City of Port Moody
Report/Recommendation to Council

Date: August 14, 2020
Submitted by: Engineering and Operations Department – Project Delivery Services Division
Subject: Ioco Townsite Bridge Rehabilitation Feasibility

Purpose

This report has been prepared to provide information on the feasibility and associated costs to restore or replace the timber pedestrian bridge that crosses Village Creek at the Ioco Townsite.

Recommended Resolution(s)

THAT the report dated August 14, 2020 from the Engineering and Operations Department – Project Delivery Services Division regarding Ioco Townsite Bridge Rehabilitation Feasibility be received for information.

Background

At the May 14, 2020 Heritage Commission meeting, the Commission passed the following resolution:

> *HC20/009*
> THAT Council support the rehabilitation of the Ioco Bridge on behalf of the Heritage Commission.

During the Special Council Meeting held on June 23, 2020, Council considered a report dated May 19, 2020 from the Heritage Commission regarding Ioco Bridge Rehabilitation and passed the following resolution:

> *RC20/260*
> THAT the report dated May 19, 2020 from the Heritage Commission regarding Ioco Bridge Rehabilitation be referred to staff for action.

This report responds to resolution *RC20/260* by summarizing the feasibility and high-level cost estimates for restoring or replacing the Ioco Townsite Bridge.

The Ioco Townsite Bridge is a timber pedestrian bridge that crosses Village Creek and its associated ravine on the alignment of 1st Street, between 2nd Avenue and 3rd Avenue at the Ioco Townsite. The bridge is currently in a poor state of repair and closed to the public due to its unsafe nature. Pedestrians are currently able to detour around the bridge via Ioco Road, as shown in Figure 1.

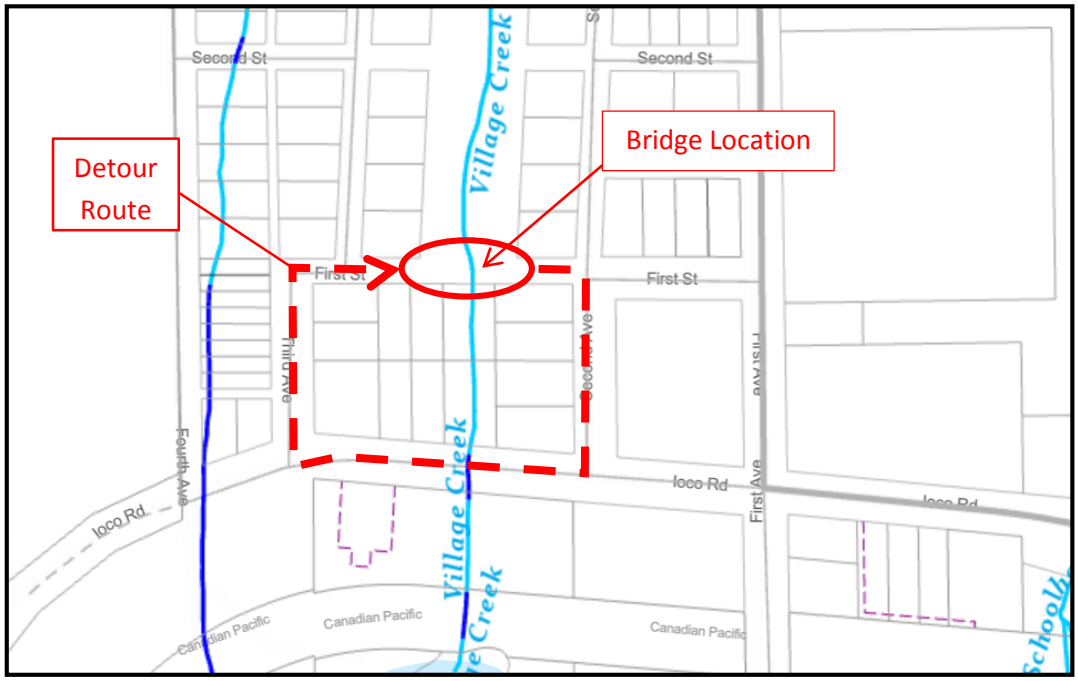

Figure 1 – Ioco Townsite Bridge Location and Pedestrian Detour

The bridge is approximately 35-40 metres long and comprises two spans supported from a single timber trestle-style pier beside the creek and concrete abutments at each end. The bridge itself is formed from two creosote treated timber beams with transverse timber deck planks and a timber post and rail hand railings system.

The age and history of the bridge is not known to staff; however, the glue laminated construction method combined with the protective creosote treatment suggests that the bridge was likely built in the 1960s or 1970s. This type of treated timber typically has a life expectancy of up to 50 years before rot starts to compromise the integrity of the wood.

A brief visual review of the bridge by staff indicates that the timber railing is in a very poor and unsafe condition (Figure 2). A condition inspection and evaluation by a Professional Engineer who specializes in bridge structures would be needed to properly evaluate the condition of the other load bearing elements on the bridge (i.e. the beams) to determine if they could be salvaged and re-used as part of a restoration.

Figure 2 – Ioco Townsite Bridge, Existing Condition

Discussion

Before it is possible to determine the range of costs and possible options for restoration of the bridge, a detailed inspection and condition evaluation would need to be completed by a consultant Professional Engineer who specializes in bridge structures. This type of condition evaluation and reporting would cost in the order of $10,000 and would only provide an indication as to whether the existing timber can be re-used. It should be noted that given the estimated age of the bridge, even if the timber is in good condition, it is unlikely that the remaining timber elements will last more than ten years before needing further repair or replacement.

Best Case Scenario

Staff anticipate the best case scenario from a cost perspective would be where the main load carrying components of the bridge are in good condition and can be reused. In this situation the restoration work would involve the replacement of the timber deck boards and timber railing system only. For this scenario, staff anticipate the following budgetary level costs to restore the bridge:

• Staff Project Management Costs:	$ 5,000
• Engineering Inspection and Condition Evaluation:	$ 10,000
• Engineering Design and Construction Support:	$ 20,000
• Construction Costs:	$ 120,000
• Project Contingency (30%):	$ 50,000
Total Budget Estimate	**$ 205,000**

Based on the age of the bridge and poor condition of some components, it is reasonable to assume that some level of repair or replacement of the main timber elements will be needed and it is unlikely that the overall project costs will fall within this best case scenario.

Worst Case Scenario.

The worst case scenario from a cost perspective would be where most or all of the main structural elements of the bridge require replacement, including those forming the intermediate

pier. This would require temporary access during construction to the creek and associate riparian areas giving rise to the need to obtaining Environmental and Archaeological approvals. Extensive monitoring during construction would also be needed in this situation.

Without undertaking further engineering, it is difficult to estimate exactly the costs for replacement. Some of the environmental and archeological constraints of building a new bridge can be offset by building a longer bridge that spans the full width of the ravine; however, this requires much larger beams, or a truss structure, which ultimately costs more. In addition, timber is not generally used for longer timber bridges such as this, unless they are landmark structures, making it hard to find comparative cost data.

For comparison, the construction costs to replace the existing timber bridge with a two span utilitarian concrete bridge would be in the order of $1.5M and a 50% premium should be expected to use timber. For this scenario, staff anticipate the following budgetary level costs for replacing the existing bridge with a basic two span timber bridge:

• Staff Project Management Costs:	$ 20,000
• Engineering Inspection and Condition Evaluation:	$ 10,000
• Engineering Design and Construction Support:	$ 100,000
• Environmental and Archeological Support:	$ 50,000
• Construction Costs (timber):	$ 2,000,000
• Project Contingency (30%):	$ 650,000
Total Budget Estimate	**$ 2,830,000**

It is noted that these costs are based on replacement with a similar structure and do not include any allowance for a more complex or a single span bridge.

<u>Further Discussion and Consideration</u>

Staff recognize that it may be possible to develop a repair scheme that reuses some of the existing elements; however, the associated costs cannot reliably be estimated without knowledge of elements that need repair. Given the size of the bridge and the length of the beams, any repairs to these beams will likely have order of magnitude costs in the $100,000s.

When determining the approach and next steps, consideration should be given to the following:

- the existing timber structure is old and at the end of its design service life;
- elements of the existing structure are in poor condition and it is likely that this is true of the main structural elements too;
- modern code requirements may prevent restoration of the bridge to its historical appearance; however; alternative designs may be possible;
- repair costs are anticipated to start in the order of $200,000 for a basic repair and range to nearly $3M for a more extensive repair or replacement;
- the historical value of the bridge notwithstanding, the bridge does not currently service a sizeable community and there are detours available; and
- if the bridge is restored or rehabilitated, and reopened to the public, ongoing maintenance and inspection of the bridge asset, with associated costs, will be required to ensure it remains in safe, operable condition.

Next Steps

If council determines that further work should be undertaken towards the restoration of the Ioco Townsite Bridge, staff recommend commissioning a detailed condition inspection and evaluation of the existing structure by a Professional Engineer that specializes in bridge structures. As noted above, the estimated costs for this work are $10,000.

Other Option(s)

1. THAT staff initiate a detailed condition inspection and evaluation of the Ioco Townsite Bridge and report back to Council with the findings;

   AND THAT the cost of up to $10,000 for the study be referred to Finance Committee for identification of a funding source.

2. THAT staff report back on the feasibility of removing the existing Ioco Townsite Bridge structure.
   **Full removal of the bridge structure could help to protect the City from any liability or future maintenance and restoration costs that could arise from the old structure collapsing further into the creek and ravine.*

Financial Implications

Costs vary depending upon which option is feasible/adopted and are estimated to range from $200,000 up to $3M for the repair or replacement of the bridge. A detailed condition inspection and evaluation to provide better scope definition by a Professional Engineer will cost approximately $10,000.

Communications and Civic Engagement Initiatives

There are no communications or civic engagement requirements associated with this report.

Council Strategic Plan Objectives

The recommendations in this report align with the community evolution objectives of the Council Strategic Plan by ensuring City assets are optimized, maintained, and funded for current and future needs.

Report Author

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Report Approval Details

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Attachments:	
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This report and all of its attachments were approved and signed as outlined below:

Kim Law, Manager of Project Delivery Services - Aug 12, 2020 - 11:04 AM

Jeff Moi, General Manager of Engineering and Operations - Aug 17, 2020 - 11:04 AM

Tracey Takahashi for Dorothy Shermer, Corporate Officer - Aug 17, 2020 - 12:49 PM

Natasha Vander Wal for Rosemary Lodge, Manager of Communications and Engagement - Aug 18, 2020 - 11:14 AM

Paul Rockwood, General Manager of Finance and Technology - Aug 20, 2020 - 9:32 AM

Tim Savoie, City Manager - Aug 25, 2020 - 3:24 PM