



DESIGNING IN CONTEXT OF COMPLETE STREETS

BICYCLE
FACILITIES

MODULE 4

BICYCLE FACILITIES

FHWA Memorandum – August 20, 2013
“Bicycle and Pedestrian Facility Design Flexibility”

Support for taking a flexible approach

Guide for the Development of Bicycle Facilities (AASHTO)
Designing Urban Walkable Thoroughfares (ITE)
Urban Bikeway Design Guide (NACTO)

New 2015

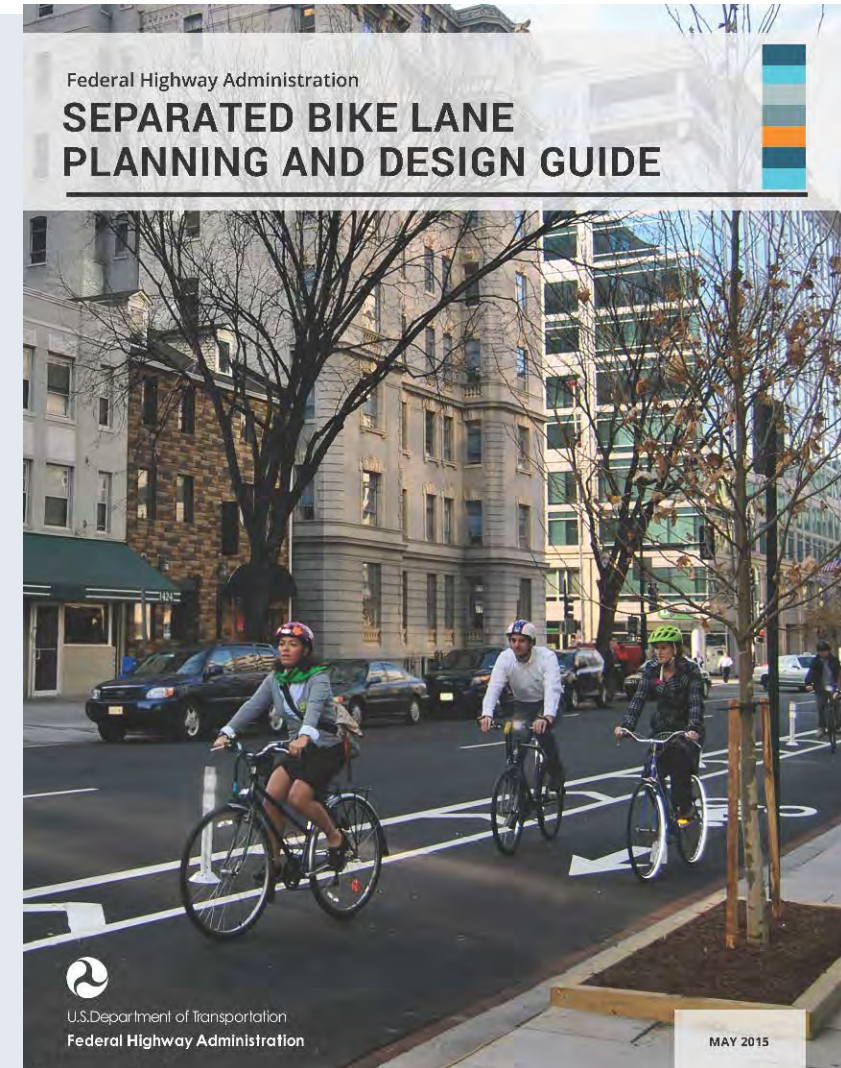
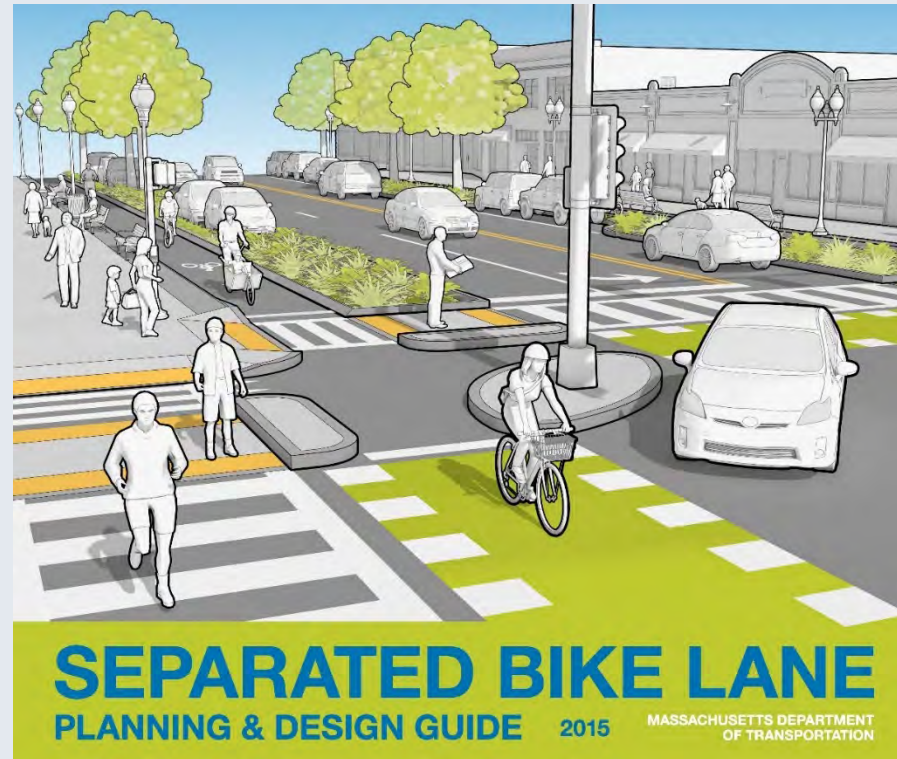
Separated Bike Lanes Planning & Design Guides (FHWA)

http://www.fhwa.dot.gov/environment/bicycle_pedestrian/overview/policy_accom.cfm

http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/

REFERENCES

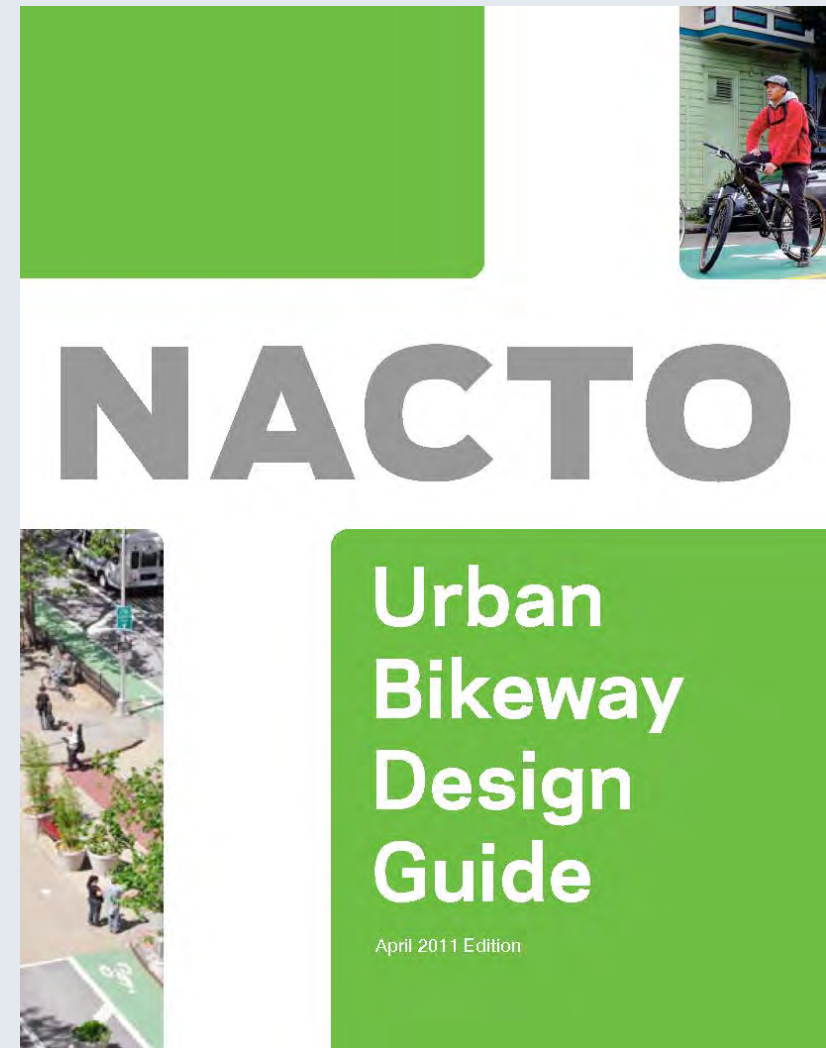
- FHWA Separated Bike Lane Planning and Design Guide, 2015
- MassDOT, 2015 – Frequently referenced



REFERENCES

- The vast majority of NACTO *Guide* is either allowed or not precluded but non-compliant TCD's may be piloted through the MUTCD experiment process.
- Some treatments are compliant, some are experimental, some are actually currently prohibited by FHWA. Guide doesn't distinguish which is which.

CHECK the MUTCD Website



BICYCLE FACILITY TYPES

- Wide lanes
- Shared lanes
- Shoulders
- Bike lanes
- Separated bike lanes
- Shared use paths



Wide lane: 14' provides minimum width for a car to pass a cyclist without encroaching into the adjacent lane

SHARED LANES

- Good design features
 - Pavement quality
 - Sight distance
 - Lower speed & volume
 - Bicycle compatible grates, railings, tracks, & expansion joints
- Supplemental features
 - Pavement markings or “sharrows”
 - Detectors & signal timing



SHARED LANES



W11-1



W16-1P



R4-11

SHARED LANES

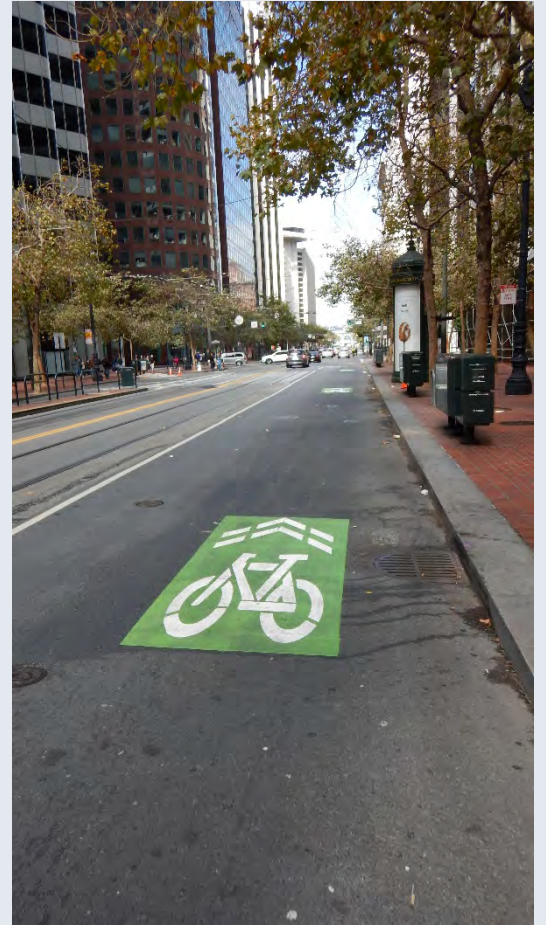
Shared Lane Marking

- 35 mph or less
- 4' min from curb
- 11' min from curb
with on-street parking
(*Guidance changing to
12' from curb*)



SHARED LANE MARKINGS

- Minimum longitudinal spacing of 50'
- May place in center of a narrow travel lane
- Use of green color (currently experimental)
- Use of SLM in turn lane (current compliant use with EXCEPT BIKES plaque)
- Provide SLM on receiving (far) side of intersection



San Francisco

PAVED SHOULDERS

- Useful for higher traffic volume and/or speed
- Frequently used for rural
- Not a travel lane – intersection conflicts
- Uphill direction when constrained



BIKE LANES

- Preferred in urban/suburban
- Rural for high demand for bicycle travel
- Preferential space for bicyclists delineated
- Priority for uphill



BIKE LANES

Bike Lane next to Back-in Angled Parking



Vancouver, BC

BIKE LANES

Used to separate bicycle lane from adjacent travel lane and/or parking lane.

Crosshatch pattern should be consistent with Section 3B.24



BIKE LANES

Bike Lane buffered
from Parallel
Parking



BIKE LANES

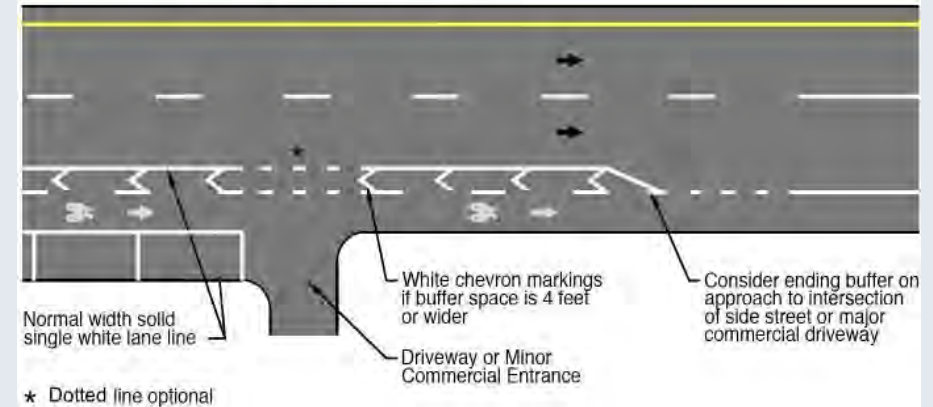
Bike Lane buffered
from Parallel
Parking



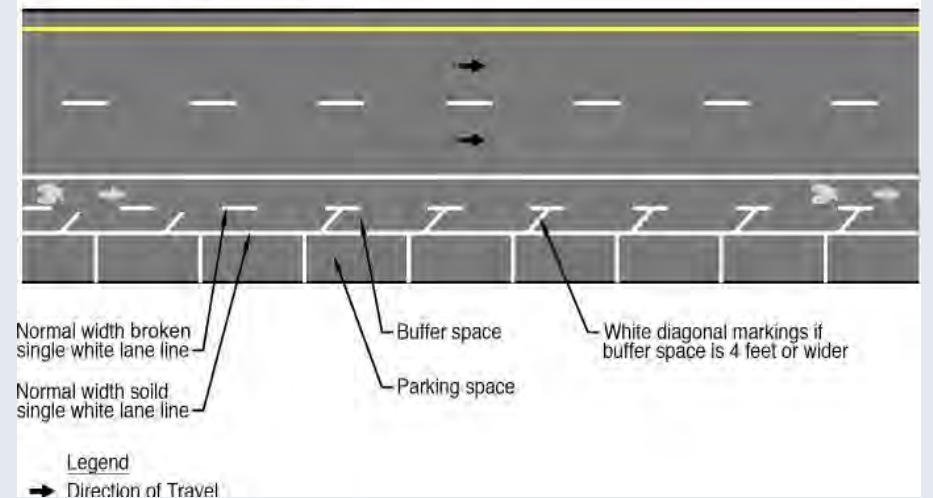
BUFFERED BIKE LANES

- The longitudinal marking on the bike lane side of the buffer shall be broken to denote crossing is permitted. Consistent with Section 3D
- Buffer width >4' should have cross hatch markings (chevrons next to travel lane, diagonals next to parking. Consistent with Section 3B.24)

A - Buffer between bicycle lane and general purpose lane.



B - Buffer between bicycle lane and parking lane.



BIKE LANES

Bike Lane right of
the Bus Stop

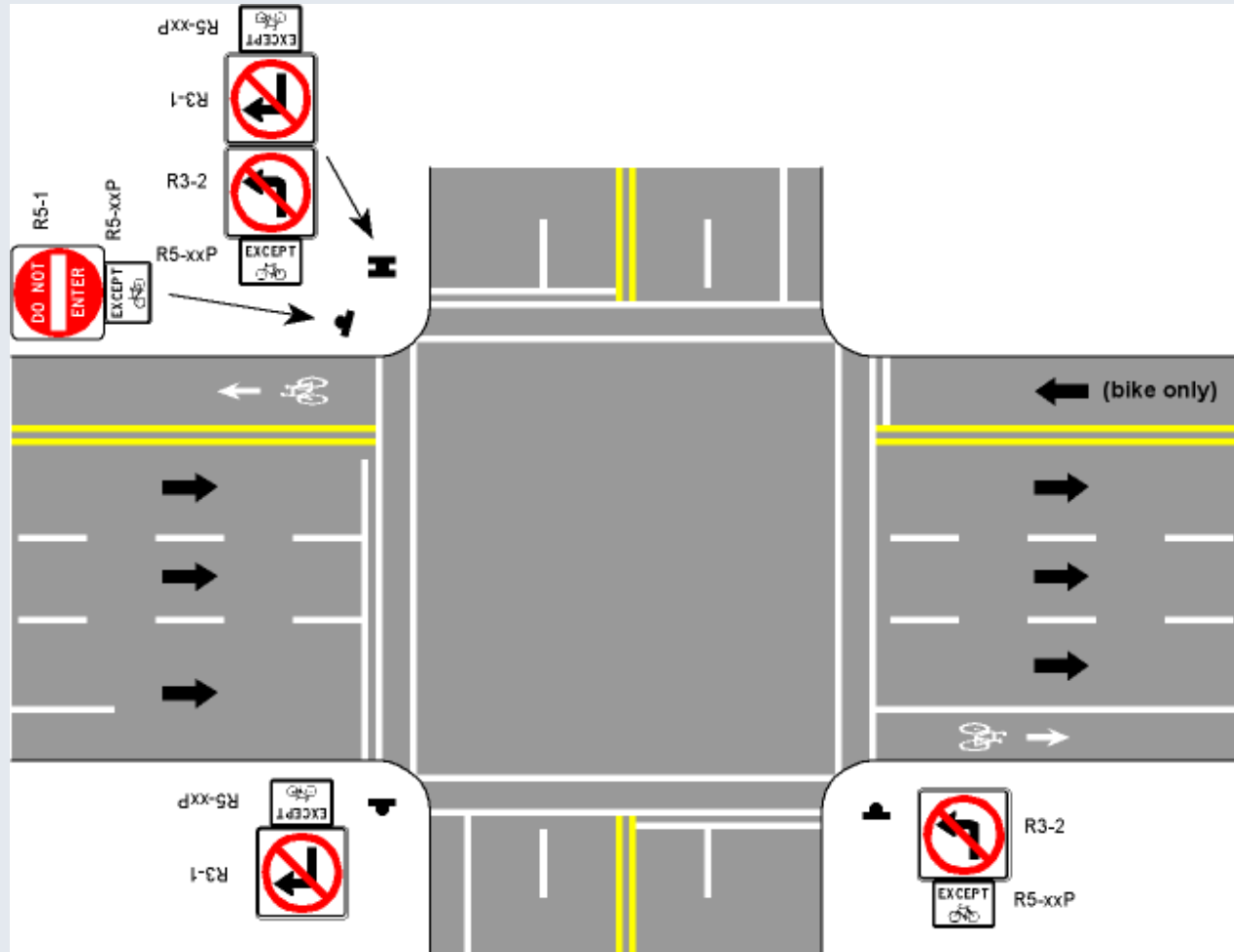


CONTRAFLOW BIKE LANES



Allows lawful use by bicyclists to travel in opposite direction on 1-way roadways

EXCEPT BIKES PLAQUE – CONTRAFLOW LANE



R5-xxP
Except Bicycles (plaque)
24" x 18", 4D text, 7" bicycle symbol

BIKE LANE EXTENSIONS

Note in both of these photos the green markings are not correct. The green markings should not be solid through the intersection but rather match the white dashed markings. Similar to the dashed portion on the next slide.



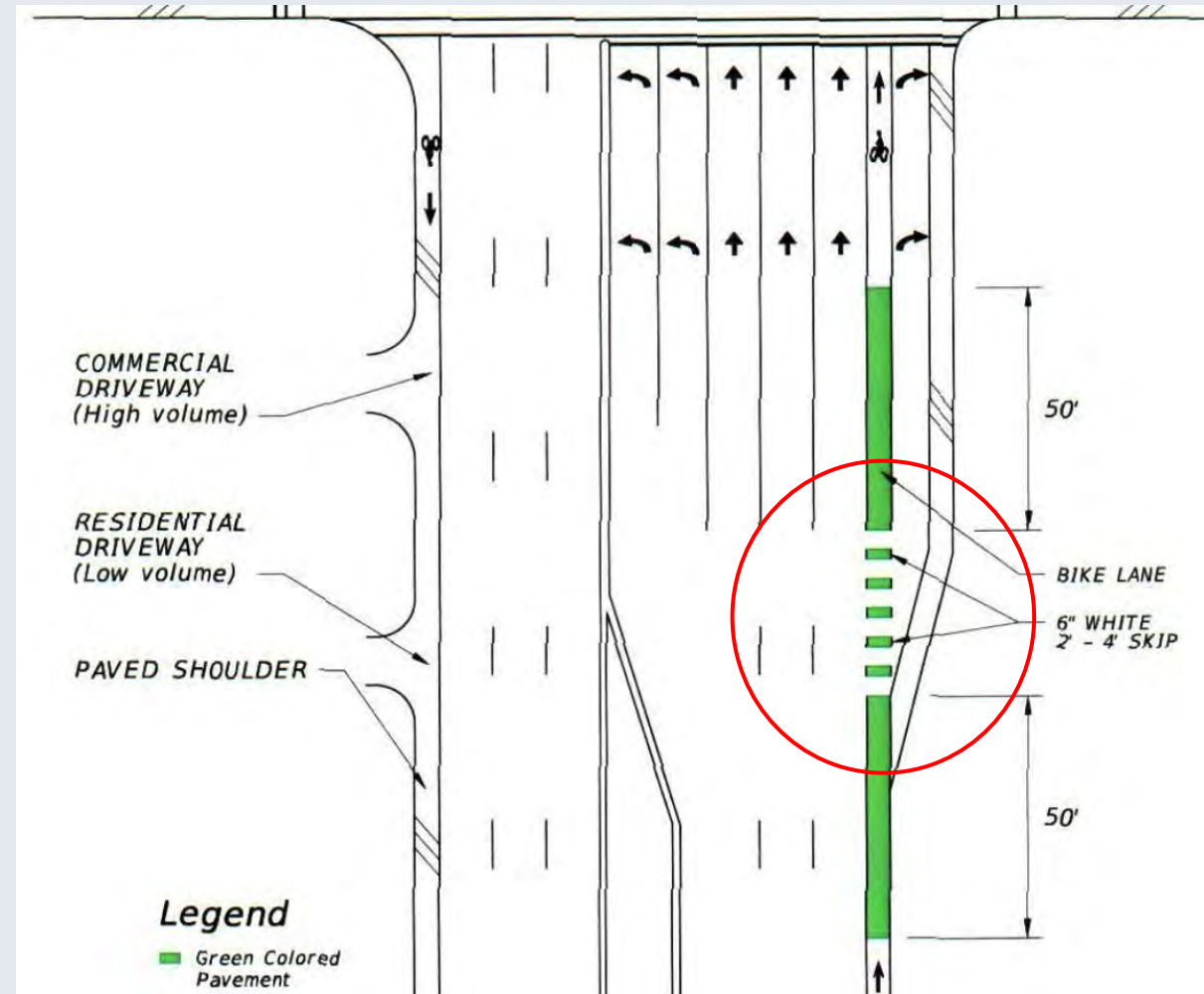
Binney St Cambridge, MA



Used to extend bicycle lanes through intersections consistent with Section 3B.08

Northampton, Mass

BIKE LANE EXTENSIONS

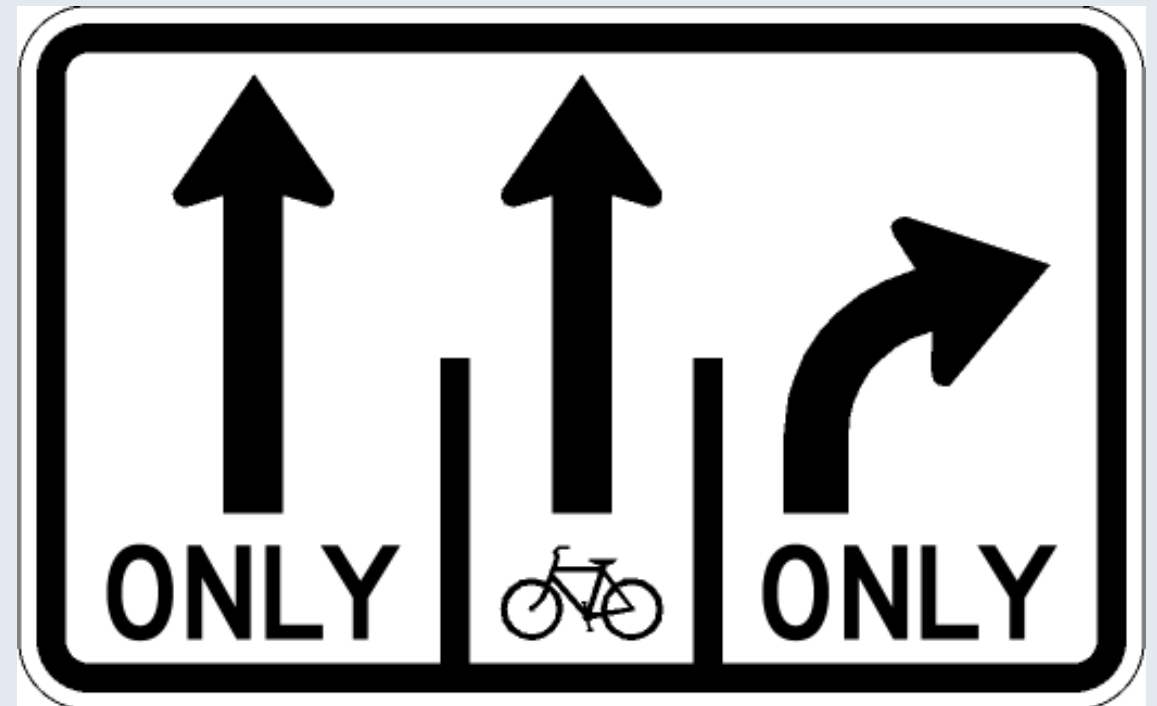


NEW LANE CONTROL SIGNS

R3-5Xp BIKE PLAQUE FOR LANE SIGN



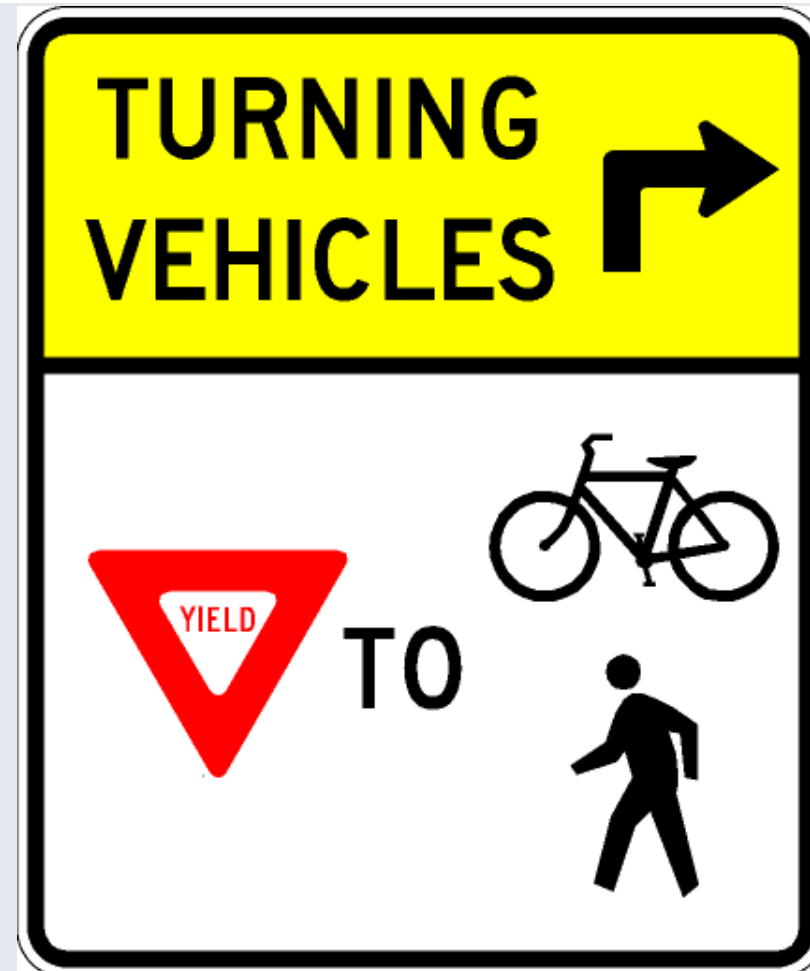
R3-8 ADVANCE INTERSECTION LANE CONTROL SIGN



BIKE - MODIFIED R10-15



R10-15a



R10-15b

EXCEPT BIKES WARNING PLAQUE

- Used beneath warning signs where it is desired to alert bicyclists that the specific condition depicted on the warning sign is not applicable to them.
- All text version is compliant with current MUTCD



BIKE LANE WARNING SIGNS - TRANSITIONS

- Warning signs for bike lane endings and subsequent bike merge.
- Similar to standard roadway lane drop warning signs.
- Applicable distance or “AHEAD” plaques may be added.



W9-XX Bike Lane Ends Sign
(30" panel, 9" tall bicycle symbol, 5" D & C text)

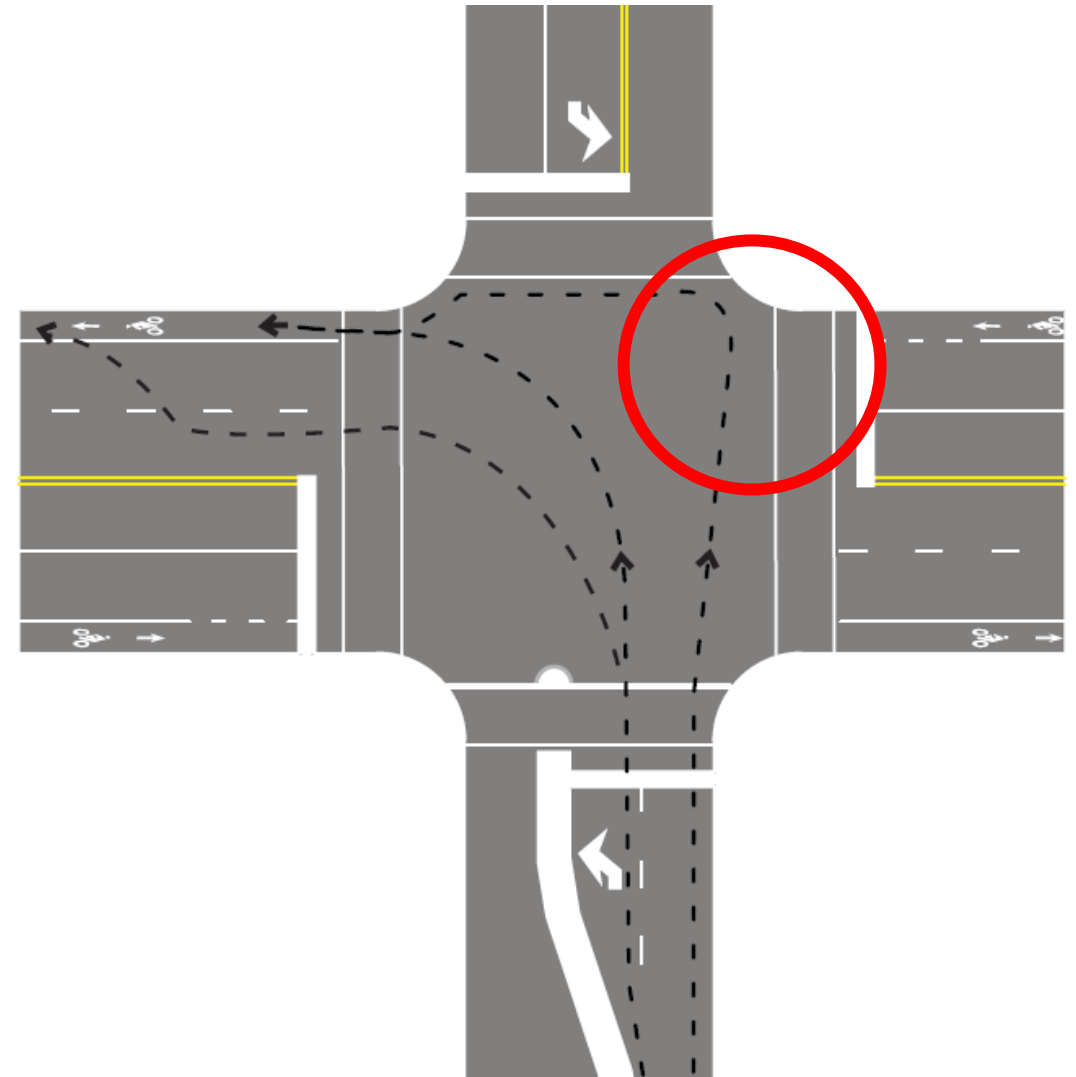


W9-XX Bike Merge Sign
(30" panel, 9" tall bicycle symbol, 5" D & C text)

2-STAGE TURN BOXES

Typical left turn movements by cyclists through an intersection

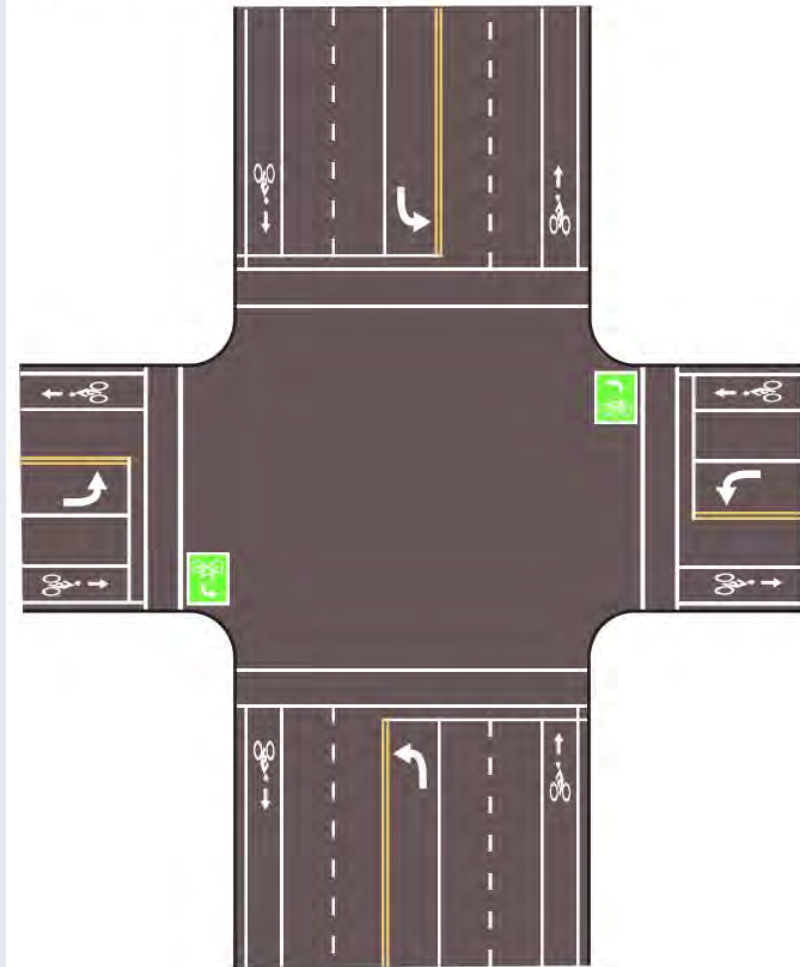
2- Stage Turn Box formalizes left turn movement currently allowed by traffic laws



2-STAGE TURN BOXES

- Waiting area for bicyclists to queue for left turn.
- Location of box should be out of line of cross street traffic
- Right-on-red prohibition recommended.
- Can be used through Request to Experiment (RTE)

Figure 9C-x. Example of a Two-Stage Turn Queueing Box



TWO STAGE TURN BOX



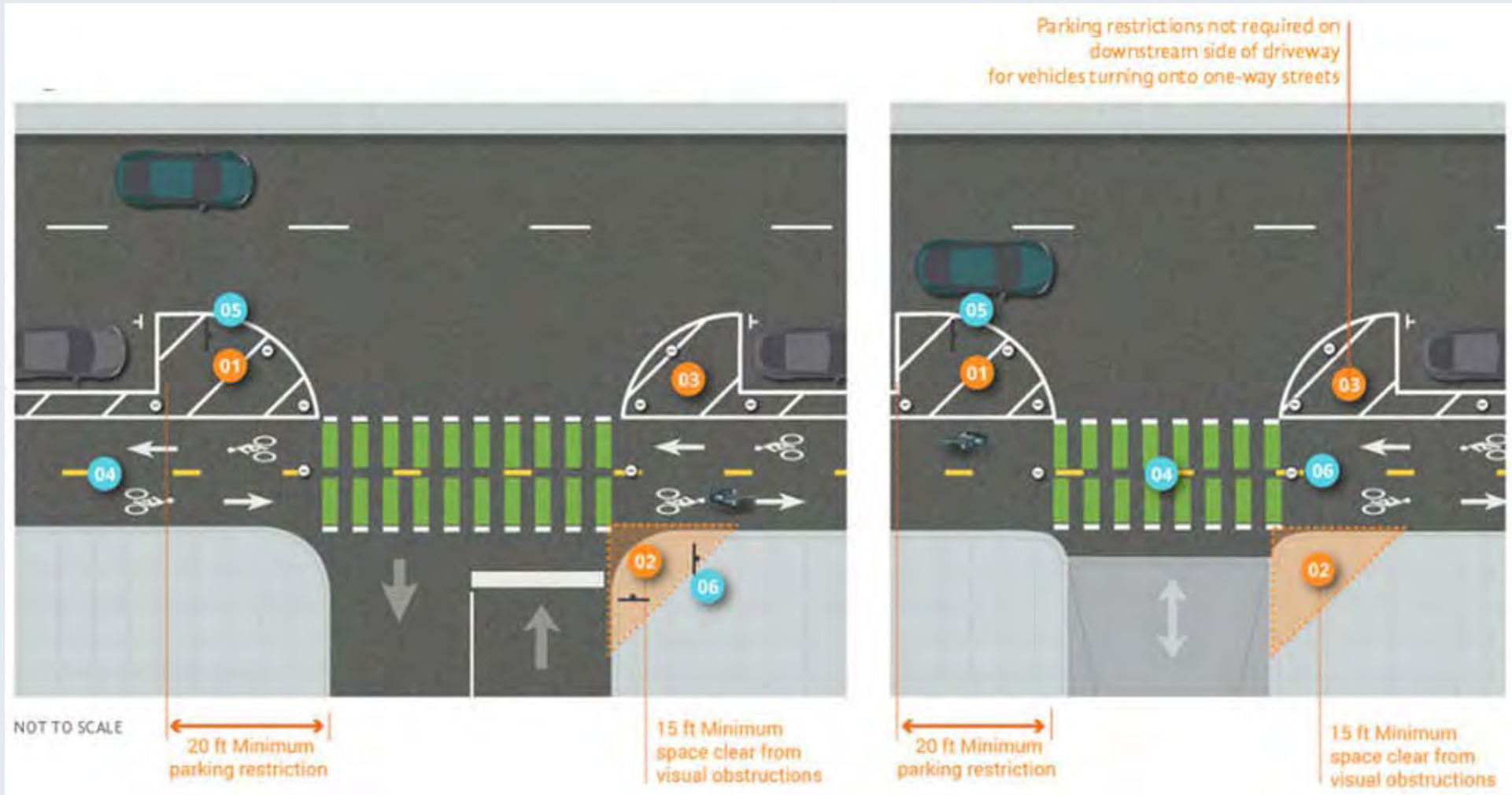
Binney Street, Cambridge, MA

CYCLE TRACK – SEPARATED BIKE LANE

Cycle Track
separated from
Motorized Vehicles



CYCLE TRACK – SEPARATED BIKE LANE



CURRENT DESIGNS PROHIBITED – COMBO LANES

Confusing?

You bet it is!



Asheville, NC

CORRECT – KEYHOLE LANE



CURRENT DESIGNS PROHIBITED – INAPPROPRIATE USE OF SLM'S



New York City

■ SLM in a bike box

CURRENT DESIGNS PROHIBITED- INAPPROPRIATE USE OF SLM'S

Brookline, Mass



■ With longitudinal markings ("priority bike lanes")

CURRENT DESIGNS PROHIBITED- INAPPROPRIATE USE OF SLM'S

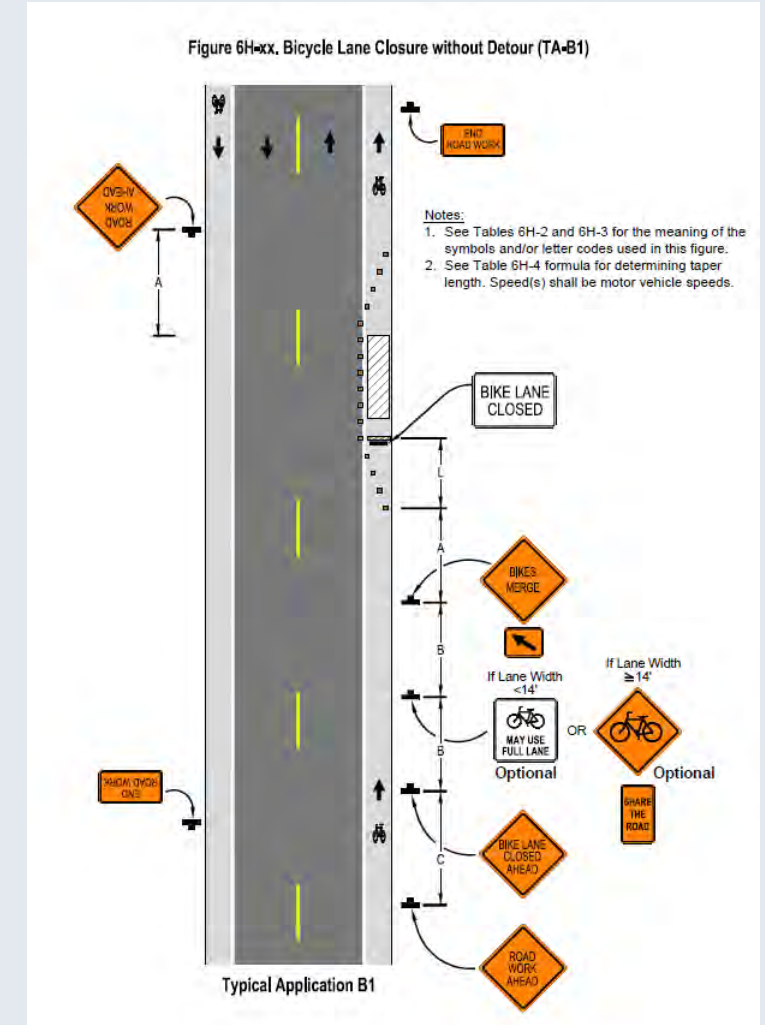
Excessive wear of
dashed lines



TEMPORARY TRAFFIC CONTROL FOR BIKES

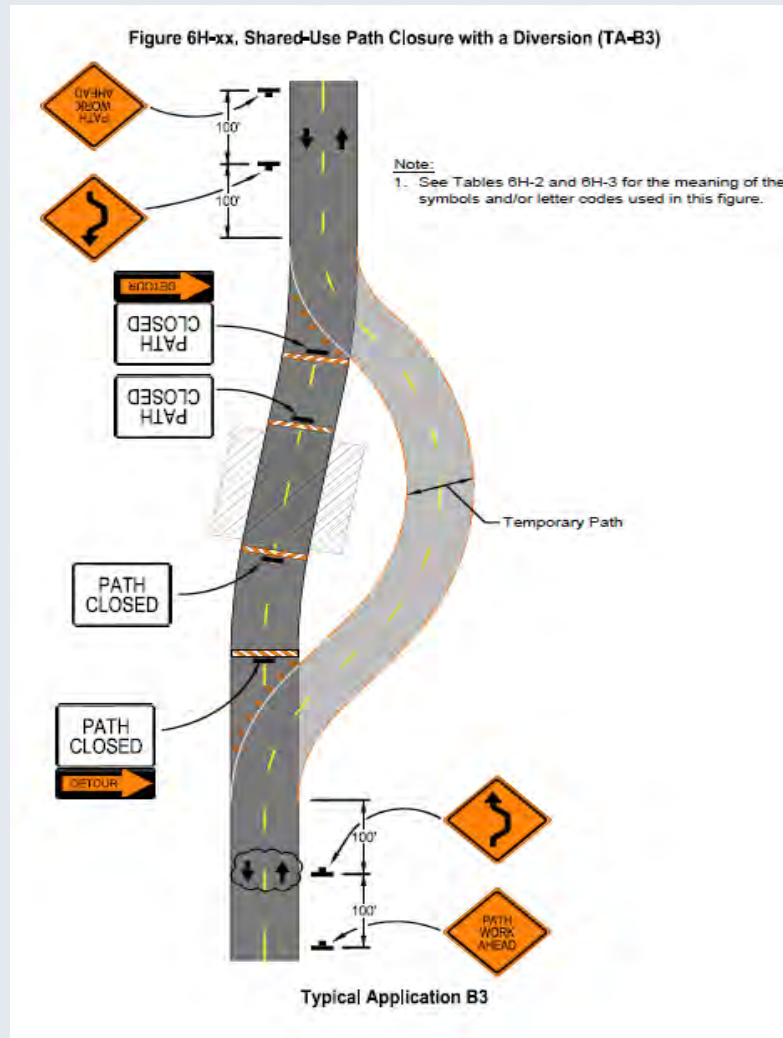
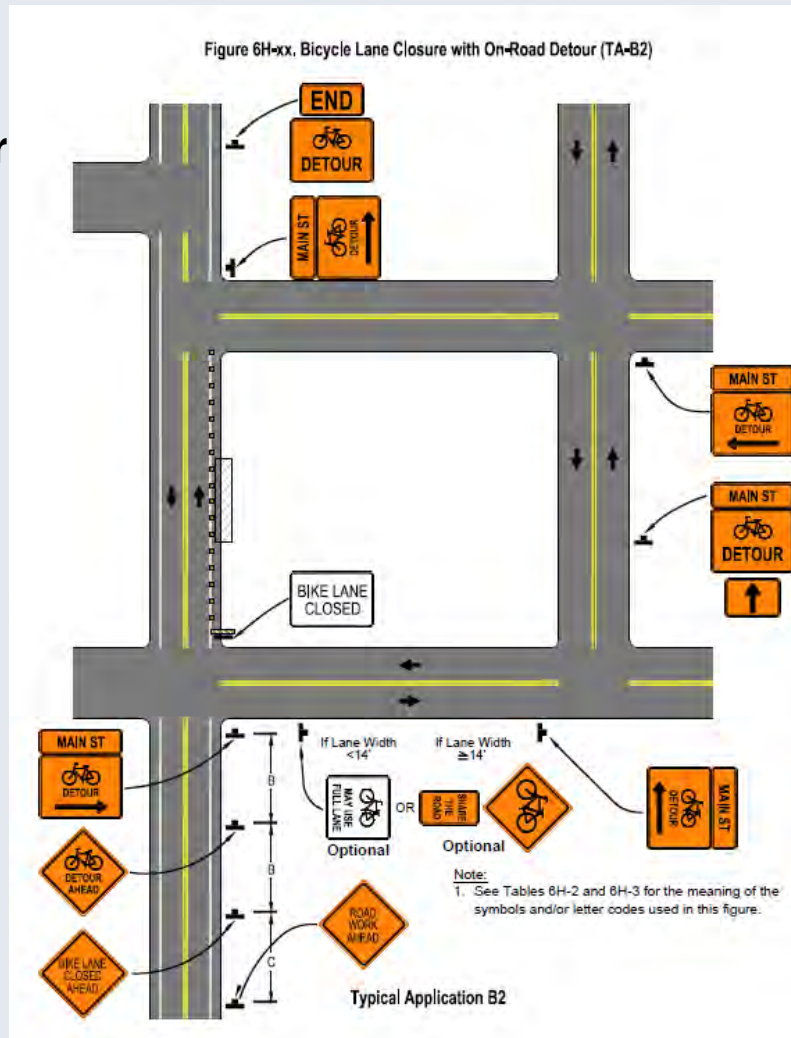
- **Part 6 Typical Applications for Guidance and Support to provide bikeway continuity through or around a Temporary Traffic Control (TTC) zone.**

Bike lane closure with diversion into traffic lane



TEMPORARY TRAFFIC CONTROL FOR BIKE

Bike lane closure with on-road detour



Path closure with diversion

BIKE/PED DETOUR CONSIDERATIONS – IMPORTANT

Henderson Bridge Repair Providence, RI



FHWA sponsored source for reports, data, case studies:

www.pedbikeinfo.com

www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane

Information on status of new bike designs:

www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_guidance/mutcd_bike.cfm

Information on MUTCD, links to state supplements and Interim Approvals:

www.fhwa.mutcd.org

Information on the NCUTCD:

www.ncutcd.org

RESOURCES