

**BENEFICIAL WATER REUSE PROJECT  
THE TOWN OF MILLSBORO, DELAWARE  
By Mark Downes, CABA Assoc.**

This is a summary of the presentation by Mark K. Downes, P.E., CABA Associates, Inc. to the Delaware Water Supply Coordinating Council on December 3, 2009.

The Town of Millsboro's wastewater treatment plant currently discharges its reclaimed water into a small tributary of Indian River. The Total Maximum Daily Load (TMDL) Regulation for Delaware's Inland Bays watershed, which includes the Indian River, requires the systematic elimination of all point-source discharges. For the past several years, the Town has been working to meet the regulatory and financial challenges associated with the mandate to eliminate its point-source discharge.

At the onset of the TMDL regulation, the Town Council decided to upgrade the wastewater treatment plant to produce a high-quality effluent that would not be limited to spray irrigation, but would maximize aquifer recharge and water reuse alternatives. Of major concern with spray irrigation was the cost of acquiring the large quantity of land necessary at a time when property prices were rapidly escalating. This decision however proved to be instrumental in paving the way for Millsboro's current beneficial water re-use efforts.

The plant upgrade, completed in September 2009, utilizes membrane bioreactor technology. Following fine screening and grit removal, a biological nutrient removal (BNR) process employs anoxic and aerobic zones to remove total nitrogen by nitrification / denitrification. Ultrafiltration through membranes having an average pore size of approximately 0.03 microns removes virtually all suspended solids, all bacteria and a large portion of viruses that may be present in the untreated wastewater. Ultraviolet light disinfection inactivates any viruses that may pass through the membranes. The final effluent not only meets the nitrogen and phosphorous limits for land application in the Inland Bays watershed, but also meets State Reclaimed Water Quality regulations for sites unlimited to public access.

The Town is currently in the process of acquiring approximately 438 acres of land for a proposed aquifer recharge facility. Soils and hydrogeological investigations indicate that the site is well suited for both spray irrigation and rapid infiltration basins (RIBs). The Town proposes to initially use the majority of the reclaimed water to recharge the underlying aquifer using these two methods of aquifer recharge. Detailed investigations continue to provide the information required for design and permitting.

Millsboro is particularly excited and proud to be at the forefront of water reclamation efforts in Delaware for beneficial reuse at sites unlimited to public access. Its first project is irrigating the athletic fields at the Millsboro Middle School and W. B. Atkins Memorial Park. Both of these facilities currently irrigate with potable water from Millsboro's public water system which, at times, has placed a strain on the system's supply capacity. Bids for construction of the reclaimed water transmission main to serve these sites were received on December 3, 2009. It is anticipated that the systems will be operational for the 2011 growing season.

The Town of Millsboro anticipates that the success of these first water reuse systems on sites unlimited to public access will help to change public perceptions about reclaimed water and lead to more beneficial reuse projects in the near future. Irrigating golf course fairways and greens, water hazard replenishment and dust control are potential uses that have been specifically

discussed. In time, perhaps these efforts will lead to full-fledged “purple pipe” reclaimed water distribution systems for private lawn irrigation, toilet flushing and other suitable domestic uses.