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**L1. GENERAL**

Stormwater management is regulated provincially under both the *Environmental Protection and Enhancement Act* and the *Water Act* and federally by the *Navigable Waters Protection Act*, *Fisheries Act* and the *Canadian Environmental Assessment Act*. The Developer is responsible to ensure that all stormwater facilities and infrastructure is designed and constructed in accordance with the requirements of all Provincial and Federal regulations.

Storm water management systems must be designed by a qualified professional to minimise the adverse environmental impact of developments locally, on water courses downstream of the site, drainage systems upstream of the development and on groundwater. The stormwater system must ensure that post-development runoff to adjacent properties will be no greater than pre-development rates and include the necessary mitigation measures to protect existing downstream drainage systems and/or receiving water bodies.

This section provides a summary of stormwater systems. Refer to the AEP publication *Stormwater Management Guidelines for the Province of Alberta* and Lacombe County's *Standards for Stormwater Management Facilities* for details. Additionally, these systems must comply with any local drainage study requirements i.e. the *Wolf Creek/Whelp Brook Master Drainage Plan*.

**L2. ALIGNMENT**

Storm water management facilities must be contained within a public utility lot. No storage will be permitted in a road right of way. Any drainage channel located outside of a road right of way or reserve must also be contained on land that is designated as a public utility lot.

Access must be incorporated into, or provided up to, any public utility lot that is part of the stormwater management system to facilitate maintenance.

**L3. STORMWATER MANAGEMENT PLAN**

A Stormwater Management analysis must be conducted by a qualified professional and the resulting Stormwater Management Plan must be submitted to the County.

The Stormwater Management plan must address the following:

## ***L – STORMWATER MANAGEMENT***

1. Pre-development drainage systems and offsite catchments including rates of run-off and analysis of the downstream receiving channel.
2. The physical constraints of the site and how these factors influence the selection of the proposed stormwater system.
3. Clearly defined objectives for stormwater management (improved water quality, control rate of run-off, flood prevention, etc.).
4. Description of the proposed stormwater collection system including an explanation of how the proposed system best supplies the drainage requirements and meets the stormwater management objectives. This should also include supporting detailed hydrology and hydraulic calculations for all facilities.
5. An overall plan depicting the proposed stormwater collection system, the location of all facilities, emergency spillways, preliminary facility cross-sections and details of inlets and the outfall control structure. If the implementation of the scheme is to be staged, the staging method should be presented.
6. Description and plan of the interim storm water management system to be in place during construction
7. Description of what Stormwater Best Management Practices (BMPs) were followed in particular:
  - a. lot-level BMPs
  - b. conveyance system BMPs
  - a. end-of-pipe BMPs
  - b. Report which outlines the life-cycle cost of construction, operation, maintenance and replacement of each proposed BMP

### **L4. STORMWATER BEST MANAGEMENT PRACTICES (BMPS)**

#### **L4.1 General**

Stormwater Best Management Practices (BMPs) are methods of managing stormwater drainage for adequate conveyance and flood control. These methods retain as much of the “natural” runoff characteristics and infiltration components of the undeveloped system as possible and reduce or prevent water quality degradation.

Storing the volume of runoff from a 25-mm storm over the contributing area is appropriate for stormwater quality control using detention devices such as constructed wetlands. A detention time of 24 hours should also be used for detention facilities.

Stormwater management facilities shall be designed for self-sustainability and to minimize maintenance.

#### **L4.2 BMP Screening and Selection**

##### **1. Initial Screening**

There are a range of stormwater BMP options available for most applications.

The selection of an appropriate BMP or group of BMPs depends on the objectives for stormwater management defined for a particular catchment area, as well as the constraints placed on the feasibility of particular BMPs by physical site factors.

Once the objectives for stormwater management are well defined and the site constraints are understood individual BMPs can be evaluated in terms of their overall effectiveness as a stormwater control facilities. The evaluation of overall effectiveness must include both water quantity and water quality objectives.

##### **2. Physical Constraints**

Site characteristics may be the factor that will ultimately determine the applicability of individual or combinations of BMPs. Physical factors that need to be assessed in evaluating the suitability of BMPs include:

- a. Topography
- b. Soils stratification
- c. Depth to bedrock
- d. Depth to seasonably high water table
- e. Drainage area

##### **3. Final Screening**

In the initial screening phase the options for BMPs were limited by particular disadvantages and site constraints. The list of BMP options that are still considered feasible are further screened by the application of specific objectives that must be met as part of the development including:

- a. Water quality
- b. Flooding
- c. Erosion
- d. Ground water recharge

**L4.3 Lot Level BMPs**

Important stormwater management criteria, such as the preservation of water quality, protection from erosion, and the maintenance of base flow can begin to be addressed at the lot level. Lot-level controls ought to be considered when planning the stormwater drainage system.

**L4.4 Stormwater Conveyance System BMPs**

Stormwater conveyance systems transport drainage from developed areas to storage facilities or a receiving water body.

Road runoff normally carries high levels of solids, oils, greases, metals and chlorides if road salt is applied during the winter months. Removal of these contaminants prior to end-of-pipe can enhance the performance of any storage or treatment facilities. In all cases deliberate discharge of storm water into the sanitary system must be prevented.

**L4.5 End-of-Pipe Stormwater BMPs**

End-of-pipe stormwater BMPs provide water quality enhancement to stormwater prior to discharge into a receiving water body. A number of end-of-pipe alternatives are available for application depending on the characteristics of the upstream catchment and the requirements for water quality enhancement. Generally, the County will only give approval for constructed wetlands.

**L5 Signage**

The design of stormwater management facilities shall include adequate provisions for the installation of signage to warn of anticipated water level fluctuations, with demarcation of maximum water levels to be expected for design conditions. Warning signs will be designed by the Developer and approved by the Engineer.

**L6 Maintenance and Warranty**

**L6.1 Maintenance Plan**

The engineer shall provide a detailed maintenance plan for all components of the stormwater management system including, but not limited to, vegetation management and forebay or catch basin cleanout.

**L6.2 Maintenance and Warranty Period**

In addition to the standards set out in A11.5 the developer shall be responsible for all maintenance of the stormwater management facilities for a period of two (2) years after the acceptance of a Construction Completion Certificate.