

Maximizing Vehicle Efficiency at Walnut and 34th Streets

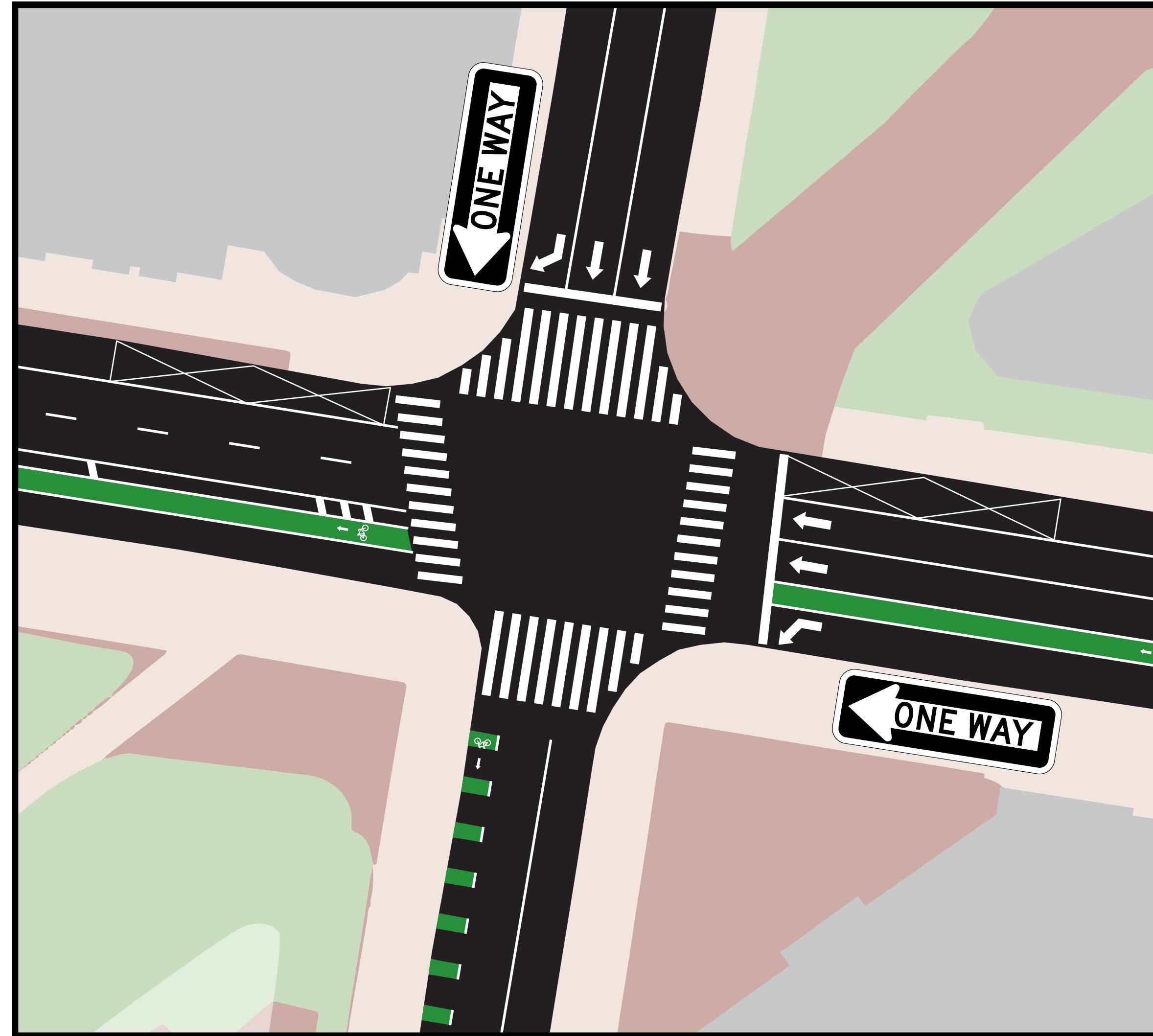
December 5, 2018 PennDesign CPLN 650



Welcome to
University City

34th Street

- Major arterial
- One-way (south)

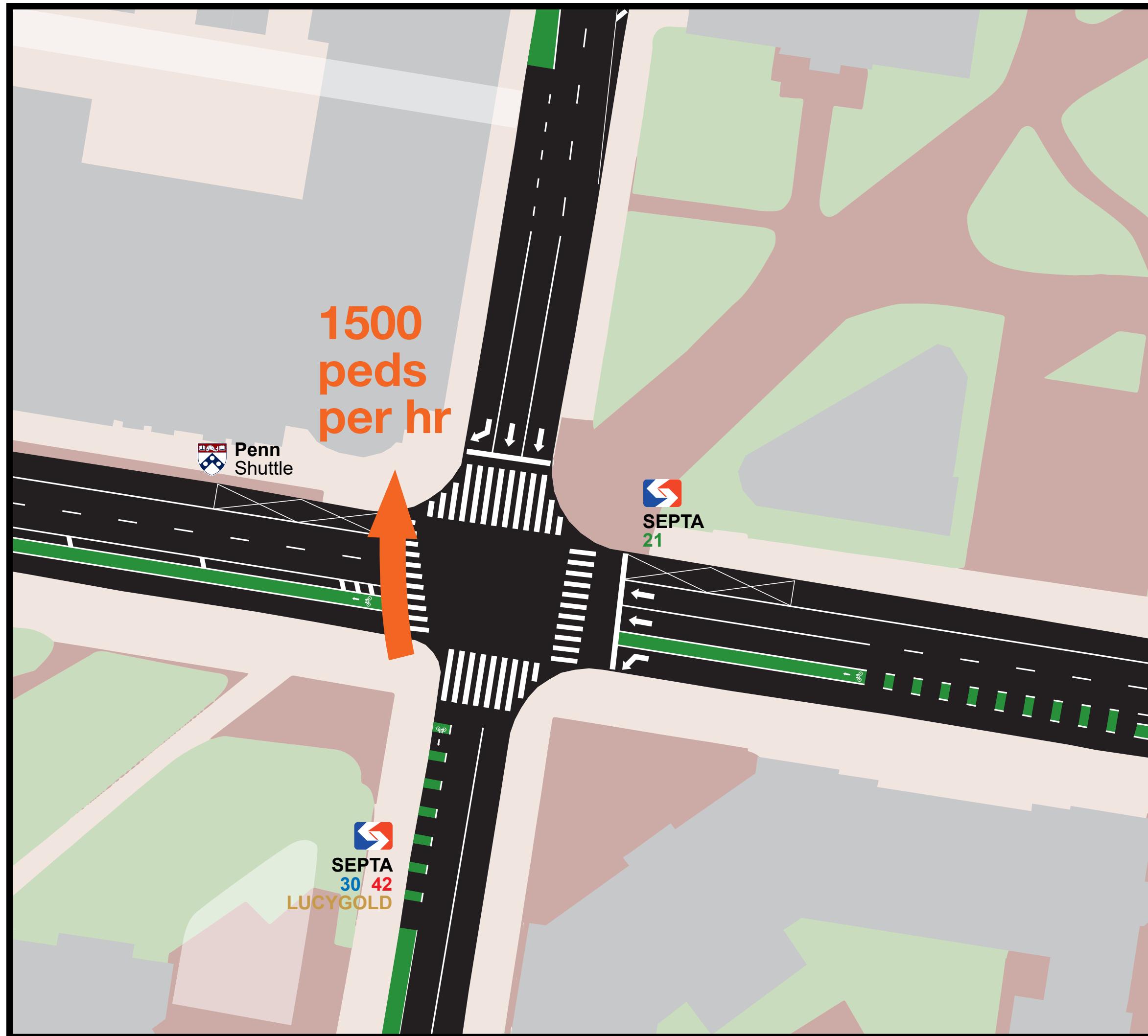


Walnut Street

- Major arterial
- One-way (west)

Peds & Bikes

- 1500 peds/hr using west crosswalk
- Three bicycle mixing zones

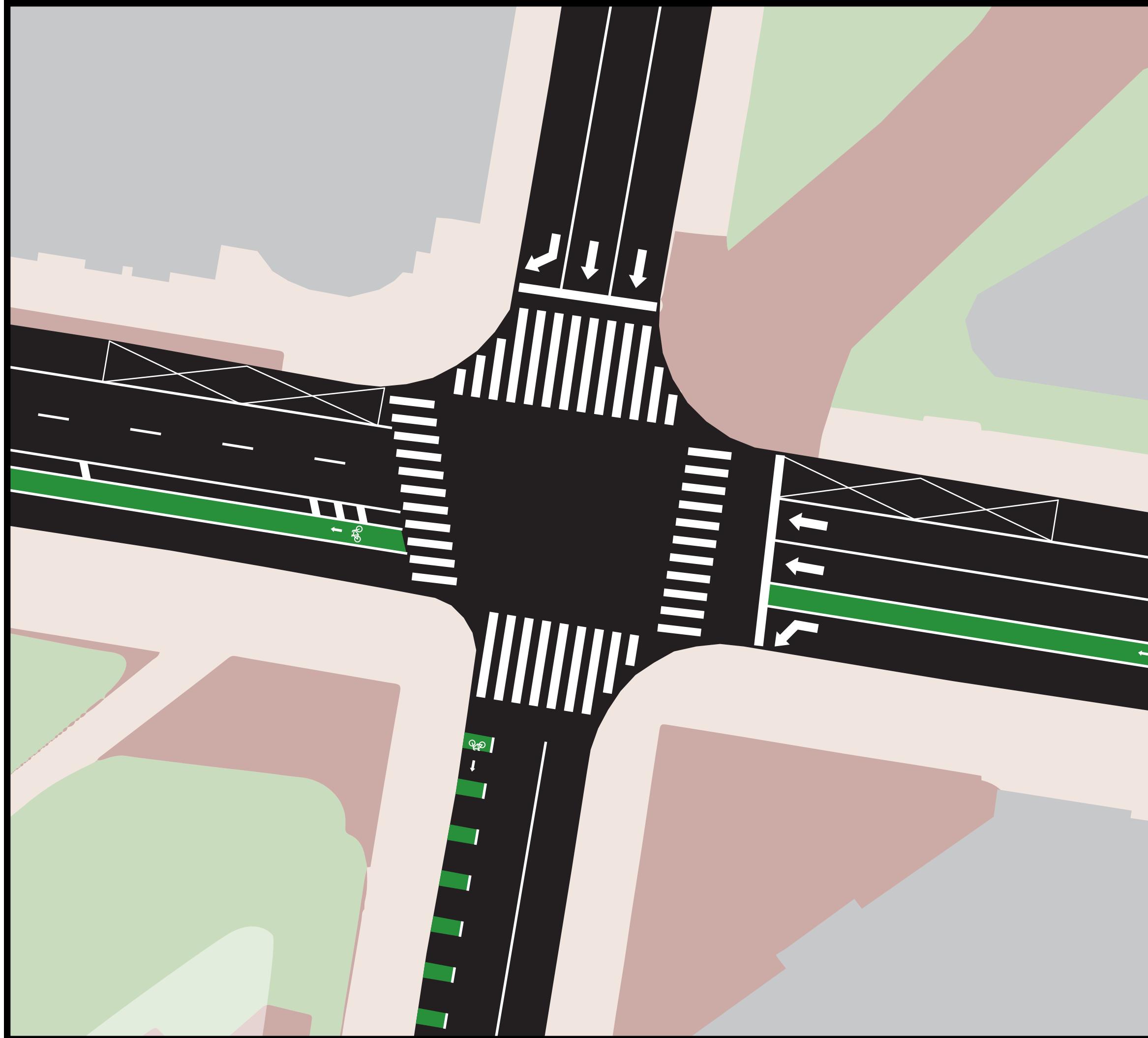


Transit & Parking

- Insufficient parking availability
- Bus-bike conflict



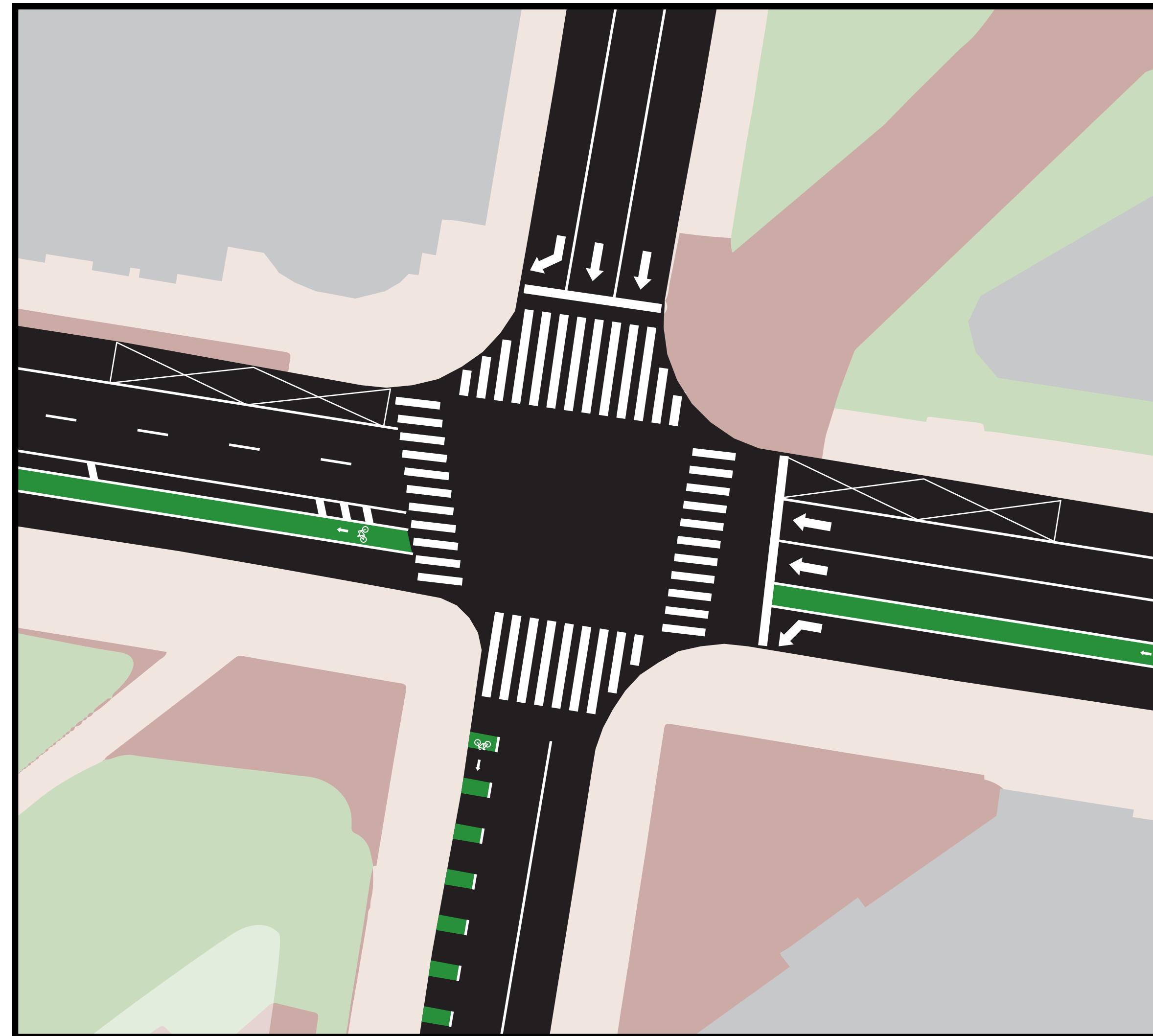
- to the north
- Chestnut Street
(major arterial)
 - MFL and trolleys





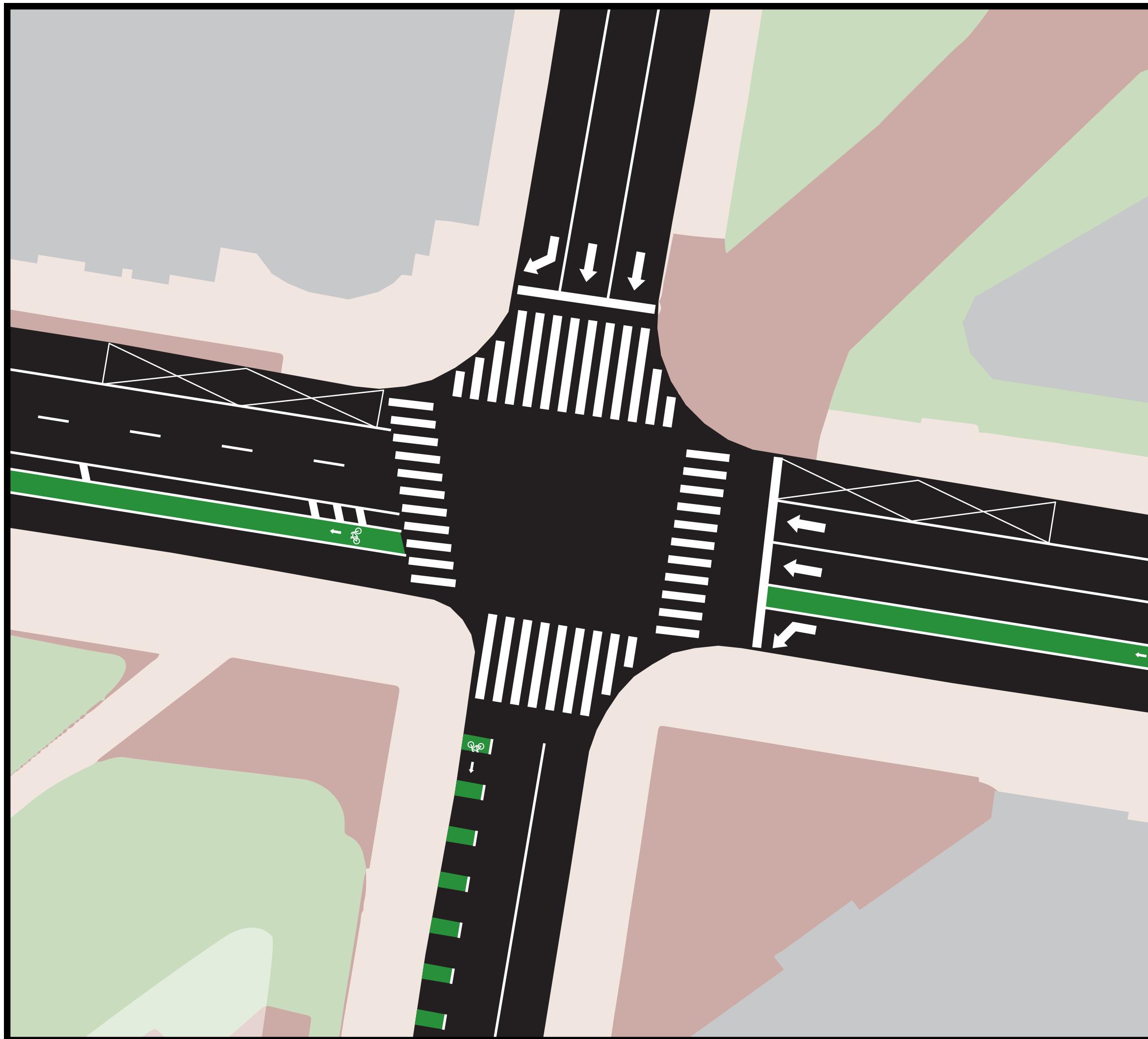
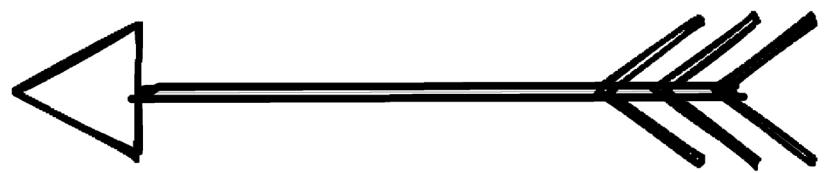
to the
east

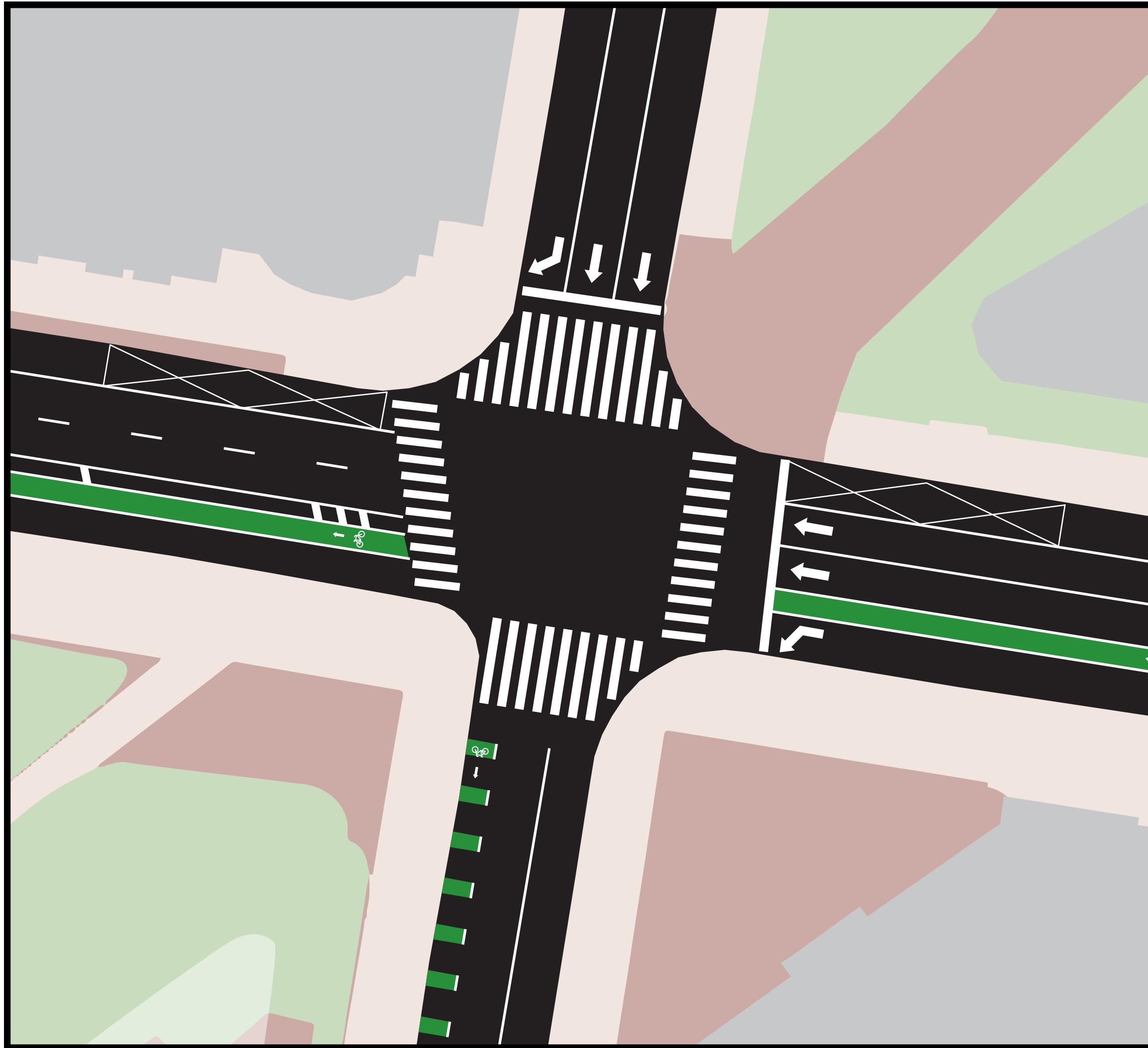
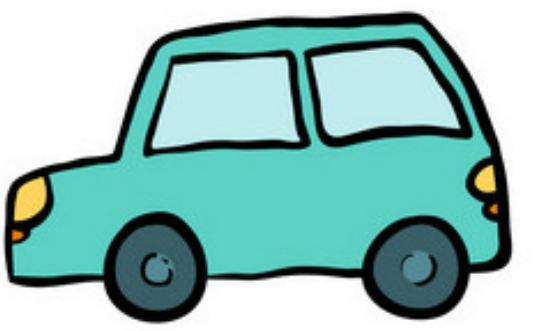
- Highway access
- Center City



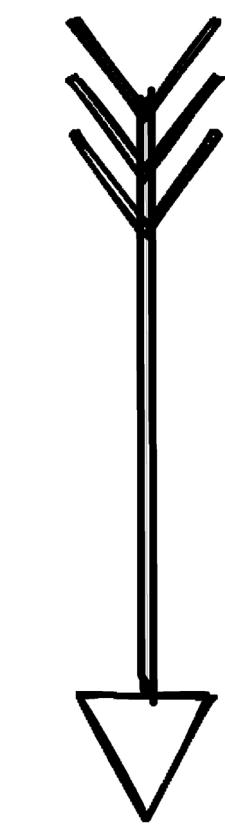
- West Philly
- Inner Pennsylvania

to the
West





- Highway access
- Penn Hospital



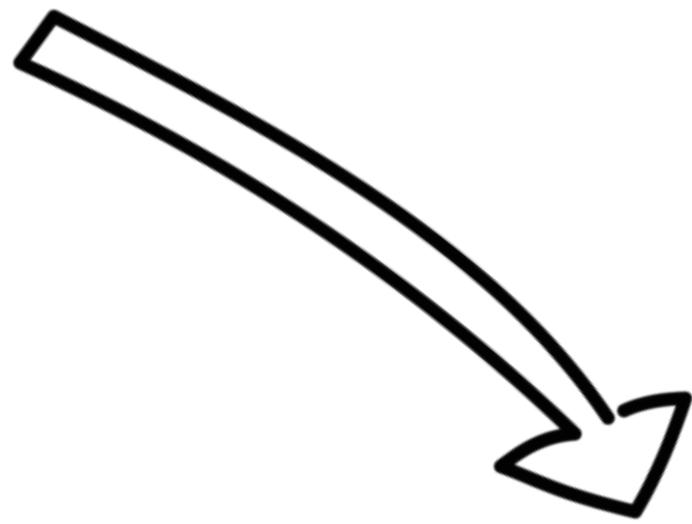
to the
south



What is
Vehicle Efficiency?



delay
time

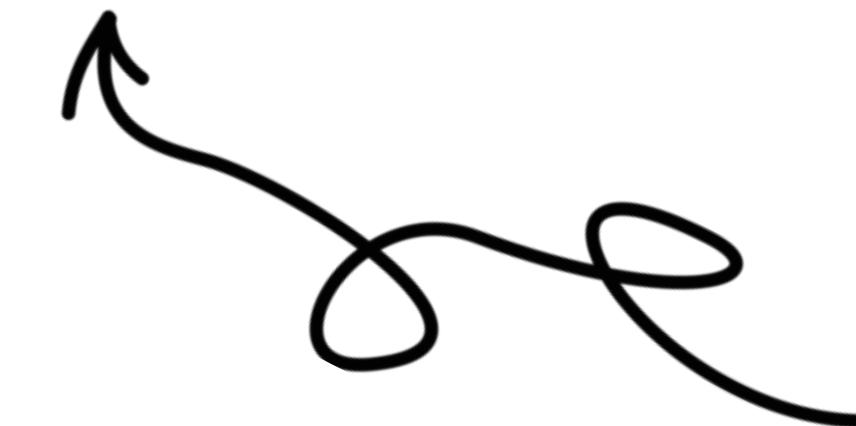
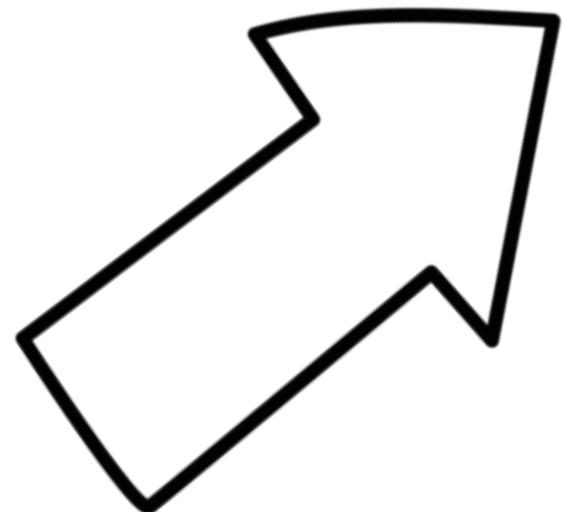


flow &
capacity



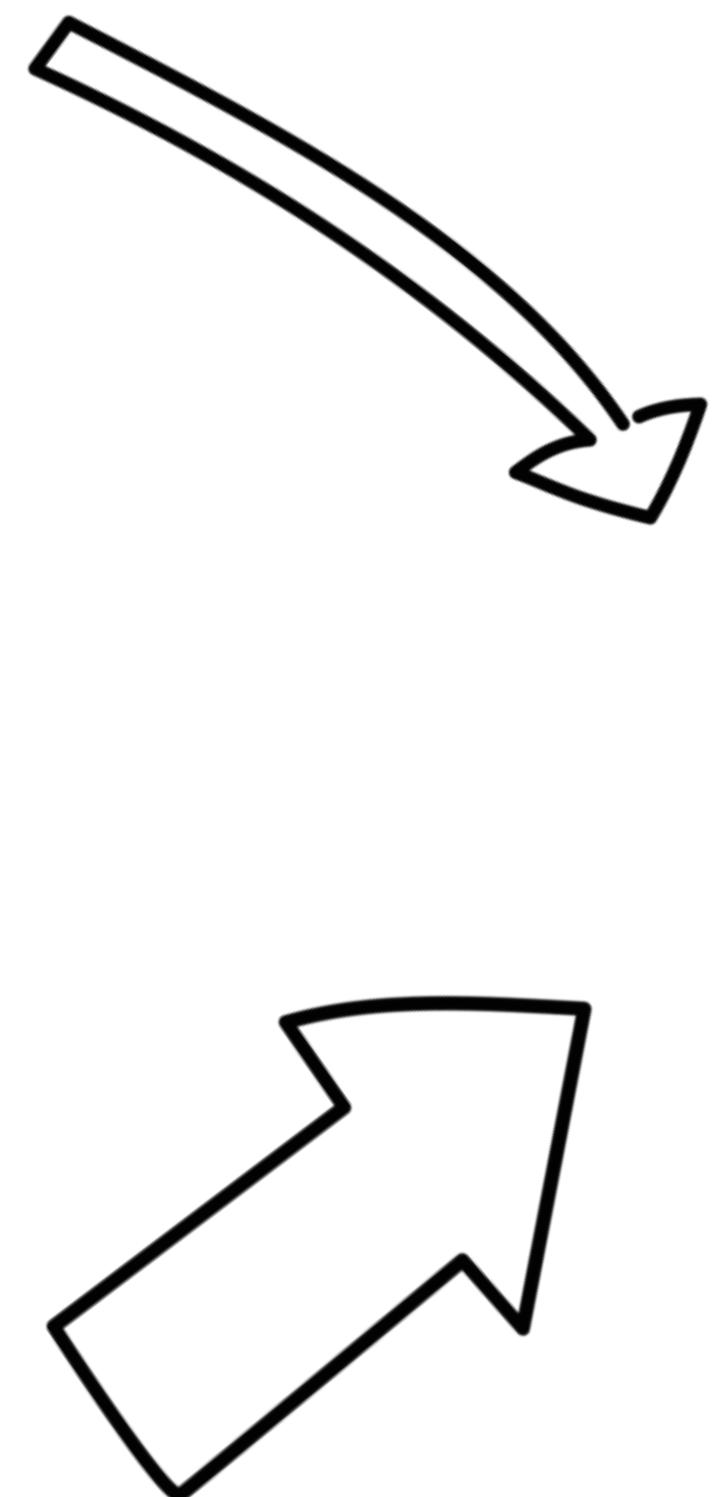
Vehicle Efficiency

queue
length



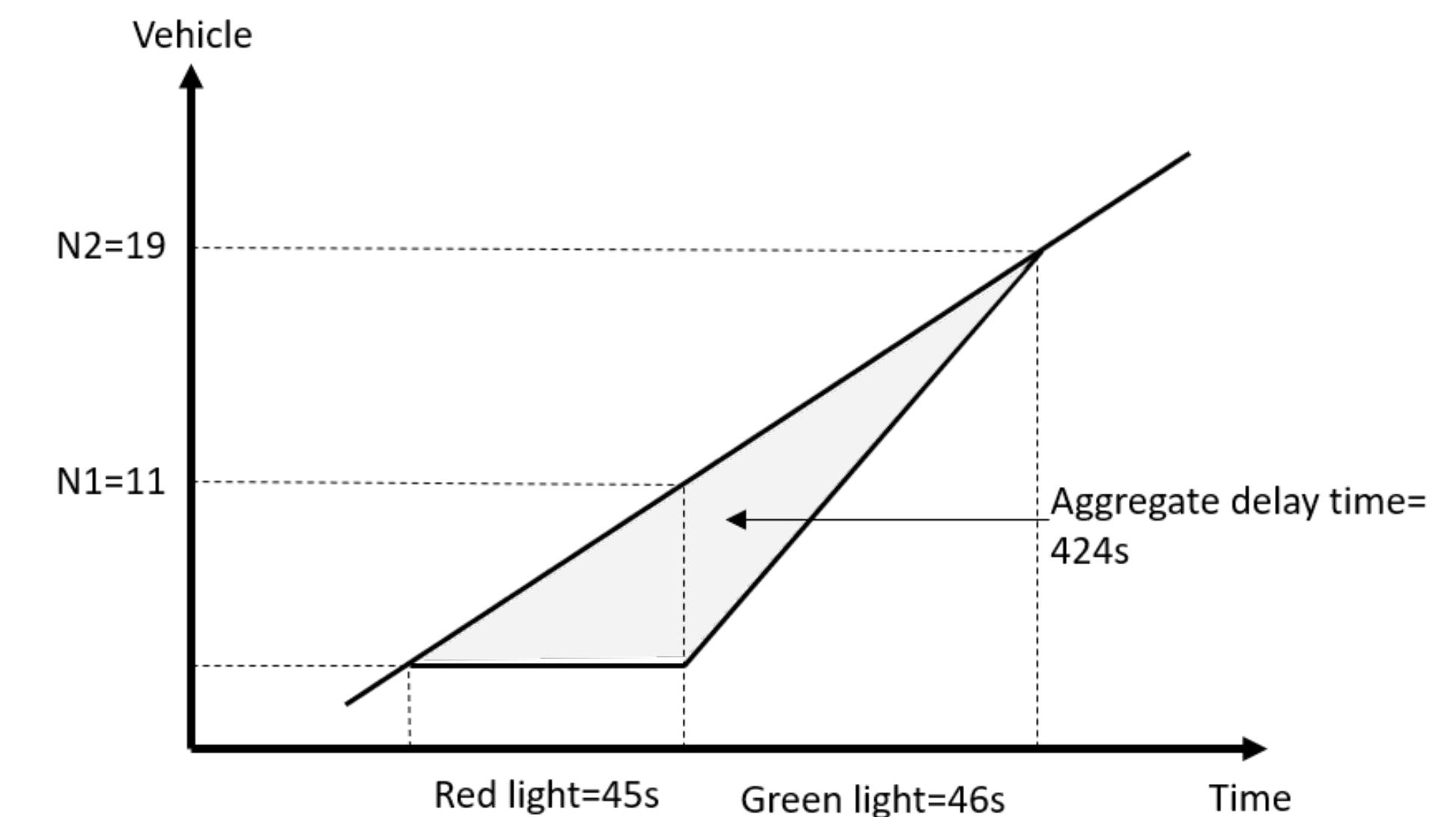
traffic
obstructions

delay
time



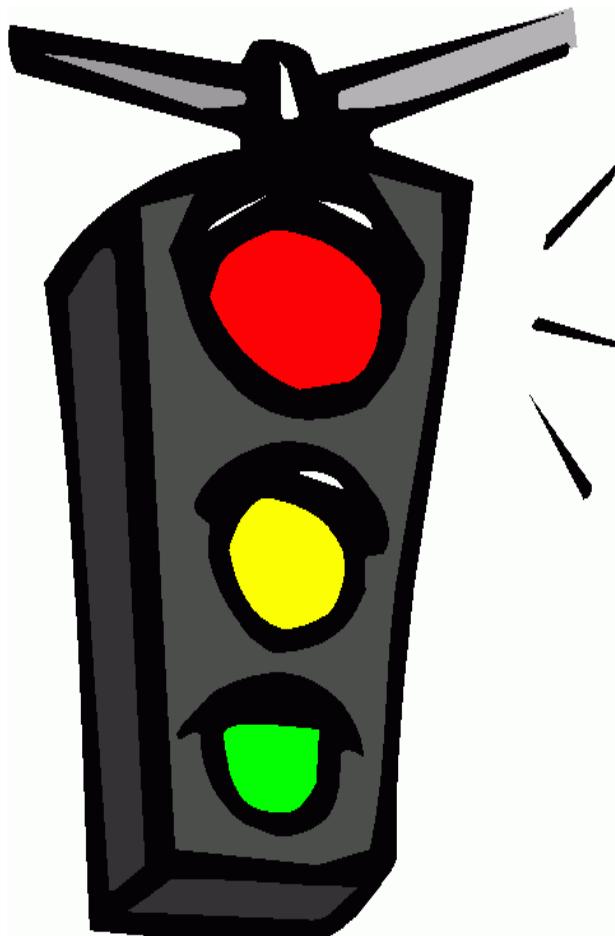
queue
length

Signal Timing



Redesign #1

Optimize Signal Timing



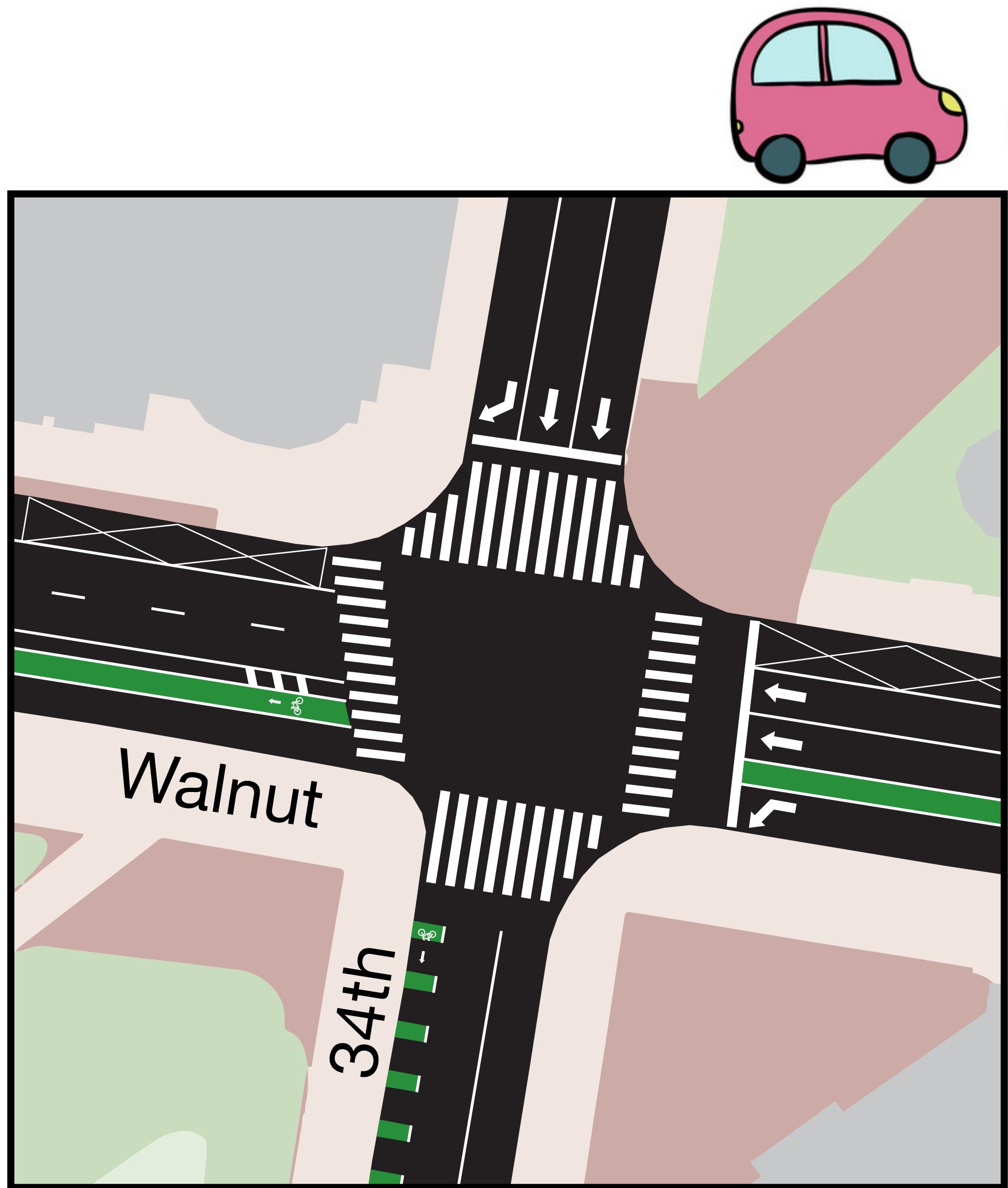
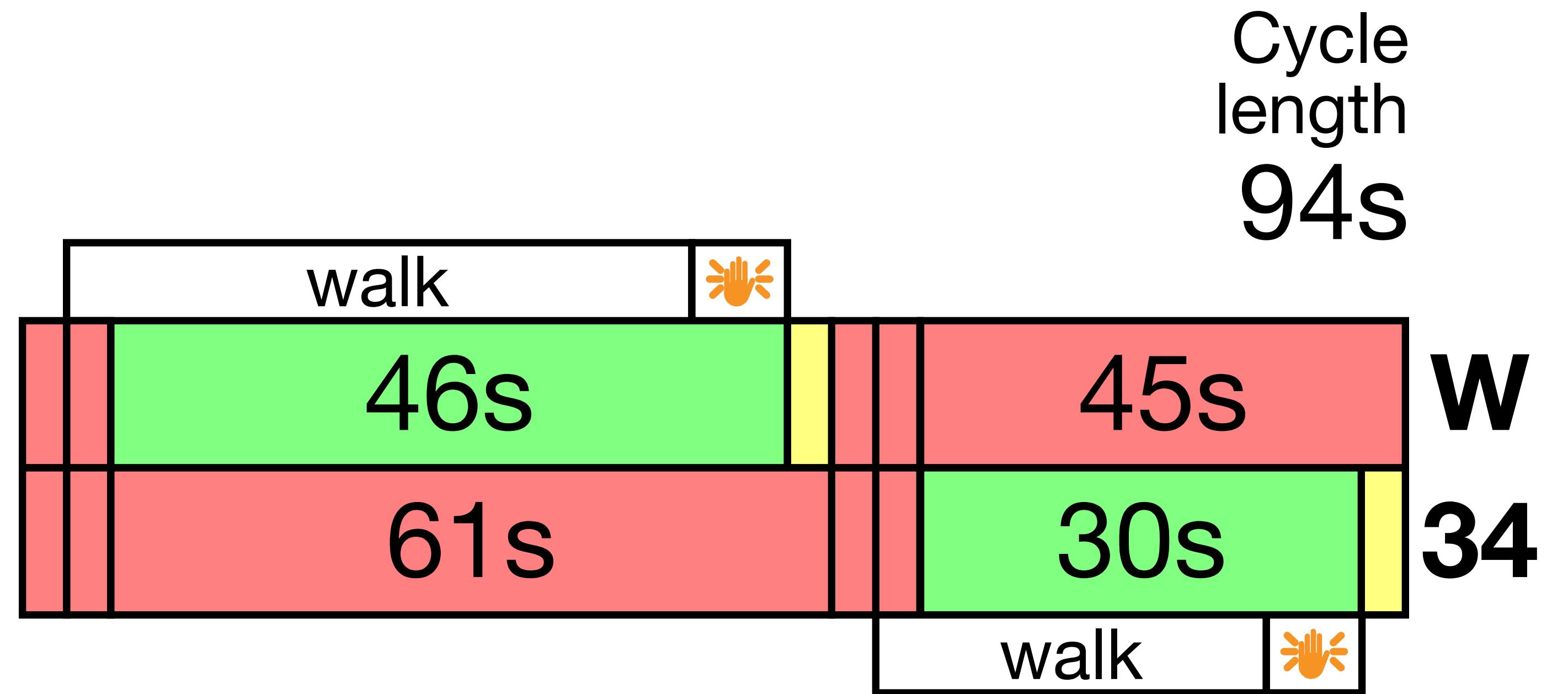
Redesign #1 Signal Timing

- a. Shorten Cycle Length
- b. Remove Leading Pedestrian Intervals



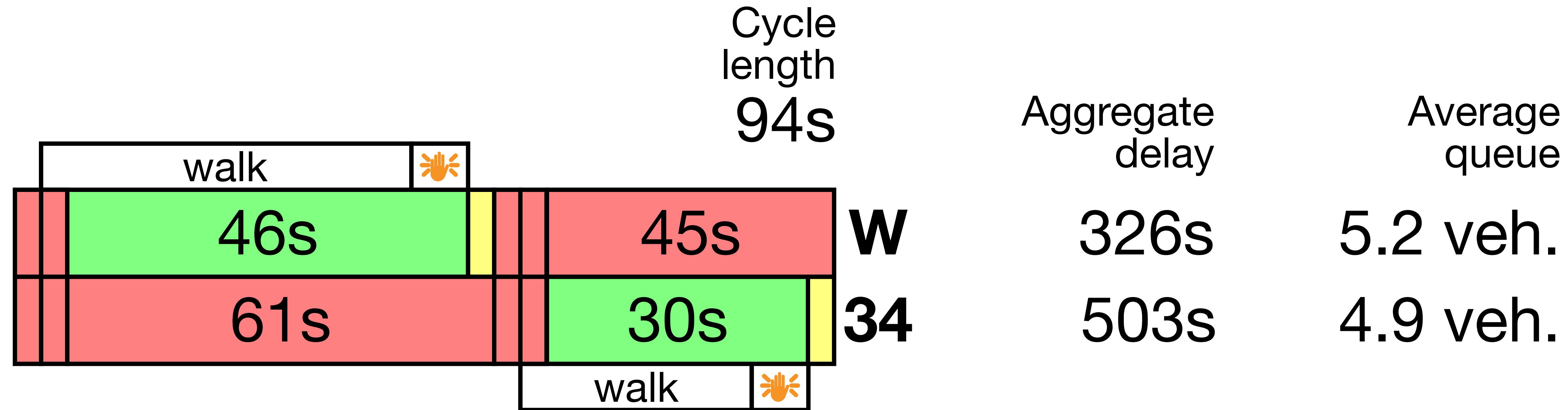
Redesign #1 Signal Timing

Existing Condition

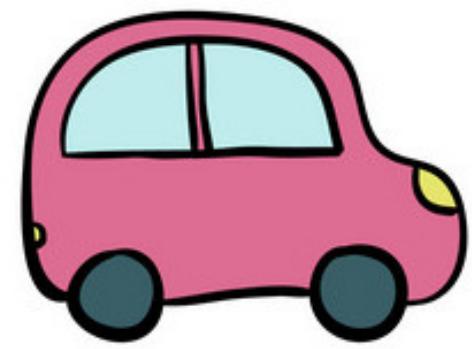
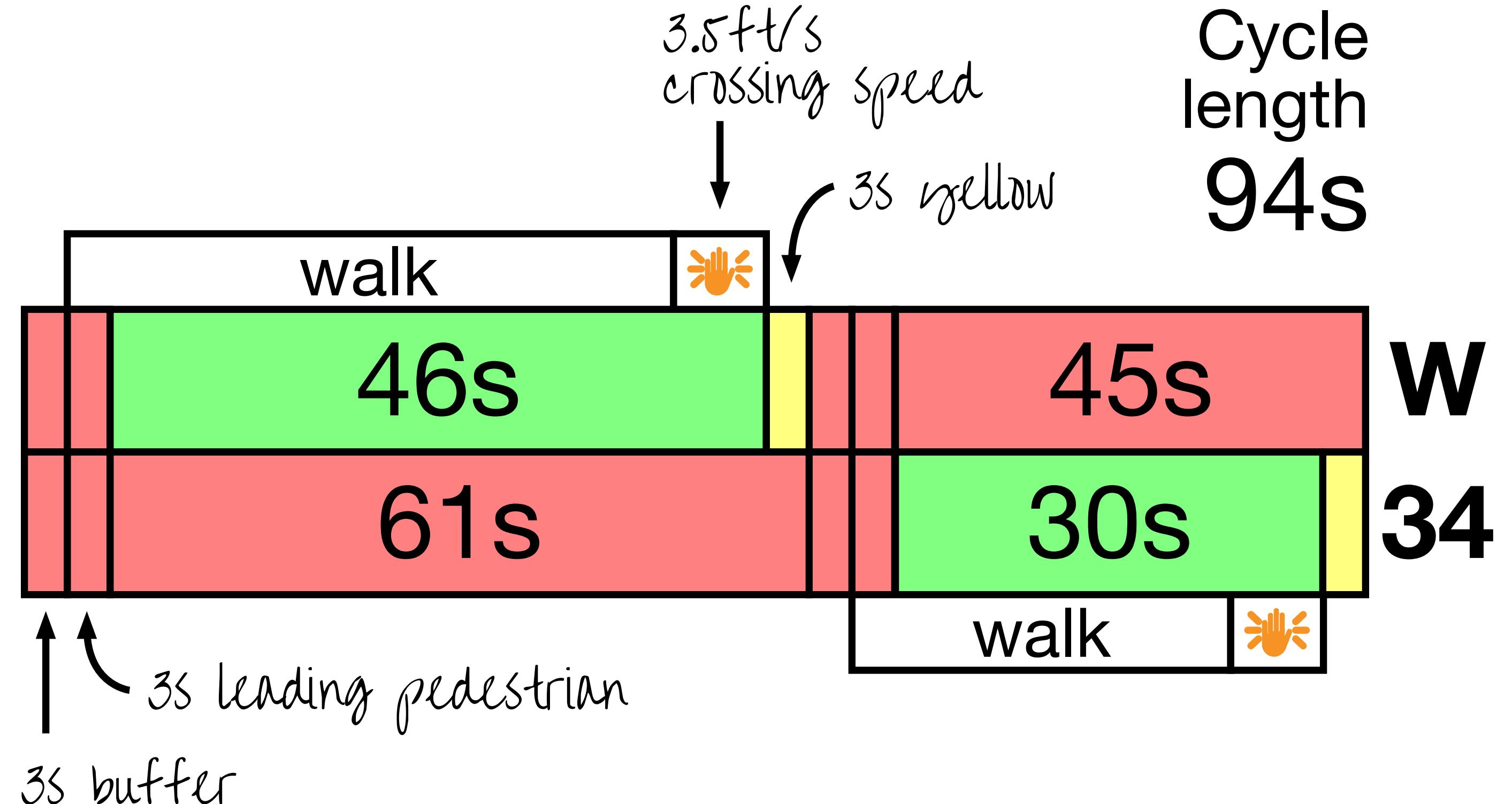


Redesign #1 Signal Timing

Existing Condition

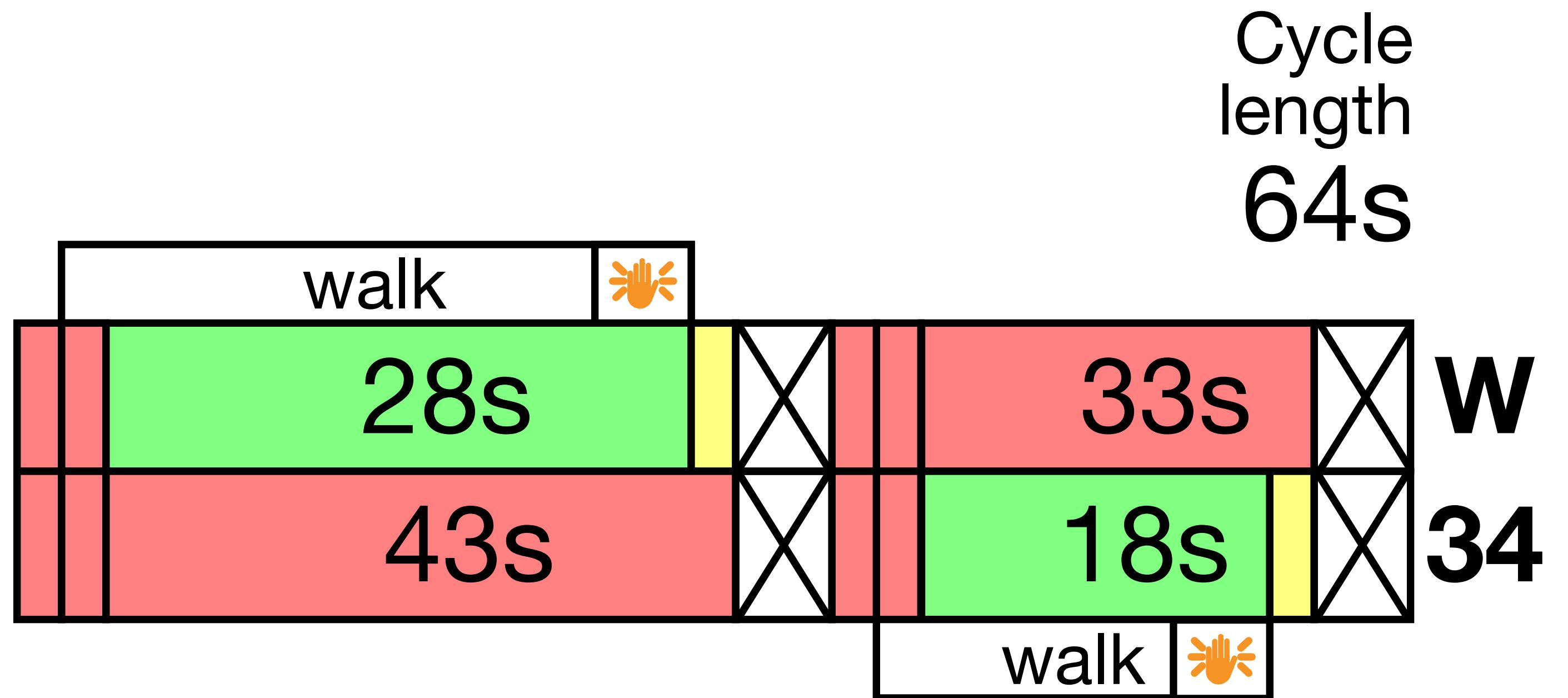


Redesign #1 Signal Timing



Redesign #1 Signal Timing

Shorten signal cycle



Cycle
length
64s

Change in
delay

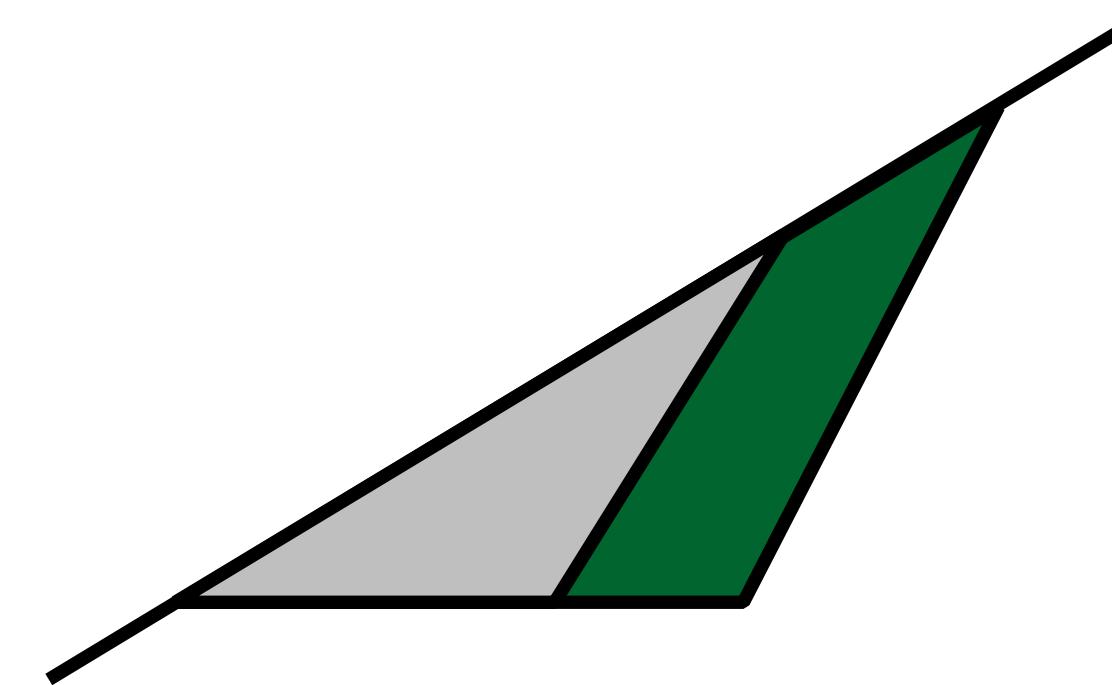
-151s

-253s

Change
in queue

-1.0 veh.

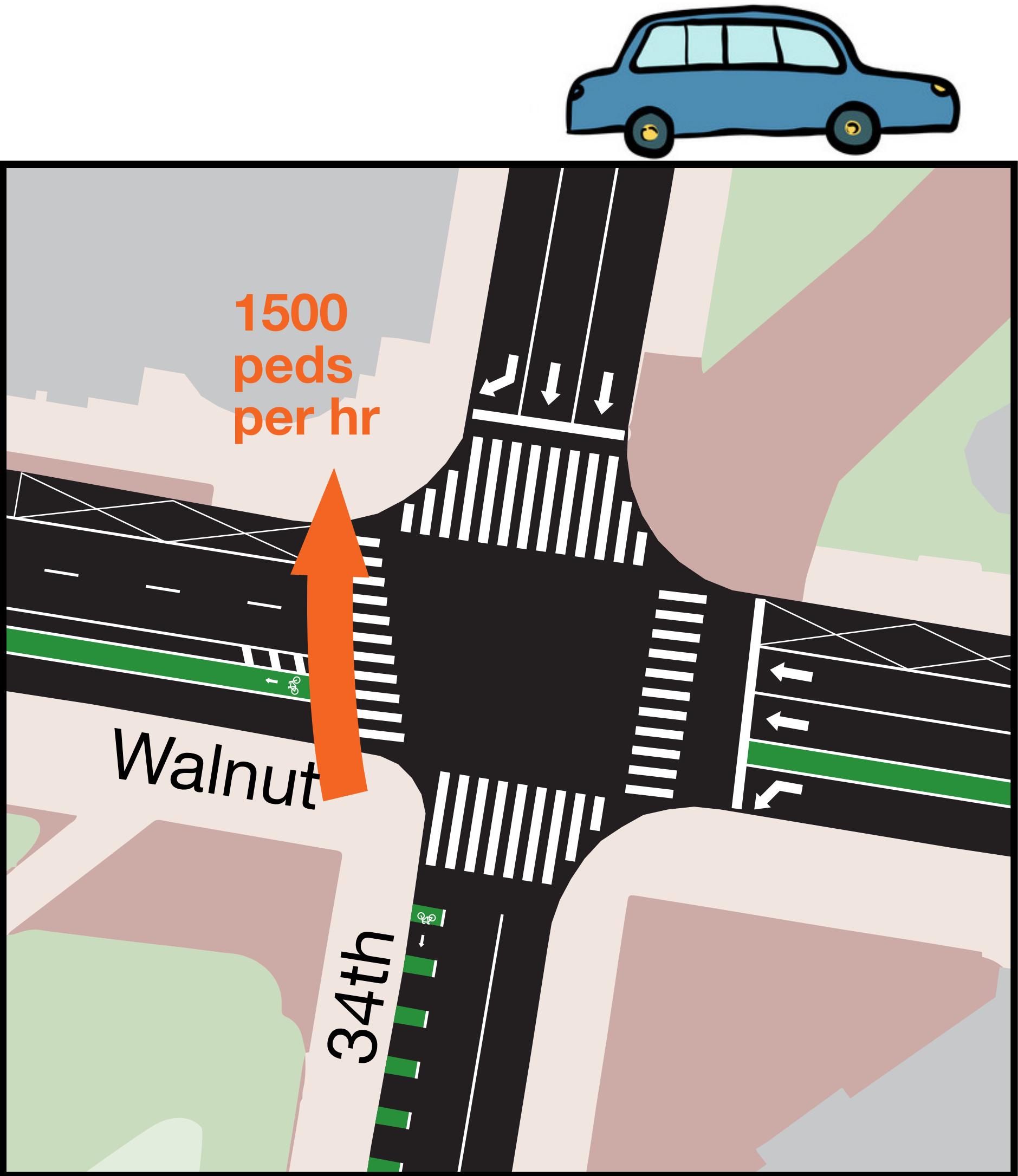
-1.2 veh.



Redesign #1 Signal Timing

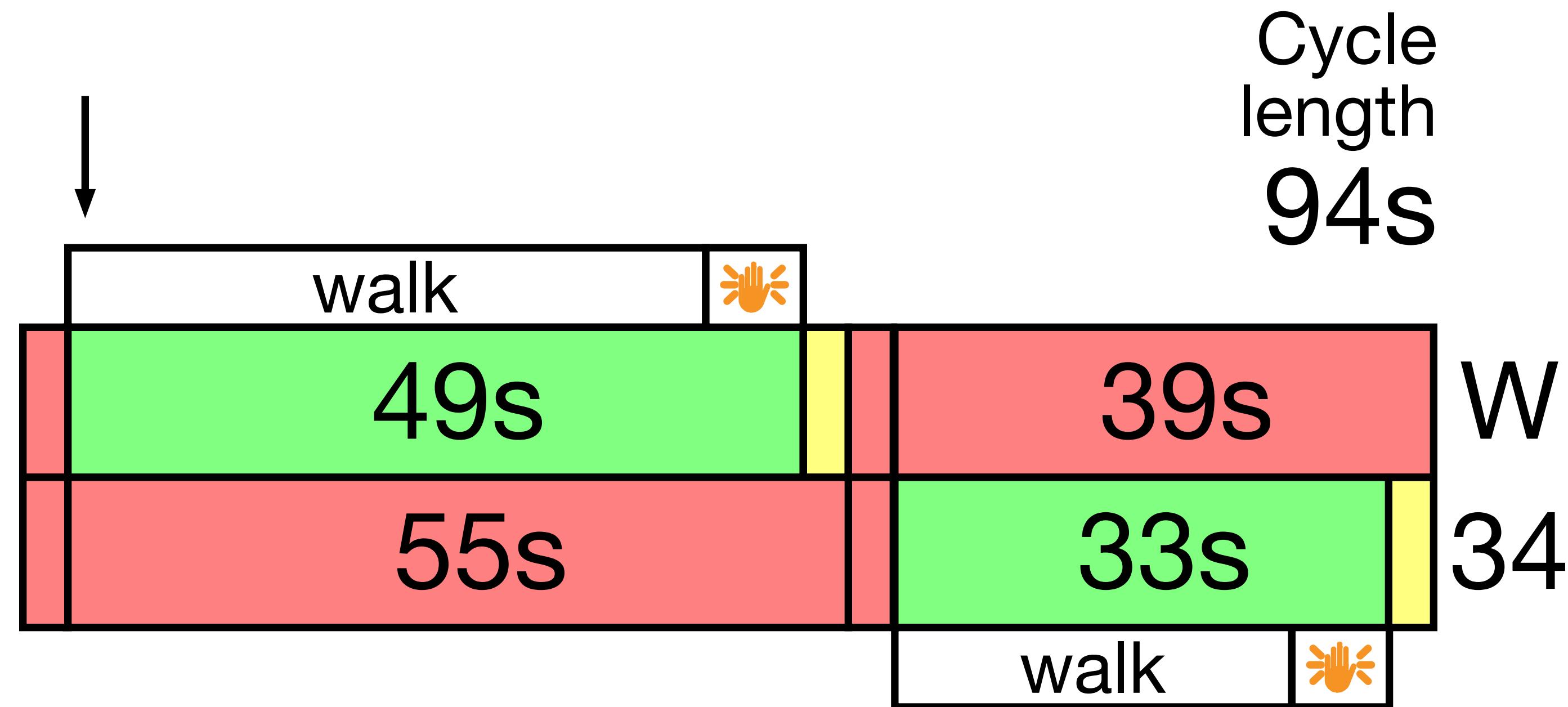
A serious problem:
...too many **pedestrians!**

play
video
#1



Redesign #1 Signal Timing

Remove LPI



Change in delay

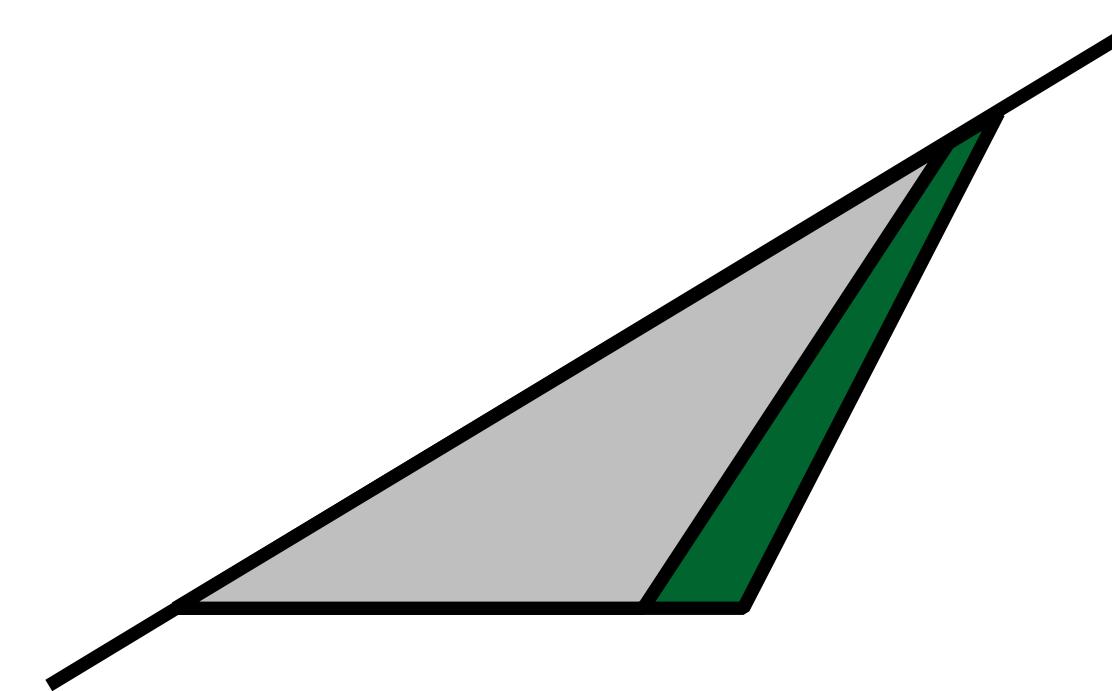
-42s

-48s

Change in queue

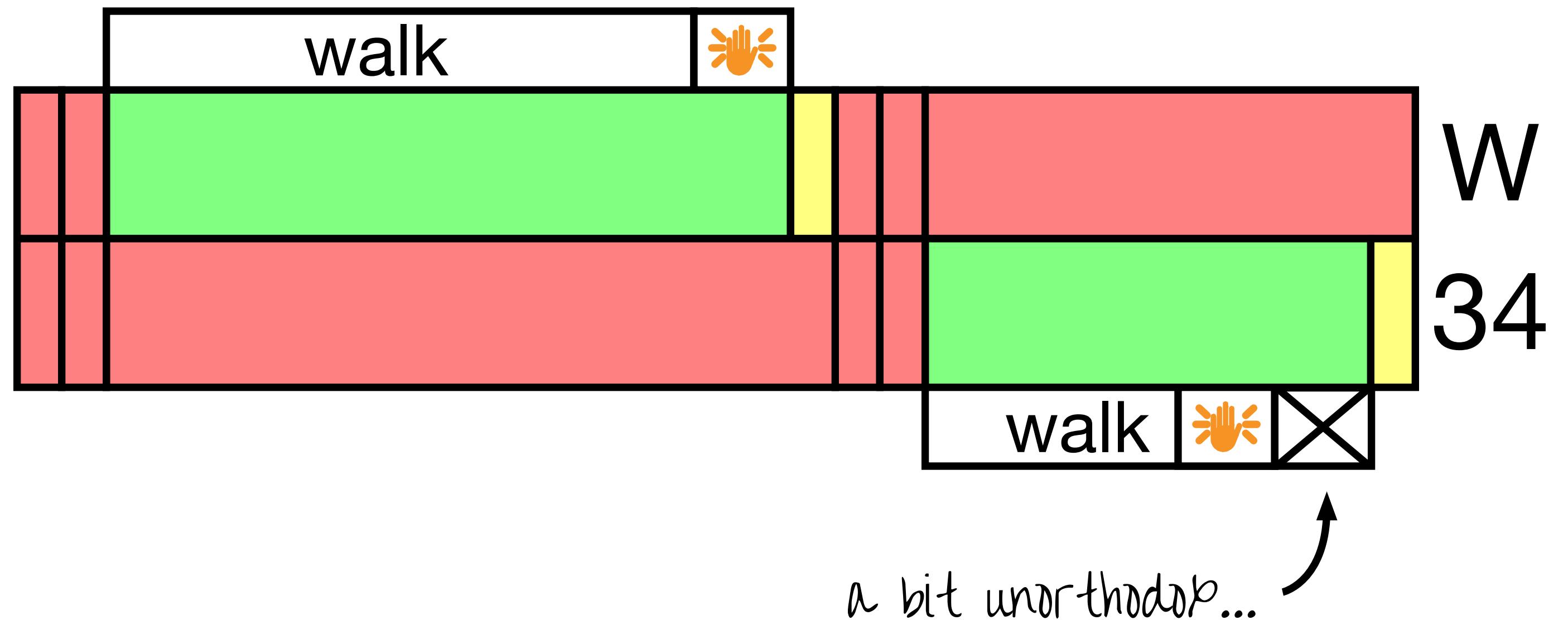
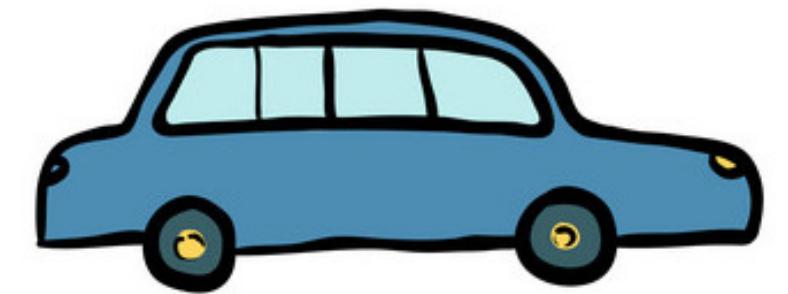
-0.6 veh.

-0.8 veh.



Redesign #1 Signal Timing

Shorten walk time?



Redesign #1 Signal Timing

- a. Shorten Cycle Length to 64s
- b. Remove LPIs

Both strategies help reduce delay, but removing an LPI is unsafe and unpopular, especially at this intersection.



Redesign #2

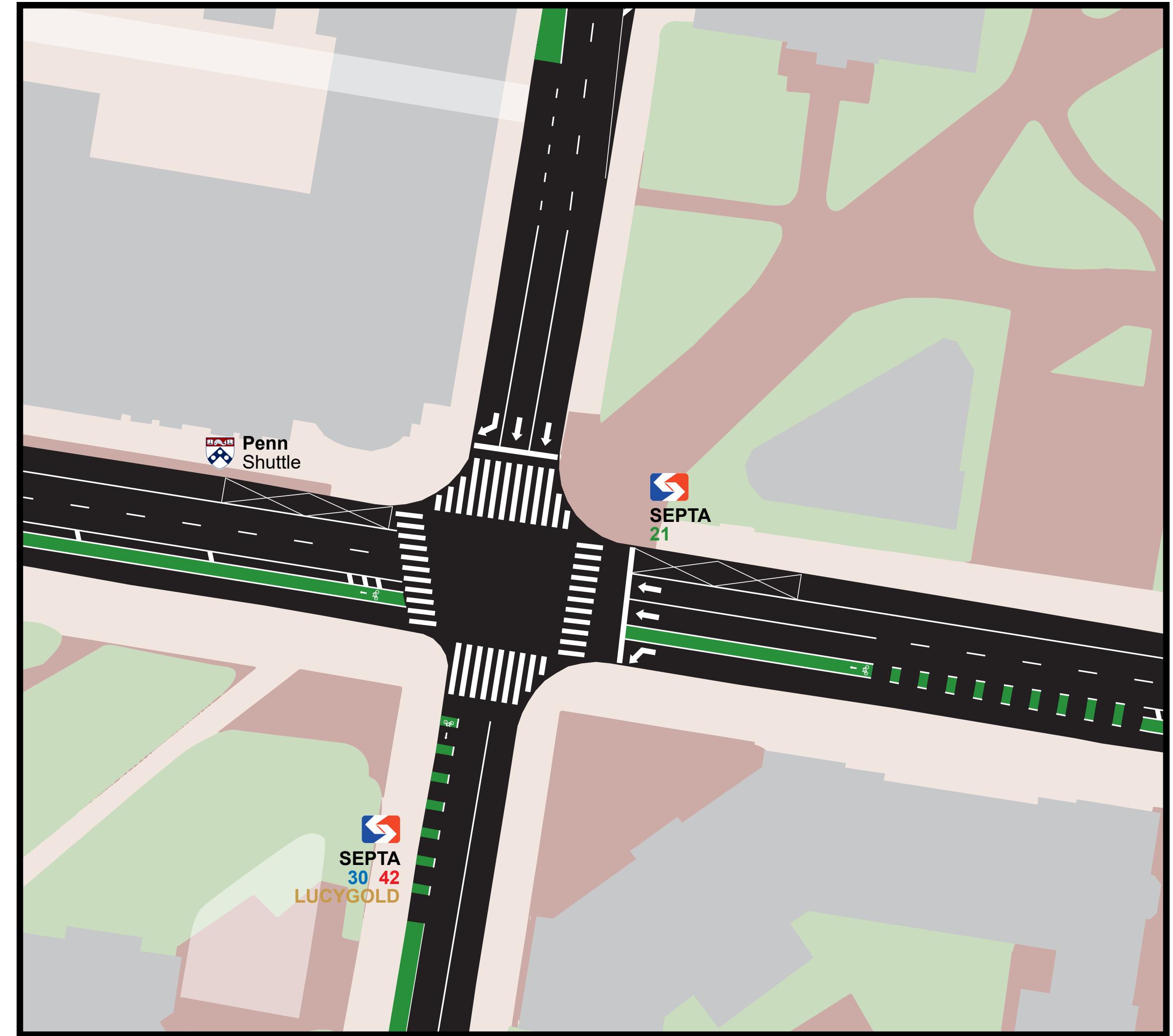
Prevent Roadway Conflict



Redesign #2 Roadway Conflict

Existing Condition

Concern is not crashes,
but mixing zones, loading,
and parking.



Redesign #2 Roadway Conflict

A serious problem:
Parking and loading is inaccessible.

play
video
#2

Redesign #2 Roadway Conflict

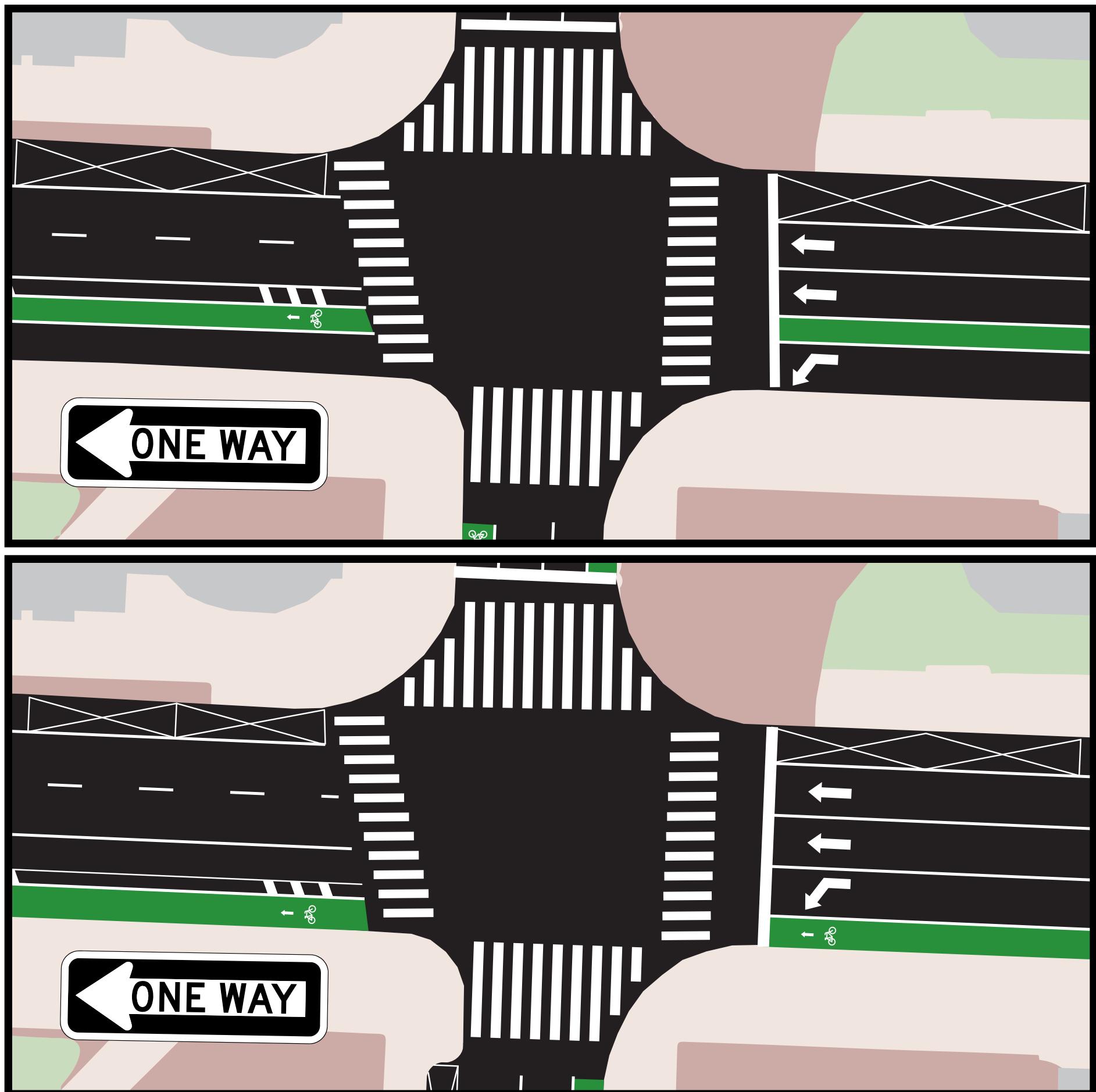
Lane Reconfiguration

Floating parking with 3-ft buffer:

- is easily accessible from the road.
- protects alighting drivers and passengers from aggressive and inattentive cyclists.



Walnut Street



Existing
Reconfig.

Redesign #2 Roadway Conflict

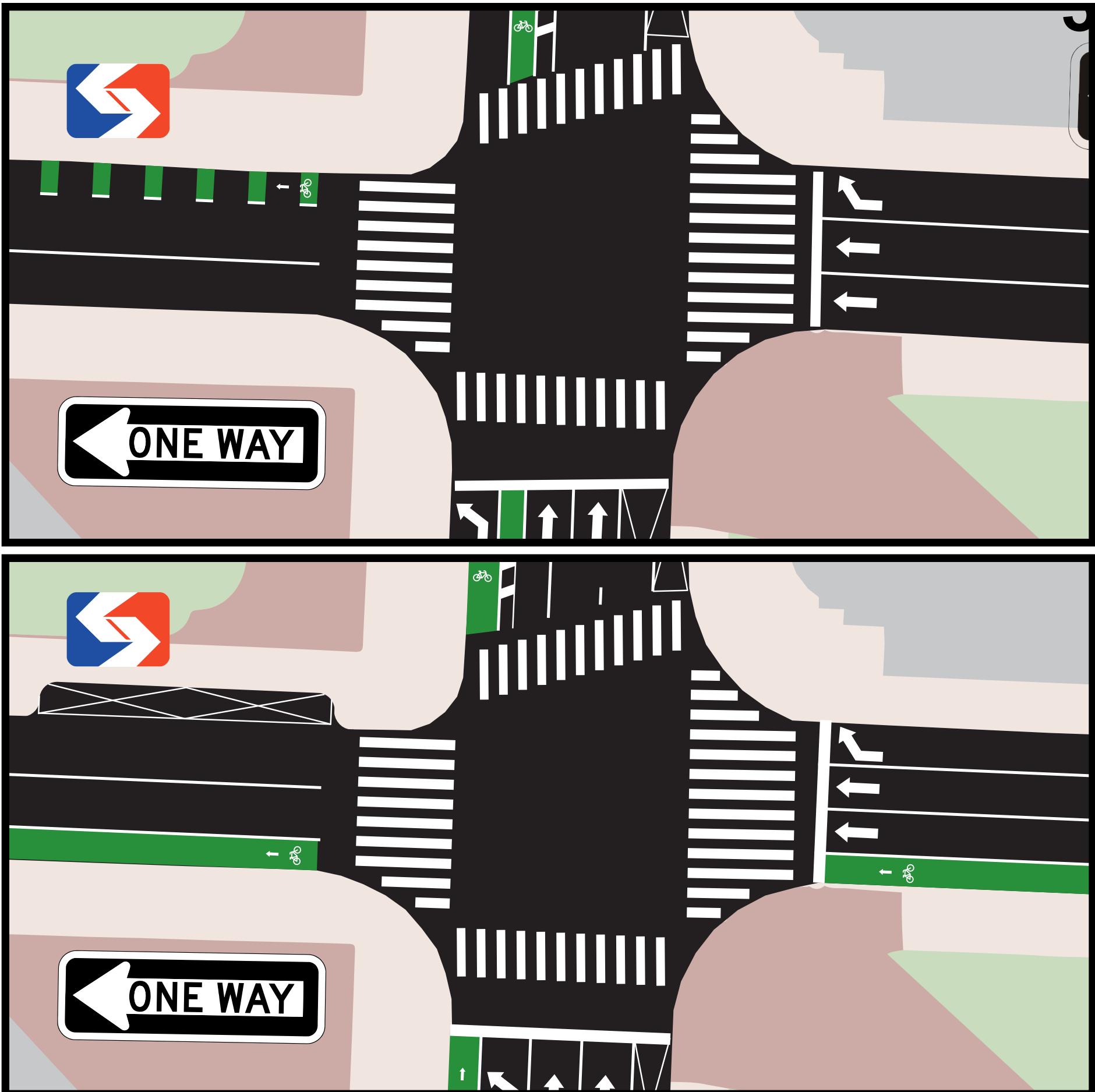
Lane Reconfiguration

Left-side bike lane and bus stop curb cut:

- clears the right turn from bicycle conflicts.
- clears the bus stop from bicycle conflicts.
- allows wider turns.



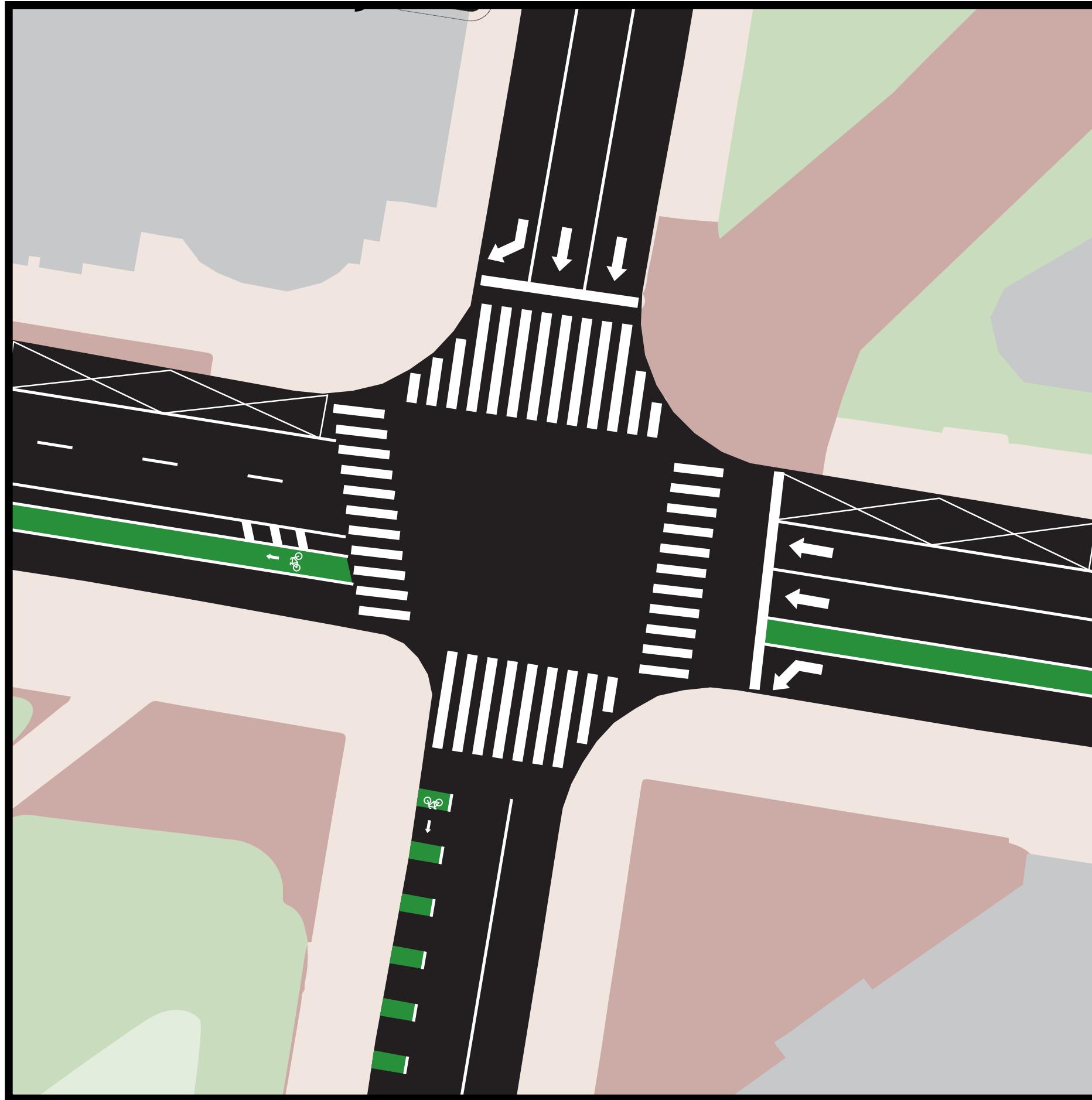
34th Street



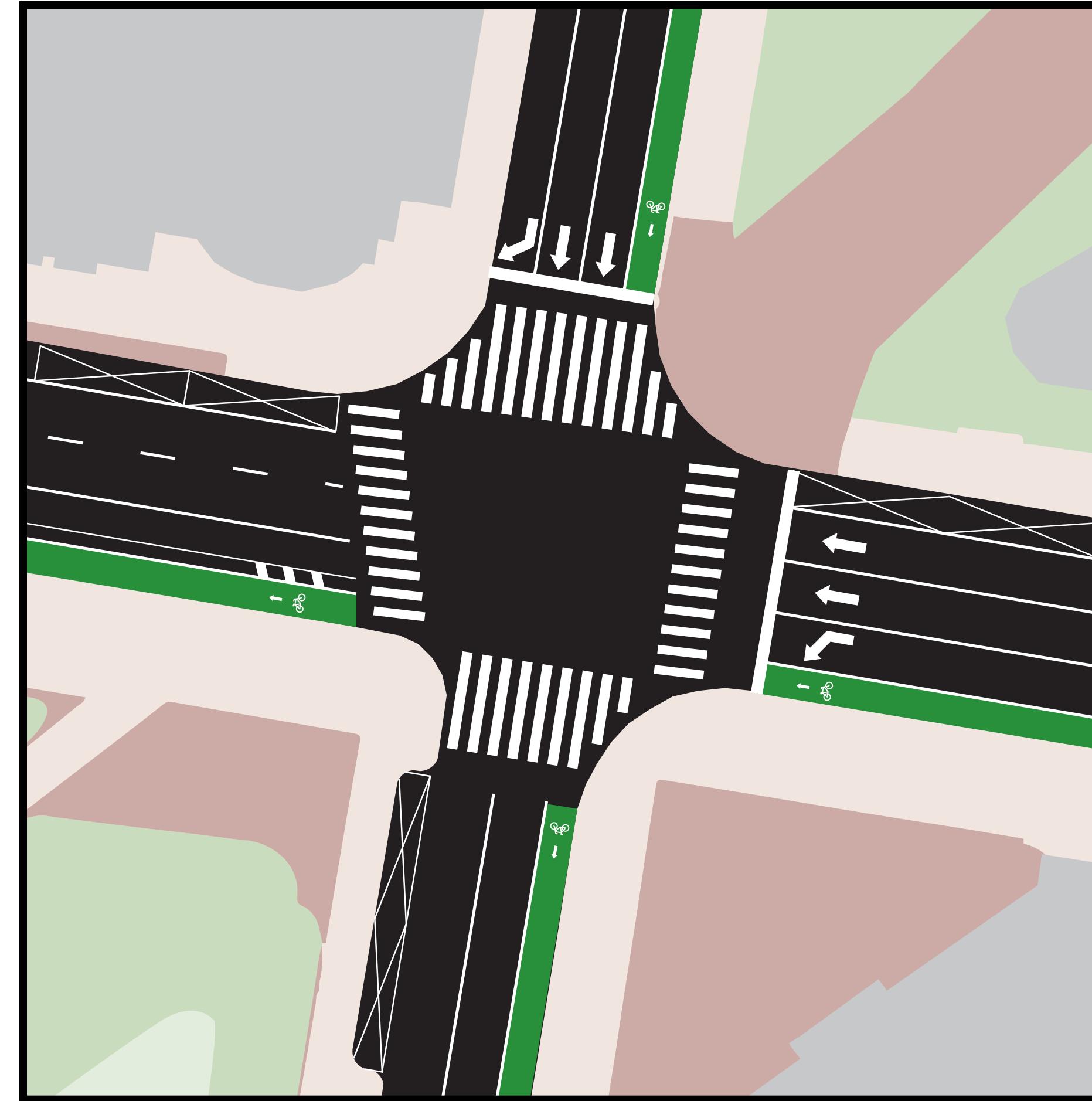
Existing
Reconfig.

Redesign #2 Roadway Conflict

Existing



Reconfigured



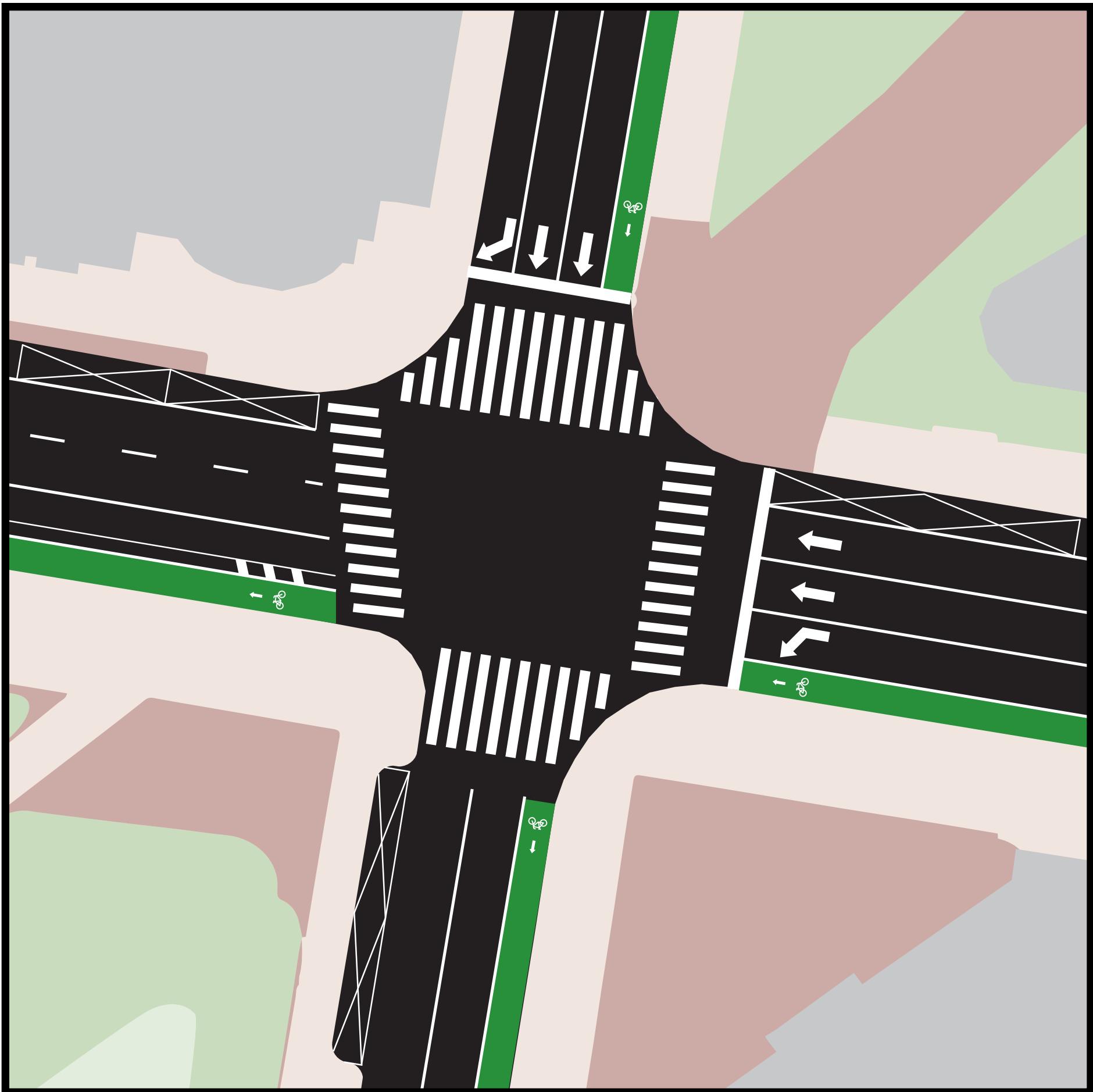
Redesign #2 Roadway Conflict

Lane Reconfiguration

Easy turns for bicycles
and buses, but a small
bicycle safety risk.



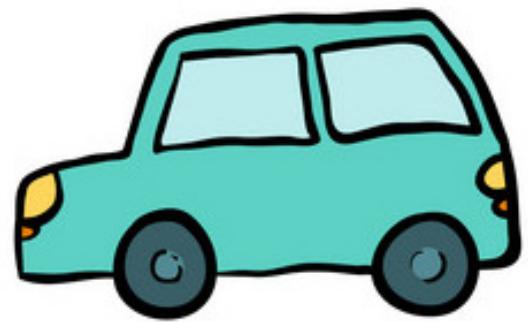
Reconfigured



Redesign #2 Roadway Conflict

Lane Reconfiguration Alternative?

Channelization is efficient, but places a large safety burden on pedestrians.

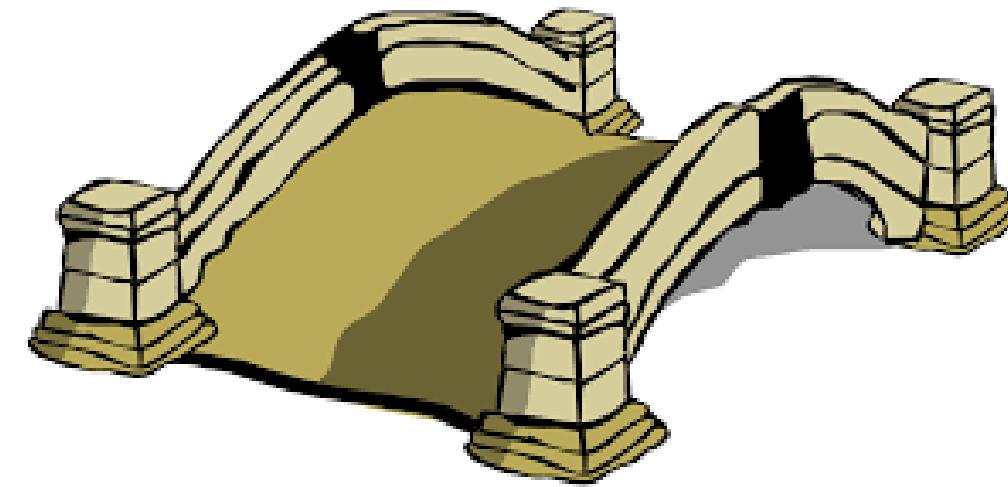
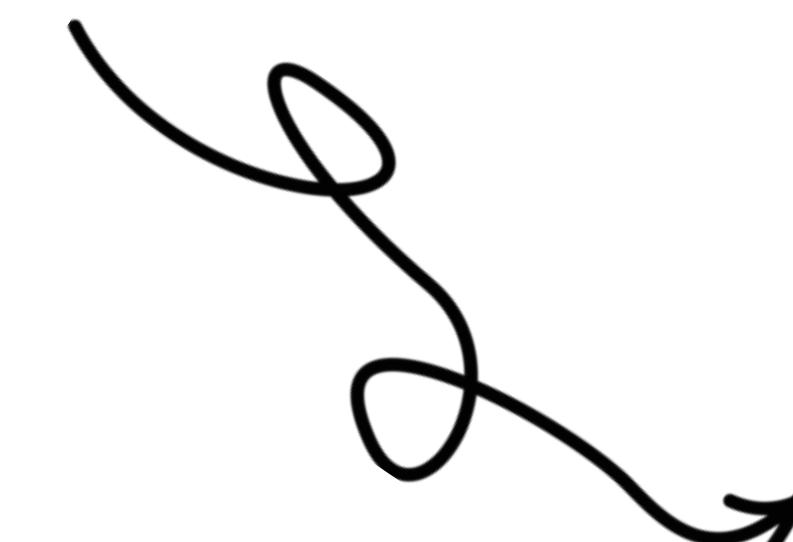


channelized?



Redesign #2 Roadway Conflict

What's an **attractive, convenient, and accessible alternative** to crossing the street?



A pedestrian bridge.



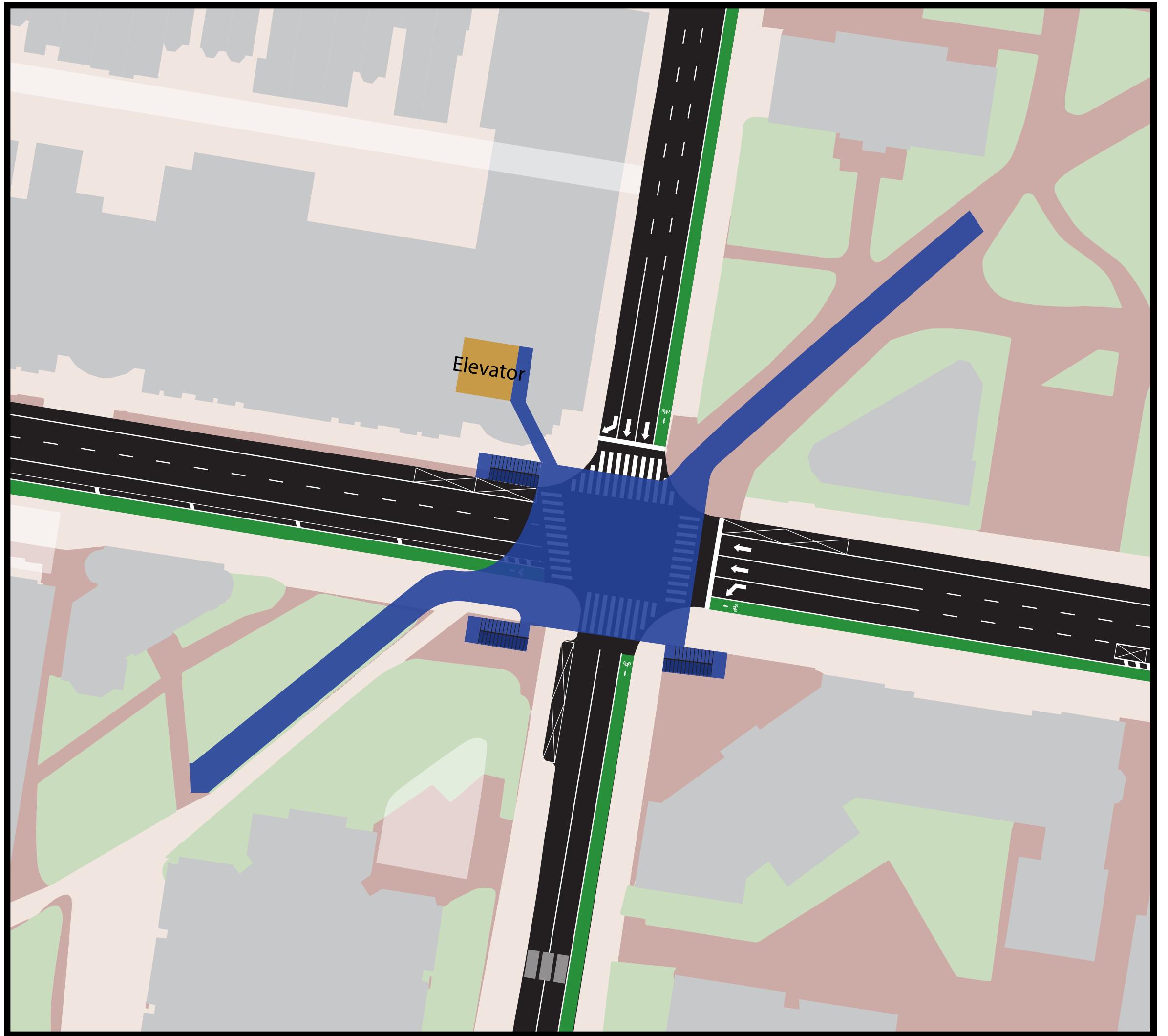
Redesign #2

INTERIOR
REDISIGN
PLAZA

Redesign #2 Roadway Conflict

Pedestrian Bridge

15 ft tall
5000 sq ft



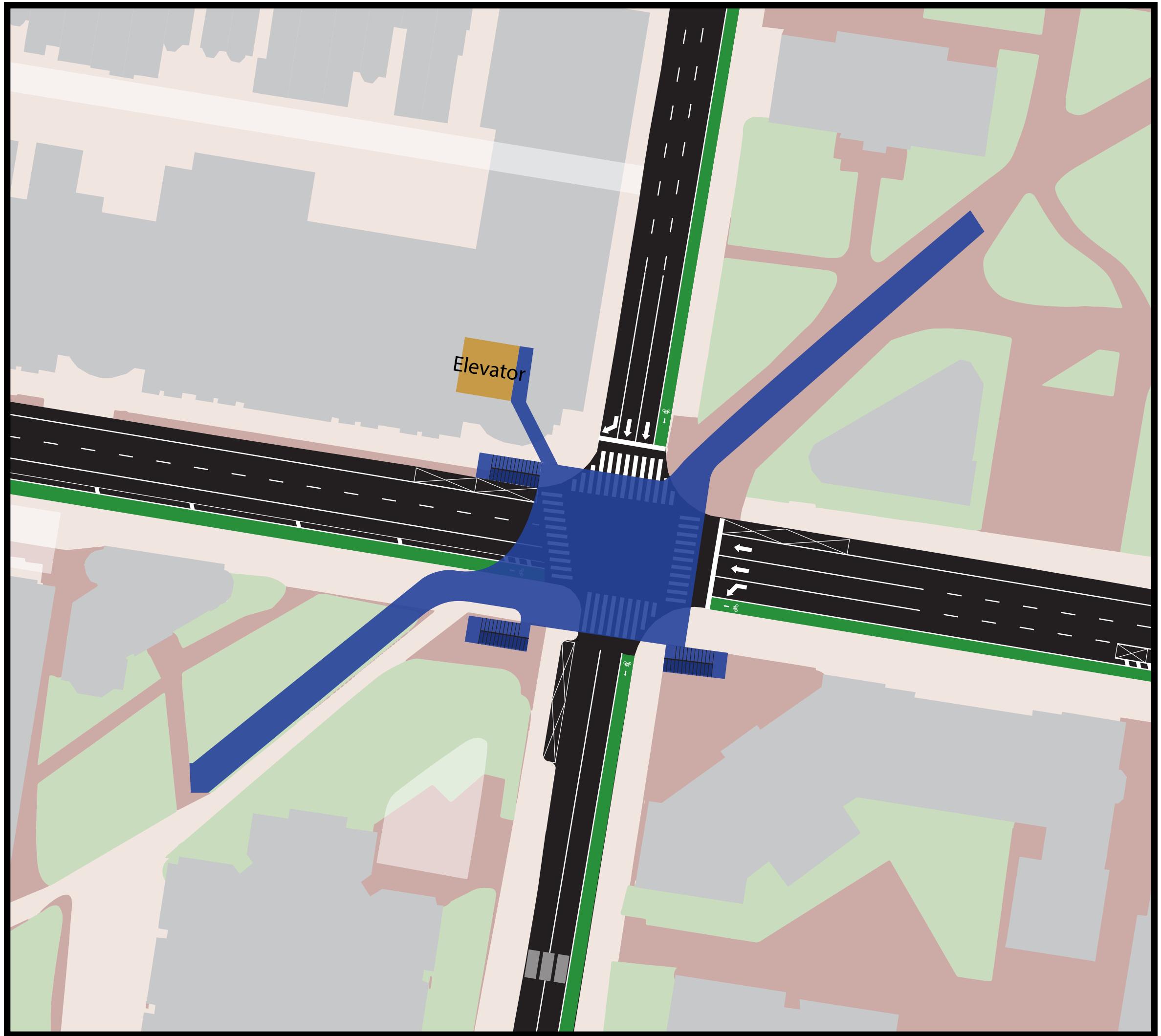
Redesign #2 Roadway Conflict

Pedestrian Bridge

ADA regulation:

1 ft horiz. run per
1 in vertical rise

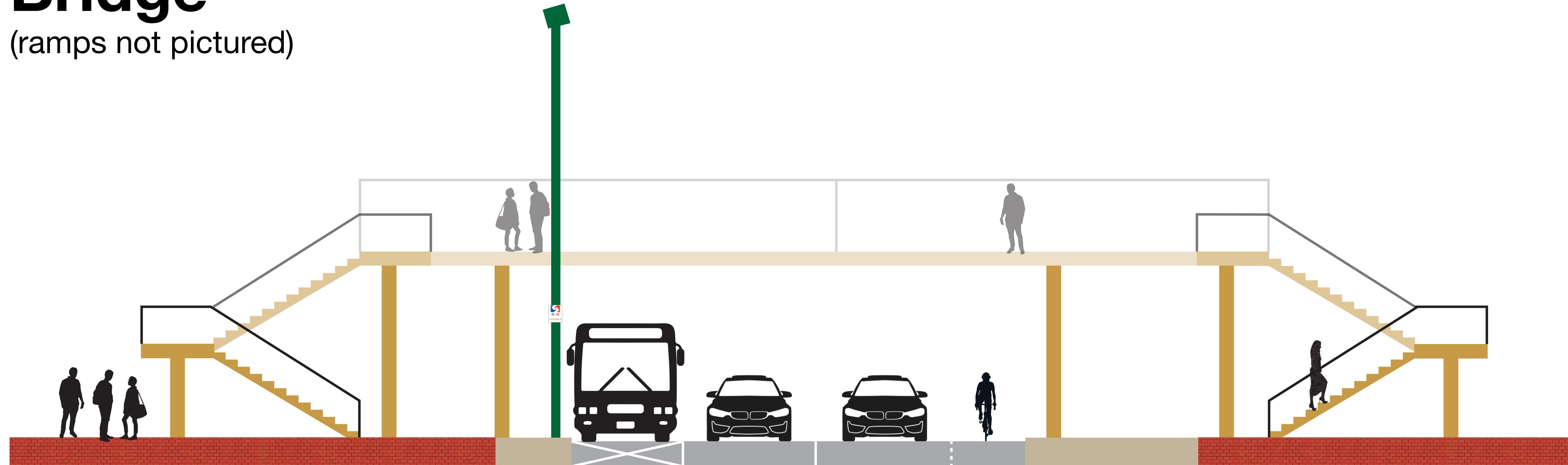
Two 180-ft ramps + 70-ft diagonal
= 430 ft long



Redesign #2 Roadway Conflict

Pedestrian Bridge

(ramps not pictured)



34th Street facing north
(between Meyerson Hall and Fisher-Bennett Hall)

Redesign #3

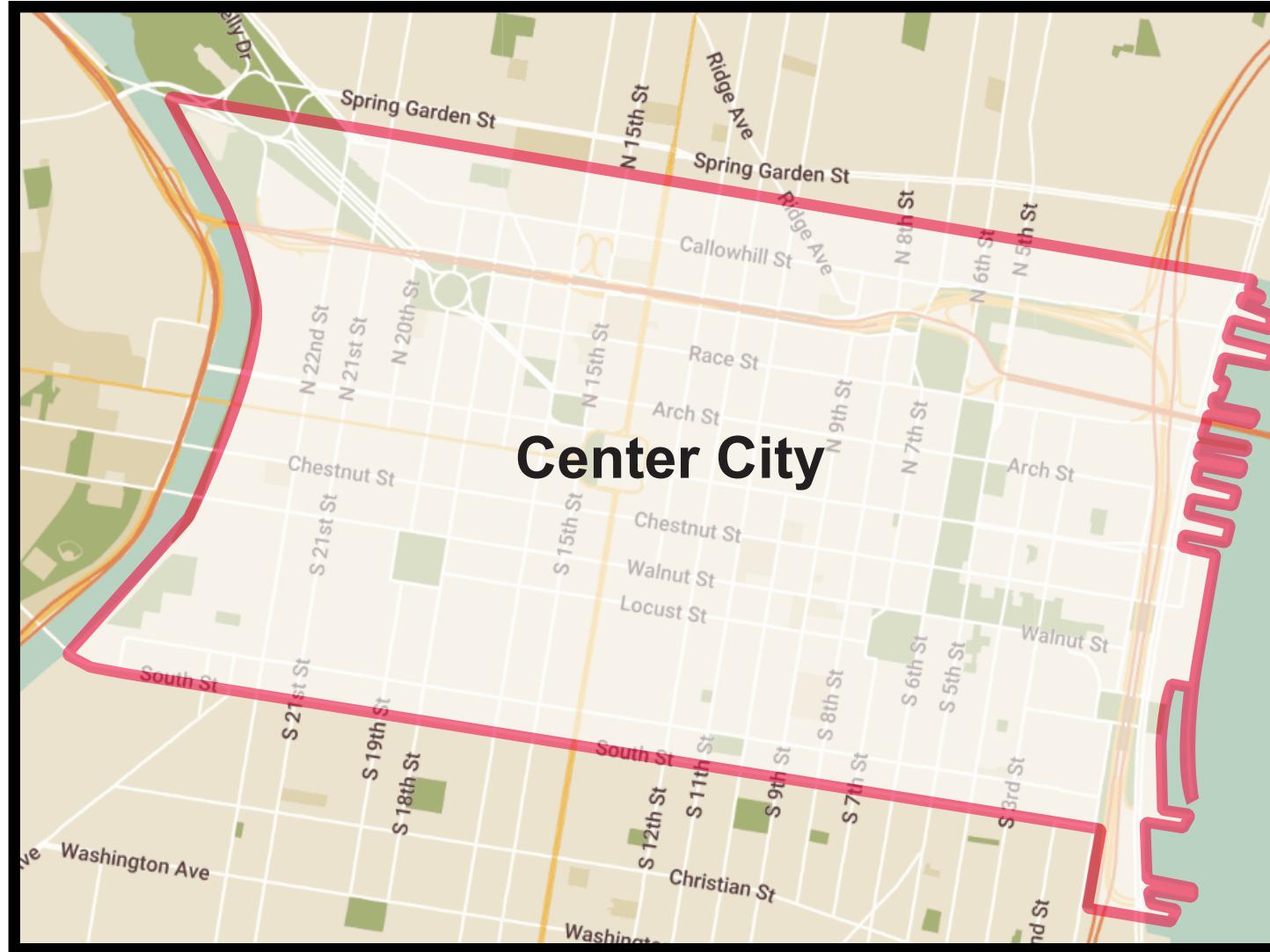
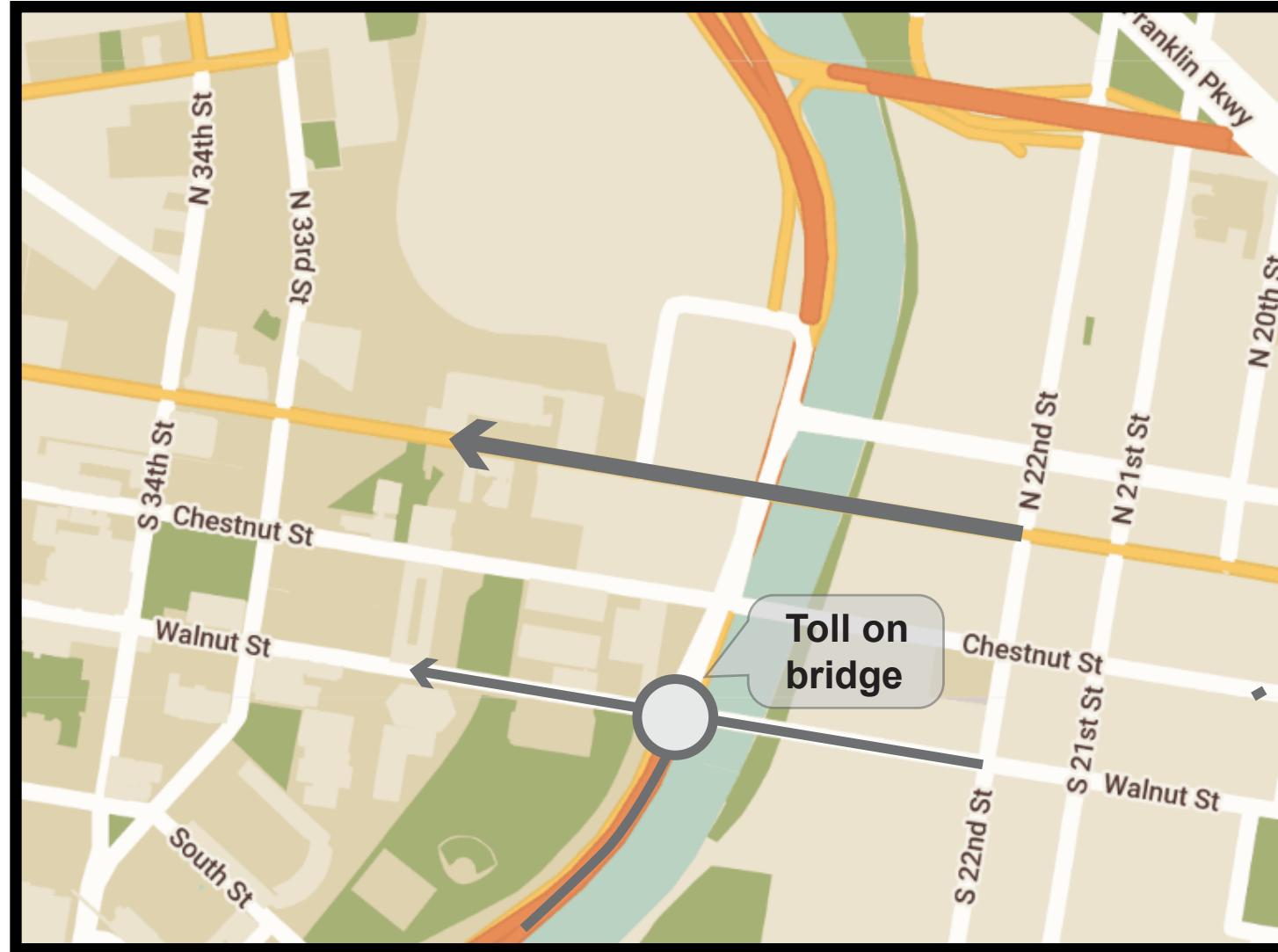
Congestion Pricing



Redesign #3 Congestion Pricing

Evening Demand

Walnut	34th
895 veh/hr	664 veh/hr

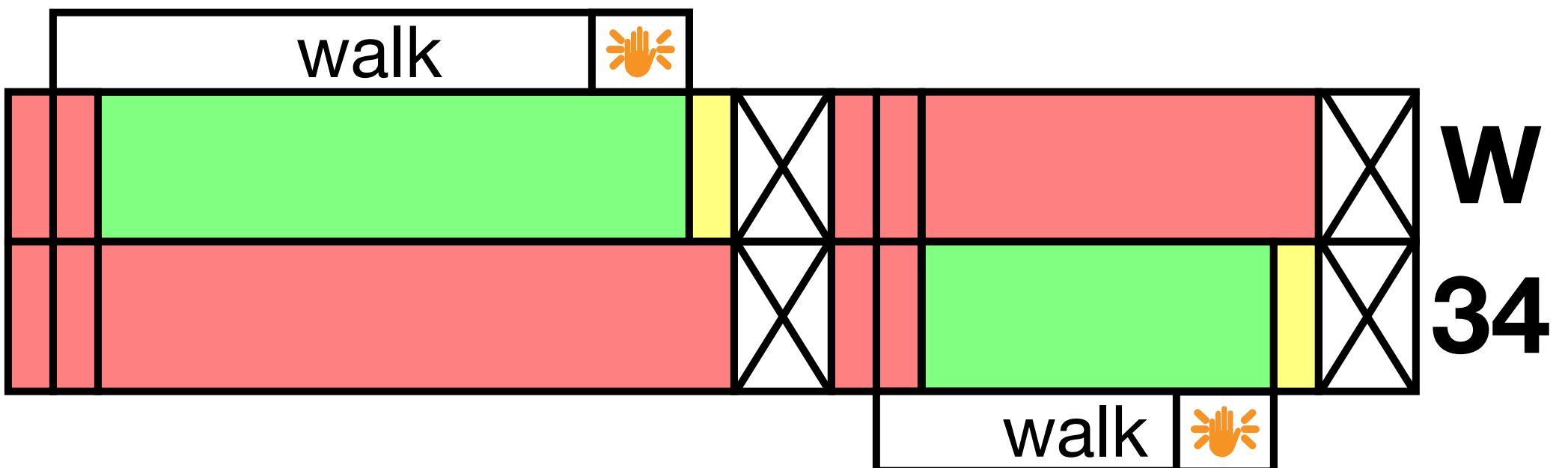


- Simple to implement
- Increased congestion elsewhere

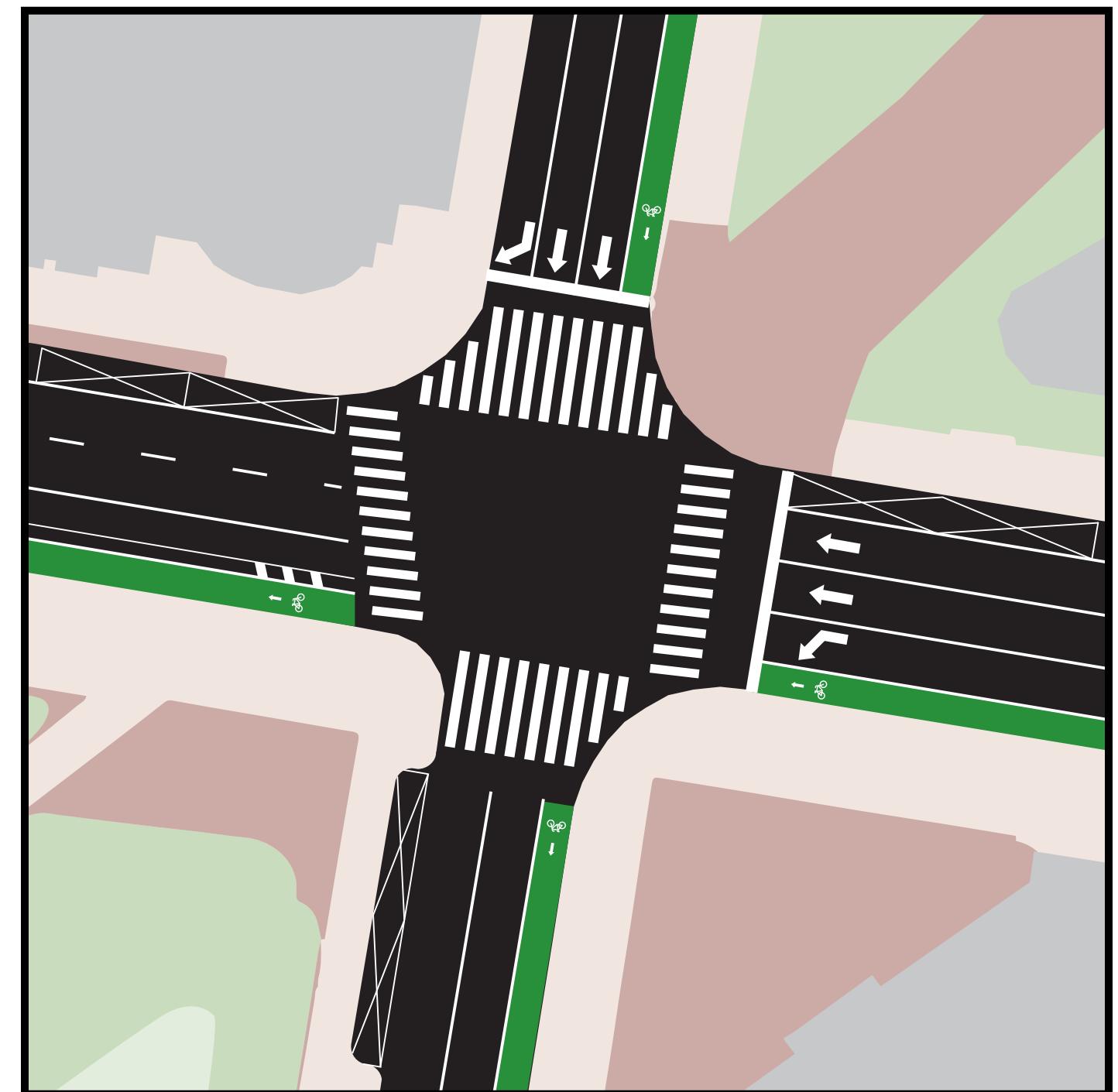
- Reduce traffic overall
- Politically impossible, practically difficult

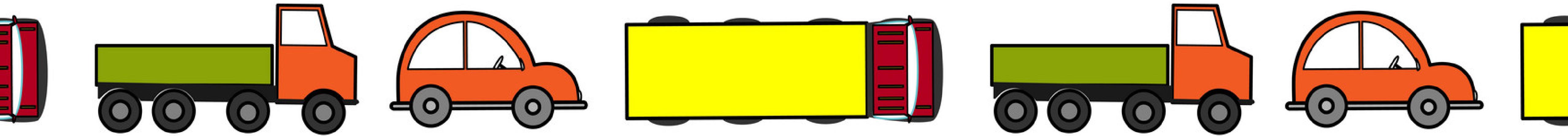
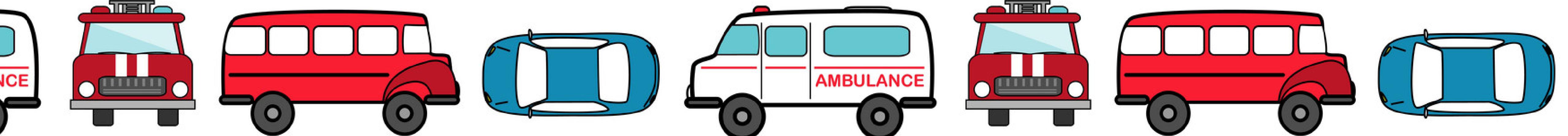
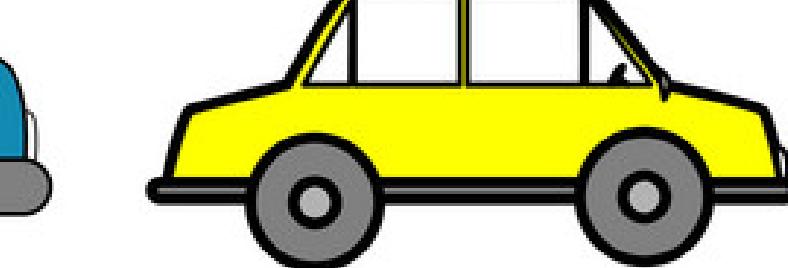
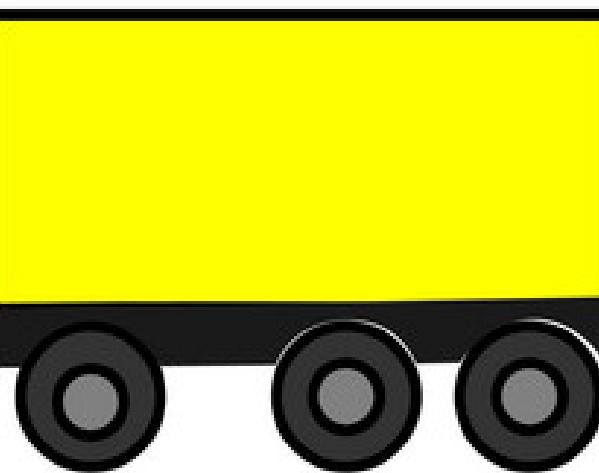
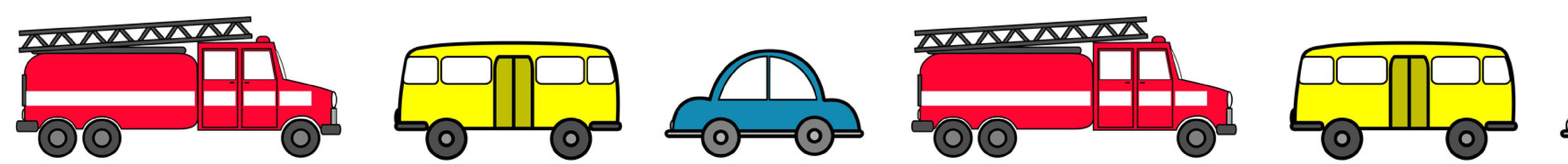
- Targeted to University City (fewer toll gates)
- Possible support from UC stakeholders

Redesign #1
**Shorten
Signal Cycle** -50%
delay



Redesign #2
Lane Config. safer,
faster.





Thanks!