APPENDIX B: ENGINEERING & DESIGN GUIDANCE

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DESIGN SOURCES & PRINCIPLES

NATIONAL, STATE, AND LOCAL STANDARDS AND GUIDANCE

The design of many pedestrian elements is regulated by local, state and federal law. Traffic control devices must follow the standards set forth in the California Manual of Uniform Traffic Control Devices (MUTCD), while elements such as sidewalks and curb cuts must comply with guidelines for implementing the Americans with Disabilities Act (ADA). The City of Berkeley also has a variety of adopted planning standards and policies that contain specific pedestrian and streetscape design guidance or impact design decisions.

NATIONAL

Americans With Disabilities Act

Title II of the ADA, signed into law in 1990, is a civil rights act that prohibits public entities from discrimination on the basis of disability. Newly constructed public facilities must be free of architectural barriers that restrict access or use by individuals with disabilities.

The ADA's Accessibility Guidelines can be accessed here: https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/background/adaag

Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way

The United States Access Board "is developing new guidelines for public rights-of-way that will address various issues, including access for blind pedestrians at street crossings, wheelchair access to on-street parking, and various constraints posed by space limitations, roadway design practices, slope, and terrain. The new guidelines will cover pedestrian access to sidewalks and streets, including crosswalks, curb ramps, street furnishings, pedestrian signals, parking, and other components of public rights-of-way. Once these guidelines are adopted by the Department of Justice, they will become enforceable standards under title II of the ADA."

The proposed guidelines may be viewed here: https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/proposed-rights-of-way-guidelines

NACTO Urban Street Design Guide

A blueprint for designing 21st century streets, the National Association of City Transportation Officials (NACTO) guide unveils the toolbox and tactics cities use to make streets safer, more livable, and more economically vibrant. The Guide outlines both a clear vision for complete streets and a basic road map for how to bring them to fruition. The document charts the principles and practices of the nation's foremost engineers, planners, and designers working in cities today.

The interactive NACTO Urban Street Design Guide is here: https://nacto.org/publication/urban-street-design-guide/

NACTO Transit Street Design Guide

The Transit Street Design Guide provides design guidance for the development of transit facilities on city streets, and for the design and engineering of city streets to prioritize transit, improve transit service quality, and support other goals related to transit.

The NACTO Transit Street Design Guide is here: https://nacto.org/publication/transit-street-design-guide/

NACTO Urban Street Stormwater Guide

The Urban Street Stormwater Guide provides context-sensitive best practices for the design of green stormwater infrastructure along transportation corridors in urban areas.

The Urban Street Stormwater Guide is available here: https://nacto.org/publication/urban-street-stormwater-guide/

AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities

The American Association of State Highway Transportation Officials (AASHTO) guide compiles information related to pedestrian facilities, including the accommodation of pedestrians with disabilities into national guidance. The purpose of this guide is to provide guidance on the planning, design, and operation of pedestrian facilities along streets and highways.

The guide is available here: https://store.transportation.org/Item/CollectionDetail?ID=131

Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts

These guidelines, published by the Federal Highway Administration (FHWA), "highlight ways that planners and designers can apply the design flexibility found in current national design guidance to address common roadway design challenges and barriers. It focuses on reducing multimodal conflicts and achieving connected networks so that walking and bicycling are safe, comfortable, and attractive options for people of all ages and abilities."

The Design Flexibility guidelines are available online: https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multimodal_networks/

Handbook for Designing Roadways for the Aging Population

The Handbook provides information that links aging road user performance to highway design, operational, and traffic engineering features. It supplements existing standards and guidelines to facilitate designs that accommodates older road users, including pedestrians.

The Handbook is available here: https://safety.fhwa.dot.gov/older_users/handbook/

STATE

Highway Design Manual (HDM)

The Caltrans HDM provides roadway design guidance for use in the state of California. The manual was initially prepared for the California Department of Transportation (Caltrans) for use on the California State highway system.

The manual is available here: https://dot.ca.gov/programs/design/manual-highway-design-manual-hdm

California Manual of Uniform Traffic Control Devices (MUTCD)

When installing traffic control devices, the City of Berkeley follows the procedures and policies set out in the California MUTCD, which provides uniform standards and specifications for the placement, construction, and maintenance of all traffic control devices including traffic signals, traffic signs and street markings, including crosswalks.

The California MUTCD is available online: https://dot.ca.gov/programs/safety-programs/camutcd

Main Street, California: A Guide

This guide provides information on design guidance on Caltrans policies that aim to improve multimodal access and sustainability within the transportation system, including pedestrian design features.

The guide is available here: https://dot.ca.gov/-/media/dot-media/programs/design/documents/main-street-3rd-edition-a11y.pdf

REGIONAL

AC Transit Multimodal Corridor Guidelines

This street design guidance supports efficient and reliable transit operations. The manual equips agencies in control of street design with a useful reference document offering context sensitive guidance at each stage of the design process.

http://www.actransit.org/wp-content/uploads/AC_Transit_Multimodal_Corridor_Guidelines_Final.pdf

LOCAL

The City of Berkeley Municipal Code

The City code includes regulations that apply to sidewalk engineering and use. These design guidelines incorporate existing municipal code standards.

The city code is available from the following website: https://www.codepublishing.com/CA/Berkeley/

Berkeley Complete Street Resolution 65,978-N.S.

The Resolution outlines principles and guidelines to ensure safe and convenient travel along and across streets for all pedestrians. Design standards and design flexibility are addressed in Section B-2 of the policy.

https://www.cityofberkeley.info/completestreetspolicy/

Berkeley Bicycle Plan

The Berkeley Bicycle Plan is intended to make Berkeley a model bicycle-friendly city where bicycling is a safe, comfortable, and convenient form of transportation and recreation for people of all ages and abilities.

The plan is available here: https://www.cityofberkeley.info/berkeleybikeplan/

DESIGN NEEDS OF PEDESTRIANS

Pedestrian Types

Berkeley's streets are home to a diverse population that includes children, youth, college and university students, adults, older adults, people with mobility, vision, and cognitive disabilities, people of international origin, visitors, and tourists.

These groups all have unique needs when it comes to pedestrian facility design. People with vision disabilities require physical delineation between the pedestrian walkway and the frontage or amenity zones, as well was tactile and audible design elements at crosswalks, while people with mobility challenges or those pushing strollers require smooth and even pavement surfaces and curb ramps at intersections.

Trip Purposes

These diverse users rely on pedestrian facilities to complete a variety of trip purposes. For example, people use pedestrian facilities for commutes to work or school, shopping and leisure, entertainment, recreation, traveling to or from transit stops, and to reach medical or social services.

Most people are pedestrians for at least a portion of their trip, as even those using other primary modes of transportation, such as bicycling, public transit, or driving, must usually reach their destination by walking or using a mobility assistance device.

Health and Safety for All Users

To serve this wide variety of pedestrian types and trip purposes, street design in Berkeley should enhance the safety of all users, including children, older adults and people with disabilities with an emphasis on the protection of vulnerable road users. Streets in Berkeley should encourage walking as a safe, convenient mode of transportation that promotes health and independence for all people. Street design can minimize impacts of traffic and protect all users.

FIGURE B-1: PEDESTRIANS OF ALL AGES AND ABILITIES.

PRINCIPLES OF GOOD PEDESTRIAN DESIGN

The following design principles represent a set of ideals which should be incorporated, to some degree, into every pedestrian improvement. They are ordered roughly in terms of relative importance.

1. The pedestrian environment should be safe. Sidewalks, walkways and crossings should be designed and built to be free of hazards, offer a sense of security and minimize conflicts.

2. The pedestrian network should be accessible to all. Sidewalks, walkways and crosswalks should ensure the mobility of all users by accommodating the needs of people regardless of age or ability.

3. The pedestrian network should connect to places people want to go. The pedestrian network should provide continuous direct routes and convenient connections between destinations.

4. The pedestrian environment should be easy to use. Sidewalks, walkways and crossings should be designed so people can easily find a direct route to a destination and will experience minimal delay.

5. The pedestrian environment should provide a sense of place. Good design should enhance the look and feel of the pedestrian environment. Amenities such as seating, street furniture, banners, art, trees, plantings, shading, and special paving, along with historical elements and cultural references, should promote a sense of place.

6. The pedestrian environment should serve multiple functions. It should be a place where public activities are encouraged. Commercial activities such as dining, vending and advertising may be permitted when they do not interfere with safety and accessibility.

7. Pedestrian improvements should preserve or enhance the historical qualities of a place and the city. Good design will allow pedestrians to experience a sense of Berkeley's history.

Adapted from the Berkeley Pedestrian Master Plan (2010).

PEDESTRIAN FACILITIES AND AMENITIES

SIDEWALKS

Sidewalks play a critical role in character, function, and accessibility along all streets, from rural and suburban to urban contexts. They connect residential neighborhoods, commercial areas, schools, parks, and other community destinations.

In addition to providing space for pedestrians and transit stop facilities, the space between property lines and curbs also accommodates street trees and other plantings, café seating, stormwater infrastructure, street lights, and bicycle/micromobility parking. The pedestrian realm can be divided into three main zones, each with their own functions. This section of the Toolkit defines those zones and provides considerations for better activating the streetscape to enhance the users' experience. These zones include:

The Frontage Zone – the area that immediately abuts buildings along the street. Its elements include architectural features, awnings, signage, outdoor displays, and seating.

The Pedestrian Zone – the walking zone. This area should be kept clear of obstacles to allow a clear path for people using mobility devices and allow for people to walk side by side and pass each other comfortably.

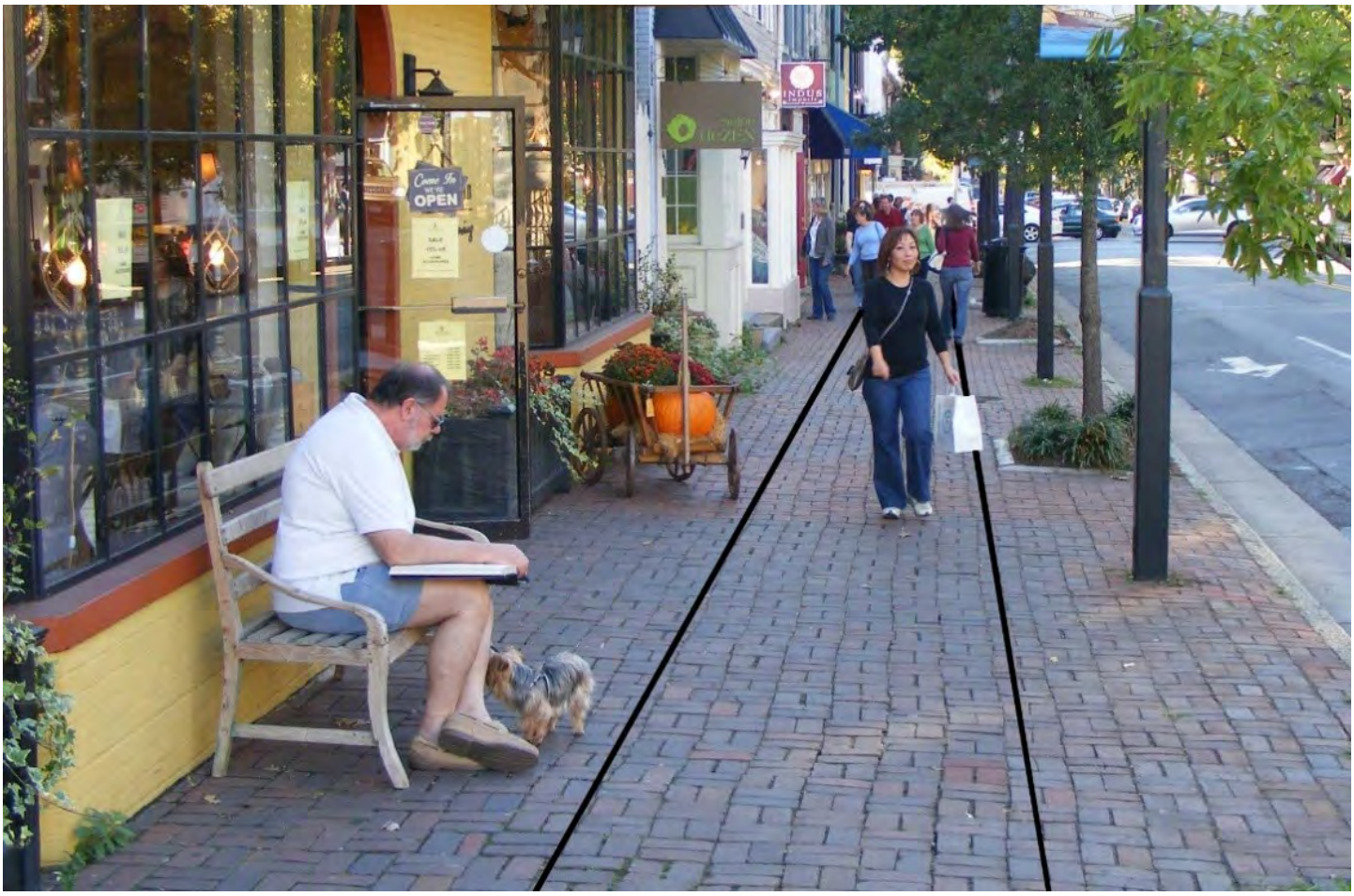
The Amenity Zone – the area between the curb and the Pedestrian Zone. This zone's elements include lights, trees, bicycle and micromobility parking, parking meters, utility infrastructure, or any other elements that need to remain close to the curb.

ACCESSIBILITY REQUIREMENTS

Americans with Disabilities Act (ADA) regulations apply to the accessibility requirements for sidewalks. The proposed public right-of-way accessibility guidelines (PROWAG) cover these facilities.

Grade-separated crossings must meet accessibility requirements, which may include elevators, ramps, landings, and handrails. Sidewalks must meet accessibility criteria at driveway crossings.

FIGURE B-2: SIDEWALK ZONES. (PHOTO CREDIT: TOOLE DESIGN)



FRONTAGE ZONE **PEDESTRIAN ZONE** **AMENITY ZONE**

PREFERRED WIDTHS FOR SIDEWALK ZONES

The width for each sidewalk zone will vary given the street type, the right-of-way, the building scale and the intensity and type of uses expected along a street. Accessibility guidelines for people with disabilities also impact zone widths. Sidewalk design should strive to meet or exceed these recommended dimensions.

Considerations

- A balanced approach to determine the sidewalk zone width should consider the neighborhood's character and the anticipated pedestrian activities. Wider sidewalks are appropriate in these contexts:
  - » A retail street that encourages window shopping
  - » A street that connects a commercial area to a residential neighborhood where pedestrians need to pass one another or walk side by side
  - » A street where adjoining buildings are tall or the character and scale of the street is large
- In locations with severely constrained rights-of-way, it is possible to provide a narrower Frontage Zone and Amenity Zone.

Guidance

- Sidewalk width is based on local context. In retrofit locations with low pedestrian volumes, 6-foot-wide sidewalks may be adequate.
- Frontage Zones used for sidewalk cafés are a special condition and should generally be no less than 6 feet in width.
- Berkeley Municipal Code provides specific design regulations for café seating, benches and planters.
- Where on-street parking is not present, wider dimensions should be provided to create a buffer between people walking and vehicular traffic.
- Tree wells or landscape strips within the Amenity Zone will be based on the existing or planned neighborhood character.
- Sidewalk stormwater facilities (including rain gardens) require a minimum width of 7 feet for the Amenity Zone. The final dimensions will be established based on the context of each landscape area.
- Sidewalks should be maintained to avoid uplifting, uneven pavement, and tripping.

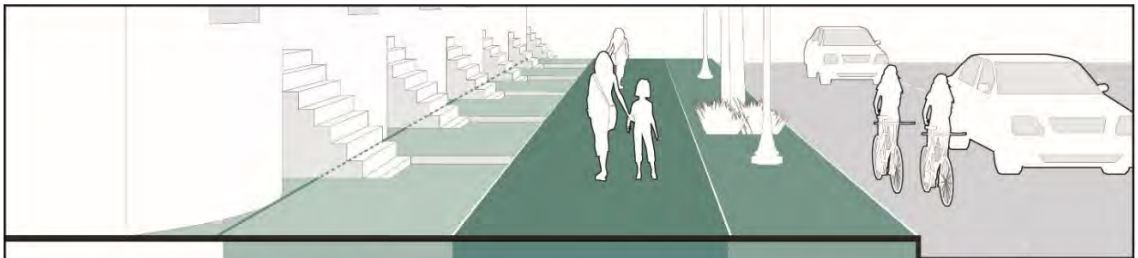
References

Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) (2011)

Berkeley Municipal Code, Section 21.40.150 (1987)

NACTO Urban Street Design Guide (2013).

FIGURE B-3: PREFERRED WIDTH OF SIDEWALK ZONES FOR DIFFERENT STREET TYPES



Street Type	Frontage Zone Door swings, Awnings, Café seating, Retail signage and displays, Building projections	Pedestrian Zone Zone should be clear of any and all fixed obstacles. Clear space for pedestrian travel only.	Amenity Zone Street lights and utility poles, Street trees, Bicycle racks, Parking meters, Transit stops, BMPs, Street furniture and signage	Total Width	Example
Main Street	2'	8'-12'	6'-10'	16'-24'	Telegraph Avenue
Mixed Use Boulevard	2'	8'-12'	6'-10'	16'-24'	University Avenue
Neighborhood Connector	2' or N/A	5'-7'	6'-7'	13'-16'	Marin Avenue
Neighborhood Residential	N/A	5'-7'	5'-7'	10'-14'	Channing Way
Industrial	2' or N/A	5'-7'	5'-7'	12'-16'	Second Street
Shared Streets	2'	N/A	N/A	N/A	Jack London Sq. (Oakland)

INTERSECTIONS AND CROSSINGS

Intersection design must balance the needs of drivers, transit users, pedestrians, and bicyclists. To improve safety for vulnerable road users, such as pedestrians and bicyclists, intersections should have short crossing distances, slow motor vehicle turning speeds, and good visibility.

Crossings, whether midblock or at an intersection, should provide safe and comfortable locations for people to cross the street. A crossing location should be designed to encourage motorist yielding or stopping to allow pedestrians to cross.

CROSSWALK POLICY AND DESIGN

Safety of people walking should be the most important criterion in crosswalk policy and design. Unless specifically prohibited, it is legal for pedestrians to cross the street at any intersection. Marked crosswalks indicate to pedestrians where they should cross the street and inform drivers where to expect pedestrians.

Considerations

- Designs of crosswalks should be easily understandable, clearly visible, and incorporate enhanced safety devices such as traffic signals or rapid flashing beacons where vehicle speeds and volumes are high.
- Crosswalks shall connect to directional curb ramps on either end that meet ADA requirements and PROWAG design guidelines.
- Continental style crosswalks (made up of many thick parallel lines), including the City's standard crosswalk marking detail for high-visibility crosswalks (see **Figure B-4**), are more visible to drivers than transverse lines. The City standard detail should be used at locations lacking traffic control on the conflicting major or collector street, and on the major or collector street leg of signalized intersections.
- Pedestrian signal phases must be timed based on crossing distance. Non-compliance is more likely when pedestrian wait times exceed 30 seconds. Countdown signals and shorter signal phases increase compliance.
- Raised crossings can calm traffic and increase the visibility of pedestrians.
- Marked and signed crossings should be provided near schools, and on established school walking routes, as well as near parks, plazas, senior centers, transit stops, hospitals, campuses, and major public buildings. Additional pedestrian facility enhancements, such as signalization, may be required in conjunction with crosswalk markings at locations with high vehicle speeds or volumes (see **Figure B-6**).
- Crossing marking locations should take into account both existing and projected crossing demand.
- Signals should be structured such that the pedestrian signal phase may be extended with the "walk" sign when time is still remaining in the phase. At signals with detection, to add time during heavy traffic periods, pedestrian signal should return to walk after the countdown if more time is remaining, to communicate to pedestrians that there is still time to cross.
- Where marked crosswalks are more than 600' apart, where there is a major destination creating a pedestrian desire line, mid-block crossings can provide additional crossing opportunities and discourage people from crossing outside of a marked crosswalk. Mid-block marked crosswalks should be accompanied by advanced signage (W11-2 signage with W16-7P and W16-9P) and pedestrian-scale lighting to improve visibility.
- Advance stop bars shall be placed 8-10' (or a minimum of 4' where sight distance is obscured) before the edge of crosswalks to reinforce yielding to pedestrians.

Guidance

- Factors that may affect the decision of whether to install marked crosswalks include: number of lanes, presence of a raised median or corner island, distance from adjacent signalized intersections, pedestrian volumes and delays, average daily traffic (ADT), posted or statutory speed limit or 85th percentile speed, geometry of the location, consolidating multiple crossing points, and availability of street lighting.
- Detectable warning surfaces mark boundaries between pedestrian and vehicular ways where there is no raised curb. Detectable warning surfaces are required by 49 CFR, Part 37 and by the ADA.
- At all approaches to intersections, with priority for implementation at uncontrolled approaches (legs of intersections that do not have stop signs or signals), parking should be set back a minimum of 20' to expand sight lines. This allows people crossing the street (as well as vehicular cross-traffic) to be visible to drivers. Additional parking setbacks may be required on all approaches at intersections with significant crash history or where physical conditions deem it necessary for safety. Red painted curb and no parking signs should be used to designate no-parking areas. See **Figure B-5**.

References

NACTO Urban Street Design Guide (2013)

ADA Accessibility Guidelines (2004)

California MUTCD (2014).

Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) (2011)

Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations: Final Report and Recommended Guidelines (2005)

FIGURE B-4: CITY OF BERKELEY STANDARD CROSSWALK DETAIL FOR HIGH-VISIBILITY CROSSWAKLS

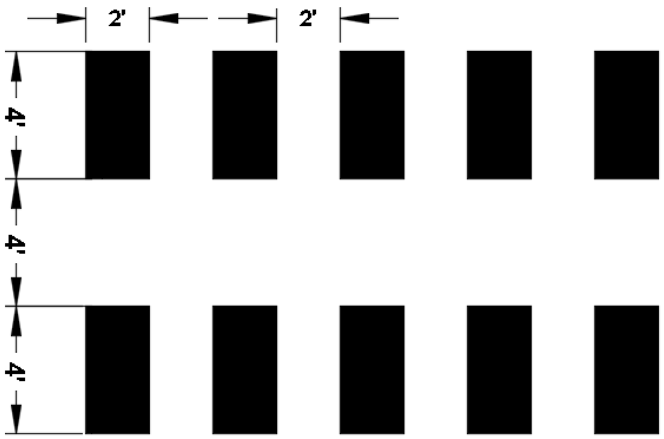


FIGURE B-5: IMPROVING VISIBILITY AT INTERSECTIONS.

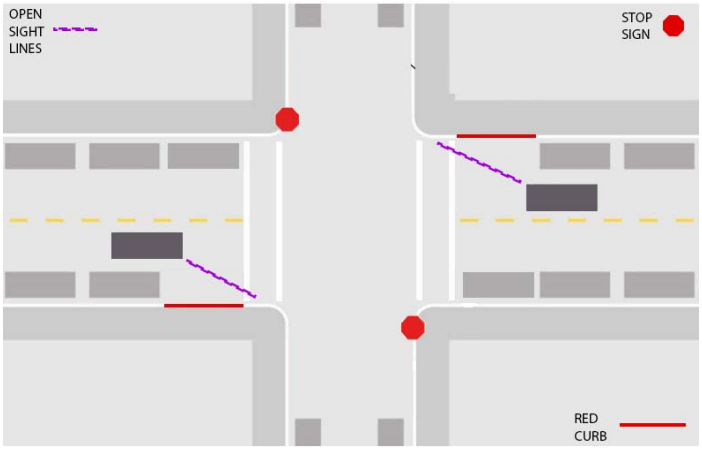


FIGURE B-6: FEDERAL HIGHWAY ADMINISTRATION RECOMMENDATIONS FOR INSTALLING MARKED CROSSWALKS AND OTHER PEDESTRIAN IMPROVEMENTS AT UNCONTROLLED LOCATIONS

ROADWAY TYPE (Number of Travel Lanes and Median Type)	VEHICLE ADT ≤9,000			VEHICLE ADT >9,000-12,000			VEHICLE ADT >12,000 -15,000			VEHICLE ADT >15,000		
	SPEED LIMIT											
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
Two Lanes	●	●	●	●	●	●	●	●	●	●	●	●
Three Lanes	●	●	●	●	●	●	●	●	●	●	●	●
Multilane (four or more lanes) w/ raised median	●	●	●	●	●	●	●	●	●	●	●	●
Multilane (four or more lanes) w/o raised median	●	●	●	●	●	●	●	●	●	●	●	●

● Candidate sites for marked crosswalks

● Candidate sites for marked crosswalks with additional safety elements such as island or curb extensions or enhanced signing/striping

● Candidate sites for marked crosswalks with enhanced/active warnings, pedestrian hybrid beacons, half or full signals

CORNERS AND CURB RADII

Pedestrian safety and comfort are enhanced by smaller curb radii, which shorten crossing distances for pedestrians and reduce vehicle turning speeds. However, some streets must accommodate large turning vehicles, such as freight and transit vehicles. Intersection design should strive to accommodate large vehicles while keeping intersections as compact as possible. This requires design flexibility and evaluation of specific conditions, as each intersection is unique in terms of approach and departure angles, the number of travel lanes, the presence of a median, and other features that fundamentally impact corner design.

Considerations

- The actual curb radius is the radius of the physical curb, whereas the effective curb radius is the radius at which a vehicle can complete the turn.
- A smaller actual curb radius expands the pedestrian area, allowing for better pedestrian ramp alignment.
- Parking or bicycle lanes at an intersection can increase the effective radius.
- If the actual curb radius is too small, vehicles may drive over the curb placing waiting pedestrians and bicyclists in danger.
- At signalized intersections, corner design should assume that a large vehicle will use the entire width of the receiving lanes on the intersecting street.
- In some cases, it may be possible to allow a large turning vehicle to encroach on the adjacent travel lane on the departure side (on multi-lane roads) to make the turn.
- Mountable truck aprons deter passenger vehicles from making higher-speed turns but accommodate the occasional large vehicle without encroachment or off-tracking into pedestrian areas. Mountable truck aprons should be visually distinct from the adjacent travel lane and sidewalk.

Guidance

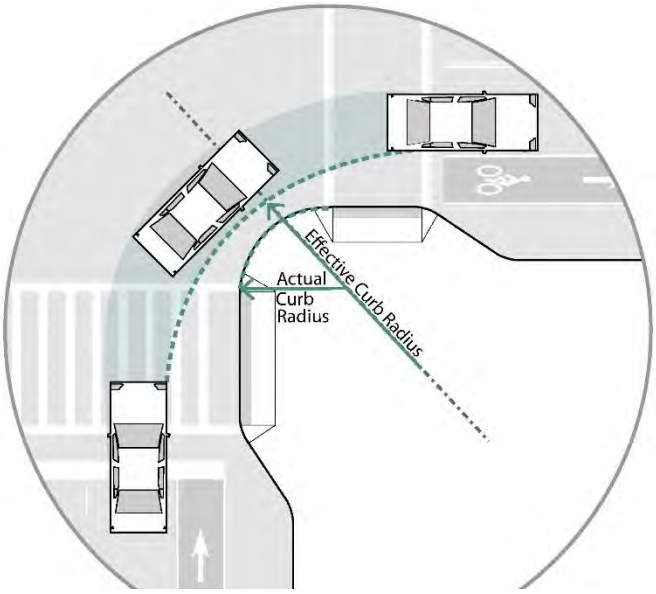
- Turning speeds should be limited to 15 MPH or less to ensure safe interactions between pedestrians and turning vehicles at crosswalks.
- The Berkeley Municipal Code presently states that corner radii on residential blocks be no less than 15 feet and in commercial districts or on major streets no less than 20 feet.
- NACTO Urban Street Design Guide calls for standard curb radii of 10-15 feet in urban settings, with corner radii exceeding 15 feet in exceptional cases only.
- Effective turning radius can be minimized by employing one or more of the following techniques:
  - » Use a design vehicle that is appropriate to the context. The SU-30 (delivery truck) is appropriate for local streets and residential areas.
  - » Accommodate larger trucks and 40’ buses on designated truck and bus routes on collectors and major streets.
  - » Restrict right turns on red so there is no expectation of turning into the nearest receiving lane.
  - » Require larger vehicles to employ on-roadway personnel to “spot” vehicles through difficult turns.
  - » Design so that emergency vehicles may utilize the full area of the intersection for making turns.
- The City may delineate the appropriate curb radius using interim materials such as epoxied gravel, planters, and bollards (see Interim and Quick Build Design Treatments section).

References

NACTO Urban Street Design Guide (2013).

Berkeley Municipal Code, Section 21.40.150 (1987).

FIGURE B-7: A WIDE EFFECTIVE OR ACTUAL CURB RADIUS ENCOURAGES TURNING DRIVERS TO MAINTAIN GREATER SPEEDS, REDUCING PEDESTRIAN SAFETY AT CROSSWALKS.



CURB EXTENSIONS

Curb extensions (also known as "bulb-outs," or "neck downs"), decrease the width of a roadway through the physical extension of a curb line or sidewalk. Curb extensions may enhance pedestrian safety in several ways: by making pedestrians, bicyclists and motorists more visible to each other, by keeping motor vehicles from parking too close to crossings and blocking sight lines; by reducing crossing distance, and by narrowing curb radii at intersections, which may slow turning traffic.

Curb extensions also facilitate better placement of curb ramps and prevent ramps from being blocked by vehicles that park at the corner. At signalized locations, curb extensions may reduce motorist delay by reducing the amount of signal time that must be devoted to the pedestrian phase due to the shorter crossing distance.

Curb extensions should be considered for where these issues are most critical.

Considerations

- Curb extensions should never extend into travel lanes, bicycle lanes, or shoulders.
- Care should be taken to maintain direct routes across intersections by aligning pedestrian desire lines on either side of the sidewalk. Curb extensions often make this possible as they provide extra space for grade transitions.
- The turning needs of emergency and larger vehicles should be considered in curb extension design.
- Curb extensions can create additional space for curb ramps, as well as landscaping and street furniture that maintain sightlines.
- When a curb extension conflicts with turning movements, consider reducing its width instead of eliminating it.
- Consider providing a 20' long curb extension to restrict parking within 20' of an intersection to enhance visibility.

Guidance

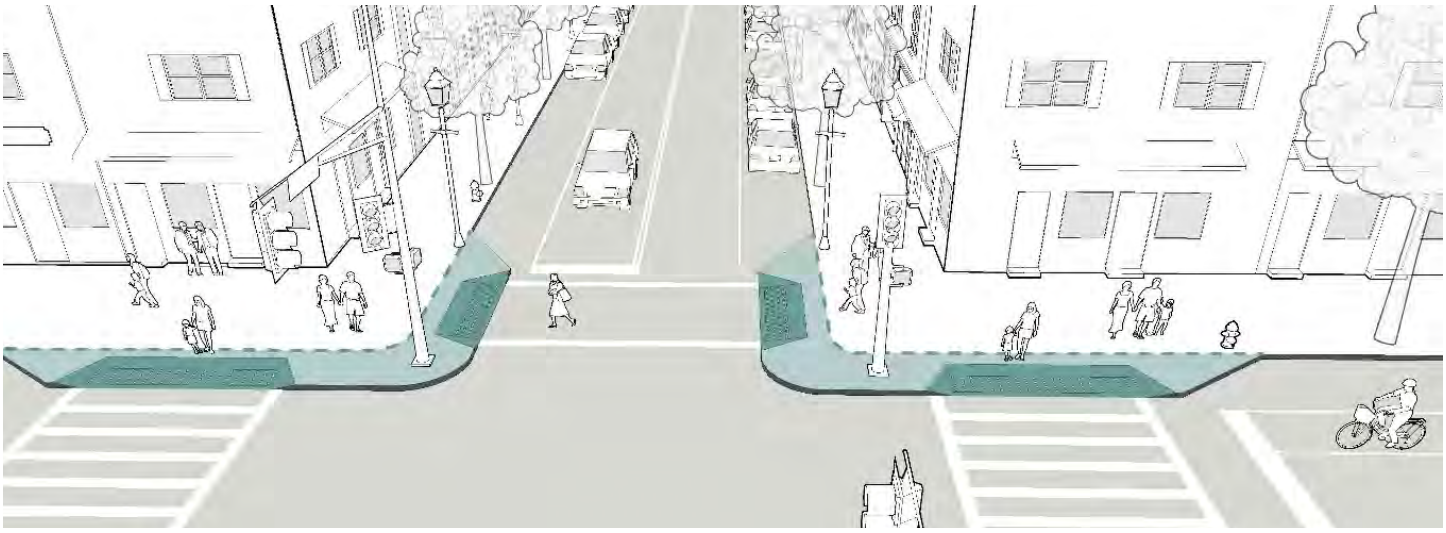
- Curb extensions should be considered only where parking is present or where motor vehicle traffic deflection is provided through other curbside uses such as bicycle share stations or parklets. They cannot be installed where the curbside lane is a vehicle travel lane.
- Curb extensions should not reduce a travel lane or a bicycle lane to an unsafe width.
- A typical curb extension extends approximately the width of a parked car (or about 6' from the curb).
- Curb extensions can require changes to or relocation of drainage structures, which can increase installation cost. Drainage impacts can be minimized with curb extension designs which maintain water flow to existing drainage structures via the use of drainage slots with appropriate solid surface plating at pedestrian crossings.
- If funding for full curb extensions is unavailable, lower cost curb extensions can be designed with bollards, temporary curbs, planters, or striping (see interim/quick-build treatments below).

References

AASHTO Guide for the Development of Bicycle Facilities (2012).

NACTO Urban Street Design Guide (2013).

FIGURE B-8: CURB EXTENSIONS SHORTEN CROSSING DISTANCES AND PROVIDE MORE SPACE FOR CURB RAMPS, LANDSCAPING, AND STREET FURNITURE



CURB RAMPS

Curb ramps guide people crossing the street into the correct crossing direction, which is especially important for people with sight impairments. Curb ramps should be directional whenever possible.

Designing directional curb ramps may be more difficult in retrofit situations or on corners with large curb radii or limited space. This page contains details on how to design directional ramps under these circumstances.

FIGURE B-9: DIRECTIONAL RAMPS ON A LARGE RADIUS CORNER (ALTA PLANNING + DESIGN).

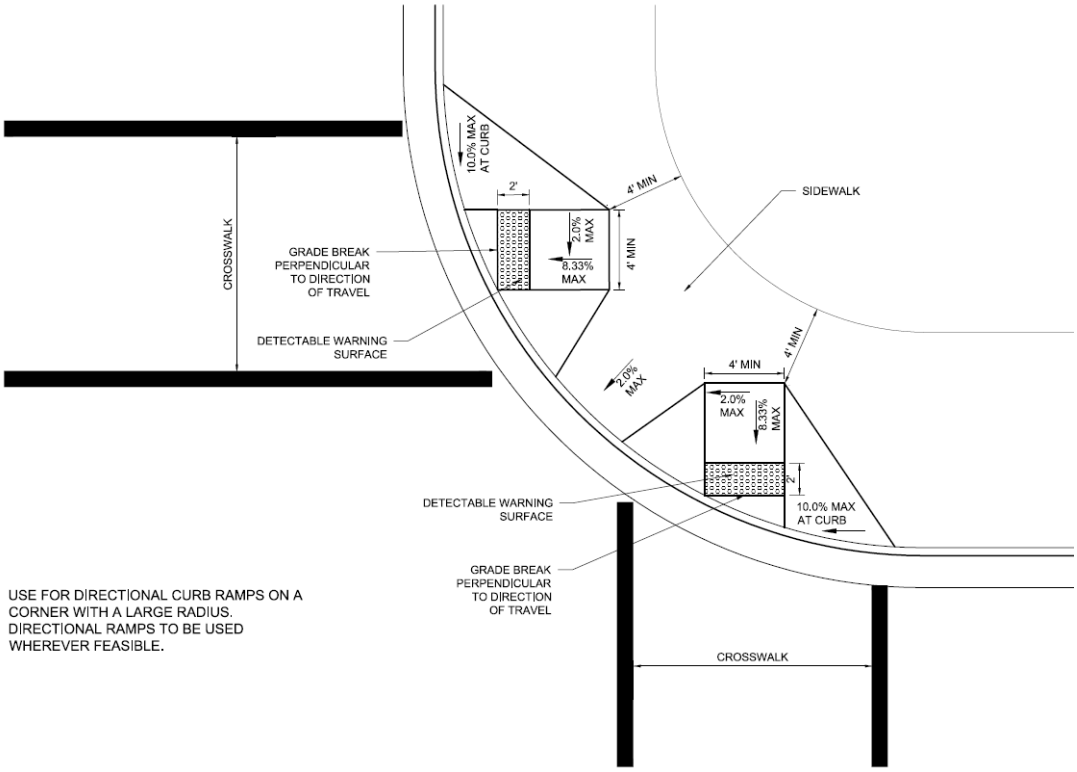
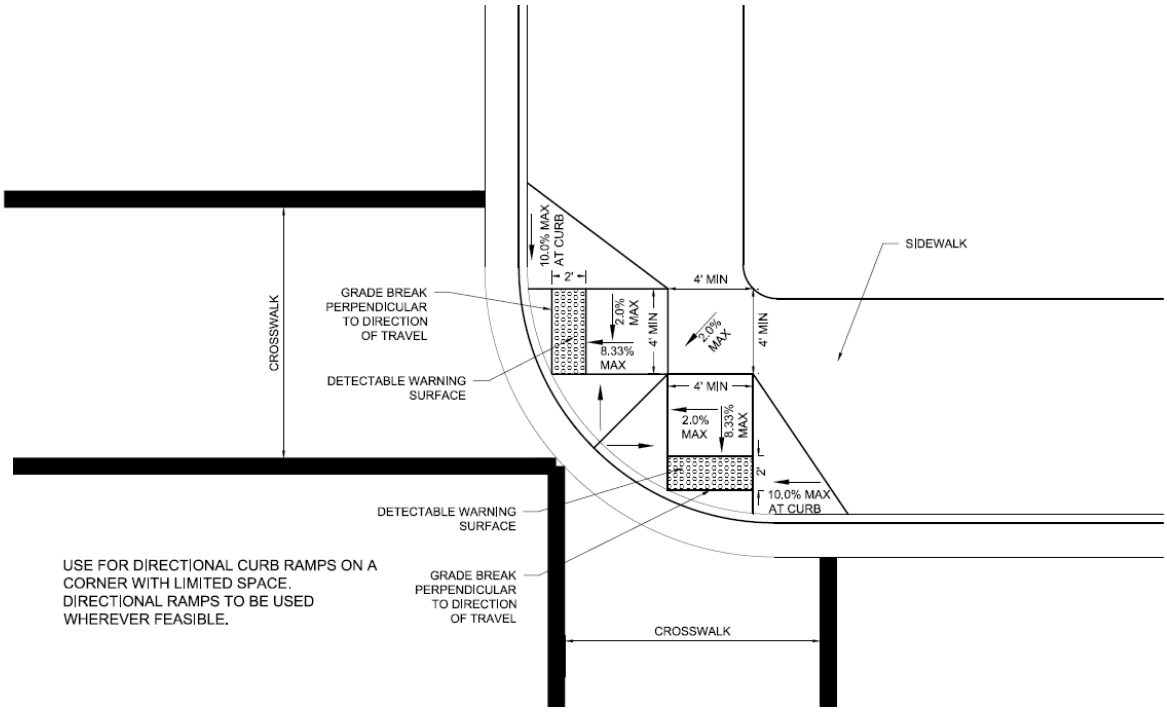


FIGURE B-10: DIRECTIONAL RAMPS ON A LIMITED SPACE CORNER (ALTA PLANNING + DESIGN).



CROSSING ISLANDS

Crossing islands are medians that provide a pedestrian refuge and allow multi-stage crossings of wide streets. They can be located mid-block or at intersections. Medians may be placed along the centerline of a street, at roundabout entrances, as splitter islands, or as "pork chop" islands where right-turn slip lanes are present.

Crossing islands improve pedestrian safety by shortening the crossing distance, reducing the number of conflicts pedestrians must address at once, reducing vehicle speeds approaching the island, calling greater attention to the pedestrian crossing, and providing space for additional signage or lighting.

Street design should install accessible crossing islands where feasible and appropriate, as determined by the considerations below.

Considerations

- Medians can provide a place of refuge for pedestrians, allowing them to cross one direction of traffic at a time.
- On a local road with relatively low traffic speeds and volumes, placing a raised median or crossing island might be done to enhance aesthetics, create space for green infrastructure, provide traffic calming, or to accommodate high pedestrian crossing volumes.
- Crossing islands may be enhanced using plantings or street trees. Plantings may require additional maintenance responsibilities and need to be maintained to ensure visibility.
- On a collector road with moderate-to-high traffic speeds and volumes, or on multi-lane roadways, a raised median or crossing island installation should be strongly considered.
- Where midblock crossings are provided along multilane arterials, a raised median or crossing island and supplementary traffic control devices may improve safety.
- Crossing islands can be coupled with other traffic calming features, such as partial diverters and curb extensions at mid-block and intersection locations.
- Crossing islands can be installed at signalized intersections to provide additional conflict management between crossing pedestrians and motor vehicle traffic.
- At offset crossings, islands should facilitate pedestrian path of travel through the island in a way that orients pedestrians so that they are facing oncoming traffic for the second stage of the crossing.

Design

- Crossing islands should be considered where there are 3 or more lanes of traffic or where crossing distances are greater than 50 feet, whichever is a shorter distance. For long distances, islands permit multi-stage crossings, which in turn allow shorter signal phases.
- Include at-grade pedestrian cut-throughs as wide as the connecting crosswalks, detectable warnings, and adequate grading to prevent standing water and ensure sufficient drainage.
- Raised median refuges must include ADA compliant curb ramps and landings. Detectable warnings are required at the threshold of each roadway surface for both raised and cut-through island refuges.
- Crossing islands should be at least 6' wide, preferably 8–10'. Where a 6' wide median cannot be attained, a narrower raised median is still preferable to nothing. The minimum protected width is 6', based on the length of a bicycle or a person pushing a stroller. The refuge is ideally 40' long.
- Signalized intersections with crossing islands should be designed to allow pedestrians to cross in one stage.

References

NACTO Urban Street Design Guide (2013).

California MUTCD (2014).

CA Highway Design Manual Topic 305 - Median Standards; Figure 405.4- Pedestrian Refuge Islands.

FHWA Proven Safety Countermeasure: Medians and Pedestrian Crossing Islands in Urban and Suburban Areas.

FIGURE B-11: CROSSING ISLAND ANGLED TO ENCOURAGE PEDESTRIAN AWARENESS OF TRAFFIC ON THE ROADWAY ABOUT TO BE CROSSED (PHOTO BY BRUCE LANDIS)

ACCESSIBLE PEDESTRIAN SIGNALS

Accessible pedestrian signals (APS) and accessible detectors communicate information in non-visual formats about the pedestrian phase to pedestrians with visual and/or hearing impairments. APS and detectors may include features such as audible tones, speech messages, detectable arrow indications, or vibrating surfaces. When new pedestrian signals are installed, they should be APS. For existing pedestrian signals, the APS and pedestrian pushbuttons should be provided when the signal controller and software are altered, or the signal head is replaced.

Considerations

- Accessible pedestrian signals are audible signals that indicate when it is or is not appropriate to cross the street. ADA guidelines and California MUTCD recommend the use of APS if determined appropriate based on engineering judgment.
- Consistent signal design helps people with disabilities cross a signalized street safely. APS allows pedestrians with visual impairments to more easily cross the street.
- APS features include pushbutton locator tones, tactile arrows, audible work indicators, vibrotactile walk indicators, automatic volume adjustment, audible beaconing.
- APS can be deployed in conjunction with fixed signal timing and automatic pedestrian signal recall to ease crossing for all pedestrians.

Guidance

- Pushbutton locator tones are used for locating the pedestrian pushbutton needed to actuate the WALK interval. Detectable arrows should be located on pushbuttons to point in the same direction as the crosswalk. At corners of signalized locations where two pushbuttons are present, they should be separated by at least 10'.
- The tone duration is 0.15 seconds or less, repeated at 1 second intervals. The tone should be audible at 6-12 feet from the pushbutton, or to the building line, whichever is less.
- Audible walk indications should have the same duration as the pedestrian walk indication unless the pedestrian signal rests during the pedestrian phase, in which case the audible indication should be provided in the first seven seconds of the Walk interval.
- Vibrotactile indications on the pushbutton provide information to the persons with hearing or visual disabilities. A speech pushbutton information message tells pedestrians the name of the street they are crossing. Braille or raised lettering on the pushbutton housing can also provide street name information. Some pushbutton housings include a map of the intersection in relief on the side of the housing that informs pedestrians as to the number of lanes and islands they will have to cross.
- For automatically-called pedestrian phases, pushbuttons can be used to activate accessible pedestrian signal features such as detectable arrow indications and/or speech messages. Automatic recall to walk should remain in place after APS is installed.

References

California MUTCD, Sections 4E.09 through 4E.13 (2014).

Accessible Pedestrian Signals: A Guide to Best Practice. www.apsguide.org.

American Council for the Blind. Accessible Pedestrian Signals (APS). https://acb.org/content/accessible-pedestrian-signals-aps

FIGURE B-12: VIBROTACTILE PUSHBUTTONS POINT USERS IN THE SAME DIRECTION AS THE CROSSWALK. (PHOTO CREDIT: TOOLE DESIGN)

LEADING PEDESTRIAN INTERVAL

Leading pedestrian intervals (LPIs) provide pedestrians a head start when crossing at a signalized intersection. LPIs can be programmed into existing signals to give pedestrians the WALK signal three to seven seconds before motorists are given a green light. This provides pedestrians with an opportunity to establish their presence in the crosswalk. This head start increases the percentage of motorists who yield the right-of-way to pedestrians and can minimize conflicts between pedestrians crossing a roadway and turning vehicles.

LPIs can be provided automatically with each phase or provided only when actuated (actively or passively). LPIs should be implemented where feasible at intersections with frequent conflicts between pedestrians and turning traffic.

Considerations

- LPIs are most effective when paired with right turn on red restrictions.
- If an intersection has particularly high pedestrian volumes, consider lengthening the LPI or adding an exclusive pedestrian phase instead of a leading pedestrian interval.
- This treatment may be beneficial at locations with low pedestrian demand where signals are semi- or fully-actuated and where short minimum green times result in motorists expecting a limited amount of time to enter a main road, thus resulting in conflicts with pedestrians when they are present.
- The LPI should be used at intersections with high volumes of pedestrians and conflicting turning vehicles and at locations with a large population of elderly or school children who tend to walk slower.

Guidance

- Pedestrians are given a minimum 3–7 second head start entering the intersection.
- The LPI should be accompanied by an audible noise to inform visually-impaired pedestrians that it is safe to cross.
- A lagging protected left arrow for vehicles may be provided to accommodate the LPI.

References

NACTO Urban Street Design Guide (2013).

FHWA's Handbook for Designing Roadways for the Aging Population - 15.E. Leading Pedestrian Interval (2014).

FHWA Proven Safety Countermeasure: Leading Pedestrian Intervals.

FIGURE B-13: LEADING PEDESTRIAN INTERVAL IN CHICAGO, IL. (PHOTO CREDIT: TOOLE DESIGN)

FIGURE B-14: LEADING PEDESTRIAN INTERVAL (SOURCE: FHWA)

ALL-WAY PEDESTRIAN CROSSING ("SCRAMBLE")

At signalized intersections, an exclusive pedestrian phase, also known as a pedestrian scramble or diagonal crossing, allows pedestrians to cross in any direction. Vehicles at all approaches to the intersection are stopped while pedestrians are given the "WALK" signal. This treatment can increase pedestrian safety and may improve the efficiency of intersections where turning vehicles are delayed by high pedestrian volumes. It is particularly advantageous in situations where other intersection treatments are cost prohibitive or infeasible due to insufficient right of way. This design can reduce pedestrian crashes by 50 percent in some downtown locations with heavy pedestrian volumes and low vehicle speeds and volumes. Pedestrian scrambles should be considered at appropriate locations.

Considerations

- This treatment should be used in densely populated urban areas, such as downtown, and signalized intersections with frequent turning-vehicle-pedestrian conflicts. Consider pedestrian scrambles when:
  - » Pedestrian volume exceeds vehicle volume by 30 percent or more during the peak hour.
  - » Turning traffic through any crosswalk exceeds 200 vehicles per hour.
  - » Crashes between turning vehicles and pedestrians exceed the city average.
- Scrambles typically require longer overall signal cycle lengths which may increase delay for all types of users.

FIGURE B-15: PEDESTRIAN SCRAMBLE IN SAN FRANCISCO, CA (SOURCE: FHWA)

Guidance

- No Turn on Red restrictions must be implemented for all approaches.
- Non-visual guidance should be provided for pedestrians who are visually impaired so that they know when it is an appropriate time to cross – normal auditory cues are not applicable at locations with exclusive pedestrian phases, so specialized programming is necessary.
- Additional signage may be needed to inform pedestrians of crossing requirements and to prevent illegal crossing.
- Sidewalk space must be sufficient to handle a queue of pedestrians waiting to cross.
- The signal timing required for this treatment must be implemented in concert with adjacent intersections to ensure appropriate signal coordination.
- Additional pedestrian signal heads may be installed facing diagonally.

References

California MUTCD Section 3B-18 Crosswalk Markings (2014).

NACTO Designing Cities. 2017. "Meet Los Angeles." Chicago, IL. https://nacto.org/wp-content/uploads/2017/11/Los-Angeles-DOT.pdf

NACTO Global Designing Cities – Crossing Types. https://globaldesigningcities.org/publication/global-street-design-guide/designing-streets-people/designing-for-pedestrians/pedestrian-crossings/crossing-types/

FIGURE B-16: PEDESTRIAN SCRAMBLE IN SANTA MONICA, CA (PHOTO CREDIT: L.A. GREAT STREETS)

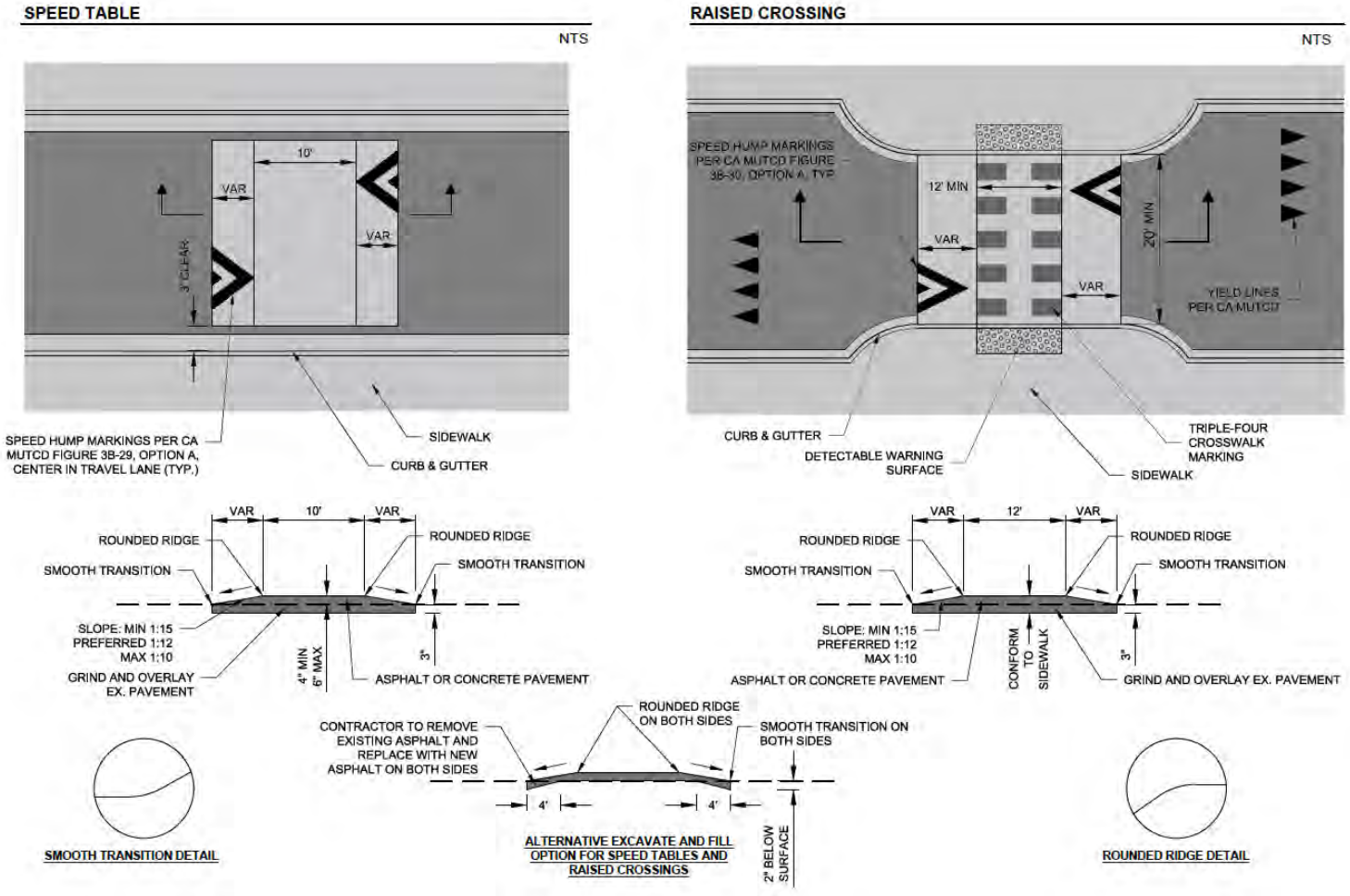
SPEED TABLES AND RAISED CROSSWALKS

Raised crossings are a vertical traffic control measure that are designed to reduce vehicle speeds, and improve pedestrian and bicyclist crossing safety. Raised crossings are designed with slopes on each vehicle approach to elevate the entire crosswalk (raised crossing) or intersection (raised intersections) slowing drivers, increasing yielding, and increasing visibility between pedestrians, bicyclists, and drivers. In some cases, raised crossings or raised intersections are elevated to the level of the sidewalk, eliminating the need for curb ramps (though detectable warnings are still required). Research finds raised crossings improve safety for motorists approaching a crossing straight-on or for motorists turning to or from a side street or driveway over a crossing. Raised crossings should be considered where speed control is desired.

Considerations

- These treatments should be considered in school zones and locations where pedestrian safety, speeding and motorist yielding have been identified as concerns.
- Raised crossings and speed tables may require additional design considerations and consultation on truck routes, bus routes, emergency routes, and arterial streets.
- Consider stormwater drainage and snowplowing in the design of the raised crosswalk.
- Crosswalks can be built with a variety of materials, including asphalt, concrete, stamped concrete, or brick pavers.
- Some cities use raised crossings for bicyclists along shared-use paths.
- Vehicular noise may increase, particularly if trucks or transit regularly use the route.
- Markings and signs should promote nighttime visibility of raised devices for bicyclists and motorists.

FIGURE B-17: RAISED CROSSING AND SPEED TABLE STANDARD DETAILS (ALTA PLANNING + DESIGN).



Guidance

- Raised crossings can be provided along side streets of major thoroughfares to slow traffic exiting the main street.
- Raised crossings should be used at crossings with a large population of elderly or school children who tend to walk slower.
- Design speeds and emergency vehicle routes must be considered when designing vehicular approach ramps.
- Raised crossings and intersections require detectable warnings at the curb line for persons with visual disabilities.
- Roadway operating speeds should be below 35 MPH.
- Do not use for crossings on steep curves or roadways with steep grades where visibility is limited.
- Speed tables should not be applied on streets wider than 50 feet. On 2-way streets, speed tables may be applied in both directions.
- Parking should be restricted on the crossing approaches to provide adequate sight distance. The traveled way may also be narrowed with curb extensions to improved sight lines and shorten the pedestrian crossing distance.
- Trench drains or pedestrian safe plates may be used to maintain existing drainage patterns.
- Longitudinal slopes (vehicle approach slopes) should not exceed 1:10 or be less steep than 1:25. A slope of 1:12 is preferred.
- Transverse side slopes should be no greater than 1:6 (if tying the raised crossing back to the existing pavement elevation in front of the curb).
- Raised crossings shall be accompanied by a Pedestrian Crossing warning sign (MUTCD W11-2) paired with a downward pointing arrow sign (MUTCD W16-7P) and a Speed Hump warning sign (W17-1).
- Speed tables shall be accompanied by a speed hump warning sign (MUTCD W17-1) and a 15 MPH Speed Limit sign (W13-1P).
- MUTCD Section 3B.25 guidance for Speed Hump Markings may be applied at raised crosswalks.

References

NACTO Urban Street Design Guide.

California MUTCD (2014).

Schepers, J. et al. 2011. “Road Factors and Bicycle-Motor Vehicle Crashes at Unsignalized Priority Intersections,” Accident Analysis and Prevention, Vol. 43, Issue 3, pp. 853-861.

Thomas, L. et al. 2016. NCHRP Synthesis 498: Application of Pedestrian Crossing Treatments for Streets and Highways, Transportation Research Board of the National Academies, Washington, D.C.

PEDESTRIAN ENVIRONMENT

Careful and thoughtful design of the pedestrian environment can affect everything from accessibility to legibility to sense of place on any given street. The elements that give a street its character are often found in the frontage or amenity zones and can include lighting, wayfinding, stormwater management, and transit and micromobility stops and amenities.

This section details some of these elements and offers design guidance and considerations for each.

PEDESTRIAN-ORIENTED LIGHTING

Lighting can enhance the walking environment and increase pedestrian safety and security. Pedestrian facility and intersection lighting help motorists to see pedestrians and avoid collisions. Pedestrian walkways, crosswalks, transit stops, both sides of wide streets, and streets in commercial areas should be well lit with uniform lighting levels to eliminate dark spots.

In urbanized areas, lighting is desirable at intersections and other potential pedestrian crossing areas, particularly where a higher volume of pedestrians is expected. The selection of light post locations impacts the effectiveness of the lighting. An offset location of the luminaries may provide for better visibility or contrast.

Considerations

- Lighting should reflect the character and urban design of the street type to create a recognizable hierarchy of roads and spaces.
- Lighting illuminates squares, public spaces, and special districts to encourage nighttime use.
- Use clear and consistent patterns to reinforce the direction of travel and delineate intersections.
- Pedestrian-scale lighting (poles lower than 20') should be used alone or in combination with roadway scale lighting in high activity areas to encourage nighttime use or as a traffic calming device.
- Lighting may either alternate on either side of a street or be arranged parallel. Parallel arrangements are more formal and common in retail activity centers.
- Critical locations such as ramps, crosswalks, transit stops and seating areas that are used at night must be visible and lit.
- Trees can interfere with intended lighting patterns, particularly in season of full foliage. Light and tree placement should be coordinated to provide consistent lighting year-round.
- Enhance the character of the streetscape by using fixtures that reflect the City's character and the unique look of specially designated districts.

Guidance

- Lighting levels can vary depending on context (adjacent land uses, pedestrian volumes, etc.). In general, a minimum of 0.5 foot candles (fc) provides a comfortable lighting level in pedestrian areas.
- Higher lighting levels should be considered at crosswalk locations, commercial/high-activity areas, and high crime areas. At crosswalks, luminaires should be placed on the approaches to the crossing. Research indicates that 1.9 fc at the crossing works well to illuminate pedestrians.
- Lighting is typically located in the Amenity Zone of the street. Depending on conditions, lighting may be permitted in medians.
- Light poles are typically located a minimum of 18" behind the face of curb.
- New street lighting should be dark-sky compliant with cutoff fixtures to ensure that a minimum of 95 percent of emitted light is directed toward the ground.

Personal Security

Crime prevention through environmental design (CPTED) principles can be applied to deter criminal behavior and improve personal security. CPTED is particularly applicable to pedestrian facility design because its principles of natural surveillance, access control, and territoriality (i.e., sense of control over an environment) all have roles in reducing crime along pedestrian facilities.

Well-lit streets with open space tend to have a positive impact on the feeling of personal security. Pedestrian facilities that attract many users also tend to provide an increased sense of security. A diversity of land uses can promote and extend the hours during which pedestrian activity is high and adds to the sense of security on the street.

References

Berkeley Streets and Open Space Improvement Plan – Chapter 12 Lighting

https://www.cityofberkeley.info/Planning_and_Development/Downtown_Area_Plan/Streets_and_Open_Space_Improvement_Plan.aspx

National Crime Prevention Council. https://www.ncpc.org.

Project for Public Spaces: Lighting Use and Design (2008).

FIGURE B-18: PEDESTRIAN SCALE LIGHTING AT INTERSECTION IN ALEXANDRIA, VA (PHOTO SOURCE: TOOLE DESIGN)

PEDESTRIAN-ORIENTED WAYFINDING

Pedestrian-oriented wayfinding signs make it easier for people walking to efficiently travel around Berkeley. They may be included as part of a broader wayfinding system with signs for pedestrians, bicyclists, and transit users. Modern, cohesive, multimodal sign plans and designs distinguish walking and bicycling routes, highlight specific destinations, and facilitate connections to and from public transit stops. They can also define connections with popular hiking trails and regional trails.

Considerations

- A pedestrian and bicycle wayfinding plan can provide a comprehensive strategy for customized design and placement of city wayfinding signs.
- The MTC has issued guidelines for wayfinding signs at public transit stops and stations, which can be distinct from the City's wayfinding sign design and integrated into an overall city wayfinding signage plan.
- Sign types can include destination signs, central hub maps, and trail signs.
- Destinations can include locations of amenities such as water fountains and restrooms to provide more complete information.
- Well-designed and branded wayfinding can reinforce a community's sense of place.

Guidance

- Signs should specify distances in blocks, average walking time, or other measurements meaningful to pedestrians.
- Pedestrian wayfinding signs should not be retroreflective.
- On one-way streets, street name signs should still face both ways to serve people walking from both directions.
- To minimize visual clutter and driver distraction, the MUTCD provides the following guidance to minimize the conspicuity of pedestrian signs to vehicular traffic:
  - » Pedestrian wayfinding signs should be located further from the street and away from high-priority traffic control devices.
  - » Pedestrian messages should face towards the sidewalk and away from the street.
  - » If pedestrian wayfinding signs are mounted at the same height as vehicular traffic signs, they should be cantilevered over the sidewalk to keep them away from the line of sight of vehicular traffic.

References

Berkeley Downtown Streets & Open Space Improvement Plan, Chapter 11 Signage and Wayfinding (2012).

MTC Regional Transit Wayfinding Guidelines and Standards (2012).

California MUTCD, Section 2D.50 Community Wayfinding Signs (2014).

FIGURE B-19: PEDESTRIAN AND BICYCLE WAYFINDING SIGNS CAN BE COORDINATED IN A COHESIVE WAYFINDING PLAN AND DESIGN LANGUAGE.

FIGURE B-20: PEDESTRIAN-ORIENTATED DOWNTOWN WAYFINDING SIGN UTILIZING BLOCKS AS A MEASURE OF DISTANCE.

TRANSIT STOPS AND AMENITIES

Any marked or signed location where transit vehicles stop and passengers board and alight is a transit stop. The most basic transit stops have only a pole-mounted "header" sign indicating the transit provider and route(s). High frequency routes and higher volume stops generally have more passenger amenities such as benches, shelters, traveler information, trash receptacles, bicycle parking, and other features.

For the City of Berkeley, detailed guidance is available in the AC Transit Multimodal Corridor Design Guidelines.

Considerations

- Transit stops in Berkeley are typically located at the natural curb line or on a bus bulb. Some transit routes with dedicated transit lanes use transit islands and medians.
- Transit operations, curbside uses, posted speed limits, traffic volumes, transit frequency and typical bus dwell time all influence location decisions for transit stops. See Transit Accommodations at Intersections for bus bulb design guidance.
- The length of the stop depends on vehicle type as well as the location of the stop, (i.e., near-side, far-side or mid-block) and should be done in consultation with the transit provider.
- The location of a transit stop can affect transit travel time, passenger safety, and roadway operations. Berkeley prefers "far side" transit stops. At signalized intersections this can allow for transit signal priority.
- Bus bulbs enhance boarding and operations efficiency. They may be considered where additional pedestrian space is needed, where it is challenging for transit vehicles to reenter traffic, or to address safety issues.
- Seating at or near transit stops can improve passenger comfort, as can shade from street trees or awnings. Seating options may include leaning rails, planters, ledges, or other street elements. Real-time information is also a desirable amenity at transit stops with high passenger activity.

Guidance

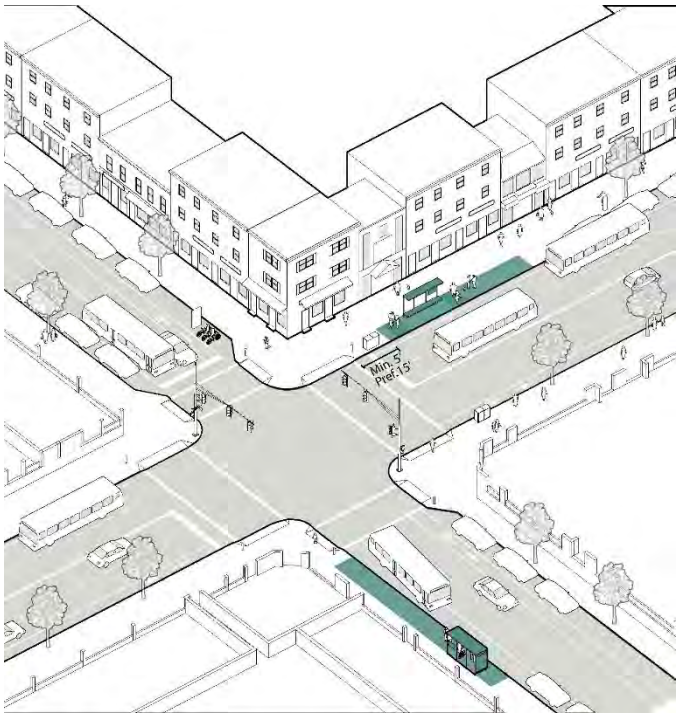
- Transit stops should be proximate to crosswalks. Mid-block stops should provide access to mid-block crosswalks.
- Transit stops should be set back a minimum of 5' from crosswalks. Where feasible, a 10' setback is preferred.
- Landing zones, or locations at the transit stop where passengers board and alight from the transit vehicle, should be provided at transit vehicle doors and clear of obstructions such as trees, sign posts, and street furniture. Buses can vary in length and will have different door configurations. Landing zones should be designed in coordination with all transit providers.
- Bus bulbs, or curb extensions the length of a transit stop, should extend to within 1' to 2' of the edge of travel lane. All transit stops should meet ADA Standards.
- Where possible, trash and recycling receptacles should be placed near the front of the transit stop, at a minimum of 18" from landing zones, minimum 3' away from benches or shelters, and in the shade where possible. They should also be anchored to the pavement to deter theft.

References

AC Transit Multimodal Corridor Design Guidelines.

NACTO Transit Street Design Guide (2016).

FIGURE B-21: LANDING ZONE SHOULD BE PROVIDED AT ALL DOORS OF THE TRANSIT VEHICLE.



VEGETATED STORMWATER MANAGEMENT

Vegetated stormwater management facilities—such as swales, bioretention basins, and stormwater planters—capture, treat, and infiltrate runoff from impervious surfaces. By holding and slowing down stormwater during rain events, these facilities reduce flooding in streets and local streams. Planting in stormwater facilities also helps keep streets cooler through shading from larger trees and by evapotranspiration. Streetscape projects in Berkeley should strive to integrate stormwater management facilities where appropriate.

Considerations

- Bioretention facilities can be incorporated in the design of several street components, including curb extensions, planters, medians, traffic circles, roundabouts, and any other landscaped area.
- Stormwater planters can line an entire block if breaks are provided where on-street parking exists.
- Planters can be combined with seat walls to provide seating.
- Visible stormwater management can increase people's awareness of native plants and the natural cycle of water.

Guidance

- Appropriate soils and infiltration media – sand, compost, gravel – should be used to ensure infiltration and health of the plants. Overly compacted soils can reduce infiltration capacity.
- The side slopes of vegetated stormwater facilities without solid walls should have gentle slopes to prevent erosion.
- Check dams can be used to slow the velocity of the water and catch sediment.
- Plants selected for bioretention facilities should be able to tolerate short periods of inundation, long dry periods, and local environmental constraints like pollution, and maintenance capacity.
- Proper maintenance is crucial to the health and performance of vegetated stormwater management facilities. Annual maintenance can include;
  - » Removal of sediment and litter
  - » Weeding and replacement of plant materials as needed, and
  - » Inspection and cleaning of inflow and overflow points and other structural components.
- Designs should consider connections to traditional stormwater drainage systems.
- Avoid locating facilities near high pollutant sites such as gas stations and maintenance yards.

References

NACTO Urban Street Stormwater Guide.

FIGURE B-22: VEGETATED STORMWATER MANAGEMENT FACILITIES HELP CAPTURE AND TREAT STORMWATER AND INCREASE GREENERY IN DEVELOPED AREAS.PHOTO: GOOGLE EARTH

INTERIM AND QUICK-BUILD DESIGN TREATMENTS

Examples of quick-build design treatments include both pilot projects and interim designs, and have been implemented in many nearby communities including San Francisco and Oakland. Interim designs provide rapidly-implementable, cost-effective ways to explore street design improvement strategies, address safety issues, or increase public space for pedestrians. Typically, permanent right-of-way reconfigurations can take years and significant resources to design and implement. Interim and quick-build design treatments are meant to be implemented in a relatively short timeframe and be responsive to evolving community needs. The success of an interim design treatment should demonstrate the need for a permanent solution.

Considerations

- Quick-build design treatments change street designs using temporary or inexpensive materials.
- Examples of quick-build treatments include: sidewalk extensions, bulb outs, painted mixing zones, temporary street closures, and interim public plazas, new crosswalks, and protected bikeways.
- Quick-build designs serve as a demonstration to test needed safety improvements or new right-of-way configurations ahead of permanent capital projects.
- These rapid-implementation designs allow prototyping of new street functionality and features before going into capital construction.
- Adjustable, modular, or prefabricated materials should be used to reduce design and implementation efforts and allow for feedback.
- Design treatments need to consider maintenance—including removing litter, caring for vegetation, and replacing materials—to ensure the space is always usable, attractive, and accessible to the public.
- Quick-build design projects require coordination across departments to be successful. A design and implementation team could be convened.
- The City should engage the community before and after implementation to educate users on the design, ensure the solution addresses their needs, and obtain feedback.

Guidance

- Quick-build materials can include:
  - » Bollards, jersey barriers, traffic cones, stone blocks, or planters (delineate temporary curbs)
  - » Striping and paint (mark pedestrian space and lane edges)
- Parking spaces can be repurposed with:
  - » Bike corrals
  - » Bike sharing stations
  - » Cycletracks
  - » Parklets -temporary or permanent conversion of a parking space into a green space with benches and other street furniture amenities
- The design treatment should increase or maintain the level of safety of the existing condition and needs to meet the minimum design and engineering requirements of federal standards in AASHTO, ADA, and MUTCD.
- Surveys and traffic counts should be conducted to measure public perception and usage of the treatment and determine need for permanent solution.

References

NACTO Urban Street Design Guide (2013).

FIGURE B-23: CURB EXTENSIONS COMPRISED OF PLANTER BOXES IN MEMPHIS, TN. (PHOTO CREDIT: ALTA PLANNING + DESIGN)

DOCKLESS MICROMOBILITY PARKING

As shared micromobility services, such as bicycles and scooters rented through smartphone apps, continue to grow, it is important to determine how to park and store dockless vehicles properly. Without the appropriate guidance and education on dockless vehicle parking, poorly stored dockless vehicles may block streets or sidewalks and pose a public safety hazard.

Considerations

- Physical designation for dockless vehicle parking creates clear limits on where micromobility users can park their bikes and scooters and can make use of existing infrastructure like bike racks. Clearly designated areas for parking are easier for users to identify and easier to enforce.
- Guidance, including signage and in-app messages telling people where parking is prohibited encourages micromobility parking outside of the roadway, sidewalk, or planting beds.
- Unrestricted parking provides more flexibility to micromobility users if the vehicle does not impede pedestrian or vehicular flow and does not require additional infrastructure. However, it is more difficult to manage and enforce, and users may block sidewalks and streets if they do not understand the policy fully.

Guidance

- Communication and education on the parking policies for dockless bikes and scooters are crucial to the success of the program.
- Use of existing infrastructure creates clear and enforceable rules for parking but may cause overcrowding of the racks for personal micromobility users. Micromobility parking infrastructure should be expanded in areas of high usage.
- Demarcated areas that designate parking for dockless bikes and scooters with paint, tape, or thermoplastic markings can be relatively inexpensive and quick to implement. However, improperly stored vehicles may still fall over into the pedestrian zone.
- A hybrid of different policies may be considered depending on the physical and digital environment of the community. Densely populated areas of Berkeley may require a different approach compared to less populated areas.

References

NACTO, Guidelines for the Regulation and Management of Shared Active Transportation. https://nacto.org/wp-content/uploads/2018/07/NACTO-Shared-Active-Transportation-Guidelines.pdf

Transportation for America, Shared Micromobility Playbook. http://playbook.t4america.org/

FIGURE B-24: DESIGNATED PARKING FOR DOCKLESS BICYCLES IN SILVER SPRING, MD. (PHOTO SOURCE: TOOLE DESIGN).

FIGURE B-25: DESIGNATED PARKING FOR E-SCOOTERS IN LONG BEACH, CA (PHOTO CREDIT: TOOLE DESIGN)