



Arbutus Attenuation Tank



2021

ABOUT THIS PROJECT:

Market Segment:
Water Holding Structures

Products Used:
Xypex Admix C-500
Bio-San C500

Location:
Victoria, British Columbia, Canada

PROBLEM

Located in Victoria, BC, Canada, the Arbutus attenuation tank is an underground concrete water-holding structure for a combined sewer designed to temporarily hold surge water caused by inflow of rainwater during high-volume storms until it can be safely redirected to a treatment plant, reducing sewage overflows and environmental impact along the coastline.

The engineers for this project faced two challenges, achieving a watertight structure, and protecting it from acid attack from Microbial Induced Corrosion (MIC), Low-flow sewage environments, such as the

Arbutus attenuation tank are the ideal environment for the formation of acid-producing bacteria such as Thiobacillus. The sulfuric acid produced rapidly degrades the surface of the concrete and also results in sulfate attack, leading to spalling.

THE XYPEX SOLUTION

To avoid these potential problems, NAC Constructors Ltd. selected Xypex Admix C-500 and Xypex Bio-San to permanently protect and waterproof the attenuation tank.

To construct the subterranean tank, NAC Constructors elected to first install secant pile walls around the perimeter of the tank.



The concrete used for the secant piles contained Xypex Admix C-500 to permanently protect the reinforced concrete and minimize water infiltration during excavation and construction of the tank. Xypex Admix chemical treatment reacts with cement and the byproducts of cement hydration to fill the capillaries in the internal structure of the concrete, creating a non-soluble crystalline matrix. The result is concrete that prevents water penetration for its entire service life.

For the concrete structures of the attenuation tank, 2,500 cubic meters of concrete was treated with Xypex Bio-San, including the walls and roof slab. In addition to the crystalline waterproofing contained in Xypex admix C-500, Xypex Admix Bio-San also

contains bio-active mineral solids that become permanently fixed within the concrete matrix, impairing bio-film formation, thus inhibiting the growth of acid-causing sewer bacteria such as Thiobacillus. The antimicrobial initiates a two-stage kill mechanism that stops the Thiobacillus bacteria from developing, thereby preventing the formation of sulfuric acid.

With the combination of integral waterproofing and protection from MIC in Xypex admix Bio-San, NAC Constructors Ltd. permanently protected this critical structure's reinforced concrete, ensuring its structural integrity and reducing future maintenance requirements in a hard-to-access underground tank.

PROJECT BIO

Since 2020, as required by law, all cities in Canada must provide secondary wastewater treatment. The tank can hold up to 5000 cubic meters of excess sewage flow until it is safe to release it back into the system.

After completion, the tank was completely buried, and the site was planted with the same vegetation as the local woodland.

