

# THE CORPORATION OF THE CITY OF COURTENAY

## NOTICE OF COMMITTEE OF THE WHOLE MEETING

*We respectfully acknowledge that the land on which we gather is the  
unceded traditional territory of the K'ómoks First Nation*

**DATE:** Monday, January 27, 2020  
**PLACE:** City Hall Council Chambers  
**TIME:** 4:00 p.m.

---

## AGENDA

### K'OMOKS FIRST NATION ACKNOWLEDGEMENT

Pg #

#### 1.00 STAFF REPORTS/PRESENTATIONS

##### (a) Engineering Services

- |    |   |
|----|---|
| 1  | 1. Fifth Street Bridge Rehabilitation and Presentation facilitated by Katie Hamilton, Tavola Strategy Group |
| 51 | 2. Sixth Street Bridge Options Analysis and Presentation facilitated by Dan Casey, Urban Systems            |

#### 2.00 RESOLUTIONS OF COUNCIL

##### 1. Councillor Cole-Hamilton - 5<sup>th</sup> Street Bridge Rehabilitation Funding

Whereas residents of the entire Comox Valley frequently need to cross the Courtenay River for school, work, medical care or recreation, and a significant number of these crossings occur at the 5<sup>th</sup> Street Bridge; and,

Whereas the City of Courtenay will soon undertake vital rehabilitation work to extend the lifespan of this widely used asset, work which will benefit all users but with the full cost borne by taxpayers of Courtenay;

Therefore be it resolved that the City of Courtenay work together with the Village of Cumberland, Town of Comox and the Comox Valley Regional District with the goal of obtaining financial contributions towards the rehabilitation of this crucial regional asset.

## 2. **2020 - 2024 Financial Plan Discussions - Meeting Schedule**

**Staff Note:** on December 2<sup>nd</sup>, 2019 Council passed the following resolution:

*“that based on the December 2<sup>nd</sup>, 2019 staff report “Meeting Schedule - 2020-2024 Financial Plan Discussions and 2020 Property Tax Rates”, Council approve OPTION 1 to approve the meeting schedule as proposed in Table 1 on Page 2 of this report.”*

**Suggested Motion:** that Council amend the 2020 - 2024 Financial Plan meeting schedule identified in *Table 1 - Financial Plan Meeting Schedule* on Page 2 of the December 2<sup>nd</sup>, 2019 Staff Report “*Meeting Schedule - 2020-2024 Financial Plan Discussions and 2020 Property Tax Rates*” and cancel all future proposed budget discussion meetings within Table 1 of the report; and,

That the 2020 - 2024 Financial Plan budget presentations be considered at a future date with staff to provide advance public notice as required by statute, and;

That Council direct staff to post notice on the City of Courtenay website advising of the change to the 2020 - 2024 Financial Plan meeting schedule.

### **3.00 ADJOURNMENT**



## STAFF REPORT

---

**To:** Council  
**From:** Chief Administrative Officer  
**Subject:** 5th St Bridge Rehabilitation

**File No.:** 5335-20; 5400-02  
**Date:** January 27, 2020

---

### PURPOSE

The purpose of this report is to move forward with the 5<sup>th</sup> Street Bridge Rehabilitation Project to ensure completion of the project by the March 31, 2022 funding deadline through the following steps:

1. Update on the actions taken since September 2019, including: the public engagement process (Attachment 1); construction staging and scheduling future options (Attachment 2); and information regarding cycling and walking connectivity (Attachment 3).
2. Confirm the final design for the 5th St Bridge Rehabilitation Project, which currently includes the addition of cantilevers to provide two 3 metre wide multi-use pathways; or

Alternatively, direct staff to proceed with a final design that does not include cantilevers.

3. Confirm whether to obtain approval for a loan authorization bylaw for the 5th St Bridge Rehabilitation Project by assent of the electors (i.e. referendum), or by the Alternate Approval Process, as required by sections 85 and 86 of the *Community Charter*.

### EXECUTIVE SUMMARY

The 5th St Bridge plays an important role in the entire Comox Valley transportation network serving 20,000 vehicles, 650 pedestrians and 500 cyclists each day. Completed in 1960, the 72-metre steel truss bridge has two vehicle lanes and 1.5 metre sidewalks on both sides of the bridge. The bridge requires rehabilitation of various elements to maximize its service life for all users.

At the June 24<sup>th</sup> Council meeting, staff were directed "...to proceed with the associated next steps to rehabilitate the 5<sup>th</sup> Street Bridge, including the upgrade of adding cantilevered multi-use pathways...". Recall that rehabilitation of the bridge is estimated to take approximately 6 months, with an estimated cost of \$6.3 million dollars. Including the upgrade of adding cantilevered multi-use pathways will add approx. 2 months to project duration, and an additional \$2 million dollars the estimated cost of the project.

The 5<sup>th</sup> Street Bridge Rehabilitation Project is one of City of Courtenay's top Strategic Priorities, was identified in November 2019 as one of Council's five "NOW" Priorities and forms a part of several staff Operational Strategies in the near term.

Since September, the City has undertaken a public consultation process for the 5<sup>th</sup> Street Bridge that included in-person meetings with several local stakeholder groups, an open house with 97 attendees and an online survey that resulted in 671 respondents, of which 67% were Courtenay residents. The public engagement process resulted in extensive awareness of the need to rehabilitate the 5th St Bridge and

solicited extensive input to help inform construction planning, connectivity and communications preferences.

Additional technical work has also been completed since September to understand potential traffic implications during different stages of the project, confirm the environmental/regulatory requirements, utility considerations, and how to best manage traffic and emergency response during construction.

In September 2019 a report titled “Project Scope for Bridge Rehabilitation, and New Cantilevered Pathways” was included in the staff report presented to Council on September 16<sup>th</sup>. The previous report highlighted a number of considerations for the project including; Bridge Upgrade Scope, Expected Bridge Closure Geometry, Rehabilitation and Staging Considerations; and Sample Bridge Cross Sections.

This report provides supplemental details to the information provided in September, including further details about what to expect during construction, and reviews of the various construction staging scenarios that may be contemplated with respect to the construction sequencing. This report also provides supplemental information on the following four critical considerations comparison:

- Accommodation of vehicle traffic,
- Accommodation of active transportation,
- Cost Implications; and
- Schedule Implications.

In terms of improving multi-modal amenities and connections across the Courtenay River, the project team has developed options for 5<sup>th</sup> Street Multi-use pathway connections, outlining potential multi-modal amenities and connectivity, as well as associated costs and construction considerations for connecting the multi-use pathways to existing pedestrian and cycling networks on both sides of the bridge.

Connection improvements include three metre pathways connecting to adjacent bike lanes and sidewalks on the west and east approaches, new let downs, wayfinding and regulatory signage, and a bike wheel channel on the south-west approach stairway. The recommended connection improvements are included in the existing project budget.

After factoring in grant contributions and infrastructure reserves, the City will need to borrow funds over the long term to rehabilitate the bridge, as well as any multi-modal upgrades. **Once the project scope is given final approval, a loan authorization bylaw process must be commenced this spring to meet the construction schedule, and the federal grant requirement that the bridge must be completed by March 31, 2022.** A draft bylaw has been prepared that outlines the specific scope and borrowing amount as per section 179(2) of the *Community Charter*. An associated communications plan will also be prepared in early 2020 once final decisions have been made on scope, borrowing and other factors.

#### **CAO RECOMMENDATIONS:**

##### Rationale Regarding Cantilevers

**RECOMMENDATION ONE** is presented as a choice between two options for the 5th St Bridge Rehabilitation Project (add cantilevers, or do not add cantilevers) rather than as a recommendation from the CAO.

The original CAO recommendation, which was included in a June 24, 2019 staff report, was to not include cantilevers. A copy of this report is provided for reference as Attachment 4.

At Council's direction, in the last several months the project team has undertaken additional work that is intended to assist Council in making a final decision on project design (yes or no to cantilevers). This is essential in order for construction to complete prior to the March 31<sup>st</sup> 2022 grant completion date in order to receive the \$1.96 million grant. Therefore, the following is provided for Council's consideration:

### **RECOMMENDATION ONE**

**OPTION 1:**

That Council reaffirm its decision to include cantilevers in the final design of the 5th St Bridge Rehabilitation Project.

**OPTION 2:**

That Council direct staff not to include cantilevers in the final design of the 5th St Bridge Rehabilitation Project.

### Rationale Regarding Elector Assent Process

**RECOMMENDATION TWO** is presented as choice on how to proceed with obtaining Elector Assent for long term borrowing for the 5th St Bridge Rehabilitation Project, through either the Alternate Approval Process or by Referendum.

A loan authorization bylaw process must be commenced this spring to meet the construction schedule, and the federal grant requirement that the 5th St Bridge project must be completed by March 31, 2022. This requires Elector Assent which can be obtained through either the Alternate Approval Process (AAP) or by Referendum. **Staff are recommending the Alternate Approval Process as it is the least costly and time consuming, and if successful will have less impact on the project schedule.**

### **RECOMMENDATION TWO**

**OPTION 1 (Recommended):**

That Council direct staff to obtain elector approval for a loan authorization bylaw for the Fifth Street Bridge Rehabilitation Project through the Alternate Approval Process.

**OPTION 2:**

That Council direct staff to obtain elector approval for a loan authorization bylaw for the Fifth Street Bridge Rehabilitation Project through the Referendum Process.

Respectfully submitted,



David Allen, BES, CLGEM, SCLGM  
Chief Administrative Officer

## **BACKGROUND**

The following council resolutions respecting the 5<sup>th</sup> Street Bridge Project, have provided direction to staff and informed the information outlined in this staff report.

### June 24<sup>th</sup>, 2019

That based on the June 24<sup>th</sup>, 2019 staff report “5<sup>th</sup> Street Bridge Rehabilitation Project” Council approve OPTION 2 that Council direct staff to proceed with the associated next steps to rehabilitate the 5<sup>th</sup> Street Bridge, including the upgrade of adding cantilevered multi-use pathways plus development of detailed traffic management and public engagement plans, and report back to Council no later than September 16, 2019; and

That staff simultaneously prepare a supporting draft Borrowing Bylaw for Council consideration.

### **Subsequent Motion:**

That staff bring forward a report providing options for exploring a 6<sup>th</sup> Street multi-use pedestrian-bike bridge at a future Council meeting.

### September 16<sup>th</sup>, 2019

That Council direct staff to expedite delivery of a range of options and stakeholder engagement for the 6<sup>th</sup> Street multi-use pedestrian-bike bridge concept to provide greater information related to the design cost, public safety features and funding source options simultaneously with the 5<sup>th</sup> Street Bridge rehabilitation project update, and bring forward for consideration at a future Council meeting in January 2020.

## **DISCUSSION**

The 5th St Bridge plays an important role in the entire Comox Valley transportation network serving 20,000 vehicles, 650 pedestrians and 500 cyclists each day. Completed in 1957, the 72-metre steel truss bridge has two vehicle lanes and 1.5 metre sidewalks on both sides of the bridge. Four important utilities are suspended beneath the bridge and are discussed below.

The City was successful in receiving \$1.96 million in funding from the New Building Canada – Small Communities Fund, which requires rehabilitation of the bridge to occur by March 31, 2022. Construction is planned for 2021.

To address the structural condition and safety of the current bridge, the original scope of the 5<sup>th</sup> St Bridge Rehabilitation Project includes:

- Bridge deck replacement and cathodic protection systems,
- Structural repairs to the steel bridge structure,
- New handrails
- Removal of rust and existing lead-based coating
- Recoating of all steel to prevent corrosion

Recognizing the important role the bridge plays in the City's transportation network, there are several elements to consider when planning how best to safely rehabilitate the bridge in a timely manner while maintaining access for all modes of traffic.

The bridge rehabilitation project also presented the opportunity to consider improved multi-modal amenities across the Courtenay River. The current project scope includes cantilevering new three-metre-wide multi-use pathways on both sides of the bridge. The current bridge provides narrow sidewalks on either side of the bridge and does not provide a safe connection for cyclists as they are expected to merge with traffic in a single file manner across the bridge. The cantilevered walkways will improve the user experience while on the bridge however users will revert to bike lanes and sidewalks as they move away from the bridge. Cost estimates for new three-metre-wide multi-use pathways on both sides of the bridge are provided in FINANCIAL IMPLICATIONS below.

### **Public Input Process**

Public and stakeholder consultation occurred in November and December 2019, engaging with a variety of organizations across the Comox Valley and hundreds of residents in conversation about the bridge rehabilitation project. A detailed *What We Heard* report outlining the public engagement process undertaken and input received is provided as Attachment 1. Some highlights are listed here:

- The most important considerations related to mitigating construction are reducing congestion, maintaining access for all modes during construction and duration of construction. There is a high interest in improving pedestrian and cycling connections, however there is much debate about how or where to best improve amenities.
- The majority of respondents indicated they would take an alternate route during construction, followed by planning for more time and driving outside of peak travel periods
- If priority for connections must be considered, the west side is seen as a higher priority with connection to downtown, Cliffe Avenue, existing bike lanes and sidewalks receiving highest mentions. The highest mention on the east side was Lewis Park Recreation Centre.
- Overall, there was low interest in a colour change, however, should the colour change, respondents expressed stronger thoughts about what should guide the colour choice.
- The interests of downtown businesses were mentioned often, as were ensuring emergency services had priority access.
- The need to rehabilitate the bridge was widely understood, however many respondents would like an investment made into increasing the capacity for vehicles crossing the river.
- Several expressed relief that the bridge would remain open to traffic and accommodate all modes during construction.
- Residents expressed interest in staying informed about the project through signage, local newspaper and radio, City of Courtenay Facebook, and project emails. Those who attended the open house also preferred open houses.

### **Utilities**

Four utilities are suspended beneath the 5th St Bridge:

- 1) City of Courtenay water main
- 2) Comox Valley Regional District (CVRD) water main
- 3) Fortis gas line
- 4) Telus telecommunications line

Preliminary consultation has occurred with the Comox Valley Regional District, Fortis and Telus to ensure awareness of the planned construction, and to identify considerations for safeguarding all utilities during construction. On-going discussions with all stakeholders will be required throughout design and construction phases.

### **Environmental and Regulatory Permitting**

As the construction work will be conducted above the Courtenay River, there are a number of important environmental considerations including permits and plans that will be required. The two main components will be:

- An application will need to be submitted to the BC Ministry of Forests, Lands and Natural Resource Operations (FLNRO) under Section 11 of the Water Sustainability Act for works in and about a stream. In addition, a Request for Review will need to be prepared and submitted to Fisheries and Oceans Canada (DFO).
- The Courtenay River is important habitat for all species of Pacific salmon, steelhead and resident fish species such as rainbow trout, Dolly Varden and cutthroat trout. As such, an Environmental Management Plan (EMP) will be prepared to support the BC Water Sustainability Act and DFO applications. The EMP will provide recommendations and best management practices to minimize the potential for adverse impacts to the Courtenay River as a result of the bridge works.

The regulatory and EMP applications should be completed and submitted once the final scope of work is confirmed. It will be important to ensure any timing windows are understood and the permits can be incorporated into any tender packages. Permit windows can range from two to six months depending on the perceived impact of the project.

Other additional permits that may be required depending on the scope are:

FortisBC Gas – Depending on the pressure class of the existing FortisBC gas main suspended beneath the bridge, a permit issued by Fortis will be required to work around the main or make any adjustments to it for project purposes. Preliminary consultation has occurred with FortisBC and they will need to be consulted once the final scope of the work is confirmed.

BC Heritage Conservation Act – Due to the proximity to the river and known registered archeological sites in the area, a ground disturbance (site alteration) permit from the Province may be required for any excavation work required in and around the bridge. This could include work on the approaches for the new cantilevers. The permit review and approval period can take from three to six months. An application for a ground disturbance permit should be submitted as soon as the final scope is confirmed, and any potential ground excavation locations are definitively identified.



### **Traffic Management**

In order to protect the Courtenay River from exposure to the lead paint being removed, the bridge must be scaffolded and wrapped in plastic for an extended duration of construction. The scaffolding reduces the geometry (clearances) of the bridge, narrowing the height and width available for all modes of travel. Construction can be completed while maintaining access for vehicles, BC Transit and SD71 buses, cyclists and pedestrians. However, there is a vertical height limitation of 3.6 metres that will limit some large vehicles, including the City's fire department ladder truck.

The project team has had discussions with local emergency services, BC Transit, 19 Wing, and School District 71 to evaluate height limitations, service impacts, and potential alternatives. Outreach to the local contractors and construction community will be required to communicate the temporary height restrictions during construction. Maintaining emergency access for police, fire and ambulance services, including volunteer firefighters living and/or working in west Courtenay, reporting to the station will be a priority during construction. Options for maintaining access may also include alternate routes (for example Condensory/Dove Creek Bridges, and the 17<sup>th</sup> St Bridge).

Courtenay Fire/Rescue Services, the Comox Valley Emergency Program, Engineering Services and Public Works Services will work together to explore opportunities to identify volunteers and staff crossing the bridge for a response and various means to accommodate this need.

Since September, work has advanced on understanding the current travel patterns associated with the bridges in Courtenay, estimating bridge capacity and demand, and projecting the traffic impact due to the bridge work. The findings are guiding the detailed options for traffic management to minimize negative impacts to the network, where feasible.

### **Staging of Work**

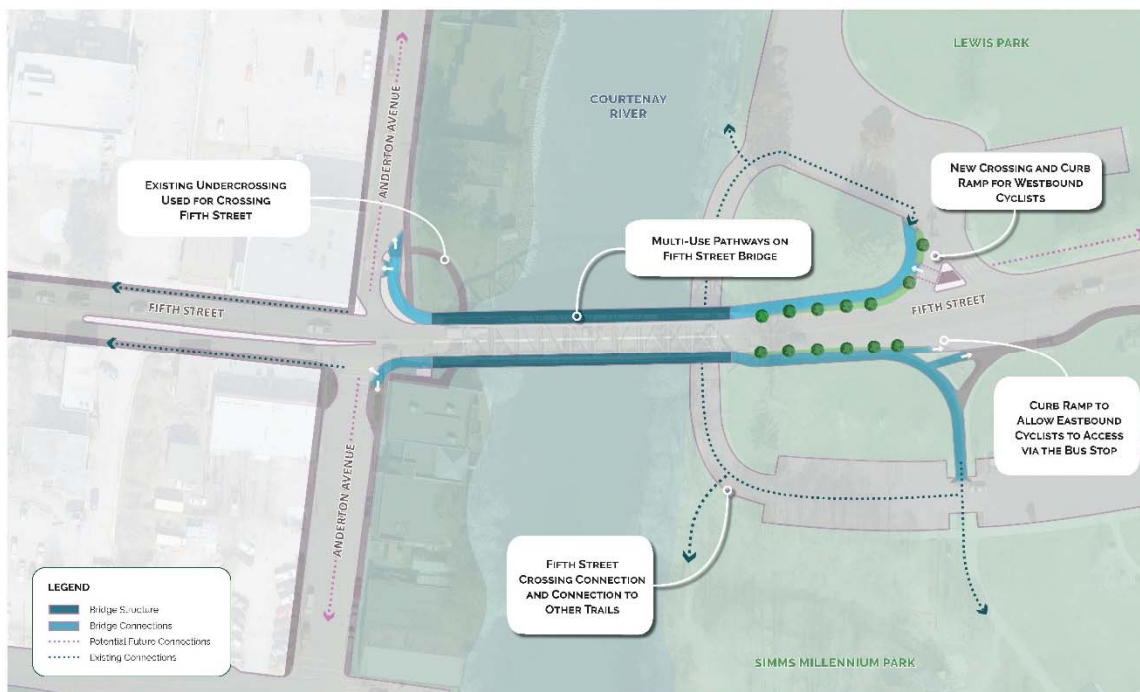
The scope of the bridge improvements includes varying requirements for bridge closures and staging. While it is expected that all these will be undertaken under a single contract, it may be possible in future to entertain various options of bridge closures by trading increased public convenience against increased cost.

The various staging options are provided in Attachment 2 to this report: *Construction Sequencing and Bridge Closure Considerations* memo. The prospective options will only become relevant once the decision has been made regarding the inclusion of cantilevers in the Project Scope and then may serve to inform and refine the information provided the public during the Alternative Approval Process.

The financial information contained in Attachment 2 is to be considered supplemental and subordinate to the information provided in the table provided in the FINANCIAL IMPLICATIONS section below.

### **Multi-modal connections to the 5th St Bridge multi-use pathways**

The current project scope includes cantilevering three metre wide multi-use pathways on both sides of the bridge. The proposed cantilevers inherently provide a better experience and improved safety for non-motorized, multi-use travellers than the current 1.5 metre wide pathways because they are further separated from cars. They will also allow cyclists to avoid having to share the roadway with vehicles and provide more space for all active users. The current scope of work for connectivity includes immediate tie-in to the pre-existing network as presented in Figure 1 below.



**Figure 1 – 5th St Bridge Multi-Use Pathway Connectivity**

Opportunities to increase the safety, comfort and experience for pedestrians and cyclists connecting have been considered using the following criteria.

- Pedestrian Safety
- Cyclist Safety
- Pedestrian Connectivity to existing networks
- Cyclist Connectivity to existing networks
- Pedestrian Comfort/Experience
- Cyclist Comfort/Experience
- Vehicle Impact
- Integration into existing and future park infrastructure
- Value for money

A concept design has been developed identifying the preferred option for connecting the proposed cantilever facilities on both sides of the bridge.

The Class D estimate for the recommended multi-modal connections is \$400,000 and is included within the current project budget for the cantilever option. The 5th St Bridge Connectivity memo is provided as Attachment 3 to this report.

**PROJECT TIMELINE (including cantilever option)**

The milestone project schedule remains the same with borrowing, design and planning occurring in 2020. Construction will commence in spring 2021 and is planned to be completed by the end of 2021. For grant compliance, all works must be completed prior to March 31, 2022.

City of Courtenay Fifth Street Bridge - Summary Schedule										
	2019	2020				2021				2022
	Sep-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar
Communications and Public Consultation										
Complete Design										
Borrowing Bylaw										
Contract Tender										
Construction										
Project Close-out										

**FINANCIAL IMPLICATIONS:**

After factoring in grant contributions and infrastructure reserves, the City will need to borrow funds over the long term to rehabilitate the bridge, as well as any multi-modal upgrades. Once the project scope is given final approval, a loan authorization bylaw process must be commenced this spring to meet the construction schedule, and to meet the federal grant requirement that the bridge must be completed by March 31, 2022.

Project Element	1) Original Scope - Rehabilitation	2) Rehabilitation + Cantilever Upgrade
<b>Outcome</b>	Rehabilitated crossing with 20-year updated useful service life with full utilization of the grant and cathodic protection versus deck replacement.	A rehabilitated crossing with extended service life that provides improved cycling and walking amenities, with full utilization of the grant.
<b>Bridge Recoating &amp; Deck Renewal</b>	\$4.1 million	\$4.1 million
<b>Structural and Traffic</b>	\$2.2 million	\$2.2 million
<b>Cantilever Pathway</b>	n/a	\$2 million
<b>Total</b>	\$6.3 million	\$8.3 million
<b>Fed/Provincial Grant</b>	\$1.96 million	\$1.96 million
<b>Reserves</b>	\$0.94 million	\$0.94 million
<b>City Borrowing Amount</b>	<b>\$3.4 million</b>	<b>\$5.4 million</b>
<b>Tax Implications (based on 2019 assessments and tax rates)</b>	Average residential property \$13 per year  Average commercial property \$82* per year	Average residential property \$20 per year  Average commercial property \$130* per year

*\*Note: Commercial Class 6 encompasses a wide range of businesses and assessment valuations.*

### **Borrowing Bylaw Process**

The statutory borrowing process is estimated to take upwards of eight months, therefore starting early to ensure all approvals are in place for the fall of 2020, is recommended to facilitate tendering. Once a certificate of approval has been received by the Inspector of Municipalities, Council must then pass a Municipal Security Issuing Resolution and forward it to the Comox Valley Regional District to be included in the next Regional District Security Issuing Bylaw that will go through further adoption at the regional level.

### **Elector Approval:**

Section 180 of the *Community Charter* requires elector approval of a loan authorization bylaw before it can receive final adoption. There are two options available to gain elector approval as follows:

#### **1. Alternative Approval Process (AAP)**

An AAP requires that ten percent or more of the eligible electors must sign and submit response forms in opposition to the proposed loan authorization bylaw to the local government to obtain assent of the electors in order to proceed. If ten percent of the electors sign forms in opposition to the AAP, there are two choices: proceed to referendum within eighty days, or the loan authorization bylaw could be put on hold and Council may consider alternatives.

#### **2. Referendum**

A referendum involves asking electors to cast their vote in relation to the loan authorization bylaw. Assent of the electors is achieved if a majority of votes counted are in favour of proceeding with the bylaw. If elector assent is not granted the loan authorization bylaw could not be adopted and Council would need to consider alternatives. It should be noted that if a bylaw that requires the assent of the electors does not receive that assent, a bylaw for the same purpose may not be submitted to the electors within a period of 6 months.

A referendum is a much more costly and time consuming activity than the Alternative Approval Process, therefore staff recommend gaining elector approval through the AAP process for this loan authorization bylaw. It is estimated that an AAP process would cost \$1,200 whereas a referendum would cost at least \$40,000 to perform. An AAP process takes approximately 8 months, whereas a referendum would take approximately 10 months.

### **ADMINISTRATIVE IMPLICATIONS:**

The 5th St Bridge Rehabilitation Project will be led by Engineering Services, with support from most other City Departments. Consultants with technical knowledge specific to this work will be utilized to develop and implement detailed designs and processes. Estimated costs associated with external consultants are included in the project capital budget.

### **ASSET MANAGEMENT IMPLICATIONS:**

The 5th St Bridge is one of the City's most valuable assets providing a critical service of connecting the east and west parts of the community and it is an emergency route for fire, police and ambulance services. In addition, it remains an essential means to cross the Courtenay River for the many residents and businesses from adjacent communities as well as other out of area travellers using BC Ferries, the regional airport, regional hospital, 19 Wing Comox and BC Highway 19A to other destinations.

On-going maintenance is periodically required to maintain the asset at its intended level of service thereby avoiding catastrophic failure, severe transportation disruptions and increased costs resulting from reactive rather than planned maintenance. The bridge is inspected annually under contract and routine maintenance and repairs are undertaken at approximately 20,000 a year in PWS operational budget

In Asset Management practice and parlance, the rehabilitation of this asset is actually maintenance that is periodically necessary to return the asset to its intended level of service. While the rehabilitation project cost surpasses the financial threshold from operating to capital, this is indeed maintenance of an existing asset providing an existing level of service. Therefore, the rehabilitation and its associated funding source is a practice and cost of doing business.

Also in Asset Management practice and parlance, adding cantilevers to the existing asset is outside the bounds of present capital asset renewal and maintenance planning. It is therefore, a Council discretionary service upgrade for which new capital funding and other unanticipated lifecycle expenses must be found.

#### **STRATEGIC PRIORITIES REFERENCE:**

##### **Strategic Priorities 2019 - 2022**

In addition to being identified one of Council's five "NOW" Priorities, the following Themes and Operational Strategies are relevant to the 5th St Bridge Rehabilitation Project:

##### Strategic Priorities:

##### **We focus on organizational and governance excellence**

- Communicate appropriately with our community in all decisions we make
- Responsibly provide services at levels which the people we serve are willing to pay

##### **We proactively plan and invest in our natural and built environment**

- Focus on asset management for sustainable service delivery

##### Operational Strategies:

#### **DIRECTOR LEGISLATIVE & CORPORATE SERVICES**

2. Borrowing Bylaw: Approval Process Jan '20

#### **DIRECTOR FINANCIAL SERVICES**

2. Draft Borrowing Bylaws: Prepare Jan '20

#### **DIRECTOR ENGINEERING SERVICES**

1. 5<sup>th</sup> St. Bridge/6<sup>th</sup> St. Bridge: Open House Nov '19

**OFFICIAL COMMUNITY PLAN REFERENCE:**

The OCP sets out the following policies in Part 4 Land Use Designations and Part 5 Transportation:

**4.6.6.3 Policies**

1. Wherever possible, the walkway portion of the Riverway system will be adjacent to the foreshore of the Courtenay River, slough and estuary. Where necessary or desirable, land acquisitions or easements will be sought to accomplish this objective while considering the integrity of these areas.
2. Council will investigate the feasibility of a pedestrian/bicycle bridge crossing of the Courtenay River, to link the west bank downtown with Lewis Park and/or Simms Millennium Park (for example, a suggested pedestrian/bicycle bridge from 6th Street to the east bank).

**5.3 Policies**

7. The City will continue to pursue the development of a continuous, integrated bicycle network in order to promote and encourage cycling as a commuting alternative to the automobile and as a means of active recreation. The Bicycle Planning Strategy adopted in 1995 will be reviewed and updated.

**REGIONAL GROWTH STRATEGY REFERENCE:**

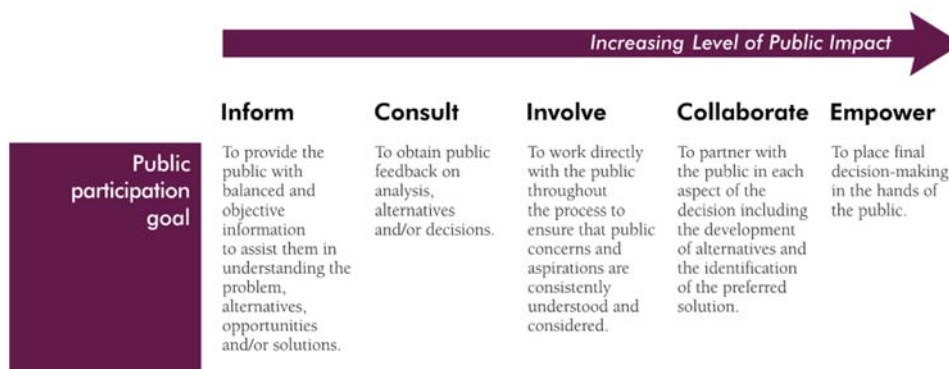
The 5th St Bridge Rehabilitation Project is aligned with “Goal 4: TRANSPORTATION” of the RGS:

**Supporting Policies:**

- 4B-1 Promote and encourage cycling plans and programs through ongoing local and regional initiatives and actions.
- 4B-4 OCPs should identify regionally important, priority street connections for pedestrian and cycling improvements and require that connections be established as a condition of redevelopment.

**CITIZEN/PUBLIC ENGAGEMENT:**

In addition to the legislative requirements for advertising a borrowing bylaw, a proactive communications strategy including media, social media, and online and print advertising will be undertaken to support the Borrowing Bylaw process. Staff would Inform the public based on the IAP2 Spectrum of Public Participation as the project progresses, but will Empower the public regarding the borrowing bylaw process:



**OPTIONS:**

**RECOMMENDATION ONE**

OPTION 1:

That Council reaffirm its decision to include cantilevers in the final design of the 5th St Bridge Rehabilitation Project.

OPTION 2:

That Council direct staff not to include cantilevers in the final design of the 5th St Bridge Rehabilitation Project.

**RECOMMENDATION TWO**

OPTION 1 (Recommended):

That Council direct staff to obtain elector approval for a loan authorization bylaw for the Fifth Street Bridge Rehabilitation Project through the Alternate Approval Process.

OPTION 2:

That Council direct staff to obtain elector approval for a loan authorization bylaw for the Fifth Street Bridge Rehabilitation Project through the Referendum Process.



**Prepared by:**

Chris Davidson, P.Eng  
Manager of Engineering Projects

**ATTACHMENTS (5):**

Attachment 1 – *What We Heard* Public Engagement Summary

Attachment 2 – *Construction Sequencing and Bridge Closure Considerations* memo

Attachment 3 – 5th St Bridge Connectivity Memo

Attachment 4 – Staff Report “5<sup>th</sup> Street Bridge Rehabilitation Project” dated June 24, 2019.

# What We Heard

Fifth Street Bridge Rehabilitation Project  
Phase 1 Public Engagement Summary



CITY OF  
**COURTENAY**  
Engineering Services

December 2019

Prepared by






## About The Project

The City is planning for the rehabilitation of the Fifth Street Bridge, including improving cycling and pedestrian accessibility across the Courtenay River. New widened pathways will improve pedestrian and cycling connectivity across the river, access to downtown, and help accommodate continued growth in the number of people who walk, cycle and use mobility aids.

Originally constructed in 1960, the Fifth Street Bridge is an important piece of transportation infrastructure spanning the Courtenay River. The bridge requires structural improvements, new coating and paint to repair and prevent corrosion and deck repairs. The last significant investment in the bridge, including seismic upgrading, was completed in 2012.



*On-going public engagement is an important project objective with opportunities for people to learn more and provide feedback throughout the various phases of the project.*

## Overview

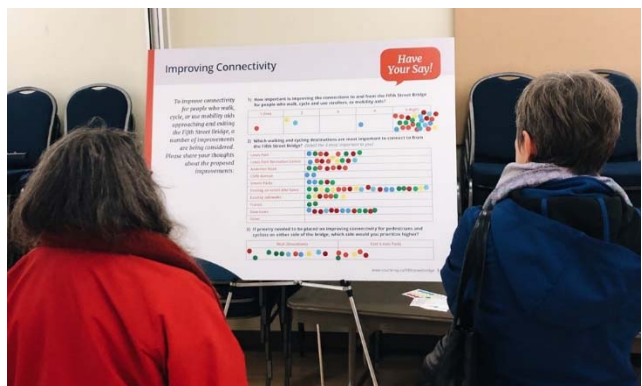
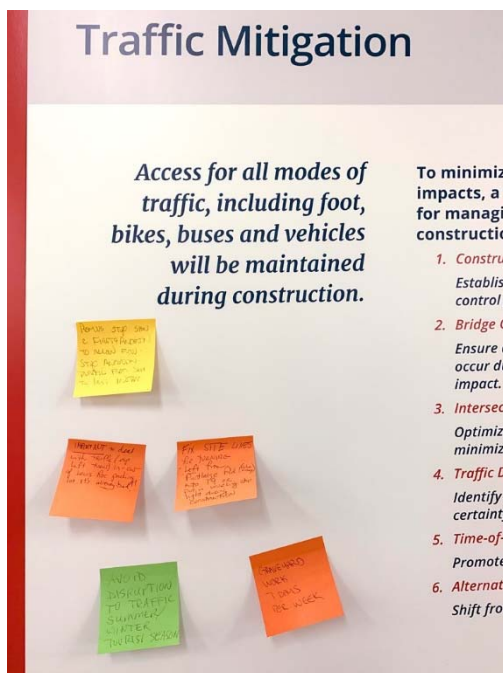
In November and December 2019, the City reached out to the community for input and offered a variety of ways for residents to review project plans, speak with project staff, and provide feedback about what is important to consider as the City plans for ways to mitigate impacts wherever possible during construction. A survey (online and print), stakeholder meetings, and a public open house took place.

# What Was Shared

- 1) Overview of Fifth Street Bridge
- 2) Description of the Fifth Street Bridge Rehabilitation Project
- 3) Connecting Courtenay: Transportation Master Plan
- 4) Sixth Street Multi-Use Bridge
- 5) Where we are in the process
- 6) Project budget and funding impacts
- 7) What to expect during construction
- 8) What else to expect during construction
- 9) Traffic Mitigation

## OPEN HOUSE:

A drop-in style open house provided opportunity for the community to learn more and provide feedback about the project on Thursday, November 21, 2019 from 5 p.m. – 7 p.m. at the Florence Filberg Centre. 98 people attended. Print surveys, Informational display boards and a series of interactive boards to solicit input from the public were present. A multi-disciplinary team of staff and consultants was on-hand to answer questions.



**SURVEY:**

Available from Tuesday, November 12 – Friday, December 6, 2019, through SurveyMonkey.com online and print, 643 responded to the survey.

**STAKEHOLDER MEETINGS:**

Letters were sent out to over 20 stakeholders in the region inviting them to a one-on-one meeting with City staff and project consultants. To date, meetings with the following stakeholder groups has occurred and outreach to others continues.

- |   |   |
|---|---|
| 1) CFB 19 Wing Comox  | 6) BC Transit   |
| 2) Cycling Coalition  | 7) Comox Valley Regional District                             |
| 3) BC Ambulance   | 8) Province of British Columbia<br>Ministry of Transportation |
| 4) Comox Valley Chamber of<br>Commerce                                | 9) Courtenay Fire Department                                  |
| 5) The Downtown Courtenay Business<br>Improvement Association (DCBIA) |   |

## Promotion and Awareness-Raising

- Letters were sent via mail and email to key stakeholder groups
- Media release was distributed to local media
- Social media posts were shared by City of Courtenay via Twitter and Facebook and promoted throughout the awareness campaign
- Print ads appeared in the Comox Valley Record and the CV Collective
- Emails sent via project e-newsletter

Promotional print ad >

Learn More About Plans  
to Rehabilitate and Upgrade  
the Fifth Street Bridge

The City of Courtenay is planning for the rehabilitation of the 60-year-old Fifth Street Bridge, including upgrading cycling and pedestrian connections across the Courtenay River.

Learn more, ask questions of the project team, and provide feedback at an upcoming open house. If you can't make the open house, the same information and opportunities to provide input are available online.

**OPEN HOUSE:**  
Thursday, November 21, 2019  
5 p.m. – 7 p.m.  
Florence Filberg Centre, Rotary Hall (downstairs)

**Other ways to share your feedback:** Complete the online survey by Friday, December 6, 2019 - [www.courtenay.ca/fifthstreetbridge](http://www.courtenay.ca/fifthstreetbridge)

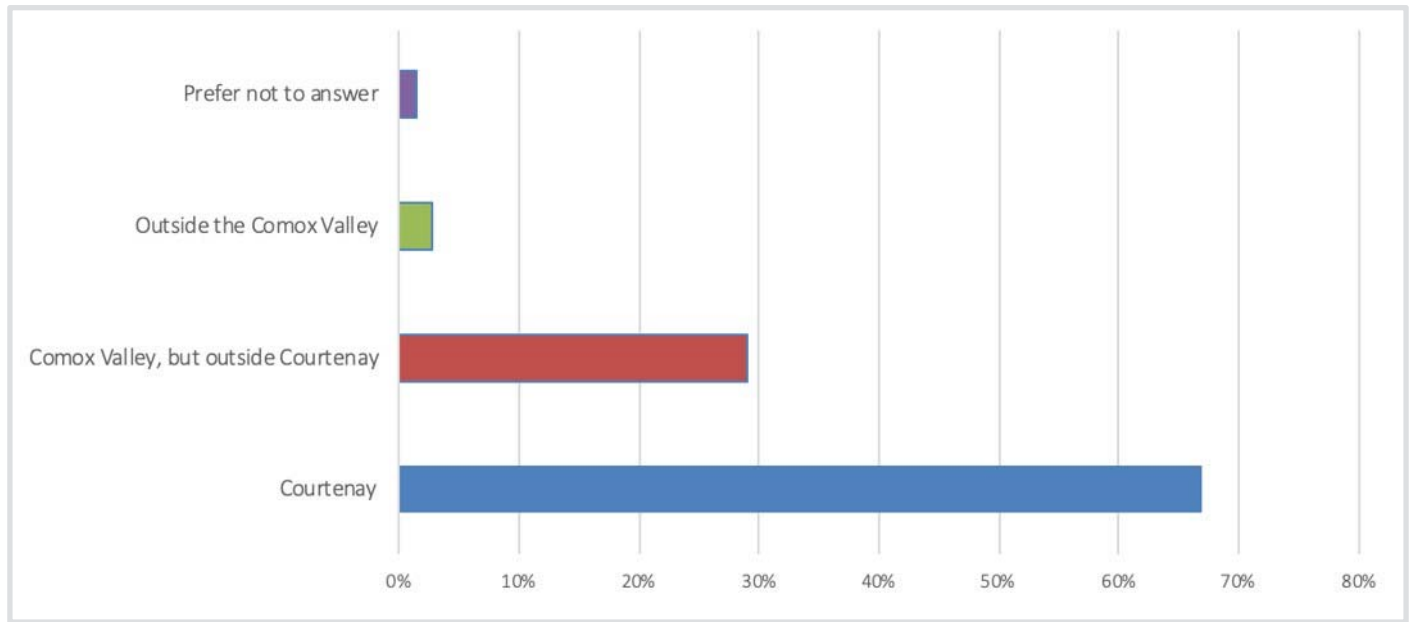
---



Email: [fifthstreetbridge@courtenay.ca](mailto:fifthstreetbridge@courtenay.ca)  
Phone: 250.703.4838

## Who Participated

2/3 of the respondents to the online survey lived in the City of Courtenay.



## What We Heard

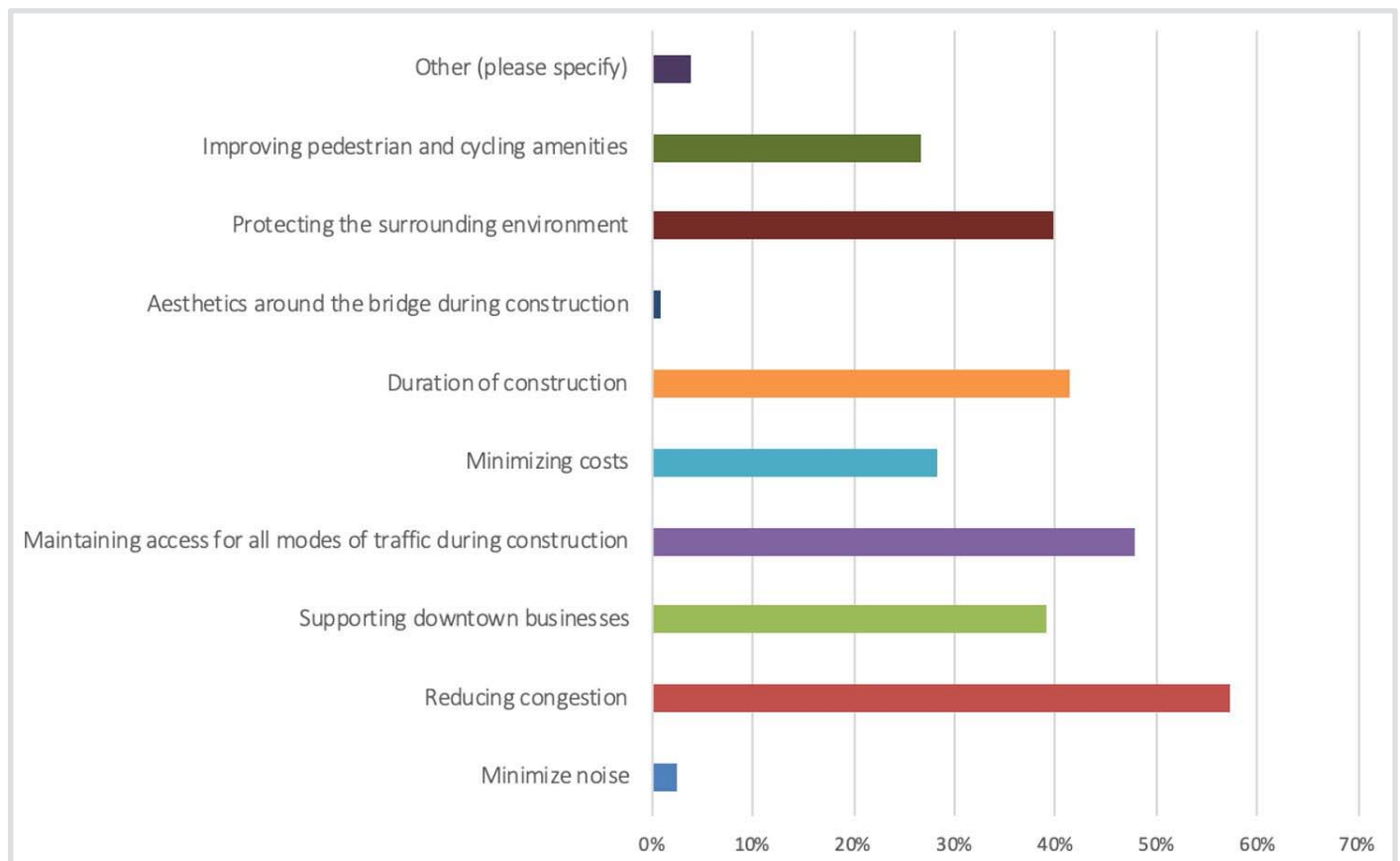
A number of themes emerged from the stakeholder meetings, 631 completed surveys, and the comments received at the open house.

- During construction, respondents are most interested in seeing congestion reduced, maintaining access for all modes, and minimizing the duration of construction. Respondents are concerned about how congested the area will be during construction and about potential construction delays.
- When asked about travel behaviours, respondents are most likely to take an alternate route, plan for additional time, or travel outside of peak periods. 20% indicated they may not change their travel behaviour.
- When asked about the importance of improving connections to and from the bridge, there were strong polar views about whether connections to the bridge were needed. Those who cycle and those who attended the open house ranked the need for improving connections higher.

- When asked about placing priority on connections on the west or east side of the river, the west was preferred.
- The majority of respondents did not feel strongly about changing the colour of the bridge. However, if it is decided that the colour will change, there are stronger feelings about what colour it should be or what should guide that decision.
- In terms of communications preferences, construction signage, newspaper and radio and City of Courtenay Facebook were preferred. Several respondents indicated interest in an app or text service that would deliver updates to a mobile device. Of those who attended the open house, there was higher interest in open houses and a project e-newsletter.
- The importance of priority access for emergency vehicles was mentioned several times. Discussions with Courtenay Fire Department also highlighted the importance of priority access for fire department volunteers responding to the station in an emergency.
- Stakeholder meetings with BC Transit, School District and emergency services, highlighted the need for ongoing dialogue in relation to impacts to tall vehicles and scheduled routing.
- When the public was asked what they like most about the rehabilitation project, respondents indicated the improved amenities and access for cycling and walking and mobility aids, improved aesthetic of the bridge and that the work is overdue. Several noted the iconic or landmark role of the bridge within the community.
- A common concern expressed is that the investment doesn't address the current vehicle congestion and several questioned whether vehicle lanes could be expanded or whether money is better spent building a new vehicle bridge at Fifth Street or at a different crossing. Several questioned whether the multi-use pathways are needed and whether the additional construction time was worth the impact to the community and downtown businesses.

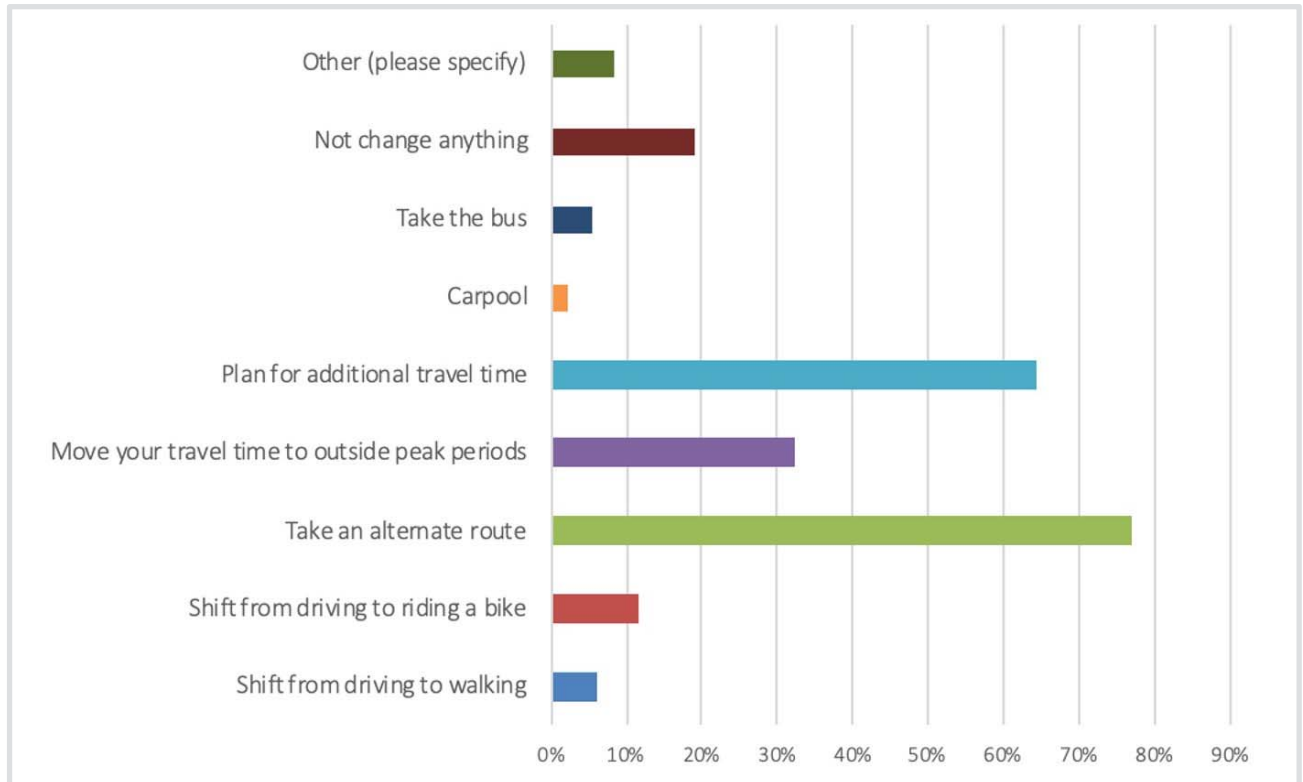
## What Was Heard By Question:

1) *Rehabilitating and upgrading a bridge while remaining open to traffic requires a number of considerations. The safety of both work crews and public will always be top priority. Of the following considered, please select three that the most important to you:*

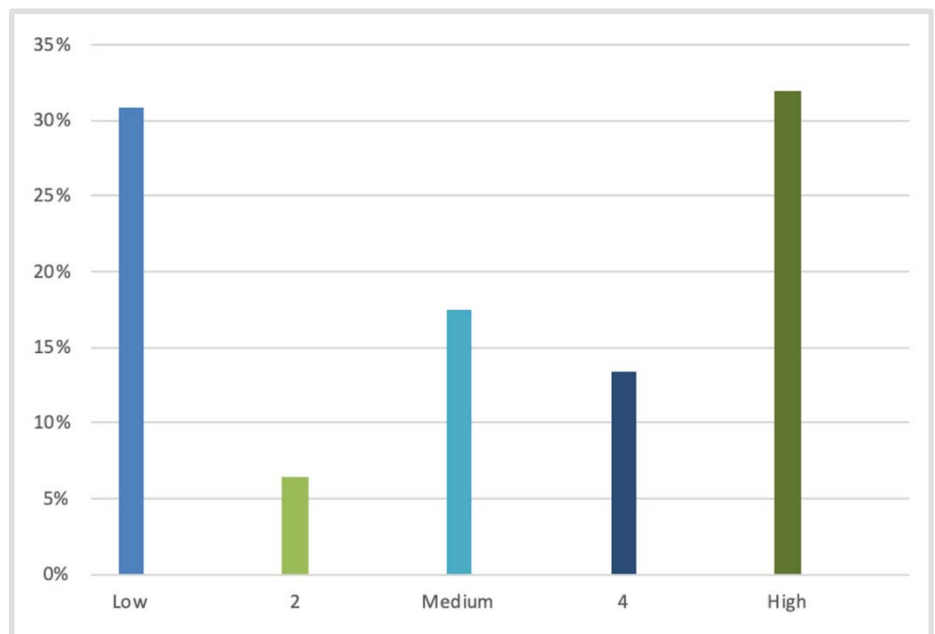


Note: of those who attended the open house the most important considerations during construction were protecting the surrounding environment and improving pedestrian and cycling amenities.

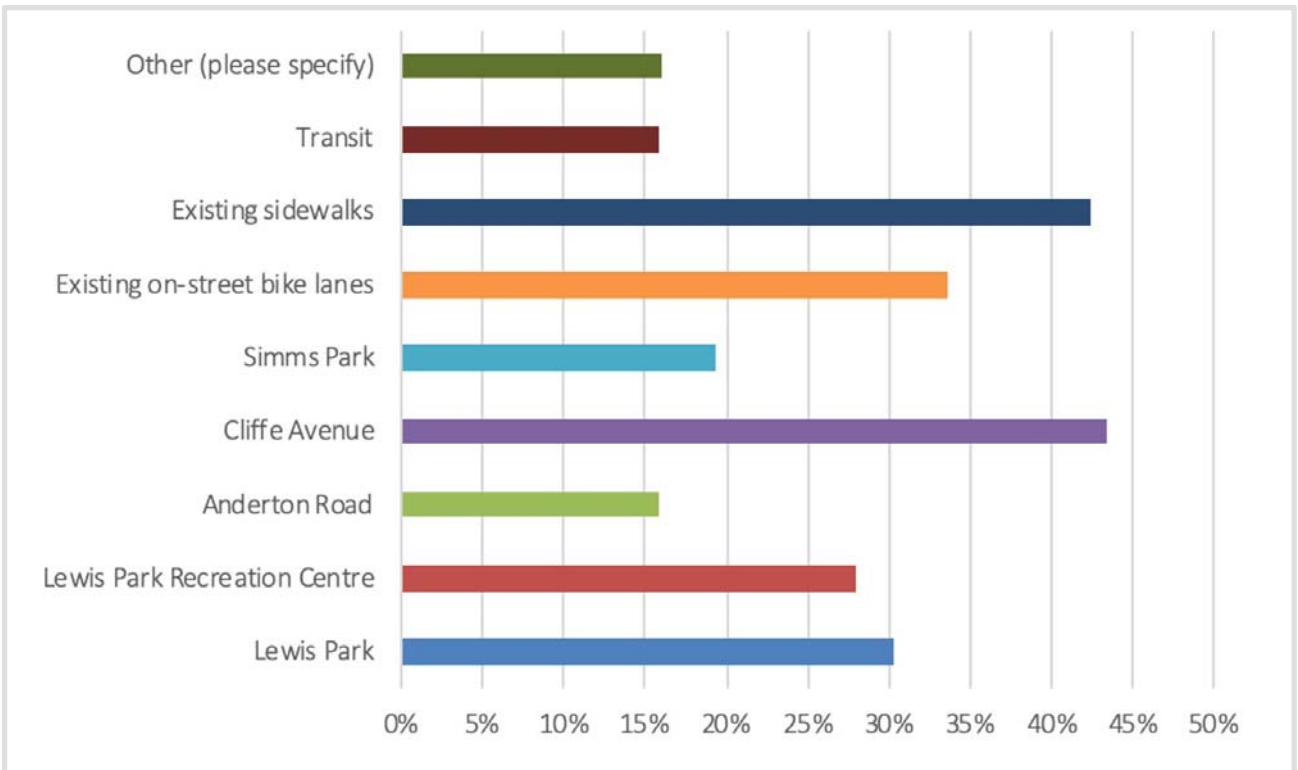
2) *The construction required to safely rehabilitate the Fifth Street Bridge will causes traffic disruption in adjacent areas for several months. In terms of your own travel behaviours, during construction are you most likely to:*



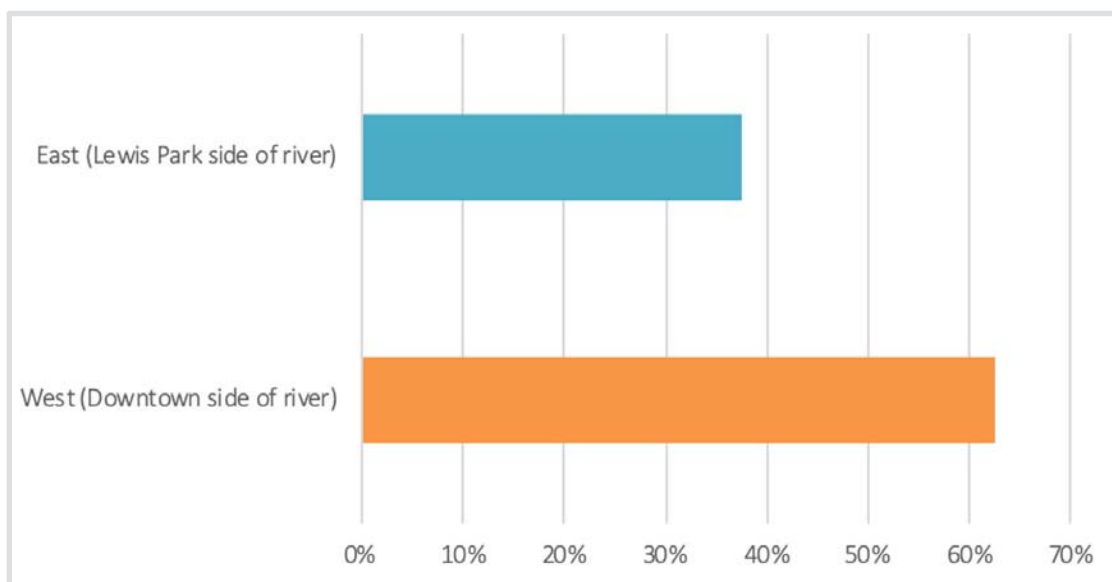
3) *How important is improving the connections to and from the Fifth Street Bridge for people who walk, cycle, and use strollers or mobility aids?*



4) Which walking and cycling destinations are most important to connect to, from the Fifth Street Bridge?

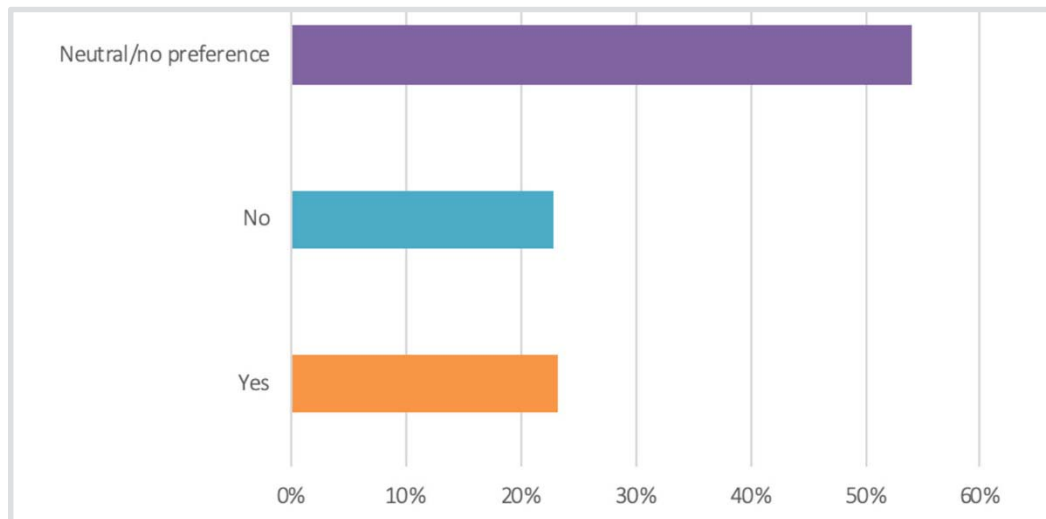


5) If priority needed to be placed on improving connectivity for pedestrians and cyclists on either side of the bridge, which would you prioritize higher?

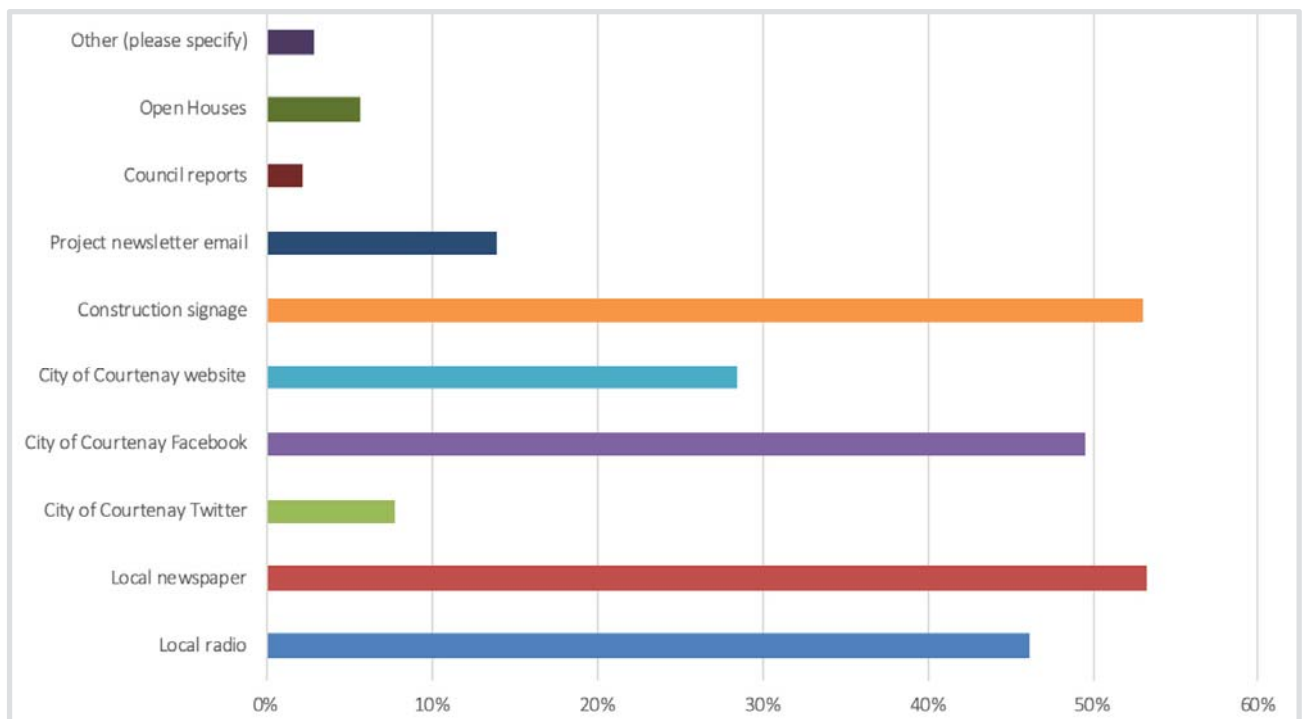




6) *The Fifth Street Bridge Rehabilitation project includes moving all of the existing lead paint and recoating the bridge to protect the steel from corrosion. They are may be an opportunity to change the colour of the bridge. Do you feel the Fifth Street Bridge should be recoated a different colour?*



7) *We recognize that regular and proactive communications during construction are important to mitigating impacts to the public. What is the best way to keep you informed?*



Note: open house respondents rated the project email and open houses higher.

## Next Steps

All input collected within Phase 1 of the public engagement process will be considered in detail and will further inform overall project and traffic management planning. The results of the public engagement process will be presented to Courtenay City Council in early 2020 and will be shared on the City of Courtenay website.

# MEMORANDUM

Date: January 21, 2020  
To: Chris Davidson, Manager of Engineering Projects  
From: Eric Sears  
File: 3222.0045.02  
Subject: Fifth Street Bridge – Construction Sequencing and Bridge Closure Considerations

## BACKGROUND

As a result of the expected upgrades that will be undertaken on the Fifth Street Bridge, during the construction phases there will be the need to limit traffic across the bridge resulting in the travelling public experiencing traffic delays and loss of parking in adjacent areas. While these traffic limitations are necessary to the project there are considerations that would either reduce the overall time of the disruptions or accommodate longer periods during construction where these disruptions would be minimized. Based on stakeholder and public feedback we understand that the potential for traffic delays and the length of the delays are major concerns to the public perceptions of the project.

As such, over the past number of months the project team has explored the various impacts associated with construction sequencing in order to start to understand the impacts and plan for mitigation. This assessment has been led by the two following criteria:

- One lane on the bridge will be required to be maintained open for alternating single lane vehicular traffic (SLAT) during the construction; and
- Cycling and pedestrian access must be accommodated in some form over the bridge during the construction.

In September 2019 a report titled “Project Scope for Bridge Rehabilitation, and New Cantilevered Pathways” was prepared by Hatch and was provided to council as part of a staff report that that was then presented to council on September 16<sup>th</sup>. The report highlighted several considerations for the project including:

- Bridge Upgrade Scope,
- Expected Bridge Closure Geometry,
- Rehabilitation and Staging Considerations; and
- Sample Bridge Cross Sections.

This memo provides supplemental details to the information provided in that memo that aims to provide addition details on what to expect during construction, and a review of the various scenarios that may be contemplated with respect to the construction sequencing. This report also provides supplemental information on the 4 critical considerations comparison:

- Accommodation of vehicle traffic during construction,
- Accommodation of active transportation users during construction,
- Cost Implications; and
- Schedule Implications.

MEMORANDUM

Date: January 21, 2020  
File: 3222.0045.02  
Subject: Fifth Street Bridge – Construction Sequencing and Bridge Closure Considerations  
Page: 2 of 10



In addition, this memo provides further details on what to expect during construction with respect to existing infrastructure on the bridge.

## BRIDGE RESTRICTIONS AND LANE CLOSURE EXPECTATIONS

The scope of work for the bridge improvements includes 3 specific elements that all come with varying requirements for bridge closures and staging. While it is expected that all these elements will be undertaken under one contract, based on the needs, it is possible to undertake some of these elements concurrently or under dictated individual timeframes. This sequencing of the repair elements will have varying implications on traffic disruptions, overall project timing and cost implications.

The three main repair elements are:

- The addition of multi-use paths – The removal of existing cantilevered paths and replacement with 3.0 m paths.
- Structural and coating repairs – Structural repairs to the underside of the bridge and a complete re-coating of the steel structure
- Deck replacement – Removal and replacement of the concrete bridge deck.

There are other minor elements that fall between or slightly outside the above three elements however these are considered the elements that will dictate the project schedule and traffic disruptions.

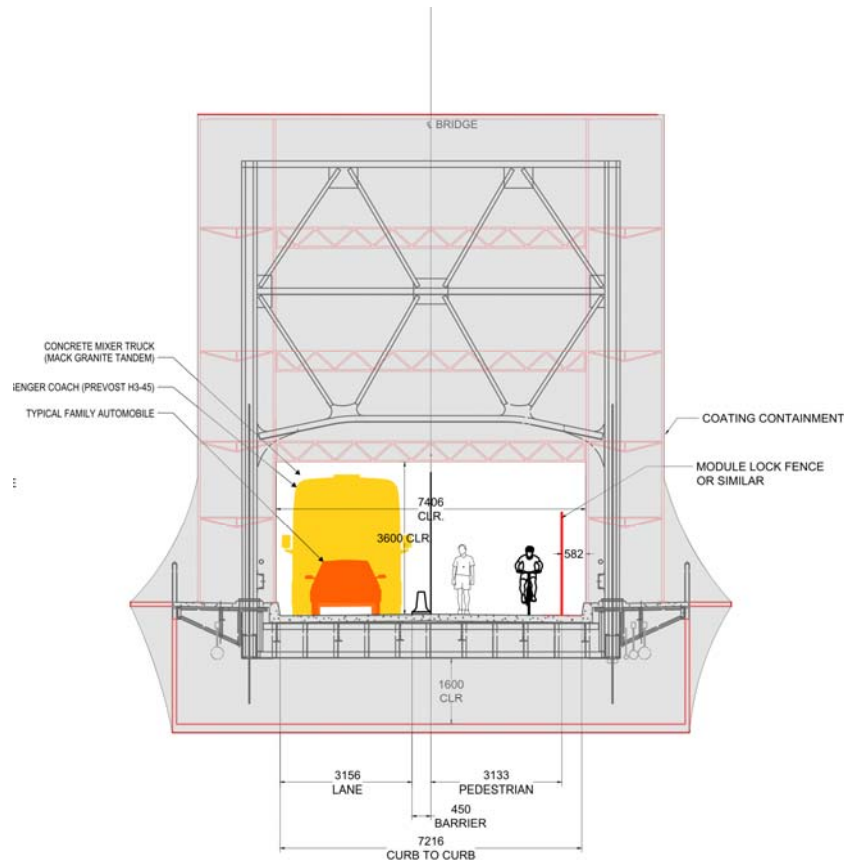
With the above in mind we have reviewed possible sequencing scenarios that could be expected, and that the City would have an opportunity to dictate to a certain degree during construction. The scenarios have been prepared based on the following overall assumptions:

- 1) The existing bridge vertical clearance is in the order of 4.6 m. During construction the scaffolding required to facilitate the recoating could potentially reduce the clearance to 3.6 m.
- 2) The Existing lane widths are approximately 3.6 m. During construction the minimum lane width may be reduced at times to 3.1 m.
- 3) Pedestrian traffic during construction would need to be accommodated either on new wider multi use paths or within the bridge roadway itself as per **Figure 1** below. It is not expected that the scaffolding required to facilitate the recoating would allow for pedestrians to use the existing cantilevered paths during the recoating phase of the project.
- 4) During the deck repairs, if the scaffolding were removed pedestrians could use the new or existing cantilevered pathways. A single lane closure would however still be necessary to facilitate the deck replacement work.

MEMORANDUM

Date: January 21, 2020  
File: 3222.0045.02  
Subject: Fifth Street Bridge – Construction Sequencing and Bridge Closure Considerations  
Page: 3 of 10

**Figure 1 - Sample Concept of Bridge Cross-Section Durign Rehabilitation with Cyclists and Pedestrians Using Travel Lane**



Based on the above, we are presenting the below 4 possible scenarios that may be considered with respect to construction sequencing. The timeframes represented are estimated based on the overall expected length of the project but may require adjustments based on the eventual mobilization and construction needs and the schedules brought forward by the contractor.

**Scenario 1 – Full Bridge and Decking Repairs and Addition of Multi Use Paths Completed Concurrently**

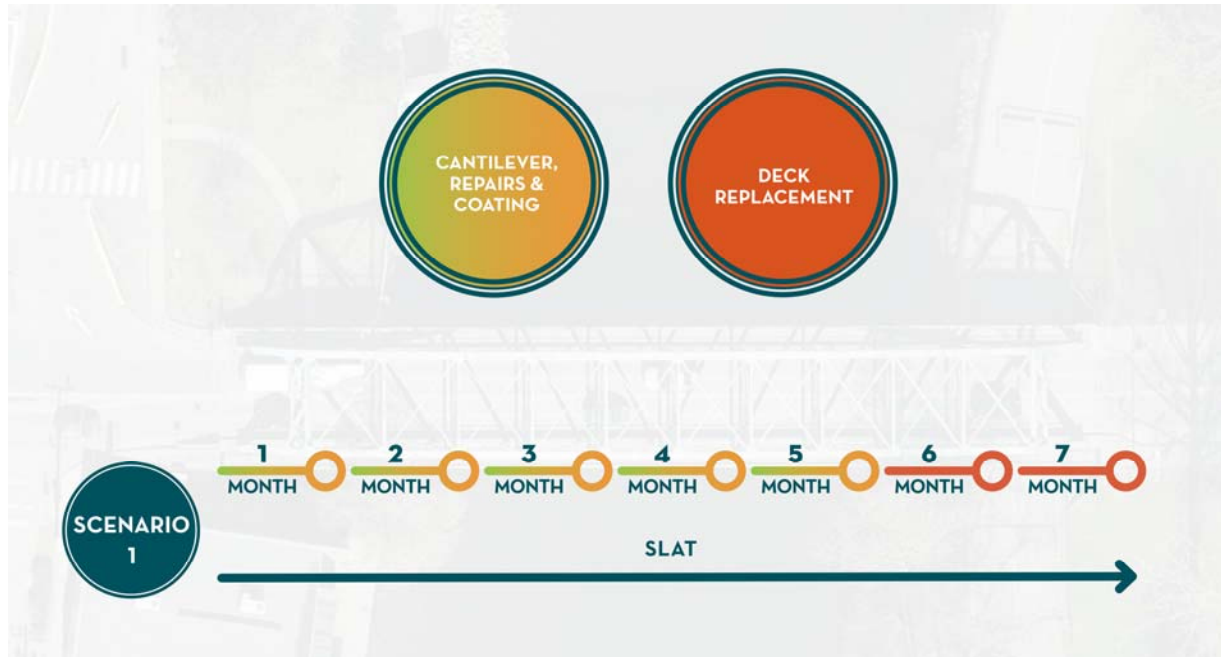
This scenario would see the full scope of the project being undertaken concurrently. The overall project timeline for this scenario is expected to be 6 to 7 months. In this scenario the contractor would be able dictate and adjust their own schedule and sequence of the elements based on the needs of the project.

During construction we would expect the bridge closures to generally follow the sequence shown in **Figure 2**, however, the contractor would be able to adjust this based on what they feel would be the most efficient sequence.

MEMORANDUM

Date: January 21, 2020  
File: 3222.0045.02  
Subject: Fifth Street Bridge – Construction Sequencing and Bridge Closure Considerations  
Page: 4 of 10

Figure 2 – Scenario 1 Construction Timeline



It would be expected that bridge shutdowns for this scenario would primarily include single lane alternating traffic (SLAT) for most of the project, with possible periods of two-way traffic.

Advantages:

- Accommodates full scope of the project with the shortest length of overall construction.
- Would provide the most cost-effective scenario as the contractor would be free to dictate schedule.

Disadvantages:

- SLAT during much of the project timeframe.

**Scenario 2 – Installation of Multi Use Paths Followed by Full Bridge Coating and Decking Repairs**

Installing the multi-use paths first, without any other works, would result in a slightly longer construction period but would allow for a longer period where traffic disruptions could be minimalized. This is something that the City could dictate as part of the construction phasing. With the new paths added, pedestrians and cyclist would be able to use them during the coating phase of the project allowing the bridge lanes to be utilized for two-way traffic for large portions of the schedule. This concept is shown in **Figure 3** below. During the deck replacement the traffic would need to revert to SLAT to accommodate the work. During construction we would expect the bridge closures to generally follow the sequence shown in **Figure 4**. It should be noted that during the timeframe that is shown as two-lane traffic there may still be periods where SLAT would need to be used.

MEMORANDUM

Date: January 21, 2020  
File: 3222.0045.02  
Subject: Fifth Street Bridge – Construction Sequencing and Bridge Closure Considerations  
Page: 5 of 10

The above scenario would be expected to come at a slight cost premium to Scenario 1 due to the longer construction length. This premium would be expected to be in the 5 to 10% range.

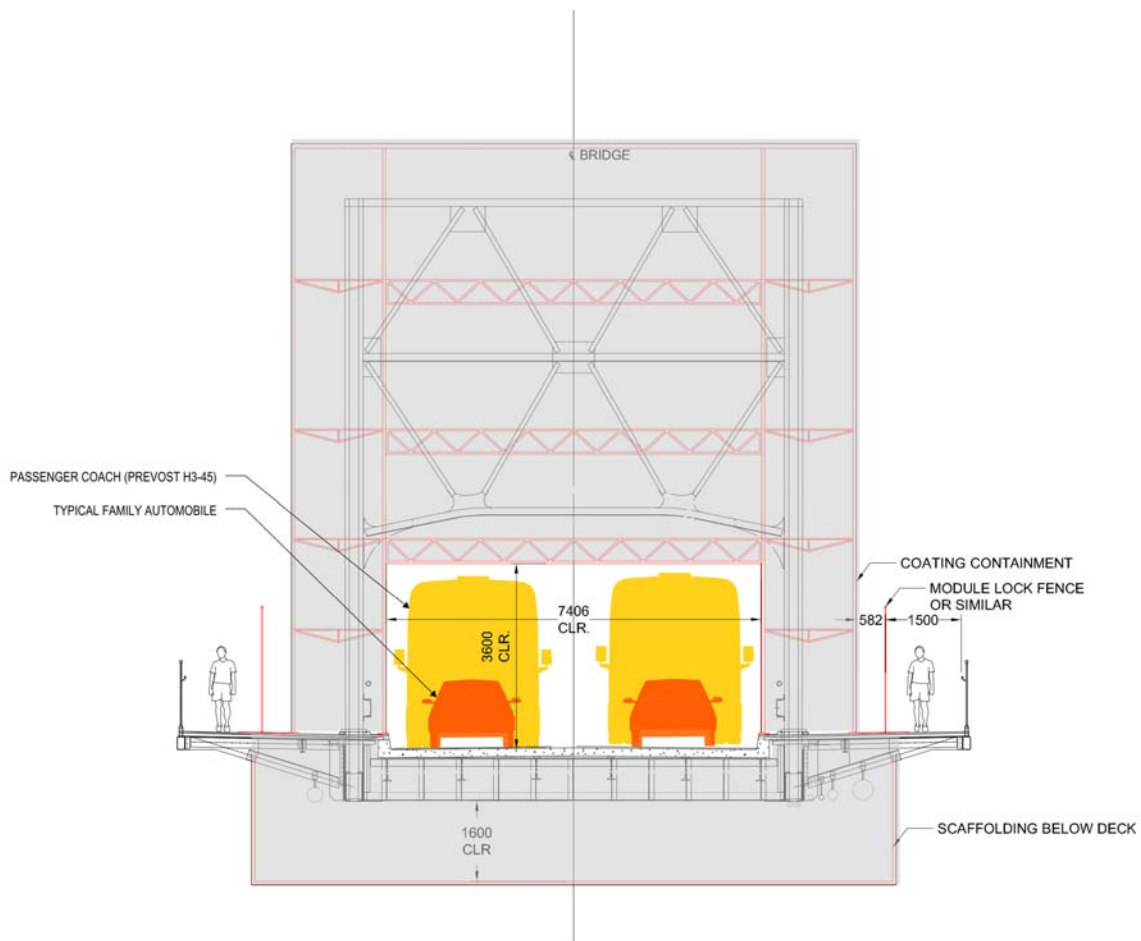
Advantages:

- Accommodates the full scope of the project.
- Allows for two-way traffic during most of the bridge coating work.

Disadvantages:

- Longer construction timeframe
- Would result in a cost premium to Scenario 1

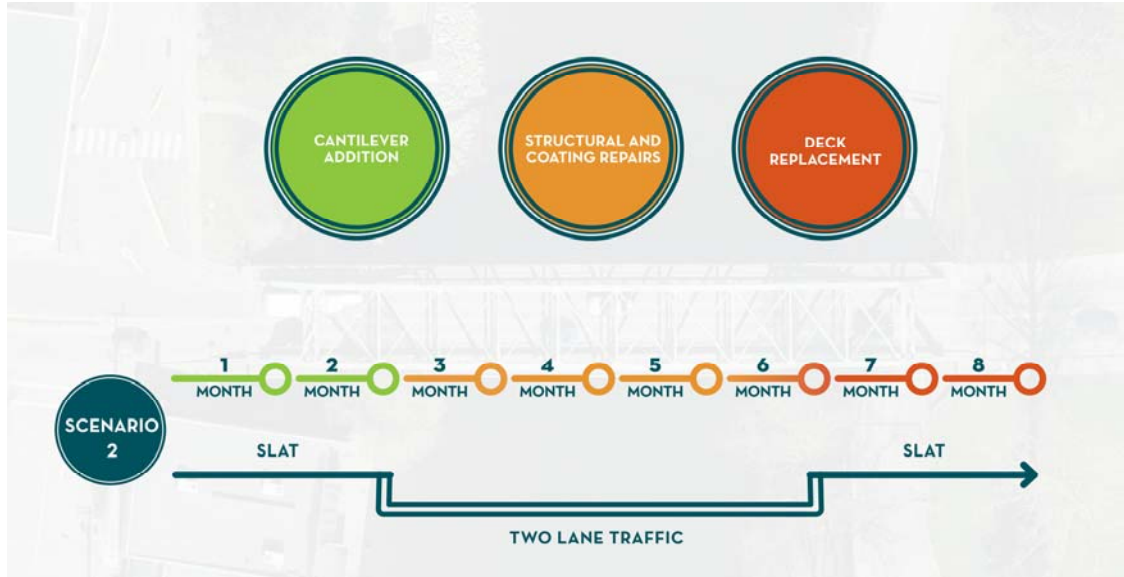
**Figure 3 - Sample Concept of Bridge Cross-Section Durign Rehabilitation with Cyclists and Pedestrians Using New Multi Use Paths**



MEMORANDUM

Date: January 21, 2020  
File: 3222.0045.02  
Subject: Fifth Street Bridge – Construction Sequencing and Bridge Closure Considerations  
Page: 6 of 10

Figure 4 – Scenario 2 Construction Timeline



Scenario 3 – Full Bridge and Decking Repairs with No Multi-Use Pathway Addition

Scenario 3 is similar to Scenario 1 but without the addition of the multi-use paths. With the paths removed from the project the overall construction length is reduced from other scenarios to approximately 6 months. This scenario would generally require the bridge to operate under SLAT conditions for the entire length of the project. This concept is shown in Figure 5.

Figure 5 - Scenario 3 Construction Timeline





MEMORANDUM

Date: January 21, 2020  
File: 3222.0045.02  
Subject: Fifth Street Bridge – Construction Sequencing and Bridge Closure Considerations  
Page: 7 of 10

During the coating and structural works, while the bridge is contained, pedestrians would be using the inside lanes to cross the bridge.

Advantages:

- Provides the shortest overall construction length and lowest capital cost.

Disadvantages:

- Would require SLAT traffic for the duration of the project.
- Does not include the addition of multi-use paths.

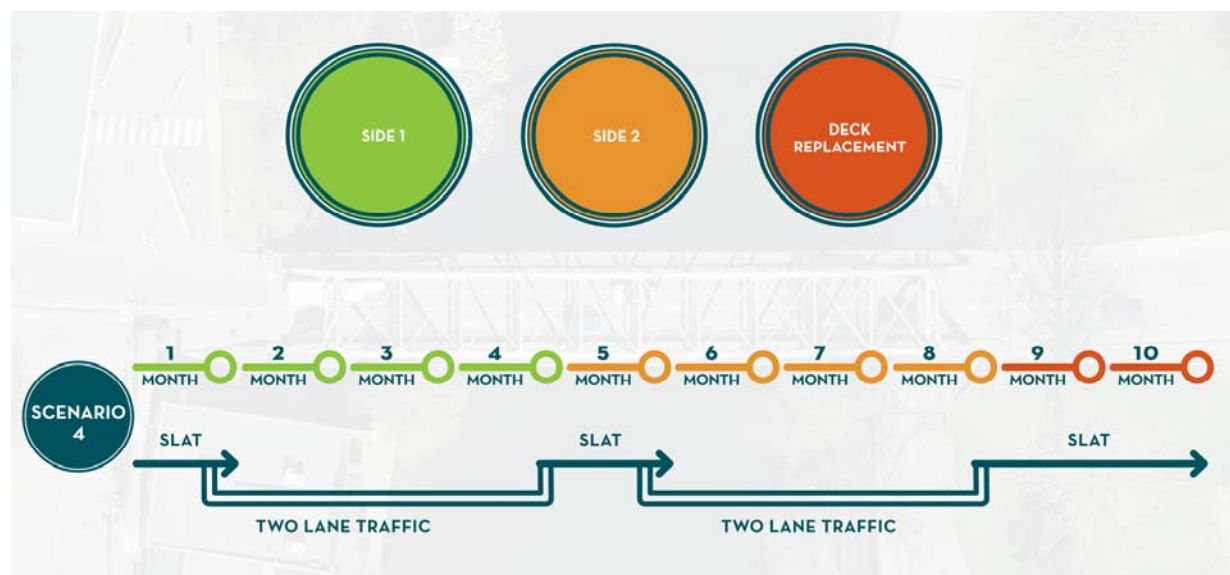
**Scenario 4 – Installation or work split up between north and south sides.**

This option was discussed in a previous report to council. In this option the contractor would be required to upgrade the bridge work in two phases, the north side and then the south side (or vice versa). Scaffolding and containment would be erected on half the bridge at a time so that pedestrians and cyclists would be able to use the existing walkways on the side of the bridge that wasn't being improved.

It would require two separate scaffolding and containment set ups and could include or not include new multi-use paths. This scenario would result in the ability to have 2-way traffic through the bridge for a large portion of the project. This concept is shown in **Figure 6**.

The complication of this scenario would however increase the overall project timing of the work to up to 10 months. The extended timing and addition efforts would also be expected to result in a costs premium of up to 20% to the base costs.

**Figure 6 - Scenario 4 Construction Timeline**



MEMORANDUM

Date: January 21, 2020  
 File: 3222.0045.02  
 Subject: Fifth Street Bridge – Construction Sequencing and Bridge Closure Considerations  
 Page: 8 of 10



**Advantages:**

- Accommodation of 2-way traffic during large portions of the project. This advantage is most beneficial to a scenario where the pathways are not included in the project.

**Disadvantages:**

- We would expect a cost premium of approximately 20% for the additional efforts for staging this scenario
- Would significantly increase the overall timing of the project
- Dictation of the construction sequencing in this way may detract contractors from bidding on the project.

**Comparison**

The following table provides a comparison of the four options:

	<b>Scenario</b>	<b>Advantages</b>	<b>Disadvantages</b>	<b>Estimated Capital Cost</b>
1.	Full bridge and decking repairs and addition of multi-use paths completed concurrently	<ul style="list-style-type: none"> <li>• Accommodates full scope of the project with the shortest length of overall construction.</li> <li>• Provides the most cost-effective scenario as the contractor would be free to dictate schedule.</li> </ul>	<ul style="list-style-type: none"> <li>• SLAT traffic during much of the project timeframe.</li> </ul>	<ul style="list-style-type: none"> <li>• \$8.3 Million</li> </ul>
2.	Installation of multi-use pathways followed by bridge coating and decking repairs	<ul style="list-style-type: none"> <li>• Accommodates the full scope of the project.</li> <li>• Allows for two-way traffic during much of the bridge coating work.</li> </ul>	<ul style="list-style-type: none"> <li>• Longer construction timeframe</li> <li>• Would result in a cost premium to Scenario 1.</li> </ul>	<ul style="list-style-type: none"> <li>• \$8.7 to 9.1 Million</li> </ul>
3.	Full bridge and decking repairs with no multi-use pathways	<ul style="list-style-type: none"> <li>• Provides the shortest overall construction length and lowest capital cost.</li> </ul>	<ul style="list-style-type: none"> <li>• Would require SLAT traffic for the duration of the project.</li> <li>• Does not include the addition of pathways.</li> </ul>	<ul style="list-style-type: none"> <li>• \$6.3 Million</li> </ul>

MEMORANDUM

Date: January 21, 2020  
 File: 3222.0045.02  
 Subject: Fifth Street Bridge – Construction Sequencing and Bridge Closure Considerations  
 Page: 9 of 10



	Scenario	Advantages	Disadvantages	Estimated Capital Cost
4.	Installation or work split up between north and south sides	<ul style="list-style-type: none"> <li>Accommodation of 2-way traffic during large portions of the project. This advantage is most beneficial to a scenario where the pathways are not included.</li> </ul>	<ul style="list-style-type: none"> <li>We would expect a cost premium of approximately 20% for the additional efforts for staging this scenario</li> <li>Would significantly increase the overall timing of the project</li> <li>Dictation of the construction sequencing in this way may detract contractors from bidding on the project.</li> </ul>	<ul style="list-style-type: none"> <li>\$7.6 to \$10 Million (no Paths / including Paths)</li> </ul>

**BRIDGE INFRASTRUCTURE CONSIDERATIONS**

Four utilities are housed underneath the Fifth Street Bridge:

- 1) City of Courtenay water main,
- 2) Comox Valley Regional District (CVRD) water main,
- 3) Fortis gas line; and
- 4) Telus telecommunications lines

Some of these utilities are located under the current cantilevered sidewalks which may need to be adjusted or supported as part of the new multi-use paths.

Preliminary consultation has occurred with the Comox Valley Regional District, Fortis and Telus to ensure awareness of the planned construction, and to identify considerations for safeguarding all utilities during construction. Regarding Fortis and CVRD, respective opportunities to piggyback coating of the gas line and adding pipe protection to the water main are being explored. On-going discussions will be required throughout design and construction phases.

Based on the above we feel that the proposed scenarios provide several different options for the City in being able to manage and minimize traffic impacts due to the required works on the bridge. Once a direction has been confirmed the above scenarios can be advanced to technical stages for implementation during construction.

MEMORANDUM

Date: January 21, 2020  
File: 3222.0045.02  
Subject: Fifth Street Bridge – Construction Sequencing and Bridge Closure  
Considerations  
Page: 10 of 10



Sincerely,

**URBAN SYSTEMS LTD.**

Eric Sears, P.Eng  
Project Manager

# MEMORANDUM

Date: January 20, 2020  
To: Chris Davidson, Manager of Engineering Projects  
From: Eric Sears  
File: 3222.0045.02  
Subject: Fifth Street Bridge Active Transportation Connection | Concept Design

As part of the Transportation Master Plan (TMP) that was recently adopted by Council, it was identified that widening the cantilevered sidewalks on both the north and south side of the Fifth Street Bridge would have significant connectivity and safety impacts across the Courtenay River for all active modes of transportation. This lack of connectivity was a key constraint brought forward in the TMP.

The City of Courtenay is considering the replacement of existing cantilever pedestrian sidewalks on the bridge as part of the maintenance work in order to utilize the expected closures during the construction period. The current bridge provides narrow sidewalks on either side of the bridge and does not provide a safe connection for cyclists as they are expected to merge with traffic in a single file manner across the bridge. The City hopes that the wider cantilevers would improve the walking and cycling conditions across the bridge from a safety, connectivity, and comfort standpoint and would tie into the proposed networks on either side of the bridge as developed as part of the TMP and the Parks and Recreation Master Plan.

The following memorandum identifies opportunities to transition the proposed cantilever facilities to surrounding pedestrian and cycling facilities. This document is a continuation of the September 09, 2019 memorandum that describes the high-level approach to connectivity.

## 1. Concept Design

Connectivity options have been developed and reviewed against various criteria to analyze which option would be the best for the City to pursue. The criteria set out is primarily focused on active transportation users while also considering other impacts. The criteria are as follows:

- Pedestrian Safety
- Cyclist Safety
- Pedestrian Connectivity to existing networks
- Cyclist Connectivity to existing networks
- Pedestrian Comfort/Experience
- Cyclist Comfort/Experience
- Vehicle Impact
- Integration into existing and future park infrastructure
- Value

The goal of the connections is to increase the safety, comfort and experience for pedestrians and cyclists. The proposed cantilevers inherently provide a better experience than the current condition because they provide a wider pathway and are further separated from cars. They also allow for cyclists to avoid having

## MEMORANDUM

Date: January 20, 2020  
File: 3222.0045.02  
Subject: Fifth Street Bridge Active Transportation Connection | Concept Design  
Page: 2 of 6

to share the roadway with vehicles and provide more space for all active users. Beyond the bridge it will be important that this comfort is extended to the various connections to existing and future networks.

A concept design has been developed identifying the preferred option for connecting the proposed cantilever facilities on both sides of the bridge. The concept design noted in **Figure 1** and key features are summarized below.

### Overall

- Multi-use pathways are provided at each end of the bridge with appropriate transitions to nearby walking and cycling facilities.
- All pathways are 3.0m wide, which is consistent with the proposed cantilever facility width and is sufficiently wide to accommodate both pedestrian and cyclist activities.
- Multi-use pavement markings are provided on all pathway segments. Appropriate regulatory, warning, and wayfinding signage should also be included.

### West Side of Bridge

#### Southwest Corner:

- The southwest corner pathway will connect to Fifth Street and Anderton Avenue via a letdown at the intersection of Anderton Avenue and Fifth Street.
- The existing stairs to the path under the bridge will remain to provide pedestrian connectivity to the north side of the bridge. It is recommended that a bike wheel channel (i.e., a groove adjacent the staircase to facilitate rolling bikes up/down the staircase) along the stairs to allow cyclists access to the stairs.
- The existing CVRD water valve kiosk will need to be relocated out of the pathway and a retaining wall will need to be constructed to support this extension and relocation.

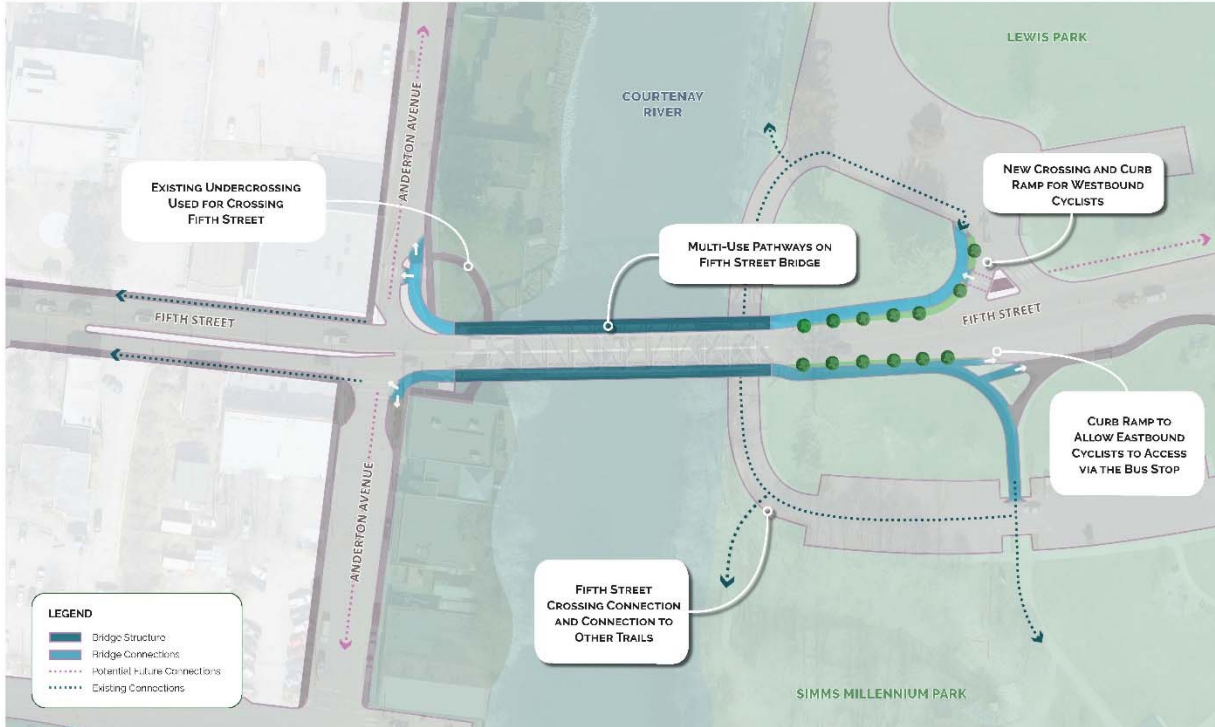
#### Northwest Corner:

- The northwest corner pathway will turn to the north and connect to Anderton Avenue via the existing crosswalk and a new letdown at the curb extension. These letdowns will allow cyclists to continue north along Anderton Avenue.
- The pathway will connect to the existing sidewalk and pathway under the bridge to provide connectivity for pedestrians and cyclists looking to cross 5<sup>th</sup> Street.

The existing underpass could be used by pedestrians and cyclists to connect under Fifth Street, but cyclists would be required to dismount and walk under the bridge. The underpass is also susceptible to localized flooding during high-tide or heavy rainfall events, which would impact walking / cycling during peak events.

MEMORANDUM

Date: January 20, 2020  
File: 3222.0045.02  
Subject: Fifth Street Bridge Active Transportation Connection | Concept Design  
Page: 3 of 6



An alternative for cyclists seeking to cross Fifth Street on the west side of the bridge would be to utilize the existing underpass on the east side of the bridge. Wayfinding signage and education would be necessary to direct users that are approaching from the east on which side of the bridge will be most effective to get them to their desired locations.

East Side of Bridge

Southeast Corner:

- The southeast corner pathway runs along Fifth Street and connect to the parking lot in Simms Millennium Park. A boulevard space is provided between the pathway and roadway to increase comfort on the pathway and provide opportunities for new street trees.
- An eastbound cycling access ramp to Fifth Street is provided to allow cyclists to enter the bus stop and then merge with vehicular traffic in a safe manner.

MEMORANDUM

Date: January 20, 2020  
File: 3222.0045.02  
Subject: Fifth Street Bridge Active Transportation Connection | Concept Design  
Page: 4 of 6



Northeast Corner:

- The northeast corner pathway runs along Fifth Street and terminates at the access point to Lewis Park. A letdown is provided at the existing crosswalk and median island to allow westbound cyclists to merge onto the pathway.
- Another letdown is provided to the Lewis Park parking lot to provide connectivity to the park.

On the east side of the bridge connectivity between the north and south cantilevers will be achieved via the current roadway underpass. Cyclists and pedestrians would utilize this underpass in both directions to connect between the north and south sides of Fifth Street. Wayfinding signs and education would be needed to illustrate this connection as it is not intuitive. Utilizing the underpass is susceptible to localized flooding during high-tide or heavy rainfall events, which would impact connectivity during these events.

An alternative option is to extend the pathway on the north side of Fifth Street east to the Fifth Street and Comox Road intersection. This would allow for an at-grade crossing for pedestrians and cyclists at this intersection. This option would enhance crossing opportunities, particularly for longer distance cycling trips along this corridor, but would add an additional cost of \$150,000 to \$200,000.

## 2. Long-Term Considerations

The Transportation Master Plan (TMP) outlines the proposed cycling and pedestrian networks for the City. On the west side of the bridge, Anderton Avenue and Sixth Street are identified as the preferred cycling connections on the west side of the bridge. The Sixth Street crossing is also discussed as a desired option in the City of Courtenay Downtown Playbook that was created in 2016, and the Parks and Recreation Master Plan that was adopted in 2019. For the east side of the bridge, the TMP calls for a multi-use path along the north side of Fifth Street/Old Island Highway connecting to the Lewis Centre and east Courtenay. The TMP also designates bike paths through Lewis Park and Simms Millennium Park. Figure 2 indicates the Medium Term (10 Year) Cycling Improvement Priorities map that is included in the TMP and includes the above noted network connections.

These future connections have been reviewed and considered during the development of the connectivity options to the new cantilevers on the Fifth Street Bridge.



MEMORANDUM

Date: January 20, 2020  
 File: 3222.0045.02  
 Subject: Fifth Street Bridge Active Transportation Connection | Concept Design  
 Page: 5 of 6

**Figure 2 - Medium Term (10 Year) Cycling Improvement Priorities**



MEMORANDUM

Date: January 20, 2020  
File: 3222.0045.02  
Subject: Fifth Street Bridge Active Transportation Connection | Concept Design  
Page: 6 of 6



**Cost Estimates**

Order-of-magnitude cost estimates were prepared for the proposed concept design. The estimated cost is approximately **\$400,000**, distributed as follows:

Southwest corner	\$110,000
Northwest corner	\$70,000
Northeast corner	\$110,000
Southeast corner	\$110,000

The above costs include all works required for the connections discussed in this report including, concrete works, abutments modifications, signage and surface markings. The estimates include a 40% allowance for Contingency and Engineering and are presented in costs that would be expected based on construction in 2021.

These costs are consistent with costs previously associated with the cantilevers in the overall project costs estimates.

**Next Steps**

Based on the above we feel that the proposed connectivity concepts will begin to provide pedestrian and cycling links to existing and future networks on both sides of the bridge. Once a direction has been confirmed the above connectivity concepts should be advanced to detailed design technical stages.

Sincerely,

**URBAN SYSTEMS LTD.**

Eric Sears, P.Eng  
Project Manager

/eds

U:\Projects\_VIC\3222\0045\02\R-Reports-Studies-Documents\R1-Reports\January 2020 Council Information\100%\2020-01-20 Fifth St Bridge AT Connectivity\_Concept Design- Final.docx



THE CORPORATION OF THE CITY OF COURTENAY

## STAFF REPORT TO COUNCIL

**To:** Council  
**From:** Chief Administrative Officer  
**Subject:** 5<sup>th</sup> Street Bridge Rehabilitation Project

**File No.:** 5335-20 / 5400-02  
**Date:** June 24, 2019

### PURPOSE:

This report is intended to describe for Council the scope and costs of near-term rehabilitation of the 5<sup>th</sup> Street Bridge so as to restore it to its intended functional condition and achieve an updated useful life lasting until at least the year 2040.

This report also contains supplementary information on a potential level of service increase and capital upgrade to the 5<sup>th</sup> Street Bridge as an alternative to constructing a new Pedestrian Bridge at a 6th St location, should Council choose to consider such an unfunded capital upgrade or new capital construction.

### BACKGROUND:

Built in 1960, the 5<sup>th</sup> Street Bridge acts as a gateway to downtown Courtenay and requires rehabilitation to maintain the level of service for various modes of transportation. Over the years, multiple engineering assessments of the bridge have identified the need for structural repairs and re-coating to slow normal deterioration during service. Routine maintenance and periodic rehabilitation is important to ensure the asset's intended level of service and life-cycle can be achieved.

In 2016, the City engaged Hatch Mott Macdonald (HMM) and Urban Systems to complete a scoping study to determine the rehabilitation requirements. A field investigation and evaluation report recommended that the City repair several structural deficiencies, refurbish the bridge decking and recoat the bridge steel within the next five to seven years. The Class D estimate provided at that time was \$2.94M less \$1.96M from a successful New Building Canada Fund – Small Communities Fund (NBCF-SCF) grant application.

Urban Systems Technical Memorandum dated January 22, 2019 "5<sup>th</sup> Street Bridge Rehabilitation - Project Cost Escalation Summary" (Attachment 1) provides a 20-year chronology of rehabilitation needs, options and costs as they have evolved since 1999. For reasons provided below, the most recent estimate to meet the same intended scope of work and level of service until at least 2040 as well as continue to meet the existing grant approvals is \$6.3M. This estimate was received in November 2018 and reconfirmed in March 2019. Furthermore, repeated inquiries of the granting authority have confirmed that additional funding to accommodate cost escalations(s) are not available.

The detailed scope of work and funding options to achieve the planned rehabilitation are provided below in the body of this report.

Aside: while not yet presented to nor adopted by Council, staff can indicate that the draft Transportation Master Plan (TMP) identifies opportunities to improve east-west connectivity and safety for people who bike and walk. One, for example, is to consider an upgrade to the 5<sup>th</sup> Street Bridge by installing 3.0 metre cantilevered multi-use pathways on both sides of the existing bridge structure. Alternatively, construction of a new pedestrian-cycling bridge could be considered at 6th Street in future. Either option would require additional analysis and substantially more funding (see Financial Considerations below). As the former is an upgrade and the latter new construction, neither is included within the current scope of 5<sup>th</sup> Street Bridge rehabilitation nor may the City expend approved NBCF-SCF grant funding on these prospective initiatives.

These opportunities are included in the Options available to Council, but are not recommended for reasons provided below related to Asset Management principles suggesting mindfulness of unanticipated capital costs and the lack of full life-cycle cost information within an organization-wide context.

**CAO RECOMMENDATION:**

That based on the June 24<sup>th</sup>, 2019 staff report “5<sup>th</sup> Street Bridge Rehabilitation Project” Council approve OPTION 1 and OPTION 4:

OPTION 1 - That Council direct staff to proceed with the associated next steps to rehabilitate the 5<sup>th</sup> Street Bridge within its original scope including development of detailed traffic management and public engagement plans, and report back to Council no later than September 16, 2019; and

That staff simultaneously prepare a supporting draft Borrowing Bylaw for Council consideration.

OPTION 4 - That staff bring forward a report providing options for exploring a 6<sup>th</sup> Street multi-use pedestrian-bike bridge as an alternative to an upgrade to the 5<sup>th</sup> Street Bridge of adding cantilevered multi-use pathways; and

That a decision to explore and report on further development of a 6<sup>th</sup> Street multi-use pedestrian-bike bridge be subsequent to Council’s receipt and adoption of the forthcoming Transportation Master Plan.

Respectfully submitted,



David Allen, BES, CLGEM, SCLGM  
Chief Administrative Officer

**DISCUSSION:**

**Original Project Scope:**

For more than a decade the scope of rehabilitation of the 5<sup>th</sup> Street Bridge has been to repair structural deficiencies, refurbish the bridge decking and recoat the bridge steel within the next five to seven years. Specifically:

- Removal of the lead-based paint and application of new coating;
- Steel repairs to the end of the deck beams underneath the bridge;
- Recoating the steel (4,200 m<sup>2</sup>);
- Removal of the hand rails and hot dip galvanizing the railings and rub rails;
- Removal of existing concrete overlay;
- Deck concrete removal to a partial depth;
- Placement of a new concrete overlay; and
- new road markings.

In March 2018, a conceptual design investigation was completed confirming the previous scope of work remains accurate. However, the investigation noted that the deck requires more extensive repair than earlier anticipated. Due to the deteriorated condition of the deck, two full-scale improvements were considered: cathodic protection or full deck replacement.

Cathodic protection is a well-proven technique originating in the marine environment used to protect metal from corrosion. By making the protected metal the cathode in a small DC electrical circuit, with sacrificial metal blocks added to the exterior of the structure to act as an anode causing the softer metal anodes to corrode while the cathode – the structural steel of a ship – does not. Though its application to reinforcing steel embedded in the concrete structure of the 5<sup>th</sup> Street Bridge is more complex, the intended technique will yield the same benefit. Therefore, cathodic protection is preferred to full deck replacement as it will protect the deck from further corrosion for the remaining life of the bridge. While only a partial deck replacement is immediately necessary (~\$240K), the life-cycle costs of cathodic protection are far less expensive than a full deck replacement that will very likely be required early in the intervening 20 years.

The project team has reviewed several other bridge projects on Vancouver Island, in particular the recent bridge rehabilitation projects in Campbell River and Duncan. Figure 1 highlights the recent Campbell River bridge rehabilitation which also required “wrapping” the steel structure for recoating which allowed the bridge to remain open to traffic. Understanding market conditions and drawing on these recent experiences has informed our thinking on the options, estimates and alternatives for our own project. However, when considered within the context of the City’s needs for maximizing the life of the bridge, traffic management and community impacts, and the original grant requirements, many alternatives explored to date are not considered feasible.

Therefore, the updated budget for deck rehabilitation includes cathodic protection (rather than full or partial deck replacement) and traffic management costs to ensure the bridge remains open to single lane traffic throughout the approximate six month construction period. To protect the marine environment from the lead paint removal process, the bridge will be wrapped during construction, which may reduce the access height of the bridge, but a detailed traffic management plan will be developed to mitigate traffic impacts where possible. The traffic management plan will review the current crossing and alternate routes and recommend strategies for addressing safety and traffic flow amongst all transportation modes and types of vehicles. Although temporary closures may be required at scheduled times, a full closure of the bridge is no longer being contemplated.

### **Cost escalation:**

Since 2016, construction cost estimates for the original proposed scope of rehabilitation have increased significantly.

The original cost estimate of \$2.9 million contemplated cost-sharing of \$1.96 million (Province/Federal) and \$0.94 million (City of Courtenay) from the City’s reserve funds. The new cost estimate is \$6.3 million. This figure was received in November 2018 and reconfirmed in March 2019.

Representatives with the New Build Canada – Small Communities Fund have confirmed that the original grant amount of \$1.96 million would not be increased due to cost escalation. As a result, the City’s portion of the budget to rehabilitate the bridge (with no new pedestrian or cycling amenities) has increased to \$4.3 million.

Despite numerous cost estimates prepared over the last 20 years, which informed the grant application, the cost escalations over the last four years has been significant. The largest cost escalations occurred between 2014 and 2018, which have been record years for the value of construction on Vancouver Island,

increasing the cost of many municipal projects. Therefore, the cost impacts are in addition to conventional escalation (e.g. inflation), which is typical of construction trends, in combination with continuing deterioration of the bridge deck that requires a more intensive repair than originally estimated.

**Opportunities for multi-modal amenities**

The draft City of Courtenay Transportation Master Plan recommends a number of strategies for improving pedestrian and cycling connectivity across the Courtenay River. While a network of trails and access routes exist on the east and west sides of the 5<sup>th</sup> Street Bridge, the existing 1.5 metre sidewalks on the bridge are limited in their ability to accommodate travellers and respond to expected growth in walking and cycling. Cyclists crossing the bridge are currently required to either use the centre of the vehicle lane or walk their bike on the sidewalk. The TMP outlined two options for improving connectivity across the River: an upgrade to the 5<sup>th</sup> Street Bridge by adding cantilevered multi-use pathways on both sides of the bridge or the construction of a new, dedicated pedestrian and cycling bridge at 6<sup>th</sup> Street.

*Cantilevered Multi-Use Pathway:* As part of the rehabilitation project, 3.0 metre multi-use pathways can be cantilevered on both sides of the bridge to improve the level of service for people who walk and bike across the bridge. Cost estimates for the cantilevered pathway are preliminary, as the extent of trail and pathway upgrades in the vicinity of the bridge have not been studied, preventing development of full life-cycle cost estimates. Preliminarily, the cost for cantilevered pathways is \$2 million including tie-ins to existing pathways. However, further study would be required to refine estimates and maximize cross-river connectivity. Also, undertaking this capital upgrade will extend the duration of the rehabilitation project by several months and introduce new risk due to these unknown design and cost uncertainties.

*Dedicated Multi-Use Bridge at 6<sup>th</sup> Street:* The draft TMP also explores the concept of a dedicated pedestrian-cyclist bridge at 6<sup>th</sup> Street as an alternative to upgrading the 5<sup>th</sup> St Bridge with cantilevered multi-use pathways. This proposal was also referenced in the draft Parks and Recreation Master Plan (PRMP). Preliminary cost estimates for this facility are \$2 million - \$4 million. Urban Systems Technical Memorandum dated January 31, 2019 "6th Street Pedestrian and Cycling Bridge Cost Comparison Summary and Analysis" (Attachment 2) provides further details.

Should this be a preferred option, further analysis including level of service and full life-cycle costs for detailed design, maintenance, extent of pathway tie-ins, environmental considerations, approach improvements for access around 6<sup>th</sup> Street, and other Asset Management implications of a new, unfunded and unanticipated capital asset will need to be explored. Choosing this option will not affect the 5<sup>th</sup> Street Bridge rehabilitation project as long as they are not undertaken simultaneously.

**FUNDING**

Table 1 summarizes the original project estimate prepared in 2015 for the grant as well as the revised project costs in 2019 dollars.

**Table 1: 5<sup>th</sup> Street Bridge Rehabilitation – 2015 vs. 2019 Project Costs**

<b>2015 Project Cost Estimate: \$2.9 million</b>
<ul style="list-style-type: none"> <li>• Provincial/Federal Funding (grant): \$1.96 million</li> <li>• City reserves: \$0.94 million</li> </ul>
<b>2019 Project Cost Estimate: \$6.3M</b>
<ul style="list-style-type: none"> <li>• Provincial/Federal Funding (grant): \$1.96 million</li> </ul>

- City reserves \$0.94 million
- City Borrowing amount: \$3.4 million

**Table 2: Rehabilitation elements and associated costs**

Rehabilitation Element	COST (2019 \$)
Removal and replacement of Protective Coating	\$4.1 million
Cathodic Protection System to Extend Life of Bridge Deck	\$1.05 million
Structural Improvements	\$0.8 million
Traffic Management	\$0.35 million
<b>Total</b>	<b>\$6.3 million</b>

A contingency is built into the project budget for costs such as engineering, communications, project financing, construction capital costs, inspection and contract administration.

**OPTIONS**

Four options are presented below for Council consideration and are summarized in the following table:

Project Element	1) Original Scope - Rehabilitation	2) Rehabilitation + Cantilevers	3) Defer Project	4) New 6 <sup>th</sup> St. Pedestrian Bridge
<b>Outcome</b>	Rehabilitated crossing with 20-year updated useful service life with full utilization of the grant and cathodic protection versus deck replacement.	A rehabilitated crossing with extended service life that provides improved cycling and walking amenities, with full utilization of the grant.	Further deterioration and related liability of an important infrastructure asset.	Dedicated multi-use pedestrian-cyclist bridge at 6 <sup>th</sup> Street.
<b>Duration</b>	6 months	8 months	N/A	N/A
<b>Bridge Recoating &amp; Deck Renewal</b>	\$4.1 million	\$4.1 million	TBD	N/A
<b>Structural and Traffic</b>	\$2.2 million	\$2.2 million	TBD	TBD
<b>Cantilever Pathway</b>	n/a	\$2 million	TBD	N/A
<b>Total</b>	\$6.3 million	\$8.3 million	TBD	\$2 million to \$4 million
<b>Reserves</b>	\$0.94 million	\$0.94 million		
<b>City Borrowing Amount</b>	\$3.4 million	\$5.4 million	N/A	ALL
<b>Borrowing Costs*</b>	\$233,300	\$370,550	N/A	N/A
<b>Tax Impact**</b>	1%	1.6%	N/A	N/A

<b>Borrowing Costs*</b>	\$233,300	\$370,550	N/A	N/A
<b>Tax Impact**</b>	1%	1.6%	N/A	N/A

\* Borrowing costs calculated at standard MFA 20 year rate of 3.14%

\*\* Tax Impact calculated based on 2019 tax rates.

**FINANCING IMPLICATIONS**

Project costs beyond grant funding and use of reserve funds would need to be financed as per municipal borrowing procedures for capital works (Municipal Finance Authority 3.14%, 20 year amortization). If Option 1 is chosen – the original scope of work – it would require borrowing \$3.4M and result in an estimated annual servicing cost of @\$233,000 per year, equaling approximately a 1% increase to the debt levy for property taxation purposes beginning in 2021 when the first payments would be due.

In order for the City to be included in the Fall 2020 long term borrowing issued through the Municipal Finance Authority, the borrowing process must begin no later than October 31, 2019. Steps to complete this process include bylaw preparation and three readings by Council, review and approval by the Province, elector approval, final adoption by Council with a one month quashing period, then issuance of a certificate of approval by the Province. The process can take up to eight months before funds are received.

**ADMINISTRATIVE IMPLICATIONS**

This will vary substantially depending upon the Option chosen, the method of project management and other factors that will be identified in the follow-on report of September 16, 2019.

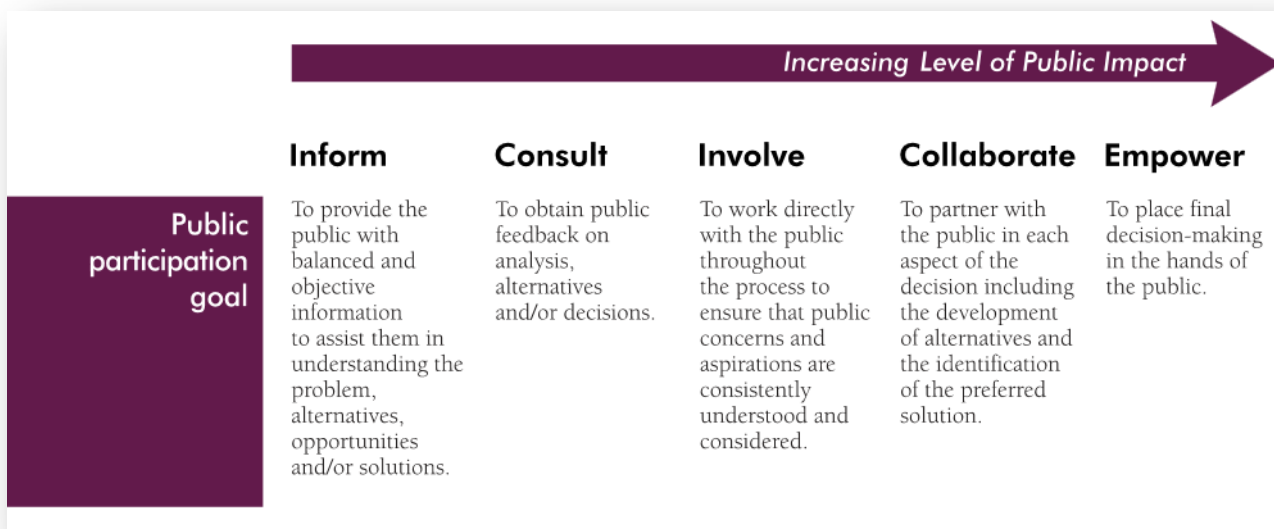
**PUBLIC ENGAGEMENT**

The 5<sup>th</sup> Street Bridge is a critical community asset which affects and supports a variety of stakeholders and users. There is a need for extensive engagement amongst residents, businesses, river users, recreational groups, commercial drivers, and transit service providers, among others.

Proactive communications efforts about the scope and timing of the project, the implications to traffic and pedestrian/cycling movements and the travel alternatives that can be utilized to limit delays during periods of construction is essential to supporting the community. A detailed engagement plan for the lead-up period, ongoing during construction and reporting out to the public on completion will be prepared for Council consideration once an Option has been selected by Council.

The levels of public engagement based on the IAP2 Spectrum of Public Participation will likely vary for each phase of the project.





**ASSET MANAGEMENT IMPLICATIONS**

These are yet to be determined until an Option has been chosen.

**STRATEGIC PRIORITIES, OCP AND TMP REFERENCE**

**Strategic Priorities 2019 - 2022**

As part of the Strategic Priorities for 2019 – 2022 the following are relevant to the 5<sup>th</sup> Street Bridge Rehabilitation project:

**We proactively plan and invest in our natural and built environment**

- Focus on asset management for sustainable service delivery
- ▲ Look for regional infrastructure solutions for shared services
- ▲ Advocate, collaborate and act to reduce air quality contaminants
- ▲ Support social, economic and environmental sustainability solutions

**We plan and invest in methods of multi-modal transportation**

- Move forward with implementing the City's Transportation Master Plan
- ▲■ Collaborate with regional and senior government partners to provide cost-effective transportation solutions

**Transportation Master Plan**

In relation to the working draft of the TMP the following transportation vision was stated:

*The City of Courtenay supports a transportation network that prioritizes connectivity and access to daily destinations and, through a balanced approach to transportation planning, provides all road users safe choices in their mode of transportation.*

The supporting values to achieve the transportation vision include:

**Values**

1. Sustainability, livability & health
2. Safety + efficiency

3. Economic Prosperity
4. Connectivity
5. Affordability
6. Sustainable Land Use

### **Official Community Plan**

In regards to the Official Community Plan for Courtenay, the following goals of Section 5.0 Transportation are relevant:

#### **5.2 Goals**

1. integrate land use changes with transportation planning to coordinate changes and increases to traffic patterns.
2. development of a transportation system that provides choices for different modes of travel including vehicle, transit, pedestrian, cycling and people with mobility impairments.
3. protect the integrity of the road classification system to facilitate the purpose and function of the specific road types.
4. support an integrated transportation system that works towards reducing travel distances and congestion.
5. support a transportation system that recognizes the importance of the character and overall appearance of the City.
6. provide an effective transportation system that facilitates the movement of vehicles throughout the community and the Comox Valley to major regional services such as the Little River Ferry System and the Comox Valley Airport.

### **CONCLUSION**

Given the need for rehabilitation and the increasing cost escalation that will continue should work be delayed, City staff recommend that Council direct staff to proceed with Option 1 and the associated next steps to rehabilitate the 5<sup>th</sup> Street Bridge, including developing a traffic management plan that maintains single lane vehicles access during construction, and comprehensive public engagement strategy. Staff also recommend that a draft Borrowing Bylaw for Council be prepared for Council consideration and staff will report back to Council in September 2019.

### **OPTIONS**

#### **Option 1 & Option 4 (Recommended):**

Option 1 - That Council direct staff to proceed with the associated next steps to rehabilitate the 5<sup>th</sup> Street Bridge within its original scope including development of detailed traffic management and public engagement plans, and report back to Council no later than September 16, 2019; and

That staff simultaneously prepare a supporting draft Borrowing Bylaw for Council consideration.

Option 4 - That staff bring forward a report providing options for exploring a 6<sup>th</sup> Street multi-use pedestrian-bike bridge as an alternative to an upgrade to the 5<sup>th</sup> Street Bridge of adding cantilevered multi-use pathways; and

That a decision to explore and report on further development of a 6<sup>th</sup> Street multi-use pedestrian-bike bridge be subsequent to Council's receipt and adoption of the forthcoming Transportation Master Plan.

Option 2:

That Council direct staff to proceed with the associated next steps to rehabilitate the 5<sup>th</sup> Street Bridge including the upgrade of adding cantilevered multi-use pathways plus development of detailed traffic management and public engagement plans, and report back to Council no later than September 16, 2019; and

That staff simultaneously prepare a supporting draft Borrowing Bylaw for Council consideration.

Option 3:

That Council direct staff to defer the 5<sup>th</sup> Street Rehabilitation Project to a future date of their choosing.

Prepared by:



Ryan O'Grady, P.Ag., P.Eng.  
Director of Engineering Services

Prepared by:



David W. Love, CD, BA, LGM(Dip), MM, PE, PCAM  
Senior Advisor, Strategic Initiatives

**ATTACHMENTS (2):**

1. Urban Systems Technical Memorandum dated January 22, 2019 "5<sup>th</sup> Street Bridge Rehabilitation - Project Cost Escalation Summary".
2. Urban Systems Technical Memorandum dated January 31, 2019 "6<sup>th</sup> Street Pedestrian and Cycling Bridge Cost Comparison Summary and Analysis"

**APPENDIX A: FIGURES (2)**

1. Fully Wrapped Bridge Accommodating Traffic
2. Conceptual Plan View of Cantilever-Pathway and Network





## STAFF REPORT

---

**To:** Council  
**From:** Chief Administrative Officer  
**Subject:** Sixth Street Bridge Options Analysis

---

**File No.:** 5335-20; 5400-02  
**Date:** January 27, 2020

### PURPOSE

The purpose of this report is to provide an update on the information requested in Council's resolution of September 24, 2019:

*Moved by Cole-Hamilton and seconded by Frisch that Council direct staff to expedite delivery of a range of options and stakeholder engagement for the Sixth Street multi-use pedestrian-bike bridge concept to provide greater information related to the design cost, public safety features and funding source options simultaneously with the Fifth Street Bridge rehabilitation project update, and bring forward for consideration at a future Council meeting in January 2020.*

Respectfully submitted,

David Allen, BES, CLGEM, SCLGM  
Chief Administrative Officer

### EXECUTIVE SUMMARY

The Sixth Street Multi-Use Active Transportation Bridge concept has been discussed within the community for many years. A Sixth Street Multi-Use Bridge is included in the recently completed Parks & Recreation Master Plan and referenced in the Transportation Master Plan for the City of Courtenay. The bridge is listed as a long-term improvement in the Parks and Trails Master Plan. The Downtown Courtenay Playbook also notes an additional crossing at Sixth Street should be explored further.

The potential for a Sixth Street Crossing generated a lot of dialogue during recent public consultation that occurred in November and December 2019. Further to Council's September direction, the project team has developed four bridge concepts to provide a range of aesthetic and costing options. The four options outlined within this report include:

1. Pre-Engineering Pedestrian Truss Bridge (Bowstring)
2. Modular Panel Bridge
3. Network Arch Bridge
4. Cable Stayed Bridge

The associated budgets for these options range from \$3 million - \$4.1 million. There is currently no funding identified within the City's capital budget or financial plan for a Sixth Street Bridge crossing, however the project would be a candidate for potential grant funding.

Limited stakeholder engagement has been undertaken and needs to be further explored in discussion with Council, pending a final decision on the Fifth Street Bridge Rehabilitation Project being considered in staff report at the January 27<sup>th</sup> 2020 council meeting.

## **BACKGROUND**

The City of Courtenay is currently developing and evaluating various options for improving active transportation connections across the Courtenay River adjacent to downtown. In conjunction to this report, Urban Systems and Hatch Engineering are working with the City of Courtenay to review the options and connectivity of the potential new cantilevers on the Fifth Street Bridge to support improved cycling and pedestrian connections across the river. At the September 16<sup>th</sup>, 2019 Council meeting, Council directed staff to expedite delivery of a range of options for a Sixth Street Multi-Use Bridge concept in order to provide greater information related to the design, cost, public safety features and funding source options for a Sixth Street crossing.

- 1) This staff report provides various bridge options and costs, connectivity pieces and ultimately an evaluation and recommendation of the preferred Sixth Street Multi-Use Bridge.

### **Sixth Street Multi-Use Bridge**

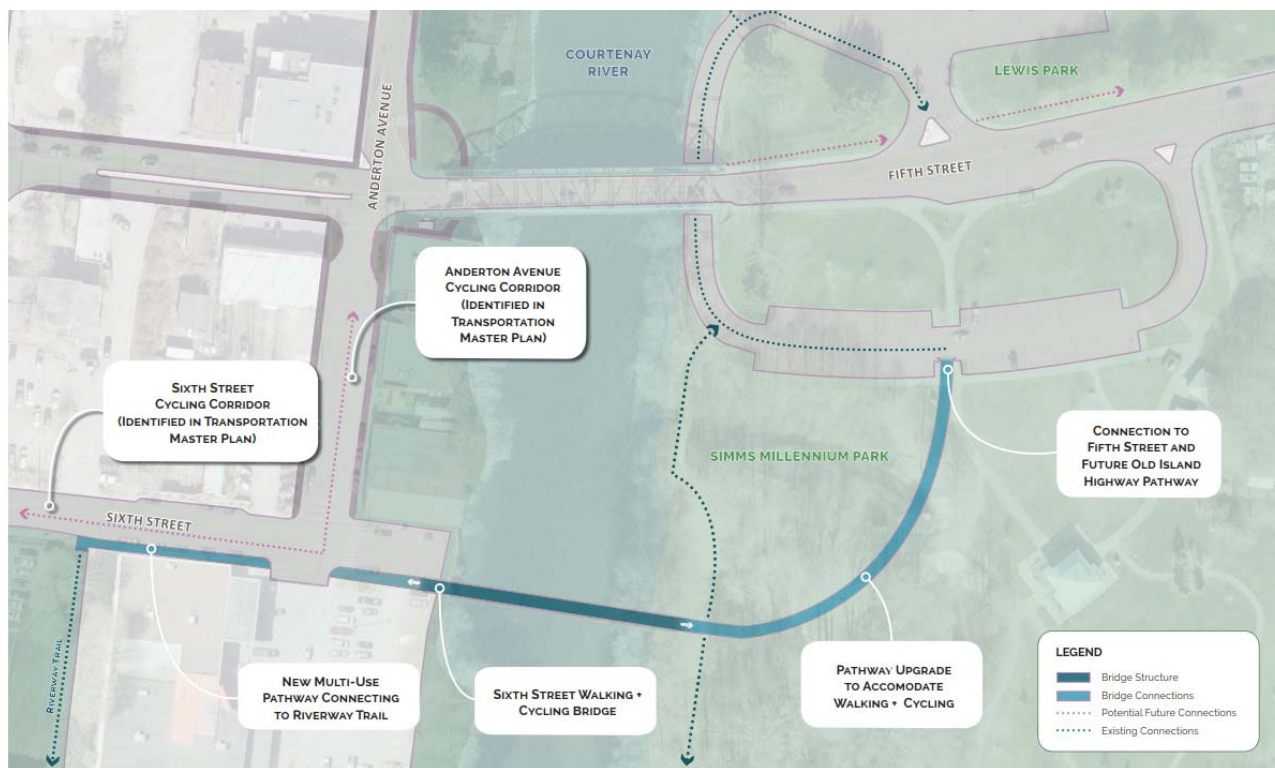
The Sixth Street Multi-Use Bridge concept has been a topic of discussion within the community and the municipality over the last 10 years. In 2015, Outlook Land Design and 3D Design prepared a Design Brief detailing a concept design for a Sixth Street Multi-Use Bridge. This design brief explored a cable-stayed structure that was 4.5 metres wide that provided connections to Simms Millennium Park and Sixth Street.

A Sixth Street Multi-Use Bridge is included in the recently completed Parks & Recreation Master Plan and referenced in the Transportation Master Plan for the City of Courtenay. The bridge is listed as a long-term improvement in the Parks and Trails Master Plan. In addition, the Downtown Courtenay Playbook also notes an additional crossing at Sixth Street should be explored further.

A Sixth Street Multi-Use Bridge would provide a dedicated cycling and pedestrian connection between downtown and Simms Millennium Park as well as a connection to the future cycling network along Sixth Street, Anderton Avenue, the Courtenay Riverway Trail, and the pathway connection to the Lewis Centre.

Figure 1 below shows the approximate location of the proposed Sixth Street Multi-Use Bridge and the connections to the park and the future cycling and pedestrian network.

**Figure 1 – Sixth Street Overall Concept**



A crossing at Sixth Street would be approximately 60 metres long. A steel superstructure would be required based on the span length. For the purpose of the report, four bridge types were reviewed to provide a range of aesthetic appeal and costs. The four bridge types are listed below and discussed in the appendix attached.

1. Pre-Engineering Pedestrian Truss Bridge (Bowstring)
2. Modular Panel Bridge
3. Network Arch Bridge
4. Cable Stayed Bridge

The associated preliminary cost estimates for these bridge options are \$3 million - \$4.1 million (2020 Dollars) including the structure, abutments and recommended connections to existing networks.

A detailed report, "Sixth Street Bridge Feasibility and Options Review" is attached for information.

### **Connectivity**

Cycling and pedestrian connections to connect to a multi-use river crossing generated a lot of dialogue during preparation of this report. Concepts were developed to demonstrate how a potential Sixth Street multi-use pathway could connect into the larger network.

The goal of the bridge connections is to increase the safety, comfort and travelling experience for pedestrians and cyclists. The proposed bridge at Sixth Street would allow cyclists to avoid having to share the roadway with larger motorized vehicles while crossing the river and provide more space for all active users. Beyond the bridge footprint, it will be important that this approach is extended to the other connections to existing and future networks.

The Transportation Master Plan identifies long-term networks for both pedestrians and cyclists. The long-term cycling plan identifies Sixth Street, Anderton Avenue and Old Island Highway as proposed cycling corridors. The existing Courtenay Riverway Trail connects to Sixth Street just west of Anderton Avenue and would provide a recreational and commuting connection to the south from the proposed multi-use bridge. The Downtown Courtenay Playbook also notes an additional crossing at Sixth Street should be explored further.

The cost of these connections are included within the overall project estimates noted on the following page.

**FINANCIAL IMPLICATIONS:**

Table 1 provides a summary of the capital costs that would be expected for each bridge option. The costs have been separated into elements that include the supply and installation of the bridge in 2020 dollars. The costs also include contingencies and engineering allowances.

**Table 1: Capital Cost Estimates**

Project Element	Pre-engineered Truss	Modular Panel Bridge	Network Arch Bridge	Cable Stayed Bridge
Construction Duration	4.5 to 6 months	5.5 to 7 months	4.5 to 6 months	5.5 to 7 months
<b>Costs</b>				
Bridge Structure Costs <sup>1</sup>	\$0.65 - \$0.75 M	\$0.8 - \$0.935 M	\$1.3 - \$1.5 M	\$1.4 - 1.6 M
Abutments <sup>1</sup>	\$1.1 M	\$1.1 M	\$1.1 M	\$1.1 M
Geotechnical Ground Remediation (Allowance)	\$0.5 M	\$0.5 M	\$0.5 M	\$0.5 M
Connectivity to Existing Networks <sup>2</sup>	\$0.35 M	\$0.35 M	\$0.35 M	\$0.35 M
Engineering and Project Management <sup>3</sup>	\$0.4 M	\$0.45 M	\$0.5 M	\$0.55 M
<b>Total</b>	<b>\$3 - \$3.1 M</b>	<b>\$3.2 - \$3.335 M</b>	<b>\$3.75 - \$3.95 M</b>	<b>\$3.9 - \$4.1 M</b>

<sup>1</sup> All bridge structure related costs including structure and abutments include a 15% contingency.

<sup>2</sup> Pathway connectivity costs include a 25% contingency.

<sup>3</sup> Engineering and Project management estimated at 15% of construction costs.



### **FUNDING OPPORTUNITIES**

The City has applied for grant funding from the Federation of Canadian Municipalities Green Municipal Fund for the 6th St Options Analysis/Feasibility Study. If the grant is successful, it will fund approximately 50% of the study, which is approximately \$50K. The application is currently being reviewed and the City should know more in early February.

There is also an opportunity for further FCM grant funding for detailed design and construction of the bridge. A detailed application would need to be prepared, and would be subject to peer review. This application would also require a supporting motion from council, and that an appropriate capital funding source be identified in the City's Five Year Financial Plan. Additional work would be required to determine the capital funding schedule and grant intake timing.

In addition to obtaining grant funding, there are possible opportunities to partner with local community groups and clubs to help fund the project.

### **PROJECT TIMELINE**

A timeline has not been developed as part of the feasibility study, and would be guided by the decision to proceed, available funding, and design and construction timelines. If there was a decision to proceed with the project it would be expected that the design of the bridge would take up to a year to complete and the construction would be expected to last five to seven months, depending on the preferred concept. To minimize impacts to the community and manage the City's capacity, it is recommended to not begin construction until the Fifth Street Bridge Rehabilitation Project is complete.

### **ADMINISTRATIVE IMPLICATIONS:**

The Sixth Street Bridge Project has been led by the City of Courtenay Engineering department, with support from other departments within the City. Consultants with technical knowledge specific to this work have been utilized to develop and implement designs. Costs associated with external consultants are included in the project budget.

### **ASSET MANAGEMENT IMPLICATIONS:**

The City has recently adopted an Asset Management Bylaw. This bylaw assigns the practice of Asset Management principles and advice related to Council decision-making to the CAO and staff. The Bylaw requires taking into account full life-cycle costs when making decisions regarding renewal, upgrade and acquisition of Tangible Capital Assets; and, that full life-cycle costs are considered to include the planning, procurement, creation, operation, maintenance, renewal and decommissioning of Tangible Capital Assets.

**STRATEGIC PRIORITIES REFERENCE:**

**We proactively plan and invest in our natural and built environment**

- Continued focus on asset management for sustainable service delivery
- Focus on infrastructure renewal rather than upgrades
- Continued support for social, economic and environmental sustainability solutions



- **Area of Control**  
The policy, works, and programming matters that fall within Council’s jurisdictional authority to act.
- ▲ **Area of Influence**  
Matters that fall within shared or agreed jurisdiction between Council and another government or party.
- **Area of Concern**  
Matters of interest outside Council’s jurisdictional authority to act.

**Strategic Priorities 2019 - 2022 NOW/NEXT**

As part of the 2019 Strategic Priorities “Check in,” a list of Council’s NOW/NEXT priorities were adopted. An open house for the Fifth and Sixth Street Bridge was noted as a NOW priority. The open house was conducted in late November. Under the Advocacy/Partnerships section, the Sixth Street Bridge Grant Application was referenced, and this was submitted as noted previously in the staff report.

**Strategic Priorities 2019 - 2022**

As part of the Strategic Priorities for 2019 – 2022 the following are relevant to the Fifth Street Bridge Rehabilitation Project:

**We proactively plan and invest in our natural and built environment**

- Focus on asset management for sustainable service delivery
- ▲ Look for regional infrastructure solutions for shared services
- ▲ Advocate, collaborate and act to reduce air quality contaminants
- ▲ Support social, economic and environmental sustainability solutions

**We plan and invest in methods of multi-modal transportation**

- Move forward with implementing the City's Transportation Master Plan
- ▲■ Collaborate with regional and senior government partners to provide cost-effective transportation solutions

● **AREA OF CONTROL:** The policy, works and programming matters that fall within Council's jurisdictional authority to act

▲ **AREA OF INFLUENCE:** Matters that fall within shared or agreed jurisdiction between Council and another government or party

■ **AREA OF CONCERN:** Matters of interest that are outside Council's jurisdictional authority to act

### Master Plan References

The Sixth Street Multi-Use Bridge is included in the recently completed Parks & Recreation Master Plan and referenced in the Transportation Master Plan for the City of Courtenay. The bridge is listed as a long-term improvement in the Parks and Trails Master Plan.

### OFFICIAL COMMUNITY PLAN REFERENCE:

Regarding the Official Community Plan for Courtenay, the following goals of Section 5.0 Transportation are relevant:

#### 5.2 Goals

1. Integrate land use changes with transportation planning to coordinate changes and increases to traffic patterns.
2. Development of a transportation system that provides choices for different modes of travel including vehicle, transit, pedestrian, cycling and people with mobility impairments.
3. Protect the integrity of the road classification system to facilitate the purpose and function of the specific road types.
4. Support an integrated transportation system that works towards reducing travel distances and congestion.
5. Support a transportation system that recognizes the importance of the character and overall appearance of the City.
6. Provide an effective transportation system that facilitates the movement of vehicles throughout the community and the Comox Valley to major regional services such as the Little River Ferry System and the Comox Valley Airport.

### REGIONAL GROWTH STRATEGY REFERENCE:

The Fifth Street Bridge Rehabilitation Project is aligned with the transportation network goal from the Regional Growth Strategy:

#### Goal 4 - Transportation:

Develop an accessible, efficient and affordable multi-modal transportation network that connects Core Settlement Areas and designated Town Centres and links the Comox Valley to neighbouring communities and regions.



**Chris Davidson, P.Eng**  
**Manager of Engineering Projects**

## Appendix A – Sixth Street Bridge Feasibility and Options Review



---

**CITY OF COURTENAY - SIXTH STREET BRIDGE  
FEASIBILITY AND OPTIONS REVIEW**

January 2020

---

**Sixth Street Bridge Feasibility and Options Review**

City of Courtenay

Chris Davidson, P.Eng.

3222.0064.01

290 A England Avenue, Courtenay BC, V9N 6L6 | T: 250-220-7060

**Contact: Eric Sears, P.Eng.**

T: 250-220-7060

[esears@urbansystems.ca](mailto:esears@urbansystems.ca)

**[urbansystems.ca](http://urbansystems.ca)**

*This report is prepared for the sole use of City of Courtenay. No representations of any kind are made by Urban Systems Ltd. or its employees to any party with whom Urban Systems Ltd. does not have a contract.*

© 2020 URBANSYSTEMS®.

---

# TABLE OF CONTENTS

1	INTRODUCTION .....	3
1.1	Background Information .....	3
2	COMPARATIVE BRIDGE REVIEW .....	4
3	DESIGN CRITERIA .....	6
3.1	Design Width .....	6
3.2	Bridge Length .....	7
3.3	Pathway Grade.....	7
4	BRIDGE DESIGN CONCEPTS .....	8
4.1	Bridge design Options .....	8
4.1.1	Pre-engineered Truss Bridge (Bowstring) .....	8
4.1.2	Modular Panel Bridge .....	9
4.1.3	Network Arch Bridge .....	10
4.1.4	Cable Stayed Bridge .....	11
4.2	Bridge Abutments and Embankments .....	13
4.3	Bridge Design Considerations .....	14
4.3.1	Bridge Decking .....	14
4.3.2	Bridge Railings .....	15
4.4	Other Design Considerations .....	16
4.4.1	Lighting.....	16
4.4.2	Wayfinding.....	17
4.4.3	Landscaping .....	17
4.4.4	Safety .....	17
5	CONNECTIVITY CONSIDERATIONS .....	17
5.1.1	Key CONNECTIONS for Consideration .....	18
6	ENVIRONMENTAL AND PERMITTING REVIEW .....	19
	CONSTRUCTIBILITY CONSIDERATIONS .....	20
7	20	
7.1.1	Home Hardware .....	20
7.1.2	Bridge Clearance.....	20
7.1.3	Geotechnical .....	20
7.1.4	Tree Impacts .....	20
7.1.5	Laydown Sites.....	20

8	COST ESTIMATES .....	21
9	OPTION EVALUATION .....	23
9.1	Evaluation Criteria .....	23
9.2	Evaluation Results .....	23
10	RECOMMENDATION .....	25
11	NEXT STEPS .....	25



---

# 1 INTRODUCTION

The City of Courtenay is currently developing and evaluating various options for improving active transportation connections across the Courtenay River adjacent to downtown. In conjunction to this report, Urban Systems and Hatch Engineering are working with the City of Courtenay to review the options and connectivity of the potential new cantilevers on the Fifth Street Bridge to support improved cycling and pedestrian connections across the river. At the September 16<sup>th</sup>, 2019 Council meeting, Council directed staff to expedite delivery of a range of options for a Sixth Street Multi-Use Bridge concept in order to provide greater information related to the design, cost, public safety features and funding source options for a Sixth Street crossing. The concept of a Sixth Street crossing is not new and has been discussed numerous times over the past 10 years within the community and at the municipal level. This report will focus on the Sixth Street crossing providing various bridge options and costs, connectivity pieces and ultimately an evaluation and recommendation of the preferred Sixth Street Multi-Use Bridge.

---

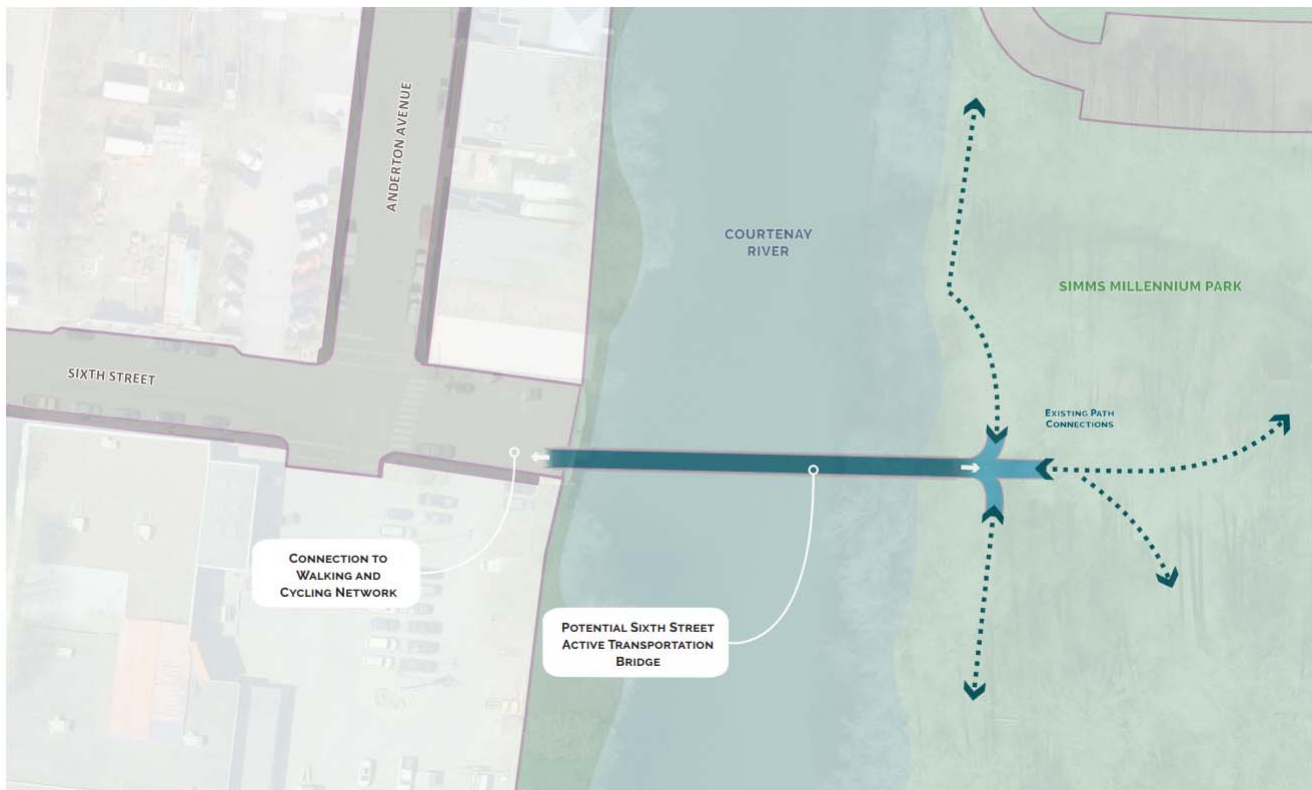
## 1.1 BACKGROUND INFORMATION

The Sixth Street Multi-Use Bridge concept has been discussed many times within community and at the municipal level in the last 10 years. In 2015, Outlook Land Design and 3D Design prepared a Design Brief detailing a concept design for the Sixth Street Multi-Use Bridge. This design brief explored a cable-stayed structure that was 4.5m wide that provided connections to Simms Millennium Park and Sixth Street.

The Sixth Street Multi-Use Bridge is included in the recently completed Parks & Recreation Master Plan and referenced in the Transportation Master Plan for the City of Courtenay. The bridge is listed as a long-term improvement in the Parks & Recreation Master Plan.

The Sixth Street Multi-Use Bridge would provide a connection between downtown and Simms Millennium Park as well as a connection to the future cycling network along Sixth Street, Anderton Avenue, the Courtenay Riverway Trail, and the pathway connection to the Lewis Centre.

**Figure 1** below shows the approximate location of the proposed Sixth Street Multi-Use Bridge and the connections to the park and the future cycling and pedestrian network.



**Figure 1:** Conceptual Location and Connections of the Sixth Street Multi-Use Bridge

## 2 COMPARATIVE BRIDGE REVIEW

As a preliminary assessment of design criteria and the range of options for the Sixth Street Multi-Use Bridge, bridges with similar characteristics were identified and are briefly presented below for comparison and to provide a range of options similar to what would be available to the City. The comparison review considered the functional width, user volumes (if available), and bridge decking material of the comparative bridges to help guide the design decisions of the Sixth Street Multi-Use Bridge. These bridges are all located on Vancouver Island or the Lower Mainland of BC and are intended for a mix of active transportation users.

### JOHNSON STREET BRIDGE, VICTORIA BC

The new Johnson Street Bridge in Victoria features active transportation facilities on both sides of the bridge. The north pathway, as seen in the **Figure 2** below, is a mixed-use path connecting Downtown Victoria to Vic West, and the E&N and Galloping Goose Regional Trails, making it a hub for active transportation users. This section of the bridge is approximately 5 metres wide and lifts with the bascule bridge. The Johnson Street Bridge saw well over 300 bikes in the peak hour in October 2018. The decking is a special non-slick grooved metal surface.



**Figure 2:** The Johnson Street Bridge multi-use pathway in Victoria, B.C.

### **SALTON ROAD PEDESTRIAN-CYCLE BRIDGE, ABBOTSFORD BC**

The Salton Road Pedestrian-Cycle Bridge in Abbotsford is a multi-use bridge over the Trans-Canada Highway shown in **Figure 3** below. Built as part of the City of Abbotsford’s initiatives to improve cyclist and pedestrian safety, the bridge is connected to separate bike paths on the neighbouring streets. The bridge itself is approximately 4 metres wide. Traffic counts are not currently available for the bridge. The bridge has a smooth concrete surface.



**Figure 3:** The Salton Pedestrian Bridge in Abbotsford, B.C.

## MAFFEO SUTTON WALKWAY, NANAIMO BC

The Maffeo Sutton Walkway Bridge in Nanaimo connects the City's multi-use harbour front walkway across the mouth of the Millstone River, shown in **Figure 4** below. Approximately 3 metres wide, the bridge's narrower design requires cyclists to dismount before crossing. Traffic counts aren't currently available for the bridge. The bridge has a smooth concrete surface.



**Figure 4:** The active transportation bridge in Maffeo Sutton Park, Nanaimo, B.C.

---

## 3 DESIGN CRITERIA

Design specifications for the Sixth Street Multi-Use Bridge will be based on best practices for multi-use pathways in British Columbia. The *British Columbia Active Transportation Design Guide* (BCAT) provides direction for designing active transportation infrastructure appropriate to a project's context. The guide outlines space requirements for multi-use pathways based on the volume of current and anticipated pathway users, and the ratio of pedestrians to daily pathway users.

---

### 3.1 DESIGN WIDTH

Applying this guidance to Sixth Street Bridge requires some approximation of these user volumes. Current and anticipated user volume was estimated from data collected by the Comox Valley Cycling Coalition (CVCCo) on active transportation users on the Fifth Street Bridge in August 2019. The Sixth Street Bridge was assumed to take half of the observed volume on the Fifth Street Bridge, with 5% annual growth for

pedestrians and 3% annual growth for cyclists. Based on the CVCCo counts, there would be approximately 785 pedestrians and 386 cyclists per day using the Sixth Street Bridge by 2049.

Based on BCAT guidelines, pathway width should vary with total user volume and the proportion of pedestrian users among total users. For the estimated 1,171 total users with more than 20% of pedestrian users, the BCAT recommends a minimum usable width of 3.5 metres (see **Table 1**).

**Table 1:** Calculation Guidance for Pathway Widths (from BCAT)

USER RATIO FOR SEPARATION	DAILY ANTICIPATED USER VOLUME FOR VARIOUS PATHWAY WIDTHS (USERS)		
	3m	3.5m	4m
More than 20% of users are pedestrians and total user volumes are greater than 33 persons per peak hour	1,000	1,200	1,400
Less than 20% of users are pedestrians and total user volume is greater than 50 persons per peak hour	1,500	1,750	2,000

Considering that these guidelines are not specific to multi-use active transportation bridges and accounting for future growth in user volume beyond these current estimates, a minimum functional width of 4 metres is recommended for the Sixth Street Bridge. The bridge will also require additional width for structural supports or other components that would be above-and-beyond the recommended functional width.

Further consideration of surface material and design speed are also necessary. BCAT recommends asphalt as an accessible and durable surface that comes at moderate cost. Speed on the Sixth Street Bridge will likely be low due to the mix of users and should therefore conform to the BCAT guidelines, design speed should be 20km/h for the multi-use facilities. Specific design considerations including curves, signing and pavement markings should be considered during detailed design to keep speed low for all users, especially e-bikes.

## 3.2 BRIDGE LENGTH

The proposed bridge span length is approximately 60m (196 ft.). This bridge length is developed to minimize the span length but to keep the bridge from impacting the Courtenay River waterway. The abutments will be built on the shores of the river and no construction activity will need to take place within the river.

## 3.3 PATHWAY GRADE

Most design guides indicate that the ideal slope for cyclists and pedestrians is less than 4%, with some stating that up to 5% is appropriate. The current concept design for the bridge shows the grades along the abutment to be at 4%. The grades will be confirmed during the detailed design stage but should strive to be less than 4% or up to 5% for short segments. This will ensure the bridge provides a comfortable experience for individuals of all ages and abilities.

---

## 4 BRIDGE DESIGN CONCEPTS

---

### 4.1 BRIDGE DESIGN OPTIONS

Several bridge designs options have been reviewed and are presented in the report based on the consulting team's experience and research for the location under consideration, as well as the City's requirements. The bridge abutments and foundations are assumed to be the same for all options, so only the bridge superstructure is presented and evaluated.

The proposed bridge crossing is approximately 60m long and a steel superstructure is considered based on the span length. For the purpose of the report, four bridge types were reviewed to provide a range of aesthetic appeal and costs. The four bridge types are listed below and discussed in the following sections:

- Pre-Engineering Pedestrian Truss Bridge (Bowstring)
- Modular Panel Bridge
- Network Arch Bridge
- Cable Stayed Bridge

A modular bridge recently acquired by the Comox Valley Regional District (CVRD) was reviewed for installation at Sixth Street. However, it was determined that it was not designed to span the full 60m needed for this bridge and such was not evaluated any further. The modular panel bridge included below is similar to the CVRD Bridge but is capable of spanning the river.

---

#### 4.1.1 PRE-ENGINEERED TRUSS BRIDGE (BOWSTRING)

Pre-engineered pedestrian bridges have been a prime choice for many municipalities, transportation authorities, light rail companies, golf courses and developers for many decades. The structures are precision-engineered and manufactured in a controlled factory environment with precise tolerances and key fabrication differentiators, such as welding integrity, mitred end connections, mill scale removal and finish quality.

With top chords arching up from its base, the Bowstring steel truss bridge is a cost-effective combination of visual appeal and design efficiency. Refer to **Figure 5**. Bowstring bridges are available with spans up to 60m in an underhung configuration and up to 62m.



**Figure 5:** Bowstring Truss bridge

Bridge manufacturers are highly experienced in shipping pedestrian / cyclist bridges throughout Canada and beyond. They can often be installed more quickly than other bridge structure types, using local crews and on-hand equipment. The truss would be spliced in three places off-site and crane lifted as one piece, as shown in **Figure 6**. Due to the width of the bridge deck, there would also be a splice down the centreline to allow shipment. A pressure treated timber deck is considered for economic reasons but cast-in-place concrete is also an option.



**Figure 6:** Installation of a Bowstring Truss Bridge

---

#### 4.1.2 MODULAR PANEL BRIDGE

The Modular Panel Bridge system is a conventional truss system that uses 3m pinned panels to achieve clear spans of more than 82m for pedestrian, vehicular and utility support applications. Refer to **Figure 7**. The proposed truss configuration is built from hot dipped galvanized steel. The proposed bridge deck would be steel covered with epoxy aggregate. The manufacturers maintain an inventory of these popular systems ready to be shipped anywhere in Canada for permanent or temporary applications, like detour bridges or emergency bridge washout replacements.

These “Bailey Bridge” style systems are easy to assemble, install and re-use. All components are hot dip-galvanized for maximum durability. They are easy to assemble with local crews and may be reused.

Assembled bridges can be cantilever-launched from one side or they can be crane lifted into place. Assembly and installation examples are shown in **Figure 8** and **Figure 9**.



**Figure 7:** Modular Panel Bridge



**Figures 8 & 9:** Assembly and Installation

---

### 4.1.3 NETWORK ARCH BRIDGE

An efficient and aesthetically pleasing signature structure can be delivered with the use of a network arch bridge system, as shown in **Figure 10**. The main span of 60m long can be achieved and would be comprised of a painted steel network arch built from curved steel pipes and round bar hangers. The use of bent pipes for the arch ribs and tie beams can significantly reduce structure cost and achieve a slender and elegant look.

The lightweight steel arch is easy to assemble off-site and crane lifted into place as one piece. See **Figure 11**. The concrete deck is cast-in-place concrete cast on galvanized steel stay-in-place forms.



While this type of bridge does provide better aesthetics, it does come at a slightly high cost when compared to the previous two options. Another disadvantage is that additional inspection and maintenance efforts will be required due to the complexity and height of the network arch system.



**Figure 10:** Network Arch Pedestrian Bridge Example



**Figure 11:** Bridge Assembly

---

#### 4.1.4 CABLE STAYED BRIDGE

The 2014 Outlook Land Design report that proposed a cable stayed bridge was reviewed by Hatch as part of this study. The bridge would have a single weathering steel bridge tower on the east bank, with bridge strand cable stays supporting two steel girders that span 60m. The tower would have bridge strand backstays attaching to concrete anchorages within Simms Park. The main girder and bracing system would be galvanized. The proposed cable stayed bridge is shown in **Figure 12** and **Figure 13**. The bridge

superstructure would be assembled off-site and crane lifted into place as one piece. The bridge tower erection would be challenging from a construction point of view.

The bridge deck proposed by the previous report is a heavy pressured treated timber deck similar to what is used for government wharfs. A cast-in-place concrete deck can also be used instead of the timber deck.

Of the four bridge design options, this option would have the greatest inspection and maintenance effort due to the complexity and height of the tower. Specialized equipment would also be required for future bridge tower and cable inspections. There is also a higher construction risk associated with this option due to its complexity as compared to the other three options.



**Figure 12:** Previous Proposed Bridge (by Outlook Land Design)



**Figure 13:** Previous Proposed Bridge (by Outlook Land Design)

---

## 4.2 BRIDGE ABUTMENTS AND EMBANKMENTS

The bridge abutments for all four options would be similar and would consist of a concrete cast-in-place wall, similar to **Figure 14** below, supported on driven 610mm diameter, 25m long, steel pipe piles. The bridge embankments can be built from cast-in-place concrete walls or with the cost effective MSE (Mechanically Stabilized Earth) system. See **Figure 15** for a General Arrangement drawing showing bridge abutments and embankments layouts.



**Figure 14:** Bridge Embankments

Based on the preliminary geotechnical assessment performed by Levelton in 2012, ground improvement is required at both abutments due to the presence of poor soils and the need to mitigate displacements in conjunction with the pile foundation. Ground improvements would involve installation of stone columns or

vibro-replacement points to 10m depth, to increase shear strength to reduce soil liquefaction. The cost of ground improvement is based on estimates provided in previous geotechnical reporting.

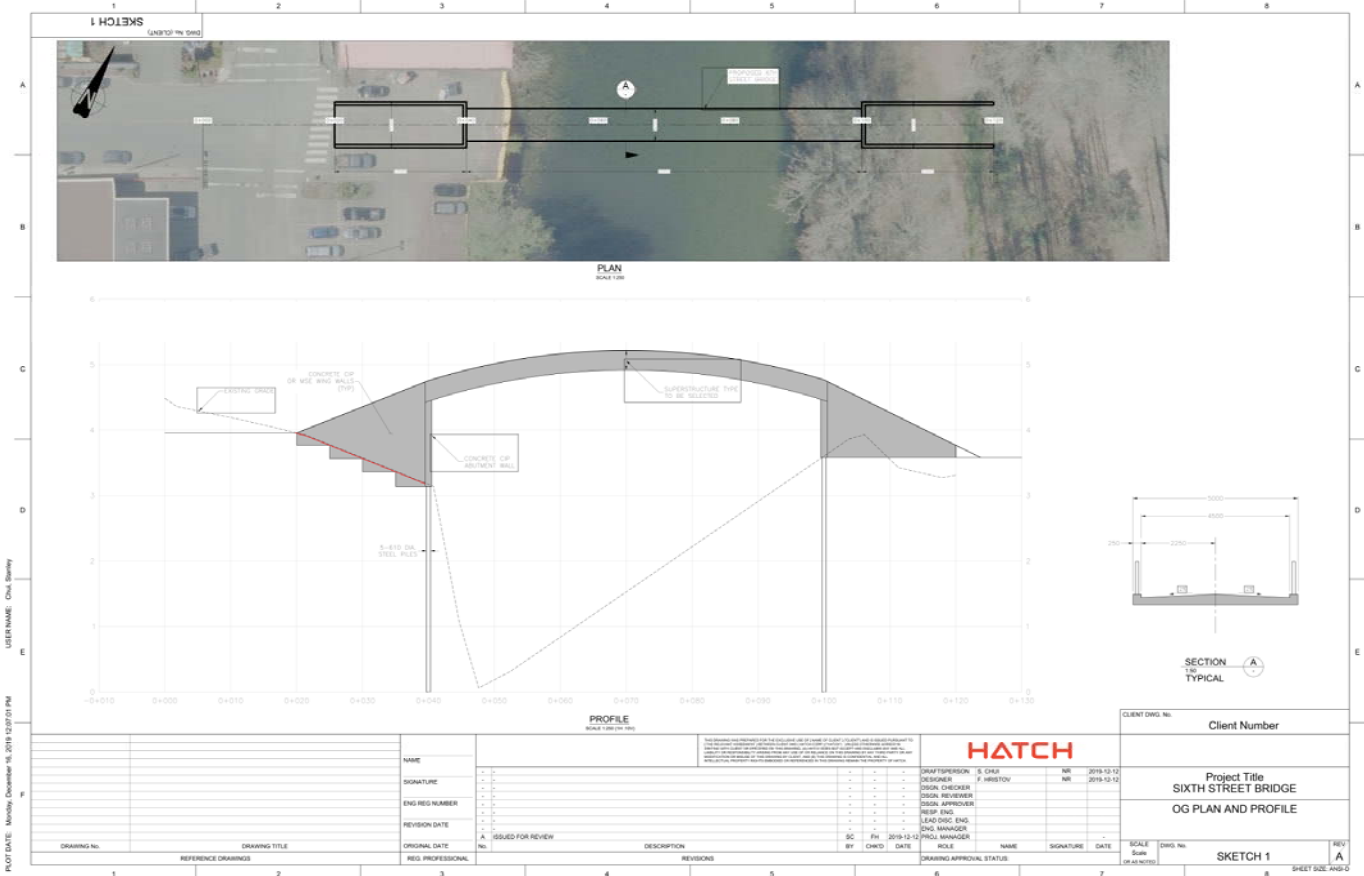


Figure 15: Bridge Embankments and Abutment Concept

## 4.3 BRIDGE DESIGN CONSIDERATIONS

### 4.3.1 BRIDGE DECKING

Bridge decking can have significant impacts on the aesthetic and useability of a bridge. The texture or surface material for bridge decking can impact the useability of a bridge for wheeled users especially wheelchairs users. A rough or bumpy surface can be uncomfortable and can have a negative impact on the experience of using the bridge by wheeled users.

The deck options are as follows:

- Heavy pressured treated timber deck similar to that one used for government wharfs

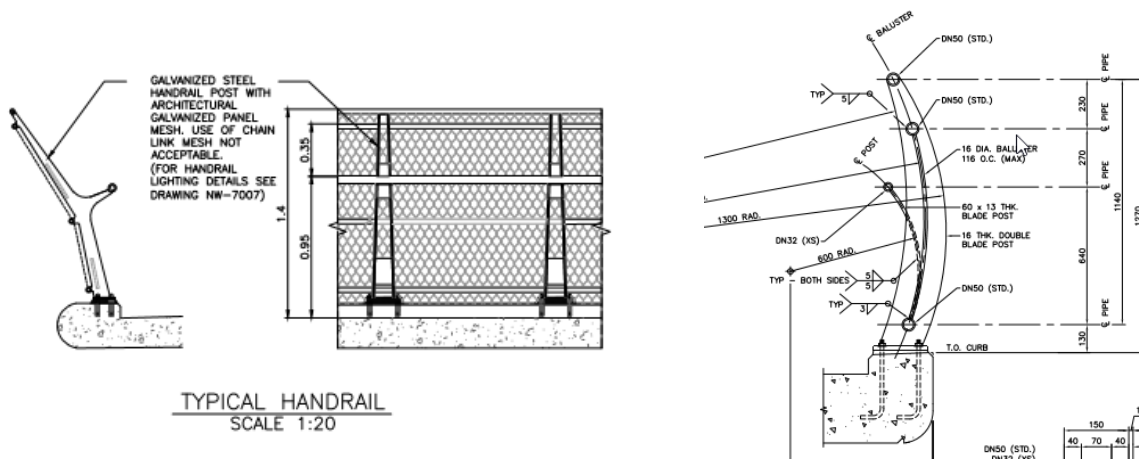
- Concrete deck
- Steel deck covered with epoxy aggregate

While treated timber decking is a potential consideration, we would recommend that it should not be considered as the decking material for the bridge due to comfort use for wheeled users. It would also result in increased maintenance and replacement considerations.

### 4.3.2 BRIDGE RAILINGS

Like bridge decking, bridge railings can add to the aesthetic value of a bridge. However, bridge railing can also have impacts to the user experience of the bridge. Bridge railings can impede sightlines and certain design features can be unsafe for cyclists or negatively impact those with vision impairments. Careful consideration must be given to the design of the bridge railings to make sure these potential negative impacts are reduced.

Custom made, aesthetically pleasant railings can be designed for the bridge, like the ones shown in **Figure 16** and **Figure 17** below. These types of railing have been considered for the network arch and the cable stay bridge options.



**Figures 16 & 17: Bridge Railing Options (Examples)**

The two prefabricated bridge options will be supplied with prefabricated custom steel railings designed specifically for their system. See **Figure 18** and **Figure 19** below for the typical railing systems for Bowstring and Modular bridge systems.



**Figure 18:** Bowstring Bridge Railing



**Figure 19:** Modular Bridge Protective Screen System

---

## 4.4 OTHER DESIGN CONSIDERATIONS

---

### 4.4.1 LIGHTING

Lighting for the bridge can generally be grouped into two types – functional and architectural. Functional lighting provides users on the bridge with the basic level of lighting for safety and useability of the bridge when it is dark outside. Architectural lighting can be used to highlight architectural features of the bridge or improve the overall ambience of the space.

Specific design lighting options have not been developed during this report and can be evaluated during detailed design. We also understand that there are lighting considerations with respect to the river and adjacent natural spaces, and these would also need to be considered. For the purposes of this report allowances have been made for lighting for each bridge option.

---

#### 4.4.2 WAYFINDING

Wayfinding can be an important tool to help guide pedestrians and cyclists to the key infrastructure and destinations in the City. It is recommended that wayfinding be included in the development of the Sixth Street Multi-Use Bridge that is consistent in design and messaging as with wayfinding throughout the City.

---

#### 4.4.3 LANDSCAPING

As the bridge will have the opportunity to be a significant structure landscaping around the entrances to the bridge should be considered. While the detail of the landscaping has not been advanced at this time allowances for landscape features have been included in the preliminary costing.

---

#### 4.4.4 SAFETY

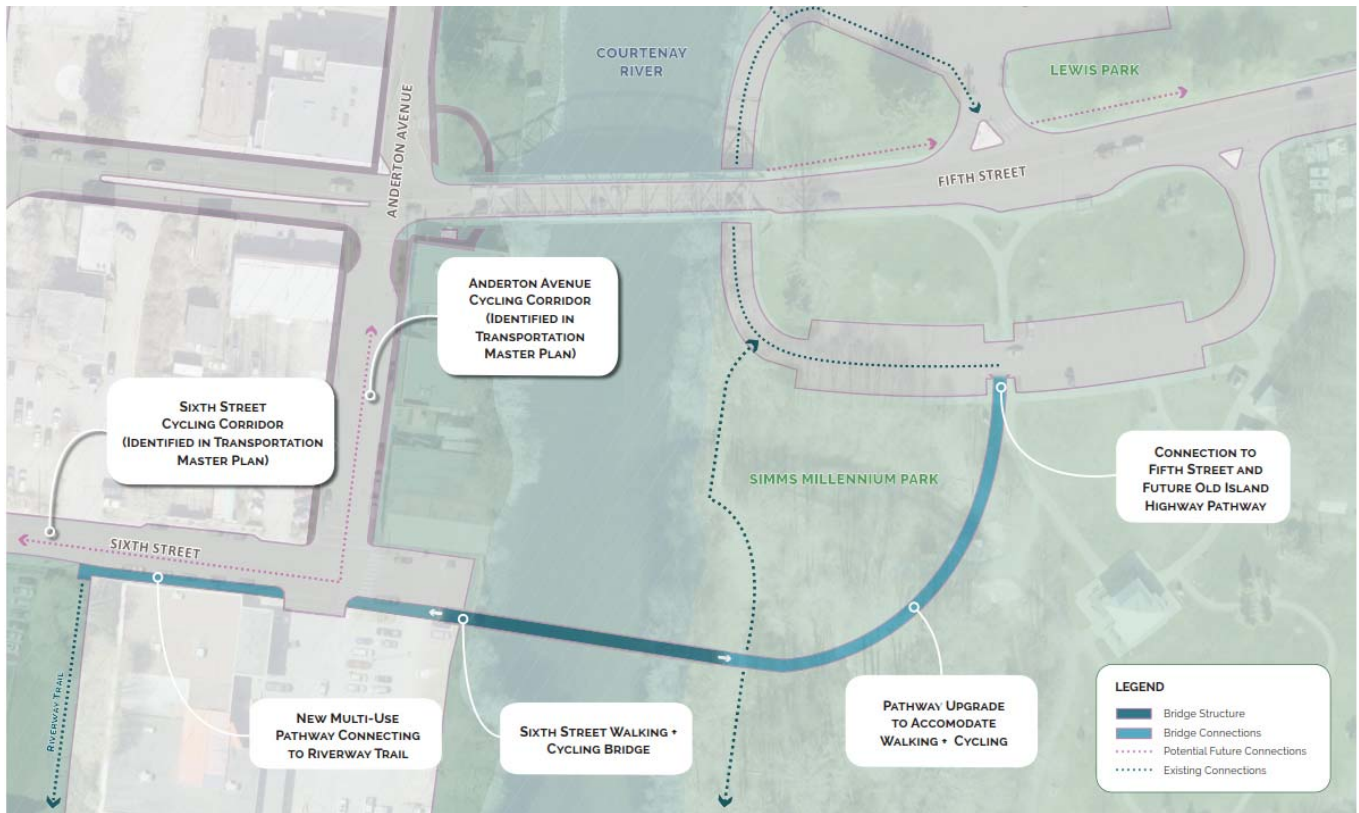
With all multi-use pathways safety is a consideration for people that walk, people that cycle and all other users. Specific design considerations including pathway curves, signing and pavement markings should be considered during detailed design to ensure a safe experience. Many jurisdictions are currently reviewing safety considerations with respect to E-bikes. While E-bikes are speed restricted by the province, there are currently no specific design guidelines for E-bikes at this time. There are however design considerations that would limit speeds and educate all users on proper E-bike use and assimilation into multi-use pathways. This should be explored further as the project moves into the design phases.

---

## 5 CONNECTIVITY CONSIDERATIONS

The key goal of the bridge crossing would be to ensure it is properly integrated into the surrounding walking cycling networks. The proposed bridge provides a better experience than the current condition because they provide a wider pathway and are further separated from cars. They also allow for cyclists to avoid having to share the roadway with vehicles and provide more space for all active users. Beyond the bridge it will be important that this comfort is extended to the various connections to existing and future networks.

The Transportation Master Plan identifies both long-term pedestrian and cycling networks. The long-term cycling plan identifies Sixth Street, Anderton Avenue and the Old Island Highway as proposed cycling corridors. The existing Courtenay Riverway Trail connects to Sixth Street immediately west of Anderton Avenue and would provide a recreational and commuting connection to the south from the proposed multi-use bridge. **Figure 20** shows the key connectivity considerations for the Sixth Street Multi-Use Bridge.



**Figure 20: Sixth Street Connectivity Map**

### 5.1.1 KEY CONNECTIONS FOR CONSIDERATION

#### Old Island Highway Pathway

A pathway is proposed on the north side of the Old Island Highway that provides a direct connection to the Lewis Centre. The Sixth Street bridge connection to this proposed pathway would utilize the existing roadway underpass underneath Fifth Street.

#### Anderton Avenue

Anderton Avenue provides a north-south connection for pedestrians and cyclists west of the Courtenay River, with connections to the Riverway Trail via Sixth Street. Improvements are required at the Anderton Avenue / Fifth Street intersection to allow for pedestrian and cycling connections across Fifth Street and to maximize the Sixth Street Bridge’s connectivity to the north end of downtown Courtenay.

#### Sixth Street

Sixth Street is identified as a cycling route between Anderton Avenue and Fitzgerald Avenue. The bridge design should ensure an efficient connection to the Sixth Street cycling corridor.



### Simms Millennium Park

Existing pathways in Simms Millennium Park will need to be upgraded to provide a comfortable connection between the new bridge and the roadway underpass connection to Lewis Park.

### Riverway Trail

The Riverway Trail is an existing multi-use trail that extends from Sixth Street to beyond the Comox Valley Parkway. The Sixth Street Multi-Use Bridge would connect to the Riverway Trail via a multi-use pathway along the south side of Sixth Street. This would provide a seamless and safe connection extending the Riverway Trail through to Simms Millennium Park.

### Pedestrian Connections

The Sixth Street Multi-Use Bridge will provide a key connection, along with the Fifth Street Bridge, for pedestrians between Simms Millennium Park and Lewis Park and downtown Courtenay.

---

## 6 ENVIRONMENTAL AND PERMITTING REVIEW

As the construction work would be conducted above the Courtenay River and within the riparian area, there are a number of environmental considerations including permits and plans that will be required. The three main components will be:

- Preparation of environmental permits – An application will need to be submitted to the BC Ministry of Forests, Lands and Natural Resource Operations (FLNRO) under Section 11 of the Water Sustainability Act for works in and about a stream. In addition, a Request for Review will need to be prepared and submitted to Fisheries and Oceans Canada (DFO). Additionally, a fish collection permit will be required when isolating the work area from the remainder of the Courtenay River.
- Preparation of a Provincial heritage permit - Due to the proximity to the river and the known registered archaeological site within the proposed project area, a Provincial heritage permit (*BC Heritage Conservation Act*) will be required for any excavation work required in and around the proposed bridge. The permit review and approval period is typically in the range of 3 to 6 months. An application for a ground disturbance permit should be submitted as soon as the scope is confirmed, and any potential ground excavation locations are determined.
- Preparation of Environmental Management Plan – The Courtenay River is important habitat for all species of Pacific salmon, steelhead and resident fish species such as rainbow trout, Dolly Varden and cutthroat trout. As such, an Environmental Management Plan (EMP) will be prepared to support the BC Water Sustainability Act and DFO applications. The EMP will provide recommendations and best management practices to minimize the potential for adverse impacts to the Courtenay River as a result of the bridge works.

- Tree Clearing in Simms Park – In order to construct the Sixth Street Multi-Use Bridge, many large trees will be removed from Simms Millennium Park. The tree clearing should take place outside of the nesting period and should consider avoid any culturally or environmentally significant trees if possible.

The EMP and regulatory applications should be completed and submitted once the final scope of work is confirmed. It will be important to ensure any timing windows are understood and the permits can be incorporated into any tender packages. Permit windows can range from 45 days to 6 months depending on the permit and the perceived impact of the project.

---

## 7 CONSTRUCTIBILITY CONSIDERATIONS

---

### 7.1.1 HOME HARDWARE

There is a building on the northeast corner of the Anderton Avenue / Sixth Street intersection that is currently used by Home Hardware with two garage doors that open onto Sixth Street adjacent to the location of the bridge abutments. Access to this building will need to be reviewed as part of any design.

---

### 7.1.2 BRIDGE CLEARANCE

The Sixth Street crossing has been designed with clearance consistent with the Fifth Street Bridge to retain space underneath the bridge for recreational boats and kayaks. It is our understanding that the Courtenay River in this location is not a navigable waterway and large boats are not to be accommodated.

---

### 7.1.3 GEOTECHNICAL

A preliminary geotechnical assessment performed by Levelton in 2012 found that ground improvement would be required at both abutments to mitigate displacements. Ground improvements involve installation of a stone columns or vibro replacement points to 10m depth to increase shear strength to reduce soil liquefaction.

---

### 7.1.4 TREE IMPACTS

Many trees will be impacted in Millennium Simms Park in order to construct the Sixth Street Multi-Use Bridge. Consideration for minimizing the number of trees to be removed is to be given during detailed design.

---

### 7.1.5 LAYDOWN SITES

Several laydown sites have been identified by the City that are within close proximity to the bridge site. These laydown sites can be used to prefabricate the structure of the bridge as required. Using these laydown sites will also prevent trees from being removed from Simms Park due to using it as a laydown site. The City can determine the preferred laydown site during detailed design based on the preferred bridge structure type and timing of construction.

## 8 COST ESTIMATES

Based on the information provided above **Table 2** provides a summary of the capital costs that would be expected for each bridge option. The costs have been broken down into a number of elements that include both supply and installation of the bridge and associated elements in 2020 dollars. Adjusting these costs into the future should be carefully considered. Costs are highly susceptible to fluctuations in the Canadian dollar, steel costs, other economic factors and the availability of contractors. Escalation costs should be revisited in the future based on the above factors and not just relative inflations values.

**Table 2: Capital Cost Estimates**

Project Element	Pre-engineered Truss	Modular Panel Bridge	Network Arch Bridge	Cable Stayed Bridge
Construction Duration	4.5 to 6 months	5.5 to 7 months	4.5 to 6 months	5.5 to 7 months
<b>Costs</b>				
Bridge Structure Costs <sup>1</sup>	\$0.65 - \$0.75 M	\$0.8 - \$0.935 M	\$1.3 - \$1.5 M	\$1.4 – \$1.6 M
Abutments <sup>1</sup>	\$1.1 M	\$1.1 M	\$1.1 M	\$1.1 M
Geotechnical Ground Remediation (Allowance)	\$0.5 M	\$0.5 M	\$0.5 M	\$0.5 M
Connectivity to Existing Networks <sup>2</sup>	\$0.35 M	\$0.35 M	\$0.35 M	\$0.35 M
Engineering and Project Management <sup>3</sup>	\$0.4 M	\$0.45 M	\$0.5 M	\$0.55 M
<b>Total</b>	<b>\$3 - \$3.1 M</b>	<b>\$3.2 - \$3.335 M</b>	<b>\$3.75 - \$3.95 M</b>	<b>\$3.9 - \$4.1 M</b>

<sup>1</sup> All bridge structure related costs including structure and abutments include a 15% contingency.

<sup>2</sup> Pathway connectivity costs include a 25% contingency.

<sup>3</sup> Engineering and Project management estimated at 15% of construction costs.

Bridge structure costs include fabrication, delivery and installation of the bridge structure. The connectivity to existing networks cost above includes the costs for constructing a paved multi-use pathway connecting to the Riverway Trail along the south side of Sixth Street and to the parking lot in Simms Millennium Park as shown in the connectivity map (Figure 18). These costs include the necessary tree and civil removals and other civil works required to construct these pathways including signage, lighting and surface markings.

## **LIFE CYCLE COST CONSIDERATIONS**

With any piece of infrastructure life cycle costs are a major consideration. If we consider that all different bridge types use the same deck type and steel type, the only difference in the 20 years lifecycle costs would be the inspection costs.

In general, it could be expected that the bridge options would require painting touch ups every 10 years with a coating replacement needed every 30 years. The network arch bridge and cable stayed bridge would be more costly to coat due to their geometry

The cable stayed bridge will require inspections with specialized equipment to monitor cable conditions. Because of the complexity and height of the tower access to the bridge elements would also be significantly more difficult for this structure.

## **FUNDING CONSIDERATIONS**

There are several funding considerations for the City to consider helping with the costs of the Sixth Street Multi-Use bridge construction. Some potential funding options available are:

- BC Active Transportation Infrastructure Grants Program,
- Federation of Canadian Municipalities (FCM) Grant program,
- Union of BC Municipalities (UBCM) Gas Tax Agreement -Community Works Fund
- Investing in Canada Infrastructure program.

The Province of BC has restructured the BikeBC grant funding to include more active transportation related projects for 2020. The program will still include a yearly intake period with successful applications being notified within a few months of submission. If successful, the Province could provide up to \$500,000 cost sharing funds for the project.

The Federation of Canadian Municipalities provides funding options for capital projects that support sustainable transportation network and commuting options. FCM provides low-interest loans and up to 15% grants (of the loan) for infrastructure projects that support transportation project that will help support residents switching to a less polluting form of transportation. The City has also recently applied to the FCM Green Municipal Fund for a grant that would cover much of the cost of the feasibility study to review these bridge options. We understand that the FCM is currently reviewing and considering the application.

Federal funds are available through the renewed Gas Tax Agreement. The UBCM allocates funding to municipalities each year and the City can include this project on their list to help with the construction costs.

The Investing in Canada Infrastructure program provides grants for infrastructure projects throughout Canada. The program is currently closed for intake but could be reopened in the future and should be considered.

---

## 9 OPTION EVALUATION

---

### 9.1 EVALUATION CRITERIA

Each bridge option is being evaluated against various criteria to help understand a preferred crossing option. The following criteria are the basis for the evaluation:

- Aesthetic Value
- Pedestrian / Cyclist Comfort / Experience
- Environmental Impact
- Constructability Considerations
- Capital Cost
- Lifecycle Considerations (operations and maintenance)

---

### 9.2 EVALUATION RESULTS

The evaluation matrix is provided below in **Table 3** below.

**Table 3: Evaluation Matrix Summary**

	Pre-engineered Pedestrian Truss Bridge (Bowstring)		Modular Panel Bridge		Network Arch Bridge		Cable Stayed Bridge	
Aesthetic Value	Convention structure with truss systems	3	Convention structure with truss systems. Typically used for temporary structures.	1	Signature Structure	4	Signature Structure	5
Pedestrian / Cyclist Comfort / Experience	Comfortable with smooth decking and safe railing design. Design grade at or below 4%.	4	Semi comfortable with smooth steel decking and safe railing design. Design grade at or below 4%.	3	Comfortable with smooth decking and safe railing design. Design grade at or below 4%.	4	Proposed wood decking would be uncomfortable for wheeled users and others with mobility challenges. Design grade at or below 4%.	2
Environmental Impact	Minimal. Mitigation methods can be implemented.	3	Minimal. Mitigation methods can be implemented.	3	Minimal. Mitigation methods can be implemented.	3	Minimal. Mitigation methods can be implemented. Additional tree clearing required on the east side due to the need for concrete anchor system.	2
Constructability Considerations	Constructing the bridge during colder months would cost more due to heating and conditioning of contained workspace. Significant laydown space required.	3	Constructing the bridge during colder months would cost more due to heating and conditioning of contained workspace. Significant laydown space required.	3	Constructing the bridge during colder months would cost more due to heating and conditioning of contained workspace. Significant laydown space required.	3	Higher construction risks for this bridge option because of its complexity.	2
Capital Cost	\$\$	4	\$\$	4	\$\$\$	2	\$\$\$\$	1
Lifecycle Considerations (operations and maintenance)	Minimal First maintenance touch-up painting at 10 years Full overcoat of structure at thirty years	3	Minimal maintenance required. Temporary structure that won't last as long as a standard bridge.	3	Increased future inspection & maintenance efforts First maintenance touch-up painting at 10 years Full overcoat of structure at thirty years	2	Increased future inspection & maintenance efforts Special equipment is required for tall bridge tower and cable inspections	1
<b>Total Score</b>	<b>20</b>		<b>17</b>		<b>18</b>		<b>13</b>	

---

## 10 RECOMMENDATION

Based on the criteria presented above and the conducted evaluation, if the City were to advance the Sixth Street Multi-Use bridge, the recommended bridge design is the Pre-Engineered Bowstring Truss Bridge. While slightly less aesthetically pleasing, the bowstring truss bridge would provide the City with an economical choice while still meeting the functional requirements of active transportation users of the bridge.

If a ‘signature’ structure is more desirable a network arch would provide this, but it would come at a slightly higher capital cost and with greater maintenance considerations.

---

## 11 NEXT STEPS

The following are the recommended next steps for the Sixth Street Bridge:

1. Present this report to Council to confirm direction;
2. Research funding opportunities and start preparation of applications for applicable funding applications; and
3. Prepare a preliminary and detail design of a Sixth Street Multi-Use Bridge, if approved by Council to proceed.

