URBAN SYSTEMS

FIFTH STREET BRIDGE REHABILITATION

Traffic Management Strategy

DRAFT Report

Prepared for

The City of Courtenay

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URBAN SYSTEMS

Contents

Executive Summary

The City of Courtenay is currently preparing for the proposed upgrades to the Fifth Street Bridge which is planned for the Spring and Summer of 2021. The Fifth Street Bridge rehabilitation works require reducing the bridge to a single travel lane for vehicles plus a sidewalk/pathway for pedestrians and cyclists. The work timeline is anticipated to take up to six months.

The Traffic Management Strategy for the Fifth Street Bridge Rehabilitation has been prepared to identify and evaluate various traffic management scenarios and develop a recommended strategy. The goal of this strategy is to provide a safe environment for all road users during the construction phase while minimizing impacts to the public, businesses, and priority vehicles (transit, emergency services, etc.). The recommendations are intended to be used by the City to communicate both internally and externally as well as forming the basis of the contractor's Traffic Management Plan.

The recommendations in this report are based on the anticipated construction approach and resulting traffic management requirements. However, the recommendations in this Traffic Management Strategy will likely be refined in conjunction with the successful contractor and implementation will be subject to the contractor's work plan and the available budget.

Courtenay residents and various stakeholders and organizations were engaged early in the development of this traffic management strategy. Extensive feedback was considered to understand the community's needs and identify potential mitigation options. The most important considerations identified through stakeholder consultations were:

- Reducing congestion and maintaining access for all modes is the highest priority.
- Adjustments in travel behaviors are expected and are most likely to include taking an alternate route, planning for additional travel time, and travelling outside peak periods (limited support was shown for taking the bus and carpooling).
- Maintaining access for emergency services and public transit are important considerations.

Technical analysis of single lane traffic during pre-construction conditions and during construction conditions was completed, and four options were developed: eastbound traffic only, westbound traffic only, single lane alternating traffic, and mid-day direction change. The analysis concluded that single lane alternating is the preferred method for managing traffic during the construction phase. In comparison to the other three options, single lane

alternating allows residents and commuters similar access to what they currently enjoy, albeit maybe more slowly. It also provides continued access to and from the downtown. Additionally, single lane will provide more balanced network performance at bridges as well as highways and municipal roads and is most responsive to the concerns identified by the public and stakeholders.

The recommended traffic management strategy is illustrated in **Figure E-1** and described as follows.

General Purpose Traffic

Leaving Downtown

- General purpose traffic will be directed to access the bridge via a detour route involving travelling northbound on Cliffe Avenue, right on 3rd Street, left into the laneway between Cliffe Avenue and Anderton Avenue, right on 1st Street and finally right onto Anderton Avenue.
- This detour will minimize impacts to business and provide storage for most of the traffic queues on Anderton Avenue instead of 5th Street.
- Use of the laneway between Cliffe Avenue and Anderton Avenue for bridge traffic is recommended since the laneway has minimal direct accesses and its use would minimize the impact of queues on the residents on Cliffe Avenue between 3rd Street and 1st Street[1].
- On Anderton Avenue, parking on the west side can be re-allocated for queue storage. This would enable 2-way free flow traffic to be maintained for access to destinations on Anderton Avenue, such as the Filberg Centre. This lane would also act as a priority lane for transit leaving downtown.
- On 1st Street, there appears to be sufficient room to accommodate a queue lane on the right side while maintaining two-way traffic. This will enable access to the Condensory Bridge and destinations on Anderton Avenue to be maintained.
- Traffic control personnel may be required to help manage the queue, especially during the initial phase of the construction.
- To facilitate general traffic detour 5th Street eastbound (towards the bridge) will be closed at Cliffe Avenue except for local traffic and Anderton Avenue will be closed at 6th Street except for local traffic and large trucks.

[1] As an alternative to using the laneway, traffic could be directed to continue on Cliffe Avenue to 1st Street. This can be considered further at future stages of the Traffic Management Plan Development with consideration of the trade-offs of potential impacts to residents versus a higher volume of traffic utilizing the laneway.

Entering Downtown

- No significant changes to current traffic patterns for general purpose traffic have been identified. There are changes required for access to the park that are discussed below.

Priority Vehicles

Priority vehicles include transit, emergency services, school buses, and potentially car-pool or high occupancy vehicles.

Entering Downtown

- Create a dedicated priority vehicle lane on Old Island Highway from Ryan Road to the bridge to enable BC Transit and emergency services to bypass the general traffic queues.
- Old Island Highway provides sufficient space to accommodate a temporary priority lane (queue jumper) lane, assuming 3.3m for a general-purpose travel lane, 3.5m for a left turn lane and 3.5m for a queue jumper lane (13.6m in total).
- Locating the priority vehicle lane in the curb (right lane) is recommended to enable vehicles destined to Lewis Park can also utilize the priority vehicle lane.
- Once on the downtown side of the bridge, transit will need to be re-routed since the current right-in only from the Fifth Street Bridge to Anderton Avenue will be changed to left-out only to facilitate the general traffic routing.
- It is proposed that transit entering downtown will proceed straight on 5th Street, turn right onto Cliffe Avenue, right onto 1st Street, and finally right to Anderton Avenue. This is the same route used now, just in the opposite direction.

Leaving Downtown

- As noted above, transit will need to be re-routed to be leaving downtown via 1st Street and Anderton Ave.
- As two-way traffic is being maintained on Anderton Avenue in addition to the bridge queue, buses can use the travel lane to by-pass the queue and get to the front of the line for the bridge.
- Temporary relocation of bus stops to the opposite side of the road will need to be coordinated with BC Transit.
- As general-purpose traffic will be detoured and not able to access the bridge from 5th Street, emergency services may find it more efficient to use 5th Street rather than Anderton Avenue or the bus routing when leaving downtown.

- Communications with traffic control personnel will be explored in order to ensure access to the bridge by emergency services can happen as easily as possible.

Commercial Vehicles/Oversize Vehicles

- As the bridge will have a maximum height of 3.6m, some large vehicles will not be able to use the Fifth Street Bridge. Instead these vehicles will need to use the 17th Street Bridge. The signage and communication regarding this will need to be developed as part of the communications strategy.

Pedestrians and Cyclists

- It is preferable to keep the underpass open to pedestrians and cyclists on both sides of the bridge, but the park side is higher priority. Use of shipping containers or another measure can be considered to separate pedestrians and cyclists from construction activities and protect them from any potential overhead hazards. Shipping containers are frequently used to protect pedestrians from overhead hazards when there is construction adjacent to the sidewalk. However, the bridge has very low clearance and there may not be sufficient space for a shipping container.
- On the Lewis Park side, if the underpass is closed to pedestrians and cyclists, flaggers should be used to direct the pedestrian and cyclist movements and facilitate crossing of 5th Street. However, each crossing of 5th Street on the Lewis Park side will impact the single lane alternating operation and reduce the vehicle capacity.
- On the downtown side, pedestrians and cyclists will be able to cross Anderton Avenue without any conflicts while traffic is entering downtown and then cross 5th Street without any conflicts while traffic is leaving downtown.

Park Access

- Access to the Lewis Park and/or Millennium Simms Park parking lots should be maintained for park users and as a potential park-and-ride or park-and-walk/bike location.
- Traffic accessing the parking lots could be permitted to utilize the priority vehicle lane which would provide a time savings and incentive to bike/walk across the bridge.

- The right-out access from Lewis Park to the bridge is proposed to be closed to prevent short-cutting traffic from using the park to bypass the traffic queues on 5th Street/Old Island Highway.
- If it is not practical to maintain vehicle access under the bridge between Lewis Park and Millennium Simms Park, the splitter islands at the parking lot accesses will need to be modified to enable left-out from Lewis Park and left-in to Millennium Simms Park. Alternatively, a traffic control person could be used to facilitate these movements.
- During any periods where vehicle access under the bridge between the parks cannot be maintained, closure of the Simms Millennium Parking lot should be considered to minimize the disruption to traffic crossing the bridge caused by vehicles attempting to make a left-turn into the parking lot.

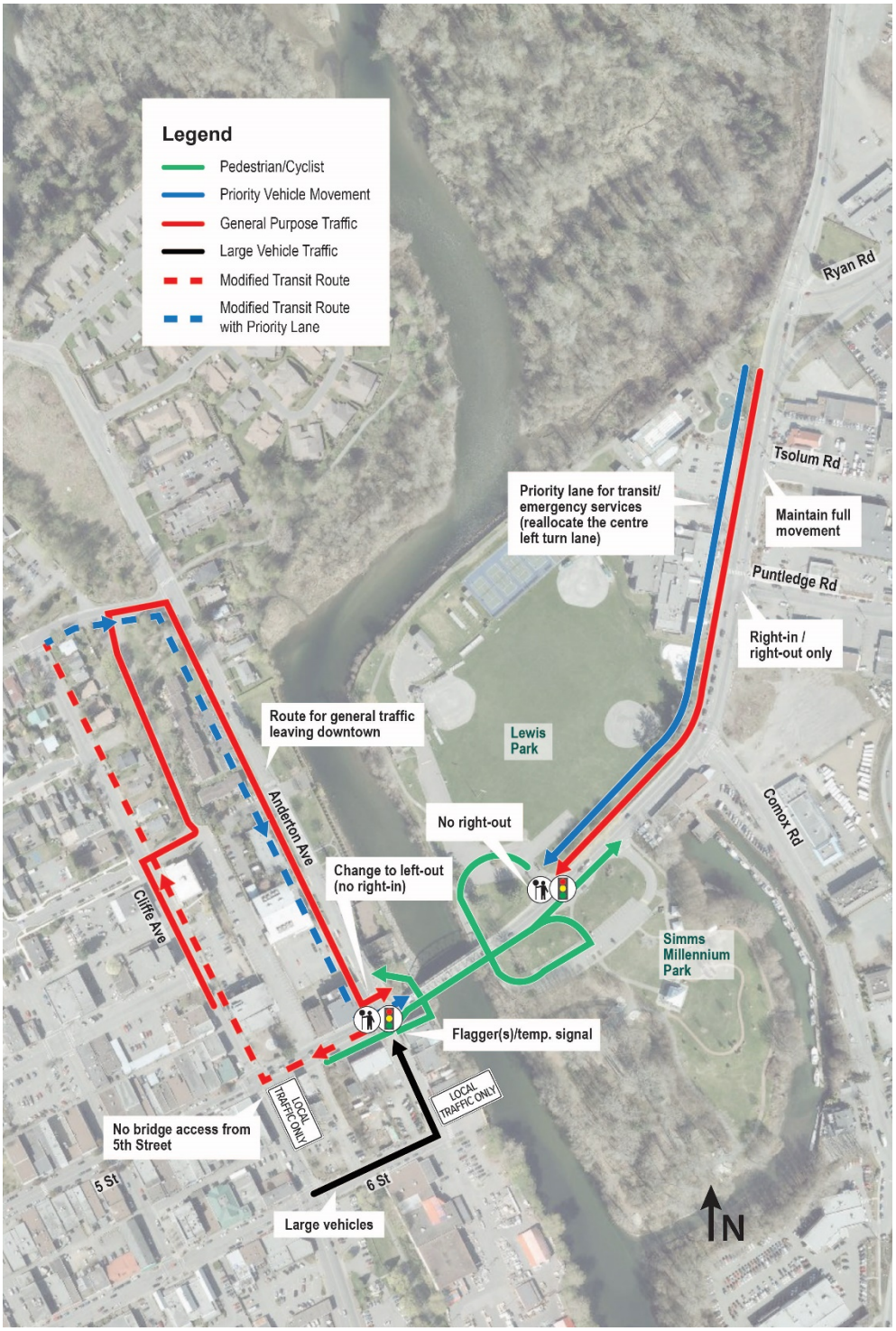


Figure E-0-1: Recommended Traffic Management Strategy

Transportation Demand Management

While the measures outlined above are intended to minimize the construction impacts on road users, reducing the travel demand during peak periods is also an important strategy and can provide significant benefits. Potential opportunities to encourage people to switch from driving to walking, cycling or taking transit have been identified, including:

- Park-and-ride (transit subsidy, rideshare, and shuttle)
- Park-and-walk/bike

The proposed traffic management approach must be supported by a detailed communications plan to ensure timely and broad awareness raising efforts across the Comox Valley prior to and during construction.

1.0 Overview

The Fifth Street Bridge plays an important role in the entire Comox Valley transportation network. Completed in 1960, the 72-metre steel truss bridge has two vehicle lanes and 1.5-metre sidewalks on both sides. Four important utilities run underneath the bridge - two water mains, a Fortis gas line and Telus telecommunications line.

The bridge requires rehabilitation of various elements to maximize its service life to the City of Courtenay (City). 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 scope of the Fifth Street 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

1.1 Purpose

The purpose of the traffic management strategy is to understand the impact that the bridge rehabilitation will have on all modes of travel and to identify a pro-active strategy for mitigating community impacts to the greatest extent possible. Mitigation strategies range from traffic management, to travel demand management and strategic communications. The strategy is intended to address concerns identified by the public and stakeholders, and to be refined through on-going discussions.

The details of construction parameters and the impact on pedestrian, cycling and vehicle traffic is identified in *Section 2.0*.

1.2 Key Characteristics

The following are key characteristics of the Fifth Street Bridge:

- It is a 72-metre steel truss bridge that was constructed in 1960.
- Two travel lanes (one in each direction) are provided, each is approximately 3.5m wide. 1.5m sidewalks are provided on both sides.
- Dedicated cycling facilities are not currently provided on the bridge. Cyclists either ride in line with vehicles or dismount and use the sidewalks.
- Underpasses are provided on both the west and east sides of the bridge that allow people who walk and cycle to pass from one side to the other.
- Four utilities run underneath the bridge - two watermains, a Fortis gas line, and Telus telecommunications line.
- Approximately 20,000 vehicles, 160 buses, 650 pedestrians and 500 cyclists cross the bridge each day[2].

[2] Vehicle volumes based on figures from the Transportation Master Plan (2019), pedestrian and cyclist data based on summertime counts completed by the Comox Valley Cycling Coalition, and bus data provided by BC Transit.

2.0 Construction Parameters

The rehabilitation work is anticipated to take approximately six months. Timing will ultimately depend on the final extent of the rehabilitation works and the approach to construction phasing. The traffic management strategy plans for one travel lane to remain open and access for pedestrians and cyclists will be maintained through the duration of construction. The recommendations in this report are based this construction approach and resulting traffic management requirements. However, the recommendations in this Traffic Management Strategy will likely be refined in conjunction with the successful contractor and implementation will be subject to the contractor's work plan and the available budget.

The rehabilitation includes two primary elements that would impact all modes of traffic:

- The existing concrete bridge deck will be removed and replaced; and
- Structural repairs to the underside of the bridge and a complete re-coating of the steel structure, which includes a scaffolding and wrap structure that reduces the vertical and horizontal clearances for travel on the bridge

To safely complete the rehabilitation work, multi-modal travel will be impacted by the following conditions:

- The scaffolding required to allow the recoating work may reduce the height clearance to 3.6m (reduced from the current 4.6m);
- The travel lane width may be reduced to 3.0m during construction (reduced from the current approximately 3.5m width);
- The free space within the wrapping will be approximately 6.0m with half of the space being allocated to pedestrians and cyclists;
- The scaffolding is expected to encapsulate the existing bridge sidewalks, requiring that people who walk and cycle are accommodated in a dedicated space on the bridge roadway.

3.0 Community Input

Courtenay residents and representatives from local stakeholder organizations were engaged in the process of developing this traffic management strategy for rehabilitation of the Fifth Street Bridge. The intent was to ensure that concerns related to traffic interruptions during the rehabilitation works were understood and could be considered fully when planning the traffic management strategy.

The following sections provide a summary of key feedback from the public and stakeholders.

3.1 Methods

Public and stakeholder feedback has been primarily received via three methods:

1. A survey was made available to the public from Tuesday, November 12 to December 06, 2019 seeking feedback on the bridge rehabilitation project. A total of 643 survey responses were received online and in print.
2. An open house was hosted on Thursday, November 21st from 5:00 to 7:00pm at the Florence Filberg Centre. A total of 98 people attended.
3. Letters were sent out to over 20 stakeholder organizations in the Comox Valley inviting them to a one-on-one meeting with City staff and project consultants. Meetings have been held with many of the invited groups.

3.2 Feedback Received

The feedback received has helped inform the traffic management strategy, including developing a full understanding of public and stakeholder concerns as well as helping to identify management approaches. The following are some of the key feedback that was received:

- Reducing congestion and maintaining access for all modes is of highest priority.
- Adjustments in travel behavior are most likely to include taking an alternate route, planning for additional travel time, and travelling outside peak periods (limited support was shown for taking the bus and carpooling).
- Maintaining access for emergency services and public transit is an important consideration.

A full summary of public and stakeholder feedback is provided in the *What We Heard: Fifth Street Bridge Rehabilitation Project, Phase 1 Engagement Summary* document, which was presented to council on January 27th, 2020.

4.0 Traffic Conditions - No Construction

The current traffic conditions and travel patterns in Courtenay, including daily traffic profiles, typical congestion and travel times near the bridges and the origins and destinations of traffic using the Fifth Street Bridge have been reviewed and are summarized in the sections below.

4.1 Daily Traffic Profile at the Bridges

24-hour traffic counts have been analyzed for the three bridge crossings (Fifth Street Bridge, 17th Street Bridge, Piercy Bridge) to obtain an understanding of the traffic profile in terms of peak hour and traffic volume.

The traffic for all three bridges generally reaches a morning peak around 8 am and then continuously builds throughout the day and reaches the afternoon peak at between 4 pm and 5 pm. The directional traffic on all three bridges is generally balanced. During the PM peak hour, Fifth Street Bridge, 17th Street Bridge, and Piercy Bridge carry approximately 1000, 1500, and 250 vehicles per hour per direction respectively. See **Figure 4-1** through **Figure 4-3**.

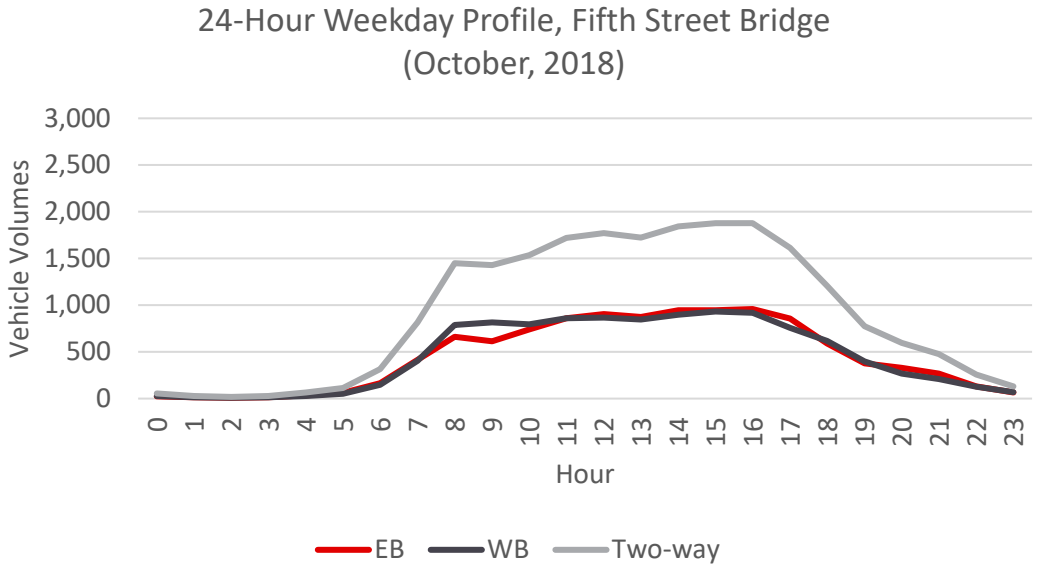


Figure 4-1. 24-Hour Traffic Volume Profile (Fifth Street Bridge)

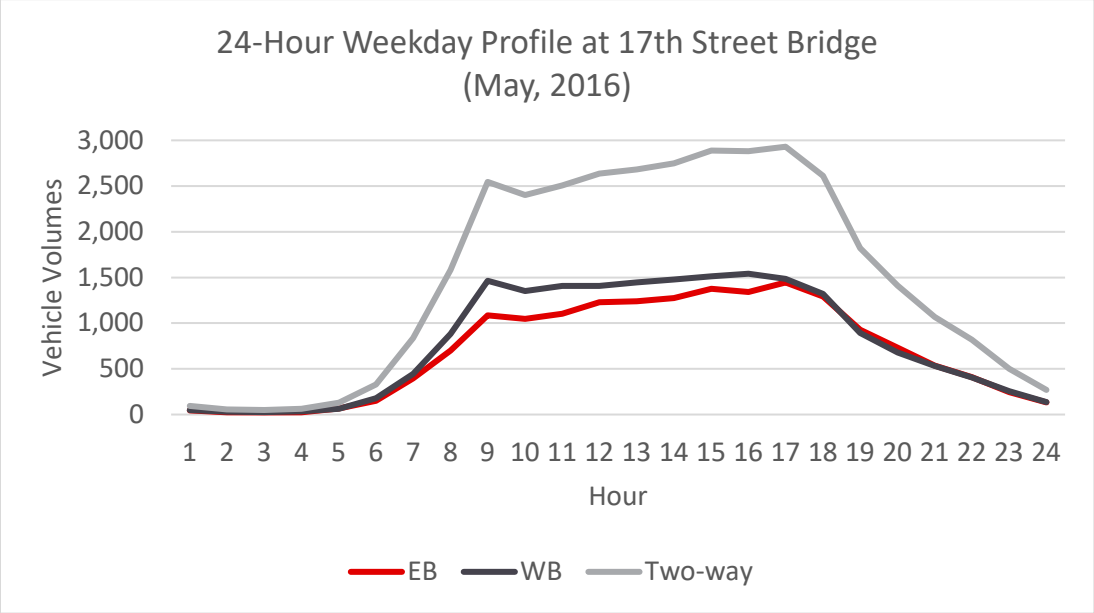


Figure 4-2. 24-Hour Traffic Volume Profile (17th Street Bridge)

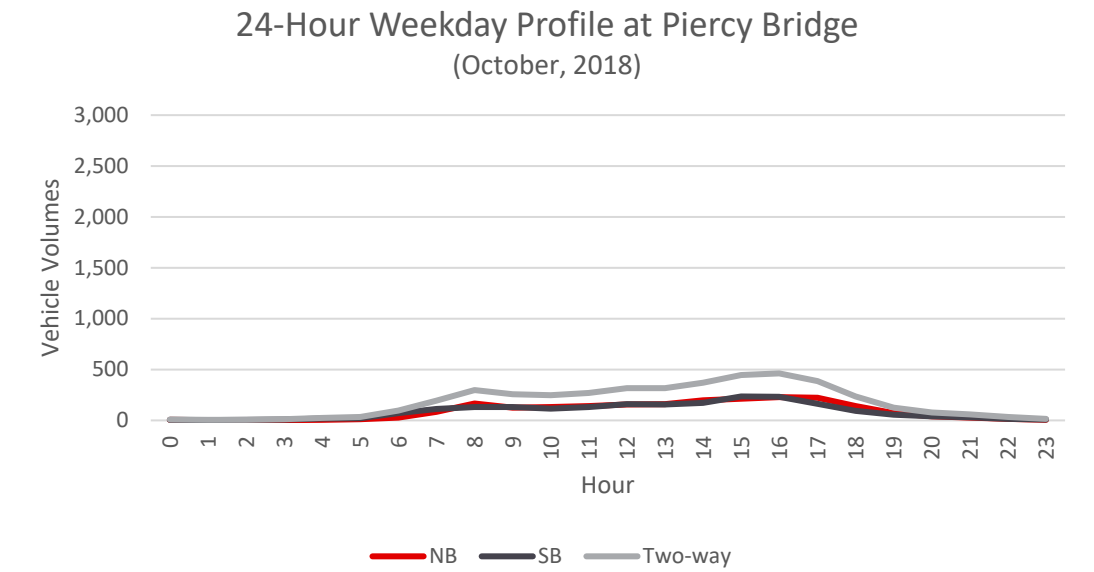
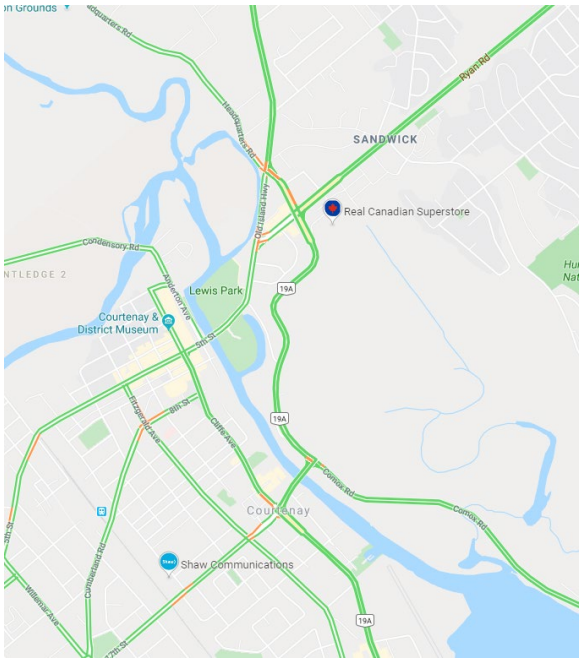


Figure 4-3. 24-Hour Traffic Volume Profile (Piercy Bridge)

4.2 Typical Traffic Condition

Google Typical Traffic indicates that afternoon traffic conditions are typically worse than morning conditions. Traffic pressure is generally concentrated around the City's core areas and major connections including the Fifth and 17th Street bridges, Cliffe Avenue and Ryan Road. See **Figure 4-4**. Based on observed traffic counts and traffic performance from Google Traffic, the Fifth Street and 17th Street bridges appear to operate near or at full capacity during the PM peak period.

Typical Traffic, Morning Peak (8:00am)



Typical Traffic, Afternoon Peak (4:30pm)

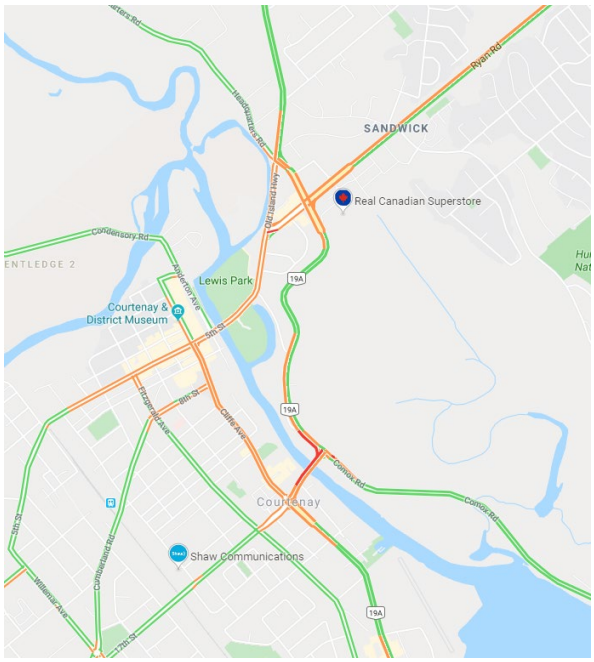


Figure 4-4. Typical Traffic Conditions in Courtenay (Source: Google Traffic)

On certain days, actual traffic performance is worse than Google Typical Traffic's long-term average. **Figure 4-5** below illustrates one Thursday in November 2019 where the travel speeds on bridges and major connections were much slower than usual.

Google Live Traffic (4:30pm Thursday November 28, 2019)

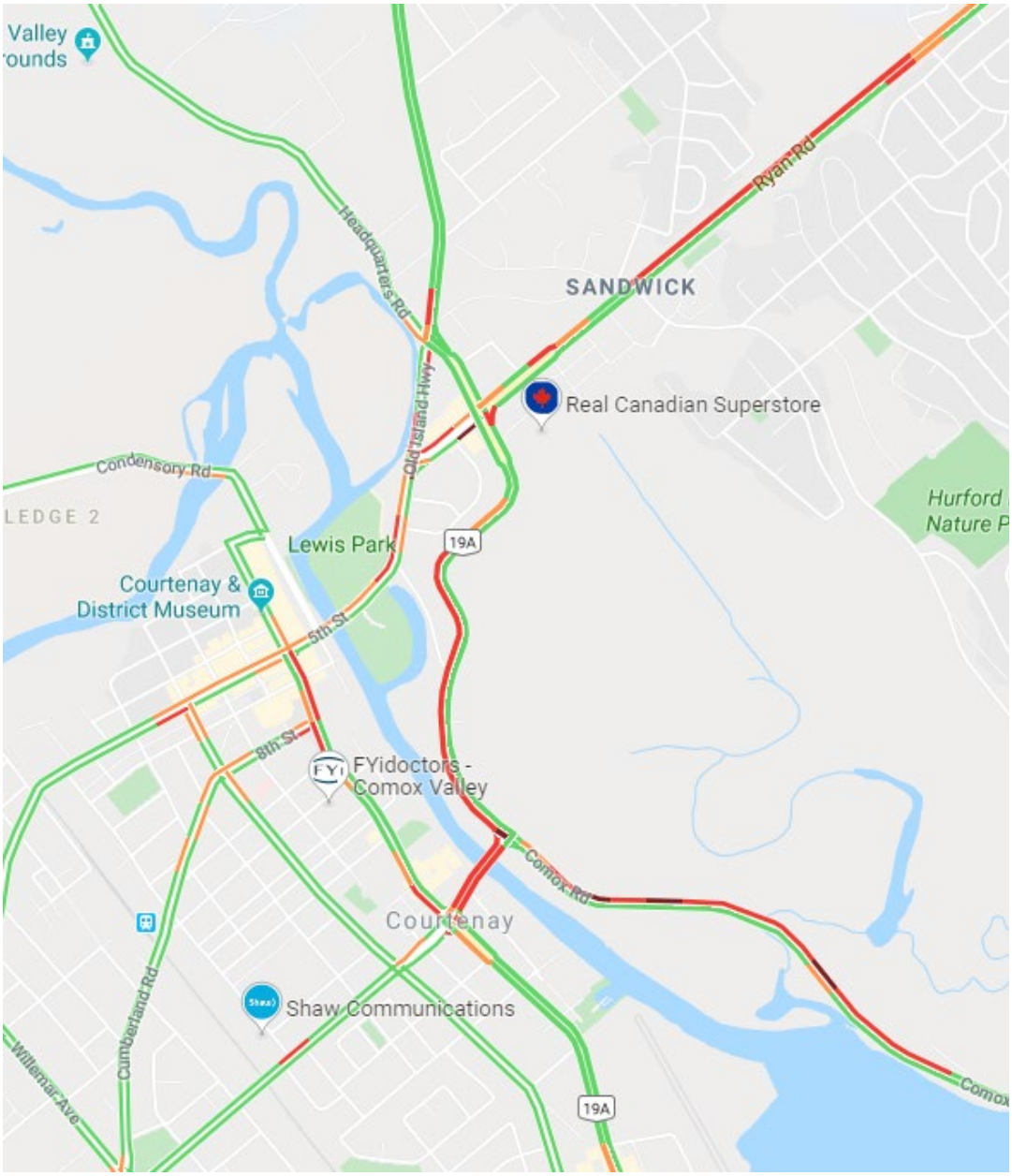


Figure 4-5. Live Traffic Conditions in Courtenay (Source: Google Traffic)

4.3 Travel Pattern (Origin + Destination)

The marjority of vehicles using the Fifth Street Bridge travel between downtown Courtenay and areas in east Courtenay via Ryan Road or Old Island Highway. Origins and destinations of Fifth Street Bridge traffic is illustrated in **Figure 4-6**.

A limited number of Fifth Street Bridge vehicles access the area via Cliffe Avenue and Highway 19a/Comox Road. These vehicles are assumed to cross the Courtenay River via the 17th Street Bridge.

Eastbound (Leaving Downtown)

Westbound (Entering Downtown)

Figure 4-6. Origin and Destination of Fifth Street Bridge Traffic (Source: Travel Demand Model)

4.4 Travel Time

There are three options to cross the Courtenay River when travelling between east and west Courtenay, as shown in **Figure 4-7**. Generally, the travel distance via the Fifth Street Bridge or 17th Street Bridge is much less as compared to the Piercy Bridge, which requires circuitous routing via Piercy Road / Condensory Road.

Figure 4-7. Courtenay River crossing options between east and west Courtenay

Travel times to leave and enter downtown Courtenay during a typical weekday PM peak hour have been estimated using Google Typical Traffics information.

Table 4-1 summarizes the typical travel time and distance between Cliffe Avenue and Ryan Road via the three routes illustrated in the figure above.

	Fifth Street Bridge		17th Street Bridge		Condensory Rd Bridge	
	Distance (km)	Travel Time	Distance (km)	Travel Time	Distance (km)	Travel Time
From Cliffe Ave to Ryan Rd	2.4km	4-8 min	3.5km	5-10 min	8.1km	10-14 min
From Ryan Rd to Cliffe Ave		5-10 min		6-12 min		10-16 min

Table 4-1. Google Travel Time between Cliffe Avenue and Ryan Road

5.0 Traffic Conditions - During Construction

The following describes how the planned rehabilitation works will impact traffic. This includes both the impact on the transportation function and capacity on the bridge, as well as the impact on local and network-wide traffic conditions. The preceding analysis also provides a baseline against which possible mitigation options can be tested to ensure they will have value in addressing traffic challenges.

During the rehabilitation work, the capacity on the Fifth Street Bridge will be reduced from two lanes to one lane, as described in *Section 2.0*. Four scenarios for how the single lane could be operated were developed. These scenarios are:

1. **Single lane alternating -** This scenario maintains traffic from both directions by alternating eastbound and westbound traffic flows. Traffic control persons or temporary traffic signals will be required at both ends of the bridge to allow / stop traffic safely.
2. **Westbound (WB) only open**. - This scenario closes the bridge to eastbound traffic and keeps it open in the westbound direction.
3. **Eastbound (EB) only open** - This scenario closes the bridge to westbound traffic and keeps it open in the eastbound direction.
4. **Mid-day direction change** – This scenario operates the bridge in the westbound direction in the morning and the eastbound direction in the afternoon, or vice-versa

A high-level analysis of the impact of the construction on the Fifth Street Bridge's traffic capacity and resulting network wide traffic performance has been assessed for the scenarios during the PM peak hour. Visum[3] was utilized to estimate the change in traffic on each link resulting from the reduced bridge capacity associated with each scenario. Traffic analysis software Synchro and SimTraffic were used to perform traffic operational analysis. Signal timing was optimized as necessary. For this analysis it was assumed that the mode share splits remain unchanged and there are no impacts from emergency vehicles and transit buses. Once a preferred option(s) is identified then more detailed analysis, including consideration of transit and emergency vehicle accommodation will be completed.

The results and network impacts described below are for the PM peak hour which is the busiest period for Courtenay's road network. For most of the day the impacts will be less

[3] Visum is a macro transportation demand model and was previously used to support the City's Transportation Master Plan

significant. However, supporting the use of alternative transportation and encouraging off-peak travel to mitigate traffic pressures will be critical and highly recommended.

5.1 Scenario 1: Single Lane Alternating

With single lane alternating traffic, the resulting capacity of the bridge is anticipated to be reduced by half to 500 vehicles per hour per lane. Most traffic is expected to divert to the 17th Street Bridge while a small number of motorists will divert via the Piercy Bridge. It is anticipated that both the Fifth Street and 17th Street bridges will operate over capacity during the peak periods. The Piercy Bridge has spare capacity but due to the much longer travel distance it is not an attractive option for many motorists. Consequently, more severe delays and queues are expected to occur resulting in longer peak periods along 17th Street, 5th Street, Cliffe Avenue and Ryan Road.

SimTraffic results indicate that the average network travel time in Courtenay during the PM peak hour will increase by approximately 40% under this scenario.

5.2 Scenario 2: Westbound Only Open

In this scenario, all eastbound traffic needs to travel via other bridges and the 17th Street Bridge is expected to receive most of the diverted traffic. Analysis shows that this scenario would result in gridlock, excessive delays, and long queue lengths throughout the network. The 17th Street Bridge eastbound and its intersection with Comox Road is the main constraint restricting downstream capacity. Eastbound queues from the 17th Street / Comox Road intersection extend back to the 17th Street / Cliffe Avenue intersection (as they currently do during select periods). Consequently, the diverted eastbound and northbound traffic cannot proceed through the 17th Street / Cliffe Avenue intersection. Significant construction would be required to increase capacity for the affected movements, and therefore this option is not recommended and is not further evaluated.

5.3 Scenario 3: Eastbound Only Open

In this scenario, all westbound traffic needs to travel via other bridges, and 17th Street Bridge is expected to receive most of the diverted traffic. With no network modifications this scenario would also result in gridlock, excessive delays, and long queue lengths. One of the critical movements is the westbound right turn at 17th Street / Cliffe Avenue. Currently the westbound right turn is channelized with yield control since there is only one northbound receiving lane on Cliffe Avenue. Additionally, long southbound queues occur on Comox Road at 5th Street as there is a significant increase in demand for the westbound left-turn

movement by motorists diverting to the 17th Street Bridge. The network constraints can be mitigated through the following network changes:

- **17th Street / Cliffe Avenue** - Convert one of the dual southbound to eastbound left-turn lanes on Cliffe Avenue to create a second westbound receiving lane. This enables the northbound right-turn traffic to have its own receiving lane and operate as a free flow movement.
- **5th Street / Comox Road** - Extend the existing westbound left-turn lane into the current TWLTL (two-way left turn lane) at the 5th Street / Comox Road intersection to provide more storage and add a protected westbound left-turn phase to the signal (or use a traffic control person).

With the network improvements listed above, 17th Street Bridge is expected to accommodate the additional westbound traffic to some degree. However, the 17th Street Bridge is expected to be over capacity during the peak periods with more severe delays and queues compared to current conditions, particularly in the southbound direction on Comox Road approaching the 17th Street Bridge. SimTraffic results indicate that the average network travel time in Courtenay during the PM peak hour will increase by approximately 35% under the eastbound only open scenario.

5.4 Scenario 4: Mid-day Direction Change

This scenario is a hybrid of Scenarios 2 and 3 where the bridge would be operated as eastbound only in the morning and westbound only in the afternoon or vice-versa (westbound only in the morning and eastbound only in the afternoon). This can provide benefits where there is different peak travel direction during the morning and afternoon rush-hours. However, as illustrated in **Figure 4-1**, there is no peak travel direction in Courtenay on the Fifth Street Bridge. During any hour of the day, the volume of vehicles travelling eastbound or westbound across the bridge is essentially the same. Therefore, changing the direction of the bridge operation mid-day will not provide any traffic efficiency benefits over Scenario 2 or 3. This option is also likely to be more confusing to the public as they must remember which direction traffic is flowing at different times of day and make the signage/public information more complex as time of day and directional information would also need to be communicated. Therefore, this option is not recommended or evaluated further.

5.5 Summary and Recommendation

A high-level analysis of the three scenarios for the Fifth Street Bridge has identified that the westbound only open scenario causes network-wide gridlock. All traffic leaving downtown

must divert to the 17th Street Bridge which results in a significant increase in demand for the left-turn from 17th Street to Comox Road. This movement does not have sufficient capacity which causes congestion on 17th Street, Cliffe Avenue, 5th Street and eventually across the 5th Street Bridge and Ryan Road. Therefore, this option is not recommended. Queuing during the PM peak hour is significantly higher under this scenario, as shown in **Figure 5-1**.

The mid-day direction change scenario was found to provide no traffic benefits since there is not a peak travel direction on the Fifth Street Bridge and therefore is not recommended.

The single lane alternating and eastbound only open options both result in a similar level of overall delay on the network. However, both options will result in long delays and queue lengths during the peak periods. Single lane alternating allows residents and commuters similar access to what they currently enjoy, albeit maybe more slowly. It also provides continued access to and from the downtown. Additionally, single lane will provide more balanced network performance at bridges as well as highways and municipal roads. Therefore, single lane alternating is recommended.

Scenario 1. **Single-Lane Alternating (Recommended)**	Scenario 2. **Westbound Open (Not Recommended)**	Scenario 3. **Eastbound Open (Can be Considered but Not Recommended)**
		

Figure 5-1. Estimated PM Peak Hour Queuing for Traffic Management Options

6.0 Traffic Management

Based on the traffic analysis results in *Section 5.0*, review of community and stakeholder input, and through discussions with the City Staff, the Single Lane Alternating option was selected as the preferred option for traffic management on the bridge. This option provides a more balanced network performance at the bridges as well as highways and municipal roads and is most responsive to the concerns identified by the public and stakeholders. Details of the traffic management plan in the following section of this document correspond to the Single Lane Alternating option, which includes consideration of the following items:

- Traffic queue storage locations to minimize disruption to local businesses.
- Accommodation of priority vehicles.
- Connectivity for pedestrian and cyclist facilities.
- Traffic control methods including time-of-day modifications to the traffic management to best accommodate peak and off-peak traffic.
- Intersection Modifications; and
- Travel time forecasts.

Figure 6-1: illustrates the key considerations to the Traffic Management Strategies.

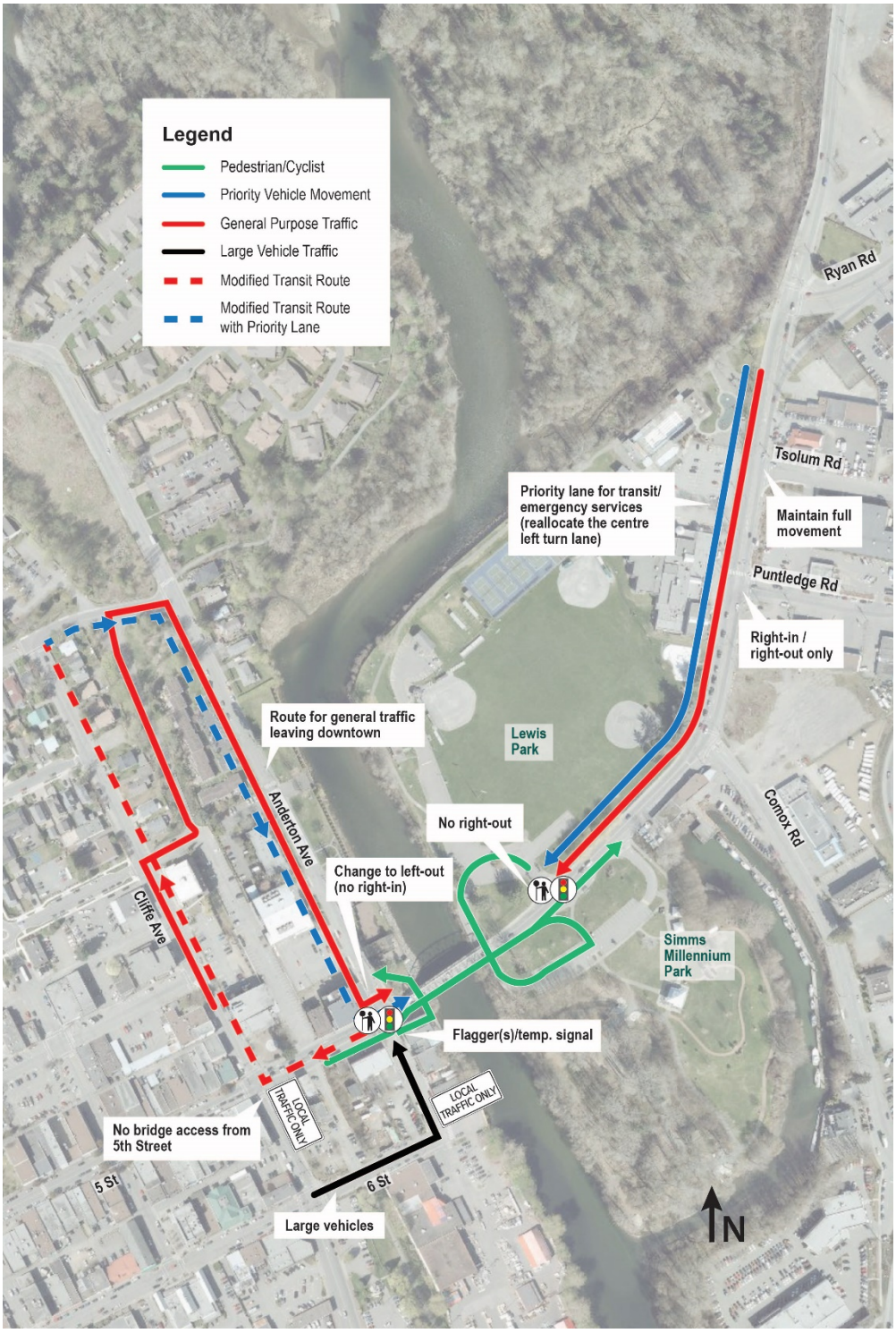


Figure 6-1: Overall Traffic Management Strategy

6.1 Queue Storage Location Comparison (General Purpose Traffic)

With the reduced capacity due to use of single lane alternating traffic, congestion and queues can be expected. For traffic leaving downtown two options for managing the queue have been identified:

- 5th Street – illustrated in **Figure 6-2**, this option requires minimal network changes and uses 5th Avenue to store traffic queues; or
- Anderton Avenue – illustrated in **Figure 6-3**, this option uses Cliffe Avenue and Anderton Avenue north of 5th Street to store traffic queues by converting the right-in at Anderton Avenue to left-out and restricting a few movements on 5th Street.

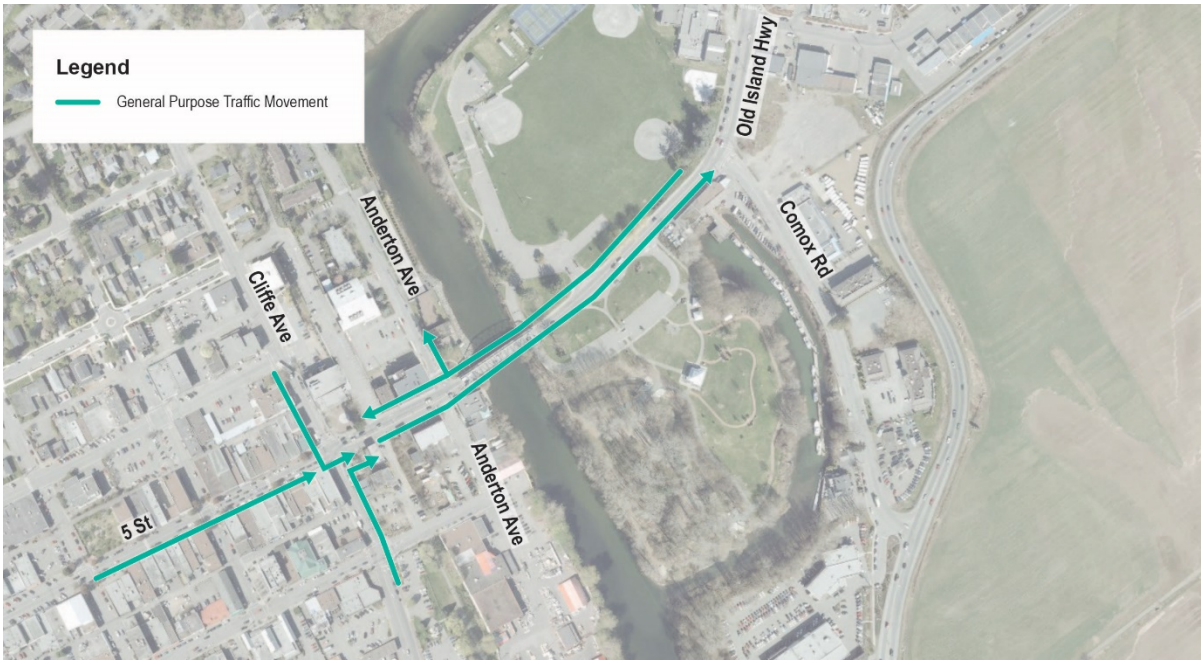


Figure 6-2: 5th Street Queue Option

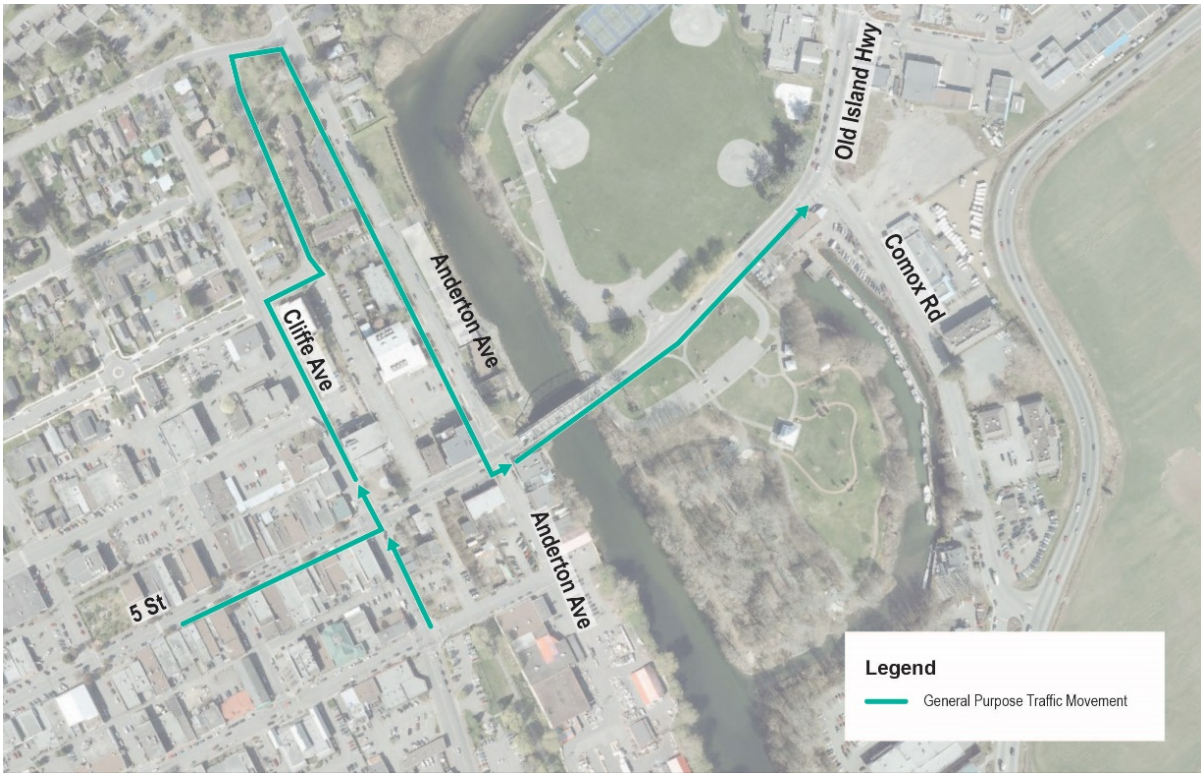


Figure 6-3: Anderton Avenue Queue Option

6.1.1 5th Street Queue Option

In this option there are minimal changes to the existing road network and routing for traffic leaving downtown via the Fifth Street Bridge. Traffic would queue along 5th Street and the various side roads, including Cliffe Avenue. Estimated queue lengths during the PM peak hour are illustrated in **Figure 6-4**, below. The actual queue lengths will vary depending upon day-to-day traffic fluctuations and how behaviour changes in response to the construction (change of trip time, use of 17th Street Bridge, walk or cycle, etc.). However, congestion on 5th Street and the side roads can be expected which will limit access to local businesses and access to parking downtown.

6.1.2 Anderton Avenue Queue Option

An alternative approach is to restrict 5th Street from Cliffe Avenue to Anderton Avenue to local traffic only (no access to the bridge) and require all traffic leaving downtown to access the bridge from the north side of Anderton Avenue as shown in **Figure 6-3**. This would require converting the right-in at Anderton Avenue and 5th Street to a left-out and re-routing transit. The transit re-routing is discussed further in Section 6.2 as part of the Priority Vehicles.

Estimated queue lengths during the PM peak hour are illustrated in **Figure 6-4**, below. The actual queue lengths will vary depending upon day-to-day traffic fluctuations and how behaviour changes in response to the construction (change of trip time, use of 17th Street Bridge, walk or cycle, etc.). This option is intended to minimize the impact of congestion and queuing on local businesses by moving the queue out of the downtown core, off 5th Street and most of Cliffe Avenue to Anderton Avenue.

On Anderton Avenue, removing the parking on the west side of the road should be considered with use of this space as a lane for traffic queuing to access the bridge. This would enable 2-way free flow traffic to be maintained for access to destinations on Anderton Avenue, such as the Filberg Centre. Similarly, creation of a dedicated queueing lane on 1st Street should be considered. There appears to be sufficient room to accommodate a queue on the right side of 1st Street while maintaining two-way traffic. This will enable access to the Condensory Bridge and destinations on Anderton Avenue to be maintained. Traffic control personnel may be required to help manage the queue, especially during the initial phase of the construction.

Additionally, use of the laneway between Cliffe Avenue and Anderton Avenue for traffic destined to the bridge is suggested for consideration[4]. This laneway appears to have minimal direct accesses and its use would minimize the impact of queues on the residents on Cliffe Avenue between 3rd Street and 1st Street.

6.1.3 Queue Storage Location Recommendation

As discussed, above, a high-level traffic analysis has been completed to compare the PM peak hour queues for the 5th Street and Anderton Avenue options as illustrated in **Figure 6-4**. The Anderton Avenue Detour scenario will store most of the queues on Anderton Avenue instead of 5th Street, which will minimize impacts to the downtown core businesses. Therefore, the Anderton Avenue Queue option is recommended and is the basis of the subsequent sections. Traffic control methods/devices at key locations will be discussed in detail in Section 6.4 along with intersection modifications in Section 6.5.

[4] As an alternative to using the laneway, traffic could be directed to continue on Cliffe Avenue to 1st Street. This can be considered further at future stages of the Traffic Management Plan Development with consideration of the trade-offs of potential impacts to residents versus a higher volume of traffic utilizing the laneway.

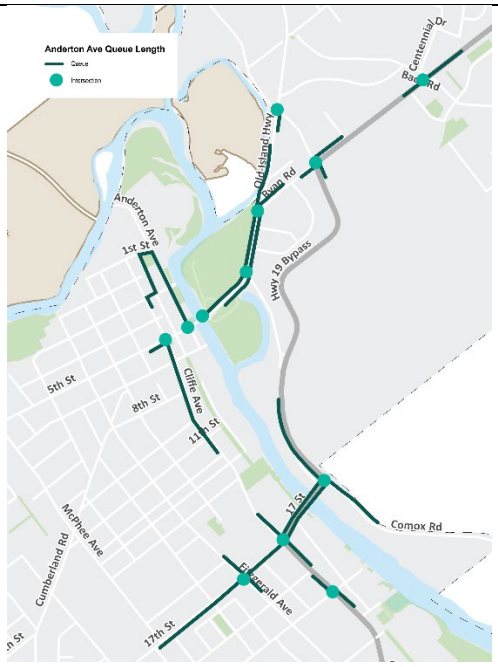
5th Street Queue Option	Anderton Avenue Queue Option
	

Figure 6-4: Estimated Queue Lengths

Under the Anderton Avenue Queue option, large vehicles (for example, trucks that are less than 3.6m in height) leaving Downtown Courtenay will be directed to travel via 6th Street/Anderton Avenue. Additionally, large vehicles that exceed the 5th Street Bridge's height restriction (approximately 3.6m) or vehicles with trailers/boats will be directed to use the 17th Street Bridge or Piercy Bridge instead.

Turning templates for key movements at key locations along Cliffe Avenue, have been reviewed to ensure that vehicles can turn safely during the construction phase. The movements that were evaluated include:

<u>Cliffe Avenue/6th Street/Anderton Avenue route for trucks (Truck Route)</u>

- Right turn from 5th Street onto Cliffe Avenue
- Left turn from Cliffe Avenue onto 6th Street
- Left turn from 6th Street onto Anderton Avenue
- Right turn from Anderton Avenue onto the Fifth Street Bridge

<u>Cliffe Avenue/3rd Street/Laneway/1st Street/Anderton Avenue route for general purpose traffic (GP Route)</u>

- Left turn from 5th Street to Cliffe Street

- Right turn from Cliffe Street to 3rd Street
- Left turn from 3rd Street to laneway
- Right turn from laneway to 1st Street
- Right turn from 1st Street to Anderton Avenue
- Left turn from Anderton Avenue to the Fifth Street Bridge

The review indicates that the design vehicles (heavy single unit trucks for trucks and motorhomes for general purpose traffic) generally are able to turn along the designed detours. For the truck route, trucks may need to make a wider right turn from 5th Street onto Cliffe Avenue by using the middle lane instead of the curbside lane. At Anderton Avenue where trucks need to turn right onto the Fifth Street Bridge, they may drive over the painted median on 5th Street. For the general-purpose route, the full width of 3rd Street and laneway will be taken for turning, which are as expected and acceptable.

Clear signage and a comprehensive communications strategy will be required to direct these vehicles to travel via 6th Street/Anderton Avenue and/or the 17th Street and Piercy Bridges.

6.2 Priority Vehicles

The needs of priority vehicles (emergency services, BC Transit, School Buses, etc.) require specific consideration as part of the traffic management strategy development to ensure they experience as little delay as possible. The following opportunities have been identified:

- For traffic entering downtown, creation of a priority vehicle (queue jumper) lane on the westbound bridge approach to enable BC Transit and emergency services to bypass the general traffic queues.
- For traffic leaving downtown, utilizing a separate queuing space for general purpose traffic to provide priority access to the bridge for BC Transit and emergency services.
- Enabling communication between the traffic control people and emergency services to enable them to pro-actively manage traffic for any approaching emergency vehicles. This could be achieved by providing the traffic control people and emergency services with radios on the same frequency.
- Use of temporary signals instead of traffic control people is recommended for the night time period when traffic volumes are lower. The signals should be able to be operated with a relatively short cycle length that will minimize delays for emergency services. However, opportunities to provide emergency services pre-emption as part of any temporary traffic signals can also be explored. If emergency pre-emption is not possible with the temporary traffic

signals and emergency services priority is necessary at night, an alternative approach would be to have traffic control people on-site overnight.
- Volunteer fire department members may need to cross the bridge in a personal vehicle to access the fire hall and respond to a call. These first responders would also be able to use the priority vehicle lane/route. Each responder could have a bright sign or piece of paper to put on their dash or otherwise display to indicate to the traffic control people that they are responding to a call and permitted to use the priority vehicle facilities.

6.2.1 Westbound (Entering Downtown) Priority Vehicle (Queue Jumper) Lane

On the park side of the bridge, 5th Street has a 3-lane cross-section from the bridge to Comox Road. It consists of one through lane in each direction and an eastbound right turn lane to Comox Road. Given the relatively low eastbound right turn volumes, the right turn lane can be combined with the through lane to allow for adding a queue jumper lane.

The segment of Old Island Highway between Comox Road and Ryan Road is also a three-lane road consisting of one through lane in each direction and left turn lanes or TWLT (two-way left turn) lanes in the middle. A variety of factors including current lane geometry, expected queue length during construction, and bus routes, were reviewed to determine if it is feasible to temporarily add a fourth lane on Old Island Highway to accommodate priority vehicles. Key findings include:

- According to BC Transit' bus routes and schedule information, most of the buses heading to Downtown Courtenay via the Fifth Street Bridge come from Ryan Road;
- The queue length on 5th Street/Old Island Highway during construction is expected to build up beyond Ryan Road; and
- The road width of this segment ranges between 13.7m to 15.2m (roughly measured using aerial images).

Based on the findings, the segment of Old Island Highway provides sufficient space to accommodate a temporary priority lane, assuming 3.3m[5] for a general-purpose travel lane, 3.5m for a left turn lane and 3.5m for a queue jumper lane (13.6m in total)[6]. Most access along

[5] 3.0m is the minimal width for general travel through lane as per TAC's Geometric Design Guide for Canadian Roads, Chapter 4, Table 4.2.3
[6] 3.3m as the minimal width for bus lanes as per BC Transit Design Guidelines, Chapter 5.

Old Island Highway should be restricted to right-in/right-out to minimize conflicts. This is discussed further in *Section 6.5.2*.

The queue jumper lane, located on the right side of the westbound approach, can serve priority vehicles including emergency vehicles and transit buses. Park users can also utilize this lane to bypass traffic queues with a few exceptions which will be further discussed in Section 6.5.3. **Figure 6-5** illustrates the recommended queue jumper lane location.

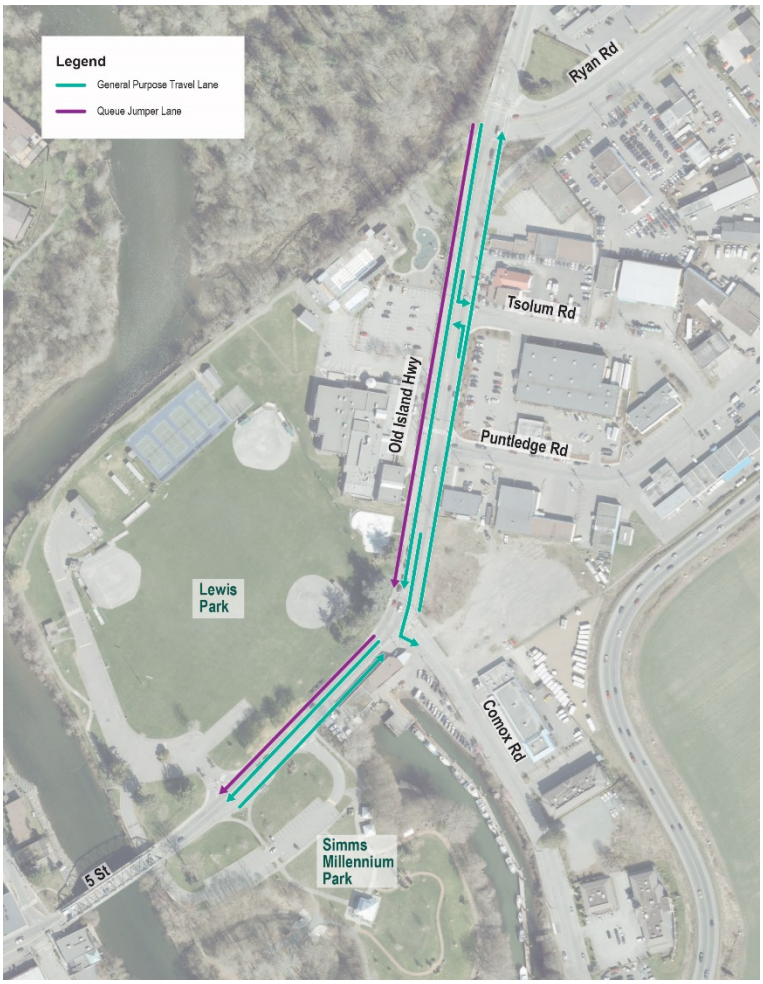


Figure 6-5: Queue Jumper Lane (East Side)

6.2.2 Eastbound (Leaving Downtown) Priority Route

The current right-in only from the Fifth Street Bridge to Anderton Avenue is changed to left-out only to enable general purpose traffic to access the bridge via Cliffe Avenue, 1st Street and Anderton Avenue as discussed in Section 6.1. Therefore, all buses entering downtown Courtenay via the Fifth Street Bridge can no longer turn right onto Anderton Avenue and will

need to be rerouted. As illustrated in **Figure 6-6**, the proposed re-routing for buses is to proceed straight on 5th Street before turning right onto Cliffe Avenue, right onto 1st Street, and finally right to Anderton Avenue. This route will enable the same locational stops with temporary relocation of bus stops to the opposite side of the road which will need to be coordinated with BC Transit.

As two-way traffic is being maintained on Anderton Avenue in addition to the bridge queue, buses can use the travel lane to by-pass the queue and get to the front of the line for the bridge.

If general purpose traffic is directed to use the laneway between Cliffe Avenue and Anderton Avenue, large trucks may find some of the turns too tight. Instead large trucks can use the same routing as the buses or access the bridge via the south side of Anderton Avenue (6th Street, left on Anderton Avenue, right onto the bridge).

Emergency services can use the same routing as buses, or alternatively they can access the Fifth Street Bridge directly from Fifth Street by ignoring the local traffic only restriction at 5th Street and Cliffe Avenue.

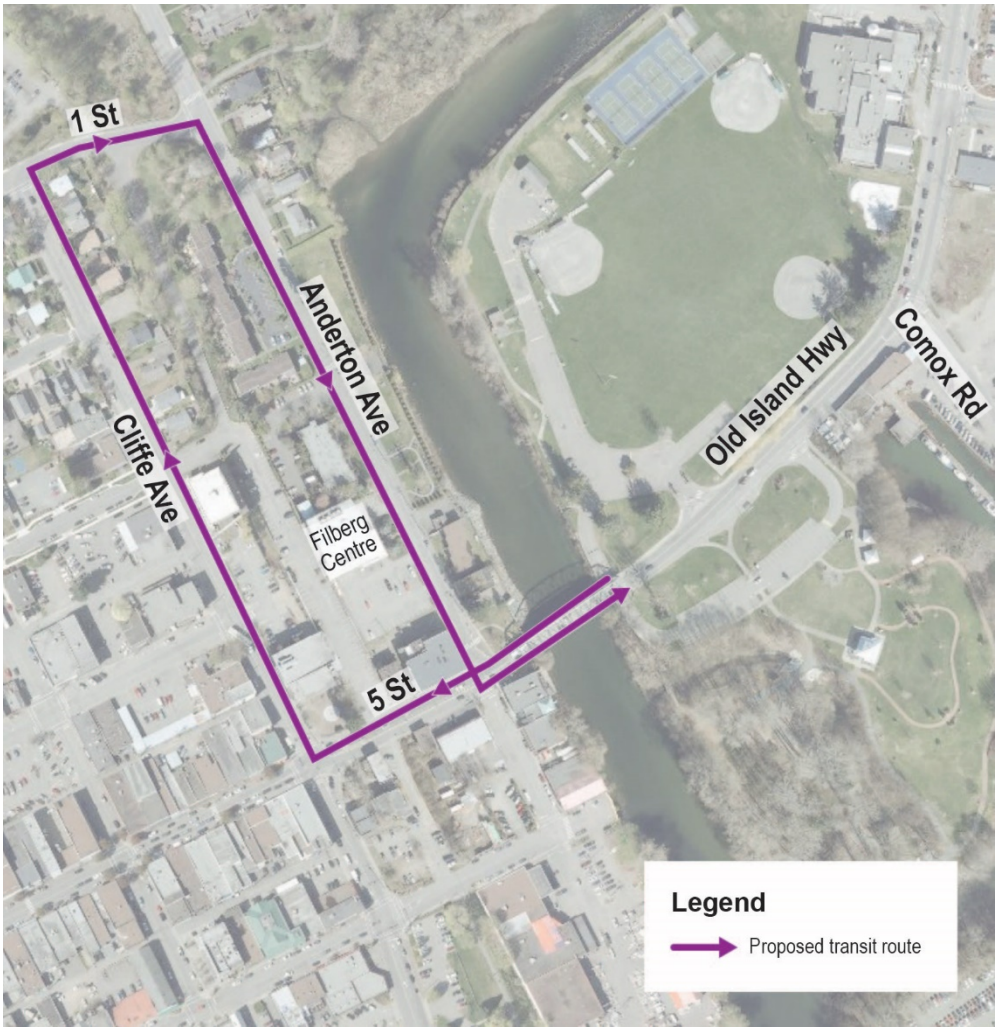


Figure 6-6: Transit Routes (West Side)

6.3 Pedestrians and Cyclists

Providing pedestrian and cyclist facilities for individuals to safely navigate during the construction phase is crucial. Good connectivity for pedestrians and cyclists will not only ensure the users' safety but also encourage individuals to choose walking or cycling instead of driving and help reduce congestion.

The Fifth Street Bridge currently allows pedestrians and cyclists on both sides of the bridge. On the west (downtown) side of the bridge, there is a pathway underneath the bridge that connects to Anderton Avenue. On the east side of the bridge, there is a pathway underneath the bridge connecting Lewis Park and Simms Millennium Park.

During construction, the bridge should maintain connections for pedestrians and cyclists on one side at a minimum. The south side is preferred because it involves fewer conflicting points between pedestrians and cyclists and vehicles on the west (downtown) end of the bridge.

It is recommended to maintain the underpass on both sides of the bridge open for pedestrians and cyclists. However, some construction activities may necessitate a closure. Use of shipping containers or another method to separate pedestrians and cyclists from construction activities and protect them from any overhead work occurring on the underside of the bridge could be considered to enable pedestrians and cyclists to use the underpass while there is construction in the vicinity. Shipping containers are frequently used to protect pedestrians from overhead hazards when there is construction adjacent to the sidewalk and the sidewalk would otherwise need to be closed. However, the bridge has very low clearance and there may not be sufficient space for a shipping container.

If the underpass needs to be closed to pedestrians and cyclists, use of flaggers on the Lewis Park side to direct their movements and facilitate crossing of 5th Street should be considered. However, it is important to note that each crossing of 5th Street on the Lewis Park side will impact the single lane alternating operation and reduce the vehicular capacity. Therefore, closing the underpass to pedestrians and cyclists on the Lewis Park side should be considered a less desirable solution and only utilized if absolutely necessary and/or for a limited period when there is work occurring in the immediate vicinity of the underpass.

On the downtown side pedestrians and cyclists can cross Anderton Avenue, then 5th Street. The proposed operation of the single lane alternating traffic with vehicles entering downtown using 5th Street while traffic exiting downtown using Anderton Avenue will result in opportunities to cross both roads with no conflicting traffic.

6.4 Traffic Control Methods

During the daytime peak period (between approximately 7:00am and 7:00pm), use of traffic control people on both sides of the bridge to direct traffic and facilitate the single lane alternating is recommended. Traffic control people are better able than temporary traffic signals to respond to variations in traffic demand to maximize the throughput of the bridge. Additionally, they can adjust the traffic control to prioritize emergency services and transit. **Figure 6-7** illustrates the locations of the traffic control people. Additional traffic control people may be required to monitor signs and the detour operations.

Figure 6-7: Locations of Flaggers (Peak Periods)

On the west (downtown) side, the traffic control person will manage the single lane alternating traffic to ensure the westbound traffic flows through the 5th Street and Cliffe Avenue intersection and doesn't back up to the bridge. They will also ensure emergency services and transit gets priority access to the bridge.

On the east side, the traffic control person will manage the single lane alternating traffic and monitor park usage and prevent short-cutting traffic, which is discussed in detail in *Section 6.6.2*.

During off-peak periods, the traffic volumes are much lower, and a temporary signal can be used instead of traffic control people on both sides of the Fifth Street Bridge. The signal's cycle length will be determined following the recommendations from the Ministry's *Traffic Management for Work on Roadways (2015)*.

This document was prepared based on the assumption that the bridge can only accommodate one travel lane during the construction phase, therefore, flaggers/temporary signals will be required at all times during the construction phase. If the contractor is able to open both travel lanes during part of the day, it is recommended to open both lanes during the daytime and return to single-lane alternating at night with temporary signal on both ends of the Fifth Street Bridge.

6.5 Intersection Modifications

Intersection modifications have been identified in the immediate vicinity of the Fifth Street Bridge, plus on the wider road network to accommodate the change in traffic patterns associated with more traffic using the 17th Street Bridge and the Piercy Bridge. These changes will include both signal optimization and layout modifications.

6.6 Signal Optimization

Signal optimization (phase/cycle length and phasing changes) are recommended for a number of MoTI and City of Courtenay intersections to best accommodate the traffic patterns during the construction phase. Intersections recommended for signal optimization by priorities include:

High Priority

- 5th Street & Cliffe Avenue
- 5th Street & Comox Road
- 17th Street & Cliffe Avenue
- 17th Street & Comox Road

Medium Priority

- Old Island Highway & Ryan Road
- Ryan Road & Highway 19A
- Cliffe Avenue & Westerly Access Road
- Cliffe Avenue & 6th Street

Low priority

- Rest of the signalized intersections in Courtenay

Locations ranked as high priority mean that their signal timings would require to be re-timed to ensure the detour traffic can flow through the Fifth Street Bridge and 17th Street Bridge efficiently. Locations ranked as a medium priority mean that these locations will likely require signal re-timing to best accommodate the traffic patterns at a network level. Locations ranked as low priority mean that these locations will not likely require immediate signal re-timing. They can be monitored throughout the construction phase on an as-needed basis.

In particular, the signal at the intersection of 5th Street & Cliffe Avenue should operate concurrently with the flagger/temporary signal at the Fifth Street Bridge to allow westbound traffic (traffic entering Downtown Courtenay) to flow through without stopping. This

operation can be achieved by having a fixed cycle length that is consistent with the single lane alternating operating time and appropriate timing splits during peak periods and off-peak hours.

The signal controllers are anticipated to have the capability of handling revised signal timings and different timing plans by time-of-day; however, this needs to be confirmed. If the controllers do not have this ability, queues and congestion are likely to be greater than forecast in this strategy. In particular, if the 5th Street & Cliffe Avenue controller cannot be optimized for the single lane alternating, it may result in reduced capacity across the bridge during construction. An alternative would likely require the use of temporary signals at this intersection.

Among the four intersections that are ranked as high priority, the two signals under the City's jurisdictions could be considered for an upgrade. According to the findings from the *City of Courtenay Traffic Controller Condition Assessment Report (2018),* prepared by PBX Engineering, the signal controllers at the intersections of 5th Street & Cliffe Avenue and 5th Street & Comox Avenue are recommended to be upgraded to a newer standard. While the two MOTI's signals (17th Street & Cliffe Avenue and 17th Street & Comox Road) were not reviewed as part of the PBX's report. All four signals should be assessed and may benefit from upgrades as needed prior to the construction phase.

6.6.1 Turn Restrictions/Modifications

In addition to the signal optimization outlined above, some turn restrictions or intersection modifications were identified. These changes will enable the intersections to operate as efficiently as possible with the change in traffic patterns.

<u>Cliffe Avenue and 5th Street</u>

Since no traffic will be permitted to access the bridge via 5th Street, 5th Street should be restricted to local traffic only at Cliffe Avenue. As illustrated in **Figure 6-8**, all traffic travelling towards the bridge on 5th Street would be directed to turn onto Cliffe Avenue. The left-turn restriction from 5th Street to Cliffe Avenue would be removed. Vehicles will be still permitted to access the businesses in the block between Cliffe Avenue and Anderton Ave but will have to turn right onto Anderton Avenue rather than cross the bridge.

Figure 6-8: 5th Street and Cliffe Avenue Modifications

Anderton Avenue and 6th Street

Anderton Avenue should be restricted to local traffic and large trucks at 6th Street since no general-purpose traffic will be permitted to access the bridge from this side of Anderton Avenue. Any vehicles visiting a business in this block of Anderton Avenue would need to turn around and return to 6th Street.

Anderton Avenue and 5th Street

As shown in **Figure 6-9**, traffic would be permitted to make the left-turn from Anderton Avenue on to the bridge since this is the proposed queue storage location for general purpose traffic. No traffic entering downtown would be permitted to make a right-turn to Anderton Avenue. On the south side of Anderton Avenue buses and emergency services will be permitted to make a right turn from Anderton Avenue on to the bridge, but no general traffic. The configuration of the concrete barriers on Anderton Avenue may need to be adjusted to facilitate the right-turn from the bridge to Anderton Avenue.

Figure 6-9: Anderton Avenue and 5th Street Modifications

Old Island Highway and Comox Road

The southbound left-turn lane from Old Island Highway to Comox Road would need to be temporarily extended to facilitate the increase in traffic using the 17th Street Bridge.

Comox Road -Puntledge Road to Tsolum Road

Some access management to allow a smoother traffic flow during the construction phase and also minimize confusion and challenges with travelling through traffic cones is recommended for Comox Road from Puntledge Road to Tsolum Road as illustrated in **Figure 6-10**. Specifically restricting the following accesses to right-in, right-out only: Puntledge Road, the south driveway to the Lewis Recreation Centre/Outdoor Pool, and the driveway to National Car and Truck Sales. All turning movements would be permitted at the Tsolum Road/north driveway to the Lewis Recreation Centre.

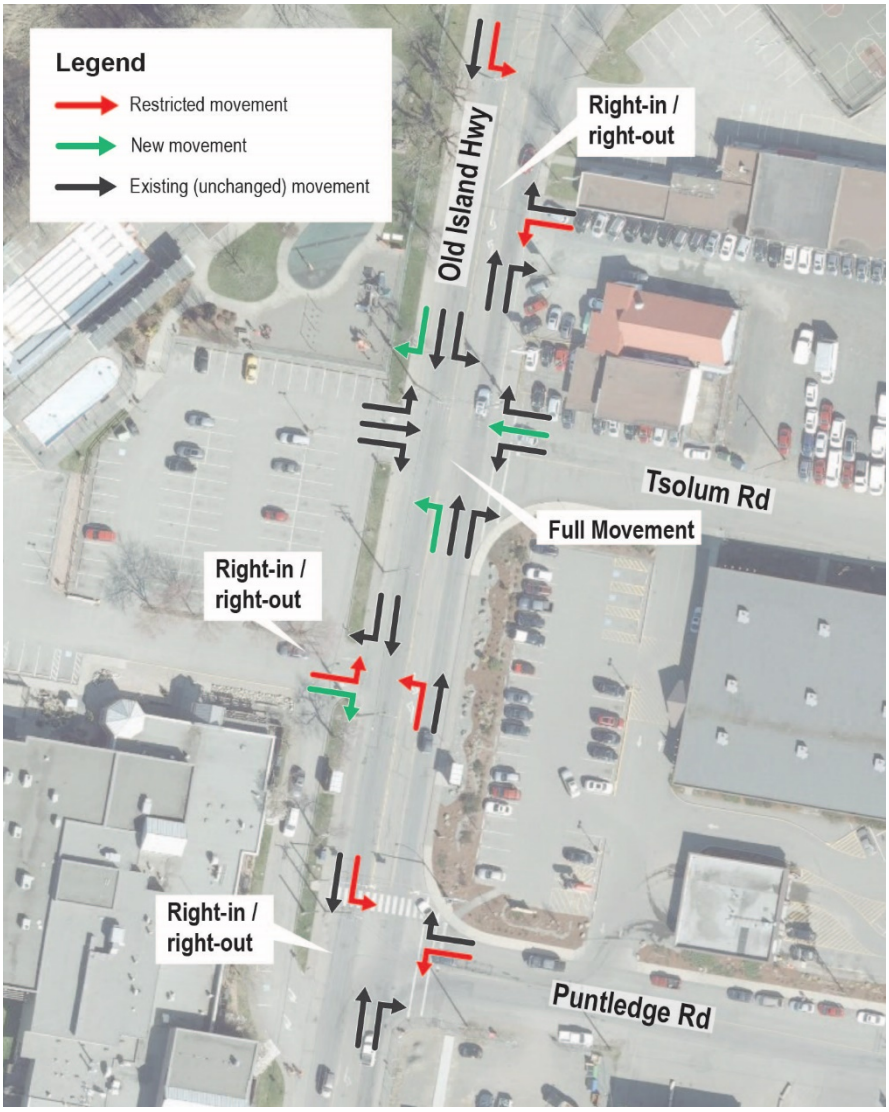


Figure 6-10: Comox Road Modifications

6.6.2 Park Access and Traffic Management

Currently there are parking lots on either side of 5th Street for Simms Millennium Park and Lewis Park. Access to these parking lots is restricted to right-in, right-out using median islands. Motorists are able to enter/exit in any direction to/from 5th Street by using the underpass between the two parks. These parking lots have a number of potential uses during the construction phase including: parking for park users, facilitating Park-and-Ride/Walk/Bike to reduce single occupancy vehicles, and/or construction staging.

The priority vehicle lane can be utilized by motorists accessing these parking lots to avoid being stuck in any congestion. However, to prevent abuse of the priority vehicle lane closing the right-out from Lewis Park to the bridge is recommended.

The underpass between Lewis Park and Simms Millennium Park is currently open to all modes including pedestrians, cyclists, and vehicles (with height restrictions). During the construction phase, it may be necessary to close the underpass to facilitate construction. (However, opportunities to maintain access for pedestrians and cyclists throughout construction by providing protection from construction activities/overhead hazards should be considered. This is discussed further in *Section 6.3*.)

Underpass Open to Vehicular Traffic

If the underpass is open to vehicular traffic, individuals can choose to park at either Lewis Park or Simms Millennium Park. The right-out access from Lewis Park to the bridge should be closed to prevent short-cutting traffic using the park to bypass the traffic queues on 5th Street/Old Island Highway.

Underpass Closed to Vehicular Traffic

If the underpass is closed to vehicular traffic, maintaining the right-out restriction from Lewis Park is still recommended. To enable users to exit the Lewis Park parking lot, either the concrete median would need to be reconfigured, or a flagger positioned to enable 2-way traffic (right-in, left-out) to use the existing entrance.

For the Simms Millennium Park parking lot users would only be able to access the parking lot by first crossing the bridge based on the current island configuration. This means that the trips destined to this park cannot use the westbound queue jumper lanes to prevent short cutting traffic.

The travel routes under these scenarios are illustrated in **Figure 6-11**. A hybrid scenario that closes the underpass for a portion of the construction and maintains the connection for the rest of the phase can also be considered.

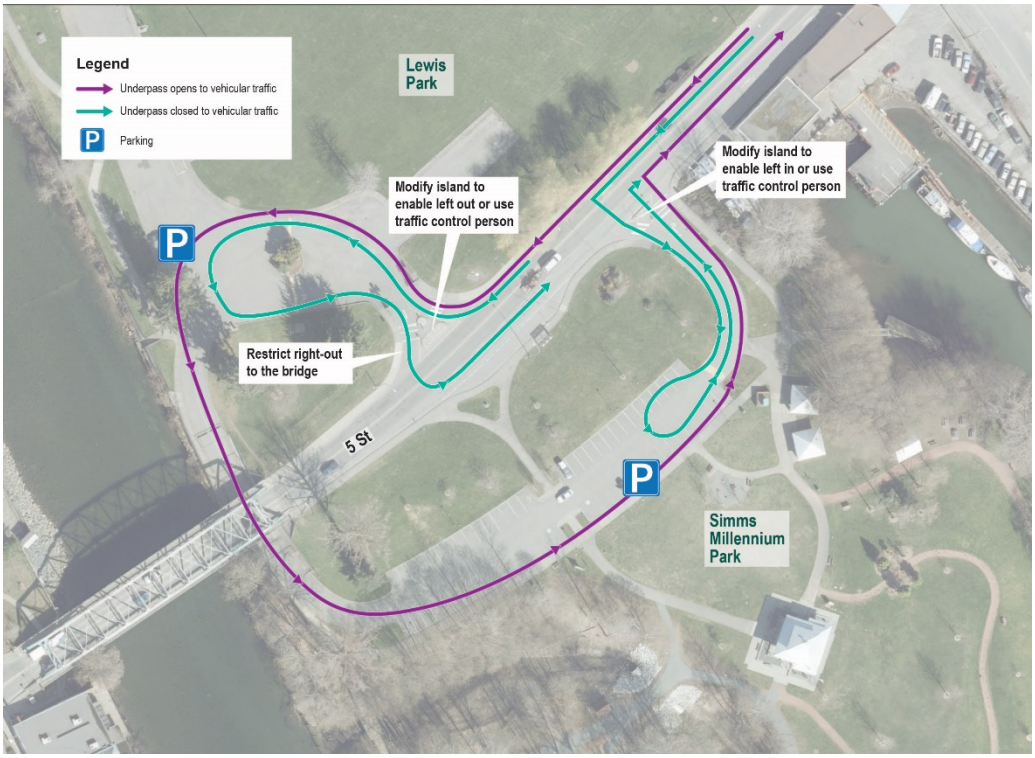


Figure 6-11: Park Access Routes

The strategies for traffic management described in this document are designed for the regular times during the construction phase. During special events that take place at the parks, special considerations will be given on case by case basis.

6.6.3 Laneway Between Cliffe Avenue and Anderton Avenue

If the laneway between Cliffe Avenue and Anderton Avenue is used as a queue storage location some minor improvements should be made including basic asphalt patching at the corner from the 3rd Street to the laneway, signage indicating the laneway is 1-way only, and some brush clearing to improve sightlines at the exit from laneway at 1st Street along with the addition of a stopbar and stop sign.

6.7 Travel Time Forecast

Forecasts of the potential delay associated with the construction activities have been developed. These forecasts represent the average delay during the PM peak hour on a typical day and assuming no one switches to a different mode or shifts their travel to another time of day. Depending upon daily fluctuations, weather and a variety of other factors, some motorists are likely to experience more delay while others may experience less delay.

6.7.1 General Purpose Traffic

The travel time for general purpose traffic was forecasted based on a trip between the north of the intersection of Back Road and Ryan Road and the intersection of Cliffe Avenue and 13th Street as shown in **Figure 6-12**. As shown in

Table 6-1, motorists are anticipated to experience 6 to 10 minutes of additional delay.

Figure 6-12: Travel Time Origin and Destination for General Purpose Traffic

Direction	Pre-construction	During Construction	Change
Entering Downtown (Ryan Rd to Cliffe Ave)	9 minutes	15 minutes	6 minutes
Leaving Downtown (Cliffe Ave to Ryan Rd)	7 minutes	17 minutes	10 minutes

Table 6-1: Travel Time for General Purpose Traffic

6.7.2 Transit

The travel time impacts for transit were also assessed. The transit assessment is based on a bus starting at the intersection of Old Island Highway and Ryan Road, entering downtown, then returning to the same start point as shown in **Figure 6-13**, below. Transit is anticipated to experience approximately 5 minutes of additional delay, as shown in **Table 6-2.** However, if there is congestion on the wider network the overall impact of the construction on transit could be more significant.

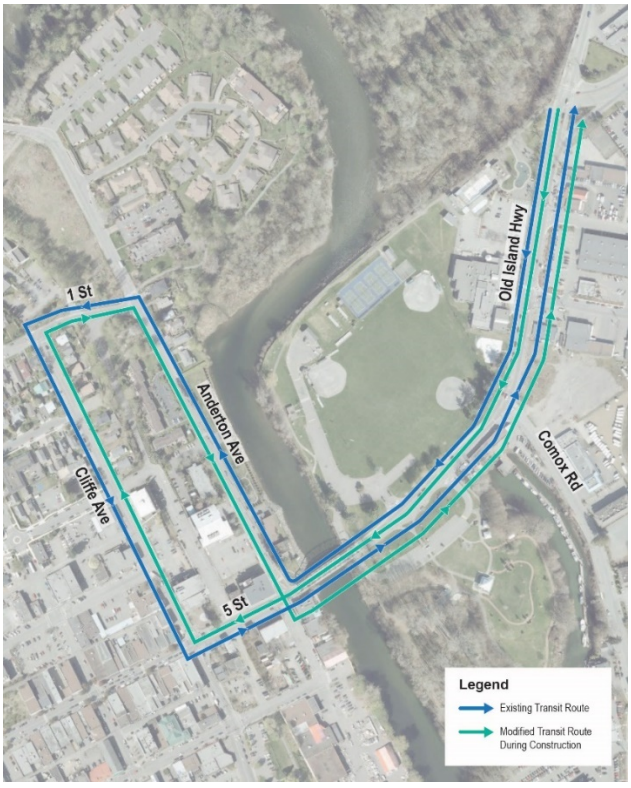


Figure 6-13: Travel Time Route for Transit

Route	Pre-construction	During Construction	Change
5th St/Ryan Rd to Downtown and return	5 minutes	10 minutes	5 minutes

Table 6-2: Travel Time for Transit

7.0 Transportation Demand Management

Transportation demand management (TDM) refers to strategies that influence travel behavior. Opportunities to use TDM approaches to address challenges during the bridge rehabilitation works are explored in the following sections, both in terms of shifting travel demand to mode/options that are less impacted and shifting travel demand to off-peak periods.

7.1 Mode Shift

A number of opportunities to facilitate and support shifting travel to modes that are less impacted by the bridge rehabilitation have been identified.

7.1.1 Park-and-Ride

Park-and-ride would require establishing and promoting parking locations available to commuters throughout the construction period. These could be located in both downtown/west Courtenay and east Courtenay, to facilitate park-and-ride activities in both directions over the bridge. Typical target parking areas may include public facilities or commercial sites with under-utilized parking supply. Currently the Lewis Park/Simms Millennium Park parking lots have been identified as potential park-and-ride locations[7].

There are three travel options that may be considered for transporting individuals between the identified park-and-ride parking areas and key end destinations such as downtown Courtenay, North Island College and North Island Hospital. Important for all options is that they result in greater convenience and/or reduced travel time as compared to a single-occupant vehicle, which may be achieved by bridge traffic control facilitating priority vehicles and/or identified detour routes that are more effective than the Fifth Street Bridge.

The three opportunities are as follows:

1. **Transit** – Encourage use of route no.1 (Comox Mall / Anfield Centre) or other routes in east or west Courtenay that might access dedicated parking areas. A subsidy or free Transit could be provided for any passenger using the park-and-ride. For example, free Transit or a reduced fare could be provided for individuals boarding the bus at specified park-and-ride locations (such as Lewis or Millennium Simms Park). A dated

[7] It is difficult to predict the level of park and ride demand. It is our understanding that during weekdays Lewis Park has excess parking capacity which is likely to provide sufficient space for park-and-ride. Limited utilization of park-and-ride is anticipated during the evening or weekends however. However, if park-and-ride demand in Lewis Park exceeds capacity an area on the grass could be used as overflow as necessary.

voucher for a free or reduced fare return trip could be given to the individual to identify them as a park-and-ride user.

This approach has the benefit of utilizing an existing service and potentially exposing new users to transit which may encourage increased Transit use post construction. Transit service across the Fifth Street Bridge is very frequent which means minimal wait times, depending upon the park-and-ride location. However, this may cause some existing transit users to change patterns and start driving to the park-and-ride location to access the subsidy. If Lewis or Millennium Simms Parks are used for park-and-ride, motorists could use the queue jumper lane to reduce their travel time. The financial impact of providing a transit subsidy would depend upon the level of subsidy and the number of users.

2. **Rideshare** – Targeted communications could be used to encourage ridesharing and reduce the number of vehicles crossing the Fifth Street Bridge. Allowing high-occupancy vehicles to utilize the priority vehicle route/lanes could also be considered to further encourage rideshare. Creation of dedicated parking spaces at key end-point locations such as North Island College (outside peak semesters such as summer months) and some of the commercial areas along Ryan Road would also support rideshare. Some potential locations for priority parking spaces are illustrated in **Figure 7-1**.

   The parking spaces for rideshare will be subject to interest and cooperation from the property owners, including issues of liability. Temporary signage and information would need to be made available clarifying which areas of identified parking are available for rideshare and the conditions of using the parking area. For example, a maximum stay of 10 to 12 hours and rideshare activities only.

Figure 7-1: Potential Parking Locations for Rideshare

3. **Shuttle** – Consideration may be given to operating a shuttle service during the construction period operating between identified park-and-ride locations and key destinations. For this to be an appealing option the shuttle must operate throughout the day (or timed to align with key shift start/end time) and have high enough frequency to be competitive with driving. The daily cost to operate a shuttle is likely at least $1000[8] per day. This approach may be challenging to justify given the considerable operating cost over the project life and unknown demand. In many

[8] This is based on an assumed hourly rate of $100, a single vehicle and 10 hours of service (7:30am-5:30pm)

cases it might be more cost effective to provide a Transit subsidy rather than operate a separate shuttle.

7.1.2 Park-and-Walk/Bike

There is opportunity for dedicated parking spaces in Lewis Park, Simms Park and/or Lewis Recreation Centre that allow motorists originating east Courtenay and destined for downtown Courtenay to park in these locations and walk/bike over the Fifth Street Bridge to access downtown. If using park-and-bike, individuals would drive to the designated parking location with their bike on/in their vehicle, cycle to their destination, secure their bike at their destination then cycle back to their vehicle at the end of the day. This option will not appeal to all motorists as the walk/bike trip may be further than many are willing to make or they lack secure bicycle parking at their destination. Traffic accessing the parking lots could be permitted to utilize the priority vehicle lanes which would provide a time savings and incentive to bike/walk across the bridge.

7.2 Time-of-Day Travel

Opportunities will be identified to encourage travel outside peak periods to minimize congestion during busy times. The following are opportunities that may be explored:

- Options to stagger work shift times to avoid peak congestion periods
- Altering school or post-secondary class / bell times to avoid peak congestion periods
- Ensuring elective activities and special events are scheduled outside peak periods where possible

Another approach taken will be to explore opportunities to encourage working from home to avoid the need to travel altogether. This may be pursued by encouraging / incentivizing individuals throughout the Comox Valley to work remotely and/or by working with some the of the larger employers and organizations to encourage working remotely among their employees.

8.0 Communications

Construction has potential to impact a variety of stakeholders and residents. As a result, strategic and timely communications will be an important mitigation effort to assist in minimizing impacts to the community. Proactive communications will occur throughout all stages of construction in an effort to mitigate impacts to the travelling public and to adjacent areas.

A detailed communications plan will guide communications prior and throughout construction to keep the public informed and to appropriately anticipate and respond to unplanned issues.