

APPLIED COASTAL

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Project: Beach Nourishment Design for
Spectacle Island, Massachusetts;
Boston Harbor, MA

Contact: Central Artery Project
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As part of the Central Artery/Tunnel project, a detailed beach nourishment design was developed for the southern shoreline of Spectacle Island, which is located within Boston Harbor. In 1994, background work to develop the beach nourishment design incorporated coastal engineering numerical models combined with appropriate assumptions regarding littoral processes. The propagation of waves from Massachusetts Bay into Boston Harbor was modeled using the refraction/diffraction model REF/DIF1. This model predicts the transformation of waves in areas where bathymetry is irregular and where diffraction is important, such as at Spectacle Island. The resulting wave heights, periods, and directions were used as input to both longshore and cross-shore sediment transport models. These models were employed to simulate the performance of several different beach fill designs.

In 1994, John Ramsey served as project manager and coastal engineer for the initial design effort while employed by Aubrey Consulting, Inc. In 1999, Applied Coastal Research and Engineering, Inc. performed the redesign effort due to alterations to nearshore bathymetry from construction activities on the Island. The modified design was based on observed shoreline and bathymetric change rates following the armoring of the majority of the Spectacle Island shoreline. A variety of sand sources were reviewed for sediment compatibility and a specification for acceptable beach material was developed.

