

# 2019 Water System Improvements Project

Preliminary Engineering Report  
Meade County Water District



August 2019



*Handwritten signature and date: 8/13/19*

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**1. Project Planning**

Introduction

Meade County Water District (MCWD) provides potable water to a majority of Meade County not including the City of Brandenburg (COB) and City of Muldraugh along the eastern part of Meade County. MCWD distributes water only and does not produce and treat water for consumption as potable water. MCWD purchases all of its water from Hardin County Water District No. 1 (HCWD1) from the south eastern section of the distribution system.

In order to improve water quality for its customers, reduce disinfection byproducts (DBPs) in the drinking water, increase system resiliency throughout the distribution system and provide water to meet existing and future system demands, MCWD is planning to implement a series of improvements to provide system redundancy, improve system hydraulics, and increase customer base for the entire MCWD distribution system.

This Preliminary Engineering Report (PER) will detail the goals of the project by reviewing and evaluating the existing interconnects and grid ties within MCWD's distribution system and extending service to additional customers. This report will also provide a current look at the project budgetary numbers.

Existing Facilities

MCWD currently serves over 4,900 residential and commercial customers in Meade County, Kentucky. MCWD also has two wholesale customers, the City of Louisville (Otter Creek Park) and Doe Valley Inc. The service area includes areas west of the Fort Knox Military Reservation and outside the limits of the City of Brandenburg. Communities currently served by MCWD include Flaherty, Ekron, Payneville-Battletown, Wolf Creek, and Concordia.

Due to the inability of the City of Brandenburg to convert their treatment process to

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chloramines, MCWD now purchases all of its potable water wholesale from the Hardin County Water District (HCWD) No. 1.

HCWD No. 1 provides potable water to MCWD through various interconnects. The primary interconnect is at KY 313 and KY 1882. This interconnect along with KY 313 BPS feeds the 952 Pressure Zone (PZ) and three elevated tanks. Another interconnect is provided from HCWD No. 1 at New Salem Church Rd, which feeds the Sand Hill area by gravity. Pressure is provided from HCWD No.1 Brizendine Tank/1085 PZ.

Back-up interconnects from HCWD No. 1 are provided at KY 144 BPS and KY 1600 (gravity) interconnects.

When MCWD converted to chloramines the interconnect and supply of water from the City of Brandenburg was taken out of service.

The major components of MCWD's distribution system are three water storage tanks, three booster pump stations, and water lines. The tanks and booster pump stations in the system include:

- Garrett Elevated Tank (OE 952) - 300,000 gallons
- Payneville Elevated Tank (OE 952) - 300,000 gallons
- Flaherty Elevated Tank (OE 952) - 500,000 gallons
- KY 144 BPS – two (2) constant speed pumps, rated at 350 GPM; the KY 144 Pump Station serves as an emergency/back-up station and is only utilized when HCWD No. 1 closes the KY 1600/KY 920 Interconnect.
- KY 313/1882 Interconnect and BPS– two (2) 60 HP variable speed pumps rated at 1,000 GPM; this facility is an above ground duplex pumping station, which serves as the primary pump station and interconnect that provides water supply to the entire MCWD system.

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The existing distribution system consists of approximately:

- 4 miles of 2-inch PVC
  - 5 miles of 3-inch PVC
  - 48 miles of 4-inch PVC
  - 75 miles of 6-inch PVC/DI
  - 59 miles of 8-inch PVC/DI
  - 10 miles of 10-inch PVC/DI
  - 4.8 miles of 12-inch PVC
- 208 miles total

This entire distribution system, except for the Sandy Hill area, is served by a single pressure zone (952). Average daily demand is approximately 845, 000 gallons per day. During peak periods, the system's maximum daily demand is 1,000,000 GPD.

Even though recent expansions were completed in 2018 there remains numerous dead end mains which cause concerns if there is a water main break out in the system. Water quality also becomes a concern at dead end mains due to the potential of low usage in the area causing the water to not be able to turn over. By constructing grid ties it gives the water a continuous flow path to turn over more frequently. There are also households within the MCWD service area that are currently not served by the district.

## **2. Design & Alternatives Considered**

### **Alternative 1**

To alleviate dead end mains, increase flow and pressure, improve water quality and provide redundancy in the distribution system, MCWD plans to design and construct 12 grid ties consisting of approximately 1,000 LF of 8-inch water main, 19,300 LF of 6-inch water main, and 8,100 LF of 4-inch water main.

MCWD also plans to design and construct 18 water main extensions throughout its distribution

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system, along state and county roadways, to add potentially 150 new customers. These water main extensions would consist of 950 LF of 8-inch water main, 32,950 LF of 6-inch water main, and 21,800 LF of 4-inch water main.

See Figure 1 in Appendix A for a breakdown and location of each proposed grid tie and water main extension.

To help determine where the grid ties should be constructed the MCWD and HCWD No. 1 pipe networks and facilities (tanks, pump stations) were combined to perform a hydraulic analysis to determine flow rates and pressures at existing and new grid tie locations. Various scenarios were modeled for average day and peak hour demand conditions.

The line extensions were determined by looking at where the underserved areas are located and where future growth is anticipated to take place.

*Alternative 2*

A do nothing alternative was considered. Under this alternative no action was taken and the MCWD continues operations as normal with inadequate redundancy and dead end lines.

**3. *Selection of Alternative***

Alternative 1 was selected because it increases redundancy and resiliency in MCWD's distribution system as well as extending service to an additional 195 potential customers. If Alternative 2 was selected the dead end mains would remain and the underserved area of the service area would remain without access to water and redundancy would be lacking leaving the MCWD vulnerable to main breaks that could leave customers without water for an undetermined amount of time while the break is repaired. Alternative 2 was not a viable option for the MCWD.

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**4. Proposed Project**

Project Design

The design includes approximately 28,400 LF of 4-inch, 6-inch, and 8-inch water main for twelve (12) grid ties and 52,600 LF of 4-inch, 6-inch, and 8-inch water main for main extensions along eighteen (18) roadways. The water mains will be constructed throughout the MCWD distribution system. Figure 1 in Appendix A is a detailed map showing the locations of the proposed grid ties and water main extensions.

Proposed Budget – Table 1

Table 1 below shows the current budget for the proposed project. The project will be financed with USDA – Rural Development Loan.

*Table 1*

<b>BUDGET INFORMATION</b>		
	<i>Cost Category</i>	<i>Cost</i>
1	Administrative Expenses	\$10,000
2	Legal Expenses	\$20,000
3	Land, Appraisals, Easements	\$5,000
4	Planning	\$35,000
5	Engineering Fees - Design	\$120,906
6	Engineering Fees - Construction	\$30,226
7	Engineering Fees - Inspection	\$91,013
8	Engineering Fees – Other	\$5,000
9	Construction	\$1,962,750
10	Miscellaneous	\$30,000
11	Contingencies	\$196,275
12	<b>TOTAL PROJECT COSTS</b>	<b>\$2,506,170</b>

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*Permit Requirements*

Kentucky Division of Water – 401 Water Quality Certification

Kentucky Division of Water – Approval to Construction

Kentucky Transportation Cabinet – Encroachment Permit

Meade County Road Department – Encroachment Approval

*Sustainability Considerations*

This project is designed to accommodate growth for the next 20 years. The pipeline assets will have a 50 plus year lifespan.



## Appendix A


Figure 1 – Project Location Map

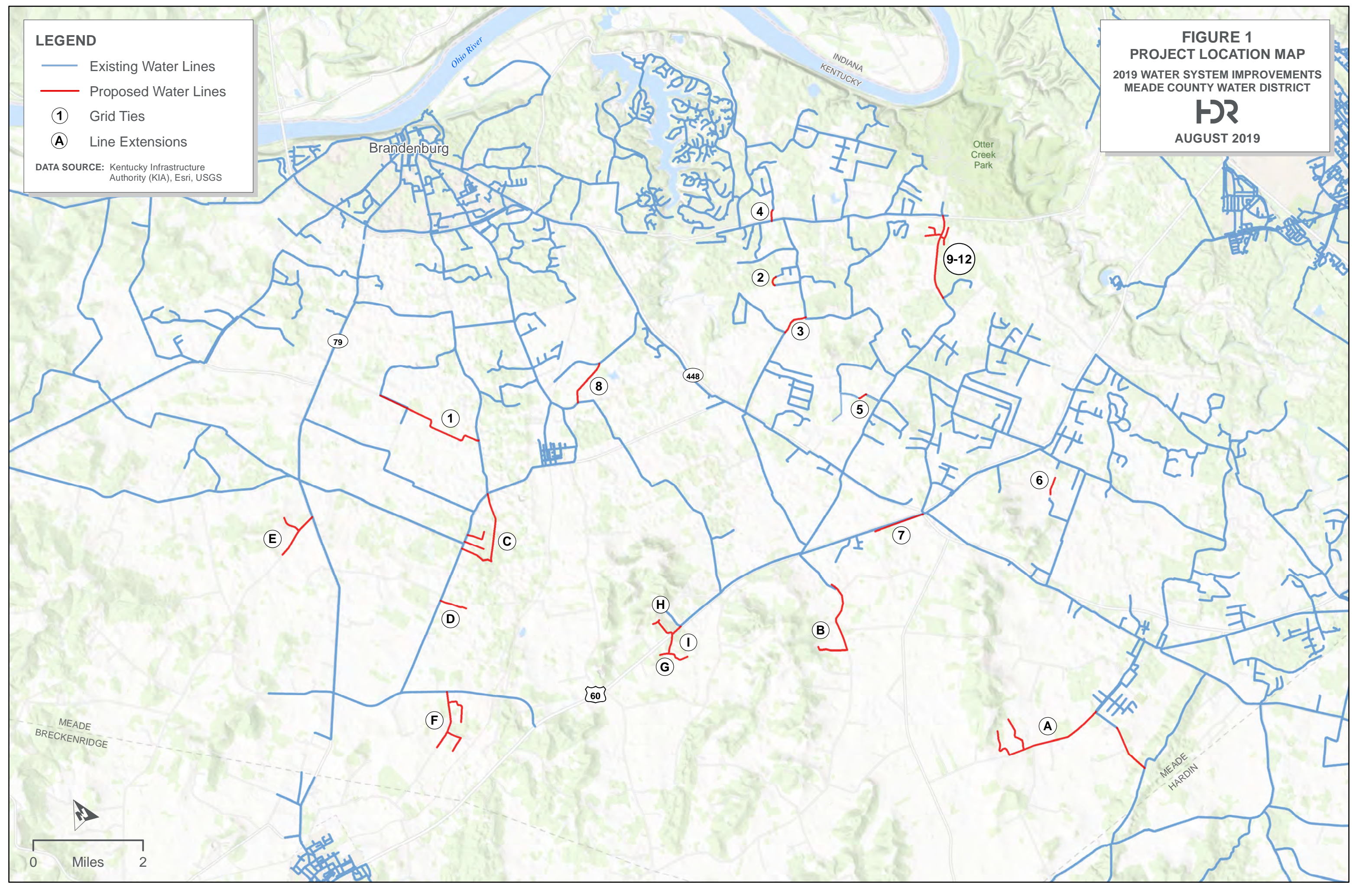
Table 2 – Preliminary Construction Cost Estimate

**LEGEND**

- Existing Water Lines
- Proposed Water Lines
- ① Grid Ties
- Ⓐ Line Extensions

DATA SOURCE: Kentucky Infrastructure Authority (KIA), Esri, USGS

**FIGURE 1**  
**PROJECT LOCATION MAP**  
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**Table 2 - Preliminary Construction Cost Estimate**

No.	Location	Pipe Size	Quantity	Unit Price	Proposed Cost
<b>GRID TIES</b>					
①	Fred Fackler To Old State Road	6	6,600 LF	\$25	\$165,000
②	Tammy Lane to Williards Lane	4	1,300 LF	\$20	\$26,000
③	Buckgrove Rd. (Mobley to Gaines Road)	6	2,000 LF	\$25	\$50,000
④	M. Cain Road to 1638	6	900 LF	\$25	\$22,500
⑤	Buck Knob's Gap	4	800 LF	\$20	\$16,000
⑥	Whelan Road Gap	4	2,600 LF	\$20	\$52,000
	Thompson Lane to US 60	6	0 LF	\$0	\$-
⑦	US 60 Gap to Brandenburg Road	8	1,000 LF	\$30	\$30,000
⑧	Farris Road (Doe Run to Shumate)	6	3,500 LF	\$25	\$87,500
	Dave Smith Rd. to Payne Road	6	0 LF	\$0	\$-
	Sirocco Rd. (Navajo Tr. to Midway Road)	6	0 LF	\$0	\$-
⑨	Garrett Rd. (Ritchie Dr. to 1638)	6	6,300 LF	\$25	\$157,500
⑩	Spike Buck	4	1,200 LF	\$20	\$24,000
⑪	Fawn Lane/ Doe Court	4	800 LF	\$20	\$16,000
⑫	Folkhorn	4	1,400 LF	\$20	\$28,000
<b>LINE EXTENSIONS</b>					
A	Sand Ridge to St. Martins via Lancaster	6	6,150 LF	\$25	\$153,750
	St. Martins to Tucker Road	6	7,400 LF	\$25	\$185,000
	Vessels Road	4	2,700 LF	\$20	\$54,000
	Tucker Road	4	1,900 LF	\$20	\$38,000
B	Stith Valley Road	6	5,000 LF	\$25	\$125,000
	Springdale Road	4	2,500 LF	\$20	\$50,000
C	Old State Road (144 to Kennedy Road)	6	5,100 LF	\$25	\$127,500
	Kennedy Road	6	2,500 LF	\$25	\$62,500
	Ridge Point Drive	4	1,500 LF	\$20	\$30,000
	Point Salem Drive	4	2,000 LF	\$20	\$40,000
D	Country Lane	4	2,000 LF	\$20	\$40,000
E	Sandy Hill Road (Midway) to Meyer Lane	6	3,700 LF	\$25	\$92,500
	Gobbler Knob Road	4	1,000 LF	\$20	\$20,000
F	Charlie Pile Road (Guston)	6	3,100 LF	\$25	\$77,500
	Guy Court, Fallen Road, Oaks Lane	4	5,200 LF	\$20	\$104,000
G	Green Meadow Road	4	1,500 LF	\$20	\$30,000
H	Forrest Hill Road	4	1,500 LF	\$20	\$30,000
I	US 60 Extension to Green Meadow Rd.	8	950 LF	\$30	\$28,500
<b>Preliminary Opinion of Probable Construction Cost</b>					<b>\$1,962,750</b>