Active Transportation Indiana
A Community Guide to Pedestrian and Bicycle Design
This guide was prepared on behalf of Bicycle Indiana with the help of much volunteer assistance and input. We would like to thank the many people who were very generous with their time assisting with this project including the following:

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- Laurence Brown, Director, Columbus Area Metropolitan Planning Organization (CAMPO)
- Mitch Barloga, Transportation Planning Manager, Northwestern Indiana Regional Plan Commission
- Sallie Dell Fahey, Executive Director, The Area Plan Commission of Tippecanoe County

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Thank you,
Nancy Tibbett
Executive Director
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The Basics
**INTRODUCTION**

Bicycle Indiana intends this guide to assist community members who would like to get involved in conversations about the design of walking and bicycling infrastructure. The tips and suggestions from this guide are to assist community members in understanding the process and to offer the knowledge necessary to confidently express their opinions. **Strong and successful communities** require far-sighted officials and innovative designers, but perhaps nearly as important, a community needs strong champions to flourish. With information in hand, community members can add valuable input based on their experience bicycling and walking in the area. Bicycle Indiana hopes that the insight included in this guide will encourage community members to **play an active role** in shaping the transportation infrastructure in their community.

**Walking & Bicycling in Indiana**

Indiana is a great place to walk and ride a bicycle. Towns and cities across the state have been supporting safer walking and bicycling facilities and finding that local communities and businesses are being reenergized by the improved on-street activity. Outside of urban areas, many recreational riders appreciate the great scenic rides provided by the long, straight roads in the North and the hilly, back roads of the South. Already eight communities statewide have been recognized with national bicycle friendly and walk friendly community awards for the work they have been doing. Visionary community leaders are recognizing the real-time and long-term impact that a culture of walking and bicycling can create in making Indiana an even better place to live.

**How to play a role?**

How we plan and build the streets, trails and highways in our communities has a **direct effect on the daily life** of Indiana residents. Many streets have been principally designed to move as many vehicles as quickly as possible to their destinations. In recent years, **safety concerns and the increasing demand** for walking and bicycling have prompted officials to consider all users when designing a roadway. Community members can continue to facilitate this transition by attending public meetings, voicing their demand for active transportation infrastructure, and following projects through to construction.

**Why get involved in transportation projects?**

A new public project is an important opportunity to add walking and bicycling infrastructure as well as improve local...
access and safety. The old adage of doing it right the first time couldn’t be more true for transportation infrastructure, as reconstruction or retrofitting is often more costly than adding to the original design and the process can take as long as several decades due to other priorities in the community. Participating in the public input process allows the community to voice their wants and concerns at a point where they are most likely to be addressed, resulting in tangible, timely progress.

Actively participating in the planning and design of new facilities ensures that they best reflect the current and future needs of the community and provide the best value, safety and utility for the tax dollars spent.

GUIDING PRINCIPLES
The following principles about walking and biking underlie discussions throughout this guide:

• Pedestrians and bicyclists are legitimate users of the roadway and an integral part of our transportation system.
• Pedestrians encompass community members of all ages and abilities, including those with mobility and vision impairments.
• Bicycling refers to a range of uses including: commuter bicycling, quick trips, recreational uses, exercise, and children riding bikes to and from school.
• Bicyclists have a range of ages, abilities and comfort levels.
• The safety and access needs of pedestrians and bicyclists should be considered from planning through construction and maintenance.
• Pedestrians and bicyclists have the same destination, convenience and access needs as other users of the travel network.
• Designers have the flexibility to work within the existing roadway space to address different needs, purposes and overall safety.

WHAT IS THE BEST TYPE OF DESIGN?
There is no one-size-fits-all type of design that fits rural, suburban, urban and small town communities. What to build depends on the local land use and flexibility depending on the community needs and context. All designs have advantages and
disadvantages, and community members have different preferences depending on their age, ability and comfort level. At a minimum, the design of every roadway needs to consider the needs of every transportation mode. Accommodating vehicles, pedestrians, and bicycles allows communities to create a transportation network that encourages alternative transportation options and its many benefits.

**Making Space for Walking and Bicycling**

Many walking trips are made for work, education, and shopping. Regardless of our primary means of getting around, we are all pedestrians at least once during a trip - walking to catch a bus to school, walking from work to the car in the parking lot, or walking to the store after parking a bicycle.

Like other users of the transportation network, bicyclists need a combination of travel options to reach their destination. They may travel on-road with motorized vehicles or be more comfortable in a dedicated separated space, depending on local conditions.

Designers take into consideration the space needed to maximize the safety and comfort of pedestrians and bicyclists in different scenarios. They also consider the unique needs related to walking, passing people or wheelchairs, as well as powering a bicycle and staying balanced.

**Safety and Comfort Considerations**

Having an understanding of walking and bicycling considerations is a critical component to discussing the design of a facility. Most importantly, pedestrians and bicyclists are vulnerable users of the roadway and lack the physical protection that is provided by a vehicle. Pedestrians and bicyclists make many trip decisions based on both real and perceived safety and comfort factors. The following table outlines some of the range of factors that impact walking and bicycling trips.
<table>
<thead>
<tr>
<th><strong>Factors</strong></th>
<th><strong>Bicyclists</strong></th>
<th><strong>Pedestrians</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Speed</strong></td>
<td>• Vehicle &amp; downhill speed</td>
<td>• Vehicle speed</td>
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<tr>
<td></td>
<td>• Stopping distances for bicyclists and vehicles</td>
<td>• Driver impatience of slower speed pedestrians</td>
</tr>
<tr>
<td></td>
<td>• Minimum speed required to remain stable</td>
<td>• Judging approach distance of vehicles</td>
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<tr>
<td></td>
<td>• Driver impatience of slower speed bicyclians</td>
<td></td>
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<tr>
<td><strong>Infrastructure &amp; Facilities</strong></td>
<td>• Gaps and pinch points in routes</td>
<td>• Quality of sidewalks, paths and trails</td>
</tr>
<tr>
<td></td>
<td>• Inadequate on-road facilities can lead to excessive exposure to vehicles</td>
<td>• Separation from vehicles</td>
</tr>
<tr>
<td></td>
<td>• Quality of bikeways</td>
<td>• Connected facilities &amp; minimizing gaps</td>
</tr>
<tr>
<td></td>
<td>• Taxis, delivery trucks, etc.</td>
<td>• Out-of-way routes can lead to shortcuts</td>
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<tr>
<td></td>
<td>• Preferred routes combine directness and comfort</td>
<td>• Taxis, delivery trucks, etc.</td>
</tr>
<tr>
<td></td>
<td>• Facilities that end abruptly</td>
<td>• Different needs for elderly and disabled</td>
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<tr>
<td></td>
<td></td>
<td>• Obstructions in sidewalk</td>
</tr>
<tr>
<td><strong>Crossings &amp; Conflict Points</strong></td>
<td>• Sight lines at intersections and driveways</td>
<td>• Sight lines at intersections and driveways</td>
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<tr>
<td></td>
<td>• Width of intersections increases exposure</td>
<td>• Visibility of crossing pedestrians &amp; traffic</td>
</tr>
<tr>
<td></td>
<td>• Countdown signal timers &amp; ability to clear intersection</td>
<td>• Ability to cross in time due to roadway width</td>
</tr>
<tr>
<td></td>
<td>• Turning vehicles</td>
<td>• Presence of signal timers</td>
</tr>
<tr>
<td><strong>Signs &amp; Pavement Markings</strong></td>
<td>• May be inadequate or incomplete</td>
<td>• May be inadequate or incomplete</td>
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<td></td>
<td>• May not serve travel in both directions</td>
<td>• May not serve travel in both directions</td>
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<tr>
<td></td>
<td>• Adequate warning/detour information during construction</td>
<td>• Adequate warning/detour information during construction</td>
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## The Basics

### Indiana Pedestrian and Bicycle Guide

<table>
<thead>
<tr>
<th><strong>Factors</strong></th>
<th><strong>Bicyclists</strong></th>
<th><strong>Pedestrians</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surface Quality</strong></td>
<td>• Traction and stability in wet conditions</td>
<td>• Traction and stability in wet conditions</td>
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<td></td>
<td>• Drainage of roadway</td>
<td>• Tripping hazards</td>
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<tr>
<td><strong>Traffic</strong></td>
<td>• Volume and speed</td>
<td>• Volume and speed</td>
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<tr>
<td></td>
<td>• Adjacent passing distance</td>
<td>• Closeness and proximity</td>
</tr>
<tr>
<td><strong>Visibility/Poor Lighting</strong></td>
<td>• Well-lit intersections, crossings and ramps</td>
<td>• Pedestrians are difficult to see at night</td>
</tr>
<tr>
<td></td>
<td>• Bike lights, ability to be seen by motorists</td>
<td>• Well-lit crossings and ramps</td>
</tr>
<tr>
<td></td>
<td>• Lit bikeways</td>
<td>• Well-lit sidewalks and trails</td>
</tr>
<tr>
<td><strong>Behaviors</strong></td>
<td>• Bicyclist distractions</td>
<td>• Pedestrian distractions</td>
</tr>
<tr>
<td></td>
<td>• Risky behavior (e.g. running lights)</td>
<td>• Risky behavior (e.g. crossing against lights)</td>
</tr>
<tr>
<td><strong>Routine Maintenance</strong></td>
<td>• Surface deterioration and debris accumulation</td>
<td>• Surface deterioration and debris accumulation</td>
</tr>
<tr>
<td></td>
<td>• Leaves and glass</td>
<td>• Facility visibility due to wear &amp; fading</td>
</tr>
<tr>
<td><strong>Seasonal Factors</strong></td>
<td>• Snow, ice, &amp; wet leaves</td>
<td>• Snow, ice, &amp; wet leaves</td>
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<td></td>
<td>• Rain &amp; wind gusts</td>
<td>• Rain &amp; wind gusts</td>
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<tr>
<td></td>
<td>• Temperatures</td>
<td>• Temperatures</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td>• Provision of safe, adequate and continuous detour facilities</td>
<td>• Provision of safe, adequate and continuous detour facilities</td>
</tr>
<tr>
<td></td>
<td>• Construction debris affecting roadway surface</td>
<td>• Construction debris affecting roadway surface</td>
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</tbody>
</table>

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Indiana Pedestrian and Bicycle Guide
The Transportation Design Process
Even for seasoned and involved community members, knowing who to talk to and deciphering how roads and streets get built is difficult. This section presents the basics about the various people and the different steps involved in the transportation design process. It is intended to orient community members on how best to play a role in making sure that walking and bicycling needs are heard and addressed. Most key decisions don’t just occur in one moment in time but are made through many smaller decisions along the way.

**Knowing Who’s Who**

**Public Officials**

Public officials are those in a position of official authority, whether appointed or elected or employed. Officials perform or administer public tasks including major decisions related to how roads get built or improved. The positions cover a broad range from your local elected commissioner to the likes of town planning director. Elected officials can serve on city or town commissions or boards. Non-elected officials may work for the local transportation department, public works department or a planning agency.

Public officials act on behalf of the community and under many rules and constraints. Engaging with the public on substantive topics of community concern and interest is part of their role. Local officials are generally accessible via email and can be contacted with comments or questions at any point in the design process.

**Tips:**

- Developing friendly working relationships with officials is key to long-term success on any efforts.
- Always treat public officials professionally and with respect
- Find ways to direct resources, especially funding, towards officials to assist them with your requests and suggestions.
- Although their offices are public, it is recommended to notify officials before visits.
- Invite officials on walking or bicycling tours to hold infrastructure conversations.

**Engineers and Planners**

Engineers are the people who design, build, operate or maintain a facility. Planners work earlier in the process in planning what is to be built as well as funding and policy issues. Some engineers and planners work for governmental agencies while others work for consulting firms.
firms engaged by public agencies. Engineers and planners generally work together to bring a new or expanded project from an idea to completion.

Tips:
• Engineers and planners working for local agencies can offer a wealth of information, advice, and access to many resources.
• Don’t be put off or intimidated by the technical jargon used by engineers and planners. This guide can help!
• Understanding the language used and constraints that such professionals work under will lead to more productive dialogues.
• Host and invite planners and engineers to events about innovative design topics as well for field tours and visits.

BICYCLE/PEDESTRIAN COORDINATOR
This is a position dedicated to bicycling/pedestrian issues which is found in a local transportation, health or sustainability department, or college program. Coordinators may also work for a non-profit or sports-focused organization. Typically, a local bicycle/pedestrian coordinator’s primary job is to implement the programs and projects in the local bicycle and/or pedestrian plans. The coordinator often has other responsibilities, such as reviewing road design and private development proposals to ensure that local bicycle/pedestrian requirements are incorporated and to assess walking and bicycling impacts. Other responsibilities may include educational and promotional programs, coordinating with other departments, agencies and jurisdictions on walking and bicycling topics and serving as the public contact for bicycling/walking inquiries and complaints. Not all communities have a bicycle or pedestrian coordinator and a bicycle and/or pedestrian plan.

Tips:
• Developing a supportive working relationship with the bike/pedestrian coordinator is very important.
• Invite the coordinator to give regular updates on work in progress to local groups.
• Provide volunteer support for the coordinator in their efforts; this is often a position with limited funding resources.
• Help build wider support for the coordinator position, funding and efforts.
Community Members
Community members include all those affected by a project, whether they live directly next to the facility or in the wider community. Specific personal interests may depend on how close the community member is to the facility and how they plan to use it, as well as personal values placed on safety, speed, environmental issues and aesthetics. Some of these disparate interests may conflict with each other. Generally, interest in any project is higher among the residents closest to the project, with the adjacent property owners generally becoming the most involved in giving input.

Tips:
• Community members should introduce themselves at the earliest opportunity to local officials and elected officials.

• It is important for community members to leverage other community roles (e.g. involvement in the PTA, parks commission, etc.) to help push for improvements in the community.

• Agencies and officials are more likely to listen to concerns if they are hearing about needed changes from a range of community members.

Recognized Stakeholders
Stakeholders are those with an interest or concern in a particular topic such as walking or bicycling facilities. Community members can become recognized stakeholders by making their interests known to public officials and by taking on volunteer board and commission appointments.

Stakeholders become more involved in community issues for a variety of reasons but all see the need for improved and safer facilities and have shown or expressed willingness to devote time or energy to related issues. By becoming recognized as having a higher-level of interest, community members may be able to enhance their roles and communications with public officials. Well-informed stakeholders can pay special attention to what is planned in their community and educate others regarding the benefits of particular designs. They can build long-term relationships with public officials and provide both policy and design input in a more consistent fashion from planning through construction. Rarely does a project proceed quickly or without changes, so the commitment may extend through several years. Common stakeholders to include are the Police, schools, advocacy clubs and organizations, and local businesses. Public health professionals and local healthy community coalitions are becoming increasingly important stakeholders as well.
Tips:
• Become a recognized local stakeholder by making known your interest in seeing improvements made.
• Help spread the word and news about planned projects and related opportunities to other interested community members.
• Help build support for projects through wider community engagement and coalitions.
• Leverage other community roles (e.g. involvement in the PTA, parks commission, etc.) to help push for improvements in the community.
• Agencies and officials are more likely to listen to concerns if they are hearing about needed changes from a range of community residents.
• Seek out those with a broad community focus like bike shop owners, bike riding clubs, local rotary groups, local business associations, historical societies and homeowner associations.
• Join or organize using online tools such as local Google Groups, Facebook and meetup.org to find new potential supporters in your community.
• Make sure that local volunteer boards and commissions are informed of upcoming plans and have the opportunity to get involved.

How Transportation Design Works
How to Get Involved in This Process
Community members can make a difference and get involved in expressing their thoughts about a project at many points in the process. The contribution should relate to the stage of the process to be effective. Showing up and expressing comments early is the best chance of having a meaningful and lasting impact on what is planned but there are opportunities all along the way to give input.
New transportation projects are initiated because a problem, need or opportunity has been identified in the community. Public issues are raised when transportation projects are proposed or when plans are in the later stages of development. The role of the citizens is to ensure that transportation projects are developed for the benefit of the community.

### Defining problems and opportunities and planning a course of action

- Agencies identify needs
- Decide what to fund
- Agencies advertise and hold public meetings
- Revise planning based on technical input, citizen requests and local funding decisions

### Preparing initial engineering plans and calculations

- Determine project size, type, location
- Prepare design based on available right-of-way, existing facilities, safety, obstacles and funds
- Prepare design in accordance with standards and adopted policies

### Public issues

- Lack of awareness of opportunities to express ideas
- Lack of support for good ideas
- Lack of awareness of need or problem

### What you can do

- Find forums to contribute ideas
- Write about needs to elected officials, local agencies
- Send written complaints to agencies about infrastructure deficiencies and missing connections
- Champion projects for new connections and repurposing abandoned rights-of-way

- Submit requests to be included in long-term plans
- Request specific facilities and funding
- Attend public meetings
- Write letters to agencies and elected officials
- Meet with local officials
- Volunteer on advisory committees
- Keep ears open, develop channels to stay informed

- Find out what is specifically proposed to accommodate walking and bicycling
- Insist that locally-adopted policies and plans be followed and ask why exceptions are made
- Visit site with plans to look for missed details and unaddressed concerns or opportunities
<table>
<thead>
<tr>
<th>WHAT YOU CAN DO</th>
<th>ACTIONS</th>
<th>PUBLIC ISSUES</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Conduct meetings and hearings to involve the general public in the decision</td>
<td>• Present plans and studies to community members and other stakeholders in open forums</td>
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<tr>
<td></td>
<td>• Attend public meetings</td>
<td>• Monitor for possible design changes</td>
</tr>
<tr>
<td></td>
<td>• Alert other community members about plans</td>
<td>• Stay in touch with project manager</td>
</tr>
<tr>
<td></td>
<td>• Coordinate among community members</td>
<td>• Once in final design, changing plans becomes considerably more difficult</td>
</tr>
<tr>
<td></td>
<td>• Educate officials about pedestrian and bicyclist safety needs</td>
<td>• Review and comment on items that may be prepared late in the process such as traffic striping and construction detour plans</td>
</tr>
<tr>
<td></td>
<td>• Remind officials of policies and pedestrian and bicycling guidelines</td>
<td>• Monitor plans for possible late-stage changes</td>
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**Preparation of final detailed engineering plans to construct the project**

- Finalize plans for construction
- Plans can vary from preliminary design
- Some projects may become “Design/Build” and move through a compressed schedule handled by a private firm
- May need to make special effort to be involved or aware of project process during final stages
- Monitor to ensure that unexpected field changes do not impact walking or bicycling facilities
- Check for safe ongoing walking and bicycling access
- Construction trailer offices are sometimes open to the public (call first)
- Bring field problems to the construction manager rather than addressing them to construction workers
- Take photos to document problematic conditions

**Project is awarded and built in accordance with the approved plans**

- Local agencies select the contractors and agree on costs and time to completion
- For many in the community, the first news that a project is planned may be when they see bulldozers
- Walking and bicycling conditions can be particularly impacted by the construction process
- Monitoring for possible late-stage changes
- Check for safe ongoing walking and bicycling access
- Construction trailer offices are sometimes open to the public (call first)
- Bring field problems to the construction manager rather than addressing them to construction workers
- Take photos to document problematic conditions
The Transportation Design Process

<table>
<thead>
<tr>
<th>IDEAS</th>
<th>PLANNING</th>
<th>EARLY DESIGN</th>
<th>PUBLIC INPUT</th>
<th>FINAL DESIGN</th>
<th>CONSTRUCTION</th>
<th>FINAL</th>
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</thead>
</table>

**Road or Facility is Opened and Put into Use**
- Final inspections and approvals of new construction by local officials and agencies
- Open new facility after final approval
- Plans available on file at site

**Public Issues**
- Community members may not be aware when that facility is open and in use
- May take time for a new travel opportunity to show up in route planning information

**What You Can Do**
- Publicize project
- Thank and recognize officials
- Invite community members to walk and ride on new facilities
- Plan tours inviting officials and others to learn about the new facility and the history of how it was built
- Continue monitoring the project in case of later opposition

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Finding Out About Upcoming Projects and Meetings

It takes some legwork and on-going engagement to find out what is coming up the community. However, once plugged into the local information pipeline, much information will come to those who are interested. It has become easier with e-mail notifications and through following social media to find out plans well in advance. Here are some of the common ways to find out what’s being discussed locally:

- Check local newspapers for official meeting notifications.
- Periodically check agency websites and sign up for any notifications.
- Call your local officials if you hear rumors of plans.
- Get in touch with local elected officials and ask to be kept informed.
- Sign-up for local elected officials and agency newsletters.
- Read community news sources.
- Follow local organizations on social media.
- Build up a network of contacts with understanding and knowledge of your interests.
- Local officials may notify interested parties or homeowner associations about upcoming meetings.
- Get on mailing lists and other forums to be informed about upcoming meetings.
- Official notices may be required for formal public meetings so research local notification procedures.
- Become a recognized local stakeholder.

Public Meetings

An important step in any decision-making process is when the public are invited in to give their input. Public meetings are generally intended as a chance for community members to learn details of what is being planned or designed before important decisions are made. Generally such meetings are held by a local department of transportation but could be held by some other agency. Public meetings are often held on evenings or weekends in some sort of public institution. While some public meetings are required to meet the project implementation rules, others may be held at local agency discretion.

For those who are interested in walking and bicycling infrastructure, these opportunities really matter. Showing up and making informed comments can have real influence on design, especially where overlooked items are pointed out or community benefits are expressed well. Frequently, constructive ideas will be considered by the agency and can change the
ultimate design. It’s important to then follow up afterwards on what you’ve learned.

**Public Hearings vs. Public Meetings**

In general, public hearings and public meeting will feature the same elements and may appear similar in format. However, it is important to understand the distinction between the meeting type being held and its purpose.

<table>
<thead>
<tr>
<th><strong>Background</strong></th>
<th><strong>Public Hearing</strong></th>
<th><strong>Public Meeting</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Why held</td>
<td>Federally required for many transportation projects</td>
<td>Optional event tailored to agency and community needs. Sometimes held as a courtesy to update public on upcoming plans or details of construction.</td>
</tr>
<tr>
<td>When held</td>
<td>Prior to decision points during project development</td>
<td>At any stage in process</td>
</tr>
<tr>
<td>Type of meeting</td>
<td>Formal</td>
<td>Ranges from less formal to informal</td>
</tr>
<tr>
<td>Who is invited?</td>
<td>All members of the public</td>
<td>All members of the public</td>
</tr>
<tr>
<td>Public comments</td>
<td>Community comments are recorded in written form as input to an agency.</td>
<td>May be received but may not require formal response or action</td>
</tr>
<tr>
<td>Format</td>
<td>Generally formal presentations, a public comment session, and a project display area where local officials and their consultants explain details of the project.</td>
<td>May include formal presentations, a public comment session, and a project display area where local officials and their consultants explain details of the project. More likely to include other elements such as hands-on activities.</td>
</tr>
<tr>
<td>Impact of commenting</td>
<td>More likely to have impact on future decisions</td>
<td>Agency may not be required to consider comments made.</td>
</tr>
</tbody>
</table>

**Best Practices in Public Involvement**

Indiana Department of Transportation (INDOT) publishes an on-line guide containing detailed advice about public meetings and how to get involved.
Giving Input
Tips for Being Effective & Persuasive
When Commenting
• Make a good first impression: Be friendly and polite.
• Refrain from sweeping accusations and past recriminations.
• Listen before jumping in: Make sure you understand what’s being proposed and what stage it’s at in the process.
• Do your homework: Research the project and its history beforehand. Walk the site if at all possible.
• Be flexible: Be willing to compromise and work with others to achieve your long-term goal.
• Be persistent: This is a most important aspect of the process and leads to future opportunities for improvement also.
• Be sincere: Officials want to make the right decision about ideas and issues rather than be converted to your cause.
• Be focused: Don’t try to fix all the problems at once. You can go back later to fix the others.
• Be ambitious: Think bigger and beyond how things have always been done. Have a vision of how things could be.

Tips for Written Input
• Generally, few community members take the time to submit comments on how a design could be improved for pedestrians or bicyclists. However, it is extremely effective to submit feedback on projects.
• Written comments allow for more thoughtful explanation of the issues than may be possible in the public meetings.
• Submit comments via e-mail, letters or comment sheets.
• Submit comments by closing date stated in the agency instructions.
• Be specific about issues and request particular design features.
• Write as an individual or organization.
• Include contact information.
• State whether or not you support particular design features including the reasons why.
• Sort separate issues under clear headings.
• Correct misinformation from public meetings or the media.
• Copy your local elected officials and other interested groups.
• If necessary, ask elected officials for their support.
• Be respectful and thank officials and agencies for their work.
• Encourage other community members to write in support also.

**JARGON AND TERMS**
With a little homework, community members can readily learn commonly-used vocabulary and engineering terms. In many cases, the terms used are just specialized words or acronyms that are well-known within the field. Knowing what these terms refer to will assist with understanding what is being explained as well as allow improved conversations with designers and local officials.

See Appendix A for a glossary of commonly used terms.

**STEPS TO REVIEW AND COMMENT ON PROJECTS**

**GATHER INFORMATION**
It is always useful to gather available information to understand the proposed project better. This includes information to document existing conditions as well as plans or studies about what is proposed.

Information about existing conditions that can be collected by visiting the site, found online or through requests to officials may include:

• Photos that show views of surfaces, transit stops, and evidence of use such as a worn path.
• Digital views from Google Earth, Bing or any other online services.
• Tax map information showing boundary lines (possibly offered online).
• GIS maps for the project area (possibly offered online).
• Crash information for key intersections (available from the state Department of Transportation or local law enforcement officials).

In the early planning stages, there may be supporting studies available digitally; these may provide explanatory narrative as well as discuss alternative options considered. At early
stages in the design, there may be concept drawings or illustrations available of the proposed project. Ask local officials whether drawings or planning studies can be viewed at their office or if copies can be obtained.

The more detailed drawings that are prepared in the next stages contain much important information but can be difficult for non-professionals to decipher. However, some community members may already have some type of engineering or technical background and may be willing to review or interpret the plans. Local officials, particularly the project manager, will be important in assisting in interpreting this information. The latest drawings are generally kept on file and copies are usually available at a nominal cost from the agency. Copies of the plan view sheets (i.e. view from above) provide most of the needed information and are likely all that are needed. Some agencies also display these detailed plans online or are willing to provide access to digital copies.

Building up a network of contacts with understanding and knowledge of design drawings and issues will prove valuable in considering the details of the available information. Reviewing what is planned together should generate some specific comments and requests for submission to the local officials.

Another source of expert information is the project manager and the engineering staff working on the project. They may be willing to meet to go over the plans and explain the design details, especially early in the process.

FIELD VISIT TO THE PROJECT SITE
Visiting the proposed site early on will often yield a much better understanding of what is being proposed and may also raise some overlooked details:

- If possible walk or bike the entire project area, including from different approaches and directions.
- Visualize the planned future walking or biking facilities.
- Compare the project drawings or plans with existing conditions.
- Look for details such as driveways, entrances, walls, poles, drainage features, and railroad tracks.
- Check for opportunities to add short connections to neighborhoods, parks, schools, libraries or transit stops.
- Take photos of existing features and community members using facilities.
- Look for overlooked evidence of pedestrian or bicycle usage.
- Check for possible sight line obstructions or steep drop offs.

It can also prove useful to plan a follow-up visit with others such as the project manager, elected officials or other community members to discuss the design or possible opportunities at the project site.
Sidewalks & Trails
Sidewalks and trails can be found along public roads as well as in parks and rail and utility corridors where there are few conflicts with motorized vehicles. Facilities may allow for two-way bicycling travel which may be mixed with a range of pedestrian users. Sidewalk and trail facilities can also include amenities such as lighting, signs and benches.

Indiana has made a lot of progress creating and improving trails, especially in the last decade. Many of the new trails have hardened surfaces that are great for walking and biking. The trails connect communities and are great alternative transportation corridors while longer trails are often built on old railroad corridors. There are a number of databases on-line that provide detailed inventories about Indiana trails including on the following sites: The Greenways Foundation, IndianaTrails.com (maintained by the Hoosier Rails to Trails Council), and TrailLink (maintained by the Rails-to-Trails Conservancy).
Sidewalks provide an area for walking that is separated from vehicle traffic. Sidewalks are usually separated from the roadway by a curb or gutter and sometimes a landscaped planting strip area. They can be paved (such as concrete, asphalt, or brick) or unpaved surfaces that are maintained and can be found on one or both sides of the street. Sidewalks should provide accessible, safe, and continuous links to close-by destinations and be built along travel ‘desire lines’.

**BENEFITS + DRAWBACKS**
- Sidewalks improve pedestrian safety in the vicinity of moving vehicles.
- Missing segments can cause pedestrians to travel in the street, and may make the sidewalk network unusable for the mobility impaired.
- Planting strips and street trees along sidewalks can contribute to the overall safety, community interaction, and visual comfort of sidewalk users.

<table>
<thead>
<tr>
<th>Street Classification</th>
<th>Parking Lane/Enhancement Zone</th>
<th>Furnishing Zone (width)</th>
<th>Walking Area (width)</th>
<th>Front of Property (width)</th>
<th>Total (width)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Streets</td>
<td>Varies</td>
<td>2 - 5 feet</td>
<td>4 - 6 feet</td>
<td>N/A</td>
<td>6 - 11 feet</td>
</tr>
<tr>
<td>Commercial Areas</td>
<td>Varies</td>
<td>4 - 6 feet</td>
<td>6 - 12 feet</td>
<td>2.5 - 10 feet</td>
<td>11 - 28 feet</td>
</tr>
<tr>
<td>Moderate to Heavy Traffic Streets</td>
<td>Varies</td>
<td>2 - 6 feet</td>
<td>4 - 8 feet</td>
<td>2.5 - 5 feet</td>
<td>8 - 19 feet</td>
</tr>
</tbody>
</table>
Sidewalks are the most fundamental element of the walking network and they are especially needed close to:

- Schools & libraries
- Commercial shopping centers
- Hospitals and medical facilities
- Transit stops and stations
- Recreational facilities such as pools, courts, and fields

Sidewalks should be more than areas to travel; they should provide places for people to interact.

It is important to provide adequate width along a sidewalk corridor. Two people should be able to walk side-by-side and pass a third comfortably.

Plantings and street trees should contribute to the overall psychological and visual comfort of sidewalk users, and be designed in a manner that contributes to the safety of people.

A shared-use trail is physically separated from traffic and handles pedestrians and two-way bicycle traffic. Trails can be used for recreation as well as travel by different types of users of a complete range of skill levels. Trails provide off-road connections to destinations and are found within parks, along waterways, abandoned or active railroad and utility rights-of-way, or within the right of way of limited access highways. Due to the fact that nearly all trails are used by pedestrians they should be accessible for mobility impaired users. Sidewalks are a specific type of shared use trail that run adjacent to the roadway.

Sidewalks with many driveways or other crossings have higher rates of conflicts with motorists. It is important to add treatments to increase the awareness of pedestrians and bicyclists if a sidewalk crosses a roadway.

**BENEFITS + DRAWBACKS**

- Trails can serve a wide range of uses in connections, recreation, short cuts, and commuter routes
- Some bicyclists may prefer the road network as it may provide a more direct route with fewer conflicts with other users
- Trails may attract pedestrians of all types, bicyclists, joggers, in-line skaters and more

A dashed painted centerline may be required when users volumes or speeds are high.

Solid centerline striping can be used on tight or blind corners to keep users on opposite sides.

Maintain an 8-10 feet overhead clearance.

2+ foot shoulder on both sides of the path.

3 foot minimum if installing signs or bench seating.
**when to use**

To provide a travel connection not possible by road

Vacated rail corridors (Rails-to-Trails), active rail corridors (Rails-with-Trails), or along stream or utility corridors

To provide a local recreational amenity

Close a gap in a pedestrian or bicycling facility or route

**design variations**

Rails-to-Trails or Rails-with-Trails

Different types of surfaces create different types of trail experience and use. Surfaces include natural, crushed stone, gravel, asphalt, or concrete

Regional trail systems can close gaps with on-road facility connections

**checklist**

- Adequate width for types of use
- Safe intersection crossings
- Overhead clearance
- Safety in isolated stretches
- Striping, signs, and lighting
- Safety measures for tight or blind corners

**additional resources**

There is no one-size-fits-all design solution for walking or bicycling facilities. This section provides user-friendly information covering a range of possible pedestrian and bicycling designs and their key features. The information in this section is intended to serve as a guide for what to look for and consider in any particular design as well as to illustrate the range of possibilities. Both local officials and community members have similar goals to build a safe, user-friendly network. Community members may be aware of routes in need of pedestrian and bicycle facilities and can use this guide to communicate ideas that will guide officials toward a user-friendly design. Community members also bring their own understanding of the day-to-day issues faced by pedestrians and bicyclists as they use roads, trails, and crossings.

As an example, the adjacent illustration shows the range of bicycling facilities that can be used on roadways depending on many factors including the type of road, the traffic speeds, the volumes of vehicles, and available space. Facility types are selected based on traffic studies, previous planning decisions, engineering judgment, community input and local context.
On shared roadways, bicyclists and motor vehicles use the same roadway space. Shared roadways are typically used where speeds and traffic are low, however even where volumes are higher roads can be shared when there are wide outside lanes or shoulders. If there is no wide outside lane or shoulder provided, a motor vehicle will usually have to cross over into the adjacent travel lane to pass a bicyclist.

To improve bicycling conditions, shared roadways may employ a large variety of treatments from simple signs and shared lane markings to more complex treatments including directional signs, traffic diverters, and/or other traffic calming devices to reduce vehicle speeds or volumes.
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A wide shared lane is a general purpose outside travel lane that allows motorists and bicyclists to comfortably share the lane side-by-side. The lane does not have any special facilities, but is wide enough that the motorist is able to safely pass a bicyclist without encroaching on the adjacent lane. A wide shared lane can improve traffic flow since it provides enough space to accommodate both vehicle and bicyclists traveling in the same direction. These wide shared lanes can be enhanced with shared lane markings (sharrows) and directional and bike route sign.

**BENEFITS + DRAWBACKS**

- Wide curb lanes may encourage motorized vehicles to travel faster
- Many bicyclists are uncomfortable riding in wide outside lanes with traffic
- Most major streets are characterized by conditions (e.g., high vehicle speeds and/or volumes) for which dedicated bike lanes are the most appropriate facility to accommodate safe and comfortable riding

Sharrows should be placed every 50 to 250 feet. 14 foot minimum lane width adjacent to a curb allows bicyclists and motorists to travel side-by-side within the same traffic lane.

If there is a steep uphill grade, obstacles, or on-road parking, the wide lane should be 15 feet.

Bicycle route signs should be applied at the beginning and end of the route, at major changes in direction or at intersections with other bicycle facilities, and at intervals along bicycle routes not to exceed ½ mile.
**when to use**
The facilities are typically used on roads with low speeds and traffic volumes and where there is adequate space to configure the appropriate width.

It may be possible to restripe and reduce the width of the adjacent vehicle lanes to create a wide curb lane.

Although opportunities to add bike facilities through road widening may exist, many streets have physical constraints that make this difficult or impractical.

**design variations**
If it is not possible to meet minimum width for outside lanes, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roads. In these situations, an absolute minimum of 3 feet of riding space should be provided.

**checklist**
- Consider striping a bike lane if the lane is wider than 15 feet.
- Can motorists safely pass bicyclists.
- Road surface condition.
- Signs and wayfinding.

**additional resources**
- MUTCD Chapter 9
- AASHTO Guide for the Development of Bicycle facilities
- NACTO Urban Bikeway Design Guide
- BIKESAFE
Bicycle boulevards, also known as neighborhood greenways, are streets with low traffic volumes and speeds, designated and designed to give bicycle travel priority. Bicycle boulevards use signs, pavement markings, and speed and volume management measures to discourage through trips by motor vehicles and create safe, convenient crossing of busy arterials. Many bicycle boulevard designs not only benefit people on bicycles, but they also help create “quiet” streets that benefit residents and improve safety for all road users.

**BENEFITS + DRAWBACKS**

- Intersection crossings are designed to enhance safety and minimize delay for bicyclists
- Volume and speed control treatments calm the corridor by deterring and slowing through-trips for non-local motorized traffic
- Without treatments for bicyclists and pedestrians, intersections can become major barriers
**when to use**

Traffic volumes are limited to 3,000 vehicles per day (ideally less than 1,500)

Local streets with a posted speed limit of 25 mph or less

Local streets that offer a continuous and direct route along low-traffic streets. Routes are ideally long and continuous

A bicycle boulevard running parallel to a major roadway can provide access to commercial destinations for people who do not feel safe riding along the main street

**design variations**

Signs, pavement markings, traffic calming and/or traffic reduction, and intersection modifications should be used in combination

Green infrastructure may be included to enhance the local environment and collect rain run-off

There are various types of vertical and horizontal traffic calming treatments

Major street crossings may pose a significant barrier to the effectiveness of a bicycle boulevard

**checklist**

- Low traffic speed and volume
- Low stress for pedestrians and bicyclists
- Signs, striping, & wayfinding
- Continuous route with minimal stops
- Safe & convenient intersection crossings for bicyclists and pedestrians
- Trip convenience and connections
- Appropriate sight distance and visibility

**additional resources**

- MUTCD Chapter 9
- AASHTO Guide for the Development of Bicycle facilities
- NACTO Urban Bikeway Design Guide
- BIKESAFE
- Alta Planning + Design Bicycle Boulevard Planning and Design Handbook
- City of Berkeley Bicycle Boulevard Design Tools and Guidelines
Designated for bicycle travel, separated bikeways are separated from vehicle travel lanes by striping, and can include pavement stencils and other features. Separated bikeways are most appropriate on major to low/moderate traffic streets where higher traffic volumes and speeds warrant greater separation.

Separated bikeways can increase safety and promote proper riding by:

- Defining road space for bicyclists and motorists
- Reducing the likelihood that motorists will stray into the bicyclists’ path
- Discouraging bicyclists from riding on the sidewalk
- Reducing the incidence of wrong way riding
cycle tracks

two-way cycle tracks
Shoulders

Typically found in less-dense areas, shoulder bikeways are paved roadways with striped shoulders wide enough for bicycle travel. Shoulder bikeways often, but not always, include signs alerting motorists to expect bicycle travel along the roadway. Shoulder bikeways may be considered a temporary treatment, with full bike lanes planned for construction when the roadway is widened or completed with curb and gutter. Paved shoulders are frequently used on rural roadways and should only be used where constraints exist.

**Benefits + Drawbacks**

- A paved shoulder provides a bicyclist a separated facility to ride on
- Roadway surface and debris maintenance may be poor
- Adjacent barriers (guardrail, concrete barrier, etc.) are potential hazards requiring extra buffering distance

<table>
<thead>
<tr>
<th>Feature</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paved shoulders</td>
<td>Should be provided on both sides of the road</td>
</tr>
<tr>
<td>Parking</td>
<td>Should be limited on shoulders</td>
</tr>
<tr>
<td>Rumble strips</td>
<td>Should have a gaps of 40 - 60 feet interval spacing</td>
</tr>
</tbody>
</table>

The distance between any rumble strip to the edge of a paved shoulder should be at least 4 feet

4-12 | Streets & Crossings
When to use

On roadways with bicycle traffic but inadequate rights-of-way to install a bike lane or cycle track

As a temporary treatment, with full bike lanes planned for construction when the roadway is widened or completed with curb and gutter

On rural roadways with minimal rights-of-way

Design variations

If there is an adjacent barrier (guardrail, concrete barrier, etc.), the minimum width should be 5 feet

Rumble strips should be a minimum of 4 feet from the edge of the paved shoulder and have gaps to allow bicyclists to cross

Paved shoulders should be provided on both sides of the road

Checklist

☐ Adequate shoulder width

☐ Paved on both sides of the road

☐ Appropriate signs

☐ Additional width provided if there is an adjacent barrier, such as a guardrail

☐ Interval gaps in rumble strips, if used

Additional resources

MUTCD Chapter 9 | AASHTO Guide for the Development of Bicycle facilities | NACTO Urban Bikeway Design Guide | BIKESAFE
Bicycle lanes, also known as bike lanes, are an exclusive space for bicyclists created through the use of pavement markings and signs. The bike lane is located adjacent to vehicle travel lanes and is generally used in the same direction as motor vehicle traffic. The bike lane is typically located on the right side of the street, and should be wide enough for a bicyclists to ride comfortably between the adjacent travel lane and either the curb, road edge, or parking lane.

Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway than if they are expected to share a lane with vehicles.

**BENEFITS + DRAWBACKS**
- Separate biking space on road allows better overtaking by motorists
- Provide better separation from motorists
- Visually narrows road to encourage lower vehicle speeds
- Turns at intersections have to be figured out so that bicyclists are not in conflict with vehicles

**BICYCLE LANES**

<table>
<thead>
<tr>
<th>Width</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'</td>
<td>4 foot minimum when no curb and gutter is present</td>
</tr>
<tr>
<td>5'</td>
<td>5 foot minimum when adjacent to curb and gutter</td>
</tr>
<tr>
<td>6'</td>
<td>Preferred width</td>
</tr>
<tr>
<td>7'</td>
<td>Where high bicycle traffic or significant travel speed differences, 7 foot wide bike lanes preferred</td>
</tr>
</tbody>
</table>

**MUTCD R3-17 (optional)**

- Bike lane dashed white line prior to intersections
- Bike lane markings
- Bike lane signs
- Wayfinding signs
- Well-maintained pavement surface preferred
when to use

- Streets with 3,000+ motor vehicle average daily traffic
- Streets with a posted speed limit of 25+ mph
- Streets with high transit vehicle volume
- Where there is adequate space to configure appropriate width

design variations

The following options all follow the general principles of a conventional bike lane:

- Buffered bike Lane – more protection/separation
- Colored bike lane – heightened visibility
- Contra-flow bike Lane – reduce out-of-way travel

checklist

- Appropriate bike lane width
- Bicycle symbols and signs
- Extra pavement width for car door zone when adjacent to parallel parking or high parking turnover
- Good drainage to prevent pooling and conflict with bicycle tires

additional resources

- MUTCD Chapter 9
- AASHTO Guide for the Development of Bicycle facilities
- NACTO Urban Bikeway Design Guide
- BIKESAFE Bike Safety Audit Guidelines and Prompt List
A cycle track is a 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 traffic and distinct from the sidewalk.

Cycle tracks may be one-way or two-way, and may be at street level, sidewalk level, or at an intermediate level between the street and sidewalk height. A combination of curbs, medians, bollards, on-street parking, and different pavement/color is used to protect and differentiate the cycle track from motor traffic and the sidewalk.

**BENEFITS + DRAWBACKS**

- Provide space that is intended to be exclusively or primarily used by bicycles and separated from motor vehicle travel lanes, parking lanes, and sidewalks
- Driveways and access points may create conflicts as vehicles cross the cycle track

**Cycle Tracks**

Openings in the barrier or curb are needed at intersections and driveways or other access points to allow vehicle crossing. Parking should be set back 30 feet from minor intersections or driveways to provide improved visibility for bicyclists.

For one-way cycle tracks: recommended minimum width is 7 feet to accommodate passing. Width can drop to 5 feet in constrained locations.

Bicycle lane word, symbol, and/or arrow markings are placed at the beginning of a cycle track and at periodic intervals.

Parking buffer should be 3 feet to allow for passenger loading and prevent collisions.

Raised medians, on-street parking, bollards or different pavement/color are used to separate a cycle track.
### when to use

- Along streets with long blocks and few driveways
- When destinations are primarily on one side, a two-way cycle track may reduce additional crossings
- Cycle tracks located on one-way streets have fewer potential conflict areas than those on two-way streets
- Along important travel corridors where additional separation from traffic is needed

### design variations

- At sidewalk level, a curb or median separates the cycle track from motor traffic and pavement color/texture separates the cycle track from the sidewalk
- At street level, the cycle track can be separated from motor traffic by planters, raised medians, on-street parking or flexible bollards
- Raised cycle track – improved separation
- Two-way cycle track – work best on one-way streets

### checklist

- Cycle track width (one-way or two-way)
- Pedestrian and bicycle interaction at transit stops
- Colored pavement and signs used at vehicle crossings
- Use of a raised median, curb, flexible bollards, or planters to establish protected buffer
- Bicycle lane word, symbol, and/or markings at start of cycle track and periodic intervals
- Plan for cleaning debris and removing snow (may require special equipment)

### additional resources

- MUTCD Chapter 9
- AASHTO Guide for the Development of Bicycle facilities
- NACTO Urban Bikeway Design Guide
- BIKESAFE
An intersection is where two or more streets meet or where a sidewalk or trail meets a street that is to be crossed. Intersections vary widely in the complexity of how they are designed or work based on geometry, numbers of travel lanes, the ranges of traffic speeds and volumes, the range of turning movements and the variety and relative volumes of users. Intersections must manage the safe movement of pedestrians and bicyclists, as well as motorized vehicles.

Controlled intersections have traffic lights, yield signs or stop signs. Uncontrolled intersections are without signals or yield/stop signs but may have warning signs. Driveways, business entrances and bus stops located in and around intersections add to the complexity and safety issues for pedestrians and bicyclists.
**Bike Box & Two-Stage Turn Box**

A bike box is a designated area located at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible space to get in front of traffic lined up during a red signal. Motor vehicles must line up behind the white stop line at the rear of the bike box.

Two-stage turn boxes offer bicyclists a safe way to make left turns at multi-lane signalized intersections from a right side cycle track or bike lane. These are often installed together with cycle tracks due to bicyclists’ difficulty merging left into traffic.

**BENEFITS + DRAWBACKS**

- Improves bicyclist confidence at intersections
- Bike boxes increase awareness and help mitigate “right hook” accidents
- Two-stage turn boxes provide a safer way to make a left turn
- Both intersection treatments are considered experimental by the FHWA (as of 2014)

---

**Bike Box**

May be combined with intersection crossing markings and colored bike lanes in conflict areas

Colored pavement can be used in a bike box for increased visibility

Wide stop lines used for increased visibility

If used, colored pavement should extend 50' from the intersection

**Two-Stage Turn Box**

Consider using colored pavement inside two-stage turn boxes to further define the bicycle space

Turns from a bicycle lane may be protected by an adjacent parking lane or crosswalk setback space

Turns from cycle tracks may be protected by a parking lane or other physical buffer

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*Streets & Crossings*
Intersection Crossing Markings

Bicycle pavement markings through intersections indicate the intended path of bicyclists through an intersection or across a driveway or ramp. They guide bicyclists on a safe and direct path through the intersection and provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane.

The use of colored pavement is recommended to identify where right turns might lead to conflicts with through bicyclists. Common applications use either solid or dashed striping through intersections or where bicyclists come into conflict with vehicles.

**Benefits + Drawbacks**
- Intersection crossing markers provide a clear route and boundary for bicycle travel
- Colored pavement improves awareness and visibility of a bicyclist in conflict areas
- Maintaining marked crossings needs to be a priority for the treatment to be effective
\textbf{ADA Compliant Curb Ramps}

Americans with Disabilities (ADA) compliant curb ramps allow all users to make the transition from the street to the sidewalk. Properly designed curb ramps ensure that the sidewalk can be reached from the roadway. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access.

Although diagonal curb ramps might save money, they create potential safety and mobility problems for pedestrians, including reduced maneuverability and poor placement as vehicles turn, particularly in areas with high traffic volumes. They are the least preferred of all options.

\begin{itemize}
\item Make the transition from the street to the sidewalk easier for all users
\item Greatly improve access to sidewalk for someone in a wheelchair
\item Diagonal curb ramps are the least preferred option due to reduced maneuverability and increased interaction with turning vehicles
\end{itemize}

\textbf{Benefits + Drawbacks}

- Curb ramps shall be located so they don’t project into traffic lanes, parking spaces, or parking access aisles. Three configurations are listed below
- Truncated domes are used as a physical way of warning pedestrians with visual impairments that they are entering the street
- Diagonal ramps shall include a clear space of at least 48 feet within the crosswalk for user mobility

\textbf{Diagram}

- Perpendicular Curb Ramp
- Diagonal Curb Ramp (not preferred)
Signalized crossings serve and improve the safety of all road users. Signalized crossings help assign the rights-of-way order between intersecting road users. All users must remain vigilant for potential conflicts with other road users when crossing.

Consider the use of a Leading Pedestrian Interval (LPI) to provide additional traffic protected crossing time to pedestrians.

Audible pedestrian traffic signals help visually-impaired pedestrians cross at signalized intersections.

Push buttons should be located so that someone in a wheelchair can easily reach them.

**BENEFITS + DRAWBACKS**

- Signalized intersections serve and improve the safety of all road users.
- Signalized crossings help assign the rights-of-way order between intersecting road users.
- All users must remain vigilant for potential conflicts with other road users when crossing.

Countdown pedestrian signals are particularly valuable for pedestrians, as they let pedestrians know the time to cross the street before the crossing signal ends. Countdown pedestrian signals should be used at all signalized intersections and increased crossing times should be used at crossings where older pedestrians or those with a disability are expected. A Leading Pedestrian Interval (LPI) typically gives pedestrians a 3–7 second head start when entering an intersection.
Curb Radii & Curb Extensions

The size of a curb’s radius can have a significant impact on pedestrian comfort and safety. A smaller curb radius provides more pedestrian waiting area at the corner, allows curb ramps to be placed in better spots, results in a shorter crossing distance and requires vehicles to slow down more as they approach their turn.

Curb extensions shorten crossing distance and reduce pedestrian exposure to vehicle traffic. This gives pedestrians a better chance to see and be seen before committing to crossing. Curb extensions are appropriate for any crosswalk where it is desirable to shorten the crossing distance and there is a parking lane next to the curb.

**Benefits + Drawbacks**

- A smaller curb radius slows turning vehicles and improves the safety and comfort of pedestrians
- Curb extensions can be problematic for bicycle and truck traffic if there is no parking lane
- Planted curb extensions can be designed as a bioswale, a type of system where plants are used to help collect and filter rain water

Reduced size curb radii can improve safety by requiring motorists to reduce vehicle speed as they make the turn.
Intersection design should take into consideration existing and anticipated bicyclists, pedestrian and motorists all travelling at different speeds.

It is important to look at the intersection holistically and utilize a combination of intersection treatments that work well together.

There are additional design components that can be used to enhance safety of intersections including median refuge islands, marked crosswalks, through bike lanes, and combined bike lane/turn lane.

Curb extensions can be painted on the street in the short term and outlined with temporary bollards to test the impact of the recommendations on traffic flow.

Offset intersections, where opposing streets don’t line up, can be a challenge.

There is no one ‘correct’ type of intersection. The goal of intersection design is to consider the needs of all users - whether on foot, bicycle, or vehicle - and provide the maximum amount of safety and comfort for all.

- Signals and signs for pedestrians and bicyclists
- Good sightlines for all users
- Adequate gaps and places for bicyclists to wait comfortable
- Better lighting
- Continuity of bicycling facility through intersections
- Suitable curb ramps for wheelchair users
- Safety and comfort of bicyclists and pedestrians

Additional resources:
MUTCD Chapter 9 | AASHTO Guide for the Development of Bicycle facilities | NACTO Urban Bikeway Design Guide | BIKSAFE | PEDSAFE
Medians are areas to separate road users in the middle of the street that can either be open (painted markings only) or channelized (raised medians or islands). Pedestrian crossing islands (or refuge islands) are raised medians placed in the center of a street between opposing lanes of traffic or at the mid-point of a marked crossing.

If designed appropriately, medians improve safety by allowing pedestrians and bicyclists to cross one direction of motorized traffic at a time. Medians minimize exposure to risk from moving vehicles by shortening crossing distances and increasing the number of available gaps for crossing.

**BENEFITS + DRAWBACKS**

- Medians can provide safety benefits at mid-block locations as well as at intersections
- Crossing the street is a complex task - Medians allow stopping midway reducing the complexity of the crossing
- Refuge islands may collect road debris and may require more frequent maintenance

Cut through median islands are preferred over curb ramps, to better accommodate bicyclists.

Can be applied to roadways with a left turn center lane or a median area that is at least 6 feet wide.

Through passage is usually at same level as street to make it easier for wheeled users.

The angled crossing can direct pedestrians to face upstream and increase the pedestrian's awareness of approaching traffic.
**when to use**
Where there are significant numbers of pedestrians crossing
On streets with high levels of traffic and medium to high speeds
Multi-lane roads where pedestrians may not be able to cross the road before the signal changes
At crossings in the middle of a block where there is no traffic signal or stop sign

**design variations**
Cut through median islands are preferred over curb ramps, to better accommodate wheeled users
The pedestrian island should be at least 6 feet wide between travel lanes (to accommodate bikes with trailers and wheelchair users) and at least 20 feet in length
If an island is landscaped, the landscaping should not decrease visibility of those crossing. Shrubs and ground plantings should be no higher than 1 ft 6 in so as to not block sight lines

**checklist**
- Accommodate wheelchairs and bicycles with trailers
- Visible to motorists
- Vegetation and sight lines
- Impacts on bicycling facilities
- Signs and reflectors

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**additional resources**
FHWA Manual on uniform Traffic Control Devices
A crossing is defined as any place where a pedestrian or bicyclist leaves a sidewalk or trail and enters the roadway crossing the motorist’s path of travel. Pedestrian crossings may be in the middle of the block as well as at street corners. At an intersection, vehicles can be moving in numerous directions because of turns while at a mid-block crossing traffic is generally moving in just two directions. Whether or not well-designed crossing facilities are present at a major street crossing can significantly affect a pedestrian or bicyclist’s choice or safety in making the crossing. Wide crossings with multiple lanes of traffic can become major neighborhood network barriers and compromise safety.

**BENEFITS + DRAWBACKS**

- Designed to improve awareness and visibility for all users
- A marked crosswalk signalizes to motorists that they must stop for pedestrians and encourages pedestrians to cross at designated locations
- Turning vehicles can pose a risk to crosswalk users

### Continental Markings

Continental markings are a type of crosswalk striping that is more visible to drivers. The crosswalk should be located to align as closely as possible with the through pedestrian zone of the sidewalk. Wide crossings with multiple lanes of traffic can become major neighborhood network barriers and compromise safety.
**when to use**

- At signalized intersections, all crosswalks should be marked
- At an intersection with visibility constraints, position pedestrians where they can best be seen by oncoming traffic
- At a complex intersection, orient pedestrians in finding their way across
- At an intersection within a school zone on a walking route

**design variations**

- Mid-block crossings help those who may be reluctant to go out of their way to the closest street corner
- Alternative materials (bricks, pavers, etc.) can be used to provide a tactile and visual component to improve awareness
- Continental or colored crossing walks provide additional visibility
- A raised crosswalk makes the crossing higher than the street causing drivers to have to slow down and be more aware of pedestrians

**checklist**

- Lighting and visibility
- Clear markings
- Type of markings or material used
- Signs and reflectors
- ADA curb ramps

**additional resources**

- MUTCD Chapter 9
- AASHTO Guide for the Development of Bicycle facilities
- NACTO Urban Bikeway Design Guide
- BIKESAFE
- PEDSAFE
- Bicycle Road Safety Audit Guidelines and Prompt List
The modern roundabout is a type of intersection that has a generally circular shape. Roundabouts usually require entering vehicles to yield to those already traveling on the inner circle. Bicyclists generally find that they can mix easily with low-speed traffic on single-lane roundabouts while pedestrians may find that lane crossing distances are shorter. Single-lane roundabouts generally benefit bicyclists and pedestrians by slowing traffic but multi-lane roundabouts may present greater challenges for those traveling by foot or bike. On some multi-lane roundabouts, options such as providing a bicycle ramp exit to the sidewalk can be added to the design to reduce challenges.

**BENEFITS + DRAWBACKS**

- Bicyclists are most vulnerable when circulating on the roundabout and entering traffic does not yield or when circulating traffic exits across the path of the bicyclists.
- Single-lane roundabouts can provide safety benefits for bicyclists when their needs are incorporated into the design.

Pedestrian crossings are set back at least one car length from the entrance of the roundabout.
when to use

Roundabouts should be considered as an alternative for intersections that involve new construction or reconstruction where there is sufficient space.

Roundabouts should also be considered when rehabilitating existing intersections that have been identified as needing major improvements in safety or how they work.

Roundabouts have also proven to be effective at freeway interchange ramp terminals and at rural high-speed intersections.

design variations

Provide separated facilities for bicyclists who prefer not to navigate the roundabout on the roadway, or widen sidewalks to accommodate bicyclists and pedestrians.

Provide visible, well-marked crossings to alert motorists of the presence of bicyclists and pedestrians.

checklist

- No bike lanes on roundabout
- Termination of bike lane prior to roundabout
- Signs and striping
- Visibility and sight distance
- Number of lanes on roundabout
- Vehicle entry and exit designed for lowest speed possible
- Separate walking and bicycling facilities provided to navigate roundabout

additional resources

- MUTCD Chapter 9
- AASHTO Guide for the Development of Bicycle facilities
- NACTO Urban Bikeway Design Guide
- BIKESAFE
Additional Key Infrastructure
As well as streets and roadways, the transportation network includes or interconnects with bridges, tunnels, railroads and waterways. These transportation facilities are long-term investments that remain in place for many years. However, many times, these parts of the system do not include space for pedestrians or bicyclists or can act as a barrier to those walking and bicycling. Retrofit or replacement of these facilities is an important time to seek inclusion of space for pedestrians and bicyclists whether to use the access or to allow passage around these facilities. From time to time, these facilities are abandoned or taken out of use which can create a great opportunity for repurposing and dedicating them to pedestrians and bicyclists.
These are structures erected over a depression or an obstruction such as water or a roadway. They are key connections in any transportation network. Bridges can be a significant barrier to walking and bicycling due to lack of dedicated space in the structure. In part because of their high construction costs, these facilities may be physically narrower than the approach roads on either side.

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**Important Considerations**

- Absence of bicycle facility on approach should not prevent bicycle accommodation on bridge
- Consideration should be given to shared-use path with concrete barrier on both sides of bridge
- Where bridge is too narrow, it may be possible to add cantilever structure to accommodate bikes
- Extensive overpass ramping allows wheelchairs and bicyclists access, but results in long crossing distances and lengthy slopes that discourage use
- Overpasses work best when natural conditions allow for a crossing without ramps, such as an overpass over a sunken highway
- Many pedestrians will not use an overpass if they can cross at street level in about the same amount of time
These are types of enclosed roadways with access at both ends. Tunnels and underpasses may allow pedestrians and bicyclists to continue their travel uninterrupted by a gap or avoid hazardous road crossings.

**Important Considerations**

- Personal safety concerns and an inability to see through to the other opening may lead to user unwillingness to enter.
- Pedestrians may not use if the underpass creates an out-of-the-way travel route.
- Proper lighting is crucial as the enclosed natures leads to a lack of natural light.
- Debris and road hardware can be harder to see creating on-road bicycling hazards.
- Absence of bicycle facility on approaches should not prevent bicycle accommodation within the tunnel/underpass.
- Unexpected ice patches may occur due to overhead drips and lower ambient temperatures.
These are the intersections of a roadway or a path with a railway line or tram line tracks that cross the streets of many urban communities as well as in rural areas. Tracks that cross streets or trails on a diagonal can cause steering difficulties and spills for bicyclists and are hazardous to those who rely on wheeled devices for mobility. Rails or ties that are not embedded in the travel surface create a tripping hazard for pedestrians.

**Important Considerations**

- Bikeways that cross tracks at a diagonal may cause steering difficulties or loss of control for bicyclists due to slippery surfaces, degraded rough materials, and the size of the flangeway gaps.
- Improvements to track placement, surface quality, flangeway opening width and crossing angle can minimize risks to people riding.
- Concrete railroad surface types provide the smoothest and least slippery riding surface across a railroad crossing.
- Railroad surface type can vary from concrete, rubber, asphalt, or timber.
- Consider posting warning signs to alert pedestrians and bicyclists.

Allow cyclists access to the full widened pavement area to allow them to choose the path that suits their needs best.

- Improved sight triangle
- 6 foot minimum width
- 60 to 90 degree crossing
Linear waterways served as important transportation corridors in the past. Many canals were constructed with adjacent towpaths used for towing boats before engines were available. These flat towpaths provide opportunities for walking and biking trails. Often the banks on either side of waterways and canals can be made accessible at a relatively low cost.

**Important Considerations**

- Canal trails can add good community connections and links to the transportation network, in part reflecting their original travel purpose.
- Maintaining grass buffers within the towpath corridor can provide a continuous strip of land for ecological purposes as well as a safe refuge area for users to step onto.
- The linear nature and flat grading of canal properties lend themselves to trail development.
- Bank widths on either side can vary widely and narrow widths may preclude the use of certain machinery for laying surfaces.
- Amenities such as benches and wayfinding signage are often designed to reflect the history and environment of the area.
Streets and sidewalks are important social spaces where people interact and walk together, catch a bus, window shop, or stop to talk to a neighbor. The following additional design elements should also be considered when thinking about how to encourage and improve walking and biking on and along the streets in the community. They each play a role in making walking and biking accessible and safe as well as in encouraging more use of local streets.
Driveways are a type of private road that provides access between a public road and adjacent properties. Driveways allow vehicles to cross the sidewalk when entering or exiting the street.

Driveway crossings should be designed so that interactions, slopes and lines of sight accommodate pedestrians and bicyclists also.

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**Important Considerations**

- Drivers are supposed to yield when crossing sidewalks. Unfortunately, this does not always happen, and pedestrians and bicyclists may be put at risk when vehicles pull in and out.
- Minimizing the number of driveway crossings in a sidewalk significantly improves pedestrian and bicyclist safety.
- Driveways can impair the use of sidewalks, particularly for wheelchair users.
- Consolidating driveways can be an effective solution to reducing the number of access points along an existing roadway.
- Avoid abrupt changes in surface height that create a bump for bicyclists turning into or out of a driveway.

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When the driveway has a constant slope, the sidewalk slope has to dip to cross. This is the least-preferred driveway option.

By wrapping the sidewalk around the driveway, this allows the sidewalk to still remain level.

It is best to keep sidewalks two feet clear of hedges, fences, or buildings.

Planter strips allow sidewalks to remain level, with the driveway grade change occurring within the planter strip.

When sidewalks are next to angled parking, wheel stops should be used to prevent vehicles from overhanging into the sidewalk.
Bicyclists expect a safe, convenient place to secure their bicycle when they reach their destination. Bike parking consists of infrastructure that allows a bicyclist to securely and conveniently secure their bike to a fixed location. Bicycle parking is classified as short-term (unattended for a short time) or long-term (unattended for a long period of time) and can be implemented in a variety of ways.

**Additional Design Features**

- A loop may be attached to retired parking meter posts to formalize the meter as bicycle parking.
- Bicycle shelters consist of bicycle racks grouped together within structures with a roof that provides weather protection.
- Removing vehicle parking improves corner visibility.
- Bicycle pavement marking indicates maneuvering zone.
- Remove existing sidewalk bicycle racks to maximize pedestrian space.
- A physical barrier to avoid accidental damage to bicycles or racks.
- Avoid fire zones, loading zones, bus zones, etc.

**Important Considerations**

- Bike parking should be easy to locate and simple to use and be located in a well-lit area.
- Priority locations include: stores, restaurants, residential complexes, offices and public facilities such as transit stops, schools, parks, and libraries.
- The parking area should be a concrete or asphalt surface and large enough to support bicycles locked to the rack.
- Rack design can take many forms, but a preferred design will support the bicycle at two points above its center of gravity and accommodate high security U-shape locks.
- The user should not have to lift the bicycle off of the ground.
Lighting helps motorists, pedestrians and bicyclists see and be seen as they interact and cross travel paths. Street lighting lights up the roadway and intersections. Pedestrian level lighting illuminates pedestrian areas to improve visibility, comfort, and safety. Good lighting is a key component to make people feel safe and secure walking and bicycling in the community.

**Important Considerations**

- Pedestrians are adversely affected by low-light conditions with increased crashes occurring between dusk and dawn.
- Lighting may only be possible when an appropriate supply of electrical power is available or solar power is possible.
- Lighting is especially important at intersections and midblock crossings and around transit stops.
- Other key sites where lighting is needed include: along sidewalks and trails with higher volumes of night-time activity, bicycle parking areas, in commercial pedestrian districts, in higher density residential areas, and near colleges and universities.

Pedestrian-scale lighting is characterized by shorter light poles and closer spacing between lamp posts. Adequate lighting is an important aspect of making intersections clear and visible.
Wayfinding provides information and navigates pedestrians and bicyclists. Wayfinding systems use a clear visual language and consistent signs that can be universally understood to direct pedestrians and bicyclists to their destinations. Wayfinding signs direct bicyclists to the best routes connecting destinations or circumventing barriers, while indicating to motorists that bicyclists may be present.

### Signs & Wayfinding

**Description**

A bicycle wayfinding system consists of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes. There are three general types of wayfinding signs:

- **Confirmation Signs**
  
  Indicate to bicyclists that they are on a designated bikeway. Make motorists aware of the bicycle route.
  
  Can include destinations and distance/time. Do not include arrows.

- **Turn Signs**
  
  Indicate where a bikeway turns from one street onto another street. Can be used with pavement markings.
  
  Include destinations and arrows.

- **Decisions Signs**
  
  Mark the junction of two or more bikeways.
  
  Inform bicyclists of the designated bike route to access key destinations, includes destinations and arrows and distances.

### Important Considerations

- Pavement markings should be repainted and signs replaced as needed. Wayfinding signs should be regularly updated with new major destinations and bikeways.
- A wayfinding system for bicyclists will include signs and pavement markings that are placed at decision points along preferred bicycle routes.
- Colors and logos can be used to ‘brand’ a local walking or biking network.
- Bicycling network wayfinding signs and markings can enhance other encouragement efforts to promote bicycling in the community.
- Wayfinding systems can enhance pedestrian and bicycling circulation and create a sense of place while increasing comfort of those unfamiliar with an area.
Higher vehicle speeds increase the frequency and severity of crashes with pedestrians and bicyclists. Maintaining vehicle speeds closer to those of bicyclists’ greatly improves the safety and comfort of a street.

Vehicle speed can be controlled by slight rises in the road pavement which require a speed reduction to cross.

**Important Considerations**
- Traffic calming can be implemented on a trial basis
- Emergency vehicle response times should be considered wherever street calming projects are being planned
- Traffic calming can deter motorists from driving on a street
- The appropriate level of treatment to apply is dependent on roadway conditions, particularly motor vehicle speeds and volumes
- Slower vehicular speeds improve motorists’ ability to see and react to pedestrians and bicyclists and reduce conflicts at driveways

**Speed Hump**
Neighborhood greenways should have a maximum posted speed of 25 mph. Use traffic calming to maintain speed below 22 mph.

**Offset Speed Hump**
Speed humps are raised areas usually placed in a series across both travel lanes. A 14’ long hump reduces impacts to emergency vehicles. Gaps can be provided in the center or by the curb for bicyclists as well as to allow good drainage.

**Temporary Speed Cushion**
Speed lumps or cushions have gaps to accommodate the wheel tracks of emergency vehicles.

**Raised Crosswalk**
Speed tables are longer than speed humps and flat-topped. Raised crosswalks are a type of speed table marked and signed for a pedestrian crossing.
Traffic can be slowed down by slight constrictions in the horizontal roadway space or by increasing the need for careful maneuvering by drivers. These techniques make drivers feel like they need to travel slower on a street and reinforce the expectation of lower speeds in that corridor.

**Horizontal Traffic Calming**

Traffic can be slowed down by slight constrictions in the horizontal roadway space or by increasing the need for careful maneuvering by drivers. These techniques make drivers feel like they need to travel slower on a street and reinforce the expectation of lower speeds in that corridor.

**Important Considerations**

- Consider how bicyclists can avoid having to merge into traffic when roads are narrowed
- Where possible, provide a bicycle route outside of the element so that bicyclists can avoid having to merge into traffic at a narrow pinch point
- Traffic calming should be designed to minimize impacts to snowplows
- Traffic calming techniques work particularly well in areas that already have well-designed sidewalks. Otherwise, these techniques can be problematic for those with mobility impairments.

**Temporary Curb Extension**

These can installed while maintaining a street width of 20 feet (or 28 feet with parking on both sides). The length of the road construction should be at least 20 feet in the direction of travel.

**Chicane**

Chicanes are a series of raised curb extensions, edge islands, or parking bays on alternating sides of a street forming an “S”-shaped curb, which reduce vehicle speeds by requiring motorists to shift from side-to-side in narrowed lanes.

**Choker or Neckdown**

Chokers or neckdowns extend the curb line into the street, narrowing the street width and slowing drivers.

**Pinchpoint with Bicycle Access**

Pinchponts are curb extensions placed on both sides of the street, narrowing the travel lane and encouraging all road users to slow down. They reduce the size of the curb and further lower motor vehicle speeds.
Routine Local Opportunities
Other occasions arise where walking or bicycling considerations can be added to local conversations. In some cases, there may be routine projects that can be altered or public demand can encourage agencies to reshuffle their priorities and look at an issue that had yet to be considered. These projects can come about from prior public input and ongoing conversations with agency staff.

Planning Projects
Any type of local planning project is an opportunity to bring up walking and bicycling in the community. This includes new and updated Comprehensive Plans, Area-wide Plans, Parks and Recreation Plans, Trail Plans, School Facility Siting and School Rehabilitation Plans. Reading these plan documents and attending advertised meetings are great ways to engage local staff and politicians regarding pedestrian and bicycling needs in the community.

Drainage Facility Replacement
Small bridges or culverts are often the location of walking and bicycling pinch points and their replacement is an important opportunity to improve access. Such structures are particularly expensive and often do not get replaced for many years due to their longevity and costs. It is critical to add walking and bicycling to the conversation when these projects are replaced as the opportunity may not arise again for decades. Additionally, these types of projects may not be advertised publicly. It is important to stay in contact with local staff to become aware of these projects.

Construction Practices
Safe walking and bicycling access should be maintained during construction, regardless of debris or obstacles. As such, it is important for the construction project to have a plan regarding safety and access during the various phases of construction. Maintaining an ongoing relationship with the project manager and establishing a relationship with the construction team will assist in becoming aware of issues.
### Before Construction
- Delays in construction can lead to changes in the safety and access plan.
- Negotiation and acquisition of rights-of-way along the project can lead to delays and occasional changes in the design.
- Utility relocation may impact walking and bicycling access through the project area.

### During Construction
- Adequate access to the roadway, sidewalks or trails should be provided, and if a route is closed, a signed detour should be provided.
- Pedestrians and bicyclists need to be notified in advance of restrictions, detours and closures. This is especially important for the mobility impaired.
- Temporary surfaces should be safe and suitable, with removal of debris as necessary.
- Field decisions can impact how walking and bicycling facilities end up constructed.

### After Construction
- Inadequate compaction can lead to uneven surfaces creating tripping hazards. Uneven settlement can affect the roadway or trail surface impacting bicycle travel also.
- Signs, pavement markings and surface conditions need to be restored to at least previous levels in the impacted area.
- Clean up and restoration of surfaces, facilities and amenities to original condition is needed after a project wraps up.
Maintenance Programs
Routine maintenance of facilities keeps them safe, operational, and often extends their usable life. Regular maintenance of the road includes pothole repair, debris removal, restriping, replacing broken or faulty equipment, and general wear and tear. Maintenance of shared-use trails include repair of damage to the surface caused by invasive roots, maintenance vehicles using the path, and snow and debris removal. A maintenance program needs designated responsibility and funding as well as a mechanism to address future reconstruction.

Road Repaving
Road repaving programs offer opportunities to widen a roadway, include bicycle facilities, or generally improve conditions for bicyclists. Depending on the type of paving, roads may be repaved every 10 to 15 years or more. Repaving work may be the best time to address pinch points, fill in short gaps along routes, or add an extra width to the shoulder. Let local officials know about the aspects of repaving that impact bicycling such as smaller asphalt chip size being preferable for smoother riding surfaces and the problems associated with abrupt edges where new pavement overlay extends only part-way into a bike lane or paved shoulder. If chip sealing is to be performed, request that the smallest possible chip be used on bike lanes and shoulders and that loose chips be swept regularly.

Pedestrian Accessible Design Requirements
Federal law requires all new roadway construction and alterations of existing facilities to be made accessible to people with disabilities. The primary purpose of the Federal Highway Administration’s (FHWA) Americans with Disabilities Act of 1990 is to ensure that all transportation systems, including streets, sidewalks, and transportation facilities, are accessible to people with disabilities. This includes providing accessible pedestrian facilities such as traffic signals, traffic signs, and pedestrian crossings. The FHWA provides guidance on accessible design requirements for roads and highways, including sidewalks, crosswalks, and other pedestrian facilities. This guidance is designed to ensure that these facilities are accessible to people with disabilities, including those who use wheelchairs, walkers, and other mobility aids. The FHWA’s guidance also includes requirements for accessible pedestrian signals, which must be provided at all intersections where pedestrians are likely to cross, and must be accessible to people with visual impairments. These requirements are intended to ensure that people with disabilities have safe and convenient access to transportation facilities, and that they can travel independently and with dignity. The FHWA’s guidance on accessible design requirements for roads and highways is designed to ensure that these facilities are accessible to people with disabilities, including those who use wheelchairs, walkers, and other mobility aids. This guidance is intended to ensure that people with disabilities have safe and convenient access to transportation facilities, and that they can travel independently and with dignity.
(ADA) program is to ensure that pedestrians with disabilities have opportunity to use the transportation network and system in an accessible and safe manner. As part of their regulatory responsibility, FHWA ensures that recipients of Federal funding and State and local entities do not discriminate on the basis of disability in any highway transportation program, activity, service or benefit they provide to the general public; and ensure that people with disabilities have equal opportunities to use public rights-of-way.

**Experimental Requests**

Non-standard roadway features outside of U.S. standards can be requested for use as an experimental treatment. The proposed design will need considerable local official support and must be backed by solid research. All requests for experimentation should originate with the state or local highway agency responsible for managing the location where the experiment will take place. Requests are submitted to the FHWA headquarters.

Through this program, it may be possible to suggest and experiment with new traffic control devices or a different application of an existing device that will improve road pedestrian or bicycling user safety or operation. A successful experiment is one where the research results show that the public understands the new device or application, the device or application generally performs as intended, and the device does not cause adverse conditions. Be aware that agencies seldom proceed with a non-standard pedestrian or bicycle facility design without conducting an official experiment through the FHWA. All requests for experimentation should originate with the state/local highway agency or toll operator responsible for managing the roadway.

The MUTCD Official Rulings is an online resource that contains up-to-date information about requests for changes, experiments, standards, and interpretations related to the MUTCD.

**Rapid Implementation and Pilot Projects**

There are several new concepts being used by progressive communities around the United States to get projects on the ground quickly. Rapid implementation upends the usual order of the design process to install projects temporarily and then refine the design based on public input and actual usage. Pilot projects are another type of temporary project that can play a role in
rapid implementation of a new facility. Pilot projects typically measure several metrics to judge the performance of the project's goals. Both methods involve extensive public outreach and are most suitable for projects like cycle tracks and protected facilities on bridges and include technical observations, and public feedback.

These tools work best in an environment where there is extensive political and official will and high levels of local support.

**Verifying Information**

Errors can creep into projects, particularly if the original information was not correct or if time has elapsed since the project was initiated. Reviewing plans in the field and looking for existing worn paths can reveal forgotten connections or other important existing conditions. Online mapping and street viewing tools can provide a good start to evaluating overlooked conditions and providing graphics for meetings.

It is typically better not to rely on second-hand information and assurances that a project features an important design feature. Check with the local official responsible or the current design drawings. When a design changes, the drawings and plans are altered and previous versions should not be used as a reference as they can be incorrect.

**Walking and Bicycling Tours**

Walking and biking tours of local facilities can be readily organized and are a fun way to get civic leaders and local design officials out and experiencing new facilities on foot or bike. Such tours can serve to **showcase progress and best practices**. They can be effective tools for local officials to learn from one another and initiate peer to peer discussions on implementation. These events can be very effective for building relationships, transmitting ideas about regional opportunities, and building cooperative coalitions for joint funding applications.
Seeing Projects Through
Successful completion of a project is a great moment to **celebrate the achievement**. Even after all the planning and design work has been completed, there are a few last scenarios that make it worthwhile to maintain a relationship with the project team until it is fully built.

**Checking Back In**

Although uncommon, changes can be made right through construction and final completion. It’s worth checking in periodically on the status of the project to see how it’s proceeding. Maintaining contact with the project manager and establishing a relationship with the construction team may assist in becoming aware of changes such as:

- Delays in construction start-up
- Projects can get scaled back due to reduced budgets
- Funding issues can impact phasing stages and connectivity
- Right-of-way negotiation and acquisition can lead to delays and changes in design
- Field errors during construction can lead to modifications to the original design

**Celebrate Success**

Project completion is an occasion for positive media stories, blog articles, and press releases. The opening of a new community facility provides an opportunity for positive publicity and to publicly thank officials. A ribbon cutting ceremony is another good chance to thank all those who helped and an opportunity for a positive local media story. This will serve as a moment to acknowledge the hard work and perseverance of everyone involved.

There may also be opportunities to organize a celebration of the successful construction and implementation of a project. These can be simple in organization ranging from cookies and lemonade at the site or the local community hall. This becomes another occasion to talk to officials, take photos, and present awards for those who played significant roles.

As stories appear in the media, some may raise objections to the spending involved. Be prepared to respond appropriately to negative press or misinformation with the positive benefits and good value of the work, the range of folks involved in supporting the project, and thanking those with vision for the future of the community.
Thank You’s
It is important to send thank you messages or notes to officials and elected representatives to let them know that you appreciate their work and support for projects. Such thanks can take many forms, from hand-written cards to public awards and media acknowledgements. Even in cases when the process may have had difficult moments along the way, acknowledgement and appreciation of all parties involved will go towards smoothing future relations.

Conclusion
Good design can enhance a community for generations to come. Community members have many experiences and interests and can contribute meaningful input to how new facilities are designed and implemented. Public participation is based on the belief that those affected by a decision have a right to be involved in decision making. This guide gives you the tools and insight necessary to meaningfully contribute to that process in your community. The process will require passion, patience, and perseverance; however, this Guide will serve as a stepping stone towards making your community a more walkable, bikable, and livable place.

There are many good things happening for walking and bicycling infrastructure across Indiana. The Indianapolis Cultural Trail has shown how the community can join together and support the installation of a world class downtown pedestrian and bike trail that enriches the community while improving safety and access too. Evansville has successfully converted narrow four-lane streets into streets with three lanes and bike lanes. Bloomington and Elkhart have continued expanding bike lane routes while Carmel’s walkable Arts and Design District has demonstrated how these initiatives have positive impacts on local businesses and residents. Community members have come together to support these local projects, leading to a new legacy of healthier built local infrastructure.
“Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it’s the only thing that ever has.”

- Margaret Mead
Appendix
Glossary of Terms

AASHTO: The American Association of State Highway and Transportation Officials is a national standards-setting body.

Americans with Disabilities Act (ADA): Law prohibiting discrimination and guaranteeing disabled people access to public facilities.

Annual average daily traffic (AADT): The annual number of vehicles on a road divided by 365 days.

Average daily traffic (ADT): Average number of vehicles on a road passing a specific point both ways.


Complete Street: A street designed and operated to allow safe travel for all users.

Comprehensive Plan (or Master Plan): A long-range plan that defines the community goals for development, including transportation.

Contraflow: Travel in the opposite direction to traffic.

Cross section: A cut-through view of the road surface perpendicular to the centerline.

Curb ramp or cut: A ramp leading smoothly from a sidewalk or trail to a street.

DOT: Commonly used acronym for a department of transportation.

Engineering drawings: Drawings or plans that show what is proposed to be built.

Easement: A legal right to use land owned by another. Used sometimes for paths and utilities.

Final design: Preparation of final detailed engineering drawings for review and approval.

Grading: The act of altering the soil to a desired slope by cutting, filling, leveling or surfacing.

Gutter pan: Concrete channel next to the curb for carrying runoff, typically 1-2 feet wide.

Highway Capacity Manual (HCM): Contains computations for the design performance of traffic volumes on roads, published by the TRB.

Leading Pedestrian Interval (LPI): A 3-7 second head start to the pedestrian signal when entering an intersection with a corresponding green signal in the same direction of travel,
Level of Service (LOS): Estimate of the service quality of a road facility under certain operating conditions based on traffic delay and congestion.

Line of sight: A straight line from the eye of the driver, bicyclist or pedestrian.


Preliminary design: The initial phase of design drawings and supporting documents.

Right-of-way (ROW or R/W): Land owned by a jurisdiction that is used for the road, services and adjacent access areas.

Road diet: Reduction in the number of through travel lanes on a roadway, usually to make room for a two-way left-turn and bike lanes.

Sight distance: The length of roadway or shared-use path that is visually unobstructed.

Stop bar (or line): A wide solid white line indicating the required position behind which to stop vehicles.

Striping: Road surface paint lines, which can be solid or dashed, white or yellow.

Striping plan: Plans showing traffic control devices including road striping.

Traffic calming: Set of strategies aimed at slowing down or reducing traffic volume.
SUGGESTED REFERENCES

If further information is needed, there are many design resources available focusing on walking and bicycling. The following suggestions cover walking and bicycling design issues comprehensively. Several are readily available digitally at no cost while others may make worthwhile investments for personal or organizational libraries.

American Association of State Highway and Transportation Officials (AASHTO) Guides

- **AASHTO Guide for the Development of Bicycle Facilities (2012):** The AASHTO Bike Guide (as it is widely known) provides detailed planning and design guidelines on how to accommodate bicycling in most riding environments. It covers the planning, design, operation, maintenance, and safety of on-road facilities, shared use paths, and parking facilities. Order through AASHTO website ($120-$144).

- **AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (2004):** This guide provides detailed information for the planning, design, operation, and maintenance of pedestrian facilities, including signals and signing. The guide details many aspects of pedestrian mobility and varying roadway and facility types. Order through AASHTO website ($85-$102).

National Association of City Transportation Officials (NACTO) Guides

- **NACTO Urban Bikeway Design Guide (2014):** The NACTO Bike Guide (as it is widely known) provides graphics and photos of more recently developed bicycle designs. The NACTO designs are compatible with the AASHTO Bike Guide and demonstrate new and innovative solutions for varied urban settings. Digital version free on NACTO website or order paper version through NACTO ($50).

- **NACTO Urban Street Design Guide (2013):** This guide includes design details with many graphics and photos showing how to transform urban streets to make them more livable and safer for all users. Digital version free on NACTO website or order paper version through NACTO ($50).

Other Useful Documents:

- **Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE):** This guide provides specific tips to effectively select and review engineering, education, or enforcement treatments to improve pedestrian safety. Available through the FHWA website.
• Bicycle Safety Guide and Countermeasures Selection System (BIKESAFE): This guide provides specific tips to effectively select and review engineering, education, or enforcement treatments to improve bicycling safety. Available through the FHWA website.

• Rethinking Streets, An Evidence-Based Guide to 25 Complete Street Transformations (2013): This book provides detailed case studies showing how streets have been redesigned and reimagined around the U.S. Each case study includes before and after data and photos and describes impacts on safety, speeds, the redesign process and key outcomes. Download a free PDF copy or purchase a print copy at the Rethinking Streets website ($40).

• Association for Bicycle and Pedestrian Professionals (APBP) Bicycle Parking Guidelines: This is an informative resource for the selection and proper placement of racks for short-term and long-term bike parking as well as details about ancillary facilities such as lighting, showers, lockers, etc. Order through the APBP website ($20-$45).

• Manual on Uniform Traffic Control Devices (MUTCD) (2009): The MUTCD is a detailed compilation of national standards for all traffic control devices, including road markings, highway signs, and traffic signals. It is primarily employed by engineers and designers in their work. Digital version free on FHWA website or order paper version through AASHTO and other transportation organizations ($50-$60).
Indiana Pedestrian and Bicycle Guide