Executive Summary

Rainbow Haven Provincial Park is a popular provincial park located east of Halifax near Cole Harbour, situated with the Atlantic Ocean to the south and the Cole Harbour Salt Marsh to the North. Based on recent discussions between Nova Scotia Department of Natural Resources (DNR) and CBCL, DNR is planning to update the existing infrastructure at Rainbow Haven Beach, including road work and parking area upgrades. To inform the design of this work, in particular the siting of infrastructure and design elevations, DNR engaged CBCL to conduct a coastal risk assessment at Rainbow Haven Beach.

Flood and Erosion Hazards

The access roads, parking lot and day-use facilities at Rainbow Haven Provincial Park are vulnerable to coastal flooding from extreme storm surge due to low lying elevations of the area. A 2025 LiDAR survey of the region show that the dunes are the highest elevation point in the park and therefore offer a natural protection from extreme storm surge and wave action. Comparison of historical air photos indicates dune retreat rates between 0.3 to 0.4 m per year. High current speeds through the estuary channel present further potential erosion hazards for the beach area. While the parking lot and main building are vulnerable to coastal flooding, they are not vulnerable to erosion within the foreseeable future.

Sustainable Management Options

Sustainable management requires the intentional alignment of intervention approaches with dynamic processes and increasing hazards. The most sustainable approach is to locate new assets or migrate existing assets at risk away from flood and erosion hazard areas. Only short-term infrastructure should be considered within vulnerable areas. Such infrastructure should be set back from the shore and raised above flood levels where practical, depending on intended lifetime. Natural protection offered by the existing beach-dune system can be optimized by monitoring and maintaining the health of the dunes, including planting of native dune grasses, removal of fixed infrastructure on the seaside of the dunes, and providing a horizontal buffer behind the dunes in line with observed migration rates.

Future Considerations

As part of future planning work for the site, it is recommended that DNR consider raising the elevation of infrastructure, including parking lot and access roads, to a minimum elevation of 2.4 m CGVD2013. This is typically in the order of 1.4 m ± 0.5m above existing elevations. The most vulnerable areas are the parking lot and south entrance road, followed by sections of the north exit road. Practically, this significant raising project can be done in phases to accommodate funding constraints and other factors outside the scope of coastal hazard considerations. Additionally, it is recommended that a continuous monitoring and maintenance program be established for the beach-dune system to maximize its natural protection potential. This should include regular beach surveying and maintaining flooding and storm damage records. The resulting datasets can be used to improve predictions of coastal risk and make better informed decisions for future management. Finally, a minimum horizontal buffer of 70 m should be provided between the leeward side of the dune and any new infrastructure.