# Prioritizing Bicyclist Safety and Mobility: Which Guidance Do I Use?

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## Project Objective

The objective of this project was to provide guidance to practitioners and researchers regarding agency usage of various guidance documents for bicycle infrastructure design through a synthesis of information from a literature review and a survey distributed to all US state Departments of Transportation Pedestrian/Bicycle coordinators (including the District of Columbia) and the top 25 most populous cities in the United States.

## Problem Statement

Current design standards and guidance documents for bicycle-focused infrastructure have taken on a rekindled importance as operators attempt to improve rider comfort and safety through both geometric (cycle tracks, bike boxes, mixing zones, and protected intersections, to mention a few) and signal timing (bicycle signal) treatments. However, the availability of information from such varied resources can cause challenges for practitioners. With so much available, which guidance is the most desirable? Which of these manuals has the most up-to-date information? Which ideas/treatment/guidance has been vetted by research, as opposed to other guidance which might be experiential in nature? Are there liability impacts of using suggestions and design guidelines in these various references? This project aims to answers these questions through the below methodology.

## Research Methodology

This study used a multi-staged approach to investigate the use of bicycle infrastructure design guides. First, a literature review synthesized available literature and published guides on bicycle infrastructure design. Second, a survey was conducted to gather information from practitioners about their use of bicycle infrastructure design guides. The survey was sent to Pedestrian/Bicycle coordinators or similar positions in all 50 states, including the District of Columbia, as well as the top 25 most populous cities in the United States (44 completed surveys were ultimately suitable for analysis). The data collected from the literature review and survey were analyzed to identify trends, relationships, and gaps in the knowledge about bicycle infrastructure design guidance. The study results were then synthesized to provide guidance on usage trends of the various design guides and which ones may be better suited to specific operational situations or used by a certain type of agency.

## Results

As shown below in Figure 1, the most widely utilized document by these survey respondents was the Manual on Uniform Traffic Control Devices (MUTCD) followed by the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities (GDBF). It was observed that cities tended to use the National Association of City Transportation Officials (NACTO) guidance more than states. Figure 2 shows the relative frequency of use for a guidance document over specific scenarios, again with the MUTCD typically being used more often, followed by supplemental state or municipality documents, and then the GDBF (by states) and the Urban Bikeway Design Guide by NACTO (by cities), then the Separated Bike Lane Planning and Design Guide by the

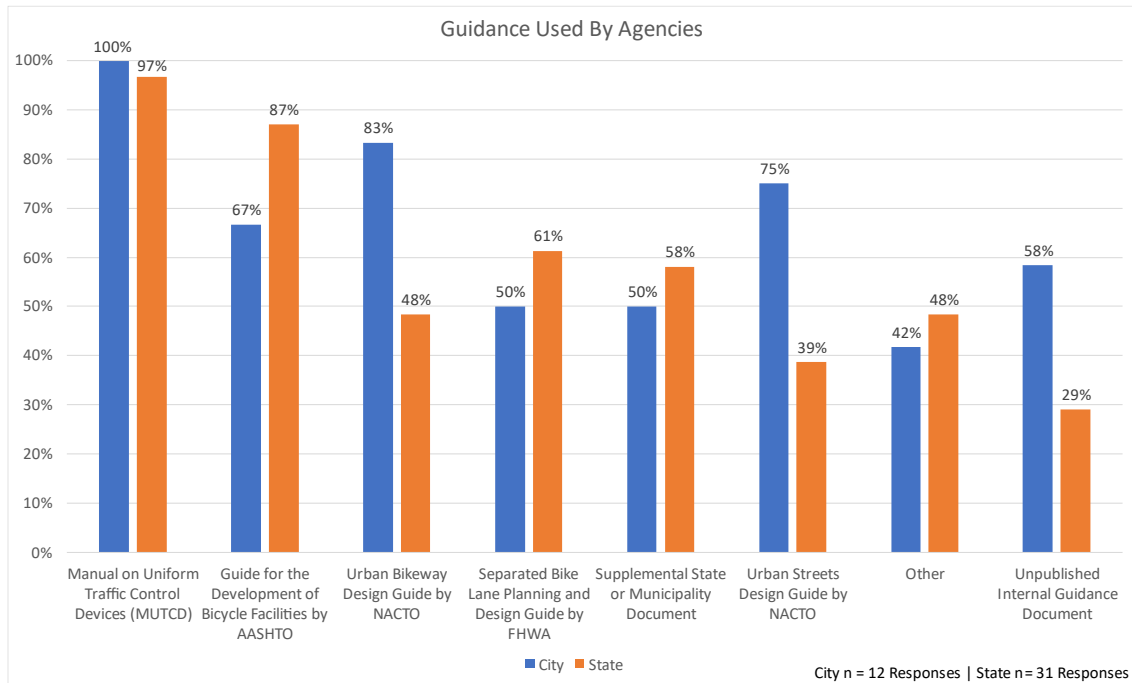Federal Highway Administration (FHWA), with the remaining documents likely used only in certain scenarios.



**Figure 1: Guidance document usage by agencies**

| Scenario | Agency Type | Manual on Uniform Traffic Control Devices (MUTCD) | Urban Bikeway Design Guide by NACTO | Guide for the Development of Bicycle Facilities Guide by AASHTO | Separated Bike Lane Planning and Design Guide by FHWA | Urban Streets Design Guide by NACTO | Supplemental State or Municipality Document |
|---|---|---|---|---|---|---|---|
| **On-Street Bike Lane Design** | City | 7.4 | 5.8 | 4.9 | 3.5 | 3.8 | 6.9 |
| | State | 8.3 | 3.5 | 7.1 | 3.5 | 2.6 | 6.9 |
| **Separated Bike Lane Design** | City | 6.2 | 6.0 | 4.2 | 4.7 | 4.5 | 6.5 |
| | State | 6.4 | 3.9 | 5.5 | 4.7 | 2.7 | 5.9 |
| **Shared-Use Pathway Design** | City | 5.8 | 4.4 | 4.4 | 2.8 | 2.7 | 5.3 |
| | State | 6.5 | 2.6 | 7.2 | 2.8 | 2.3 | 5.5 |
| **Separation of User Conflicts at Intersections** | City | 7.2 | 6.2 | 4.3 | 4.5 | 3.8 | 5.9 |
| | State | 6.5 | 3.2 | 5.4 | 2.9 | 2.7 | 5.1 |
| **Bicycle Signal Design and Operation** | City | 7.2 | 4.6 | 2.9 | 3.5 | 2.8 | 5.7 |
| | State | 6.2 | 2.9 | 3.2 | 3.3 | 2.6 | 4.0 |
| **Shared Bicycle/Motor Vehicle Lane Design** | City | 5.7 | 5.0 | 3.6 | 2.3 | 3.0 | 5.5 |
| | State | 7.8 | 2.9 | 6.0 | 2.8 | 2.7 | 5.2 |

Note: 0 = Agency does not use; 1 = rarely used; 10 = always used

Legend: 0.0 = not used — used more often = 10.0

**Figure 2: Results for agency usage of different guidance documents related to design scenarios**

## Conclusions

Two federally published guidance documents (the MUTCD and GDBF) were the most frequently utilized by survey respondents and were noted to be held as the standard for bicyclist infrastructure planning and design by some, however they are sparsely updated and tend not to align with some contemporary community expectations. Multiple respondents did note that the GDBR is receiving an update soon which will include considerations from modern guidance and allow for greater flexibility in planning design. Additionally, states tended to rely on the MUTCD and GDBF while cities utilized a larger variety of guidance documents such as those published by NACTO. It was also found that state agencies may not engage in the planning or design of bicycle infrastructure and instead turn to outside contractors for these considerations.