

BROADWAY



Corridor Description

- The Broadway corridor connects multiple key north-south streets including Commercial Drive, Main Street, Cambie Street, and Granville Street.
- Broadway connects the Expo, Millennium, and Canada lines by serving the Commercial-Broadway and Broadway-City Hall stations.
- The surrounding neighbourhoods include key destinations like Vancouver City Hall, UBC, and Vancouver General Hospital.
- Broadway is the second largest employment corridor in British Columbia after the downtown Vancouver business district.

Quick Facts

Length	13.1 km
Subregion	Vancouver/UBC
Primary Routes	9, 99
All Routes	4, 8, 9, 14, 44, 84, 99, N8, N9, N17

Notes: Corridor ranked #1 for person-delay per km in Fall 2021. Profile area adds an extension to UBC. Ridership is reported for the location with the most cumulative passengers on-board the bus throughout the day. Broadway Subway construction likely had an impact on delay during this time period.

40
Maximum hourly bus trips per direction

1,750
Person-hours of delay per day

40,300
Total households (1,900/km² density)

37%
Low income households

33%
Zero vehicle households

11,700
Total ridership (daily load in one direction)

92
Bus-hours of delay per day

Demographics within 400m of corridor



Broadway, continued

Corridor Significance

- **Broadway is a well-served and well-utilized transit corridor.** During weekday peak hours, there is a bus every 2-3 minutes on Broadway. The 99 B-Line sees over 29,000 boardings each weekday. Nearly 60% of people traveling on some parts of Broadway are on buses during morning rush hours. Broadway ranks third among profile areas in the share of zero-vehicle households.
- **Bus performance along Broadway has an enormous impact on regionwide bus service.** More than 13% of Vancouver/UBC bus boardings start in this corridor. During heavier traffic, an end-to-end trip on Broadway can take nearly 13 minutes longer compared to a best-case trip, when the bus is able to move smoothly along the corridor. People experience a total of 1,750 person-hours of delay per day on Broadway, the highest of all profile areas.

Key Challenges for Bus Speed & Reliability

- Bus service continues to be important during and after the Broadway Subway extension.
- Construction of the Broadway Subway extension limits the lanes for vehicle travel and causes added delay for buses.
- Prior to construction, bus lanes were only active during peak-hours, in the peak direction. Existing peak hour bus lanes were removed between Main Street and Arbutus Street. Bus lanes continue to be active during peak-hours, in the peak-direction, east of Main St and west of Arbutus St. -Both before and during construction, bus lanes during peak hours only are insufficient in providing speed and reliability to those travelling during off-peak hours and on evenings and weekends.

Location of Common Causes of Bus Delay

Issue	Location(s)
Motorists turning left (or other delay from left-turns)	<ul style="list-style-type: none"> • EB University Blvd at Wesbrook Mall • EB/WB Broadway between Arbutus St and Alma St • EB Broadway at MacDonald St • EB/WB Broadway at Arbutus St • EB Broadway at Woodland Dr • EB Broadway at Commercial Dr
Motorists turning right (or other delays from right-turns)	<ul style="list-style-type: none"> • EB Broadway at Alma St • EB Broadway at MacDonald St • EB Broadway from Heather St to Kingsway • EB/WB Broadway at Clark Dr • WB Broadway from Kingsway to Main St • WB Broadway at Cambie St • WB Broadway at Hemlock St • EB/WB University Blvd at Wesbrook Mall
Roadway congestion	<ul style="list-style-type: none"> • Throughout the profile area, especially from Arbutus St to Granville St, and from Main St to Clark Dr
Re-entering traffic from bus stops	<ul style="list-style-type: none"> • Throughout the profile area, especially from Arbutus St to Granville St, Birch St to Kingsway, and at Clark Dr
Short spacing between bus stops	<ul style="list-style-type: none"> • EB Broadway from Main St to Kingsway • WB University Boulevard at Wesbrook Mall
Pedestrian movements (including pedestrian signals)	<ul style="list-style-type: none"> • EB/WB Broadway at University Blvd • EB/WB Broadway at Alma St • EB Broadway at MacDonald St • EB/WB Broadway at Clark St
Uncoordinated traffic signals	<ul style="list-style-type: none"> • Throughout the profile area at major intersections, especially between Alma St to Kingsway
HOV or bus-only lane violations	<ul style="list-style-type: none"> • EB Broadway from Granville St to Cambie St
Overhead trolley wire-related delays/conflicts	<ul style="list-style-type: none"> • EB Broadway at Alma St • EB Broadway at Fraser St

Broadway, continued



Key Opportunities



43

Signalized intersections along corridor



50+

Bus stops below spacing guidelines (50% of total)



10 km

New bus lanes (directional)

Map Callouts

- 1 Manage right-turning motorists that delay buses from exiting bus loop.
- 2 Coordinate traffic signals at major and minor intersections, especially between Arbutus St and Fraser St.
- 3 Manage left and right turns from Broadway to Cambie.
- 4 Consider relocating B-line stop between Main St and Kingsway.
- 5 Manage right turns from westbound Broadway to Clark Dr.
- 6 Manage northbound and southbound left turns.

Corridor-Wide Opportunities

- At the 43 signalized intersections along Broadway, solutions such as signal priority, signal coordination, or timing/phasing adjustments can help reduce delay.
- At the approximately 50 bus stops that are below spacing guidelines (300m) thoughtful removal or relocation could achieve more consistent spacing while maintaining access.
- Up to 10 km of new bus lanes could be added. Different types of lanes are appropriate in different contexts.

Further analysis is needed for all opportunities.

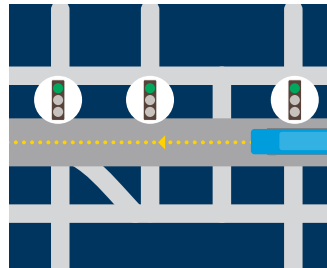
Broadway, continued

Considerations for Key Solutions



INTERSECTION OPERATIONS

Intersection operations can include providing active signal priority, passive signal priority, or adding a new traffic signal or signal phase that benefits the direction of bus travel, or coordinating signals along a corridor to prioritize bus travel and reduce delay.

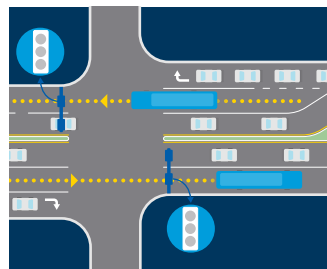


Passive signal priority includes coordinating/timing signals to create a “green wave” based on the expected speed of bus travel.



LEFT- AND RIGHT-TURN SOLUTIONS

Where right-of-way permits, turn solutions include dedicated turn pockets. Where right-of-way is limited, solutions include turn restrictions for general traffic but permitted for buses.

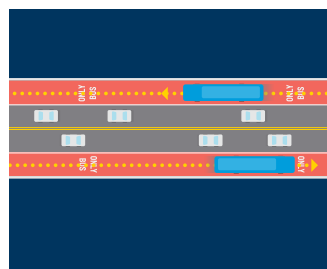


Turn pockets separate buses and motor vehicle traffic to reduce time spent by buses queuing behind general traffic. Consider turn pockets when turn volumes are high.

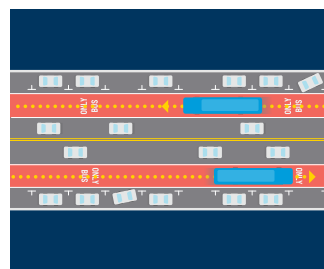


BUS LANES

Bus lanes can be implemented in context-specific solutions that consider traffic conditions, on-street parking and access to business and destinations; and integration with facilities for bicyclists or goods movements.

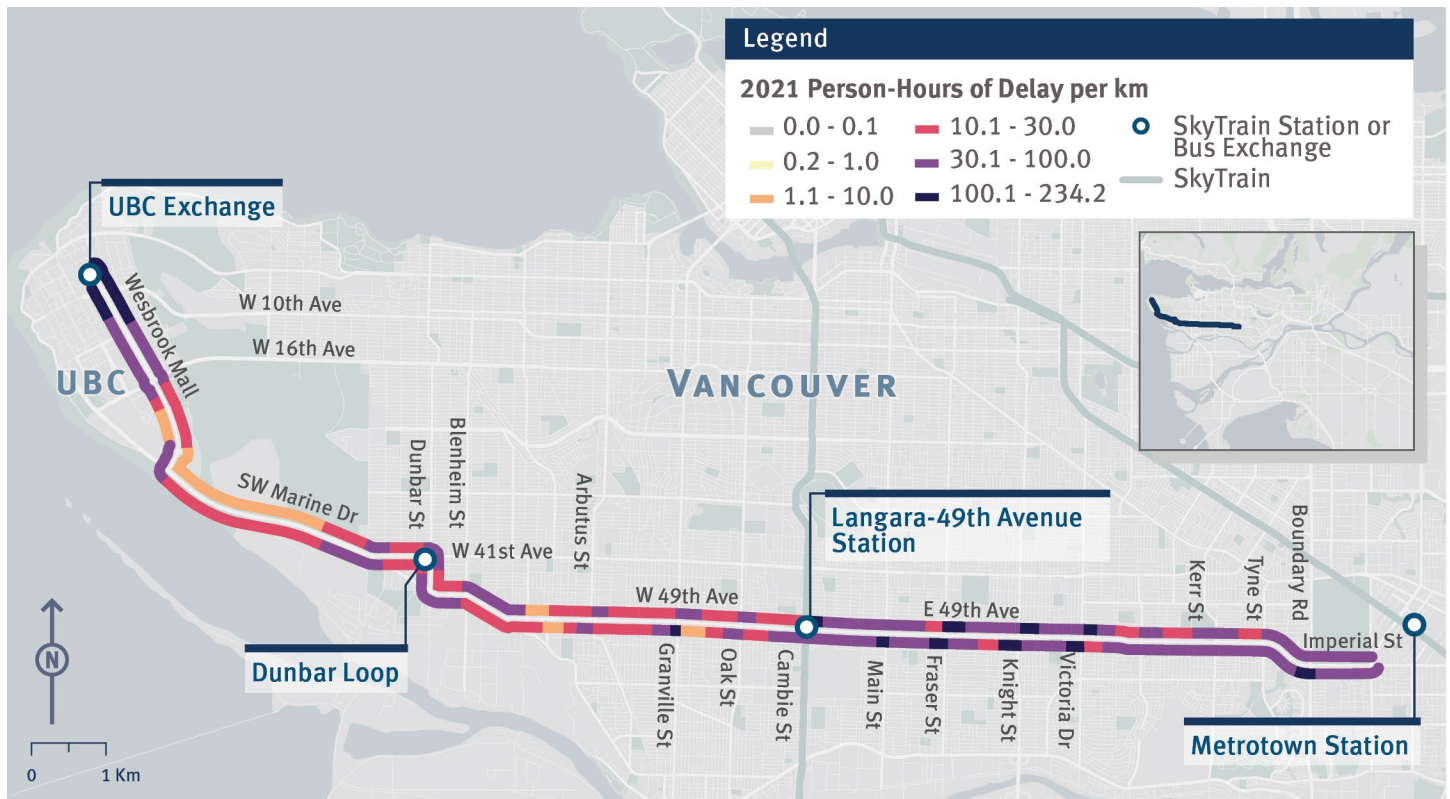


Curbside bus lanes can be full-time or part-time (peak hours). They are quick to implement but may have conflicts with right turning motor vehicle traffic and require enforcement and curb management to deter parking during operating hours.



Offset bus lanes (in commercial areas) run between an on-street parking lane and a through-traffic lane and preserve parking and loading along the curb. Bus bulbs used with offset bus lanes can provide additional space for passengers at bus stops and shorten pedestrian crossing distances.

49 AVE TO UBC



Corridor Description

- The 49 Ave corridor is served by lines 49 and 430 and directly connects the Expo and Canada Lines in serving the Metrotown and Langara-49th Avenue stations.
- The surrounding neighbourhoods feature key education destinations as the corridor serves multiple elementary and secondary schools, Langara College, and UBC.

Quick Facts

Length	19.9 km
Subregions	Vancouver/UBC, Burnaby/New Westminster
Primary Routes	49; 430, R4
All Routes	25, 26, 31, 33, 41, 49, 68, 430, R4

Notes: Consists of the Wesbrook Mall and 49 Ave corridors, ranked #3 and #5 for person-delay per km in Fall 2021, respectively. Ridership is reported for the location with the most cumulative passengers on-board the bus throughout the day; lower end of the range accounts only for routes using the corridor for at least 1 km and upper end of the range reflects all routes.



76

Maximum hourly bus trips per direction



1,740

Person-hours of delay per day



24,300

Total households (700/km² density)



39%

Low income households



11%

Zero vehicle households

Demographics within 400m of corridor

6,500-13,100

Total ridership (daily load in one direction)

76

Bus-hours of delay per day



49 Ave to UBC, continued

Corridor Significance

- **49 Ave is served by the second busiest bus route in the region.** Route 49 has over 22,000 boardings each weekday and provides an important east-west connection between the Canada and Expo lines, with 3,500 daily boardings at Langara Station and 2,900 daily boardings at Metrotown Station. Approximately 8% of bus journeys in Vancouver/UBC begin on 49 Ave. Approximately a third of people traveling along 49 Ave in the morning rush hours are on buses. And buses carry almost 50% of people travelling along Wesbrook Mall at peak hours. The share of low-income households along 49 Ave ranks third among profile areas.
- **49 Ave has the highest variability among areas profiled.** During heavier traffic, an end-to-end trip between Metrotown Station and UBC can take over 18 minutes longer compared to a best-case trip, when the bus is able to move smoothly.
- **A portion of 49 Ave is a proposed future BRT line in TransLink's 10-Year Priorities.** People travelling on 49 Ave experience a total of 1,740 person-hours of delay daily, the second highest of all profile areas. Improvements to reduce congestion on 49 Ave will improve reliability and support transit expansion in the future.

Key Challenges for Bus Speed & Reliability

- Narrow and lengthy corridor, often with one travel lane in each direction. Heavy demand for left and right turns at major intersections and minor intersections with few turn lanes.
- Parking permissions throughout the corridor are not consistent and conflict with peak periods of travel adding to delays throughout the corridor.
- Traffic signals, including pedestrian signals, are not coordinated which contributes to delay along the corridor.

Location of Common Causes of Bus Delay

Issue	Location(s)
Motorists turning left (or other delay from left-turns)	<ul style="list-style-type: none"> • SB Wesbrook Mall at SW Marine Dr • EB SW Marine Dr at Dunbar St • WB 41 Ave at Dunbar St • EB/WB 49 Ave at Arbutus St • EB/WB 49 Ave at Granville St • WB 49 Ave at Alberta St • EB/WB 49 Ave at Main St • EB/WB 49 Ave at Fraser St • EB/WB 49 Ave at Victoria Dr • WB 49 Ave at Elliot St • WB 49 Ave at Kerr St • EB 49 Ave at Tyne St • EB/WB 49 Ave at Boundary Rd • EB Imperial St at Willingdon Ave
Motorists turning right (or other delay from right-turns)	<ul style="list-style-type: none"> • NB Wesbrook Mall at Thunderbird Blvd • SB/NB Dunbar St at 41 Ave • EB/WB 49 Ave at Arbutus St • WB 49 Ave at Oak St • WB 49 Ave at Cambie St • EB/WB 49 Ave at Main St • EB/WB 49 Ave at Fraser St • EB/WB 49 Ave at Knight St • EB/WB 49 Ave at Victoria Dr • WB 49 Ave at Willingdon Ave

49 Ave to UBC, continued

Issue	Location(s)
Roadway congestion	<ul style="list-style-type: none"> • NB/SB Wesbrook Mall between University Blvd and SW Marine Dr • EB/WB from 41 Ave to Blenheim St via Dunbar St • EB/WB 49 Ave approaching major intersections including Arbutus St, Granville St, Oak St, Cambie St, Main St, Fraser St • EB/WB 49 Ave from Knight St to Kerr St • EB/WB 49 Ave from Tyne St to Willingdon Ave
Closely spaced driveways or other roadways	<ul style="list-style-type: none"> • WB 49 Ave at Elliot St
Re-entering traffic from bus stops	<ul style="list-style-type: none"> • WB 49 Ave at Blenheim St • WB 49 Ave from Macdonald St to Dunbar St
Location of bus stops	<ul style="list-style-type: none"> • EB 49 Ave at Fraser St • WB 49 Ave at Victoria Dr
Short spacing between bus stops	<ul style="list-style-type: none"> • EB 41 Ave from Alma St to Dunbar St • EB 49 Ave from Adera St to Granville St • EB 49 Ave at Fraser St • WB 49 Ave at Victoria Dr • WB 49 Ave from Knight St to Inverness St
Pedestrian movements (including pedestrian signals)	<ul style="list-style-type: none"> • SB Wesbrook Mall from W 16th Ave to Ross Dr • NB Wesbrook Mall from Agronomy Rd to University Blvd • SB/NB Dunbar St at 41st Ave • EB 49 Ave at Arbutus St • EB/WB 49 Ave at Langara-49th Station • EB/WB 49 Ave between Alberta St and Ontario St • EB/WB 49 Ave at Main St • EB/WB 49 Ave at Fraser St • EB 49 Ave at Knight St • EB 49 Ave at Victoria Dr • EB 49 Ave at Killarney St • EB 49 Ave at Kerr St • EB 49 Ave at Boundary Rd
Uncoordinated traffic signals	<ul style="list-style-type: none"> • SB Wesbrook Mall from W 16 Ave to Ross Dr • EB 49 Ave at Oak St • EB 49 Ave at Cambie St • EB/WB 49 Ave between Alberta St and Ontario St • EB/WB 49 Ave at Main St • EB/WB 49 Ave at Boundary Rd
Bus/bicycle interactions	<ul style="list-style-type: none"> • EB SW Marine Dr at Dunbar St • WB 49 Ave at Oak St • EB 49 Ave at Cambie St

49 Ave to UBC, continued

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49 Ave to UBC, continued



Key Opportunities



21

Signalized intersections along corridor



50+

Bus stops below spacing guidelines (50% of total)



22 km

New bus lanes (directional)

Map Callouts

- 1 Access to/from UBC Exchange at University Blvd.
- 2 Bus left-turn lane and signal to address SB delay.
- 3 Address delay for EB right-turns and NB left-turns.
- 4 Address delay for SB left-turns.
- 5 Potential for bus lane with offset stops to accommodate bike lane and/or queue jump.
- 6 WB queue jump from near-side stop and address EB delay due to left-turns.
- 7 Potential bus lanes or intersection treatments between Boundary and Willingdon.

Corridor-Wide Opportunities

- At the 32 signalized intersections, solutions such as signal priority, signal coordination, or timing/phasing adjustments can help reduce delay.
- At the approximately 50 bus stops that are below spacing guidelines (300m) thoughtful removal or relocation could achieve more consistent spacing while maintaining access.
- Up to 22 km of new bus lanes could be added. Different types of lanes are appropriate in different contexts.

Further analysis is needed for all opportunities.

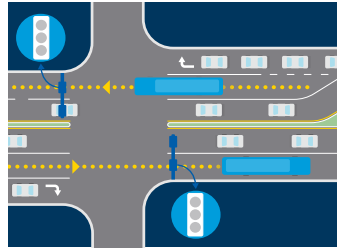
49 Ave to UBC, continued

Considerations for Key Solutions

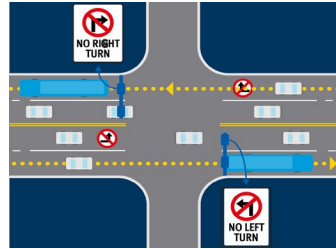


LEFT- AND RIGHT-TURN SOLUTIONS

Where right-of-way permits, turn solutions include dedicated turn pockets. Where right-of-way is limited, solutions include turn restrictions for general traffic but permitted for buses.



Turn pockets separate buses and motor vehicle traffic to reduce time spent by buses queuing behind general traffic. Consider turn pockets when turn volumes are high.

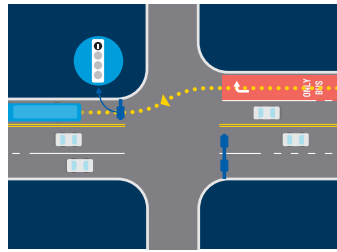


Turn restrictions limit left or right turns for general traffic to reduce delay for buses and other vehicles traveling along a corridor. Buses may be exempted from the restrictions.

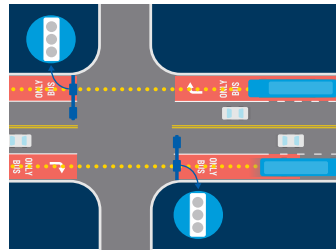


QUEUE JUMPS AND APPROACH LANES

Queue jumps and approach lanes should be implemented strategically and in combination with intersection operations and turn solutions. They are typically implemented when the right-of-way is too limited to create a whole bus lane.



Queue jump in right-turn lane or BAT lane without a receiving lane. A specialized **transit signal** and / or phase is required to help the bus transition back into traffic.

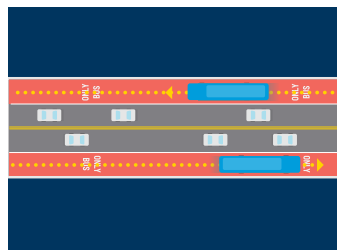


Queue jumps can be implemented **in the right-turn lane or BAT Lane**. Signal priority is not required but may be complementary.

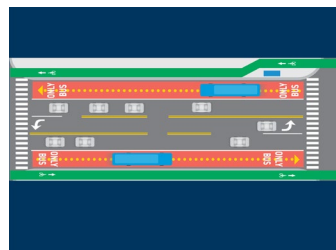


BUS LANES

Bus lanes can be implemented in context-specific solutions that consider traffic conditions, on-street parking and access to business and destinations; and integration with facilities for bicyclists or goods movements.



Curbside bus lanes can be full-time or part-time (peak hours). They are quick to implement but may have conflicts with right turning motor vehicle traffic and require enforcement and curb management to deter parking during operating hours.

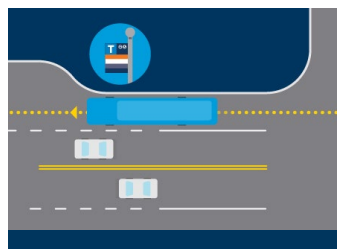


Bus lanes along bicycle routes can have floating bus stops so buses do not have to merge in and out of bike routes and pedestrians have a dedicated stop area.



IN-LANE STOPS

In-lane stops (also called “bus bulb” or “floating bus stop”) may be temporary platforms or paved extensions of the sidewalk. Both applications improve passenger visibility for the bus and reduce passenger conflicts with pedestrians on the sidewalks.



HASTINGS ST



Corridor Description

- Northernmost continuous east-west arterial across Vancouver and Burnaby, connecting neighbourhoods, employment, goods, services, and other destinations. Routes serve the Northeast Sector and North Shore.
- Direct connection to Barnet Hwy (extending furthest east to Port Moody, Coquitlam, Port Coquitlam, Maple Ridge, Pitt Meadows, and beyond) and Hwy 1 (extending to the City of North Vancouver and District of North Vancouver).
- Very high combined frequency of service: R5 RapidBus connects Downtown Vancouver and Simon Fraser University; many local bus routes serve parts of the corridor, including Route 130 through Burnaby Heights and Route 160 between Burnaby Heights and Port Coquitlam.

Quick Facts

Length	11.7 km
Subregions	Vancouver/UBC, Burnaby/New Westminister
Primary Routes	R5
All Routes	3, 8, 14, 16, 20, 28, 129, 130, 131, 132, 160, 222, R5, N8, N20, N35

Notes: Corridor ranked #4 for person-delay per km in Fall 2021. Ridership is reported for the location with the most cumulative passengers on-board the bus throughout the day; lower end of the range accounts only for routes using the corridor for at least 1 km and upper end of the range reflects all routes.

 47 Maximum hourly bus trips per direction	 1,200 Person-hours of delay per day	 27,000 Total households (1,500/km ² density)	 43% Low income households	 30% Zero vehicle households
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4,200-8,000
Total ridership (daily load in one direction)

96
Bus-hours of delay per day

Demographics within 400m of corridor



Hastings St, continued

Corridor Significance

- **Hastings is a well-served and well-utilized transit corridor.** The R5 RapidBus along with Routes 14, 16, and 20 operate through downtown Vancouver. R5 and Route 130 are the most heavily used bus routes in Burnaby. Combined, these five routes have more than 50,000 boardings each weekday. Buses on Hastings St arrive every 2-3 minutes or more often throughout the day. Entering downtown Vancouver, Hastings St has a bus mode share of more than 40% in the AM peak.
- **Performance on Hastings has an enormous impact on regionwide transit service.** The above routes, along with Route 160 serving Port Coquitlam, all serve FTN corridors that provide important connections to UBC and throughout the region. Hastings St ranks first in bus delay per kilometre among profile areas. During heavier traffic, an end-to-end trip between Kensington and Burrard Station can take over 13 minutes longer compared to a best-case trip, when the bus is able to move smoothly.
- **Social equity need along Hastings is significant.** Among profile areas, Hastings St ranks second for the share of low-income households and fourth for the share of zero-vehicle households.
- **Transit improvements are under consideration.** The Hastings Street Improvement Project is considering a range of mobility improvements along Hastings St in Burnaby. Upgrading R5 to a BRT line is identified in TransLink’s 10-Year Priorities.

Key Challenges for Bus Speed & Reliability

- Bottleneck at Hwy 1 affects the entire corridor. Westbound Hastings between Boundary Rd and Hwy 1 is a critical bottleneck to the North Shore (130) and Downtown Vancouver.
- Some intersections lack left-turn pockets or adequate right-turn lanes, contributing to delay for buses and all vehicles. Some left-turns are restricted in the PM peak.
- Mismatch between HOV lane hours across jurisdictions exacerbates compliance challenges. Current hours are not long enough to address delay at all times of day and on weekends.
- Timing of pedestrian signals affects overall signal coordination and flow of buses along the corridor.

Location of Common Causes of Bus Delay

Issue	Location(s)
Motorists turning left (or other delay from left-turns)	<ul style="list-style-type: none"> • WB Hastings at Inlet Dr • WB/EB between Gilmore Ave and Willingdon Ave • WB/EB between BC-1 and Victoria Ave
Motorists turning right (or other delay from right-turns)	<ul style="list-style-type: none"> • WB/EB at Willingdon Ave • WB/EB at Gilmore Ave • WB/EB at Renfrew St • WB at Nanaimo St • WB/EB at Clark Dr • WB/EB between Granville St and Main St
Roadway congestion	<ul style="list-style-type: none"> • WB Alpha Ave to Gilmore Ave • EB Ingleton Ave to Alpha Ave • WB/EB at Boundary Rd • WB/EB between Renfrew St and Templeton Ave • WB/EB at Commercial Dr • WB/EB between Princess Ave and Burrard Street
Location of bus stops	<ul style="list-style-type: none"> • EB at Commercial Dr

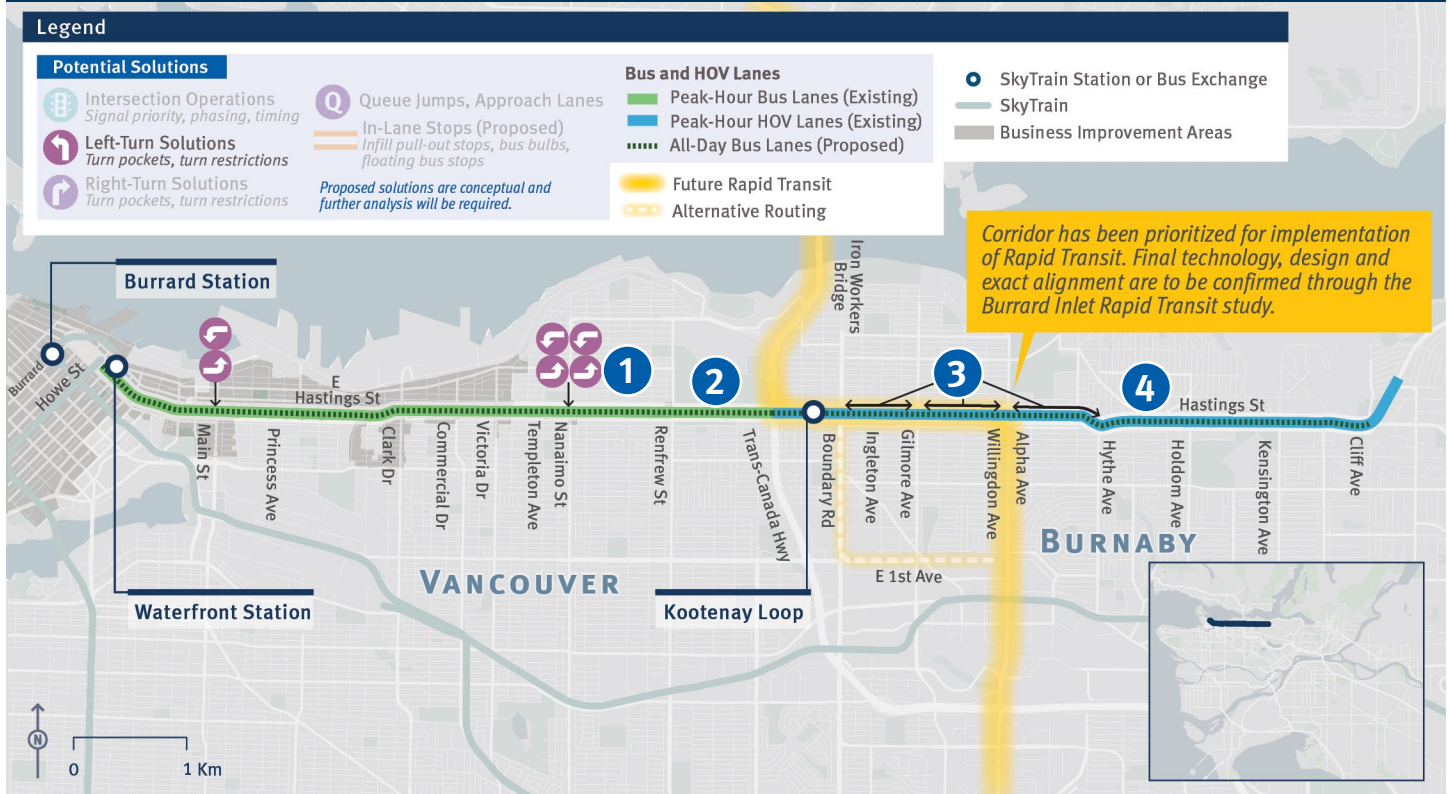
Hastings St, continued

Issue	Location(s)
Pedestrian movements (including pedestrian signals)	<ul style="list-style-type: none"> • WB/EB between Gilmore Ave and Hythe Ave • WB/EB between Renfrew St and Commercial Dr • WB/EB between Main St and Granville St
HOV or bus-only lane violations	<ul style="list-style-type: none"> • WB/EB between Inlet Dr and Gilmore Ave (HOV) • EB between Commercial Dr and Nanaimo St

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Hastings St, continued

Potential Solutions to Address Bus Speed and Reliability Issues



Key Opportunities



31

Signalized intersections along corridor



40+

Bus stops below spacing guidelines (40% of total)



1 km

New bus lanes (directional)

Corridor has been prioritized for implementation of Rapid Transit. Final technology, design and exact alignment are to be confirmed through the Burrard Inlet Rapid Transit study.

Map Callouts

- 1 Evaluate left- and right-turn management between Templeton St. and Renfrew St. (EB left-turns at Nanaimo St. currently restricted 3-7 PM).
- 2 Existing peak-direction bus lanes west of the Trans-Canada Highway should be upgraded to all-day.
- 3 Improve coordination of signals at major and minor intersections. City of Burnaby and TransLink would evaluate turning movements as part of Rapid Transit implementation.
- 4 There are existing peak-direction HOV lanes in Burnaby. Improvements to be determined through the Hastings Street Improvement Project.

Corridor-Wide Opportunities

- At the 31 signalized intersections, solutions such as signal priority, signal coordination, or timing/phasing adjustments can help reduce delay.
- At the approximately 40 bus stops that are below spacing guidelines (300m) thoughtful removal or relocation could achieve more consistent spacing while maintaining access.
- Up to 1 km of new bus lanes could be added. Different types of lanes are appropriate in different contexts.

Further analysis is needed for all opportunities.



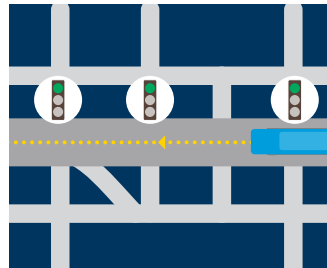
Hastings St, continued

Considerations for Key Solutions



INTERSECTION OPERATIONS

Intersection operations can include providing active signal priority, passive signal priority, or adding a new traffic signal or signal phase that benefits the direction of bus travel, or coordinating signals along a corridor to prioritize bus travel and reduce delay.

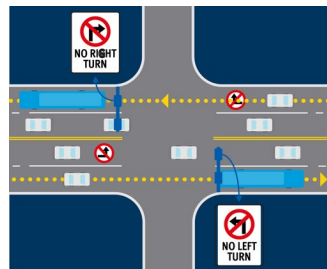


Passive signal priority includes coordinating/timing signals to create a “green wave” based on the expected speed of bus travel.



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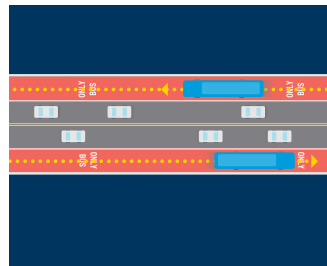


Turn restrictions limit left or right turns for general traffic to reduce delay for buses and other vehicles traveling along a corridor. Buses may be exempted from the restrictions.

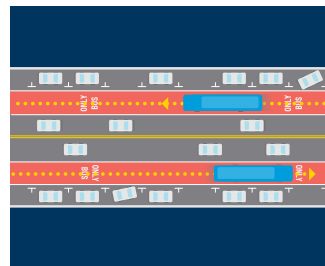


BUS LANES

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Curbside bus lanes can be full-time or part-time (peak hours). They are quick to implement but may have conflicts with right turning motor vehicle traffic and require enforcement and curb management to deter parking during operating hours.



Offset bus lanes (in commercial areas) run between an on-street parking lane and a through-traffic lane and preserve parking and loading along the curb. Bus bulbs used with offset bus lanes can provide additional space for passengers at bus stops and shorten pedestrian crossing distances.

KING GEORGE BLVD / 104 AVE

Corridor Description

- The R1 RapidBus links King George Blvd and 104 Ave as a single, continuous transit corridor between the Newton Exchange and Guildford Town Centre. Routes 321 and 394 run continuously along King George Blvd between Surrey Central and South Surrey Park & Ride.
- This corridor connects Surrey’s most populated urban town centres to key destinations such as downtown Surrey, City Hall, Surrey Memorial Hospital, SFU, and the Expo SkyTrain.
- At the heart of this corridor is Surrey Central Station where many of the busiest routes in Surrey and Langley originate or pass through. This area is a regional target for future growth.

Quick Facts

Length	20.7 km
Subregion	Southeast
Primary Routes	320, 321, 337, R1
All Routes	314, 320, 321, 326, 329, 337, 351, 352, 354, 363, 375, 393, 394, 501, 502, 503, 509, R1

Notes: Consists of the King George Blvd and 104 Ave corridors, ranked #23 and #8 for person-delay per km in Fall 2021, respectively. Ridership is reported for the location with the most cumulative passengers on-board the bus throughout the day; lower end of the range accounts only for routes using the corridor for at least 1 km and upper end of the range reflects all routes.



44

Maximum hourly bus trips per direction



1,260

Person-hours of delay per day



18,100

Total households (400/km² density)



34%

Low income households



10%

Zero vehicle households

Demographics within 400m of corridor

6,300-11,100

Total ridership (daily load in one direction)

72

Bus-hours of delay per day



King George Blvd / 104 Ave, continued

Corridor Significance

- **King George Blvd is a major transit corridor.** More than a quarter of bus journeys in Southeast begin on this corridor. During morning rush hours, buses carry approximately 30% of the people traveling through the northern and central parts of the corridor. During weekday peak hours, a bus arrives every 2-3 minutes.
- **Variability along King George Blvd is third highest among areas profiled.** During heavier traffic, an end-to-end trip between South Surrey and Guildford can take 17 minutes longer compared to a best-case trip, when the bus is able to move smoothly. King George Blvd has the sixth highest person-hours of delay per kilometre among profile areas.
- **King George Blvd is a key area for continued investment in transit priority.** In 2021, the R1 RapidBus saw over 11,000 average daily boardings, the highest among all routes on the corridor. Building on the success of the R1 line, TransLink's *10-Year Priorities* includes a possible extension of RapidBus service or conversion to BRT.

Key Challenges for Bus Speed & Reliability

- Segments of King George Blvd and 104 Ave are narrow and constrained by development on either side.
- Vehicles entering and exiting the roadway via closely spaced driveways causes delay.
- Bike lanes along King George Blvd are adjacent and/or shared with bus lanes which may slow buses down.

Location of Common Causes of Bus Delay

Issue	Location(s)
Motorists turning left (or other delay from left-turns)	<ul style="list-style-type: none"> • SB King George Blvd at 148 St • SB King George Blvd at 72 Ave • NB King George Blvd at 76 Ave • NB King George Blvd at 100 Ave • NB King George Blvd at 102 Ave • SB City Parkway at 102 Ave • NB/SB City Parkway at 104 Ave • EB/WB 104 Avenue at 152 St
Motorists turning right (or other delay from right-turns)	<ul style="list-style-type: none"> • SB King George Blvd at Highway 10 • NB King George Blvd at 68 Ave • NB/SB King George Blvd at 76 Ave • SB King George Blvd at 78 Ave • NB King George Blvd at 88 Ave • EB 104 Ave at King George Blvd • EB/WB 104 Ave at 150 St • EB/WB 104 Ave at 152 St
Roadway congestion	<ul style="list-style-type: none"> • NB/SB King George Blvd between 32 Ave Diversion and 148 St • SB King George Blvd at Highway 10 • NB King George Blvd from 62 Ave to 64 Ave • NB King George Blvd from 68 Ave to 72 Ave • NB King George Blvd at 76 Ave • SB King George Blvd from 84 Ave to 68 Ave • NB/SB King George Blvd between 96 Ave and 102 Ave • NB/SB City Parkway between 102 Ave and 104 Ave • EB/WB 104 Ave between City Parkway and Whalley Blvd • EB/WB 104 Ave between 148 St and 150 St • EB /WB 104 Ave at 152 St

King George Blvd / 104 Ave, continued

Issue	Location(s)
Closely spaced driveways or other roadways	<ul style="list-style-type: none"> • NB King George Blvd from 29A Ave to 148 St • NB King George Blvd from 146A St to Crescent Rd • NB King George Blvd at 72 Ave • NB King George Blvd at 76 Ave • NB King George Blvd from 96 Ave to 98A Ave • NB King George Blvd from 100 Ave to 102 Ave • NB City Parkway from 102 Ave to 104 Ave • EB 104 Ave from King George Blvd to Whalley Blvd • EB 104 Ave from 149 St to 150 St
Re-entering traffic from bus stops	<ul style="list-style-type: none"> • NB King George Blvd at 152 St • NB King George Blvd at 29A Ave • NB King George Blvd at 64 Ave • NB King George Blvd at 76 Ave • NB King George Blvd at 88 Ave • WB 104 Ave from 152 St to 150 St
Location of bus stops	<ul style="list-style-type: none"> • SB King George Blvd at Highway 10
Short spacing between bus stops	<ul style="list-style-type: none"> • NB King George Blvd from 34 Ave to Crescent Rd • NB King George Blvd at 100 Ave
Pedestrian movements (including pedestrian signals)	<ul style="list-style-type: none"> • SB King George Blvd from 32 Ave to 148 St • NB King George Blvd at 148 St • NB/SB King George Blvd at King George Station • NB/SB King George Blvd at Surrey Central Station • WB 104 Ave at 150 St
Uncoordinated traffic signals	<ul style="list-style-type: none"> • SB from 148 St to 32A Ave • NB King George Blvd at 34 Ave • NB/SB King George Blvd between 100 Ave and 102 Ave • NB/SB City Parkway between 102 Ave and 104 Ave • EB 104 Ave at 152 St
Schedules and/or timepoints	<ul style="list-style-type: none"> • NB/SB King George Blvd at King George Station
HOV or bus-only lane violations	<ul style="list-style-type: none"> • WB 104 Ave at Guildford Exchange
Bus/bicycle interactions	<ul style="list-style-type: none"> • NB King George Blvd at 152 St • NB King George Blvd at 148 St • SB King George Blvd at 76 Ave

King George Blvd / 104 Ave, continued

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King George Blvd / 104 Ave, continued

Potential Solutions to Address Bus Speed and Reliability Issues

Corridor has been prioritized for implementation of BRT-level bus priority. Final design, including exact alignment and the northern and southern extents of BRT/RapidBus are to be determined in next stage of planning.

Map Callouts

- 1 152 Street Transit Priority Study identified opportunities for EB and WB Bus lanes between 152 St and 150 St along 104 Ave, and a NB right-turn pocket at 105 Ave and 150 St.

Corridor-Wide Opportunities

- At the 28 signalized intersections, solutions such as signal priority, signal coordination, or timing/phasing adjustments can help reduce delay.
- At the approximately 20 bus stops that are below spacing guidelines (300m) thoughtful removal or relocation could achieve more consistent spacing while maintaining access.
- Up to 38 km of new bus lanes could be added. Different types of lanes are appropriate in different contexts.

Further analysis is needed for all opportunities.



Key Opportunities



28

Signalized intersections along corridor



20+

Bus stops below spacing guidelines (20% of total)



38 km

New bus lanes (directional)

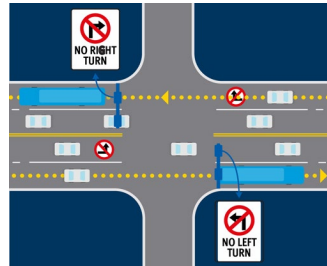
King George Blvd / 104 Ave, continued

Considerations for Key Solutions



LEFT- AND RIGHT-TURN SOLUTIONS

Where right-of-way permits, turn solutions include dedicated turn pockets. Where right-of-way is limited, solutions include turn restrictions for general traffic but permitted for buses.

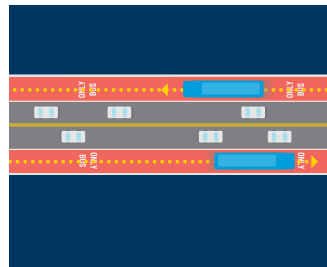


Turn restrictions limit left or right turns for general traffic to reduce delay for buses and other vehicles traveling along a corridor. Buses may be exempted from the restrictions.

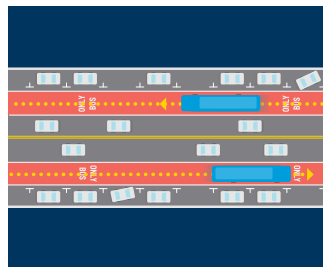


BUS LANES

Bus lanes can be implemented in context-specific solutions that consider traffic conditions, on-street parking and access to business and destinations; and integration with facilities for bicyclists or goods movements.

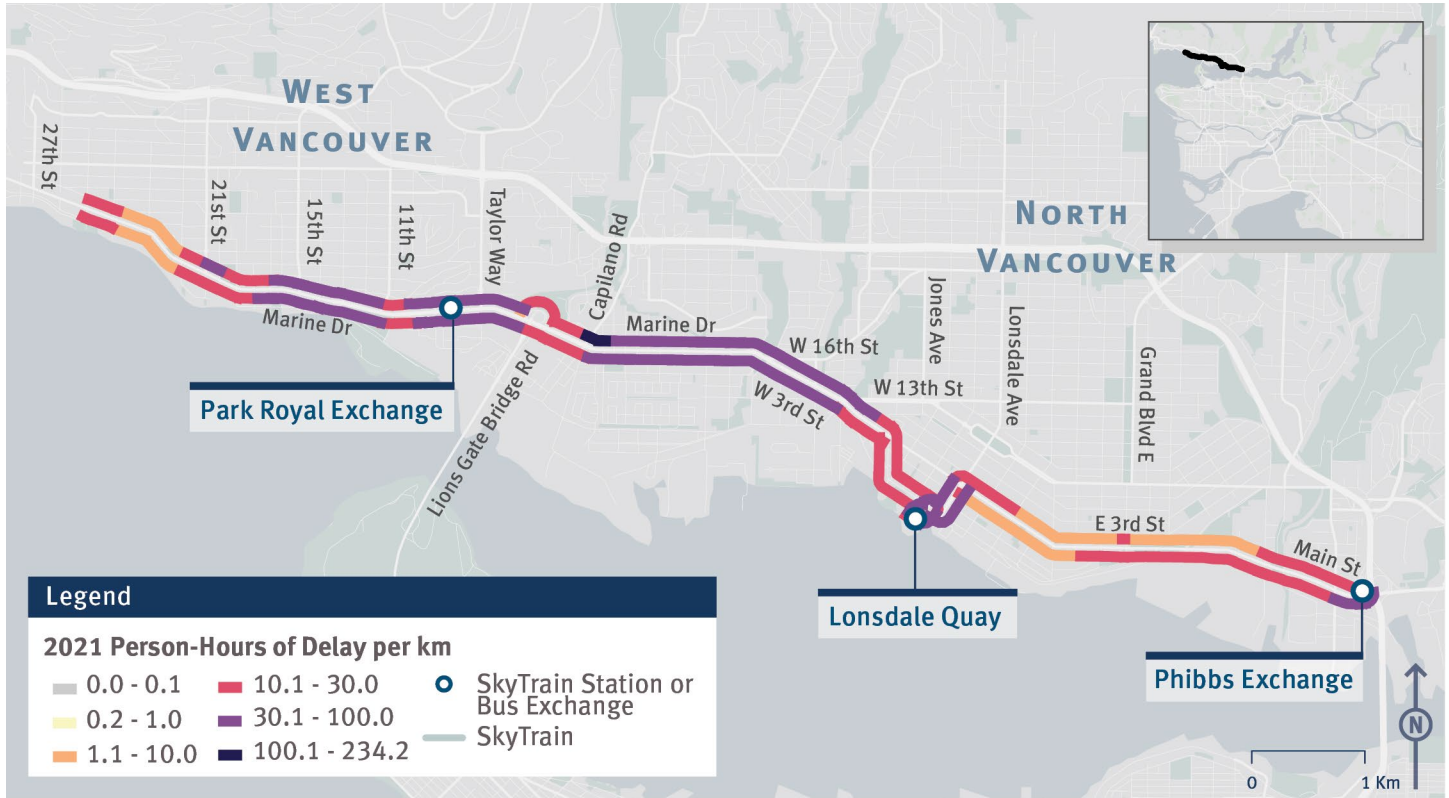


Curbside bus lanes can be full-time or part-time (peak hours). They are quick to implement but may have conflicts with right turning motor vehicle traffic and require enforcement and curb management to deter parking during operating hours.



Offset bus lanes (in commercial areas) run between an on-street parking lane and a through-traffic lane and preserve parking and loading along the curb. Bus bulbs used with offset bus lanes can provide additional space for passengers at bus stops and shorten pedestrian crossing distances.

MARINE DR / 3RD ST / MAIN ST



Corridor Description

- The Marine Drive and 3rd/Main Street corridor provides access to key destinations along the North Shore waterfront including Park Royal and Lonsdale Quay.
- The corridor connects the North Shore subregion with the Sea to Sky region and rest of the Metro Vancouver region.
- The R2 RapidBus line connects to many other North Shore transit lines at Park Royal, Lonsdale Quay, and Phibbs Exchange.
- Surrounding areas feature shopping, restaurants, and the North Vancouver waterfront.

Quick Facts

Length	13.0 km
Subregion	North Shore
Primary Routes	R2, 255
All Routes	228, 231, 232, 236, 240, 241, 246, 247, 249, 250, 251, 252, 253, 254, 255, 256, 257, R2, N24

Notes: Consists of the Marine Dr and 3rd/Main corridors, ranked #10 and #36 for person-delay per km in Fall 2021, respectively. Ridership is reported for the location with the most cumulative passengers on-board the bus throughout the day; lower end of the range accounts only for routes using the corridor for at least 1 km and upper end of the range reflects all routes.



43

Maximum hourly bus trips per direction



780

Person-hours of delay per day



18,700

Total households (900/km² density)



29%

Low income households



18%

Zero vehicle households

4,600-5,600

Total ridership (daily load in one direction)

62

Bus-hours of delay per day

Demographics within 400m of corridor



Marine Dr / 3rd St / Main St, continued

Corridor Significance

- **Marine Drive is an important connection for passengers moving along the North Shore.** The R2 RapidBus has over 4,000 average weekday boardings. Marine Dr sees a bus approximately every 3 minutes all day. Buses carry a quarter of people travelling on Marine Drive during the morning rush hours, depending on the portion of the corridor.
- **Bus performance on Marine Drive impacts people traveling in the North Shore.** During heavier traffic, an end-to-end trip on the corridor between West Vancouver and North Vancouver can take nearly 14 minutes longer compared to a best-case trip, when the bus is able to move smoothly. Marine Dr ranks sixth highest in terms of bus delay per kilometre.
- **Marine drive is a key link between downtown Vancouver and the North Shore.** People can access the North Shore from downtown via either the Lions Gate Bridge or the Iron Workers Memorial Bridge.
- **Transit priority improvements are planned on Marine Drive.** Two RapidBus routes are planned as part of TransLink's *10-Year Priorities*, including connections to Lynn Valley and Park Royal/Ambleside. Consideration and planning work for BRT is also proposed.

Key Challenges for Bus Speed & Reliability

- Some segments of the profile area are narrow, often with one travel lane where bus and motor vehicles must share the road.
- Connections between the North Shore and the rest of the Metro Vancouver region must consider needs of goods movement and emergency vehicles.
- Areas near commercial and shopping centres with off-street and on-street parking experience delay from vehicles turning into centres or on-street parking movements.

Location of Common Causes of Bus Delay

Issue	Location(s)
Motorists turning left (or other delay from left-turns)	<ul style="list-style-type: none"> • WB Marine Dr at 21 St • EB Marine Dr at 17 St • EB Marine Dr at 16 St • WB Marine Dr at 15 St • EB Marine Dr at Tatlow Ave • EB Marine Dr at Pemberton Ave • Lonsdale Quay Bay • NB Lonsdale Ave at East Esplanade • NB Lonsdale Ave at 2 St
Motorists turning right (or other delay from right-turns)	<ul style="list-style-type: none"> • WB Marine Dr at 21 St • EB/WB Marine Dr between 17 St and 14 St • EB Marine Dr at Park Royal • EB/WB Marine Dr between Capilano Rd and Pemberton Ave • WB Marine Dr at 16 St W • EB/WB Marine Dr at Fell Ave • EB West Esplanade from Chesterfield Ave to Rogers Ave • SB Rogers Ave at West Esplanade • SB Lonsdale Ave at West Esplanade • NB Lonsdale Ave at 3 St • EB E 3 St at Moody Ave • WB Cotton Rd at Brooksbank Ave

Marine Dr / 3rd St / Main St, continued

Issue	Location(s)
Roadway congestion	<ul style="list-style-type: none"> • EB/WB Marine Dr at 25 St • WB Marine Dr at 21 St • EB/WB Marine Dr between 18 St and 14 St • EB/WB Marine Dr at Park Royal • EB/WB Marine Dr between Capilano Rd and Pemberton Ave • WB Marine Dr at W 16 St • EB/WB Marine Dr between Fell Ave and Bewicke Ave • EB West Esplanade from Chesterfield Ave to Rogers Ave • Lonsdale Quay Bay • NB/SB Lonsdale Ave between West Esplanade and 3 St • EB E 3 St from Moody Av to Harbour Ave
Closely spaced driveways or other roadways	<ul style="list-style-type: none"> • WB Marine Dr at McGuire Ave • WB Marine Dr at W 16 St
Re-entering traffic from bus stops	<ul style="list-style-type: none"> • EB Marine Dr from 18 St to 16 St • WB Marine Dr from 22 St to 13 St • WB Marine Dr at Park Royal • EB Marine Dr from Capilano Rd to Tatlow Ave
Location of bus stops	<ul style="list-style-type: none"> • EB Marine Dr from Fell Ave to Bewicke Ave
Short spacing between bus stops	<ul style="list-style-type: none"> • WB Marine Dr at Bridgman Ave • WB Marine Dr from 20 St to 22 St
Pedestrian movements (including pedestrian signals)	<ul style="list-style-type: none"> • EB Marine Dr at 25 St • WB Marine Dr at 21 St • EB Marine Dr from 18 St to 15 St • WB Marine Dr 14 St to 16 St • WB Marine Dr at Bridgman Ave • EB Marine Dr at Pemberton Ave • WB Marine Dr at W 16 St • EB/WB Marine Dr between Fell Ave and Bewicke Ave • EB West Esplanade from Chesterfield Ave to Rogers Ave • NB/SB Lonsdale Ave between West Esplanade and 3 St
Uncoordinated traffic signals	<ul style="list-style-type: none"> • EB Marine Dr at 25 St • EB Marine Dr from Capilano Rd to Pemberton Ave • WB Marine Dr from Mission Rd to Bewicke Ave • NB Lonsdale Ave at 2 St
Schedules and/or timepoints	<ul style="list-style-type: none"> • EB Cotton Rd at Brooksbank Ave
HOV or bus-only lane violations	<ul style="list-style-type: none"> • EB Cotton Rd at Moody Ave

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Marine Dr / 3rd St / Main St, continued



Key Opportunities



32

Signalized intersections along corridor



40+

Bus stops below spacing guidelines (>50% of total)



19 km

New bus lanes (directional)

Corridor has been prioritized for implementation of Rapid Transit:

- Near-Term: Extension of the R2 RapidBus line to Metrotown in Burnaby.
- Longer-Term: Final technology, design and exact alignment are to be confirmed through the Burrard Inlet Rapid Transit study.

Map Callouts

- 1 WB bus stop on near-side of intersection; opportunity for queue jump or stop relocation.
- 2 Improve EB queue jump.
- 3 Add right-turn arrow to help downtown-bound buses access bus-only on-ramp sooner.
- 4 City of North Vancouver is planning to extend hours of operation for existing queue jump.
- 5 EB bus lane not currently feasible.
- 6 Improvements to bridge over Lynn Creek will require coordination between the City and District of North Vancouver.

Corridor-Wide Opportunities

- At the 32 signalized intersections, solutions such as signal priority, signal coordination, or timing/phasing adjustments can help reduce delay.
- At the approximately 40 bus stops that are below spacing guidelines (300m) thoughtful removal or relocation could achieve more consistent spacing while maintaining access.
- Up to 19 km of new bus lanes could be added. Different types of lanes are appropriate in different contexts.

Further analysis is needed for all opportunities.

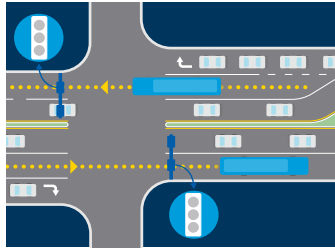
Marine Dr / 3rd St / Main St, continued

Considerations for Key Solutions



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Where right-of-way permits, turn solutions include dedicated turn pockets. Where right-of-way is limited, solutions include turn restrictions for general traffic but permitted for buses.

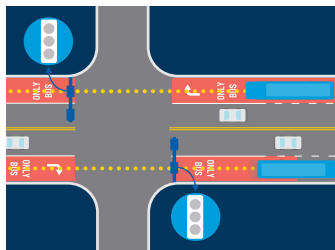


Turn pockets separate buses and motor vehicle traffic to reduce time spent by buses queuing behind general traffic. Consider turn pockets when turn volumes are high.



QUEUE JUMPS AND APPROACH LANES

Queue jumps and approach lanes should be implemented strategically and in combination with intersection operations and turn solutions. They are typically implemented when the right-of-way is too limited to create a whole bus lane.

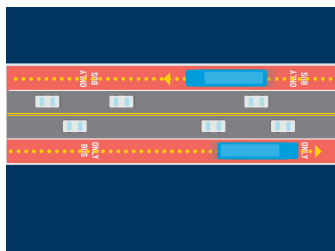


Queue jumps can be implemented **in the right-turn lane or BAT Lane**. Signal priority is not required but may be complementary.

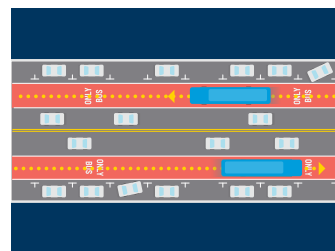


BUS LANES

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IN-LANE STOPS

In-lane stops (also called “bus bulb” or “floating bus stop”) may be temporary platforms or paved extensions of the sidewalk. Both applications improve passenger visibility for the bus and reduce passenger conflicts with pedestrians on the sidewalks.

