AGENDA

SPC ON UTILITIES AND CORPORATE SERVICES

May 15, 2019, 9:30 AM

IN THE COUNCIL CHAMBER

Members

Councillor W. Sutherland, Chair
Councillor P. Demong, Vice-Chair
Councillor G. Chahal
Councillor D. Colley-Urquhart
Councillor J. Farkas
Councillor D. Farrell
Councillor S. Keating
Mayor N. Nenshi, Ex-Officio

1. CALL TO ORDER

2. OPENING REMARKS

3. CONFIRMATION OF AGENDA

4. CONFIRMATION OF MINUTES

   4.1 Minutes of the Regular Meeting of the SPC on Utilities and Corporate Services Committee, 2019 April 17

5. CONSENT AGENDA

6. POSTPONED REPORTS
   (including related/supplemental reports)

   None

7. ITEMS FROM OFFICERS, ADMINISTRATION AND COMMITTEES

   7.1 Scoping Report on Reducing Waste from Single-Use Items, UCS2019-0370

   7.2 Landfill Disposal Discount, UCS2019-0552

   7.3 2018 Integrated Watershed Management Update, UCS2019-0654

7.4 2018 Flood Resiliency and Mitigation Annual Update, UCS2019-0653

7.5 Corporate Environment, Health and Safety (EHS) Performance Report, UCS2019-0460

7.6 Response to NM2017-36 on Green Roofs, UCS2019-0620

7.7 Calgary's Strategic Approach to Managing City Land - Update, UCS2019-0663

8. ITEMS DIRECTLY TO COMMITTEE

8.1 REFERRED REPORTS
None

8.2 NOTICE(S) OF MOTION
None

9. URGENT BUSINESS

10. CONFIDENTIAL ITEMS

10.1 ITEMS FROM OFFICERS, ADMINISTRATION AND COMMITTEES

10.1.1 Proposed Lease (Renfrew) - Ward 09 (220 St. Georges Dr NE), UCS2019-0663

10.1.2 Proposed Sale (Bayview) - Ward 11 (8945 14 St SW), UCS2019-0642

10.2 URGENT BUSINESS

11. ADJOURNMENT

MINUTES

SPC ON UTILITIES AND CORPORATE SERVICES

April 17, 2019, 9:30 AM
IN THE COUNCIL CHAMBER

PRESENT:	Councillor P. Demong Chair
	Councillor G. Chahal Vice-Chair
	Councillor D. Colley-Urquhart
	Councillor J. Farkas
	Councillor D. Farrell
	Councillor S. Keating
ALSO PRESENT:	Deputy City Manager B. Stevens
	Acting City Clerk L. Gibb
	Legislative Advisor J. Palaschuk

1. CALL TO ORDER

Councillor Demong called the Meeting to order at 9:33 a.m.

Following nomination procedures, Councillor Chahal was elected as Vice-Chair for this meeting, by acclamation.

2. OPENING REMARKS

Councillor Demong provided opening remarks.

3. CONFIRMATION OF AGENDA

Moved by Councillor Colley-Urquhart

That the Agenda for the 2019 April 17 Regular Meeting of the Standing Policy Committee on Utilities and Corporate Services be confirmed.

MOTION CARRIED

4. CONFIRMATION OF MINUTES

4.1 Minutes of the Regular Meeting of the Utilities and Corporate Services Committee, 2019 March 20

Moved by Councillor Chahal

That the Minutes of the Regular Meeting of the Standing Policy Committee on Utilities and Corporate Services, held 2019 March 20, be confirmed.

MOTION CARRIED

5. CONSENT AGENDA

None

6. POSTPONED REPORTS

None

7. ITEMS FROM OFFICERS, ADMINISTRATION AND COMMITTEES

7.1 Proposed Non-Market Housing Land Disposition Policy - UCS2019-0505

Distributions with respect to Report UCS2019-0505:

- A presentation entitled “Non-Market Housing Land Disposition Policy,” dated 2019 April 17;
- Letter from Community Housing Affordability Collective Re: Proposed Non-Market Housing Land Disposition Policy – UCS2019-0505, dated 2019 April 17;
- Letter from Aboriginal Standing Committee on Housing and Homelessness (ASCHH) Re: Proposed Non-Market Housing Land disposition Policy – UCS2019-0505, dated 2019 April 15;
- Letter from Vibrant Communities Calgary Re: Non Market Land Disposition Policy, dated 2019 April 17.

SPEAKERS:

1. Beverly Jarvis
2. Martina Jileckova
3. John Harrop
4. Matt Vernunt
5. Lee Stevens

Councillor Demong introduced a group of 52 students and 10 volunteers from Senator Patrick Burns School, in Ward 4, along with their teachers Jonathan Dardon and Jose Alija.

Moved by Councillor Keating

That with respect to Report UCS2019-0505, the following be approved:

That the Standing Policy Committee on Utilities and Corporate Services recommends that the letters from CHACH and Aboriginal Housing Affordability be included in the Corporate Record.

MOTION CARRIED

Moved by Councillor Farrell

That the Administration Recommendations be amended by adding an additional Recommendation as follows:

4. Direct that this Report go to Council no later than 2019 May 27.

Against: Councillor Colley-Urquhart and Councillor Keating

MOTION CARRIED

Moved by Councillor Farrell

That with respect to report UCS2019-0505, the following be approved, **as amended:**

That the Standing Policy Committee on Utilities and Corporate Services recommends that Council:

1. Adopt the Non-Market Housing Land Disposition Policy (Attachment 1);
2. Direct the ongoing administration of the Non-Market Housing Land Disposition Program by requesting Administration to report back with up to 10 separate development sites to be offered in a sales package in 2019 and every two years following, with performance of the program to be reviewed at the end of each business cycle;
3. Direct Administration to formalize the coordination of the offering of surplus City-owned land with both provincial and federal funding application review so that resources from all levels of government can work together in the most effective way and report back on the progress of this work by Q2 2020; and
4. **Direct that this Report go to Council no later than 2019 May 27.**

Against: Councillor Colley-Urquhart and Councillor Keating

MOTION CARRIED

7.2 Updates to CS005 - Sustainable Building Policy - UCS2019-0083

A Presentation entitled "Updates to CS005 Sustainable Building Policy", dated 2019 April 17, was received for the Corporate Record with respect to Report UCS2019-0083.

Moved by Councillor Farrell

That with respect to report UCS2019-0083, the following be approved:

That the Standing Policy Committee on Utilities and Corporate Services recommends that Council approve the proposed Sustainable Building Policy (Version 3.0, 2019).

MOTION CARRIED

8. ITEMS DIRECTLY TO COMMITTEE

8.1 REFERRED REPORTS

None

8.2 NOTICE(S) OF MOTION

None

9. URGENT BUSINESS

None

10. CONFIDENTIAL ITEMS

Moved by Councillor Farkas

That, the Standing Policy Committee on Utilities and Corporate Services move into Closed Meeting in the Council Board Room, at 11:40 a.m. in order to consider confidential matters with respect to the following items pursuant to Sections 23, 24 and 25 of the *Freedom of Information and Protection of Privacy Act*:

- 10.1.1 Summary of Green Line Real Property Transactions for the Fourth Quarter 2018, UCS2019-0490
- 10.1.2 Proposed Acquisition – (Greenview Industrial Park) – Ward 07 (911 32 AV NE), UCS2019-0493
- 10.1.3 Proposed Method of Disposition – Various Properties (AD) (MAS), UCS2019-0495
- 10.1.4 Amendment to Previously Authorized Approval of Expropriation (Stoney 2) Ward 05 (2020 Airport TR NE), UCS2019-0521
- 10.1.5. Proposed Lease (Stoney 2) - Ward 05 (9707 Barlow TR NE), UCS2019-0522

MOTION CARRIED

The Standing Policy Committee on Utilities and Corporate Services reconvened in public session at 11:57 a.m., with Councillor Demong in the Chair.

Moved by Councillor Colley-Urquhart

That Committee rise and report.

MOTION CARRIED

10.1 ITEMS FROM OFFICERS, ADMINISTRATION AND COMMITTEES

10.1.1 Summary of Green Line Real Property Transactions for the Fourth Quarter 2018 - UCS2019-0490

Administration in attendance during the Closed Meeting discussions with respect to Report UCS2019-0490:
Clerk: L. Gibb, J. Palaschuk Advice: J. Moisan , S. McClurg, B.Stevens Observer: R. Aulclaire, F. Snyders, J. Cullen Legal: J. Saab

Moved by Councillor Keating

That with respect to Report UCS2019-0490, the following be approved:

That the Standing Policy Committee on Utilities and Corporate Services recommends that Council:
1. Receive this Report for information; and
2. Request that the Recommendations, Report and Attachments remain confidential pursuant to Sections 23 (Local public body confidences), 24

(Advice from officials), and 25 (Disclosure harmful to economic and other interests of a public body) of the *Freedom of Information and Protection of Privacy Act,* unless The City is required to disclose pursuant to the Expropriation Act (Alberta).

MOTION CARRIED

10.1.2 Proposed Acquisition - (Greenview Industrial Park) - Ward 07 (911 32 AV NE) - UCS2019-0493

Administration in attendance during the Closed Meeting discussions with respect to Report UCS2019-0493:
Clerk: L. Gibb, J. Palaschuk Advice: R. Meier, S. McClurg, A. Muir, B.Stevens, R. Auclaire, B. Tran, D. Bell Observer: F. Snyders, Legal: J. Saab

Moved by Councillor Farrell

That with respect to Report UCS2019-0493, the following be approved, **after amendment:**
That the Standing Policy Committee on Utilities and Corporate Services recommends that Council:
1. Authorize the Recommendations as outlined in Attachment 2;
2. Request the Recommendations, Report and ***Attachments 1, 2 and 3*** remain confidential pursuant to Sections 23 (Local public body confidences), 24 (Advice from officials) and 25 (Disclosure harmful to economic and other interests of a public body) of the *Freedom of Information and Protection of Privacy Act*, until the transaction has been closed; and
3. ***Request that Attachments 4 and 5 remain confidential pursuant to Sections 23 (Local public body confidences), 24 (Advice from officials) and 25 (Disclosure harmful to economic and other interests of a public body) of the Freedom of Information and Protection of Privacy Act.***

MOTION CARRIED

10.1.3 Proposed Method of Disposition - Various Properties - UCS2019-0495

Administration in attendance during the Closed Meeting discussions with respect to Report UCS2019-0495:
Clerk: L. Gibb, J. Palaschuk Advice: S. McClurg, B.Stevens, R. Auclaire, T. Benson Observer: F. Snyders, Legal: J. Saab

Moved by Councillor Chahal

That with respect to Report UCS2019-0495, the following be approved:

That the Standing Policy Committee on Utilities and Corporate Services recommends that Council:
1. Authorize the Recommendation as outlined in Attachment 2;
2. Request the Recommendations, Report and Attachments 1, 2, and 3

remain confidential pursuant to Sections 23 (Local public body confidences), 24 (Advice from officials), and 25 (Disclosure harmful to economic and other interests of a public body) of the *Freedom of Information and Protection of Privacy Act,* until the sale transactions have closed; and
3. Request that Attachments 4 and 5 remain confidential pursuant Sections 23 (Local public body confidences), 24 (Advice from officials), and 25 (Disclosure harmful to economic and other interests of a public body) of the *Freedom of Information and Protection of Privacy Act*.

Against: Councillor Farrell

MOTION CARRIED

10.1.4 Amendment to Previously Authorized Approval of Expropriation (Stoney 2) Ward 05 (2020 Airport TR NE) - UCS2019-0521

Administration in attendance during the Closed Meeting discussions with respect to Report UCS2019-0521:
Clerk: L. Gibb, J. Palaschuk Advice: S. McClurg, B.Stevens, R. Auclaire, C. Gusa, Observer: F. Snyders, Legal: J. Saab

Moved by Councillor Chahal

That with respect to Report UCS2019-0521, the following be approved:
That the Standing Policy Committee on Utilities and Corporate Services recommends that Council:
1. Reconsider its decision contained in the minutes of the 2019 February 04 Combined Meeting of Council with respect to Recommendation (1)(d) of Attachment 2 contained in UCS2019-0100;
2. Adopt Recommendation (1)(d) of Attachment 2 contained in UCS2019-0521; and
3. Request that the Recommendations, Report and Attachments remain confidential pursuant to Sections 23 (Local public body confidences), 24 (Advice from officials), and 25 (Disclosure harmful to economic and other interest of a public body) of the *Freedom of Information and Protection of Privacy Act,* unless The City of Calgary is required to disclose pursuant to the Expropriation Act (Alberta).

Against: Councillor Farrell

MOTION CARRIED

10.1.5 Proposed Lease (Stoney 2) - Ward 05 (9707 Barlow Tr NE) - UCS2019-0522

Administration in attendance during the Closed Meeting discussions with respect to Report UCS2019-0521:
Clerk: L. Gibb, J. Palaschuk Advice: S. McClurg, B.Stevens, R. Auclaire, C. Gusa, Observer: F. Snyders, Legal: J. Saab

Moved by Councillor Chahal

That with respect to Report UCS2019-0522, the following be approved:
That the Standing Policy Committee on Utilities and Corporate Services recommends that Council:
1. Authorize the Recommendations as outlined in Attachment 2; and
2. Request the Recommendations, Report and Attachments remain confidential pursuant to Sections 23 (Local public body confidences), 24 (Advice from officials), and 25 (Disclosure harmful to economic and other interests of a public body) of the *Freedom of Information and Protection of Privacy Act,* unless The City of Calgary is required to disclose pursuant to the Expropriation Act (Alberta).

MOTION CARRIED

10.2 URGENT BUSINESS

None

11. ADJOURNMENT

Moved by Councillor Colley-Urquhart

That this meeting adjourn at 12:03 p.m.

MOTION CARRIED

The following items have been forwarded to the 2019 April 29 Combined Meeting of Council:

- Updates to CS005 - Sustainable Building Policy - UCS2019-0083
- Summary of Green Line Real Property Transactions for the Fourth Quarter 2018 - UCS2019-0490
- Proposed Acquisition - (Greenview Industrial Park) - Ward 07 (911 32 AV NE) - UCS2019-0493
- Proposed Method of Disposition - Various Properties - UCS2019-0495
- Amendment to Previously Authorized Approval of Expropriation (Stoney 2) Ward 05 (2020 Airport TR NE) - UCS2019-0521
- Proposed Lease (Stoney 2) - Ward 05 (9707 Barlow Tr NE) - UCS2019-0522

The following item has been forwarded to the 2019 May 27 Combined Meeting of Council:

- Proposed Non-Market Housing Land Disposition Policy - UCS2019-0505

The next regular Meeting of the Standing Policy Committee on Utilities and Corporate Services is scheduled to be held on 2019 May 15 at 9:30 a.m.

CONFIRMED BY COMMITTEE ON

CHAIR

ACTING CITY CLERK

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0370

Scoping Report on Reducing Waste from Single-Use Items

EXECUTIVE SUMMARY

The purpose of this report is to respond to Council direction from 2018 May 28 to prepare a scoping report investigating options for reducing waste associated with single-use items, and explore any potential unintended consequences of acting to reduce single-use items. As directed, this report also includes the costs of developing a strategy for addressing single-use items, including engaging citizens, businesses and institutions.

Single-use items are convenience items typically used once before being discarded as waste. Some of these items serve valuable functions, such as storage and transportation of food, but many are unnecessary or can be replaced with more sustainable alternatives.

Reducing waste from single-use items would support work by Waste & Recycling Services (WRS) to lead the community towards zero waste through a focus on reduction and reuse. While single-use items are a small percentage of overall waste generated in Calgary, they are some of the most commonly found materials in waste receptacles in Calgary public spaces, and contribute to litter. In addition, most single-use items cannot be recycled, and those items that can be recycled, such as single-use plastic bags, can be challenging to process at recycling facilities. Single-use items also lead to contamination in Calgary's recycled paper and plastic, impacting the marketability of Calgary's recyclable materials. Further, plastic bags represent the primary contamination issue at the composting facility.

There is increasing public interest in decreasing waste from single-use items. In Calgary, some businesses have already taken steps to reduce the use of these items. In October and November 2018, WRS conducted preliminary online engagement with Calgarians to understand their views on whether The City should take action on single-use items. The majority of people who responded to the online engagement indicated that The City should take action to reduce waste from these items.

Many jurisdictions have adopted approaches that target single-use items distributed by businesses. These include:

- Bans – making it illegal to distribute items.
- Fees – charges on items provided to customers.
- On-demand strategies – items can only be provided on customer request.
- Mandatory reduction plans – businesses and organizations must determine how best to reduce the use of items and report on their success.

Depending on how they are structured, these approaches can also lead to unintended consequences, such as increased costs for businesses and consumers, increased health risks due to contamination of raw food and exclusion of persons with disabilities, higher environmental impact, enforcement costs, and legal challenges.

The scope of the engagement proposed by WRS involves Calgarians, local businesses, and institutions, and consultation with other jurisdictions that have single-use items reduction strategies in place. This engagement process will lead to the development of a single-use items reduction strategy for Calgary. A final strategy is proposed for Q3 2020. The citizen research, engagement and communications required for the project is estimated to cost $250,000 to $300,000, including staff time.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0370

Scoping Report on Reducing Waste from Single-Use Items

ADMINISTRATION RECOMMENDATION:

That the Standing Policy Committee on Utilities and Corporate Services recommend that Council direct Administration to develop a single-use items reduction strategy and return to Committee with a strategy no later than Q3 2020.

PREVIOUS COUNCIL DIRECTION / POLICY

On 2018 May 28, Council approved the Waste and Recycling Services Outlook for 2018 to 2025 (UCS2018-0153). The report identified the need for targeted programs for materials that continue to go to landfill, such as single-use items. Council directed Administration to undertake a scoping report that investigates options and unintended consequences for significantly reducing waste, "avoidable" plastic waste, and single-use items, engage citizens and waste generators, and the costs of doing this work, and report back to the SPC on Utilities and Corporate Services with a scoping report no later than Q2 2019.

BACKGROUND

Single-use items are convenience items typically used once before being discarded as waste. Such items account for roughly half of the plastic produced around the world each year. In Calgary, items such as plastic bags, coffee cups, plastic cups, and foam containers make up as much as 2% of waste to landfill. While this is a relatively small component of overall waste, these are some of the most common items found in Calgary's public spaces, filling waste receptacles and sometimes contributing to litter. Foam food containers and plastic bags are among the top ten items found in waste receptacles in Calgary parks and at transit stops and LRT stations.

Most single-use items are not accepted for recycling in Calgary because they are:

- Too small or lightweight to be processed in the facilities that process Calgary's materials.
- Made of mixed materials, which makes them expensive and difficult to separate.
- Made of plastic materials that do not have end-markets.
- Fragile and break apart during transportation and sorting, contaminating other commodities.

While single-use plastic bags can be recycled, they are often not prepared properly for recycling (i.e. by bundling together in a single bag). Loose plastic bags are challenging to sort due to their light weight, and contaminate other recyclable materials. On average, three to five per cent of a sorted mixed paper bale is made up of plastic bags and plastic wrap. This level of contamination impacts the marketability of Calgary's sorted recyclables. Recent changes in global recycling markets have resulted in higher quality standards for recycling, therefore controlling contamination in processed recyclables is critical to ensure that Calgary's materials are marketable.

Some Calgary businesses have already taken action on single-use items, by charging customers for plastic bags, providing straws to customers only on-demand, using compostable items for take-out, and giving discounts to customers who bring their own re-usable item.

Scoping Report on Reducing Waste from Single-Use Items

INVESTIGATION: ALTERNATIVES AND ANALYSIS

Scan of options adopted by other jurisdictions

Approaches that have been adopted by other jurisdictions include bans, fees, on-demand strategies and mandatory reduction plans. These approaches apply to single-use items distributed by businesses, not the retail sale of these items.

Bans make it illegal to distribute items to customers. A ban is very effective at reducing waste from specific items in a short amount of time. In the Regional Municipality of Wood Buffalo, Alberta, there was a 90 per cent decrease in plastic bag litter after a ban was introduced.

Fees at the point of sale are also effective for reducing waste from single-use items. In the United Kingdom, use of plastic bags decreased by 70 to 80 per cent after a fee was introduced.

With on-demand strategies, consumers are provided items only on request. This option is commonly adopted for straws and utensils.

With mandatory reduction plans, organizations are required to have plans in place to reduce use of select single-use items and may adopt methods that best suit their needs. Organizations must track and report usage of the targeted items. Vancouver is the only jurisdiction identified to have adopted this approach.

Unintended consequences of these policies can include:

- Increased cost for businesses and consumers.
- Increased health risks due to contamination of raw food and exclusion of persons with disabilities.
- Higher environmental impact if resource-intensive alternatives are used as substitutes (for example, paper bags as an alternative to plastic).
- Increased enforcement costs.
- Legal considerations.

A report summarizing policies adopted by other jurisdictions is provided in Attachment 1.

Scoping report

The initial list of single-use items suggested for consideration in Calgary is based on the most commonly targeted items and initial feedback from online engagement. This list also aligns with Vancouver's strategy, which is based upon the most comprehensive review performed by a Canadian municipality. The items are:

- plastic bags
- plastic stir sticks
- plastic disposable straws
- plastic utensils
- take-out containers
- disposable cups (hot and cold beverage)

A strategy for the City of Calgary will be developed based on results from research and engagement with stakeholders in Calgary as well as lessons learned from jurisdictions like Vancouver. Both online and in-person research and engagement methods will be used to obtain

stakeholder input. This work will ensure that the strategy developed is practical for all stakeholders.

Results from the research and engagement will help determine:

- Which single-use items stakeholders want included in the strategy.
- Preferred reduction approaches for these items.
- Potential impact of the preferred approach and unintended consequences.
- Options to mitigate unintended consequences.

WRS will also consult with other orders of government to ensure proposed strategies align with long term waste management and environmental strategies.

The final strategy will be presented to Council no later than Q3 of 2020. The estimated project cost is $250,000 to $300,000, which covers citizen research, engagement, communications, and staff time for Law and Waste & Recycling Services. Detailed information on the proposed approach is provided in Attachment 2.

Stakeholder Engagement, Research and Communication

WRS conducted preliminary engagement with over 3,400 Calgarians using the online engagement portal from 30 October to 13 November 2018. This was conducted to gain insight into Calgarians' perceptions of single-use items. It also helped to inform the list of single-use items to consider, as outlined above, and the level of stakeholder engagement required for the proposed strategy. Detailed findings from the online engagement are provided in Attachment 3.

WRS also met with several local businesses to better understand practices they have adopted to manage waste from single-use items, motivations for adopting these practices, and key challenges they face in reducing single-use items. Detailed findings are provided in Attachment 3.

WRS will obtain input from Calgarians, local businesses and institutions when developing the strategy. Research and engagement is planned for Q3 and Q4 2019 to develop a draft strategy. Stakeholder input will be invited on the draft strategy and results of all engagement will be shared online. A final proposed strategy will be presented to Committee by Q3 2020.

Strategic Alignment

A single-use items reduction strategy would provide options for waste reduction, and contribute to the Citizen Priorities for a Healthy and Green City and a Well-Run City.

Social, Environmental, Economic (External)

Social

A single-use items reduction strategy would require a change in consumer behaviour. Consumers may need to pay for or stop using an item altogether.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0370

Scoping Report on Reducing Waste from Single-Use Items

Environmental

A single-use items reduction strategy encourages waste reduction and the use of environmentally sustainable alternatives. Reducing and diverting waste lowers greenhouse gas emissions, redirects natural resources back into the economy and reduces environmental liability. It will be important to consider the potential of a higher environmental impact if resource-intensive alternatives are used as substitutes.

Economic (External)

A single-use items reduction strategy could positively or negatively impact costs for businesses and citizens. Potential economic impacts will be a key consideration in developing a strategy for Calgary.

Financial Capacity

Current and Future Operating Budget:

Operating costs related to this project include research, engagement and communication with stakeholder groups, and is estimated at $250,000 to $300,000 including staff time. This can be managed within WRS' current operating budget, drawing on existing staff and consulting budgets.

Current and Future Capital Budget:

This project will not impact WRS' capital budget.

Risk Assessment

Risks associated with not approving this recommendation include:

- Continued costs to process recycled materials with contamination and associated impact on the marketability of Calgary's recycled materials.
- Continued landfilling of single-use items.

Risks associated with approving this recommendation include:

- Businesses may realize additional costs, which will be passed on to consumers.

REASON(S) FOR RECOMMENDATION(S):

A single-use items reduction strategy would reduce waste from single-use items, and reduce contamination of recyclables.

ATTACHMENT(S)

1. Attachment 1 – Scan of Policy Options Adopted by Other Jurisdictions
2. Attachment 2 – Scoping Report on Reducing Waste from Single-Use Items
3. Attachment 3 – Summary of Preliminary Stakeholder Engagement
4. Attachment 4 – Presentation

UCS2019-0370
Attachment 1

Scan of Policy Options Adopted by Other Jurisdictions

TABLE OF CONTENTS

1. Introduction

Waste & Recycling Services (WRS) conducted a scan of other jurisdictions globally that have strategies in place to reduce waste from single-use items. This document provides findings from the external scan of 18 jurisdictions, including the strategies that have been implemented and the resulting impacts and unintended consequences.

2. Policy Options

The following options were identified as ways to reduce waste from single-use items:

- Bans – making it illegal to distribute items.
- Fees – charges on items provided to customers.
- On-demand strategies – items will only be provided on customer request.
- Mandatory reduction plans – businesses and organizations must determine how best to reduce the use of items and report on their success.

Single-use items that have been targeted and policies that have been adopted by different jurisdictions are listed in Appendix 1.

2.1 Bans

Bans require enacting a law or bylaw that makes it illegal for businesses to distribute specific single-use items to customers.

Bans can be very effective in achieving a significant reduction in the use of these items within a short amount of time. For example, there was a 90 per cent decrease in plastic bag litter after plastic bags were banned in the Regional Municipality of Wood Buffalo, Alberta. Penalties for non-compliance may include warnings or fines.

Some jurisdictions that have enacted bans also have exemptions for some items or stakeholder groups. For example, there are exemptions to plastic straw bans to accommodate persons with disabilities, while some jurisdictions with plastic bag bans have exemptions for raw foods to ensure public health and safety. Also, to prevent the overuse of paper bags where plastic bags are banned, a fee is charged on paper bags in some jurisdictions.

Costa Rica intends to ban all single-use plastics by 2021, the European Union will ban ten single-use items by 2021, and Taiwan is planning a ban on all single-use items by 2030[1].

[1] Costa Rica announced it intends to be the first country in the world with a comprehensive national strategy to eliminate single-use plastics. According to the Taiwan EPA, in 2030 no single-use plastic items will be allowed to be manufactured, imported or sold anywhere in Taiwan.

2.2 Fees

This approach requires businesses to charge a minimum mandatory fee, at the point of sale, when an item is provided to the customer. Businesses may charge more than the minimum fee at their discretion. Typically, businesses keep the money from these fees and may use it to offset the cost of the items, or donate it to charity. The government may require that all or a portion of the fee be paid by the businesses to the government to fund related programs.

Fees can be very effective for reducing the use of single-use items. For example, The United Kingdom experienced a 70 - 80 per cent decrease in plastic bag use after a fee was introduced.

2.3 On-Demand Policies

An on-demand approach requires businesses to provide items to customers only on request. This tends to limit distribution, as customers will request items only if needed. In Vancouver, 71 per cent of residents indicated they would reduce their use of single-use items, if they were required to ask for that item at the time of purchase[2]. Most jurisdictions with policies for straws and utensils have adopted this approach.

2.4 Mandatory Reduction Plans

Mandatory reduction plans require businesses to have plans in place to reduce the distribution of single-use items. Under this approach, businesses can adopt the reduction plans that work best for them. Businesses may decide to use one or a combination of the previously listed policies. They are also required to track and report on the number of single-use items distributed. Of the jurisdictions reviewed, only Vancouver has adopted this strategy and will complete a review in three years to determine its effectiveness. If the reduction targets are not met, Vancouver will evaluate the need for a bylaw specifying the approach that businesses must take.

3. Item Specific Policies

3.1 Plastic Bags

Canadians use approximately 2.86 billion plastic bags every year[3]. It is estimated that over 581 million plastic bags were distributed in Alberta by grocers, retailers and pharmacies in 2013. The City of Calgary collects roughly 90 million plastic bags for recycling at the Materials Recovery Facility annually.

Most jurisdictions with single-use items strategies in place target plastic bags, with fees and bans being most common. Exemptions for health and safety reasons such as food packaging

[2] City of Vancouver, “Single-Use Item Reduction Strategy 2018-2025” (May, 2018)
[3] Plastic Oceans “Why we launched Plastic Oceans Foundation in Canada” (January, 2018)

are common. In Canada, most jurisdictions with policies for plastic bags have implemented a ban. The Northwest Territories charges a fee for plastic or paper bags provided to the customer. Retailers in Prince Edward Island will start charging 15 cents for each plastic bag issued to consumers from July 1, 2019 and this will increase to 25 cents on January 1, 2020.

In Calgary, major retailers such as Calgary Co-op, Real Canadian Superstore, Walmart, and Dollarama voluntarily charge customers five cents for plastic bags. In considering the option of a fee for plastic bags, the specific fee to be charged and options for the revenue stream would be evaluated

3.2 Plastic Straws

The State of California and Portland, Oregon are some of the jurisdictions that have implemented on-demand policies for plastic straws. Bans are in place or are being considered in the following jurisdictions:

- The City of Vancouver is planning to ban the distribution of single-use plastic straws, with a tentative implementation date of April 22, 2020 (taking into consideration appropriate exemptions for health care needs).
- The City of Seattle became the first major city in the US to ban plastic straws in July 2018.
- The United Kingdom plans to ban plastic straws at some time between October 2019 and October 2020, subject to feedback from public consultation.
- The European Union voted in October 2018 to ban several single-use items, including plastic straws by 2021.
- Fast food chains in Taiwan will be prohibited from distributing plastic straws in 2019.

Some global food service restaurants also plan on taking steps to reduce waste from plastic straws:

- Starbucks intends to stop using plastic straws by 2020.
- McDonald’s began a phased rollout of paper straws to all restaurants in the UK and Ireland in September 2018, with completion planned for 2019.

In July 2018, over 150 establishments in Calgary participated in the “Last Straw” campaign coordinated by Plastic Free YYC to encourage consumers to reduce plastic straw use. As part of this initiative, more than 50 establishments in Calgary have gone permanently straw-free.

3.3 Plastic Utensils

Several jurisdictions have banned plastic utensils:

- The Republic of Korea banned free distribution of plastic utensils in 2015.
- Monaco has a ban on the manufacture, distribution and sale of utensils made of less than 40 per cent bio-based materials.
- The Seychelles island nation prohibited the manufacture, importation, distribution and sale of plastic utensils[4] in 2017.
- Seattle is the first city in the US to ban plastic food utensils in the food services industry.
- The City of Malibu (US) banned plastic utensils in June 2018.
- Plastic utensils are included in the list of items the European Union plans to ban by 2021.
- France intends to implement a ban on plastic utensils in 2020.

Since May 2017, food service providers in Culver City California have been required to provide plastic cutlery to customers only on request. In Canada, starting November 2019, The City of Vancouver will prohibit business licence holders from distributing single-use utensils unless requested by the customer.

3.4 Disposable Cups

France intends to ban the distribution of all disposable cups by 2020 and Taiwan in 2030. Disposable coffee cups are currently banned in Scottish government offices.

In Vancouver, business license holders will be prohibited from distributing foam cups beginning January 2020. In addition, businesses are required to have plans in place to reduce the amount of other disposable cups (paper cups, disposable plastic cups, single-use cups designed and marketed as disposable/ compostable) they distribute. Vancouver plans to review the effectiveness of this strategy in three years to determine if further action is needed.

Though some coffee shops in Calgary offer financial incentives to customers who bring their own reusable cups, disposable cups are still the norm.

3.5 Take-Out Food Containers

Portland, Seattle and San Francisco have implemented a ban on foam food containers. Businesses in Vancouver will be banned from providing food in foam containers beginning January 2020. The City of Vancouver is also exploring the option of supporting container exchange networks. A container exchange offers reusable takeout containers through participating restaurants. Dirty containers are returned to the restaurant or a drop-off location

[4] United Nations Environment Programme “Report on Legal Limits on Single-Use Plastics and Microplastics: A Global review of National Laws and Regulations” (Accessed December, 2018).

for collection and washing at an industrial facility. The clean containers are then distributed to participating restaurants.

4. Unintended Consequences of Policy Options

Strategies aimed at reducing waste from single-use items may have some unintended consequences. Engaging all stakeholder groups that may be impacted and understanding impacts of proposed options will be key to the success of the strategy. WRS will consider the following potential risks in developing a single-use items strategy.

4.1 Costs for Businesses and Consumers

If an item is banned, alternatives need to be readily available and affordable to consumers. Any proposed strategy will also need to consider potential impact on the cost of doing business.

4.2 Health Risks

It is important to consider health limitations when deciding on the appropriate approach. Banning plastic straws may negatively affect persons with disabilities. Also, healthcare facilities tend to use disposable items for health and safety reasons. Some types of plastic bags are used to package raw or bulk foods to ensure health and safety.

4.3 Environmental Impact of Alternatives

Care must to taken to ensure strategies do not cause overuse or misuse of alternatives. In some instances, consumers may treat alternatives the same way as single-use items. In Portland Oregon, recycled paper checkout bag use increased 491 per cent.[5] Some studies have also suggested canvas bags may need to be used 130 times before they start achieving any net environmental benefit when compared with single-use plastic bags[6].

4.4 Enforcement

To ensure the success of any single-use items reduction strategy, monitoring and enforcement will be required, which will increase program costs.

[5] City of Portland Bureau of Planning and Sustainability, “Promoting Reusable Checkout Bags in Portland: One Year Report” (October 3, 2012).
[6] Bloomberg Article “How a Ban on Plastic Bags Can Go Wrong”, (August 18, 2015).

4.5 Legal Considerations

There have been legal challenges in some jurisdictions:

- The Canadian Plastic Bag Association challenged The City of Victoria in court over its plastic bag ban. The City's ban was upheld by the B.C. Supreme Court in June 2018, and is going to the B.C. Court of Appeals.
- Manufacturers in Austin and Dallas sued authorities for banning plastic bags and the courts sided with the manufacturers.
- The City of New York was engaged in a three-year legal battle on its proposal to ban foam food and beverage containers. The state Supreme Court sided with The City in June 2018.

There have also been instances of conflict between government authorities. For instance, The State of New York passed legislation blocking the proposed fee on plastic bags by The City of New York, citing government overreach.

APPENDIX 1: SELECT JURISDICTIONS WITH POLICIES ON SINGLE-USE ITEMS

Jurisdiction	Targeted Item(s)	Policy Type	Date
Canada			
City of Vancouver	Plastic straws	Ban	April, 2020
	Foam cups and take-out containers	Ban	January, 2020
	Plastic utensils	On-demand only	November, 2019
	Plastic and paper bags, and disposable cups	Mandatory reduction plans (ban if reduction targets are not met by 2021)	2019 to 2020
City of Victoria	Plastic bags	Ban	July, 2018
	Paper bags	Fee	July, 2018
City of Montreal	Plastic bags	Ban	January, 2018
	Foam cups, plates and containers, disposable plastic cups, plastic utensils and take-out containers	Ban	2020 (anticipated)
Regional Municipality of Wood Buffalo	Plastic bags	Ban	September, 2010
Northwest Territories	Plastic bags	Fee	February, 2011
Prince Edward Island	Plastic bags	Fee	July, 2019
United States			
City of Seattle	Foam cups and take-out containers	Ban	January, 2009
	Single-use packaging for take-out food	Ban	July, 2010
	Plastic bags	Ban	July, 2012

Jurisdiction	Targeted Item(s)	Policy Type	Date
	Paper bags	Fee	July, 2012
	Plastic straws and plastic utensils	Ban	July, 2018
City and County of San Francisco	Plastic bags	Ban	April, 2007
	Paper bags	Fee	October, 2013
	Foam cups and take-out containers	Ban	January, 2017
	Plastic straws, stirrers, toothpicks, beverage plugs, cocktail sticks, coated paper based food containers	Ban	July, 2019
	Plastic and compostable utensils	On-demand only	July, 2019
City of Portland	Foam containers	Ban	March, 1989
	Plastic bags	Ban	March, 2013
	Plastic straws, utensils, stirrers and condiment packaging	On-demand only	July, 2019
State of California	Plastic bags	Ban	November, 2016
	Paper bags	Fee	November, 2016
	Plastic straws	On-demand only	January, 2019
City of New York	Foam food containers	Ban	January, 2019
	Plastic bags	Ban	March, 2020 (anticipated)
New York State	Plastic bags	Ban	January, 2019
City of Chicago	Plastic and paper bags	Fee	February, 2017

Jurisdiction	Targeted Item(s)	Policy Type	Date
Europe			
France	Plastic bags	Ban	2016
	Plastic straws (Paris)	Ban	2019
	Plastic utensils, plates and cups	Ban	2020
United Kingdom	Plastic bags	Fee	October, 2015
	Plastic straws, stirrers, cotton buds	Ban	Between 2019 and 2020
European Union	Plastic straws, plates, forks, knives, spoons, sticks, drink stirrers, cotton swab sticks, balloon sticks, and foam (EPS) food and drink containers	Ban	2021
	Plastic food containers and drink cups	Mandatory reduction	2025
Others			
Taiwan*	Plastic bags, disposable food containers, beverage cups and utensils	Fee Fee increase Ban	2020 2025 2030
	Plastic straws	Fee (in-store use) Fee (carryout) Ban	2020 2025 2030
Costa Rica	Plastic bags, food containers, steam protection packaging, plates/tableware, cups, cutlery, straws, bottles, coffee stirrers, toothpicks, cotton swab sticks and disposable razors	Ban	2021

** Taiwan intends to implement a fee for all items in 2025 (increase the fee for plastic bags) and move to a blanket ban of all items by 2030.*

Scoping Report on Reducing Waste from Single-Use Items

TABLE OF CONTENTS

1. Introduction

This document outlines the proposed scope for developing a single-use items reduction strategy for Calgary. The scope includes an approach and timeline, as well as the budget.

A single-use items reduction strategy is being considered for the following reasons:

- **There is increased public interest**: Results from the preliminary engagement found that most respondents would like The City of Calgary to take action to reduce waste from single-use items.
- **Single-use items contribute to waste in our public spaces**: Single-use items are some of the top items found in our public space waste receptacles. Limiting use of these items may reduce costs incurred by The City to manage this waste.
- **Single-use items can become litter**: When single-use items don't get recycled or disposed of properly, they can become litter in our parks and pathways, or in other public spaces.
- **Single-use items contaminate our recycled materials**: While some of these items are recyclable, they are often not sorted properly for recycling - for example: plastic bags not bundled together in a single bag. They may also contaminate the other recyclable materials or cause problems with the sorting equipment at the Materials Recovery Facility, impacting the marketability of Calgary's recyclables.
- **Single-use items are wasteful and alternatives exist for many of these items**: There are reusable, easy to recycle or compostable alternatives for most of these items.
- **Reducing waste from single-use items supports our vision** to lead the community towards zero waste.

2. Proposed Approach, Timeline and Budget

This section of the report provides an overview of the proposed approach to develop a strategy to reduce waste from single-use items.

2.1 Items in Scope

The following items will be considered in scope for a single-use items reduction strategy as they are the most commonly targeted items, which align with the initial feedback received from Waste & Recycling Services' (WRS') online engagement and Vancouver's single-use item reduction strategy:

- plastic bags
- plastic stir sticks
- plastic disposable straws
- plastic utensils
- take-out containers
- disposable cups (hot and cold beverage)

A final list of items for a single-use items reduction strategy will be based on further research and stakeholder engagement.

2.2 Stakeholders

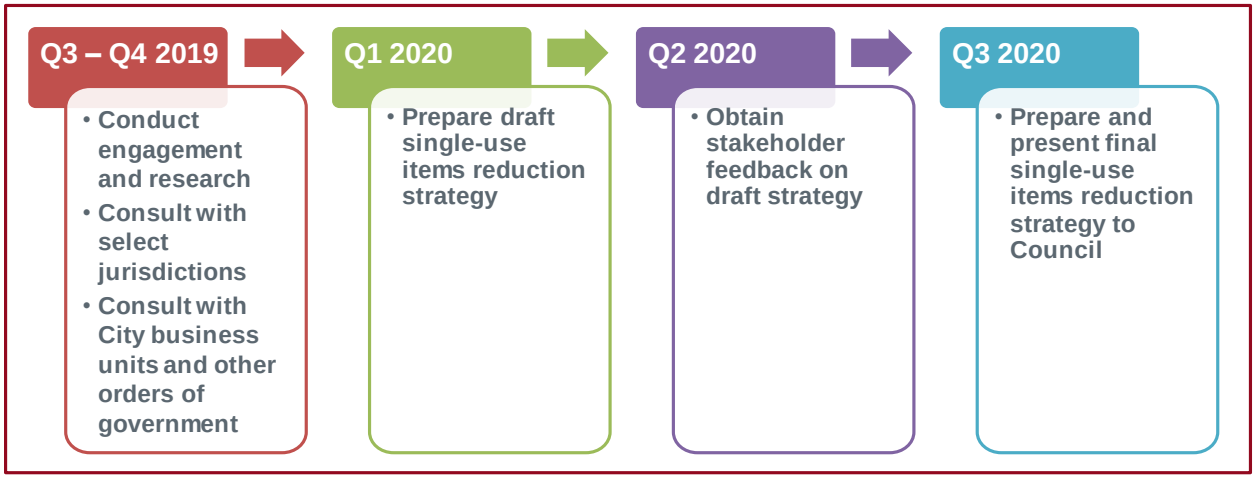
In developing this strategy, WRS will consult with individuals, businesses and institutions. Some of the stakeholder groups that may be directly or indirectly impacted and consulted include:

- citizens
- food establishments
- retailers
- health institutions
- specialized care facilities

In addition to external stakeholders, WRS will consult with other Business Units internally and other orders of government.

2.3 Approach and Timeline

The proposed approach and timeline for developing a single-use items reduction strategy is presented below:



Conduct Research and Engagement

Stakeholder input will be obtained using research and engagement. Through the research and engagement, WRS will seek to understand:

- Which single-use items stakeholders want included in the strategy.
- Preferred reduction approaches for these items.
- Potential impact of the preferred approach and unintended consequences.
- Options to mitigate unintended consequences.

WRS will engage an external research firm to contact Calgarians and business and institutional stakeholders. Engagement will be facilitated by City staff and may include feedback through an online portal, workshops, festivals and pop-ups.

Consult with Select Jurisdictions

WRS will consult with jurisdictions that have single-use items reduction strategies to better understand:

- The methodology used
- The specific factors that influenced their strategy decisions
- Their long-term goals
- Lessons learned from the development and implementation of a single-use items reduction strategy

The City of Vancouver, which has undertaken an extensive consultation and engagement process over the past three years, will be a key resource. WRS will also engage The City of Edmonton to identify opportunities for potential alignment. Several other jurisdictions are being considered for additional consultation and the final selection will occur following further research.

Consult with City Business Units and Other Levels of Government

Internal consultation across business units within The City will be conducted to understand how proposed strategies may impact customers and The City as a corporation. It will be essential to consult with Law, Calgary Community Standards, and Environmental & Safety Management. WRS will also consult with appropriate provincial and federal departments to determine areas of alignment and how the strategy may be developed to coordinate with future provincial or federal initiatives.

Prepare Single-Use Items Reduction Strategy

WRS will prepare a draft single-use reduction strategy by Q1 2020, taking into consideration results from stakeholder research, engagement, and strategies that have been adopted by other jurisdictions. WRS will then obtain stakeholder feedback on the draft strategy by Q2 2020, modify the strategy as needed, and present a final single-use items reduction strategy to Council by Q3 2020.

2.4 Budget

The estimated cost for citizen research, engagement and communication costs is $250,000 to 300,000 including staff time. This can be managed within WRS' current operating budget by allocating existing staff and consulting budget to this project.

Summary of Preliminary Stakeholder Engagement

TABLE OF CONTENTS

1. Introduction

This document contains a summary of:

- Preliminary online engagement conducted in 2018.
- Interviews with four businesses in Calgary that have already undertaken initiatives to reduce waste from single-use items.

2. Preliminary Online Engagement

Waste & Recycling Services (WRS) conducted preliminary engagement of Calgarians using the City of Calgary online engagement portal. The online engagement ran from 30 October 2018 to 13 November 2018. The survey asked respondents:

- Do you believe The City of Calgary should take action to reduce garbage from single-use items? Why or why not?
- Which single-use items do you think The City of Calgary should take action to reduce?
- Which single-use items do you use most frequently?
- Which single-use items do you think you could live without?

The results are not considered statistically representative. A detailed copy of the "What We Heard Report" is available at https://engage.calgary.ca/single-use.

Summary of Responses

3,431 responses were received via the online engagement portal. The majority of contributors shared that they ***would*** like The City of Calgary to take action to reduce waste from single-use items. The following themes emerged from contributors who want The City to take action:

- Protect people and the environment.
- Enhance climate resilience.
- Too much waste is ending up in landfills.
- The City of Calgary should be a leader in reducing waste generated by single-use items.
- Single-use items are too readily available.
- More options / material alternatives for single-use items are needed / should be available.
- Consider the needs of those individuals for whom single-use items are still needed.
- Businesses and individuals should be active participants in reducing garbage from single-use items.

A few contributors shared that they ***would not*** like The City of Calgary to take action to reduce waste from single-use items. The following themes emerged from contributors who would not like The City to take action regarding single-use items:

- The City of Calgary should be focusing resources elsewhere. A single-use items waste reduction strategy should not be a priority.

- A reduction strategy will not have an impact and government should not be directing people what they can and cannot use.
- There is already enough happening to reduce waste from single-use items and more work is not needed.

Items to be Considered for a Single-Use Items Waste Reduction Strategy

The survey included a list of items that could be included in a single-use items waste reduction strategy and asked respondents to identify the ones they think The City should take action to reduce. Responses are shown in Figure 1. Other suggestions were also provided and are listed in the "What We Heard Report".

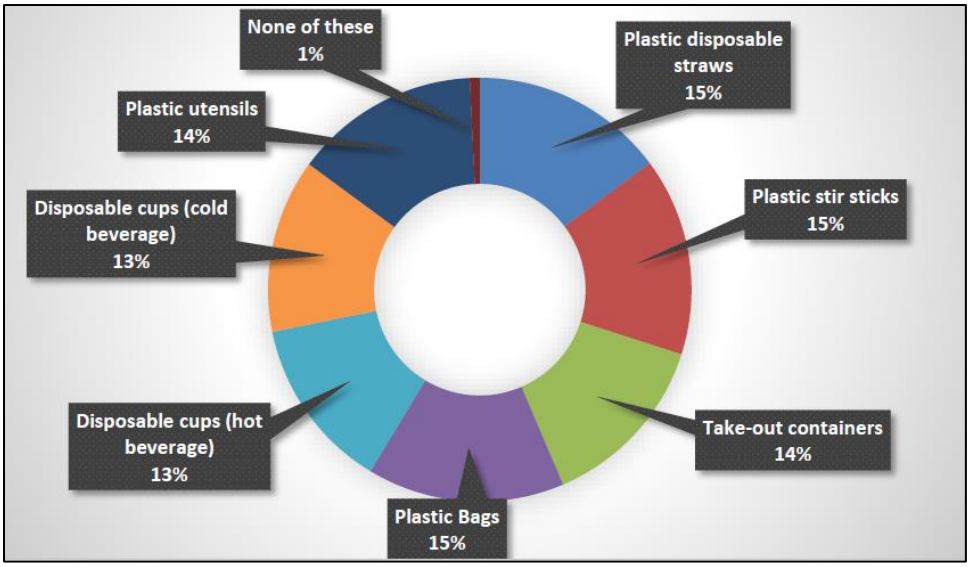


Figure 1. Online survey responses to "Which single-use items do you think The City of Calgary should take action to reduce?"

Items Used Most Frequently

Contributors also provided information on single-use items they use most frequently. Responses are shown in Figure 2. Other suggestions were also provided and are listed in the "What We Heard Report".

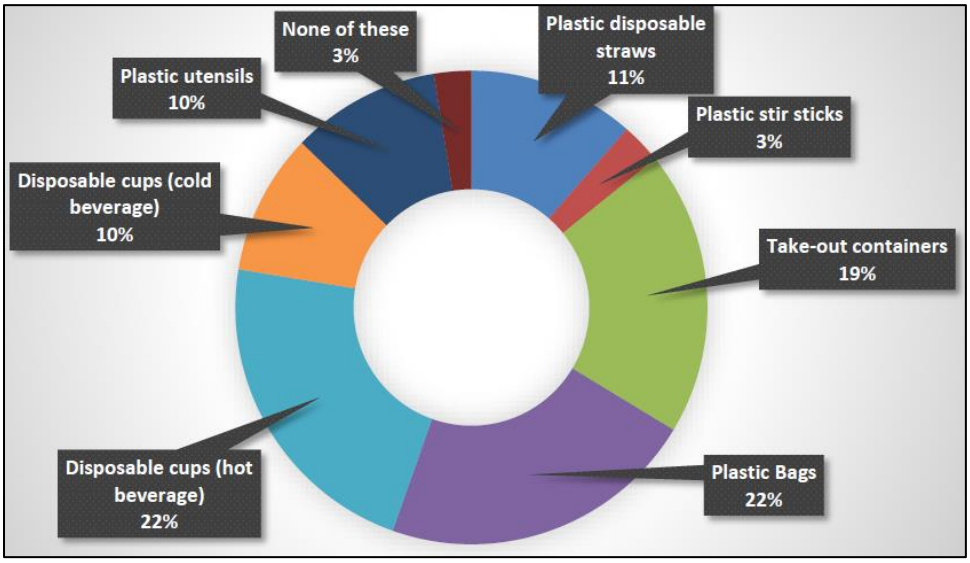


Figure 2. Online survey responses to "Which single-use items do you use most frequently?"

Items Contributors Can Live Without

Contributors also indicated which items they could live without. Responses are shown in Figure 3. Other suggestions were also provided and are listed in the "What We Heard Report". Some respondents indicated that they could not live without any of the listed items.

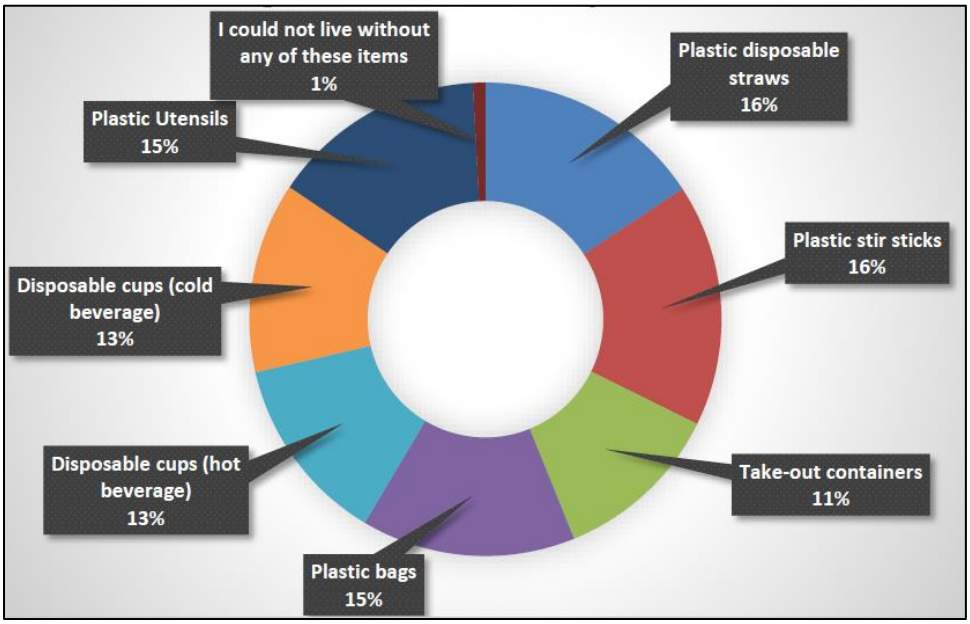


Figure 3. Online survey responses to "Which single-use items do you think you could live without?"

3. Case Studies of Calgary Businesses

Many businesses in Calgary have already taken action to reduce waste from single-use items. WRS spoke to four businesses that have strategies in place to reduce waste from single-use items to better understand practices they have adopted to manage waste from single-use items, motivations for adopting these practices, and key challenges they face in reducing single-use items.

The businesses interviewed represent some of the sectors that will be impacted by a single-use items waste reduction strategy. Businesses included in this report are:

- A & W: Canadian fast-food chain with more than 50 locations in Calgary.
- Boogie's Burgers: Calgary-based full-service restaurant with two locations in the city.
- Rosso Coffee Roasters: Calgary-based business with cafés in seven locations across the city.
- SPUD.CA and Blush Lane Organic Market: Western Canadian partnership between an online grocer with local delivery and a retail grocer with four locations in Calgary.

3.1 Waste Reduction Initiatives

A & W

A & W launched initiatives to reduce waste from single-use items in 2010. Waste reduction initiatives include:

- Using reusable mugs, plates and cutlery for dine-in customers.
- Eliminating foil items and using compostable burger packaging.
- Eliminating plastic straws in its restaurants.

Boogie's Burgers

Boogie's Burgers waste reduction initiatives include:

- Using reusable dishes, cutlery and glasses for dine-in customers.
- Providing straws and milk-shake lids to customers on-demand.
- Using compostable bags for take-out orders and compostable single-use cups.
- Providing plastic cutlery, condiment packets, and napkins to customers for take-out orders only on-demand.
- Planning to switch to compostable cutlery once it uses up its current inventory of plastics.

Rosso Coffee Roasters

Rosso Coffee Roasters waste reduction initiatives include:

- Using reusable cups and glassware for dine-in customers.
- Using compostable coffee cups, stir-sticks and salad containers.
- Using recyclable coffee lids.

- Using re-usable containers and utensils for catering orders.
- Using paper bags instead of plastic bags for purchases.
- Offering discounts to customers who bring in their own cup and who bring in previously used coffee bean jars for coffee bean purchases.
- Planning to switch to paper straws once the current inventory of plastic straws is used up.

SPUD.CA and Blush Lane Organic Market

SPUD.CA and Blush Lane Organic Market waste reduction initiatives include:

- In-store: Using paper bags instead of plastic bags for purchases. Paper bags are only provided on-demand.
- In-store: Switching to paper straws.
- In-store: Allowing customers to bring in reusable containers for bulk items.
- Grocery delivery service: Using reusable bins, freezer jackets and cold packs.
- Using compostable trays for pre-made meals.
- Introducing the “Pink Bag Takeback Program”, which allows customers to return Be Fresh (SPUD’s private label) stand up plastic pouches for recycling as these items are not currently accepted in The City’s recycling stream.

The company also plans to switch to compostable plastic bags for produce.

3.2 Key Considerations

Experiences of the businesses profiled may not be representative of others in their industry. However, there are valuable learnings that can be used to inform a potential single-use items reduction strategy.

Availability and Cost of Alternatives

Costs for compostable take-out containers and straws are similar to conventional ones. Other single-use items with compostable alternatives may cost two to five times as much because there are limited recyclable or compostable options for some of these items. This may create a barrier for some businesses. Increased demand for sustainable alternatives, however, may result in more manufacturers making such options available which could lead to lower prices. Another consideration is that not all materials labelled as recyclable or compostable can be processed at existing recycling or composting facilities in the Calgary region.

Customer Expectations and Behaviours

Not all customers are well informed about the impact of single-use items. This can reduce the acceptance of initiatives implemented by some of these businesses. For example, customers may have difficulty sorting waste properly, ask for plastic straws when they don’t need one, complain about paper straws, or complain that burgers not wrapped in foil are not warm enough. Customer education to understand the importance of reducing waste from these items and a

better understanding of waste diversion options available in Calgary will make it easier for businesses to implement waste reduction strategies from these items.

Effectiveness of Voluntary Reduction Efforts

Most businesses are cost conscious and are unlikely to make changes unless required, due to the effort and in some instances, cost associated with implementing single-use waste reduction policies. Therefore, voluntary reduction efforts are unlikely to be effective. Businesses that have implemented action to reduce waste from single-use items have either been driven by the passion of business owners or, in the case of corporate organizations, their environmental policies. By creating policies to reduce waste and requiring businesses to implement these policies, The City creates a level playing field for all businesses.

Lessons Learned from Vancouver

Vancouver has undertaken an extensive consultation process, including research and engagement, with both businesses and citizens. Businesses agree that Vancouver has done a very good job and that their strategy is sound and adaptable. Leveraging the model adopted by Vancouver may be beneficial to Calgary.

Scoping Report on Reducing Waste from Single-Use Items

UCS2019-0370

ISC: Unrestricted

Standing Policy Committee on Utilities and Corporate Services

15 May 2019

Waste & Recycling Services Trends

Waste & Recycling Services Outlook for 2018 to 2025 (UCS2018-0153)

- Trend #1: Increasing customer expectations
- Trend #2: Changing market standards for recycled materials
- Trend #3: Increasing contamination of recyclables
- Trend #4: Decreasing tonnage of waste for disposal
- Trend #5: Advancing technology

The plan for achieving 70% by 2025

Waste & Recycling Services Outlook for 2018 to 2025 (UCS2018-0153)

Previous Council Direction

On 2018 May 28, as part of the Waste & Recycling Services Outlook for 2018 to 2025 (UCS2018-0153), Council directed Administration:

“to undertake a scoping report that investigates options and unintended consequences for significantly reducing waste, "avoidable” plastic waste, and single-use items, engage citizens and waste generators, and the costs of doing this work, and report back to the SPC on Utilities and Corporate Services with a scoping report no later than Q2 2019.”

Single-Use Items

These are convenience items, typically distributed by businesses with other purchases, that are designed to be used once before being thrown away.

Take-out Containers

- Plastic containers
- Styrofoam containers

Disposable Cups

- Plastic drink cups
- Foam cups
- Plastic lids
- Paper coffee and fountain pop cups

Plastic Utensils

- Plastic spoons, forks, knives
- Plastic stir sticks
- Coffee stoppers

Plastic Bags

- Bags provided to customers with the aim of holding purchases made in stores

Disposable Plastic Straws

Why is this important for Calgarians?

82% of Canadians urging government action to tackle waste from plastic items.

Single-use items…

- Are the focus of increasing public interest
- Contribute to waste in our public spaces
- Can become litter
- Contaminate our recycled materials
- Can be replaced with alternatives
- Contribute to waste in landfills

Policy Options

- Bans on distributing items
- Fees charged to customers
- On-demand strategies
- Mandatory reduction plans

Many jurisdictions are taking action to reduce waste from single-use items

Example Jurisdictions

REGIONAL MUNICIPALITY OF WOOD BUFFALO

It's time to shift our thinking about waste.

CITY OF VANCOUVER | GREENEST CITY

#ReduceSingleUse

European Union

UCS2019-0370
Attachment 4

Potential Unintended Consequences

1. Increased costs for businesses and consumers
2. Health risks
3. Environmental impact of alternatives
4. Enforcement costs
5. Legal considerations

Preliminary Engagement

A&W

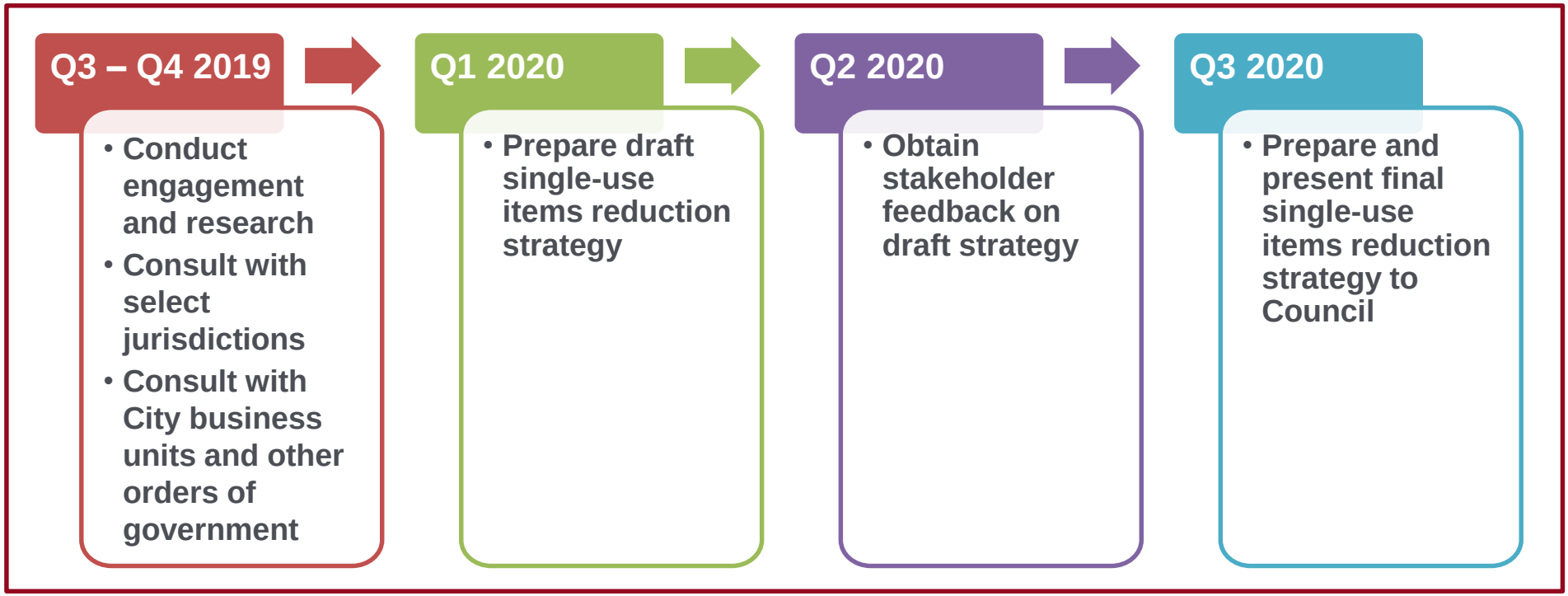
ROSSO COFFEE ROASTERS

SPUD.CA
Be Part of the Solution

BOOGIE'S Burgers

Blush Lane ORGANIC MARKET
SUSTAINABLE / LOCAL / SEASONAL

Proposed Approach



The estimated cost for this work is $250,000 to $300,000

Recommendation

That the Standing Policy Committee on Utilities and Corporate Services recommend that Council direct Administration to develop a single-use items reduction strategy and return to Committee with a strategy no later than Q3 2020.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0552

Landfill Disposal Discount

EXECUTIVE SUMMARY

Waste & Recycling Services (WRS) has been approached by commercial haulers to consider a discounted Basic Sanitary Waste rate for garbage disposed at The City of Calgary (The City) Waste Management Facility (WMF) landfills. The purpose of this report is to consider the value of providing a discounted rate to WMF account customers and to propose a recommendation.

With the adoption of the 80/20 by 2020 waste diversion goal in 2007, WRS had limited tools available to encourage diversion, especially in the non-residential sectors. Stakeholder engagement indicated that the cost of disposal was too low for diversion markets to develop. Between 2007 and 2014, the Basic Sanitary Waste rate was increased from $50 per tonne to $107 per tonne. While raising the waste disposal rate did assist in creating local markets and improving diversion, it also made some of our account customers look for less expensive disposal options elsewhere.

WRS has since implemented other diversion tools and policies including: reduced rates for source-separated construction and demolition recyclables; Disposal Surcharge rate for mixed loads that contain recyclable materials; and bylaw requirements for onsite sorting of recyclables and food and yard waste. With these additional tools to support diversion, WRS is now in a position to consider a discount of the Basic Sanitary Waste rate, which is currently at $113/tonne.

WRS has completed a municipal scan of disposal rates and considered different types of discount options. These options include: 1. WMF Account Customer monthly weight discount; 2. weight per load discount; and 3. independent individual discount agreements.

To respond to customer inquiries in a transparent way, while exploring potential opportunities for increased operational efficiencies, including reduced lineups at the WMFs, WRS proposes to implement a WMF Account Customer monthly weight discount of the Basic Sanitary Waste rate starting 2019 July 1. The proposed discount will provide some financial relief to approximately 500 of our current, as well as any new WMF account customers. As the Basic Sanitary Waste rate is set by Council through Bylaw 20M2001, Council approval is required to implement the proposed discount.

Regardless of the discount considered, WRS will not waive the requirement for diversion. The Disposal Surcharge Program and associated rate of $180 per tonne for waste loads containing recyclable and/or compostable materials will still apply.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0552

Landfill Disposal Discount

ADMINISTRATION RECOMMENDATION:

That the Standing Policy Committee (SPC) on Utilities and Corporate Services (UCS) recommend that Council:

1. Direct Administration to implement a WMF Account Customer Monthly Weight discount starting 2019 July 1; and
2. Give three readings to the proposed Bylaw amendments for Waste and Recycling Bylaw 20M2001 (Attachment 5).

PREVIOUS COUNCIL DIRECTION / POLICY

As part of the business planning and budgeting cycle at The City, WRS recommends and Council approves the garbage disposal rate called the Basic Sanitary Waste rate, through Bylaw 20M2001.

2018 November 14, C2018-1158 One Calgary 2019-2022 Service Plans and Budgets. In Attachment 3Z, Council approved Bylaw 20M2001 with the Basic Sanitary Waste rate for 2019-2022. Through One Calgary, The City continues to set rates at levels that support diversion via existing markets and service providers. WRS did not increase the disposal rate for 2019 or 2020, as the regional economy is still recovering. As waste is typically one of the last areas to experience economic recovery, only small increases for 2021 and 2022 are proposed.

2017 November 27, C2017-1123 Action Plan 2018 Adjustments Attachment 7. Council directed that the Basic Sanitary Waste rate in 2018 be frozen at the 2016 level, rather than increased as per Action Plan.

2016 November 21, C2016-0863 Action Plan Mid-Cycle Adjustments Attachment 16. Council directed that the Basic Sanitary Waste rate in 2017 be frozen at the 2016 level, rather than increased as per Action Plan. Attachment 1 outlines the historical Council direction for the Basic Sanitary Waste rate.

BACKGROUND

With the adoption of the 80/20 by 2020 waste diversion goal in 2007, WRS had limited tools available to encourage diversion, especially in the non-residential sectors. Stakeholder engagement indicated that cost of disposal was too low for diversion markets to develop. While an increased disposal rate does not directly create diversion, it does assist in the creation of markets for diverted material. When garbage disposal is not the lowest cost option, waste generators have an additional financial incentive to find diversion opportunities.

Since 2014, WRS has seen a decline in tonnes of garbage disposed at the WMFs by account customers. The high Basic Sanitary Waste rate, increased diversion, and change in the economic climate have all contributed to the decline. WRS has also seen a change in the makeup of our customer base, with declining number of account customers. Attachment 2, shows the change in number of account customers and associated tonnes of waste received at The City's WMFs between 2013 and 2018.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0552

Landfill Disposal Discount

INVESTIGATION: ALTERNATIVES AND ANALYSIS

WRS offered a disposal rate discount to high volume customers in the past, from 1994 to 2003. Between 2007 and 2014, the Basic Sanitary Waste rate was increased from $50 per tonne to $107 per tonne. While raising the Basic Sanitary Waste rate did assist in creating local markets and improving diversion, it also resulted in some of our account customers looking for less expensive waste disposal options elsewhere. Waste tonnage disposed at The City WMFs by account customers declined by 37 percent over the same time period.

Over the last few years, WRS implemented tools and policies that encourage diversion, including:

- Differential tipping fees for recyclable construction & demolition materials brought to the WMFs (2009).
- Disposal Surcharge rate for commercial waste loads mixed with recyclable and/or compostable materials brought to WMFs (2009).
- Differential tipping fee for yard waste brought to WMFs for composting (2012).
- Bylaw requirements for onsite sorting of recyclables (2016) and food and yard waste (2017) for multi-family complexes and businesses.

Given that the Basic Sanitary Waste rate is no longer the primary tool to support diversion, WRS is in a position to consider the Basic Sanitary Waste Rate discount once again.

Municipal Scan - Benchmarking

WRS completed a scan of other municipalities' rate discount practices, and reviewed the National Solid Waste Benchmarking Initiative summary of disposal rates at municipal landfills across Canada. The scan indicated that The City's 2018 Basic Sanitary Waste rate of $113 per tonne was about 19 per cent above the national median of $95 per tonne. The scan of discounts showed that municipalities use a variety of incentives and disincentives tailored to their specific needs, as summarized in Attachment 3.

Evaluation Framework

To evaluate discount options, WRS used a modified Strategic Evaluation Framework. Table 1 details the outcomes that should be considered with any changes to the Basic Sanitary Waste rate.

Customer	Financial Sustainability	Environmental Sustainability
Transparency	Limit net reduction in revenue	Provide a local waste management option
Fair application across all customer classes	Efficient and effective operation	Confirm success of diversion "right thing being done"

Table 1: Modified WRS Strategic Evaluation Framework

Landfill Disposal Discount

Disposal Discount Options

Based on the municipal scan of tipping fee rates and discounts, WRS considered three types of discounts:

1. WMF Account Customer monthly weight discount
2. Weight per load discount
3. Independent individual discount agreements

A detailed investigation is included in Attachment 4, outlining how each type of discount supports or risks achieving WRS' Strategic Evaluation Framework.

It should be noted that, regardless of the discount considered, WRS will not waive the requirement for diversion. The Disposal Surcharge Program and associated rate of $180 per tonne for mixed loads containing recyclable and/or compostable materials will still apply.

Each of the discount options is outlined below:

1. WMF Account Customer monthly weight discount

To be eligible for these discounts, customers must have an account with WRS so that the discount can be calculated and applied to a monthly bill. By becoming a WMF account customer, specific vehicle information is stored within the scale and billing system and invoices are generated monthly. With this type of discount, the amount of the discount is tied to the weight of waste brought to the landfill for disposal on a monthly basis.

Discounts The City offered in the 1990's and 2000's are examples of WMF account customer monthly weight based discount, as noted in Attachment 1.

Key findings:

- Discounts would be transparent, as they are posted on Calgary.ca and at the WMFs.
- Account customers reduce lineups at the WMFs, improving customer service.
- Depending on the size of the discounts, there is a limited revenue risk of less than $300,000 per year or less than 2 per cent of total tipping fee revenue; about 2,600 tonnes in new business would be required to offset the potential revenue loss.

2. Weight per load discount

With this discount option, the rate charged depends on the size of the load for each visit to the landfill. This type of discount does not require a customer to have an account with WRS.

Key findings:

- Discounts would be transparent, as they are posted on Calgary.ca and at the WMFs.
- No reduction in lineups at the WMFs, but larger loads support an efficient operation at the landfill face.
- Depending on the size of the discounts, there is a limited revenue risk of less than $300,000 per year or less than 2 per cent of total tipping fee revenue; about 2,600 tonnes in new business would be required to offset the potential revenue loss.

Landfill Disposal Discount

3. Independent individual discount agreements

For this type of discount, each customer would be able to negotiate individual agreements with WRS. The agreed upon rate would be known only to the participants. To offer individual agreements new authority would need to be granted to the Director, WRS within Bylaw 20M2001. These types of agreements are typically a practice implemented by privately owned landfills. As this option compromises transparency of WRS' rates to all customers, it was not considered further.

Conclusion

To respond to customer inquiries in a transparent way, while exploring potential opportunities for increased operational efficiencies, including reduced lineups at WMFs, WRS proposes to implement a WMF Account Customer monthly weight discount starting 2019 July 1. The proposed discount would apply only to the Basic Sanitary Waste rate, which is currently at $113/tonne. The proposed discount structure is based on the monthly tonnage thresholds outlined in Table 2.

DISPOSAL RATES for WMF ACCOUNT CUSTOMERS		
Description	**Proposed Basic Sanitary Waste rate for 2019 and 2020**	**Proposed Basic Sanitary Waste rate for 2021 and 2022**
For less than 1,000 tonnes per month	$108 / tonne	$110 / tonne
For 1,000 tonnes or more per month	$100 / tonne	$102 / tonne
For 2,000 tonnes or more per month	$90 / tonne	$92 / tonne
For 3,500 tonnes or more per month	$80 / tonne	$82 / tonne

Table 2: Proposed Disposal Discount Structure

The proposed discount will provide some financial relief to approximately 500 of our current as well as any new WMF account customers. WRS will monitor the financial outcomes and return to Council through the Mid-Cycle Adjustment process to modify and/or remove the discount, if needed. The annual Budget Adjustment Process will be used to address any required changes to the discount. As Council sets the Basic Sanitary Waste Rate, WRS requests that Council approve updates to Bylaw 20M2001. The required bylaw amendments are outlined in Attachment 5.

Stakeholder Engagement, Research and Communication

WRS has been approached by haulers about an opportunity for a discount. Haulers have indicated interest in a WMF Account Customer monthly weight discount of the Basic Sanitary Waste rate.

Strategic Alignment

Disposal discounts aligns with the Council Directive for A Well-Run City:

W4 – We need to recognize that we miss opportunities for innovation in management, service delivery and planning because of an existing culture of risk avoidance. We need to create a culture, including Council, which embraces appropriate levels of risk, innovation, experimentation and embraces lessons learned as opportunities to improve.

Social, Environmental, Economic (External)

Social

The appropriate disposal of garbage in landfills ensures the protection of public health and the environment. Use of discounts needs to be transparent for all customers and promote customer equity wherever possible.

Environmental

Increasing use of The City's WMFs provides an option for local management of waste. Materials leaving The City puts a strain on other municipalities' infrastructure and increases the amount of greenhouse gases produced in their transportation.

Economic (External)

The current economic downturn has impacted Calgary businesses. WRS strives to be responsive to customer needs and has the ability to benefit haulers in the marketplace who may not have access to alternative disposal options at a competitive rate.

Financial Capacity

Current and Future Operating Budget:

There are minimal impacts to WRS operating budget with this recommendation. There is a low revenue risk of less than $300,000 per year or less than 2 per cent of WRS' total tipping fee revenue.

Potential revenue shortfalls or additional costs would be addressed in two ways. In the short-term, they would be managed using funds from the WRS Sustainment Reserve and in the long-term, WRS would return to Council through the Budget Adjustment Process to either remove the discount or adjust operating budgets.

Current and Future Capital Budget:

There are no impacts to WRS' capital budget with this recommendation.

Risk Assessment

Specific risks for the implementation of the recommended discount option are:

- Alternative disposal companies respond to The City's discounts with an even lower tipping fee for their own facilities, resulting in WRS loss of revenue beyond current projections contained in this report.
- Reputational risk for The City if customers view the discount as unfair and inequitable, especially for existing WMF customers.

Landfill Disposal Discount

- Reputational risk for The City, as it has the potential to create the perception that WRS is encouraging disposal instead of diversion, which would impact achieving The City's goal of diverting 70 per cent of Calgary's waste away from landfills by 2025.

REASON(S) FOR RECOMMENDATION(S):

A higher Basic Sanitary Waste rate created a financial incentive to encourage diversion within the non-residential sectors. Given that this rate is no longer the primary financial tool to encourage diversion, WRS is in a position to consider a discount of the Basic Sanitary Waste rate.

WRS has completed a municipal scan of disposal rates and considered three types of discounts. To respond to customer inquiries in a transparent way, while exploring potential opportunities for increased operational efficiencies, including reduced lineups at WMFs, WRS proposes to implement a WMF Account Customer monthly weight discount.

Although the discount poses a risk to tipping fee revenue, that risk is limited to less than 2 per cent of total tipping fee revenue and approximately 2,600 tonnes in new business would be required to offset the potential revenue loss.

ATTACHMENT(S)

1. Attachment 1 – Historical Council Direction for the Basic Sanitary Waste Rate
2. Attachment 2 – Landfill Tonnes and Account Customers
3. Attachment 3 – Scan of Municipal Tipping Fees
4. Attachment 4 – Disposal Discount Options
5. Attachment 5 – Bylaw Amendment

LANDFILL DISPOSAL DISCOUNT:
HISTORICAL COUNCIL DIRECTION FOR THE BASIC SANITARY WASTE RATE

2018
C2018-1158 One Calgary 2019-2022 Service Plans and Budgets. In Attachment 3Z, Council approved Bylaw 20M2001 with the approved Basic Sanitary Rate for 2019-2022.

The City of Calgary (The City) continues to set rates at levels that support diversion via existing markets and service providers. Waste & Recycling Services (WRS) did not increase the Basic Sanitary rate for 2019 nor 2020, as the regional economy is still recovering. As waste is typically one of the last areas to experience economic recovery, only small increases for 2021 and 2022 are proposed. WRS will monitor all operating and capital costs, customer activity, and economic recovery and may adjust the rate and charges through the Mid-Cycle Adjustment process.

C2018-0489 One Calgary: Setting Indicative Rates for 2019-2022. In Attachment 2, WRS outlined the proposed Basic Sanitary Rate for the budget cycle. The rate was developed to ensure that: WRS is able to continue next steps towards the 70 per cent by 2025 diversion goal; maintain services levels for existing customers; extend those services to new communities; maintain capacity and efficiency of its infrastructure; and respond to inflationary impacts.

2017
C2017-1123 Action Plan 2018 Adjustments Attachment 7. Council directed that the Basic Sanitary Rate per tonne in 2018 be frozen at the 2016 level, rather than increased as per Action Plan.

2016
C2016-0863 Action Plan Mid-Cycle Adjustments Attachment 16. Council directed that the Basic Sanitary Rate per tonne in 2017 be frozen at the 2016 level, rather than increased as per Action Plan.

2014
C2014-0863 2015-2018 Action Plan Proposed Business Plans and Budgets. WRS proposed and Council approved Bylaw 20M2001 with the approved Basic Sanitary Rate for 2015-2018.

2000's
UE2008-36 Waste & Recycling Services – Financial Sustainability. Beyond WRS' financial plan for sustainability, this report includes the Basic Sanitary Rate for Council approval through the bylaw for 2009-2011. The rate were set to support: funding a 10-year capital plan aligned with the 80/20 by 2020 capital plan including needs for growth, regulatory and environmental requirements; and to fully fund the landfill liability.

UE 2007-36 Calgary's Construction and Demolition Waste Strategy Action Plan. While The City and the stakeholders agree that increasing landfill tipping fees is essential for increasing diversion of construction and demolition (C&D) materials, each party has a differing perspective on the timing and rate of increases. No increases were recommended.

UE2007-34 Landfill Disposal Rates. WRS recommended an increase in the approved basic municipal solid waste disposal rate for 2008 of $54 per tonne to $58 per tonne. Based on information from 2006 and 2007 C&D reports as well as emerging legislative and environmental drivers which were increasing cost for waste management facilities (WMF), Council approved an increase in the approved basic municipal solid waste disposal rate for 2008 of $54 per tonne to $64 per tonne.

UE2006-28 State of Construction and Demolition Waste Diversion in Calgary. Stakeholder feedback at the time was that the Basic Sanitary Waste rate for garbage disposal was too low to support C&D recycling markets.

OE2002-62 2003 Landfill Rates. To remove the current block rate structure for sanitary waste disposal.

C2001-90 2002 Landfill Rates. To reduce the current block rate structure for sanitary waste disposal. The report indicated that the plan was to phase out the discounts completely by 2003.

Description	Discount per Month	Net
0 to 499 tonnes	$0.00	$33.50 / tonne
500 to 999 tonnes	$2.00	$31.50 / tonne

C2000-57 2001 Landfill Rates. Implement a revised block rate discount for sanitary waste disposal, based on changes in the operating environment including hauler amalgamation and increased economic activity and increasing costs. The report indicated that the plan was to phase out the discounts completely by 2003.

Description	Discount per Month	Net
0 to 499 tonnes	$0.00	$30.00 / tonne
500 to 999 tonnes	$2.00	$28.00 / tonne
1,000 tonnes or more	$3.50	$26.50 / tonne

1990's

C98-77 1999 Landfill Rates. Implement a revised block rate structure for sanitary waste disposal, based on changes in the operating environment including hauler amalgamation and increased economic activity.

Description	Discount per Month	Net
0 to 499 tonnes	$0.00	$30.00 / tonne
500 to 999 tonnes	$2.00	$28.00 / tonne
1,000 to 3,999 tonnes	$3.50	$26.50 / tonne
4000 tonne or more per month	$5.00	$25.00 / tonne

FB94-111 – 1995 Landfill Rates. A review was completed to assess the possibility of implementing a wider range of discounts to encourage commercial haulers to use The City's disposal sites.

Description	Discount per Accounting Period	Net
2,300 tonnes or less	$0.00	$30.00 / tonne
More than 2,300 tonnes Less than 3,100 tonnes	$3.00	$27.00 / tonne
More than 3,100 tonnes Less than 4,600 tonnes	$4.50	$25.50 / tonne
More than 4,600 tonnes Not to exceed 100,000 annually	$6.00	$24.00 / tonne

FB93-102 – Volume Discount on Landfill Rates. Council approved reduced landfill tipping fees for high volume customers. Solid Waste Service Division implemented a 15% discount on the rate for sanitary waste disposed by commercial account customers who deliver 2,750 tonnes or more per month. This discount was equal to $4.50 per tonne.

FB92-64 – 1993 Budget Adjustments Due to Reduced Tonnages Disposed. This report was about cost containment measures and budget cuts due to decreased tonnes going to The City's WMF.

The history of the Basic Sanitary Waste rate per tonne since 1992 to present is shown in Figure 1.

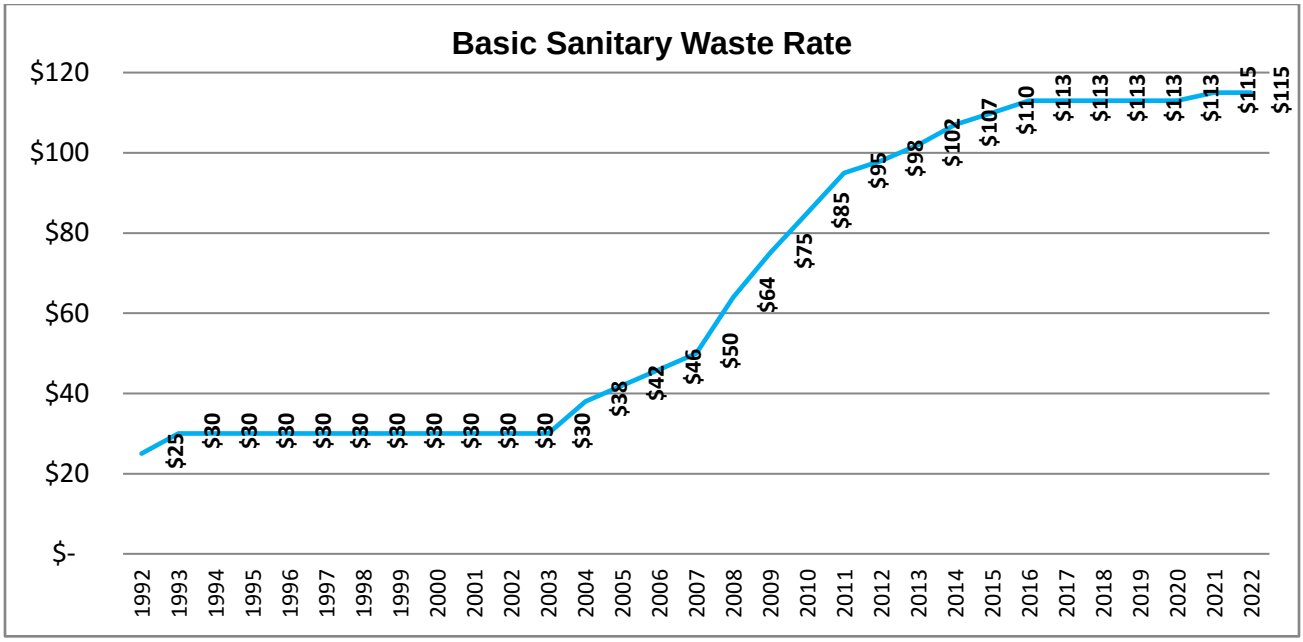


Figure 1: Waste Management Facilities Basic Sanitary Waste Rate

Table 1: WRS' Basic Sanitary Waste rate per tonne and policy / program timeline

Year	Rate per tonne*	Rate per tonne**	Policy and Program
1992	$25		
1993	$30		
1994	$30		• Disposal discount of 15% with 2,750 tonne threshold
1995	$30		• Disposal discount rates with 4 different levels
1996	$30		• Discount continued
1997	$30		• Discount continued
1998	$30		• Discount continued
1999	$30		• Adjust disposal discount rated – 4 new levels
2000	$30		• Discount continued
2001	$30		• Disposal discount rates – only 3 levels
2002	$30		• Disposal discount rates – only 2 levels
2003	$30		• Disposal discount removed
2004	$38		
2005	$42		
2006	$46		
2007	$50		• Construction and demolition (C&D) stakeholder feedback that the Basic Sanitary Waste rate too low to support recycling markets

Year	Rate per tonne*	Rate per tonne**	Policy and Program
2008	~~$54~~	$64	• New tipping fee strategy - increase Basic Sanitary Waste rate to support creation of diversion markets
2009	$75		• Continued to increase Basic Sanitary Waste rate • Pilot for diversion of construction & demolition materials (asphalt shingles, drywall and wood) from landfill • Designated Materials Rate: New higher rate for mixed loads containing materials designated as recyclable (concrete, brick/masonry, asphalt and metal)
2010	$85		• Continued to increase Basic Sanitary Waste rate • New program to divert construction & demolition materials (asphalt shingles, drywall and wood) from landfill • Designated Materials Rate increased
2011	$95		• Continued to increase Basic Sanitary Waste rate Designated Materials Rate increased
2012	$98		• Designated Materials Rate increased
2013	$102		• Designated Materials Rate increased and added new materials: wood and drywall
2014	$107		• Designated Materials Rate increased
2015	$110		• Designated Materials Rate increased
2016	$113		• Bylaw requiring multi-family complexes and businesses to have onsite sorting for recyclables. • Designated Materials Rate renamed: Disposal Surcharge rate and increased. Added new material: paper and cardboard
2017	~~$116~~	$113	• Rate frozen at 2016 levels • Bylaw requiring multi-family complexes and businesses to have onsite sorting for food and yard waste • Disposal Surcharge rate increased
2018	~~$119~~	$113	• Rate remains frozen at 2016 level • Disposal Surcharge rate increased and added new materials: food and yard waste
2019	$113		• Rate to remain frozen at 2016 levels • Disposal Surcharge rate increased. Remove material: asphalt shingles
2020	$113		
2021	$115		
2022	$115		

*As approved at the start of the budget cycle
**Adjusted during budget cycle

LANDFILL DISPOSAL DISCOUNT:
LANDFILL TONNES AND ACCOUNT CUSTOMERS

Waste & Recycling Services (WRS) has seen a change in the makeup of our customer base over time, with fewer account customers and fewer waste tonnes from account customers. Figure 1 shows the number of Waste Management Facility (WMF) account customers for the last five years.

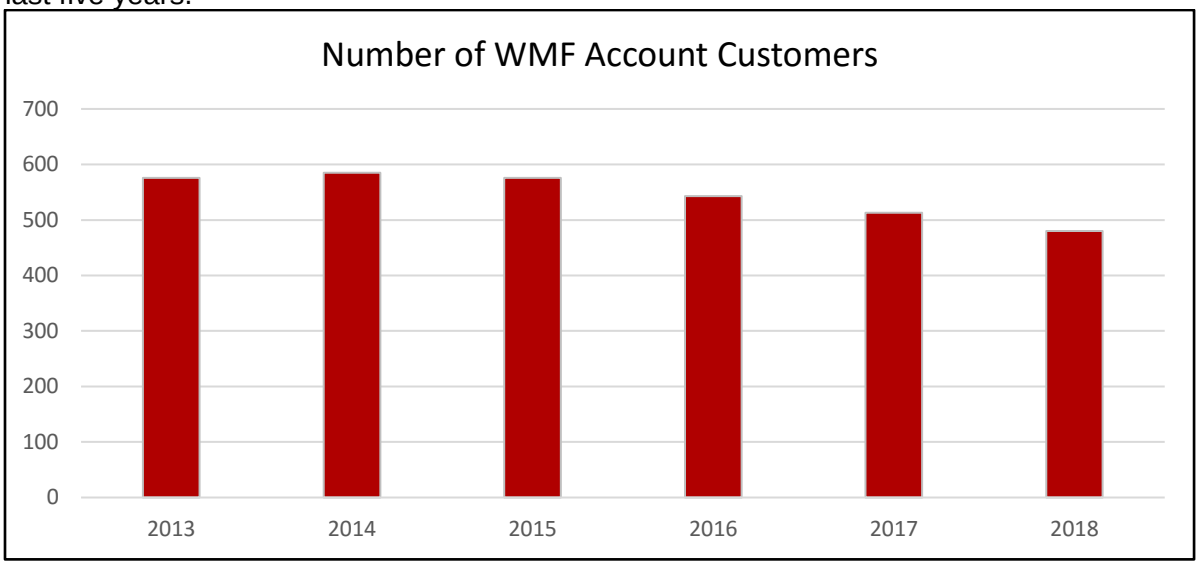


Figure 1: Number of WMF Account Customers

Figure 2 shows the annual tonnes of waste brought to The City's waste management facilities by WMF account customers over the last five years.

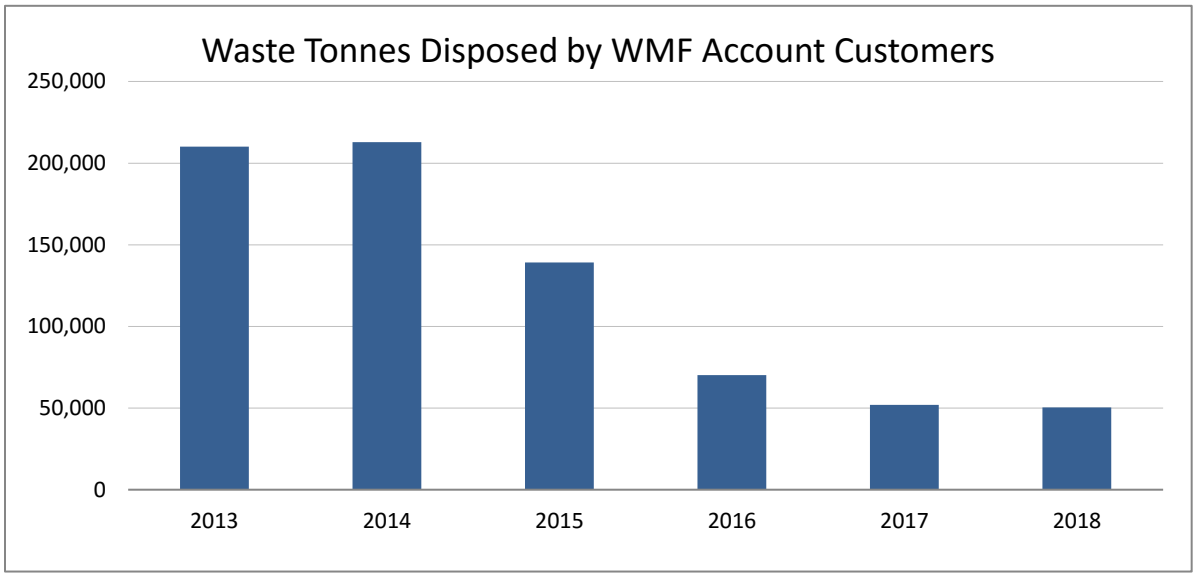


Figure 2: Tonnes of Waste Disposed by WMF Account Customers

LANDFILL DISPOSAL DISCOUNT:
SCAN OF MUNICIPAL TIPPING FEES

WRS completed an external scan of other municipalities' rates for materials brought to Waste Management Facilities and / or landfills. Municipalities include:

- Aquatera, City of Grand Prairie - Utility
- Augusta, Georgia
- Capital Regional District
- City of Barrie
- City of Bismarck, North Dakota
- City of Brantford
- City of Kelowna
- City of London
- City of Melfort
- City of Orillia
- City of Ottawa
- City of Palm Beach County, Florida
- City of Peterborough
- City of Red Deer
- City of Richland, Washington
- City of Regina
- City of San Diego, California
- City of Santa Maria, California
- City of Southampton, UK
- City of Townsville, Australia
- City of Winnipeg
- District of Mission
- ECOWASTE, Richmond, BC
- Halifax Region
- Hillsborough County, Florida
- Island Waste Management Corporation
- Metro Vancouver
- Niagara Region
- Orange County, California
- Region of Waterloo
- Regional Municipality of Usborne No. 310
- Rappahannock Regional Solid Waste Management Board, Stafford Virginia

Municipalities with disposal incentives / disincentives:

Municipality	Discount Details
ECOWASTE	Higher discounts for larger tonne loads, paid based on monthly basis
City of London	Higher rate for waste from outside service area
City of Richland, WA	Higher rate for larger loads
City of San Diego, CA	Higher rates for waste from outside region
City of Santa Maria, CA	Higher rates for larger loads
City of Southampton, UK	Discount when you pay via Direct Debit
District of Mission	Higher rate for waste from outside region
Metro Vancouver	Based on tonnes for each individual load, lower rates for larger loads
RM of Usborne No. 310	Higher rate if waste from outside region
Rappahannock Regional Solid Waste Management Board	Lower rates for higher monthly volumes

The National Solid Waste Benchmarking Initiative summarizes disposal rates at municipal landfills across Canada in Figure 1. The scan indicated that The City's 2018 Basic Sanitary Rate of $113 per tonne was about 19 per cent above the national median of $95.00 per tonne.

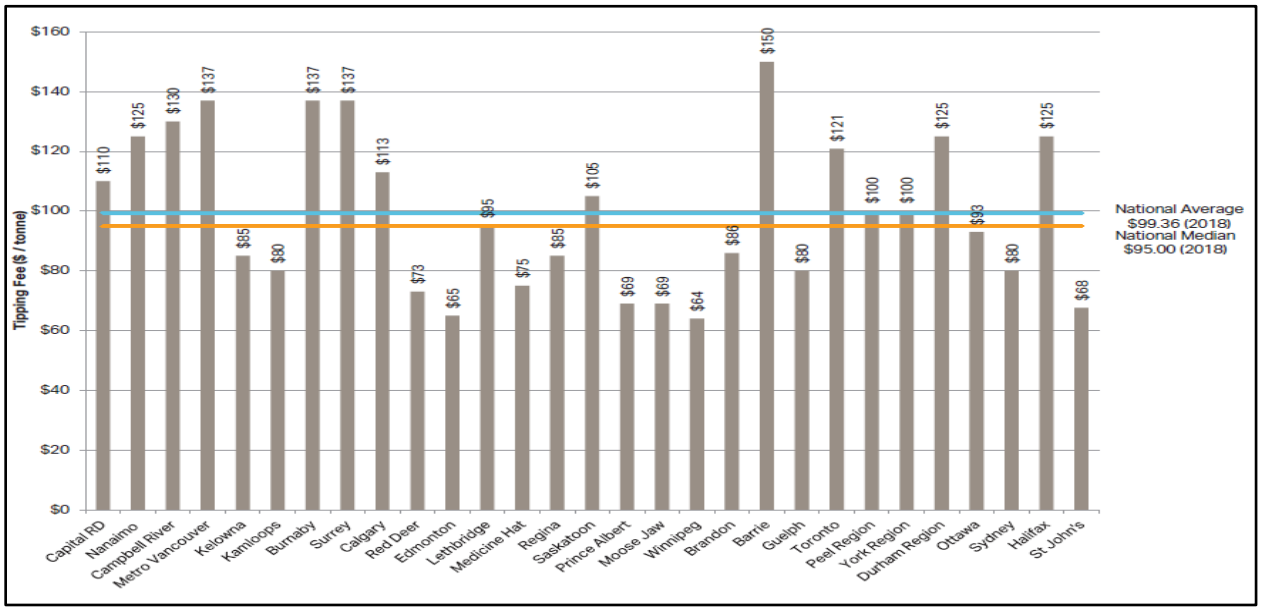


Figure 1: 2018 Benchmarking of Disposal Rates at Municipal Landfills.

LANDFILL DISPOSAL DISCOUNT:
DISPOSAL DISCOUNT OPTIONS

Waste & Recycling Services (WRS) considered discounts based on options identified from the external scan (Attachment 2) of rates used by other municipalities. WRS evaluated three major types of discounts:

1. Waste Management Facility (WMF) account customer monthly weight discount
2. Weight per load discount
3. Independent individual discount agreements

It should be noted that, regardless of the discount considered, WRS will not waive the requirement for diversion. The Disposal Surcharge Program and associated rate of $180 per tonne, for mixed loads containing recyclable and/or compostable materials will still apply.

1. <u>WMF Account Customer monthly weight discount</u>

To be eligible for these discounts, customers must have an account with WRS so that the discount can be calculated and applied to a monthly bill. By becoming a WMF account customer, specific vehicle information is stored within a scale and billing system and invoices are generated monthly. With these types of discounts, the amount of the discount is tied to the weight of garbage brought to the landfill for disposal on a monthly basis.

Discounts The City offered in the 1990's and 2000's are an example of WMF account customer monthly weight based discount, as noted in Attachment 1.

Assessment of this option with WRS' strategic framework:
Customer

- Discounts would be transparent as they are posted on Calgary.ca and at the WMF.
- With a discounted rate The City has the ability to benefit haulers in the marketplace who may not have access to alternative disposal options at a competitive rate.
- Cash customer may perceive the discount to be unfair.
- All account customers receive some level of discount.
- Account customers reduce lineups at the WMFs, improving customer service.

Financial Sustainability

- Depending on the size of the discounts, there is a limited revenue risk of less than $300,000 per year or less than 2 per cent of total tipping fee revenue.
- About 2,600 tonnes in new business would be required to offset the potential revenue loss.
- Servicing account customers at the WMF is more efficient and effective than servicing cash customers, as account customers streamline operations at the WMFs, reducing lineups and cash/ debit transaction costs.

Environmental Sustainability

- Continued application of the disposal surcharge has the potential to help confirm diversion success.
- Haulers using The City's local WMFs minimize greenhouse gas emissions generated through transportation activities.

2. Weight per load discount

With this discount option, the rate charged depends on the size of the load for each visit to the landfill. This type of discount does not require a customer to have an account with WRS.

Assessment of this option with WRS' strategic framework:
Customer

- Discounts would be transparent as they are posted on Calgary.ca and at the WMF.
- With a discounted rate The City has the ability to benefit haulers in the marketplace who may not have access to alternative disposal options at a competitive rate.
- Depending on the thresholds required to receive the discounts, small volume haulers may not perceive them as fair.
- No reduction in lineups at the WMFs.

Financial Sustainability

- Depending on the size of the discounts there is a limited revenue risk of less than $300,000 per year or less than 2 per cent of total tipping fee revenue.
- About 2,600 tonnes in new business would be required to offset the potential revenue loss.
- Discounts for larger loads support an efficient operation at the landfill face.
- These discounts do not require a customer to have an account so they will not streamline scalehouse operations at the WMFs, therefore no additional efficiencies would be realized.

Environmental Sustainability

- Continued application of the disposal surcharge has the potential to confirm diversion success.
- Haulers using The City's local WMFs minimize greenhouse gas emissions generated through transportation activities.

3. Independent individual discount agreements

For this type of discount, each customer would be able to negotiate individual agreements with WRS. The agreed upon rate would be known only to the participants. To offer individual agreements new authority would need to be granted to the Director, WRS within Bylaw 20M2001. These types of agreements are typically a practice implemented by privately owned landfills.

As this option compromises transparency of WRS' rates to all customers, it will not be considered further.

Risks to Discounted Basic Sanitary Waste Rate

- Alternative disposal companies may respond to The City's discounts with even lower tipping fees for their own facilities, resulting in WRS' loss of revenue beyond current projections.
- Reputational risk for The City if customers view the discount as unfair and inequitable, especially for existing WMF customers.
- Reputational risk for The City as it has the potential to create the perception that WRS is encouraging disposal instead of diversion, which would impact achieving The City's goal of diverting 70 per cent of Calgary's waste away from landfills by 2025.

- There is a risk for an increase of bad debt expenses with more WMF Account Customers, however the amount is unlikely to be higher than what WRS' would have previously experienced in a robust economy with more large volume customers.

Conclusion

To respond to customer inquiries in a transparent way, while exploring potential opportunities for increased operational efficiencies, including reduced lineups at WMFs, WRS proposes to implement a WMF Account Customer monthly weight discount starting 2019 July 1. The proposed discount would apply only to the Basic Sanitary Waste rate, which is currently at $113/tonne. The proposed discount structure is based on the monthly tonnage thresholds outlined in Table 1.

DISPOSAL RATES for WMF ACCOUNT CUSTOMERS		
Description	**Proposed Basic Sanitary Waste rate for 2019 and 2020**	**Proposed Basic Sanitary Waste rate for 2021 and 2022**
For less than 1,000 tonnes per month	$108 / tonne	$110 / tonne
For 1,000 tonnes or more per month	$100 / tonne	$102 / tonne
For 2,000 tonnes or more per month	$90 / tonne	$92 / tonne
For 3,500 tonnes or more per month	$80 / tonne	$82 / tonne

Table 1: Proposed Disposal Discount Structure

WRS will monitor the financial outcome of the proposed discount and will return to Council through the Mid-Cycle Adjustment process to modify and/or remove the discount, if needed. The annual Budget Adjustment Process will be used to address any required alterations to the discounts.

LANDFILL DISPOSAL DISCOUNT:
PROPOSED BYLAW AMENDMENT

PROPOSED TEXT FOR A BYLAW TO AMEND BYLAW 20M2001, WASTE AND RECYCLING BYLAW

1. Bylaw 20M2001, the Waste and Recycling Bylaw, as amended, is hereby further amended.

2. In section 2, the following definition is added: "waste management facility account customer" means a City approved account owner for waste services at disposal sites.

3. In Schedule "B", the following Table 1.a is added:

TABLE 1.a - DISPOSAL RATES for WASTE MANAGEMENT FACILITY ACCOUNT CUSTOMERS

(sections 3.1(1)(a) and (a.1))

For waste disposed at a City Disposal Site (Waste Management Facility)	2019	2020	2021	2022
For less than 1,000 tonnes per month	$108/tonne	$108/tonne	$110/tonne	$110/tonne
For 1,000 tonnes or more per month	$100/tonne	$100/tonne	$112/tonne	$112/tonne
For 2,000 tonnes or more per month	$90/tonne	$90/tonne	$92/tonne	$92/tonne
For 3,500 tonnes or more per month	$80/tonne	$80/tonne	$82/tonne	$82/tonne

4. This bylaw comes into force on July 1, 2019.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0654

2018 Integrated Watershed Management Update

EXECUTIVE SUMMARY

A healthy, resilient watershed providing clean, reliable water is vital for current and future generations in the Calgary region. Working with the Province and regional partners, The City takes an integrated watershed management approach to protect our water supply, use water wisely, keep rivers healthy and build resiliency to flooding. The Water Utility delivers on this commitment through three lines of service: water treatment and supply, wastewater collection and treatment, and stormwater management. This report summarizes the integrated watershed management actions taken in 2018 and highlights of actions underway and planned for 2019.

Actions taken in 2018 to protect our water supply include the development of a Source Water Protection Plan and initiation of a Drought Risk and Vulnerability Assessment. Regional collaboration was advanced through the establishment of the Calgary Metropolitan Region Board (CMRB) and implementation of The City's new policy on Regional Water, Wastewater and Stormwater Servicing. The Water Utility is achieving its targets relating to water conservation and remaining below its threshold goals for river water withdrawals.

The Water Utility continues to make progress on implementing stormwater management initiatives that keep pollutant loadings below The City's thresholds despite a growing city. This includes protecting riparian (areas adjacent to waterbodies) health through the Riparian Action Program's restoration, monitoring and education activities. We also continue to invest in major upgrades to the Bonnybrook wastewater treatment plant to ensure continued compliance with regulations and a growing population. Efforts to improve flood resiliency and reduce local stormwater flooding are ongoing through infrastructure and programs (see UCS2019-0653).

ADMINISTRATION RECOMMENDATION:

That the SPC on Utilities and Corporate Services receive this report for information.

PREVIOUS COUNCIL DIRECTION / POLICY

On 2013 May 29, the SPC on Utilities and Corporate Services received the Watershed

Management Planning Annual Update (UCS2013-0046) report for information which included annual progress updates for the Water Efficiency Plan and Stormwater Management Strategy.

Subsequent annual Watershed Management Planning Update reports from 2013 to 2017 (UCS 2014-0108, UCS2015-0080, UCS2016-0167, UCS2017-0266, and UCS2018-0093) were received for information.

BACKGROUND

Increased pressure on watersheds from growth in the region and impacts of a changing climate make watershed management one of Calgary's most critical resiliency challenges. The Water Utility's commitment to watershed protection considers the needs of a growing customer base and balances the economic, social and environmental impacts of our decisions, programs, and actions. The Water Utility's integrated watershed management approach addresses the important interconnectedness between watershed protection, climate resiliency and water's influence on city-building. This approach aims to achieve four key goal areas: protect our water supply; use water wisely; keep our rivers healthy; build resiliency to flooding.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

This section highlights key 2018 actions in the four key watershed protection goal areas.

Goal #1: Protect our water supply.

A safe and secure water supply is critical for economic and urban growth in Calgary and the region. 2018 highlights:

- A Water Security Strategy and Plan was initiated. This roadmap will connect priorities for water supply, water efficiency, climate change, regional servicing and drought management to build future water supply management solutions.
- A Source Water Protection Plan was finalized, with targeted collaborative actions including convening task forces on both wildfire-source water and on the Bearspaw Reservoir and ensuring source water protection activities are included in the CMRB's Interim Growth Plan.
- Development of a Drought Risk and Vulnerability Assessment is underway, aligning with Calgary's Climate Resiliency Strategy. This work will support development of a Corporate Drought Management Plan.
- A revised policy on Regional Water, Wastewater and Stormwater Servicing came into effect, affirming the need for collaborative regional servicing plans that balance economic, social and environmental factors.
- The CMRB was established in 2018, of which The City of Calgary is a member. With an interim plan now in place, the Board is required to develop a long-term Growth Plan and Servicing Plan by January 2021.

Goal #2: Use water wisely

The Water Utility is on track to achieve its Water Efficiency Plan target to accommodate Calgary's population growth with the same amount of water removed from the river in 2033 as in 2003. 2018 highlights:

- The Water Utility revamped and expanded its residential water leak education program to support high water use messaging and increased peak day communications to reduce outdoor water use.
- In 2018, Calgary's overall water use was 362 litres per capita per day (lpcd). This is a 30 per cent decrease since 2003, showing continued progress toward our 2033 target of 350 lpcd.
- Despite a service population increase of 25,000 people in Calgary and region and another warm, dry summer in 2018, water withdrawn from the river remained below the 2003 benchmark.
- Calgary's highest total water use in a single day (peak day) occurred on July 7 and remained below the current capacity of The City's water treatment plants.
- The Water Utility continued to identify and fix watermain leaks through its surveying program, saving an estimated 119,000 litres per day in 2018.

Goal #3: Keep our rivers healthy

The City works to reduce our impact on the rivers. 2018 highlights:

- Major upgrades to the Bonnybrook Wastewater Treatment Plant are advancing to ensure continued compliance with regulatory requirements and to support population

growth. Significant progress was made on the flood protection barrier. As well, major electrical upgrades were completed and four new secondary clarifiers and an upgraded sludge digester were commissioned.

- Work to update the 2005 Stormwater Management Strategy began in 2018. The Water Utility completed initial engagement that focused on understanding internal and external stakeholder perspectives on stormwater management. This will form the basis of continued engagement to identify priority areas for the Strategy update.
- The Bowmont East Stormwater Quality Retrofit pond in Dale Hodges Park became operational in 2018. The project reduces the amount of sediment entering the Bow River from the local stormwater catchment area by approximately 50 per cent.
- The Water Utility continued to advance the Riparian Action Program, with 25 bioengineering and riparian planting projects underway or completed in 2018. Field monitoring began in 2018, and results will help measure the improvement of riparian (areas next to waterbodies) health over time.

Goal #4: Build resiliency to flooding

The Water Utility continues to advance flood resiliency and reduce local stormwater flooding. Flood resiliency and localized flooding program activities are detailed in a separate report to Council (UCS2019-0653). 2018 Highlights:

- Funding awarded through the Alberta Community Resilience Program in 2018 includes support for construction of the Downtown flood barrier, the Upper Plateau Separation stormwater upgrades for the community of Sunnyside and building resiliency through the replacement of the 9th Avenue bridge.
- The total funds received for flood mitigation and resiliency work as of 2019 is now approximately $69.1M, in support of 13 projects. The City completed five of the 13 projects in 2018, and the remaining eight projects are underway.
- The City continues to work closely with the Province to advocate for and provide technical support for timely construction of upstream flood mitigation for Calgary on both rivers.
- Through the Water Utility's Community Drainage Improvements (CDI) program, projects in the communities of Christie Park and Braeside were completed in 2018.
- Continued the Lot Drainage Improvements Project to identify ways to minimize stormwater flooding issues on private properties.
- The City plans to complete a residential Guide to Lot Drainage and present potential revisions to the Lot Grading Bylaw in 2019.

Stakeholder Engagement, Research and Communication

The Water Utility takes a citizen-first approach to watershed management by working collaboratively with Calgarians, other orders of government, regional municipalities, landowners, developers, and businesses. Through engagement, research, partnerships and education, we aim to incorporate what matters most to citizens into watershed management decisions. In 2018, engagement focused on flood mitigation projects and input for an update to the Stormwater Management Strategy.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0654

2018 Integrated Watershed Management Update

Strategic Alignment

The Water Utility's work aligns with The City's Climate Resilience Strategy and the Corporate Resilience Strategy. Advancing watershed management goals aligns to the following One Calgary Council Directives:

- Integrated watershed management is essential to protect public health and the environment, while strengthening our resiliency to a changing climate.
- Calgary must develop our communities with a focus on achieving future water security and a sustainable water supply.
- Watershed management must be integrated into our land use policies, plans and decisions.
- Accomplishing sustainable, effective watershed management within Calgary and the region will also require working collaboratively with other orders of government, adjacent municipalities, residents, landowners, developers, businesses, and the First Nations.

Social, Environmental, Economic (External)

Watershed management initiatives are critical to ensuring healthy rivers for Calgary and neighbouring communities. Our programs, plans and policies are also aimed at ensuring public health and safety, reducing risk to property and increasing community awareness.

Sustainable management of water is critical to long term city-building efforts in Calgary and the region. The Water Utility is working collaboratively with regional partners to develop regional servicing plans that balance the needs of stakeholders while supporting vibrant communities. Community resiliency related to water management is addressed though the Infrastructure and Environment themes of the Resilient Calgary strategy. Watershed protection activities support Calgary's Climate Resilience Strategy water management actions.

Financial Capacity

Current and Future Operating Budget:

Program initiatives to achieve the watershed management planning goals are incorporated in the 2019-22 Service Plans and Budgets.

Current and Future Capital Budget:

Program initiatives to achieve the watershed management planning goals are incorporated in the 2019-22 Service Plans and Budgets.

Risk Assessment

Sustainable management of water resources is one of Calgary's most significant community resiliency challenges. Our integrated watershed management approach prioritizes actions to ensure reliable service delivery, reduce risk to our watershed health from growth and consider impacts of climate change. Key risks include:

- Calgary's water supply is impacted by regional growth, drought and climate change and the provincial closure of the South Saskatchewan River Basin to new water licences. Upstream forest fires and land use impacts remain the two highest risks to Calgary's water supply and quality. Collaborative actions under the developing Water Security

Strategy and Plan are working to address these risks. The City continues to enhance water efficiency programs, and is working to align water demand forecasting and infrastructure planning to meet future needs of Calgarians and regional customers.

- Upcoming renewal of our water and wastewater approval licences require The City to work proactively to meet anticipated regulatory requirements.
- A focus on regional servicing including actions under the CMRB, will require The City to work collaboratively with regional stakeholders to adapt service delivery, strategies and infrastructure.

REASON(S) FOR RECOMMENDATION(S):

This report is provided for information as an update on progress of the Water Utility's watershed management implementation and planning.

ATTACHMENT(S)

1. Attachment 1 – 2018 Integrated Watershed Management Activity and Results Summary
2. Attachment 2 – 2018 Integrated Watershed Management Update

2018 Integrated Watershed Management Activity and Results Summary
Goal 1: PROTECT OUR WATER SUPPLY

UCS2019-0654
Attachment 1

Background: Story Behind the Baseline

Goal: Ensure reliable, secure, high quality water supply for current and future generations. Reduce risks to Calgary's water supply.

Risks: Our region is prone to drought while regional growth continues to place pressures on Calgary's water supply. Impacts from future land development also pose risks to water quality. Climate change will likely impact our future water supply, as does the provincial closure of the South Saskatchewan River Basin to new water licences.

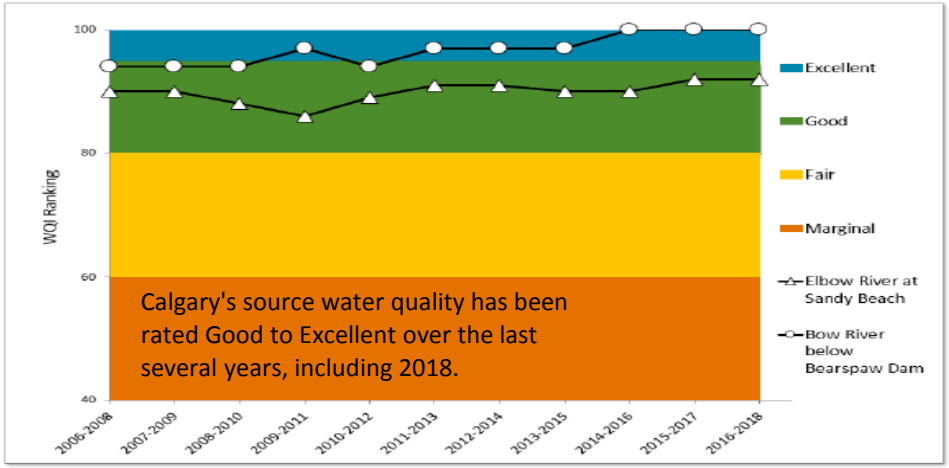
What We Did: 2018 Highlights

- The Water Security Strategy and Plan was initiated to build improved water supply solutions for the future.
- A Drought Risk and Vulnerability Assessment is underway and builds on the Water Utility's current drought response actions using lessons learned from drought prone sectors in the US and worldwide.
- The Calgary Metropolitan Region Board (CMRB) was established, and developed an Interim Growth Plan and Interim Regional Evaluation Framework for the region.
- The Source Water Protection Plan was finalized in 2018. Two related task forces were convened, and source water issues were included in the CMRB's Interim Growth Plan.
- Identified adjustments required to ensure compliance with the new Health Canada guideline for lead in drinking water.

2019 Planned Actions - Highlights

- Advance Source Water Protection Plan actions, complete Drought Vulnerability and Risk Assessment, and further the Water Utility's climate resilience activities.
- Continue work with the CMRB to ensure future regional water servicing.
- Participate in the Bow River Working Group feasibility study of major infrastructure for flood and water supply management.
- Advance Council's Integrated Watershed Management Directive through improved policy and guidebook development in the Next 20 (MDP) update.
- Adjust the existing lead management program to comply with new Health Canada Guidelines on lead.

Water Quality Index - Calgary's source water quality



Strategic Alignment

One Calgary 2019-2022: We will continue to work with stakeholders to reduce risks to our source water, all to ensure the quality and quantity of The City's drinking water.

2018 Integrated Watershed Management Activity and Results Summary
Goal 2: USE WATER WISELY

Background: Story Behind the Baseline

Goal: The Water Efficiency Plan (WEP) calls for the same amount of water to be withdrawn from the river in 2033 as was taken out in 2003.

Risks: Population growth continues to place increased demands on the rivers and Calgary's treatment plants. Water conservation actions remain critical to reduce per capita consumption. A focus on regional servicing agreements, including actions under the Calgary Metropolitan Region Board, will require The City to adapt service delivery, strategies and infrastructure.

What We Did: 2018 Highlights

- Focus on residential leak detection education, high water use messaging, outdoor water use and peak day specific communications.
- Despite a service population increase in Calgary and region, water withdrawn from the river remained below the 2003 benchmark and decreased slightly from 2017.
- Overall water use was 362 litres per capita per day (lpcd), representing a 30 per cent decrease since 2003 and continued progress toward our 2033 target of 350.
- Residential water demand was 210 lpcd in 2018, meeting the corporate 2020 sustainability target for single family residential water use of 201 lpcd.
- Highest total water use in a single day occurred on July 7 and remained below the current capacity of The City's water treatment plants.
- Continued to identify and fix watermain leaks, saving 119,000 litres per day in 2018.

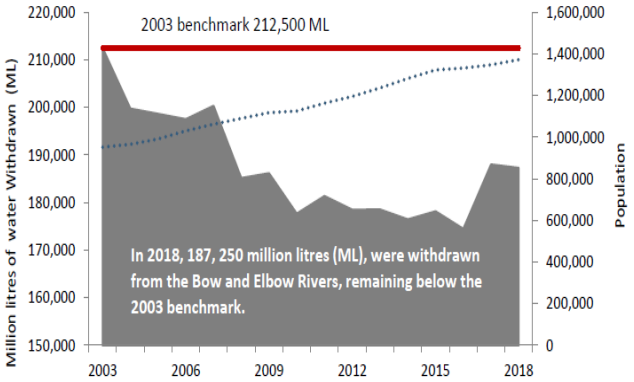
2019 Planned Actions - Highlights

- Expand water efficiency programs for business and multi-family customers.
- Begin work on revising Water Efficiency Plan targets and goals.
- Align water efficiency programming, demand forecasting and infrastructure planning.
- Continue to provide education and outreach to customers about the Water Utility, leaks and high-water consumption, address peak day demand through increased outdoor water use programming and communications.

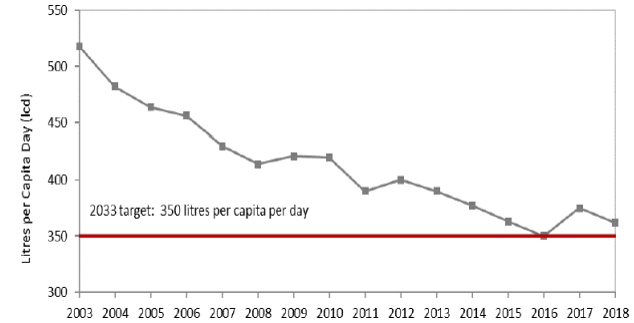
Strategic Alignment

One Calgary 2019-2022: We will continue to work with stakeholders to reduce risks to our source water, all to ensure the quality and quantity of The City's drinking water.

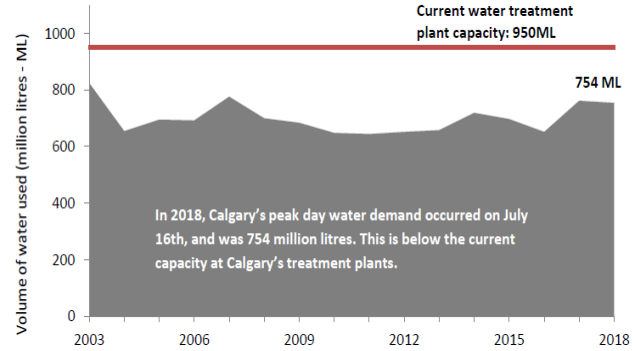
Annual water withdrawal from rivers relative to population



Calgary's total per capita water demand trend



Peak day demand: Maximum volume of water used in one day



2018 Integrated Watershed Management Activity and Results Summary
Goal 3: KEEP OUR RIVERS HEALTHY

Background: Story Behind the Baseline

Goal: The City's Approval to Operate, Total Loading Management Plan and Stormwater Management Strategy aim to reduce river pollutant loadings. The City's Riparian Action Program aims to improve the health of areas near rivers.

Risks: Water quality and river health are impacted by pollutants entering our rivers. Managing pollutant loadings and changes to our regulatory environment requires investment in maintenance and infrastructure upgrades.

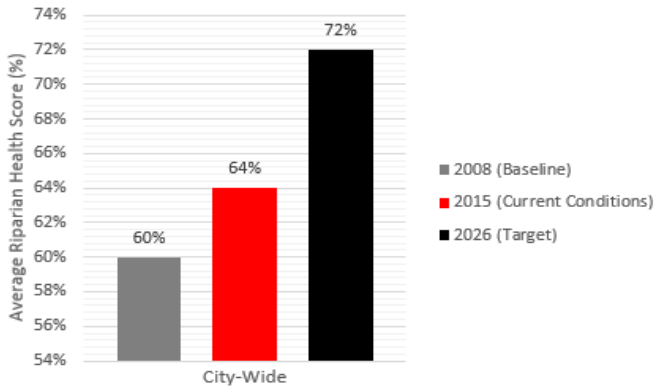
What We Did: 2018 Highlights

- Major upgrades to the Bonnybrook Wastewater Treatment Plant continued, including a flood protection berm and four new secondary clarifiers.
- Sediment and phosphorus pollutant loadings from stormwater and wastewater remained below provincial and City limits.
- The Bowmont East Stormwater Quality Retrofit pond became operational in 2018, which will reduce sediment entering the Bow River from this catchment in NW Calgary by approximately 50 per cent.
- Continued to advance the Riparian Action Program, with 25 bioengineering and riparian planting projects underway or completed in 2018. Field monitoring work began to evaluate overall Riparian health trends.

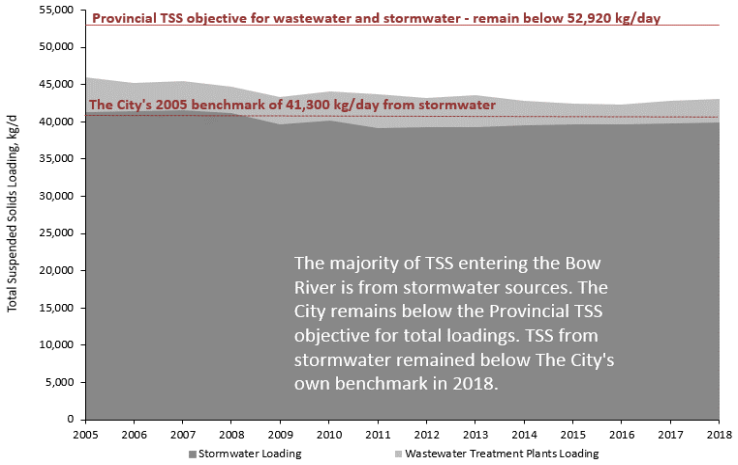
2019 Planned Actions - Highlights

- Advance the Riparian Action Program: riparian monitoring program, site restoration and continue outreach.
- Continue stakeholder engagement to inform an update of The City's Stormwater Management Strategy.
- Negotiate Wastewater Approval to Operate 2018-2028. Continue wastewater treatment plant upgrades.
- Continue stormwater pond modifications and improvements in three communities.
- Complete next phase of watershed health index reporting.

City-wide riparian health scores



Total Suspended Solids (TSS) to the Bow River



Strategic Alignment

One Calgary 2019-2022: The City will continue to work with regulators and make additional investments in wastewater treatment upgrades to meet regulatory compliance and protect the health of the river. We will strengthen our resiliency to climate change by considering climate change parameters into capital design and operating activities. The City will make investments in flood resiliency and improvements to river and riverbank health.

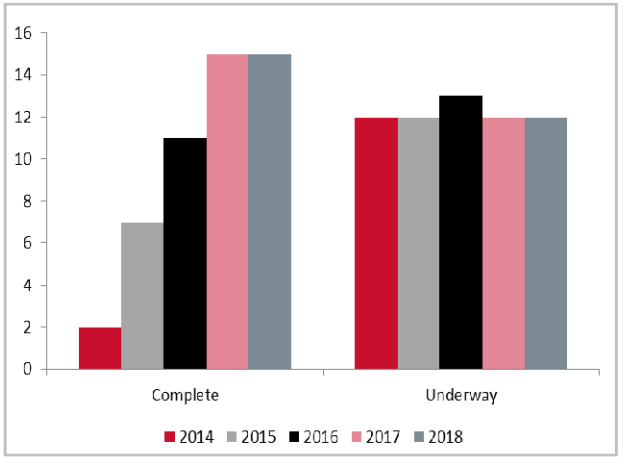
2018 Integrated Watershed Management Activity and Results Summary
Goal 4: BUILD RESILIENCY TO FLOODING

Background: Story Behind the Baseline

Goal: The City continues to advance flood resiliency, including implementing actions in the Flood Resilience Plan and reducing risk of local stormwater flooding through the Community Drainage Improvement (CDI) program

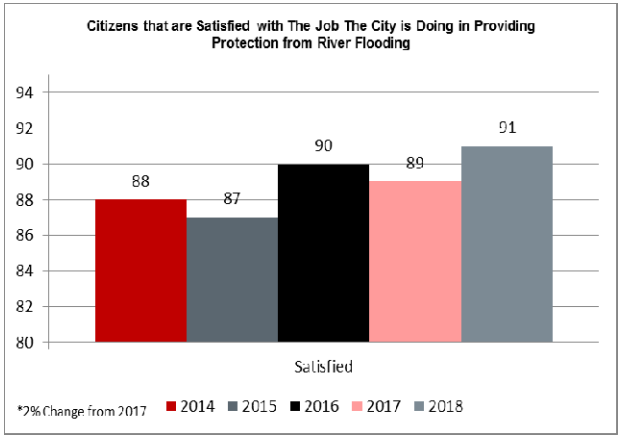
Risks: Another major flood in Calgary is likely to occur, and could cause significant damage to the downtown business core, public and private property, and disrupt critical systems and services. The costs of local flooding will continue until projects are completed.

Progress on the 27 Expert Panel recommendations



What We Did: 2018 Highlights

- Centre Street Bridge and West Eau Claire flood barrier projects completed.
- Delivered 5 year anniversary flood readiness campaign.
- Community engagement for flood mitigation in Sunnyside and Bowness started in 2018.
- The Provincial Springbank project is undergoing Federal environmental assessment.
- The City continues to support the Bow River Working Group for upstream mitigation options on the Bow.
- Mitigation completed or ongoing has reduced exposure to river flood damage by about 30%.
- The Community Drainage Improvement Program is on track, and the Lot Drainage Improvement Project, intended to help reduce stormwater flooding on private properties, continued.



2019 Planned Actions

- Continue to build resiliency to flooding through engaging with flood-affected community members on potential mitigation projects, delivery of key flood mitigation infrastructure, and reviewing and updating The City's flood-related policies.
- Advocate with the Province on the need for upstream mitigation and funding of flood mitigation projects.
- Support delivery of Community Drainage Initiative program by investing in stormwater infrastructure improvements in communities with the highest risk of local stormwater flooding.

Strategic Alignment

One Calgary 2019-2022: The City will make investments in flood resiliency and improvements to river and riverbank health and collaborate with citizens and partners on flood mitigation and preparedness. Climate Resilience Plan: preparing for increasing risks of flooding, drought, and declining water supply.

2018 INTEGRATED WATERSHED MANAGEMENT UPDATE

2018 Report

Contents

1. INTRODUCTION

1.1 PLANNING FOR A HEALTHY WATERSHED

A healthy, resilient watershed provides clean, reliable water and is vital for current and future generations in Calgary and the surrounding region. The Bow River watershed, which includes the Bow and Elbow rivers, is a natural system interacting with our built environment. Activities within Calgary and upstream of our city influence river flows, river health, water quality downstream, and the many users that depend on the watershed. This interconnectedness must be considered when working together to address the impacts of city-building on watershed management. Human activities can impact the health and sustainability of our water resources as well as the ability to adapt a changing climate. Increased water demand, potential water shortages, flooding, stormwater management, and water quality issues influence each other, affecting Calgary and the surrounding region.

As the provider of drinking water and wastewater treatment to nearly one in three Albertans, The City of Calgary (The City) is dedicated to implementing the Government of Alberta's *Water for Life Strategy* through an integrated water management framework. An integrated watershed management approach helps manage the interconnection between human activities and the watershed, while considering the environment, economy and society. The City relies on this approach to protect water resources, minimize impacts on Calgary's water resources, and to ensure a resilient water future.

Working with the Province, regional partners, stakeholders and citizens, The City aims to protect the water supply, use water wisely, keep rivers healthy and build resiliency to flooding. The City's Water Utility (the Utility) delivers on this commitment through three lines of service: water treatment and supply, wastewater collection and treatment, and stormwater management.

Increased pressure on watersheds from growth in the region as well as the impacts of a changing climate make watershed management one of Calgary's most critical resiliency challenges. The Utility's commitment to watershed protection considers the needs of a growing customer base and balancing the economic, social and environmental impacts of our decisions, programs, and actions. Sustainable management and building resiliency of our shared water resources is the driving force behind an integrated watershed management approach.

1.2 OUR GOALS

The Utility's integrated watershed framework works to achieve the following goals to protect public health and the watershed:

1. **Protect our water supply** by reducing risks to our water source.
2. **Use water wisely** through responsible and efficient use.
3. **Keep our rivers healthy** by reducing impacts of city-building on the rivers.
4. **Build resiliency to flooding** through mitigation, emergency planning and building awareness.

Our integrated watershed management framework (Figure 1.1) is designed to be flexible in delivering these goals while also responding effectively to emerging issues and customer needs. We use adaptive management to evaluate progress, risks and the effectiveness of our services. This approach guides business decisions and investment planning for a sustainable watershed. This report describes the 2018 actions taken to achieve the goals, how our actions support the services we deliver to customers, and address The City's watershed challenges and priorities.

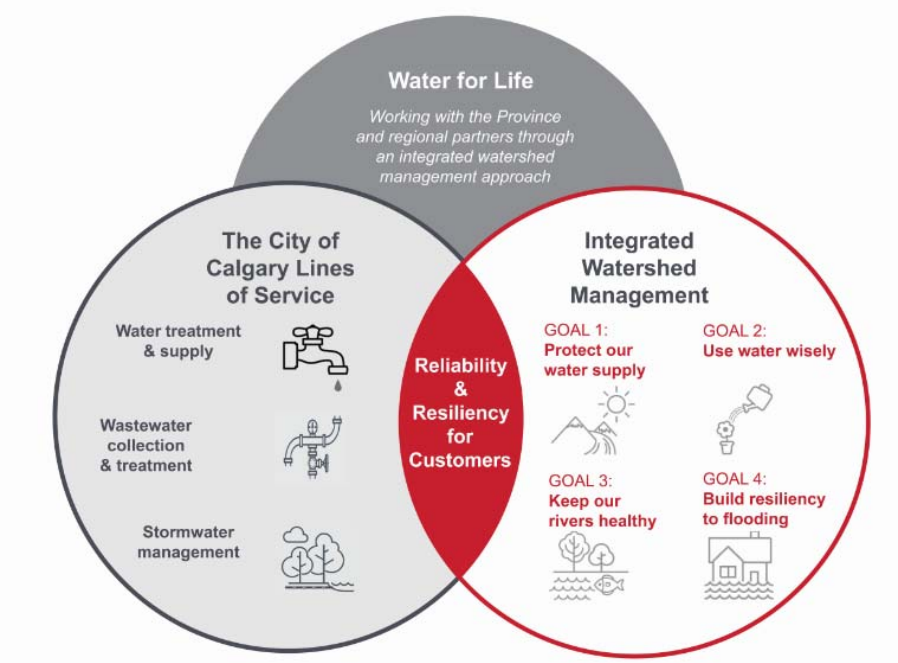


FIGURE 1.1 THE UTILITY'S INTEGRATED WATERSHED MANAGEMENT STRATEGIC FRAMEWORK

1.3 ALIGNMENT WITH CORPORATE PRIORITIES

The Water Utility's watershed management goals are aligned with One Calgary's Council Directive of **A Healthy and Green City**, and **A City of Safe and Inspiring Neighbourhoods,** which we work to achieve across the utility's three lines of services (Figure 1.2).

A Healthy and Green City: Calgary is a leader in caring about the health of the environment and promotes resilient neighbourhoods where residents connect with one another and can live active, healthy lifestyles.

- Integrated watershed management is essential to protect public health and the environment, while strengthening our resiliency to a changing climate.
- Calgary must develop our communities with a focus on achieving future water security and a sustainable water supply.
- Watershed management must be integrated into our land use policies, plans and decisions.
- Accomplishing sustainable, effective watershed management within Calgary and the region will also require working collaboratively with other orders of government, adjacent

municipalities, residents, Watershed Planning and Advisory Councils (WPACs), stakeholders, landowners, developers, businesses and the First Nations.

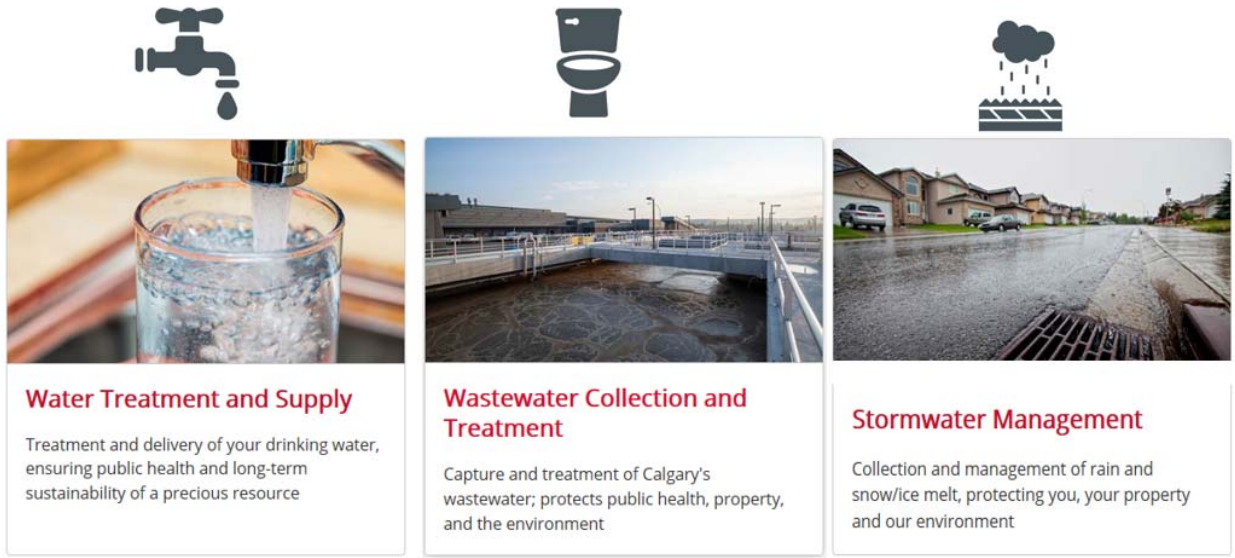


FIGURE 1.2 THE CITY ADVANCES ITS INTEGRATED WATERSHED MANAGEMENT APPROACH THROUGH THE UTILITY'S THREE LINES OF SERVICE

This work is also aligned with The City's Climate Resilience Strategy Water Management actions (preparing for increasing risks of flooding, drought and declining water supply) and programs (River Flood Mitigation and Resiliency, Stormwater Management, Long Term Water Supply) as well as the Natural Asset Management and Adaptation action to protect natural assets. The Corporate Resilience Strategy will also support watershed protection through its Infrastructure and Environment resilience themes. Examples of how The Utility's work helps achieve corporate priorities are highlighted throughout this report.

2. GOAL #1: PROTECT OUR WATER SUPPLY

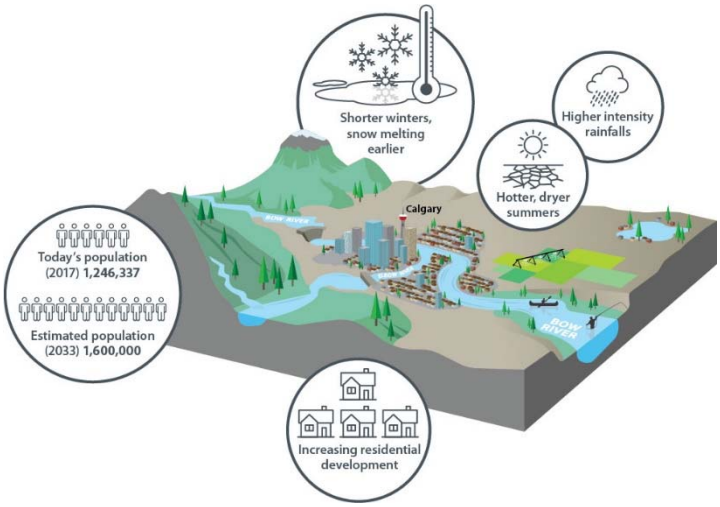


FIGURE 2.1 CALGARY'S ELBOW AND BOW WATERSHEDS

A safe and secure water supply is critical for economic and urban growth in Calgary and the region. Our watershed is prone to drought and Calgary's future water supply is limited because of climate change impacts and the provincial closure of the South Saskatchewan River Basin to new surface water licences. An integrated water supply management approach will help identify risks facing our water supply for both quality and quantity, and recommend actions to address challenges.

Watershed protection aligns with the Provincial Water for Life Strategy, South Saskatchewan Regional Plan and supports the work of the Calgary Metropolitan Region Board (CMRB) growth and servicing plans of which The City is a partner.

2.1 WATER SUPPLY MANAGEMENT

Development of a Water Security Strategy and Plan was initiated in 2018 to create a roadmap that connects various water management plans, initiatives and concepts to build water supply solutions for the future. This initiative will ensure sustainable, long-term water supplies for Calgary and the region while providing greater resiliency to drought and climate change.

FIGURE 2.2 THE BEARSPAW RESERVOIR SUPPLIES WATER FOR CALGARY AND REGIONAL CUSTOMERS

The Water Security Strategy and Plan will identify actions to achieve shared outcomes among The City, region and the Province:

- Improve water supply availability by increasing storage capacity, enhancing operational flexibility by addressing water licence diversion limits and examining the potential for water reuse options for Calgary and the region.
- Coordinate water supply and demand planning through cooperation with the Province and regional.
- Improve watershed health by protecting Calgary's source watersheds, restoring ecosystems, decreasing pollutants in our waterways and mitigating flood impacts.
- Increase public understanding of the importance of a reliable water supply for Calgary's economy and resilience.

- Increase drought and climate resilience through scenario planning and developing flexible mitigation and adaptation strategies.

The City will be reviewing and finalizing the Water Security Strategy and Plan in 2019.

2.2 CLIMATE IMPACTS ON WATER MANAGEMENT

Climate change will alter how and when we receive precipitation in Calgary's watershed, affecting both water quantity and water quality. Mountain snowpack melting may occur earlier in the year, precipitation will fall with greater intensity, and summers will become hotter, drier and longer. With increasing temperatures and drought conditions, water demands will undoubtedly increase. Increasing threat of wildfire in our source watersheds is a risk to our source water quality.

Water management practices and storage capacity for both extreme flood and drought are priorities in preparing for climate change, and we are taking action to plan for an uncertain climate future. While we can't reduce the uncertainty of the future, we can plan for a wide range of plausible future events and ensure flexibility to adjust plans and actions along the way. In 2018, we identified impacts climate change will have and the implications on water management and the Water Utility. A number of mitigation and adaptation actions were identified and incorporated into 2019 work plans.

Priorities over the next business cycle include technical analysis to support changes to how water infrastructure and programs are designed and prioritized, ongoing collaboration with stakeholders on climate adaptation initiatives, and tracking and reporting on climate adaptation progress in the Utility. These actions will be integrated into existing and planned programs and projects with actions being included in the business planning process for 2019-2022.

2.3 DROUGHT RESPONSE AND MANAGEMENT

Higher summer temperatures and below-average precipitation persisted into 2018. Flows in the Bow and Elbow rivers were below-normal from June to September. These river flows combined with high fire risk advisories required a drought response that approached the 'Advisory' phase of the Internal City of Calgary Drought Advisory Phase (Figure 2.4). While normal Water Utility operations were maintained, watershed monitoring and collaboration efforts with watershed stakeholders were increased. River flows recovered in fall 2018, however the Utility continues to prepare for future drought conditions.

FIGURE 2.4 CALGARY'S FOUR DROUGHT ACTION PHASES

In 2018, the Water Utility initiated a Drought Risk and Vulnerability Assessment. This work builds on the Climate Adaption Plan, current drought response actions and lessons learned from drought prone sectors in the US and worldwide. The risk and vulnerability assessment will underpin a larger step-wise process to identify key drought mitigation and response strategies in a Corporate Drought Management Plan that will be developed during the 2019-22 business cycle.

2.4 SOURCE WATER PROTECTION

As part of The City's source-to-tap approach to provide safe, clean drinking water, a Source Water Protection Plan was finalized in 2018 (Figure 2.3). The Plan includes a compelling vision, four key goals, and targeted priority actions to proactively protect the quality of our source water supplies.

Implementation of high priority actions in 2018 included:

1. A **Wildfire-Source Water Task Force** was set up to address the potential for wildfires in our source watershed contaminating water supplies due to runoff from burned landscapes, which has been identified as one of the biggest risks to Calgary's source water. Experts in water, land and fire management from The City, Alberta Agriculture and Forestry, Parks Canada, and academia investigated the feasibility of new tactics and tools to reduce the impact of wildfires on water resources in our watershed and development of recommendations is underway.

- A **Task Force for the Bearspaw Reservoir** was convened, including representatives from The City of Calgary, Rocky View County and TransAlta. The Task Force has made headway reaching consensus on issues, management principles, and requirements to manage the growing risks of recreational uses and other activities on and surrounding the Bearspaw Reservoir on Calgary's source water quality.

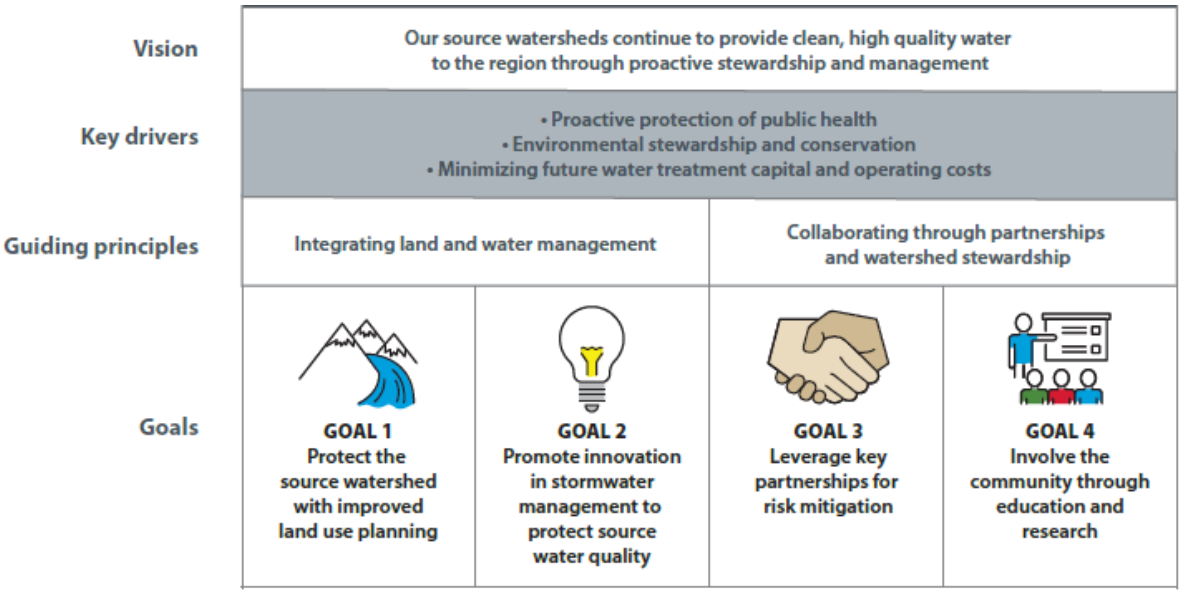


FIGURE 2.3 CALGARY'S SOURCE WATER PROTECTION PLAN

Starting in 2019, The City will initiate a watershed investment strategy to investigate mechanisms to incentivize conservation and restoration of vulnerable watershed areas, reducing potential future impacts on Calgary's source water. This is an action identified in the Source Water Protection Plan.

2.5 WATER QUALITY

The City's source-to-tap view of water quality means that as water travels from the mountains and foothills, through our water treatment plants across the city through the distribution system and to customer taps, the water is tested at every step to ensure its quality is maintained. Calgary's drinking water is safe and reliable, and meets or is better than the Guidelines for Canadian Drinking Water Quality. Monitoring results on key drinking water quality parameters can be found at www.calgary.ca/water.

FIGURE 2.5 THE CITY TESTS DRINKING WATER FROM SOURCE TO TAP

Customer commitment: *Customers receive high-quality, safe drinking water and a protected water supply for the future.*

The City of Calgary operates its water treatment and distribution system, which includes the Glenmore and Bearspaw treatment plants and a water distribution and transmission system, under the approval of the Environmental Protection and Enhancement Act. The current approval expires September 1, 2020. The City will submit an application to renew the approval for another 10 years to Alberta Environment and Parks (AEP) and will work with them to set the terms and conditions in 2019. Obtaining approval from AEP ensures that The City continues to operate its water treatment and distribution system in accordance with environmental regulations.

2.5.1 CALGARY'S SOURCE WATER QUALITY

Source water quality continues to be very good near The City's water treatment plants. Both the Bow River near the Bearspaw Dam and the Elbow River near the Glenmore Reservoir provide very high quality water supply to The City's water treatment plants. The Water Utility uses the federal Water Quality Index (WQI) to track conditions, which translates data from multiple water quality parameters into a score from 0-100, along with a descriptor (Excellent, Good, Marginal, Poor). The Bow River typically has 'Excellent' water quality, while the Elbow River typically has 'Good' water quality. Over the last decade, consistently high WQI ratings have been observed near The City's water treatment plants (Figure 2.6). Safeguarding our high quality source water provides the first line of defense in a multi-barrier approach to providing safe, clean drinking water.

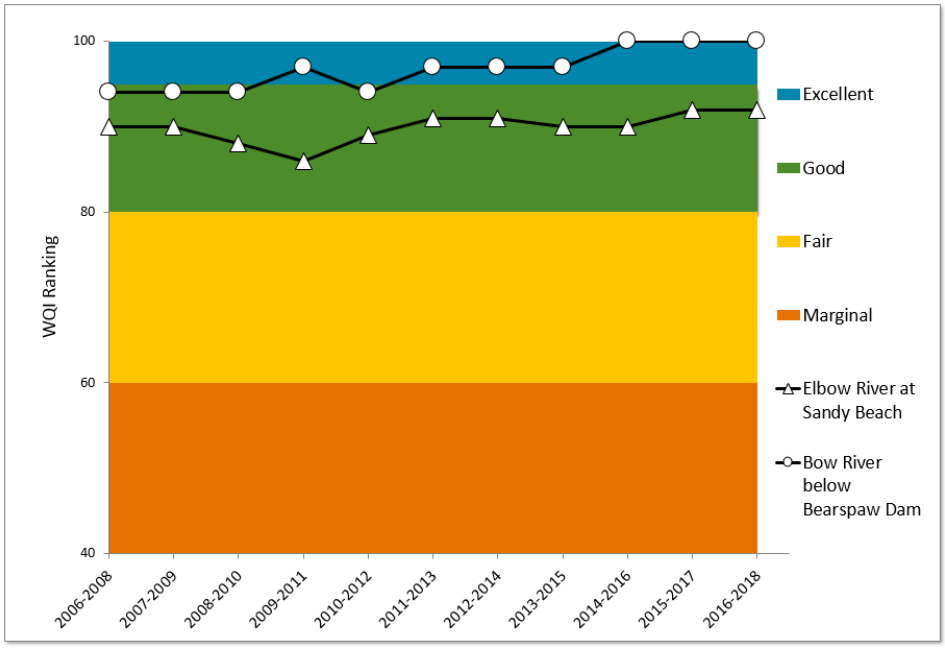


FIGURE 2.6 WATER QUALITY INDEX - CALGARY'S SOURCE WATER

2.5.2 LEAD SERVICE CONNECTION AND WATER QUALITY IMPACTS

Calgary's water quality team closely monitors drinking water daily from the river, to our treatment plants and throughout the distribution system, which delivers water to homes and businesses. Lead is not found in our source water in the Bow or Elbow rivers. Prior to 1950, lead was commonly used for water service piping. Copper and plastic pipes have since replaced lead. A service connection is the water pipe that connects from The City's water main to the piping inside residences and businesses. The service connection is on both public and private property. A lead service connection is a connection made out of lead piping.

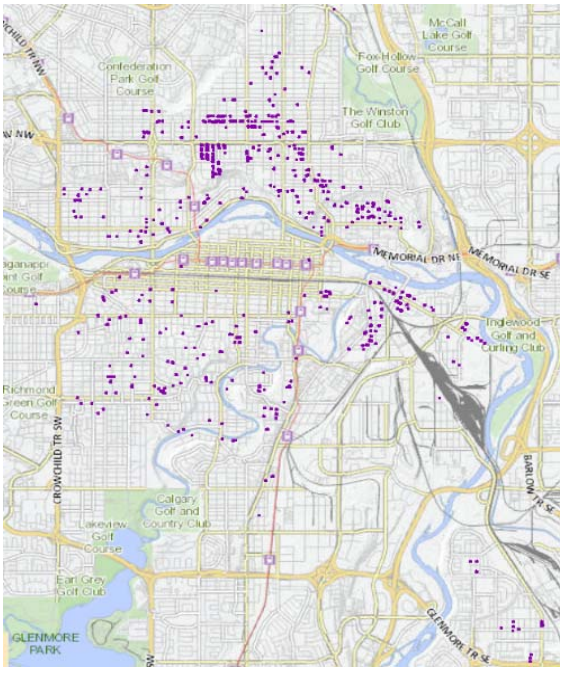


FIGURE 2.7 LEAD SERVICE PROPERTIES

The City is aware of 551 active lead service lines out of a total of 336,452 active water service lines - about 0.16 per cent of the total service count (Figure 2.7). These service lines are predominantly confined to the inner city area. For many years, The City has been managing lead through several initiatives including the Tap Water Sampling Program and Customer Rebate Program for filtration devices. Lead service connections are

typically replaced when nearby water mains are replaced, when sites are redeveloped and when determined necessary through the Tap Water Sampling Program.

Health Canada officially updated their guideline for lead in drinking water on March 8, 2019. The new guidelines will change the health risk-based maximum acceptable concentration (MAC) from 10 ug/L to 5 ug/L. The Water Utility is working closely with AEP on their policy in response to the federal change to understand the requirements and determine what adjustments are required in our long standing management program to ensure compliance.

2.6 REGIONAL COLLABORATION

Regional servicing

The City is dedicated to ensuring reliable and resilient water servicing for Calgary and its regional customers. The Water Utility provides drinking water for about one in three Albertans and has been providing water services outside of its corporate boundaries since 1961. The City continues to receive and address formal requests for extension of services outside of the Calgary's boundaries. The City retains full ownership of its water licences and has reserved roughly two percent of Calgary's annual water allocation for existing regional customers through 2022.

Calgary Metropolitan Region Board members include City of Airdrie, The City of Calgary, City of Chestermere, Town of Cochrane, Foothills County, Town of High River, Town of Okotoks, Rocky View County, Town of Strathmore and Wheatland County.

The City's new policy on Regional Water, Wastewater and Stormwater Servicing (CP2018.01) affirms that regional servicing should support fiscally responsible regional planning that balances economic and social development with environmental protection. Development of collaborative regional servicing plans need to balance the needs of all stakeholders while supporting vibrant communities. Continued growth and development in the Calgary region are highlighting the need to manage the cumulative effects on the watershed, including protecting the quality of Calgary's raw water sources. The need to protect these resources must be balanced with a strategic approach to available infrastructure capacity and future investments.

Calgary Metropolitan Region Board

The CMRB was established on January 1st, 2018 with a membership of 10 municipalities in the Calgary metropolitan region. It is mandated to promote the long-term sustainability of the Calgary Metropolitan Region, ensure environmentally responsible land-use planning and growth management, coordinate regional infrastructure investment and service delivery, and promote the economic well-being and competitiveness of the region. In 2018, the CMRB developed an Interim Growth Plan and Interim Regional Evaluation Framework (IREF) for the region. The Board is required to develop a long-term Growth Plan and Servicing Plan by January 2021. The City is working closely with the Board to ensure there is sufficient water supply, wastewater treatment and stormwater management to support current and future

The City provides water servicing to Airdrie, Chestermere, Strathmore and parts of Tsuu T'ina Nation and Foothills County. The City provides wastewater servicing to Airdrie, Chestermere, Cochrane, and parts of Tsuu T'ina Nation and Rocky View County.

regional growth and economic prosperity. This regional forum provides a further opportunity for the integrated watershed management priorities of The City to be recognized and implemented beyond Calgary's boundaries.

Bow River Working Group

The Water Utility continues to participate in the Bow River Working Group (BRWG) that made recommendations for flood and drought mitigation in the Bow River watershed in an August 2017 report to Alberta's Minister of Environment and Parks. A number of 'quick wins' were identified to improve flood and water supply resiliency in the region if implemented. Additionally, a proposed flood-focused reservoir upstream of Calgary would have short-term water supply benefits for Calgary, with three locations identified for further study. In 2018, The City advocated for implementation of the report recommendations. In 2019, the Province committed to re-engage the BRWG in its Bow Basin Water Management Options Project. This AEP project will begin the process of assessing the feasibility of three potential storage options including a new Glenbow reservoir downstream of Cochrane, a new reservoir in the Morley area, and expanding the storage capacity of the Ghost Reservoir. Given the important role upstream storage on the Bow River could play in The City's flood resilience and water supply security, The City is actively involved with this collaborative group. More on this initiative is detailed in UCS2019-0653.

2.7 PRIORITIES IN 2019

Table 2.1 summarizes activities The City plans to take to continue protecting our water supply in 2019.

Table 2.1 Goal #1: Protect Our Water Supply – 2019 focus

2019 Planned Actions
Finalize the Water Security Strategy and Plan.
Technical analysis on rainfall intensity, ongoing collaboration and engagement on climate adaptation initiatives, and pilot a Utility Climate Change Education program for Water staff.
Complete Drought Risk and Vulnerability Assessment.
Source water protection • Report on the recommendations of the Wildfire-Source Water Task Force. • Obtain Council direction on the Bearspaw Reservoir, and conduct consultations on management options. • Initiate a watershed investment strategy to investigate mechanisms to incentivize conservation and restoration of vulnerable watershed areas. • Integrate source water protection priorities in regional land use plans under development by the Calgary Metropolitan Region Board.
Work with Planning and Transportation to advance Council's Integrated Watershed Management Directive through improved policy and guidebook development in the Next 20 (MDP) update.

Continue to participate in the Bow River Working Group on the Bow Basin Water Management Options feasibility study and advocate for an upstream reservoir to manage flood and water supply.
Adjust the existing lead management program to comply with the new Health Canada Guidelines on lead.

3. GOAL #2: USE WATER WISELY

3.1 WATER EFFICIENCY PLAN

Just over a decade ago, Calgarians were using more water per person than many other cities. Our booming population and rapid economic growth placed heavy demands on our water supply, and in 2003, Calgarians were using 518 liters per person, per day, compared to the Canadian average of 335 liters per day.

Committed to using water wisely, The City developed and approved the 30-in-30 Water Efficiency Plan in 2005 and set the stage for long-term sustainable water management. Our goal is to hold withdrawals from the river steady at 2003 levels, even with population growth. To do this, the plan charted a path of programs and initiatives to reduce water consumption by 30 per cent over 30 years. We are on track to meet this goal by investing in water efficiency.

Through infrastructure investments, bylaw adjustments and water efficiency programs, we have managed to keep our water demand relatively constant, despite population growth overtime. This allows The City to defer costly infrastructure expansion and reduces stress on our rivers. (Figure 3.0)

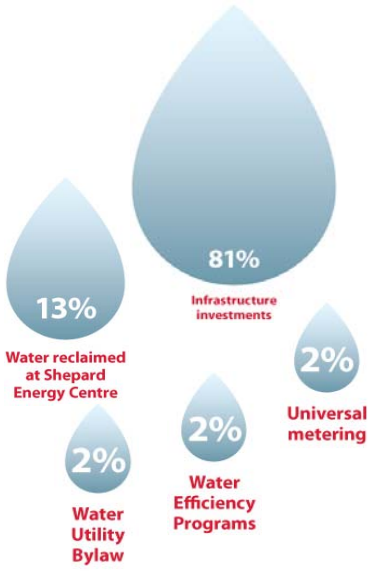


FIGURE 3.0 WATER DEMAND IN CALGARY HAS DECREASED THROUGH VARIOUS PROGRAMS AND INVESTMENTS

The City has delivered a number of programs since 2005 to encourage conservation and water savings for citizens. These programs and citizen action have contributed to keeping water demand on track to meet our Water Efficiency Plan goals and have reduced the need to upgrade infrastructure at this time. These programs have also provided customers with savings on their monthly bills through reduced water consumption.

In 2018, The City continued implementing the recommendations from the 2016 Water Efficiency Plan (WEP) update.

2018 program highlights:

- Improved water use planning and forecasting and data analysis to understand customer water use patterns (particularly high water users, business customers and Calgary Housing Corporation).
- Updated and expanded the residential water leak detection program to support high water use messaging.
- Increased focus on peak day specific messaging to reduce outdoor water use.
- Continued to deliver YardSmart program in collaboration with partner organization to reduce outdoor water use.
- Expanded Multi-family Toilet Replacement Rebate Program.
- Collaborated with Calgary Housing Corporation to reduce water use at multi-family properties.

FIGURE 3.1 WATER CONSERVATION EDUCATION BOOTH AT A COMMUNITY EVENT

In 2018, we also interacted with over 3,500 citizens sharing water conservation messages, stormwater education and watershed literacy at events such as Earth Hour, the Mayor's Environment Expo, the Calgary Home & Garden Show and other community events. The City provided public tours of the Glenmore Water Treatment Plant to 160 Calgarians throughout 2018. Citizens and youth audiences were also engaged in water conservation and watershed protection messaging through the programs and education efforts of The City's numerous watershed education partners.

3.2 CALGARY'S WATER USAGE

The 2006 Water Efficiency Plan's current "water neutral" goal is to accommodate Calgary's future population to 2033, with the same amount of water removed from our rivers in 2003. Water efficiency measures implemented by The City, as well as changes in available water efficient technology and citizen behavior change have been successful in helping remain below this benchmark of 212,500 million litres (ML) since 2003. Despite a service population increase of 25,000 people in Calgary and region in 2018, and another relatively warm and dry summer, water withdrawn from the Bow and Elbow rivers decreased slightly from 2017 (Figure 3.2).

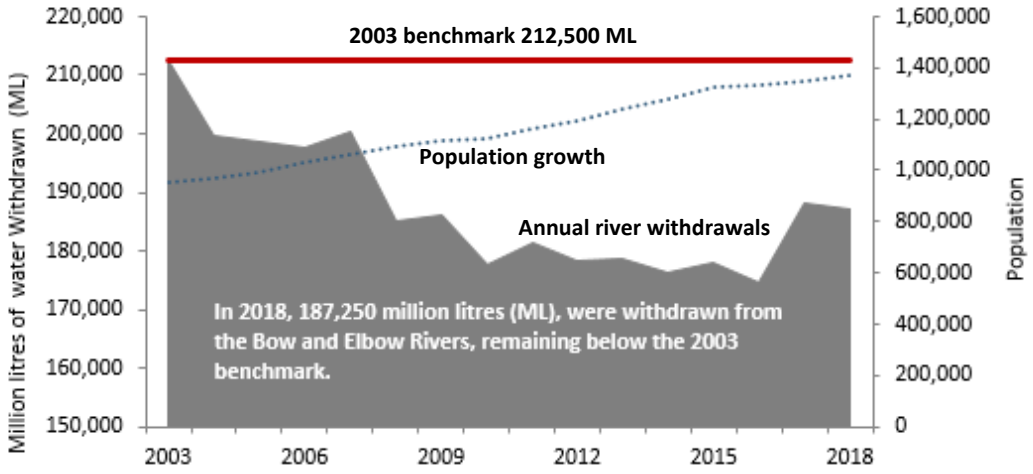


FIGURE 3.2 TOTAL ANNUAL RIVER WITHDRAWAL FROM THE BOW AND ELBOW RIVERS RELATIVE TO CALGARY'S POPULATION

3.3 CALGARY'S PER CAPITA WATER DEMAND

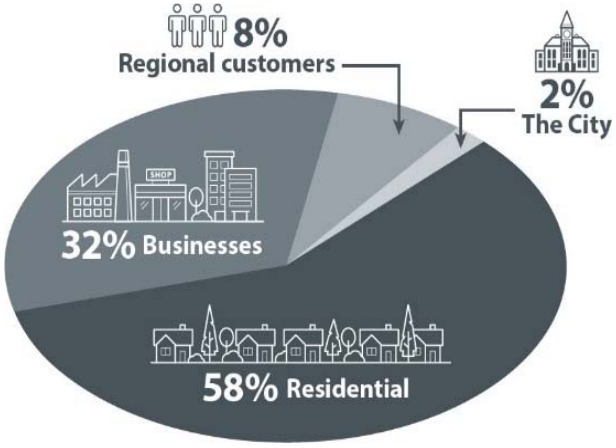


FIGURE 3.3 CALGARY'S 2018 WATER DEMAND BY CUSTOMER

Single-family and multi-family customers make up 58 per cent of Calgary's water demand, followed by business customers that comprise 32 per cent of the total water customer base (Figure 3.3).

Per capita water demand is the average volume of water used per person per day. In 2018, Calgary's overall water use, including all residential, business and municipal, was 362 litres per capita per day (lpcd). This represents a 30 per cent decrease in per capita per day use since 2003 and is well on track to meet the 2033 target of 350 lpcd (Figure 3.4).

Hot, dry summers in 2017 and 2018 contributed to an increase in per capita demand from the 2016 low, due to increased outdoor water use and water used for industrial cooling over the summer months. Single-family residential demand decreased to 210 lpcd in 2018, the lowest on record for this customer group, and meeting the corporate 2020 sustainability target for single-family residential water use of 210 lpcd.

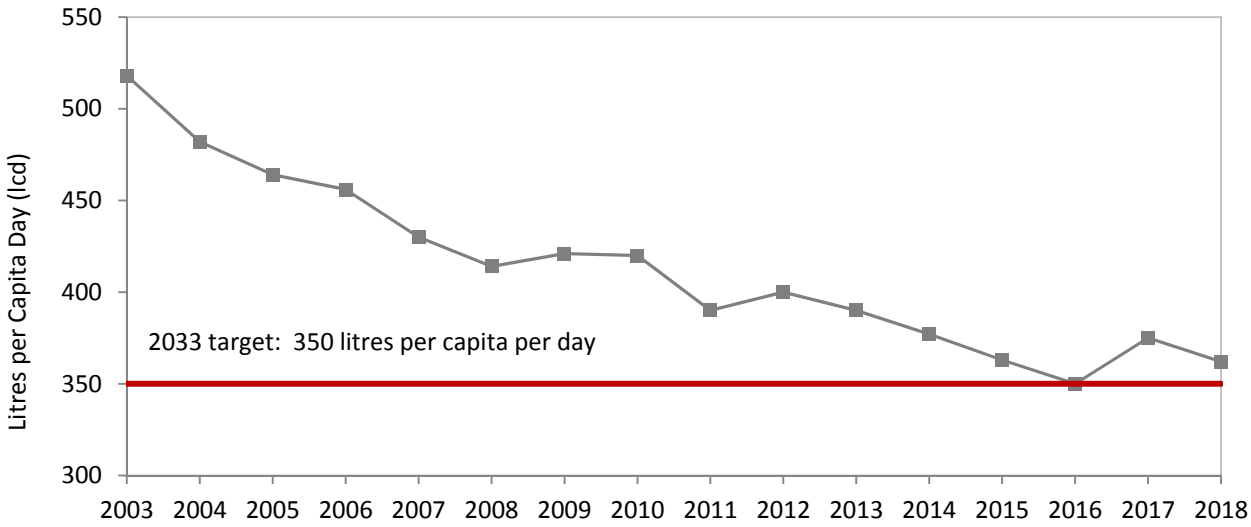


FIGURE 3.4 - CALGARY'S TOTAL PER CAPITA WATER DEMAND, 2003 - 2018

Fixing household leaks is one way to reduce per capita water demand. Our residential leak detection programming was expanded to support high water use messaging in early 2018. The original Fix a Leak program grew to include information and messaging for large-scale leaks and to communicate the unexpected effects on a monthly water bill. This led to beginning the development of a series of information modules on home water management for residential customers to make changes in their own homes and yards. This work will be completed in 2019.

Water savings of 72 million litres were achieved at multi-family properties in 2018, reducing per capita water demand. More than 860 toilets were replaced through the Multi-unit Toilet Replacement Rebate program at multi-family properties resulting in over 48 million litres of water saved in 2018. We also worked with Calgary Housing Corporation (CHC) to review water use at 10 multi-family properties. This collaboration resulted in over 24 million litres of water savings to date at a single property.

3.4 PEAK DAY DEMAND

Peak day demand is the one day each year that Calgarians use the most water. Typically, this occurs in the summer months, as water demand spikes due to increased outdoor watering and industrial cooling needs. The ability for The City to meet peak day demand means water treatment, storage and distribution infrastructure must be built to this capacity. Keeping this value low ensures that The City can continue to meet these water requirements without requiring additional infrastructure. In 2018, Calgary's peak day demand occurred on July 16, at 754 million litres which is below the 950 million litre capacity of The City's water treatment plants (Figure 3.5). This is a decrease from 2017 (762 ML) but represents one of the highest values seen since 2007.

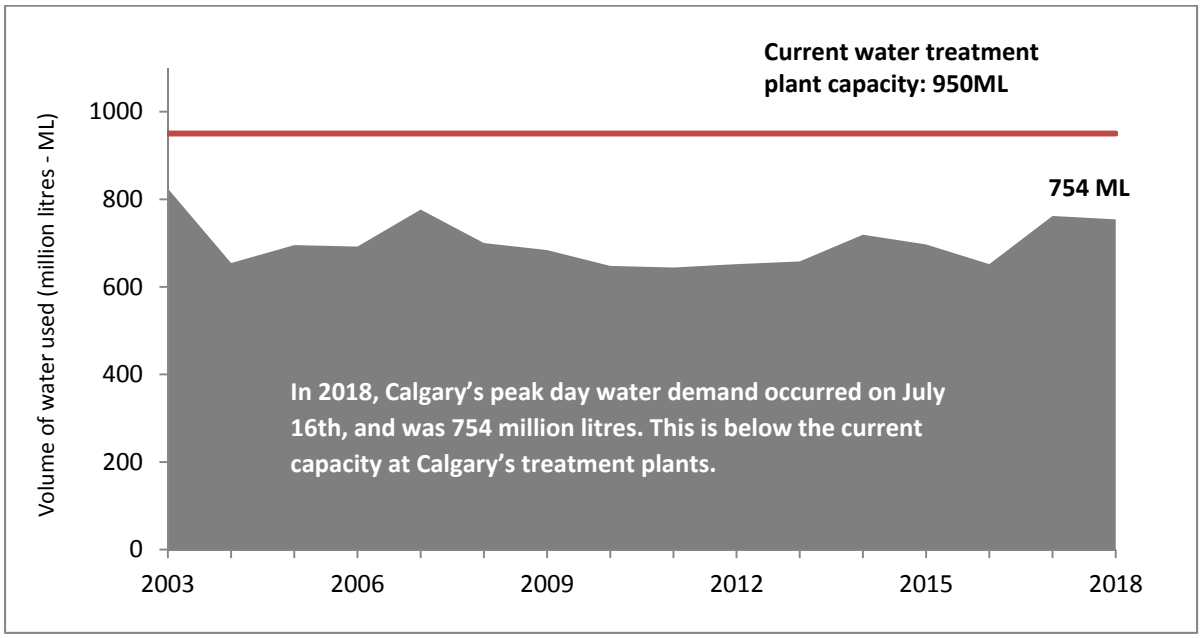


FIGURE 3.5 - PEAK DAY DEMAND – MAXIMUM VOLUME OF WATER USED IN CALGARY IN ONE DAY

Emphasis on outdoor water conservation and making low water use landscaping choices played an important role through the warm summer months in an effort to reduce peak day demand. The YardSmart program completed customer research early in 2018, and continued working with partners to deliver water wise landscape design workshops in addition to expanding its peak day specific messaging to target outdoor watering over the summer months. In 2018, the Yard Smart program reached over 5,000 Calgarians through rain barrel sales, public event booths and partner-led workshops.

3.4.1 SYSTEM LEAK DETECTION

Non-revenue water is a term used to describe water that's treated and distributed, but not billed to a customer. This includes water lost through system leakage and main breaks and water used for delivery of City services. To reduce non-revenue water loss, as well as protect property, the environment, and drinking water quality, we conduct leak detection testing on City infrastructure. In addition to addressing main breaks and other leaks that present themselves, leak detection testing is a critical part of our infrastructure maintenance program, as water from leaks in underground pipes with good soil drainage does not typically reach the surface and can go unnoticed for a long time. Leaks identified through the leak detection program are scheduled for repair. Leak detection and repair completion rates are monitored on a section-by-section basis. In 2018, City crews surveyed 50 km of water mains and identified and fixed five leaks, leading to estimated water savings of 119,000 litres per day.

3.5 PRIORITIES IN 2019

The City will continue working with customers to encourage responsible and efficient use of water. Activities planned for 2019 are summarized in Table 2.1.

Table 2.1 Goal #2: Use Water Wisely – 2019 Priorities

2019 Planned Actions
Deliver the Homeowner Water Guide series.
Deliver education to citizens about the Water Utility, leaks and high water consumption, outdoor water use and the importance of water conservation including messaging to new Canadians.
Expand peak day demand messaging to target the reduction of outdoor water use during hot, dry summer months, and continue to deliver YardSmart programming and expand program reach into new markets.
Begin work on revising Water Efficiency Plan targets and goals.
Continue aligning water efficiency, demand forecasting and infrastructure planning.
Expand programming for business and multi-family customers and continue to deliver the Multi-unit Toilet Replacement Rebate program.

4. GOAL #3: KEEP OUR RIVERS HEALTHY

The Elbow and Bow rivers supply drinking water, provide recreation, and support aquatic ecosystems within Calgary and beyond our boundaries. Goal #3 focuses on keeping the Bow and Elbow Rivers healthy through managing sediment, pollutants, and nutrients from entering the rivers. Protecting Calgary's waterways is guided by Provincial sediment management and pollutant loading objectives for the Bow River. A survey conducted by The City of Calgary in 2016 found 83 per cent of Calgarians consider Calgary's river areas important and 79 per cent supported The City investing in healthy river areas.

Reliable stormwater service provides the foundation to a healthy and green city. The Utility's stormwater line of service aims to ensure that property is protected from flooding and ensure watersheds are healthy. Our Stormwater Management Strategy is focused on mitigating the impacts that city-building has on stormwater by reducing the volume of stormwater and increasing the quality of stormwater runoff when entering the rivers. Excess nutrients, sediment, bacteria and other pollutants that enter our rivers can negatively impact fish and wildlife, the ecosystem and drinking water. We work diligently to manage these risks and protect the areas adjacent to rivers and creeks.

We are continuously working to improve the way stormwater is managed, and water's influence on city-building. Managing water quality is a major component of our alignment to the Provincial South Saskatchewan Regional Plan. This section highlights the results of these efforts in 2018 for both wastewater and stormwater management.

4.1 WASTEWATER MANAGEMENT

4.1.1 APPROVAL TO OPERATE

The City operates its three wastewater treatment plants (Bonnybrook, Pine Creek and Fish Creek) and a wastewater collection system under the Environmental Protection and Enhancement Act. A Provincial approval applies to the construction, operation and reclamation of our wastewater system. The current approval expires 2019 October 1. Obtaining this approval from the Province ensures that we continue to operate in accordance with environmental regulations. Discussions with the Province are underway to establish the terms and conditions of the renewed approval.

4.1.2 WASTEWATER TREATMENT PLANTS

In 2018, The City's wastewater treatment plants continued to produce treated effluent compliant with Provincial regulations. Major upgrades to the Bonnybrook Wastewater Treatment Plant are ongoing to ensure continued compliance with regulatory requirements and support population growth (Figure 4.1). In 2018, the Major Electrical Upgrades Project was completed, increasing infrastructure resiliency and electrical capacity to accommodate future growth.

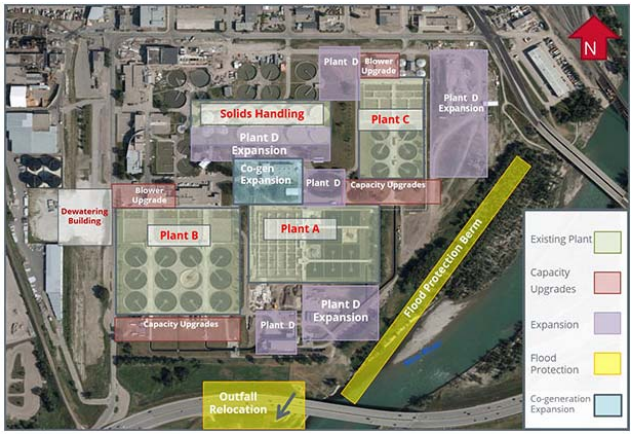


FIGURE 4.1 KEY PROJECT AREAS FOR BONNYBROOK UPGRADES

Four new secondary clarifiers and an upgraded sludge digester were commissioned to increase both liquid and solid stream treatment capacity at Bonnybrook. Construction of the Plant D Secondary Treatment project began in the summer of 2018 and is progressing well. This project will increase treatment capacity of the plant by 20 per cent when it becomes operational in 2021.

Significant progress was also made on the construction of the Bonnybrook flood protection barrier in 2018. The barrier will provide flood protection for the critical wastewater treatment infrastructure at the plant. In 2019 a design study for upgrades at the Fish Creek Wastewater Treatment Plant will be initiated. The primary objective of this study is to evaluate and select a technology for treating ammonia to meet the Federal Wastewater Systems Effluent Regulations and treat peak wet weather flows.

Customer commitment: *wastewater from toilets, sinks and drains is collected from homes and businesses, treated, and returned to the river.*

4.1.3 WASTEWATER BUSINESS CUSTOMERS

Some industrial, commercial, and institutional (ICI) establishments produce wastewater that may have a higher concentration and contain different contaminants that cause it to exceed wastewater quality guidelines – this is called high-strength wastewater. The City's Wastewater Loading Management Program aims to improve management of high-strength wastewater from ICI customers, as this wastewater is technically challenging and expensive to manage and treat.

FIGURE 4.2 PINE CREEK WASTEWATER TREATMENT PLANT

The program identifies and implements cost-effective, resource efficient, reliable and equitable strategies that meet customers' needs for wastewater load management while at the same time contributing to optimal use of existing wastewater treatment plant capacity. The City continued to advance the program in 2018 by increasing its high-strength wastewater sampling and monitoring, and investigate opportunities to build on the program in 2019.

4.2 TOTAL LOADING MANAGEMENT

When pollutants are introduced into the waterways, water quality and river health can be impacted. Pollutants can also cause maintenance issues for The City's wastewater and stormwater infrastructure. The City's TLMP identifies total suspended solids (TSS) and total phosphorus (TP) as the key parameters that require management to mitigate environmental impact to Calgary's watershed. The City's Total Loading Management Plan (TLMP) aims to ensure that pollutant loadings to the Bow River remain below certain levels by guiding future stormwater and wastewater control practices and infrastructure decisions.

4.2.1 TOTAL SUSPENDED SOLIDS IN THE BOW RIVER

Stormwater and treated wastewater contain total suspended solids, which include organic and inorganic materials. These materials enter our waterways and can impact water quality and aquatic habitat. Figure 4.3 shows that The City has remained under the Provincial objective for TSS loadings into the river from stormwater and wastewater sources.

Urban runoff from stormwater contributes a significantly higher proportion of total suspended solids to the Bow River compared to wastewater effluent. The City's Stormwater Management Strategy's goal is to maintain TSS loadings from stormwater in the Bow River at or below 2005 levels, even as the city and region grow. In 2018, estimated TSS loadings from stormwater to the Bow River were 39,918 kg/day, which is below the 2005 benchmark and well within the Province's TSS objective of 52,920 kg/day.

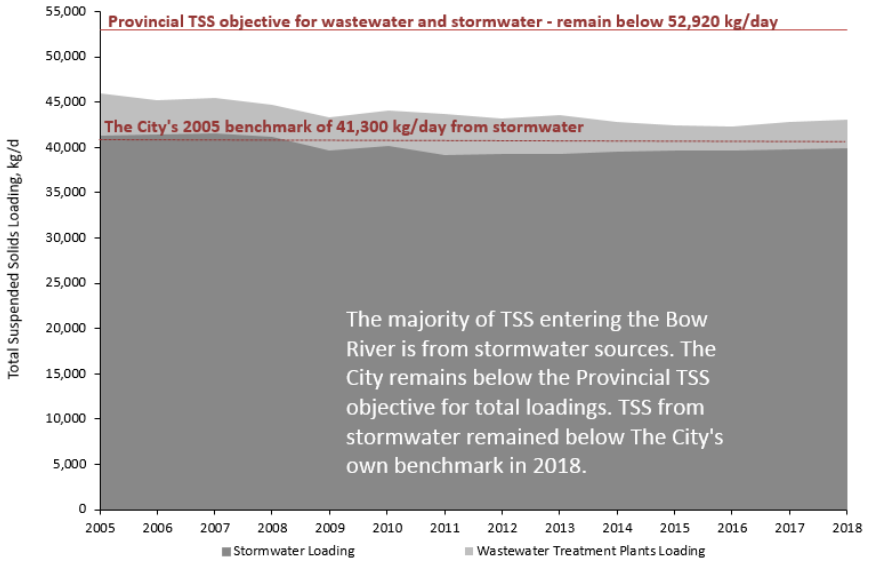


FIGURE 4.3 TOTAL SUSPENDED SOLIDS (TSS) LOADING TO THE BOW RIVER FROM STORMWATER AND WASTEWATER

4.2.2 PHOSPHORUS IN THE BOW RIVER

Impacts to fish and other aquatic life can occur when there is excess phosphorus in the waterways. Too much phosphorus can cause accelerated plant growth, algae blooms and low dissolved oxygen which is detrimental to aquatic life. The City's TLMP has a total loading objective for Total Phosphorus (TP) to ensure Calgary's aquatic habitats remain healthy and safe. The primary source of TP entering the Bow River in Calgary is from treated wastewater effluent, with the remaining amount contributed by stormwater. Figure 4.4 shows the reported amount of TP entering the river from both stormwater and wastewater to be below the Provincial objectives in 2018. Treated wastewater contributes more than double the amount of TP to the Bow River compared with stormwater sources.

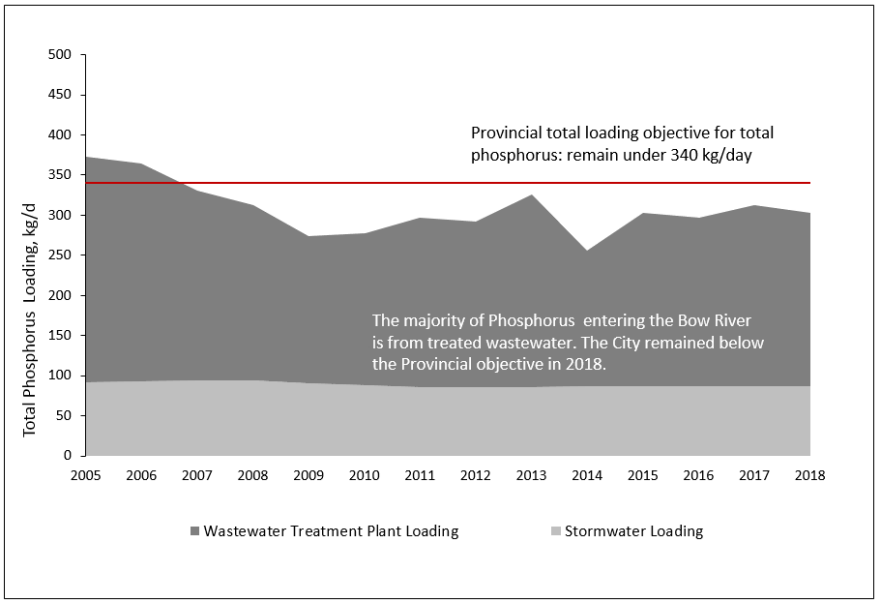


FIGURE 4.4 TOTAL PHOSOPHORUS LOADINGS TO THE BOW RIVER FROM STORMWATER AND TREATED WASTEWATER

4.3 STORMWATER MANAGEMENT

When it rains on urban landscapes, impervious surfaces like buildings, parking lots, driveways, and roads prevent the water from soaking into the ground. When water can't be absorbed through the surface, it creates runoff along our roads and into our stormwater system. Along the way, it picks up pollutants. The ultimate goal of stormwater management is to maintain the health of our watershed by mitigating the effects of city-building. The Water Utility strives to do this by working with the building industry to manage the volume, quality, and flow rates of stormwater. This helps reduce the risk of flooding, maintain healthy riparian areas, and protect water quality.

The Water Utility collects and manages stormwater, water from rain or snow/ice melt, by moving it through storm drains, pipes and ponds. Parts of Calgary's stormwater system is designed to limit the sediment going into the river, ensuring healthy rivers and river banks, which allows the quality of the rivers to be maintained for Calgarians and downstream users.

Stormwater retention ponds are extremely effective in managing sediment. As well, wetlands, stormwater quality retrofits and green stormwater infrastructure projects are effective in contributing to reducing TSS loadings to Calgary's rivers and streams.

4.3.1 STORMWATER MANAGEMENT STRATEGY UPDATE

Stormwater management is a key consideration in building Calgary's vibrant, safe and resilient communities. The City's stormwater management system has benefitted from investments put in place over the last decade or so, including innovative stormwater quality retrofits, the Community Drainage Improvement Program (CDI), and green stormwater infrastructure. These and other stormwater and land management practices have helped manage impacts of a growing city.

As The City's understanding of stormwater impacts and best practices has improved and the impacts of climate change increase, an update of the 2005 Stormwater Management Strategy is required. A refined strategy will align The City's customer-centric focus with our integrated watershed management approach to guide future investments and practices in stormwater management.

To inform this update, The City began engagement with internal and external stakeholders including businesses, the building industry, non-government agencies, academia, regional municipalities, regulators and customers in fall 2018. The process focused on increasing understanding stakeholder values and perspectives, and building a stronger understanding of stormwater management challenges and opportunities for Calgary. The second phase of engagement will work with stakeholders to identify short, medium and long-term actions that will help enhance how stormwater is managed in the future. The input from stakeholders will inform The City as it considers technical expertise, best management practices, and a Triple Bottom Line analyses to update the Stormwater

Customer commitment: *stormwater from rain and melting snow is collected and diverted, reducing flooding. Stormponds and green infrastructure remove pollutants and return water to water bodies.*

Management Strategy. The Strategy will also align with other corporate strategies and policies such as the updated Municipal Development Plan, The City's Climate Resilience Strategy, and the Corporate Resilience Strategy.

4.3.2 STORMWATER QUALITY RETROFIT INVESTMENTS

FIGURE 4.6 BOWMONT PARK - STORMWATER ENTERS THE PARK THROUGH THIS CIRCULAR NAUTILUS POND™, WHERE SEDIMENT PARTICLES ARE PREVENTED FROM ENTERING THE BOW RIVER.

The City constructs stormwater quality retrofit projects such as wet ponds or constructed wetlands across the city. These projects improve the quality of water by removing solids and other pollutants before it enters our rivers. The Bowmont East Stormwater Quality Retrofit pond in Dale Hodges Park became operational in 2018. The project reduces the amount of sediment entering the Bow River from this stormwater catchment in NW Calgary by approximately 50 per cent (Figure 4.6).

The Riverbend Trunk pond is being constructed to accommodate increased road runoff, facilitate future development, manage flows and provide stormwater treatment for industrial areas, which to date have not received treatment. Design of this facility was completed in 2018, with construction completion scheduled for 2019.

The oil-grit separator portion of the 37th Street Stormwater Quality Project was completed in 2018. This project will provide stormwater treatment for a currently untreated area. It will improve water quality in the environmentally sensitive Weaselhead Flats and the Glenmore Reservoir, which provides Calgary's drinking water.

4.3.3 STORMWATER PONDS

Calgary's stormwater drainage system contains over 300 wet and dry storage ponds. These ponds reduce the amount of sediment and other pollutants entering our rivers. They also provide flood mitigation by holding stormwater and releasing it slowly back into the stormwater system, reducing peak flows. The City's Pond Condition Assessment Program wrapped up in 2018, with approximately 26 per cent of wet ponds and wetlands analyzed since 2015.

FIGURE 4.7 SAFETY SIGNAGE AT A STORM POND

The program identified the need for regular maintenance to ensure that the ponds are operating effectively. The program also identified five wet ponds that require structural modifications to function properly, meet regulatory requirements and ensure safety standards are met. In 2018, effort continued on two wet ponds to define options for modifications and improvements. This work is continuing in 2019 with work on the additional three

ponds expected to be phased over the 2019-2022 business cycle. These projects include design, construction, maintenance and addressing operational challenges such as algae growth.

4.3.4 GREEN STORMWATER INFRASTRUCTURE

Green stormwater infrastructure (GSI), also known as low impact development, uses natural processes to treat stormwater and allows water to be absorbed and filtered by soil and vegetation. GSI is an opportunity, in conjunction with Calgary's existing stormwater management infrastructure, to improve Calgary's ability to adapt to climate change and increase resiliency to stormwater flooding. The Water Utility is aligning its natural and green stormwater infrastructure work with the Corporate Resilience Strategy.

FIGURE 4.8 GSI USES NATURAL PROCESSES TO TREAT STORMWATER

Initial stakeholder engagement on the update of the Stormwater Management Strategy indicated strong support for advancing GSI in Calgary. Water Resources supports research activities associated with bioretention, resilient landscaping and stormwater capture and use.

Over the last several years, The Water Utility has collaborated on or supported the installation of many GSI projects and pilots across Calgary, including the Mountview-Winston Heights and Bridgeland rain gardens, Water Centre soil cells and permeable pavement pilots. The most recent examples include rain gardens in Oakridge and bioswales in Lincoln Park. We continue to maintain and learn from the older installations and are monitoring some of them in collaboration with the Alberta Low Impact Development Partnership.

4.3.5 GRAVEL LANE SEDIMENT ABATEMENT STUDY

A recent study shows that gravel surfaced lanes are disproportionately large sources of stormwater pollution in Calgary. It's estimated they generate up to 11 per cent of total sediment (TSS) loadings in our waterways but compromise only 1.4 per cent of Calgary's land area. The City is undertaking a collaborative pilot study between the Water Utility and Transportation Department, along with other City stakeholders on various approaches to reduce gravel lane sediment generation. Phase I will evaluate gravel lanes and alternatives, identify pilot sites, collect baseline data and develop a preliminary action plan, designs and cost estimates. Phase 2 includes the implementation pilot designs at three locations and monitoring the effectiveness with respect to TSS reduction.

4.3.6 EROSION AND SEDIMENT CONTROL

Construction activity in Calgary exposes highly erosive subsoil, which is easily transported away by wind and water. In 2018, to protect the watershed and storm infrastructure from the impacts of construction site sediment, City staff reviewed 601 Erosion and Sediment Control (ESC) Plan applications resulting in the approval of 289 ESC Plans which are expected to reduce soil loss from those construction sites by 26,252 tonnes per year while construction is occurring. Soil losses then generally decrease once sites are stabilized with natural vegetation, buildings, roads, etc. During 2018, there were a total of 840 construction sites in Calgary with an active approved ESC Plan. City staff performed 305 inspections at 168 of those sites.

FIGURE 4.9 EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION HELPS PROTECT THE WATERSHED AND STORM INFRASTRUCTURE.

Customer service improvements for the year included rollout of the 2017 City of Calgary ESC Guidelines, and creation of Standard Specifications for ESC. The revised Guidelines now include technical education components and examples of drawings while the specifications house the technical requirements to be used during both the ESC Plan preparation and field implementation phases. Both documents support our development customers to more easily navigate ESC in Calgary. These revisions and new documents came into effect fully on July 1, 2018.

4.4 RIPARIAN ACTION PROGRAM

Riparian zones are the areas of land along the edges of rivers, creeks, and other waterbodies. The City's Riparian Action Program (RAP) delivers on the Municipal Development Plan's (MDP) goal of greening the city and MDP objectives related to green infrastructure, watershed protection and ecological networks. Protection and management of riparian areas aligns to the Natural Infrastructure pillar of Corporate Resilience and to the Corporate Climate Strategy and complements the Flood Mitigation and Resiliency Program. The RAP was developed to implement a comprehensive and coordinated approach to protect riparian areas in Calgary and contains three specific program areas: (i) Riparian Health Restoration and Monitoring, (ii) Riparian Land Use Planning and (iii) Outreach and Education. The sections below summarize the activities conducted in 2018 to support the goals and objectives of the RAP.

FIGURE 4.10 RESTORATION OF A RIPARIAN AREA ON THE ELBOW RIVER

4.4.1 RIPARIAN HEALTH RESTORATION

In 2018, The City continued its efforts to improve and restore riparian areas through bioengineering and riparian planting projects along major rivers and creeks. Bioengineering is an approach to river bank engineering that incorporates living plant materials in combination with natural and synthetic support materials for slope stabilization and erosion reduction. Riparian planting projects consist of site-specific practices using native vegetation with deep-rooted plants that stabilize the riparian area. Restoration projects lead to a more resilient riparian ecosystem able to provide protection against floods, erosion and improve water quality.

The City has implemented over 100 riparian restoration projects since 2007 including bioengineering and riparian planting projects. These projects are part of a strategic and collaborative approach between City business units, external partnerships and the community to improve riparian health. In 2018, The City designed or completed approximately 25 restoration projects.

4.4.2 RIPARIAN AREAS AND AQUATIC HABITAT

In 2018, The City continued to advance its Fish Habitat Compensation Program. This program prioritizes key projects to offset the loss of fish habitat caused by 2013 flood recovery projects. The Quarry Park Fish Habitat Project was completed, receiving public support in demonstrating improvements to aquatic habitat (Figure 4.11). The Bowmont West Fish Habitat Project was substantially completed in 2018, with final plantings and a formal reconnection of the newly constructed channel to the river planned for spring 2019. The Elbow Island Fish Habitat Project will begin construction in summer 2019. . The Inglewood Bird Sanctuary Reconnection Project also kicked off in 2018 and is moving forward to regulatory approvals. This project will improve water quality, reduce water level fluctuations in the lagoon and improve fish habitat.

FIGURE 4.11 QUARRY PARK FISH HABITAT IMPROVEMENTS

AEP and The City of Calgary partnership project - the Bioengineering Demonstration and Education Project (BDEP) – began construction in March 2018 and will be completed in the spring of 2019 (Figure 4.12). The design and education features make the project a national and global site for its innovative bioengineering techniques and treatments. Other bioengineering education initiatives being implemented in 2019 include the installation of interpretive signage, a BDEP website, and pilot education programs with Calgary Parks and Trout Unlimited.

FIGURE 4.12 THE BIOENGINEERING DEMONSTRATION AND EDUCATION PROJECT SITE 1 BEFORE (LEFT) AND AFTER (RIGHT). (PHOTO CREDIT (RIGHT): KERR WOOD LEIDAL)

4.4.3 MONITORING RIPARIAN HEALTH

Monitoring of riparian areas is one of the key actions of the RAP to measure the improvement of riparian health over time. The 2026 City-wide riparian restoration target is an average riparian health score of 72 per cent. The City of Calgary initiated a 5-year Riparian Monitoring Program in 2017, and field monitoring work started in 2018.

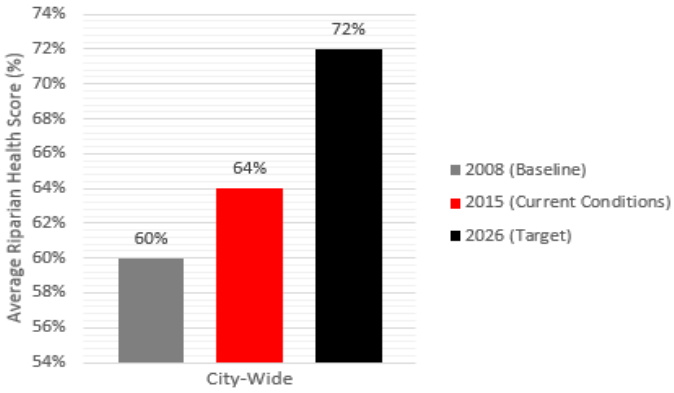


FIGURE 4.13 AVERAGE CITY WIDE RIPARIAN HEALTH SCORE

Over 90 Riparian Health Inventory (RHI) sites will be monitored to identify healthy areas and to flag areas where action is needed to improve health. In 2018, the first six RHIs were conducted encompassing approximately 50 hectares of riparian habitat. Additional sites will be monitored in subsequent years, and a comprehensive analysis will be done in 2022, the final year of the Program.

FIGURE 4.14 AN EXAMPLE OF A SUCCESSFUL BANK RESTORATION SITE ALONG THE ELBOW RIVER

In addition to the RHI, the Utility also examined the effectiveness of 19 bank restoration projects and 15 riparian planting projects in 2018. In total, fifty-five bank restoration sites and 30 riparian planting projects will be monitored to assess effectiveness of restoration efforts over the five-year program.

4.4.4 EDUCATION AND OUTREACH

In 2018, new partnerships were established to advance the Riparian Outreach and Education program. The RiverWatch River Ambassador Program engaged 4,087 pathway users in river awareness conversations and took 542 citizens on interpretive floats down the Bow River. This program will be offered again in 2019. Volunteers planted nearly 1,300 native plants and shrubs during restoration projects on the Bow and Elbow Rivers, and citizens learned about the importance of healthy riparian areas through workshops and presentations. A new Healthy Rivers Story Map was also completed, providing Calgarians with a digital connection to our rivers and the opportunity to learn about the importance of Calgary's watersheds, rivers and riparian areas.

FIGURE 4.15 RIVER AMBASSADORS AT THEIR POP-UP BOOTH (LEFT) AND ON THE RIVER (RIGHT) (PHOTO CREDIT: RIVERWATCH)

4.4.5 RIPARIAN LAND USE PLANNING

In 2018, comprehensive mapping of Calgary's non-permanent streams was completed. These streams are an important stormwater management feature, and contribute to healthy riparian areas. About 64% of these important watershed features have been lost to development in Calgary over the last 100 years. Research to improve our understanding of these complex systems in an urban context has also been completed in cooperation with the University of Calgary. Improving the protection of Calgary's waterways and riparian corridors – including non-permanent streams – will be a key focus of the next business cycle.

4.5 WATERSHED MANAGEMENT PARTNERSHIPS

The City supports regional partners, stakeholders and watershed groups on many watershed planning initiatives. City Council has endorsed three watershed management plans: the Bow Basin Watershed Management Plan (2008), the Elbow River Watershed Management Plan (2008) and the Nose Creek Watershed Water Management Plan (2007). Collectively, these watershed management plans and partnerships provide important frameworks and support actions to improve watershed health.

Nose Creek Watershed Management Partnership
The Nose Creek watershed is one of Calgary's most sensitive watersheds and it continues to experience significant land development pressures. In 2007, Council approved the original Nose Creek Watershed Management Plan, which provides a framework balancing urban development with watershed protection. In 2018, the Nose Creek Partnership completed their review and update of the original Nose Creek Watershed Management Plan. Recommendations in the updated Plan include actions to improve stormwater management and water quality, retain riparian areas and wetlands in urbanizing areas and preserve biodiversity in the watershed. Member municipalities (City of Airdrie, Rocky View County and The City of Calgary) are currently working through their respective approval processes which will be completed in 2019.

Elbow River Watershed Management Partnership
With development and other changes and pressures on the watershed, the 2009 Elbow River Watershed Management Plan is due for an update. An Elbow River State of the Watershed Report will provide the basis for the development of an updated Plan. The Report will provide a snapshot of current conditions of the watershed including natural resources, human activities, environmental data, knowledge gaps and stakeholder concerns. The Elbow River Watershed Partnership has completed phase 1 of the Report by engaging stakeholders and experts to develop the terms of the Report. In 2019, the project plan will be finalized and a project team, stakeholders, volunteers and contractors will be assembled.

When updated, the Elbow River Watershed Management Plan will identify watershed issues and provide recommendations so that stakeholders can make informed decisions to protect, restore and maintain watershed health. The City will continue to provide funding, data and subject matter expertise and have representation on the project team (both technical and steering committees).

4.6 WATER REUSE

The City continues to work with our internal and external partners on re-using rainwater and stormwater. This program enables rainwater and stormwater reuse for internal plumbing and irrigation. In 2018, we applied draft standards to projects to enable water reuse to proceed in a safe and cost-effective manner. This ensures that proposed reuse systems are effective at managing risks associated with public health, environmental protection and prevent cross contamination into The City's water infrastructure. The City continues to work closely with the Province as they continue to develop Provincial policy and guidelines on water reuse.

4.7 WATERSHED HEALTH INDICATORS

We are currently in the process of strengthening The City's urban watershed health indicators to more accurately reflect the status of our watershed resources and provide an accurate evaluation of watershed health. A new system of indicators will build on our existing watershed monitoring programs, while balancing scientific defensibility, policy relevance and simplicity of communication. The City has partnered with researchers at the Southern Alberta Institute of Technology (SAIT) to review our existing monitoring programs with local and international expertise. This ongoing research will ultimately lead to a robust system of watershed health indicators for Calgary, enhancing our ability to make informed and integrated decisions about sustainability at the science-policy interface.

FIGURE 4.16 NEW INDICATORS WILL IMPROVE OUR KNOWLEDGE OF WATERSHED HEALTH

4.8 PRIORITIES FOR 2019

To continue reducing the impacts on the watershed and keeping our rivers healthy, The City's focus areas for 2019 are summarized in Table 4.2.

Table 4.2 Goal #3: Keep Our Rivers Healthy – 2019 focus

2019 Planned Actions
Continue to negotiate with AEP on The City's Approval to Operate wastewater treatment plants and continue major upgrades of Bonnybrook Wastewater Treatment plant.
Initiate a design study for upgrades at the Fish Creek Wastewater Treatment Plant to select a technology for treating ammonia.
Continue stakeholder engagement to inform an update of The City's Stormwater Management Strategy.
Continue to invest in Stormwater Quality Retrofit projects: Design South Highfield stormwater quality retrofit pond to reduce pollutants from this industrial area. Start construction of the Bebo Grove Storm Pond and diversion trunk in the Woodland-Woodbine neighbourhood.
Continue to implement riparian restoration projects and strengthen partnerships with City business units based on a collaborative approach.

Continue to implement the Riparian Monitoring Program to measure riparian health over time and understand the effectiveness of restoration practices. Initiate monitoring work for the Bioengineering Demonstration Project as part of the Riparian Monitoring Program
Final plantings and a formal reconnection of the newly constructed channel to the river for the Bowmont West Fish Habitat Project planned for spring 2019.
Deliver an expert workshop and related research to refine the approach to Watershed Health Indicators, to inform the development of a robust system of watershed health indicators for Calgary.

5. GOAL #4: BUILD RESILIENCY TO FLOODING

5.1 RIVER FLOOD MITIGATION AND RESILIENCE PROGRAM

As of 2018, the Water Utility's focus is now on implementing its Flood Resilience Plan that was approved by City Council in 2017. The plan includes a number of projects that, in conjunction with efforts by the Province and the federal government, serves as the path to a flood Corporate Resilience. The plan is part of our integrated approach to watershed management and remains a top priority under One Calgary. As the Water Utility works to implement community flood mitigation measures, it is committed to listen to and engage with flood-affected communities to gather their input and ensure any potential trade-offs are understood before any major projects proceed.

FIGURE 5.1 FLOOD MITIGATION IS A TOP PRIORITY FOR CITY COUNCIL

The City continues to implement the 27 recommendations made by an independent Flood Expert Management Panel as directed by Council in 2014. Currently, all of the recommendations are either complete or underway. The remaining recommendations still underway continue in alignment with or as part of other initiatives within The City of Calgary, such as the development of the Corporate Resilience Strategy.

The Province announced an additional $15M in funding through the Alberta Community Resilience Program for flood mitigation projects on 2018 May 1. Funding awarded in 2018 includes funds to support construction of the Downtown flood barrier, as well as the Upper Plateau Separation, which will mitigate significant local and river flood risk for the community of Sunnyside, and building resiliency in the replacement of the 9th Avenue bridge. Additional funding was announced 2019 March 6 for the both projects. As of 2019, the total funds received by The City of Calgary is approximately $69.1M, in support of 13 projects. The City completed five of the 13 projects in 2018, and the remaining eight projects are underway.

The City continues to work closely with the Province to advocate for and provide technical support for timely construction of upstream flood mitigation for Calgary. This includes supporting the Springbank Off-Stream Reservoir (SR1) project and participating on the Technical Advisory Committee for the Environmental Assessment of SR1 currently being undertaken by Canada Environmental Assessment

Agency. The City is also The City of Calgary is supportive of the completion of a Provincial feasibility study for upstream reservoir options on the Bow River and continues to collaborate with the Province through the Bow River Working Group.

5.2 LOCALIZED FLOODING AND THE COMMUNITY DRAINAGE IMPROVEMENT PROGRAM

Local stormwater flooding occurs in communities when drainage infrastructure cannot manage the volume of stormwater resulting from rain, or snow and ice melt. Localized flooding can also occur due to a restriction in the underground system or a surface grading issue. The City organizes response strategies to mitigate these extreme events and the Community Drainage Improvements (CDI) program invests in stormwater infrastructure improvements with a focus on established communities with the highest risk of local stormwater flooding.

The CDI program prioritizes projects based on flood risk, potential impacts to the community and the cost-effectiveness of the proposed infrastructure upgrades. Investment decisions under CDI are evaluated based on which projects provide the greatest benefits to customers and communities. This is measured based on reduction of damages caused by local flooding as well as social, economic and environmental impacts.

Starting in 2019 with the community of Renfrew, The City will be using an integrated stormwater management approach to complement its existing CDI approach. Rather than solely focusing on infrastructure investments to reduce stormwater flooding, the integrated stormwater management studies will focus on improving stormwater management with focus on improving flood control, reducing water quality impacts, future redevelopment and densification considerations, considering climate change impacts, enhancing asset management, and identifying green stormwater infrastructure opportunities. The study is anticipated to be completed in spring 2019.

The City also continued the Lot Drainage Improvement Project in 2018. The project focuses on understanding the extent and nature of residential lot drainage issues, developed content for a guide to lot drainage for property owners highlighting roles, responsibilities, tools, and techniques to improve drainage on private properties, and identify opportunities to provide education to relevant stakeholders. The project will clarify roles and responsibilities and include changes to the lot grading process and technical requirements to better support developers and builders in providing positive drainage at the time of construction completion. The City plans to complete a residential Guide to Lot Drainage and present potential revisions to the Lot Grading Bylaw in 2019.

A comprehensive update on river and stormwater flooding efforts undertaken by The City can be found in the 2018 Flood Resiliency and Mitigation Annual Update (UCS2019-0653).

5.3 PRIORITIES FOR 2019

In 2019, The City will continue to build resiliency to river flooding and implement actions to reduce stormwater flooding, as summarized in Table 5.1.

Table 5.1 Goal #4: Build Resiliency to Flooding – 2019 focus

2019 Planned Actions
Continue to build resiliency through delivery of key flood mitigation infrastructure, connecting with flood-affected community members on potential flood mitigation projects and reviewing The City's flood-related policies.
Advocate with the Province on the need for upstream mitigation, funding of flood mitigation projects and continuation of the TransAlta agreement.
Support delivery of the Community Drainage Improvement program and work on implementing integrated stormwater management initiatives within CDI and other drainage programs.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0653

2018 Flood Resiliency and Mitigation Annual Update

EXECUTIVE SUMMARY

This report summarizes developments related to The City of Calgary's Flood Mitigation program and provincial upstream mitigation in 2018. As of 2019 May, all the Expert Management Panel on Flood Mitigation recommendations (PFC2014-0512) are now either complete or underway. Work underway continues in alignment with other corporate initiatives, such as Resilient Calgary and the Climate Resilience Strategy. The City will also continue to increase its understanding of flood risk and identify opportunities improve resiliency in Calgary. The City is now focused on implementing the Council-approved flood resilience plan (PFC2017-0462), and will continue to report progress annually.

The Province continues to move forward on the Springbank off-stream reservoir (SR1) project, which is currently undergoing a federal Environmental Impact Assessment (EIA). The City participates on the EIA Technical Advisory Committee. On the Bow River, the Province initiated a study of three potential sites for an upstream reservoir in 2018. The Province has also provided $69.1M of their previously announced $150M commitment to The City of Calgary through the Alberta Community Resilience Program (ACRP) to date.

The proposed community flood mitigation projects are in early stages and The City is committed to continued dialogue with communities before proceeding to subsequent project phases. The City is working with affected communities to listen, share information, and understand the best mitigation options that are consistent with community values and align with The City's approach to building flood resilience.

In addition to The City's flood resilience plan, which focuses on river flooding, this report also provides an update on The City's Community Drainage Improvements (CDI) program, which focuses on reducing local stormwater flood risk. Program investments remain on track, and strategies are currently underway to examine design innovations, investigate external funding sources, and identify project synergies to enhance service delivery of the CDI program.

ADMINISTRATION RECOMMENDATION:

That the SPC on Utilities and Corporate Services recommend that Council receive this report for information.

PREVIOUS COUNCIL DIRECTION / POLICY

On 2014 March 17 Council received the 2015-2018 Drainage Financial Plan (UCS2014-0022) for information, which included service levels and targets. A progress report on the Drainage Financial Plan (UCS2016-0414) was received by Council for information on 2016 June 20.

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.

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2018 Flood Resiliency and Mitigation Annual Update

On 2015 May 27, The SPC on Utilities and Corporate Services received the Flood Resiliency and Mitigation 2014 Annual Report (UCS2015-0082) for information. Subsequent updates were received on 2016 April 27 (UCS2016-0168), 2017 April 10, (UCS2017-0266), and 2018 February 26 (UCS2018-0092). In addition, The City of Calgary's flood resilience plan was approved by Council on 2017 June 26 (PFC2017-0462).

An update was provided to Council regarding the Province's upstream flood mitigation work on the Bow River on 2018 May 27 (UCS2018-0600).

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. As part of those recommendations, The City completed a comprehensive Flood Mitigation Measures Assessment in 2016, which examined measures to reduce Calgary's river flood risk. The Assessment recommended that upstream mitigation on the Bow and Elbow Rivers, combined with community mitigation in select locations on the Bow River and property-level mitigation would be needed to prevent flooding in Calgary similar to a 2013-level event. On 2017 June 26, Council approved The City's flood resilience plan (PFC2017-0462).

In 2015 October, the Province announced it would proceed with the SR1 project on the Elbow River, and has been progressing on completing the federal EIA requirement for SR1 since 2016 June. The Province also initiated the Bow River Working Group (BRWG) to study improving flood and drought resiliency in the region, and committed $150M to The City of Calgary to support community flood mitigation projects through the ACRP program. The *Bow River Water Management Project* final report was completed in 2017 and recommended construction of an upstream reservoir on the Bow River, with three potential locations identified for further study. Subsequently, in 2016 April, the Province announced it had reached a five-year operating agreement with TransAlta to manage water levels for flood and drought on the Bow River at the Ghost Reservoir.

In addition to The City's river flood mitigation work, 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. Though drainage improvement studies have been conducted by The City for over 20 years, The CDI program was established in 2009 to address this risk as a comprehensive infrastructure investment program.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

As of 2019 May, all recommendations of the Expert Management Panel on Flood Mitigation are now either complete or underway. Work underway continues in alignment with other corporate initiatives, such as the Corporate Resilience Strategy and the Climate Resilience Strategy. The City will continue to take an adaptive management approach and continually improve its

understanding of flood risk in Calgary and identify actions to as part of its flood resilience plan. Appendix A of the Attachment includes a summary and status of the recommendations.

Following Council's approval of the flood resilience plan, Administration is focused on implementation. The plan takes a multi-layered approach to building flood resilience in Calgary based on a combination of upstream, community-level, and property-level mitigation. This layered approach is accepted as best practice internationally and has been confirmed by independent consultants as an effective form of risk management for flooding. The City acknowledges that there is no single solution to mitigating flood risk in communities and that there are many perspectives on how to reduce flood risk in Calgary. The City has established an ongoing dialogue with the Province and communities as studies are completed, information is gathered, and options are assessed. Work in 2018 and throughout 2019 remains focused on engagement with impacted communities regarding The City's flood resilience plan.

Though upstream mitigation is the responsibility of the Province, The City continues to work closely with the Province to advocate for and provide technical support for timely construction of upstream flood mitigation for Calgary. The Province is currently compiling their response to Canadian Environmental Assessment Agency's (CEAA) 2018 August request for more information for the EIA. The EIA will resume after the response is submitted. On 2019 January 30 the Province announced it acquired 465 acres of land, approximately 20 per cent of the land required for SR1. Subsequently, Infrastructure Canada announced $168M in funding support through its Disaster Mitigation and Adaptation Fund for SR1 on 2019 March 13. While these are significant positive developments, The City continues to advocate that SR1 must be constructed as soon as possible, otherwise Calgary remains at significant risk of flood damages. SR1 when combined with the elevated gates at the Glenmore Dam, which are expected to be operational starting in 2020, will mitigate flooding on the Elbow River to a 2013-level event.

On the Bow River, the Province is currently undertaking a conceptual study for three potential upstream mitigation sites identified in the *Bow River Water Management Project* final report. It is anticipated that this conceptual study will be complete by the end of 2019. The City supports this work and continues to advocate the need for an upstream reservoir on the Bow River with and continuation of the Bow River Working Group. The City has also indicated that continuing the operating agreement with TransAlta beyond 2021 is critical, as no single mitigation component can mitigate flood risk at least a 2013-level event on the Bow River.

Work on the community mitigation projects remains ongoing. Throughout 2018, The City met with affected community members in Bowness and Sunnyside to gather information and understand their concerns. Recognizing these concerns, The City plans to continue discussions with community members as it completes additional studies to inform the projects, and will share information and gather feedback on potential mitigation options before proceeding to subsequent phases.

2018 Flood Resiliency and Mitigation Annual Update

Barriers in Calgary's downtown and Pearce Estate Park, the Upper Plateau Separation project in Sunnyside, and replacement of the 9 Avenue SE Bridge were also identified as part of the flood resilience plan. ACRP funding was announced for the Downtown flood barrier, Upper Plateau Separation, and 9 Avenue SE Bridge projects in 2018, and additional funding for Upper Plateau and the Downtown flood barrier was announced in 2019 March. As of 2019, The City has received $69.1M from ACRP for 13 projects. More information on these projects and the status of ACRP funding can be found in Appendix B of the Attachment to this report.

Development of a property-level mitigation and flood risk awareness program is underway and The City will be undertaking research and engagement to inform development of this program in 2019. The City is initiating a review of its Municipal Development Plan (MDP) and Land-Use Bylaw (LUB) concurrent with the Province's ongoing Flood Hazard Area (FHA) mapping update, which has not been released publicly. The City will continue to monitor provincial developments and integrate changes into MDP, LUB, and relevant flood development policy recommendations as necessary.

The CDI program continues to deliver stormwater infrastructure improvement projects based on comprehensive triple-bottom-line studies of established communities with identified stormwater flooding risks. Projects are prioritized based on flood risk, potential impacts to the community and the cost-effectiveness of the proposed infrastructure upgrades. A prioritized list of current and future identified CDI projects is found in Appendix C of the Attachment to this report. Starting with the community of Renfrew, The City has undertaken an integrated stormwater management study to complement its existing CDI approach, which is expected to be completed in spring 2019. This study will focus on addressing stormwater management issues such as flood control, reducing water quality impacts, future redevelopment and densification considerations, considering climate change impacts, enhancing asset management, and identifying green stormwater infrastructure opportunities.

Stakeholder Engagement, Research and Communication

The City remains in close communication with the Province regarding the need for all flood mitigation components (SR1, Bow River mitigation, the Province's agreement with TransAlta, FHA mapping, floodplain development regulations, and The City's flood resilience plan) in order to mitigate flooding to at least a 2013-level flood throughout Calgary. SR1 and Bow River upstream mitigation were identified as priorities that matter to Calgarians through The City's YYCMatters campaign in advance of the 2019 Provincial election. As part of YYCMatters, a citizen survey showed 83% of Calgarians surveyed want the Province to fund upstream mitigation on the Bow River.

The City acknowledges the potential impacts presented by proposed community flood mitigation. The City is committed to working with community members to understand the need for community mitigation and discuss risks and opportunities associated with different mitigation options. Potential community mitigation projects in the communities of Bowness and Sunnyside are in early phases, and work is underway to address issues previously raised by community members, including studies to look at options for flood mitigation. Findings from these studies

will be presented to community members throughout Q2 and Q3 2019 and ongoing further engagement is expected to occur in 2019 before moving to subsequent phases.

Strategic Alignment

The City's flood resilience plan aligns with the One Calgary stormwater line of service, which identifies the following service outcomes:

- The City works to reduce flooding from rain and snow melt that impacts homes, businesses and the community
- Calgary is prepared for flooding and recovers quickly
- The City provides quality stormwater management services that are cost efficient.

Social, Environmental, Economic (External)

The flood resilience plan is informed by The City's Triple Bottom Line Policy, Sustainability Direction, and watershed protection goals. Details on the 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:

All ACRP and federally funded flood mitigation projects include a cost-share obligation for The City of Calgary. This has been accounted for as part of One Calgary and no additional budget impacts are expected. The CDI capital budget was approved as part of One Calgary budget deliberations and no capital impacts are anticipated.

Risk Assessment

Administration is actively working with the Province, stakeholders, and communities to address identified risks, and recognizes both the high level of complexity and uncertainty as it seeks to build flood resilience. Key risks include:

- Reducing flood risk on the Bow River requires multiple components: an upstream reservoir, continuation of the TransAlta agreement, and community mitigation to mitigate to at least a 2013-level flood.
    - A new reservoir on the Bow River may not be built for many years. Three sites are being studied by the Province, with no further commitment at this time.
    - The current TransAlta operating agreement expires in 2021. Continuation of an agreement has not been confirmed at this time.
- Flood risk on the Elbow River remains if SR1 is delayed. The Province remains committed to this project and The City continues to support the project.
- Ensuring proposed flood mitigation options are consistent with community values and sufficient engagement with affected communities occurs is necessary before moving forward with community mitigation.

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- The Province has not publically updated their FHA mapping and associated floodplain development regulations. The City is monitoring developments and will assess implications if these items are released.
- Climate change could result in more severe flooding in the future. The City is accounting for this as part of its flood resilience plan and is aligning with corporate resilience initiatives.

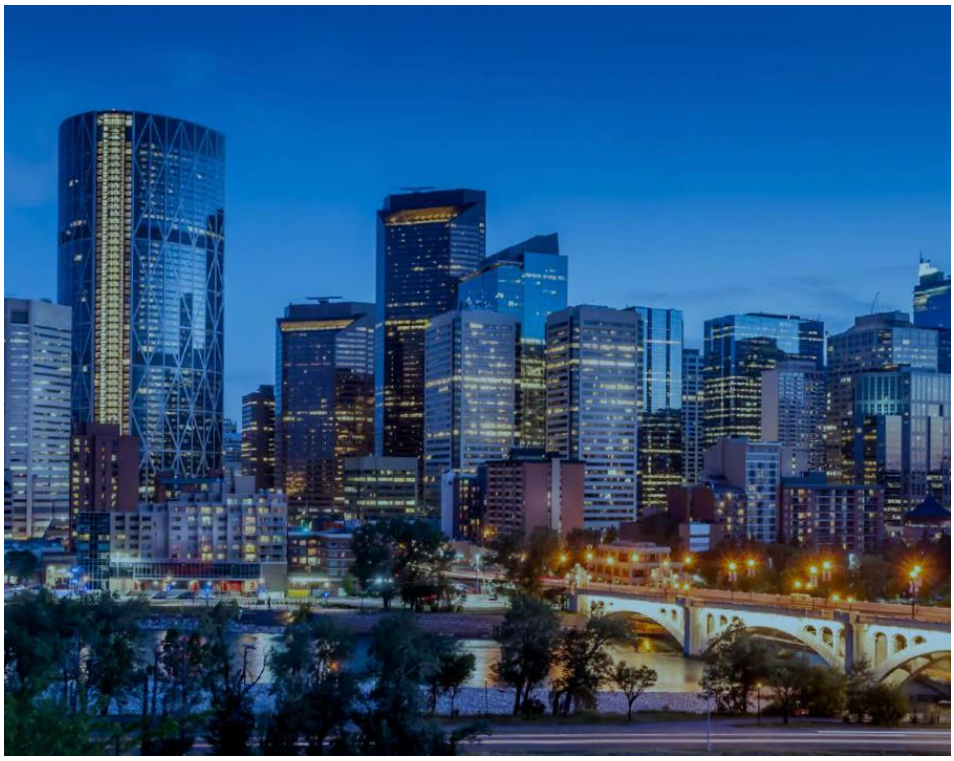
REASON(S) FOR RECOMMENDATION(S):

Flood mitigation remains a top strategic priority for City Council. The 2018 Flood Resiliency and Mitigation update provides an update on activities consistent with The City's stormwater line of service customer commitment to reduce flooding in Calgary.

ATTACHMENT(S)

1. Attachment 1 – Flood Resiliency and Mitigation 2018 Update Report

FLOOD RESILIENCY AND MITIGATION



2018 Update Report

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1. INTRODUCTION

The City of Calgary continues to make progress on building resiliency and reducing Calgary's flood risk. Significant progress has been made in the six years since the 2013 floods with numerous major infrastructure projects underway, as well as other pieces of ongoing work.

Following the 2013 floods, The City formed an independent panel of experts to examine how to reduce flooding in Calgary. In 2014, The *Expert Management Panel Report on River Flood Mitigation* outlined 27 recommendations to increase Calgary's flood resilience. Since 2014, all of the recommendations are either complete or underway. The remaining recommendations still underway continue in alignment with other initiatives within The City of Calgary, such as the development of The City's Corporate Resilience Strategy being done in partnership with 100 Resilient Cities and the Climate Resilience Strategy. Work to further build knowledge related to completed recommendations will also continue.

As of 2018, The City's focus is now on implementing its flood resilience plan that was approved by City Council in 2017. The plan includes a number of projects that, in conjunction with efforts by the Province and the federal government, serves as The City's vision and path to a flood resilient Calgary. The plan is part of The City's integrated approach to watershed management and remains a top priority under One Calgary. As The City works through its plan, it is committed to engaging with affected communities to gather their input and ensure any potential trade-offs are understood before any major projects proceed. The City will continue to report on progress annually as it enters this implementation phase.

2. SUMMARY OF 2018 ACTIVITIES

2.1 2018 SEASONAL CONDITIONS

Similar to 2017, the 2018 season started off with an above average snowpack. However, above average temperatures in early May resulted in earlier than usual spring run-off. Throughout May and June, river water levels on the Bow and Elbow rivers were high but did not reach levels where flooding occurred. Peak flow through Calgary on the Elbow River (60 m^3/s) occurred on June 23 due to rainfall, while peak flow on the Bow River (359 m^3/s) occurred on June 25 due to a combination of rainfall and snowmelt.

For safety concerns, a boating advisory was issued due to high flows on the Bow River from May 28 to June 1, and another advisory was issued for both rivers from June 23 to June 25. No emergency response activities were required in 2018, though the Province announced 2018 June 12 $1M in funds to support The City's emergency response preparedness. Average temperatures along with normal or below normal precipitation proceeded throughout the rest of the summer, and flows in both the Bow and Elbow rivers dropped quickly to normal levels from June onwards. Flows in Calgary neared drought advisory levels from late August onwards, but normal operating conditions were maintained. Due to construction on the dam crest, the Glenmore Reservoir was drawn down below the normal flood season operating level in early 2018. The reservoir began refilling after the third week of July, recovering by the first week of September.

2.2 FLOOD READINESS

THE CITY HOLDS ITS FLOOD READINESS CAMPAIGN EVERY YEAR BETWEEN MAY 15 AND JULY 15. 2018 MARKED THE FIFTH YEAR ANNIVERSARY SINCE THE 2013 FLOODS.

The City of Calgary holds its annual flood readiness campaign every year from May 15 to July 15. The campaign is intended to help citizens increase their personal flood preparedness by helping them understand, prepare and stay informed before, during and after a flood event. The campaign is also an opportunity for The City to inform citizens about its flood resilience plan, and citizens' role in building flood resilience in Calgary.

In 2018, Calgary marked the fifth anniversary of the 2013 floods. As part of the flood readiness campaign for 2018 The City increased its efforts in reaching out to citizens not only to increase awareness of flooding in Calgary, but also to share information and highlight key flood resilience projects that have been completed by citizens, The City, and the Province since 2013.

Activities undertaken in 2018 included:

- Two videos highlighting citizens' stories of mitigation and resilience
- Two open houses, with a total attendance of approximately 200 citizens
- Publication of a biweekly flood e-newsletter that was distributed to over 1,500 subscribers
- Media coverage from April to July that resulted over 1,800 news articles including nation-wide coverage, which reached approximately two-million individual reads and resulted in an approximate $1.9M return-on-investment
- Social media posts that reached over 200,000 Calgarians
- Updates to The City's flood website at calgary.ca/floodinfo, resulting in approximately 42,000 visits from April to July
- Over 30 public presentations delivered by City employees to the public.

3. FLOOD RESILIENCE PLAN

3.1 BACKGROUND

The City presented its Flood Mitigation Measures Assessment (FMMA) to Council in 2017. The FMMA recommended that to mitigate against another 2013-level flood event, a combination of watershed, community, and property-level mitigation measures were required to provide a flexible and adaptable flood mitigation program that would provide the most cost-beneficial flood resilience. Based on the FMMA's results, Council recommended on 2017 April 10, that City Administration:

1. Work with Council to advocate for an upstream reservoir and continuation of the Provincial-TransAlta operational agreement for the Bow River.
2. Continue supporting the development of the Springbank Off-stream Reservoir on the Elbow River by the Province.
3. Develop an implementation and funding plan for community level flood mitigation and report back to Council through the SPC on Utilities and Corporate Services or the Priorities and Finance Committee by Q2 2017.
4. Explore the development of a property level mitigation program.
5. In alignment with Provincial mapping and policy updates, conduct further investigation on land use policy and building regulations for areas prone to flooding.
6. Work with City Council to confirm and communicate to other orders of government that flood mitigation is a top strategic priority for The City of Calgary.

The City's implementation plan was presented to City Council and approved on 2017 June 26, and proposed a vision based on upstream, community, and local mitigation. The City's approach is consistent with international best practices and recognizes that no single piece of mitigation is capable of eliminating flood risk in Calgary.

As of 2018, 12 of the Expert Management Panels 27 recommendations remain underway, with the rest completed (Figure 1). Of those 12 recommendations, three remain underway as planned, and three are ongoing as part of The City's collaboration with the Province. The remaining six recommendations are tied to The City's Corporate Resilience Strategy, Climate Resilience Strategy, and The City's review of its Municipal Development Plan and Land Use Bylaw. A summary of the recommendations and their progress can be found in Appendix A.

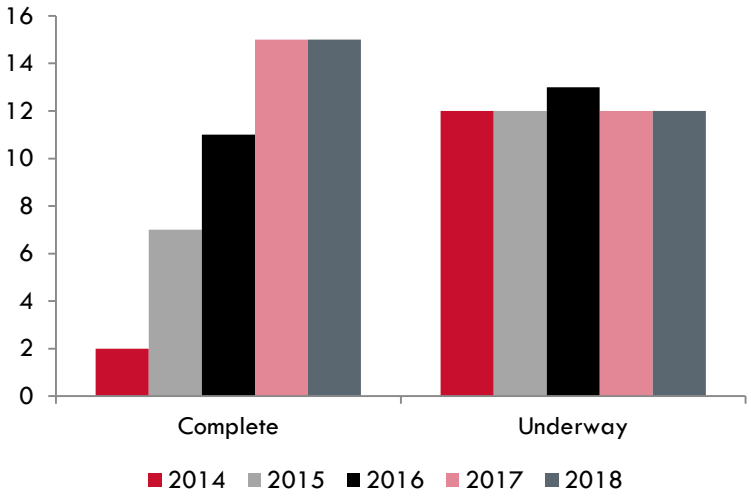


FIGURE 1: EXPERT MANAGEMENT PANEL RECOMMENDATIONS PROGRESS.

AS OF 2018 THE CITY'S FOCUS IS ON IMPLEMENTING ITS FLOOD RESILIENCE PLAN. OUSTANDING RECOMMENDATIONS CONTINUE IN ALIGNMENT WITH CORPORATE INITIATIVES, INCLUDING THE CORPORATE RESILIENCE STRATEGY AND CLIMATE RESILIENCE PLAN.

The City will continue to take an adaptive management approach and continually improve its understanding of flood risk in Calgary and identify actions as part of its flood resilience plan. This ensures The City uses the most current data to inform its decision making and modelling and possesses the most up to date knowledge of flood risk and how to manage flooding in Calgary.

4. 2018 PROGRESS

As of 2018, The City has been focused on implementing its flood resilience plan. The plan serves as the basis of The City's vision for a flood resilient Calgary (Figure 2). The multi-layered approach is intended to be flexible, enabling The City to react to variable conditions beyond its control, and supports The City's integrated watershed management approach. The flexibility also ensures The City can maximize flood mitigation work while recognizing that upstream mitigation alone cannot mitigate all flooding in Calgary, that community mitigation projects require extensive input from affected communities, and that building flood resilience is a long-term goal that requires ongoing effort. With support from the Province and federal government, completed infrastructure investments and improved emergency response planning have reduced Calgary's overall flood risk by as much as one-third.

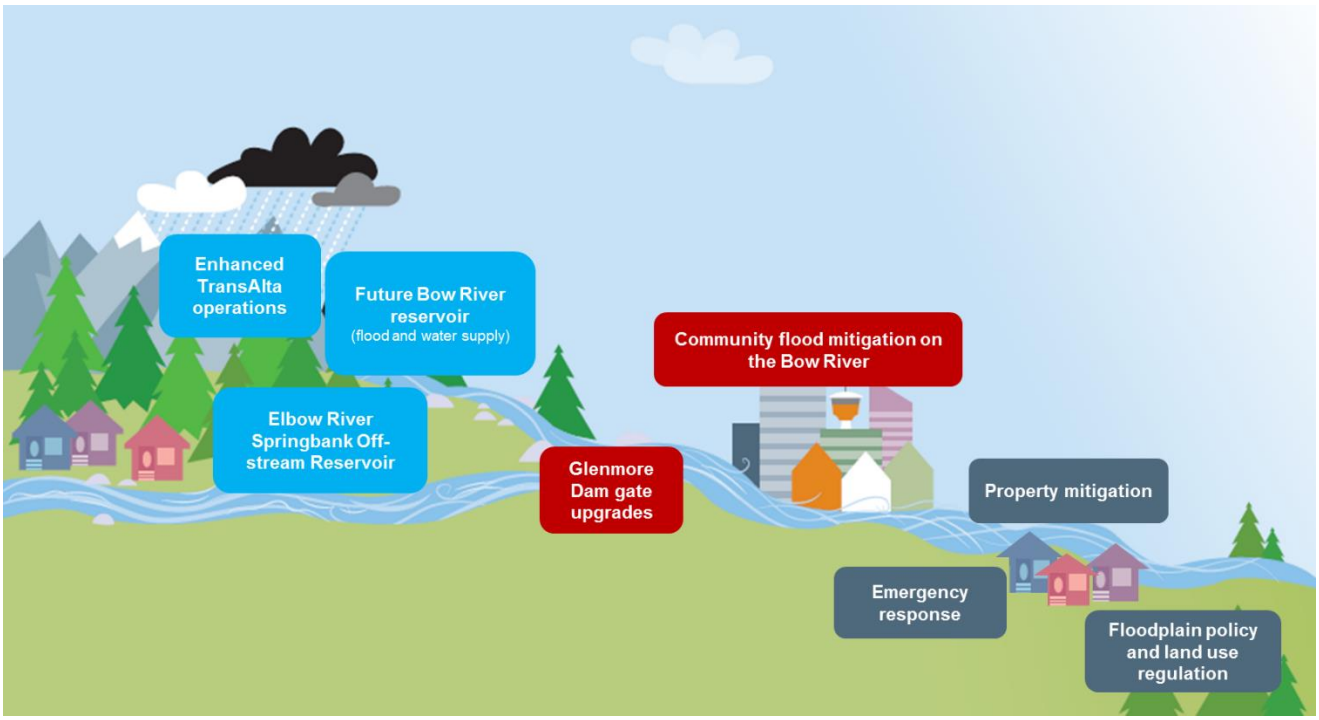


FIGURE 2: THE CITY'S FLOOD RESILIENCE PLAN RELIES ON UPSTREAM AND COMMUNITY INVESTMENTS, OPERATIONS, PROPERTY PROTECTION, AND FLOODPLAIN POLICY

4.1 ELBOW RIVER MITIGATION

The Province remains committed to the construction of the Springbank Off-Stream Reservoir (SR1), announced in 2015, to help mitigate flows on the Elbow River. Upon completion, the project, located approximately 15 kilometres west of Calgary, will work with the new gates being installed at the Glenmore Dam to mitigate floods as large as a 2013-level flood event (Figure 3).

Since 2016 June 23, SR1 has been subject to an Environmental Impact Assessment (EIA) by the Canadian Environmental Assessment Agency (CEAA). The Province submitted its Environmental Impact Statement 2018 June 29, and CEAA requested further information in 2018 August. As of 2019 April, the Province is compiling the required information. It is anticipated that the review will resume after the Province

submits their response to the information request. The City participates on the EIA's Technical Advisory Committee.

Land acquisition for the project by the Province remains ongoing. On 2019 January 30 the Province announced that it acquired 465 acres of land for the project, approximately 20 per cent of the land required. In addition to the land acquisition, Infrastructure Canada announced $168M in funding support through its Disaster Mitigation and Adaptation Fund for the project on 2019 March 13.

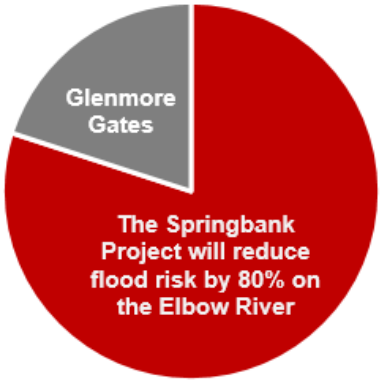


FIGURE 3: SR1, ALONG WITH GLENMORE GATES, WILL REDUCE FLOOD RISK ON THE ELBOW RIVER UP TO A 2013 SIZE FLOOD

The SR1 project has been verified by several independent consultants as the most cost-beneficial flood mitigation project on the Elbow River. The City continues to support the timely completion of this project and participate in the CEAA process to ensure SR1 is constructed as quickly as possible. The City is not supportive of other options or further delay. Failure to construct upstream mitigation as soon as possible will leave Calgary at risk of damages from another major flood.

The City has also raised the construction of upstream flood mitigation as an issue of regional concern with the Calgary Metropolitan Region Board (CMRB), citing the importance of having a flood resilient region, and the need to consider the presence of flood mitigation as part the region's long-term growth plans.

In conjunction with SR1, progress on the new elevated gates at the Glenmore Dam continues. This project is being completed as part of the larger infrastructure improvement program at the Glenmore Dam and is schedule to be operational in 2020. It should be noted that while the Glenmore Dam will provide significant flood mitigation for Calgary, it will not be able to manage a 2013-sized flood event without the completion of upstream mitigation.

4.2 BOW RIVER MITIGATION

4.2.1 UPSTREAM MITIGATION

Considering the progress on SR1 and at the Glenmore Dam, reduction of flood risk for communities along the Bow River is the focus of The City's flood resilience plan. The City of Calgary continues to advocate to the provincial and federal government for the need for upstream mitigation on the Bow River. Both an upstream reservoir and the continuation of the operations agreement between the Province and TransAlta are critical to ensure no communities in Calgary are at risk of flooding up to at least a 2013-level flood event. The Province's agreement with TransAlta is currently ongoing until 2021.

The City of Calgary continues to support the work done by the Province's Bow River Working Group to identify upstream mitigation options on the Bow River. Following the release of the *Bow River Water Management Project final report* in 2017 August, the Province committed to completing an upstream mitigation conceptual study for three potential sites. This work is currently underway and is anticipated

to be completed by the end of 2019. As part of The City's YYCMatters campaign, a citizen survey conducted between 2019 March 29 and 2019 April 3 found that 83% of Calgarians surveyed agree that upstream mitigation on the Bow River should be funded by the Province (Figure 4).

4.2.2 COMMUNITY MITIGATION

As part of The City's plan for the Bow River, the flood mitigation provided by the TransAlta agreement and a potential upstream reservoir must be complemented by community flood mitigation in key locations throughout Calgary. Community mitigation, along with an upstream reservoir, would mitigate damages up to at least a 2013-level flood event, and up to a 1000-year event in Calgary's downtown.

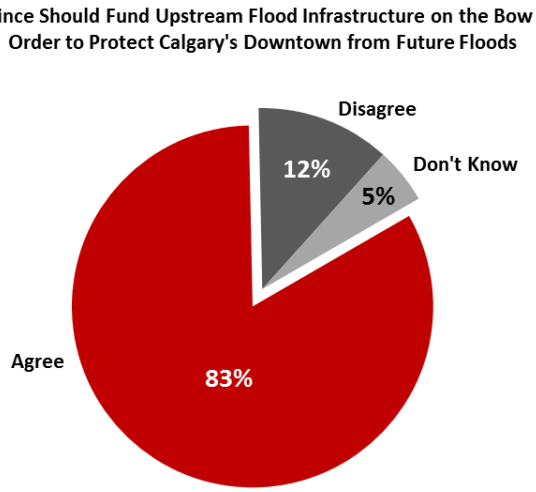


FIGURE 4: THE CITY, AS PART OF ITS YYCMATTER CAMPAIGN, CONDUCTED A SURVEY 2019 APRIL AND FOUND 83% OF CITIZENS SUPPORT THE PROVINCE FUNDING UPSTREAM MITIGATION.

Design of the Downtown flood barrier is underway. Community engagement started in 209 April and construction is estimated to begin sometime in 2020. The Downtown flood barrier, once complete, will connect with the West Eau Claire Park flood barrier and extend to the Reconciliation Bridge to form a single, contiguous piece of flood mitigation infrastructure for Calgary's downtown. This design integrates seamlessly into The City's Eau Claire Public Realm Plan.

Three additional barriers were proposed in The City's flood resilience plan, in the communities of Bowness and Sunnyside, and in Pearce Estate Park/Inglewood. Consultants were hired to explore design options for the three barriers in 2018. Preliminary studies commenced and consultants are collecting additional information and research on potential options as part of the preliminary studies.

The proposed flood barrier in Bowness, unlike other community barriers, would require access to private lands on the river front. As part of developing flood resiliency for Bowness The City initiated engagement on the Bowness flood barrier project starting in fall 2018. The initial part of the engagement process was to collect local knowledge and get input on community values, identify areas of sensitivity, and understand other factors to be considered as part of the project.

During this period, The City:

- Attended five meetings with river front property owners
- Hosted a town hall for riverfront property owners on 2018 September 20
- Held an open house for the community at large on 2018 October 30
- Conducted online public engagement, and
- Initiated one-on-one meetings with individual property owners along the river front.

This phase of one-on-one meetings with riverfront property owners is expected to continue until late spring 2019. The City also began proactive efforts to communicate to stakeholders the need for and the benefits of all components of The City's flood resilience plan, the risks of not constructing community flood mitigation, and developed a series of educational materials for community members including:

- A comprehensive project information page on calgary.ca with up to date project information, frequently asked questions, studies and reports, contact information, and current estimated timelines.
- A video series to help address and clarify some of the common areas of concern raised by community members.
- A project specific e-newsletter that includes project updates, key dates, and educational articles on general flood topics and project questions.
- A project-specific email address to allow community members to directly contact the project team.

In addition to engagement and communication activities in Bowness, The City began a series of studies to inform the design and option analysis of the potential flood mitigation. This includes groundwater studies, geotechnical investigations, river modelling, stormwater management, landscape architecture and design, and biophysical impact assessment. These studies are expected to continue in 2019. Once completed, findings will be shared with community members during further engagement sessions anticipated to be held in late fall 2019. The studies and community feedback will be used to inform design options and potential next steps for the project beyond 2019.

In 2019 May, The City will conduct additional research to get a better understanding of community attitudes towards potential flood mitigation in Bowness via telephone surveys to riverfront property owners and the broader community. Two additional information pop-ups are also tentatively scheduled in 2019 July and 2019 August to update community members on the status of the studies and answer questions, and a working group is also being formed to ensure various stakeholders from across the community can provide their input.

An open house for the proposed Sunnyside barrier project was held on 2018 December 4 to present the project to the community and gather feedback to inform preliminary studies related to the project. Site condition assessments are currently underway, which will be used as part of the mitigation option analysis that will be completed in 2019 and will examine the cost-benefit of different potential service levels for the community. Options will be presented to the community in summer 2019 for input as studies are completed and will help inform community input as the project moves forward.

Modelling of river flows by a consultant for the Pearce Estate Park barrier was completed in 2019 April. The City is in the process of assessing the modelling data to determine next steps on the Pearce Estate Park barrier project.

In addition to the community barrier projects, two additional community mitigation projects were identified in The City's flood resilience plan:

- The Upper Plateau Separation project, which provides additional flood mitigation for the community of Hillhurst-Sunnyside by separating the stormwater system from communities located above it (Figure 5), and
- The 9th Avenue Bridge Replacement, which will prevent the bridge from being damaged during a flood event and maintain a critical access point for the community of Inglewood.

Preliminary design started for both projects in 2018, with construction for both projects beginning in late 2019 or 2020.

4.3 PROVINCIAL AND FEDERAL FUNDING

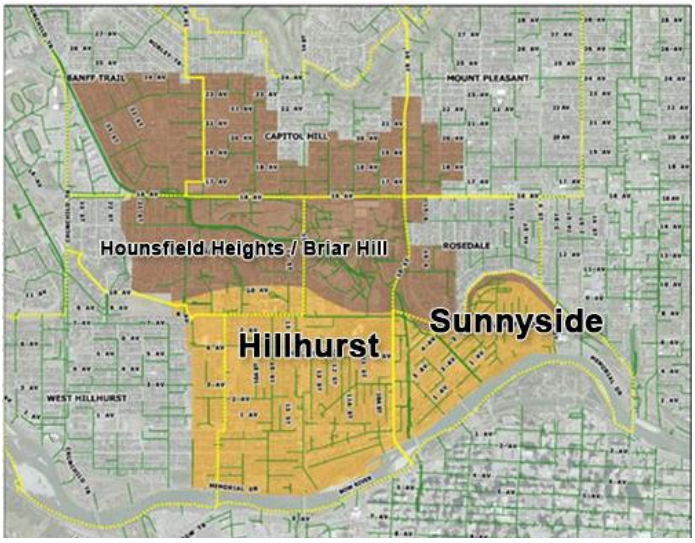


FIGURE 5: THE UPPER PLATEAU SEPARATION PROJECT WILL REDIRECT STORMWATER FROM COMMUNITIES LOCATED ON THE ESCARPMENT NORTH OF HILLHURST AND SUNNYSIDE TO REDUCE FLOOD RISKS. THIS PROJECT IS BEING COMPLETED WITH FUNDING SUPPORT FROM THE PROVINCE.

On 2015 October 26, Alberta Environment and Parks (AEP) committed $150M over 10 years to The City of Calgary through the Alberta Community Resilience Program (ACRP) to support the construction of community-level flood mitigation projects. In 2018, funds were awarded for the following projects:

- Downtown Flood Barrier ($4.15M)
- Upper Plateau Separation ($4.15M)
- 9th Avenue Bridge Replacement ($5.24M)

On 2019 March 6, a further $15M was announced by the Province for the Downtown flood barrier ($6.94M) and Upper Plateau Separation ($8.06M) projects.

This brings the total funds received by The City of Calgary since 2015 to approximately $69.1M, in support of 13 projects. The City completed five of the 13 projects in 2018:

- Centre Street Bridge Lower Deck Flood Barrier
- West Eau Claire Flood Barrier
- Roxboro Sanitary Liftstation Replacement
- Stormwater Outfall Improvements
- Western Headworks Site Condition Improvements

The remaining eight projects are underway. A summary of The City's progress on ACRP-funded projects can be found in Appendix B.

The City continues to recognize the importance of the external funding provided by the Province, as well as the $10.6M provided through the New Building Canada Fund from the federal government in 2016 to support the Bonnybrook Wastewater Treatment Plant Flood Mitigation Program and the construction of

CONCEPTUAL DESIGN OF THE EAU CLAIRE PROMENADE, WHICH INCLUDES THE DOWNTOWN FLOOD BARRIER. FLOOD MITIGATION WILL CONNECT WITH THE FLOOD BARRIER IN WEST EAU CLAIRE PARK TO GREATLY REDUCE FLOOD DAMAGE RISK IN CALGARY'S DOWNTOWN. THIS PROJECT IS BEING COMPLETED WITH SUPPORT FROM THE PROVINCE THROUGH ITS ACRP PROGRAM.

Sunnyside Pumpstation #1. The investments from both orders of government have contributed significantly to The City's ability to build flood resilience in Calgary.

The two community barrier projects in Sunnyside and Bowness were submitted to ACRP in 2017 for funding consideration. The projects have been identified as eligible under the ACRP program but have not yet received funding. Funding approval will be subject to the Province's funding criteria. The City will work with the Province to secure funding as engagement is completed and the direction of the projects is determined.

Throughout 2019 and beyond while technical studies and optional analysis is being done, The City will continue to work closely with community members to ensure that potential mitigation options receive input from citizens before advancing projects further. When potential mitigation options and details are clarified, The City will re-engage the Province on potential funding of these projects.

5. PROPERTY MITIGATION, POLICY AND MAPPING

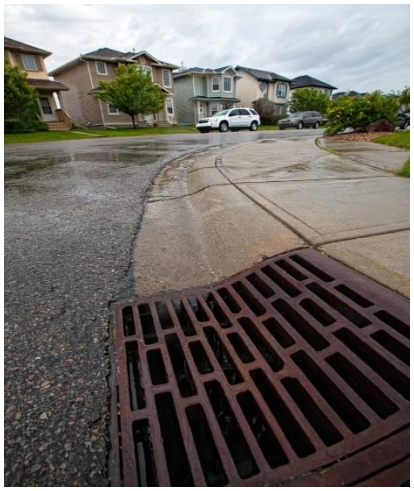
Land use planning regulations, policies to reduce flood risk, accessible and updated flood maps, and flood risk awareness and education on actions that citizens can take to protect their property are critical pieces of The City's flood resilience plan. In 2018, The City advanced initiatives in these areas, including:

- Development of a flood risk "story map" to make flood risk information more accessible and easier for citizens to understand.
- Overhaul of The City's flood web portal and webpages on calgary.ca for a more accessible and streamlined web experience. The new portal is anticipated to launch in spring 2019.
- Scoping of a project to research and develop an innovative and citizen-focused education program on flood risk awareness and property-level mitigation. The project will be conducted in 2019-2020.
- Work to integrate resilient design considerations such as accounting for groundwater flooding, climate change and appropriate standards for resilient critical infrastructure in proposed new development and redevelopment. A cross-departmental team including Water Resources and Planning and Development is leading this process.

- Review of The City's existing policies with consideration of watershed protection and increasing flood resilience is underway. This work is expected to continue through 2020 and will be conducted in alignment with The City's Municipal Development Plan review.

The City continues to communicate the need for updated flood hazard maps to the Province, and is monitoring the Province's progress, should updated flood hazard maps be released. As part of this work, The City continues to meet regularly with the Province regarding flood mitigation objectives, communications on major flood mitigation initiatives, and potential developments in provincial flood policy that could have implications on The City's flood resilience work. As part of this work The City continues to communicate that, based on The City's findings in the FMMA, removal of existing building and homes in the floodplain is not cost-beneficial and has been factored into The City's flood resilience plan.

The City of Calgary is also working with the Province and federal government on promoting best practices in flood risk, land use policy, and citizen action. All potential developments are being taken under consideration as The City proceeds with potential policy changes as they relate to development or redevelopment in the flood plain.



THERE ARE ABOUT 60,000 STORM DRAINGS IN CALGARY WHICH CAPTURE WATER OFF SIDEWALKS, STREETS, AND ROADS.

6. STORMWATER FLOODING

Local stormwater flooding occurs in communities when drainage infrastructure cannot manage the volume of stormwater from rain, or snow and ice melt. Localized flooding can also occur due to a lack of underground stormwater system capacity or surface grading issues.

In 2018, Calgary saw more localized drainage concerns than usual during the spring than in the summer. This was due to a long winter with larger than normal accumulation of snowpack in Calgary before a rapid spring melt occurred. To prepare for the melt period, The City used recent mapping of low lying areas within Calgary to help strategically target areas with a high likelihood of ponding. This approach minimized potential localized flooding concerns relative to past years.

Only one major localized flooding event that could have resulted in widespread flood damages occurred in 2018, in the established neighborhood of Parkland. However, The City implemented temporary initiatives such as sandbagging to divert excess stormwater away from properties in advance of the spring melt and received no concerns from the public regarding damages during the event.

6.1.1 COMMUNITY DRAINAGE IMPROVEMENTS PROGRAM

The Community Drainage Improvements (CDI) program invests in stormwater infrastructure improvements with a focus on established communities with the highest risk of local stormwater flooding. The Program uses a triple bottom line approach and prioritizes projects based on flood risk, potential impacts to the community and the cost-effectiveness of the proposed infrastructure upgrades.

A drainage study is first completed for selected communities, which assesses flood risk and presents options for upgrades. Investment decisions are then evaluated based upon which projects provide the greatest benefits to customers and communities. This is measured based on reduction to damages caused by local flooding as well as social, economic, and environmental impacts. A summary of identified projects under the CDI program can be found in Appendix C. The CDI Program regularly undertakes studies in communities with identified stormwater infrastructure concerns. As these studies are completed, projects are added to the program and completed on a cost-benefit priority basis.

As part of the 2016 Watershed Planning Update (UCS2017-0267), The City committed to report back to Council as part of the One Calgary process with opportunities to maximize investments within the CDI program. Strategies are currently underway to continue design innovations, seek external funding opportunities, and identify project synergies as part of the program's delivery.

THE BRAESIDE DRY POND WILL GREATLY REDUCE FLOODING DURING EXTREME RAIN EVENTS NEAR SOUTHLAND DRIVE SW AND BRAESIDE DRIVE SW.

In 2018, progress was made on a number of CDI projects, including:

- Completion of infrastructure upgrades in the community of Christie Park, underground storage for the Braeside Dry Pond, and 24 Street SW stormwater diversion trunk.
- Design for the Upper Plateau Separation project and Sunnyside Pumpstations #1 and #2
- Construction was started for the above ground components of the Braeside Dry Pond, the Bebo Grove Wet Pond, and additional community improvements as part of the Woodlands-Woodbine CDI.

The City was able to explore alternatives during the design process and identified $10M in project savings as a result of design efficiencies for the Braeside Dry Pond project. The project will also function as a soccer field when not storing stormwater, providing additional community value. Value engineering was also undertaken for the Upper Plateau Separation project and options for potential savings are being reviewed. Once review is complete, it is anticipated that detailed design will take place in 2019. The City will periodically meet with stakeholders and seek input as necessary.

In 2019, the following work is currently anticipated to proceed as part of the CDI program:

- Initiation of design work for infrastructure improvements south of Riley Park and Kensington Close, as well as at 10 Street SW and Crescent Road;
- Detailed design of the Upper Plateau Separation project;

- Improvements at 7 Avenue NW, 1 Avenue NW, 9 Street and 9 Avenue NW, 19 Street and 6 Avenue NW; and
- The remaining construction at Braeside Dry Pond, Bebo Grove Wet Pond, and additional improvements as part of the Woodlands-Woodbine CDI work.

6.1.2 OTHER STORMWATER IMPROVEMENTS AND PROJECTS

The City of Calgary continues to improve its understanding of stormwater issues affecting areas in Calgary. The City received funds from Public Safety Canada and Alberta Emergency Management Association to develop models to identify extreme rainfall flooding risks throughout Calgary in 2017. Project scoping started in 2018 and a consultant was hired in early 2019 to begin mapping Calgary's terrain to further identify low areas that are potentially at higher risk of rainfall related flood damages. The mapping and models will inform the severity of flooding in those low areas and will be completed by the end of 2019. Once complete, the models will guide potential infrastructure improvements to reduce stormwater flooding risk in communities.

Private residential drainage systems work with The City's broader drainage system to safely move stormwater from homes and streets and eventually to the river. Poor stormwater drainage on individual residential lots can cause localized flooding, property damage, impacts to public infrastructure, and public safety concerns. In 2018, The City continued progress on the Lot Drainage Improvement Project. Progress in 2018 focused on understanding the extent and nature of residential lot drainage issues, developed content for a Guide to Lot Drainage for property owners highlighting roles, responsibilities, tools, and techniques to improve drainage on private properties, and identifying opportunities to provide education to relevant stakeholders. The City plans to have a residential Guide to Lot Drainage completed and present potential revisions to the Lot Grading Bylaw in 2019.

6.1.3 INTEGRATED STORMWATER MANAGEMENT

The City has started using an integrated stormwater management (iSWM) approach to complement studies undertaken by within The City's CDI program. The goal of the approach is to improve the quality and resilience of stormwater services in mature communities. In conjunction with The City's drainage study focus on localized stormwater flooding control, iSWM studies will focus on the improving stormwater management for the following objectives:

- Reducing water quality impacts
- Planning for future redevelopment/densification
- Managing climate change impacts
- Enhancing asset management
- Identifying opportunities for green stormwater infrastructure

To test the integrated approach, a pilot iSWM study in the community of Renfrew was launched and is expected to be completed in spring 2019. Findings from this pilot study will help inform the framework for future integrated stormwater studies.

7. ACTIONS FOR 2019

- Deliver ongoing flood mitigation projects funded by ACRP
- Continue working with flood affected communities on the proposed community mitigation as part of The City's flood resilience plan
- Continue monitoring developments regarding SR1 and participate in the Environmental Impact Assessment processes, as necessary
- Support the Province's work on assessment of a new upstream reservoir on the Bow River, through the Bow River Working Group
- Continue advocating for and work with the Province on upstream mitigation on the Bow and Elbow Rivers, funding for eligible but unfunded ACRP projects, and renegotiation of the TransAlta agreement beyond 2021
- Develop components of The City's property level protection and flood risk awareness programs
- Continue work regarding development and redevelopment in flood affected areas and provide input to Municipal Development Plan and Land Use Bylaw Review
- Continue to deliver CDI projects, CDI studies, and work to integrate iSWM as part of new CDI studies
- Complete the Lot Drainage Improvement Project, including continuing residential education efforts, publication of the Guide to Lot Drainage, and reviewing the Lot Grading Bylaw

APPENDIX A – EXPERT MANAGEMENT PANEL RECOMMENDATIONS INVESTING IN FLOOD PROTECTION

Calgarians believe that investment in flood mitigation is important and The City is working with all orders of government to build flood mitigation. To date, The City has received $69.1M from the Alberta Community Resilience Program (ACRP) for 13 projects.

Investing in flood protection Expert Management Panel recommendation	Status	Timeline	2018 update
Prepare a time-phased plan to modify structures that constrain river flow during flood events, such as pathways and bridges. (4b)	Underway	Ongoing	Flood levels are currently considered as part of lifecycle project planning and implementation. Repair and reconstruction of bridges and pathways after 2013 were designed to withstand the 100+ year level flood, as are current bridge construction projects. Future construction or replacement of existing structures will be informed by future land use planning and development policy work. Flood resilience considerations will be included as part of the upcoming Municipal Development Plan and Land-use Bylaw reviews starting in 2019.
Develop a comprehensive climate adaptation plan and implementation tools to reduce The City's infrastructure and operational vulnerabilities. (6d)	Underway	2018+	City Council approved The City's climate change resilience plan in 2018. Flood resilience work continues independently but remains aligned with The City's overall Climate Resilience Strategy and Corporate Resilience Strategy.
Connect with the provincial body overseeing flood protection and loss reduction and support the Province's continuing analysis of flood mitigation options and implementation of appropriate measures through the watersheds. (6b)	Underway	Ongoing	The Province committed to completing a feasibility study for upstream reservoir options on the Bow River on 2018 November 22 as a follow-up to the Bow River Working Group's 2017 August *Bow River Water Management Project* report. The final report is expected to be complete in 2019. The City of Calgary is supportive of this process and continues to collaborate with the Province through the Bow River Working Group as needed. The City also continues to connect with provincial counterparts through regular meetings on watershed level solutions to flood mitigation.
Increase the operating water storage capacity of the Glenmore Reservoir on the Elbow River through modifications to the Glenmore Dam. (3b)	Underway	2020	The Glenmore Dam infrastructure improvement program includes a project to elevate the dam's gates to help control flooding and manage water supply. The construction of the gates is underway and the project is expected to be operational in 2020. The elevated gates will increase capacity at the Glenmore Reservoir and, operated in tandem with the proposed Springbank Reservoir, will provide mitigation for a 2013-level flood on the Elbow River.

Construct additional or higher flood barriers in key locations throughout the city and update temporary flood barrier plans to protect against higher flood levels. (3d)	Underway	Ongoing	The City's flood resilience plan is currently being implemented. The City has started initial design for the Downtown flood barrier, and has initiated discussions with the communities of Bowness and Sunnyside. The City has initiated and continues engagement with these communities to ensure potential mitigation measures are consistent with community values, and will be discussing potential trade-offs in mitigation options as it works with communities on these projects. The City continues to work with the Province, federal government, and affected communities regarding the barriers to address potential concerns identify opportunities. Temporary barrier planning continues to be updated on an annual basis as part of The City's flood preparedness and response plan. New products have been purchased to increase preparedness and reduce installation times.
Provide an annual update to City Council on progress related to the recommendations from the Expert Management Panel on River Flood Mitigation. (6f)	Complete	Ongoing	Annual updates are provided by Water Resources to Council's Standing Policy Committee on Utilities and Corporate Services.
Evaluate social, economic and environmental impacts of flood mitigation options. (6c)	Complete	2015-2016	A triple bottom line approach was used to assess possible flood mitigation measures as part of the FMMA. The Assessment determined that a combination of upstream mitigation, community level mitigation, and property level mitigation was the most cost-sustainable approach to reducing Calgary's flood risk. The recommendations generated from this assessment were approved by Council in April 2017 (UCS2017-0266)
In partnership with the Province, compare the three major capital works options for mitigating floods on the Elbow River. (3a)	Complete	2015-2016	The Springbank Off-stream Reservoir (SR1) was announced by the Province in 2015, and the Province has proceeded with this project, which is currently undergoing a federal environmental impact assessment. The City is participating on the Technical Advisory Committee for the Environmental Assessment of SR1 currently being undertaken by CEAA.
Establish a permanent team within The City to oversee flood preparedness and resilience. (6a)	Complete	2015-2016	Funding requests for a permanent team were approved in December 2014. The Watershed Planning Division was established in 2015, and supports this team.

UNDERSTANDING FLOOD RISK

There will always be a risk of river flooding and Calgary Emergency Management Association (CEMA) has identified flooding as Calgary's number one hazard and risk. Improving The City's understanding of Calgary's flood risk is one its core strategies for building resiliency. The City continues to build on this work as part of its resiliency and mitigation program.

Understanding flood risk Expert Management Panel Recommendation	Status	Timeline	2018 update
Urge the Province to regularly review and update official flood hazard maps. (5b)	Underway	2019+	The City remains in communication with the Province on their work regarding new Flood Hazard area (FHA) maps. The City continues to advocate for the completion and release of the new FHA maps to the public, and is monitoring developments to determine the implications of new FHA mapping on Calgary.
Develop a suite of watershed-scale climate models to capture various weather event scenarios, with input from regional partners, post-secondary institutions and other orders of government. (5d)	Underway	Ongoing	Projected trends in precipitation and temperature were developed for the 2050s and 2080s and were used to conduct a vulnerability and risk assessment to identify high risk climate scenarios for Calgary and the region. Further climate analysis is required to support the update of design standards in preparation for changing climate conditions. Considering climate uncertainty remains a core consideration in The City's flood mitigation work, and understanding climate implications on flood continue in alignment with The City's Climate Resilience Strategy and Corporate Resilience Strategy. The City has also partnered with academic research consortium Global Water Futures to further develop its climate change modelling.
Collaborate with academic and other partners to develop computer models that identify groundwater movement in Calgary in relation to flood conditions. (5e)	Complete	2017	In 2016, The City completed two assessments on groundwater impacts relating to flooding, which were included in The City's updated Flood Damage Assessment. Additional groundwater studies are ongoing through the current community level flood barrier projects and will inform project design.
Maintain a comprehensive flood risk database integrated with existing geographic information systems (GIS). (5c)	Complete	2015-2016	In 2016, The City produced a GIS based flood risk damage profiles at the community level. This data was created as part of The City's Flood Damage Assessment and has been incorporated into The City's GIS database.
Publish up-to-date, graduated flood maps for public information. (5a)	Complete	2015	Inundation maps prepared by The City for up to 100-year return periods have been posted to Calgary.ca/floodinfo and are available to the public. Work continues to make this information easier to access for Calgarians, including development of an interactive "storymap" that is being developed in 2019.

STRENGTHENING FLOOD-RELATED POLICIES

In addition to mitigation infrastructure, Land use policies, design standards, and flood-proofing building practices can greatly enhance community resilience to flooding. The City continues to communicate the importance of good policy and regulations with the Province and federal government in building resilience.

Strengthening flood-related policies Expert Management Panel Recommendation	Status	Timeline	2018 update
Create graduated flood protection level requirements for City infrastructure. (1b)	Underway	Ongoing	Flood levels are currently considered as part of lifecycle project planning and implementation. Flood resilience considerations will be included as part of the upcoming Municipal Development Plan and Land-use Bylaw reviews starting in 2019, and aligns with The City's Corporate Resilience Strategy and Climate Resilience Strategy.
Expand the review of the Land Use Bylaw and other development regulations to update flood resiliency requirements for private property in flood risk areas. (1c)	Underway	2019+	Flood resilience considerations will be included as part of the upcoming Municipal Development Plan and Land-use Bylaw reviews starting in 2019, and aligns with The City's Corporate Resilience Strategy and Climate Resilience Strategy.
Review The City's existing land-use planning documents and develop amendments, new guidelines or policies that will minimize development in the floodplain over time. (4a)	Underway	2019+	The City is working on potential changes to floodplain development guidelines or policies as part of the City-wide working group currently led by Calgary Growth Strategies. Flood resilience considerations will be included as part of the upcoming Municipal Development Plan and Land-use Bylaw reviews starting in 2019, and aligns with The City's Corporate Resilience Strategy and Climate Resilience Strategy. This work will also be affected by any updates to the FHA mapping currently being undertaken by the Province.
Perform a social, economic and environmental analysis to evaluate the need for a minimum flood protection level above the 1:100 flood for land-use planning and structural protection across Calgary. (1a)	Complete	2017	The FMMA completed in 2016 and 2017 analyzed a variety of scenarios and used a 2013-flood event as reference. The City intends to protect to at least a 2013 flood-event. The City currently reviews all Area Structure Plans, Area Redevelopment Plans, building permits, and City projects to identify flood risks and structural requirements based on various flood protection levels.

PARTNERING FOR A FLOOD RESILIENT CALGARY

The City recognizes the important role partnerships play in building flood resilience. The City depends on strong partnerships with the Province, the federal government, and other stakeholders such as TransAlta, flood-related organizations, and communities upstream to achieve resilience.

Partnering for a flood resilient Calgary Expert Management Panel Recommendation	Status	Timeline	2018 update
Pursue a common river forecasting platform with Alberta Environment and Parks (AEP) and TransAlta for faster and more accurate information and alerts about future flood events. (2a)	Underway	2019+	The City and AEP currently work together to share information to inform their respective forecasting platforms. The City received funds from the National Disaster Mitigation Program in 2017 to support this work, which started in 2018 and is ongoing. The Province is developing a new forecasting platform that will be used by both The City and the Province.
Strengthen partnerships with utility providers to improve resiliency of their infrastructure and operations, with first priority to energy supply and communication networks. (1d)	Complete	2017	The Flood Emergency Response Manual is updated annually to ensure maximum protection of critical city infrastructure and vulnerable communities. CEMA has developed a critical infrastructure strategy to support critical infrastructure owners in their understanding of disaster risk and how to reduce their risk. CEMA has identified core utility providers and businesses as key stakeholders.
In partnership with Alberta Environment and Parks and TransAlta, expand the network of river and weather monitoring stations upstream of Calgary and protect stations from damage during flooding. (2b)	Complete*	2017	Since 2013, The City has repaired or replaced damaged monitoring stations and installed new stations. *This recommendation is considered complete. However, as part of forecasting platform discussions, expansion and modernization of The City's forecasting platform is being done in partnership with the Province and upgrades to the Bragg Creek monitoring station are scheduled to occur before 2021.
In partnership with the Province, develop a time-phased plan to remove buildings from areas with high flood risk, while minimizing the disruption to affected communities. (4c)	Complete*	2017	The voluntary Provincial buy-outs program is complete and the Province has begun demolition of properties. No further Provincial buy-outs are planned at this time. *This recommendation is considered complete but may be re-visited in the future, depending on potential Provincial policy.
Continue to cooperate with TransAlta and the Province to increase flood storage on the Bow River through operation of existing TransAlta facilities. (3c)	Complete	2016	The Province and TransAlta have a five-year agreement in place for Ghost Reservoir operations, ending in 2021. The Bow River Working Group has recognized the importance of this agreement for flood mitigation and identified extending the agreement as a "quick-win" opportunity.
Host a national flood risk workshop to share best practices & develop a networking group. (6e)	Complete	2015	The City hosted the 2015 Livable Cities Forum on Building Flood Resilient Communities in September 2015 in partnership with Canadian Water Resources Association and ICLEI Canada. The City remains involved in national initiatives, such as Public Safety Canada's work on development of national floodplain guidelines.

COMMUNICATING WITH CALGARIANS

It is critical for The City to keep Calgarians informed, provide resources and engage with citizens when it comes to building flood resiliency. The City continues engage stakeholders, provide updates on The City's flood resilience plan, and increase flood awareness.

Communicating with Calgarians Expert Management Panel Recommendation	Status	Timeline	2018 update
Develop programs that support building owners to implement flood resiliency measures. (2e)	Underway	2019+	The City continues to support building and homeowners' understanding of their flood risk through the annual Flood Readiness Campaign. In partnership with the Chamber of Commerce, CEMA developed a business continuity handbook for Calgary businesses. Further development of a formal program to educate and support owners has been considered and resources were approved as part of One Calgary to support this work in 2019-2022.
Incorporate lessons learned from the 2013 flood to enhance communication channels to keep Calgarians informed of conditions that may lead to high river levels. (2c)	Complete	Ongoing	The City established a cross-corporate communications plan and flood readiness communications plan. Updates, information, and general communications are provided annually through The City's social media, local media and advertising, information sessions, and e-mail flood newsletter.
Expand the flood risk communication strategy and provide information and tools that empower Calgarians to make informed choices and better manage their personal flood risk. (2d)	Complete	2015-2016	The City established a cross-corporate communications plan and flood readiness communications plan, including providing information through annual open houses scheduled during flood season and regular newsletter and website updates.

APPENDIX B –CURRENT ACRP-SUPPORTED FLOOD MITIGATION PROJECTS

Project Name	Project Status	Project Description	Estimated Completion Date
Centre Street Bridge Lower Deck Flood Barrier Improvements	Completed	Construction of removable flood barriers that will be installed in the lower deck of Centre Street Bridge to prevent flooding into Chinatown.	2018
West Eau Claire Flood Barrier	Completed	Construction of a flood barrier along the Bow River downstream of Eau Claire to the Peace Bridge.	2018
Roxboro Sanitary Liftstation Replacement	Completed	Flood resilience improvements associated with a replacement sanitary liftstation in the community of Roxboro.	2018
Stormwater Outfall Improvements	Completed	Resilience upgrades to fifteen stormwater outfalls to prevent potential back flooding into affected communities.	2018
Western Headworks Site Condition Improvements	Completed	Area improvements to allow operation of a nearby outfall gate, reducing flood risk for Inglewood, the Calgary Zoo, Deerfoot Trail, and Pearce Estate Park. Additional improvements for emergency road access for river emergencies and gate operations during a flood event.	2018
Bonnybrook Wastewater Treatment Plant Flood Mitigation	Underway	Construction of a flood barrier on the eastern perimeter of the Bonnybrook Wastewater Treatment Plant, with groundwater and stormwater management enhancements to protect the plant from flooding.	2019
Heritage Drive Permanent Flood Barrier	Underway	Construction of an earth-filled berm along Glenmore Trail at Heritage Drive and Glendeer Circle SW (underneath Graves bridge) to prevent flooding of major infrastructure and roadways in the area.	2019
Sunnyside Pump station #1	Underway	Construction of a new, flood dedicated, two-storey pump station to dewater the community of Sunnyside during high water events for river and stormwater management.	2019
Sunnyside Pump station #2	Underway	Flood resilience improvements associated with an upgraded pump station in the community of Sunnyside.	2019
Glenmore Dam Elevated Hoists	Underway	Installation of 2.5m high automated steel gates to replace the existing 1.5m manual stop log system to increase storage at the Glenmore Reservoir.	2020
Downtown Flood Barrier	In design	Construction of a permanent flood barrier from Jaipur Bridge to Reconciliation bridge.	2022+
Upper Plateau Separation	In design	Partial separation of Hillhurst-Sunnyside's stormwater system from communities located above in the upper plateau catchment area.	2020
9th Avenue Bridge Replacement	In design	Raising of the 9th Avenue Bridge to prevent damage during high water events and maintain access for fire and emergency services for the community of Inglewood.	2020
Bowness Flood Barrier	Applied September 2017	Construction of a permanent flood barrier in the community of Bowness.	2024+
Sunnyside Flood Barrier	Applied September 2017	Construction of a permanent flood barrier in the community of Sunnyside.	2022
Pearce Estate Park Flood Barrier	Applied September 207	Construction of a permanent flood barrier in Pearce Estate Park near the community of Inglewood. This project is currently being reviewed by The City.	2024+

APPENDIX C – COMMUNITY DRAINAGE IMPROVEMENT PROGRAM PRIORITIZATION LIST FEBRUARY 2019

Project Name	Cost Estimate ($000's)[1]	Benefit/Cost Ratio[2]	Project Status	Construction Date[3]
Woodlands/Woodbine Bebo Grove & 24th Street SW Diversion (formerly Pond D)	*$22,143*	9	*Construction*	2018-2020
Woodlands/Woodbine - Braeside Dry Pond (formerly Pond A)	*$6,836*	9	*Construction*	2018-2019
Woodlands/Woodbine - Local Improvements	*$6,558*	6	*Construction*	2018-2020
North West Inner-City - Pump Station #1 - Sunnyside[4]	*$11,300*	4	*Construction*	2019-2020
North West Inner-City - Pump Station #2 - Sunnyside[5]	*$10,600*	4	*Construction*	2018-2019
North West Inner-City - Upper Plateau Separation[5]	*$61,000*	7	*Design*	2020-2022
Westgate - Ditch Upgrade / G20C Outfall[6]	*$4,809*	1	*Maintenance and Monitoring*	2019-2022
North West Inner-City - Kensington Close	$2,200	13	Design commence 2019	2019-2022
North West Inner-City -- Crescent Road	$1,100	11	Design commence 2019	2019-2022
North West Inner-City - 7th Avenue	$2,000	8	Design commence 2019	2019-2022
North West Inner-City - 19th Street & 9th Avenue	$2,100	8	Design commence 2019	2019-2022
North West Inner-City - 19th Street & 6th Avenue	$600	8	Design commence 2019	2019-2022
North West Inner-City - South of Riley Park	$11,200	6	Design commence 2019	2019-2022
North West Inner-City - 10th Street[8]	$10,900	2	Design commence 2019	2019-2022
North West Inner-City - 1st Avenue[8]	$2,040	1	Design commence 2019	2019-2022
North West Inner-City - Pump Station #4 - Hillhurst	$11,700	8	Study complete -- to be funded	Beyond 2022
North West Inner-City - Pump Station #3 - Hillhurst	$8,400	7	Study complete -- to be funded	Beyond 2022
Pineridge / Rundle Dry Pond B	$4,175	6	Study complete -- to be funded	Beyond 2022
Palliser/Oakridge - Phase 1 and 2	$18,326	6	Study complete -- to be funded	Beyond 2022
Tuxedo/Mount Pleasant - Phase 1, Phase 2, and local Improvements	$14,196	5	Study complete -- to be funded	Beyond 2022
Pineridge / Rundle Storage Duct #2	$2,824	5	Study complete -- to be funded	Beyond 2022
Shawnessy Stormwater Upgrades	$20,197	3	Study complete -- to be funded	Beyond 2022
North West Inner-City - 14th Street	$14,900	2	Study complete -- to be funded	Beyond 2022
Palliser/Oakridge - Phase 3	$11,247	2	Study complete -- to be funded	Beyond 2022
North West Inner-City - 17th Street & 23rd Avenue	$3,800	2	Study complete -- to be funded	Beyond 2022
Oakmount Dry Pond (Oakmont Way Rev Report)	$492	1	Study complete -- to be funded	Beyond 2022
Macleod Trail CDI Improvements[7]	$6,980	TBD	Study complete -- to be funded	TBD
Deer Run / Bonavista Downs	TBD	TBD	Study underway	TBD
Total	**$276,912**			

1 -- All Cost Estimates are based on 2015 pricing assumptions, except for projects under design or construction, where updated pricing is indicated based on the current project stage.

2 -- Benefit/Cost ratio is based on original project scope and costing (2015). Has not been updated based on current pricing

3 -- Construction schedules / project prioritization are subject to change with the addition of new projects or availability of external funding.

4 -- With funding from ACRP and the New Building Canada Fund.

5 -- With funding from ACRP

6 -- In collaboration with Alberta Transportation. Westgate Ditch and outfall upgrades required due to Southwest Ring Road impacts .

7 -- Study and preliminary cost estimates are finalized. Cost benefit and prioritization for recommendations yet to be assessed.

8 -- These projects are linked via dependency to projects above. Separately they have a low B/C Ratio, but in combination remain high.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0460

Corporate Environment, Health and Safety (EHS) Performance Report

EXECUTIVE SUMMARY

The purpose of this report is to demonstrate The City's accountability for environmental stewardship and provision of a safe and healthy work environment. The report is prepared by Environmental & Safety Management (ESM) in its capacity of providing governance and oversight for The City of Calgary's (The City's) environmental and safety management systems.

In 2018, the City's Total Recordable Injury Frequency (TRIF) and Lost Time Claim Frequency (LTCF) did not reflect safety performance expectations.

- TRIF is a percentage of City workers injured within a certain period of time, factoring in the number of hours worked/exposure hours. Injuries are defined as both Medical Aid (no time loss from work) and Lost Time (missed work due to the injury); and
- LTCF is similar to TRIF, but only accounts for lost time due to injuries and illnesses.

For both measures, lower scores indicate better safety performance. In 2018, The City's TRIF was 11.1, an increase from 10.5 in 2017; LTCF was 5.5 in 2018, an increase from 5.0 in 2017.

We are pleased to report that in the first three months of 2019, safety performance has noticeably improved, indicating that strategic and tactical actions are beginning to have a positive effect. An example of one such strategy is the adoption of ice cleats for all Calgary transit staff in 2018, leading to a 56% reduction in slips, trips and falls. This indicates a turn the curve on our safety performance in the corporation.

Historically, The City's performance on LTCF has been better than the average and median performance of comparable cities. In 2017, The City's performance fell slightly below the average. Benchmarking data for 2018 will be available later in 2019 and will be included in the next performance report.

The City made progress on fulfilling its operational environmental stewardship responsibilities, specific areas include:

- Improved corporate substance release management;
- Increased contaminated site management;
- Continued progress on tree planning; and
- Increased diversion of corporate waste.

The City reported 104 substance releases to Alberta Environment and Parks in 2018. A major update of the Corporate Substance Release Reporting Program was implemented in Q4 2018 and preliminary results indicate an improvement in The City's compliance with legislated reporting timelines.

Work is also underway to establish an overarching corporate-wide environmental management system that will enable The City to work more efficiently across organizational lines to manage environmental risks.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0460

Corporate Environment, Health and Safety (EHS) Performance Report

ADMINISTRATION RECOMMENDATION:

That the SPC on Utilities and Corporate Services recommend that Council:

1. Direct Administration to change environmental and safety performance reporting frequency from biannual to annual and provide separate corporate performance reports on the following service lines going forward as part of One Calgary:
    a. Environmental management.
    b. Organizational health, safety and wellness.

PREVIOUS COUNCIL DIRECTION / POLICY

On 2009 March 25, the SPC on Utilities and Environment directed Administration to report semi-annually to Committee on corporate environment and safety performance, including audit results (UE2009-07).

BACKGROUND

The City of Calgary's Environmental Policy and Occupational Health & Safety Policy establish The City's commitment to manage environmental and safety risks, fulfil compliance obligations, and continually improve performance. The City's environmental and safety management systems support The City in fulfilling its policy commitments.

The Environmental Management service line supports the Citizen Priority of 'a healthy and green city'. Organizational Health, Safety and Wellness is an enabling service that is foundational to delivering on all five Citizen Priorities.

The previous Corporate EHS Performance Report (UCS2018-1143) was delivered on 2018 October 10. The report provided information on actions to improve safety performance, the on-going corporate response to legislation changes, and the successful transition to the updated ISO 14001:2015 standard by The City's nine ISO 14001-registered business units.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

The Corporate EHS Performance Report includes detailed information on corporate EHS management and performance (Attachment 1). An overview of the report is provided below.

Organizational Health, Safety and Wellness

The City currently uses two key performance measures for organizational health and safety: Total Recordable Injury Frequency (TRIF) and Lost Time Claim Frequency (LTCF).

- TRIF is a percentage of City workers injured within a certain period of time, factoring in the number of hours worked/exposure hours. Injuries are defined as both Medical Aid (no time loss from work) and Lost Time (missed work due to the injury); and
- LTCF is similar to TRIF, but only accounts for lost time due to injuries and illnesses.

For both measures, lower scores indicate better performance. In 2018, The City's TRIF was 11.1, an increase from 10.5 in 2017; LTCF was 5.5 in 2018, an increase from 5.0 in 2017.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0460

Corporate Environment, Health and Safety (EHS) Performance Report

Early in 2019 we have seen The City's TRIF improve to 9.8. There have been a number of strategies and actions that have been implemented, which have led to this positive effect on performance. A key strategy includes the adoption of ice cleats for all Calgary transit staff, in 2018, 2018 led to a 56% reduction in slips, trips and falls.

The City's performance on LTCF has been better than the average and median performance of these comparable cities. In 2017, The City's performance fell slightly below the average. Benchmarking data for 2018 will be available later in 2019 and will be included in the next performance report.

The City's Certificate of Recognition (COR) audit will be begin in September 2019 and audit planning is underway. The COR Audit is an external health and safety audit conducted every three years as part of the provincial Partnership in Injury Prevention program. The COR audit is important as the City receives a Workers' Compensation Board (WCB) rebate. It is also of reputational importance, as an Alberta municipal standard. This audit assessment helps ensure the sustainability and improvement of our safety management system.

Corporate Environmental Management

Twelve business units maintain ISO 14001-based environmental management systems (EMS), with nine business units formally registered to the international standard. Environmental audits of these business units did not identify any major management system non-conformities or high-risk non-compliance findings in 2018.

The Corporation continues to make progress on fulfilling its operational environmental stewardship responsibilities. For example:

- Several energy efficiency and renewable energy projects were completed. These will contribute to long-term reductions in corporate greenhouse gas (GHG) emissions.
- The City continues to maintain and protect trees through proactive pruning and integrated pest management, including a recent trial program to control European Elm scale.
- The City's business units continued to work collaboratively to control potential sources of contamination, reduce unknown liabilities, and mitigate soil and groundwater contamination.

The City reported 104 substance releases to Alberta Environments and Parks in 2018. A major update of the Corporate Substance Release Reporting Program was implemented in Q4 2018 and preliminary results indicate that the updates are improving The City's compliance with legislated reporting timelines.

Work is underway to establish an overarching corporate-wide environmental management system that will enable The City to work more efficiently across organizational lines to manage environmental risks. The corporate EMS will support the development of a Corporate Environmental Plan, which will set goals and provide a strategic approach for reducing the environmental impacts of corporate operations.

The City continues to enhance it's use of Environmental Construction Operations (ECO) plans on capital projects to integrate environmental considerations into decision-making and support environmental compliance. ECO Plan performance data is being used to identify opportunities to improve education for project managers, contractors and consultants.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0460

Corporate Environment, Health and Safety (EHS) Performance Report

Corporate EHS Performance Reporting

Going forward into One Calgary, the Environmental and Safety Management (ESM) Business Unit is proposing to report separately on OHSW and environmental management to provide clarity between these two service lines and to increase the efficiency and alignment of reporting.

ESM is also proposing to change the frequency of formal environmental and OHSW reports to SPC on Utilities and Corporate Services from biannual to annual. Annual reporting will better align with the annual improvement cycle of The City's environmental and safety management systems and the annual work planning cycle that delivers actions and accomplishments. In addition, annual reporting will be based on more holistic analysis that considers all of The City's environmental and OHSW headline performance measures and benchmarks, many of which are only available annually.

Compliance, risk, and performance data will be continually monitored to inform strategies and actions. There are several mechanisms in place to ensure that accountability is maintained throughout the year.

A review has determined that the proposed reporting changes are consistent with approaches taken by other large organizations, including other North American municipalities such as the City of Edmonton, the City of Toronto, and the City of Vancouver.

Stakeholder Engagement, Research and Communication

Key partners and internal customers are engaged throughout the year to support the design, implementation, and improvement of programs, systems, and actions that contribute to EHS performance, compliance, and risk management.

Strategic Alignment

The Corporate EHS Performance Report aligns to Organizational Health, Safety and Wellness (OHSW) and Environmental Management service line strategies to provide service line oversight and use relevant data and information to inform decision-making.

Social, Environmental, Economic (External)

The Corporate EHS Performance Report demonstrates The City's accountability for its environmental and safety performance. Corporate performance in these areas supports the delivery of City services.

Financial Capacity

Current and Future Operating Budget:

Recent legislative changes and The City's performance on lost time claims are contributing to increased lost time claim costs.

Current and Future Capital Budget:

Capital budget has been allocated through One Calgary to address the safety and environmental investment needs identified in this report.

Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0460

Corporate Environment, Health and Safety (EHS) Performance Report

Risk Assessment

Corporate EHS risks are managed and communicated in accordance with the corporate Integrated Risk Management (IRM) model and are reported to Audit Committee twice annually via the Corporate Risk Report.

Strategies to address risks related to employee well-being, safety, and resilience are being developed and implemented. Examples include:

- Data driven incident investigation and corrective action;
- Increased site inspection frequency; and
- Certification of Recognition (COR) Audit preparation.

Strategies and plans are also in place to address environmental risks with potentially significant impacts, including climate change and soil and groundwater contaminated site liability.

REASON(S) FOR RECOMMENDATION(S):

Reporting separately on corporate environmental management and organizational health, safety and wellness will provide clarity between these two service lines and improve alignment with other service line reporting as part of One Calgary.

Annual reporting will better align with the annual improvement cycle of The City's environmental and safety management systems and the annual work planning cycle that delivers actions and accomplishments.

Annual reporting will be based on more holistic analysis that considers all of The City's environmental and OHSW headline performance measures and benchmarks, many of which are only available annually.

Compliance, risk, and performance data will continue to be monitored throughout the year to inform strategies and actions

ATTACHMENT(S)

Attach 1 – Corporate Environment, Health and Safety (EHS) Performance Report
Attach 2 – Corporate Environment, Health and Safety Performance Report Presentation

Corporate Environment, Health and Safety (EHS) Performance Report

May 15, 2019

Table of Contents

1 Introduction

The City of Calgary is committed to its corporate responsibilities related to environmental stewardship and a safe and healthy work environment. The City of Calgary's Environmental Policy and Occupational Health & Safety (OHS) Policy establish a set of commitments outlining The City's intentions to manage environmental and safety risks, fulfil compliance obligations, and continually improve performance. The City's environmental and safety management systems ensure the integration of environmental and safety considerations into The City's day-to-day operations and longer-term strategic plans.

To demonstrate accountability for these responsibilities, The City regularly reports on specific indicators of environmental, health and safety performance.

2 Organizational Health and Safety

The City's OHS Policy reinforces The City's commitment to provide a safe and healthy work environment for its employees. The City's OHS Management System establishes the standards, processes and programs to meet legislated requirements, manage health and safety risks, and continually improve safety performance. Through One Calgary, Environmental & Safety Management and Human Resources are working closely together to deliver the Organizational, Health, Safety and Wellness service.

Within the OHS Management System, The City has a Corporate Safety Strategy that identifies opportunities to strengthen corporate safety culture and improve safety performance. The strategy will be reviewed and updated in 2019 to integrate and align with One Calgary, the Healthy Workplace Strategy, recent changes to legislation, corporate learning programs, and to reflect the advancement of corporate safety programs and initiatives.

Safety Performance

Safety performance is continually tracked with two key performance measures: Total Recordable Injury Frequency (TRIF) and Lost Time Claim Frequency (LTCF):

- **TRIF** is a percentage of City workers injured within a certain period of time, factoring in the number of hours worked/exposure hours. Injuries are defined as both Medical Aid (no time loss from work) and Lost Time (missed work due to the injury); and
- **LTCF** is similar to TRIF, but only accounts for lost time due to injuries and illnesses.

For both measures, lower scores indicate better performance. In 2018, The City's Total Recordable Injury Frequency was 11.1, an increase from 10.5 in 2017. LTCF increased from 5.0 in 2017 to 5.5 in 2018.

The City participates in the Municipal Benchmarking Network, a network of Canadian municipalities that collect and compare standardized data for the purposes of service improvement. Through this network, The City benchmarks lost time incident frequency and lost time incident severity against eight cities with populations greater than 500,000.

Historically, The City's performance on lost time incident frequency has been better than the average and median performance of these comparable cities. In 2017, The City's performance fell slightly below the average. Benchmarking data for 2018 will be available later in 2019 and will be included in the next performance report.

Strategies and Actions to Improve Performance

Reducing the number of City employees getting injured continues to be a top priority for The Corporation. An increased operational focus for organizational health and safety management continued through 2018. This operational focus, along with key tactical actions, is improving safety performance. For the last 12-month period (May 2018 – April 2019) TRIF improved to 9.8.

Examples of key actions include:

- **Improving the quality of incident investigations**, including the enhanced use of data to understand incident root causes and drive effective corrective actions in operational business units. Two examples of data driven improvements involved: 1) adoption of ice cleats for all Calgary Transit staff—this led to a 56% reduction in slips, trips and falls in the business unit; and 2) application of high-visibility safety decals on the back of Water's valve crew trucks—this initiative resulted in a significant reduction in related near misses.

- **Increasing site inspection frequency** including inspections conducted by leadership teams. Site inspections not only support hazard identification and control, they also allow for behaviour-based observations and can be used to increase knowledge and awareness of safety related issues across all levels of the organization.
- **Improving safety resource efficiency** by analyzing safety resource allocation and work scopes. An analysis based on safety risk and customer-centric understanding of organizational safety support needs was completed in 2018. The analysis will support future resource allocation decisions ensuring resources are being applied toward the right areas of focus and priorities.

The Senior Safety Committee is engaged each quarter to provide strategic and tactical advice on health and safety direction and priorities, and to share information and best practices that reinforce a positive safety culture. Reviewing and improving overall safety governance will occur with an updating of the corporate safety strategy commencing in late-2019.

Safety Perceptions and Awareness

The Corporate Employee Survey (CES) captures employee perceptions of The Corporation's workplace practices that support physical and psychological safety. Results of the 2018 survey show The City continues to demonstrate strength in the protection of physical safety and psychological support. Additional areas of advancement and progress include:

- Employees better understand their responsibility for making sure they and their colleagues stay safe.
- Employees have the training to do their jobs safely.

Certificate of Recognition (COR) Audit

The Certificate of Recognition (COR) audit is an external health and safety audit conducted every three years as part of the provincial Partnerships in Injury Prevention program. The City has successfully participated in the program since 2007. The audit program has been updated to align with recent changes to Occupational Health and Safety legislation. The City's next audit will begin in September 2019 and audit planning is underway. The COR audit it important as the City receives a Workers' Compensation Board (WCB) rebate in addition to its reputational importance as an Alberta municipal standard. This audit assessment helps ensure that our safety management system remains effective and current.

Legislative changes

Joint Worksite Health and Safety Committees (JWHSC)

As a result of changes to Occupational Health and Safety (OHS) legislation, worksites with 20 or more employees require a health and safety committee. This legislative change provides an opportunity for The City to take a holistic look at our JWHSC structure and design a structural approach that will work best for our complex organization. The City has been working closely with a group of other large employers in Alberta (e.g. University of Calgary, Alberta Health Services) to monitor how they are responding. Further, The City is taking a risk-based approach in response to this legislative change.

Serious and potentially serious Occupational Health and Safety incidents

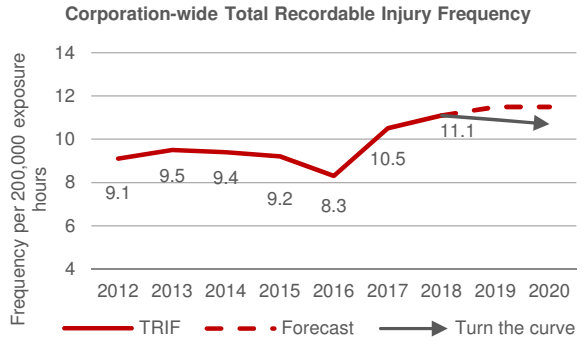
Recent legislative changes mean that any incident resulting in an employee being admitted to hospital must be reported to Alberta Occupational Health and Safety (Alberta OHS) along with “Potentially Serious Incidents”. Potentially Serious Incidents are those that had potential to cause serious injury to a person but did not. In 2018, The City successfully piloted a process to ensure the new reporting requirements are met.

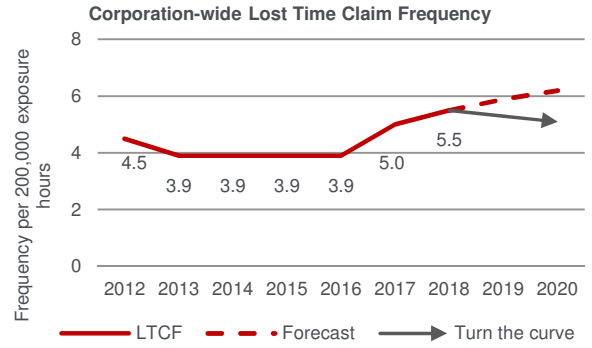
In 2018, six serious incidents were reported to Alberta OHS. These incidents have all been investigated and incident files are now closed with Alberta OHS. Changes to OHS legislation have increased our reportable incidents. We continue to learn from the investigations to improve techniques, processes and implement findings.

Preventing workplace injuries and illnesses The City's Occupational Health and Safety Policy outlines The City's commitment to providing a safe and healthy work environment for its employees. The Policy also sets out expectations for employees to contribute to a safe and healthy work environment as a shared responsibility.

Customers Leaders, managers, operational and administrative employees, health/safety/wellness risk owners, Administrative Leadership Team

Key Partners Senior Safety Committee, business unit safety contacts, Human Resources, Corporate Analytics & Innovation, Facility Management, Corporate Security, Supply Management, Law, Fleet Services, Calgary Transit, Water Services





The story behind the numbers

- Total Recordable Injury Frequency (TRIF) is a ratio of the number recordable injuries and illnesses that result in medical treatment being sought, and those that result in lost time, per exposure hours. The Corporation's TRIF increased from 10.5 in 2017 to 11.1 in 2018.
- Lost Time Claim Frequency (LTCF) is similar to TRIF, but only accounts for injuries and illnesses that result in lost time. The Corporation's LTCF increased from 5.0 in 2017 to 5.5 in 2018.
- Psychological claim acceptance by WCB in 2018 was higher due to recent legislative changes. The greater number of accepted claims increases The City's TRIF and LTCF.
- The top underlying causes of occupational incidents for 2018 were:
  1. Lack of knowledge / awareness (i.e. insufficient information or understanding of job hazards).
  2. Surface conditions (i.e. unsafe or unstable surfaces, such as wet/slick surfaces).
  3. Inadequate preparation / planning (i.e. lack of task planning; insufficient pre-work briefing).

Accomplishments

Application of data-driven incident investigations and corrective action development to drive change:

- Adoption of ice cleats for all Calgary Transit staff, in 2018 led to a 56% reduction in slips, trips and falls.
- Application of high-visibility safety decals on the back of Water's valve crew trucks resulted in reduction in related near misses.

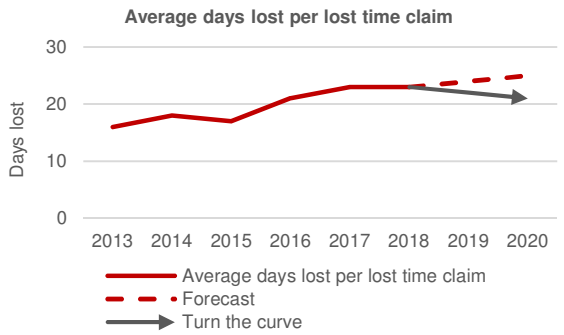
Moving Forward

- Continue improvements to incident investigations and root cause analysis, including further application of the data-driven approach to corrective action development.
- Increase site inspection frequency including inspections conducted by leadership teams.
- Increase the consistency of hazard identification during operational work planning and site set-up activities.
- Review and improve corporate occupational health and safety learning and development programs and training courses.
- Implement a 2019 Safety Month campaign focused on improving day-to-day safety dialogue among employees and leaders and encouraging employees to speak up about safety concerns.
- Review and update the Occupational Health and Safety policy, the Corporate Safety Strategy, and the Occupational Health and Safety Management System.

Managing workplace injuries and claim costs Intentional incident management includes supporting employees in seeking timely medical treatment after a work-related injury and supporting them through Workers' Compensation Board (WCB) and return to work processes to reduce the amount of time the employee loses from work. Incident management also includes thorough and timely incident investigations, which are critical to understanding causes and developing appropriate corrective actions and strategies.

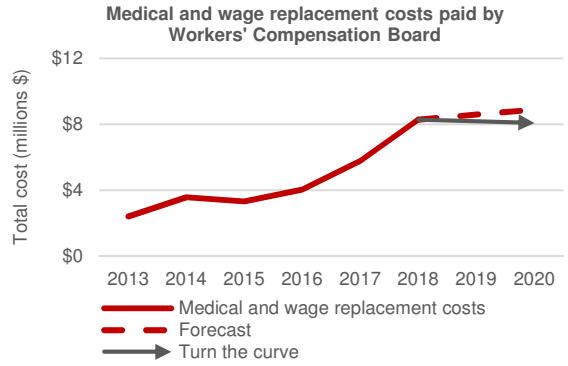
Customers Leaders, managers, and operational and administrative employees, Health/safety/wellness risk owners, Administrative Leadership Team (ALT), Council

Key partners Human Resources, City leaders and managers, Workers' Compensation Board (WCB) Alberta, industry partners



The story behind the numbers

- The average number of days lost due to work-related incidents in 2018 was 23, unchanged from 2017.
- In 2018, 75 per cent of employees that could be accommodated (based on medical clearance) were provided with an accommodation. Performance on accommodation was consistent with 2017; however, this remains an opportunity for improvement.



The story behind the numbers

- Medical and wage replacement costs paid by the Workers' Compensation Board (WCB) increased in 2018, primarily due to an increase in lost time claims. These costs directly affect The City's WCB premiums.
- The City's WCB premiums were $21 million in 2018 and are forecast to be over $22 million in 2019. Despite expected improvements in safety performance and accommodation, these are expected to continue to increase next business cycle, partially due to legislative changes. WCB premiums are also affected industry rate increases.

Accomplishments

- Finalized an Accommodation Strategy, which will improve the employee accommodation process and address legislative changes. The strategy provides direction to: establish sustainable funding for accommodations; tactics to reduce the stigma related to accommodated work and support inclusion; and streamlining of accommodation processes to improve efficiencies.

Moving Forward

- Continue implementing the Accommodation Strategy, including active case management and funding set aside for wage replacement.
- Continue to build job demands analyses of safety sensitive and high-risk positions to assist Business Units and case managers to more appropriately apply work restrictions and return employees to work sooner.
- Work with WCB on improving cost and case management, including identifying trends, improving efficiency for reporting, and improving the audit process.
- Continue with the multiple strategies and tactics to reduce the number of injuries across The Corporation.

3 Corporate Environmental Management

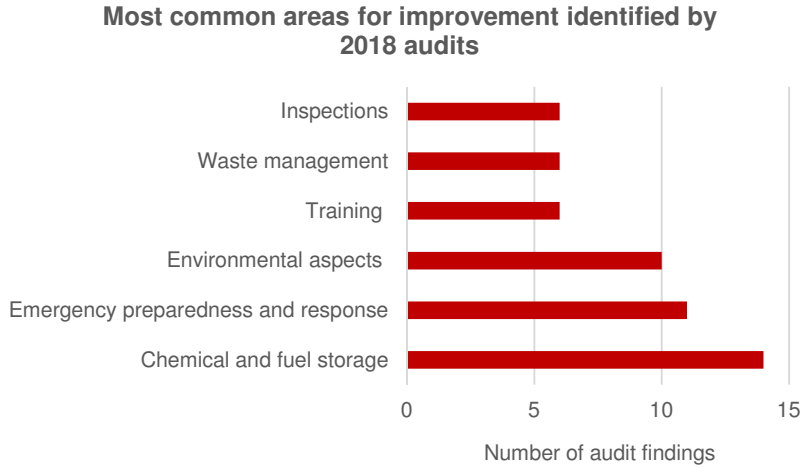
The City of Calgary's Environmental Policy provides direction for City business units to fulfill environmental compliance obligations and continually improve performance in alignment with the ISO 14001 Standard for environmental management systems (EMS). Nine business units formally registered to the ISO 14001 standard, while three additional business units (not formally registered) maintain ISO 14001-based systems.

An overarching corporate-wide EMS is being developed to manage corporate environmental risks at the operational level and take advantage of opportunities for efficiency and collaboration across The Corporation. The corporate EMS will support the development of a Corporate Environmental Plan in 2019. The Corporate Environmental Plan will provide a strategic approach for continually improving existing programs, addressing gaps in current corporate environmental programming, and establishing actions to support performance of the corporate EMS.

Internal and external environmental audits

Environmental audits of The City's twelve business units with ISO 14001-based EMS did not identify any major management system non-conformities or high-risk non-compliance findings in 2018. Audits assess conformance to the ISO 14001 standard, environmental legislation, corporate environmental management standards, and the business unit's own management system requirements.

The most common areas for improvement identified during the audit are shown on the graph to the right. Corrective actions have been developed for each audit finding and are being monitored. Examples of recent corrective actions include:

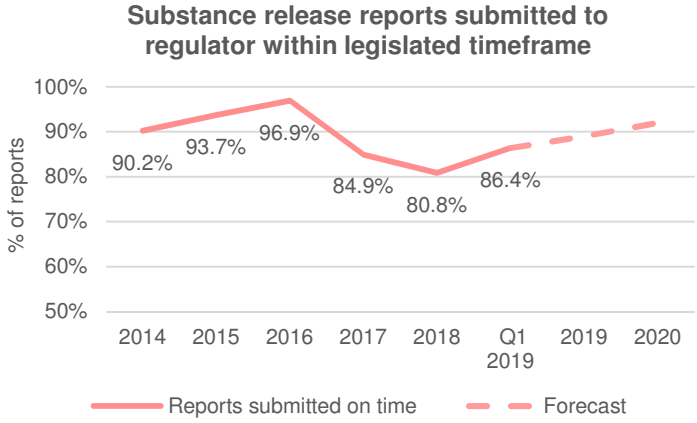


- Improved environmental emergency plan testing with a process to track the timely implementation of corrective action items.
- Reduced risk of chemical reactions, leaks, and spills by reinforcing chemical storage compliance requirements with staff.

Substance release reporting

Substance releases that exceed established thresholds or may cause an adverse effect on the environment or human health must be reported verbally to Alberta Environment & Parks (AEP). A written report must be submitted to AEP within seven days of the verbal report. The City reported 104 substance releases to AEP in 2018.

A major update of the Corporate Substance Release Reporting Program was implemented in Q4 2018. Preliminary results indicate that the updates are improving The City's reporting compliance.



Changes to environmental legislation and policy

The City continues to monitor and respond to environmental legislation and policy changes. Since the last report, amendments to Alberta's *Water (Ministerial) Regulation*, made under the *Water Act*, came into effect. The amendments establish a risk-based and enforceable Dam and Canal Safety Directive, which sets out requirements for dam design, construction, operation, surveillance, and decommissioning/ closure. The City is responding by identifying gaps and developing a policy that will align with the new requirements.

Preventing and managing soil and groundwater contamination means working collaboratively to control potential sources, reduce unknown liabilities, and mitigate contamination impacts across City facilities, capital projects, and services. This supports The City's commitment to protect the health of the environment and the public.

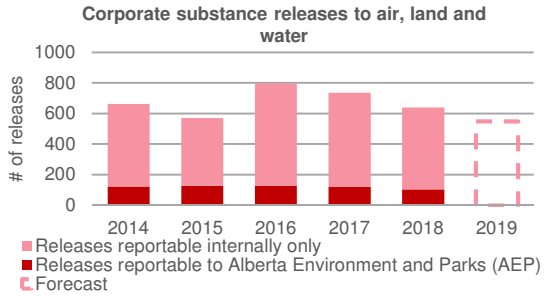
Customers

Operational business units, site operators, project managers, Planning & Development, corporate land stewards

Key Partners

Internal: Law, 311, Environmental and Safety Management (ESM), Calgary Fire Department, Law, Finance, Water Resources/Water Services, Customer Services and Communications (CSC). External**:** Consultants, regulatory authorities, Community Associations

Corporate Substance Release Management



The story behind the numbers

- Internal substance releases reports decreased in 2018. The number of spills reported to Alberta Environment and Parks also decreased. Further investigation will be completed in 2019 to understand the cause of the decline (i.e. fewer releases occurring, or releases not properly reported).
- The primary causes of 2018 releases were related to the City's fleet of vehicles and equipment and included hose/line failure, vehicle and equipment leaks, and motor vehicle accidents. The majority of spills were small and contained.

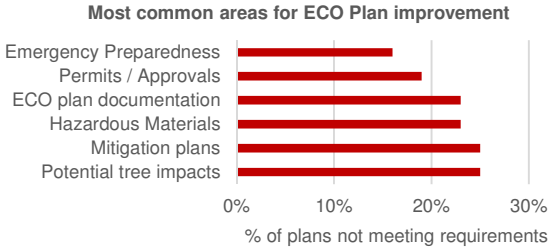
Accomplishments

- Supply Management, Fleet Services, ESM and CSC collaborated to address an observed increase in releases at The City's fuel sites. Actions included targeted communications, updated procedures, training, and revised signage.

Moving Forward

- The Corporate Substance Release Reporting Program will be incorporated into a broader program including environmental emergency management, substance release prevention and substance release management/response. Release data will be used to identify opportunities to reduce environmental impact.

Contractor Environmental Management



The story behind the numbers

- Environmental Construction Operations (ECO) plans provide a framework for The City's capital projects to integrate environmental considerations into decision-making and support compliance with applicable environmental regulations, bylaws and guidelines.
- In 2018, 75 ECO plans were reviewed. An analysis of these identified the environmental requirements that most commonly require improvement when contractors and consultants prepare the ECO Plans.

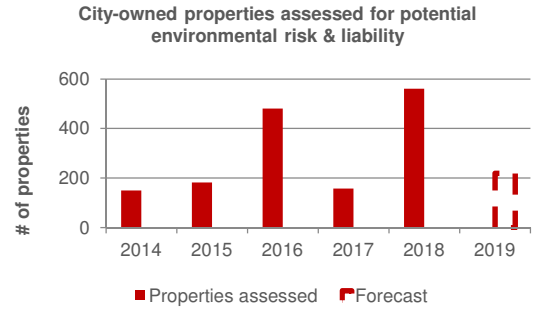
Accomplishments

- City project managers, construction supervisors, and field managers attended an environmental protection workshop to increase environmental awareness in daily decision-making.

Moving Forward

- Education for project managers, contractors and consultants on The City's environmental requirements targeting the ECO plan improvement areas.

Contaminated Site Management



The story behind the numbers

- In 2018, to reduce unknown liabilities, ESM's regular screening program assessed 561 City-owned sites for contamination risk. The number of assessments varies from year to year based on many factors (e.g. complexity/nature of environmental risks, number of land transactions and capital projects).
- To decrease unknown liabilities on a business unit portfolio basis, and in addition to the regular screening program, ESM and Calgary Housing Company (CHC) screened 1,539 CHC-managed sites for potential environmental concerns. Follow-up assessments required on 24 of these sites indicated no outstanding environmental concerns.
- The City actively managed 34 known contaminated sites in 2018, thereby reducing risk and liability.

Accomplishments

- Calgary Roads is actively working to address contamination risks related to road salts and is on track to meet six of seven national voluntary compliance targets for the management of road salts.

Moving Forward

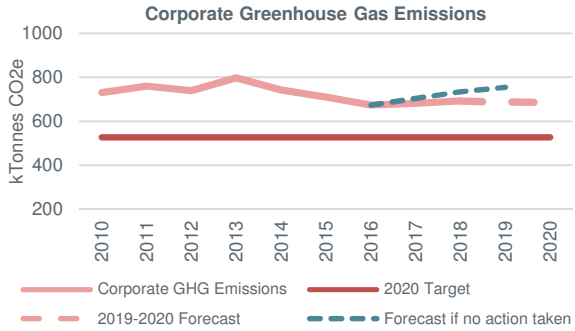
- Implement a strategic plan to improve Roads' ability to store treated abrasives under cover.
- Develop a site portfolio to understand contamination risk and liability for Facility Management.
- Implement the new Remediation Regulation and Asset Retirement Obligations accounting standard.

Fulfilling corporate environmental stewardship responsibilities means working together to conserve, protect, and enhance the environment by complying with legislation, conserving resources and preventing pollution within The City's own operations.

Customers
Council, Administrative Leadership team (ALT), business units, environmental policy owners.

Key Partners
Internal: Waste and Recycling Services, Supply Management, Calgary Parks, Environmental and Safety Management, Roads, Planning, Transportation, Water. **External:** The development and building industry, transportation experts, waste experts, academics, non-profits, consultants, external supplier community, public space users

Reducing Greenhouse Gas (GHG) Emissions



The story behind the numbers

- The opening of the municipal composting facility resulted in increased corporate emissions for 2018. When the facility is operating at full capacity, the diversion of organic material from the landfills will avoid about 110,000 tonnes of CO_2e per year in landfill gas emissions.

Accomplishments

- Solar photovoltaic panels were installed at nine locations in 2018, creating an estimated annual GHG reduction of 2,330 tonnes and generating 3.7 million kWh of energy.

Moving Forward

- The 4.5 megawatt turbine installed at the Bonnybrook Waste Water Treatment Plant will improve the reliability and efficiency of energy and heat generation.
- Landfill gas capture at Spyhill landfill will reduce methane emissions.

Maintaining and Protecting Trees

The story behind the numbers

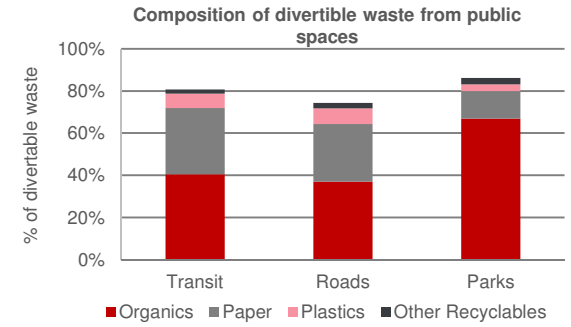
- The ReTree program ended in 2017. Starting in 2018, tree planting has focused on replacing those lost to natural lifecycle decline, approximately 3,500 trees per year. In 2018, 4,258 trees were planted.
- A key learning from the ReTree YYC program was to prioritize proactive pruning to sustain the resilience of our public trees. Pruning will make them less susceptible to breaking from heavy snowfall, especially in the spring.

Accomplishments

- Two years of data collected for an integrated pest trial program for European Elm scale. The data allows the exploration of ways to reduce pesticide use through cultural practices which benefit trees and surrounding soil communities.

Moving Forward

- Collect data to monitor existing non-native pest species.
- Continue to prioritize proactive tree pruning to sustain the resilience of public trees.
- Use ECO Plan data to target education to contractors with regard to tree protection.



The story behind the numbers

- To guide waste diversion decisions, waste composition studies were undertaken in the public spaces maintained by Calgary Transit, Calgary Parks, and Roads. The studies found that up 80% of the waste in the samples collected was potentially divertible.
- The three business units are using the results to develop and implement strategies. For example, Transit used the waste composition studies to determine a significant portion of divertible waste was paper. As a result, recycling bins have been placed at transit stations at a 1:1 ratio with waste bins.

Accomplishments

- Calgary Parks tested the effectiveness of refurbishing garbage cans and benches to conserve materials, reduce waste, and lower costs. Refurbishing saves $700/can and $400/bench. 2018 savings were $15,700.

Moving Forward

- Forecasted refurbishment of 20 benches/60 garbage cans, will divert waste from landfills, saving $50,000.
- Implement communications and education initiatives including "Recycle and Compost Right @ Work".
- Introduce a yard waste diversion focus for operational business units such as Calgary Parks.

Corporate Environment, Health and Safety Performance Report

UCS2019-0460 Attachment 2

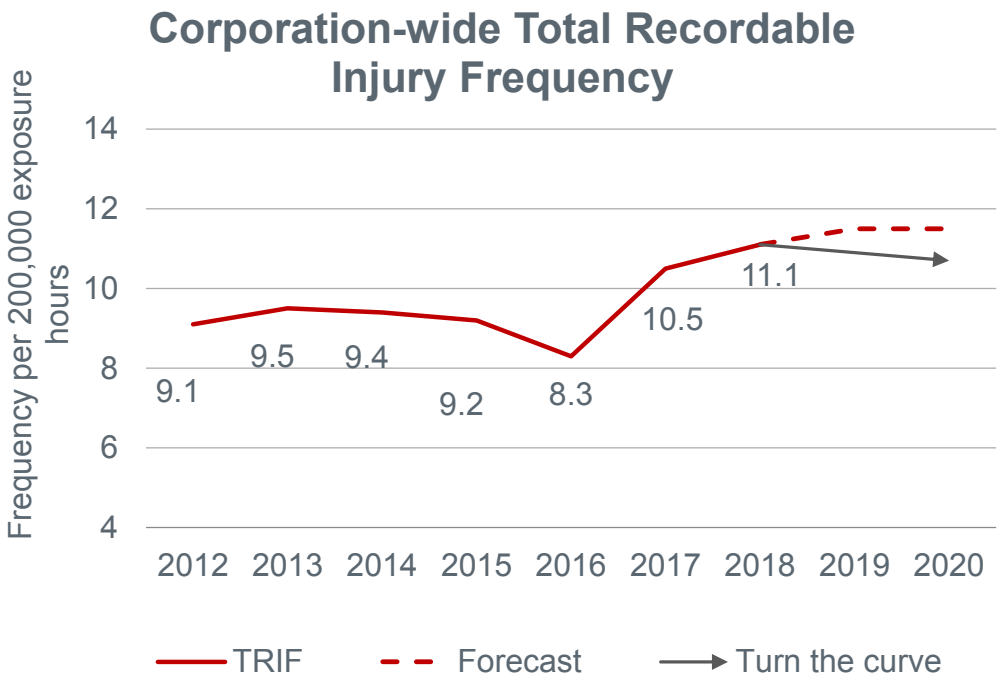
ISC: Unrestricted

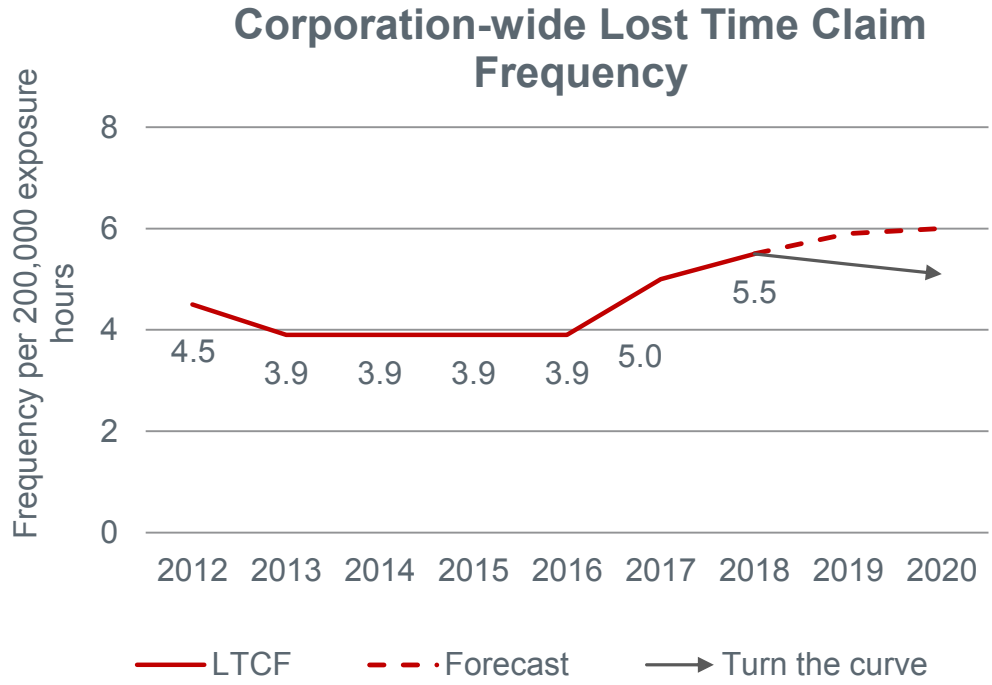
Standing Policy Committee on Utilities and Corporate Services

15 May 2019

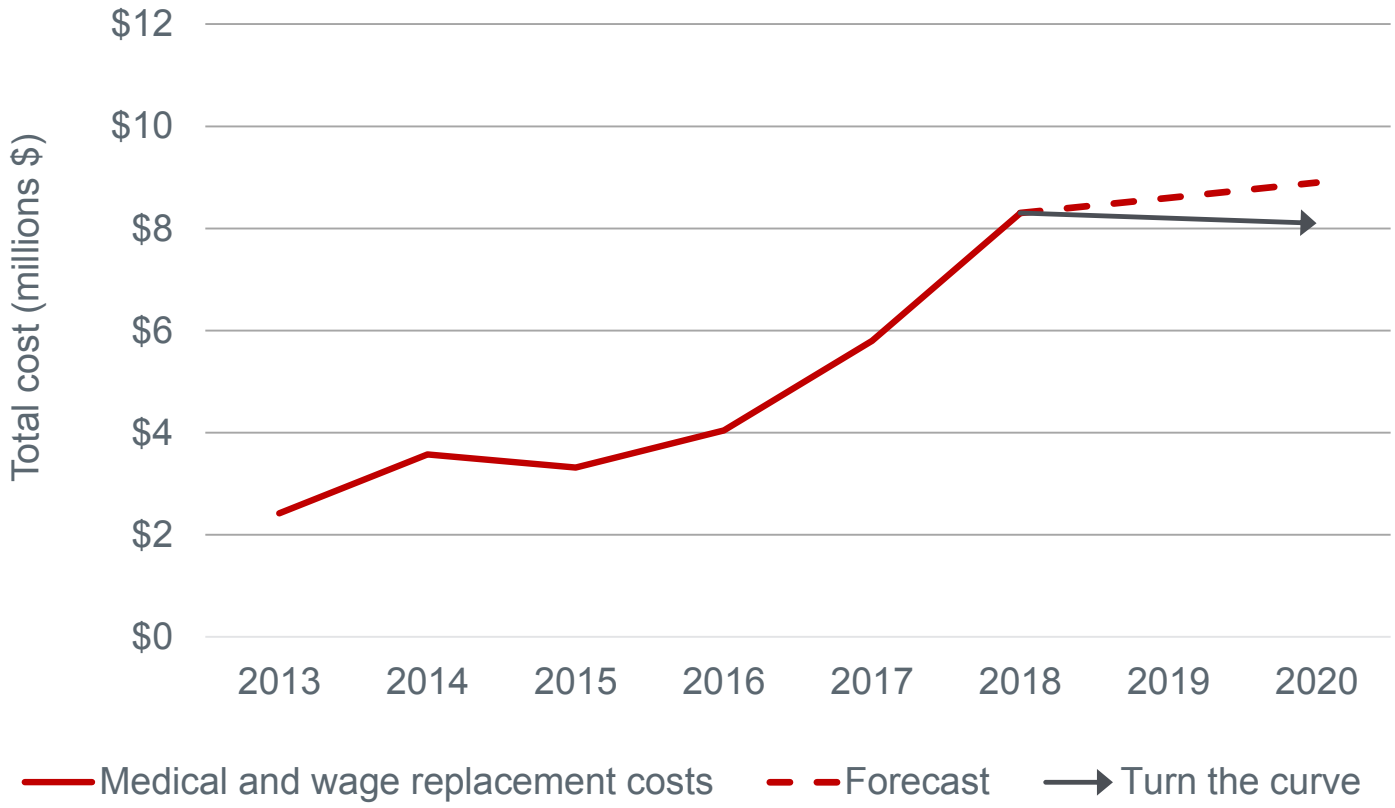
Organizational Health and Safety

Health and Safety Performance





Medical and Wage Replacement Costs paid by the Worker's Compensation Board

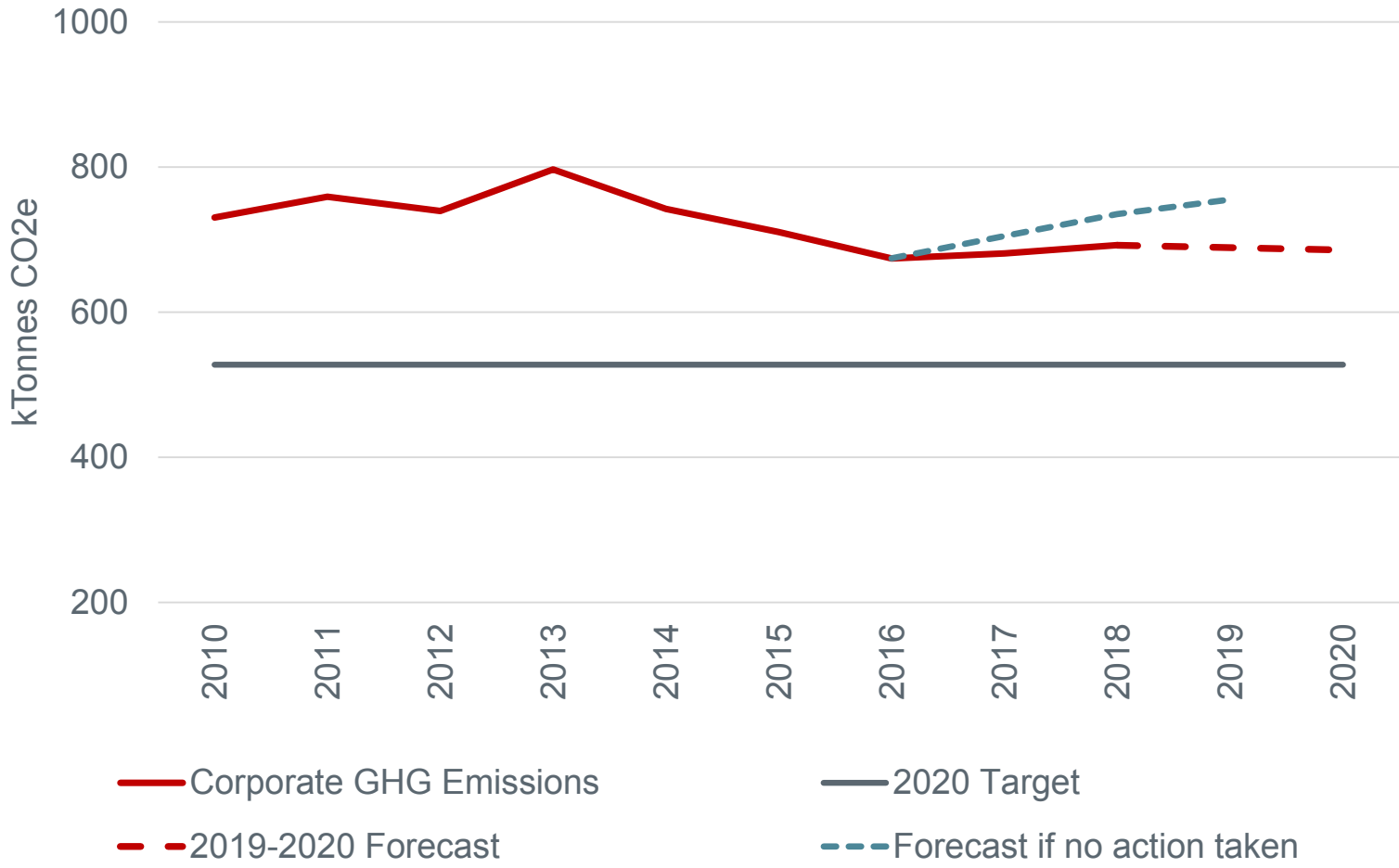


Occupational Health and Safety Actions

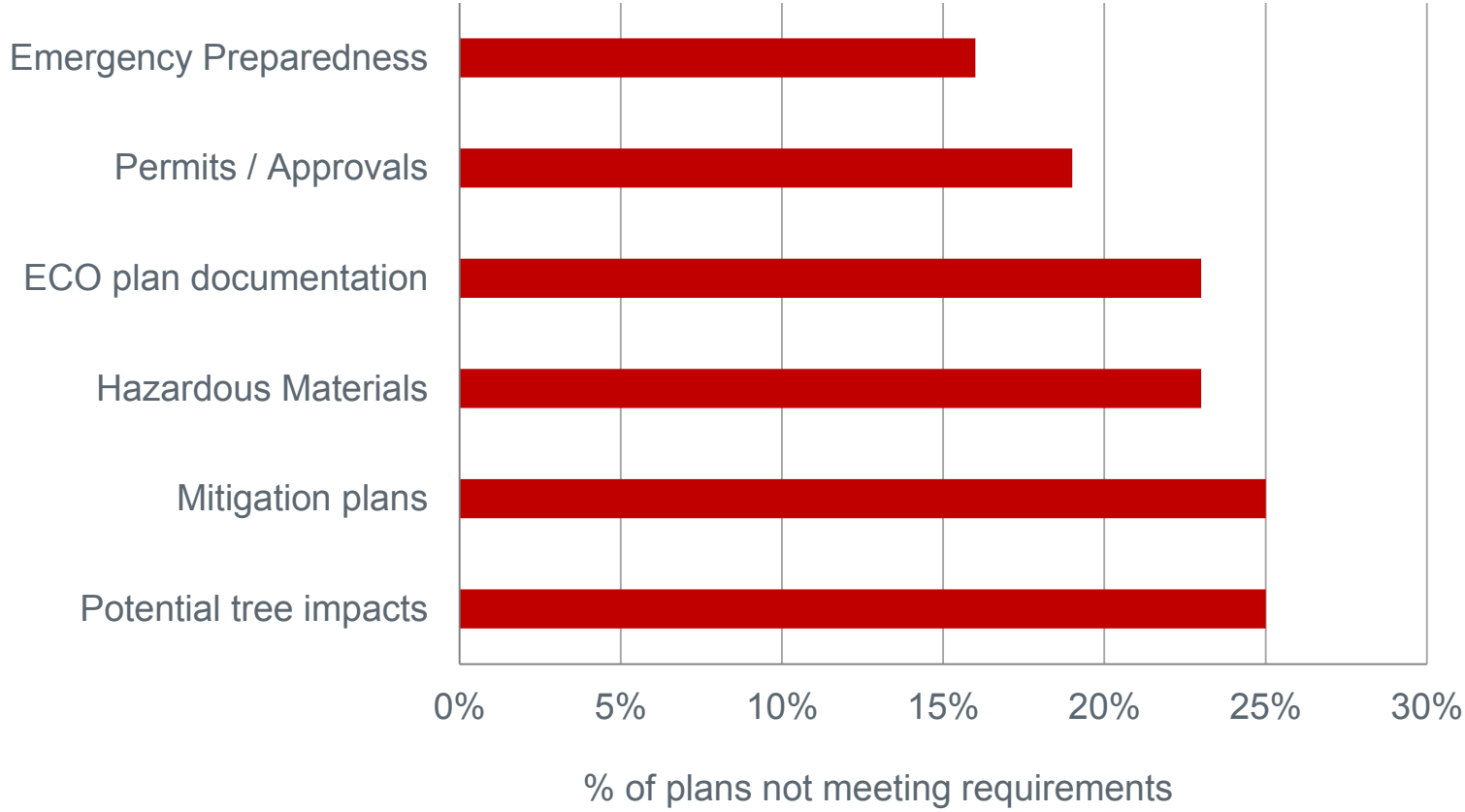
- Data-driven incident investigation and corrective action
- Increased site inspection frequency
- Risk- and needs-based safety resource allocation
- Accommodation Strategy
- Enhanced safety governance
- Certification of Recognition (COR) Audit preparation

Environmental Management

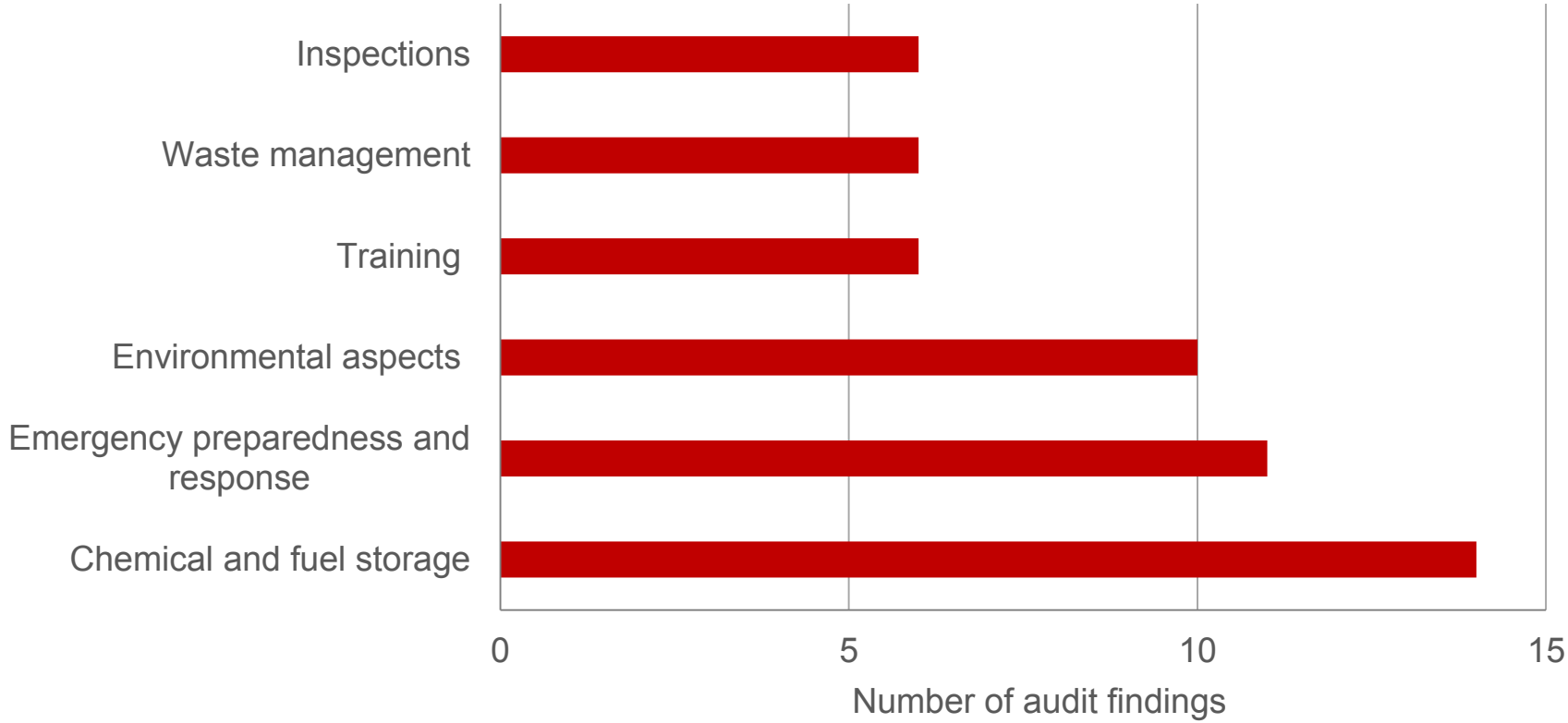
Corporate Greenhouse Gas Emissions

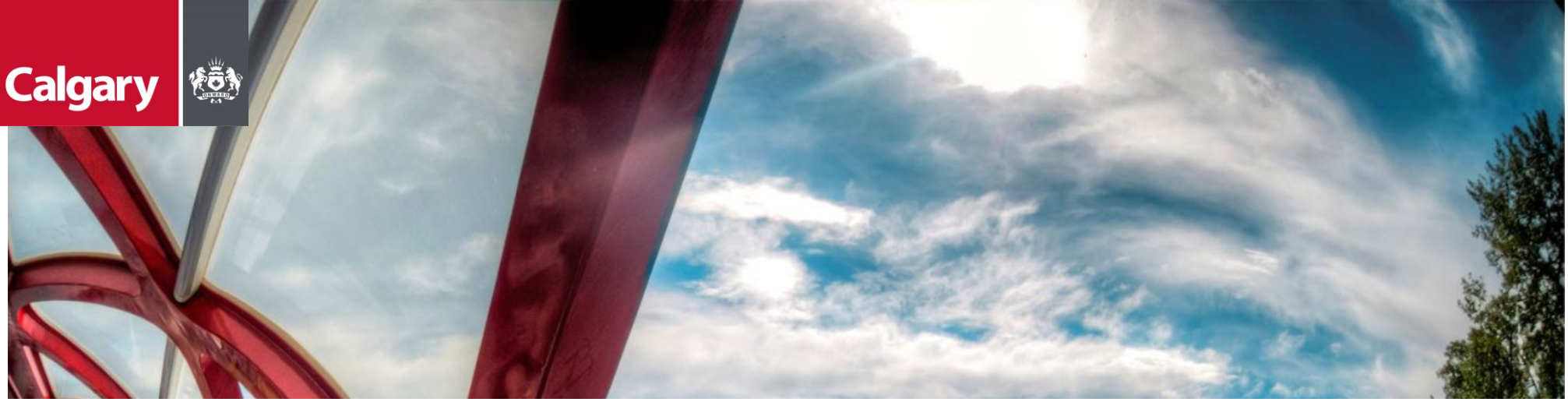


Most common areas for Environmental Construction Operation Plan improvement

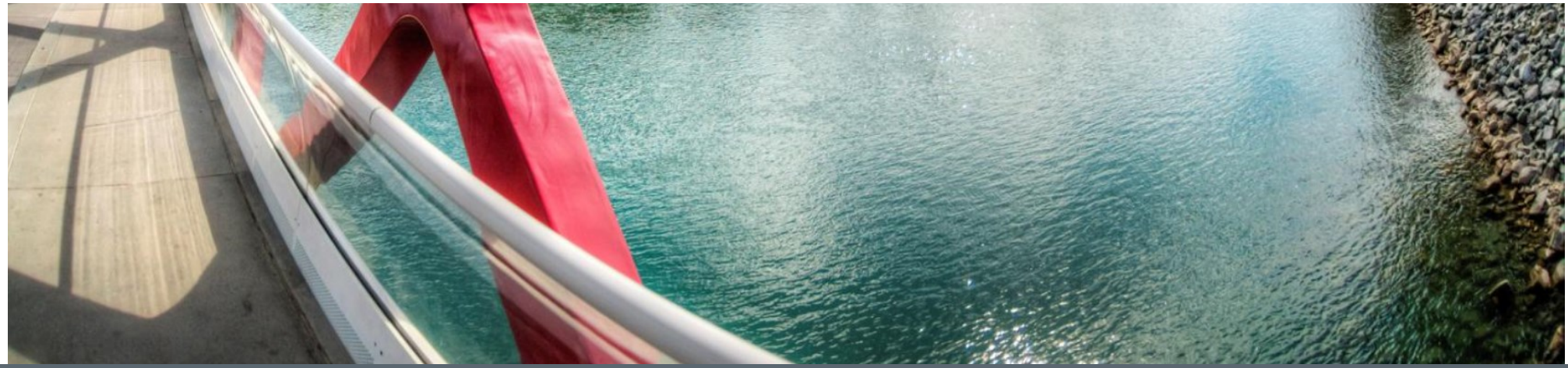


Most common areas for improvement identified by environmental audits in 2018





Environmental and Safety Reporting



Environment and Safety Reporting

Changes proposed to:

- Provide clarity between services lines moving forward as part of One Calgary.
- Align with annual improvement cycle of The City's environmental and safety management systems and annual work planning cycle that delivers actions and accomplishments.

Recommendation

That the SPC on Utilities and Corporate Services:

Direct Administration to change environmental and safety performance reporting frequency from biannual to annual and provide separate corporate performance reports on the following service lines going forward as part of One Calgary:

i. Environmental management.
ii. Organizational health, safety and wellness

Deputy City Manager's Office Report to
SPC on Utilities and Corporate Services
2019 May 15

ISC: UNRESTRICTED
UCS2019-0620

Response to NM2017-36 on Green Roofs

EXECUTIVE SUMMARY

Vegetated green roofs can provide multiple benefits to people and the local environment while supporting climate resiliency. In the right location, green roofs help capture and filter storm water, support a more biodiverse urban environment, improve building energy performance, and provide places that positively contribute to the social wellbeing of building occupants.

Facility design, stormwater engineering, and facility operations teams at The City have spent multiple years investigating the costs and benefits of green roofs as one of many design tools to achieve the above noted benefits.

The Sustainable Building Policy (the Policy) was recently revised to ensure that green roofs, along with a suite of other technologies and building techniques, will be considered by Project Sponsors, design teams and the Policy Steward. These measures will be evaluated for cost and technical effectiveness in addressing Council approved sustainability priorities. The assessment of various building design options, including green roofs, is completed during the early phases of project design, on a project-specific basis. This helps ensure that best-fit technologies are identified, are thoroughly evaluated, and viable, cost-effective options are implemented.

ADMINISTRATION RECOMMENDATION:

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

PREVIOUS COUNCIL DIRECTION / POLICY

On 2017 September 11, Councillor Pincott presented a Notice of Motion that Council direct Administration to explore retrofitting all appropriate Municipally owned buildings with Green Roof systems as part of routine lifecycle maintenance and report back to Council through the SPC on Utilities and Corporate Services on this possibility no later than 2018 Q1 and that a policy be developed to allow for all new buildings constructed by The City of Calgary incorporate Green Roof systems into their design if the roof angle allows, and return to Council, through the SPC on Utilities and Corporate Services, no later than Q2 2018.

NM2017-36 was amended and referred to Administration, to bring back a business case and a potential strategy on green roofs and actions to move forward and return to Council through the SPC on Utilities and Corporate Services no later than Q2 2018.

On 2019 January 14, Council approved a deferral of a response to coincide with the recommended updates to the Sustainable Building Policy as a means by which to encourage the consideration and incorporation of green roof systems into design for new building construction and existing building retrofits.

On 2019 April 29, Council approved the proposed updates to the Sustainable Building Policy.

Deputy City Manager's Office Report to
SPC on Utilities and Corporate Services
2019 May 15

ISC: UNRESTRICTED
UCS2019-0620

Response to NM2017-36 on Green Roofs

BACKGROUND

Located on the 4th and 5th floor roof terraces of the Municipal Building, a green roof research project was initiated in the Spring of 2014 through a partnership between Corporate Analytics & Innovation, Facility Management, Environmental & Safety Management, Water Resources, and the University of Calgary. Plant species monitoring was conducted by local Calgary consultancy and Parks has supported maintenance. The data collection period for The City's green roof pilot project located at the Municipal Building was completed in late 2018. This pilot project was intended to support local research on the benefits of green roofs, including determining capital costs in comparison to typical roofing products, measurement and monitoring of stormwater quantity and quality, impacts on local temperature and air quality, insulating factors, plant species selection, biodiversity, and maintenance scheduling and costs.

Concurrently, policy options to encourage the integration of green roofs and other green stormwater infrastructure alternatives at City-owned buildings have been reviewed with a team of internal and external experts and have been integrated into The City's amended Sustainable Building Policy. The updated Policy was approved by Council on 2019 April 29.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

Using the information collected from the municipal green roof research project, supplemented with information collected through a review of case studies from other Canadian and American jurisdictions, a cost/benefit analysis was compiled with the assistance of the University of Calgary, and a local green roof expert. The sources of supplemental information collected are primarily from cold climate green roof research and are conservative in nature.

The costs and benefits identified for green roofs include the following:

Cost	Benefit
One-time • Installation	**One-time** • Potential deferred investment in storm infrastructure and equipment
Recurring • Maintenance • Irrigation • Reroofing	**Recurring** • Energy savings • GHG emissions reductions • Heat Island mitigation • Noise abatement • Biodiversity/habitat creation • Increase productivity and decreased absenteeism from work • Job creation • Real estate effects (improved value in rent, absorption, tenant retention, risk reduction)

This analysis determined that over 25 years, the net present value (NPV) of the installation, maintenance, and replacement costs of a green roof was up to $24 per square foot more than that of a conventional, asphalt roof, depending on the extent of the roofing specifications.

Deputy City Manager's Office Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0620

Response to NM2017-36 on Green Roofs

The estimated NPV of the potential benefits over the same time period can be significant; stormwater management ($10.30/SF); energy savings ($1.30/SF); impact on occupant wellbeing and productivity ($5.70/SF), real estate value ($9.30/SF); and a number of environmental benefits ($7.80/SF) including biodiversity, improved air quality, reduced urban heat island effect and acoustics. These benefits offset the initial cost premium for building owners and/or tenants, totalling $34.40 per square foot in benefits. This means that for every dollar in incremental cost for implementing a green roof in comparison to an asphalt roofing product, approximately $1.43 in potential benefits could be theoretically achieved over 25 years. Additional societal benefits associated with job creation and skills development would be achieved but were not quantified for this analysis.

The above noted cost/benefit analysis was compiled to provide a scale of the magnitude of the theoretical financial benefits that could be achieved by green roofs. However, achieving returns on this investment are subject to multiple weather and operational risks. For example, the municipal green roof was significantly impacted by the Municipal Complex's structural upgrade project. In addition, green roofs are not applicable to all projects and require significant analysis as to the suitability of a project for a green roof in addition to mobilizing continuous maintenance resources. Green roofs also require technical experts in irrigation, landscaping, and potentially apiarists (beekeepers), depending on the project configuration.

In recognizing the potential merits of a green roof to complement a comprehensive sustainability strategy for new building construction and/or major renovation projects, the recent review of the Sustainable Building Policy included consultation with building owners and developers to identify performance specifications which could encourage consideration of green roofs as one tool in a large toolbox of potential design options.

In discussion with City facility operators, the possibility of retrofitting all appropriate City-owned buildings with green roof systems was explored. While there are no immediate reroofing projects identified in the near future that would be suitable candidates for a green roof system, recommendations were collected on policy options that would encourage the consideration of green roofs, on a case-by-case basis, as lifecycle reroofing projects are planned and implemented. These recommendations were integrated in into the Sustainable Building Policy, with the scope of the Policy now extending to existing building operations and maintenance.

The Policy encourages the consideration of green roofs in design in the following manner:

Sustainability Principle	Corresponding Minimum Sustainability Performance Specifications
Optimize energy efficiency	The 40 per cent improvement from National Energy Code for Buildings 2011 baseline building will encourage the consideration of green roofs as an option to increase the insulating factor of roof assemblies.
Reduce potable water use	A 35 per cent improvement from baseline for water use will encourage the consideration of green roofs combined with stormwater capture systems and diversion systems for use in flushing toilets and irrigation.

Deputy City Manager's Office Report to SPC on Utilities and Corporate Services 2019 May 15

ISC: UNRESTRICTED UCS2019-0620

Response to NM2017-36 on Green Roofs

Sustainability Principle	Corresponding Minimum Sustainability Performance Specifications
Encourage integration of green stormwater infrastructure	A target to manage the 90th percentile of rainfall events onsite using green stormwater infrastructure has been established. Referencing historical Calgary weather, the specification encourages the consideration of green roofs as an option to meet an objective to retain water on site for a specified period for 90 per cent of all rainfall events within a year. Green roofs help retain water on site and improve the quality of eventual run-off.
Maintain and improve biodiversity	An objective has been set to encourage the use of native species to manage stormwater while encouraging biodiversity, which can be achieved by considering green roofs as a potential design option.
Maintain social wellbeing	Social wellbeing performance requirements are currently under development and will consider the impact of green roofs in providing places for gathering, health, and wellness.

Strategic Alignment

City-owned and funded building projects, including renovations and new construction projects must adhere to The City's Sustainable Building Policy. The Policy aligns with many Council priorities including a commitment to creating and sustaining a vibrant, healthy, safe and caring community that works for all today and tomorrow. This commitment has been expressed through policies, plans and strategies including the Triple Bottom Line Policy Framework, proposed Calgary's Resilience Strategy, the imagine CALGARY plan and the 2020 Sustainability Direction. As such, the Policy addresses the intent of NM2017-36.

Social, Environmental, Economic (External)

Economic

Well-defined sustainability performance objectives help guide the development of cost-effective facilities that will provide long-term value to Calgarians.

Environmental

Green roofing technologies, in concert with other green building technologies, contribute to improving air quality, ensuring efficient land stewardship, protecting water resources, protecting open spaces, improving energy efficiency, and addressing climate resilience.

Social

Green roofs, contribute to an inclusive city by supporting a city of vibrant neighbourhoods by providing open green spaces within the site. Sustainable buildings provide improved interior environments and contribute to improved occupant comfort, wellbeing, health and productivity.

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Response to NM2017-36 on Green Roofs

Financial Capacity

Current and Future Operating Budget:

Mitigating impact on future budgets will be achieved by designing and constructing buildings with long-term resiliency and sustainability in mind. Supported by the Sustainable Building Policy, green roofs, along with many other green building technologies are evaluated early in project design. These options are evaluated by applying a lifecycle assessment. This ensures that capital costs and operating benefits are considered when making design decisions.

Ongoing maintenance and operation of the municipal green roof will continue to be funded within Corporate Analytics & Innovation's existing operating budget.

Current and Future Capital Budget:

The early establishment of building performance specifications in formal documents such as the Owner's Project Requirements, early in the project design process helps reduce the capital costs of implementing green roofs and other sustainable building technologies. Projects that identify sustainability related performance measures and targets early in the scoping process have historically had higher rates of successfully addressing performance specification in both design and construction and result in fewer changes that are associated with additional fees.

While there are capital costs on a project specific basis, these costs will be accounted for during the stage at which project capital costs are typically finalized and the request to allocate funds and approval to proceed to implementation is issued, as per City project management and stage gating frameworks.

Risk Assessment

No risks have been identified with respect to this report.

REASON(S) FOR RECOMMENDATION(S):

Green roofs are one option amongst many green building technologies to help encourage overall building sustainability. The effective application of green roofs is limited to specific building types, orientations, locations, and operating models, as such, deployment of the technology on all City buildings is not recommended. The Sustainable Building Policy has been developed to encourage the consideration of green roofs, where applicable, during project design and development, therefore, Administration recommends that the intent of NM2017-36 has been addressed through a policy mechanism.

ATTACHMENT(S)

1. Notice of Motion NM2017-36 Green Sheet

ATTACHMENT 1
UCS2019-0620

THE CITY OF CALGARY
CITY CLERK'S OFFICE

NM2017-36
NM

RECEIVED
2017 AUG 31 AM 9:46
THE CITY OF CALGARY
CITY CLERK'S

2017 09 11

NOTICE OF MOTION

CC 661 (R2009-05)

RE: GREEN ROOFS
Councillor Pincott

WHEREAS, the Citizens of Calgary, through imagineCalgary, articulated the desire for more naturalized spaces in the City;

AND WHEREAS, the City of Calgary's Biodiversity Plan commits our City to conserve habitat function by supporting native species;

AND WHEREAS, Calgary's Sustainable Building Policy commits the City to lead in developing and managing adaptable building facilities to improve economic, environmental, and social benefits;

AND WHEREAS, the City of Calgary has the goal of decreasing impervious surfaces to between 10%-20%, as per the Municipal Development Plan, and the City owns a substantial number of buildings contributing to the city's impermeability;

AND WHEREAS, Council has committed to supporting Calgarians through the economic downturn by investing in infrastructure;

AND WHEREAS, Calgary is home to engineers, reclamation and native species experts;

AND WHEREAS, the City has been undertaking research-intensive Green Roof pilot projects and private research projects exist to inform best practices in Calgary's unique climate;

AND WHEREAS, the increased roof mass represented by green roofs also contributes to an increase in energy efficiency;

AND WHEREAS, green roofs are a known and accepted technology used in storm water retention, GHG reduction, as well as mitigating the heat island effect;

NOW THEREFORE BE IT RESOLVED that Council direct Administration to explore retrofitting all appropriate Municipally owned buildings with Green Roof systems as part of routine lifecycle maintenance, and report back to Council through the SPC on Utilities and Corporate Services on this possibility no later than 2018 Q1 and;

AND FURTHER BE IT RESOLVED that a policy be developed to allow for all new buildings constructed by the City of Calgary incorporate Green Roof systems into their design if the roof angle allows, and return to Council, through the SPC on Utilities and Corporate Services, no later than 2018, Q2.

Signature of Member(s) of Council

Deputy City Manager's Office Report to
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2019 May 15

ISC: UNRESTRICTED
UCS2019-0663

Calgary's Strategic Approach to Managing City Land - Update

EXECUTIVE SUMMARY

This report provides an update on the Corporate Land Strategy project (the "Project") and provides an overview of the work to be delivered in 2019 and 2020.

Administration had identified in the Corporate Land Strategy Information Report (UCS2018-1141) that the Strategy was proposed to come forward in Q1 2019. After reviewing the scope of the Project, Administration identified a need for more coordination between it and several other planned and in-progress initiatives across the Corporation. A program-approach is now proposed to deliver the Project and ensure it is comprehensively planned, developed and aligned with these other initiatives over the next two years. With early research and stakeholder consultation completed, the Corporate Land Strategy project team believes there is a need for an overarching strategic approach to better manage risk and receive greater value from City-owned real estate.

A strategic approach will support Administration to manage land well and maximize the benefits of land and support better decision-making. To be effective, the Project outcomes will:

- Position City land to best support local economic development and diversification.
- Clarify roles and responsibilities, establish guiding principles to deliver real estate services, and establish standards and processes.
- Develop sustainable financial models to deliver its real estate and its industrial land development and strategic redevelopment services.
- Strengthen services and guide land management decisions for the Corporation.
- Define how The City will leverage land to deliver broader corporate objectives.
- Align land management and development services with Corporate direction.

Deliverables are currently being defined by Administration based on stakeholder needs, but will include a comprehensive and strategic Guiding Document, new and updated service delivery frameworks to guide program implementation, and the review and alignment of other existing policies and bylaws impacted by strategic direction changes. Administration is proposing that the Guiding Document be delivered in Q3 2019 with aligned and detailed program-specific implementation frameworks, procedures, and action plans following through 2020.

ADMINISTRATION RECOMMENDATION:

The SPC on Utilities and Corporate Services recommends that Council:

1. Receive this update report for information; and
2. Direct Administration to report back to SPC on Utilities and Corporate Services no later than 2019 September 30 with the Guiding Document.

PREVIOUS COUNCIL DIRECTION / POLICY

On 2018 November 19, Council received the "Corporate Land Strategy – Information Report" (UCS2018-1141).

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Calgary's Strategic Approach to Managing City Land - Update

BACKGROUND

The information report (UCS2018-1141) was brought forward to inform Council and create an awareness around the need to leverage the value of City land to maximize benefits to all citizens. A strategic approach was proposed to clarify how Real Estate & Development Services (RE&DS) would deliver its services to the Corporation and external customers, and to put in place frameworks, processes and actions for managing The City's various land portfolios. Administration had proposed delivery of the overarching strategy in Q1 2019, with other products to follow through 2019 and 2020.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

Following the October 2018 information report (UCS2018-1141), it became evident that several related or dependent projects were underway or proposed through One Calgary, RE&DS 2019 work programs, and other Administration initiatives. To create an effective strategy, the Project needed to align with these other initiatives. The project team also identified the growing Corporate desire to manage land and decisions to maximize the value of The City's extensive real estate portfolio to leverage highest benefits.

The Project has been reviewed to redefine its scope and ensure it delivers a clear and comprehensive and Corporate approach to managing The City's land assets. One goal will be to create a common information base and dispel misunderstanding around City-held land, why it is required, how it is managed, and provide a transparent basis to ensure Administration manages it well going forward.

Why The City of Calgary owns land?

As a municipality in the Province of Alberta, The City of Calgary has obligations granted by the Province through the Municipal Government Act (MGA, Part 1,3) to carry out "municipal purposes", including:

a) Providing good government
b) Fostering well-being of the environment
c) Providing services, facilities and other things that, in the opinion of Council, are necessary to desirable for all or part of a municipality; and
d) To develop and maintain safe and viable communities.

Having an inventory of land in its control is essential for The City to provide its citizen-focused services, that includes: roads and mobility networks, public infrastructure, schools and parks, environmental protection, recreation, community services, and facilities for fleet, maintenance and public works.

Land Inventory Overview

The City maintains extensive information on its land holdings and specific parcel data through its Land Inventory Data Application (LInDA) system. Not including roads, The City of Calgary holds title to over 8,300 parcels of land (approximately 13,800 hectares/34,000 acres) in its inventory. This represents land that has been acquired through the history of Calgary to support its growth and outward expansion. This land resides in various asset-class portfolios managed by Administration.

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Calgary's Strategic Approach to Managing City Land - Update

A summary of The City's land holdings and breakdown by business unit stewardship is included in the 2019 Corporate Land Inventory Summary sheet (Attachment 1) and included in the table below.

Table: City Land Stewardship Breakdown

Business Unit Steward	Area (acres)
Calgary Parks	17,323
Water Resources and Water Services	6,458
RE&DS	2,898
Waste & Recycling	2,551
RE&DS (CLA) – land being managed for future City purposes	1,305
Calgary Recreation	1,279
Facility Management	738
Roads	667
Remaining land stewarded by 7 business units	1,087
Total Land	34,306

Of this total, land that has currently been declared surplus to City need (240 parcels, 975 acres) represents roughly three per cent of The City's total land inventory.

The City manages the land required to deliver its services through the Administrative Leadership Team (ALT) approved standards set out in the 2015 *Corporate Land Management Framework* (CLMF). The CLMF oversees the full lifecycle of land in City stewardship as demonstrated in Attachment 2. CLMF provides operational standards and sets out management responsibilities for the 15 business units that steward land. A governance structure is also provided to support good land management practices and decision-making, through the Director-level Corporate Land Committee (CLC) and the Managers' Corporate Land Administration - Team (CLA-T). CLMF establishes a rationalization standard requiring land stewards to regularly review the lands they manage and identify if land is required to support operations. If not, opportunity is provided to find other corporate uses for land and to sell surplus parcels, with sales revenues returned to support the acquisition of new land needed for City operations. An Enhanced Rationalization program was approved through One Calgary and is being launched with the goal to accelerate the land rationalization process and identify additional surplus lands, which would be available for sale to generate revenues to finance future land acquisitions, support other Corporate initiatives and increase the tax base.

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Calgary's Strategic Approach to Managing City Land - Update

Since 1965, The City has planned, developed and serviced new industrial parks to ensure lots were available for sale to businesses to support Calgary's economic diversification, create local jobs, and expand the non-residential tax base. There are currently 35 lots (40 acres) of serviced industrial lots being actively marketed. The City also holds and actively manages 2,480 acres of raw land acquired specifically to be developed for industrial and business parks. The industrial development program is financially self-sustaining, with the revenues from sales of industrial lots returned to the program to support future industrial development projects and other Corporate initiatives. The management and delivery of the industrial land program is guided by the "*2013-22 Industrial Land Strategy: for the development of City-owned lands*", which was approved by Council in 2013. A further update on the industrial land sector will be presented in an upcoming Utilities and Corporate Strategy committee meeting.

Real Estate Services at The City of Calgary

Real Estate is typically defined as real property consisting of land and improvements, including buildings, fixtures, roads, structures and utility systems, land, buildings and expertise and support activities. Administration performs several distinct operations involving the management, programming, development and construction of City land and real estate.

The Real Estate & Development Services (RE&DS) business unit delivers two lines of service for the Corporation:

- Real Estate Services for the Corporation and internal business unit (BU) land-steward clients:
    - Real estate transactions (land acquisitions, land sales, leasing and licensing, encroachment and right-of-way agreements, and land title services).
    - Land Administration functions (administers CLMF, land policies and standards, land data and analysis, LInDA, circulations coordination and land advisory services).
- Land Development & Sales Services with two specific land development programs with focus to maximize value of City land and ensure a positive return on investments:
    - Industrial Land Development program to plan, invest in infrastructure and sell serviced industrial lots to businesses to support economic development and increase Calgary's tax base.
    - Strategic redevelopment program to leverage City land assets to deliver community building and public planning policy objectives and to capitalize on significant transit investments. The program includes transit oriented development (TOD), mixed use and surplus school sites.
    - RE&DS also provides real estate marketing, market analysis and development feasibility services to develop strategies aimed at generating leads for sales agents, and tracks and analyses market conditions to inform decision making on RE&DS' current and future industrial and strategic redevelopment projects.

Real estate and land development functions are also provided by other business units to support their stewardship of City land and delivery of their specific services:

- Parks & Open Spaces Planning –
    - Plans, builds, maintains and stewards accessible parks system
    - Conserves and promotes biodiversity and cultural landscapes

- Recreation Opportunities – create vibrant communities by leading and investing in Calgary recreation sector
    - Plans, constructs and operates recreation facilities
- Facility Management – plans, builds and operates The City's portfolio of civic facilities, including Operations Workplace Centres and the Integrated Civic Facility Planning program.
- Transportation related services– construct, operate and maintain mobility infrastructure (road, track, pavement and sidewalks) on linear rights-of-way.
- Water infrastructure related services – including Water treatment and supply and Wastewater collection and treatment
    - Construction, operations and replacement of linear and treatment facility infrastructure to support regional growth and local redevelopment.

To clarify and differentiate between these operational real estate-related functions that support service delivery, and the more strategic real estate services that manage, improve and dispose of City land to deliver broader corporate objectives and generate revenue for the Corporation, Administration has identified a need for an overarching land strategy.

Why is a Corporate Land Strategy needed?

A corporate land strategy will support Administration to manage land well, maximize the benefits of land, and support better decision-making. To be effective, the Strategy should:

- Position City land to best support local economic development and diversification.
- Clarify roles and responsibilities, establish guiding principles to deliver real estate services, and establish standards and processes.
- Develop sustainable financial models to guide land management decisions for the Corporation.
- Define how The City will leverage land to deliver broader corporate objectives.
- Align land management and land development services with Corporate direction.

How will the Strategy project be delivered?

Administration is in the early stages of redefining the Project, but is proposing it be delivered in three phases through 2019 and 2020:

- **Phase 1: Establish Strategic Direction**
    - Corporate partners and customers of services identified the Project needs to provide a corporate perspective on managing land and delivering the land development services.
    - The stakeholder engagement plan is being reviewed to ensure these broader perspectives are being considered and incorporated.
    - The project steering committee has been expanded to include Administration representation from the corporate land stewards network.
- **Phase 2: Develop New Program Frameworks**
    - New frameworks, processes or policies will be determined as stakeholder needs are defined and direction is identified. This could include development of

comprehensive guidance for the Strategic Redevelopment program, and procedures and decision-making criteria for non-market housing land initiatives.

- **Phase 3: Align Existing Program Frameworks**
  - A review of the CLMF operations and standards is planned in the 2019 work program. The Project must align its scope with the CLMF review, to build from the current strengths of CLMF, inform changes to CLMF, and minimize confusion and optimize engagement with its stakeholders.
  - Identify and fill gaps in existing strategies and processes, including the "*2013-22 Industrial Land Strategy: for development of City owned lands*", land specific implementation policies (*Encroachment Policy, S.A.L.E. (Environmental) Policy*) and the *Real Property Bylaw* update.
  - Consideration and aligning this project with other real estate and land administration deliverables being proposed for Council in 2019 and 2020.

Deliverables

Stakeholder Engagement Plan

The full suite of products to be delivered through this Project with further elaboration on the deliverables to be completed as Administration, customers and other stakeholders are further engaged. A general timeline showing the relationship between the Strategy deliverables and other real estate and land related reports coming forward in 2019 and 2020 is included as Attachment 3.

A Strategic Approach to Managing City Lands - Guiding Document (Q3 2019)

An overarching strategic approach is proposed to guide the effective management of The City's land portfolios and direct how land can be leveraged to maximize their benefits and value it provides for the Corporation and citizens. This document would include background and context on how and why The City holds and manages land, the mandate of the Strategy to direct specific Corporate land and real estate operations, guiding principles to inform strategic direction and decision-making criteria, strategic objectives and program shifts that need to happen in the next four to five years, and a road map of specific priority actions and tactics.

Desired outcomes of the Project

Review of the Project has identified the need to adjust the scope to ensure a comprehensive, corporate approach is delivered. This approach will:

- Address Council, citizen and customer expectations that The City manages its lands well.
- Ensure land management decisions are governed through a collaborative, integrated and transparent approach.
- Incorporate economic, environmental and social benefits into the land management and land development decisions.
- Ensure The City's land assets and real estate expertise are intentionally applied to increase the tax base, generate revenue or provide other corporate benefits.
- Deliver clearly defined decision-making criteria and processes in a fair, equitable and timely manner.

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Calgary's Strategic Approach to Managing City Land - Update

While the Project is being undertaken, priority operational work and projects with current Council direction will continue to be delivered. This work includes existing land development projects that are in planning, design or construction phases; the disposition of existing surplus (general) lands already in the sales queue; and launch of the Enhanced Rationalization project to increase the identification and sale of surplus City land over the next four years.

Stakeholder Engagement, Research and Communication

Engagement to refine the scope of the Project to date and other feedback received is as follows:

- RE&DS Management Team requested the Project be rescoped to build in alignment of the deliverables with the timing of these other initiatives, specifically the Corporate Land Management Framework review and engagement with CLC.
- The CLC expressed concern with lack of engagement and information with CLC/CLA-T and business unit land stewards on the initial scope of the Project, and its internal focus on RE&DS operations. It indicated a more corporate-wide focus was needed to inform, develop and communicate the Project.
- A detailed stakeholder assessment and engagement plan is being developed as part of the Project Charter review. It includes focused engagement within RE&DS, Business Unit customers of RE&DS services (through CLC, CLA-T), and Administration partners that support service delivery (Law Department, Finance, City Clerks).
- The Project will also coordinate internal engagement efforts between all current RE&DS-led projects, to optimize stakeholders' time and demonstrate alignment. This will be specifically emphasised with the upcoming CLMF review.
- External stakeholder groups and customers of The City's land development services will be engaged on Frameworks relevant to their lines of interest. This will include the industrial land development industry, multi-family and mixed-use developers and real estate market/brokerage industry experts. Not-for-profit housing providers have been engaged by Calgary Housing to support its development of the Non-Market Housing Land Disposition Policy.

Strategic Alignment

This work is informed by and aligned with existing corporate initiatives and strategic directions, including:

<u>One Calgary Service Plans and Budgets process</u>

Identifies RE&DS as the service owner to deliver the following two lines of service for the Corporation: Real Estate Services and Land Development & Sales Services. Directs review and delivery of CLMF review and Enhanced Rationalization program through 2022.

<u>Leadership Strategic Plan: Contract with Council (2014)</u>

This work supports Administration's commitment to strengthen the Corporation's financial position addressing long-term financial needs, maximizing return on municipal (land) investments, and rationalizing and divesting of municipal land no longer required by The City.

<u>Municipal Development Plan (2009)</u>

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Calgary's Strategic Approach to Managing City Land - Update

The strategic management and development of The City's land assets will support the delivery of public policy objectives of the Municipal Development Plan, including:

- Supporting a prosperous economy and creating a city attractive to business.
- Creating vibrant, transit-supportive mixed-use activity centres (TOD).
- Supporting the intensification of Developed Areas through strategic land development and capital infrastructure investments.
- Ensuring long-term financial capabilities of the Corporation by managing land assets well and making strategic investment decisions.

Social, Environmental, Economic (External)

There are no social, environmental and economic impacts resulting from this report for information. As the strategies and frameworks are fully defined, a wholesome triple bottom line analysis will be reported to support how The City will include the broader sustainability perspectives through delivery of its real estate and land development services.

Financial Capacity

Current and Future Operating Budget:

Resources to complete this work are included in RE&DS existing operating budget Program 488.

Current and Future Capital Budget:

Consulting support required to supplement the Project will be funded through existing Activity 403371, Corporate Land Management Framework 2 (Program 698).

Risk Assessment

There are no significant risks associated with this issue and operational and/or project risks which have been identified are being managed.

REASON(S) FOR RECOMMENDATION(S):

This report provides an update to Council on the Corporate Land Strategy Project and informs about changes in scope and schedule. It confirms Administration is preparing to deliver a comprehensive, corporately aligned portfolio-based approach to managing City land assets and the industrial and strategic redevelopment programs. The Project will create processes and tools to support effective decision-making across the land programs, to leverage land assets to maximize benefits for the Corporation and citizens, and position The City to be a leader in providing municipal land management services. This work will align other land-related framework, policy and bylaw reviews underway and planned, to ensure content alignment and logical sequence of delivery.

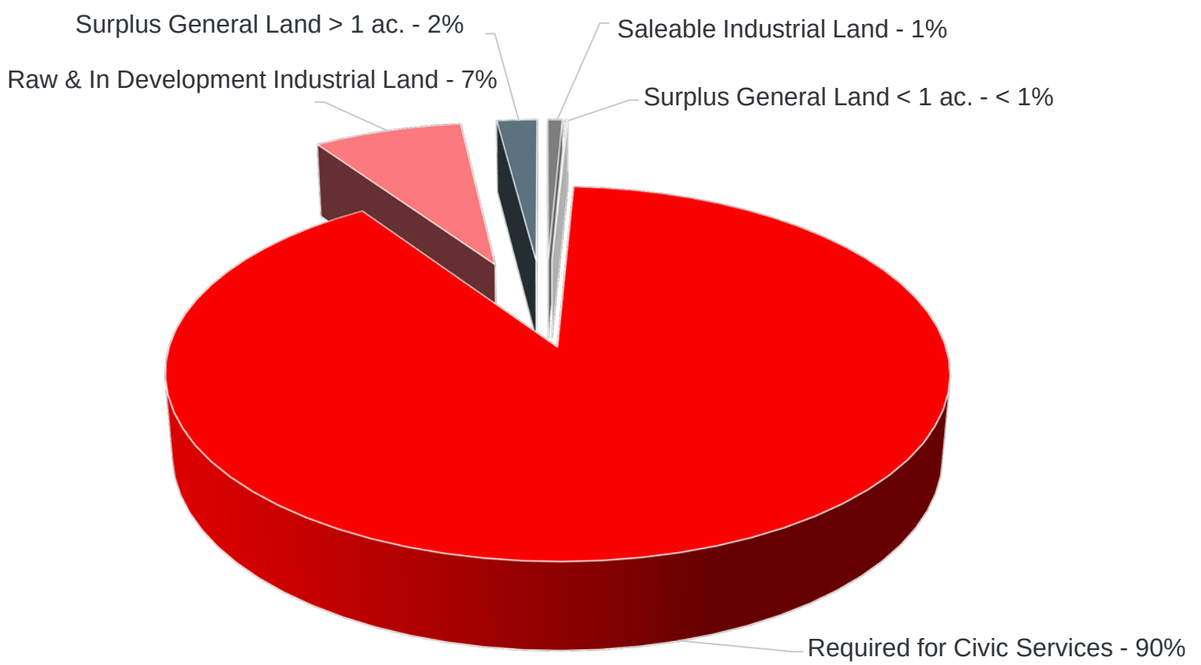
ATTACHMENT(S)

1. Attachment 1 – Corporate Land Administration – 2019 Corporate Land Inventory Summary
2. Attachment 2 – Corporate Land Management Framework Element Overview
3. Attachment 3 – Project Phases

Corporate Land Administration
2019 Corporate Land Inventory Summary

Description: The City's land asset portfolio is managed by fifteen land-stewarding Business Units providing unique services to Calgary's citizens across **34,000 acres** and **8,300 parcels**. The Corporate Land Management Framework provides a set of standards considered foundational to effectively managing The City's Land Inventory through improving governance, accountability, transparency, and collaboration.

Land Inventory Status (% in Ac.)



All Land-Stewarding Business Units are required to fully rationalize their land once per business cycle to conform with the Corporate Land Management Framework and best asset management practices. The Corporation performed this for the first time in 2018 finding roughly 97% of the City's inventory is operationally required for current or future municipal purposes. Of those that are identified as surplus the majority are small parcels less than an acre in size with limited development potential which reduces their market attractiveness for disposition.

Prepared by: RE&DS – Corporate Land Administration April 2019

Rationalization Statistics *

Status	Acres	Parcel Count
Required for Civic Services	30,950	8000
Raw & In Development Industrial Land	2480	45
Surplus General Land > 1 ac.	700	50
Surplus General Land < 1 ac.	250	190
Saleable Industrial Land	40	35

* All rationalization values are rounded

Surplus Analysis

3% of Total Inventory
990 acres
275 parcels
70% parcels < 1 acre
>120 parcels assigned to sales agents
$407M in Assessed Value**

** Actual land sale revenue that may be generated is subject to significant variance from the identified assessed value. Many surplus properties are remnant, meaning they cannot be developed on their own, and may only be sold to a willing adjoining owner. While remnant properties have an assessed value prepared in accordance with assessment standards, there may not necessarily be a market value because they cannot be sold on the open market.

Inventory Management

Action Plan: (2015-2018)

>8300 parcels reviewed in Action Plan
>1000 circulations for Lease or Disposition in Action Plan
>120 land sales bringing $250M in revenue to the Corporation

One Calgary: (2019-2022)

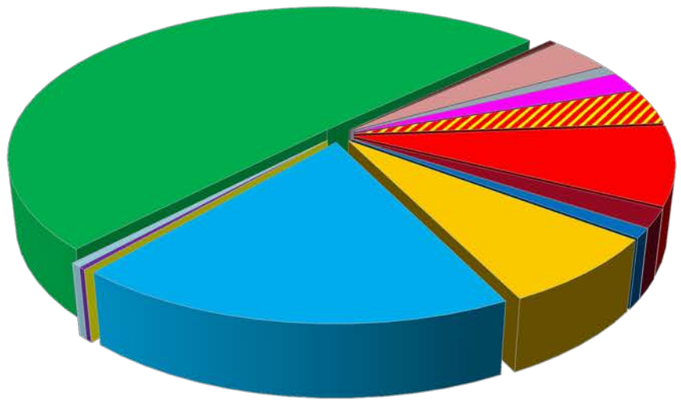
240 general land parcels declared surplus and available for lease or disposition

UCS2019-0663 Attachment 1

Corporate Land Administration
2019 Corporate Land Inventory Summary

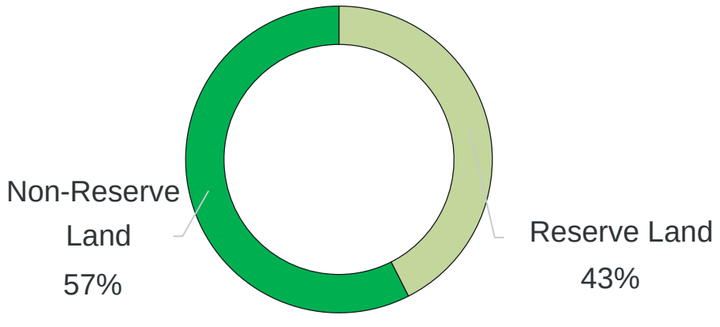
Description: The City's land asset portfolio is managed by fifteen land-stewarding Business Units providing unique services to Calgary's citizens across **34,000 acres** and **8,300 parcels**. The Corporate Land Management Framework provides a set of standards considered foundational to effectively managing The City's Land Inventory through improving governance, accountability, transparency, and collaboration.

Stewardship Breakdown (34,000 Total Acres)



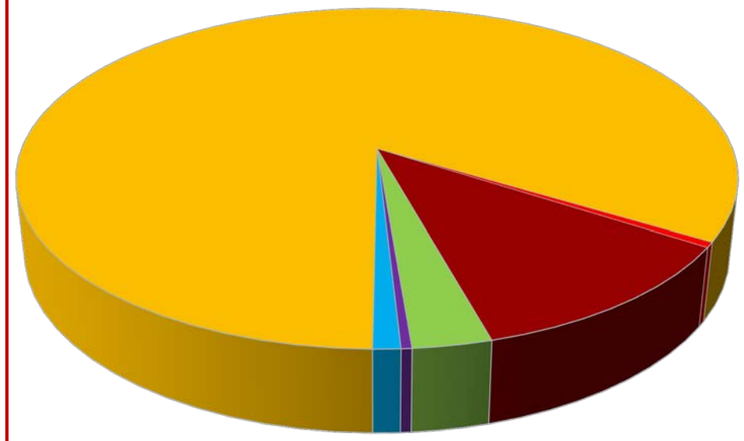
- Comm. Stds (2 ac)
- Fire (107 ac)
- Calg Hsg (143 ac)
- CPA (20 ac)
- Parks (17423 ac)
- Police (151 ac)
- Recreation (1279 ac)
- Transit (321 ac)
- FM (738 ac)
- RE&DS (CLA) (1305 ac)
- RE&DS (2898 ac)
- Roads (667 ac)
- TI (343 ac)
- W&RS (2551 ac)
- WR/WS (6458 ac)

Reserve Status of Parks Stewarded Inventory (Ac.)



The largest Steward of Calgary's City-Owned land is Calgary Parks, providing open-space and recreation areas to Calgary citizens. Calgary Parks stewards 51% (17,400 ac) of all City-Owned land, and roughly 43% of all Parks land has a reserve designation limiting development.

Land Use Districts (% in Ac.)



- Commercial - < 1%
- Direct Control - 12%
- Industrial - 3%
- Multi-Residential - < 1%
- Single-Family - 1%
- Special Purpose - 83%

The majority of City-Owned land has a Special Purpose land use designation. Special purpose land use designations are likely to require significant resource investment in order to prepare the parcels for disposition and realize an optimal return for The City.

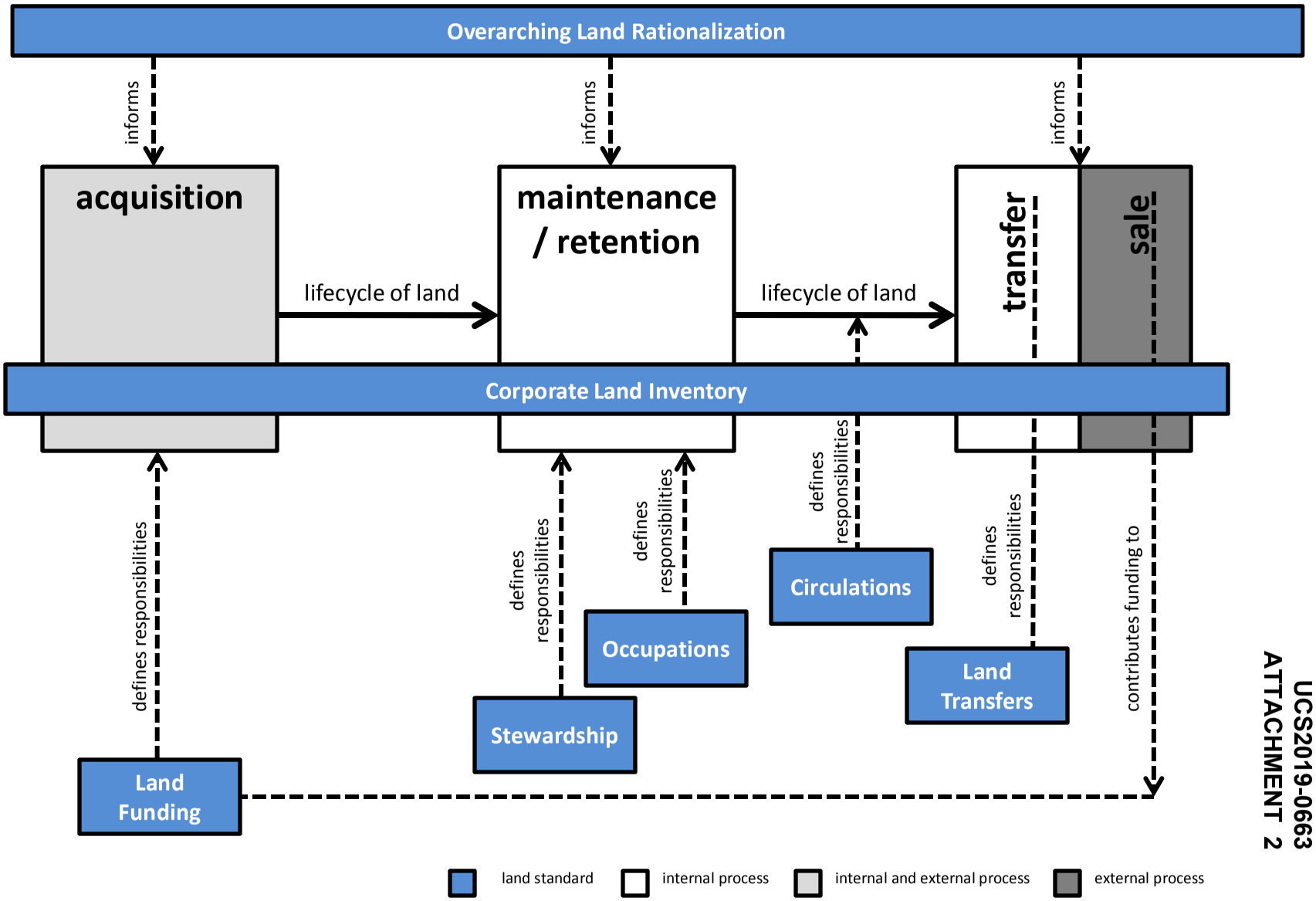
570
Leases administered by RE&DS Leasing & Property Management

For more information on the Corporate Land Inventory go to
mycity/linda

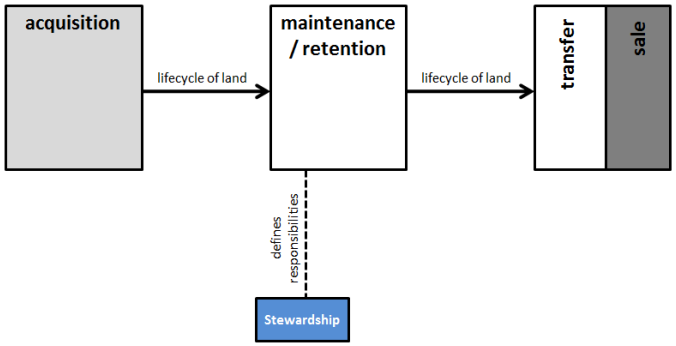
Data Prepared by: RE&DS – Corporate Land Administration April 2019

Corporate Land Management Framework Element Overview

The purpose of City land is to address citizen service needs; this land is acquired and maintained and possibly transferred to another business unit for additional municipal use or disposed of externally. This diagram demonstrates how the how each element in the framework informs holistic decision-making.



Corporate Land Management Framework



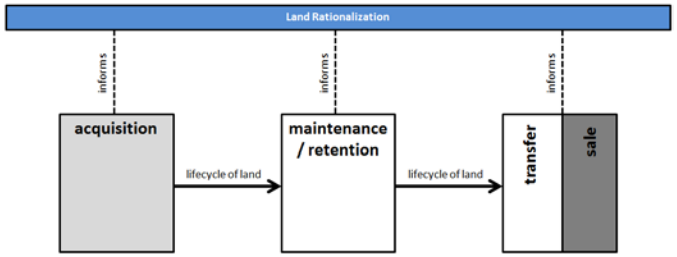
Stewardship Standard

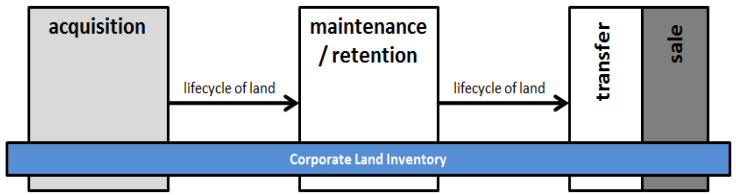
The Stewardship Standard provides clear and consistent language and outline associated roles and reciprocal responsibilities for business units who manage or steward lands owned by The City of Calgary.

Land Rationalization Standard

The Land Rationalization Standard outlines those criteria needed at each stage that business units must utilize in managing land:

- why a business unit needs land
- why a business unit needs to retain land under stewardship
- rationale as to why a business unit would transfer or sell land





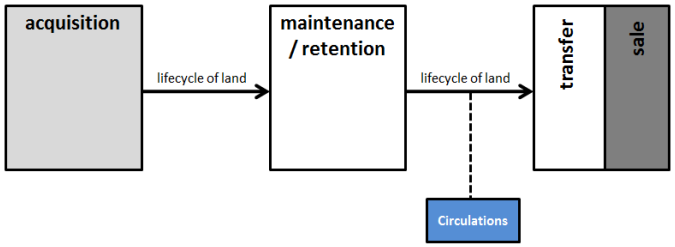
Needs Assessment for Corporate Land Inventory

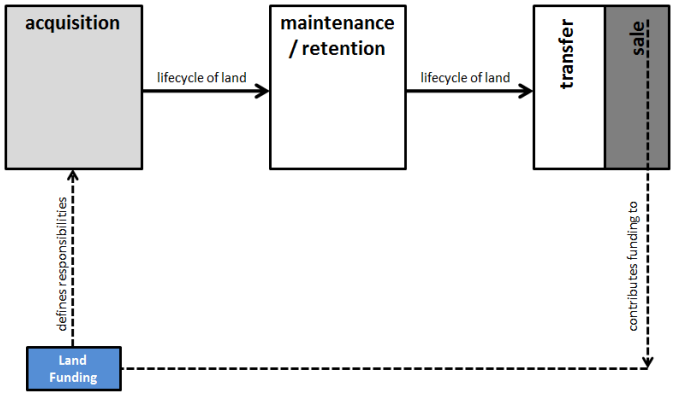
The Needs Assessment for Corporate Land Inventory outlines the provision of land management related data and systems to provide a system of truth for effective Corporate land management. The system will be accurate and complete while providing reliable land inventory to support efficient asset management and related transactions.

Corporate Land Management Framework

Circulations Standard

Corporate land inventory circulations is an integral process required to allow well-informed decisions regarding rationalization of City land.



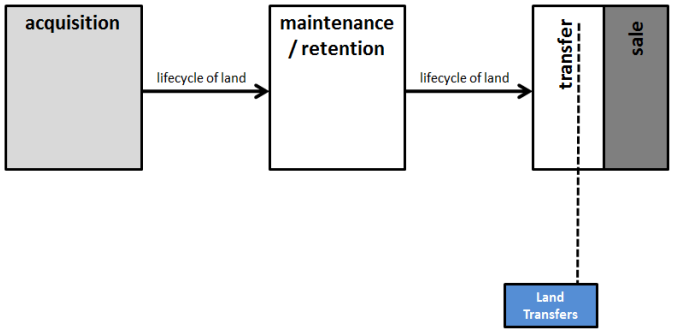


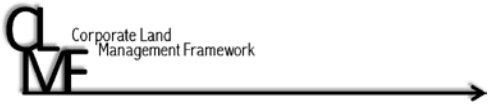
Revolving Fund for General Land Purchases

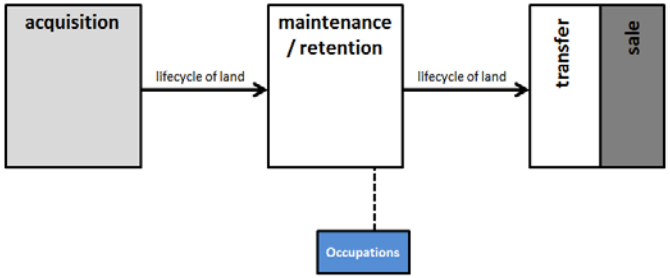
A holistic review of current land funding mechanisms determined that transparency, reciprocal responsibilities, accountability, prioritization and effective management of the fund are key elements in the acquisition of land for corporate and infrastructure purposes.

Land Transfers Standard

Land transfers are essential to support the delivery of citizen services, rationalize land and address corporate goals and objectives; the land transfers standard outlines principles, roles, responsibilities and processes.







Occupations Standard

The occupations standard outlines roles and responsibilities, accountabilities, authority to enable disposition of interest in City lands in support of effective land management and delivery of services to citizens.

Project Phases

PHASE 1 ESTABLISH STRATEGIC DIRECTION

MILESTONES

Council Report

Develop Project Plan

Engage Stakeholders

Guiding Document for Strategy

PHASE 2 DEVELOP NEW PROGRAM FRAMEWORKS

MILESTONES

Council Report

Non-market Housing Framework

Strategic Redevelopment Framework

PHASE 3 ALIGN EXISTING PROGRAM FRAMEWORKS

MILESTONES

Council Report

Corporate Land Strategy

Industrial Land Development Framework

Corporate Land Mgmt. Framework Alignment

OTHER ONGOING REAL ESTATE AND LAND INITIATIVES

Affordable Housing Land Disposition Policy

Strategic Redevelopment Investment Plan

Industrial Market Update

Bulk MOD Land Disposition I

OTHER ONGOING REAL ESTATE AND LAND INITIATIVES

Sales, Acquisition & Leasing Environmental Policy

Residential Mixed-Use Market Update

Real Property Bylaw Update

Encroachment Policy Update

OTHER ONGOING REAL ESTATE AND LAND INITIATIVES

Bulk MOD Land Disposition II

Green Line Acquisition Strategy

Green Line Real Estate Plan