

Coquitlam Cross-town Bike Route –  
Improving Bicycle Facilities in a Mature Suburban Environment

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**Abstract**  
**Coquitlam Cross-town Bike Route – Improving Bicycle Facilities in a Mature Suburban Environment**

In May 2010, City of Coquitlam Council approved, in principle, a proposed cross-town bicycle route for implementation as part of its strategic goals of strengthening neighbourhoods and enhancing the sustainability of city services and infrastructure. The cross-town bicycle route (CTBR) is 17 km long and connects northeast Coquitlam to a multitude of destinations through southwest Coquitlam.

Approximately 60 percent of the route is located on existing bicycle routes, with the remainder located on designated future routes or on low-volume local street. However, six sections were identified, primarily where the route has to cross major Arterials roads that required more analyses to address safety and improve the quality of the cyclists' experience.

Challenges included:

- transitioning between multi-use paths and on-street facilities,
- having bike paths safely cross multi-lane arterials and on-ramps,
- providing guidance and facilities when an on-street route makes a 90 degree turn
- reducing conflicts where multi-use paths cross intersections, particularly channelized right turn lanes
- placement of bollards on multi-use paths

Insufficient guidance on some of these issues was provided in current standards, and practices were inconsistent even along the bike route itself. Opus conducted a cycle-through with stakeholders, reviewed geometrics and signing, and conducted a best practices review. Based on these tasks, we developed solutions including signing, pavement marking and geometric changes to best accommodate cyclists in this constrained environment. Solutions included property dedications for off-street routes, recommendations for wayfinding, "branding" of the route, more consistent design standards, and diagrammatic directional signage at confusing transitions. A Functional Plan was prepared to recommend bike facilities, pavement marking and signage plans, cost estimates and a technical brief summarizing the findings, with associated drawings. The plan was well received by cycling advocates and will be used to identify short term improvements, long-term improvements, modifications to standards and needed dedications with redevelopment.

# 1 Study Background

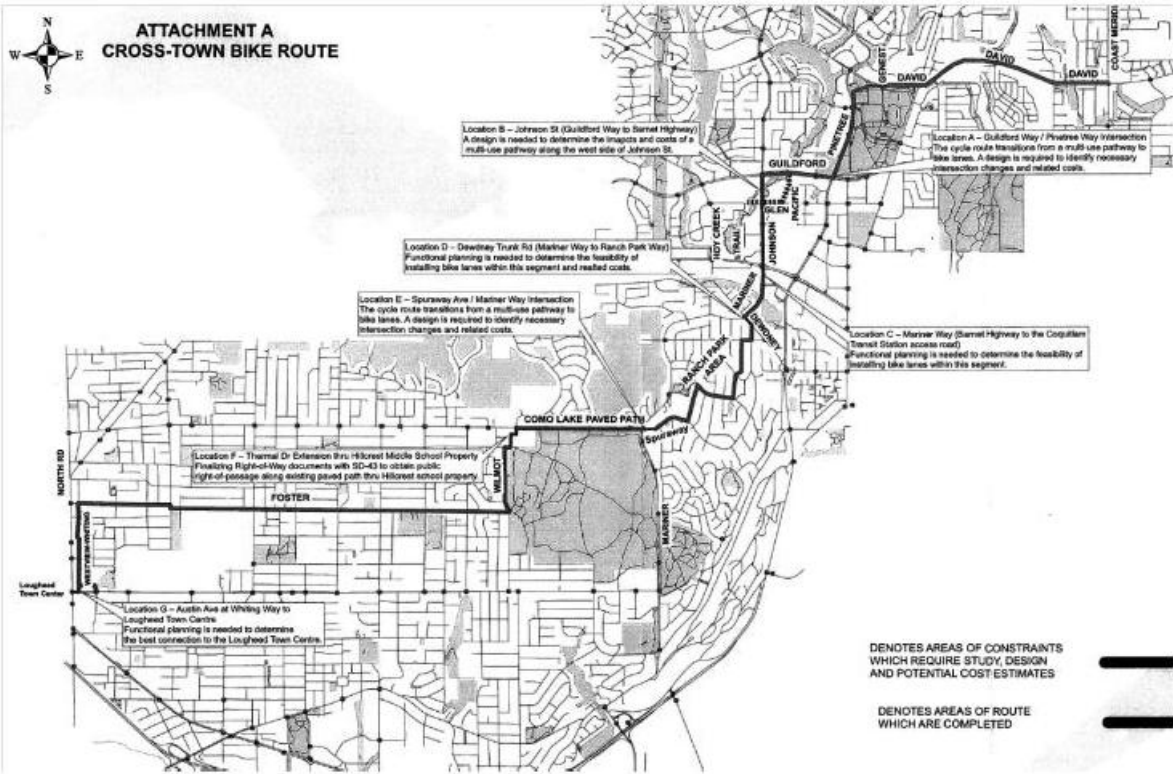
## 1.1 Introduction

In May 2010, City of Coquitlam Council approved, in principle, a proposed cross-town bicycle route for implementation as part of its strategic goals of strengthening neighbourhoods and enhancing the sustainability of city services and infrastructure. The cross-town bicycle route (CTBR) is 17 km long and connects northeast Coquitlam to a multitude of destinations through southwest Coquitlam.

Approximately 60 percent of the route is located on existing bicycle routes, with the remainder located on designated future routes or on low-volume local streets mainly in the Ranch Park Neighbourhood. The sections of the route through the Ranch Park Neighbourhood (i.e. Norman Avenue, Saddle Street, Daybreak Avenue, Armada Street, and Spuraway Avenue), as well as Wilmot Street were completed in 2010.

Additionally, enhanced signage and cross-walk treatments were recently implemented on the existing multi-use pathway along the east side of Pinetree Way to provide connections from the existing bike lanes on David Avenue to the Guildford/Pinetree intersection.

**Figure 1 Cross Town Bike Route**



(Source: City of Coquitlam)

## 1.2 Objectives

Upon completion of the sections mentioned above, staff reviewed the proposed cross-town bike route and identified a number of route sections that deserve more detailed analyses to incorporate best practices, address safety, wayfinding and improve the quality of the cyclists' experience. Accordingly, the City retained Opus to provide the following services:

1. Review issues identified by the City
2. Review the existing bike route and confirm those issues, possibly identify others
3. Develop solutions to address those issues, and conduct a high-level evaluation
4. Functional planning to ascertain recommended bike facilities for the City-identified missing link sections
5. Functional planning, including pavement marking and signage plans for missing links
6. Cost estimates for geometric solutions proposed
7. Technical brief summarizing findings, with associated drawings (PDF and ACAD)

These tasks, and others as agreed upon through the course of the study, are collectively referred to as the Cross Town Bike Route Functional Planning Study (Study).

## 2 Identification of Issues and Solutions

A number of site visits were held and various literature reviewed to better understand challenges facing the CTBR. A key element of the process was a cycle-through audit with stakeholders. Stakeholders included the consulting team (engineers and landscape architects) regional transportation authority, staff of the City of Coquitlam, and members of HUB, a cycling advocacy group. This range of perspectives and solutions contributed to the solutions identified.

The audit provided the opportunity to:

- Review the existing completed bike route and identify any safety, operational or consistency concerns
- Identify any additional gaps in the existing completed bike route
- Review the safety of various design alternatives for the identified gaps (both by the City and those found during the cycle-through) in the bike route
- Discuss the above tasks with City staff, members of TransLink and HUB.

The CTBR is shown below in Figure 1.

### 2.1 Literature Review

In addition to the two site visits a desktop review of leading bicycle design guidelines and practices were consulted. Literature consulted included:

- Bikeway Traffic Control Guidelines for Canada, Second Edition (TAC, 2012)
- NACTO Urban Bikeway Design Guide (NACTO, 2011)
- Planning and Design for Pedestrians and Cyclists (Velo Quebec, 2010)
- Minnesota DOT Bikeway Facility Design Manual (MNDOT, 2007)

- Oregon Bicycle and Pedestrian Design Guide, Third Edition (Oregon DOT, 2011)
- Technical Handbook and Bikeway Design (Velo Quebec, 1992)

## 2.2 Common Issues

The results of the cycle through were used to identify issues that might affect cyclist comfort and safety. The report noted several repeating challenges facing the CTBR, including a lack of guidance for motorists and cyclists and/or dedicated on-street bicycle facilities at:

- Right-turn channelizing islands
- Left-turns at major intersections
- Crossings for separated facilities at major and minor intersections
- Wayfinding

The results of the literature review were used to develop innovative solutions that were appropriate to the context of Coquitlam.

### *Right-turn channelizing islands*

The CTBR crosses several intersections with right-turn channelizing islands. Where on-street bike paths approach dedicated right-turn lanes, guidance should be given so that cyclists are aware that they should retain their position in the through lane. Motorists should be provided indication that cyclists could be weaving. The preferred design for this is provided in *Bikeway Traffic Control Guidelines for Canada, Second Edition*, (February 2012, Transportation Association of Canada)

Where off-street bike-paths meet channelizing islands, the off street path often crossed at an angle that made the cyclists less visible to drivers. A review of the literature indicated that the path should be curved to meet the channel at a right angle. This has the advantage of slowing cyclists, and allowing them to cross at an angle where they will be more visible to drivers. An example is shown in FIGURE 2.

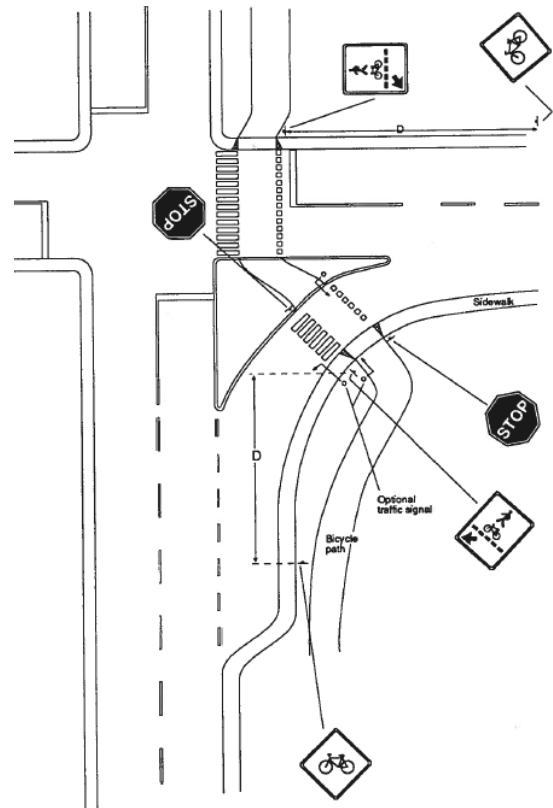


FIGURE 2 Recommended crossing of an off-street path at a channelized Right Turn lane (Source Velo Quebec, 1992)

### *Left-turns at major intersections*

The CTBR turns left (or requires such a movement) at several major intersections, where only limited signage and pavement markings are in place to guide cyclists. A review was conducted of methods available to address safety and wayfinding concerns for these maneuvers. A summary of this evaluation is shown in TABLE 1.

Due to the relatively complex nature of these movements for most cyclists, two-stage crossings which make use of pedestrian landing areas or right-turn channel islands as refuges was recommended. Wayfinding signage, crossbike crossings and expanded landing areas (with wider letdowns if appropriate) were recommended to facilitate these two-stage turns. Wayfinding signage and a dashed line break in the on-street bike lane line upstream of the left-turn movement are recommended to accommodate advanced cyclists. Additional custom signage, shown in FIGURE 3, should also be considered where left-turning cyclists make two-stage turns



**FIGURE 3 – Example of a custom sign for a two-stage left-turn**

### *Crossings at major and minor intersections*

Cyclists are required to transition from shared-use off-street facilities to on-street facilities at several locations on the CTBR, including driveways, minor intersections, and major intersections with channelized right-turns.

A primary challenge of these transitions is to safely permit cyclists to remain on their bicycles while crossing the intersection. Only limited guidance is available for transitions at these types of intersections. Crossbike markings, along with supplemental warning signs, which the City has already installed at intersections on David Avenue, are recommended for most crossings at intersections. Crossbikes provide cyclists the opportunity to ride through an intersection, increase awareness of a crossing location for motorists, and are easy to implement. Though still relatively unknown, local municipalities, including Vancouver and North Vancouver, are increasingly embracing them.

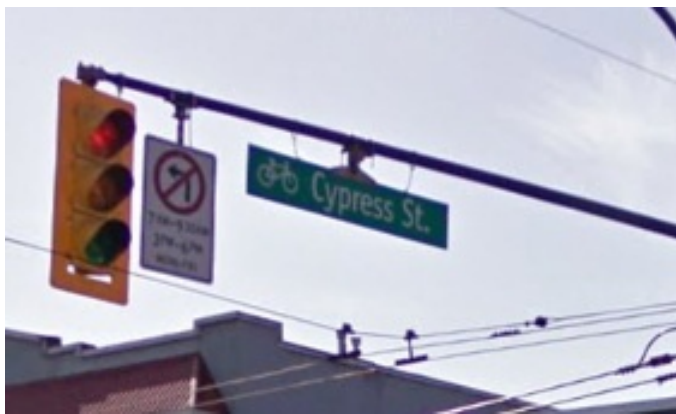
Additionally, there were two areas where a particularly challenging crossing was adjacent to land that was up for development. The CTBR review was very useful in identifying where developer contributions could significantly improve transitions for cyclists.

### *Wayfinding*

The CTBR involves many turns and transitions between dedicated on-street facilities on major road, shared facilities on minor roads, and off-street facilities. This presents a challenge for maintaining clear direction of where cyclists should be traveling as well as informing motorists that they may be sharing the roadway with a bike route. While wayfinding signage and pavement markings was in place on the CTBR, there were opportunities for improvements to make cycling the route a more safe and pleasant experience and in line with existing best practices.

*Major on-street facilities:* In general, the bike route is clearly defined on major routes where on-street facilities are provided. Confirmation signage is in place along these facilities (RB-90 signs); however, no branding of the route is provided. By adding a CTBR tab to the existing RB-90 signage, or replacing the existing signage with signage that includes appropriate branding, the City would enhance confirmation of the route for cyclists, awareness of the route for motorists, and passively market the route through consistent messaging throughout.

Directional signage is in place in advance of most turns in the route, though in areas with multiple options (e.g. westbound cyclists on Guildford Way approaching Johnson Street may continue west or turn left to continue on the CTBR) branding would help clearly delineate the route for cyclists. Similarly, overhead street name signs do not provide notice of the bike route, a common practice in many urban areas. An example from Vancouver is shown below in FIGURE 4.2.



**FIGURE 4 Bike route identification in Vancouver, BC**

*Minor on-street facilities (bicycle boulevards):* The city uses directional signs (without branding) in advance of most turns throughout the bike boulevard segments of the CTBR. Areas where directional signage is lacking are described in TABLE 4.1. Bike stencil pavement markings are used as a confirmation of the bike route for both cyclists and motorists.

The route would benefit from additional branded confirmation signage through these areas, especially after turns. Bike symbols on street name signs could also be provided. FIGURE 4 shows an example of this in the City of Vancouver.

Related to the issue of wayfinding was the use of inconsistent surfaces for multi-use paths. Many sidewalks looked like pathways, and many pathways had surfaces similar to sidewalks. This added to cyclist's confusion about correct route selection. Figure 5 shows an example of an off-street path that could be mistaken for a sidewalk.



### **3 Summary**

Recommendations were made to apply the solutions identified above in a uniform manner across the cross-town bike-route. Overall solutions included property dedications for off-street routes, recommendations for wayfinding, “branding” of the route, more consistent design standards, and diagrammatic directional signage at confusing transitions. A Functional Plan was prepared to recommend bike facilities, pavement marking and signage plans, cost estimates and a technical brief summarizing the findings, with associated drawings. The plan was well received by cycling advocates and will be used to identify short term improvements, long-term improvements, modifications to standards and needed dedications with redevelopment. By addressing the challenges at transition points, the City was able to further enhance the attractiveness and utility of an important cycling facility for Coquitlam.



## TABLES

**TABLE 1 Evaluation for Treatments for Left-turns at major intersections**

<i>Measure</i>	<i>Impact to travel modes</i>	<i>Ease of implementation</i>	<i>Safety</i>	<i>Cyclist comfort</i>
<i>Two-stage turn queue (bike) box (NACTO 2010)</i>	<ul style="list-style-type: none"> <li>▪ Increases delays for cyclists and motorists</li> <li>▪ Restricts RTOR movement for motorists</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low cost to implement</li> <li>▪ Ideally suited for locations where cross street has a parking or on-street bike lane</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduces turning conflicts between cyclists and motor vehicles</li> <li>▪ Reduces conflicts between pedestrians and cyclists in crosswalks and curb landing areas</li> </ul>	<ul style="list-style-type: none"> <li>▪ Improves cyclist comfort at major intersections</li> <li>▪ Some cyclists may feel exposed in the queue box</li> </ul>
<i>Two-stage turn with enhanced landing area</i>	<ul style="list-style-type: none"> <li>▪ Increases delays for cyclists</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low cost to implement</li> <li>▪ Requires large curb landing area with wide curb letdowns</li> </ul>	<ul style="list-style-type: none"> <li>▪ Cyclists and pedestrians must share the curb landing area and potentially a crosswalk</li> </ul>	<ul style="list-style-type: none"> <li>▪ Improves cyclist comfort at major intersections</li> <li>▪ Eliminates real or perceived exposure with queue box</li> </ul>
<i>Left-turn bike lane (TAC 2007)</i>	<ul style="list-style-type: none"> <li>▪ Minimal</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low cost to implement without a bike signal; significantly higher cost with a bike signal and bike box</li> </ul>	<ul style="list-style-type: none"> <li>▪ Requires cyclists weave across through travel lanes on a busy arterial or collector route</li> </ul>	<ul style="list-style-type: none"> <li>▪ Allows cyclists to navigate turn in one phase</li> <li>▪ Difficult maneuver even for advanced cyclists</li> </ul>
<i>Left-turn from right shoulder or cycle track (European standard)</i>	<ul style="list-style-type: none"> <li>▪ Significantly increases delays for motorists</li> </ul>	<ul style="list-style-type: none"> <li>▪ Very costly to implement</li> <li>▪ Requires bicycle signal and other signal equipment upgrades</li> </ul>	<ul style="list-style-type: none"> <li>▪ Slower cyclists that cannot complete the turn maneuver during the bike turning phase will be exposed to motorists</li> </ul>	<ul style="list-style-type: none"> <li>▪ Intimidating maneuver for many cyclists</li> <li>▪ Allows cyclists to navigate turn in one phase</li> </ul>

