Intersections

Principles

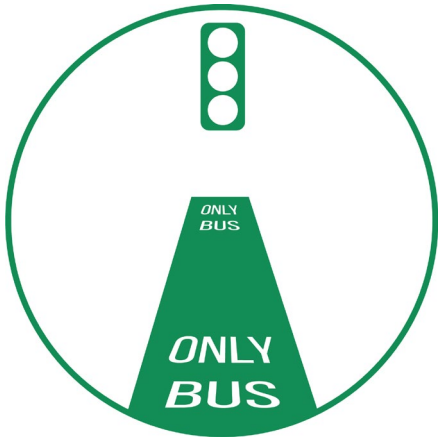
Design Tools

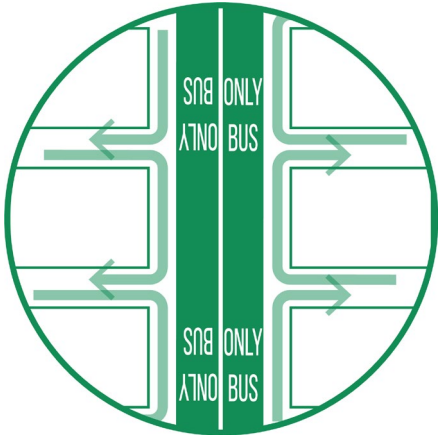
Interim Treatments

Designing Intersections for Transit

a.k.a. “Getting the Bus through the Signal”


4


ONLY
BUS
ONLY
BUS


ONLY
BUS
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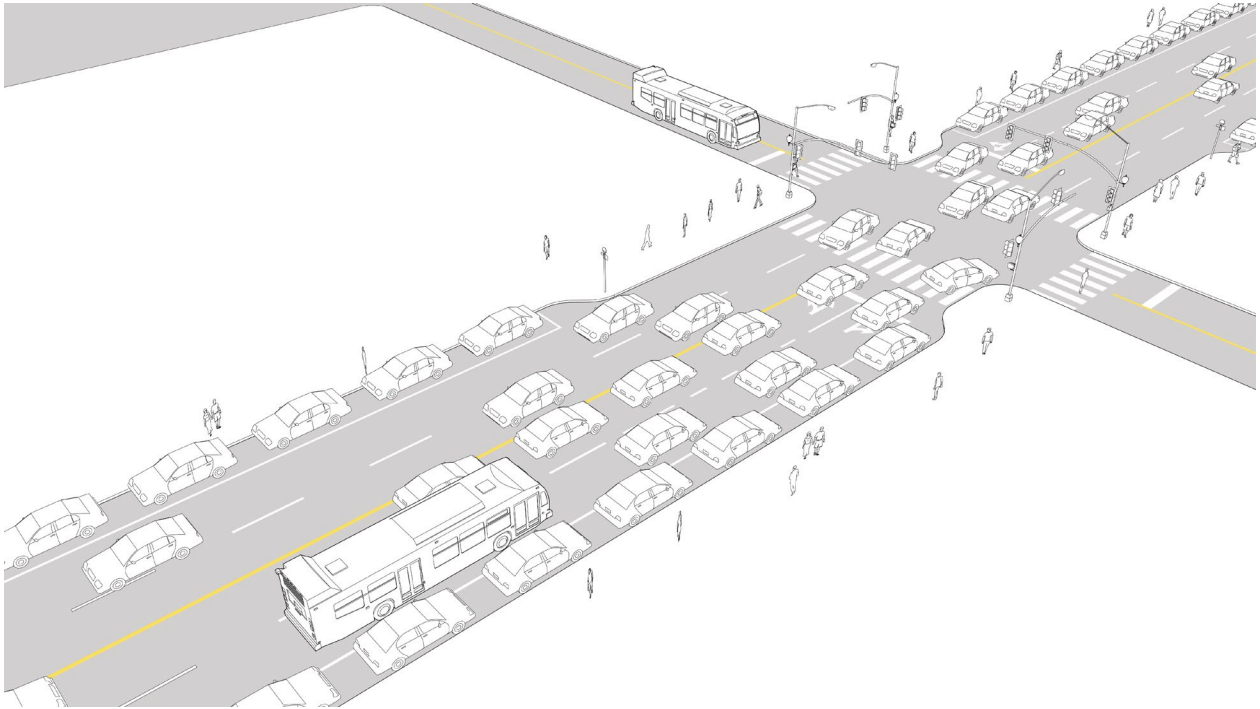
Minimize
Person Delay,

Maximize
Safety

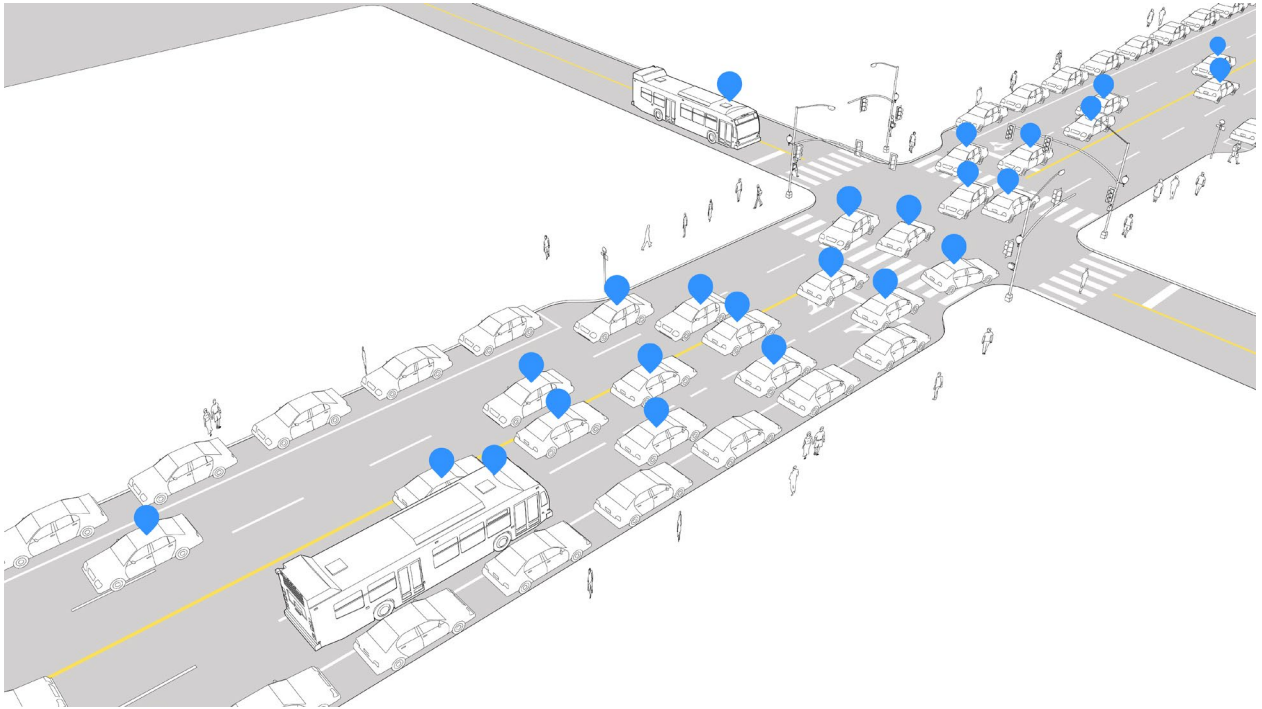
Minimize Person Delay, Maximize Safety



LOS D

(45 seconds of delay)

Minimize Person Delay,
Maximize Safety



LOS D
(45 seconds of delay)

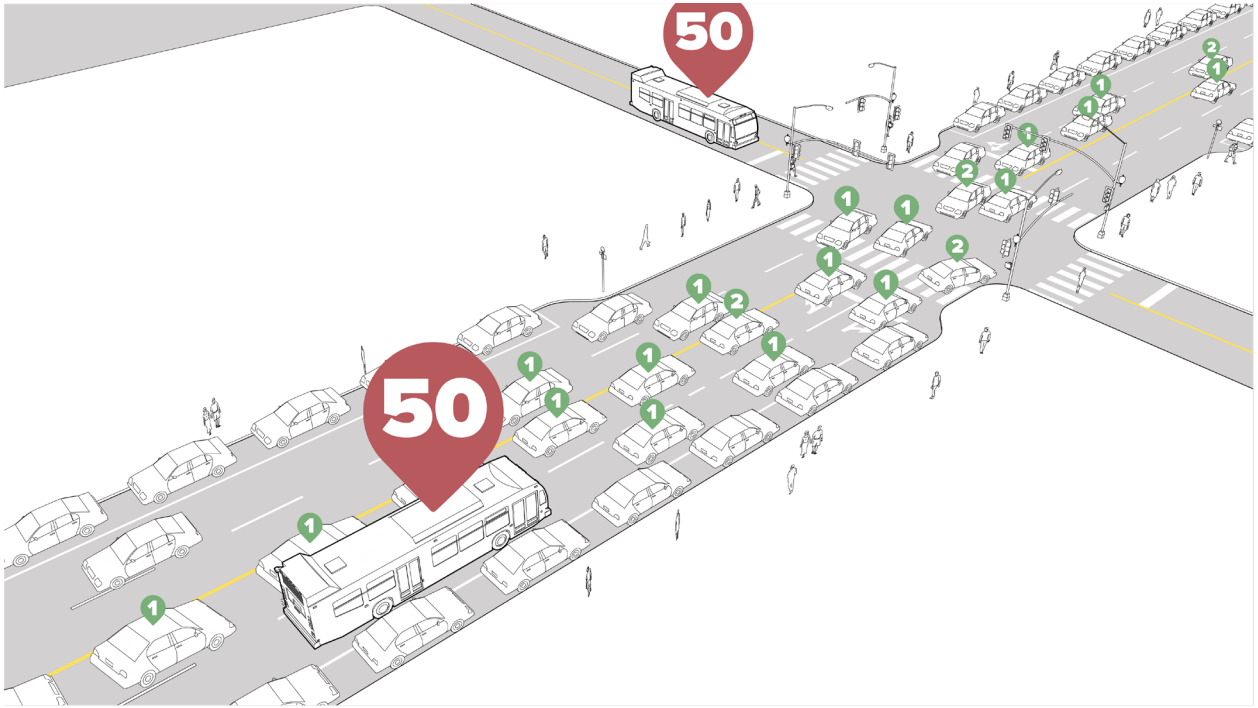
x

20 vehicles

=

900 seconds of delay

Minimize Person Delay,
Maximize Safety



LOS D
(45 seconds of delay)

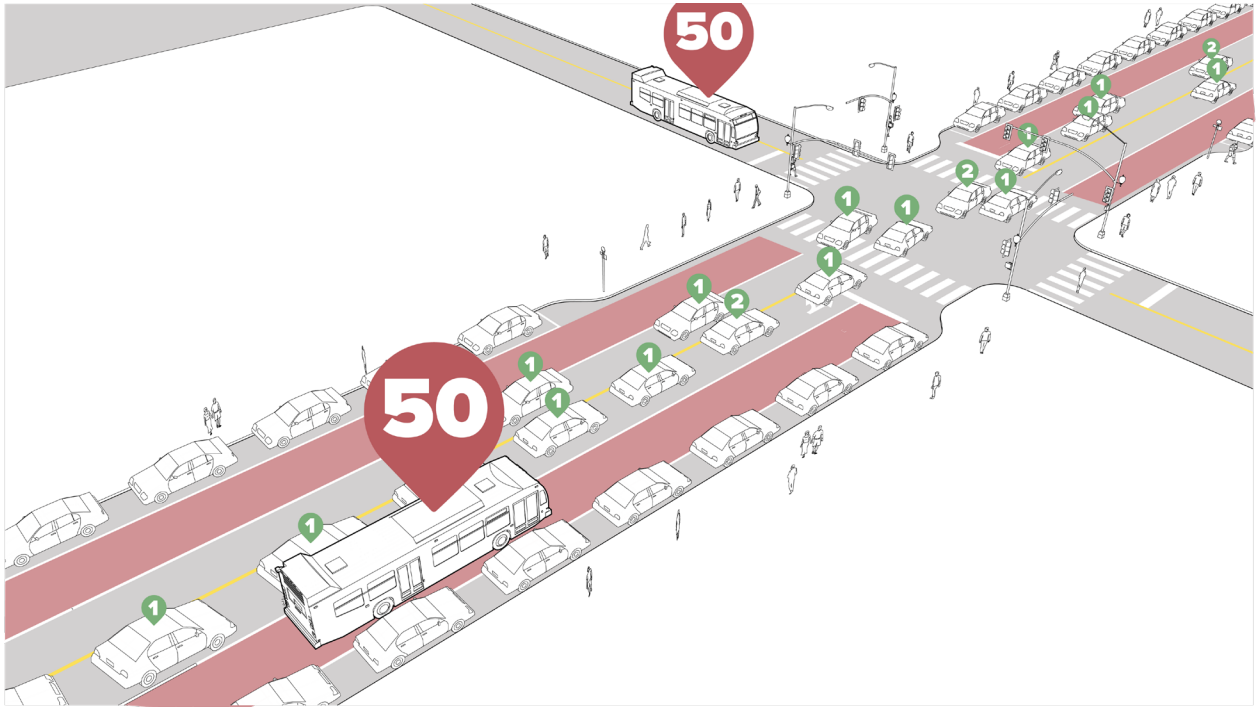
x

120 people

=

5,400 seconds of delay

Minimize Person Delay,
Maximize Safety



LOS F
(90 seconds of delay)

x

90s x 20 people

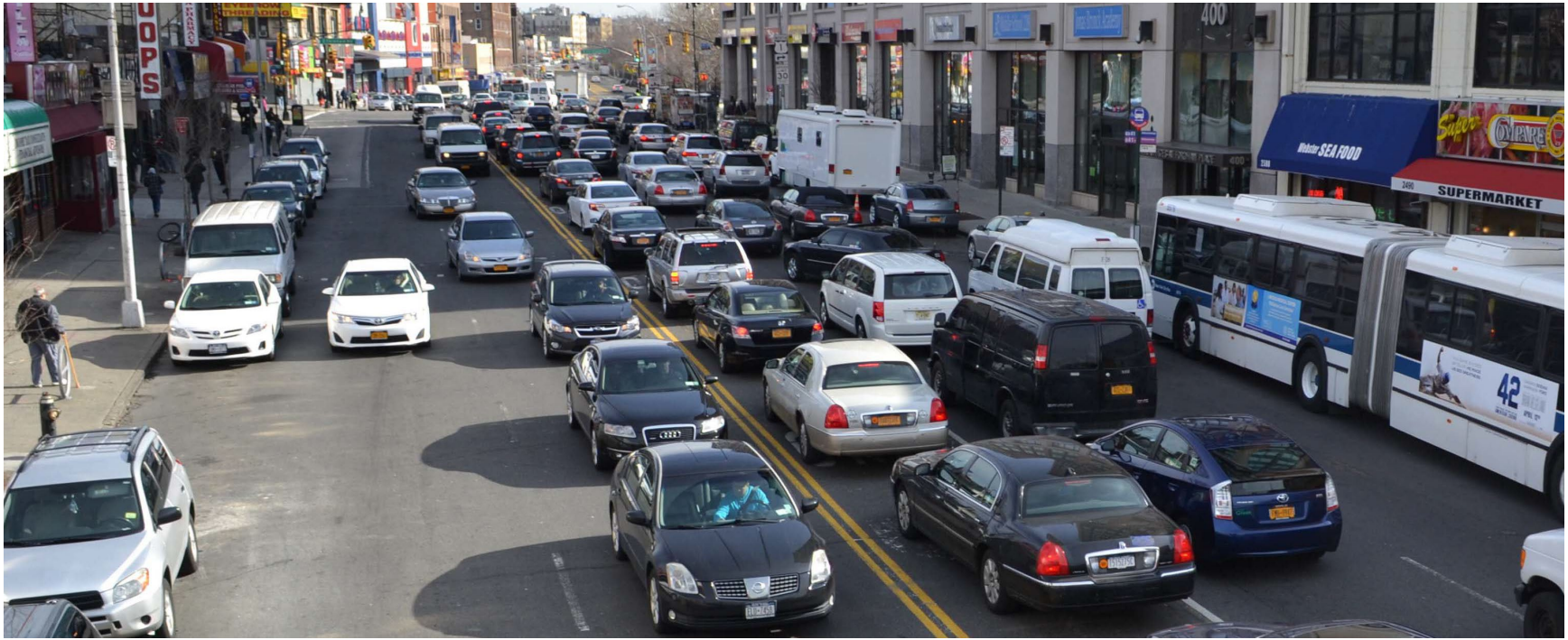
+

15s x 100 people

=

3,300 seconds of delay

Minimize Person Delay,
Maximize Safety

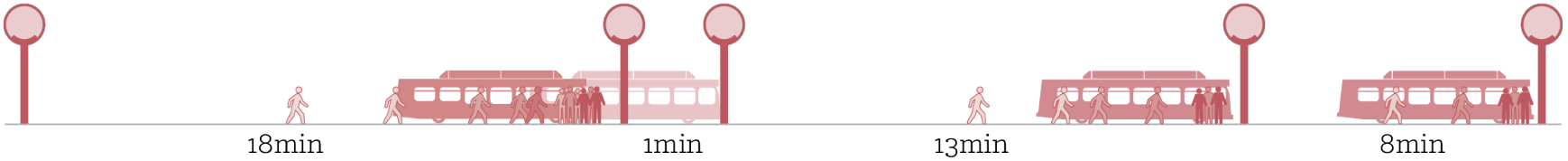


Minimize Person Delay,
Maximize Safety

Prioritize for Reliability

Reliability Matters for Riders

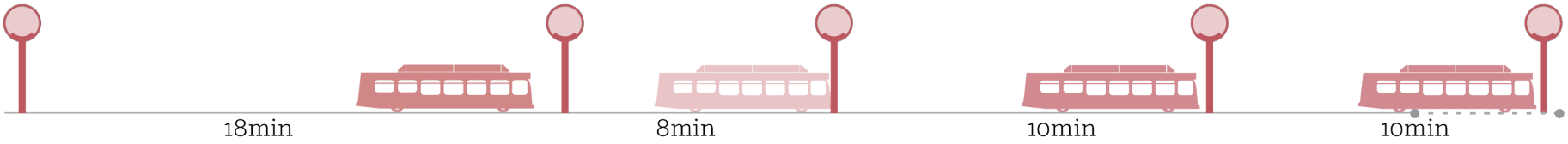
Max. Wait Time: 10 min Avg. Wait Time: 5 min



Max. Wait Time: 18 min Avg. Wait Time: 8 min

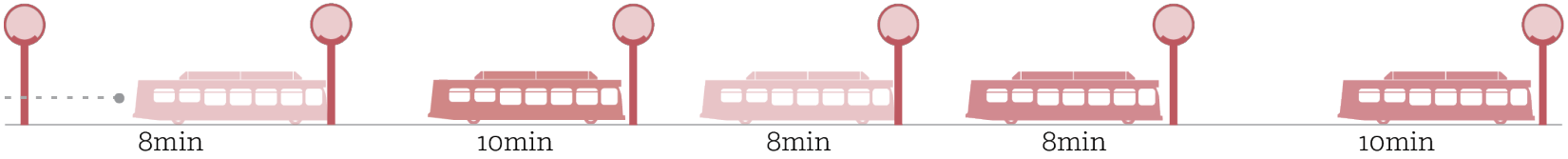
Reliability Matters for Operators

Reliability Matters for Operators

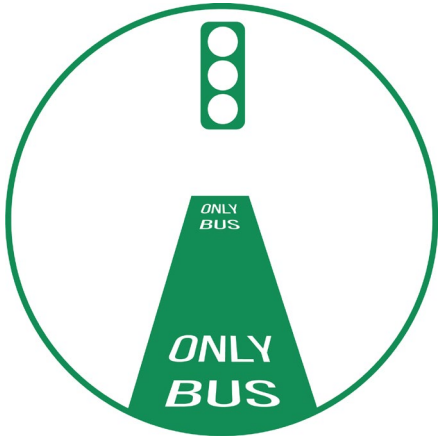


Unreliable Service means LESS service

Reliability Matters for Operators



Unreliable Service means MORE buses



Combine Signals & Dedicated Lanes

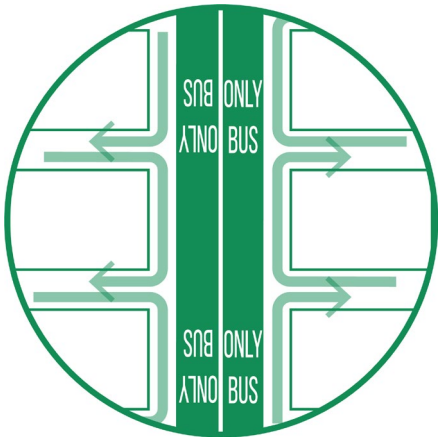
Combine Signals & Dedicated Lanes

Separate Problematic Movements

Separate Problematic Movements … and Combine Compatible Movements.


Separate Problematic Movements … and Combine Compatible Movements.
SW Moody Ave
DO NOT ENTER
EXCEPT BUS
BUS LANE
BIKE SIGNAL
MAX
FRIGHTTOWN

Dedicate, then Filter



Dedicate, then Filter

Seattle WA

Dedicate, then Filter

Seattle WA

Prioritize in Context


8 VIA PORTLAND CITY CTR
SEE WHERE IT TAKES YOU
plan your trip at trimet.org
TRIMET
2815
813
AVEDA

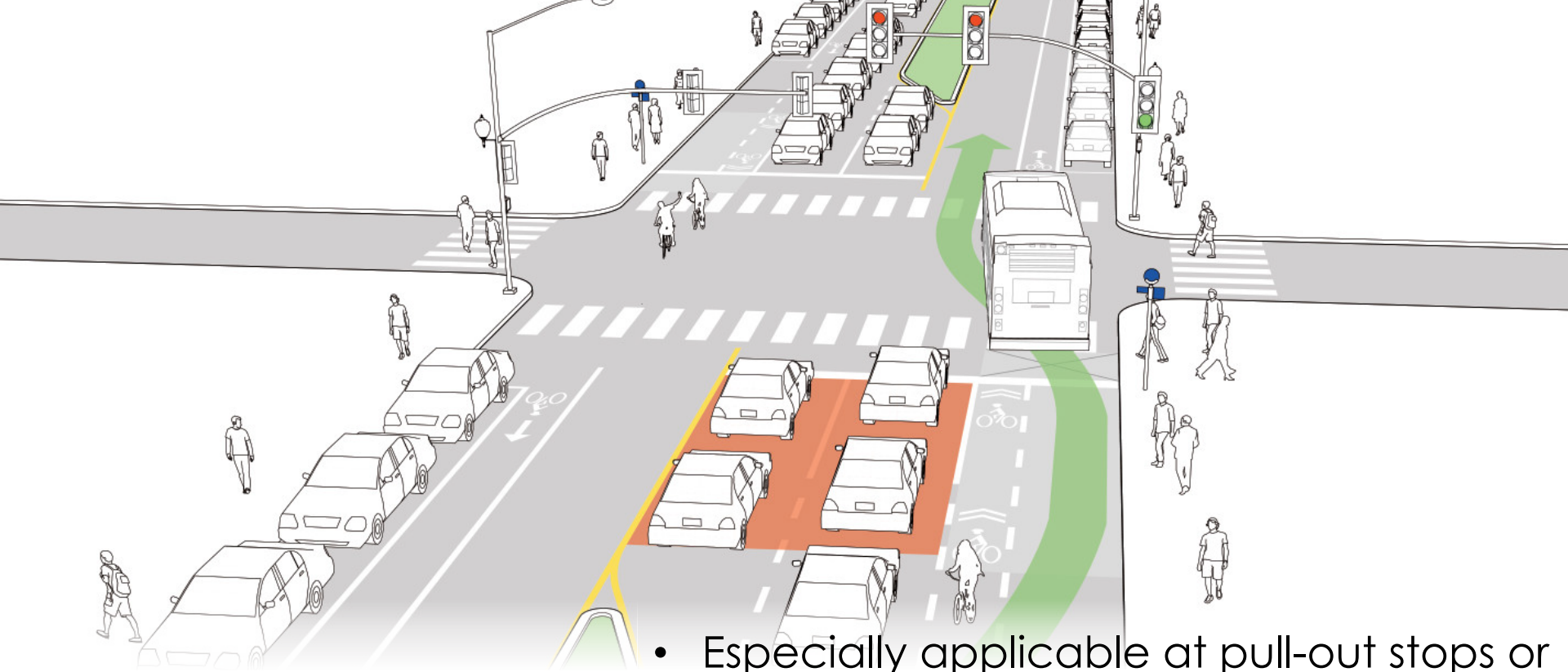
Portland, OR

Arlington, VA

Seattle, WA

Intersection Design Tools

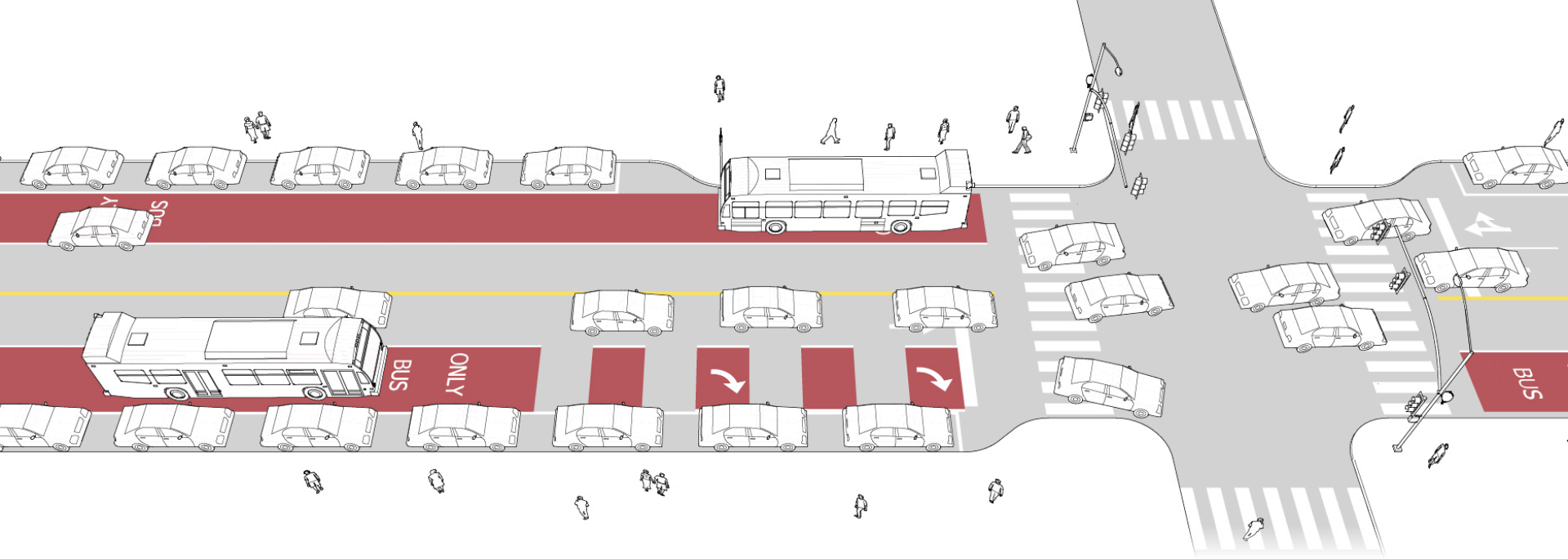
… for letting the bus go straight



Queue Jump Lane

- Especially applicable at pull-out stops or congested intersections
- Requires signalization

Queue Jump Lanes

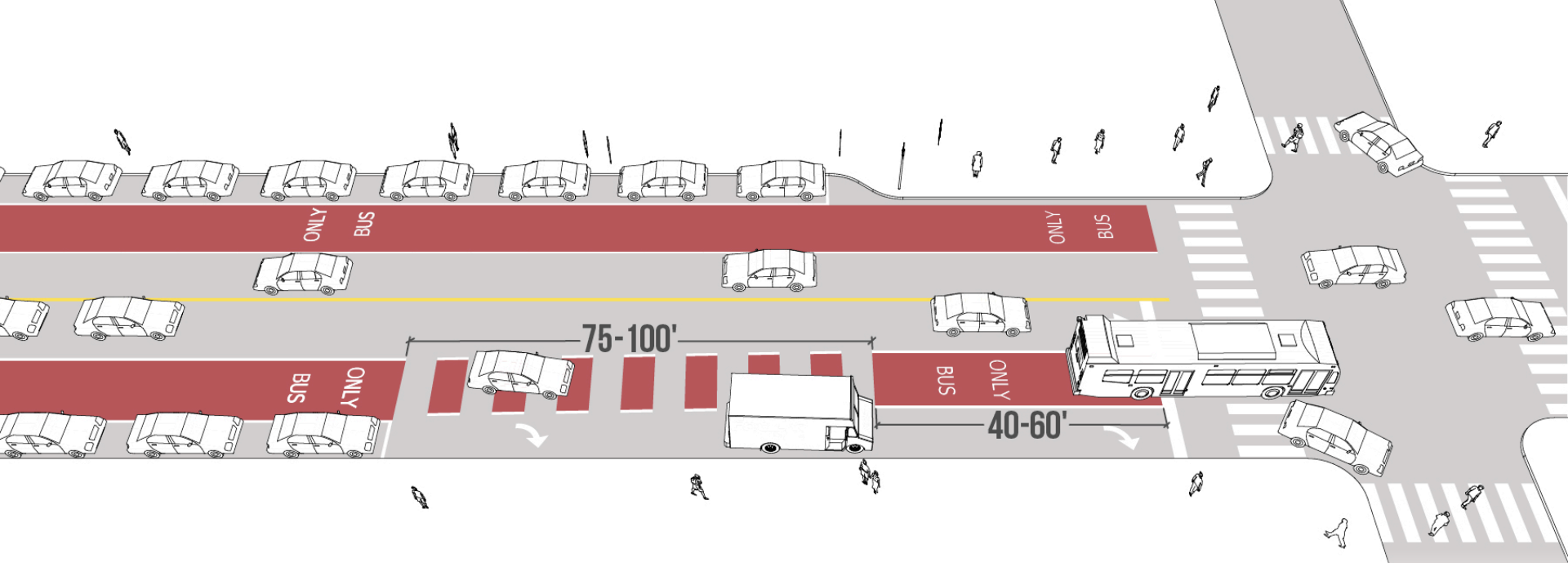


Shared Right Turn / Transit Lane

- Where right turns are low to moderate but cannot be prohibited
- Operational benefits are for vehicles
- Separate movements where ped volumes are moderate or high

Shared Right-Turn Lane

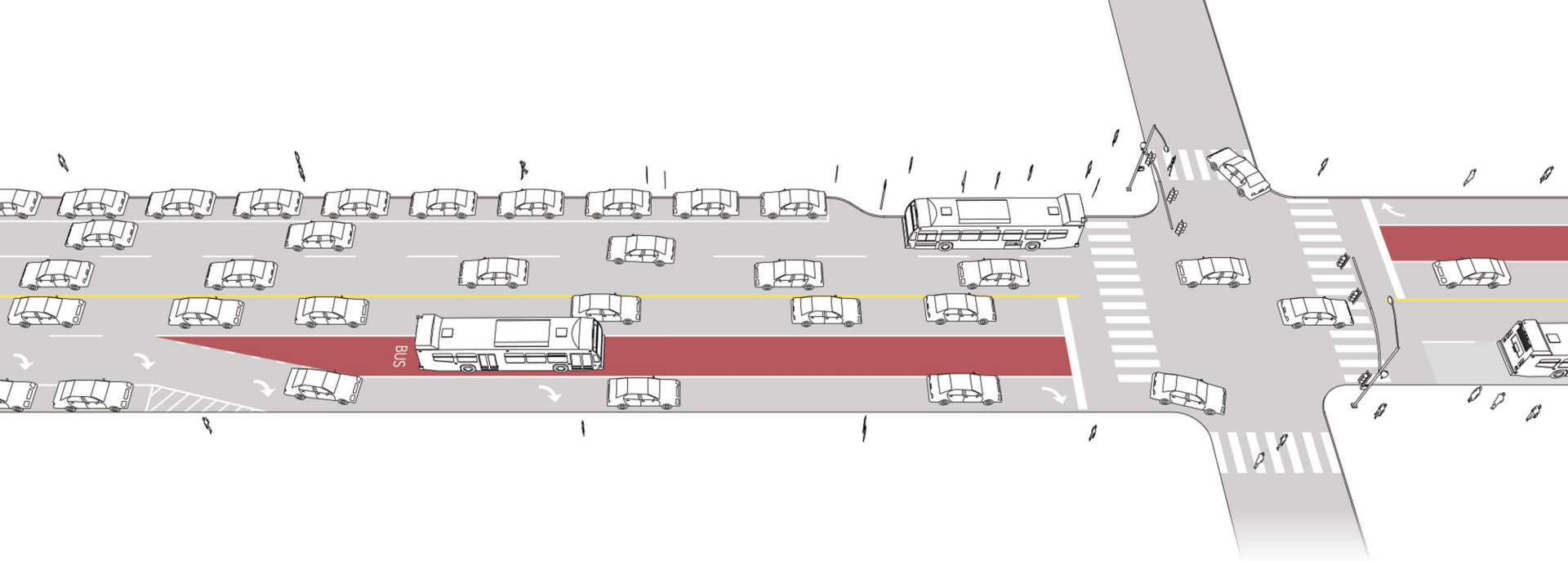
Broadway, Denver



Right Turn Pocket

- Separate turns from thru transit & reduce delay
- Lengthen pedestrian crossing distance
- Longer signal phasing / cycle
- May increase safety / comfort of protected bike lanes

Right Turn Pocket

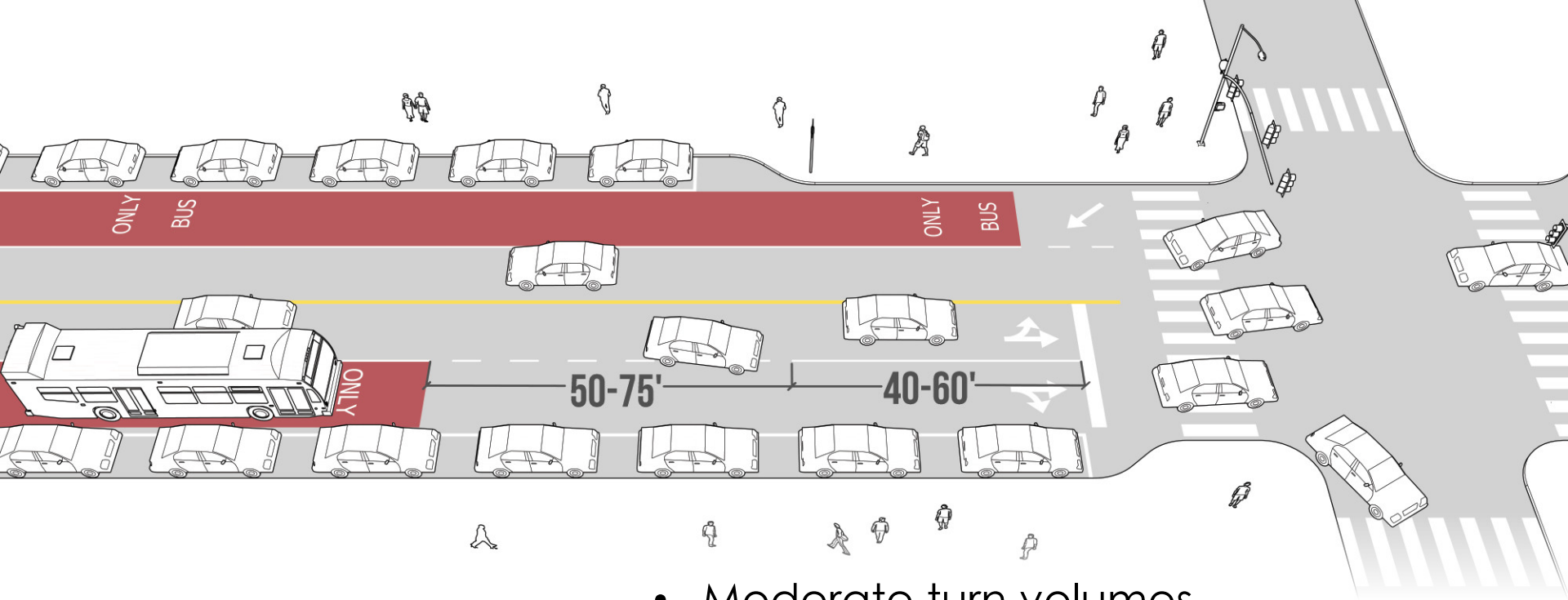


Transit Approach Lane

- Congested “trouble spots”: high turn counts, bicycle intersections.
- Can be lengthened for longest regular queue
- May be configured in any lane.

Westlake Ave, Seattle

Seattle, WA



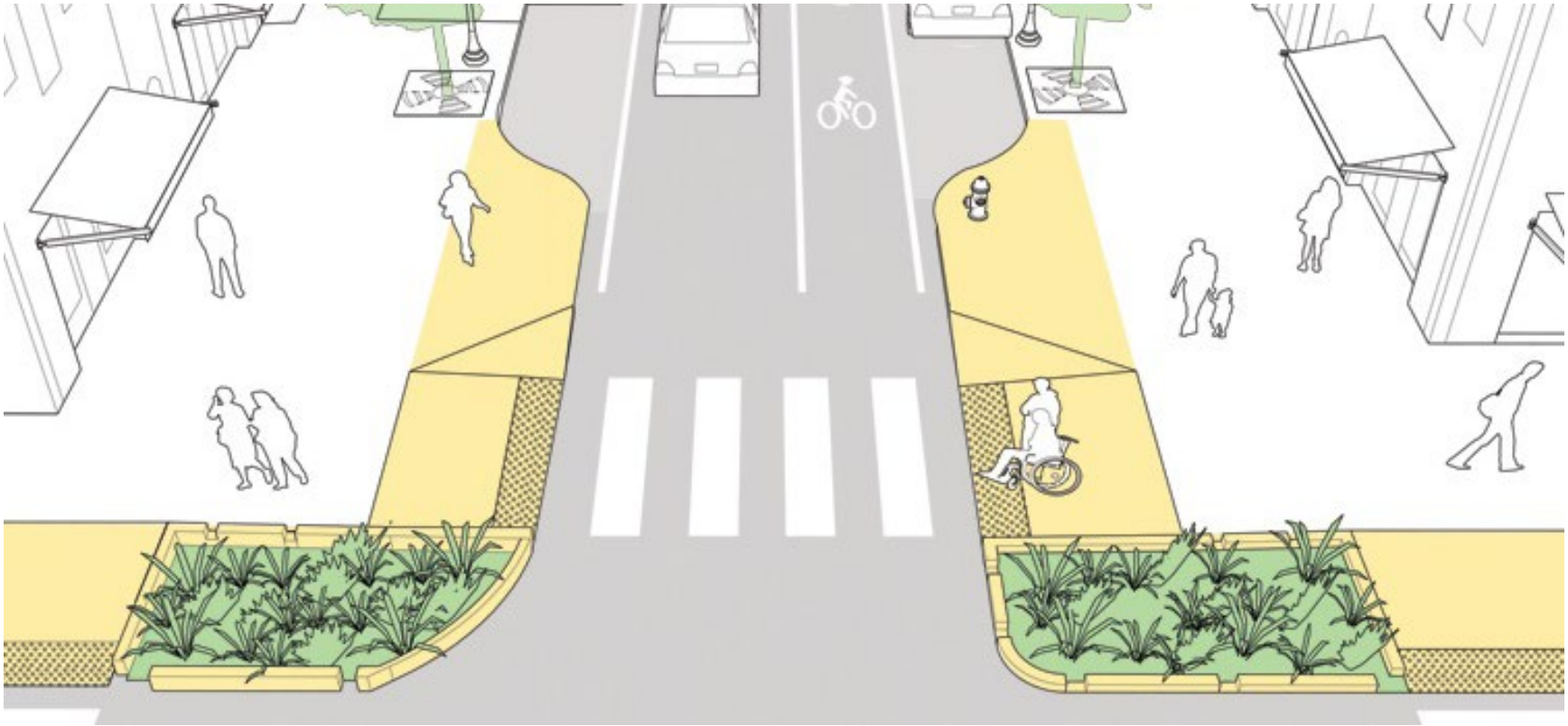
Dropped Transit Lane

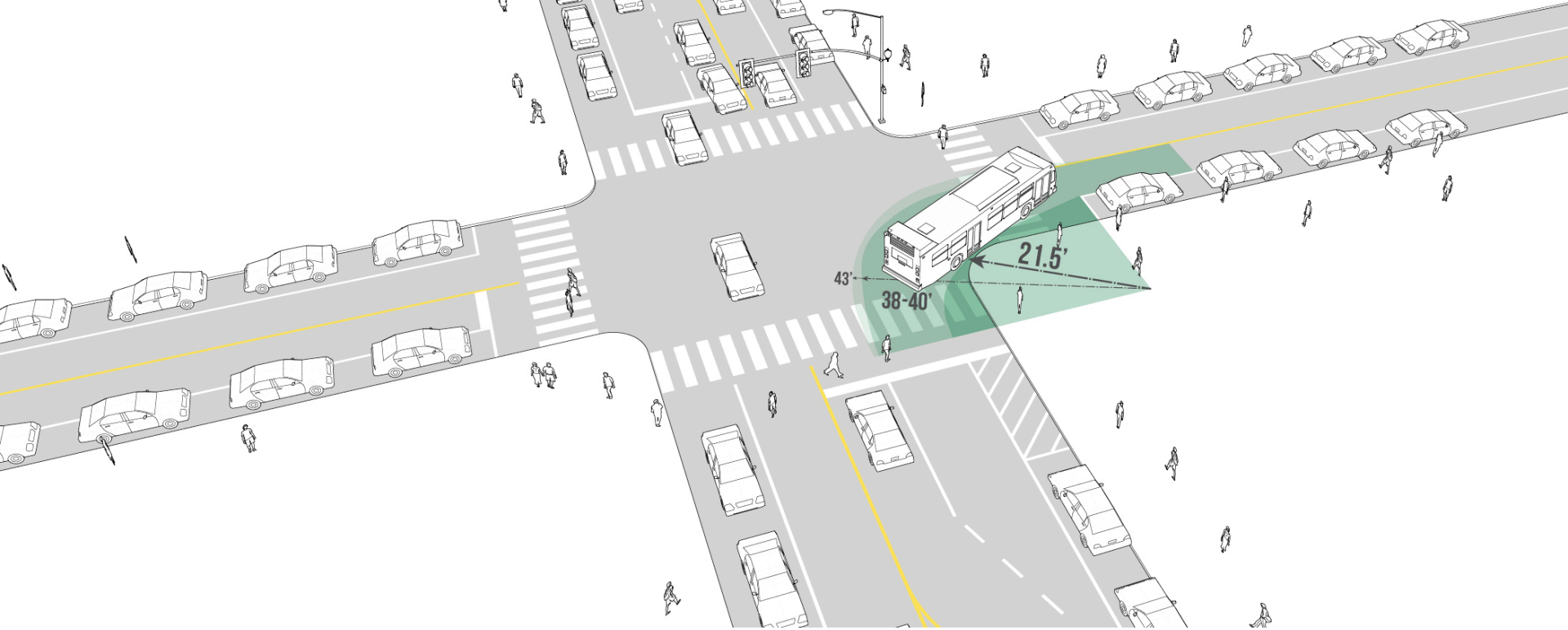
- Moderate turn volumes
- Right- and Left-turns are balanced
- Operational benefits accrue to vehicles primarily

Intersection Design Tools

… for turning the bus

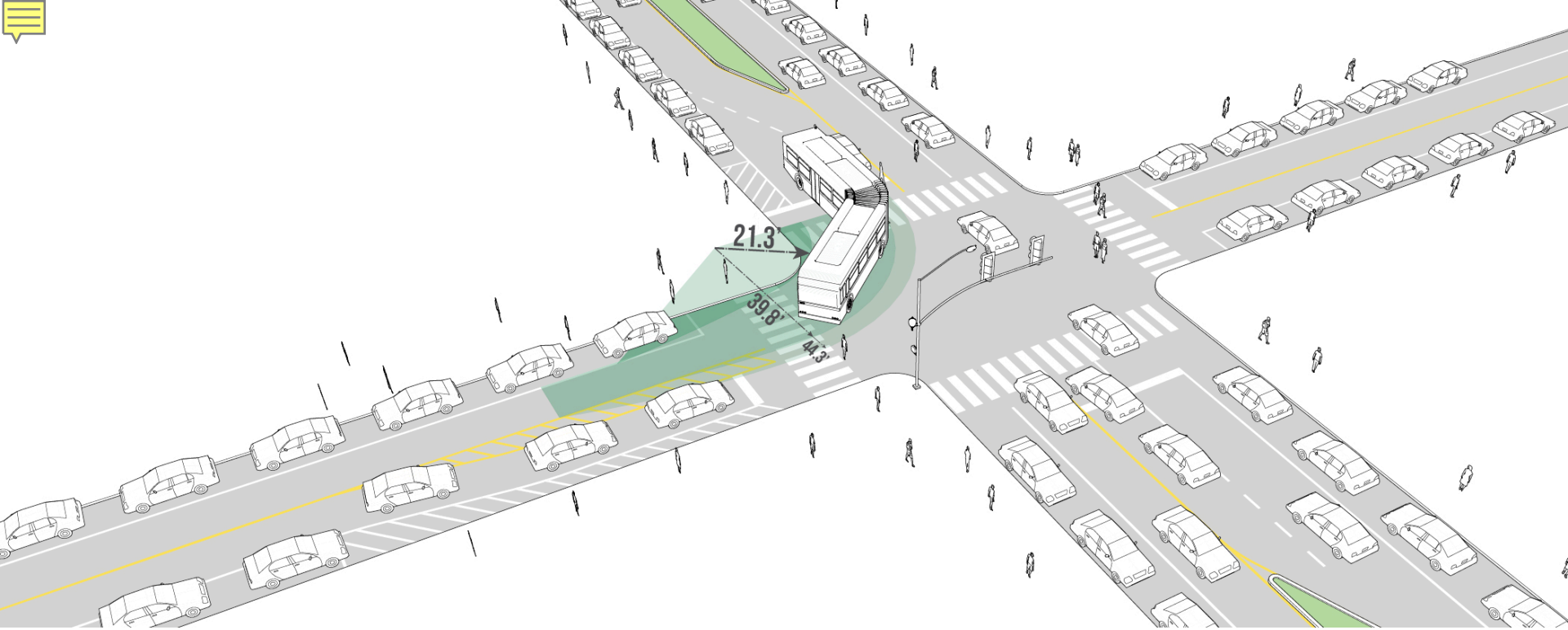
Curb Extensions





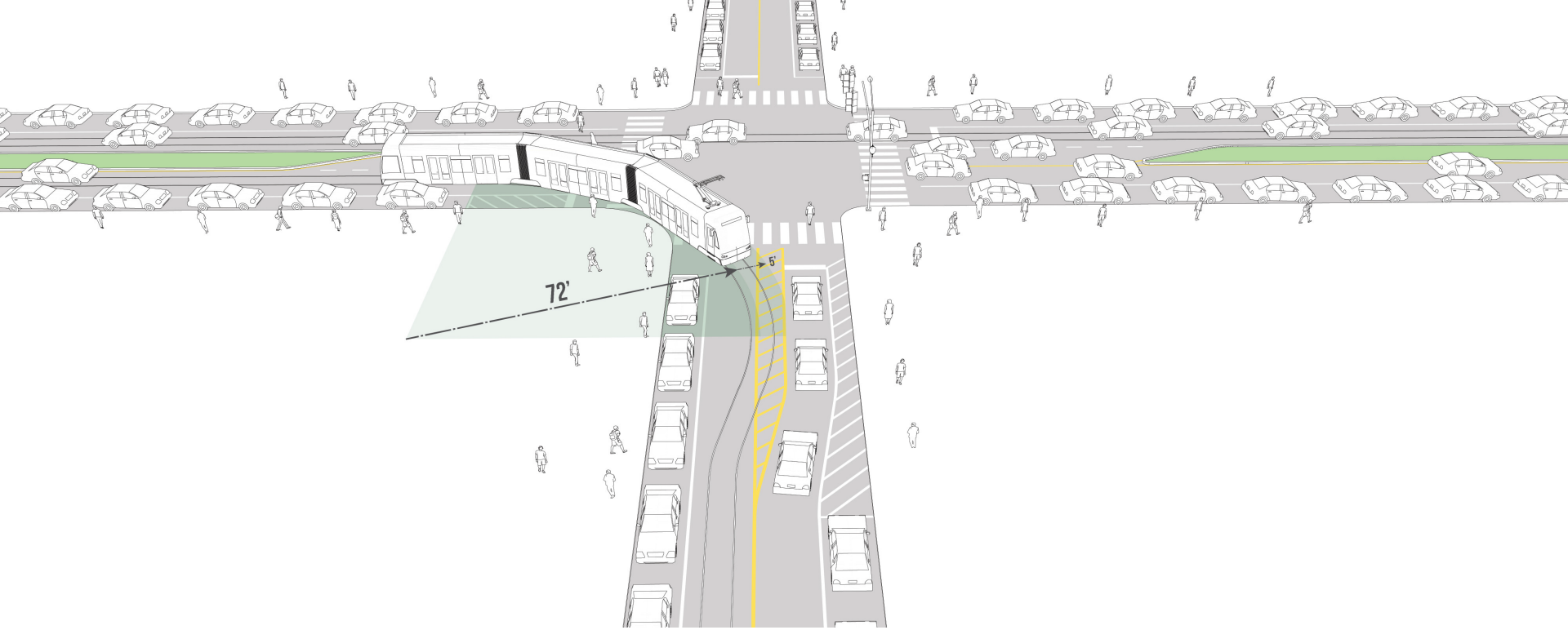
Turn Radii

- Effective radius ≠ Curb radius



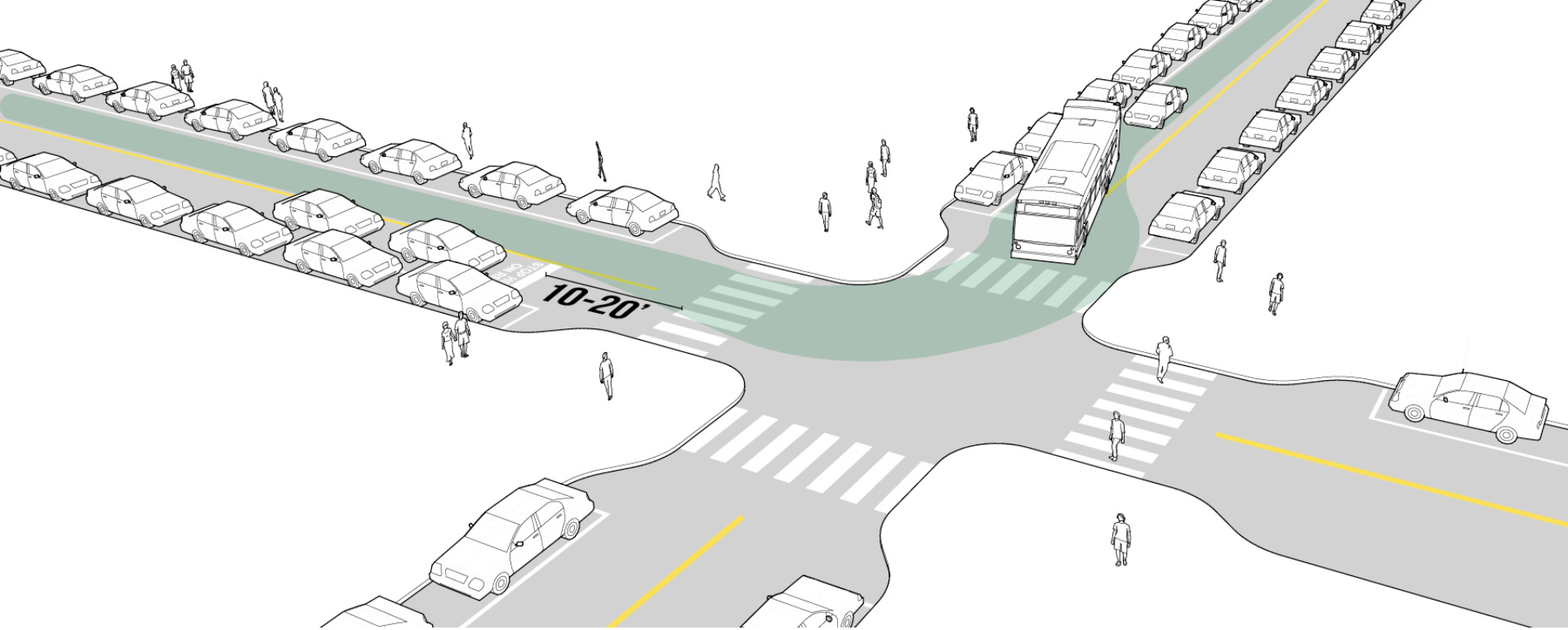
Daylighting

- Removing parking at corners can increase effective radius
- May increase turn speeds



Channelized Center Line

- Allow turning vehicles to use part of approach lane / median



Recessed Stop Bar

Turn Wedge

- Tighter turn geometry, especially on minor-to-major streets
- Allows for emergency vehicles easily

Turn Wedge & Hardened Center Line

Mountable Curb Extension

Testing Interim Treatments