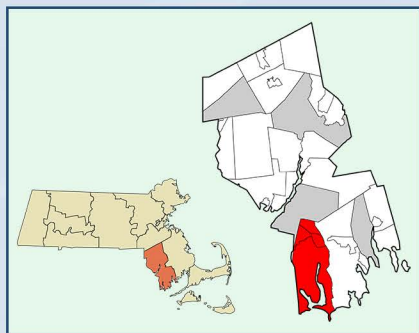


# Noquochoke Village: Affordable Housing Project

B E T T E R W A T E R . B E T T E R W O R L D .

### PROJECT OVERVIEW:



**LOCATION:** Westport, MA  
Bristol County, 02790, United States

**PROJECT NAME:**  
Affordable Housing Development

**START DATE:** 2018-06-21

**COMPLETION DATE:**  
2019-05-06

**PROJECT SIZE (gpm):**  
12,000 GPD [45 m<sup>3</sup>/D]

**FACILITY SIZE (gpm):**  
50 Homes and Community Amenities

**FACILITY OWNER:**  
Boston-based developer of the Noquochoke Village

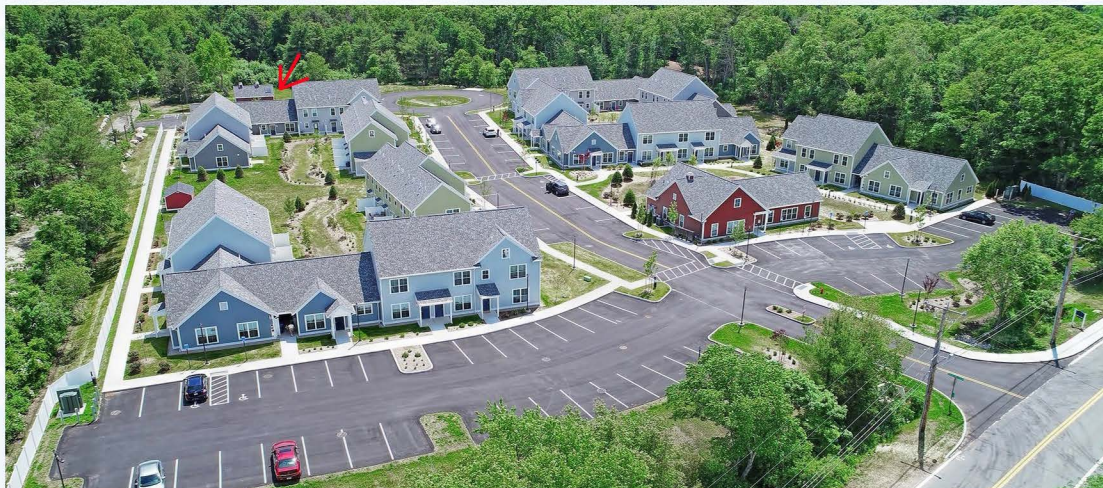
**PROJECT OWNER:**  
Allen & Major Associates, Inc.

**PROJECT DESIGNER:**  
Allen & Major Associates, Inc.

**PROJECT CONTRACTOR:**  
J&R and Wastewater Treatment Services, Inc. (WTS, Inc.)

**MANUFACTURER:**  
BioMicrobics, Inc.  
- (2) BioBarrier® HSMBR® 6.0-N (-6,000 GPD each) with a 2 compartment anoxic zone

**MANUFACTURER:**  
Geoflow  
- GEOFLOW® drip tubing for dispersal



## Affordable Housing Project Overcomes Stringent Water Requirements

*Developer fights for affordable and accessible community in Massachusetts by following wastewater removal standards*

### THE CHALLENGE

Affordable housing implementation can be challenging. As one example, a Boston-based developer, Delphi Construction, Inc., faced numerous struggles when developing the Noquochoke Village in Westport, Massachusetts. When the builder aimed to provide 50 affordable and accessible residential apartments in a town where affordable housing was scarce, he faced pushback from local residents who were concerned about a variety of issues, including housing stock, pricing limitations and special permits.

In addition to the uphill battle to start construction on the apartments, the developer faced strict limits on nitrogen in the wastewater coming from the project. He initially planned to abide by state total nitrogen (TN) limits of 25 mg/L. However, the planning board and the town ultimately lowered effluent limits to less than 5 mg/L TN at the outlet of the treatment system and a Net Zero TN at the property line due to the project's proximity to natural water sources and a conservation area.

As the design engineer of record for Noquochoke Village, Phil Cordeiro of Allen & Major Associates, Inc., said that they took on the challenging task of “designing a wastewater treatment system that met state requirements, local Westport board of health mandates, and enhanced nitrogen sensitivity considerations imparted by the local estuary commission seeking a 5 mg/L.” Cordeiro added that “in evaluating system design alternatives and service vendors,” they were “pleased to coordinate with J&R Sales and Service (J&R), who brought a wealth of knowledge to the design team on how a BioMicrobics [BioBarrier MBR] system can meet the demands, be adjusted based on varying field conditions, and be reliably maintained.”



S I M P L E . L O W C O S T . R O B U S T .

## THE SOLUTION

After calculating the flows, it was estimated that the project would generate 9,990 gallons per day - just under the 10,000 gallon per day limit for Massachusetts ground-water discharge permits. The team then turned to BioMicrobics to help reach the strict water requirements.

BioMicrobics' BioBarrier® HSMBR® (High Strength Membrane Bioreactor) system was the only viable treatment option to meet those requirements at an affordable price for the developer. The membrane and processes used in the system act as an impenetrable physical barrier for nearly all common pollutants found in wastewater. The product is used to replace the traditional clarifier, sand filter and disinfection typically used in many conventional onsite wastewater treatment processes.

The specific design of the BioBarrier® MBR® greatly simplifies the settling, screening, direct aeration and ultrafiltration of the wastewater treatment process. The BioBarrier® MBR® system treats all the blackwater and graywater from the homes in the community to be 99.9% free of contaminants such as organic matter and disease-causing organisms.

The developer felt confident knowing that the BioBarrier® MBR® systems produce consistent effluent quality, even in varying influent conditions. The treatment train begins with a settling tank equipped with a SaniTEE®, a screening device used to prevent large solids from entering the treatment zone. Then, a blower introduces oxygen into the system to create a robust circulation and aeration of the wastewater, creating the environment for the growth of microorganisms that break down organic matter. Next, the BioBarrier® modules and air grids create an upward flow while treated water is drawn through membranes by pumps for microfiltration and ultrafiltration to produce clear, odorless water.

## THE IMPACT

“With a residential project that occupies in phases, the wastewater chemistry required steady upfront adjustment to confirm that effluent parameters remained below regulatory thresholds regardless of loading rates,” Cordeiro said. “This was and remains true. With the site fully occupied, J&R remains under contract as the wastewater operator. They have provided the same educational literature and guidance to the Noquochoke Village facility manager for use with residents. The ongoing testing results have exceeded all expectations in meeting the low effluent strength thresholds set by local permits.”

Consistent testing was conducted from the installation date of June 2019 to January 2022. The team was especially impressed with the system's ability to react well to fluctuation in temperature, flows and influent strength.

This project remains a high-performing facility in the area that serves as a reference for other projects with similarly strict wastewater restrictions. In fact, J&R is using the same BioBarrier® system in a newly constructed Middle-High School in the Boston area.



The SaniTEE® screen separates floating, suspended solids from septic tank effluent, preventing large particles from being passed on to downstream processes. SaniTEE screens are used to remove solids ahead of pumps, advanced treatment systems, or conventional drain fields.



The BioBarrier® HSMBR® is a high strength wastewater treatment system that uses a Membrane Bioreactor (MBR). This technology removes organic pollutants and suspended solids with the use of ultrafiltration membranes. The system is specially designed to treat wastewater with higher organic and nutrient loads produced in commercial applications, and for larger flow rates (>1500 GPD) including residential applications.

