



# Standards for SWMF's (Stormwater Management Facilities)

## Lacombe County's Guide to Developing Stormwater Management Facilities

August 2017





## PREAMBLE

Development results in a great amount of impervious area, which during times of heavy rainfall affect the natural drainage of the land. Therefore, the water that would have dissipated into the soil and vegetative cover pre-development, now needs to be contained post development.

County policy for the development of stormwater management facilities requires that onsite stormwater retention, as a result of development, must be contained in either an existing, albeit altered, wetland on site or in a constructed wetland. This guide is intended to provide direction for developers and engineers to aid them in the understanding of the County's requirements and expectations when it comes to the use, functioning and monitoring of these natural and man-made waterbodies.

The County has taken this direction as it recognizes that wetlands play an important role in the environment in terms of their ecological, aesthetic and recreational benefits, especially in comparison to traditional stormwater management facilities whose only function was the retention of water.

These standards provide guidance on the requirements for the design of constructed wetlands and use of existing wetlands in conjunction with the County's *Standards Manual*. That being said, each site should be assessed on an individual basis, as they will have their own unique characteristics in terms of topography, catchment area, water quality and available footprint. The standards are also intended to align with the current *Alberta Wetland Policy*, the *Water Act*, the *Environmental Protection and Enhancement Act* and any other relevant legislation or guidelines. These guidelines should not be used in place of required detailed site-specific engineering drawings, in place of professional expertise of a hydrologist and/or qualified wetland professional, or as an approval from *Alberta Environment and Parks*.

Planning and Development staff are available to answer any questions that you may have concerning the County's requirements for stormwater management design.

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## Introduction

Stormwater management systems and alteration to wetlands falls under the provincial approval process of *Alberta Environment and Parks* (AEP) and some other possible federal approvals such as the *Fisheries Act*. These County standards are secondary and supplemental to the provincial or federal process and requirements. The requirements outlined in this document are the minimum standards that the County expects to be incorporated into the design and construction of stormwater management facilities and should be read in tandem with the County's *Standards Manual*.

## Policy

The County's *Municipal Development Plan* (MDP) outlines a number of stormwater management requirements for development under the Infrastructure and Technology Section. The MDP should always be read in its entirety as the overall design of any development is influenced by more than the technical requirement for stormwater management and design outlined in the following policies.

### INF&TECH 7.5.1 Stormwater Management

The preparation of stormwater management plans shall be required, as necessary, to regulate stormwater discharge and water quality, designed to accommodate a 1:100 year flood event, in accordance with Alberta Environment and Parks and Lacombe County standards.

### INF&TECH 7.5.2 Stormwater Management in the *Wolf Creek/Whelp Brook Master Drainage Plan*

Areas affected within the Wolf Creek or Whelp Brook drainage basins shall comply with the *Wolf Creek/Whelp Brook Master Drainage Plan* when completing their stormwater management plans.

### INF&TECH 7.5.3 Stormwater Management Facility

The County shall require all stormwater management facilities to either:

- a) incorporate existing onsite wetland(s) into the design; or
- b) create a constructed wetland(s).



#### **INF&TECH 7.5.4 Exception to 7.5.3**

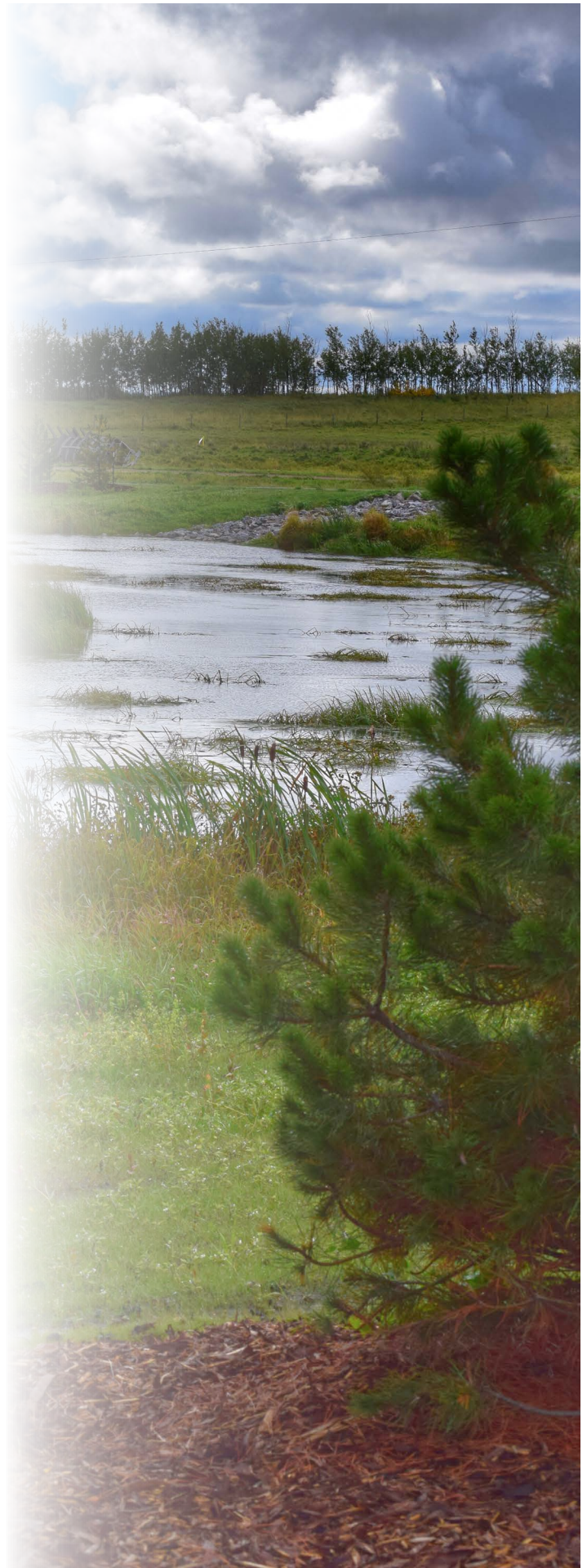
Ornamental ponds or dry ponds may be considered if it is confirmed by a qualified professional engineer that the topographical, soil, or other conditions of the site would render it unsuitable to comply with INF&TECH 7.5.3.

#### **INF&TECH 7.5.5 Storm Water Management Facility Design and Maintenance**

Stormwater management facilities shall be designed and maintained in accordance with the County's *Standards for Stormwater Management Facilities*.

### **Design/Use of Constructed Wetlands for Stormwater Management Facilities**

The purpose of constructing or using a wetland for stormwater management is to provide greater attenuation and pollutant removal, as well as increase biodiversity, aesthetics and provides amenities. Constructed wetlands often do not have all the ecological functions of a natural wetland, however, with careful design and maintenance, especially during the establishment stage, constructed wetlands can form a rich part of the ecosystem and aid in the removal of sediments and pollutants from water entering into the County's lakes and rivers. The following are the County's requirements, which are to be incorporated into the design of a constructed wetland.



Constructed wetland stormwater management facilities must be designed:

- by a qualified engineer and a qualified wetland professional as defined by AEP;
- with a drainage area of 5 ha (12.3 acres) to ensure that a permanent pool can be maintained;
- to ensure an adequate retention time for microbes that alter contaminants to carry out their life cycles for optimum pollutant removal;
- to ensure a minimum 24 hour retention period, with at least 90% total suspended solids (TSS) removal;
- to ensure there is adequate flow to minimize algal blooms;
- to ensure there is adequate flow to establish emergent and submergent vegetation;
- to have varying depths with shallower edges to ensure essential wetland vegetation establishment;
- to ensure varying depths and ensure flow which will aid in reducing loading;
- to take into consideration the amount of sediment, as forebays may be required as part of the design;
- to incorporate features which minimize and control the mosquito population;
- to allow for access to all inlets, outlets and sedimentation forebays; and
- to have a discharge rate of two (2) litres per second per hectare if located within the Wolf Creek/ Whelp Brook Master Drainage Plan area. All other stormwater management facilities can be designed to discharge at AEPs standard where the post development rate of release from the land is not greater than the pre-development rate of release.

## **Design/Use of Natural Wetlands for Stormwater Management Facilities**

A thorough wetland assessment must be carried out by a qualified wetland professional to assess, classify and delineate the type, size and number of wetlands on the development property. This will also form part of the baseline data for the monitoring and maintenance of the wetland(s) post development. One or more the wetlands can then be used or altered to accommodate the



stormwater from the development, subject to Alberta Environment and Parks (AEP) approval. The following are the County's requirements which are to be incorporated into the design of an altered natural wetland.

Natural wetland stormwater management facilities must be designed:

- by a qualified engineer and a qualified wetland professional as defined by AEP;
- to limit the extent to which the wetland(s) area is altered and the impact the alterations have on the overall hydrology of the area;
- to limit the amount of pollutants and sediment entering the wetland;
- to limit disturbance of wildlife corridors; and
- to allow for access to all inlets; outlets and sedimentation forebays.

## Designation

Constructed wetlands shall be designated as Public Utility Lots (PULs). An altered natural wetland may also require environmental reserve designation.

## Monitoring and Maintenance

The Developer is responsible for the monitoring and maintenance of the storm water management facility until such time as a Final Acceptance Certificate (FAC) has been issued by the County. An FAC will not be issued until the two (2) year warranty period has lapsed and the County deems that the



vegetation and wetland function has been established. The warranty period will not begin until the County issues a Construction Completion Certificate. An operations training and maintenance manual and a monitoring program must be provided to the County's satisfaction by the developer. Appendix A provides an example for a basic monitoring and maintenance schedule over a two year period.

## Signage

The developer is required to provide informational and educational signage about the constructed wetlands or altered wetlands in relation to their function. People should be made aware that wetlands and constructed wetlands serve a naturalized function, are not manicured park area, and will be maintained as such. Developers must also comply with the signage standards in the County's *Standards Manual*.

## Amenity

The developer will be required to provide pathways around the stormwater management facility. These will be either a local or regional trail standard depending on the specific context and constructed as per the County's *Standards Manual*. The purpose of the trail is to provide for a passive amenity to be enjoyed by the users of the development as well as the general public. Additional requirements may also include seating, garbage, picnic areas or rest stops, and the trail system itself may be part of a wider regional amenity.

## Reference Material

Lacombe County *Municipal Development Plan*  
Lacombe County *Standards Manual*



## **Appendix A**

### **Monitoring and Maintenance Schedule - Example**

## Monitoring and Maintenance Schedule (EXAMPLE ONLY)

Timing	Component	Action
Following Storms <b>OR</b> Monthly	Inlet	Erosion and cracking, and if present, repair
	Debris screens (if filtered)	Remove material that would block flows, replace filter if necessary
	Sediment forebay	Dredge if sediment fills over 50% of design volume
	Control structures, pipes, weirs, etc.	Structures need to be clear of vegetation to maintain stormwater flow
	Emergency overflow	Check flow path for erosion and repair as necessary. Structural repairs must be repaired immediately to avoid catastrophic failure
	Erosion and bank stability	Inspect banks for settlement, erosion, scouring, cracking, seepage and rilling
	Waterbody	Remove garbage and other floating debris from wetland pond Inspect for algal blooms or fish kills Test water quality
	Wildlife	Pest species must be controlled Wet areas where mosquitoes breed need careful attention
	Soil	Inspect for loss of soil on wetland banks from erosion Monitor the health of soil as wetland progress
6 Months	Littoral zones	Inspect wetland plants exotic or invasive species and remove. Control may be done manually or with appropriate herbicide by a properly licensed and registered professional Follow up inspections may be needed during the growing season
Annually	Any valves and pumps that may be present	Check pumps and valves, if present are functioning properly. Check moving parts for corrosion and lubricate if required
	Vegetation	Ensure vegetation is growing especially wetland indicators and that wetland is progressing
2 + Years	Wetland liner	Inspect liner for leaks and fix as per manufacturer's or design specifications
	Sediment forebay	Check the forebay for accumulation of sediment. In general the forebay should be dredged if sediment fills over 50% of the design volume Test sediment for contaminants (e.g., heavy metals, PAHs) prior to dredging and dispose of sediment to landfill