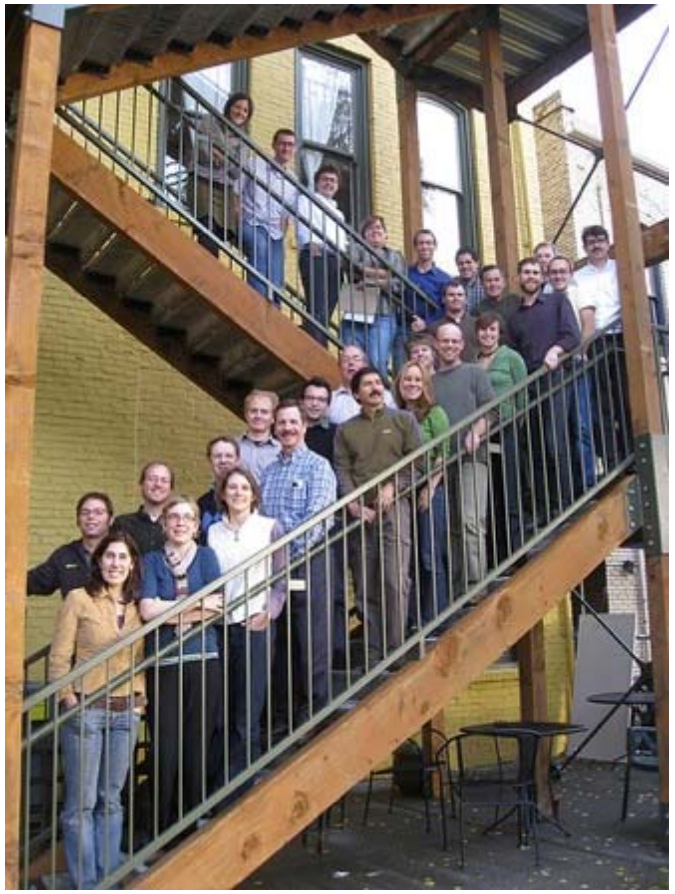
BIKES & COMPLETE STREETS

TCAT Complete Streets Forum
October 6, 2014

alta PLANNING + DESIGN

Alta Planning + Design

- North America's leading team of bicycle, pedestrian planning and design professionals
- Independent and employee owned
- 100+ planners, designers, engineers in 22 offices
- Implemented over 12,000 kilometres of bikeways, walkways and trails
- Experts in innovative solutions
- Cutting edge international, national and local research



Complete Streets Design Guidance

- The NACTO Urban Bikeway Design Guide
- The NACTO Urban Street Design Guide
- TAC Bikeway Design Guide
- TAC Geometric Design Guide
- Municipal CS Design Guidance for over 20 cities in NA including Edmonton

NACTO - Innovative Bikeway Designs

BIKE LANES
-Conventional Bike Lanes
-Left-side Bike Lanes
-Contra-Flow Bike Lanes
-Buffered Bike Lanes

CYCLE TRACKS
-One-way Protected Cycle Tracks
-Raised Cycle Tracks
-Two-way Cycle Tracks

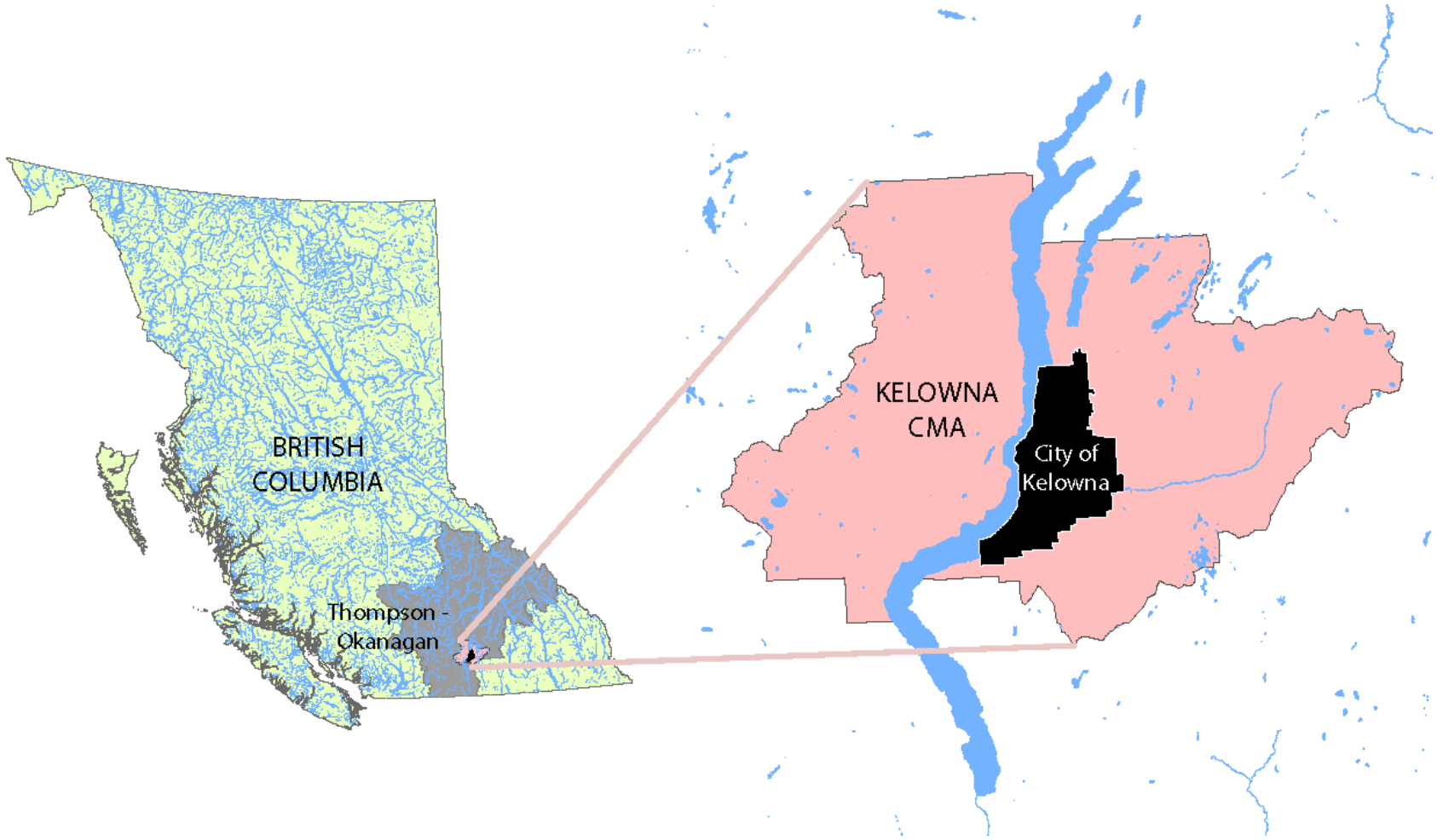
SIGNING & MARKING
-Bike Route Wayfinding Signage and Markings System
-Colored Bike Facilities
-Colored Pavement Material Guidance
-Shared Lane Markings

SIGNALS
-Bicycle Signal Heads
-Signal Actuation and Detection
-Active Warning Beacon for Bike Route at Unsignalized Intersection
-Hybrid Signal for Bike Route Crossing of Major Street

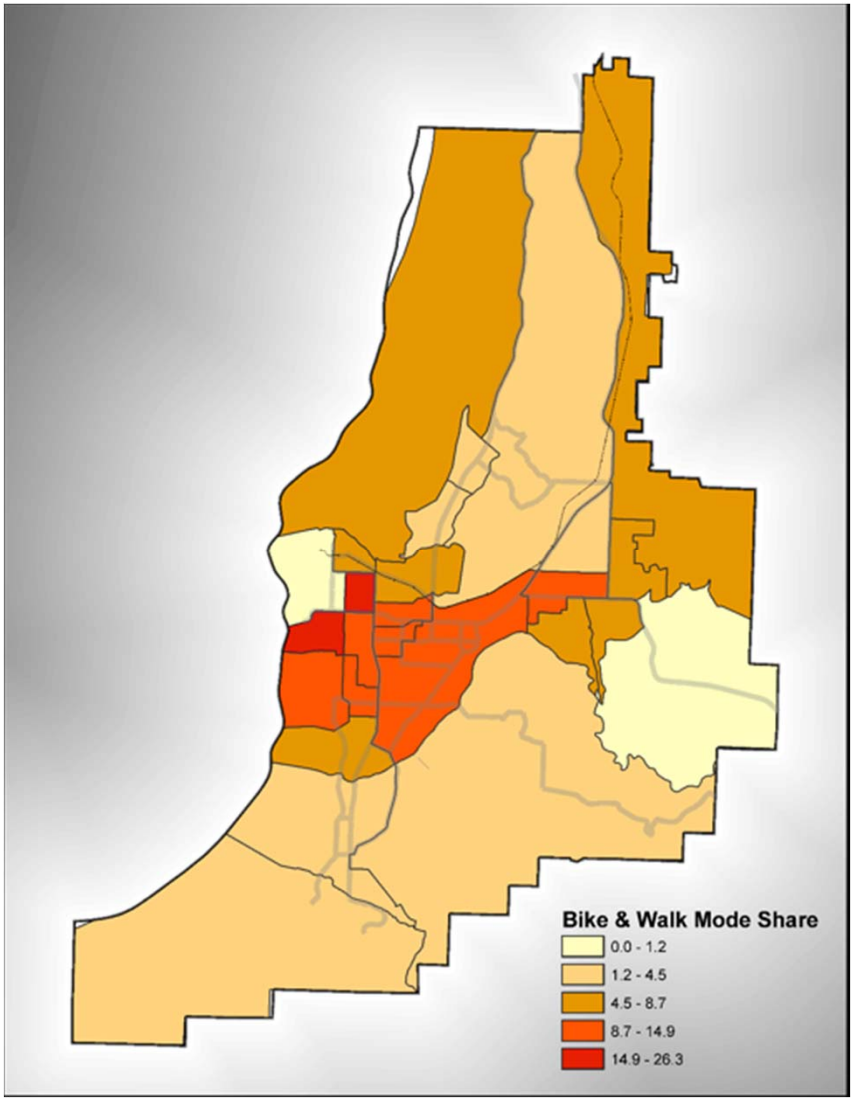
INTERSECTIONS
-Bike Boxes
-Intersection Crossing Markings
-Two-stage Turn Queue Boxes
-Median Refuge Island
-Through Bike Lanes
-Combined Bike Lane
-Cycle Track Intersection Approach

Local Street Bikeways (Bike Boulevards)
-Route Planning
-Signs and Pavement Markings
-Speed Management
-Volume Management
-Minor Street Crossings
-Major Street Crossings
-Offset Intersections
-Green Infrastructure

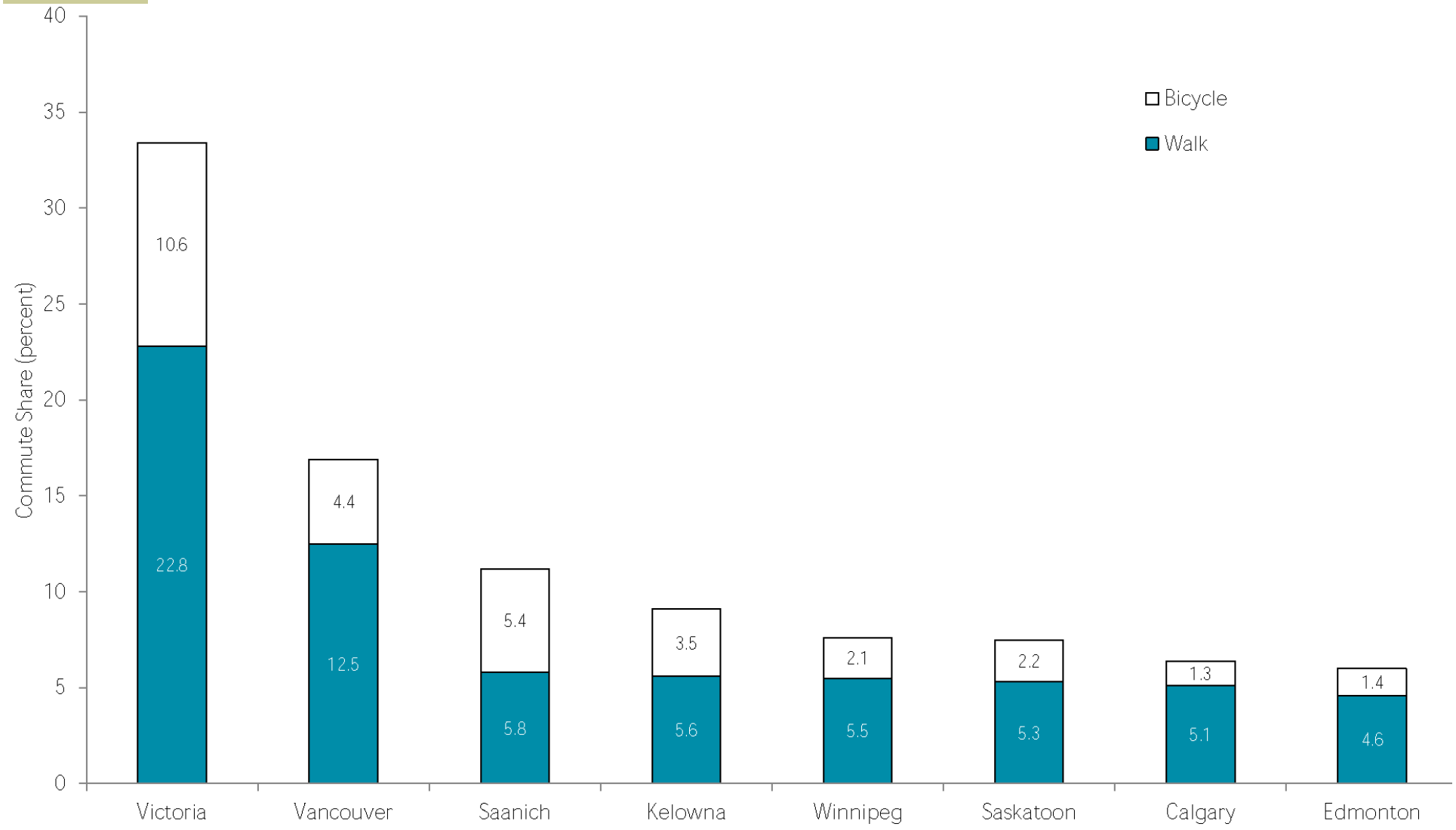
Kelowna


BRITISH
COLUMBIA
Thompson -
Okanagan
KELOWNA
CMA
City of
Kelowna

Kelowna: Walking and Cycling



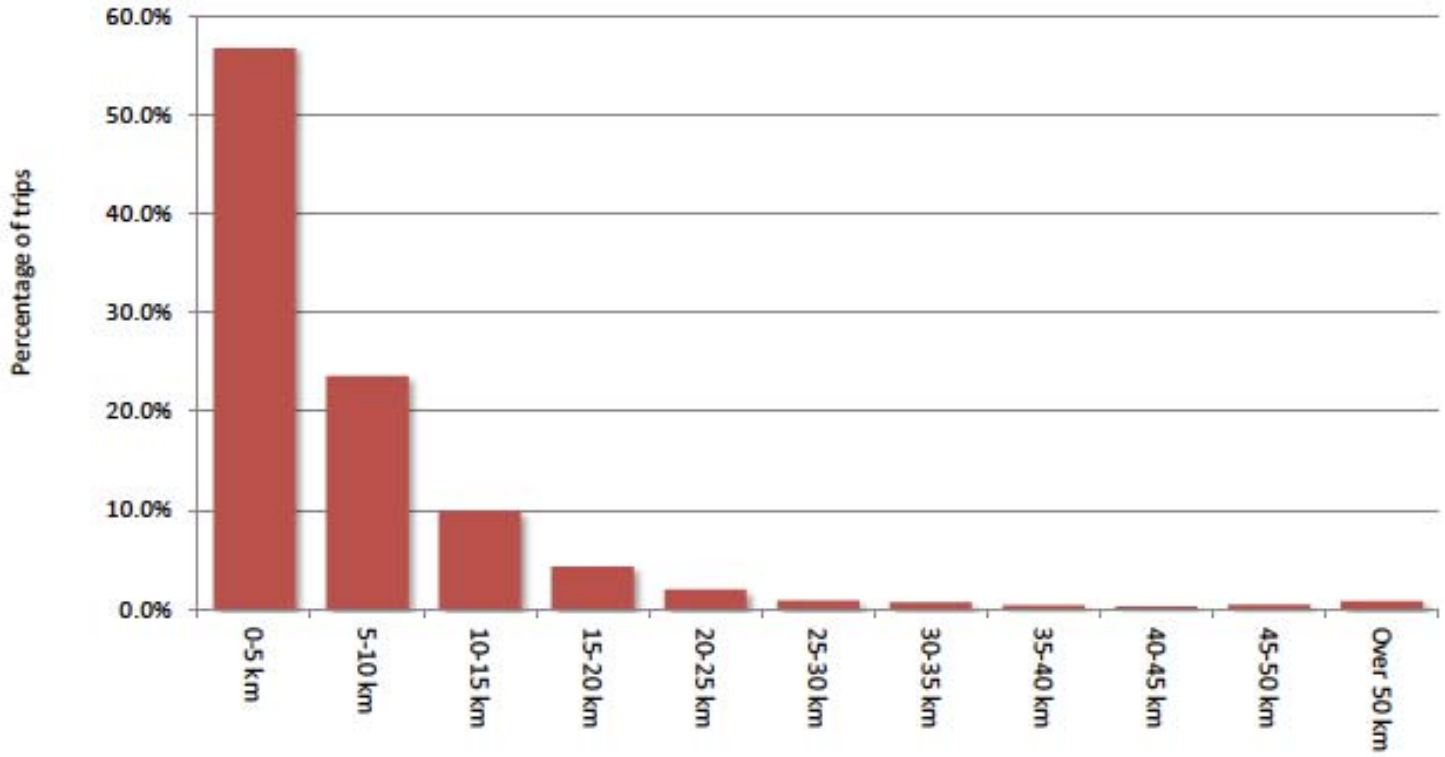
Kelowna: Walking and Cycling



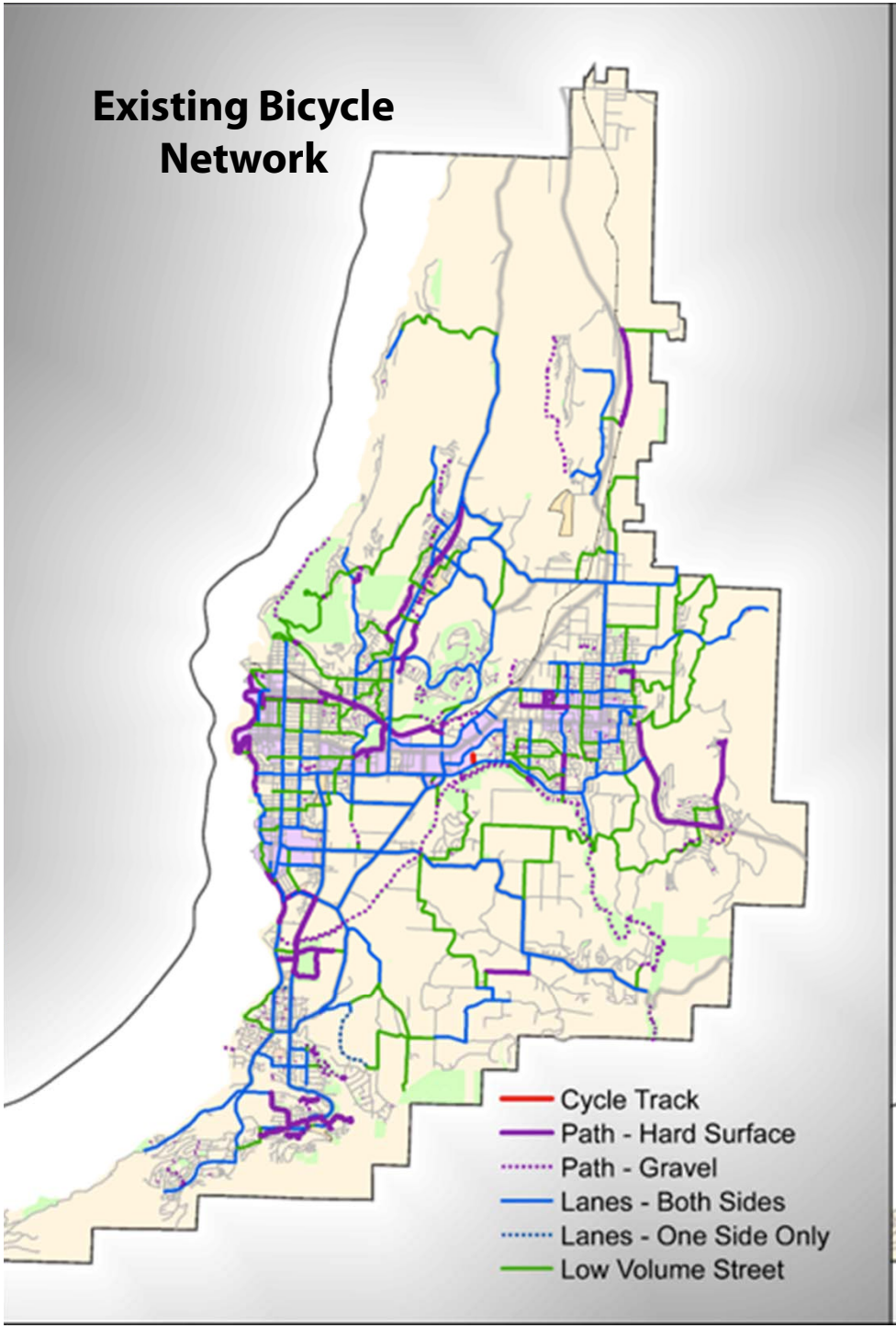
Trip Length Distribution

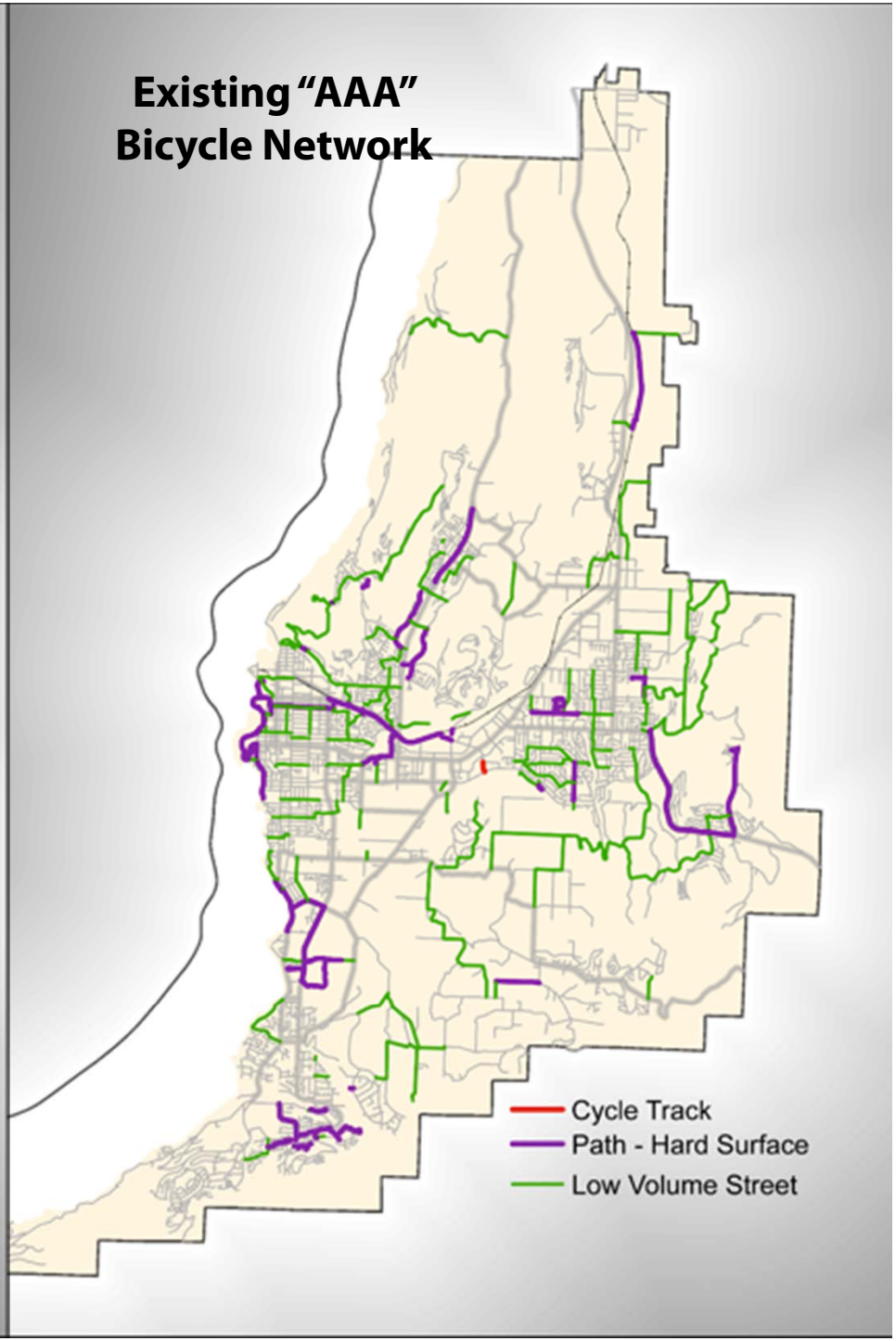
(24hr, Central Okanagan trip origins)

- 56% of trips less than 5km
- "distance market" for active transportation



Central Okanagan (Source: 2013 Travel Survey)


Existing Bicycle Network
Cycle Track
Path - Hard Surface
Path - Gravel
Lanes - Both Sides
Lanes - One Side Only
Low Volume Street


Existing "AAA" Bicycle Network
Cycle Track
Path - Hard Surface
Low Volume Street

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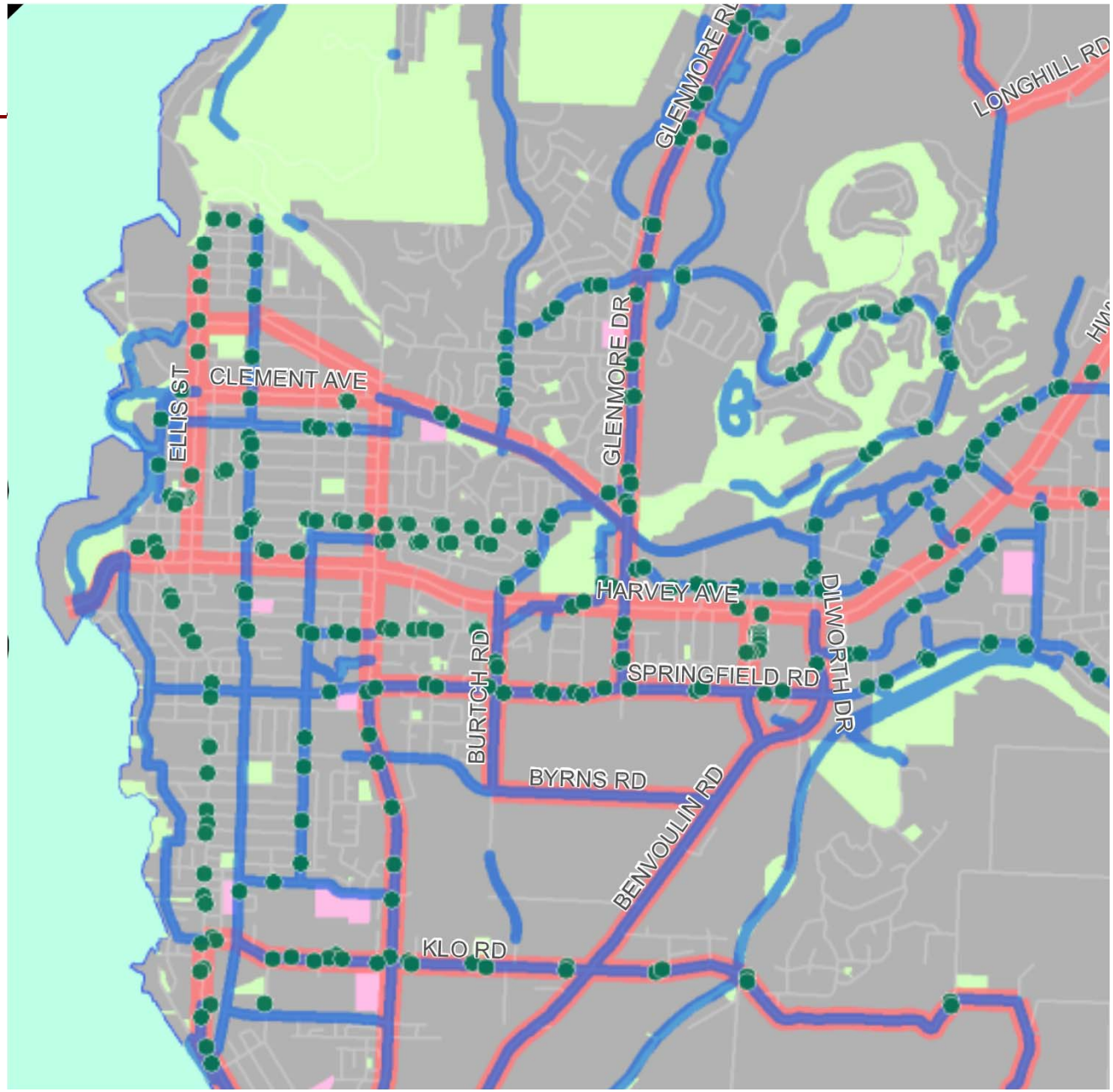
Cycling Route

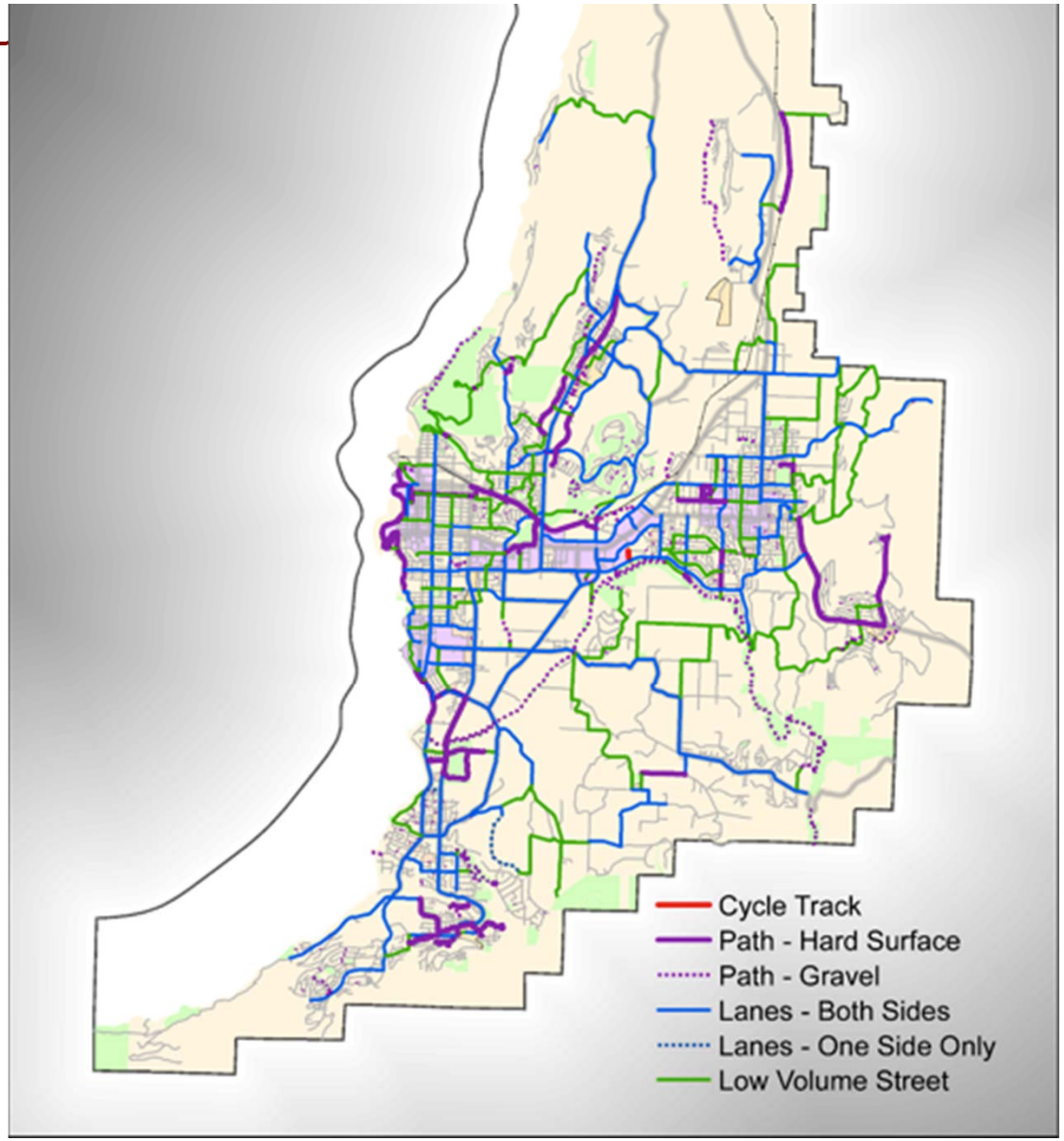
Truck Route

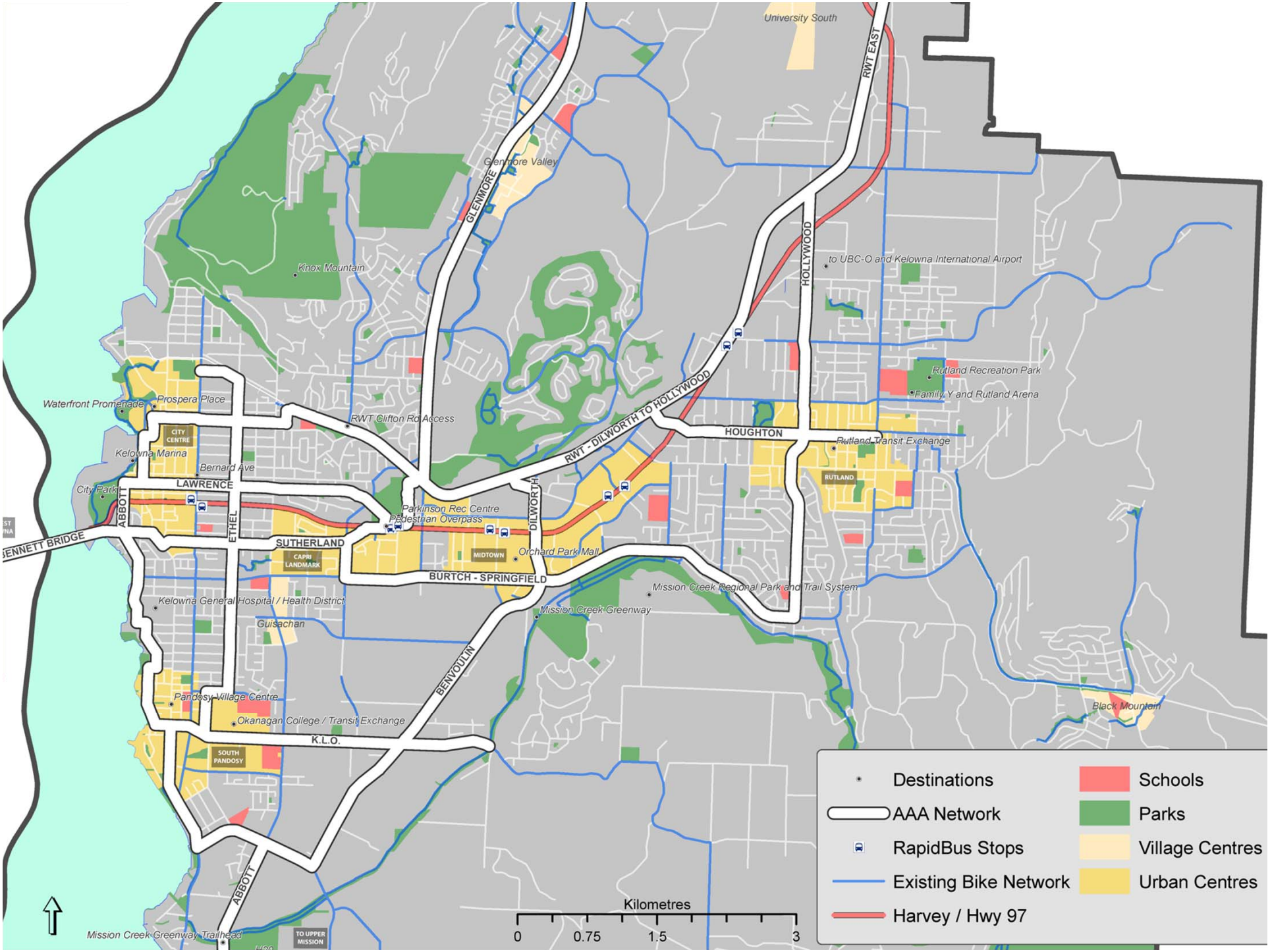
Transit Stop



Improving the Existing Network

- Legible
- Connected
- Continuous
- Appropriate for the context

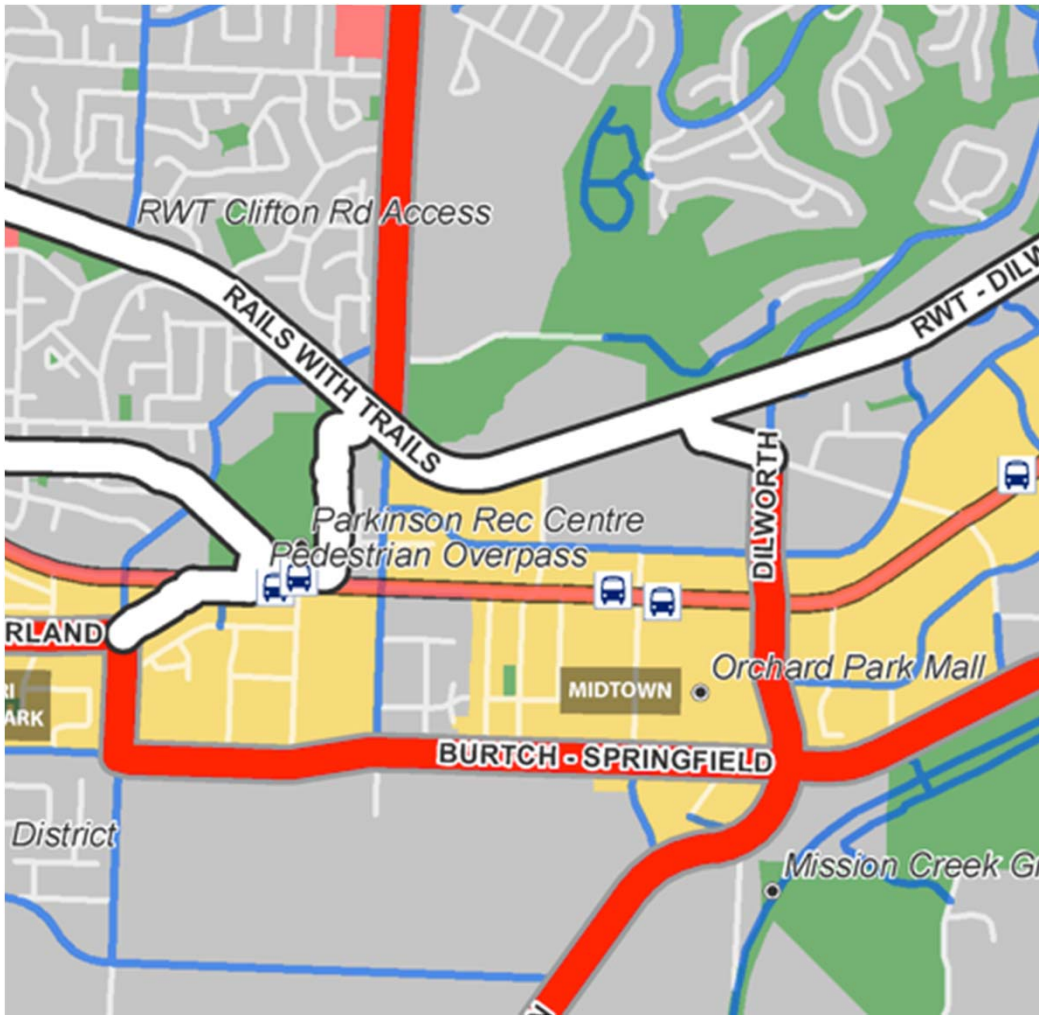


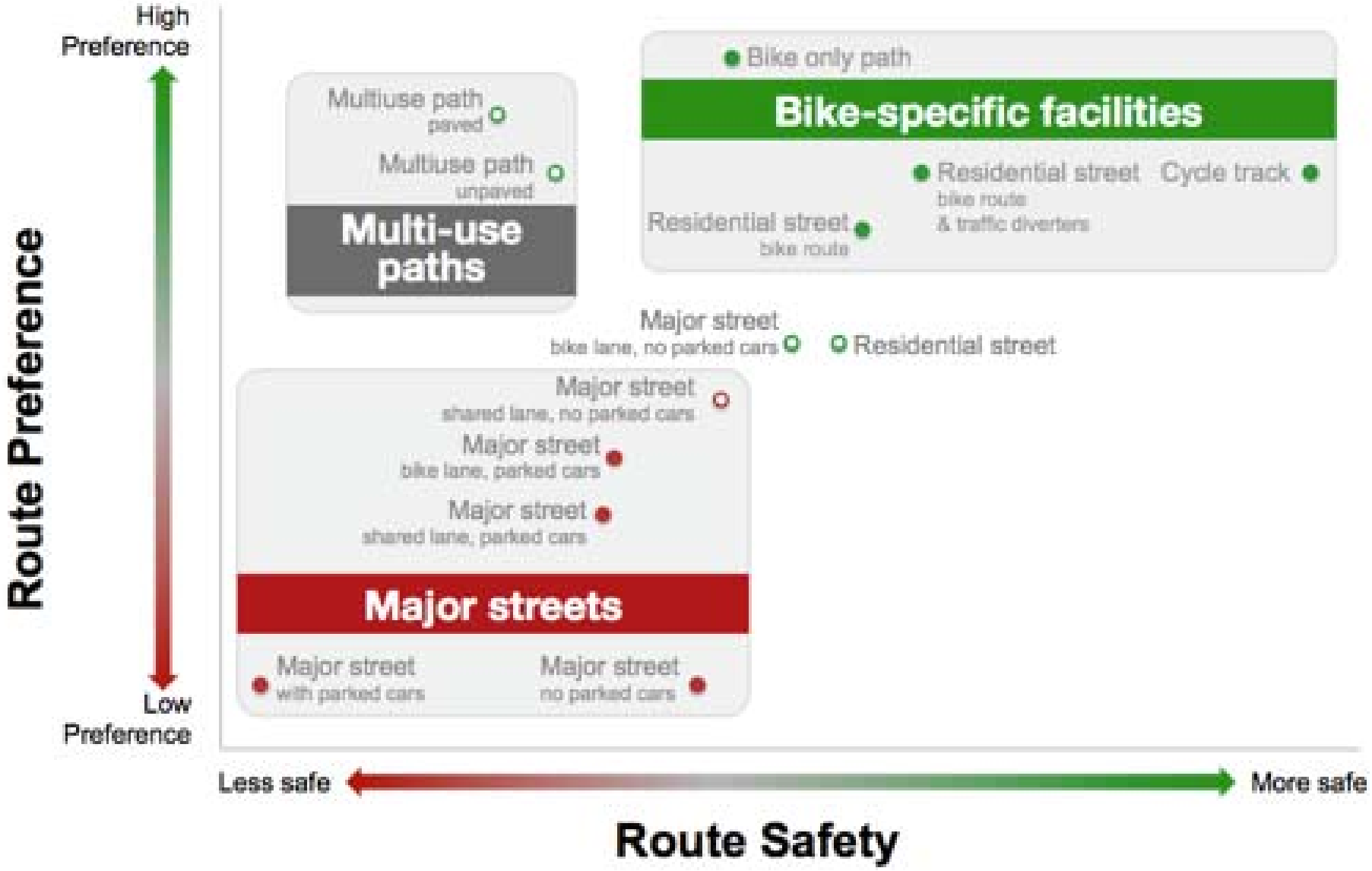

University South
RWT EAST
Glenmore Valley
GLENMORE
HOLLYWOOD
Knox Mountain
to UBC-O and Kelowna International Airport
Rutland Recreation Park
Family Y and Rutland Arena
Waterfront Promenade
Prospera Place
RWT Clifton Rd Access
RWT - DILWORTH TO HOLLYWOOD
HOUGHTON
Rutland Transit Exchange
CITY CENTRE
Kelowna Marina
Bernard Ave
City Park
LAWRENCE
RUTLAND
ABBOTT
ETHEL
Parkinson Rec Centre
Pedestrian Overpass
DILWORTH
GENNETT BRIDGE
SUTHERLAND
CAPRI LANDMARK
MIDTOWN
Orchard Park Mall
BURTCH - SPRINGFIELD
Mission Creek Regional Park and Trail System
Kelowna General Hospital / Health District
Mission Creek Greenway
Guisachan
BENVOULIN
Pandosy Village Centre
Okanagan College / Transit Exchange
Black Mountain
K.L.O.
SOUTH PANDOSY
ABBOTT
Mission Creek Greenway Trailhead
TO UPPER MISSION
Kilometres
0
0.75
1.5
3
Destinations
AAA Network
RapidBus Stops
Existing Bike Network
Harvey / Hwy 97
Schools
Parks
Village Centres
Urban Centres

The Supporting Network

AAA Route (no conflicts w/th rucks or buses)

Conflicts exist





Safe Cycling: How do Risk Perceptions Compare with Observed Risk

Meghan Winters et al., Canadian Journal of Public Health, Vol 103, No 9 (2012)

All Ages and Abilities – Local Streets

Traffic calming – Allow access

- Prohibit shortcutting
- Discourage speeding

Traffic Speed – 30km/h

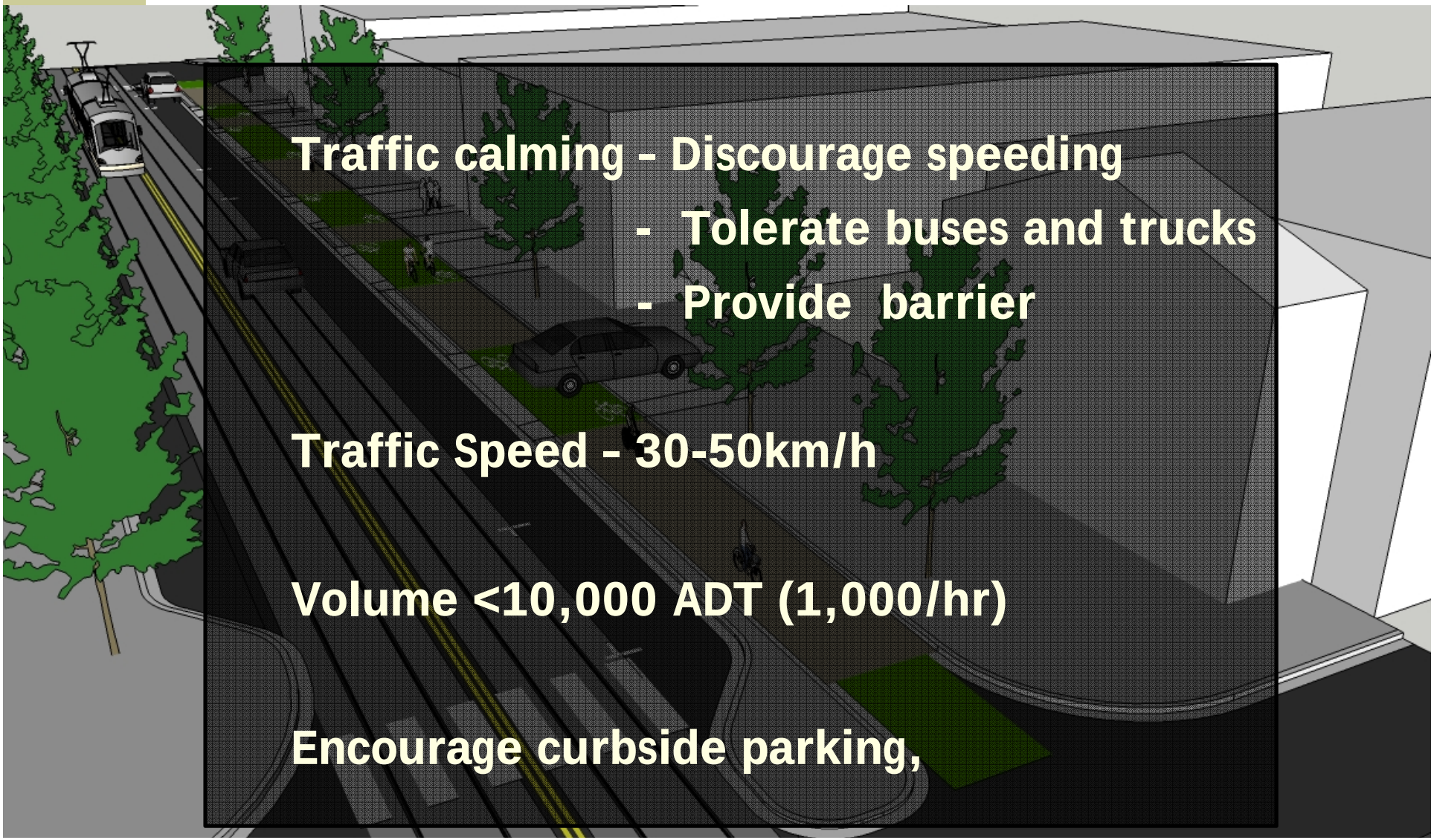
Volume >500 ADT (50/hr)

Prohibit buses and trucks

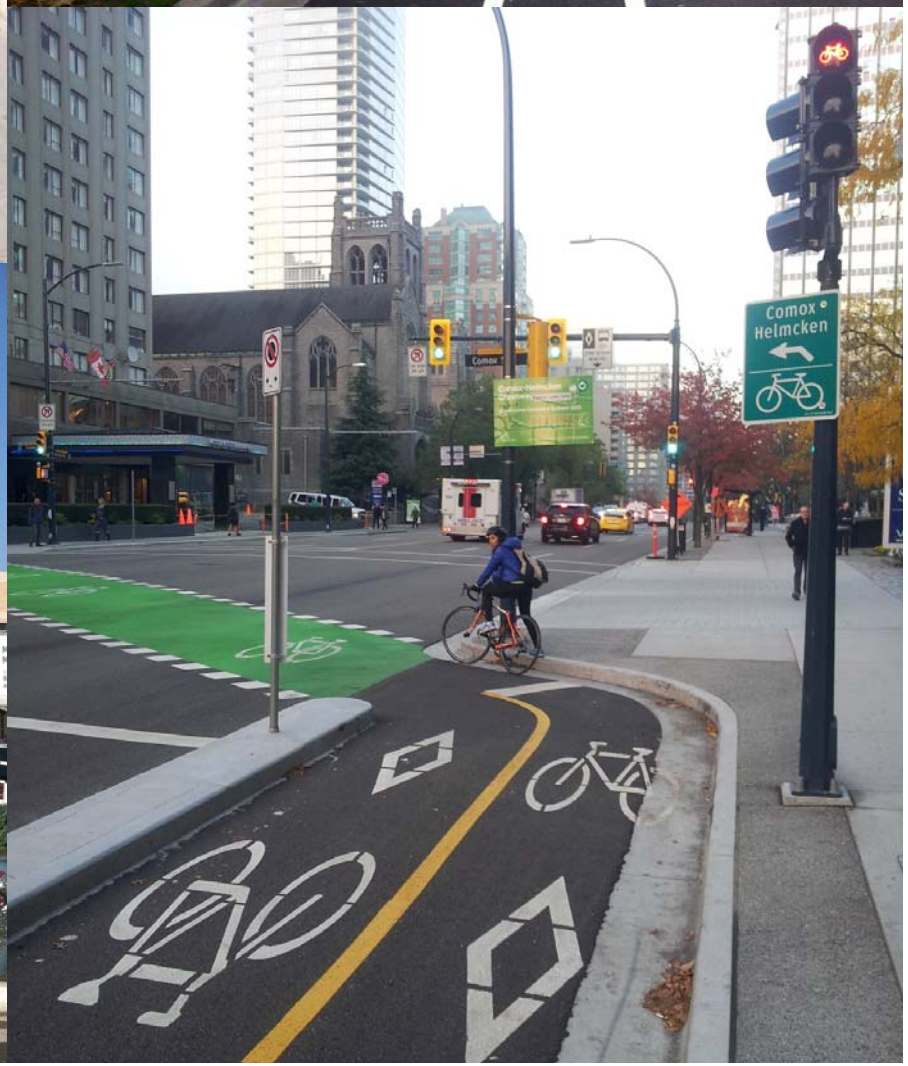
Collectors

Volume >2,000 ADT (200/hr)
Traffic Speed – 30-40km/h
Prohibit curbside parking, buses and trucks
Traffic calming – Discourage speeding

Arterials


Traffic calming - Discourage speeding
- Tolerate buses and trucks
- Provide barrier
Traffic Speed - 30-50km/h
Volume <10,000 ADT (1,000/hr)
Encourage curbside parking,

SIGNAL
NO PARKING
BIKE LANE
BIKE PATH
NO MOTOR VEHICLES OR MOTORIZED BICYCLES

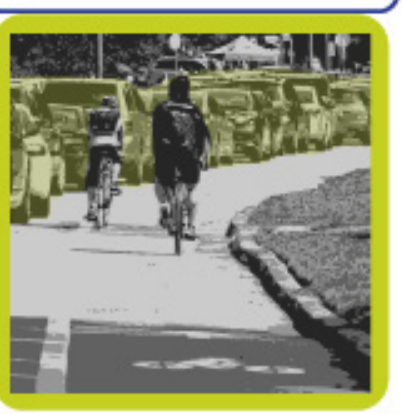

Comox
Helmcken

Canadian Examples of Cycle Tracks

	Vancouver		Montreal	Winnipeg	Ottawa	Toronto	Calgary
Street	Dunsmuir	Hornby	De Maisonneuve	Assiniboine	Laurier	Sherbourne	7 St SW
Year Built	2010	2010	2007	2010	2011	2012	2013
Direction	Bidirectional	Bidirectional	Bidirectional	Bidirectional	Unidirectional	Unidirectional	Bidirectional
Daily Traffic Volumes	15,000	13,000	15,000	2,000-8,000	6,000	12,500	--
Type of Separation	Curbs, planters, bike parking	Curbs, planters, bike parking	Curbs	Median	Median	Curb	Median, planters
Distance	0.8 km	1.8 km	3.5 km	0.8 km	1.35 km	2.5 km	0.7 km
Cost/KM	$1.6 mil/km	$1.6 mil/km	$1 mil/km	$156,000/km	$890,000/km	$1 mil/km	--
Change in Bicycle Volumes	↑ 24%	↑ 60-80%	--	--	↑ 26%	--	↑ 330%
Change in Bicycle Crashes	↓ 18%	↓ 19%	--	--	--	--	--
Change in Sidewalk Riding	↓ 80%	↓ 80%	--	--	--	--	↓ to 1% of users (from 25%)

Applications

1/2 use parked cars



1/3 use plastic posts

1/4 use curbs

a few use planters

2/3 are one-way

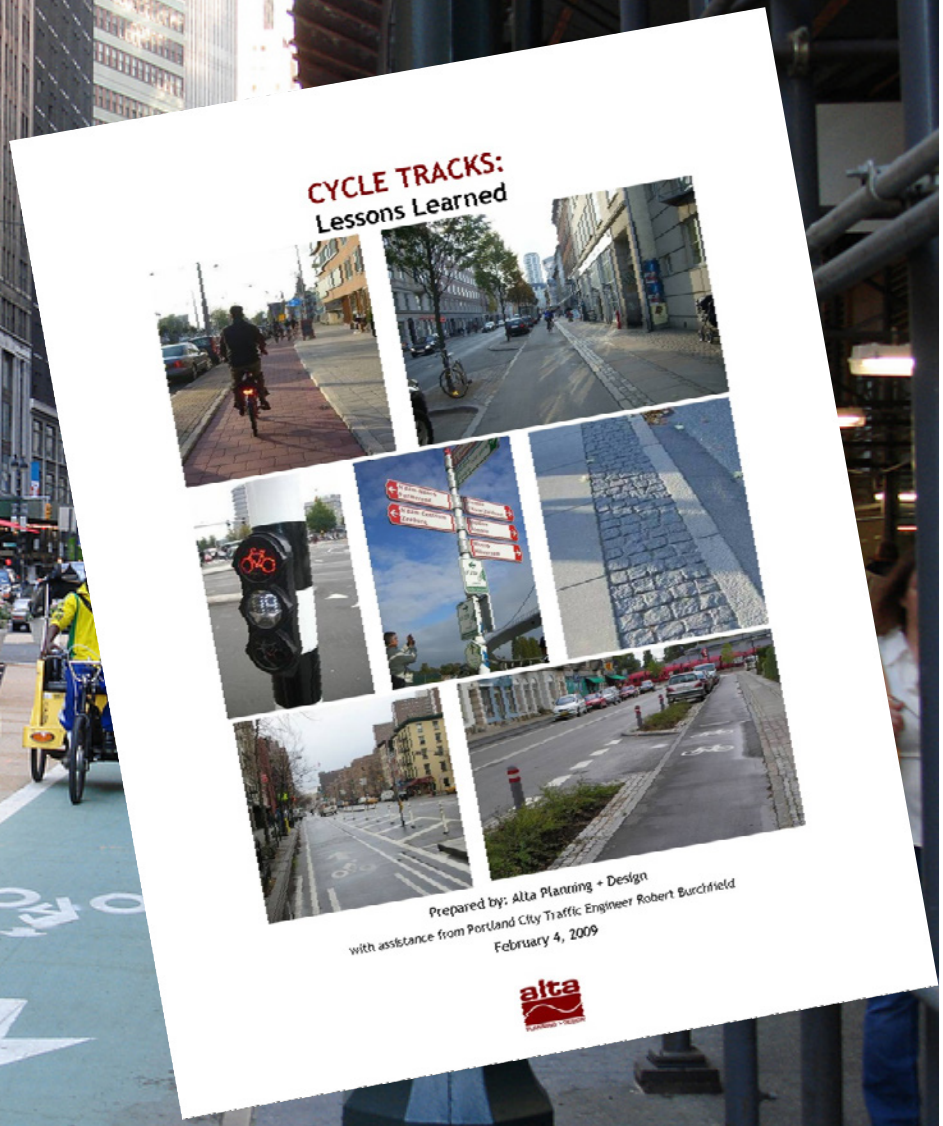
1/3 are two-way

Source: The Green Lane Project

35% decrease in injuries to all street users (8th Ave)
58% decrease in injuries to all street users (9th Ave)
Up to 49% increase in retail sales (Locally-based businesses on 9th Ave from 23rd to 31st Sts., compared to 3% borough-wide)
Left turn bays and signal phases
Mixing zones for bicycles and left-turning vehicles
Parking-protected bike lane
Pedestrian safety islands
Safety by Design
NEW YORK CITY DOT

Recent studies in Montreal and Portland indicate separated bikeways reduce bicycle collision risks compared to comparable roadway segments without separated bikeways.

Lusk *et al.*, Monsere *et al.* in: Separated Bikeways, Institute of Transportation Engineers, 2013



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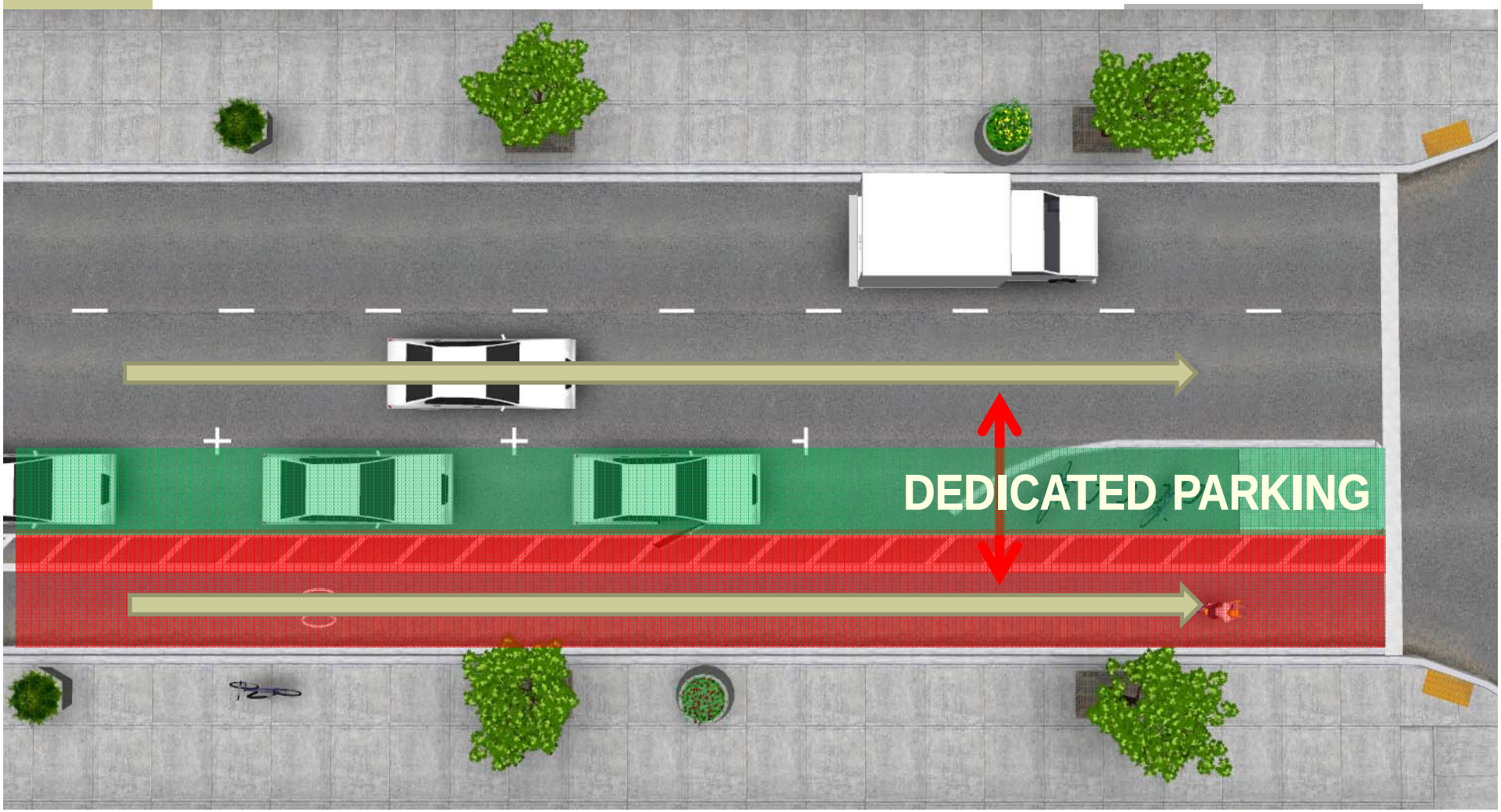
Benefits



Richards Street, Vancouver

Attractive for bicyclists of all levels and ages.

Calgary: 7th Street SW at 4th Ave SW

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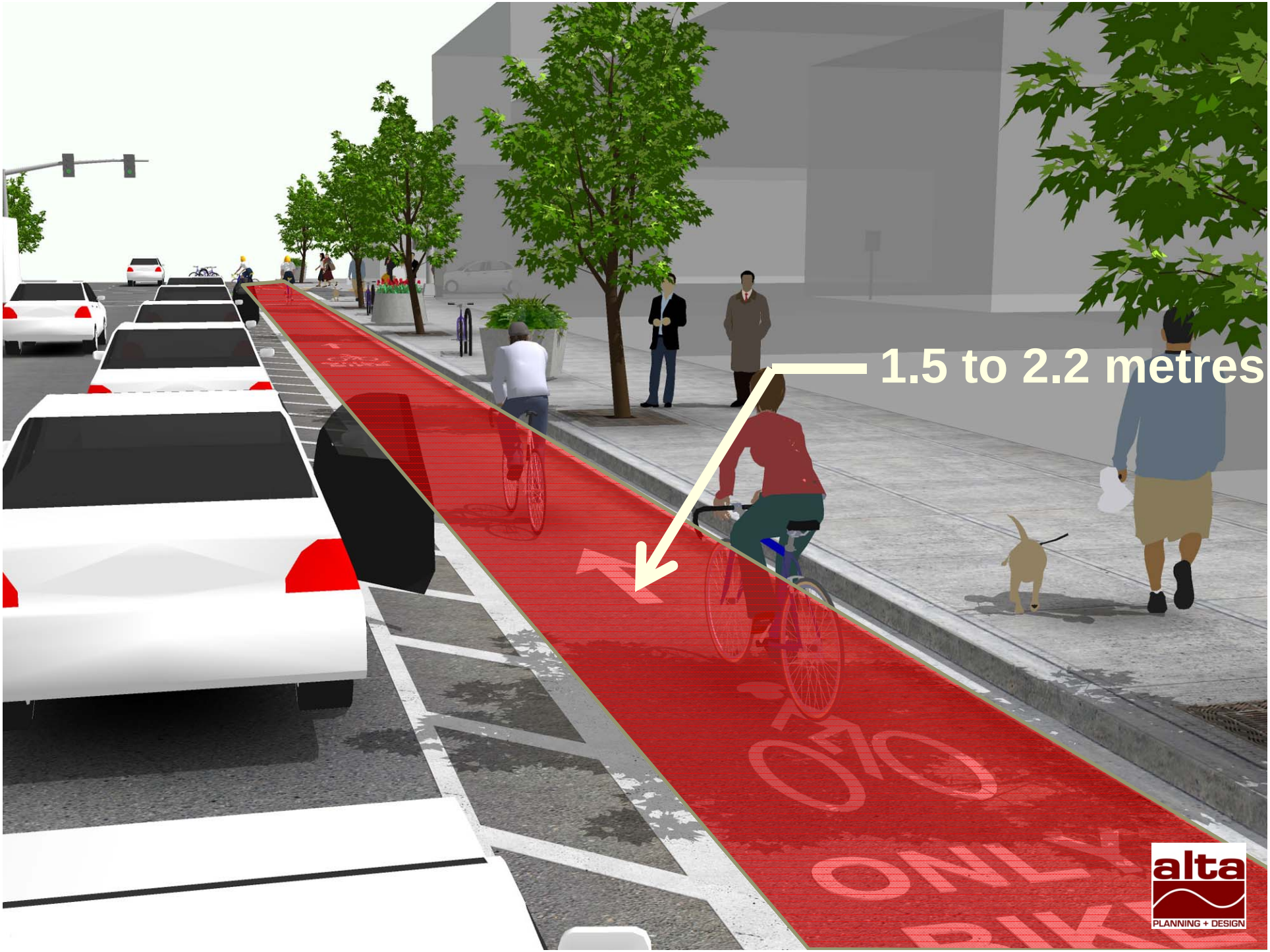
THE CITY OF CALGARY


1.5 to 2.2 metres
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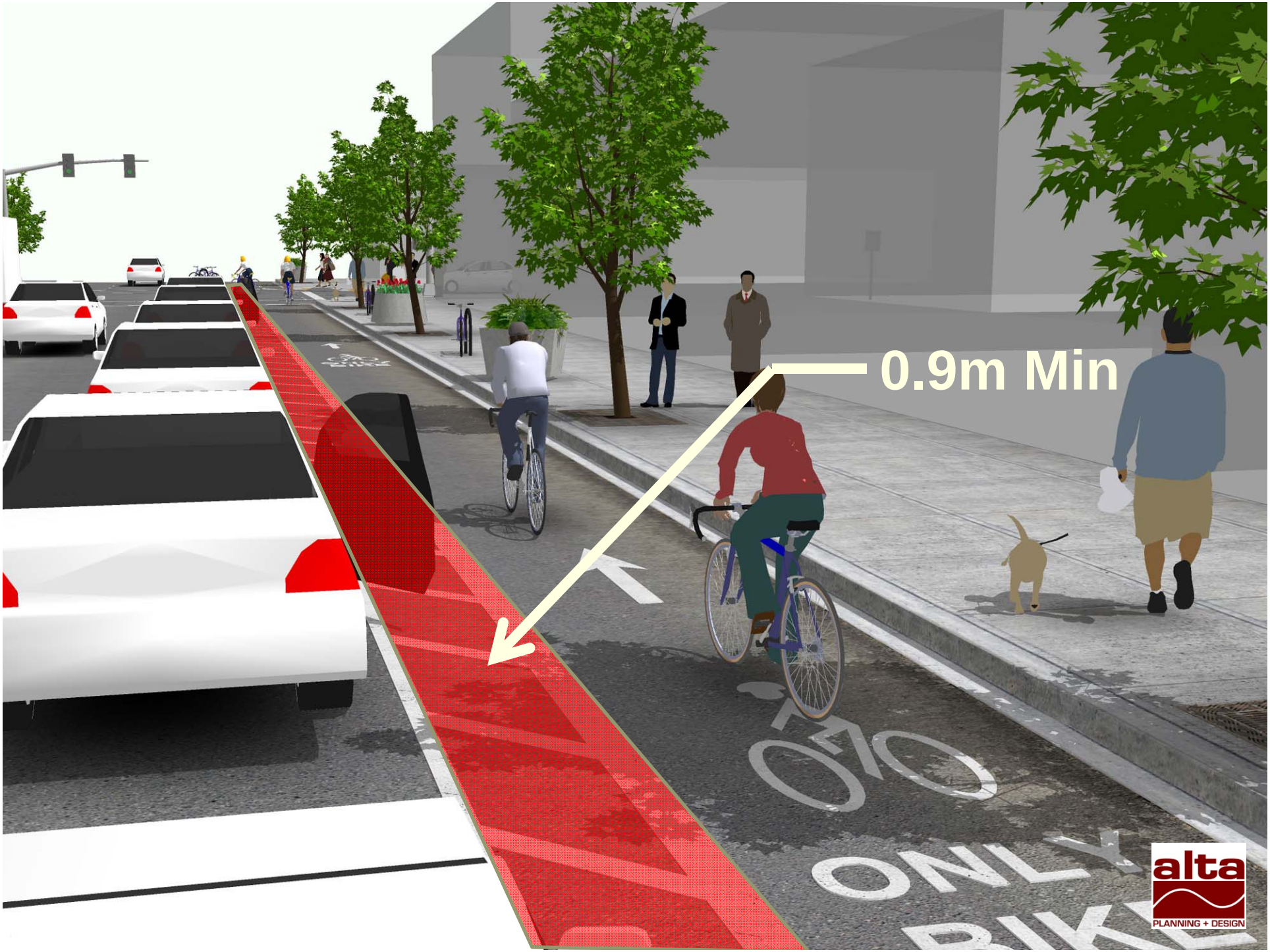
Gutter Pan
> 0.3m then
extra
width!
ONLY
alta
PLANNING + DESIGN


0.9m Min
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Cars
People
ONLY
alta
PLANNING + DESIGN

ONLY
alta
PLANNING + DESIGN

alta
PLANNING + DESIGN

ONLY
alta
PLANNING + DESIGN

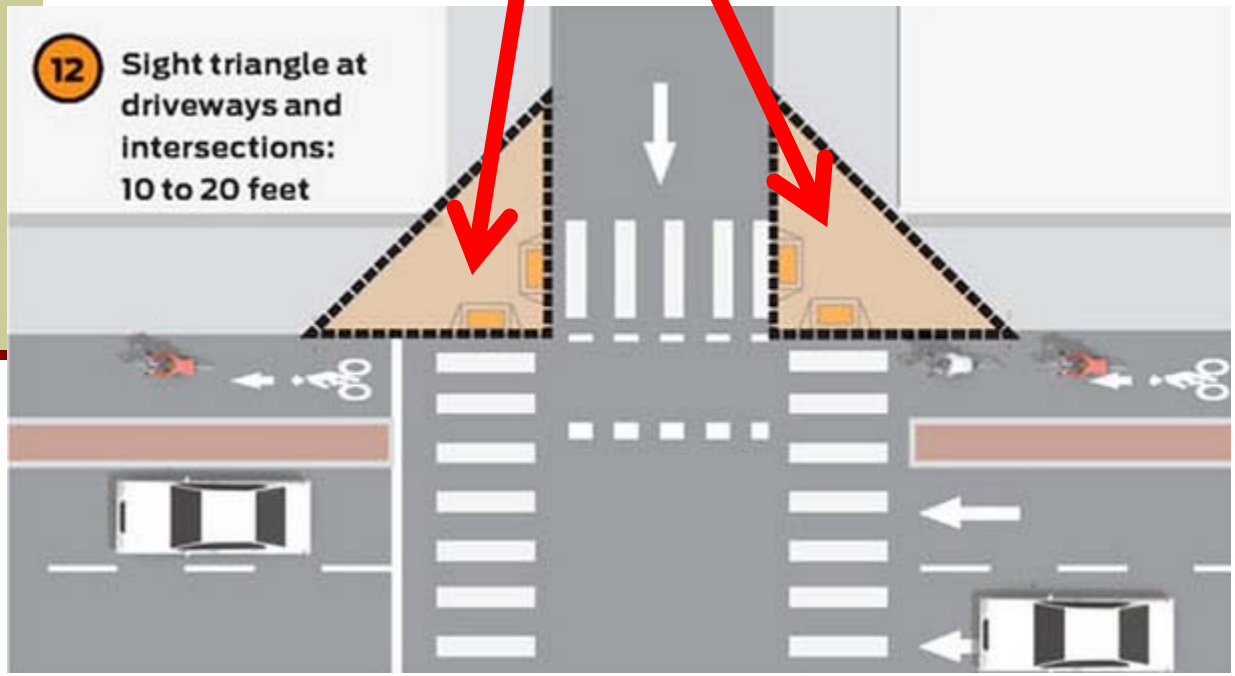
What about Snow?

Salt Lake City, UT

Design Guidance

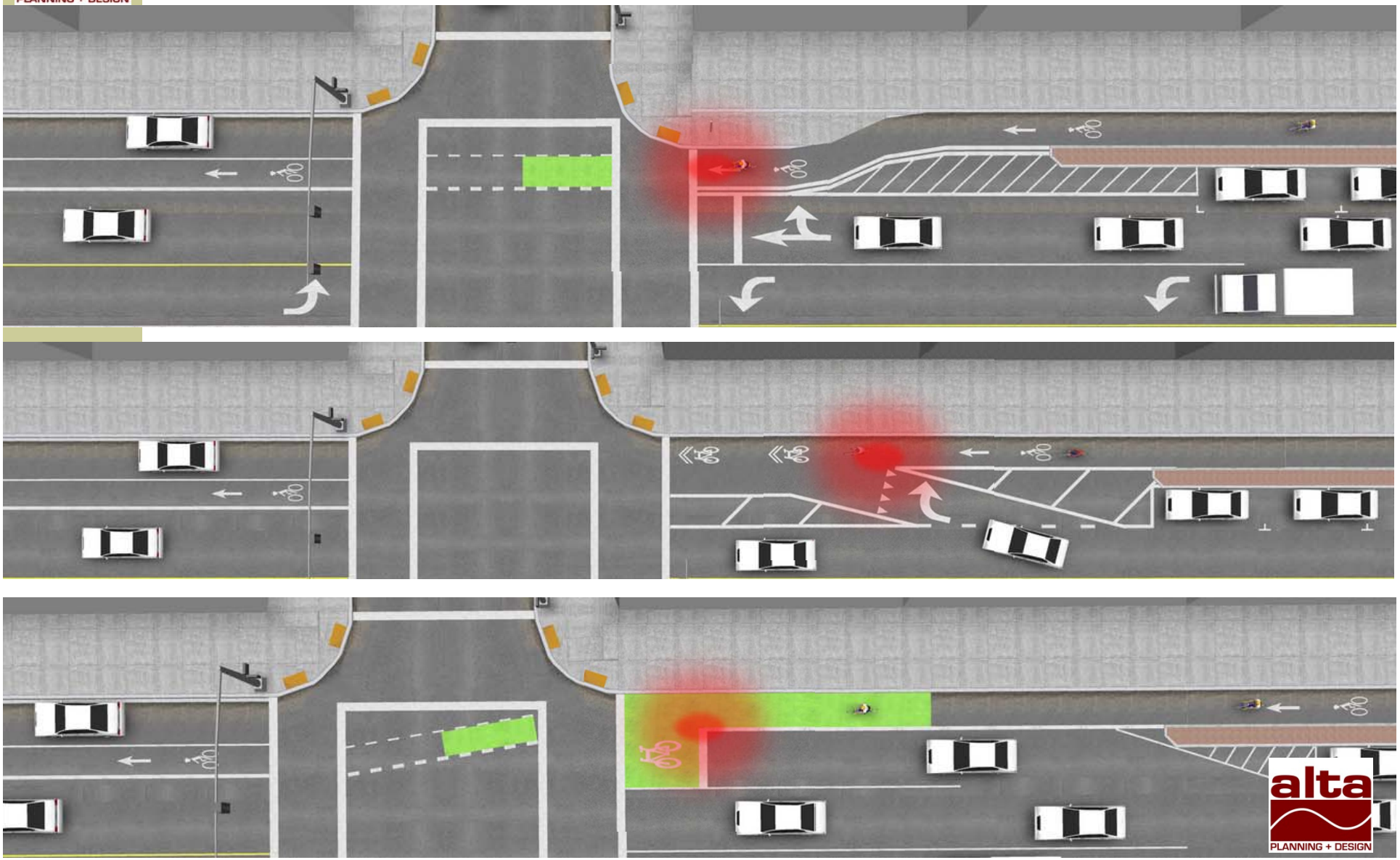
Keep Clear.. at least

- **3 metres for driveways**
- **6 metres for minor intersections**

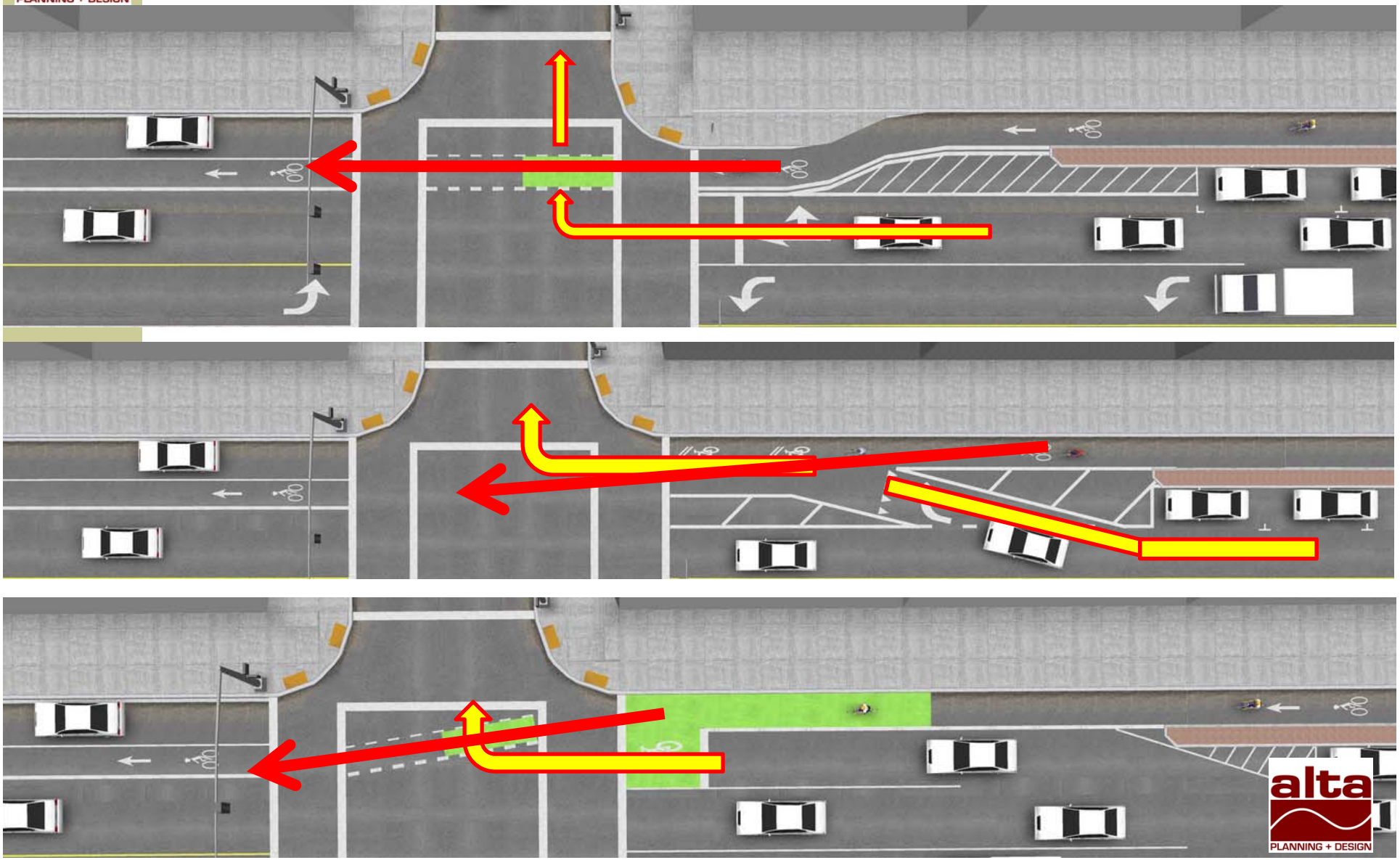


Intersection Approaches

Benefits



Benefits



Example
Portland, OR
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Intersections

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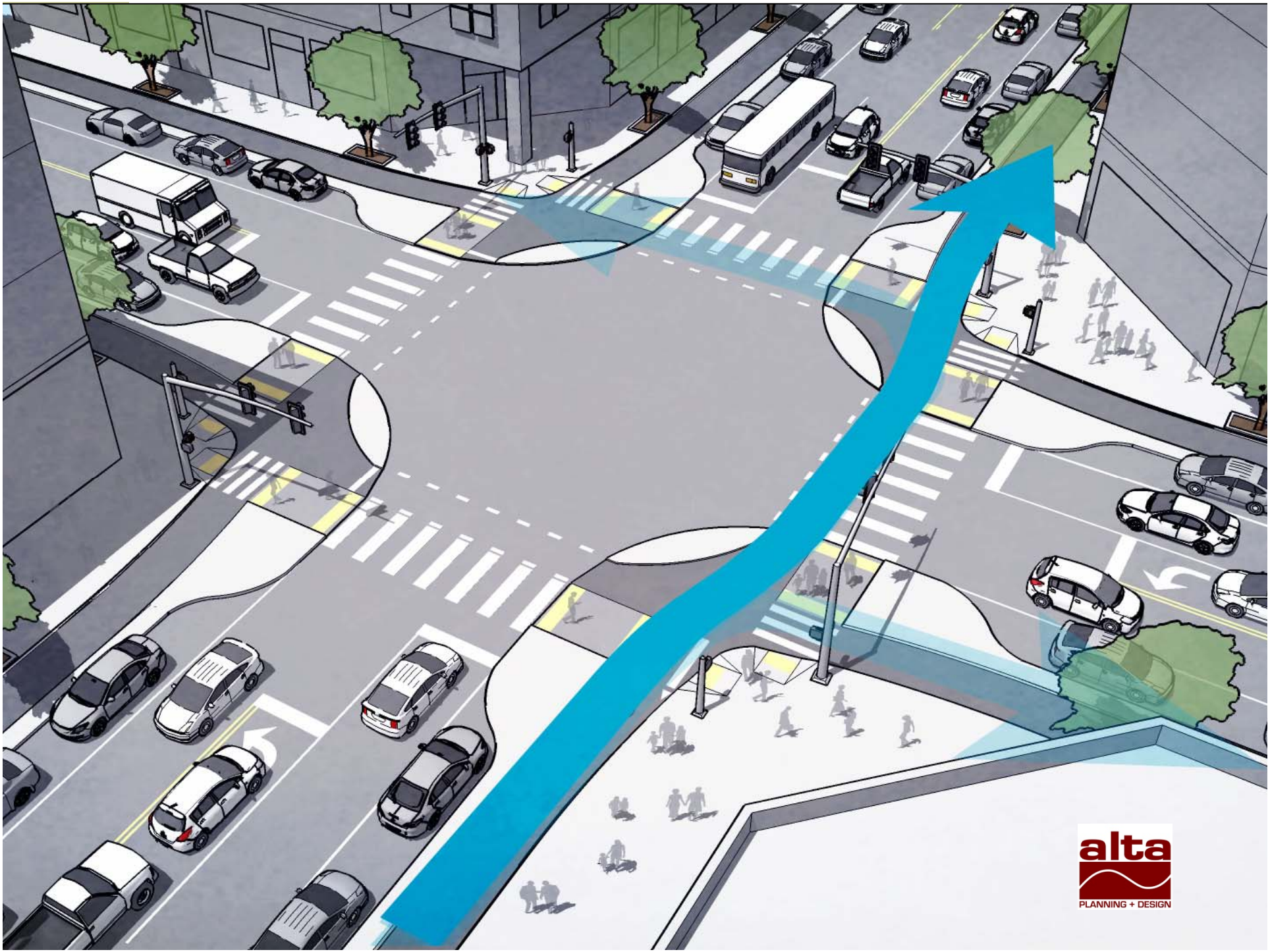
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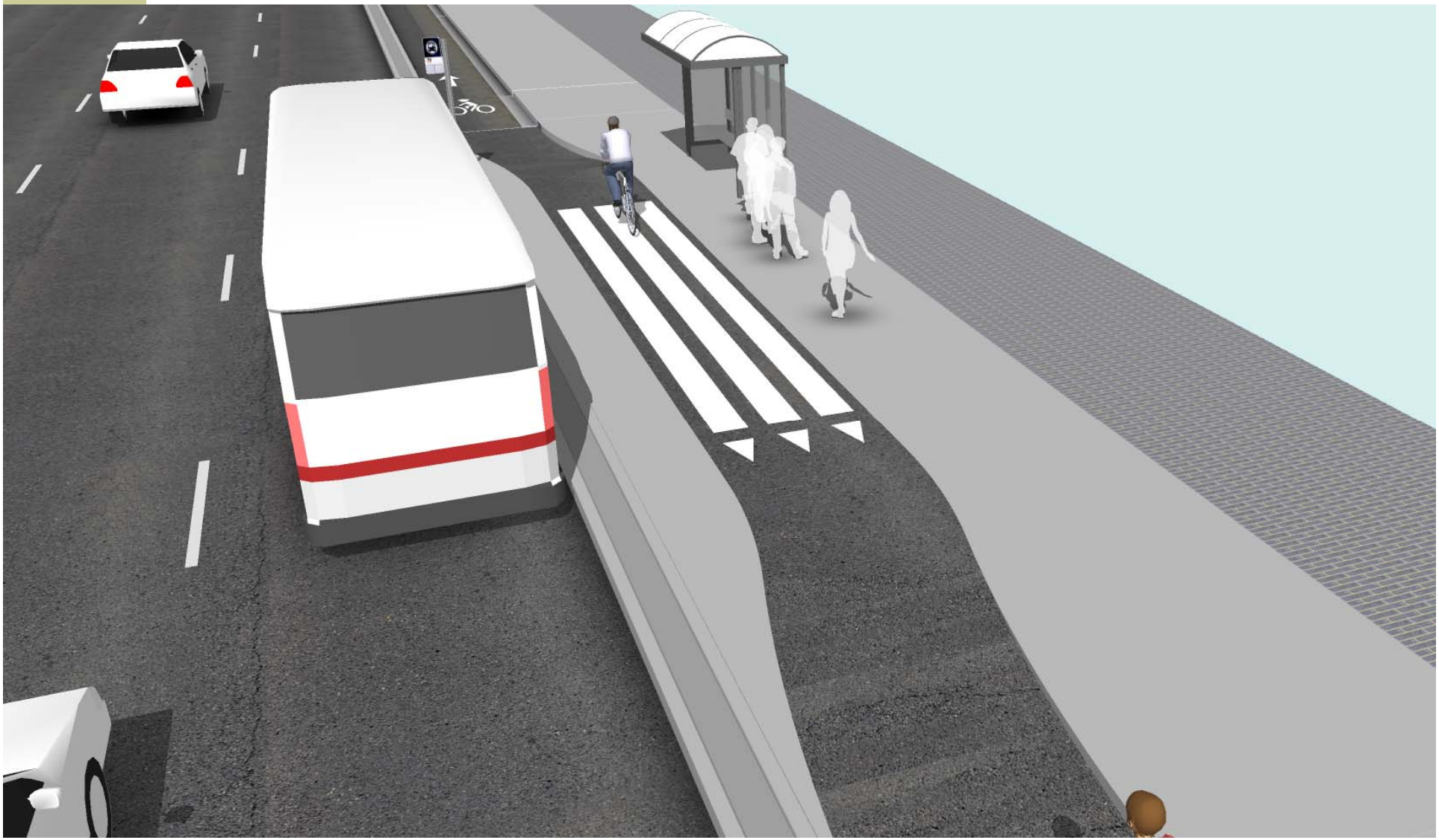
Bus Stop
On Smithe
at Expo Blvd

Bus Stop
On Smithe
at Expo Blvd

Constrained Bus Stops



Conclusions

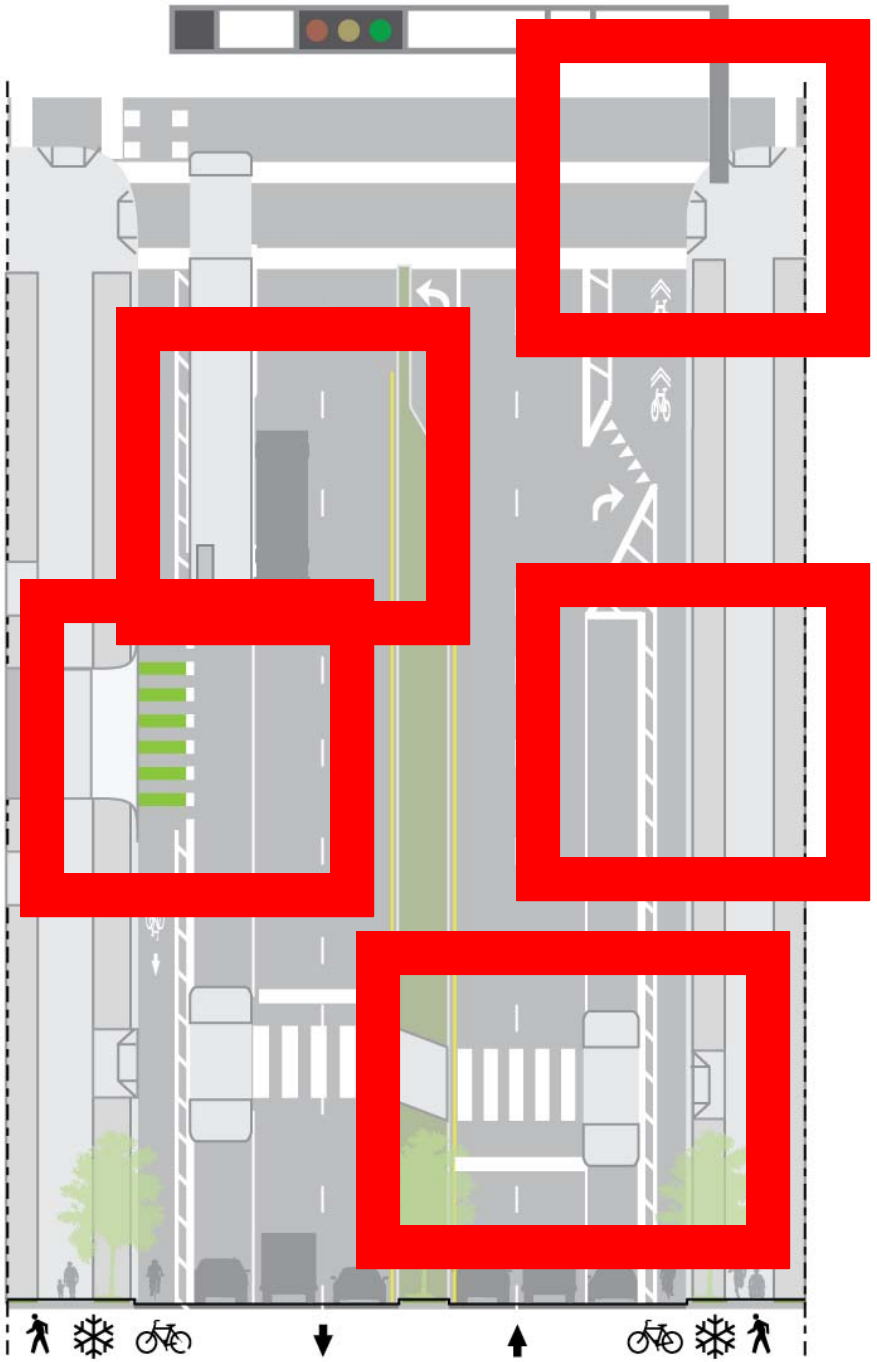
Gavin Davidson, Principal
Alta Planning + Design
gavindavidson@altaplanning.com

Arterials

- Provide mid-block crossings
- Allow buses to stop in the travel lane

Mitigate conflicts

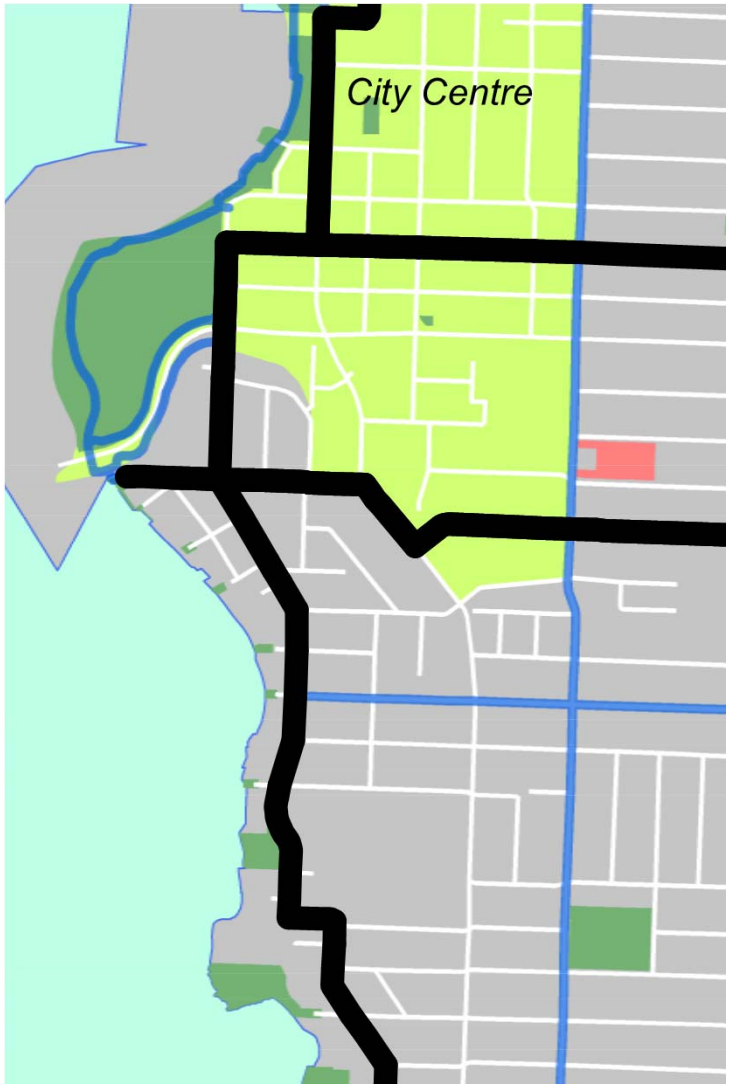
Buffer bikes and peds



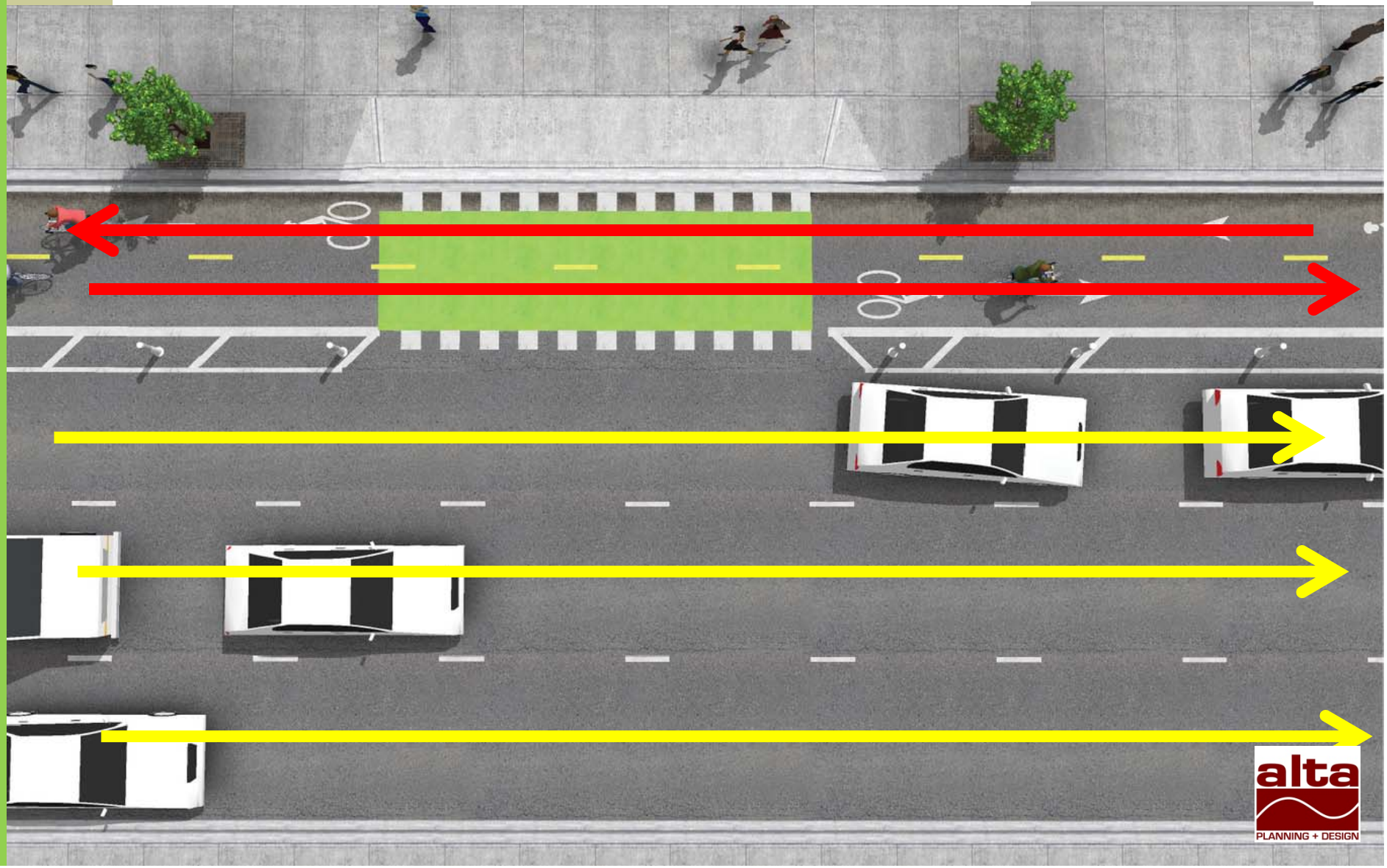
The Supporting Network

Arterial route

Supporting route



Benefits



Raised crosswalks and medians

Road Diets

Commonwealth Ave, Boston in 2005

Road Diets

Commonwealth Ave, Boston as built in 2008

What will it look like?

BEFORE

AFTER

Source: City of Cambridge

What will it look like?

COLUMBIA BEFORE

Source: City of New Westminister

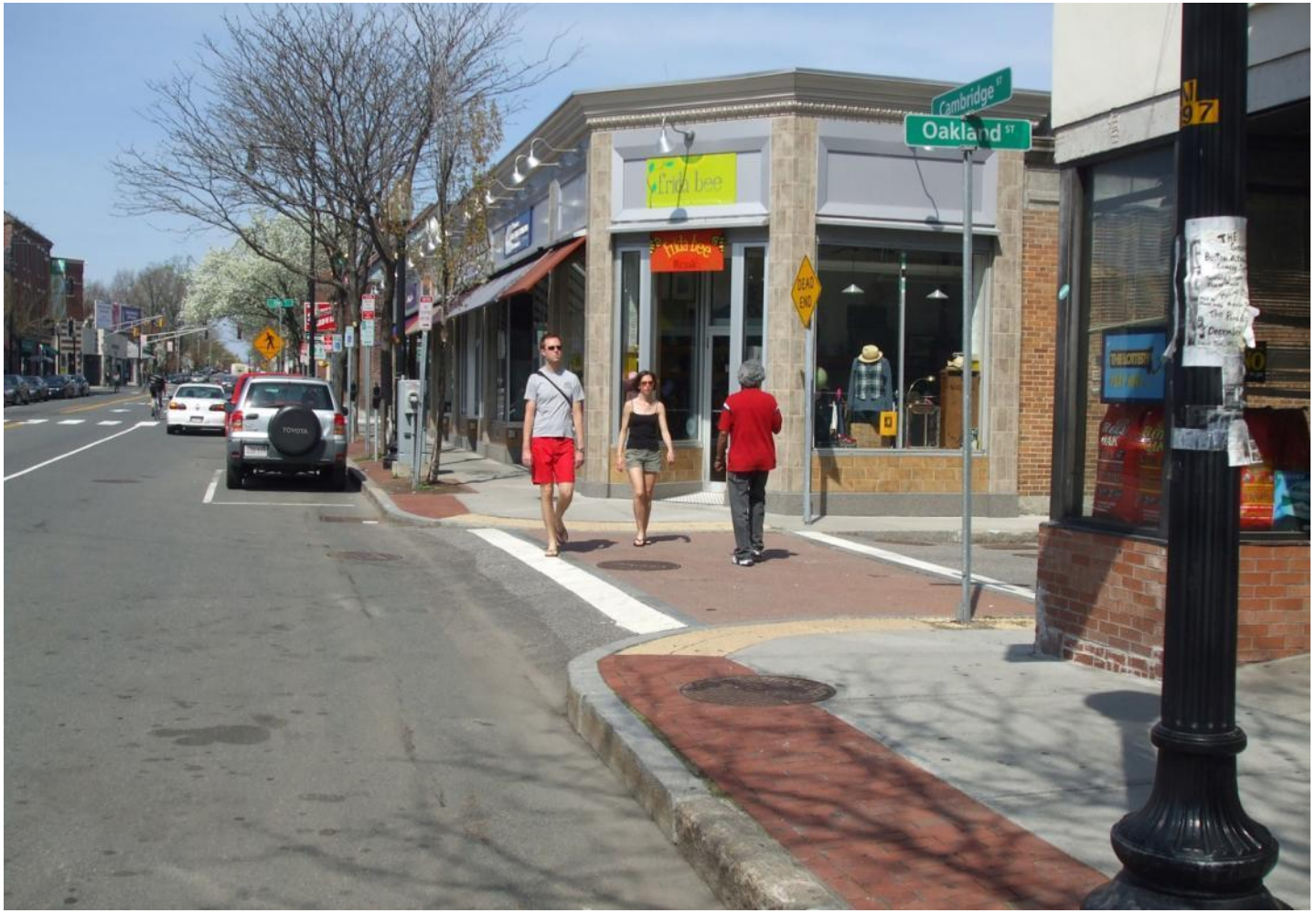
COLUMBIA TODAY

Source: Google Maps

Large turning radii encourages speeding

Source: www.completestreets.org

Small turning radii
Discourages speeding



YIELD
2-WAY CROSSING
YIELD
2-WAY CROSSING

Pavement markings

30
30