FACT SHEET

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

The Value of Artificial Wetlands for Stormwater Management

Office of Water Quality

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Introduction

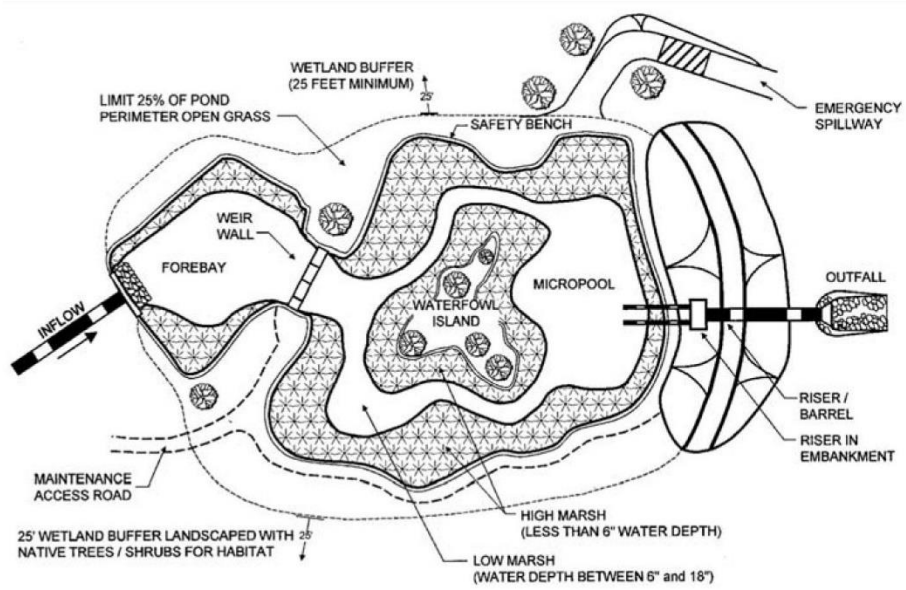
Natural wetlands provide significant value in the landscape, including moderation of stream flow, groundwater recharge, flood storage, pollutant removal, habitat, and recreational opportunities. Constructed wetlands can also provide many of the same benefits and assist with stormwater management and pollution abatement. Constructed wetlands are widely accepted as a stormwater management practice and design guidelines are available for various water quality goals.

Who would want to construct a stormwater treatment wetland?

Treatment wetlands are most likely to be constructed by a municipality. Local municipal and county governments have a responsibility to manage water resources efficiently and cost-effectively within their jurisdiction. Other groups include farmers, Leadership in Energy and Environmental Design (LEED)/green building designers, colleges, airports, healthcare facilities, industrial development, and other campuses that might have a large amount of impervious surface and therefore need to reduce stormwater runoff volume and pollution from their property.

Why would an entity construct a wetland?

Constructed wetlands can be a technically feasible approach to treating stormwater. Installing treatment systems locally provides many benefits, such as improving drought tolerance and soil health, reducing flooding and erosion in streams, providing sediment capture and nutrient uptake, and providing greenspace. In addition, constructed wetlands are less costly than grey infrastructure and are often easier to maintain.



What would it look like?

A constructed wetland looks like a natural wetland but has been designed to receive stormwater with an inlet, a series of elevation changes to promote the movement of water through the system, and an outlet. Constructed wetlands have specified planting plans that include native grasses, sedges, and wildflowers for pollutant treatment and aesthetic purposes. The wetland size is based on the volume and frequency of water entering the system and the depth needed for effective treatment. The system's designer considers the type of pollutants that regularly enter the system, as well as the possible containment of accidental pollutants.

Figure 1: Extended detention shallow wetland. From the Indiana Storm Water Quality Manual, Chapter 8. (https://www.in.gov/idem/stormwater/2363.htm)

Where would it be located?

It is recommended to place constructed wetlands on higher grounds and away from floodplains to keep polluted water separate from natural systems. This allows the constructed wetland to outlet to existing streams and/or natural wetlands after the water is treated. “Higher ground” is relative to already existing natural resources. It is most cost effective to locate the constructed wetland at the lowest point of the developed site (yet above the natural systems) so that water can be directed to the constructed wetland by gravity flow rather than pumps and lift stations.

What else should be considered?

The constructed wetland should be protected with an easement. The easement will help identify the boundaries of the feature, regulatory authority and those responsible for maintenance. Maintenance of the constructed wetland may include harvesting of vegetation, sediment and trash removal, inspection of inlet/outlet, and encroachments. The constructed wetland should be monitored for effectiveness of pollutant removal on a routine basis. A long-term operation and maintenance (O & M) manual should be prepared for the treatment wetland and responsibility for the O & M made clear.

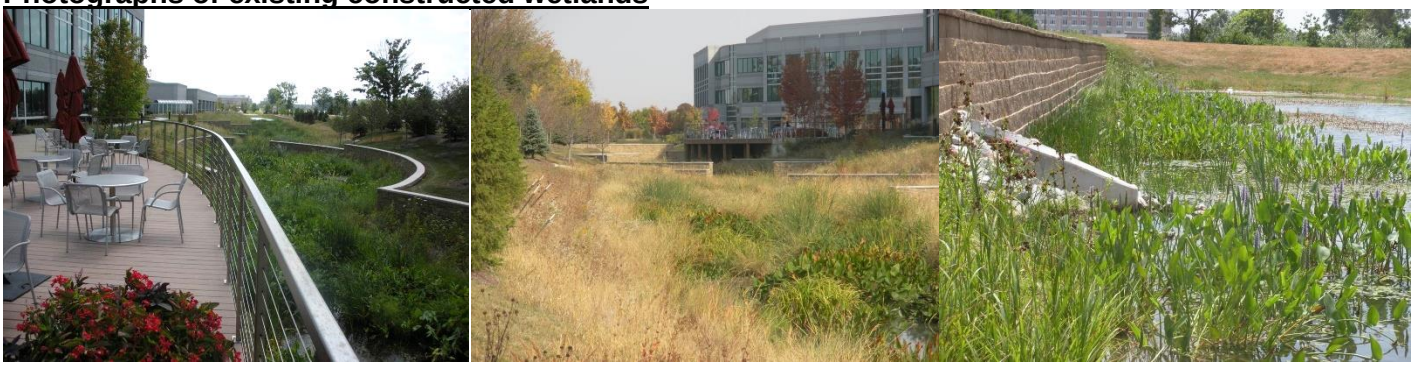
How is it regulated?

The constructed wetland used for stormwater treatment is typically regulated by the Municipal Separate Storm Sewer Systems (MS4) or other entity. An MS4 is a conveyance or system of conveyances owned by a state, city, town, or other public entity that discharges to Waters of the United States (WOTUS) and is designed or used for collecting or conveying stormwater. Regulated conveyance systems include roads with drains, municipal streets, catch basins, curbs, gutters, storm drains, piping, channels, ditches, tunnels, and conduits.

Natural wetlands are regulated by the Clean Water Act Section 401 and Section 404, which restricts fill within wetlands and streams. Wetlands constructed for a specific purpose are often exempt from Section 401/404 regulation. It is imperative that a wetland delineation be conducted prior to constructing the artificial wetland to verify any regulatory authorities.

Caution: Natural existing wetlands cannot be used for stormwater management without pre-treatment and regulatory approval.

Photographs of existing constructed wetlands



Additional information

https://www.in.gov/idem/wetlands/
https://www.in.gov/idem/stormwater/2333.htm
https://www.in.gov/idem/stormwater/files/stormwater_manual_apndx_g.pdf
https://efotg.sc.egov.usda.gov/references/public/IN/656_Constructed_Wetland.pdf