

Status of Emergency Preparedness Focus on Risk – Flooding

RECOMMENDATION:

That the Emergency Management Committee recommends that Council receive this Report for the Corporate Record.

RECOMMENDATION OF THE EMERGENCY MANAGEMENT COMMITTEE, 2022 MAY 24:

That Council receive this Report for the Corporate Record.

HIGHLIGHTS

- The City of Calgary has committed to regularly updating Council and citizens on the priority disaster risks in Calgary as identified in the *Disaster Risk Assessment*. The assessment determined that catastrophic flooding of the Bow and Elbow Rivers and major dam breach on the Bow and Elbow Rivers are four of the top 15 high risks that could impact Calgary. This report provides in-depth information on these risks and actions taken to prepare for them.
- **What does this mean to Calgarians?** With Calgary at the confluence of the Bow and Elbow Rivers, sudden increases to river flow rates can result in high waters reaching Calgary with little warning. A catastrophic river flood has a one per cent chance of occurring each year (sometimes referenced as a 1:100-year flood) and is caused by a combination of heavy rainfall, moist soil conditions, and snow melt. A major dam breach is a catastrophic type of dam failure characterized by the sudden, rapid, and uncontrolled release of impounded water. The high-risk season for catastrophic river flooding runs from mid-May to mid-July each year.
- **Why does it matter?** A major flooding event due to catastrophic river flooding or a dam breach could result in significant risk to life safety of citizens in floodplains and river valleys. In addition, there could be significant economic implications as the downtown core would be severely impacted. If citizens and businesses are aware of the top disaster risks for Calgary and understand how they can prepare, they will be able to take actions that protect themselves, their families, their businesses, and communities. Flood risk information also informs business, policy, and capital planning decisions.
- A major dam breach on the Elbow River was upgraded to a high risk in 2021 due to a reassessment of the economic impact of a potential worst-case scenario breach. Although a major dam breach has potentially catastrophic consequences, it is an extremely rare event, especially with Alberta's very high standards for dam safety.
- Strategic Alignment to Council's Citizen Priorities: A city of safe and inspiring neighbourhoods
- Background and Previous Council Direction is included as Attachment 1.

DISCUSSION

Every four years, Administration coordinates city-wide disaster risk assessments to understand Calgary's disaster risk environment, share risk information with Calgarians, and prioritize activities and allocation of resources. In 2018, a *Disaster Risk Assessment* evaluated a total of 65 individual hazards and threats that pose a risk to Calgary. The *Disaster Risk Assessment* is reviewed yearly, and the 2021 results summary is in Attachment 2.

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Risk is determined by the severity and frequency of an event, the number of people and assets exposed to the hazard, and socioeconomic, physical, and environmental factors that make them vulnerable. The *Disaster Risk Assessment* has identified flooding of the Bow and Elbow Rivers as major but unlikely events. Major dam breaches on these two rivers are identified as potentially catastrophic but extremely rare events.

The 2013 flood in Calgary was a 1:70-year flood that resulted in \$6 billion in total economic losses across southern Alberta. Over 110,000 people were evacuated in Calgary, a significant number of people lost their homes and critical infrastructure was compromised. Direct impacts and cascading indirect community impacts of future catastrophic river flood or major dam breach could include fatalities, injuries, building destruction and damage, large-scale evacuations, sewer/storm system back-ups, service delays, utility interruptions, business closures, traffic rerouting, and community service delays.

The total number of people, properties, and infrastructure exposed within the potential Bow and Elbow River dam breach inundation area is multiple times worse than a 1:100-year flood event. Communities along the Bow and Elbow Rivers would experience flooding significantly worse than the 2013 flood and the extent of the inundation would reach areas of the city that have never previously flooded. The economic impact of a major dam breach would be exponentially higher than the 2013 flood.

Preparing The City of Calgary for Flooding

Within The City, the *Municipal Emergency Plan* provides an overarching plan to guide response and recovery to any type of emergency. Attachment 3 summarizes the *Municipal Emergency Plan* and its annexes.

The City implements a range of plans, policies, and training to prepare for, and mitigate the risk of, major flooding:

- Regular spring and fall simulated scenario exercises to validate emergency plans, procedures, policies, and public communication strategies. In 2022 May, a major flood exercise was conducted to test processes and plans.
- The City of Calgary's *Flood Emergency Reference Manual* is updated annually with the latest flood mapping and prioritized flood response actions, including temporary flood barriers, stormwater outfall closures, and evacuation plans.
- The City of Calgary's 2016 *Flood Mitigation Measures Assessment*, along with Provincial Flood Mitigation Plans, guide future flood mitigation and resiliency projects.
- Strategic partnership with TransAlta, an Agency member that manages the Bow River dams, allows for collaboration in training, exercise programming, and emergency response planning.

Preparing Calgarians and the Community for Flooding

The City provides a range of infrastructure, programs, and education to help mitigate the risk of flooding in communities and ensure citizens are prepared:

- Since the 2013 flood, The City has committed over \$150 million to various flood mitigation and resilience projects throughout Calgary. Once current and planned flood mitigation projects are complete, the entire city will be protected up to a 1:200-year flood event.

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- The City is working with upstream communities and the Government of Alberta on major mitigation projects on the Bow and Elbow Rivers, including an off-stream reservoir that will significantly reduce the flood risk to Calgary.
- The Glenmore Dam and reservoir are a focal point of The City's Dam Safety Program. The City invested \$83 million to enhance flood handling, water supply, and dam safety resilience.
- In 2021, The City updated its internal *Dam Safety Policy* and advanced a program of dam safety activities to remain compliant with the Alberta *Dam and Canal Safety Directive*. Dams also meet provincial and federal legislation as well as the *Canadian Dam Association Guidelines*.

The City also has education programs and services in place designed to prepare and offer support to Calgarians in the event of a major flood:

- Emergency preparedness campaigns are ongoing with partners, including participation in national Emergency Preparedness Week.
- The [Calgary Disaster Risk Explorer](#) online resource offers the opportunity to learn about local hazards, potential and historical impacts, and mitigation activities associated with Calgary's greatest risks. It includes maps and resources to help Calgarians understand flood risk and check the risk specific to their property.
- Community outreach through the Ready Calgary Emergency Preparedness Program focuses on increasing the capacity of citizens to prepare for emergencies by raising awareness, increasing knowledge, and developing skills.

Supporting Calgarians During and Following Flooding

Incident response can be complex as it requires enhanced coordination and may have to rapidly scale in size and speed depending on the origins of the flooding.

The City has several key measures in place to support community response to a major flooding incident, including:

- A crisis communication plan to centralize all internal and external communications to ensure accurate, consistent information.
- The municipal Emergency Operations Centre, which provides a central coordinating hub for The City of Calgary's response efforts.
- Evacuation plans to support timely evacuation of homes and businesses in areas expected to flood.
- Emergency Social Services, which provides reception and lodging centres and psycho-social support services for evacuated citizens.
- Reentry plans for safe reopening of communities and reoccupying homes following an evacuation.

In some circumstances, the Government of Alberta administers the Disaster Recovery Program which provides financial assistance for uninsurable loss and damage caused by emergencies and disasters. After a disaster, if the affected municipality has its Disaster Recovery Program application approved, affected residents can apply for financial assistance.

STAKEHOLDER ENGAGEMENT AND COMMUNICATION (EXTERNAL)

- Public Engagement was undertaken
- Public Communication or Engagement was not required

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- Public/Stakeholders were informed
 Stakeholder dialogue/relations were undertaken

Administration engages more than 60 Calgary Emergency Management Agency member organizations in education, training, exercise programming, emergency response planning, and communications. The Agency consists of City of Calgary business units, government agencies, critical infrastructure operators, utilities, schools, industry groups, and community service providers.

IMPLICATIONS

Social

The work of Calgary Emergency Management Agency members aligns with the *Social Wellbeing Policy* of prevention (d) *The City will aim to stop problems before they start, using a prevention approach* by ensuring the social impacts of disasters are being mitigated before disasters such as major flooding events occur.

Environmental

A major flood event could cause major and long-lasting damage to ecosystems as well as natural and urban habitats. These risks and potential impacts are reduced though the work profiled in this report.

Economic

Calgary Emergency Management Agency members' work addresses the *Economic Resilience Strategy to create a more Resilient Economy*, as mitigation efforts will result in significant future savings. According to a Public Safety Canada 2019 report, for every dollar invested in flood mitigation efforts, seven to 10 dollars can be saved in post-flood recovery costs. Permanent flood mitigation efforts in place as of 2022 have reduced future potential flood damages by 55 per cent, or an average of \$90 million per year. Emergency response actions would further reduce potential damage.

Service and Financial Implications

No anticipated financial impact

RISK

A major flooding event poses significant risk for The City and could contribute to five of eight corporate risks: capital infrastructure, reputation, sustainable city, social wellbeing, and service delivery. Literature indicates that mitigating disaster risk and having strategies in place to decrease the impact is more economically, socially, and environmentally sound than managing disaster consequence. To ensure a more sustainable and resilient city, the *Disaster Risk Assessment* should help inform business, policy, and capital planning across The City.

ATTACHMENT(S)

1. Background and Previous Council Direction
2. Calgary Emergency Management Agency *Disaster Risk Assessment* Summary
3. Municipal Emergency Plan Annex Summary

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Emergency Management Committee
2022 May 24**

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Department Circulation

General Manager/Director	Department	Approve/Consult/Inform
Michael Thompson	Utilities & Environmental Protection	Inform