Guiding the Guide: Shaping the future of the Urban Bikeway Design Guide

Wednesday, May 17, 2023
9:30 AM - 10:45 PM
The Design Bible That Changed How Americans Bike in Cities

A movement has brought safer bicycle lanes to the United States. But it took a manual to spread them.

By Steven Higashide
By Cities for Cities

Crashes w/ Injuries
-48%
Bike Volume
+65%

Crashes w/ Injuries
-43%

Crashes w/ Injuries
-20%

Left turn signal phase with bike signal on 9th Avenue

8th Avenue at 19th Street
Growth in guidance and experience

Miles of protected bike lanes

Year

Urban Bikeway Design Guide
Urban Street Design Guide
Transit Street Design Guide
Designing for All Ages & Abilities
Join One Up at the Intersection
From permission slip to prescription
By cities

Consultants

Expert advisors

NACTO
For cities

Bikeway planners
Bikeway designers
Influences scope, organization, and content decisions

Reviewing engineer
Policy makers
City leadership
Influences framing, writing style, and layout
Outlining

The Why: Making the case
Bikeable cities are safe, healthy, sustainable, and equitable

The How: Planning & Project Development
- Planning a network
- Project development
- Facility selection and facility alignment

The What: Bikeway Design Guidance
- Facility types
- Intersection treatments
- Design details
- Maintenance & Operations
Activity
Half-page primer on engineering design guidance/standards decision-making process

- Reference FHWA design flexibility memo
- Flow chart of engineering design decision-making/cycle

"How to use the guide" section
- Shall / should / may - definitive/guidance or law to use NACo

Call-out box:
- Case study/example of great process/implementation of design specifics

Call-out box:
- Request for review per implementation process

Call-out box:
- Implementation guidance
Q1: What other guides do people use and why?

MUTCD
State
City
CROW (Netherlands)
FHWA - Separated Bike lane
AASHTO
OTHER COUNTRIES - BC, Canada (AT Design Guide)
Built Examples

WHAT'S MISSING?
Conflicts Operations Maint.
ADA/PLOUG
Rail
On-Off Road Transitions

Constraints
details
retrofit
streets
$ $$
MOST USEFUL IN A CASE STUDY

DATA

OUTREACH

$|

TAKEAWAYS

- CONTEXT (is it applicable to your design?)
- LOCAL POLICIES/PLACE (any unique conditions?)
- DATA: MORE THAN BEFORE/AFTER
  - ADJUSTMENT PERIOD
  - DEMOGRAPHICS
  - # LANES
  - DATA FROM MULTIPLE STAGES
    (not just before/after)
How can case studies be catalogued (in lieu of ad hoc) to be better shared amongst organizations?

CASE STUDY FRAMEWORK

WIKI / DEWEY DECIMAL SYSTEM "Organized by Topic"

1. Bike lanes
   2. Cycle tracks
   3. Intersection treatments

2. Bike signals
   1. Signing + Marking
   3. Bike lanes

3. Bike tracks
   Designing for all ages
1. How does your city communicate the most effective use of curb space?
   - More frequent and better communication during the process
   - Offer alternatives
     - Markings, signs,

2. In equity areas, where parking is in high demand, how do we provide better connectivity for people biking?
   - Off-site mitigations
   - More sustainable transportation options
   - Permit options \(\Rightarrow\) Need-based parking
   - Traffic calming options for shared roadways
63. What is the most persuasive argument for expanding bike networks?

How do you change your community culture to see biking as a mode of transportation?

Safe Design
DEMONSTRATE
EDUCATION

Wayfinding
Traffic Calming
Stakeholder Collaboration
Volume Management
Q3

How does your city communicate

The most effective use of curb space?

- PSA’s & Websites
- Talk w/ Stakeholders
- Yard Sales, Sandwich Boards, Flyers
- Markings + Signage
- Material Change
  - Brick, Concrete, Asphalt
- Vertical Plane Change
  - Mid-Street Marking

In equity areas, where parking is in high demand, how do we provide better connectivity for cyclists?

- Do not happen
- Offer shuttles, circulators
- Share facilities or sidewalks
- More transit!
- Suicide, sustainable, transit
- dedicate
  - 2% of roadway capacity
  - Demand Based

Derail Program — Need Bumped
How can I get help from works?

Traffic Chinig
How contextualization reflects into an equitable implementation?

 "You to be defined"
 Monitor - all implementation should be about the how - not necessarily the intent.

 Of course context matters, instead of urban vs. suburban refraime as a spatial continuum.

 #4

 Do you use the NACTO AAA Guide?  

 No 43%  Yes 57%.

 Do you have your own contextual guidance?  

 No 60%  Yes 40%.

 What contexts are missing from the NACTO AAA guide?  

 - Existing vs. Potential/Future Volumes
 - Suburban
 - Narrow Streets
 - Flexibility with Volumes/Speed
 - More Detail
 - Intersections
 - Less detail
 - Rural
 - Complex Intersections
 - High Parking Demand
 - Other Streets
Assume AAA isn't possible... Tues. #5

Tell a story based on data and engineering judgement, grounded in safety, local context, and connectivity.

Factors include:
- Crashes
- Speed
- AADT
- Land use
- Parking utilization
- ROW availability
- Parallel routes

Work w/ leaders and key stakeholders to prioritize weights on these factors.
URBAN BIKEWAY DESIGN GUIDE

- Urban arterials (4 lanes)
- Bike boulevards
- Protected intersections (queue与此同时, shielded lane, buffered bike lane)

Existing Models

NEEDS MORE FOCUS

NETHERLANDS
- Grade-separating
- Super high quality
- Ped/bike separation

SUBURBAN, HIGHSPEED, HYPERSPEED, URBANIZATIONS
- Access management
- Material selection
- Trade-offs of design/safety
Q6. How Does Built Environment Matter When Illustrating Bikeway Concepts?

- Suburban Typologies
- Row Encroachments & Parking Diversity
- Building Setbacks / Land Use & Bikeway Selection
- Overall Network Connectivity
  - CROW (Netherlands Bike Guide)
- Costs of Moving Curb When Considering Selection
- How to Build a Bikeway Over Time, An Evolving Streetscape
- Turn Management
  - Left Turns @ 2-way Cycle Tracks
- Need to See More Communities Reflected.
How do people use the current edition of NACTO?

How are you using the guide?

- Design (67%)
- Guidance (32%)
- Planning (10%)
- Understanding (57%)
- Recipes (57%)

Which medium do you prefer?

- Website (34%)
- PDF (88%)
- Physical Book (88%)

How do you navigate the guide?

- By section (30%)
- Search feature (50%)
- Table of contents (59%)

Which topics do you most use?

- Highest
  - Prescriptive Design Guidance (30, dimensions)
  - Innovative Design
  - Centre applications
  - Case Studies
  - New Metrics to replace Vehicle LOS

- Lowest
  -
8. Which factor do you consider most important when considering raising a bike way:
   A. Roadway speed - 40%
   B. Adjacent land use - 36%
   C. Traffic Volume - 16%
   D. Community Input - 8%
   E. Funding/Maint - 8%
#8 - Why raise a bikeway?

Factors to consider -
- Volume of bike traffic
- Available ROW
- Traffic speed
- Presence of transit
- Planned bike network
- Schools
- Volume of peds
- Nearby destinations
- Drainage
- Driveways & transitions
9. How do you separate sidewalk level bikeways from sidewalk space?

- Minimum N/W:
  - 2-3"
**Question #9**

**What design considerations are present when constructing a sidewalk level bikeway?**

**Design:**
- Drainage
- Maintenance Programming (Flow & Sweep)
- Curb Cut Regulation
- Look for Complimentary Land Uses
- Address Parking Issues on Bikeway
- Intersection Treatments
- Active & Passive Detection of Ped & Bikes
- Accessibility (Detectable)

**Collect Data**

Volumes of Ped & Bikes
#10  Advisory Bike Lanes

Under which circumstances:

- Traffic volume: very low, low or very low
- Speeds: low or very low
- Bike lane width: Standard
- Traffic lane width: One standard lane
- Cross section width: 22 ft
Advisory Bike Lane

Educate
- TV/Social Media
- Door to Door Educ.
- Intuitive Design

Design
- Couple with traffic calming elements

Implement
- Neighborhood Bikeways
- Signage
IDEAL SEPARATED BIKEWAY

Adjacent Lane Width: 10’ – 11’

Buffer: 4’ + w/o Separators
3’ with Vertical Separators

Bike Lane Width: 5’-7’ → 6’
What is the ideal separated bikeway on a busy road?

- Street-level protected bikeway on a 30 mph (50 km/h)
  Collector without parking

![Diagram of ideal separated bikeway](image)

- Unprotected:

![Diagram of unprotected bikeway](image)

- Protected:

![Diagram of protected bikeway](image)
Question 12

1. If you could only use green pavement markings in limited areas, which locations would you prioritize?

   - Intersections
   - Mixed Zones/Merge Areas
   - Entrance to Bike Facility
   - Driveways

2. What type of materials does your jurisdiction use for green pavement markings?

   **Asphalt Roads**
   - Green MMA - 10
   - Water-based paint - 1
   - Thermoplastic - 14
   - Durable paint - 2

   **Concrete Roads**
   - Green MMA - 4
   - Integral color - 2
   (Green paint mixed into the concrete)
1. Where should green markings be used?
   A. Full width/length
   B. All intersections
   C. High Traffic Intersections
   D. Bike Boxes
   E. Driveways
   F. Multiuse Trail Crossings
How do you decide which pavement materials to use?

1. A. Cost (capital)
2. B. Durability
3. C. Cost Operating
4. D. Climate
5. E. Visibility

Additional comments:

- E. Street Context
Q13. MAINTENANCE

There is a clear need for guidance & best practices.

Strategies:
- Wider bike lanes when possible.
- Consider raised lanes if city has sidewalk maintenance program.
- Consider all budget resources needed (equipment, labor, materials, storage).
- Consider operational deployment options (zones/districts/priority routes, etc.).
- Develop performance metrics (e.g., revenue times, quality, etc.) also public expectations & shareholder criteria.
13A. As your bikeway network expands, how do you also create a maintenance budget?

A: Advocate policy changes that increase/evaluate operations budgets.

13B. How do you build capacity to maintain new/innovative materials associated w/bikeway design elements?

A: Partnerships & incentives (public & private)
Question 14:
When to build a 2-way bikeway or not?

Two-way Pros

1. Row constraints allow to use space more efficiently.
2. When not congested, a 2-way feels larger, safer, and accommodates larger design bikes.
3. Has maintenance benefits (can fit trucks), damage & sun exposure may help, or crows are.
4. Avoids conflicts that are focused on one side of the corridor.
5. Can provide more comfortable access to destinations on one side of street.
6. On one way street it can benefit two-way bike travel with no one way travel.

Two-way Cons

1. Most cities assume that a one-way bikeway facility is the standard.
2. Drivers don’t expect to have to have both ways for bikes.
3. May require signal upgrades to allow intersection operations.
4. Complexities on corridors (mixing facility types).
5. Additional way finding may be needed.
2-WAY BIKEWAYS

Factors influencing suitability

Green = positive for 2-way Brown = negative for 2-way

One-way street
Connectivity at ends
High # of driveways
Turning conflicts
Cross-section width
Short block lengths
Total length of facility
Land use/Desire paths
Signal modifications
Designing wider at ends
Maintenance ease
ROW limitations
<table>
<thead>
<tr>
<th>Presidential</th>
<th>Non-Pres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes, almost always</td>
</tr>
<tr>
<td>Can the community handle reduction in parking supply?</td>
<td>No analysis needed up to 30% reduction. Analysis needed beyond this.</td>
</tr>
<tr>
<td>ADA &amp; Loading always need to be considered.</td>
<td>&quot; &quot;</td>
</tr>
<tr>
<td>Can bike parking be a replacement?</td>
<td>Yes</td>
</tr>
<tr>
<td>Who are the residents?</td>
<td>Need loading/ADA nearby.</td>
</tr>
<tr>
<td>senior ADA</td>
<td>&quot; &quot;</td>
</tr>
</tbody>
</table>
QUESTION #15

HOW MUCH IS TOO MUCH?
REMOVING PARKING ALONG A PARKING PROTECTED BIKEWAY?

-GUIDANCE FOR PARKING REMOVAL IS CONTEXT.

-TYPICAL RESTRICTIONS ARE IN A RANGE OF 10 - 15 FT, HOWEVER SIGHT VISIBILITY SHOULD DICTATE.

APPROACH SIDE IS MORE IMPORTANT
Question 15: How much is too much—removing parking along a parking protected bikeway?

Important Design Criteria

**Width of Road**
1) Vertical elements to buffer parking
2) Road Diet
3) Width for Sweeping
4) Door zone Buffer

**Length of Facility**
1) Sight zone Lengths
2) # of access conflicts
3) Turn radii for conflicts + Preserving ADA parking

Connectedness & Access