



### PROJECT DESCRIPTION

Coldwater Consulting Ltd. was contracted by Halifax Regional Municipality (HRM) to provide a technical assessment of the 3.2 km length of the Salt Marsh Trail that crosses the Cole Harbour estuary and to develop a corresponding long-term maintenance strategy.

### DESIGN APPROACH

The first stage of the study was a detailed technical assessment of present condition of the Salt Marsh Trail, including mapping, literature review, data assimilation, and an assessment of LiDAR, wind, water level and offshore wave statistics. This was followed by a geomorphic analysis based on historical records and maps to evaluate past and ongoing changes to the estuary. Coldwater then established several computer models to help assess the environmental conditions, including a preliminary, yet detailed tidal model and wave climate models to predict wave conditions along the causeway under various storm scenarios and to estimate wave pumping at the estuary entrance. These tools permitted an analysis of the frequency and severity of overtopping and armour stone damage for the existing causeway geometry under present conditions and under several future sea level rise scenarios to be performed. Similarly, evaluations of present and future design conditions along the causeway and of present and future ecological and geomorphic implications for the Salt Marsh due to the continued presence of the causeway were performed.

The study's second phase centred on the development of a plan for ongoing protection of the causeway. This included the establishment of performance criteria for the causeway and openings (structural, trail-use, aesthetic, and ecological/geomorphic) and development of design alternatives to meet these criteria. Coldwater's Coastal Infrastructure Adaptation and Planning System (CIAPS) was used to optimize the designs of the alternatives for a range of sea level rise scenarios. Each alternative was then evaluated to determine its effectiveness and to identify its pros and cons. After consultation with HRM staff and other parties, Coldwater prepared an implementation strategy complete with concept-level engineering drawings, quantity estimates and preliminary specifications for the preferred alternative.

### CLIENT

Halifax Regional Municipality  
Halifax, NS

### LOCATION

Cole Harbour, NS

### DATE

2009-2011