

CASE STUDY: Exeter, New Hampshire Wastewater Treatment Facility



Applications:	1st Stage Anoxic, Anoxic Swing, Mixing Limited Aeration, 2nd Stage Anoxic, and Aerated Sludge Holding
Design Flow (ADF):	4.5 MGD
Mixing Efficiency:	≈ 0.14 HP/1000 FT ³
Compressors:	Two (2) 40 HP Rotary Screw
Nozzles:	154
Design Engineer:	Wright-Pierce Engineering

BioMix™ System Provides Savings and Environmental Benefits for Facility in Exeter, NH

In June 2017, the Town of Exeter began construction of a new wastewater treatment facility to replace an antiquated lagoon process. The new facility was designed to substantially reduce the nitrogen load to the Squamscott River which flows north into the Great Bay, a sensitive tidal estuary.

To meet the stringent seasonal total nitrogen limit of 5 mg/l, the new facility integrated a four-stage, Bardenpho process for enhanced nitrogen removal. The process utilizes anoxic biological selectors to create conditions for bacteria to reduce total nitrogen.

Wright-Pierce, the project’s engineering firm, and the Town of Exeter selected EnviroMix’s BioMix Compressed Gas Mixing for the following applications: 1st Stage Anoxic, Anoxic Swing, Mixing Limited Aeration, 2nd Stage Anoxic, and Aerated Sludge Holding.

BioMix provides the Town annual operation and maintenance cost savings of \$25,000 and 20-year net present worth savings of over \$535,000 versus hyperbolic mixers. Implementation of BioMix in the new Bardenpho process has reduced the load of nitrogen discharged to the Squamscott River by over 100 tons per year.



The new Town of Exeter WWTF is actively improving the water quality of the Squamscott River.



ENERGY EFFICIENCY

20% power savings versus hyperbolic mixers

Energy efficiency of 0.14 hp/1,000 ft³



STRAIGHTFORWARD OPERATION

A duty and standby compressor replace 16 mechanical mixers

Minimal, localized maintenance



PROCESS OPTIMIZATION

Optimal mixed process conditions in the anoxic selectors to enhance denitrification



UNPARALLELED FLEXIBILITY

Integrates with aeration to provide anoxic mixing in swing zones

Allows decoupling of aeration from mixing in sludge holding tanks



EnviroMix valve modules facilitate adjustment of the mixing intensity to suit process requirements.



BioMix seamlessly integrates with the fine bubble aeration system within both the swing zones and the aerated sludge holding tanks.

BioMix provides annual O&M cost savings of \$25,000 and 20-year net present worth savings of over \$535,000 versus hyperbolic mixers.

BioMix Compressed Gas Mixing was selected for numerous reasons.

- The BioMix system offered 20% lower energy consumption than hyperbolic mixers. The system operates independently from or concurrently with aeration to provide anoxic mixing or supplemental mixing with aeration in the swing zones. It also allows decoupling of aeration from mixing in the aerated sludge holding tanks. In both applications, the result is reduced energy consumption.
- BioMix is seamlessly integrated into the mixed zones and sludge holding tanks, improving the design, reducing the cost, and increasing the performance of the aeration system. If hyperbolic mixers had been selected, aeration diffusers in those zones would have needed to be eliminated and the surrounding aeration diffuser piping system reinforced.
- The centralized compressor system produces the high pressure compressed air while the control system distributes that air optimally to mix multiple processes throughout the facility. A duty and standby compressor simplify maintenance by replacing 16 mechanical mixers while still meeting the total process demand.

EnviroMix is pleased to be an integral part of the Exeter wastewater treatment facility, providing high efficiency mixing that results in optimal process conditions and allows the Town to achieve its nitrogen removal goals and protect the environment.



Contact sales@enviro-mix.com today to discuss the ways EnviroMix can optimize your mixing solutions.