



# The Town of Stephenville Engineered Wetland

**Location:** Town of Stephenville, Newfoundland and Labrador

**Type:** Municipal Sewage Treatment

**Population Served:** 7,800 P.E. (Population Equivalent)

**Average Flow:** 3,500 m<sup>3</sup>/d

**Wetland Treatment Area:** 20,000 m<sup>2</sup>

- 8 horizontal-flow subsurface wetland beds
- 2 vertical-flow subsurface wetland beds

**Constructed in:** June – November 2005

**Commissioned in:** 2009/10

## Description:

This is the largest subsurface wetland system providing secondary treatment in Atlantic Canada. It is located in the Town of Stephenville, on the west coast of the island of Newfoundland. The system is located on the Stephenville airport property. Subsurface flow ensures that the wetland does not attract water fowl or other wildlife that could impact the airport operations

The wetland system was constructed in 2006 but due to delays in the headworks and collection system the system was commissioned in 2009.

Effluent from the town passes through a spiral screen to remove plastics and non-biodegradable items. Then the flow enters a primary clarifier to settle out suspended solids. From the clarifier the flow is split eight ways and proceeds through the horizontal-flow wetland beds where biological reduction takes place. The flow is then recombined and passes through two vertical beds with final discharge to the ocean.

Sludge treatment cells are located on the other side of the airport. Reed plants mineralize the sludge from the clarifier, producing a compost-like material. Onsite sludge treatment cells provide significant cost savings by eliminating expensive sludge transportation and disposal costs.



Aerial view of system



Planting during construction



One of eight horizontal beds



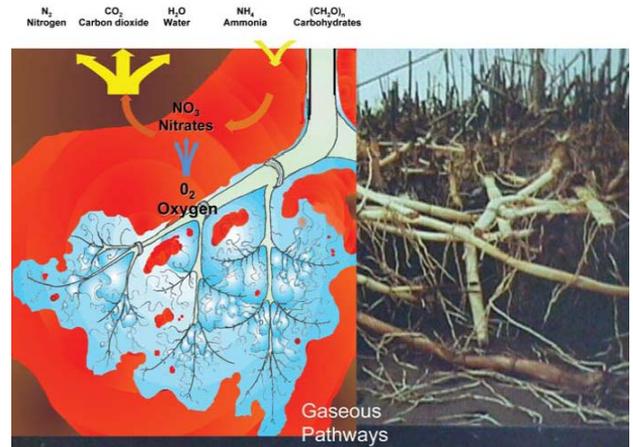
Application of sludge to sludge cell



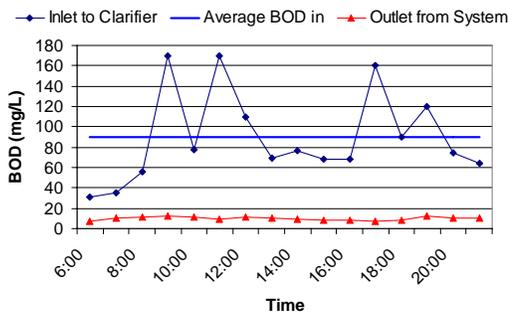
## How it Works

Treatment occurs below the surface of the wetland, in a region of soil and gravel that is referred to as the matrix. Specialized reed plants transfer air to their root mass thereby allowing aerobic bacteria to thrive in the matrix. The matrix is specifically designed to host thousands of different types of bacteria.

The bacteria consume the sewage flowing through the wetland, treating it to produce a naturally clean effluent. Each system is engineered to meet its own specific treatment requirements.



**Typical BOD Results - March 23, 2010**  
Stephenville Engineered Wetland



## Treatment Results

The quality of the incoming wastewater fluctuates corresponding to daily and seasonal variations. Daily peaks are typically at midmorning and in the evening. These peaks are recorded as elevated BOD levels entering the clarifier. By the time the effluent has passed through the wetland the BOD has been reduced by 70-97% to approximately 5-10 mg/l. This is well below Stephenville's limit of 40 mg/l for ocean discharge. Similar results have been obtained for total suspended solids and phosphorous. Nitrogen treatment is expected to come online in late 2010.

Both the solid and liquid portions of the waste are treated in the wetland system. In the sludge treatment cells that accompany many systems, such as Stephenville and Appleton-Glenwood, separate reed beds dewater and mineralize sludge through the natural processes of water consumption, evapotranspiration, and microbial treatment. This converts the biosolids from septic tanks and clarifiers into an inert compost-like material that can be reused for landscaping.

## Typical Sludge Volume Reduction

