



Powder Point Bridge Cobble Berm

Project Overview

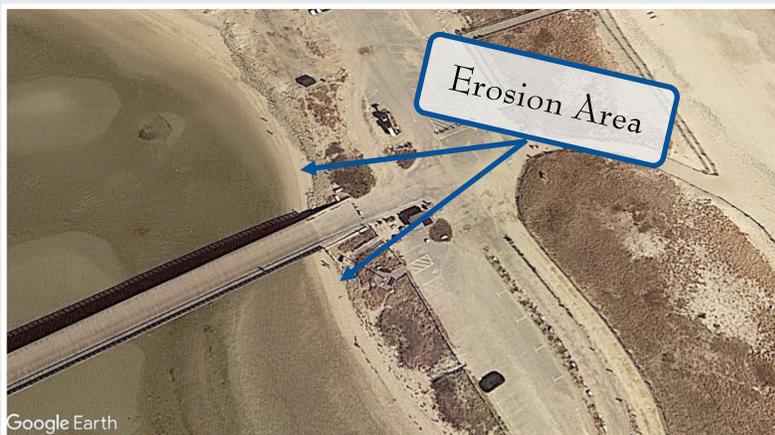
As a popular beach destination for Duxbury and South Shore residents alike, Duxbury Beach is inextricably linked to its most popular access—the Powder Point Bridge. The longest wooden bridge in the United States, the Powder Point Bridge was originally constructed in 1892 and later reconstructed in 1987. Duxbury Beach is a barrier beach and as such is constantly migrating and changing with the forces of wind and water, both on its oceanside and bayside. Efforts were made to mitigate erosion on the eastern end of the bridge where it connects to Duxbury Beach, however, erosion on either side of the abutments and scour under the bridge have continued. In order to protect the eastern end of the bridge as well as the barrier beach, it is vital to mitigate the ongoing erosion at the bridge abutments.

Project Benefits

- **Maintain & Enhance** the connection between the bridge and the barrier beach
- **Reinforce** the existing native cobble
- **Strengthen** the bayside berm
- **Shield** the abutments and wooden bulkhead
- **Protect** the barrier beach from continued bayside erosion
- **Limit** narrowing of the beach and reducing the likelihood of breaching



Sediment has been eroded under and on either side of the bridge where waves move around the connection to the beach.



Restoration Components

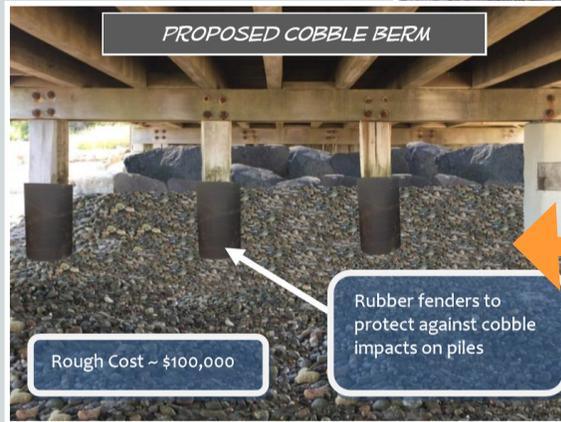
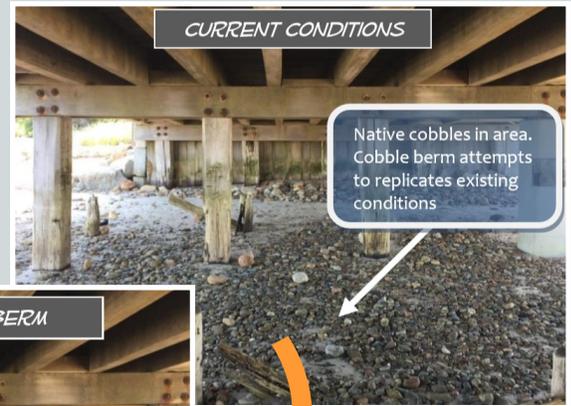
- ⇒ Cobble berm utilizing cobbles matching the size and shape of native cobble to create a berm in the areas undergoing erosion.
- ⇒ Larger armor units against the wooden bulkhead.
- ⇒ Rubber fenders to protect against cobble impacts on piles.

Cobble Berm Specs

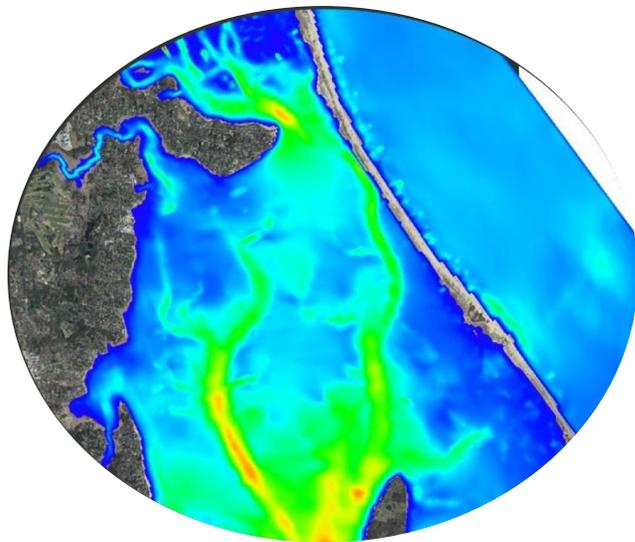
- ⇒ 75 linear feet
- ⇒ 2-4 inch rounded cobble



Woods Hole Group, an environmental engineering firm, recommended that Duxbury Beach Reservation and the Town of Duxbury implement a three part



restoration project to better protect both the Powder Point Bridge and Duxbury Beach. **The estimated cost of the complete project is \$100,000.**



Hydrodynamics at Play

Through the creation of the 2015 report “Coastal Processes Study and Resiliency Recommendations for Duxbury Beach and Bay”, the Woods Hole Group performed simulations for the normal tidal conditions to evaluate water surface elevations, circulation patterns, and velocities within Duxbury Bay. In the simulation to the left, green indicates higher velocities. This shows high water velocities close to the bayside of Duxbury Beach at the bridge. This, combined with wind-generated waves produced in the bay, serves to increase erosion along the bayside of the barrier beach, narrowing the site and exposing it to greater risk of breaching.

Early History

The Powder Point Bridge, originally known as “Gurnet Bridge” was originally built in 1892 by the Gurnet Bridge Company. The Town of Duxbury, Plymouth County, and Duxbury resident William Wright funded the project. The bridge shortened the 8-mile route through Marshfield to Duxbury Beach to under half a mile—which for William Wright meant access for the 263 homes he planned to build on Duxbury Beach. This of course did not come to pass, and today the bridge is both a historic landmark and the route for many visitors to Duxbury Beach.

In 1931, the Duxbury Beach Association constructed a parking lot at the east end of the Powder Point Bridge. Prior to that, the bridge itself was a popular spot to park before heading to Duxbury Beach! (photo c. 1917)

