

**Utilities & Environmental Protection Report to
SPC on Utilities and Corporate Services
2018 February 14**

**ISC: UNRESTRICTED
UCS2018-0092
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2017 Flood Resiliency and Mitigation Annual Update

EXECUTIVE SUMMARY

The City is dedicated to implementing the Government of Alberta's Water for Life Strategy, through its water management framework that ensures reliable, resilient water servicing for Calgary and regional customers. Working with the Province and regional partners, The City aims to protect the water supply, use water wisely, keep rivers healthy, and build resiliency to flooding.

This report provides a summary of the activities undertaken by The City of Calgary's Flood Mitigation program in 2017 to address the goal of building flood resiliency in Calgary. As of 2017 December, all the Expert Management Panel on Flood Mitigation recommendations (PFC2014-0512) are either complete or substantially underway.

Updates on the City Council-approved Flood Mitigation Measures Implementation Plan (PFC2017-0162), as well as the current status of Provincial upstream mitigation work, are included. The report also provides updates on the Community Drainage Improvement (CDI) program aimed at mitigating the impacts of local stormwater flooding in communities. A more comprehensive report is provided as Attachment 1.

ADMINISTRATION RECOMMENDATION:

That the Standing Policy Committee on Utilities and Corporate Services recommends that Council receive this report for information.

PREVIOUS COUNCIL DIRECTION / POLICY

On 2014 June 26, Council approved the River Flood Mitigation Panel Final report (PFC2014-0512), which included direction to provide an annual update to City Council on progress related to the recommendations from the Expert Management Panel on River Flood Mitigation.

On 2016 May 25, the Drainage Financial Plan Progress Report (UCS2016-0414) included an update on the Community Drainage Improvement (CDI) program. This report included a commitment to the ongoing evaluation of opportunities to accelerate CDI projects and was received for information.

On 2015 May 27, The SPC on Utilities and Corporate Services received the Flood Resiliency and Mitigation 2014 Annual Report (UCS2015-0082) for information. A subsequent annual update for 2015 was received for information on 2016 April 27 (UCS2016-0168) and 2017 April 10, (UCS2017-0266). The 2016 update also outlined The City's strategic approach to watershed and community level flood mitigation measures for Calgary. The subsequent implementation plan was approved by Council on 2017 June 26 (PFC2017-0462).

BACKGROUND

In 2014 June, the Expert Management Panel on River Flood Mitigation delivered 27 recommendations to Council aimed at achieving a safer, more flood resilient Calgary. To date all recommendations are substantially underway, with 15 of the 27 recommendations complete. Appendix A of Attachment 1 summarizes progress on the recommendations.

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In 2016, The City completed a comprehensive Flood Mitigation Measures Assessment (FMMA), which examined river flood mitigation measures for both the Bow and Elbow rivers to reduce Calgary's flood risk. The FMMA recommended that upstream structural mitigation, combined with community and property-level mitigation measures as the most cost-beneficial approach to increase Calgary's flood resilience. Non-structural measures such as revised development policies and building regulations were also identified as helping provide further reduced flood risk in light of ongoing climate uncertainty.

On 2017 June 26, Council approved the Flood Mitigation Measures Implementation Plan (PFC2017-0162), which included funding approvals to begin work on community barriers at four locations. These projects are pending service level negotiations and funding assistance from the Province and are located:

- Downtown from Jaipur bridge to Reconciliation bridge;
- In Sunnyside-Hillhurst, from the Peace bridge to the existing community flood barrier;
- In Bowness, along Bow Crescent; and
- From the existing Inglewood flood wall to the south-eastern portion of Pearce Estate Park.

In 2015 October, the Province committed to moving forward the Springbank Off-stream Reservoir (SR1) for flood mitigation on the Elbow River. The Province also entered a five-year agreement with TransAlta to manage reservoirs on the Bow River between May and July each year to mitigate seasonal river flooding. The Province also committed \$150 million to The City through the Alberta Community Resilience Program (ACRP) over ten years to deliver community-level flood mitigation. As of 2017, \$40.3 million has been provided by ACRP to The City for ten flood mitigation projects. Once complete, these projects will reduce Calgary's flood risk by as much as 30 per cent.

As part of its commitments, the Province also initiated the Bow River Working Group (BRWG) and Advisory Committee with The City of Calgary and other stakeholders in 2015 October to improve flood and water supply resiliency in the region. A number of 'quick wins' were identified to improve flood and water supply resiliency in the region if implemented. Additionally, a proposed flood-focussed reservoir upstream of Calgary would have short-term water supply benefits for Calgary, with three locations identified for further study. However, the majority of reservoir scenarios to address drought were focussed on southern Alberta agricultural irrigation downstream of Calgary.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

RIVER FLOODING

Watershed mitigation – Elbow River

Once completed, the Springbank Off-Stream Reservoir (SR1) operated in tandem with the Glenmore gates, will provide flood mitigation on the Elbow River for a flood event similar to 2013. The City has also identified two gravel bars in the community of Mission to be reshaped to support SR1 and the Glenmore gates and to continue to provide the expected level of mitigation. Construction on the gravel bars is expected to occur throughout 2018. Glenmore gates is expected to be operational by 2020.

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On 2016 June 23, the Canadian Environmental Assessment Agency (CEAA) announced that a federal environmental assessment for SR1 would be undertaken. Alberta Transportation submitted the environmental assessment report to CEAA on 2017 October 17, which CEAA subsequently referred back to Alberta Transportation for additional information on 2017 November 20. Work is underway by Alberta Transportation to provide the additional information requested. As part of the assessment, CEAA invited stakeholders including The City of Calgary to participate in a technical working group for the SR1 project. The City will continue to provide technical support for SR1 until the environmental review process is complete.

Watershed mitigation – Bow River

The City of Calgary co-chaired the Bow River Advisory Committee and participated on the BRWG with Alberta Environment and Parks, which has been evaluating water management options on the Bow River since 2015. In 2017 August, the BRWG released the *Bow River Water Management Project Final Report*, which outlined short, medium, and long term operational and infrastructure improvements to improve flood mitigation and water supply on the Bow River.

The report recommended that a single new reservoir upstream of Calgary, combined with additional operational efficiencies and modifications at existing reservoirs would provide significant flood mitigation for Calgary. The efficiencies and modifications includes negotiating a long-term watershed agreement with TransAlta and extending the Ghost Reservoir flood operations agreement and drawdown rate.

These operational modifications and upstream mitigation, once complete, will work in combination with the community barriers being constructed by The City to provide mitigation up to a flood event similar to 2013. As of 2018 January, the Province has begun follow-up work on the BRWG's short-term, "quick-win" mitigation recommendations. For recommendations related to large infrastructure recommendations, next steps have not yet been communicated by the Province. Work on a long-term solution requires Provincial commitment, and actions to move forward must be addressed collaboratively with stakeholders.

The City continues to stress to the Province that flood mitigation is one of its top strategic priorities. An upstream reservoir on the Bow River is a holistic water management solution for the watershed and is critical to Calgary's flood resilience, while also providing short-term water supply benefits.

Community mitigation

Applications to the ACRP program for the four community barriers identified above and two additional projects, the Upper Plateau Separation and the 9th Avenue SE Bridge Replacement, were submitted to the Province on 2017 September 29. Design for the Upper Plateau Separation and the 9th Avenue SE Bridge Replacement began in 2017.

Pending service level negotiations with the Province and confirmation of ACRP funding, The City will advance detailed design work on the four community barriers identified in the FMMA. Also beginning in 2018, The City of Calgary will reach out to affected communities to provide information on the FMMA and seek input on these projects before designs are finalized.

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Property mitigation, flood policy and mapping

An internal City-wide working group led by Calgary Growth Strategies was established in 2017 to evaluate changes made to the Municipal Development Plan (MDP) and Land Use Bylaw (LUB) after the 2013 floods. In 2018, the group will continue to review the effectiveness of existing measures, and will also explore potential changes to the MDP and LUB to further improve Calgary's flood resiliency.

The City anticipates that new Flood Hazard Area (FHA) maps will be released by the Province in 2018. The new maps will likely have implications on any potential policy changes made by The City, including future redevelopment in the floodway. However, implications are uncertain at this time.

STORMWATER FLOODING

Localized flooding occurs when stormwater drainage infrastructure cannot manage the volume of stormwater either from precipitation, snow or ice melt. Communities built prior to 1990 are at the greatest risk due to aging infrastructure and historic design standards. The CDI program was established to address this risk. It uses a triple bottom line cost-benefit approach to prioritize investments in communities to address infrastructure issues that cause stormwater flooding for these communities. In 2017, local improvement investments were made in the communities of Sunnyside-Hillhurst, Christie Park, Glendale, and Glenbrook, and Optimist Park. Design was also commenced on several projects in Woodlands-Woodbine, Cedarbrae, and Braeside. Delivery of the CDI projects and expected benefits for communities remains on track.

Two CDI projects, Sunnyside pump stations #1 and #2 are also currently supported by the ACRP program. These projects will help mitigate local stormwater and river flood risk for the community by pumping excess stormwater back into the river. Design was started for both projects in 2017 and interim upgrades at Sunnyside pump station #2 have been completed. A third project, the Upper Plateau Separation, was submitted to ACRP for funding consideration in 2017 and is expected to begin in 2018.

New drainage studies for the communities of Renfrew and Macleod Trail were also started in 2017. The studies are expected to finish in 2018 and will inform future CDI program investments. A prioritized list of current and future identified CDI projects is in Appendix C of Attachment 1.

Stakeholder Engagement, Research and Communication

Building flood resiliency is a shared responsibility of all orders of government as well as Calgarians. The City has developed strong relationships with the Province, TransAlta, businesses, and community leaders, as it works to build Calgary's flood resilience. Administration continues to support the BRWG and implementation of the *Bow River Water Management Final Report* recommendations. The City is also participating in CEAA's environmental assessment review of the SR1 project.

The City undertook public engagement throughout 2016 to gather input on the potential flood mitigation measures and to inform Administration's recommendations. Engagement included a Community Advisory Group, a phone survey, community workshops, open houses and online

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engagement. The City will also be reaching out to communities and citizens in 2018 as design work begins on the four community barriers identified in the FMMA.

Strategic Alignment

Moving forward on flood mitigation and resiliency strongly supports and contributes to a number of Strategic Action areas in Council's Priorities for 2015-2018:

- A city of inspiring neighbourhoods (N2 - Build resiliency to flooding, and N3 - Enhance The City's capacity and resiliency to prepare for and respond to pandemics, natural disasters and emergency situations).
- A healthy and green city (H3 - Manage the interrelationships between flood protection, water quality and quantity, and land use, and H4 - Work with our regional partners and the Government of Alberta on an integrated approach to the watershed).

Social, Environmental, Economic (External)

Administration conducted a comprehensive sustainability analysis based on The City's Triple Bottom Line Policy, Sustainability Direction and watershed protection goals as part of its Flood Resiliency and Mitigation Strategy. Details on the social, environmental and economic analysis that was conducted can be found in report UCS2017-0266.

Financial Capacity

Current and Future Operating Budget:

There are no operating budget implications from this report.

Current and Future Capital Budget:

The four community barriers, Upper Plateau and 9th Avenue SE Bridge projects were submitted in 2017 September to the ACRP for funding. These projects were approved by Council as part of the Flood Mitigation Measures Implementation Plan (PFC2017-0462). Administration is negotiating service level for the barriers with the Province and ACRP funding for the 2017 submissions is pending Provincial approval. Current ACRP projects underway since 2014 are funded within the existing capital budget and are listed in Appendix B of Attachment 1.

Council previously approved an accelerated capital budget for the CDI program for the 2015-2018 business cycle. Strategies for continued investment in the CDI program will be presented to Council as part of the 2019-2022 service plans and budget planning.

The City continues to pursue potential external funding opportunities for new projects as they arise. Any funding from the Province or the Federal Government may require up to a 60 per cent cost share by The City to be approved.

Risk Assessment

Another major flood in Calgary is likely to occur and would create significant disruption to critical systems and services, Calgarians, and businesses, and cause damage to public and private property. A significant flood poses health and safety, environmental, and business continuity risks. The approach to flood mitigation described in this report has been designed to mitigate the potential damages associated with a major flood.

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A number of risks also remain for implementing Calgary's flood mitigation. Key risks include:

- Flood mitigation service level for community barriers is under negotiation with the Province and ACRP funding for the four new barriers is dependent on these negotiations. Administration continues to advocate for a combined approach of upstream and community level mitigation, which considers financial constraints and community acceptance.
- A new reservoir on the Bow River may not be built for many years or at all, leaving significant flood risk for Calgary. The need for an upstream reservoir is identified by the BRWG but location, costs, and timelines remain uncertain, and next steps have not yet been communicated by the Province. The City continues to strongly advocate for this work through the BRWG and other avenues.
- Flood risk on the Elbow River remains if the Springbank Off-stream Reservoir is delayed, leaving significant flood risk on the Elbow River for Calgary. The Province remains committed to this project and The City continues to support the development of the reservoir, despite opposition from some stakeholders.
- The Province and TransAlta may not continue their agreement for seasonal operation of the Ghost Reservoir after 2021. The Province is taking steps to negotiate a long term agreement with TransAlta, and Administration continues to advocate for this as a key contributor to flood mitigation for Calgary.
- New Provincial FHA mapping and policy has not yet been released, creating uncertainty over how future Provincial regulations could impact The City. There is a risk that The City will have to review policies again once the Provincial maps and policies are released.
- Construction of barriers may disrupt communities and require land access negotiation in some cases. Barriers can also be over-topped during larger flood events. Administration is implementing communications tactics and developing engagement planning to work with communities to provide the best flood protection possible with the least disruption.

Administration is actively working with the Province and stakeholders to mitigate all of these risks, amidst continued uncertainty.

REASON(S) FOR RECOMMENDATION(S):

Flood mitigation remains a top strategic priority for City Council. While The City of Calgary can implement some mitigation measures within its jurisdiction, it is essential that timely upstream watershed level mitigation is in place to reduce Calgary's overall flood risk and that The City continue to advocate for this mitigation.

ATTACHMENT(S)

1. 2017 Flood Resiliency and Mitigation Update