorine which do not generate THM's.

Studies have shown that THM formation can be reduced by conventional treatment consisting of coagulation, flocculation, sedimentation, and filtration prior to chlorination. This reduction of formation potential by conventional treatment has been demonstrated at a number of existing plants, where elimination of prechlorination has at times reduced THM formation to below the MCL of 0.1

mg/l. However, elimination of predisinfection can result in problems associated with algae growth within the plant's treatment basins. Elimination of pathogens and the oxidation of taste, odor, and color-causing compounds are also accomplished by prechlorination. If prechlorination is discontinued, other substitute chemicals should be provided to meet these treatment requirements.

Powdered activated carbon and potassium permanganate are effective in eliminating tastes, odor, color, and THM precursors, and will be provided for the new WTP. However, these chemicals are not effective disinfectants. Chlorine dioxide and ozone are powerful disinfectants and oxidants, and are the best available treatment alternative to replace chlorination. Both chemicals are effective against pathogens, taste, odor, and color, and will kill nuisance organisms such as algae, in a short period of time. On the basis of cost and simplicity of operation, chlorine dioxide is a possible alternative for predisinfectant and oxidant when high levels of THM precursors may result in unacceptable THM concentrations in the plant's effluent. Little has been done to develop chlorine dioxide generating systems which are economically feasible for small systems to use. Until an economical system is available, it is recommended that chlorine be used for predisinfection when possible.

Because the old plant maintains compliance with the THM limit, the new plant should continue to provide adequate protection against THM formation by using conventional treatment for THM precursor removal.

Additional control of THM will be provided by designing the WTP expansion with the capability of adding chlorine at variable feed points in the treatment process.

### **Bacteria**

Turbidity removal and disinfection are the primary processes for the elimination of bacteria and viruses from water. A treated water turbidity of less than 0.5 TU can be achieved by conventional treatment. This level of turbidity is well below the MCL and will ensure the effectiveness of the disinfection process. As discussed under THM removal, the disinfectants utilized in the treatment process must eliminate pathogens without excessive formation of THMs.

Use of a solids contact clarifier system similar to the existing upflow system is recommended in order to provide adequate turbidity removal for low turbidity water.

### **Algae, Taste, and Odors**

Accumulation of algae and organic decomposition products in the lake especially during summer and fall months can lead to these problems. This accumulation could become large enough to present treatment problems, i.e., filter clogging, growth in basins, etc. Undesirable raw water tastes and odors typically accompany the algae. Methods to control algae, taste and odor include the addition of potassium permanganate for which a feeder will be provided. Tastes and odors can also be controlled by adsorption on powdered or granular activated carbon. The new plant will be equipped with a carbon feed system.

## **Iron and Manganese**

USEPA Secondary Drinking Water Regulations recommend a SMCL for iron and manganese of 0.3 mg/l and 0.05 mg/l, respectively. These maximum concentrations were set to avoid brownish discolorations from the water and the potential for staining of fixtures and laundered goods, together with the adverse taste effects imparted by these substances. Reduction of these two compounds to acceptable levels will be accomplished by oxidation and sedimentation in the treatment process.

## **Regulatory Trends**

The addition of monitoring requirements for volatile organic chemicals (VOCs), synthetic organic chemicals (SOCs) and inorganic and microbiological contaminants along with the trend toward lower MCL's on existing standards are foreseen in the next generation of water plants.

It is therefore essential that future anticipated water quality requirements be considered in the design of the WTP. Of primary concern in the design of treatment facilities to meet future quality requirements are parameters involving VOC and SOC compounds and the need to control by-products of disinfection. Future control of VOCs and SOCs may require addition of carbon adsorption facilities. Plant layout and hydraulics should therefore include provisions for future addition of these facilities without the need for significant modifications.

## **Proposed Facilities**

Based on the treated water quality criteria required by Federal and State regulatory agencies, a conventional water system, consisting of coagulation, flocculation, sedimentation and filtration, is recommended for the new Water Treatment Plant. Proposed coagulation and flocculation will condition the particulate matter suspended in raw water by particle destabilization and the formation of floc. The floc will be subsequently removed in the sedimentation and filtration processes. Sedimentation will decrease the overall solids loading on the fillers, thereby improving treatment efficiency and increasing filter run times. The sedimentation process also will reduce the load on the filters resulting from nuisance organisms such as algae and from iron and manganese components. New processes for coagulation, sedimentation and filtration will be considered during final design taking into account lab results from service analysis to optimize the treatment process. New promising techniques will be analyzed.

The proposed facilities will be designed to treat water by conventional treatment with chemical coagulation, flocculation, sedimentation and filtration to reduce turbidity to less than 0.5 NTU's. The plant will utilize caustic soda, alum and polymers for pH adjustment and coagulation. Potassium permanganate and activated carbon will be used to control algae, taste and odors and to remove undesirable organics. Disinfection will be accomplished by chlorination. Fluoride will be added in accordance with State law. Caustic soda will be used for final pH adjustment and corrosion control.

The new plant will be designed for a flow rate of 1,750 gpm or 2.5 mgd and will contain the following treatment units:

- (1) Rapid Mix System with 30 seconds detention time. A 5' x 5' x 8' tank containing a 5 HP mixer will be used.
- (2) Two 900 gpm modular clarification/setting units for solids removal.
- (3) Chemical feed equipment as described in this report.
- (4) Four Filtration Units with mixed media filter beds, high rate bottoms and surface wash equipment.
- (5) A 200,000 gallon capacity backwash storage unit and a total of 500,000 gallons clearwell capacity.
- (6) High Service Pumps with up to 1,750 gpm capacity.
- (7) Raw water intake and water line from Car Creek Lake.

A schematic of the plant is shown on Figure 2.

Chemical storage and feed facilities will be provided for chlorine, alum, potassium permanganate, activated carbon, polymer, hydrofluosilicic acid, and sodium hydroxide. A schematic of the plant and points of chemical application are indicated on Figure 2. Chemical storage and feed facilities will be housed in the Control Building.

Liquid chemicals will be chosen over dry chemicals whenever possible for the operation of the WTP. Liquid chemicals are more convenient to handle and store than dry chemicals. Handling chemicals in liquid form will eliminate serious dust problems that would require an air treatment system in the chemical storage room. Liquid chemicals can be handled by pumps instead of by hand or forklift trucks, as is required with dry chemicals. Storage of dry chemicals requires large amounts of space between materials that may interact, as well as separate storage spaces for combustibles and toxic chemicals. Storage of liquid chemicals in bulk tanks will minimize the total storage area requirements, while providing adequate isolation of the different chemicals.

In addition to handling and storage advantages, feeding of liquid chemicals is normally simpler and less costly. Liquid feeding systems are often more compact and more accurate than dry feeding systems, and lend themselves more to flow automation, enabling the chemical feed to be proportioned to the dosage required and to the flow through the plant.

Potassium permanganate and activated carbon will be the only chemicals handled in a dry form and will be stored in the plant chemical storage room.

1. Chlorine. Chlorine will be used for iron and manganese removal and for disinfection. The chlorine feed and storage systems of the existing plant and the new plant will operate independently. The existing storage and feed equipment will continue to have the ability to apply chlorine at the existing raw water influent, filter influent, filter effluent, and treated water storage, while new equipment will be provided for chlorine application at the raw water influent line, the new filter influent and the new filter effluent.

New chlorine solution feeders will be located in a separate chlorine feed room. The dosage will range from 0.5 mg/l to 10 mg/l, averaging 5.0 mg/l. Distribution panels and rotameters will be used for distributing the solution to the feed points.

2. Aluminum Sulfate (Alum). Liquid alum will be used as a coagulant and will be applied at the rapid mix chambers. The alum feed system will use liquid alum. The dosage will range from 5 to 50 mg/l, averaging 30 mg/l. Alum will be handled in liquid form and will be stored in a 3,000 gallon fiberglass storage tank in the chemical storage room. Two transfer pumps (one standby) will be provided for transferring solution from bulk storage to a day tank located in the chemical feed room. Two metering pumps (one standby) will be provided. Local, manual controls will be provided on each alum metering pump.
3. Potassium Permanganate. Permanganate solution will be fed to the raw water line to control taste and odor in place of the existing solid potassium permanganate addition. The dosage will range from 0.1 to 2.0 mg/l, averaging 0.5 mg/l. Potassium permanganate will be handled in bags and will be stored in the existing plant chemical storage room for pretreatment. A dissolving tank and timed mixer will be provided in the storage area. The permanganate solution will be mixed in this tank and transferred to a holding tank located in the chemical feed room. One metering pump will be provided to feed the permanganate solution. Controls will be provided to regulate the solution feed rate.
4. Activated Carbon. Adsorption of organics for taste and odor controls will be provided by activated carbon fed at the raw water line or at the filters. The dosage will range from 1.0 to 30 mg/l, with an average dosage of 5.0 mg/l. Activated carbon will be handled as a slurry. The tank will be provided with a mixer equipped with a two-speed motor; the higher speed to place the carbon in suspension before usage, and the low speed to maintain suspension during feeding.

Carbon will be stored at one pound per gallon slurry concentration. The one pound per gallon slurry will be transferred from the storage tank to a feed tank, where it will be diluted to a 5 percent slurry. A rotodip feeder with an eductor at the discharge point will be provided to feed the 5 percent slurry to the raw water line.

5. **Polymer.** Liquid polymer for use as a coagulant and filter aid will be applied at the new rapid mix chamber and filter influent. The dosage at the rapid mix chamber will range from 0.1 to 5.0 mg/l, averaging 1.0 mg/l. Liquid polymer will be stored in 55 gallon drums in the chemical storage room. Two simplex metering pumps (one standby) will be provided to feed polymer to the rapid mix chamber. Controls will be provided on each metering pump for manual setting of polymer feed rate.
6. **Hydrofluosilicic Acid (fluoride).** Hydrofluosilicic acid will be used for fluoridation and will be fed to the new filter effluent line. The dosage will range from 0.1 to 2.0 mg/l, averaging 1.0 mg/l. The acid will be stored in 55 gallon drums: A transfer pump will transfer hydrofluosilicic acid to a day tank placed on a platform scale in the chemical feed room. One metering pump will be provided in the feed room. Controls will be provided for manual setting of the feed rates.
7. **Sodium Hydroxide (Caustic Soda).** Caustic soda will replace lime, which is used for pH adjustment and will be fed at the raw water influent line and the filter effluent. The dosage will range from 2.0 to 20.0 mg/l, with an average dosage of 11.0 mg/l. It will be delivered in tank trucks and stored in one 304 stainless steel tank. The tanks will be located in a heated area of the Control Building. Provisions for containment of spills will be made in accordance with State and Federal standards. Caustic soda will be delivered and stored as 50 percent solution. Two transfer pumps will be provided for transferring solution from the bulk storage to a day tank located in the chemical feed room. The caustic soda will be diluted to a 25 percent solution prior to entry into the day tank. Two metering pumps located in the chemical feed room will be provided to feed caustic soda. Controls will be provided on each metering pump for manual setting of caustic soda feed rates.

### **Future Capacity Expansion to 5 MGD**

The proposed 2.5 MGD water treatment plant will be designed for the future expansion to a capacity of 5 MGD, when demand requires. The following will be required to expand capacity:

1. The raw water pumps will be replaced with larger pumps.
2. A new chemical mix and feed equipment will be required.
3. A parallel flocculation/clarification unit shall be installed.
4. Filters will be high rated from 2 gpm/S.F. to 4 gpm/S.F.
5. Additional clearwell/storage shall be constructed.
6. High service pump station upgrade to larger capacity pumps.
7. Additional sludge holding shall be constructed.
8. Miscellaneous site work and site piping/valving will also be required.

Total estimated cost to expand the water treatment plant to 5 MGD is \$3,700,000. The provided cost includes construction, contingency, planning, engineering, design, and construction management.

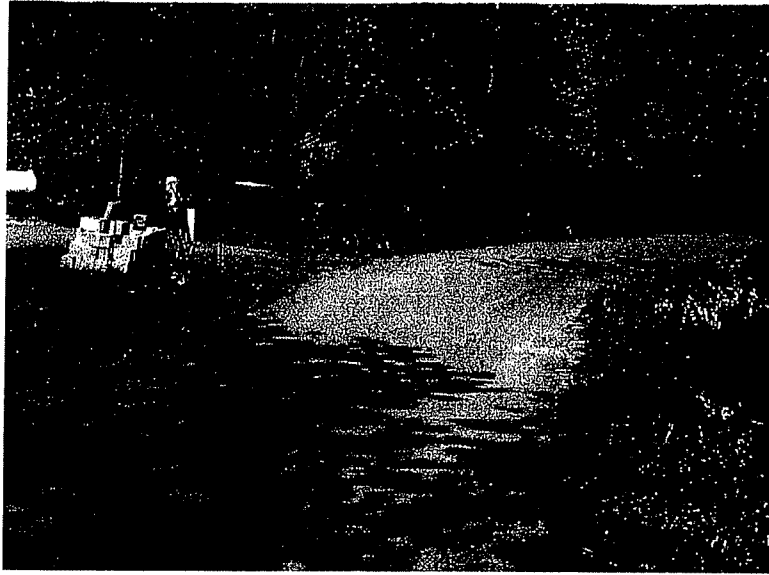
### **Operations, Maintenance, and Equipment Replacement**

Operations and maintenance costs are greatly dependent upon the quantity of water treated due to power costs of pumping, chemical costs, operator hours, etc. Reasonable O&M for a 2.5 MGD facility is \$0.80/1,000 gallons. Assuming an average daily usage of 1.2 MGD and based on \$0.80/1,000 gallons treated, the annual operations and maintenance is estimated to be \$377,293. No debt service principal, interest, or coverage are included. Scheduled maintenance and repair of equipment is included in this amount.

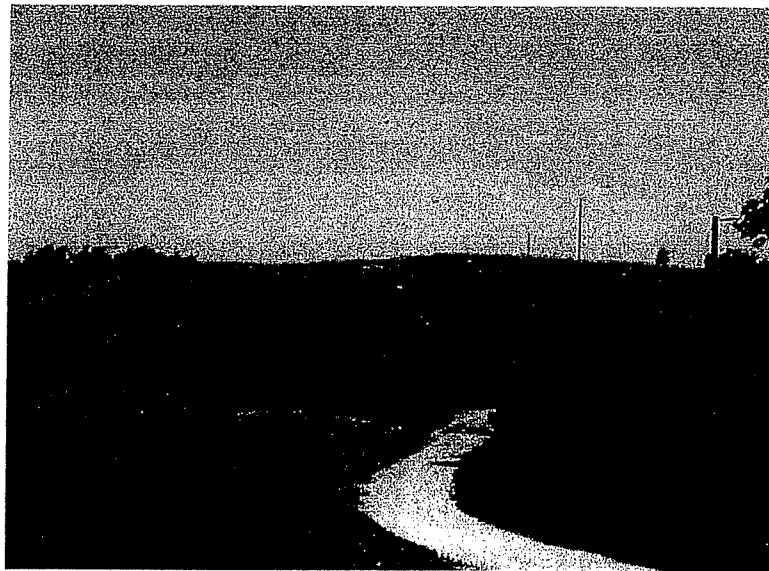
Operations and maintenance expenses for the expansion to a 5 MGD capacity would increase, however, not at the same rate. No additional operations personnel will be required for the expansion. Only the power and chemical costs should increase. The unit price of \$0.80 per 1,000 gallons of water treated is reduced to \$0.60 per 1,000 gallons treated for the 5 MGD scenario. Based on 4.0 MGD of treated water, the annual operations and maintenance budget for a 5 MGD capacity water treatment plant would increase \$642,449.

The proposed plant location is on a new site to be acquired west of Highway 1231 on Left Fork or Trace Fork. A proposed facility layout of the site is shown in Figure 3. The site is level and has been used as a mining scrap metal storage. Photographs of the site are included as Figures 4 and 5.



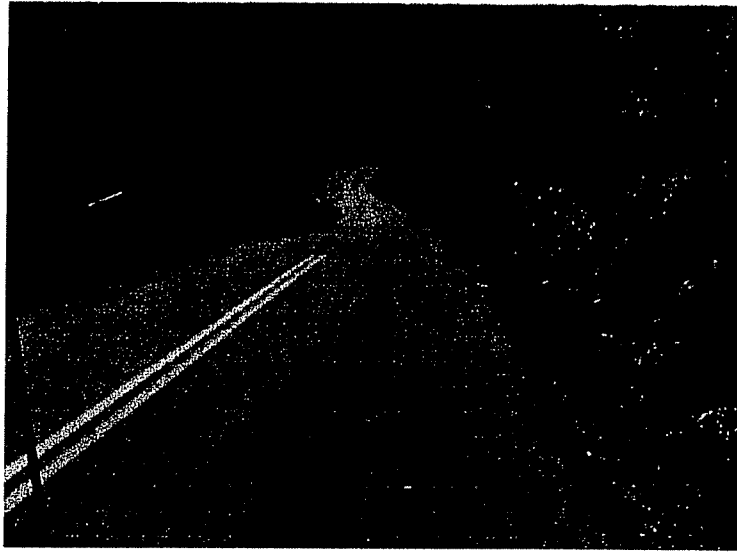


**Typical Right of Way for Water Line Construction**

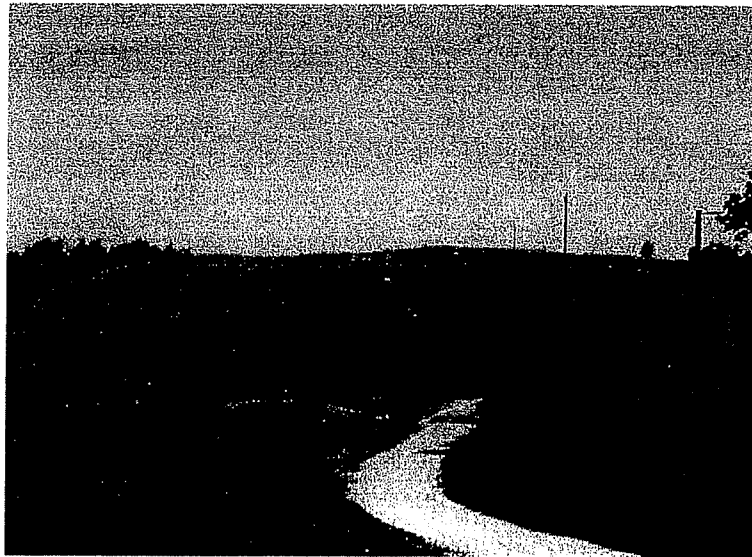


**Tank Site and Access Road Candidate**

**Figure 7 - Photographs of Water Line Route and Tank Site**



Highway Slide Area - Rock Ditch line on Opposite Side



DOT Guardrails and Limited Working Area

Figure 8 - Water Line ROW Construction Constraints

## **PROJECT FINANCING**

Cost estimates for the 2.5 MGD water treatment facility have been developed on the assumption that Federal funds will be used to develop the project. This requires expenditures for specific funding agency requirements as outlined herein.

### **Sources of Funds**

The following sources of funds can be considered for the project:

#### **Rural Economic and Community Development Agency (RECD)**

Formerly the Farmers Home Administration which was established in 1935 to provide long-term low cost credit to families in rural areas. Its programs now are organized into three broad divisions: farm related, housing, and community and business, which includes the rural water financing program. FmHA has financed utility systems since 1937, but until 1954 only in 17 western states. In 1961, the program was extended to include small rural communities as well as the rural farm population. The RECD Utility Program, as it is now known, is administered by the state office in Lexington. While specific program rules have varied over time, RECD currently provides both grants and loans at interest rates of between 4.5 percent and the "market" rate for the installation, repair, improvement, or expansion of rural water and sewer facilities. The service area may not include any city of more than 20,000 population. Grant funds may not exceed 75 percent of the total project costs.

By law, grants are to be directed to financially needy communities. Income eligibility levels are determined for each service area, using Census data. If Census data does not accurately reflect incomes in the service area, the district office may conduct surveys in the service area to determine a more accurate median household income level. The community must also demonstrate a health risk associated with the project to qualify for the 4.5 percent loan rate. Grants may not be used in any project where the median household income is more than 85 percent of the non-metropolitan median in the state.

Consequently, the entire project area should be grant and loan eligible if elimination of a health risk can be associated with the project. Violation of the Safe Drinking Water Act by the present system would constitute a health risk.

#### **Community Development Block Grant Funds**

The Community Development Block Grant program in the Department of Housing and Urban Development was established under the federal Housing and Community Development Act of 1974. Its primary objectives are to prevent or eliminate "slums or blight" and to meet community development needs of a special urgency, all of which must benefit predominantly low to moderate income people. The seven Kentucky cities with populations of over 50,000 automatically receive annual allocations of CDBG funds. All other jurisdictions compete annually through an application process administered by the Kentucky Department of Local Government. Although these are federal funds, they may be considered local monies by other funding agencies, such as RECD and EDA, which require local matches, for their funds.

Kentucky communities can compete for grants up to \$750,000 in the annual public facilities funding cycle. "Special" projects can also be submitted quarterly. These special projects often do not compete well because of high cost per user or insufficient use of other funds, but they merit funding because of a great need. Economic grants are also available for water and sewer infrastructure where job creation by industry is involved.

### **Economic Development Administration**

The Economic Development Administration was established by Congress in 1965 with the mandate "to generate jobs in economically distressed areas and promote the capacity of states and localities to plan and conduct economic development programs." Its programs are divided into three major areas of concentration: Public Works, Technical Assistance and Planning, and Business Loans. Most EDA funding has been channeled into public facilities for use by industrial concerns and requires creation of new jobs. Because of reduced appropriations, EDA can only be considered a source of utility system financing where creation of significant numbers of new jobs by industry commitment can be demonstrated.

### **Kentucky Infrastructure Authority**

The Kentucky Infrastructure Authority was established in 1988 and is currently housed in Office for Investment and Debt Management of the Finance and Administration Cabinet.

The General Assembly created a General Infrastructure Revolving Fund with state monies. This fund (called fund "C") can be used to fund wastewater projects, drinking water projects, storm sewers, solid waste, and other public facilities. Fund "C" interest rates are generally near the market rate, but below what a system could obtain on its own. In addition, the Authority administers a State Revolving fund which was started with EPA funds and state matching funds. This fund may only be used to construct wastewater treatment systems, collector sewers, interceptors, pumping stations, and other sewer rehabilitation work. This program (called fund "A") provides discounted interest rates at 3 points below the index rate. Low income communities can obtain loans at 5 points below the index rate. Finally, a third fund (fund "B") is used to make below market loans related to infrastructure needed for economic development. This loan is available at a two points discount (four points discount for low income communities). Fund B is often used in combination with CDBG economic grant funds. Applications for KIA loans are considered monthly by the KIA board.

### **Kentucky League of Cities/Kentucky Association of Counties**

The Kentucky League of Cities and the Kentucky Association of Counties are non-profit associations of cities and counties, respectively. The KLC has established a pooled lease financing program available to member cities to finance public works or purchases under a wide variety of financing options. The program is able to take advantage of arbitrage earnings and economics of scale through a single large financing for participants. The interest rates and terms are nominally better than a City could obtain on its own. A credit review is required.