CITY OF CALGARY

Stormwater Rate Structure Study

SUMMARY REPORT / JULY 13, 2022

RAFTELIS

MOOREVIEW
Management Consulting Inc.

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Contents

Tables

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1. Introduction

The City of Calgary (The City) currently charges a flat stormwater service charge for residential, industrial, commercial, and institutional (ICI) wastewater customers. The monthly (30 day) fee for 2022 is $15.63 per wastewater account or $190.17 annually.[1] The stormwater fee supports stormwater management efforts to provide reliable street drainage, flood protection, and river health (Calgary, 2022).

The current stormwater service fee was developed within the framework of The City's *User Fee and Subsidies Policy* (CFO010; Calgary, 2012). The *User Fee and Subsidies Policy* outlines six principles that will guide any changes to the existing stormwater drainage fee structure:

- **Benefits Principle:** those who receive benefits from a particular municipally provided good or service should pay for that good or services according to the level or value of the benefit received.
- **Cost Recovery Principle:** the full cost of providing a good or service, including operating expenses, administrative costs, capital expenses (including depreciation), as well as implicit costs of foregone opportunities or activities that are not being undertaken, environmental costs and social costs, should be the starting point when calculating the appropriate user fee.
- **Management of Public Assets Principle:** public assets have a value and The City has a responsibility to recognize this value and protect these assets.
- **Allocation of Resources Principle:** in an environment with limited resources available and increasing public demand for goods and services, user fees have value as a mechanism for allocating scarce resources.
- **General Tax-supported Subsidies Principle**: when consumption or use of a good or service benefits society as a whole, all citizens should pay for the societal benefit.
- **Tax-supported Subsidies for Individuals Principle**: in cases where individuals may have resources below an acceptable level and are not able to make the choice to consume and pay for City goods and services, The City could provide a subsidy to the individual in order that they are allowed the choice to consume.

Bylaw 37M2005 *to regulate storm sewers and stormwater in The City of Calgary* (Calgary, 2021), presents the system of rates and fees currently charged to customers as the "Stormwater Service Charge." The bylaw states that the "Owner of a Premises which is located within the boundaries of The City and connected to the Wastewater System must pay a Stormwater Service Charge to The City." (Calgary, 2021). The bylaw gives the Director of Water Resources the ability to "establish a system for the billing and collection of any rates, charges and fees in connection with the Stormwater System," and therefore, as long as the variable rate were to continue to be charged to wastewater accounts, a bylaw update will not be necessary to enact a variable impervious area (IA) - based rate structure.

The City of Calgary has grown to over 1.2 million people living in 850 km^2. This growth in population and industry in Calgary has led to an expansion of impervious surfaces such as roads, parking lots, and buildings,

[1] City of Calgary Water Rates. Accessed: www.calgary.ca/uep/water/customer-service/water-and-wastewater-rates/residential-water-rates-and-billing.html

replacing the natural surfaces that used to slow the runoff of stormwater and trap pollutants before entering the Bow and Elbow rivers. Because stormwater runoff enters the Bow and Elbow river directly, The City is working to reduce the volume of polluted stormwater that enters the system. The City's stormwater system is composed of a series of stormwater management practices that work to reduce the volume of stormwater and pollution entering the local waterways. These practices include storm drains, wet and dry ponds, low impact development, wetlands, and outfalls. The current flat fee that is charged to each wastewater customer does not account for the impact of impervious surfaces on the stormwater system and does not provide a means to recognize property owners' reduction of their burden on the system.

Over the past few years, The City has commissioned studies examining equitable methods of distributing stormwater costs among customers (Jacobs, 2021). The results of previous studies suggest a variable rate based on impervious area to be a more equitable method of distributing stormwater costs among customers. The most recent study conducted by Jacobs in 2021 examined the feasibility of introducing a variable stormwater drainage fee. The Jacobs study examined multiple rate structures and alternatives and compared The City's approach to other municipalities' stormwater drainage fees and cost allocation methods. Jacobs concluded that a variable rate structure based on impervious area aligns best with the objectives and policies of The City. They present a tiered impervious area-based approach for residential ICI customers with phased implementation to reduce immediate impact to customers.

Mooreview Management Consulting Inc. and Raftelis have built upon the work of previous studies to review the feasibility of a variable rate structure.[2] This study included the following:

- In-depth assessment of impervious area, parcel, and billing data that form the basis of the variable rate structure to understand data gaps and required data updates and maintenance to implement a variable rate structure
- Sampling of residential properties in ArcMap to review and confirm the previously developed equivalent residential unit (ERU)
- Information gathering from City staff to identify major data needs and broad implementation considerations and timeline
- Development of two potential rate structures including an evaluation of customer impacts and revenue generated for each alternative fee structure
- Broad evaluation of the critical path to implementation of a variable stormwater drainage fee based on impervious area

This report details the findings of the data analysis, the potential rate structures and their customer impacts, and a broad critical path towards implementation of a variable stormwater drainage fee.

While data were analyzed to generate potential rate structures and a preliminary broad critical path was developed, this report does not contain a detailed implementation plan because The City elected to continue with the flat stormwater charge, and work on this project was stopped without selecting a proposed variable rate structure and beginning the implementation planning phase.

[2] The planned tasks were as laid out in these bullet points, but the outcome is less detailed because Raftelis and Mooreview were instructed stop work due to the decision to forgo consideration of a variable stormwater fee.

2. Data Analysis and Information Gathering

In order to transition from an exclusively account-based fee to an account-based fee with a parcel and impervious area-based charge, new datasets need to be developed. The new datasets account for the amount of impervious area on each parcel and match each parcel to a current wastewater account.

2.1. GIS Data

A master parcel file was developed to aggregate data on parcels from several data sources. The 379,667 parcels were classified into residential and ICI customer categories based on building assessment data and impervious area was determined for each parcel. Prior to implementation, The City will have to determine how to charge parcels that have both ICI and residential customers. The resulting dataset has 359,159 parcels because it just includes parcels that have impervious area. Under a variable impervious area-based rate structure, a typical step is to develop a unit of charge. Similar to water service, which has a unit of charge of cubic meters, this storm water rate structure has a unit of charge of square meters of impervious area. The industry practice is to make the unit of charge equivalent to impervious area on a typical single family residential unit, called an equivalent residential unit (ERU). For the purposes of the analysis in this phase, the ERU is 225m^2. If The City moved to adopt the variable fee, the unit of charge would need to be carefully considered and decided upon.

2.2. Billing Data

The City provided stormwater account summary data that was used to validate the stormwater management program revenue based on the flat annual fee of $190.17 and the number of stormwater accounts. Based on the number of accounts at the end of December 2020, the stormwater revenue for 2020 should be about $73,478,455. Parcel to account matching to calculate units of service and potential customer impacts used record level billing data for Non-Residential and ICI accounts that was retrieved from the billing service provider. This data has 14,450 Non-Residential ICI accounts. Matching efforts resulted in 74% of accounts (10,714 accounts) being matched to a parcel and 26% (3,736) remaining unmatched.

2.3. Information Gathering

Raftelis held multiple meetings with City staff to identify major data needs and the broad implementation considerations and timeline. During the Billing Support and Customer Service meeting it was identified that a variable rate structure would be a major change in the billing approach, but the current meter management system is an existing framework that could be followed. It was also discussed that at this time, there is not a clear mechanism for how to charge stormwater only parcels that do not have a wastewater account but do have impervious area, and it is anticipated that it would require a bylaw change. During the Data Management meeting, it was discussed that The City will need to maintain a database to match parcel charges to wastewater accounts and convey that data to the billing service provider for each account. Based on previous experience with the billing service provider, it could take about 1-1.5 years to implement a new billing system. This timeline would be shorter for a tiered approach than for a fully variable approached.

While the meetings were helpful to begin considerations for the feasibility of the potential rate structures, more information will need to be gathered to move towards implementation.

3. Potential Variable Rate Structures

An early decision in the project, based on the impacts calculated during the Jacobs study, was to focus on a pragmatic, incremental transition to a variable charge. Impervious area-based variable rate structure alternatives were developed, building upon the current rate structure and adding in a more equitable recovery of revenue based on impervious area. For the potential variable rate structure, customers were divided into two classes, Residential and Industrial, Commercial, Institutional (ICI). Customer class definitions remain consistent with the current definitions for water, wastewater, and stormwater rates. Residential customers include single family homes (SFR), duplexes/triplexes/fourplexes, and attached homes where units have an individual City water meter. ICI customers included anyone not in the residential category, including multi-family residential units.

Another customer category that could be defined, as was considered during the Information Gathering Phase, is stormwater only parcels (i.e., parcels not connected to the wastewater collection system). Because stormwater only parcels place a demand upon the stormwater system, there is merit to charge them a stormwater drainage fee.

Under both potential rate structures, the stormwater drainage fee remains an account-based fee, charged to each wastewater account holder, with the addition of charges based on per parcel impervious area.

3.1. Alternative 1 – Tiered Impervious Area-Based Rate Structure

Alternative 1, the Tiered Impervious Area-Based approach, keeps the $15.63 monthly/$190.17 annual flat fee and adds an additional per parcel charge based on impervious area. All residential customers would continue to be charged the same $15.63/month flat stormwater fee per wastewater account regardless of parcel size and impervious area. ICI customers that have impervious area greater than one ERU are split into three tiers: Small, Medium, and Large. ICI properties that are less than one ERU will continue to be charged the flat fee per wastewater account, just like residential properties. Depending on the amount of additional revenue that needs to be generated to fund the stormwater system, the fee for each tier can be set at different levels. The example below demonstrates the additional monthly charge per parcel charge for each tier to get an estimated $2.17 million in additional revenue above the revenue generate by the existing flat fee. The additional monthly charge is based on impervious area, specifically the midpoint numbers of ERUs in each tier and was calculated by dividing the midpoint of impervious area for each tier by one ERU (225m^2).

Table 1. Alternative 1 Proposed Rate Structure

	Tier Range (IA m^2)	Existing Per Account Charge Revenue (estimated) based on $190.17 annual charge	Additional Monthly Charge Per Parcel	Additional Annual Charge Per Parcel	Additional Revenue (estimated)	Total Revenue (estimated)
Residential		$ 69,926,269.68			$ 0	$ 69,926,270
ICI ≤ 225	0 to ≤ 225	$ 383,773.63			$ 0	$ 383,774
ICI - Small	>225 and ≤3000	$ 1,268,328.25	$ 6.67	$ 81.11	$ 400,148	$ 1,668,476
ICI - Medium	>3000 and ≤7000	$ 781,545.88	$ 22.22	$ 270.37	$ 688,693	$ 1,470,239
ICI - Large	>7000	$ 1,019,522.50	$ 33.33	$ 405.56	$ 1,081,481	$ 2,101,004
Total		**$ 73,379,440**			**$ 2,170,323**	**$ 75,549,763**

Under this proposed rate structure, an account-based rate increase of $2.60 annually (from $190.17 - $192.77) would be needed to generate approximately $1 million in additional revenue. Alternatively, the flat fee could remain consistent, and an additional parcel-based monthly charge as outlined below would generate $1 million in additional revenue.

Table 2. Additional Monthly Charge for each Tier to Generate $1 Million in Additional Revenue

	Tier Range (IA m^2)	Additional Monthly Charge
ICI ≤ 225	0 to ≤ 225	-
ICI - Small	>225 and ≤3000	$ 5
ICI - Medium	>3000 and ≤7000	$ 9
ICI - Large	>7000	$ 13

Another option under Alternative 1 would be to reduce the per account charge so that residential and small ICI customers receive a reduction in their stormwater fee while additional revenue is recovered from the per parcel impervious area-based charge for ICI customers. This approach would have the same structure as outlined above with a $15.14 (monthly)/$184.17 (annual) account-based fee for all customers. The reduction of the account-based fee to $184.17 was selected to generate the same amount of revenue that is currently being generated by the flat fee of $190.17, while adding the additional impervious area-based charge.

Table 3. Alternative 1 Proposed Rate Structure with Reduced per Account Charge

	Tier Range (IA m^2)	Per Account Charge Revenue (estimated) based on $15.14 monthly/$184.17 annual charge	Additional Monthly Charge Per Parcel	Additional Annual Charge Per Parcel	Additional Revenue (estimated)	Total Revenue (estimated)
Residential		$67,720,045.68			$ 0	$67,720,046
ICI ≤ 225	0 to ≤ 225	$371,665.29			$ 0	$371,665
ICI - Small	>225 and ≤3000	$1,228,311.58	$6.67	$81.11	$400,148.15	$1,628,460
ICI – Medium	>3000 and ≤7000	$756,887.54	$22.22	$270.37	$688,693.42	$1,445,581
ICI - Large	>7000	$987,355.83	$33.33	$405.56	$1,081,481.48	$2,068,837
Total		**$71,064,266**			**$2,170,323**	**$73,234,589**

3.2. Alternative 2 – Fully Variable Impervious Area-Based Rate Structure

Under Alternative 2, Fully Variable Impervious Area-Based Rate Structure, the $15.63 (monthly)/ $190.17 (annual) per account charge remains consistent while additional revenue is recovered from ICI customers on a fully variable impervious area ERU basis. The additional impervious area-based charge is a per parcel charge that would be added to the account based flat fee for ICI customers with greater than one ERU of impervious area. In the scenario presented below, the additional charge per ERU is calculated by determining the total amount of additional revenue to be generated and dividing that amount by the number of impervious area ERUs in the ICI customer category. To allow for comparison between the two alternatives, the additional revenue was set at $2,140,593, the same amount of revenue generated in the Alternative 1 example above.

Table 4. Alternative 2 Proposed Rate Structure

	Accounts (estimated)	IA (estimated)	ERU (225 m^2)	Existing Per Account Charge Revenue (estimated) based on $15.63 monthly/$190.17 annual charge	Additional Annual Charge Per ERU (225 m2)	Total Revenue (estimated)
Residential	367,704	77,006,321	367,704	$ 69,926,269.68	$ -	$ 69,926,270
ICI	18,160	67,467,744	299,857	$ 3,453,487.20	$ 7.14	$ 5,594,080
Total				**$ 73,379,757**	$ 2,140,593	**$ 75,520,350**

An annual account-based fee increase of $2.60 (from $190.17 - $192.77) or an added annual charge of $3.33 per ERU would generate an additional $1 million in revenue.

Similar to Alternative 1, Alternative 2 provides the option to reduce the per account charge such that residential and small ICI customers receive a reduction in their stormwater fee, while additional revenue is recovered from the per parcel impervious area-based charge for ICI customers. This approach would have the same structure as outlined above with a $15.14 (monthly)/$184.17 (annual) account-based fee for all customers.

Table 5. Alternative 2 Proposed Rate Structure with Reduced per Account Charge

	Accounts (estimated)	IA (estimated)	ERU (225 m^2)	Per Account Charge Revenue (estimated) based on $15.14 monthly/$184.17 annual charge	Additional Charge Per ERU (225 m2)	Total Revenue (estimated)
Residential	367,704	77,006,321	367,704	$67,720,045.68	$-	$67,720,046
ICI	18,160	67,467,744	299,857	$3,344,527.20	$7.14	$5,485,120
Total				**$71,064,573**	**$2,140,593**	**$73,205,166**

4. Customer Impacts

Under each of the two potential variable rate structures, all residential customers and ICI customers with less than 225m^2 of impervious area would continue to pay the same flat stormwater rate. ICI customers with larger amounts of impervious area (and therefore a greater contribution of runoff to the stormwater system) would pay an increased per parcel charge depending on their total amount of impervious area. Overall, ICI customers' stormwater drainage fees would increase by approximately 4% to 200%. The customer impacts outlined below are based on one account per parcel (which it is understood will not be the case for many of the large parcels). In the case of multiple accounts per parcel, the parcel-based fee could be split between the accounts therefore reducing the burden of the fee increase.

Table 6. Comparison of Customer Impacts Under the Two Potential Rate Structures

	Alternative 1			Alternative 2				
Units of Service	**Annual Fee**	**Monthly Fee**	**%Fee Increase**	**Annual Fee**	**Monthly Fee**	**%Fee Increase**	**Parcels**	**Accounts**
Residential	$190.17	$15.63	**No change**	$190.17	$15.63	**No change**		367,704
ICI ≤ 225	$190.17	$15.63	**No change**	$ 190.17 – $ 197.31	$ 15.63 – $ 16.22	**0 – 3.8%** ⇧	1,061	2,018
ICI - Small	$271.32	$22.30	**43%** ⇧	$ 197.31– $ 285.37	$16.22 - $ 23.45	**3.8 – 50%** ⇧	4,933	6,669
ICI - Medium	$460.51	$37.85	**142%** ⇧	$ 285.37 – $ 412.30	$ 23.45 - $ 33.88	**50 – 117%** ⇧	2,547	4,110
ICI - Large	$595.69	$48.96	**213%** ⇧	$ 412.30 and up	$ 33.88 and up	**117% and up** ⇧	2,667	5,361
ICI - Large (>13,000 m2 IA)	$595.69	$48.96	**213%** ⇧	$602.63 and up	$ 49.53 and up	**217% and up** ⇧	1,668	

Alternative 2 – Fully Variable would result in a lower fee increase for most ICI customers than Alternative 1, but it would have a substantially larger impact on large ICI customers (i.e., greater than 13,000 m^2 impervious area). Approximately 15% of total ICI parcels would have higher fees under Alternative 2. Below are the total number of parcels projected to be in each range of impervious area that would face the greatest burden of the fee change under Alternative 2.

Table 7. Impacts of Alternative 2 on Large ICI Customers with One Account and IA >9,000 m^2

Impervious Area (m^2)	Estimated Number of Parcels (inclusive)	Fee (Annual)	Fee (Monthly)
IA > 100,000	62	**$ 3,362.94** and up	**$ 276.41** and up
IA > 50,000	224	**$ 1,776.55** and up	**$ 146.02** and up
IA > 25,000	693	**$ 983.36** and up	**$ 80.82** and up
IA > 13,000	1,668	**$ 602.63** and up	**$ 49.53** and up
IA > 9,000	2,567	**$ 475.72** and up	**$ 39.10** and up

Capping the total stormwater fee at a certain level would reduce the impacts of Alternative 2 on large ICI customers. In order to meet revenue requirements with the addition of a fee cap, the cap can't be too low or the per parcel fee must be raised to compensate for lost revenue due to the cap.

5. Implementation Considerations

5.1. Considerations for each Alternative

The advantages and disadvantage of each potential rate structure are outlined below:

	Advantages	Disadvantages
Alternative 1	• Lower impact on 15% of ICI customers with more than 13,000 m^2 of IA • Requires fewer changes to the current billing system	• Greater impact on small and medium ICI customers • Less of a direct relationship between impact of impervious area on stormwater system and the fee
Alternative 2	• Stronger direct relationship between fee and impact on stormwater system • Lower impact on small, medium, and some large ICI customers	• Major impact on ICI customers with more than 25,000 m^2 of IA • Substantial changes required to implement a fully variable rate through the current billing system • Requires more communication with stakeholders to explain the wide range of impacts on ICI customers

Both alternatives are more equitable than the existing framework because they account for the impact of impervious area on the stormwater volume and quality.

5.2. Critical Path to Implementation

Moving from the current flat rate structure to a variable rate will require a number of steps for successful implementation. The critical path to implementation includes data development and updates, development of a capital project for IT infrastructure, coordination with the billing service provider, stakeholder engagement, and council approval. Initial data development has been conducted but will need to be finalized and updated to be used for billing purposes. Prior to data development, critical decisions that must be finalize include the following:

- Basis of fee – Flat account-based fee with variable impervious area fee for ICI customers
- Billing unit – Wastewater account for flat fee and ERU for impervious area fee
- ERU definition – 225m^2 of impervious area
- Definitions of customer classes
    - Residential Customers – residential parcels with one to four units
    - ICI Customers – all parcels that have wastewater accounts and are not residential customers
- Customer class billing approach – selection of alternatives outlined above
    - Tiered approach or fully variable impervious area-based approach for ICI customers

- Policy on stormwater only parcels
    - Adding fees for stormwater only parcels likely requires a charter change
    - This decision is critical in the path towards implementation because it substantially influences the units of service and therefore the final rate that would be required
- Policy on exemptions, fee caps, and credits
    - Potential exemption of properties such as the airport
    - Potential total fee cap and fee credits

Additional policy considerations that will be necessary after the critical decisions are made include the following:

- How to charge accounts associated with multiple parcels of the same class
    - Options include aggregating impervious area from all parcels and charging the one account based on the total impervious area on associated parcels or developing stormwater only parcels
- How to charge accounts associated with multiple parcels of different classes
    - Options include aggregating the impervious area for all of the ICI parcels and then charging based on total impervious area or ERUs for the ICI parcels and then either charging just one account based flat fee for the residential parcels or one flat fee for each residential parcel
- How to charge multiple accounts associated with one parcel
    - Options include charging one account for the entire parcel, or charging a flat rate for each account and splitting the impervious area/ERU based fee among all the accounts on the parcel
    - Another option would be to just charge one flat fee and impervious area-based fee, which is split between all accounts on the parcel
    - Splitting the fee between multiple accounts can be a challenge on a mixed use parcel where some accounts are for ICI customers and others are for residential customers
- Mechanisms to address non-payment of stormwater fees
- Mechanisms for adding new properties
    - This will have to be through billing service provider because new customers set up their accounts directly with the billing service provider
    - If there is a decision to charge stormwater only parcels without wastewater accounts, there will need to be a process for adding new stormwater only accounts

Data development will include an updated layer of all parcels classified as residential or ICI, impervious area layer with the total area of impervious area on each ICI parcel, and a file that links the impervious area and parcel data to the billing service provider's account data. The City will need to develop a capital project for IT infrastructure, which will require stage gate approval, to develop and maintain the parcel and impervious area data in a way that can be matched to account data and updated as necessary. A new database and potentially new software will need to be developed and used to translate impervious area and parcel data to account based billing data. Following the development of the internal data process, integration with the billing service provider will be required.

A strategic communications plan will need to be developed and implemented to ensure stakeholder engagement and public outreach occurs throughout the fee development and implementation process. Sharing the rate structure and potential fees early in the process and explaining the benefits of a more equitably distributed stormwater fee will help to get public support and council approval. In addition to communicating the new fee, public engagement can also include gathering of input on potential credit programs. The final step in the critical path to implementation is council review and approval.

5.3. Additional Implementation Considerations

Changes to staffing and resource allocation will be needed to support data development and maintenance, customer service, and engineering/development that will be required for a variable stormwater fee. Additional GIS and IT staff will be required to maintain updated impervious area and parcel data. The City team will need to maintain a spreadsheet with updated account-based billing data to be shared daily with the billing service provider. Customer service staff will be needed, particularly during the initial implementation phase, to respond to customer inquiries regarding the new fee structure. Lastly, engineering and development staff will be required to focus on the development and implementation of a potential credit program.

6. Conclusion

If The City chooses to consider a variable impervious area-based rate structure in the future, both Alternative 1 and Alternative 2 are viable options that have clear paths to implementation. While some data gaps and necessary decisions were noted in the report, The City has sufficient, high-quality data available to implement an impervious area-based stormwater fee. The rate structures presented under both Alternative 1 and Alternative 2 provide The City with flexibility to identify the amount of revenue needed and update the account or parcel-based fees accordingly. Additionally, Alternative 2, which has a large potential impact on large ICI customers, allows for flexibility to cap the total fee amounts in order to reduce the impact of an impervious area-based fee on large customers. While critical decisions will need to be made prior to the implementation of either alternative, there is a clear path as well as models to build upon should The City consider pursuing a variable rate structure in the future.