

## APPLIED COASTAL

RESEARCH AND ENGINEERING, INC.



766 Falmouth Road, Suite A-1  
Mashpee, MA 02649  
<http://www.appliedcoastal.com>

**Project:** Plymouth Long Beach Dike Extension and Nourishment Project, Plymouth, Massachusetts

**Contact:** Town of Plymouth  
Department of Natural Resources  
11 Lincoln Street  
Plymouth, MA 02360  
Mr. David Gould; 508-830-4062

Plymouth Long Beach is located on the western shore of Cape Cod Bay about 30 miles southeast of Boston, Massachusetts. Long Beach is a continuous barrier beach approximately 2.8 miles long, with a stone dike structure that extends along the full length of the beach. Long Beach separates historic Plymouth Harbor from the open waters of Cape Cod Bay, thereby providing sheltered water for the many pleasure and commercial boats that utilize the Harbor. Plymouth Harbor is the only major harbor between the Cape Cod Canal and Boston, and therefore serves a vital function as a safe harbor of refuge during storms.

Despite past shore protection efforts, major storms continue to create numerous overwash areas along the southern half of the barrier. Northeast storms in 1991 and 1992 caused severe damage to the beach including dune and beach erosion and numerous overwash areas. Two of the largest overwash areas were repaired by the Town of Plymouth by the construction of berms and sand fill.

The Plymouth Beach Restoration Program was initiated to as to improve the storm protection capacity of the beach by reconstruction of an existing dike together with an extensive beach nourishment. In 2002, Applied Coastal Research and Engineering, Inc. (Applied Coastal) was hired by the Town of Plymouth to provide a beach nourishment design and prepare permitting documents for the proposed work.

Applied Coastal performed engineering analyses including historical shoreline change, beach sediment characterization, and wave and sediment transport modeling to evaluate the present conditions along the beach, and also to model several design alternatives to determine the relative performance of each.

Long-term recommendations made by Applied Coastal to the Town were developed to address the continued deterioration of the barrier beach and partial loss of natural sediment supply. The recommended alternative consists of a 300,000 yd<sup>3</sup> nourishment to protect the beach and backshore from erosion and overwash and to provide sediment supply to maintain downdrift beaches. An optional element is repair of the existing Corps dike, to improve the stability of the structure and to bring the structure to its original design height.

