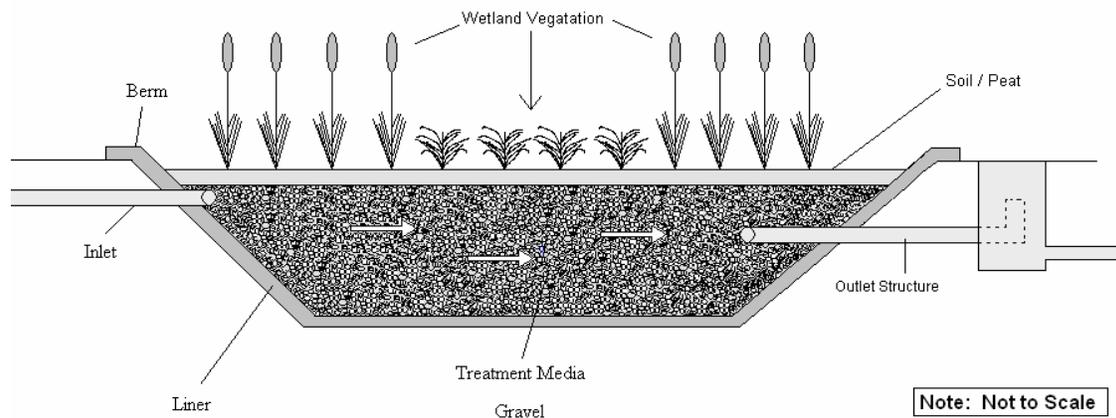


System Type: **Constructed Wetlands**

Basic Design: Constructed wetlands are non-mechanical pretreatment systems following a septic tank. These systems are designed and constructed to utilize the natural processes involving wetland vegetation, soils, and their associated microbial assemblages to assist in treating wastewater. A constructed wetland system (CWS) pre-treats wastewater by filtration, settling, and bacterial decomposition in a natural-looking lined marsh. Subsurface Flow Systems are designed to create subsurface flow through a permeable medium, keeping the water being treated below the surface, thereby helping to avoid the development of odors and other nuisance problems. The media used (typically soil, sand, gravel or crushed rock) greatly affect the hydraulics of the system. The wetland treatment systems are typically constructed in basins or channels with a natural or constructed subsurface barrier to limit seepage. The components of a complete system include: a septic tank for primary settling of the wastewater; a bermed or retained cell(s) that contains an impermeable liner, a gravel substrate, mulch and water-loving plants and a distribution system. Constructed wetlands are typically used as a pretreatment component before discharge to a soil absorption system. These systems are able to reduce biochemical oxygen demand (BOD), total suspended solids (TSS) and fecal coliforms. However, this pretreatment device has not been approved statewide in Ohio for soil absorption or soil depth credits.



Advantages: Under the right site conditions, constructed wetlands can be an affordable alternative to conventional wastewater treatment systems. Constructed wetlands can be an effective natural method for wastewater treatment and are generally simple to build and maintain. Wetlands require little or no energy to operate and provide effective secondary effluent treatment. They are passive systems that do not require much routine maintenance. Constructed wetlands generally do not have any odors.

Disadvantages: Constructed wetlands are site-specific; expert design and additional calculations to determine the economics are advised. Because year-round flow is necessary to sustain the plants, constructed wetlands are not appropriate for seasonal residences. In colder climates larger cells are needed for freeze-prevention design, and efficiency will be compromised. On steep slopes, cut-and-fill may be necessary to keep the effluent flow slow enough for proper absorption. Potential slow initial start-up period before vegetation is adequately established every year. Burrowing animals may pose a threat. All external sources of flow, including precipitation, affect sizing of these systems.

Operation and Maintenance: Overall operational costs of Subsurface Flow Constructed Wetlands range from \$200-\$500 per year which includes pumping the tank, repairs, maintenance, and electricity. A routine schedule should be developed to inspect the wetland for any plants that are invasive, noxious, or fibrous. Regular pumping of the septic tank (every 2-5 yrs) at a cost of \$50-\$100 annually.