

PRELIMINARY ENGINEERING REPORT

**2021 WATER SYSTEM IMPROVEMENTS PROJECT
PARKSVILLE WATER DISTRICT
BOYLE COUNTY, KENTUCKY**

OCTOBER 2023

PREPARED BY:



**3 HMB CIRCLE
FRANKFORT, KENTUCKY
502-695-9800
502-695-9810-FAX**

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SECTION I

PROJECT PLANNING

This Preliminary Engineering Report will examine the proposed 2021 Water System Improvements Project to be performed for the Parksville Water District (PWD). The project includes five areas where new water lines shall be replaced and extended. In addition, PWD plans to perform tank assessments on all four of its tanks as well as perform a SCADA system update. It is estimated that the proposed project will have a construction cost of \$2,124,000 and a project cost of \$2,455,000. Appendix A shows the PWD service area, and Appendix B shows the proposed construction exhibits.

The project lies in Southern Boyle County, near Parksville, KY. Parksville is a small unincorporated community in south central Boyle County, Kentucky, United States. Danville is the county seat and is located approximately 35 miles south of Lexington.

Parksville is located at the Western end of KY Route 300, where it intersects with KY Route 34, near the US Post Office. The economy is based on agriculture. The population derives their income primarily from farming, commercial and/or factory work in Danville, Nicholasville or Lexington. The population of Boyle County is approximately 30,750. The population has remained stable, with a 0.8% yearly population increase since 2010.

PWD is run by its board of directors and their manager, who make decisions for the interest of the community.

SECTION II

EXISTING FACILITIES

PWD currently serves approximately 1,650 residential households. All water used is purchased from the City of Danville. PWD has gone through several expansions in its history, from its startup in 1960 to the current state of the system today.

The system contains four water tanks.

Asset Name	Capacity (gal)	Date Constructed	Date Inspected
MITCHELLSBURG KNOB TANK	30,000	1/1/1999	8/29/2022
MITCHELLSBURG TANK	75,000	1/1/1996	8/29/2022
PARKSVILLE TANK	96,000	10/1/2005	8/29/2022
PERSIMMON KNOB TANK	116,000	10/1/2005	8/29/2022

There are approximately 130 miles of water lines in the PWD Distribution system. The pipe sizes range from 2” to 10” diameter. There are several areas where this infrastructure is older and can create problems for PWD and its customers. There are approximately 10 miles of water lines which were installed at the startup of the water district and are over 40 years old. PWD also operates four pump stations. The existing system mapping is shown in Appendix A.

PWD purchases approximately 128,450,000 gallons of water per year. The current rates for the cost of 4,000 gallons of finished water is approximately \$50.11. The last rate increase that was implemented was in 2015.

PWD Income projections:

- Operation Revenue (2023 Projected) - \$1,020,000 (Projected)
- Operation Revenue (2022) - \$1,004,360
- Operation Revenue (2021) - \$977,444
- Operation Revenue (2020) - \$964,871

SECTION III

NEED FOR PROJECT

The PWD distribution system is experiencing periodic diminished performance and pressure. This can be attributed to several causes, including line breaks resulting from older infrastructure. The most recent estimate is that PWD has approximately 18% water loss through their system. This has led to contamination and frequent service outages and boil water advisories. Replacing the water lines at White Oak Road, Cash Road, and Worthington Road will update the aging infrastructure and reduce the risk of leaks and water contamination. Correcting these deficiencies will maintain water quality, reduce boil water advisory frequency and duration and improve reliability of service to PWD customers.

The system has also had issues with hydraulic performance in some areas. An additional interconnect via the Parksville Cross Pike connection will increase the interconnectivity of the system. Also, the water pressures provided at Old Orchard Road are limited by the size of the existing water line and can be upgraded to improve service. The existing SCADA system is operating on obsolete radios and PC software that requires additional time and resources to read. The system can be updated with new technology to increase operational efficiency and accuracy of meter readings. The system's water storage tanks require periodic assessment, and there are several deficiencies that will likely require attention and potential repair. These repairs will be made where required to address cracks, oxidation, and other issues that may appear.

SECTION IV

ALTERNATIVES CONSIDERED

Alternative No. 1 - Continue to repair line breaks and failures as they occur.

Alternative option 1 is to address the needed repairs as they appear and create problems. This reactive approach is currently the state of the system for PWD. In order to maintain service to customers, as line breaks occur, the maintenance crews will dig up and patch the sections in question as they break down. PWD will issue boil water advisories whenever these issues occur, and could lead to health hazards for the system's users. This option will lead to increasing costs as more of the water infrastructure suffers from the effects of aging and fails to deliver quality water to customers.

Alternative No. 2 – Construct new water storage tanks

Alternative option 2 is to construct new water storage tanks. In order to save on repair costs associated with aging water storage tanks, this option would build new storage tanks to replace the existing tanks. It would be more expensive in the short term but would slightly reduce the regular maintenance costs that are associated with aging infrastructure. However, it is likely not necessary in the next 3 to 5 years to completely replace the water tanks.

Alternative No. 3 – Install an automatic radio meter reading network

Alternative option 3 is to install base stations and antennas in conjunction with the new radio enabled water meters. This would allow for the District to receive all monthly meter reads remotely, as well as have the ability to identify leaks as they occur. The project would require 3 base stations and new infrastructure to be able to read 95% of Parksville's existing water meters. The costs associated with this project make it unfeasible in comparison to the drive-by readable water meters.

SECTION V

SELECTION OF AN ALTERNATIVE

In order to decide between the proposed project and the alternate options, there are several factors that should be identified and analyzed. These include up-front cost, operations and maintenance costs, environmental impacts, and quality of service.

Alternative number 1 presents the option of doing nothing to replace the aging infrastructure. PWD deals with frequent line breaks and leaks that create significant amounts of lost water and require repairs immediately by PWD personnel. The breaks also cause the customers to undergo boil water advisories and leads to the potential of health hazards for system users. Replacing the water lines will also be better environmentally. There will be reduced groundwater surges due to broken lines, as well as higher quality water supplied throughout the system. The option to leave the system in its current state and avoid upgrading and replacing existing water lines will have no cost initially, but each successive year will bring higher risks of maintenance and repair costs, and do not guarantee a permanent fix. Therefore, it is recommended that the problematic areas at White Oak Road, Cash Road, and Worthington Road are replaced with new PVC water line.

Alternative number 2 presents the option to build new water storage tanks. The four tanks in the system currently are the Mitchellsburg Knob Tank, Mitchellsburg Tank (Glass Lined), Parksville Tank (Glass Lined), and the Persimmon Tank (Glass Lined). In the most recent inspection performed in 2022, each tank was assessed to be in good / fair condition, and were estimated to have issues that were minor and correctable. These include resealing the interior seams and installing new anodes in the three glass lined tanks. The Mitchellsburg Knob Tank was in good condition and only requires a thorough power wash. The cost of regular maintenance will be low, as compared to a much higher cost to replace the tanks. The environmental impact of continuing to use the current tanks is negligible, as compared to replacing functional infrastructure with new materials. The quality of service will not be improved by replacing the tanks as there are currently no issues with the current tanks. Therefore, it is recommended that the tanks are maintained and continue to provide service for PWD customers.

Alternative number 3 is the option to install a full radio read meter system. This would include installing three new radio read base stations in conjunction with 6 smaller collector units, as well as new meters and antennas at each customer service. The proposed project includes replacing all the PWD meters as capable of drive-by readings but not for radio collection throughout the service area. The up front cost of Alternative 3 is much higher, and does not have a significant savings for operations and maintenance costs. There is no major difference in the environmental impact from the proposed project to the alternative. The quality of service will also not change between the two alternatives. It is recommended that PWD installs new meters that are readable from drive-by collection methods.

SECTION VI

PROPOSED PROJECT

PWD is currently experiencing diminished hydraulic performance within their distribution system due to consistent line breaks in certain parts of the system. These line breaks cause customers to be without water and contaminants to be introduced into the system, and this project proposes to replace multiple problematic and/or vulnerable areas, such as White Oak Rd and Cash Rd and seeks to replace sections of these problematic lines. In addition, PWD seeks an additional interconnection with the City of Danville on Parksville Cross Pike and proposes to install the line extension required to do so.

Also included in the project is the relocation of water main along Worthington Rd. Both of these sections of water main are parallel to creeks and the changing stream channel exposed sections of the water main, which is in imminent danger of failure in these areas. Also, a significant user at the end of Old Orchard Rd is experiencing low pressure and the upgrade of water main serving this road is proposed to improve service in the area. PWD's four water storage tanks are all due for assessment and three of them need rehabilitation based upon their last assessments. This rehabilitation will also be included in the project.

The existing SCADA system is operating on obsolete radios and PC software that is vulnerable to cyber-attack. This project will provide new up to date drive-by read radios and PC hardware and software to improve security of the system. An upgrade to the District's GIS mapping and AMR hand-held readers and software is included. See Appendix B for the proposed project map.

Project Funding will come in the form of Local ARPA Grant Funds, Cleaner Water Program Grant Funds, and a USDA RD Loan. The total cost estimate is \$2,455,000 and is outlined in detail in Appendix C.

Proposed funding for this project is being made available by the following:

Table 1: Proposed Funding

Local ARPA Grant Funds	\$598,000
Cleaner Water Program Round 2 Grant	\$900,000
USDA RD Loan ⁽¹⁾	\$957,000
TOTAL PROJECT FUNDING	\$2,455,000

(1) 3.75% loan for 40 years with principal deferred for 2 years.

The project has an anticipated start date of October 2024. The plans for the project are in the design phase and are currently approximately 70% complete. The plans has been submitted to the KY Division of Water.

PWD took a net loss in the past two years of operating. The project to replace and upgrade the water lines and infrastructure will provide relief in the form of greater water efficiency as well as fewer maintenance projects to be addressed from the operating budget.

Table 2: Short Lived Assets

Replacement Reserve - Short Lived Assets				
Type of Reserve	Use/Description	Replacement Cost	Reserve on Hand	Annual Reserve
1 - 5 Years	Vehicles	\$80,000	\$0	\$16,000
1 - 5 Years	Pumps	\$15,000	\$0	\$3,000
1 - 5 Years	Small Meters	\$10,000	\$0	\$2,000
Subtotal 1 - 5 Years				\$21,000
5 - 10 Years	Backhoe	\$80,000	\$0	\$8,000
Subtotal 5 - 10 Years				\$8,000
10 - 15 Years	Tank Rehab	\$300,000	\$0	\$20,000
10 - 15 Years	Tank Repaint	\$150,000	\$0	\$10,000
Subtotal 10 - 15 years				\$30,000
Replacement Reserve - Short Lived Assets				\$59,000

Table 3: Assets and Liabilities

Assets			Liabilities	
Savings	\$205,024		Accounts Payable	\$37,159
Debt Reserves	\$106,430		Customer Deposits	\$75,433
Accounts Receivable	\$117,353		Other	\$34,366
Prepayments	\$1,061		Long Term	
Total Current Assets	\$429,868		Long Term Debt	\$1,257,500
Land	\$135,334		Total Liabilities	\$1,404,458
Buildings	\$4,884,138			
Furniture and Equipment	\$172,167			
Other	\$103,520			
Accumulated Depreciation	\$2,761,483			
Net Total Fixed Assets	\$2,533,676			
Total Assets	\$2,963,544			

Total Assets	\$2,963,544
Total Liabilities	\$(1,404,458)
Net Worth	\$1,559,086

Total 2022 Income	\$1,004,360
2023 Proposed Income	\$1,020,000
2023 Proposed O+M	
Tanks	\$600
Water Purchasing	\$310,000
Pump Expenses	\$30,000
Transmission Costs	\$33,000
Salaries	\$328,500
Interest	\$18,600
Other Expenses	\$67,000
Total	\$787,700

SECTION VII

CONCLUSIONS AND RECOMMENDATIONS

The recommendation for PWD is to proceed with the plan to replace sections of outdated and problematic water lines, perform maintenance on the water storage tanks, create a new interconnect with Danville, and install new drive by capable water meters. There are no additional studies deemed to be necessary at this time. This project will increase the reliability of the water delivery as well as raise water quality to all customers.

It is recommended that the project be funded by Rural Development and a Letter of Conditions be issued as soon as possible.

Prepared By:

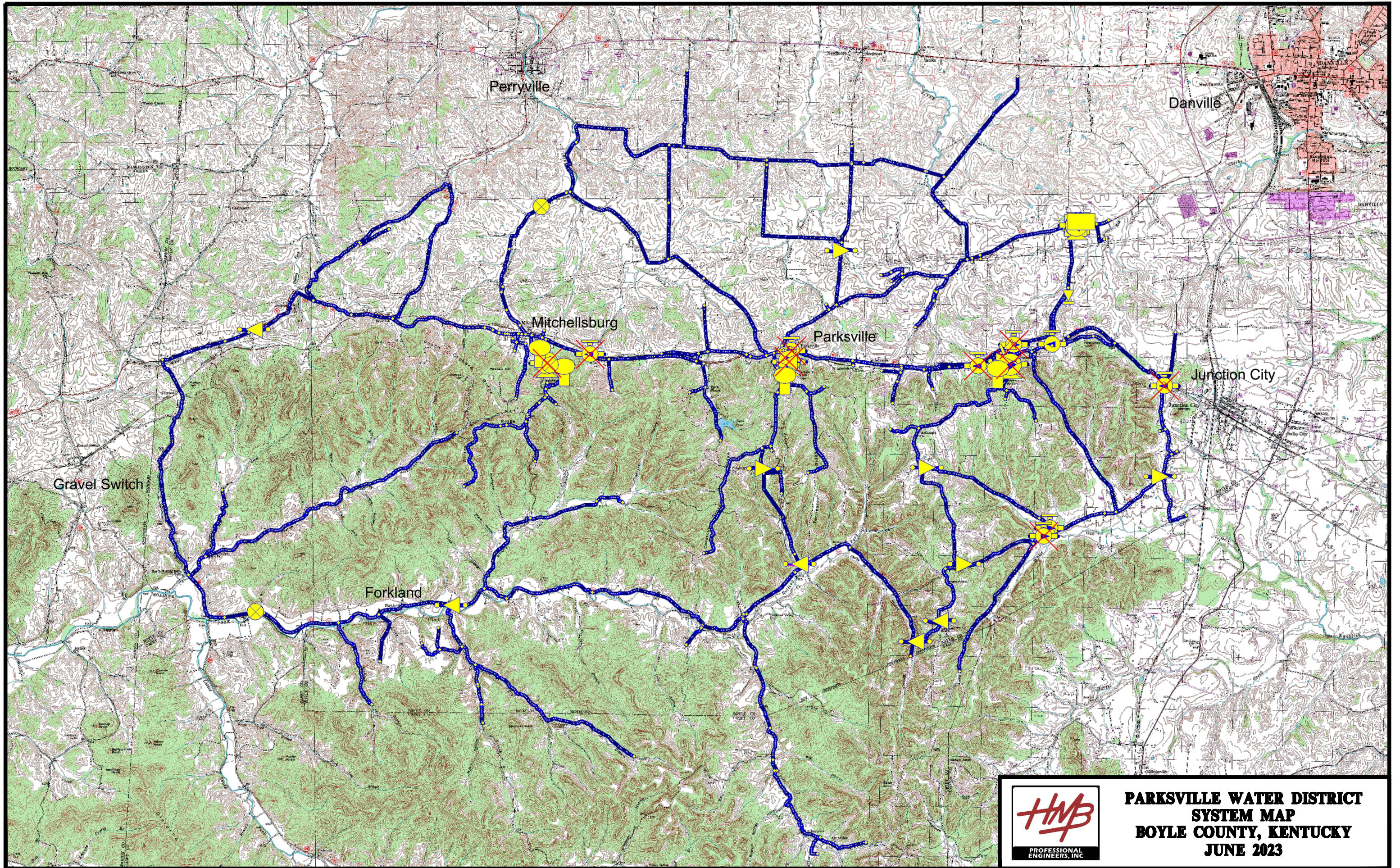
HMB Professional Engineers, Inc.

Nicholas Pilcher, PE
Water Resources Design Engineer



APPENDIX A

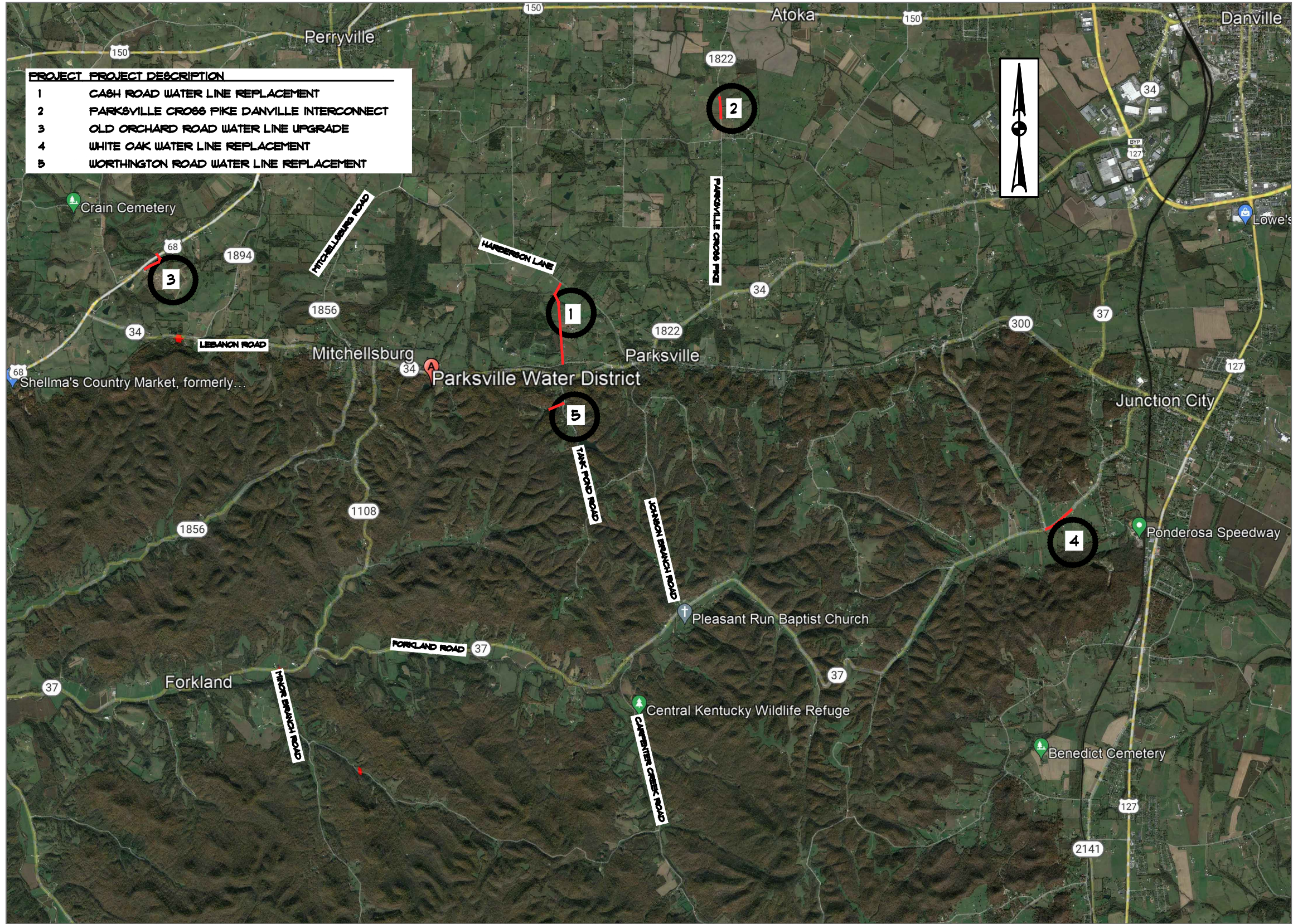
PWD SYSTEM MAP



**PARKSVILLE WATER DISTRICT
SYSTEM MAP
BOYLE COUNTY, KENTUCKY
JUNE 2023**

APPENDIX B

PROPOSED PROJECT MAP



PROJECT	PROJECT DESCRIPTION
1	CASH ROAD WATER LINE REPLACEMENT
2	PARKSVILLE CROSS PIKE DANVILLE INTERCONNECT
3	OLD ORCHARD ROAD WATER LINE UPGRADE
4	WHITE OAK WATER LINE REPLACEMENT
5	WORTHINGTON ROAD WATER LINE REPLACEMENT

NO.	DATE	REVISIONS	CHKD	APPRD	DATE

PROJECT: 435100 DATE: JULY 2023		
DESIGNED BY	NAME	DATE
DRAWN BY	NAP	07/23
CHECKED BY	NAP	07/23
RECORD DWG.	CAG	07/23



3 HMB CIRCLE
FRANKFORT, KENTUCKY
(502) 695-9800
(502) 695-9810 FAX

**PARKSVILLE WATER DISTRICT
SYSTEM UPGRADES
BOYLE COUNTY, KENTUCKY
LOCATION MAP**

SHEET
LM

APPENDIX C

COST ESTIMATE



Water Resources
 Transportation
 Surveying
 Environmental

Project: 4337.00
 Date: 7/25/2023
 Engineer: NAP
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**Opinion of Probable Cost
 for
 Water System Improvements 2021 Project
 Parksville Water District**

White Oak Road WL Replacement:

<u>Item No.</u>	<u>Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Total</u>
1.	6" PVC SDR 21 Water Main	1,060	LF	\$50	\$53,000
2.	Tracer Wire	1,060	LF	\$2	\$2,120
3.	6" x 4" Tapping Sleeve and Valve	1	EA	\$6,000	\$6,000
4.	6" x 6" Tapping Sleeve and Valve	1	EA	\$7,000	\$7,000
5.	Customer Service Reconnection	4	EA	\$1,500	\$6,000
6.	#57 Crushed Stone	50	LF	\$30	\$1,500
7.	12" Steel Casing by Bore and Jack	90	LF	\$250	\$22,500
8.	#9M Crushed Stone Bedding	10	TN	\$30	\$300
9.	Add'l 3/4" HDPE Service Tubing	200	LF	\$35	\$7,000
10.	Cleanup & Restoration	800	LF	\$2	\$1,600
11.	Pre-Construction Video	1	LS	\$1,000	\$1,000
Construction Subtotal					\$108,020
USE					<u>\$110,000</u>

White Oak Alternates:

7A.	Bituminous Pavement Replacement	50	LF	\$140	\$7,000
7B.	12" Steel Casing by Bore	50	LF	\$220	\$11,000

Water Storage Tank Rehabilitation

1.	Water Tank Assessment	4	EA	\$5,000	\$20,000
2.	Mitchellsburg Tank Rehabilitation	1	LS	\$50,000	\$50,000
3.	Parksville Tank Rehabilitation	1	LS	\$70,000	\$70,000
4.	Persimmon Knob Tank Rehabilitation	1	LS	\$85,000	\$85,000
5.	Temporary Storage/Pumping/VFD Installation	3	EA	\$30,000	\$90,000
6.	Pre-Construction Video	3	EA	\$500	\$1,500
Construction Subtotal					\$316,500
USE					<u>\$317,000</u>



**Water Resources
Transportation
Surveying
Environmental**

Project: 4337.00
Date: 7/25/2023
Engineer: NAP
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**Opinion of Probable Cost
for
Water System Improvements 2021 Project
Parkville Water District**

Water System Improvements:

Parkville Cross Pike - Danville Interconnection

1.	4" PVC SDR21 Water Main	1,400	LF	\$40	\$56,000
2.	Tracer Wire	1,400	LF	\$2	\$2,800
3.	Connection to Existing Line	1	LS	\$3,500	\$3,500
4.	4" Gate Valve and Box	2	EA	\$3,500	\$7,000
5.	Master Meter, Vault & Installation	1	LS	\$25,000	\$25,000
6.	Customer Service Reconnection	3	EA	\$1,500	\$4,500
7.	#57 Crushed Stone	50	LF	\$60	\$3,000
8.	Free Bore Under Paved Surfaces	200	LF	\$140	\$28,000
9.	#9M Crushed Stone Bedding	40	TN	\$30	\$1,200
10.	Add'l 3/4" HDPE Service Tubing	300	LF	\$35	\$10,500
11.	Cleanup & Restoration	1,400	LF	\$2	\$2,800
12.	Pre-Construction Video	1	LS	\$1,000	\$1,000
Construction Subtotal					\$145,300

USE \$145,000

Cash Rd WL Replacement

1.	3" PVC SDR21 Water Main	4,800	LF	\$35	\$168,000
2.	Tracer Wire	4,800	LF	\$2	\$9,600
3.	3" x 4" Tapping Sleeve and Valve	1	EA	\$4,000	\$4,000
4.	3" x 3" Tapping Sleeve and Valve	1	EA	\$4,000	\$4,000
5.	3" Gate Valve and Box	2	EA	\$3,000	\$6,000
6.	Creek Crossing by Open Cut	100	LF	\$100	\$10,000
7.	6" Steel Casing by Bore and Jack	110	LF	\$150	\$16,500
8.	Customer Service Reconnection	12	EA	\$1,500	\$18,000
9.	#57 Crushed Stone	400	LF	\$30	\$12,000
10.	#9M Crushed Stone Bedding	40	TN	\$30	\$1,200
11.	Add'l 3/4" HDPE Service Tubing	100	LF	\$35	\$3,500
12.	Cleanup & Restoration	5,000	LF	\$2	\$10,000
13.	Pre-Construction Video	1	LS	\$1,000	\$1,000
Construction Subtotal					\$263,800

USE \$265,000



Opinion of Probable Cost
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Parksville Water District

Water System Improvements:

Worthington Rd Relocation

1.	3" PVC SDR21 Water Main	1,100	LF	\$35	\$38,500
2.	Tracer Wire	1,100	LF	\$2	\$2,200
3.	3" Tapping Sleeve and Valve	1	EA	\$3,500	\$3,500
4.	3" Gate Valve and Box	1	EA	\$3,000	\$3,000
5.	6" Steel Casing Pipe Road Crossing by Open Cut	30	LF	\$250	\$7,500
6.	Asphalt Replacement	20	LF	\$120	\$2,400
7.	Customer Service Reconnection	9	EA	\$1,200	\$10,800
8.	Cleanup & Restoration	1,100	LF	\$2	\$2,200
9.	Pre-Construction Video	1	LS	\$500	\$500

Construction Subtotal \$70,600

USE \$70,000

Old Orchard Rd Upgrade*

1.	4" PVC SDR21 Water Main	1,500	LF	\$40	\$60,000
2.	Tracer Wire	1,500	LF	\$2	\$3,000
3.	Connection to Existing Line	1	LS	\$3,500	\$3,500
4.	4" Gate Valve and Box	2	EA	\$4,000	\$8,000
5.	3" Gate Valve and Box	1	EA	\$3,500	\$3,500
6.	8" Steel Casing By Bore and Jack	200	LF	\$250	\$50,000
7.	Customer Service Reconnection	3	EA	\$1,000	\$3,000
8.	Extend Existing Culvert	1	EA	\$4,000	\$4,000
9.	#57 Crushed Stone	50	LF	\$30	\$1,500
10.	#9M Crushed Stone Bedding	20	TN	\$30	\$600
11.	Add'l 3/4" HDPE Service Tubing	50	LF	\$35	\$1,750
12.	Cleanup & Restoration	1,500	LF	\$2	\$3,000
13.	Pre-Construction Video	1	LS	\$1,000	\$300

Construction Subtotal \$142,150

USE \$142,000

* Project to be Included if Funding Allows

Automated Meter Reading Installation

<u>Item No.</u>	<u>Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Total</u>
1.	Sensus 520M Single Port Meter Transceiver Unit (MXU)	1,750	EA	\$185	\$323,750
2.	5/8" x 3/4" iPerl TR/PL Water Meter, 1G Read	1,700	EA	\$165	\$280,500
3.	Water Meter Installation	1,650	EA	\$70	\$115,500
4.	Large Water Meters (8-1", 2-1.5", 4-2" Sensus Omni T2's)	1	LS	\$8,610	\$8,610
5.	Large Water Meter Installation	14	EA	\$300	\$4,200
6.	M4700 Vehicle Gateway Basestation (VGB) with Laptop	1	EA	\$24,000	\$24,000
7.	Trimble Ranger 5 Handheld Device	3	EA	\$5,000	\$15,000
8.	Sensus Command Link II	3	LS	\$750	\$2,250
9.	Software Package, Setup, Integration, and Training	1	LS	\$20,000	\$20,000
10.	CITCO Support and PM Costs	1	LS	\$20,000	\$20,000
11.	Misc. Meter Equipment Replacement	1	LS	\$5,000	\$5,000

Construction Subtotal \$818,810

USE \$820,000



Water Resources
 Transportation
 Surveying
 Environmental

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**Opinion of Probable Cost
 for
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 Parkville Water District**

Other Items

<u>Item No.</u>	<u>Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Total</u>
1.	Map Book Update (BGADD)	1	LS	\$5,000	\$5,000
2.	Ten (10) Replacement Radios (9 sites + 1 spare) and Programming	1	LS	\$20,000	\$20,000
3.	One (1) Replacement 15 Amp Pump and Motor Assembly and Two Starters and Install	1	LS	\$18,000	\$18,000
4.	One (1) Replacement 25 Amp Pump and Motor Assembly and Two Starters and Install	1	LS	\$22,000	\$22,000
				Construction Subtotal	\$65,000
				USE	<u>\$65,000</u>

Project Costs

Construction

White Oak Rd WL Replacement	\$110,000
Water Tank Rehabilitation	\$317,000
Parkville Cross Pike Interconnection	\$145,000
Cash Rd Replacement	\$265,000
Worthington Rd Relocation	\$70,000
Old Orchard Rd Upgrade	\$142,000
AMR Meter Upgrade	\$820,000
Other Items	\$65,000
	Subtotal \$1,934,000
Construction Contingencies (10%)	\$190,000

Total \$2,124,000

Engineering (per RD Fee Scale)

Preliminary Engineering	\$15,000
Design	\$104,000
Advertising & Bidding	\$15,000
Construction Administration	\$30,000
Construction Observation	\$90,000
Environmental (CatEx Only)	\$11,000
PSC (RD Format Only)	\$2,000
American Iron & Steel Monitoring	\$5,000
	Subtotal \$272,000

Legal and Admin

Local Counsel (RD Fee Scale)	\$6,000
Bond Counsel (RD Fee Scale & RD Funding Only)	\$15,000
Wage Rate Monitoring	\$10,000
Funding Admin	\$25,000
	Subtotal \$56,000

Grand Total \$2,452,000

USE \$2,455,000



Water Resources
 Transportation
 Surveying
 Environmental

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**Rural Development Loan Projection
 for
 Parkville Water District**

Parkville Project Related Costs to Date:

Computer System Upgrade	\$18,000.00
Scrubgrass and Forkland Creek Crossing Emergency Repairs	\$64,870.00
Creek Crossing Project Costs (Design and Construction)	\$496,130.00
Projected Alum Springs Emergency Repair Costs	\$68,000.00

Subtotal PWD Project Expenses **\$647,000.00**

Total ARPA Funding	\$1,245,000.00
Subtotal PWD Expenses	\$647,000.00

Remaining ARPA Funding for 2021 System Improvements Project **\$598,000.00**

Total Projected Cost for 2021 System Improvements Project	\$2,455,000.00
ARPA Funding for 2021 System Improvements Project	\$598,000.00
Total CWP Funding	\$900,000.00

Projected USDA RD Loan	\$957,000.00
Interest Rate	3.75%
Term (Years)	40

Approximate Annual Payment	\$46,250.00
Approximate Monthly Rate Impact (1650 Meters)	\$2.34