Example Preliminary Engineering Report for Grant Applicants

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Introduction

McDowell County is a rural county located within the Catawba River Basin in western North Carolina at the eastern foot of the Blue Ridge Mountains. The county covers approximately 442 square miles and contains a population of approximately 42,151 persons. It contains two incorporated municipalities and many small, unincorporated communities. The largest incorporated area within the county is the City of Marion with a population of approximately 6,343 persons. Marion is located in Central McDowell County and is the county seat. McDowell County borders Buncombe, Yancey, Mitchell, Avery, Burke, and Rutherford counties of North Carolina.

McDowell County provides water service into the Nebo Community of eastern McDowell County to service residential and commercial customers. Water service was extended to the Harmony Grove Road/I-40 Interchange in 2017 to provide services to several residents who had experienced water quality and/or quantity issues with their private wells.

McDowell County has authorized Davis Civil Solutions, P.A. to prepare this Preliminary Engineering Report (PER) to outline and define the need for a municipal potable water distribution system within the area. The proposed project detailed within this report will extend water service and fire protection to the area surrounding Exit 90 off Interstate 40 to serve several businesses located outside of the current service area. The project consists of two primary line extensions, one along Burma Road East and a second along Boyd Road. These lines will provide a reliable water source for four businesses that employ a total of 10 employees, and a new industrial/commercial greenfield development. In addition to these businesses, the proposed water lines will also pass six residences and one house of worship that will be eligible for water service.

Existing Facilities

McDowell County has water potable water service available to approximately 354 connections in the Nebo and Harmony Grove Road communities with an approximate service area population of 852 people. The system consists of approximately 21 miles of 2-inch through 12-inch water lines and associated appurtenances. Potable water for this system is provided by the City of Marion via an interconnection of these systems. The current water service area in the vicinity of the project area is limited to Harmony Grove Road and terminates at the 1-40 East Bound on and off ramps.

The City of Marion currently withdraws raw water from Mackey Creek, Clear Creek, and Buck Creek. The maximum daily withdrawal from these sources totals 4.1 MGD with the total available supply being 4.3 MGD. The existing water treatment plant is rated for 4.0 MGD of finished water production, with current average and maximum daily demands of
1.6 MGD and 2.9 MGD respectively.
Finished water storage for the distribution system is supplied via four (4) storage tanks having a combined capacity of 5.2 MGD. The City of Marion maintains six (6) booster pump stations to fill the storage tanks. Water is delivered to system customers through a network of pipes ranging in size from 2-inch to 24-inch in diameter. The majority of the distribution lines are constructed of PVC.

Environmental

The water lines will be installed along existing NCDOT-road shoulders with minimal impact to previously undisturbed areas. No environmental permitting is anticipated as all construction will follow regularly maintained road shoulders.

There are no wetlands in the proposed project area that will be impacted by the proposed project. Erosion and sedimentation control during construction will be minimal and the disturbed acreage for the proposed project will be minimal and is well below the threshold for formal erosion control permitting.

The project area does not include any public lands, scenic, recreational, or State natural areas.
The project area does not include any known archaeological or historical sites.

Proposed Improvements

East and Boyd Road. These extensions include the installation of approximately 2,700 LF of new 8-inch DIP to provide municipal potable water service to residents and businesses in the area. In addition, the project will provide fire protection to the area by including fire hydrants, gate valves, and all other accessories and appurtenances.

The extension of public water to the various business sites will provide a reliable water source for these employers. The stable supply will allow the businesses to maintain sustainability. The four businesses on Burma Road East employ a total of approximately ten people. It is anticipated that the existing employers will maintain their current level of employment, if not increase their payrolls due to the availability of public water. The availability of public water to the new industrial/commercial development greenfield site will greatly expand the job creation opportunities for these buildings beyond what is possible with a private well. For example, the new water line would allow for a sprinkler, which is typically impossible with a well. In addition, the availability of public water will improve the marketability and development opportunities for existing greenfield sites in these corridors.

Permitting requirements for the proposed improvements include a Plan and Specification Approval and an Authorization to Construct from the North Carolina Department of Environmental Quality Public Water Supply Section (NCDEQ PWSS), and an encroachment agreement from the North Carolina Department of Transportation (NCDOT). These are anticipated to be approved within three months and will be applied for near the completion of the design phase.

Alternative Actions

Under the "No Action" alternative, the residents and business owners in the area would not have a reliable water source with the current existing individual well-based water supply systems. Additionally, without public water, the potential for commercial business development will be limited to what is typical of an individual well based system. For example, fire protection via hydrants or a sprinkler system would not be an option for businesses in this area without availability of a robust public water system. This alternative will not provide the infrastructure improvements needed for much needed economic activity in this area. In addition, the homes in the area will also not receive the benefits of improved water supply and fire protection. Therefore, this alternative is not considered feasible and will not be considered any further.

Construct Water System Extension

This alternative will consist of a new water line connecting to an existing 12-water on Harmony Road and installing approximately 2,700 LF of 8-inch water line and associated appurtenances along the shoulder of Burma Road East and Boyd Road. These water lines will be designed to provide municipal potable water service not only to current residents and businesses in the area but to provide the water service necessary to increase business activity and employment in the vicinity of the project area. In addition, the project will provide fire protection to the area to both the business and residential areas.

No environmental concerns are raised with this alternative, as construction would take place within existing road shoulders and NCDOT right-of-way.

Proposed Project Costs

ITEM	Description	QTY	UNIT	UNIT PRICE	TOTAL
	Mobilization (3.0%)	1	LS	$13,980.00	13,980.00
	8" DI Water line	2,700	LF	$77.00	207,900.00
	8" Compact DI Fittings	700	LBS	$6.00	4,200.00
	8" Gate Valve and Box	3	EA	$3,300.00	9,900.00
	12" x. 8" Tapping Sleeve and Valve	1	EA	$8,800.00	8,800.00
	Connect to Existing 12" Gate Valve	1	EA	$3,300.00	3,300.00
	Fire Hydrant Assembly	4	EA	$4,400.00	17,600.00
	20" x 0.125" \'Vall Thickness Steel Encasement Pipe, Bored and Jacked	100	LF	$441.00	44,100.00
	Pavement Repair	100	LF	$55.00	5,500.00
	Driveway Repair	60	LF	$33.00	1,980.00
	2" Commercial Meter and BFP	1	EA	$38,600.00	38,600.00
	6" Commercial Meter and BFP	1	EA	$82,700.00	82,700.00
	Rock Excavation	100	CY	$110.00	11,000.00
	Select Backfill	150	CY	$33.00	4,950.00
	Erosion Control	1	LS	$5,500.00	5,500.00
	Relocate Existing Automatic Flushing Station	1	LS	$2,200.00	2,200.00
	New Automatic Flushing Station	1	EA	$3,900.00	3,900.00
Construction Subtotal					**466,110.00**
	CONTINGENCY 20%				$93,200.00
	PRELIMINARY ENGINEERING				$5,000.00
	ENGINEERING DESIGN AND PERMITTING				$39,500.00
	CONSTRUCTION OBSERVATION & ADMINISTRATION				$35,000.00
	LEGAL/ ADMINISTRATIVE/ EASEMENTS				$5,000.00
	GRANT ADMINISTRATION				$10,000.00
TOTAL PROJECT COST				**$653,810.00**	

1. All costs shown are in current dollars.
2. The Engineer maintainsno control of labor costs, materials, equipment, or services furnished by others the Contractor{s}' methods for determining prices. or competitive or market conditions. The opinions herein for project and construction costs represent the Engineer's best judgment. and are based on experience and qualifications as a Professional Engineer who possesses familiarity with the construction industry. The Engineer does not guarantee the accuracy of the cost opinions which may vary from bids or actual project **and** construction costs.

Project Schedule

The proposed project will be funded through a combination of funds from McDowell County, and the ARC grant application supported by this PER. Should this critical funding be made available for the proposed project, the following schedule is proposed:

ACTIVITY	COMPLETION
Funding Procurement	October 2023
Engineering Design	February 2024
Permitting	May 2024
Advertisement for Construction Bids	June 2024
Award Construction Contract	September 2024
Construction Completion	February 2025

Conclusion

Access to a public water system is critical to support existing businesses and individual residents and provide opportunities for future growth. Private well systems are, with rare exceptions, unable to provide the same level of service as a public water system, particularly in terms of fire protection. The County has identified two areas adjacent to its existing water system that will benefit from the extension of the water system.

The award of the ARC grant would provide the necessary funding to assure that these areas can be provided with reliable, safe, and plentiful water for potable use and fire protection.

Project Map(s)