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TECHNICAL MEMORANDUM

TO:
Village of Unity 121 North Madison Street Unity, WI 54488

DATE: April 23, 2018
JOB NO.: 1814-036
ATTENTION: Heidi Maldonis
RE: Unity Preliminary Water System Report

On behalf of the Village of Unity, WI, Davy submitted the preliminary engineering report (PER) an Environmental Report (ER) to USDA-Rural Development (RD) and Wisconsin DNR on July 2nd via email. Hard copies were sent the following week to USDA-RD at their request.

The purpose of the report was to evaluate the need and requirements of a new water utility system within the Village of Unity Corporate limits. The driving force behind the project was groundwater contamination that was documented in the 1990s and early 2000s, but got more attention in 2015 when EPA had Tetra Tech perform an site assessment and documented the environmental impacts and threats to health and human safety. (reference the January 26, 2015 Tetra-Tech Final Assessment Report in the appendix of the PER).

The Village Residents and businesses currently rely on individual private wells for water supply, so there is no existing infrastructure or utility setup to provide water. Since a water supply system relies on supply source and pumping, distribution system, storage system, and treatment system (if necessary), the costs for constructing these along with establishing a utility are substantial. The PER evaluated the sizing of the water system components based on population, where to find a water source(s) and required pumping, size and location of distribution system alternatives, size and location of a storage reservoir, and based on local residential well water test results, the need for treatment system. Cost estimates were developed based on two alternatives that differed in the location of the water distribution system. Both alternatives assumed some water treatment was going to be necessary for iron and manganese.

Below is brief breakdown of each component of the Report, covered through Sections 3-5 of the report.

1. **Water Demand and sizing of pumps and storage reservoir:**
   - The water system was sized based on a resident population of 340 with an average consumption rate of 75 gallons per capita per day(gpcd) and a peak consumption rate of 263 gpcd for a total daily flow requirement of 89,420 gpd.
   - Pumps sized for a peak 2-hour demand, at 149 gpm.
   - Water tank or reservoir was sized at 100,000 gallons to provide for peak consumption and for fire protection.

2. **Water Supply**
   - Because of the geology in and around Unity, and the location of the contamination plume, a potential well site west of the Village, and west of the Little Eau Pleine River was used for estimating purposes. The Actual location will have to be determined in a well site investigation report with test wells, if the project moves forward.
   - Due to the hydrogeology in the area, we estimate multiple wells will be needed to provide sufficient capacity. Again, the size and location of the wells will be determined in the Well Site Investigation step if the project moves forward. We used (3) wells for estimating purposes. The pumps will provide a total of 150 gpm water supply.

3. **Water Distribution**
   - The Water system was sized using the minimum fire protection pipe size of 6" and at a pressure range of between 35-60 psi. Materials were PVC C900 pipe with DIP piping used for Hydrants.
   - Water services to each residence or business were sized at 1" lateral services with a shut-off valve located at each home or business property line.
   - Fire hydrants were spaced within the distribution to meet the ISO and WDNR Requirements.
   - To measure consumption, each home or business will be required to have a flow meter that would be read and reported on a quarterly basis.
   - Two alternatives were considered for layout of the water distribution system
     - Alternative #1 – ran watermains along STH 13 with boring of services under the RR tracks.
     - Alternative #2 – would NOT run water main along STH 13, but instead run laterals from mains on Madison St and Main Street to businesses/residences on STH 13. This was done to help reduce costs associated with Street repair/replacement along STH 13. It also limited water mains on East Salter Rd and CTH P to help reduce costs. This would need to be approved by PSC prior to implementation.
   - See Appendices 4-2 and 4-3 for proposed layouts of the water system in Unity.

4. **Water Quality and Treatment**
   - WDNR has specific water quality standards that must be met for municipal water systems. Test well or wells will be sampled during the Well Site Investigation phase. The PER evaluated some existing private well tests samples and considered these.
   - Based on the private well sample results, the PER did include provisions for chemical sequestration of iron and manganese. These can be removed if the test well(s) show that it is not necessary in the next phase of the project.

5. **Street Restoration**
   - Typically, watermain distribution system runs within the street rights-of-way. Some non-excavation methods can be used, but with installation of valves, hydrants, and other fittings/connections, there will be significant amount of street repairs required. A good percentage of the costs with a new distribution system are street replacement costs due to excavation.
   - The PER considered two (2) alternatives for street replacement
     - Alternative A – paving all disturbed streets with a 22-24ft wide section of hot mix asphalt (HMA)
     - Alternative B – limits the paved areas of the project to only the replacement along STH 13 and CTH P.

Sections 6 - 8 of the report evaluate project costs and funding options. Because of the size and scope of the project the Village will require assistance from one or multiple programs to be able to afford and establish and new water system utility. The PER evaluated costs for the two alternatives above listed with and without paved streets. (Alternative #1 with paved streets, Alternative #2 without paved streets or WM to Village limits) Appendix 6-1 and 6-2 contain these estimates.

The estimate cost for alternative #1 was **$7.35 Million Dollars**, with full watermain distribution and paved streets. Alternative 2 using limited paving and reducing the distribution piping was estimated at **$5.43 Million Dollars.** To cover the costs the Village will require some grant money to be supplemented with a low interest loan. Most programs below offer a loan interest loan, with some form of grant depending on qualification requirements. Interest rates for the loans are currently very low ranging from 1.056% to 4.5%. The USDA-RD loan is over a 40-year term and is currently listed at 1.5% for intermediate income levels. (Based on medium household income MHI)

Funding sources and the programs were discussed in Section 7. Programs considered are listed below:
- USDA-RD
- Wisconsin DNR Safe Drinking Water Program (SDWLP)
- EPA Trust Funds and State and Tribal Assistance Grant (LUST, STAG)
- Wisconsin State Trust Fund
- Wisconsin Community Development Block Grant (CDBG)

The PER was sent to USDA-RD and WDNR for review and approval and for consideration of funding sources and assistance. With the health and safety issues that are evident in Unity, this qualifies the Village for 75% grant assistance with USDA -RD program. Once feedback is received from WDNR and USDA-RD the Village should have some idea on the funding sources available, and how to proceed. If the feedback is positive, other options to help supplement funding (EPA or CDBG) should be considered.

The PER evaluated USDA-RD funding at 45% and 75% grant, and 25% or 55% low interest loan alternative using paved streets but with the reduced watermain. Bellow is table 7.3 from the PER showing the estimate user costs. REU is resident equivalent user. These costs do include operation and maintenance costs expected to operate and maintain the water utility.

Table 7.3 – USDA-RD Loan & 75% Grant Alternative

USDA-RD Loan and Grant (75%)	
Total Estimated Cost	**$6,525,000**
Interest During Construction	$326,250
75% Grant	($4,893,750)
Rural Development Loan	$1,957,500
USDA-RD Loan, 2.25%, 40 years	$74,730
10% Reserve	$7,473
Total Annual P&I	$82,203
Estimated Annual O&M	$36,000
Total Annual Cost	**$118,203**
REU	140
Annual Cost per REU	**$844.31**
Monthly Cost per REU	**$70.36**

Also, in the report are some examples of what others in the area pay for water service:

Table 7.4 – Other Community Rates

Other Rates				
	Mo rate	*Qtr rate*	*MHI*	*%MHI*
Colby, WI	46.44/mo	139.32/qtr	$42,188	1.30%
Owen, WI	70.19/mo	210.57/qtr	$34,667	2.43%
Loyal, WI	38.30/mo	114.90/qtr	$41,591	1.10%
Stratford, WI	56.19/mo	168.57/qtr	$46,548	1.45%

Once the Village gets approval of the PER from USDA-RD, we should meet with Village Officials, WDNR, and USDA-RD to discuss the next steps. The Village will be able to get the SEARCH Grant funds upon approval of the PER.

Feel free to email or call me with any questions or concerns.