Everglades Turbidity System

Homestead, FL

Project Background

Three creeks were created for tidal habitat creation project in the Florida Everglades and required stringent turbidity control. The specification was for zero NTU increase into the adjacent waters of the Biscayne Bay. Mackworth-Enviro designed, fabricated, and installed a 3-barrier system for the protection of the local ecosystem.

Mackworth used both bench scales tests to determine the most appropriate fabric, and computational fluid dynamics (CFD) modeling to evaluate water current modifications and optimize design.

The three-barrier system was designed with each barrier having different design characteristics based on its function in the system. The innermost barrier, the diversion barrier, did not terminate on either end, and extended 10 ft (3.1 m) down from the water surface. The middle and primary filtering barrier was a bottom-sealed curtain which consisted of an impermeable collar that extended several feet below the water surface. The lower portion consisted of fine filter materials. This curtain was anchored with an innovative self-anchoring system comprised of lightweight fluke style anchors removing the need for divers to enter the water. The outer curtain acted as a final barrier to sediment transfer to the channel. This curtain was designed to maintain a 24 in. (61.0 cm) clearance above the channel bottom. The primary filter barrier and outer silt curtain both had reefing capabilities which allowed depth adjustments and assisted with movement of the systems from one creek site to the next without removing them from the water.

Performance

The contractor was able to reef the system components, move them, and redeploy with guidance form Mackworth. There were three compliance points immediately outside of the silt curtain and three in the Biscayne Bay no-turbidity increase area at the mouth of the channel to which the creeks were open. Each point was sampled during operations at near-surface, mid-depth and near bottom. Water quality results were in compliance throughout the project duration with no exceedances.

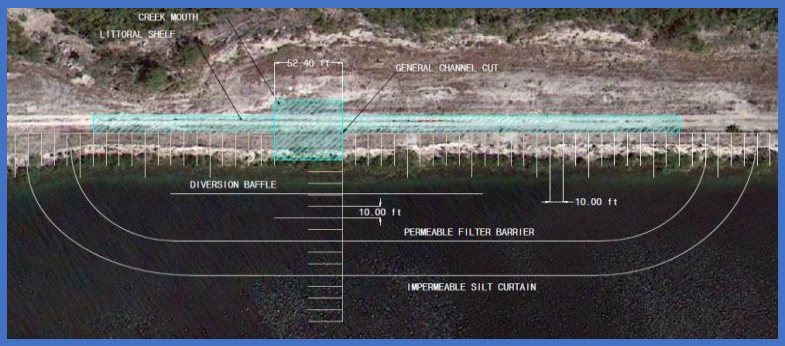

Figure 1. Conceptual alignments for turbidity control measures

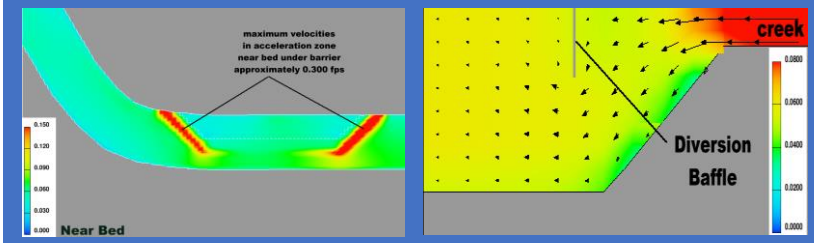

Figure 2. Plan view and elevation view of CFD output with turbid flow exiting newly created marsh creek

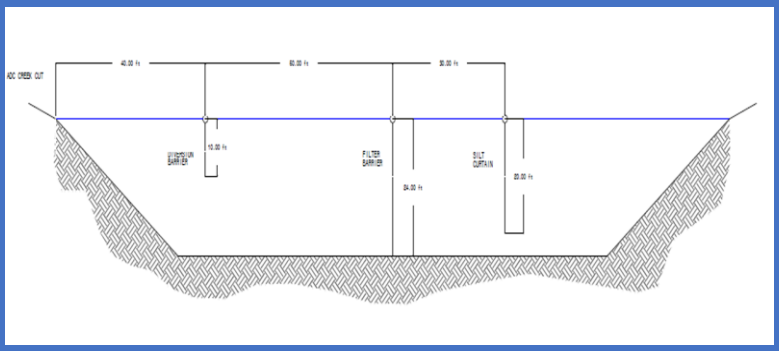

Figure 3. Cross section of turbidity control system

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