City of Calgary Approach to Runoff Volume Control Implementation

Background:

The City of Calgary (The City) has been an active member of the Nose Creek Watershed Partnership through the development and implementation of the Nose Creek Watershed Water Management Plan (the Plan). The Plan included staged implementation of the recommended volume control targets to provide an opportunity for technology and industry best practices to develop and time for all stakeholders to adapt to more stringent runoff volume targets. Since implementation of the Plan in 2008, the development industry has tried to adapt; however, the technical tools available to support integrated stormwater management into the design and development of watershed scale stormwater management strategies has not progressed as quickly as originally envisioned. The step down in runoff volume control target in 2013 began to highlight the existing limitations with tools and policy and resulted in challenges when trying to achieve the more stringent targets.

Implementation Challenges:

Working with the development industry, The City has had limited success in achieving the 2013 16 mm runoff volume control target. Based on our experience, designs associated with large scale Outline Plans that have primarily single-family residential lots can only achieve the stringent runoff volume target if stormwater reuse through irrigation of all green spaces is applied in addition to resilient landscaping practices. Although the target for these designs has been achieved in theory, there is still uncertainty related to the practical implementation and sustainability of the design. For example, provincial guidance and policy related to stormwater reuse systems have not been fully developed to address the associated potential public health risks.

To support the achievement of The City's Municipal Development Plan goals, higher densities and mixed-use planning are required in new development designs. These new requirements help to reduce urban sprawl and the overall environmental impact of urbanization. In our experience, when the density of development increases, and more mixed uses are introduced, the ability to meet the current target (16mm) using our current tools decreases. Although a variety of tools have been put forward for consideration over the years, many have proven to have limited implementation from a runoff volume control perspective. For instance, low impact development (LID) tools such as bioswales and infiltration are often not an option due to soil conditions.

In addition, new communities typically take several years to progress through the development process. Development applications that were approved during the early stages of the Plan implementation are only now reaching a stage where details on how the targets can be practically achieved are being evaluated. None of the applications that have been approved with the 16 mm target (2013) have been fully constructed. Through future monitoring, we anticipate to learn more about the actual runoff volume reductions achieved through the tools that have been implemented in the design process.

Consequences of not meeting Runoff Volume Targets

Potential challenges with meeting runoff volume targets were recognized even with the original 2008 Plan. It was not intended to replicate pre-development conditions; however, the

Partnership jointly decided to embark on a precautionary approach that would minimize impacts on Nose Creek and West Nose Creek.

The runoff volume control targets set out in the original 2008 Plan were established with the understanding that the targets would still likely result in: a near doubling of stream width, lower habitat suitability for aquatic life, unstable streambanks, degraded riparian areas, and limited protection for existing infrastructure upstream of the Calgary city limits. The impacts were expected to be greater within Calgary as existing communities currently have no runoff volume control in place.

Delaying the implementation of the 2017 target, while implementation challenges are addressed, will likely result in the continued degradation of Nose and West Nose creeks, however, at a slower rate than before any runoff volume control was implemented (pre-2008).

Working with the Development Industry

In the summer of 2018, BILD Calgary Region and NAIOP raised concerns that stormwater was becoming one of the largest barriers facing development. The development industry has shared that The City's overall stormwater objectives/outcomes are not clear and that new stormwater requirements, including runoff volume control, have resulted in significant costs and time delays to new developments. To address these concerns, Water Resources has established weekly meetings which began in the summer of 2018 to collaboratively work through challenges on active applications.

Interim Approach to Volume Control Target Implementation:

The City's approach to implementing runoff volume control has evolved since implementation of the Plan in 2008. Early implementation was focused at an individual lot level, which provides limited opportunities for regional type solutions and economies of scale. The current approach typically includes a detailed review of the practical achievability of proposed runoff volume reductions at the Master Drainage Plan or Staged Master Drainage Plan stages. This encourages subdivision-wide solutions and lot level targets that can be more practically balanced based on land use.

In response to concerns shared by BILD Calgary Region and NAIOP, The City developed an interim approach that provides clarity on runoff volume control while taking into consideration the practical tools currently available. Expectations include:

- maximization of stormwater reuse through irrigation of public park spaces.
- use of resilient landscaping practices to meet achievable targets for private lots.
- achievement of an overall runoff volume between 40 mm and 90 mm in new subdivision areas, dependent on the proposed composition of multi-family, industrial, commercial and institutional development.

While we recognize that the interim approach will not achieve the targets set out in the Plan and will result in greater impacts on Nose Creek and West Nose Creek, the approach continues to support the goals and intent of the Plan. Without the interim approach, each new development application would be reviewed and relaxations explored on an ad hoc basis. This would result in inconsistencies, major delays for the development industry and frustration for both internal staff and applicants.

The implementation of the interim approach is contingent on the updated Plan being endorsed, as the current Plan does not provide flexibility for municipalities to evaluate the applicability of the runoff volume control targets. The interim approach is intended to remain in place until new policy and tools become available, and the modelling work and review of stormwater management targets recommended in the updated Plan is completed.

Pilot Projects:

The City has been working with developers in several areas within the Nose Creek catchment to explore new, innovative concepts. The updated Plan will also provide flexibility for The City to work with industry to try new solutions or tools, which may help to achieve targets in redevelopment areas and reduce the need for relaxations in the future.

BILD Calgary and NAIOP have recently put forward a new low energy release concept that has potential to mitigate some risks of further erosion in Nose Creek while also reducing costs to the development industry. The concept considers optimized use of available storage in storm ponds and a slow, low-energy release rate from the ponds. The concept aims to reduce the impact of smaller storm events, by reducing the cumulative impact of discharges. Work is underway to explore this concept further throughout 2019.