



Project Background

The Taunton River is the longest coastal river in New England without dams, and it supports 45 species of fish. A new water desalination plant was constructed on the river and began operating in 2008.

Mackworth designed, installed, and seasonally deployed a fish exclusion system for the Taunton River Desalination Plant from 2008-2019.

The system was put in place to ensure compliance with the Clean Water Act 316(b) requirement for intakes to incorporate the Best Available Technology (BTA) for the protection of fish populations. The TRDP also employed other exclusionary devices such as Johnson wedge wire screens.

Design and Performance

Primary considerations and challenges for the design of the Taunton River Desalination Plant barrier and anchoring system were:

- Adequate barrier structural strength to withstand high loading from currents and tides
- Max river currents approximately 1.78 fps
- Max instantaneous intake flow of 20,733 gpm and daily max intake flow of 10 MGD
- Three Mile River confluence with Taunton River 900 ft upstream of the site
- The potential for debris loading
- Recreational boat use in the proximity of the system as river is 200 ft wide in the area
- Fabric permittivity, cleaning ability, strength, and durability in the Taunton River environment
- Filter curtain design sizing for sealing with the river bottom and at the north and south shoreline terminations meeting regulatory restrictions and operational considerations
- System load for the filter curtain's operational geometry, evaluation of stresses and anchor system engineering



Figure 1. TRDP barrier deployment



Figure 2. TRDP barrier winter retrieval and cleaning

Design and Performance

- Flotation system design for supporting the system under design loads as well as failsafe overtopping if design loads were exceeded
- Strength and durability of impermeable fabrics, mooring hardware, connection hardware

The final design was a floating boom; approximately 220 ft long and an average fabric curtain depth of twelve feet, resulting in a maximum of 3,600 ft² total filtering area. The system was constructed in one piece consisting of flotation hood assembly, double sided filtration curtain, ballast chain pocket w/chain and mooring attachment points. The filtration curtain was divided into cells, about 7.5 ft wide, that provided the enclosed sections for implementation of an air burst system. The barrier was outfitted with a 0.5- mm apparent opening size (AOS) mesh screening devise and an airburst system. The airburst system is designed to actively remove fish eggs and larvae in contact with the fabric. The barrier was designed to extend from shoreline to shoreline on either side of the intake. The area encompassed by the floating boom provides a reservoir for the intake without interfering with the wedge wire screens.

The anchoring design consisted of helical anchors deployed at specified locations both inside and outside the barrier. The outside anchors maintained the AFB position against forces from plant and river current flows. The inside anchors maintained the AFB configuration (1) on the downstream end where river current is exiting the barrier’s enclosed area, (2) during a discharge cycle and (3) whenever the plant is operating at a lower rate or is shut down completely.

An extensive fisheries monitoring program was conducted to determine entrainment and impingement exclusion rates from Taunton desalination plant. Annual monitoring reports indicated that that the plant was exceeding 80% exclusion rate for river herring eggs, white perch eggs, and rainbow smelt. Further reports indicated that the barrier system appeared to be very effective at reducing impingement and entrainment.

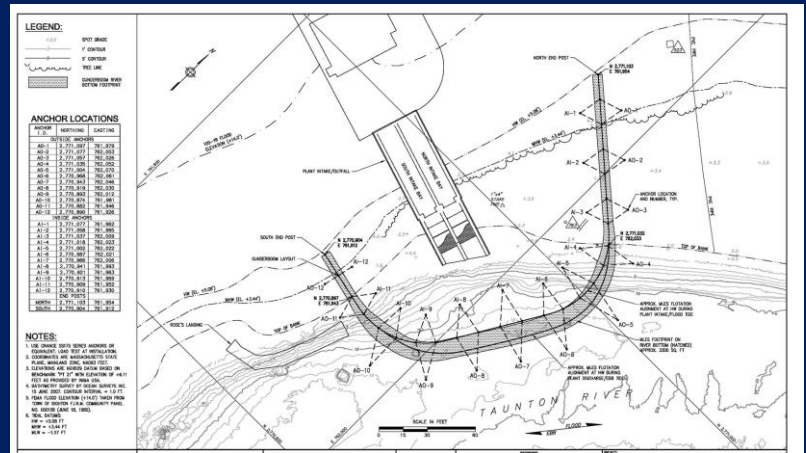


Figure 3. Anchor system layout for TRDP barrier



Figure 4. Side view of barrier system in Taunton River

Contact Mackworth-Enviro for more information

info@mackworth-enviro.com

cguelke@mackworth-enviro.com

www.mackworth-enviro.com