

County of Vermillion River

Blackfoot & Devonia Functional Stormwater Drainage Plan

Final Report



Date: July 21, 2014
Prepared for: County of Vermillion River
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Project No: 1152

Executive Summary

In 2011, Clifton Associates Ltd. completed a Master Stormwater Management Plan (the Master Plan) for the County of Vermilion River (the County), incorporating the area surrounding the City of Lloydminster where most of the development activity has been happening, and is expected to continue. The County has now retained Sameng Inc. to complete a functional stormwater drainage plan for the Blackfoot and Devonia Drainage Basins.

The overall objective of the study is to develop a clear, applicable and sustainable functional stormwater drainage plan for the Blackfoot and Devonia Basins, as extensions to the Master Plan, to meet the stormwater servicing needs of those Basins.

Basin boundaries were provided by the County and confirmed by Sameng. An area of approximately 13.8 km² (1378 ha) originally identified as being in the Blackfoot Basin is actually within the Stretton Creek Basin. Similarly, for the Devonia Basin, the original boundaries included an area which was determined to be part of a drainage basin identified as the Blackfoot Creek Sub-basin, which drains directly into Blackfoot Creek.

Using the Water Survey Canada hydrometric stations Stretton Creek near Marwayne and Big Gully Creek near Maidstone, a pre-development release rate of 1.65 l/s/ha is recommended for the Blackfoot and Devonia Basins, which reflects the agricultural nature of, and the large storage capacities of the wetlands within, the basins.

Two public Open Houses were held to meet with landowners, developers and other stakeholders. The first Open House was held on June 25, 2013, at the start of the study, to gather information and allow the public, developers and other stakeholders to provide input to the development of the functional drainage plan. The second Open House was held on February 18, 2014 to introduce the conceptual functional drainage plan and to obtain feedback from the public, developers and other stakeholders. Flooding of the Blackfoot Wetland at the outlet to the Blackfoot Basin, and flooding around Devonia Lake and downstream impacts were the primary water-related issues identified at the Open Houses.

To determine the pre- and post-development runoff flows from the basin, an EPA SWMM model was created and used to determine the existing and future runoff and storage parameters in the Blackfoot and Devonia Basins. The rainfall events used to obtain the pre- and post-development flows were the City of Edmonton design storms, based on the 1:100-year 24-hour Huff Distribution and the 1:100 year 4-hour Chicago Distribution. From these two rainfall events, the highest peaks occurred from the 24-hour storm and, therefore, this event was used to develop the stormwater management scenarios.

The functional stormwater drainage plan for the Blackfoot Basin proposes the Blackfoot East Drainage Channel which drains into the Blackfoot Wetland and the Blackfoot West Drainage Channel, which drains into the Blackfoot East Drainage Channel just upstream from the Blackfoot Wetland. The total estimated cost for the Blackfoot East Drainage Channel is approximately \$1,316,000 and for the Blackfoot West Drainage Channel approximately \$1,226,000.

The functional stormwater drainage plan for the Devonia Basin includes the existing

Central Devonia Drainage Channel and proposes the Devonia East and Devonia West Drainage Channels. The total estimated cost for the Devonia East Drainage Channel is approximately \$1,509,000 and for the Devonia West Drainage Channel approximately \$359,000. Provided the Central Devonia Drainage Channel has been maintained to its original design standards, this channel provides proper drainage to the Hamlet of Blackfoot and the surrounding lands and no additional works are required.

As development is from east to west, from the City of Lloydminster, the priority for implementation is:

1. Devonia East Drainage Channel
2. Central Devonia Drainage Channel
3. Devonia West Drainage Channel.

Flooding issues around Devonia Lake and downstream impacts should be addressed prior to implementing the Devonia Basin functional stormwater drainage plan.

Major development within the Blackfoot Basin is not anticipated in the foreseeable future. This provides the County with some lead time to address the flooding concerns around the Blackfoot Wetland.