

### Analysis: Fire Station Case Study

Many factors impact the overall cost of facilities. Listed below are the major cost drivers and their significant features. This list is not exhaustive and excludes many minor cost drivers that have a negligible impact on overall project cost.

#### Climate Resilience Policy C627A

The most significant cost driver of City of Edmonton facilities is Climate Resilience Policy C627A, which was originally approved by Council on April 19, 2021, in report UFCD000209 Revised Community Energy Transition Strategy - Final Strategy, Action Plan and Policy and subsequently updated and approved on June 11, 2024. The report outlined that the construction of emission neutral buildings represented a substantial performance increase from the previous policy level, which would have a major financial impact on project capital costs. The report also mentioned that operational cost savings were expected over the asset's lifecycle.

Policy C627A has been applied to several new construction projects to date. The Blatchford Fire Station is the furthest advanced and is currently under construction. The Walker and Wellington Fire Stations, along with the Southeast Transit Garage, are currently in design. The results of the case study align with Administration's observations on these active capital projects.

Policy C627A requirements impact the direct construction costs of the full Policy Design. Below are examples of the design features leading to increased costs.

- Increased insulation performance for all exterior enclosures, such as walls/roof/windows/doors.
- More efficient, fully electrical mechanical systems, such as ground source heat pumps, heat recovery systems and domestic water heaters.
- Improved lighting and lighting control systems.
- Larger backup generator due to the electrification of heating equipment.
- Solar photovoltaic system and structural reinforcement to accommodate it.

Policy C627A requires an emission neutral facility. This means that the building only uses renewable energy or produces and supplies renewable energy sufficient to offset any greenhouse gas production inherent in energy supplied and consumed for operations. This is an important requirement and one of the many steps towards the City to meet its objective of being a carbon neutral community by 2050. Additional benefits include:

- Energy efficiency: The full policy design consumes approximately half of the energy of the Basic design.
- Durability: An upfront investment in high-quality, high-performance material, equipment, and design features supports increased durability and reliability.

- Climate adaptation.

As per the Corporate Policy Framework, a scheduled review of Policy C627 has been initiated. The review will take into account the observations and learnings of the policy implementation, including the capital projects designed and built to meet the requirements.

### Fire Rescue Service Delivery Policy C523A

The second most significant cost driver of City of Edmonton facilities is the Fire Rescue Service Delivery Policy C523A<sup>1</sup>. This policy strives to meet or exceed National Fire Protection Association<sup>2</sup> standards and outlines the Edmonton Fire and Rescue Services' commitment to deliver an essential public service, helping to make Edmonton a safer place to live, work and play.

Practically, this policy is implemented and actualized through the Fire Rescue Master Plan and associated functional program documents. Below are examples of design features from the fire station functional program, leading to the increase in direct construction costs of the Full Policy Design.

- In-slab heating in the gear room, apparatus bay and other locations.
- Mandatory lightning protection system.
- Numerous other items, such as mechanical systems, interior finishes and equipment requirements, that overlapped with other policy alignments.

Policy C523A offers guidance through its mission, vision, core values, and goals. This ensures that fire station design aligns with corporate strategy and facilitates sustainable, long term service delivery.

### City of Edmonton Facility Construction Standards

The City of Edmonton Facility Construction Standards, documented through the City of Edmonton Facility Consultant Manual - Volume 1<sup>3</sup> and Volume 2<sup>4</sup>, are the third cost driver. They are technical guidelines to follow when designing new buildings or for renewal projects in existing buildings. The standards were established over time, based on industry best practices, operational requirements to support efficiency and

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<sup>1</sup> Fire Rescue Service Delivery Policy C523A

<https://www.edmonton.ca/sites/default/files/public-files/assets/PoliciesDirectives/C523A.pdf?cb=1625041189>

<sup>2</sup> "National Fire Protection Association." *National Fire Protection Association*, 2025, <https://www.nfpa.org/about-nfpa> . Accessed 09 May 2025.

<sup>3</sup> Facility Design & Construction Consultant Manual Volume 1

<https://www.edmonton.ca/sites/default/files/public-files/assets/PDF/COE-IM-GUIDE-0001.pdf>

<sup>4</sup> Facility Design & Construction Consultant Manual Volume 2

[https://www.edmonton.ca/sites/default/files/public-files/Commissioning\\_Consultant\\_Manual\\_2024.pdf?cb=1724240814](https://www.edmonton.ca/sites/default/files/public-files/Commissioning_Consultant_Manual_2024.pdf?cb=1724240814)

maintainability and lessons learned from previous capital projects and overall maintenance experience. The manuals are updated on a regular basis every few years.

Below are examples of the design features that increase the direct construction costs of the Full Policy Design.

- Backup generator installed indoors, requiring an increased building footprint.
- Increased footprint of the building required to house the HVAC systems indoors rather than on the roof or outside of the building.
- Water rather than air-based heating and cooling systems.
- Enhanced lighting controls and security system requirements.
- Copper wire versus aluminum for utility service feeders.

The City of Edmonton Facility Construction Standards ensure that the City's buildings are:

- Leveraging the central systems across City infrastructure, such as fire alarm, security, controls, Information Technology (City Network) and Closed Circuit Television (CCTV). The consultant manual dictates how to design to ensure integration with these central systems, which yields operational cost savings. It also specifies basic items for consistency and ease of use, like how to key door locks.
- Maintainable based on maintenance recommendations for equipment and systems.
- Utilizing lessons learned from previous projects, integrated into the Standards.
- Designed to meet the operational requirements and service levels of the operating and maintenance business areas, including specialty equipment and infrastructure such as pools, arenas and spray parks.
- Designed to ensure the safety of the maintenance and operational teams through consistent systems, for example, gas detection, to ensure the same alarms and lights have the same meaning, no matter the facility.

### Edmonton Design Committee Process

The fourth most significant cost driver of City of Edmonton facilities is the City's commitment to design excellence. Edmonton Design Committee Bylaw 20673<sup>5</sup>, through the creation of the Edmonton Design Committee (EDC), aims to improve the quality of the city's urban design. EDC reviews the design of new City facilities ahead of the development permit approval, focusing on the building's shape and size, materials, circulation and access and connection to its environment.

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<sup>5</sup> Edmonton Design Committee Bylaw 20673  
<https://www.edmonton.ca/sites/default/files/public-files/BL20673.pdf?cb=1746817659>

To meet the goal of design excellence, the Full Policy design introduces exterior building material, geometry and form consistent with an architectural intent suited for a fire station in Edmonton, such as:

- Brick over most of the envelope.
- Additional building height over the dorms and the office area.
- Illuminated ceiling and roof structure above apparatus bay.
- Landscape architecture upgrades.
- Exterior and architectural lighting.

The Edmonton Design Committee Bylaw encourages the design of City's buildings to be aesthetically pleasing and functional places and spaces that work for people. Through quality urban design, communities become more vibrant, attractive and easy to navigate. The EDC helps ensure that new projects are sustainable and well-integrated into the existing urban fabric.

The Edmonton Design Committee has identified the need to potentially change the scope of its reviews, including its geographical jurisdiction. Currently, the EDC reviews all City buildings and private developments specific to nine neighbourhoods in and around Downtown Edmonton. This work will be considered for the 2025-26 EDC work plan.

### Operational and Utility Costs

The case study focused on the construction costs associated with the two designs of the fire station. It also included a high level life cycle analysis, which suggests that the operational and utility costs of the Full Policy design are higher than those of the Basic design. This is partly due to the requirements of the Climate Resilience Policy C627.

To achieve emissions neutrality, all energy supplied to the building must be renewable, or any greenhouse gas production inherent in energy supplied and consumed for operations must be offset by on-site production of renewable energy. Practically, this generally means that no natural gas should be used. While the energy usage for the Full Policy design is half that of the basic design, due to the cost of electricity being 10 to 11 times more than natural gas, the utility costs of the Full Policy design are higher than those of the Basic design.

Another factor influencing the operational costs is that the more expensive pieces of equipment utilized in the Full Policy design tend to result in higher costs at periodic replacement times in the life cycle analysis. However, the life cycle analysis was not granular enough to relate the maintenance costs to specific equipment, which have increased durability of the equipment used in the Full Policy design.