

BRIDGE RENEWAL PROGRAM UPDATE

RECOMMENDATION

That the January 19, 2022, Integrated Infrastructure Services report IIS00814, be received for information.

Report Purpose

Information only.

To inform Council of the Bridge Renewal Program process and work underway during the 2019 to 2022 budget cycle and upcoming for the 2023 to 2026 budget cycle, including anticipated impacts to Edmontonians.

Executive Summary

- Edmonton has an extensive inventory of bridges and auxiliary structures. These structures require ongoing inspection, maintenance and renewal to ensure they remain in usable condition.
- In the coming years, Edmonton will experience the renewal of several key bridge structures.
- The Bridge Renewal Program is used to manage Edmonton's bridges and auxiliary structures through routine investment in renewal.
- The objective is to maximize the service life, protect public safety, and minimize unplanned disruptions of these critical pieces of the transportation network.
- Extensive work is underway in the 2019-2022 Capital Budget cycle to rehabilitate and replace bridges throughout the city.
- Further planning and design work are underway to prepare for bridge renewal construction projects programmed for the 2023-2026 Capital Budget cycle.
- Even with mitigation plans in place, bridge renewal projects are known to result in disruption to the travelling public, and businesses and residents surrounding these major projects.
- Administration makes significant efforts to examine all options and recommend the best overall strategy for the bridge renewal.

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REPORT

Edmonton has an extensive inventory of bridges and auxiliary structures such as noise walls. The inventory currently includes approximately 285 bridges worth approximately \$2.1 billion in replacement value. This significant collection of assets requires ongoing inspection, maintenance, and renewal to ensure they maintain their expected level of service in a financially sustainable manner. In the coming years, Edmonton will experience the renewal of several key bridge structures.

Overview of the Bridge Renewal Program

The Bridge Renewal Program is a vital part of the City's overall renewal approach that is used to manage the condition and service life of Edmonton's bridges and auxiliary structures (culverts, retaining walls, noise walls, stairs, and traffic barriers). The program is centred around strategic investment in structures informed by routine assessment, rehabilitation, and replacement. Through routine investment in the renewal of the City's assets, the life cycle of vital infrastructure can be optimized while at the same time enhancing select structures and taking specific action to increase safety for bridge users.

The Bridge Renewal Program focuses on the renewal of bridge structures. It includes related work such as street lighting and traffic signal rehabilitation, mature tree management, and active mode and other design improvements when required. Whenever possible, the work is conducted in conjunction with relevant growth programs such as roadway widening.

The bridge maintenance and renewal processes are described in Attachment 1, and also include high level portfolio condition information.

Bridge Renewal Program (2019-2022 and 2023-2026)

Numerous bridge renewal projects have been planned, designed and/or constructed during the 2019-2022 Capital Budget. The approved program budget totals approximately \$122.9 million, including some work and budget carried forward from the 2015-2018 Capital Budget. The work within the program will utilize the allocated funds, with some work spanning the next budget cycle. Notable bridge renewals are highlighted below.

Construction underway or completed in 2019-2022:

- Replacement of 11 pedestrian bridges in Mill Creek Ravine
- Replacement of Horsehills Road Bridge over Horsehills Creek
- Replacement of Duggan (Saskatchewan Drive) Bridge
- Replacement of 111 Street Pedestrian Bridge over Blackmud Creek
- Rehabilitation of the Glenora (107 Avenue over Groat Road) Overpass
- Rehabilitation of Groat Road (over the North Saskatchewan River) Bridge
- Rehabilitation of Ada Boulevard (over Wayne Gretzky Drive) Overpass
- Rehabilitation of Emily Murphy Park Road (over Groat Road) Overpass
- Rehabilitation of 106 Avenue (over Wayne Gretzky Drive) Overpass

Construction planned to occur within 2023-2026:

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- Replacement of Latta (Jasper Avenue) Bridge
- Replacement of Whitemud Creek Pedestrian Bridge (also called Smith Crossing)
- Replacement of Mill Creek Pedestrian Bridge (east of 98 Street NW near 93a Avenue NW)
- Rehabilitation of Kinnaird (82 Street) Bridge
- Rehabilitation of Rainbow Valley (Whitemud Drive over Whitemud Creek) Bridges
- Rehabilitation of the Dawson Road (over North Saskatchewan River) Bridge deck

Significant planning and design work is also underway in the current budget cycle in preparation for numerous other bridge rehabilitation and replacement projects anticipated for construction during the 2023-2026 Budget Cycle. Some notable projects currently in the planning or design phase include:

- Rehabilitation of High Level Bridge
- Replacement of Wellington (102 Avenue) Bridge (construction timing to be considered based on Valley Line West LRT construction)
- Rehabilitation of Scona Road Bridge over Connors Road
- Rehabilitation of the Low Level Bridges (northbound and southbound)

Other major capital investments in addition to the Bridge Renewal Program are important to consider in the programming and sequencing of bridge renewal work. These include:

- Replacement of pedestrian bridges, such as 170 Street at West Edmonton Mall and over Connors Road (as part of the Valley Line Southeast LRT project)
- Replacement of the Stony Plain Road bridge over Groat Road (as part of the Valley Line West LRT project)

Attachment 2 provides a visual depiction of bridge renewal projects in the current and upcoming budget cycles for the area surrounding Downtown, in addition to an overview of the type of renewal planned and the anticipated year of construction. Attachment 3 provides further details on the bridges programmed for renewal from 2019 through 2026.

The 2023-2026 Bridge Renewal Program is shaping up to be as significant as the 2019-2022 program, with an expected preliminary budget requirement in excess of \$170 million. A considerable influence on the Bridge Renewal Program budget for the next cycle will be the rehabilitation of High Level Bridge. A more refined program budget will be developed as that project goes through the Project Development and Delivery Model (PDDM) process.

Bridge Renewal Impacts and Considerations

Renewal of these bridges must be coordinated within the program for funding availability and cash flow, resources and network impacts. They will also be coordinated with major capital and private projects, such as LRT expansion and Jasper Avenue renewal work. The sequencing of the renewal projects is informed by the condition of the assets and criticality of the work and through a review of the operational constraints and network impacts. Other projects undertaken by private development or utility companies are also factored into the planning and programming of bridge renewals.

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An added complexity to the renewal of bridges is that some bridges are designated as Municipal Historic Resources. This is an important consideration in the options for renewal and ultimately the costs that are reviewed during the planning and design of such bridge renewal projects.

Downtown Edmonton is a special area for overall capital project coordination, including bridge renewal work. The constrained nature of water crossings and other critical bridges as part of the roadway network means that careful planning and coordination of projects is required to ensure that disruptions are minimized for roadway users during construction.

For example, to ensure two connections are continuously maintained over Groat Road, the replacement of the 102 Avenue Bridge was completed in 2016. The rehabilitation of the Glenora Bridge on 107 Avenue is currently underway in anticipation of the work required on the Stony Plain Road Bridge as part of the Valley Line West LRT expansion starting in late 2022. Additionally, the replacement of the Wellington Bridge on 102 Avenue is planned to take place after the work is completed on the Stony Plain Road Bridge.

By the nature of the work associated with bridge renewal, such projects often result in increased traffic congestion in the immediate area during certain stages of the project. The design phase for bridge renewal projects incorporates significant effort to develop traffic management plans to mitigate impacts to the travelling public.

Through the development of traffic management plans for bridge rehabilitation, construction contractors can often manage traffic through the site and maintain all existing traffic movements. However, bridge replacement projects often require either a total or a directional closure to traffic due to the type of work, at least for a portion or portions of the project duration. This is particularly common for bridges located in the vicinity of Downtown, as the bridges and bridge locations may be more compact and there are fewer options for detour structures or other mitigative measures within the site.

Temporary bridges or other detour options such as building a bridge offline or moving a pre-built structure within the worksite are considered as part of preliminary design. They are rarely implemented, as alternative travel routes are commonly available and the cost premium for such measures can be a large portion of the overall project cost. These measures can carry other non-financial impacts, such as significant tree clearing or other environmental impacts. However, they are considered and sometimes implemented in situations where the benefits outweigh the drawbacks.

Project schedules can also be extended significantly based on the measures taken to maintain traffic movements. Not only can this extend the negative impacts to surrounding residents, businesses and users of the bridge, but it can also affect the schedule of dependent projects elsewhere in the area, such as other bridge renewals or projects affecting major roadways, including private development.

For example, the Latta Bridge has been undergoing planning and design in preparation for replacement in 2022-2023. An extensive examination of the construction methodology has been conducted. Administration examined the potential to replace the bridge in halves while maintaining reduced traffic. However, the width of the bridge and the nature of the bridge deck

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supports meant that such a measure was not feasible. Further examination was done to determine the feasibility of placing a temporary bridge to the north of the site, spanning the ravine. This was also determined to not be feasible due to cost, environmental damage and limited functionality of a temporary bridge that could fit into the available area. Following a fulsome examination of the options, costs and opportunities, it was determined that a total closure of the bridge would be required to support the replacement in a timely and cost effective manner.

Edmonton will continue to see significant investment in the renewal of bridge structures. This intricate system of bridge programming followed by planning, design and construction is complex and multi-faceted. When changes to one project occur, a review of other projects, and impact on operations, is necessary; delays to one project may result in a cascade effect on the remainder of the program. Administration continuously works closely across departments to mitigate impacts to the public while advancing the critical investment needed in our infrastructure.

COMMUNITY INSIGHT

Insights gained from listening to stakeholders through inquiries, public events, and other community consultation are critical in informing plans and designs for capital infrastructure projects, including the rehabilitation and reconstruction of bridges in Edmonton. These insights are commonly gathered through the City of Edmonton's public engagement process that takes place during the conceptual planning and preliminary engineering phases of a project (PDDM Checkpoints 1 to 3). The feedback gathered through the engagement process helps Administration adjust designs, where possible, to reflect the community's current needs.

Feedback from community members influences things such as the style that may be used for a bridge replacement, enhancements for all modes of travel, tree and vegetation impacts, and history and art. Community feedback also aids Administration in understanding and mitigating other construction related issues such as access restrictions or detour requirements, traffic calming and pedestrian safety, and displacement and safety of vulnerable populations.

During the operational stage of a bridge's lifecycle, public input (through 311 inquiries or emails) helps focus maintenance activities.

GBA+

Over time, the bridge management program has evolved to ensure that all bridge types are equally considered for prioritization. This means that all types of bridges - road bridges and pedestrian bridges alike - are inspected, assessed and prioritized to ensure renewal is being conducted to optimize the asset's lifecycle and serve all types of users.

Detailed Gender Based Analysis Plus (GBA+) analysis for bridge renewal is commonly initiated during the planning and design phases of a project. GBA+ analysis is conducted to identify stakeholders through the development of public engagement plans and identify meaningful ways of connecting with those stakeholders to gather input that will help shape the plans. The process supports Administration in identifying any stakeholders who may be interested or impacted by the project and those who may be less likely to participate in traditional engagement methods.

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The input gathered often leads to the incorporation of equity measures that enhance the accessibility and usability of Edmonton's bridge infrastructure. Such measures include examples such as universal accessibility enhancements, including the widening of active mode infrastructure and the addition of accessibility ramps to enhance mobility for all users.

ATTACHMENTS

1. Bridge Maintenance and Renewal Process
2. Map of Bridge Renewal Program around Downtown (2019 to 2026)
3. Bridge Renewal Program (2019 to 2026) Project Information