CARSP 2019 Vulnerable Road Users – Panel II

Applying Vision Zero principles to create safer cycling infrastructure

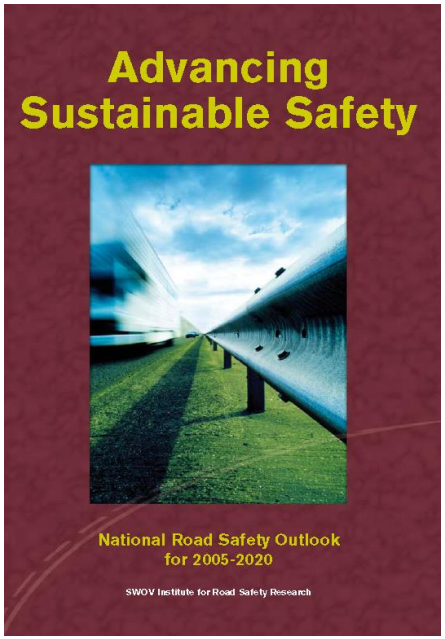
Tony Churchill – The City of Calgary

Overview of Safer Mobility Plan 2019-2023

- Five year plan with increased budget
- Vision Zero Targets focused on major injury and fatal collisions
- Traffic Safety Strategy focusing on 5 E's of transportation safety using a Safe Systems approach

- 5E's - Engagement, Engineering, Education, Enforcement, Evaluation
- Safer Systems approach - Safer Roads, Safer Vehicles, Safer Users, Safer Speeds

Approaches to improve traffic safety



Common themes to all approaches (3 E's)

Human fallibility and physical tolerances

All three aim to minimize/eliminate harm

Why is Speed so important?

Simple physics and human bio-mechanics: Kinetic Energy = ½ Mass x Velocity^2

1% increase in speed ➔ 2% increase in collisions, 3% increase in injuries, 4%increase in fatal collisions (~ Nilsson's Power model)

Relative risk of Impaired Driving at legal limit same as Speeding at 10 km/h over the limit (Kloeden et al.)

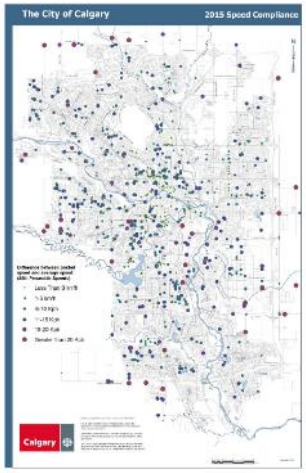
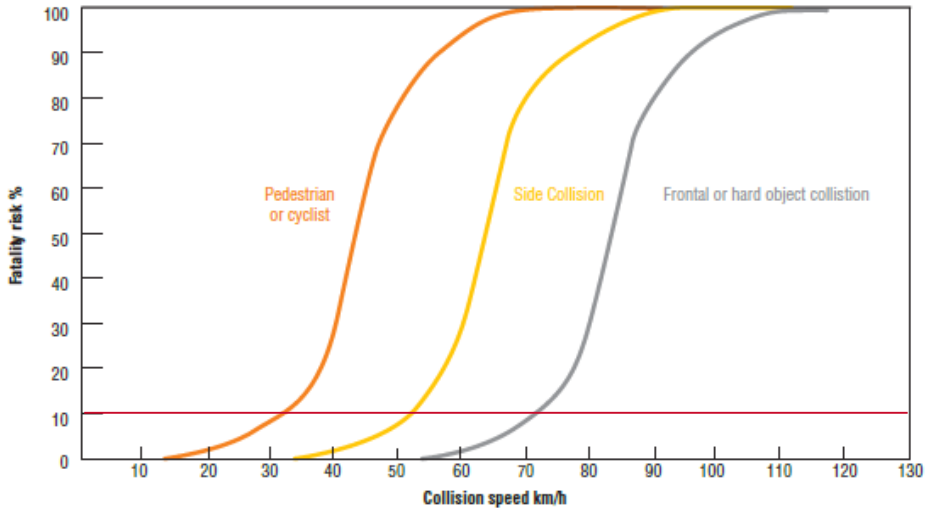
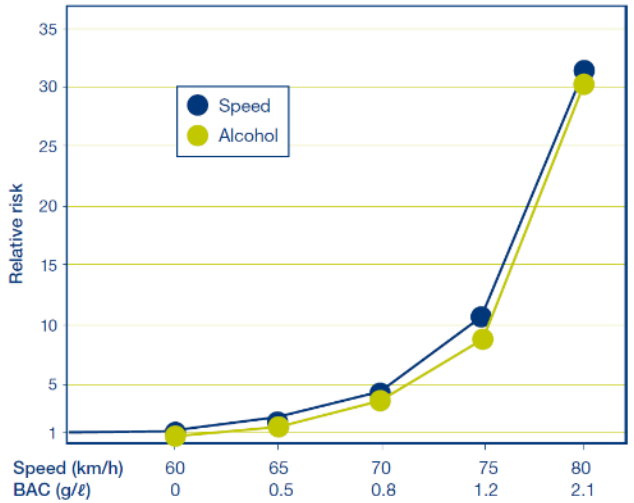


Figure E1: Fatality Risk for Three Major Collision Types and Different Impact Speeds



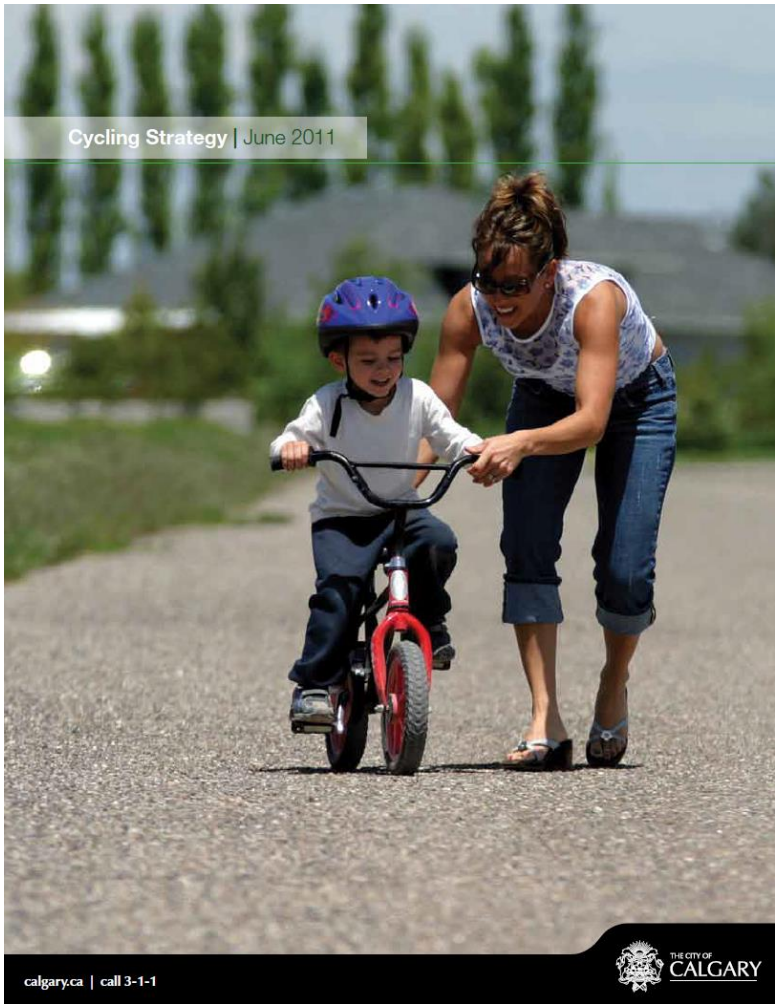


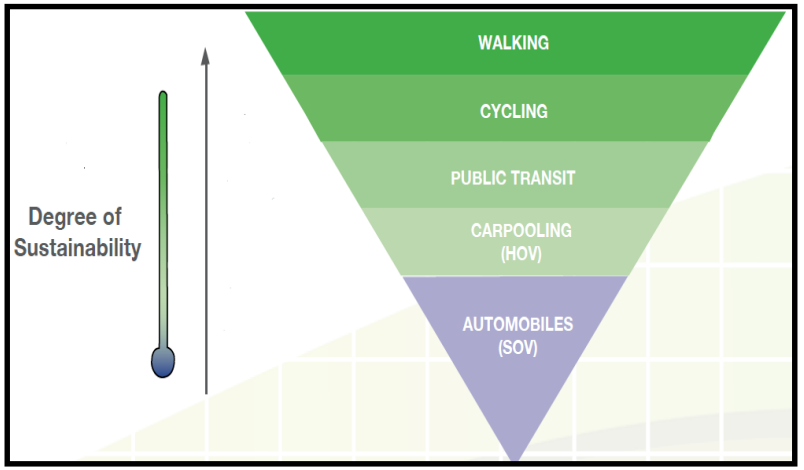
Principles of Sustainable Safety

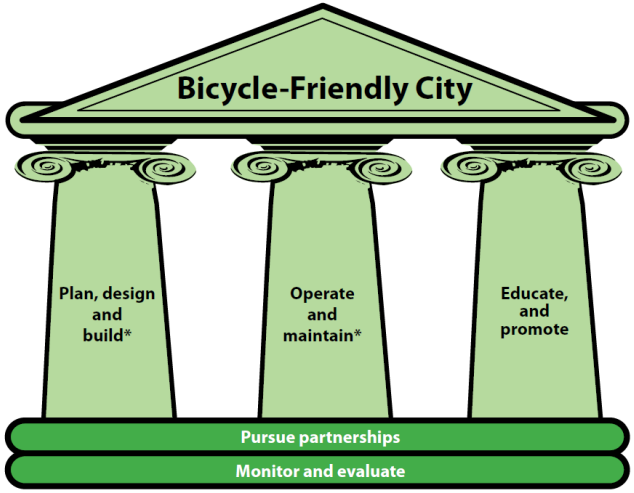
Sustainable Safety principle	Description
Functionality of roads	Monofunctionality of roads as either through roads, distributor roads, or access roads, in a hierarchically structured road network
Homogeneity of mass and/or speed and direction	Equality in speed, direction, and mass at medium and high speeds
Predictability of road course and road user behaviour by a recognizable road design	Road environment and road user behaviour that support road user expectations through consistency and continuity in road design
Forgivingness of the environment and of road users	Injury limitation through a forgiving road environment and anticipation of road user behaviour
State awareness by the road user	Ability to assess one's task capability to handle the driving task

Google search: Advancing Sustainable Safety SWOV

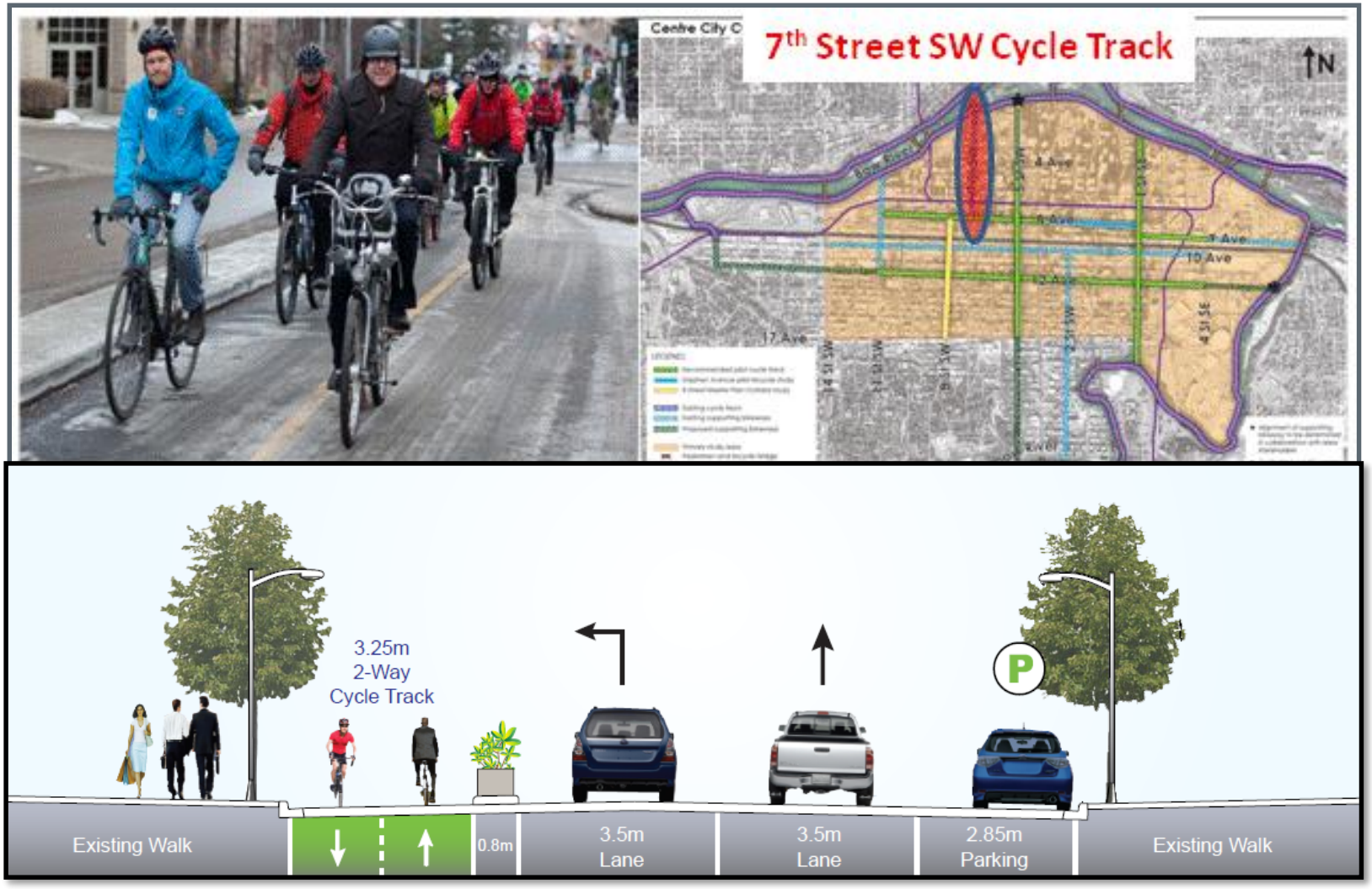
Cycling in Calgary



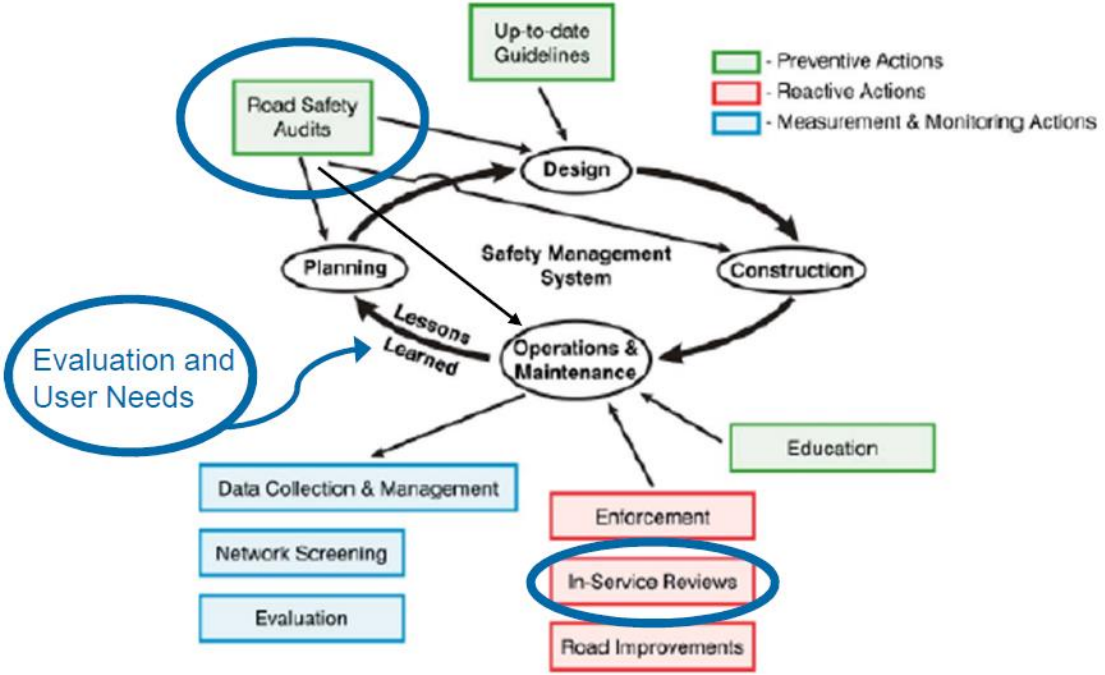




Cycle Track in Calgary



Is it a Road Safety Audit or an In-Service Road Safety Review?



Source: The Canadian Guide to In-service Road Safety Reviews 2004, Transportation Association of Canada (TAC)

Data/Reactive – In-Service Road Safety Review

Principles/Proactive – Road Safety Audit

Thanks to Bunt & Associates and Urban Systems for their Road Safety Engineering work on our cycle track!

In-Service Road Safety Review

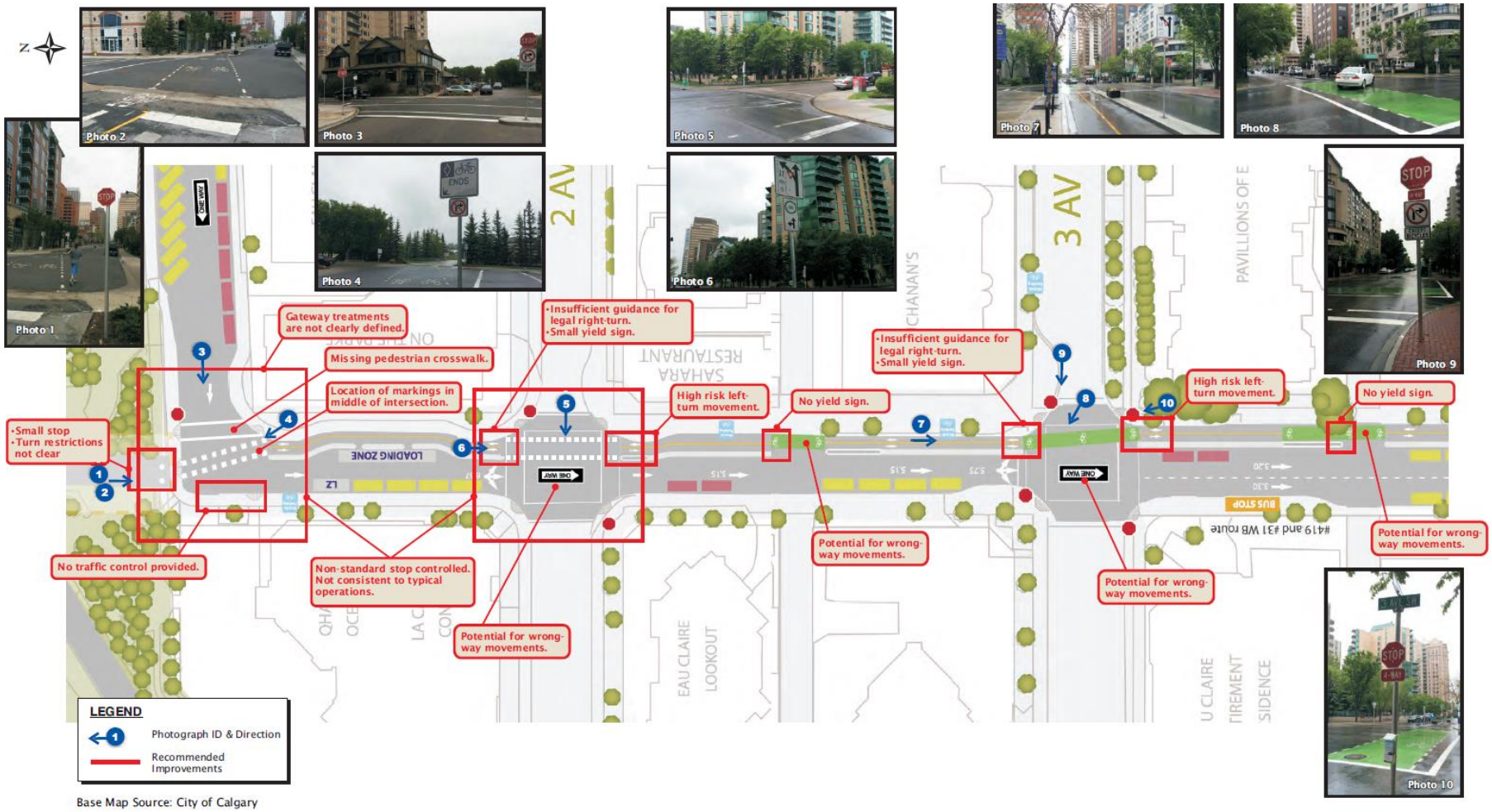
TAC process with addition of stakeholder input:

Internal (Roads, Transit, Parking, Planning, Police, etc.)

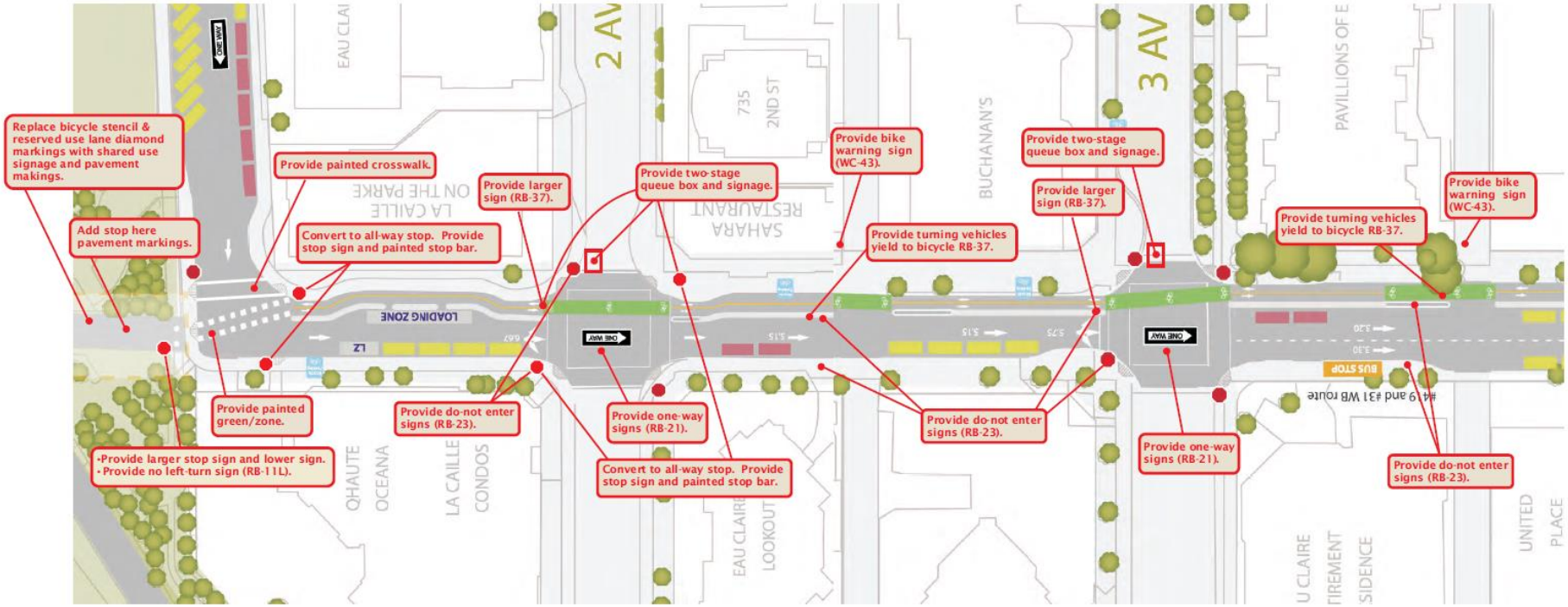
External (Bike Calgary, Eau Claire Community Association, Access Calgary special needs transport, etc.)

Workshop Settings to share information

Data, Observations, User feedback



Mitigation Suggestions



Base Map Source: City of Calgary

Exhibit 10.4

1 Avenue SW to 3 Avenue SW - Mitigation Measures

7 Street In-Service Road Safety Review
October 2014 Scale NTS

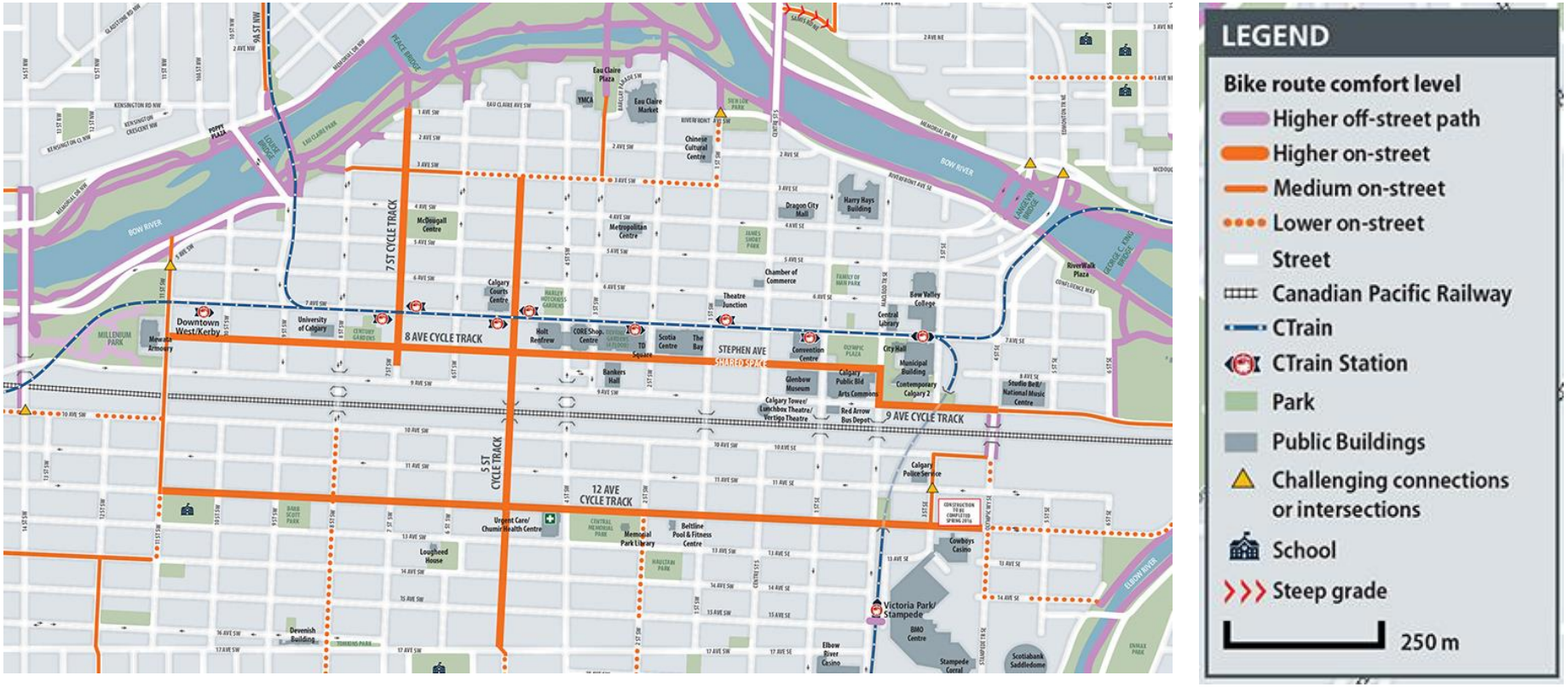
Lessons learned to apply to future cycle tracks.

Downtown Cycle Track Pilot Project

Fast track of downtown network – Opened June 2015

Applied lessons learned from 7th Street Cycle Track In-Service Road Safety Review

RSA Downtown Cycle Track Network as part of pilot detailed design and pre-opening then in-Service review after short period of opening



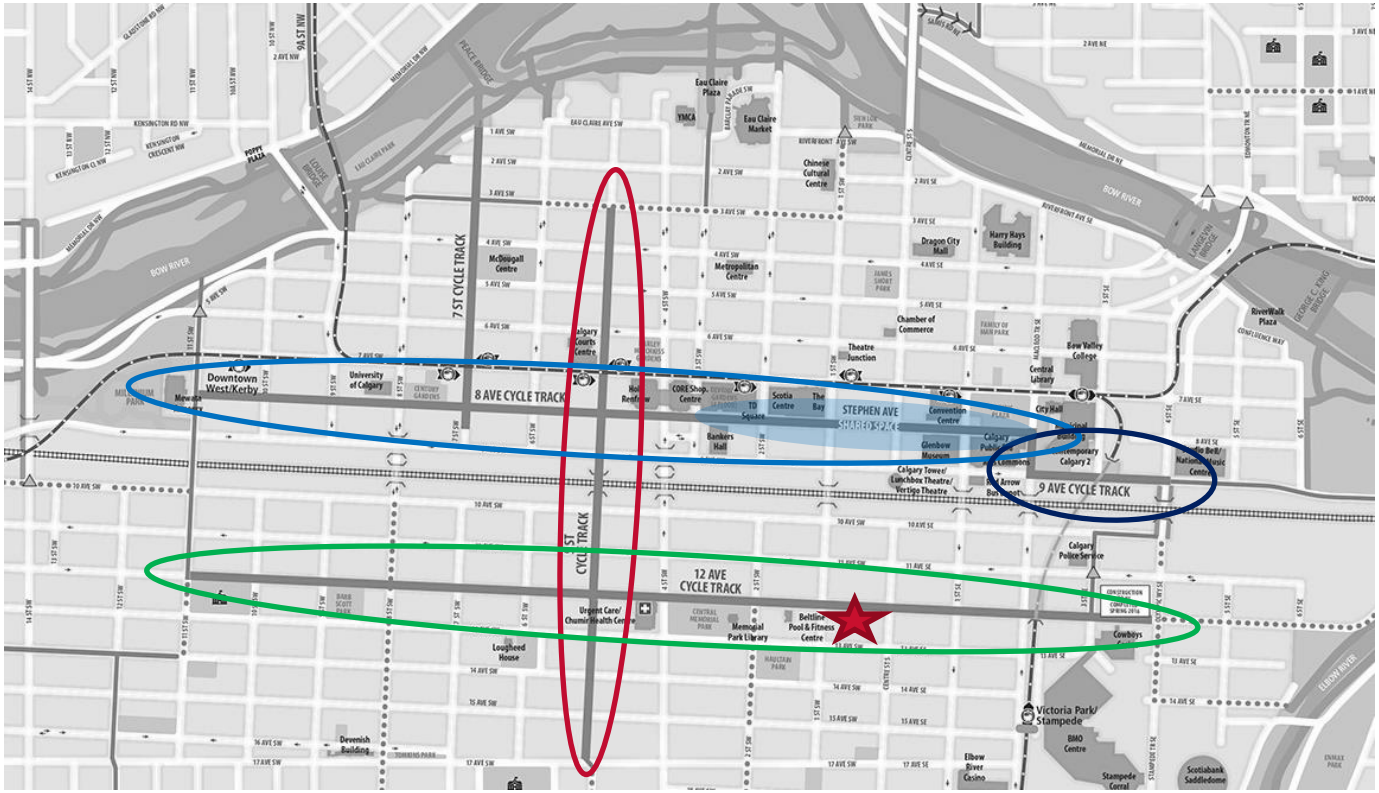
Cycle Track Corridors

5 Street (3 Avenue S.W. to 17 Avenue S.W.)

8 Avenue (11 Street S.W. to Macleod Trail S.E.)

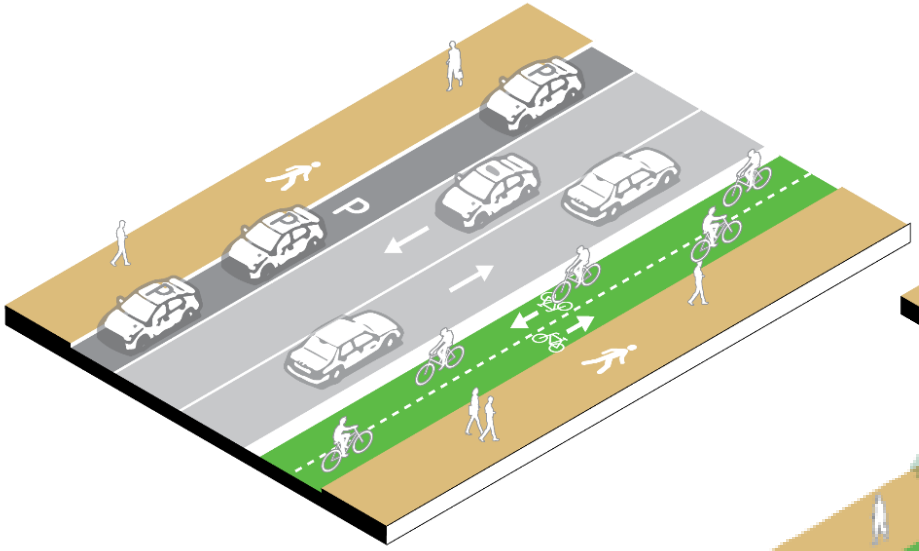
9 Avenue (Macleod Trail to 4 Street. S.E.)

12 Avenue (11 Street S.W. to 4 Street. S.E.)

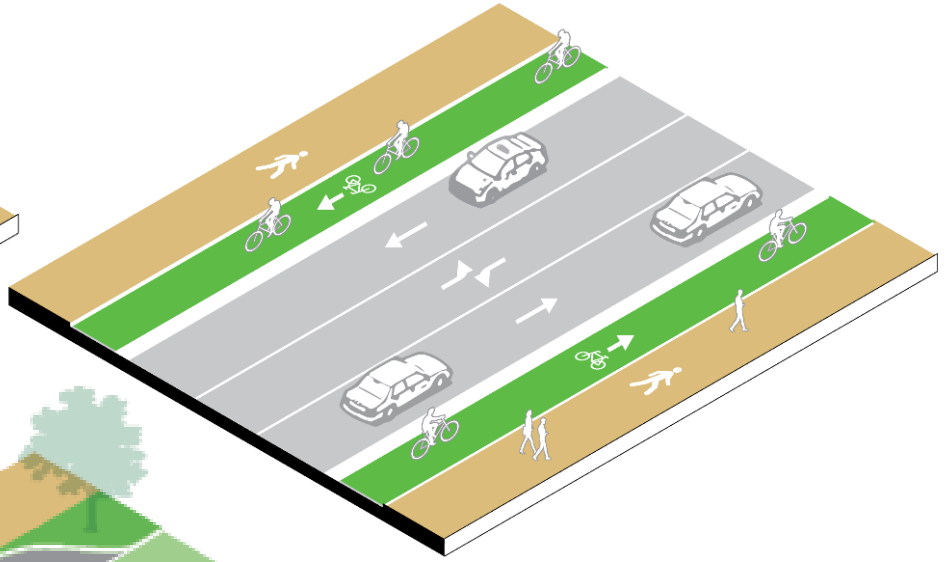


Types of Facilities

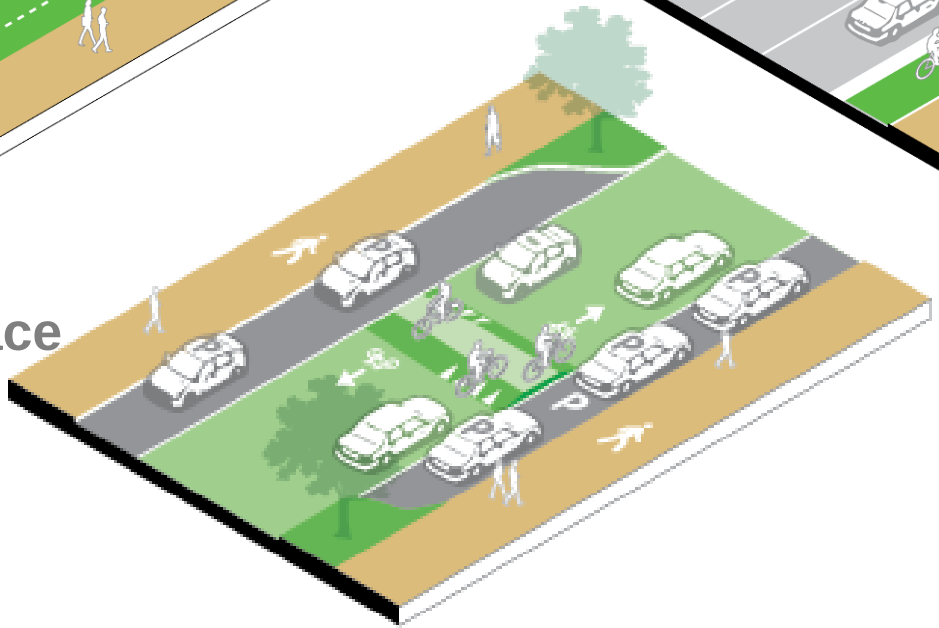
Two-Way Cycle Tracks



One-Way Cycle Tracks



Shared Space



Issue Identification

311 Data, E-mails and stakeholder input

" Near miss at 10 Avenue" …

"Concerns with permissive left turn" ….

"Better separation of all modes at this intersection is needed"

" Concerned about ongoing detours at 17 Avenue" …

"5 Street and 17 Avenue is not very safe for cyclists"

"Sightlines aren't great"

Near miss with a cyclist turning from 5 St onto 8 Ave sidewalk

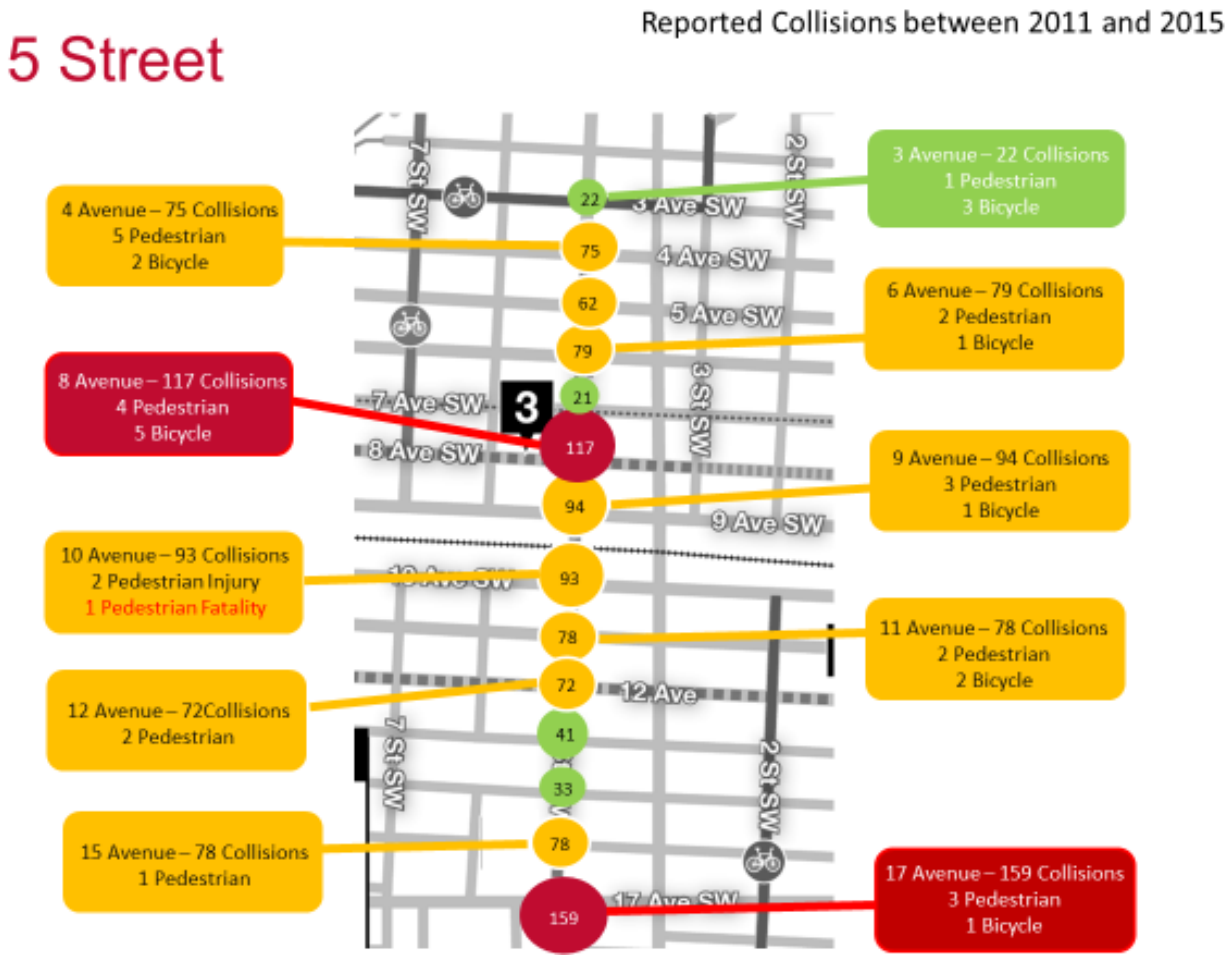
"Pavement markings are confusing on 5 Street"

"Drivers are mistakenly turning north along 5 Street into cycle track at 4 Avenue"

Figure 12 - 5 S.W. Street 311 Feedback by Month

Issue Identification

Data Analysis



Summary of Key Issues

CORRIDOR-SPECIFIC SAFETY ISSUES

CORRIDOR TREATMENTS

- Facility Type
- Width
- Buffer Zone
- Shared Spaces & Pathways

END POINTS & TRANSITIONS

CYCLE TRACK CONVERGENCE

INTERSECTIONS

- Intersection Control
- Sightlines

PARKING & LOADING ZONES

CONFLICT ZONES

TRANSIT INTEGRATION

MULTI-LOCATION SAFETY ISSUES

- Pavement Quality and Drainage
- Signal Timing
- Education and Enforcement
- Separation Type and Application
- Bicycle Signal Conspicuity
- Bicycle Stop Lines

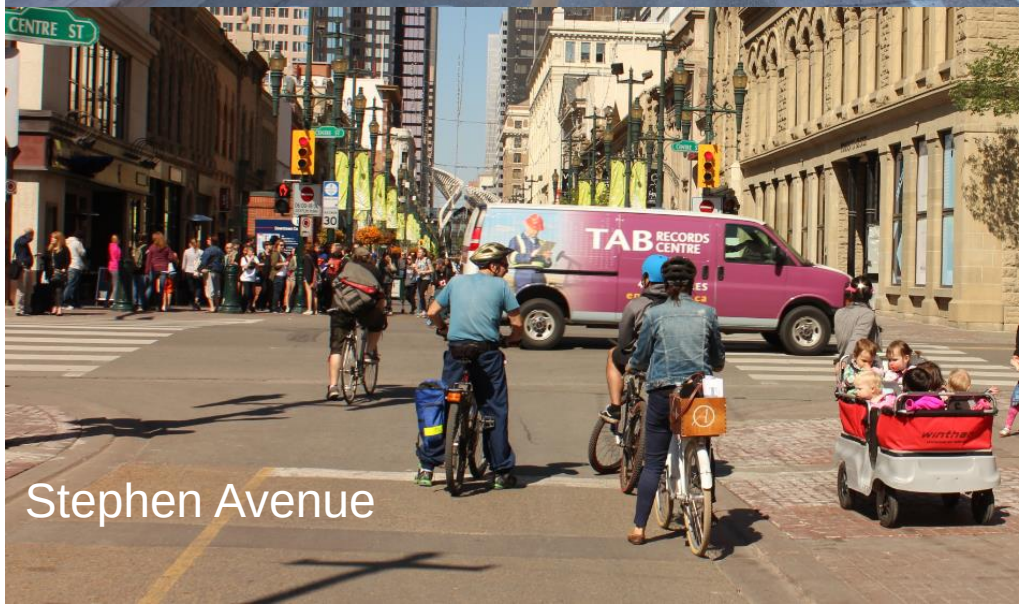
END POINTS & TRANSITIONS

CONFLICT ZONES

Shared Spaces

5 Street and 17 Avenue

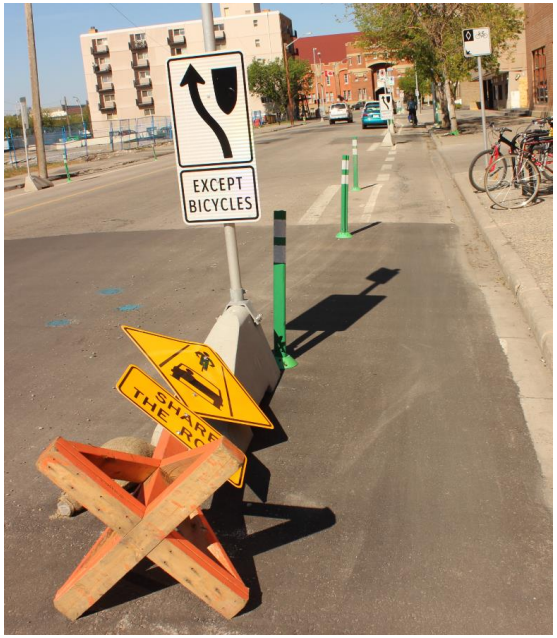

9 Avenue and 3 Street SE



Stephen Avenue


12 Avenue and 11 Street SW

Other Safety Considerations



Results

Fast facts about the cycle track pilot

2% of 300 km of downtown travel lanes used for **6.5 km** of cycle tracks

[allowing more people to choose to travel by bike.]

1.2 million bicycle trips

[between June 18, 2015 and November 20, 2016]

90 seconds longest delay to people driving

[travelling entire 12 Avenue cycle track corridor during morning peak period.]

Council approved budget **$7.1M**

Pilot cost (to date) ($1.65M under budget) **$5.45M**

net increase of parking stalls created downtown to offset the loss of parking along cycle track routes.

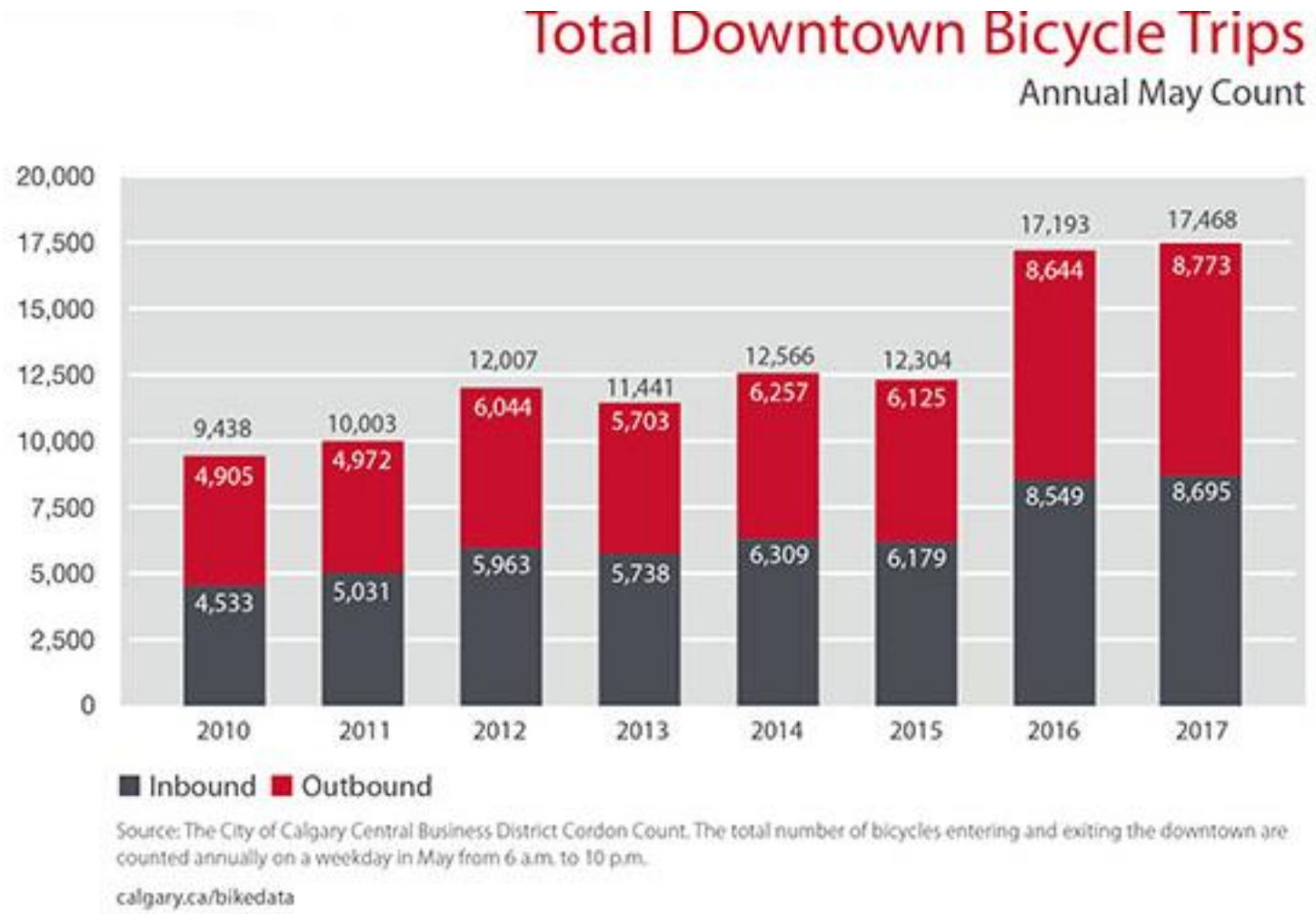
30% **of people riding cycle tracks are women,** up from 22% before cycle tracks.

Unlawful sidewalk riding has decreased from an average of 16% (pre-cycle tracks) to **2%**

67% **of Calgarians support the pilot project.** *(2016 Ipsos survey)*

100+ [made to improve traffic, loading and parking during the pilot.] adjustments

Results


Total Downtown Bicycle Trips
Annual May Count
20,000
17,500
15,000
12,500
10,000
7,500
5,000
2,500
0
9,438
4,905
4,533
10,003
4,972
5,031
12,007
6,044
5,963
11,441
5,703
5,738
12,566
6,257
6,309
12,304
6,125
6,179
17,193
8,644
8,549
17,468
8,773
8,695
2010
2011
2012
2013
2014
2015
2016
2017
Inbound
Outbound
Source: The City of Calgary Central Business District Cordon Count. The total number of bicycles entering and exiting the downtown are counted annually on a weekday in May from 6 a.m. to 10 p.m.
calgary.ca/bikedata

Applying Vision Zero principles to create safer cycling infrastructure

Thank you!