EDUCATION

Aashto Guide For The Development Of Bicycle Facilities

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Introduction: The Foundation of Modern Bicycle Infrastructure

Across the United States, communities of all sizes are reimagining their streets to accommodate a growing number of people on bicycles. Whether for commuting, recreation, or exercise, the demand for safe, connected, and comfortable bike facilities has never been higher. At the heart of this transformation lies a crucial document: the **AASHTO Guide for the Development of Bicycle Facilities**. Published by the American Association of State Highway and Transportation Officials, this guide serves as the definitive national reference for designing bicycle infrastructure that balances safety, efficiency, and user experience. For engineers, planners, advocates, and policymakers, understanding this guide is essential to creating networks that truly work for everyone.

The AASHTO bicycle guide is not merely a technical manual; it reflects decades of evolving best practices in bicycle facility design. Its recommendations shape how billions of dollars in transportation funding are spent, influencing the shape of streets from rural two-lane roads to dense urban corridors. In this article, we explore the guide's origins, its core principles, the types of facilities it covers, recent updates, and how it continues to adapt to the changing landscape of active transportation. By the end, you will have a thorough understanding of why the AASHTO Guide for the Development of Bicycle Facilities remains an indispensable tool for anyone involved in planning or designing bike-friendly communities.

History and Purpose of the AASHTO Bicycle Guide

The first edition of the AASHTO Guide for the Development of Bicycle Facilities was published in 1981, at a time when bicycle infrastructure was rare and largely experimental. The guide emerged from a growing recognition that bicycles are legitimate vehicles deserving of dedicated design standards. Over the following decades, it underwent several major revisions—in 1991, 1999, 2012, and most recently in 2020 (the sixth edition). Each update reflected new research, changing user demographics, and lessons learned from real-world implementations.

The primary purpose of the guide is to provide uniform, evidence-based recommendations for the planning and design of bicycle facilities. It aims to help state and local agencies create infrastructure that is safe, comfortable, and accessible to a wide range of users—from experienced cyclists to children and older adults. Importantly, the guide emphasizes that bicycle facilities should be integrated into the broader transportation network, not treated as afterthoughts. By following the AASHTO bicycle guide, jurisdictions can reduce conflicts between bicycles and motor vehicles, improve wayfinding, and increase the overall attractiveness of cycling as a transportation mode.

Core Principles of Bicycle Facility Design

The AASHTO Guide for the Development of Bicycle Facilities is built upon several foundational principles that inform every recommendation. Understanding these principles helps planners and engineers apply the guide flexibly to unique local conditions.

User Typology and Level of Traffic Stress

One of the most important concepts in the guide is that bicycle facilities should serve a diverse range of users. The guide categorizes cyclists into three groups: **advanced or experienced riders** who are comfortable riding in mixed traffic; **basic riders** who prefer separated facilities but can handle some low-stress streets; and **children** who need the highest level of separation. This user typology directly informs design decisions: for example, a bike lane on a high-speed arterial may serve experienced cyclists well, but a protected bike lane or shared-use path is more appropriate for basic riders and children. The guide also references the concept of **level of traffic stress**(LTS), a framework that measures how comfortable a facility feels based on traffic speed, volume, and lane configuration. Designs that achieve LTS 1 or 2 are desirable for creating inclusive networks.

Design Speed and Operating Speed

The guide stresses that designers must consider not only posted speed limits but also the actual operating speed of motor vehicles. Higher speeds dramatically increase the risk of severe injury in a crash and reduce the comfort of cyclists. Therefore, the AASHTO bicycle guide recommends that when motor vehicle speeds exceed 25 mph, some form of physical separation (e.g., a curb or buffer) is strongly advised. Similarly, bicycle facility design speed (typically 15-20 mph) influences geometric elements such as curve radius and sight distance. By aligning design speeds with real-world conditions, planners can create facilities that feel safe and intuitive.

Connectivity and Network Thinking

Isolated bike lanes or paths have limited value. The AASHTO guide emphasizes that bicycle facilities must form a coherent network that connects origins and destinations—homes, schools, workplaces, shopping centers, and transit stops. This network approach requires careful consideration of intersection treatments, wayfinding signage, and transitions between different facility types. A well-designed network reduces the likelihood of cyclists being forced onto high-stress routes and encourages trip-making by bicycle. The guide provides guidance on identifying gaps and prioritizing projects to close them.

Types of Bicycle Facilities Covered in the Guide

The AASHTO Guide for the Development of Bicycle Facilities offers detailed design standards for a wide array of infrastructure types. Below we examine the most common ones.

Bike Lanes

Bike lanes are designated portions of the roadway striped and signed for the exclusive use of bicycles. The guide specifies minimum widths (typically 5 feet, but 6 or 7 feet recommended when adjacent to parking or high traffic), marking patterns (solid white line with bicycle symbol), and buffer zones. Buffered bike lanes (with an additional striped area between the bike lane and motor vehicle lane) are recommended for higher-speed or higher-volume streets. The 2020 edition expanded guidance on **protected bike lanes**(also called cycle tracks), which use physical barriers such as bollards, curbs, or parked cars to separate cyclists from traffic. Protected bike lanes are increasingly recognized as the gold standard for attracting “interested but concerned” potential riders.

Shared-Use Paths

Also referred to as multi-use paths or recreational trails, shared-use paths accommodate bicycles, pedestrians, and other non-motorized users (skateboarders, joggers, etc.). The AASHTO guide provides extensive guidance on width (10-14 feet is typical, with wider paths recommended where user volumes are high or where there is a significant speed differential), horizontal and vertical alignment, sight distances, and intersection crossings.

Because shared paths often run along waterways, rail corridors, or through parks, they must also meet accessibility standards under the Americans with Disabilities Act (ADA). The guide emphasizes that careful attention must be paid to path termini—how users enter and exit the path safely onto the street network.

Bike Boulevards and Neighborhood Greenways

Bike boulevards are low-speed, low-volume streets that have been optimized for bicycle travel through traffic calming measures, wayfinding signs, and intersection treatments (such as traffic circles or priority crossings). The AASHTO guide covers design elements like speed humps, chicanes, and curb extensions that discourage cut-through motor vehicle traffic while maintaining comfortable bicycle flow. Bike boulevards are an efficient way to create safe routes for cyclists without the cost of dedicated separated facilities, especially in residential areas.

Intersection Treatments

Intersections are the most challenging points in any bicycle network. The AASHTO guide dedicates significant space to intersection design, including bike boxes (advanced stop lines for cyclists), two-stage turn queue boxes, hybrid signal phasing (such as a bicycle-specific signal head), and roundabout geometry that accommodates bicycles. The guide also covers crossing treatments for shared-use paths, such as pedestrian hybrid beacons (HAWK signals) and median refuges. Proper intersection design is critical because the majority of bicycle-motor vehicle crashes occur at or near intersections.

Recent Updates in the 6th Edition (2020)

The 2020 edition of the AASHTO Guide for the Development of Bicycle Facilities introduced several important evolutions that reflect contemporary thinking in transportation engineering and policy.

- Expanded guidance on protected bike lanes: Recognizing the rapid adoption of cycle tracks in cities like New York, Portland, and Chicago, the 6th edition offers more detailed guidance on barrier types, widths, and intersection integration.
- Focus on equity and community engagement: The guide now includes recommendations for engaging underserved communities early in the planning process to ensure that new facilities serve those who need them most, rather than merely reinforcing existing disparities.
- Data-driven design: The guide encourages the use of count data, crash data, and user surveys to tailor designs to local conditions. It also references tools like the Bicycle Level of Service (BLOS) model to evaluate existing conditions.
- Micromobility considerations: With the rise of e-bikes, scooters, and other small electric vehicles, the 2020 edition acknowledges that shared-use paths and bike lanes may need to accommodate a wider range of speeds and vehicle types. Guidance on width and user separation has been updated accordingly.
- Low-stress network planning: The concept of low-stress connectivity is now more prominent, with the guide providing methods for identifying low-stress routes and prioritizing projects that address gaps in the network for basic riders.

Implementing the Guide: Challenges and Best Practices

While the AASHTO Guide for the Development of Bicycle Facilities offers a robust framework, its implementation often faces hurdles. One common challenge is retrofitting existing streets where right-of-way is constrained. In such cases, creative solutions like road diets (reducing the number of motor vehicle lanes) or parking removal may be necessary. The guide provides guidance on trade-offs, but local political will and public support are essential.

Another challenge is consistency across jurisdictions. When neighboring cities or counties adopt different design standards (or none at all), cyclists experience frustrating transitions that can undermine the network. The AASHTO guide helps establish a baseline, but local agencies should adopt formal policies that align with

the guide to ensure uniformity. Training and professional development for engineers and planners are also critical, as the guide's recommendations are frequently updated and require ongoing study.

Finally, funding remains a persistent barrier. Many bicycle facilities are funded through federal and state programs (e.g., Transportation Alternatives Set-Aside, Congestion Mitigation and Air Quality Improvement Program), but competition for those dollars is fierce. The AASHTO guide can be a powerful tool in grant applications: projects that follow nationally recognized standards are more likely to be perceived as credible and worthy of investment. By demonstrating adherence to the AASHTO bicycle guide, agencies can strengthen their case for funding.

Conclusion: The Evolving Role of the AASHTO Bicycle Guide

The AASHTO Guide for the Development of Bicycle Facilities is far more than a shelf document for engineers. It is a living, evolving resource that reflects our growing understanding of how to create safe, inclusive, and enjoyable environments for people on bikes. From its early days as a simple set of standards to its current comprehensive treatment of equity, data, and micromobility, the guide continues to push the boundaries of what is possible in bicycle infrastructure design.

For planners and advocates, staying current with the AASHTO bicycle guide is essential for making informed decisions that prioritize safety and connectivity. For communities looking to become bicycle-friendly, the guide provides a clear path forward—one that balances best practices with local context. As transportation systems evolve toward sustainability and active mobility, the AASHTO guide will undoubtedly continue to serve as the cornerstone of bicycle facility development for decades to come. Embracing its principles means embracing a future where everyone, regardless of age or skill level, can ride a bicycle with comfort and confidence.

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