



MARYLAND  
AMERICAN WATER

WE KEEP LIFE FLOWING®

## A SECURE WATER FUTURE FOR BEL AIR

**Providing high-quality, reliable water service is our business. That's why we developed a long-term, sustainable solution to meet Bel Air's water supply needs.**

Maryland American Water has been the water provider for the Bel Air community since the early 1930s. For over 90 years we've remained, and continue to be, committed to delivering safe, reliable water service our customers can count on when they turn on the tap.

### Addressing the challenge

Winters Run, the main water supply for Bel Air customers, did not provide an adequate supply of water during times of drought as required by state regulators.

After reviewing a number of options, we constructed an impoundment (reservoir) that can store 90 million gallons of water. The impoundment provides a back-up water supply for Bel Air in times of drought and during other emergencies when a secondary water supply is needed.

The impoundment structure is located on the historic Mt. Soma property, land we purchased from Harford County. The impoundment is secure and only accessible to Maryland American Water employees.

### Investing in Bel Air

At \$15.4 million, the cost for securing the long-term water supply was approximately \$6.3 million less than original projections. The project fulfilled the requirement and brought the state's largest dam project in 30 years to fruition. The team designed a 62-foot-high earthen embankment to impound 90 million gallons of raw water—enough to sustain the community for several months—the same length as the longest drought of record.

To fill the reservoir, water is pumped from Winters Run, Bel Air's source of water supply—only when stream flows are adequate. When the extra water from the reservoir is needed, it is conveyed by gravity to Maryland American Water's nearby water treatment plant, before transmission and distribution to customers. The reservoir is a secure facility that helps to ensure the quality and safety of the public water supply for generations to come.

### Preserving local history

The Mt. Soma site will continue to be a treasure for Harford County. We continue to work with the County Department of Parks and Recreation to enhance other features of the historic property, outside of the secure impoundment. We thank Harford County for recently restoring the Mt. Soma barn, parts of which date back to the 1700s. We also continue to work with representatives of the Ma and Pa Trail to enhance the trail connections and route.

### Other key highlights of Mt. Soma Reservoir

- **Water Surface at Normal Pool**  
11.2 acres
- **Riser Structure Height**  
52 feet
- **Length of Fill Pipe within Reservoir**  
600 feet
- **Embankment and Impoundment Size**  
19 acres
- **Approximate Reservoir Dimensions**  
700 feet x 900 feet
- **Embankment Crest Length**  
2,825 feet
- **Maximum Dam Height**  
62 feet
- **Geomembrane Surface Area**  
13.1 acres

### To learn more

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## Liner with Longevity

A cornerstone of the reservoir design is an innovative liner used to keep the stored water from leaking into the earth. In selecting the liner, engineers knew that the volume of water stored in the reservoir could fluctuate. At times, parts of the liner would not be submerged and exposed to the forces of nature.

The design team needed a solution that could withstand stress and weather events, such as extreme heat, freezing and ultraviolet radiation. After evaluating nine liner options, engineers determined a bituminous geomembrane (BGM) liner would be the most economical, resilient and watertight barrier.

The solution blazed a new path for the design of water storage reservoirs across the country. While BGM liners have been used to line domestic canals and secondary containment lagoons, they are generally uncommon in the U.S.

The project marks the second time that a BGM liner has been used to line a water supply reservoir in the United States, and the first time on the East Coast.



## Liner benefits

BGM liners are highly flexible, which makes them suitable for most embankment slopes. The liners' dimensional stability provides permanent contact with the soil, rendering it ideal for soil settlement. Most significantly, BGM liners are durable, puncture-resistant and textured for traction, making them ideal for use in an exposed liner system.

By comparison, more commonly used high-density polyethylene or linear low-density polyethylene are usually covered with soil to protect them from punctures, stress cracking, and thermal expansion. At the Bel Air reservoir, the BGM liner eliminated the need for soil cover, which would have cost an estimated \$450,000.



## Sustainability solutions

Beyond the exposed liner, the project team faced the critical job of inhibiting algae growth and protecting the water quality that was taken from Winters Run. Algae imparts undesirable taste and odor that remain even after final treatment, decreasing water quality.

A traditional method for managing the algae involves using chemicals and requires careful monitoring to minimize the environmental impacts of overapplication.

Seeking a more sustainable and cost-effective solution, the project team designed seven man-made, floating wetland units. The wetlands feature 4,000 native aquatic plants that cover 3,000 square feet of the reservoir's surface. Microbes in the biofilm surrounding the plants' roots break down and absorb algae-promoting nutrients, reducing nitrogen and phosphorous by approximately 30 percent.

A solar-powered, ultrasonic algae control system removes up to 90 percent of existing algae in the water, inhibits new growth, and reduces the need for costly chemical control.

Also, a solar-powered water mixer promotes oxygenation and prevents stagnation. This device circulates 14 million gallons per day. The machine runs during daylight and night hours entirely powered by solar energy.

