

Title	<h2 style="text-align: center;">Creating Habitat, Adding Value and Reducing Costs Through Sustainable Remediation – Meadow Avenue</h2>
Location	Burnaby, BC, Canada
Project	<p>A site in Metro Vancouver, BC, Canada was the former home of a wood preservation plant operating in the 1930's using creosote and pentachlorophenol. The resultant contamination included the presence of creosote Non-Aqueous Phase Liquid (NAPL) in the soil and dissolved Polycyclic Aromatic Hydrocarbons (PAH) in the groundwater. As the site neighbored the Fraser River, PAH contamination had spread to its inter-tidal and sub-tidal sediments.</p>
Regulatory Context	<p>A remedial order was issued by the BC Ministry of the Environment (MOE) in 1997. BC MOE was the leading regulatory with involvement of federal, provincial and municipal agencies. The approach prescribed by the regulatory agencies was a combination of dredging the sediments and groundwater pump and treat.</p>
Sustainable elements/ approach	<p>The prescribed approach would have required extensive hauling of dredged silt by barges and trucks to an off-site landfill. The pump and treat system was expected to operate for up to 75 years to provide hydraulic control of the contaminant plume. The client group explored 14 different options and selected a more sustainable alternative. Two subsurface sheet pile barriers walls were installed along the site border with the Fraser River. An impermeable cap was placed over some of the impacted sediments and an intertidal marsh habitat and riparian enhancement area was created over top. In another section of the foreshore, the barrier walls allowed for creation of a future wharf. Only sediments outside of the off-shore wall were dredged using a unique caisson dredging methodology used for the first time in BC. This technique controlled dredge-spoil water content, protecting river water quality during dredging and reducing direct exposure of dredgate to the river water. The dual barriers walls served to restrict the NAPL from entering the Fraser River, as well as modifying the groundwater travel path to increase travel time to the river and provide enough opportunity for natural attenuation. This approach made pump and treat redundant. Regular monitoring and NAPL recovery supplemented these actions after</p>
Value Added	<p>The sustainable benefits of this approach include:</p> <ul style="list-style-type: none"> • Elimination of long term operation and maintenance of groundwater pump and treat system; • Avoidance of extensive dredging and hauling of sediments, reducing disposals costs and the associated greenhouse gas emissions; • Reduction of capital costs by \$35 M in comparison to the traditional methods; • Solution based on a 50-year design life of the components; • Significant enhancement of over 4 hectares of prime fishery foreshore; • Agency acceptance of the remediation plan required a departure from familiar and prescriptive regulatory policies; • Involvement of multiple stakeholders at various stages of the project; • Installation of a new wharf added to the site's navigational usage and industrial productivity of the property; • Completion of project with minimal disturbance to the site tenant or neighbouring facilities; and • Creation of marsh and riparian areas, including nearly 2,000 m² of highly productive intertidal marsh, vastly improving habitat in the area and receiving approval from the federal Department of Fisheries (DFO) within 5 years.