



# DND REMEDIATION OF SHORELINE LANDFILL AND RESTORATION OF MIGRATORY BIRD WETLAND AND SALT MARSH

ROYAL ROADS PROPERTY, VICTORIA, BC.

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22 October 2010





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# Royal Roads University Landfill Remediation

## Project Team

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- Andrew Smith, B.Sc., Public Works and Government Service Canada, Victoria, BC

## Project Goals

- Remediation of historic landfill
- Gathering archaeological information
- Groundwater mgt plan
- Restoration of saltwater marsh



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# Esquimalt Harbour







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# Royal Roads Landfill Remediation

- History of the site:
  - Used prior to arrival of Europeans by First Nations.
  - In 1906, James Dunsmuir bought the property and built Hatley Castle.
  - In 1940, the federal government bought the property and operated it as a Royal Roads Military College until 1994.
  - 1996 Opened as Royal Roads University
  - Core property 99yr lease with Province and periferal lands managed through a 5 year lease.





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# Royal Roads Remediation: Background

- Dunsmuir family and military school used a small area adjacent to the foreshore of Esquimalt Lagoon for disposal of domestic debris.
- Landfill berm approximately 110 meters long by 15 meters wide and 2 meters high approximately 3500 m<sup>3</sup>
- Subsurface investigations showed that material in the landfill berm was contaminated.
- Landfill berm was located on the shores of Esquimalt Lagoon, which is a federal migratory bird sanctuary.
  - Fisheries Authorization
  - EC Migratory Bird Permit





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# Berm Before Excavation







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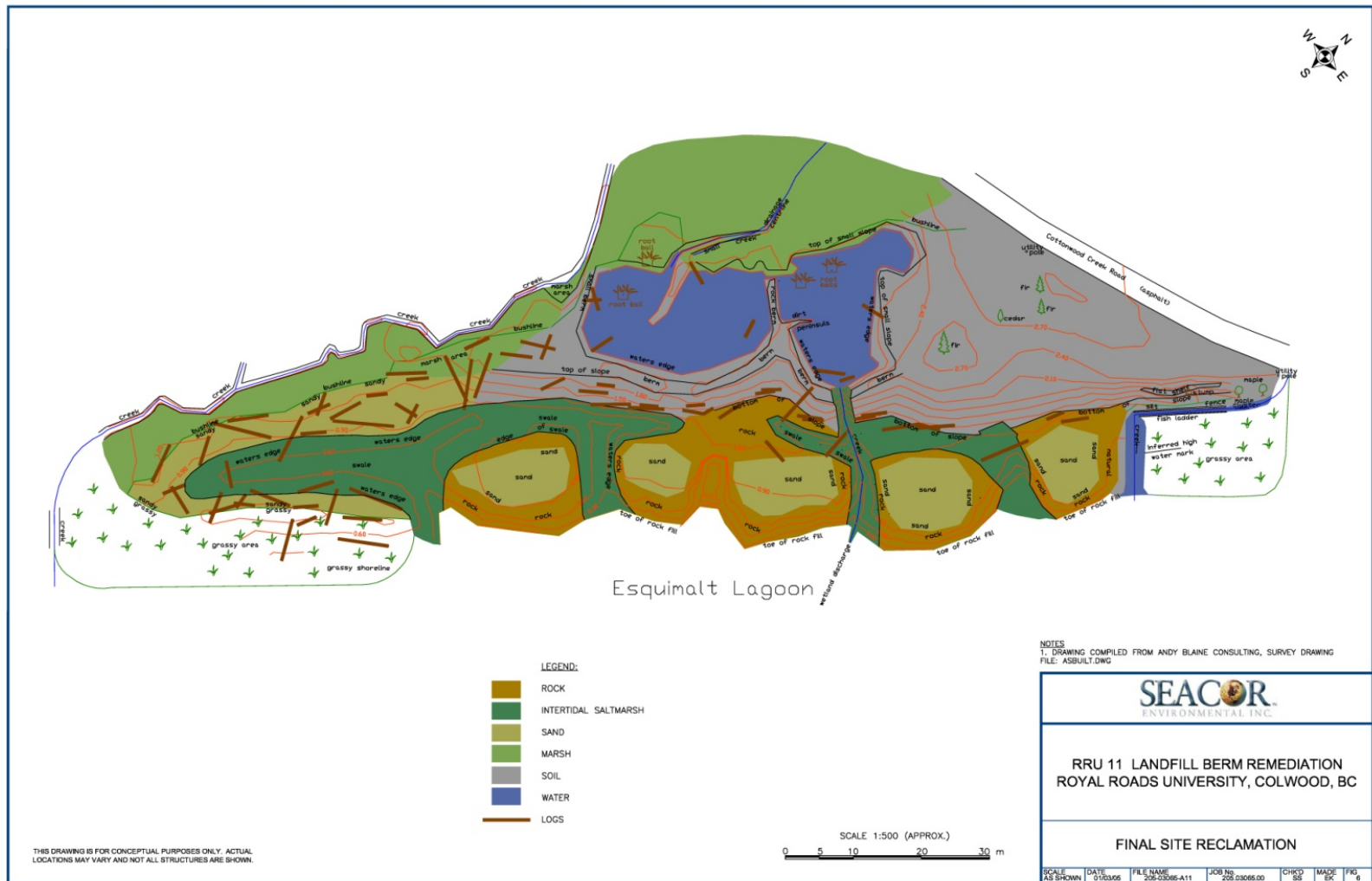
# Royal Roads: During Excavation





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# Wetland Design







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# Shoreline Restoration





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# Archaeology

- Historic significance from potential First Nations deposits
- Significance of Dunsmuir family & Royal Roads Military refuse







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# Recovered Artifacts







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# Royal Roads: Intertidal Reconstruction







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# Royal Roads: Wetland Construction







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# Royal Roads: Wetland Construction







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# FINISHED SITE 2005





**Pond inlet**

**Pond 1**

**Pond 2**

**Pond outlet**





2001





2005





2007



An aerial photograph showing a coastal landscape. On the left, a paved road runs horizontally. Below the road is a dense green forest. To the right of the forest, a rocky shoreline is visible, characterized by numerous long, light-colored logs or driftwood pieces scattered along the edge. The shoreline meets a body of dark water. In the bottom right corner, the year '2009' is printed in large white text. The water surface shows some ripples and a small, dark object near the shore.

**2009**





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# Functioning Habitat 2009







**QUESTIONS ?**