DEP PROGRAM HELPS SMALL WATER SYSTEM SAVE WATER... AND MONEY

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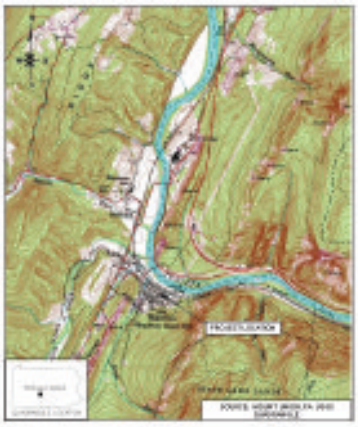
You have a small public water system with limited resources and you need to make improvements to bring your system into compliance with current regulations. You need assistance to maintain system viability and provide safe drinking water at affordable rates, but you're not sure where to start or how much it's going to cost. What do you do? You call the Pennsylvania Department of Environmental Protection (DEP) and request assistance through the Small Drinking Water Systems Engineering Services Program (ESP). That's what Mapleton Municipal Authority did when they needed to make essential repairs to their distribution system.

The 1996 Amendments to the Federal Safe Drinking Water Act (SDWA) established a requirement for states to develop programs to enhance the technical, financial and managerial capabilities of small water systems. The ESP is one of the initiatives Pennsylvania developed to accomplish this requirement. The ESP provides engineering services through an independent consultant under contract to the DEP, to assist small water systems comply with the Safe Drinking Water Act (SDWA).

The DEP contracted with alfred benesch & company (benesch), Pottsville, Pennsylvania, to provide engineering services for small public water systems across the state on an as-needed basis. The ESP began in late 1999 and is scheduled to continue through 2005. Eligible small water systems are those who serve 3,300 or fewer people. Small community water systems (CWSs) with water quality problems, nitrate maximum contaminant level (MCL) violations, or a "high" or "medium" rating under DEP's Capability Enhancement Priority Rating System receive the highest priority for assistance. Additional information can be found on the ESP Fact Sheet, which can be viewed on the DEP website at: http://www.dep.state.pa.us/dep/deputate/watermgt/WSM/Pubs-c.HTM

Project Background



Mapleton Borough originated in the mid 1800's as a railroad station. When the railroad built Fields Dam, a reservoir on Scrub Run, it was in the midst of a great maple tree forest; thus the name of Mapleton. As the town grew so did the water system and the Borough was incorporated in 1866. In 1932, the railroad sold the reservoir to the Borough for $50.00.

The Mapleton Municipal Authority (Authority) public water system provides drinking water to the Borough of Mapleton, Huntingdon County, Pennsylvania *(See Picture Above)*. The Authority serves approximately 473 people through 235 service connections to meet an average daily demand of 88,000 gallons per day (gpd). The water system consists of surface and groundwater sources, a slow sand filtration plant with disinfection and chemical treatment, a 159,000-gallon storage tank, and approximately thirteen (13) miles of distribution piping.

Knowing that lost and unaccounted-for water can significantly increase water production

rates and cost, the Authority instituted a water audit. The audit included leak detection, analysis of the time and location of leak repairs, and identification of chemical and electrical costs associated with running the filtration plant. The Authority knew leakage control would reduce financial liability and assure an adequate supply of quality water for new development and growth.

With assistance from the Pennsylvania Rural Water Association (PRWA) Water Conservation Leak Detection Program, the Authority determined that unaccounted-for water loss in the system was approximately 38,000 gpd. At 43 percent, this level was well above acceptable industry standards. Unaccounted-for water in well-maintained systems is 10 to 15 percent, although the optimal level will vary depending on circumstances. Any losses measured over 20 percent should be addressed immediately. A review of the system determined that a major leak in the four-inch cast iron pipe crossing under the Norfolk Southern Railroad, accounted for 29,000 gpd or 75 percent of the lost water. There was also some concern that the leak would eventually undermine the two-track, high-speed rail line.

This leak was causing the Authority to exceed their permitted slow sand filtration plant flow, unnecessarily taxing system equipment and increasing chemical treatment costs. Since it was on the main feed line, the leak was also jeopardizing service to the Authority's customers in this portion of the distribution system. Failure of the feed line would mean no water service to these residents.

Not Your Typical Waterline Project

With the repair/replacement project identified within the railroad right-of-way, the Authority, given their limited funds and resources, investigated various alternatives to complete the repairs. Although the Authority's staff routinely performs waterline repair/replacement, the technical complexities and stringent requirements for crossing under a railroad precluded their undertaking of this project. Therefore, the Authority requested

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engineering and technical assistance from the DEP ESP. The Authority executed an agreement with the DEP ESP to help plan, design, and administer the necessary improvements. The ESP Team, consisting of representatives from Mapleton Municipal Authority, Huntingdon County Planning and Development Department, DEP, and benesch, developed a scope of work to eliminate the leak.

The benesch team initiated the design to replace the four-inch cast iron pipe with an encased eight-inch ductile iron pipe using the bore-and-jack installation method. A key element of the design was identification of adjacent existing underground utilities, including two fiber optic communication cable systems. All utilities were identified and clearances obtained through the PA One Call System, Inc. *(See Picture Above).*

The design process included obtaining necessary approvals and permits, from the Huntingdon County Conservation District, DEP, and the Pennsylvania Department of Transportation. The project was designed to have no adverse impact on the environment and with no loss of pre-historic resources. In order to proceed with construction, railroad occupancy and construction permits were obtained from the Norfolk Southern Railroad to minimize disruption of rail service and to meet technical specifications. Pennsylvania Utility Commission (PUC) approval was granted to complete the project. Assistance through the ESP included preparation of applications for these approvals.

The Authority's goal for the project was to obtain adequate financing to lighten the burden on the small customer base. Huntingdon County contributed to the success of this project by awarding $99,000 of Community Development Block Grant (CDBG) funds to the Authority.

The project was awarded to M.L. Swanger Construction Company, Inc., Mill Creek, Pennsylvania. One hundred (100) linear feet of 16-inch steel casing pipe was installed under the rail line while 100-car trains traveling over 60 miles per hour passed by *(See Picture Bottom Right).* Under the watchful eye of Norfolk Southern Railroad inspectors, the entire bore-and-jack operation was completed in seven hours *(See Pictures Below).*

Also, as part of the main replacement project, an eight-inch waterline and gate valves were installed across the adjacent U.S. Post Office parking lot. The entire construction project was completed under the $99,000 budget.

Authority Sees Savings

Installation of the new main has resulted in significant water conservation allowing the Authority to meet their permitted plant flows. The water-saving measures were completed at a key time given Pennsylvania's current drought conditions. The repairs also assured that the customers will receive high quality service in this section of the distribution system with improved pressure and flows. Damage to the railroad will not occur as a result of the erosion from the large volume leak. The completed project adds value to the residences served through improved fire protection. In addition, the project benefited the natural resources of the reservoir, and downstream Scrub Run, by reducing the amount of stream flow withdrawn to serve the system.

The project achieved a 40 percent reduction in the estimated $5,700 direct annual treatment operating costs, including $900 for chemicals and $1,400 for electrical costs for a total annual savings of $2,300. Other cost savings include reduced labor and material costs associated with overtime, nighttime repairs, excavation, utility and traffic control, and customer service disruption. The Authority also saved on engineering costs by taking advantage of the services provided through the DEP ESP instead of relying on their in-house staff. Through development and implementation of the ESP, the Pennsylvania DEP provided the much needed technical, managerial, and financial support to the Mapleton Municipal Authority.

Water system leakage has always been a problem in the water industry. All distributors of water will, at some point in time, be forced to address unaccounted-for water losses. The equipment and expertise is available today to resolve the situation at an affordable cost. The direct and indirect benefits can be measured before undertaking such a project. The Mapleton Municipal Authority succeeded in meeting this challenge with the help of the Huntingdon County Planning Commission, the Norfolk Southern Railroad, and the DEP ESP. As a result, the Authority can meet their goal of providing safe and affordable drinking water to their customers both present and future.

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DEP ESP Team members comment on project

"The Department's Small Drinking Water Systems Engineering Services Program (ESP) is providing a valuable service that enables small drinking water systems like Mapleton to address water system concerns that might not otherwise be addressed because of financial constraints. The ESP, working together with the Huntingdon County Conservation District, was able to provide the appropriate amount of technical and financial assistance to complete this project."

"With ESP assistance, Mapleton was able to repair a major leak in a section of transmission main that was causing the water system to exceed its permitted plant flows and was jeopardizing service to the water system's customers served by this portion of the distribution system. The repair also resulted in significant water conservation during a drought."

"This is just one example of the assistance the Department is providing through programs like the ESP."

Christine Martin
Deputy Secretary for Water Management
Pennsylvania DEP

"Authorities maximize construction dollars by participating in DEP's Engineering Services Program. It was fortunate that the Authority took the initiative to request DEP's engineering assistance, because construction costs used all grant funds available to the project. ESP saved this project from being over budget."

"Engineers provided through DEP's program were among the best that I have worked with. They were very thorough, responsive and professional."

Maureen Safko
Grant Administrator
Huntingdon County Planning and Development Department

"We were amazed at how fast the engineers worked, obtained the permits and the right of ways. Working with them was a real pleasure. Had this line not been fixed, we would have run out of water."

Earl L. Kyle
Chairman
Mapleton Municipal Authority