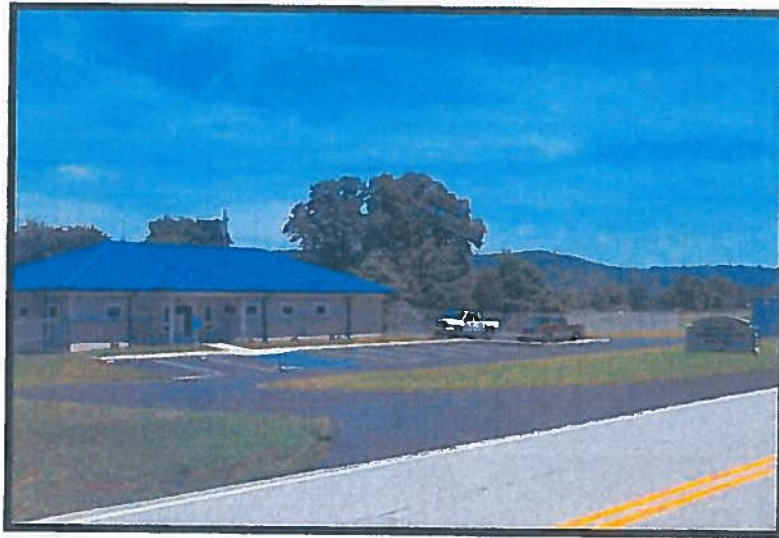


**WESTERN MASON WATER DISTRICT
WATER SYSTEM IMPROVEMENTS
PRELIMINARY ENGINEERING REPORT**



***WESTERN MASON WATER DISTRICT
2573 Mary Ingles Highway
Dover, KY 41034
January 2019***



WESTERN MASON WATER DISTRICT PRELIMINARY ENGINEERING REPORT WATER SYSTEM IMPROVEMENTS

I. GENERAL

The Western Mason Water District (WMWD) was formed in 1958. The existing system consists of approximately 100 miles of water lines with four distribution water storage tanks, three booster pump stations, two well pump stations and one water treatment plant with a capacity of .75 MGD that serve approximately 1,157 customers in Mason County.

II. PROJECT PLANNING AREA

A. Location

The WMWD is located in Northern Kentucky in the City of Dover in Mason County. The WMWD serves the majority of western Mason County including the communities of Dover, Minerva and Germantown along with a few customers in Bracken County.

The topography of Mason County is rolling to hilly, with the area of lowest local relief being in the southern part of the county. The greatest local relief is in the vicinity of the Ohio Valley. Ridgetop elevations of 900 feet are common throughout the county. The highest elevation in the county, 1,000 feet, is found on a ridge 1.5 miles west of Mays Lick on the drainage divided between the Licking River and the North Fork of the Licking River. Elevations of communities within the WMWD service area include Dover at 520 feet, Germantown at 960 feet and Minerva at 940 feet.

B. Environmental Resources

The major environmental features within the proposed area feature a variety of landforms and topographic changes from extremely steep to relatively flat terrain. The gradual undulating terrain allows for potable water to be transported with limited booster stations. Water pressures range from 30 psi to over 185 psi in sections of the system. Many of the hollows are in floodplains in particular along the Ohio River along the northern boundary of the county. No known historic sites are noted in the planning area.

C. Growth Areas and Population Trends

The census information reviewed shows a slight decrease in the population projections over the next twenty years. Since the establishment of the WMWD the population of Mason County has continued to grow. The growth of the

Western Mason Water District's system can be attributed to numerous water distribution expansion projects. The population projections for Mason County are shown below.

	<u>2020</u>	<u>2025</u>	<u>2030</u>	<u>2035</u>	<u>2040</u>
Population	17,106	17,074	16,941	16,725	16,448

III. EXISTING FACILITIES

A. Location Map

A map of the project showing the extent of the water system improvements is located at the end of this report.

B. History

The WMWD system was originally built in the late 1950's. The WMWD produces the majority of its water but does have emergency connections with the City of Maysville and the Bracken County Water District. Numerous water line extension projects have been developed over the past 50 years to establish the current WMWD customer base which serves approximately 97% of potential customers in the service area of western Mason County.

C. Condition of Facilities

WMWD currently produces an average of 250,000 gallons a day to serve its customers and a small portion of the customers within the eastern portion of the Bracken County Water District. The system is in good to fair condition and work continues to improve the older, undersized sections of the WMWD.

Several of the original transmission water mains that transport the majority of the WMWD water to its customers are undersized. During periods of peak demand WMWD can experience difficulty in keeping certain water storage tanks adequately supplied and customers can experience underserved water supply/pressure; in particular a main transmission main along Dover Minerva Road that feeds the southern portion of the system and ultimately the entire system.

D. Financial Status

Annual audits will be submitted to Rural Development as required by the RD bond issue. A customer breakdown will be provided in the Summary Addendum.

As with the majority of utilities across the country, the WMWD has seen its operating expenses rise over the past several years. Electric costs and health insurance are the expenses that have seen the largest increase.

IV. NEED FOR THE PROJECT

A. Health and Safety

The proposed project will upgrade and replace approximately 11.3 miles of distribution mains that are predominantly of asbestos cement material, but also includes some PVC, ductile iron and cast iron. The project will also include replacing approximately 275 customer service meters with new radio read meters which will help to reduce operational expenses. Improving water turnover/water age by eliminating older, problematic distribution mains and removing dead ends by looping some of the existing water lines will improve the quality of water for residents in these particular areas and also provide alternatives for service during emergency outages.

Additionally, the project will include repairs and maintenance to the District's existing storage tanks to include installation of cathodic protection and other necessary repairs.

The project will also seek to perform repairs and improvements to the District's existing pump stations to include replacement of pumps, piping and installation of VFDs and potentially installing necessary appurtenances for generator connection and a new generator, if funding allows.

Lastly, the project will seek to enhance the existing wellhead protection program through acquisition of additional surrounding land. This will continue to ensure the safety of the ground water supply needed to serve the entire District.

Many of the families within the project areas currently receive their potable water via asbestos cement distribution water mains. Due to the age and material of these mains, breaks are more common and have led to issues with continuity of service. This exposes some families to poor quality water and limits the amount of water available to them.

The proposed project will help to improve the overall service from a water quality and reliability standpoint to the WMWD customers.

B. System O&M

By upgrading and replacing approximately 11.3 miles of distribution mains and installing VFDs to existing pump stations the WMWD will reduce their pumping costs and therefore reduce the amount of operation and maintenance budget required for the WMWD system. It will also enable the WMWD to transmit more water to its distribution system.

V. ALTERNATIVES CONSIDERED

Alternatives considered included replacing asbestos cement distribution mains with like size distribution mains but this does not provide WMWD with any hydraulic improvements which in turn help to reduce operation and maintenance expenses. An additional alternative considered was to only replace the lines as they deteriorate to the point of failure. This is cost prohibitive for the WMWD and does not benefit the customers by providing a safe, dependable, high quality product.

VI. PROPOSED ALTERNATIVE

The proposed project is to upgrade, enlarge and replace approximately 11.3 miles of predominantly asbestos cement distribution mains and replace approximately 275 customer service meters. Additionally, the project will seek to install VFDs on existing pump stations. The upgrade of distribution mains occurs primarily in the central portion of the WMWD distribution system in the vicinity of the cities of Dover and Minerva. These upgrades allow for the WMWD to hydraulically flow water to all areas of their system in an efficient manner during normal operations and it also provides alternative feeds during emergency situations.

The areas in which distribution main sizes will be replaced and increased in size include Augusta Dover Road, located west, southwest of Dover, Augusta Minerva Road in an area just south of Dover to an area just south of Minerva, a majority of the water mains within the City of Dover, South Collins Road, located south, southeast of Dover, KY Highway 10, from the community of Fernleaf to KY Highway 9, Highway 435, a portion just west of Minerva, and Germantown Road, from Moyer Road to KY Highway 9. As previously discussed, these areas are primarily in the central portion of the WMWD distribution system and will allow the WMWD to flow water efficiently throughout all areas of its system.

Additionally, the project will include installation of VFDs at existing pump stations within the WMWD distribution system. These pump stations include one located in Dover and one near Minerva. The installation of VFDs will allow WMWD to more efficiently pump water throughout its distribution system and in turn reduce operational costs. Installing necessary appurtenances for a generator connection, along with a new generator, at the stations will ensure continued operation of the system in emergency situations.

The project will also include repairs and maintenance to existing storage tanks throughout the system. These repairs include, but are not limited to, installation of cathodic protection and potential repaint and touch up of necessary areas on the tanks. The WMWD currently operates four storage tanks located near Dover, Germantown, Minerva, and along KY Highway 9 known as the Highland Heights

Tank. These improvements will continue to ensure a safe supply of potable water to the District's customers.

The project will also include the replacement of approximately 275 customer service meters with radio read meters. The replacement of these meters will create efficiencies for the WMWD in reading meters, detecting leaks, and providing improved service to its customers.

Lastly, the project will seek to enhance the existing wellhead protection area through acquisition of additional surrounding land. This will continue to ensure the safety of the ground water supply needed to serve the District's customers.

Each of the items listed above will help to improve the overall service from a water quality and reliability standpoint to the WMWD customers.

A summary of the proposed project is as follows:

	Approximate Year in Service	Approximate Age (in years)	
Upgrade and replacement of 11.3 miles of distribution main	Augusta Dover Road	1962	55
	Augusta Minerva Road	1962	55
	City of Dover	1962	55
	Highway 10	1962	55
	Highway 435	1962	55
	Germantown Road	1962	55
	South Collins Road	1984	33
Pump Station and Tank Improvements	Highland Heights Tank	1988	30
	Minerva Tank	1988	30
	Dover Tank	2008	10
	Germantown Tank	2008	10
	Well Pump #1	2008	10
	Well Pump #2	2008	10
	Dover Pump Station	2008	10
	Minerva Pump Station	2013	5

Hydraulically the project takes advantage of elevations to reduce long-term pumping costs while also improving water quality and maintaining adequate pressure in all areas of the distribution system.

The total project cost is shown on the detailed engineer estimate located at the end of the report.

It is expected that the WMWD will institute a rate increase with this project. The proposed rates and additional financial data will be presented in the Summary Addendum to the Preliminary Engineering Report that follows this report.

VII. PROPOSED PROJECT SCHEDULE

The proposed project schedule is:

1. Secure Letter of Conditions from USDA RD – September 2019
2. Secure Land/Easement/Encroachment Permits – October 2019
3. Division of Water Submittal – August 2019
4. Advertise for Bids – October 2019
5. Contract Award/Initiate Construction – January 2020
6. Substantial Completion – July 2020
7. Final Completion/Initiation of Operation – September 2020



222 East Main Street, Ste. 1 • Georgetown KY 40324

Client

WMWD

Project

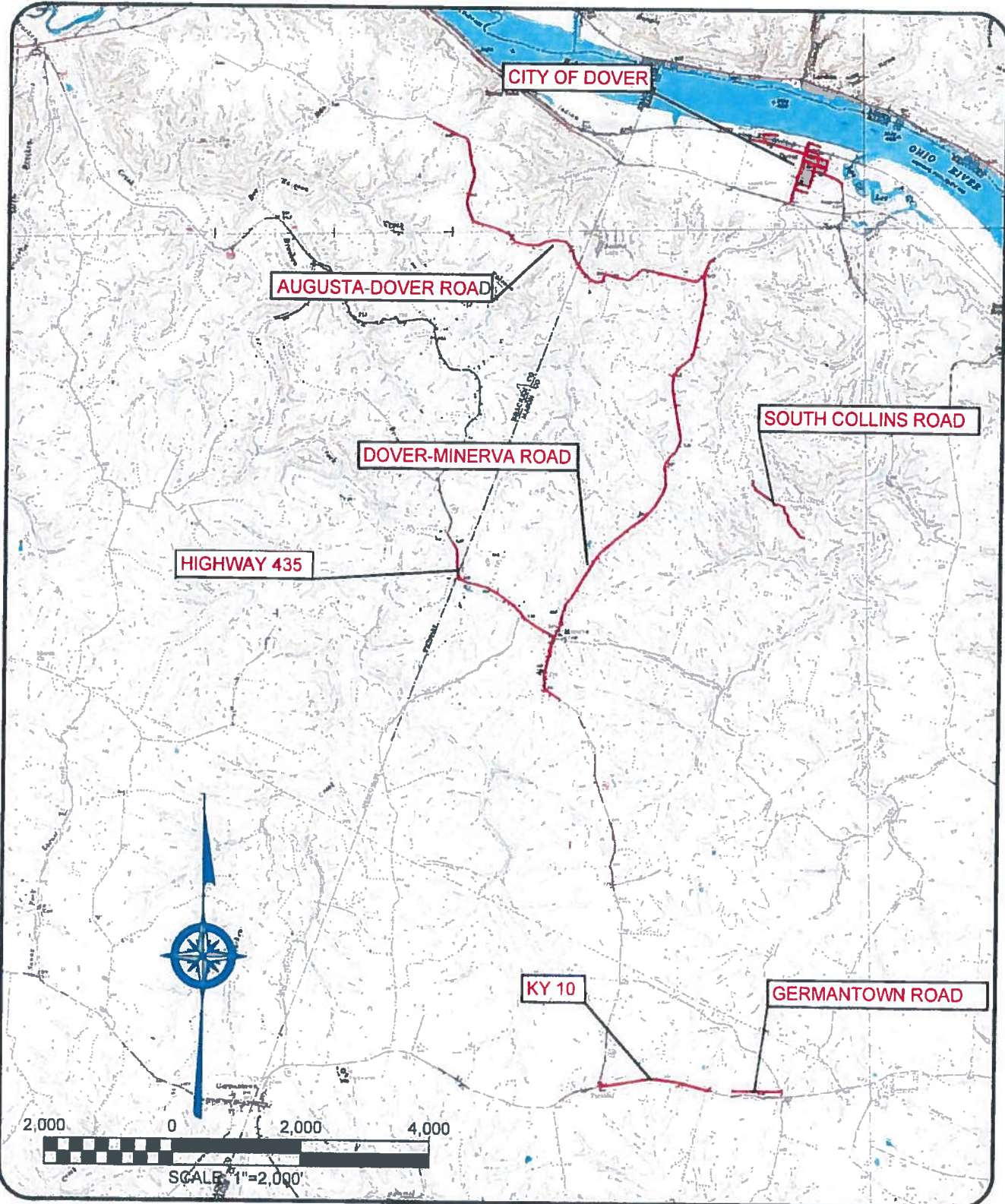
System Improvements Project

Date

Revised 7/26/19

Construction Costs					
Item #	Description	Quantity	Unit	Unit Cost	Item Cost
1	8" PVC W.M., Cl. 250	20,000	LF	\$ 20	\$ 400,000
2	6" PVC W.M., Cl. 250	16,000	LF	\$ 16	\$ 256,000
3	8" D.I.P., Class 350	400	LF	\$ 40	\$ 16,000
4	6" D.I.P., Class 350	1,000	LF	\$ 50	\$ 50,000
5	4" PVC W.M., Cl. 250	21,000	LF	\$ 13	\$ 273,000
6	3" PVC W.M., Cl. 250	6,200	LF	\$ 11	\$ 68,200
7	2" PVC W.M., Cl. 250	900	LF	\$ 10	\$ 9,000
8	Directional Drill, 4" HDPE Pipe	40	LF	\$ 40	\$ 1,600
9	Directional Drill, 6" HDPE Pipe	40	LF	\$ 45	\$ 1,800
10	Directional Drill, 8" HDPE Pipe	40	LF	\$ 50	\$ 2,000
11	Directional Drill, 10" HDPE Pipe	40	LF	\$ 55	\$ 2,200
12	Flushing Hydrant Assembly	10	EA	\$ 4,000	\$ 40,000
13	Underground Blow Off Hydrant Assembly	8	EA	\$ 2,500	\$ 20,000
14	2" Underground Blow Off Hydrant Assembly	2	EA	\$ 2,500	\$ 5,000
15	New Customer Service	267	EA	\$ 900	\$ 240,300
16	Air Release Valve	6	EA	\$ 700	\$ 4,200
17	Open Cut w/PVC Casing Pipe	350	LF	\$ 65	\$ 22,750
18	Steel Casing, Bore & Jack	300	LF	\$ 150	\$ 45,000
19	Steel Casing, Open Cut	20	LF	\$ 100	\$ 2,000
20	Tapping Sleeve & Valve	9	EA	\$ 2,000	\$ 18,000
21	Connection to Existing W.M.	6	EA	\$ 1,750	\$ 10,500
22	Cut & Plug Existing W.M.	12	EA	\$ 600	\$ 7,200
23	8" Gate Valve & Box	9	EA	\$ 1,250	\$ 11,250
24	6" Gate Valve & Box	11	EA	\$ 850	\$ 9,350
25	4" Gate Valve & Box	2	EA	\$ 750	\$ 1,500
26	3" Gate Valve & Box	20	EA	\$ 750	\$ 15,000
27	2" Gate Valve & Box	3	EA	\$ 650	\$ 1,950
28	Additional Service Tubing	500	LF	\$ 10	\$ 5,000
29	Railroad Crossing w/steel casing bore & D.I. carrier pipe	2	EA	\$ 20,000	\$ 40,000
Total - Construction Cost					\$ 1,578,800
Non-Construction Costs					
Contingencies @ 10.0%					\$ 157,880
Administrative & Legal Expenses					\$ 15,000
Interest Expenses					\$ 25,000
Land, Appraisals, Easements					\$ 15,000
Planning					\$ 20,000
Engineering Fees - Design					\$ 90,130
Engineering Fees - Construction Administration					\$ 38,630
Engineering Fees - Inspection					\$ 79,270
Engineering Fees - Other					\$ -
Total - Non-Construction Costs					\$ 440,910
Total - Project Costs					\$ 2,019,710

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**WATER SYSTEM
IMPROVEMENTS PROJECT
FOR
WESTERN MASON WATER DISTRICT**

Project No	18026
Date	1/2019
Dwg No	1