

Calgary



Fire

2024 Off-site Levies

Bylaw Review Whitepaper
September 18, 2023



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Introduction

The purpose of this document is to provide background information on the infrastructure, benefit methodology and levy rate calculation being used to support the fire portion of the 2024 Off-site Levies Bylaw.

The fire infrastructure being considered in the 2024 Off-site Levies Bylaw is emergency response stations required to service growth population in greenfield communities.

The preliminary fire levy rate is \$17,092 per hectare. Once approved, this levy rate is anticipated to be updated periodically through bylaw amendments to reflect changes to any inputs, including infrastructure inclusions, cost estimates, land absorption, discount rates and escalation rates.

This paper sets out:

- The fire infrastructure needed to support growth.
- The benefit allocation, or degree (expressed as a percentage) to which that infrastructure will benefit different areas, and growth assumptions.
- The levy rate calculation.

Infrastructure

The costs of the following type of fire infrastructure are included in the levy:

- **Emergency response station** is a facility that serves as a central hub for all hazard emergency response services, such as the Calgary Fire Department (CFD) and Alberta Health Services (medical personnel are stationed and deployed from). The central hub also provides for public safety infrastructure, and in some instances a hazardous waste drop-off point.

Identification of a need for an emergency response station is dependent on many different factors including, but not limited to:

- Actual and forecasted incident volumes.
- Actual and simulated response times.
- Existing or proposed population sizes, geographic layout, community size and deployment considerations.
- Area land use zoning and building occupancy types.

Eight emergency response stations will be required to meet the needs of future population in greenfield communities. Some fire infrastructure provides a facility for response services to more than one ASP. The response time is based on the Council-directed seven-minute response time target for emergency service (CPS2008-03).

It is assumed that infrastructure required to meet the needs of future population in greenfield communities will be built by 2055. The exact timing of the infrastructure construction and the location of the facilities will be refined based on the pace of the population growth.

More information about fire infrastructure can be found in Table 2 of Attachment 1.

Rationale for Infrastructure Inclusion

The fire levy methodology includes infrastructure benefiting greenfield growth. The need for the fire infrastructure is based on the factors described above and is set out in the ASPs which guide and direct the specific land use, subdivision and development decisions that collectively determine the form the plan area will take. This includes making decisions on land use, transportation systems, population and jobs, intensity, the sequence of development, and the provision of essential services and facilities.

The fire infrastructure as described in the ASPs will continue to evolve as policies change or as new studies are completed. Any future infrastructure additions, removals, cost updates or scope changes may be reflected in periodic updates to the Off-site Levies Bylaw, with the levy rate recalculated to reflect the most current information available.

Infrastructure Costs

The fire infrastructure cost estimates described in Table 1 and Table 2 of Attachment 1 are developed using the historical construction costs from the most recent permanent station while apparatus and aerial engine costs are based on the current City contracts for engine life-cycling or purchases. Land size estimates are based on CFD's requirements per station.

Emergency response station capital costs include:

- Construction costs (these can include any materials to construct the building and develop the site, labour costs, furniture and equipment, interior fixtures, design and planning, administrative costs, insurance, and other fees).
- Project contingencies and escalation.
- Land acquisition cost.

Areas that are experiencing growth have varying population (residents and jobs/workers) forecasts. There might be a need for a 2-bay, or more, emergency response station, depending on the population.

Using recent actuals as the baseline price index, costs were re-calculated with current observed increases impacting Non-Residential Building Construction projects up to Q2 2023. This ensures that infrastructure cost estimates are current and reflect recent inflationary increases. Estimated costs assume infrastructure is delivered through design-build contracts administered by The City.

Infrastructure costs are included in Attachment 1 below.

Growth Assumptions and Allocation of Benefit

The service provided by an emergency response station primarily benefits the immediate area surrounding the station. In cases where an emergency response station in an area or community is unable to achieve an effective response, then neighbouring emergency response stations distribute resources to concentrate on the response.

All emergency response stations included in the fire levy are located in the Greenfield Area and will provide a similar reliability, quality, and level of service provided in the Established Area, while maintaining or not affecting the current reliability, quality and level of service in the Established Area. Therefore, no benefit was allocated to the Established Area for this infrastructure.

100 per cent of the benefit is then allocated between levied lands and unlevied lands. This allocation is based on the forecast population in levied lands (where a development agreement has been executed and off-site levies have been paid), and unlevied lands (where no development agreement has been executed and no off-site levies have been paid).

The Calgary Fire Departments operates within the City of Calgary boundaries and will collaborate with our jurisdictional partners when required. No regional benefit has been assigned to calculate the benefit allocation.

The benefit is assessed based on the share of forecast population in lands that:

- have already signed development agreements and paid off-site levies (levied lands).
- have not yet signed development agreements and paid off-site levies (unlevied lands).

For each emergency response station, the benefit allocated to unlevied lands is calculated as follows:

$$\text{Benefit \%} = \frac{\text{Forecast population and jobs in all unlevied lands within emergency response station coverage area}}{\text{Forecast total population and jobs in the coverage area of emergency response station}}$$

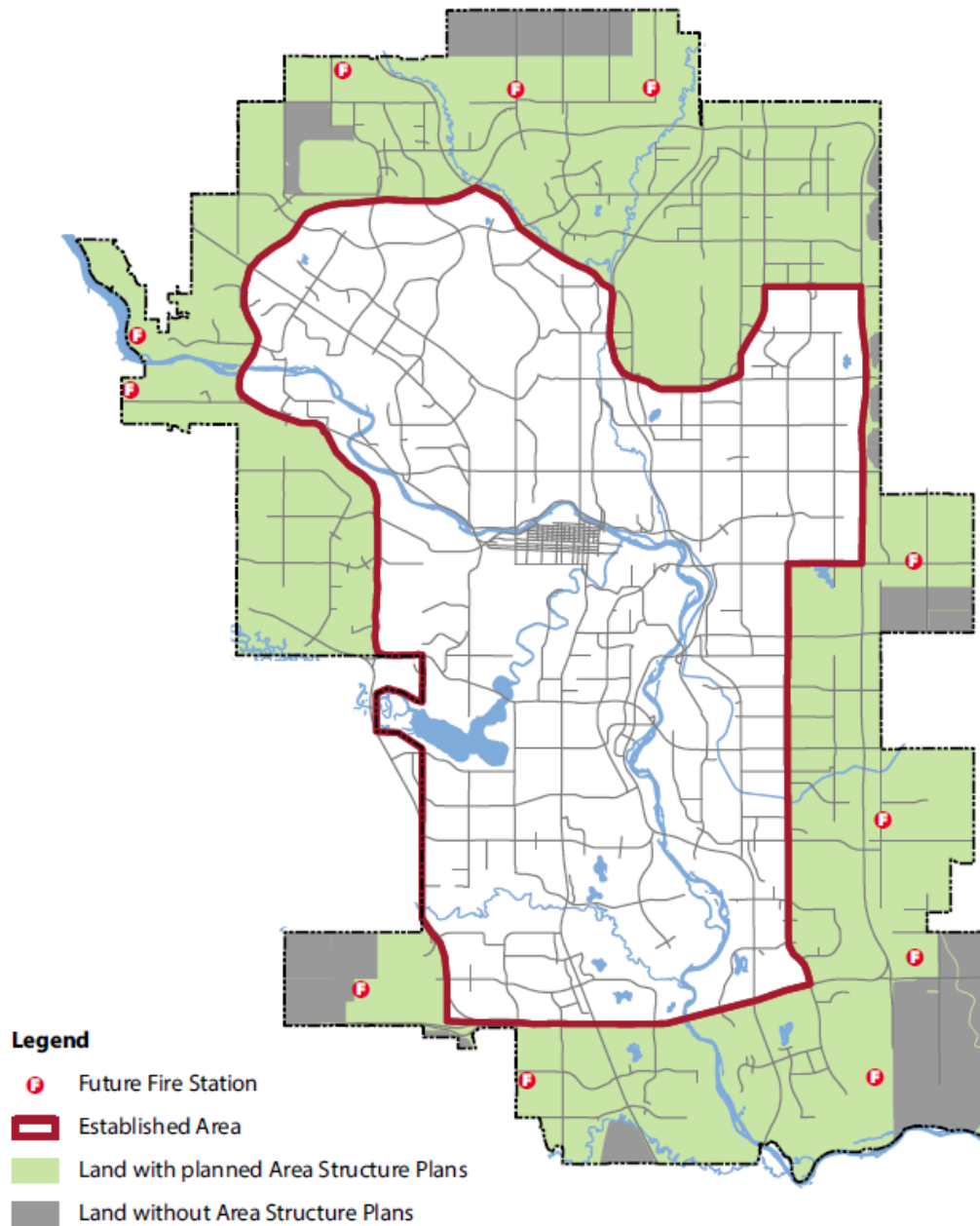
Table 2 in Attachment 1 provides the benefit allocated to unlevied lands for each emergency response station. The benefit percentage allocated to unlevied lands is then used to calculate the levy rate for the fire infrastructure determined in section 2.

It is assumed that all ASP lands within Calgary’s boundary will be developed by 2055 following current growth trends (the model allows for three additional years for levy collections based on the current collection schedule). It includes all lands within Calgary’s current boundary and does not assume any expansion or annexation of municipal boundaries during the forecast period. As of the end of 2022, there were 9,359 hectares of unlevied lands, forecast to be 9,069 hectares at the end of 2023 to be developed by 2055.

The following map illustrates The City's Established Area, Greenfield Area with ASPs and without ASPs, and the locations of future emergency response stations.

Map 1: Off-site Levy Established Area Boundary, and Greenfield Area as of the end of 2022

Established Area and Greenfield Area as of December 31, 2022



Levy Rate Calculation

The levy rate calculations and supporting data are available in the *Fire Levy Rate Model 2024 Off-site Levies Bylaw*. The calculation balances levy revenues with levy spending to ensure the levy fund has a balance of zero dollars at the end of the forecast period. This calculation:

- Accounts for the timing of both spending and developer contributions.
- Includes estimated annual income returned from investments made using the off-site levy balance.
- Incorporates a discount rate to reflect the time value of money.
- Incorporates an escalation rate to reflect inflation with respect to the cost of construction.
- Uses Excel's Goal Seek function to generate the levy rate value that, when inserted into the model's calculations, will result in an off-site levy fund balance of zero dollars at the end of the model period. This ensures that levy revenues (developer contributions plus investment income) match levy expenditures when all land has been levied and all expenditures have been completed.

<i>Iterative Annual Calculation</i> <i>applies escalation and discount rates</i>			Final Model Year
Year	y1... y2... y3... etc...	yN	
Starting Levy Fund Balance	\$		
Capital Expenditures	Minus \$		
Developer Contributions (levy rate x ha)	Plus \$		
Investment Income	Plus \$		
Ending Levy Fund Balance	= \$	= \$0	

Figure 1. Conceptual levy rate calculation

The steps for calculating the levy rate include:

1. Determining the number of hectares of unlevied land (9,069 hectares) and estimating annual land absorption through the model period.
2. Identifying the capital costs for infrastructure that benefits unlevied lands.

- 3. Determining the benefit allocations that apply to the infrastructure benefiting unlevied lands.
- 4. Determining the unlevied capital cost, as the sum of capital costs multiplied by benefit allocations.
- 5. Setting annual spending for each year in the model period. The escalation rate is applied to determine infrastructure costs in future dollars, and the discount rate is applied to determine the amount needed in today's dollars.
- 6. Using Excel's Goal Seek function to calculate the fire off-site levy rate. This is the final input to the calculation that allows for the determination of revenues needed to offset project expenditures and result in a levy fund balance of zero dollars at the end of the model period:
 - a. The levy rate is multiplied by the annual land absorption to determine developer contributions.
 - b. The discount factor, or investment rate of return, is applied to each year's closing levy fund balance to estimate annual investment revenue.

The escalation factor used for levy rate calculation (3.58%) is a five-year smoothed average, determined using Non-Residential Building Construction Price Index (CPI) for Calgary. The discount rate of 4.29% is based on the asset mix of investments held in The City's capital deposits, and the Long-term Capital Market assumptions that The City uses in projecting returns from investment portfolios.

The levy rate will be updated annually using a historic five-year smoothed average of the Non-Residential Building Construction Price Index for Calgary and through future bylaw amendments to reflect changes to any inputs, including infrastructure inclusions, cost estimates, land absorption, discount rates and escalation rates.

Attachment 1: Fire Infrastructure

Table 1. Cost estimates for an emergency response station

Station type	Value
2 Bay Station	
Facility size (sq. ft.) [A]	13,000
Building cost (\$/sq. ft.) [B]	1,100
Building cost per facility (\$) [A] x [B] = [C]	14,300,000
Land required for each facility (acre) [D]	1.5
Land acquisition cost (\$/acre) [E]	1,300, 000
Land cost per facility (\$) [D] x [E] = [F]	1,950,000

Station type	Value
Apparatus (units) [G]	1
Apparatus cost (\$/unit) [H]	1,100,000
Total apparatus cost (\$) [G] x [H] = [I]	1,100,000
Equipment (\$) [J]	400,000
Total facility cost (\$) [C] + [F] + [I] + [J]	17,750,000
3 Bay Station	
Facility size (sq. ft.) [A]	15,000
Building cost (\$/sq. ft.) [B]	1,100
Building cost per facility (\$) [A] x [B] = [C]	16,500,000
Land required for each facility (acre) [D]	2
Land acquisition cost (\$/acre) [E]	1,300,000
Land cost per facility (\$) [D] x [E] = [F]	2,600,000
Apparatus (units) [G]	2
Apparatus cost (\$/unit) [H]	1,100,000
Total apparatus cost (\$) [G] x [H] = [I]	2,200,000
Equipment (\$) [J]	800,000
Total facility cost (\$) [C] + [F] + [I] + [J]	22,100,000
4 Bay Station	
Facility size (sq. ft.) [A]	17,500

Station type	Value
Building cost (\$/sq. ft.) [B]	1,100
Building cost per facility (\$) [A] x [B] = [C]	19,250,000
Land required for each facility (acre) [D]	2.5
Land acquisition cost (\$/acre) [E]	1,300,000
Land cost per facility (\$) [D] x [E] = [F]	3,250,000
Engine apparatus (units) [G]	2
Apparatus cost (\$/unit) [H]	1,100,000
Aerial apparatus cost (\$) [I]	1,400,000
Total apparatus cost (\$) [G] x [H] + [I] = [J]	3,600,000
Equipment (\$) [K]	1,200,000
Total facility cost (\$) [C] + [F] + [J] + [K]	27,300,000

Table 2. Cost estimates and benefit allocations for emergency response stations included in the 2024 Off-site Levies Bylaw

Emergency Response Station	ASP	Cost (\$)	Benefit allocation to unlevied lands(%)
Belvedere Fire Station	Belvedere ASP	27,300,000	95
Glacier Ridge Fire station	Glacier Ridge ASP	22,100,000	95
Nose Creek Fire Station	Nose Creek ASP / Keystone Hills ASP	17,750,000	99
Providence Fire Station	Providence ASP	17,750,000	93

Rangeview Fire Station	Rangeview ASP / Ricardo Ranch ASP	22,100,000	80
South Shepard Fire Station	South Shepard ASP	17,750,000	97
West View Fire Station	West View ASP	17,750,000	99
Shepard Industrial Station	Shepard Industrial ASP	17,750,000	79

