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World-Class Pedestrian Master Plan: Literature Review

Introduction

As a first step in developing a Pedestrian Master Plan, the Montgomery County Planning Department retained Toole Design Group to conduct a literature review of local, countywide, statewide and international pedestrian and active transportation plans to identify best practices and approaches in pedestrian master planning. The review provides takeaways that support thoughtful development practices and a data-driven planning approach. These lessons are intended to help ensure the safety of all road users consistent with Montgomery County's existing pedestrian programs and goals.

Plans were drawn from Platinum and Gold Level Walk Friendly Communities,[1] Montgomery County Planning staff recommendations and online research. Several types of pedestrian planning documents were included in the review to capture ideas and approaches that may be relevant to the Pedestrian Master Plan: pedestrian master plans, bicycle and pedestrian plans or active transportation plans, addenda to comprehensive plans, pedestrian action plans, implementation plans, pedestrian safety action plans and Vision Zero plans. A total of 34 documents were reviewed in detail and a list of them is provided at the end of this appendix.

Themes to structure the literature review were selected based on topics commonly addressed in pedestrian plans, issues of interest requested by Montgomery Planning staff and emerging topics in pedestrian planning and design. These themes are grouped into the following four sections of this document. For each theme, the literature review identifies general best practices and cites examples of plans that may be models for Montgomery County. The themes are grouped into the following categories:

1. Structure, Process and Priority Concepts
2. Network Planning
3. Implementation
4. Design Guidance

Overall Findings

While bicycle planning has undergone considerable evolution over the last several decades,[2] the review of pedestrian plans revealed a significant amount of consistency and similarity in approach among those plans during that time. One emerging best practice across communities is the adaptation of the Bicycle Level of Traffic Stress methodology to a pedestrian context.

[1] Walk Friendly Communities, Communities, http://walkfriendly.org/communities/

[2] *Elements of a World-Class Bicycle Plan*, Montgomery County Bicycle Master Plan, Appendix C, http://montgomeryplanning.org/wp-content/uploads/2017/12/Montgomery-County-Bicycle-Master-Plan-Appendix-Web.pdf

The most notable plans were structured and organized, their goals clear and consistent, and recommendations well-articulated. A well-crafted plan is tailored to its audience and allows the reader to understand goals and priorities from the beginning, and consistently returns to the stated goals throughout.

Figure 1: Six examples of high-quality plans covering city, county, regional, and state scales, and an international example.

Despite the broad consistency among pedestrian plans, several stood out for their clarity and high-quality content.

- **Charlotte, NC:** This plan is well-organized and sets up a clear framework for the reader from the beginning. The characteristics "safe, useful, and inviting," derived from community input, are used to explain different pedestrian enhancements and to organize the plan. **Standout for organization, vision, goals.**
- **Portland, OR:** Portland's plan is clear about its mission, vision and goals. Icons are used to track the objectives throughout the plan. The standout aspects of the plan are the integration of equity into the document from beginning to end and how it handles outreach. **Standout for outreach, equity.**
- **Indianapolis/Marion County, IN:** The Indianapolis plan concisely communicates its message and content. Graphics are used to communicate complicated ideas. Project prioritization and implementation are clear throughout. **Standout for existing conditions, implementation, project prioritization.**
- **Pima County, AZ:** Pima's land development patterns are similar to those in Montgomery County. The plan does an excellent job of outlining appropriate pedestrian facilities for varying road types and provides clear site-specific examples. **Standout for facilities toolbox, relevance to Montgomery County's development patterns.**
- **North Carolina:** This statewide plan provides specific guidance that is flexible enough to be implemented in any place in the state. The facilities toolbox is clear and implementable. **Standout for facilities toolbox, programs, policies.**
- **London, England:** London's Walking Action Plan sets strong, ambitious goals – generally setting a high bar in its recommendations. It also demonstrates a focus on transit connections. **Standout for goals, ambition, multimodal approach.**

Structure, Process and Priority Concepts

Organization, Vision and Goals

The strongest, most compelling pedestrian plans clearly define the importance of walking, why the plan is needed and what the plan will do to address key issues. The vision and goals are defined in the beginning and are carried through subsequent sections, such as those devoted to prioritization, implementation and performance measurement. The best plans are easy for anyone to read, make a persuasive case to decisionmakers and clearly outline steps to implementation.

The weakest plans rely heavily on a list of projects or tasks, a facilities toolbox or maps to show implementation *without* providing enough context to help the reader understand how the tasks would lead to the overall vision or goal. This approach may be appropriate for implementation or action plans where the context is provided in other planning documents; however, for master plans, context is critical.

The Indianapolis/Marion County Pedestrian Plan and Charlotte Walks Pedestrian Plan stand out in their ability to communicate the need, organization, purpose and indicators for future success.

Beyond a well-organized table of contents, readers of Indianapolis' plan are guided by questions in the header of each page that explain exactly what information is communicated. The purpose and need for the plan are laid out in the first few pages, followed by four goals that are referenced throughout the plan.

Charlotte WALKS is especially successful at balancing readability for community members and technical detail for plan implementation. The use of both the "'Foot notes" sidebars and the tight focus on the plan's central themes make it easy to follow from beginning to end (see Figure 2).

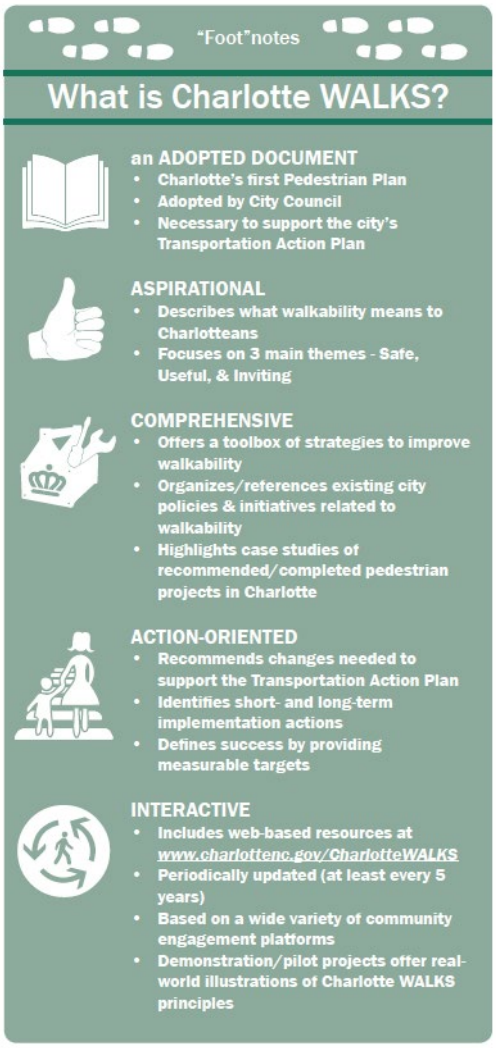


Figure 2: Charlotte WALKS plan overview

Takeaway for Montgomery County: Clearly define the plan's purpose, vision and goals at the outset, and relate subsequent sections back to these critical contextual aspects. Consider section headers and sidebars to ensure these elements are easily identified throughout the plan.

Existing Conditions

Understanding current walking conditions is critical to a world-class pedestrian plan because these conditions inform the plan's approach to goal-setting and prioritization. The best plans provide a clear overview of these conditions and the biggest barriers to improvement. This description should include both qualitative and quantitative data. Relying only on quantitative data can leave out the human-centered perspective that is integral to a pedestrian plan garnering support and spurring action.

Examples of useful quantitative data points for this section include commute mode split, trip purpose and network connectivity. Public outreach is often the best source of qualitative data. Personal anecdotes from people within the community provide an on-the-ground perspective that data cannot. For example, in the Indianapolis/Marion County

Pedestrian Plan, the plan's public outreach feedback identifies specific geographic areas in need of investment and existing drainage and maintenance issues where sidewalks are not provided.

Takeaway for Montgomery County: Existing conditions summaries are often very detailed and lengthy. Montgomery County may consider providing a summary of the existing conditions that are most relevant to plan recommendations in an appendix. This addition will ensure that the plan is readable for the average person, while retaining comprehensive information for reference or implementation. Existing conditions datasets could be made available online and, at a minimum, underlying data sources, such as sidewalk inventories, should be regularly updated, if not the analyses themselves.

Public Engagement

A comprehensive public process is critical to establishing credibility, a sense of legitimacy and community buy-in for a planning effort. Yet, the process is often rushed, or the emphasis is more on fulfilling a requirement than garnering genuine input. The best pedestrian plans go above and beyond superficial comments to make sure they reflect a representative sample of constituencies within their communities and integrate the feedback from these groups into the plan.

PedPDX, Portland's Citywide Pedestrian Plan's online survey, is posted in English, Spanish, Chinese, Vietnamese and Russian, the top languages spoken citywide. In developing the plan, leaders in the Spanish, Chinese, Vietnamese and Russian communities were engaged to promote the survey. City staff monitored the demographic makeup of the respondents while the survey was active so that they could promote the survey to underrepresented groups. Although this strong approach overcame common language barriers to public feedback, it left black/African-American residents underrepresented in the final survey response. The city supplemented the survey results with "Walking While Black Focus Groups" to ensure representation of this community's needs in the plan. The City of Portland Commission on Disabilities also provided useful guidance on messaging and outreach to Portlanders with disabilities.

Similarly, the Saint Paul Pedestrian Plan engaged a steering committee to evaluate the demographics of the survey response to identify under- and over-represented groups. To help fill in the gaps, the plan's developers subsequently engaged with teens, public housing residents, people with limited English proficiency and elders in the community.

The Charlotte WALKS plan notably includes a statistically-valid phone survey. The feedback from that survey informs the development of the three themes – safe, useful, inviting – that underlie the plan. Direct quotes from the survey responses are included throughout the plan document.

Figure 3: Portland's pedestrian outreach in Chinese, Russian, Spanish, and Vietnamese, the four most prevalent local languages other than English.

Common outreach tactics in many pedestrian plans include public meetings, focus groups, walk audits, websites and social media, a steering committee and informal online and in-person surveys (a non-statistically representative sample of the community's population).

Takeaway for Montgomery County: A lesson Montgomery County can learn from these plans is to review the reach and coverage of initial community engagement and use a continual or mid-process audit to assess whether underrepresented community voices are included in the feedback gathered. Based on these results, specific, targeted outreach efforts can be designed and deployed for any missing groups. These efforts might be directed to demographic groups, transportation user groups, people with disabilities, people living in certain geographic areas, such as urban, suburban, or rural areas, or some other group of constituents. For example, Montgomery County Planning could evaluate whether initial outreach participation matches the county's demographic analysis.[3]

Additionally, an established public engagement practice is to partner with community-based organizations engaged with the public already. An emerging trend and best practice is for transportation departments to set aside project budgets to directly pay community groups for their time conducting engagement activities in a planning or design project. For example, Oakland, California, and Portland, Oregon, have both partnered with and reimbursed community-based organizations in this manner.

Equity

In many places, inadequate pedestrian infrastructure and safety concerns disproportionately impact people of color and individuals or families with low incomes or lack of access to private automobiles. In addition, many existing pedestrian facilities are inaccessible for people with disabilities. The best pedestrian plans acknowledge these differences and historic injustices up front and make a clear and measurable commitment to addressing equity issues.

Figure 4: What Does Equity Mean When We Talk About Walking in Saint Paul?


SECTION 1: Introduction

Walking is the most fundamental means of travel. Whether walking for recreation or exercise, going to the bus stop, parking lot or a favorite restaurant, everyone is a pedestrian, even if sometimes people do not identify themselves as such.

Perhaps because of this lack of a self-identified constituency, the shorter distances traveled by foot, and the fact that walking trips are frequently linked with other modes of transportation, pedestrian considerations have not traditionally received the attention relative to their importance as part of the transportation system.

However, attention to pedestrian travel has begun to change in significant ways over the last several years.

During that time, many factors have converged to make walkability, and the closely related and necessary issue of pedestrian improvements, an important consideration in decisions relating to the built environment. Some of these factors are:

Changing residential preferences: A number of studies and reports have been released recently showing that a significant portion of Americans would prefer to live in more walkable communities, where many daily needs can safely be met on foot. To cite one example, 60 percent of respondents, particularly younger respondents, to the 2013 Community Preferences Survey from the National Association of Realtors stated that they prefer to live in a neighborhood where businesses and other destinations are within walking distance. Evidence from reports by CEOs for Cities, the Brookings Institution, and others suggests that walkability is also correlated with higher residential and commercial property values. Within the Tucson region these same preferences have been expressed through regional visioning efforts and local planning.

Note:
The terms "walking" and "walk" are used throughout this document to indicate pedestrian travel, including where travel is done with the assistance of a mobility device, such as a wheelchair. This is done solely for ease of understanding.

Aging Population: The population is getting older. As the share of the population that is over 65 increases, more residents have mobility limitations and other disabilities that affect their transportation choices. To ensure that all residents are able to travel safely and comfortably, even without being able to drive, it is necessary to increase the accessibility of the region's transportation system, particularly pedestrian facilities.

Public Health: Obesity and related chronic diseases have become an area of national concern. A growing number of public health experts identify the built environment as a factor in an increasingly sedentary lifestyle that contributes to a growing obesity rate. For example, The Centers for Disease Controls and Prevention has launched the Healthy Communities Program to reduce community factors which contribute to poor health outcomes. Part of this program includes

Figure 5: The Pima pedestrian plan prominently defines "walk" and "walking" to include people with disabilities and those that use wheeled mobility devices (Page 1).

Equity can be addressed in narrative text and in project prioritization. The best plans do both. Some of the best examples come from the Saint Paul Pedestrian Plan, Pima Association of Governments Regional Pedestrian Plan (see **Error! Reference source not found.**4 and Figure 5), PedPDX Portland's Citywide Pedestrian Plan (see Public Engagement section) and the Fort Worth Active Transportation Plan.

Saint Paul puts equity front-and-center by calling it the "foundation" of the plan. The plan goes on to define what that means for the reader: making sure all neighborhoods are safe, making investments where they are needed (not just

[3] https://stat.montgomerycountymd.gov/stories/s/Demographics/v3bn-3med/

where the loudest voices are heard) and having a transparent, consistent process. Throughout, the Saint Paul plan returns to the idea of equity and how it impacts the choices made in the plan.

Pima's pedestrian plan also addresses language around disability and mobility in the first few pages. The plan acknowledges that there are many different types of users on a sidewalk and that in this plan, all types of users are considered when the terms "walking" or "pedestrian" are used.

Prioritization Factor	Description	Sidewalks
Equity	Majority Minority Area, low-income populations, population of people with disabilities	40%
Demand	Population density, employment density, transit stations/stops, trail heads, schools, and households without access to a motor vehicle	30%
Crash History	Available crash record	20%
Comfort	Pedestrian Experience Index or Level of Traffic Stress	5%
Stakeholder Input	Interactive map priority	5%

Figure 6: The Fort Worth Active Transportation Plan sidewalk prioritization criteria weighted equity 40% of the scoring based on the percentage of minority populations, low-income populations, and people with disabilities.

The Indianapolis plan is a notable example of clearly prioritizing equity. In identifying high priority areas of the city, Indianapolis weighs factors on a scale of 1 to 3. Equity, along with health and safety, were deemed of the highest importance, above comfort, demand and "City priorities." Indianapolis measures equity by identifying areas with "higher concentrations of people with a disability, young people, older adults, households without vehicles, ethnic and racial minorities, people with limited English proficiency, and people living in poverty" because these are communities that are often dependent on transit for the majority of their trips.

The Fort Worth Active Transportation Plan places a heavy weight on equity in order to support the city's Race and Culture Task Force.

The PedPDX plan also lists historic underinvestment as the first of six objectives that the plan's implementation strategies are designed to address.

Takeaway for Montgomery County: The Montgomery County Pedestrian Master Plan should ensure that the equity content is consistent with, or advances, other efforts in the county to promote equity and make investments in underserved communities. For example, the plan could acknowledge relevant historic differences in infrastructure or housing access up front and make a clear and measurable commitment to addressing local equity issues.

Safety

Safety is a common priority for pedestrian plans. A pedestrian master plan should be focused on the goal of eliminating fatal and serious injury crashes (Vision Zero policy). The Montgomery County Council adopted a Vision Zero resolution in 2016 and the Council approved a two-year Vision Zero Action Plan in November 2018.

Implementing Vision Zero on behalf of pedestrians requires:

- Identifying the fatal and serious injury crash types, causes and locations through proactive safety analysis.
- Developing specific engineering strategies to eliminate those crashes, including low-cost interim countermeasures.
- Separating pedestrians (both crossing and walking along the street) from motor vehicles traveling 25 miles per hour or more—or, where appropriate, lowering vehicle speeds to below this level.
- Providing protected crossing phases for pedestrians at all signalized crossings.
- Ensuring crossing opportunities at least every 400-600 feet in areas where people may need to cross (urban areas, commercial and transit corridors, near schools, etc.).
- Prioritizing transportation improvements in favor of the most vulnerable populations, including pedestrians.

Figure 7 shows an example from a pedestrian plan of priority intersection recommendations for pedestrian engineering improvements.

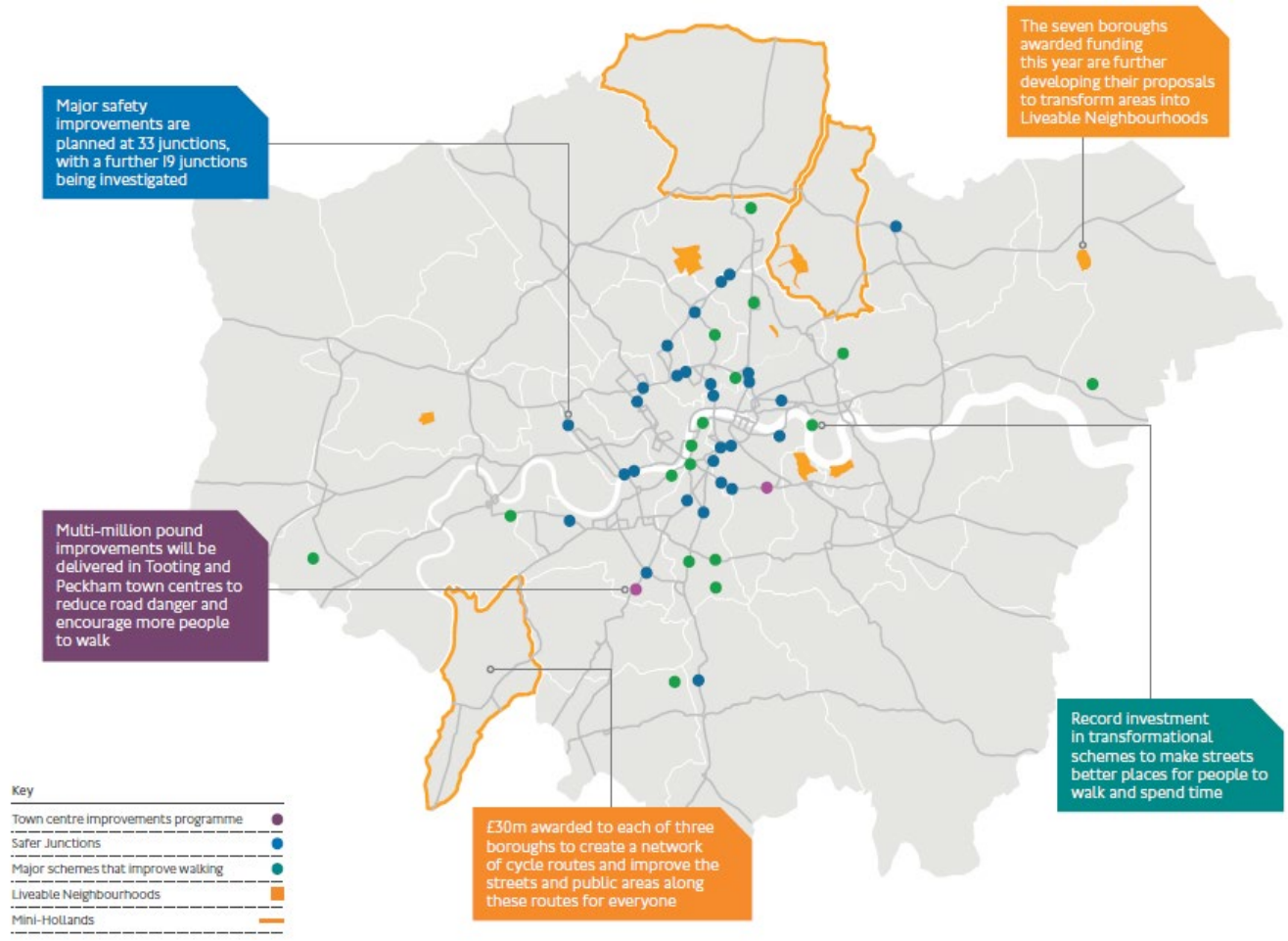


Figure 7: In this London Walking Action Plan graphic, blue dots show the location of major safety improvement projects at 33 intersections.

Takeaway for Montgomery County: The county's Pedestrian Master Plan should support and, where applicable, include recommendations from the Vision Zero Action Plan. Locations where fatal and serious injury crashes are historically overrepresented, or those that are projected to have a high risk of fatal or serious injury crashes, could be prioritized for safety improvements based on proactive safety analysis. Low-cost safety countermeasures could be identified for wide-scale application to quickly improve pedestrian safety across the county.

Land Use

The planning, design and anticipated use of pedestrian facilities strongly interact with the surrounding land uses where they are located. For example, urban sidewalks located where pedestrian volumes are expected to be higher should be wider than those in most suburban and rural contexts. The City and County of Denver Pedestrian Master Plan includes a goal to link land use, transportation and pedestrian systems to encourage mixed-use development. WalkBikeNC has a section on land use and transportation integration.

Charlotte WALKS provides an interesting treatment of land use, which defines and illustrates what “safe,” “useful,” and “inviting” mean for pedestrian design in urban and suburban contexts. The graphic shows how different design elements should be provided in high-rise commercial areas compared to low-density residential areas (see Figures 8 and 9). The plan calls for the city to “allow greater land use flexibility so residents can walk to a healthy mixture of neighborhood commercial uses.”

Figure 8: The Charlotte WALKS plan illustrates components of walkability (safe, useful, inviting) for urban neighborhoods.

Figure 9: The Charlotte Walks plan illustrates distinct components of walkability for suburban neighborhoods.

Takeaways for Montgomery County: Montgomery County contains a variety of land uses within its jurisdiction. Illustrating what appropriate and high-quality pedestrian design looks like in different parts of the county could help communicate important concepts during community meetings and in the plan document. It would also help planners and roadway designers understand how to meet pedestrian needs throughout the county.

Because many plans do not address land use context in significant detail, this is an area where Montgomery County can demonstrate leadership by addressing the topic in greater depth, as is appropriate for such a diverse county. For example, beyond just evaluating roadway design standards, staff could review land development regulations and parcel development design standards as a component of the pedestrian plan (e.g. first floor permeability and placement of parking lots behind buildings).

Network Planning

Sidewalk networks are different from bicycle networks in that most communities strive for full sidewalk coverage on their streets, so a map depicting sidewalk recommendations is not always necessary. That said, some plans use a conceptual network framework to organize and prioritize their recommendations, and the need to construct new sidewalks may vary between areas with different land use character or expected pedestrian use.

For example, Portland Metro organizes its pedestrian network into pedestrian districts, pedestrian parkways, regional pedestrian corridors and local pedestrian connectors. This framework allows the jurisdiction to understand the function of various roads and trails within the overall pedestrian network.

The following topics can be highlighted in pedestrian plans' treatment of pedestrian networks, though not every topic is addressed in all plans.

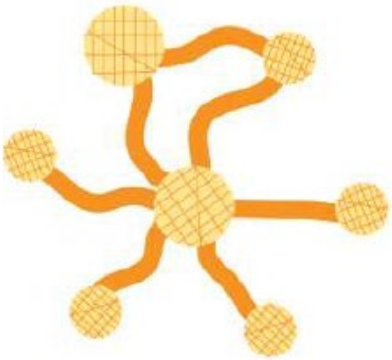


Figure 10: Conceptual illustration of Portland Metro's regional pedestrian parkways connecting pedestrian districts

Transit Connections

Connecting high-quality pedestrian facilities with transit stops and transit corridors helps people get where they need to go safely without a car. Many plans accomplish this goal by using transit proximity as a prioritization tool. The best plans go beyond prioritization and address transit connections directly.

London's Walking Action Plan has a chapter dedicated to integrating walking with public transport. One of the focal points is how to convert driving trips to the outer rail stations into walk trips. The plan seeks to accomplish this objective by improving the extent to which pedestrian networks penetrate barriers like highways, waterways or land development patterns to make walking trips shorter in distance than driving trips. It also aims to improve signage, enhance access to streets near the stations, upgrade the accessibility of transit stops and pathways for people with disabilities, and prioritize connectivity to transit stops in all new developments.

Takeaways for Montgomery County: Montgomery County should continue and expand the use of pedestrian level of comfort analysis for area plans to determine the comfortable accessibility of transit stops. The Pedestrian Master Plan could use an access to transit variable in its prioritization process to identify and prioritize key projects that are needed to improve connectivity to Metrorail, MARC, Purple Line and high-ridership or high-frequency bus stops.

Trail Connections

Despite the benefits of connecting pedestrian facilities to off-street trails, relatively few pedestrian plans discuss this issue in detail. The Portland Metro Regional Active Transportation Plan and the Fort Worth Active Transportation Plan are the exception in highlighting the special role of trails and multi-use paths in connection with pedestrian facilities. As with a well-connected bike network, well-connected pedestrian facilities will likely encourage more use. Multi-use paths and trails can provide important utilitarian transportation connections for people of all ages and abilities to get where they need to go. They also provide great places for these same facility users to enjoy recreation.

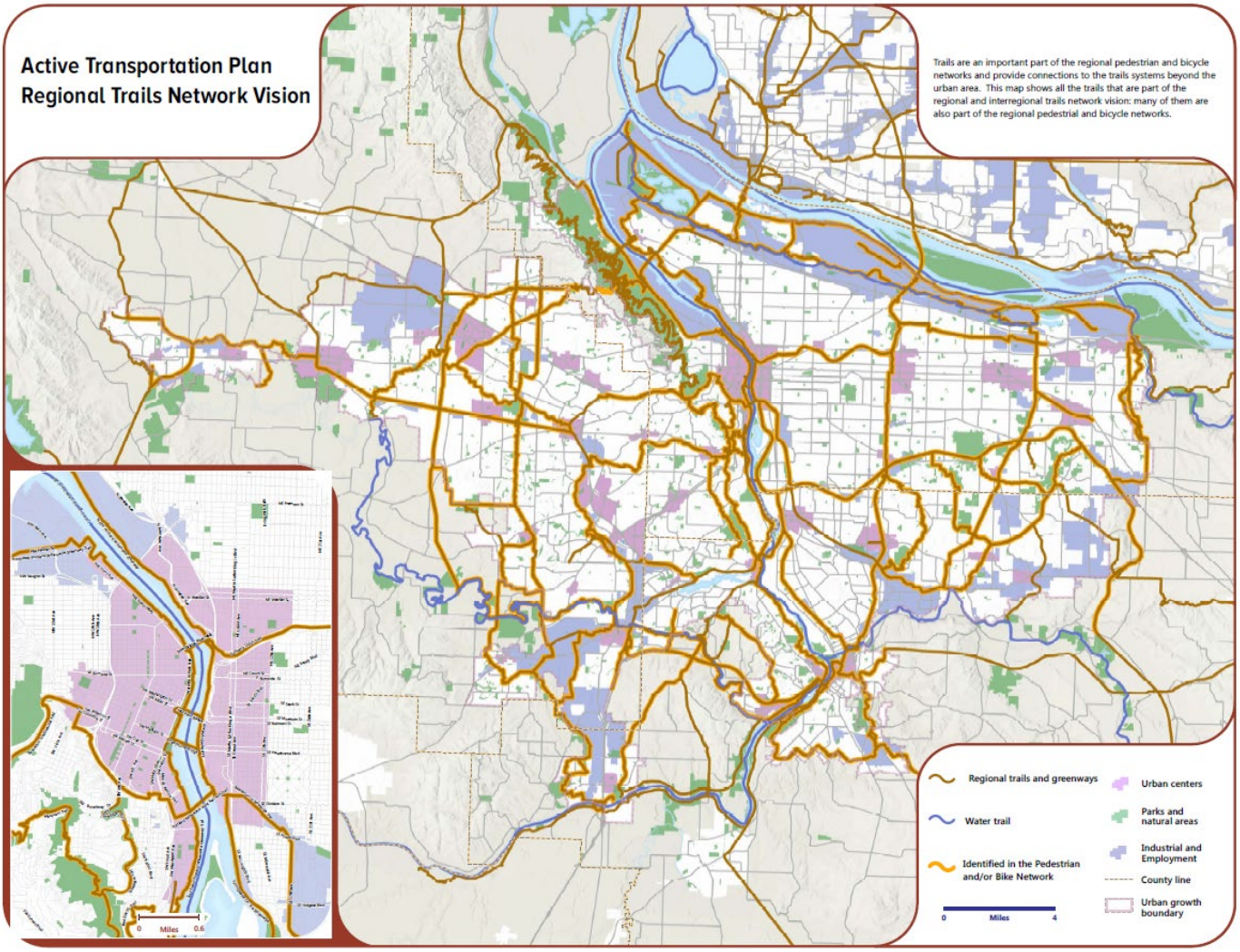


Figure 11. Portland Metro Active Transportation Plan Regional Trails Network Vision

Takeaways for Montgomery County: Montgomery County has an extensive network of trails for pedestrians and bicyclists, and should consider using proximity to trails in network planning and prioritization.

Connection to Schools

Many plans address pedestrian connections to schools, either in how they prioritize projects or through a formal Safe Routes to School program. Almost every plan reviewed referenced a Safe Routes to School program. The best plans prioritize pedestrian improvements in and around school zones and provide clear action items to address safety for children, families, teachers and school staff.

The Charlottes WALKS plan has a goal of adding 10 miles of sidewalk and 20 new pedestrian crossings each year. Most of these routes are slated to be within ¼ mile of a school. The plan also acknowledges that many school districts will need to coordinate with transportation and planning agencies to pursue collaborative Safe Routes to School projects.

The PedPDX plan prioritizes traffic calming measures in areas designated within the Safe Routes to School zone and the Denver plan identifies schools as one of the highest factors during prioritization. Both approaches ensure that pedestrian facilities around schools are prioritized.

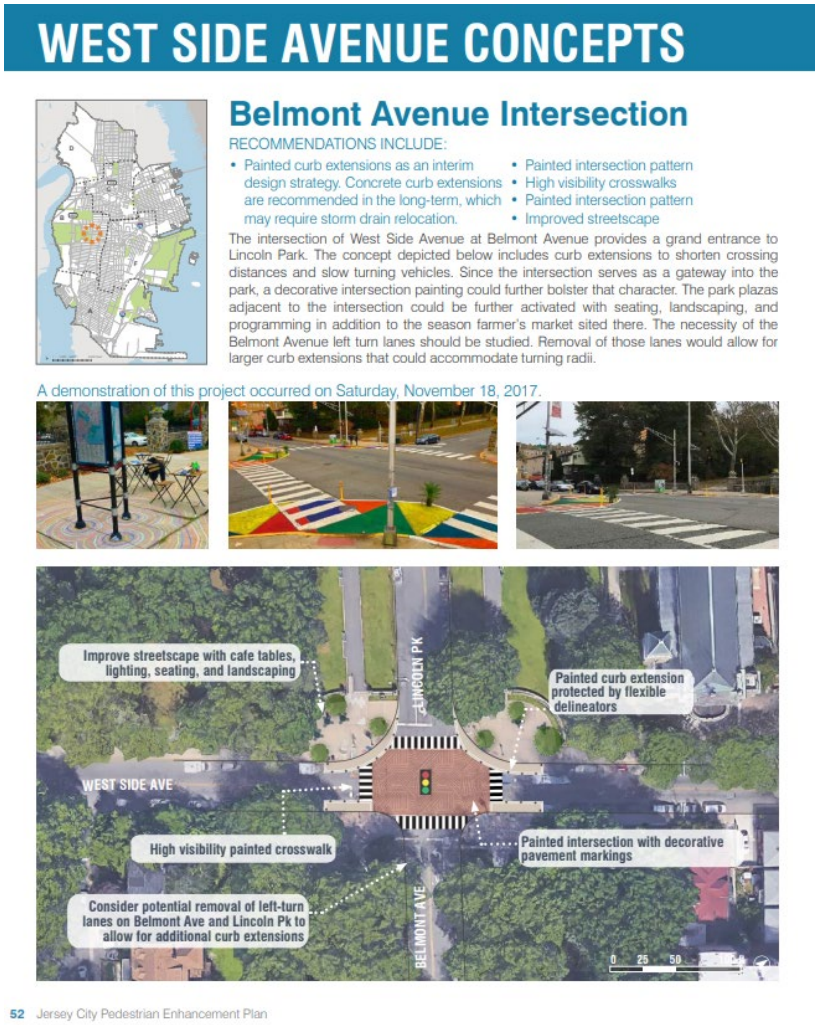


Figure 4: A detailed intersection improvement cut sheet in the Jersey City Pedestrian Enhancement Plan

Takeaways for Montgomery County: Montgomery County's Pedestrian Master Plan should support coordination with schools across the county and the county's Safe Routes to School program, providing an opportunity to increase buy-in from school principals, administrators and parents. It could prioritize investments in and around school zones and provide clear action items to improve safety in these locations.

Intersections

Plans address street intersections in various ways that range from broad policy and design recommendations (facility toolbox) to prioritized project lists and more detailed project description forms (see Figure 122 for an example). The appropriate approach depends on the needs, capacity and size of the jurisdiction.

Takeaways for Montgomery County: While providing detailed project description forms for the full county is unlikely to be feasible, Montgomery County could consider providing detailed project recommendations for several intersections to illustrate different design concepts introduced in the plan.

Implementation

A plan is only useful if it can be followed and implemented. The best plans take a critical eye to existing implementation processes and consider whether they may be tweaked to make delivery of plan recommendations easier and more likely. Planners should identify potential barriers to implementation and consider whether they need to be addressed through policy changes, new coordination methods or other strategies. Plans must also make the (potentially revised) implementation process graphically clear to the reader and use measurable action items and action verbs to provide clear direction.

The Indianapolis/Marion County Pedestrian Plan lays the groundwork for the implementation section in its recommendations section. Before outlining detailed recommendations, the plan presents a full-page graphic explaining how to read the recommendations to ensure readers understand what the section communicates. The Santa Monica Pedestrian Action Plan also takes a unique approach to implementation in its programming section. Under each program, the plan provides a description of what the program would look like with a baseline-, moderate-, or high-effort implementation.

Figure 5: An example of an introduction to a plan implementation section from Indianapolis/Marion County that clearly explains how to interpret the subsequent recommendations.

Takeaways for Montgomery County: Montgomery County's implementation plan should provide clear, concise and sufficiently-detailed information to direct staff activities. Given the needed coordination between planning and implementation agencies in Montgomery County, the Montgomery County Department of Transportation should be heavily involved in developing an implementation plan.

Project Recommendations

Pedestrian plans address network recommendations in a variety of ways, requiring varying levels of data and staff effort.

One or more of the following strategies were used in high-quality plans to develop project recommendations:

- Make policy recommendations and offer design guidance to describe when and how to build, repair or replace sidewalks and improve intersections.
- Identify high-level barriers created by highways, rivers, railroads and topography that could be addressed by large capital projects like bridges and tunnels, or barriers created by traffic conditions (see Figure 14).
- Analyze high-crash intersections.
- Inventory sidewalk gaps, either citywide (e.g. Fort Worth) or only on thoroughfares (e.g. Charlotte).
- Prioritize sidewalk and intersection projects.
- Recommend trails, shared use paths and side paths.
- Recommend transit or school access improvements.
- Provide cost estimates and implementation schedules.

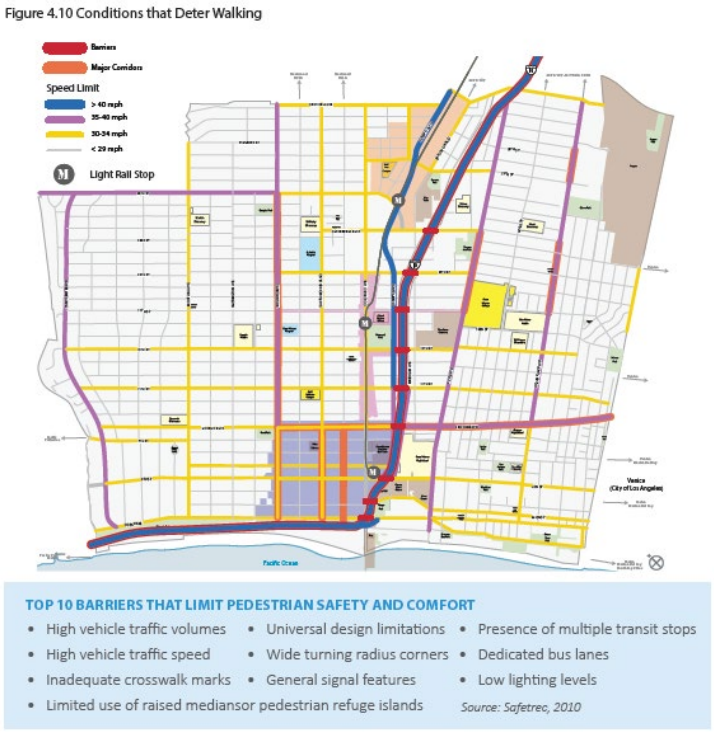


Figure 6: Santa Monica map showing the location of key barriers

The appropriate approach depends on the specific needs, available data, funding context and authority, and staff capacity of the jurisdiction.

Takeaways for Montgomery County: Montgomery County can use its formal pedestrian level of comfort analysis, based on factors such as sidewalk width, speed limit, sidewalk gaps and intersection characteristics to develop project recommendations based on locations in need of pedestrian comfort improvement. Additional factors, such as a barriers or gaps analysis, or the plan's network planning outputs, may also inform project recommendations.

Project Prioritization

A plan's project prioritization process and results should be clear and understandable to every reader. Being transparent about prioritization can help set community expectations and facilitate an easier implementation process. Prioritization can also indicate the intentions of a plan. For example, if safety near schools is a stated goal, it should be evident in the prioritization process. This transparency is especially important in plans that cover larger areas, like county and statewide plans, because there are more facilities to prioritize.

The Indianapolis/Marion County Pedestrian Plan is one example. The county identifies high-priority areas through the components of health, safety, equity, comfort, demand and city priority. Each factor is explained and given a weight. For example, the health factor is an index comprising local health indicators, including access to grocery

stores, parks and greenways, and rates of obesity, diabetes and heart disease.[4] Areas with poor health outcomes are prioritized for pedestrian projects, since increased access to pedestrian infrastructure can improve those local outcomes.[5] [6] These layers are combined to create a county-wide map of high-priority areas. Within these areas, the plan lists a combination of capital improvement projects, projects listed in other plans, a list of projects from high-crash corridors and areas without sidewalks. These projects are scored based on the high-priority areas. This ranking helped the county narrow down a large list of projects into the ones of highest priority.

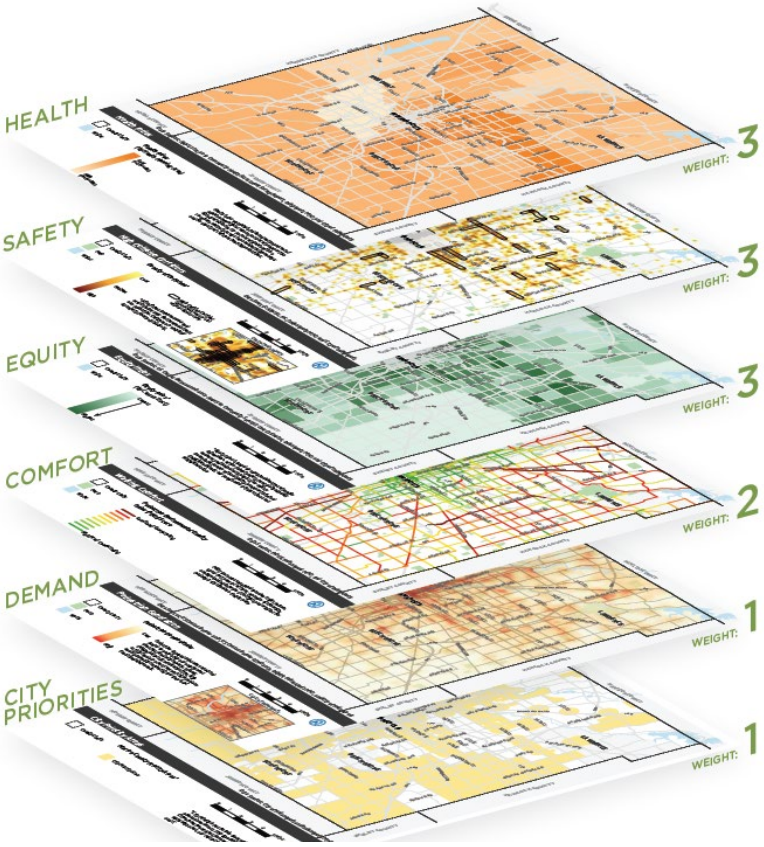


Figure 7: Prioritization image from the Indianapolis/Marion County Plan

In addition, as a component of its larger prioritization framework, Charlotte WALKS is notable in also identifying priority action items that could impact the long-term success of the plan. For example, it notes key policies that were major barriers to safer walking. One such policy is the city's 50 percent rule sidewalk exemption, which exempts development that utilizes less than 50 percent of the property from building sidewalks. Without changing that policy, Charlotte is unable to move toward a connected sidewalk network.

Takeaways for Montgomery County: Montgomery County should make sure that its prioritization process reflects the goals and values established in the plan, which should be guided by public input. Multiple factors can be used to prioritize improvement projects, such as comfort, demand, equity, health and safety factors.

[4] For more information, see Indianapolis/Marion County Pedestrian Plan p. 20 or the Plan4Health initiative.

[5] Smart Growth America. Complete Streets Promote Good Health. https://www.smartgrowthamerica.org/app/legacy/documents/cs/factsheets/cs-health.pdf

[6] Center for Health Progress. 2017. Walking Where the Sidewalks End. https://centerforhealthprogress.org/blog/walking-sidewalks-ends/

Performance Measures

Performance measures typically fall under two distinct categories: outcome-based and programmatic. Outcome-based performance measures quantify the potential results from implementation of projects or policies. For example, “percent of Portlanders commuting to work by walking” is an example of a population and behavior-based performance measure. Programmatic performance measures consider steps taken by an agency, such as “X miles of sidewalk added.” As in other plans, pedestrian plan performance measures should measure what is important and be quantifiable using available data or data that can be reasonably collected and maintained. The best plans resolve the inherent tension between those two aspects by being thoughtful and selective about the outcomes they choose to track.

Table 6.1 Pedestrian Report Card indicators

Indicator	Trend	Data Source	Partner Organization	Frequency	Level of Reporting Effort
PEDESTRIAN ACTIVITY/MODE SHARE					
Walk Trips as % of Work Trips	Increase	American Community Survey; local household survey; Travel Diary Survey	NA	Every five years in response to ACS update; biannual household survey)	Low
Walk Trips as % of All Trips	Increase	National Household Travel Survey; Local Household Survey	NA	Biannual	High
Walk Trips as % of School Trips	Increase	School Tally; Local Household Survey	PTA/SMMUSD	Annual	Medium
Number of Car Trips of Less Than One Mile	Decrease	Local household survey	NA	Biannual	High
Number of pedestrians in selected count locations	Increase	Traffic movement counts are conducted biannually	NA	Biannual	Medium
Number of students walking and bicycling to school on Bike it Walk it Day	Increase	Bike it, Walk it Day surveys	SMMUSD	Annual	Medium
% of Santa Monica employees reporting that they are walking to work	Increase	Transportation Demand Management employer survey responses	TMA	Annual	Low
PEDESTRIAN SAFETY					
Number of pedestrian fatalities and severe injury collisions	Decrease	SMPD crash data	SMPD	Annual	Low
Number of traffic-related pedestrian collisions per 1000 population counts	Decrease	SMPD crash data	SMPD	Annual	Low
Change in vehicle speeds on high priority pedestrian corridors	Reduction in 85th percentile vehicle speeds	Speed Survey	SMPD	Every 5 Years	Medium
Number of School Site Access Improvements	Increase	Capital Improvement Project Reporting	Public Works	Biannual	Low

Figure 8: Pedestrian Report Card Indicators from Santa Monica’s Pedestrian Action Plan.

Takeaways for Montgomery County: Montgomery County should identify available data and metrics to measure progress toward the goals identified in the plan. The performance metrics should be closely tied to the plan’s goals and should give a clear sense of progress both in terms of agency action and outcomes.

Policies and Programs

Thinking beyond just physical improvements and network connections, a well-rounded set of policies and programs can help foster a safer pedestrian environment and encourage walking. The plan could link to existing programs and objectives such as Vision Zero, Complete Streets, Safe Routes to School and county sustainability goals.

A few standout policies to consider are:

Crossing visibility (PedPDX): Implement vision clearance guidelines at uncontrolled crossings in conjunction with state and local capital projects, development review and paving projects. Evaluate the need for vision clearance

guidelines at controlled crossings and on local streets. Update state and local design guidance to maximize the use of curb extensions, floating curb extensions and interim painted curb extensions within the pedestrian network at both controlled and uncontrolled crossings.

Signal timing (Indianapolis): Optimize signal timing to separate and reduce conflicts between pedestrians and vehicles. This timing can have positive impacts on safety. Creating and implementing a policy regarding signal timing can ensure that it is considered at every intersection.

Banning right turns on red (Jersey City): Right turns on red are a common pedestrian-vehicle conflict in the roadway. In high-volume pedestrian areas, it is recommended to ban all right turns on red to reduce the chance of a collision.

Right-sizing municipal vehicles (Jersey City): Fire engines and other municipal vehicles are often cited as a reason why streets cannot accommodate certain pedestrian improvements like bump-outs or road diets. One way to fix this issue is to purchase smaller trucks that can maneuver more easily in a pedestrian-friendly environment.

ACTION	IMPLEMENTING VS. FUTURE ACTION	CATEGORY	LEADING ROLE
2.1 Implement vision clearance guidelines at uncontrolled crossings in conjunction with PBOT capital projects, development review, and paving projects.	Implementing Action (policy adopted with PedPDX)	Policy	PBOT Capital Delivery Division; PBOT Development Review; PBOT Parking
2.2 Identify key intersections for retroactive vision clearance improvements by Safe Routes to School, Neighborhood Greenways, Vision Zero, and Pedestrian Network Completion programs.	Future Action	Infrastructure	Vision Zero; Safe Routes to School; Neighborhood Greenways; PBOT Traffic Investigations
2.3 Evaluate the need for vision clearance guidelines at controlled crossings and on local streets.	Future Action	Policy	City Traffic Engineer
2.4 Provide high visibility crosswalks at all marked crossings when restriping or providing new crosswalks.	Implementing Action (policy adopted with PedPDX)	Infrastructure	PBOT Capital Delivery Division; PBOT Maintenance Operations
2.5 Clarify design guidance for tree location within the right-of-way.	Future Action	Policy	Urban Forestry; City Traffic Engineer
2.6 Update PBOT design guidance to maximize the use of curb extensions, floating curb extensions, and interim painted curb extensions within the Pedestrian Priority Network at both controlled and uncontrolled crossings.	Future Action	Policy	Streets 2035 Project Manager; PBOT Modal Coordinators; City Traffic Engineer

Figure 9: Policies to improve pedestrian visibility at crossings

Curbside management (multiple): With many new mobility devices, such as e-scooters and dockless bikes, as well as shared vehicles, curb space is at a premium. The best plans acknowledge this issue and provide recommendations for managing the curb space and ensuring it remains pedestrian-friendly.

Neighborhood slow zones (Jersey City): Neighborhood residential areas in particular should accommodate children, families and older people. With the expansion of navigation apps that encourage travel through neighborhoods, it is more common to see higher traffic on previously low-traffic roads. In addition, roads with posted speeds of 25 miles per hour can often see higher actual speeds. Lowering speed limits on lower volume residential roads to 15 or 20 mph, coupled with traffic calming treatments, can improve safety outcomes for everyone.

Temporary street closures (multiple): Sometimes called open, play or pedestrian streets, temporary street closures provide space for walking and other non-motorized travel on a section of a street for a day or regular hours every week. This program is a great way to get people outside and connect residents to their neighborhood and local economy.

Takeaways for Montgomery County: Montgomery County could enact policies to complement the physical improvements outlined in the plan, such as those listed in this section.

Design Guidance

Providing design guidance helps an agency integrate good pedestrian design as a routine part of street design. The best guidance provides a visualization of different types of roadways and shows clearly how to improve them.

Facilities Toolbox

Many pedestrian plans use a facilities toolbox to present the current best practices in designing for pedestrian safety and comfort. The best toolboxes are easy to read, graphically appealing, include relevant local examples (where available) or those from comparable communities, and provide the reader with a good understanding of where to implement each treatment.

The Pima Association of Governments Regional Pedestrian Plan includes a facilities toolbox that is a good example of place-based examples with clear guidelines based on roadway type.

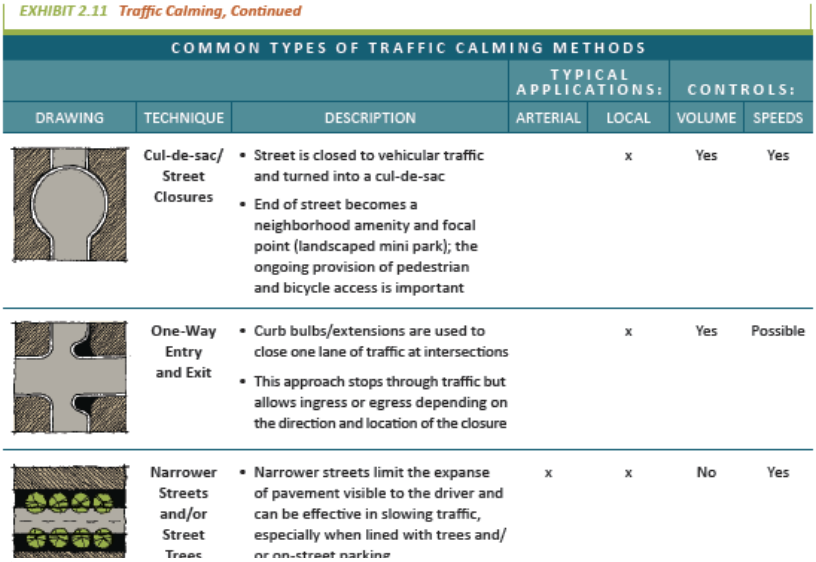


EXHIBIT 2.11 Traffic Calming, Continued

COMMON TYPES OF TRAFFIC CALMING METHODS

DRAWING	TECHNIQUE	DESCRIPTION	TYPICAL APPLICATIONS: ARTERIAL	TYPICAL APPLICATIONS: LOCAL	CONTROLS: VOLUME	CONTROLS: SPEEDS
	Cul-de-sac/ Street Closures	• Street is closed to vehicular traffic and turned into a cul-de-sac • End of street becomes a neighborhood amenity and focal point (landscaped mini park); the ongoing provision of pedestrian and bicycle access is important		x	Yes	Yes
	One-Way Entry and Exit	• Curb bulbs/extensions are used to close one lane of traffic at intersections • This approach stops through traffic but allows ingress or egress depending on the direction and location of the closure		x	Yes	Possible
	Narrower Streets and/or Street Trees	• Narrower streets limit the expanse of pavement visible to the driver and can be effective in slowing traffic, especially when lined with trees and/ or on-street parking	x	x	No	Yes

Figure 11: Example image from the Hawaii Statewide Pedestrian Master Plan and Pedestrian Toolbox

The WalkBikeNC North Carolina Statewide Pedestrian and Bicycle Plan provides an overview table of the relationship between the recommended facilities and a range of state, federal and best practices guidelines. Hawaii also has a useful facility toolbox. It is an addendum to the pedestrian plan and gives the reader clear instruction on the type of intervention, the typical application and if the intervention can help control volume, speed or both.

Summary of Complete Streets Compliance with National and State Standards and Guidelines

	FHWA MARKING COMPLIANCE	FACILITY DESIGN GUIDELINES COMPLIANCE				
	FHWA MUTCD (2009)	AASHTO GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES (2012)	NACTO URBAN BIKEWAY DESIGN GUIDE (2012)	ITE DESIGNING WALKABLE URBAN THOROUGHFARES: A CONTEXT SENSITIVE APPROACH (2010)	NORTH CAROLINA BICYCLE FACILITIES PLANNING AND DESIGN GUIDELINES (1994)	NORTH CAROLINA DEPARTMENT OF TRANSPORTATION COMPLETE STREETS PLANNING AND DESIGN GUIDELINES (2012)
Bicycle Focused Treatments						
Shared Roadway Facilities						
Unmarked Wide Outside Lane	★★★	✦	○	○	✦	○
Signed Bike Route	★★★★	✦	○	○	✦	✦
Shared Lane Markings	★★★★	✦	✦	○	○	✦
Bicycle Boulevard	★★★★*	✦	✦	○	○	○
"Home Zone"	★★★*	○	○	○	○	○

Figure 10: Image of a table in the WalkBikeNC Plan that shows how a range of guidelines address various facility types

Takeaways for Montgomery County: Montgomery Planning should provide design guidance that considers the diversity of land use contexts throughout the county. To communicate with a broad audience, the department should invest resources in graphic design to make a clear and attractive guide. To support the work of roadway designers, Montgomery Planning should coordinate with the Montgomery County Department of Transportation and other agencies and policymakers to ensure buy-in and consistency with street design guidelines.

Lighting

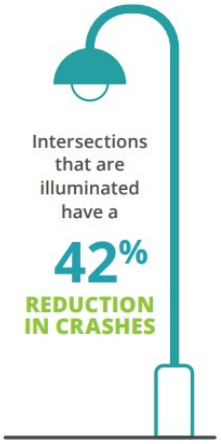
Lighting is a critical to pedestrian safety and comfort at night, but many plans are not clear about how much lighting is needed to reach a sufficient level of illumination. Some plans include design-based guidelines about lighting.

The PedPDX Plan is one exception. The plan has a lighting strategy and several action items that directly address lighting issues. The efforts to brighten streets are prioritized in high crash corridors, pedestrian priority streets and underserved areas. The plan also includes a goal of implementing new lighting guidelines. Additionally, the plan has a section of the appendices dedicated to lighting that explains how to calculate the correct level of lighting for a roadway based on its functional class.

Strategy 6
Provide adequate street lighting for pedestrians

Table 14: Index of Strategy 6 Actions

ACTION	IMPLEMENTING VS. FUTURE ACTION	CATEGORY	LEADING ROLE
6.1 Implement new lighting level guidelines in conjunction with capital projects and private development.	Implementing Action	Infrastructure	PBOT Signals and Street Lighting; PBOT Capital Delivery Division; PBOT Development Review
6.2 Strategically improve street lighting conditions to increase visibility of (and for) pedestrians on our streets, focusing investment on High Crash Corridors and locations, Pedestrian Priority Streets, and underserved areas.	Future Action	Funding	PBOT Signals and Street Lighting; Vision Zero
6.3 Address locations where street lighting is blocked by tree canopy.	Implementing Action	Maintenance	Urban Forestry; PBOT Signals and Street Lighting



Source: Oregon Department of Transportation's Crash Reduction Factor Appendix

Figure 20: Pedestrian Lighting recommendations from PedPDX

Takeaways for Montgomery County: Consider adopting new lighting guidelines, pursuing a lighting inventory, investing in facility improvements, or defining complementary strategies and actions to improve lighting on trails, along street segments and at pedestrian crossings.

Conclusion

This review of leading pedestrian plans offers insights about plan goals, existing conditions analyses, public engagement, equity, land use, network connections, implementation policies and processes, performance measures and design guidance that can be applied by Montgomery County to inform the pedestrian planning process. These findings are summarized below within each broad pedestrian master planning category identified throughout the literature review.

Structure, Process and Priority Concepts

Leading pedestrian plans have strong organization, clear vision and measurable goals tied to concrete actions and outcomes. Existing conditions concisely advance the other components of the plan, and any supplementary analyses or methodologies are presented in appendices. Public engagement in the planning process reaches all community voices—including historically underserved populations and communities—in all predominant languages spoken in the area. Compensated partnerships with community-based organizations that have existing ties to these constituencies is an emerging best practice to facilitate this type of engagement. The plans acknowledge historic injustices and differences in transportation access or investment up-front and advance equity both in the plan's text and how projects are prioritized. The plans are centered on a broad and inclusive definition of "pedestrian" and "walking" that considers universal design principles. High-quality pedestrian design examples are clearly illustrated to communicate the plan's concepts to all stakeholders and, finally, land development regulations and design standards are reviewed for compatibility with the plan's goals.

Network Planning

The best plans analyze network connections, such as transit connections, trail connections, connections to schools and intersections, to prioritize key projects that improve connectivity and safety in priority locations. Montgomery County could apply its pedestrian level of comfort (PLOC) analysis to walksheds around rail and high-ridership or high-frequency bus stops or areas surrounding schools to analyze these connections. Leading plan examples also provide detailed project description forms for several intersection types to illustrate different design concepts that could be applied in various contexts.

Implementation

The best plans provide clear, concise and detailed information to direct future projects and staff activities. They ensure prioritization reflects the plan's goals and values by transparently analyzing multiple factors tied to those goals, such as comfort, equity, safety and others. They identify available data to measure progress toward the plan's goals, both in terms of agency actions and outcomes, and advance policy recommendations to complement physical improvements.

Design Guidance

Ideal pedestrian plan design guidance considers the full diversity of land uses. Coordination of design guidance development across agencies responsible for plan implementation ensures buy-in and consistency with existing design guidelines. The best plans also address lighting design—a critical pedestrian safety aspect—through the adoption of modern lighting guidelines, lighting inventory planning, and other complementary lighting aspects to enhance pedestrian safety.

Plans Reviewed

Plan Name	City/State	Type	Year
United States Plans			
Arlington Master Transportation Plan - Pedestrian Element	Arlington, VA	Section of a Transportation Plan	2008
Bellingham Pedestrian Master Plan	Bellingham, WA	Pedestrian Master Plan	2012
Boulder Pedestrian Crossing Treatment Installation Guidelines	Boulder, CO	Guidelines	2011
Charlotte WALKS Pedestrian Plan	Charlotte, NC	Pedestrian Master Plan	2017
City of Concord Pedestrian Master Plan	Concord, NH	Pedestrian Master Plan	2017
Costa Mesa Action Transportation Plan	Costa Mesa, CA	Active Transportation Plan	2017
District of Colombia Pedestrian Master Plan	Washington, DC	Pedestrian Master Plan	2009
District of Colombia Multimodal Long-Range Transportation Plan Pedestrian Elements	Washington, DC	Section of a Transportation Plan	2014
City and County of Denver Pedestrian Master Plan	Denver, CO	Pedestrian Master Plan	2004
Eugene Pedestrian and Bicycle Master Plan	Eugene, OR	Pedestrian and Bicycle Master Plan	2011
Hawaii Statewide Pedestrian Master Plan and Pedestrian Toolbox	Hawaii	Pedestrian Master Plan and Toolbox	2013
Indianapolis/ Marion County Pedestrian Plan	Indianapolis, IN	Pedestrian Plan	2016
JCWALKS Pedestrian Enhancement Plan	Jersey City, NJ	Pedestrian Action Plan	2018
PedPDX Portland's Citywide Pedestrian Plan	Portland, OR	Pedestrian Plan	2019
Key West Bicycle and Pedestrian Master Plan	Key West, FL	Pedestrian and Bicycle Master Plan	2019
The New York City Pedestrian Safety Study & Action Plan	New York City, NY	Pedestrian Safety Action Plan	2010

Pima Association of Governments Regional Pedestrian Plan	Pima, AZ	Regional Pedestrian Plan	2014
Portland Regional Active Transportation Plan	Portland, OR	Active Transportation Plan	2014
Saint Paul Pedestrian Plan	Saint Paul, MN	Addendum to Comprehensive Plan	2018
Salt Lake City Pedestrian and Bicycle Master Plan	Salt Lake City, UT	Pedestrian and Bicycle Master Plan	2015
SBCTA Points of Interest Pedestrian Plan	San Bernardino County, CA	Section of a Non-Motorized Transportation Plan	2018
City of Santa Barbara Pedestrian Master Plan	Santa Barbara, CA	Pedestrian Master Plan	2006
Vision Zero Action Strategy	San Francisco, CA	Vision Zero Plan	2019
City of Santa Monica Pedestrian Action Plan	Santa Monica	Pedestrian Action Plan	2015
Seattle Pedestrian Master Plan	Seattle, WA	Implementation Plan	2017
Virginia Department of Transportation State Pedestrian Policy Plan	Virginia DOT	Policy Plan	2014
WalkBikeNC	North Carolina	Pedestrian and Bicycle Master Plan	2013
International Plans			
Winnipeg Pedestrian and Cycling Strategies	Winnipeg, Canada	Strategy Document	2014
London Walking Action Plan	London, England	Action Plan	2018
Melbourne Walking Plan	Melbourne, Australia	Pedestrian Plan	2014
District of North Vancouver Pedestrian Master Plan	North Vancouver, Canada	Pedestrian Master Plan	2009
Sydney Walking Strategy and Action Plan	Sydney, Australia	Action Plan	2017
New Zealand Pedestrian Planning and Design Guide	New Zealand	Guidelines	2008
City of Perth Walkability Study	Perth, Australia	Study	2015