Evolution of the NACTO Guide
Insufficient and Inadequate Design Guidance for Cities
4 Problems
With Existing Design Guidance For Bicycle Facilities In the United States
1. Insufficient Design Guidance
2. Lack of Guidance for Urban Environments
3. Inadequate Composition
4. Cumbersome Review Process
INTERNATIONAL BEST PRACTICES
State of the Practice
Benefits

NOT JUST COPENHAGEN
International Best Practices
Enough Excuses!
Seville
Innovation in US Cities
Innovation in cities across the US
New York City, NY
Chicago, IL
Philadelphia, PA
Existing Design Manuals vs. Best Practices
NACTO Urban Bikeway Design Guide
City DOTs

Atlanta

Detroit

Minneapolis

Portland

Austin

Chicago

New York

San Francisco

Baltimore

Houston

Philadelphia

Seattle

Boston

Los Angeles

Phoenix

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Bikes Belong

SRAM Cycling Fund
Expanding the Design Toolbox

21 Treatments
5 Categories
One-Way Protected Cycle Tracks

Urban Bikeway Design Guide

- Bike Lanes
- Cycle Tracks
  - One-Way Protected Cycle Tracks
  - Raised Cycle Tracks
  - Two-Way Cycle Tracks
- Intersections
- Signals
- Signing & Marking
- City Projects
- Master Reference Matrix
Raised Cycle Tracks

A raised cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. Cycle tracks have different forms but all share common elements— they provide space that is intended to be exclusively or primarily used for bicycles and are separated from motor vehicle travel lanes, parking lanes, and sidewalks. In situations where on-street parking is allowed, cycle tracks are set well to the right or side of the parking (as opposed to bike lanes).

Cycle tracks may be one-way or two-way, and may be at street level, at sidewalk level, or at an intermediate level. If at sidewalk level, a curb or median separates them from motor traffic. While different pavement colors or textures separate the cycle track from the sidewalk. If at street level, they can be separated from motor traffic by raised medians, on-street parking, or bollards. By separating cyclists from motor traffic, cycle tracks can offer a higher level of security than bike lanes and are attractive to a wider spectrum of the public.

Raised cycle tracks are bicycle facilities that are vertically separated from motor vehicle traffic. Many are paired with a furnishing zone between the cycle track and motor vehicle travel lane and/or pedestrian area. A raised cycle track may allow for one-way or two-way travel by bicyclists. Two-way cycle tracks have some different operational characteristics that merit additional consideration.

Raised cycle tracks may be at the level of the adjacent sidewalk, or set at an intermediate level between the roadway and sidewalk to separate the cycle track from the pedestrian area. A raised cycle track may be combined with a parking lane or other barrier between the cycle track and the motor vehicle travel lane (refer to protected cycle tracks for additional guidance). At intersections, the raised cycle track can be dropped and merged onto the street (see cycle track transition approach), or it can be maintained at sidewalk level, where bicycle crashes with pedestrians, possibly with a dedicated bicycle signal.

When placed adjacent to a travel lane, one-way raised cycle tracks may be configured with a diagonally curving or otherwise curved travel lane for passing other objects in its access vehicle travel lanes. This configuration has also been known as "raised bike lanes."
Sections
A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane.

A cycle track is physically separated from motor traffic and distinct from the sidewalk. Cycle tracks have different forms but all share common elements—they provide space that is intended to be exclusively or primarily used for bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks. In situations where on-street parking is allowed, cycle tracks are located to the right of the parking (in contrast to bike lanes).

Cycle tracks may be one-way or two-way, and may be at street level, at sidewalk level, or at an intermediate level. If at sidewalk level, a curb or median separates them from motor traffic, while different pavement color/texture separates the cycle track from the sidewalk. If at street level, they can be separated from motor traffic by raised medians, on-street parking, or bollards. By separating cyclists from motor traffic, cycle tracks can offer a higher level of security than bike lanes and are attractive to a wider spectrum of the public.
One-Way Protected Cycle Tracks

This treatment covers one-way cycle tracks that are at street level and use a variety of methods for physical protection from passing traffic. See raised cycle track for information on alternative cycle track designs. Street level cycle tracks are also known as “on-street bike paths” in New York City.
Compared with bicycling on a reference street...these cycle tracks had a 28% lower injury rate."


- Reduces risk of 'dooring' compared to a bike lane and eliminates the risk of a doored bicyclist being run over by a motor vehicle.
- The construction of [raised] cycle tracks has resulted in a slight drop in the total number of accidents and injuries on the road sections between junctions of 10% and 4% respectively.
  - Prevents double-parking, unlike a bike lane.

- Streets for which conflicts at intersections can be effectively mitigated using parking lane setbacks, bicycle markings through the intersection, and other signalized intersection treatments.
- Along streets with high bicycle volumes.
- Along streets with high motor vehicle volumes and/or speeds.
- Special consideration should be given at transit stops to manage bicycle & pedestrian interactions.
A BIKE LANE sign (MUTCD R3-17) may be used to designate the portion of the street for preferential use by bicyclists. A supplemental “No Cars” selective exclusion sign may be added for further clarification.

The ONLY word marking (see MUTCD Figure 36-2) may be used ... to supplement a preferential lane word or symbol marking.

Sections

Treatment Adoption and Professional Consensus

- Commonly used in dozens of European bicycle friendly cities.
- Currently used in the following US cities:
  - Boulder, CO
  - Cambridge, MA
  - Missoula, MT
  - New York, NY
  - Portland, OR
  - San Francisco, CA
  - St. Petersburg, FL
  - Washington, DC
9th Avenue On-street Protected Bike Path

New York City

In the fall of 2007, the New York City Department of Transportation built the first on-street parking and signal protected bicycle facility in the United States on Ninth Avenue between 23rd Street and 10th Street in Manhattan. Ninth Avenue is a busy, grade separated, and relatively flat roadway.

A key consideration for the implementation of the bike path was ensuring that the project was implemented seamlessly with the surrounding streets and infrastructure. This included coordinating with the New York City Department of Transportation, the Department of Environmental Protection, and other local agencies to ensure that the bike path was integrated into the existing transportation network.

Additionally, the project was designed to accommodate a variety of users, including both cyclists and pedestrians. The design included dedicated bike lanes, wide sidewalks, and improved pedestrian safety features.

A key aspect of the project was the ongoing feedback and collaboration with stakeholders. The project team worked closely with residents, businesses, and other community members to ensure that the bike path met the needs of all users.

The bike path was well-received by the community, with many users reporting increased feelings of safety and accessibility. The project also served as a model for future bike path implementations in New York City and other urban areas.
Technical Guidance

A cycle track, like a bike lane, is a type of preferential lane as defined by the MUTCD.

See MUTCD advice on diagonal striping, Section 38.24.05.

Bicycle lane word, symbol, and/or arrow markings (MUTCD Figure 9C-3) shall be placed at the beginning of a cycle track and at periodic intervals along the facility based on engineering judgment.

When using a pavement marking buffer, the desired parking lane and buffer combined width is 11 feet to discourage motor vehicle encroachment into the cycle zone.

Three feet is the desired width for a parking buffer to allow for passenger loading and to prevent door collisions.

If pavement markings are used to separate motor vehicle parking lanes from the preferential bicycle lane, solid white lane line markings shall be used. Diagonal crosshatch markings may be placed in the neutral area for special emphasis. See MUTCD Section 39.24. Raised medians or other barriers can also provide physical separation to the cycle track.

The desired width for a cycle track should be 5 feet. In areas with high bicyclist volumes or uphill sections, the desired width should be 7 feet to allow for bicyclists passing each other.

Colored pavement may be used to further define the bicycle space.

A BIKE LANE sign (MUTCD R3-17) may be used to designate the portion of the street for preferential use by bicyclists. A supplemental “No Cars” selective exclusion sign may be added for further clarification.

A BIKE ONLY legend (MUTCD 3D.01) may be used to supplement the preferential lane word or symbol marking.

Sidewalk curbs and furnishings should be used to prevent pedestrian use of the cycle zone.

Gutter seams, drainage inlets, and utility covers should be configured so as not to impede bicycle travel and to facilitate run-off.

Cycle tracks may be shifted more closely to the travel lanes on minor intersection approaches to put bicyclists clearly in the field of view of motorists. (Not shown.)
A cycle track, like a bike lane, is a type of preferential lane as defined by the MUTCD.

See MUTCD advice on diagonal striping Section 3B.24 05

4 in Normal white line

8 in Wide white line

A BIKE ONLY legend (MUTCD 3D.01) may be used to supplement the preferential lane word or symbol marking.

If pavement markings are used to separate motor vehicle parking lanes from the preferential bicycle lane, solid white lane line markings shall be used. Diagonal crosshatch markings may be placed in the neutral area for special emphasis. See MUTCD Section 3B.24. Raised medians or other barriers can also provide physical separation to the cycle track.

Colored pavement may be used to further define the bicycle space.

With high bicycle volumes or uphill sections, the desired width should be 7 feet to allow for bicyclists passing each other.

BIKE LANE

Street for preferential use by bicyclists. A supplemental "No Cars" selective exclusion sign may be added for further clarification.

Pedestrian use of the cycle zone. Gutter seams, drainage inlets, and utility covers should be configured so as not to impede bicycle travel and to facilitate run-off.

Intersection approaches to put bicyclists clearly in the field of view of motorists. (Not shown).
A cycle track, like a bike lane, is a type of preferential lane as defined by the MUTCD.

Three feet is the desired width for a parking buffer to allow for passenger loading and to prevent door collisions.

If pavement markings are used to separate motor vehicle parking lanes from the Preferential bicycle lane, solid white lane line markings shall be used. Diagonal crosshatch markings may be placed in the neutral area for special emphasis. See MUTCD Section 3E.24. Raised medians or other barriers can also provide physical separation to the cycle track.

The desired width for a cycle track should be 5 feet. In areas with high bicyclist volumes or uphill sections, the desired width should be 7 feet to allow for bicyclists passing each other.

Colored pavement may be used to further define the bicycle space.

A BIKE LANE sign (MUTCD R3-17) may be used to designate the portion of the street for preferential use by bicyclists. A supplemental “No Cars” selective exclusion sign may be added for further clarification.

Sidewalk curbs and furnishings should be used to prevent pedestrian use of the cycle zone.

Gutter seams, drainage inlets, and utility covers should be configured so as not to impede bicycle travel and to facilitate run-off.

A BIKE LANE sign (MUTCD R3-17) may be used to designate the portion of the street for preferential use by bicyclists. A supplemental “No Cars” selective exclusion sign may be added for further clarification.

When using a pavement marking buffer, desired parking lane and buffer combined width is 11 feet to discourage motor vehicle encroachment into the cycle zone.

Bicycle lane word, symbol, and/or arrow markings (MUTCD Figure 9C-3) shall be placed at the beginning of a cycle track and at periodic intervals along the facility based on engineering judgment.

A BIKE ONLY legend (MUTCD 3D.01) may be used to supplement the Preferential lane word or symbol marking.

Cycle tracks may be shifted more closely to the travel lanes on minor intersection approaches to put bicyclists clearly in the field of view of motorists. (Not shown).
Colored pavement may be used to further define the bicycle space.

The desired width of a cycle track should be at least 5-7 feet. For uphill sections, the width should be 7 feet to accommodate multiple bicyclists passing.

Cycle Track
5-7 foot minimum

Bicycle lane word, symbol, and/or arrow markings (MUTCD Figure 9C-3) shall be placed at the beginning of a cycle track and at periodic intervals along the facility based on engineering judgment.

When using a pavement marking buffer, desired parking lane and buffer combined width is 11 feet to discourage motor vehicle encroachment into the cycle zone.

Cycle tracks may be shifted more closely to the travel lanes on minor intersection approaches to put bicyclists clearly in the field of view of motorists. (Not Shown).
Treatments
BIKE LANES
BIKE LANES

Conventional Bike Lanes

Buffered Bike Lanes

Contra-Flow Bike Lanes

Left-side Bike Lanes
CYCLE TRACKS
CYCLE TRACKS

One-Way Protected Cycle Tracks

Raised Cycle Tracks

Two-way Cycle Tracks
INTERSECTIONS
INTERSECTIONS

- Bike Boxes
- Two-Stage Turn Queue Boxes
- Through Bike Lanes
- Median Refuge Island
- Combined Bike Lane/Turn Lane
- Cycle Track Intersection Approach
- Intersection Crossing Markings
SIGNALS
Signals

Bicycle Signal Heads

Signal Detection and Actuation

Hybrid Signal for Bike Route Crossing of a Major Street

Active Warning Beacon for Bike Route at Unsignalized Intersection
Signing and Marking

Colored Bicycle Facilities

Shared Lane Markings

Bike Route Wayfinding Signage and Marking System
The Next Steps: Adoption and Implementation
NACTO Coverage
Bicycle Master Plan
Complete Streets
Cities and the Guide
Cities and the Guide
Bike Share
Safety in Numbers

Bicycle Ridership and Casualties, NYC

Daily Ridership

Annual Casualties
(Injuries and Fatalities)

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Safety in Numbers

Combined Bicycle Traffic over Four Main Portland Bicycle Bridges Juxtaposed with Bicycle Crashes

Cyclists per Day

Crashes and Indexed Crash Rate

- Bridge Bicycle Traffic
- Reported Bicycle Crashes*
- Indexed Bicycle Crash Rate (Trend Line)

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Bicycle Fatalities

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- 1992: 0
- 1993: 4
- 1994: 3
- 1995: 1
- 1996: 5
- 1997: 3
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- 2001: 4
- 2002: 0
- 2003: 6
- 2004: 0
- 2005: 4
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- 2007: 4
- 2008: 0
- 2009: 4
- 2010: 4
Future Editions and Publications
## Cities that have Endorsed the NACTO Guide

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