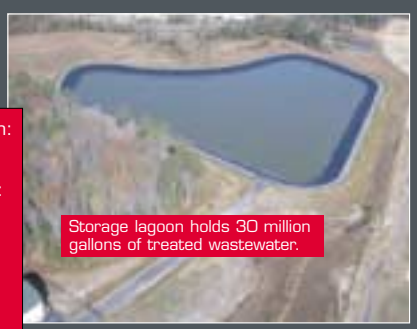
GMB QUARTERLY UPDATE

WATER & WASTEWATER TREATMENT

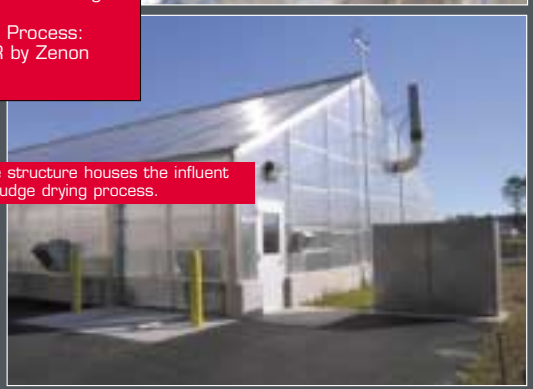
GLEN RIDDLE FARM

- Project Completion: May 2004
- Total Project Cost: $10 million
- GMB Services: Process, Civil, Architectural & Structural Design
- BNR Process: MBR by Zenon



Storage lagoon holds 30 million gallons of treated wastewater.

Flow is equalized in a 70 foot silo.



A greenhouse structure houses the influent screen and sludge drying process.

State-of-the-art membrane bioreactor system (MBR) uses the Zenon process.

A 400,000 gallon elevated water storage tank stands 175 feet high.

GMB specializes in architectural and engineering services from wastewater treatment to marine engineering, residential custom homes to commercial office buildings, and development to municipal services. As a prospective client, we hope this update will serve as a reminder that GMB is available to meet your architectural and engineering goals.

SITUATION

Centex Homes is developing the historic Glen Riddle Farm into a planned resort community, including 500 single family residential units, 150 multi-family units, a marina and two 18-hole golf courses. Because there were no centralized municipal water or wastewater systems in the area, Centex Homes needed to construct water and wastewater treatment facilities to service the new development.

SOLUTION

In a modified design-build effort, GMB designed 200,000 gallon per day (GPD) drinking water treatment and advanced wastewater treatment plants to reclaim water for irrigation on the golf courses. The $10 million project also includes an elevated water storage tank and a treated wastewater storage lagoon.

The wastewater treatment facility utilizes the Zenon process with hollow-fiber membranes providing ultra-filtration. This produces a very high quality effluent with total nitrogen levels of less that 5 mg/l.

Because of this high quality effluent, buffer zones were reduced for the spray irrigation areas. The use of spray irrigation allows for the recharge of groundwater in a sustainable design feature that is beneficial to the environment and future generations. Furthermore, this approach avoids a point source discharge into shallow coastal bays. The small footprint allows the entire facility, including the laboratory to be housed in a single barn-type building.

Adding to the complexity of the project was a highly visible site location for the water and wastewater treatment plants. In order to blend with the existing structures on the property, the design incorporated barns, a 70 foot silo and a greenhouse to maintain the farm-style character.

SCADA controls were incorporated into the project allowing Worcester County to remotely monitor the facility operations from their office in Ocean Pines. The completed project was transferred to the County for operation and ownership.

GMB was recently notified that the Riddle project is a finalist in the American Council of Engineering Companies of Maryland (ACEC/MD) Engineering Excellence Awards (EEA) competition. The project has also qualified for the National ACEC EEA competition. In these competitions, GMB will be judged on the project's achievement, value and ingenuity. Due to the innovative design that includes both engineering and architectural disciplines, the Riddle project is a top contender for an ACEC award.

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GEORGE, MILES & BUHR, LLC