

**Chapter 16**  
**Accessible Sidewalk Requirements**

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## Chapter 16

### Accessible Sidewalk Requirements

#### 16.1 Introduction

The City of Sioux Falls developed this section based on the July 26, 2011, “Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way.” This section was developed in accordance with Federal regulations ([23 CFR 652](#) and [28 CFR 35](#)) and is considered the most current standard by the Federal Highway Administration. Acknowledgement is given to the Iowa Statewide Urban Design and Specifications (SUDAS) organization as the bulk of this chapter was written using the information listed in their accessible sidewalk requirement design manual.

Sidewalks are an integral component of the transportation system. Where sidewalks are provided, they must be constructed so they are accessible to all potential users, including those with disabilities. This section establishes the criteria necessary to make an element physically accessible to people with disabilities. This section also identifies what features need to be accessible and then provides the specific measurements, dimensions, and other technical information needed to make the feature accessible. The requirements of this section were developed based on the following documents:

- 16.1.1 ADAAG.** The “Americans with Disabilities Act Accessibilities Guidelines” (ADAAG) was written by the US Access Board and adopted by the Department of Justice (DOJ) in 2010. This document includes a broad range of accessibility guidelines including businesses, restaurants, public facilities, public transportation, and sidewalks. These standards were originally adopted in 1991 and have been expanded and revised several times.
- 16.1.2 PROWAG.** The July 26, 2011, “Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way” was written by the U.S. Access Board and is also known as the Public Right-of-Way Accessibility Guidelines or PROWAG. PROWAG provides more specific information than the ADAAG for transportation facilities within the right-of-way including pedestrian access routes, signals, and parking facilities. The PROWAG requirements are currently in the development and adoption process and have not been officially adopted by the Department of Justice; however, the Federal Highway Administration has issued guidance that the draft version of the PROWAG “are currently recommended best practices, and can be considered the state of the practice that could be followed for areas not fully addressed” in the existing ADAAG requirements.

Due to the widespread acceptance of the PROWAG, and their pending adoption in the future, the standards of this chapter are based upon the PROWAG requirements. The designer is encouraged to reference the complete PROWAG document for additional information ([www.access-board.gov](http://www.access-board.gov)). References to the PROWAG in this section are shown in

parentheses; e.g., (R302.7). Buildings and other structures not covered by PROWAG must comply with the applicable requirements of the ADAAG. For parks, recreational areas, and shared use paths, refer to other sections within this chapter.

**16.1.3 International Building Code (IBC).** The International Building Code or IBC is promulgated and published by the International Code Council (ICC). The IBC is revised and published in a three-year code cycle and has been adopted by the City of Sioux Falls, with amendments and additions outlined in City Ordinance Chapter 150. The IBC provides and establishes minimum standards and regulations for commercial building systems to safeguard the public health and safety in the built environment. The IBC outlines accessibility requirements for accessible entrances from the sidewalk within the public right-of-way to buildings (including Title II and Title III buildings). Site development, redevelopment, and right-of-way construction projects that adjoin accessible entrances shall meet IBC requirements.

## **16.2 Accessible Sidewalk Design**

It has been common practice to place the responsibility for sidewalk ramp layout on the contractor or construction inspector. This has resulted in the sidewalk, curb ramps, driveway crossings, etc., being designed in the field, often with mixed accessibility results. As public right-of-way accessibility comes under greater scrutiny, it is increasingly important that newly constructed or altered sidewalks meet accessibility requirements. Therefore, sidewalks, curb ramps, and street crossings shall be included as part of the design process and the details of those designs shall be included in the contract documents as appropriate.

Design information that needs to be shown on the plans includes, but is not limited to, the location, size, and grade of sidewalks, turning spaces, ramps, and detectable warning panels. Spot elevations may also be necessary. Additionally, callouts for the beginning and end points of curb and gutter tapers need to be shown.

## **16.3 Construction Standards**

Construction standards shall be the most current edition of the South Dakota Department of Transportation *Standard Specifications for Roads and Bridges with Supplemental Specifications and Errata*.

## **16.4 Definitions**

**Accessible:** Facilities that comply with the requirements of this section.

**Alteration:** An alteration is a change that affects or could affect the usability of all or part of a building or facility. Alterations of streets, roadways, or highways include activities such as reconstruction, rehabilitation, resurfacing, widening, and projects of similar scale and effect.

**Alternate Pedestrian Access Route:** A route provided when a pedestrian circulation path is temporarily closed by construction, alterations, maintenance operations, or other conditions.

**Cross Slope:** The grade that is perpendicular to the direction of pedestrian travel.

**Crosswalk:** See pedestrian street crossing.

**Curb Line:** A line at the face of the curb that marks the transition between the curb and the gutter, street, or highway.

**Curb Ramp:** A ramp that cuts through or is built up to the curb. Curb ramps can be perpendicular, parallel, or a combination of parallel and perpendicular curb ramps.

**Detectable Warning:** Detectable warnings consist of small, truncated domes built in or applied to a walking surface that are detectable by cane or underfoot. On pedestrian access routes, detectable warning surfaces indicate the boundary between a pedestrian route and a vehicular route for pedestrians who are blind or have low vision.

**New Construction:** Construction of a roadway where an existing roadway does not currently exist.

**Pedestrian Access Route:** A continuous and unobstructed path of travel provided for pedestrians with disabilities within, or coinciding with, a pedestrian circulation path.

**Pedestrian Circulation Path:** A prepared exterior or interior surface provided for pedestrian travel in the public right-of-way.

**Pedestrian Street Crossing:** A marked or unmarked route providing an accessible path to travel from one side of the street to the other. Pedestrian street crossings are a component of the pedestrian access route and/or the pedestrian circulation path.

**PROWAG:** The Public Right-of-way Accessibility Guidelines establish the criteria for providing a feature within the public right-of-way that is physically accessible to those with physical disabilities.

**Running Slope:** The grade that is parallel to the direction of pedestrian travel.

**Scope of the Project:** Work that can reasonably be completed within the limits of the project. This is not defined by the written project scope; however, it focuses on whether the alteration project presents an opportunity to design the altered element, space, or facility in an accessible manner.

**Structurally Impracticable:** Something that has little likelihood of being accomplished because of those rare circumstances when the unique characteristics of terrain prevent the incorporation of full and strict compliance with this section. Applies to new construction only.

**Technically Infeasible:** With respect to an alteration of an existing facility, something that has little likelihood of being accomplished because existing structural conditions would require removing or altering a load-bearing member that is an essential part of the structural frame; or because other existing physical or site constraints prohibit modification or addition of elements, spaces, or features that are in full and strict compliance with the requirements of this section (2010 ADAAG 106.5).

**Turning Space:** An area at the top or bottom of a curb ramp providing a space for pedestrians to stop, rest, or change direction.

## 16.5 Applicability

**16.5.1 New Construction.** Newly constructed facilities within the scope of the project shall be made accessible to persons with disabilities, except when it can be demonstrated it is structurally impracticable to provide full compliance with the requirements of this section. Structural impracticability is limited to only those rare situations when the unique characteristics of terrain make it physically impossible to construct facilities that are fully compliant. If full compliance with this section is structurally impracticable, compliance is required to the extent that it is not structurally impracticable [[2010 ADAAG](#) 28 CFR 35.151(a)].

**16.5.2 Alterations.** Whenever alterations are made to the pedestrian circulation path, the pedestrian access route shall be made accessible to the maximum extent feasible within the scope of the project. If full compliance with this section is technically infeasible, compliance is required to the extent that it is not technically infeasible. [[2010 ADAAG](#) 28 CFR 35.151(b)] Alterations shall not gap pedestrian circulation paths in order to avoid ADA compliance.

Resurfacing is an alteration that triggers the requirement for curb ramps if it involves work on a street or roadway spanning from one intersection to another. Examples include, but are not limited to, the following treatments or their equivalents:

- New layer of surface material (asphalt or concrete, including mill and fill)
- Reconstruction
- Concrete pavement rehabilitation and reconstruction
- Open-graded surface course
- Microsurfacing and thin lift overlays
- Cape seals (slurry seal or microsurfacing over a new chip seal)
- In-place asphalt recycling

[[DOJ/U.S. DOT Glossary of Terms](#) and [DOJ/U.S. DOT Technical Assistance](#); June 28, 2013]

Where elements are altered or added to existing facilities, but the pedestrian circulation path is not altered, the pedestrian circulation path is not required to be modified (R202.1). However, features that are added shall be made accessible to maximum extent feasible. The following are examples of added features:

- Installation of a traffic sign does not require sidewalk improvements; however, the sign cannot violate the protruding objects requirements.
- Installation of a traffic or pedestrian signal does not require sidewalk improvements; however, the signal must be accessible.
- Installation of a bench adjacent to the pedestrian access route would not require sidewalk improvements, but the bench cannot be placed in a manner that would reduce the sidewalk width below the minimum requirement.

**16.5.3 Maintenance.** Accessibility improvements are not required for work that is considered maintenance. Examples of work that would be considered maintenance include, but are not limited to, the following items:

- Painting pavement markings, excluding parking stall delineations
- Crack filling and sealing
- Surface sealing
- Chip seals
- Slurry seals
- Fog seals
- Scrub sealing
- Joint crack seals
- Joint repairs
- Dowel bar retrofit
- Spot high-friction treatments
- Diamond grinding
- Minor street patching (less than 50% of the pedestrian street crossing area)
- Curb and gutter repair or patching outside the pedestrian street crossing
- Minor sidewalk repair that does not include the turning space and curb ramps
- Filling potholes

If a project involves work not included in the list above, or is a combination of several maintenance items occurring at or near the same time, the agency administering the project is responsible for determining if the project should be considered maintenance or an alteration. If either of these two situations is determined to be maintenance, the agency administering the project must document the reasons for this determination. If the project is defined as maintenance, federal funding and Farm-to-Market funds cannot be used.

When a maintenance project modifies a crosswalk, installation of curb ramps at the crosswalks is recommended, if none already exists. The other accessibility improvements of this section are also recommended, but not required with such projects.

**16.5.4 Technical Infeasibility.** Examples of existing physical or site constraints that may make it technically infeasible to make an altered facility fully compliant include, but are not limited to, the following:

- Right-of-way availability. Right-of-way acquisition in order to achieve full compliance is not mandatory, however, it should be considered. Improvements may be limited to the maximum extent practicable within the existing right-of-way.
- Underground structures that cannot be moved without significantly expanding the project scope.
- Adjacent developed facilities, including buildings that would have to be removed or relocated to achieve accessibility.
- Drainage cannot be maintained if the feature is made accessible.
- Notable natural or historic features that would have to be altered in a way that lessens their aesthetic or historic value.
- Underlying terrain that would require a significant expansion of the project scope to achieve accessibility.
- Street grades within the crosswalk exceed the pedestrian access route maximum cross slopes, provided an engineering analysis has concluded that it cannot be done without significantly expanding the project scope (for example, changing from resurfacing an intersection to reconstructing that intersection).

**16.5.5 Safety Issues.** When accessibility requirements would cause safety issues, compliance is required to the maximum extent practicable.

**16.5.6 Documenting Exceptions.** If the project cannot fully meet accessibility requirements because the accessibility improvements are structurally impracticable, technically infeasible, or safety issues, an Accessibility Exemptions Certification form, available on the Engineering Division's website, needs to be completed to describe how the existing physical or site constraints or safety issues limit the extent to which the facilities can be

made compliant. This form should identify the specific locations that cannot be made fully compliant and provide specific reasons why full compliance cannot be achieved. This form shall be submitted with the plan and is subject to approval of the City Engineer. This document will be retained in the project file.

**Note:** Documenting exceptions does not remove the Owner or the City's responsibility to consider making accessibility improvements the next time the facility is altered because physical or site constraints and safety issues may change over time. The determination of exceptions and corresponding documentation needs to be made each time a facility is altered, based on the existing conditions and the scope of the proposed project.

**16.5.7 Reduction in Access.** Regardless of whether the additions or alterations involve the modification of the existing pedestrian circulation path, the resulting work cannot have the result of reducing the existing level of accessibility below the minimum requirements. For example, the installation of a bench cannot have the effect of reducing the width of the pedestrian access route to 3 feet (4 feet is the minimum). Likewise, the construction of an overlay cannot result in a street cross slope of more than 5%, nor have a lip at the curb ramp that exceeds 1/2 inch.

Pedestrian facilities may be removed if they are being rerouted for safety reasons or terminated because they do not connect to a destination or another pedestrian circulation path.

## **16.6 Standards for Accessibility**

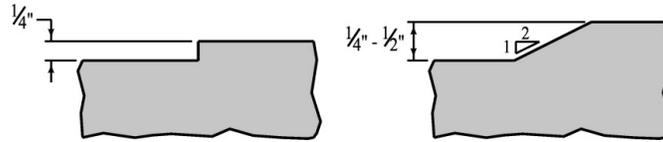
The following section summarizes the design standards for the elements of an accessible pedestrian access route. The minimum and maximum values stated are taken from the PROWAG. Target values are also provided. Designing features to the target values, rather than the allowable maximum or minimum, allows for appropriate construction tolerances and field adjustment during construction while maintaining compliance with the PROWAG standards.

**16.6.1 General Requirements.** These requirements apply to all parts of the pedestrian access route.

**16.6.1.1 Surfacing.** PROWAG requires all surfaces to be firm, stable, and slip-resistant (R302.7). All permanent pedestrian access routes shall be paved with concrete or asphalt. The use of asphalt must be approved by the City Engineer.

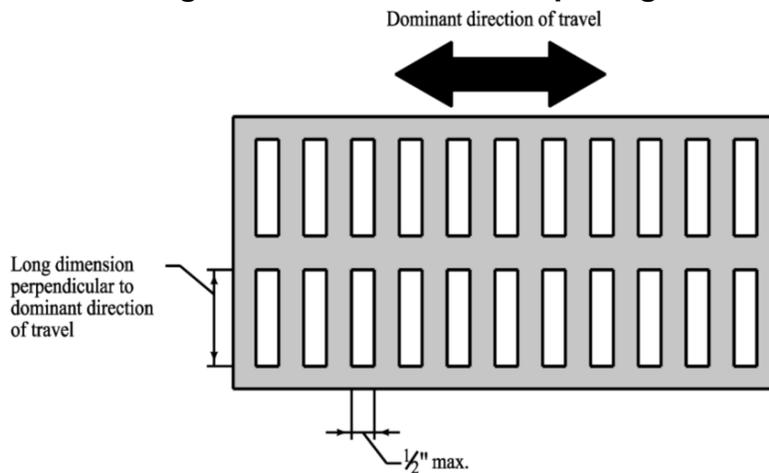
**16.6.1.2 Changes in Level.** Changes in level, including bumps, utility castings, expansion joints, etc., shall be a maximum of 1/4 inch without a bevel or up to 1/2 inch with a 2:1 bevel. Where a bevel is provided, the entire vertical surface of the discontinuity shall be beveled (R302.7.2).

**Figure 16.01: Vertical Surface Discontinuities**



**16.6.1.3 Horizontal Openings.** Horizontal openings shall not allow passage of a sphere more than 1/2 inch in diameter. Elongated openings in grates shall be placed so the long dimension is perpendicular to the dominant direction of travel. The use of grates within the pedestrian access route is discouraged; however, where necessary, the grate should be located outside of curb ramp runs, turning spaces, and gutter areas if possible (R302.7.3).

**Figure 16.02: Horizontal Openings**



**16.6.2 Standard Sidewalk.** Sidewalks solely serving private residences outside the public right-of-way are not required to follow these requirements.

**16.6.2.1 Location.** Sidewalks shall be constructed on both sides of all roadways unless specifically waived by the City Engineer. Sidewalk shall typically be detached and generally be located 2 feet from the property line.

**16.6.2.2 Cross Slope.** The maximum cross slope is 2.0% with a target value of 1.5% (R302.6).

**16.6.2.3 Running Slope.** Sidewalks with a running slope of 5% or less are acceptable. However, where the sidewalk is contained within the street right-of-way, the grade of the sidewalk shall not exceed the general grade of the adjacent street (R302.5). For design, consider the general grade of the adjacent street to be within approximately 2% of the profile grade of the street.

**16.6.2.4 Width.** Sidewalk width shall be 4 feet minimum on local streets and cul-de-sacs with residential housing. On collector and arterial streets and streets abutted by commercial, industrial, and multifamily lots, the minimum sidewalk width shall be 5 feet. When sidewalk is located back of curb, the minimum width shall be 6 feet (R302.3).

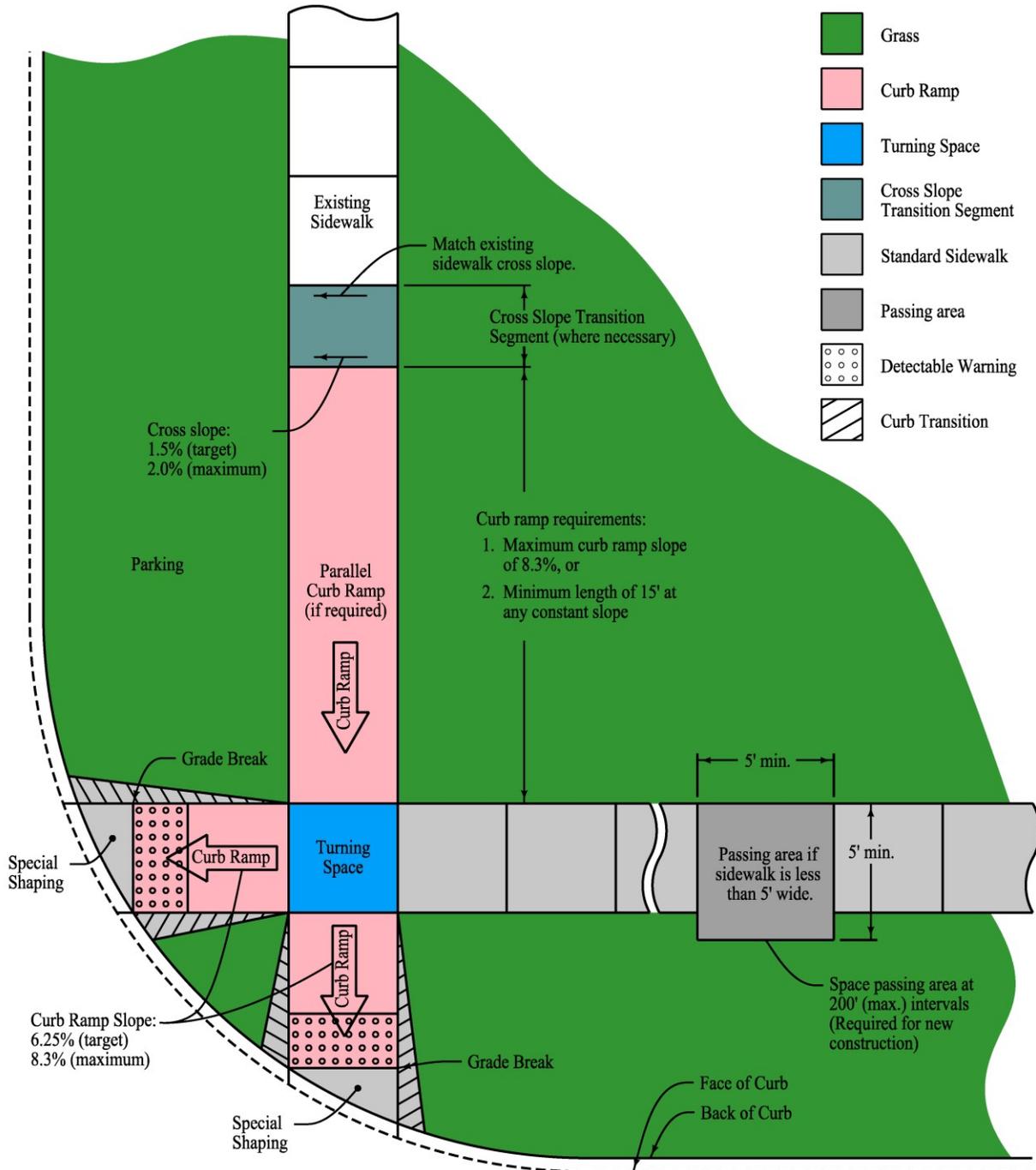
**16.6.2.5 Thickness.** Sidewalk thickness shall be a minimum of 4 inches. At driveway locations, it shall be the thickness of the adjacent driveway. When the sidewalk is located back of curb or when the area between the building and the back of curb is filled in with sidewalk (i.e., downtown), the thickness shall be a minimum of 6 inches.

Sidewalk thickness at ramp locations including the turning space, ramp, and flares shall be a minimum of 6 inches thick.

**16.6.2.6 Passing Spaces.** Where the clear width of the pedestrian access route is less than 5 feet, passing spaces are required at maximum intervals of 200 feet. The passing space shall be 5-foot minimum by 5-foot minimum. Passing spaces may overlap with the pedestrian access route (R302.4).

Driveways may be used as passing spaces, as long as the 2.0% maximum cross slope is not exceeded. To accommodate the passing space requirement in residential areas where the sidewalk is 4 feet wide, the sidewalk width through each driveway must be 5 feet wide. The designer shall indicate passing space locations when it is anticipated the 200-foot interval will not be met by the additional width at the driveways.

**Figure 16.03: Standard Sidewalk and Curb Ramp Elements**

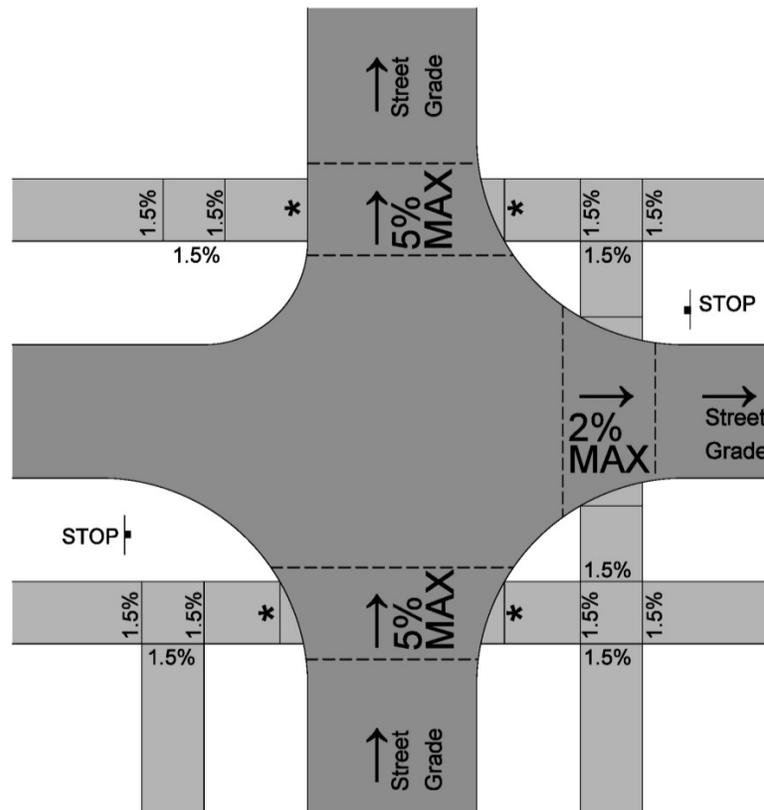


### 16.6.3 Pedestrian Street Crossings.

**16.6.3.1 Cross Slope.** The longitudinal grade of a street becomes the cross slope for a pedestrian street crossing. PROWAG has maximum limits for the cross slope of pedestrian street crossings, which vary depending on the location of the crossing and the type of vehicular traffic control at the crossing. These requirements, in effect, limit the longitudinal grade of a street or require a “tabled crosswalk” at the intersection (R302.6).

- 1) **Intersection Legs with Stop or Yield Control:** For pedestrian street crossings across an intersection leg with full stop or yield control (stop sign or yield sign), the maximum cross slope is 2.0% (maximum 2.0% street grade through the crossing).
- 2) **Intersection Legs without Stop or Yield Control:** For pedestrian street crossings across an intersection leg where vehicles may proceed without slowing or stopping (uncontrolled or signalized), the maximum cross slope of the pedestrian street crossing is 5.0% (maximum 5.0% street grade through the crossing).
- 3) **Midblock Pedestrian Street Crossings:** At midblock crossings, the cross slope of the pedestrian street crossing is allowed to equal the street grade.

**Figure 16.04: Example Street Intersection**



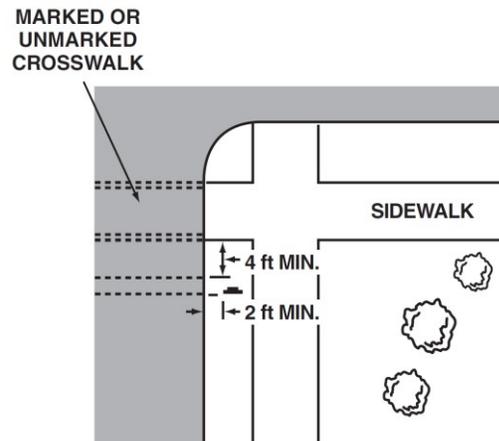
\* Match pedestrian street crossing cross slope or flatter

**16.6.3.2 Running Slope.** The running slope of the pedestrian street crossing is limited to a maximum of 5.0% (maximum street cross slope or superelevation of 5.0%) (R302.5.1).

**16.6.3.3 Location.** Driver anticipation and awareness of pedestrians increases as one moves closer to the intersection. Therefore, curb ramps and pedestrian street crossings should be located as close to the edge of

the adjacent traveled lane as practical. Where a stop sign or yield sign is provided, MUTCD requires the pedestrian street crossing, whether marked or unmarked, be located a minimum of 4 feet from the sign between the sign and the intersection. It is recommended stop and yield signs be located no greater than 30 feet from the edge of the intersecting roadway; however, MUTCD allows up to 50 feet. Consult MUTCD for placement of curb ramps and pedestrian street crossings at signalized intersections.

**Figure 16.05: Pedestrian Street Crossing Location**



Source: MUTCD, FHWA

**16.6.3.4 Medians and Pedestrian Refuge Islands.** Medians and pedestrian refuge islands in pedestrian street crossings shall be cut through level with the street or complying with the curb ramp requirements. The clear width of pedestrian access routes within medians and pedestrian refuge islands shall be 5.0 feet minimum (R302.3.1). If a raised median is not wider than 6 feet, it is recommended the nose not be placed in the pedestrian street crossing.

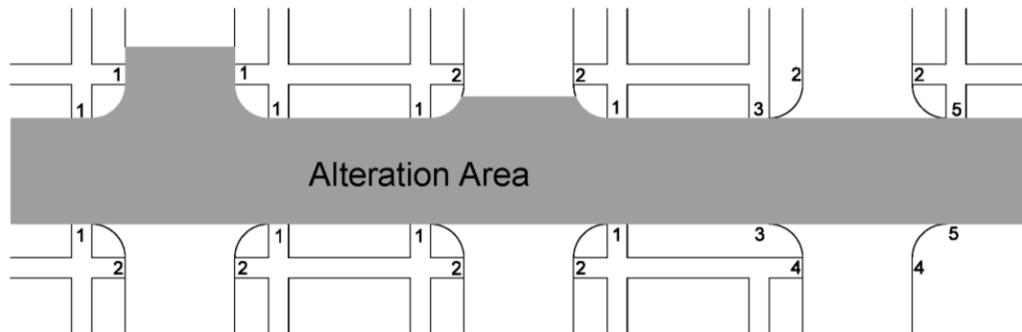
#### **16.6.4 Curb Ramps.**

**16.6.4.1 General.** There are two types of curb ramps: perpendicular and parallel. Perpendicular curb ramps are generally perpendicular to the traffic they are crossing with the turning space at the top. Parallel curb ramps have the turning space at the bottom. Parallel curb ramps may be used where the sidewalk begins at or near the back of curb and there is little or no room between the sidewalk and curb for a perpendicular curb ramp.

A separate curb ramp is required at each pedestrian street crossing for new construction. Parallel ramps with a large turning space, as shown in Figure 16.08, are allowed. For alterations, follow the new construction requirements if possible; however, a single diagonal curb ramp is allowed but not recommended where existing constraints prevent two curb ramps from being installed.

For transitions into and out of driveways, curb ramp requirements may be used. For curb ramps within and near an alteration area, see Figure 16.06.

**Figure 16.06: Curb Ramps for Alterations**



1. Required.
2. Strongly recommended.
3. Required due to barriers in the path of travel between the sidewalk on one side of the street to the sidewalk on the other side of the street.
4. Recommended, but not required because it is outside the alteration area. Consider based on pedestrian usage, safety, and land development.
5. Install both sides or remove the existing one, based on pedestrian usage, safety, and land development.

#### 16.6.4.2 Technical Requirements.

- 1) **Cross Slope:** The maximum cross slope is 2.0% with a target value of 1.5%; however, for intersection legs that do not have full stop or yield control (i.e., uncontrolled or signalized) and at mid-block crossings, the curb ramp cross slope is allowed to match the cross slope in the pedestrian street crossing section. See “pedestrian street crossings” for additional details (R304.5.3).
- 2) **Running Slope:** Provide curb ramps with a target running slope of 6.25% and a maximum slope of 8.3%; however, curb ramps are not required to be longer than 15 feet, regardless of the resulting slope (R304.2.2 and R304.3.2).
- 3) **Width:** The minimum width of a curb ramp is 4 feet, excluding curbs and flares. If the sidewalk facility is wider than 4 feet, the target value for the curb ramp is equal to the width of the sidewalk (R304.5.1).
- 4) **Grade Breaks:** Grade breaks at the top and bottom of curb ramps must be perpendicular to the direction of the curb ramp run. Grade breaks are not allowed on the surface of curb ramp runs and turning spaces (R304.5.2).
- 5) **Flared Sides:** For perpendicular curb ramps on Class A sidewalks, or configurations where the pedestrian circulation path crosses the curb ramp, PROWAG requires the flares along the sides of the curb ramp to be constructed at 10% or flatter (R304.2.3). This allows pedestrians to

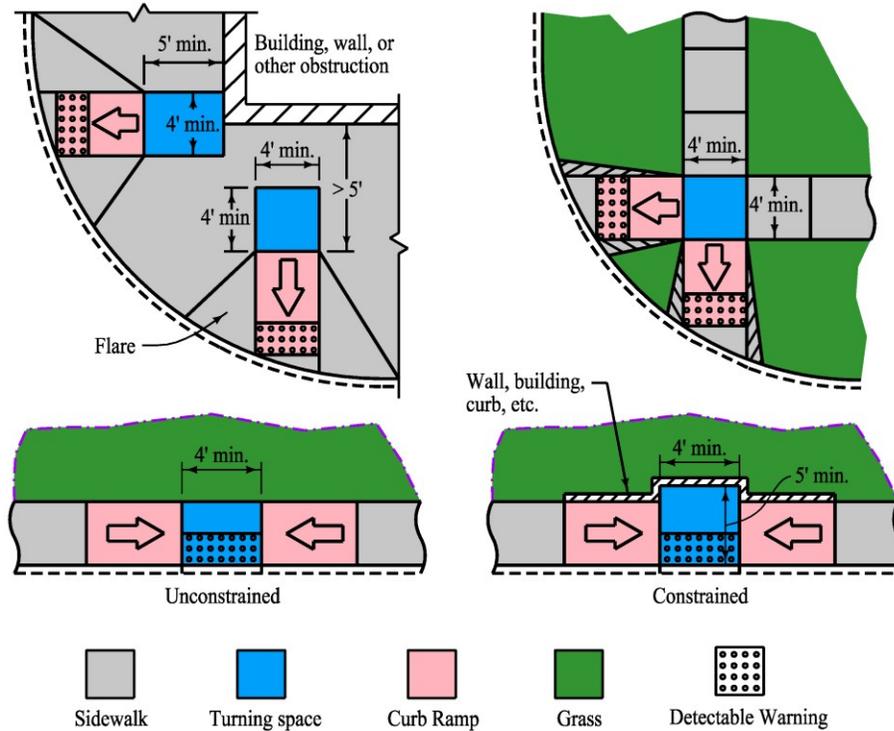
approach the curb ramp from the side and prevents a tripping hazard. It is recommended to design these flares at a slope between 8% and 10%, which will clearly define the curb ramp from the sidewalk.

- 6) **Clear Space:** At the bottom of perpendicular curb ramps, a minimum 4-foot by 4-foot area must be provided within the width of the pedestrian street crossing, but wholly outside of the parallel vehicle travel lanes (R304.5.5).
- 7) **Turning Space:** Turning spaces allow users to stop, rest, and change direction on the top or bottom of a curb ramp (R304.2.1 and R304.3.1).
  - a) **Placement:** A turning space is required at the top of perpendicular curb ramps and at the bottom of parallel curb ramps.
  - b) **Slope:** The maximum cross slope and running slope is 2.0% with a target value of 1.5% (R304.2.2 and R304.3.2). When turning spaces are at the back of curb, cross slopes may be increased to match allowable values in the pedestrian street crossing section (R304.5.3).
  - c) **Size:** The turning space shall be a minimum of 4 feet by 4 feet. Where the turning space is constrained on one or more sides, provide 5 feet in the direction of the pedestrian street crossing.
- 8) **Special Shaping Area:** Transition area between the back of curb and the grade break. The longest side cannot exceed 5 feet.

#### 16.6.4.3 Curb Ramp Design Considerations.

- 1) **Combination Curb Ramps:** For many intersection configurations, a perpendicular curb ramp will not provide enough length to establish the top turning space at the sidewalk elevation; in these situations, a parallel curb ramp is often required to transition from the turning space up to the sidewalk elevation. The use of a perpendicular curb ramp from the curb to the turning space in conjunction with a parallel curb ramp between the turning space and the sidewalk elevation is referred to as a combination curb ramp. When transitioning from a turning space to sidewalk elevation on a steep street, it is not necessary to chase the grade. As noted in the technical requirements above, a parallel curb ramp is not required to exceed 15 feet in length, regardless of the resulting curb ramp slope. In practice, the parallel curb ramp should be extended to the next joint beyond 15 feet.

**Figure 16.07: Curb Ramp Turning Spaces**



- 2) **Cross Slope Transition Segment:** When connecting to existing construction that is out of cross slope compliance, the cross slope transition should be completed beyond the parallel curb ramp or turning space; this recommendation eliminates the need to list this curb ramp in the transition plan. It is recommended this cross slope transition take place at 1% per foot or less. Typically, this can be accomplished in a single panel.
- 3) **Parking Slope:** In situations where the length of the perpendicular curb ramp is insufficient to bring the turning space up to sidewalk elevation, consider lowering the sidewalk and flattening the parking slope.
- 4) **“T” Intersections:** If a pedestrian access route exists at a “T” intersection, then separate curb ramps should be provided at all quadrants. Engineering judgment shall be used in determining the feasibility of providing separate curb ramps at all quadrants of a “T” intersection. Factors to consider include, but not be limited to, physical constraints (for example, driveway approach), volume of pedestrian traffic, alternate pedestrian crossing locations, and crossing safety.

**16.6.5 Blended Transitions.** A blended transition is allowed but not recommended. Design and constructability is difficult to meet compliance requirements. In lieu of a blended transition, a curb ramp or standard sidewalk should be used.

## **16.6.6 Detectable Warnings.**

**16.6.6.1 General.** Detectable warning surfaces are detected underfoot or with a cane by blind and low vision individuals. The warnings indicate the location of the back of curb. Detectable warnings also provide a visual queue to pedestrians with low vision and aid in locating the curb ramp across the street. For these reasons, the detectable warning shall contrast visually (light on dark or dark on light) from the surrounding paved surfaces (R305.1.3).

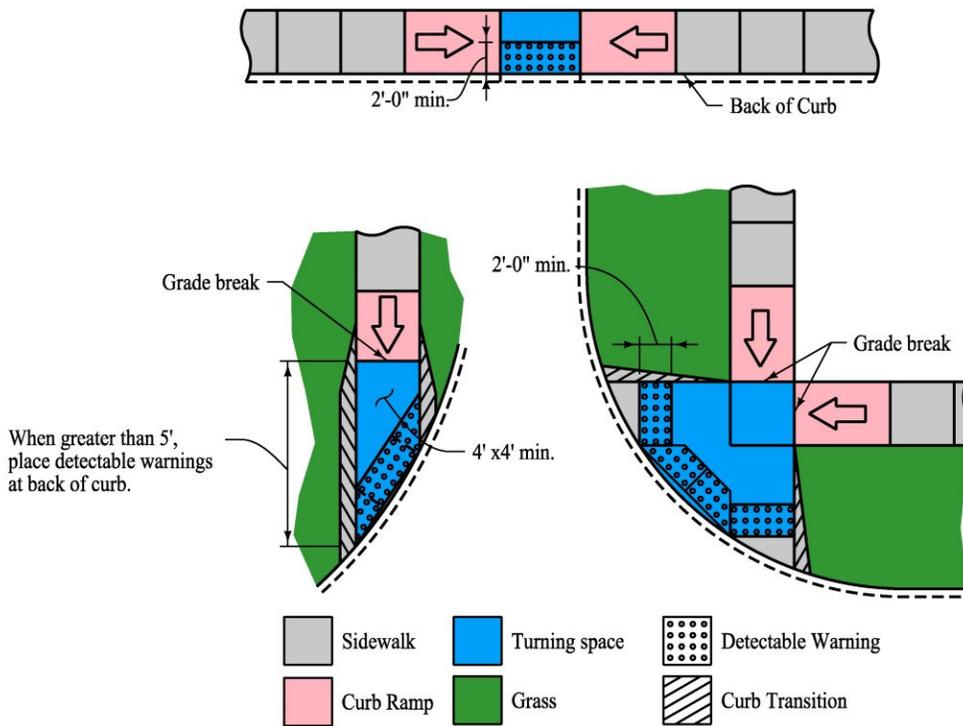
**16.6.6.2 Location.** Detectable warnings shall be installed at all pedestrian street crossings and at grade rail crossings (R208.1). Detectable warning surfaces should not be provided at crossings of residential driveways since the pedestrian right-of-way continues across the driveway. Where commercial driveways are provided with yield control, stop control, or traffic signals at the pedestrian access route, detectable warnings should be installed at the junction between the pedestrian access route and the driveway (Advisory R208.1).

**16.6.6.3 Size.** Detectable warning surfaces shall extend a minimum of 2 feet in the direction of pedestrian travel and extend the full width of the curb ramp or pedestrian access route (R305.1.4).

**16.6.6.4 Dome Orientation.** On curb ramps, the rows of truncated domes should be aligned perpendicular to the grade break so pedestrians in wheelchairs can track their wheels between the domes. On surfaces less than 5% slope, dome orientation is less critical.

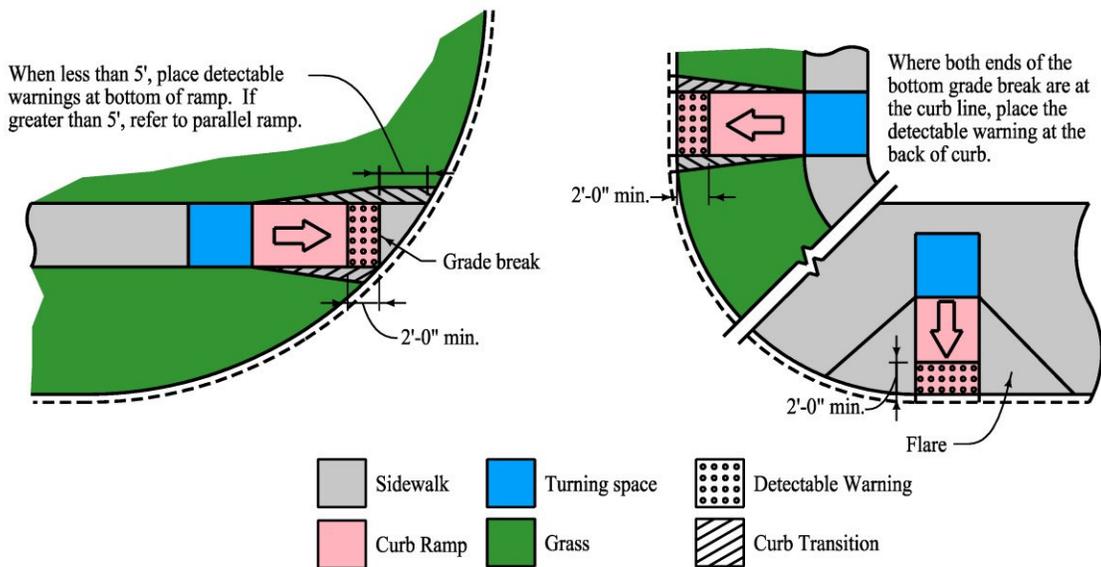
**16.6.6.5 Parallel Curb Ramps.** On parallel curb ramps, detectable warning shall be placed on the turning space at the back of curb (R305.2.2).

**Figure 16.08: Detectable Warnings on Parallel Curb Ramps**



**16.6.6.6 Perpendicular Curb Ramps.** Placement of detectable warning varies based upon location of grade break as shown in Figure 16.09.

**Figure 16.09: Detectable Warnings on Perpendicular Curb Ramps**



**16.6.6.7 Refuge Islands.** Where refuge islands are 6 feet wide or greater from back of curb to back of curb, detectable warning shall be placed at the edges of the pedestrian island and separated by a minimum 2-foot strip without detectable warnings. Where the refuge island is less than 6 feet wide, a 2-foot strip without detectable warnings cannot be installed. In these situations, detectable warnings shall not be installed at the island and the pedestrian signal must be timed for full crossing (R208.1 and R208.2).

**16.6.6.8 Rural Cross-section.** Detectable warnings should be placed similar to urban layouts, except at the edge of shoulder instead of the back of curb.

## **16.6.7 Ramps.**

### **16.6.7.1 Technical Requirements.**

- 1) General: Any part of a pedestrian access route with a slope greater than 5% that is not adjacent to a street is considered a ramp and shall comply with this section. It is recommended to provide a walkway with stairs in addition to the walkway with ramps for use by those individuals for whom distance presents a greater barrier than steps.
- 2) Running Slope: Ramp runs shall have a running slope between 5% minimum and 8.3% maximum.
- 3) Cross Slope: The cross slope of ramp runs shall be 2% maximum.
- 4) Width: The clear width of a ramp run and, where handrails are provided, the clear width between handrails shall be 3 feet minimum.
- 5) Rise: The rise for any ramp run shall be 2.5 feet maximum.
- 6) Landings: Ramps shall have landings at the top and the bottom of each ramp run.
  - a) Slope: Landing slopes shall be 2% maximum in any direction.
  - b) Width: The clear width of the landing shall be at least as wide as the widest ramp run leading to the landing.
  - c) Length: The landing clear length shall be 5 feet long minimum.
- 7) Change in Direction: Ramps that change direction between runs at landings shall have a clear turning space (5 feet by 5 feet minimum).
- 8) Handrails: Ramp runs with a rise greater than 6 inches shall have handrails complying with PROWAG.
- 9) Edge Conditions: Ramps and landings with drop-offs shall have curbs, walls, railings, or projected surfaces that prevent people from slipping off the ramp. Curbs shall be a minimum of 2 inches high.

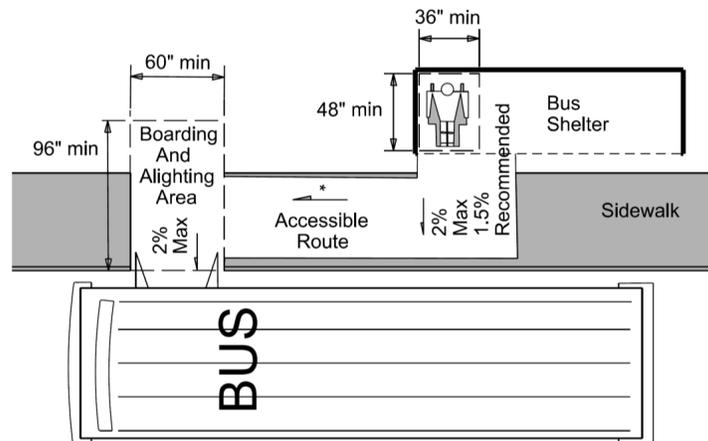
## 16.7 Bus Stop

**16.7.1 Bus Stop Pads.** New and altered bus stop pads shall meet the following criteria:

- Provide a firm, stable, and slip-resistant surface (R308.1.3.1).
- Provide a minimum clear length of 8 feet (measured from the curb or roadway edge) and minimum clear width of 5 feet (measured parallel to the roadway) (R308.1.1.1).
- Connect the pad to streets, sidewalks, or pedestrian circulation paths with at least one accessible route (R308.1.3.2).
- The slope of the pad parallel to the roadway will be the same as the roadway to the maximum extent practicable (R308.1.1.2).
- Provide a desirable cross slope of 1.5% up to a maximum cross slope of 2.0% perpendicular to the roadway (R308.1.1.2).

**16.7.2 Bus Shelters.** Where new or replaced bus shelters are provided, install or position them to allow a wheelchair user to enter from the public way. An accessible route shall be provided from the shelter to the boarding area (R308.2).

**Figure 16.10**



\* Slope may be the same as the roadway

## 16.8 Pedestrian Push-Buttons at Curb Ramps

**16.8.1 Pedestrian Push-Buttons at Curb Ramps Design Considerations.**

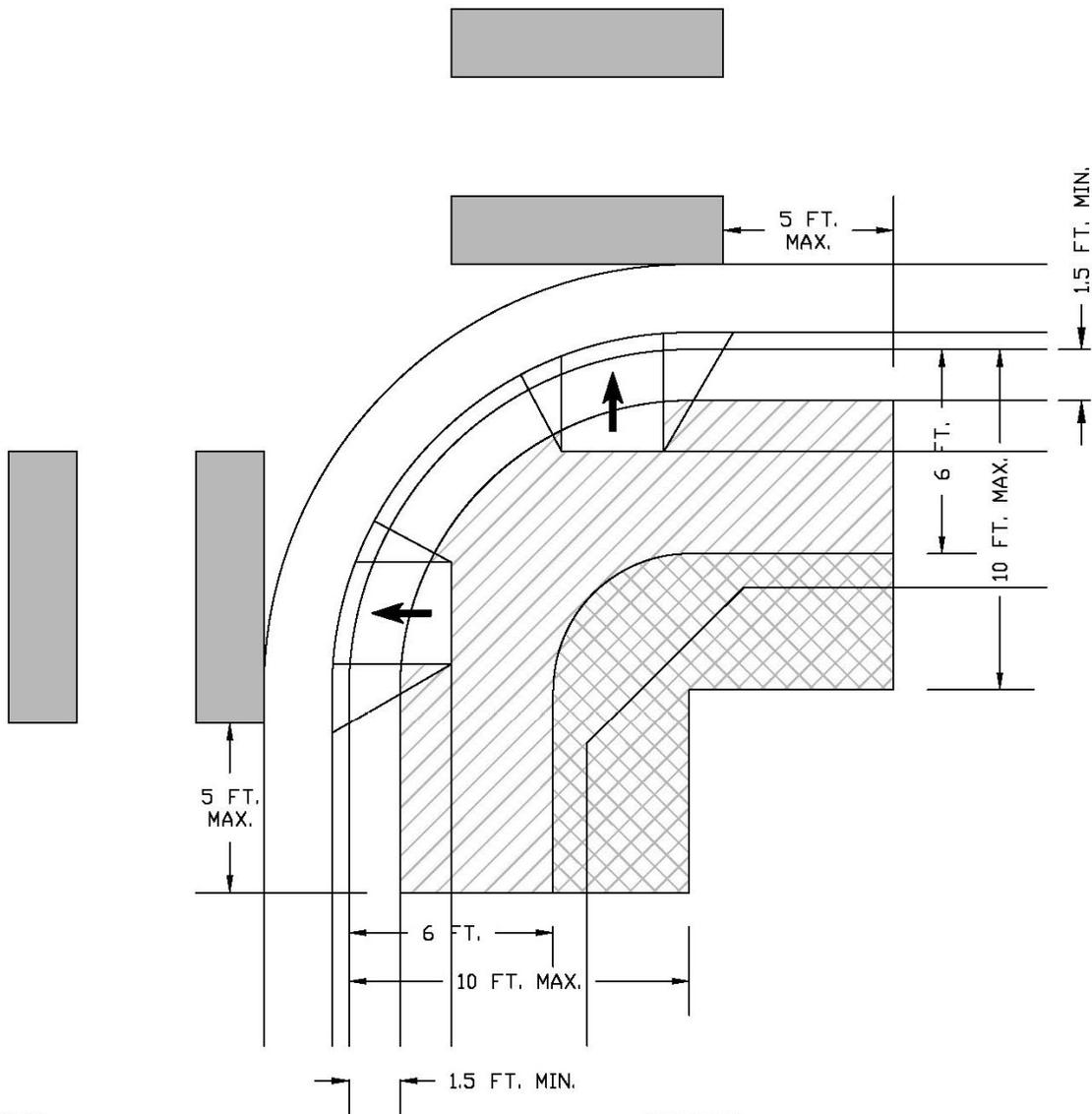
- Signalized (or potential for signalized in the future), always design curb ramps to accommodate two push-button poles.
- Typically, pedestrian push-button poles will be used rather than push-buttons being mounted on signal poles.

- Pedestrian push-button poles are to be placed in front of the curb located on the backside of ramp (i.e., parallel curb ramps).
- The alignments of sidewalks around the push-buttons and curb ramps are designer's choice (straight or curved).
- There should be one full unobstructed side of clear space at pedestrian push-buttons (either in front or behind push-button). The minimum clear width shall be 4 foot, exclusive of the curb.

**16.8.2 Pedestrian push-buttons should be located as follows:**

- Within 1.5 to 6.5 feet from the edge of curb.
- Where two push-buttons are provided, the push-buttons should have at least 10 feet of separation from each other. If two accessible pedestrian push-buttons must be less than 10 feet apart or on the same pole, each button shall meet the APS push-button equipment requirements outlined in the MUTCD.
- If two curb ramps are used, the push-button should be between the edge of the crosswalk line farthest from the intersection, but not greater than 5 feet from the crosswalk line.
- The push-button should be mounted adjacent to a clear ground space. The clear ground space shall be at least 30 inches x 48 inches and shall slope no more than 50:1 (2%) in any direction. The push-button shall be centered on either side of the clear ground space (either the 30 inches or 48 inches side). The 30 inches x 48 inches clear ground space cannot touch the detectable warning panel.
- Where a clear ground space allows a parallel (side) approach to a push button, a side reach of 10 inches (maximum) over a curb or obstruction is permitted.
- The push-button face should be parallel to the crosswalk being used.
- The push-button poles shall not interfere with the minimum clear width of the pedestrian access route.

**Figure 16.11**



NOTES

- \* PUSHBUTTONS SHALL BE MOUNTED PARALLEL TO CROSSWALKS.
- \* THERE SHALL BE AT LEAST 10 FEET OF SEPARATION BETWEEN PUSHBUTTON LOCATIONS.
- \* ONLY ONE PUSHBUTTON SHALL BE MOUNTED ON A PUSHBUTTON POLE.

LEGEND

-  RECOMMENDED PUSHBUTTON LOCATIONS.
-  IF RECOMMENDED PUSHBUTTON LOCATIONS ARE IMPRACTICAL, THIS AREA IS ACCEPTABLE.

## 16.9 On-Street Parking (Accessibility)

- When on-street parking is marked or metered, provide accessible parking spaces according to Table 16.01 (R214 and R309.1).

**Table 16.01 On-Street Accessible Parking Spaces**

Total Number of Marked or Metered Parking Spaces on the Block Perimeter	Minimum Required Number of Accessible Parking Spaces
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 and over	4% of total

- Identify accessible parking spaces by displaying signs with the International Symbol of Accessibility (R411).
- Comply with R403 Operable Parts for parking meters and pay stations that serve accessible parking spaces.
- Locate accessible parking spaces where the street has the least crown and grade (R309.1).
- Accessible parking spaces located at the end of the block can be served by the curb ramps or blended transitions at the pedestrian street crossing (R309.4).
- Keep sidewalks adjacent to parallel accessible parking spaces free of signs, street furniture, and other obstructions. Locate curb ramps or blended transitions so the van side lift or ramp can be deployed to the sidewalk (R309.2)
- At parallel accessible parking spaces, locate parking meters at the head or foot of the parking space (R309.5.1). Ensure information is visible from a point located 3.3 feet maximum above the center of the clear space in front of the parking meter or parking pay station (R309.5.2).
- For areas where the sidewalk width or available right-of-way exceeds 14 feet, provide an access aisle 5 feet wide at street level the full length of the parallel parking space and connect it to a pedestrian access route (R309.2.1). When an access aisle is not provided due to the sidewalk or right-of-way not exceeding 14 feet, locate the accessible parallel parking space at the end of the block face (R309.2.2).
- Provide an 8-foot-wide access aisle the full length of the parking space for perpendicular or angled accessible parking spaces. Two accessible parking spaces are allowed to share a common access aisle (R309.3).

- For perpendicular or angled spaces, connect the access aisle to the pedestrian access route with a curb ramp. Do not locate curb ramps within the access aisle (R309.4).

## 16.10 Protruding Objects

### 16.10.1 Introduction.

This section provides guidance to comply with Section R402 of PROWAG. The pedestrian area is any prepared area available for pedestrians (equivalent to the pedestrian circulation path as defined in PROWAG). A protruding object is any obstacle that reduces the clearance width and/or the clearance height within a pedestrian area. The pedestrian area is not limited to the sidewalk or the pedestrian access route intended by the designer. The pedestrian area includes any areas that may be perceived as a pedestrian walking space, including adjacent parking lots and paved frontage.

Common protruding objects include:

- Signs and sign poles
- Landscaping and branches
- Utility boxes or poles and their stabilizing wires
- Mailboxes (public and private)
- Trash cans
- Transit shelters
- Bike racks
- Planters
- Fire hydrants
- Parking meters
- Benches
- Public art

### 16.10.2 Protruding Object Locations.

**16.10.2.1 Outside the Pedestrian Area.** A protruding object can result in narrow passing spaces, reduced access, and injury. Therefore, protruding objects should be placed completely outside of the pedestrian area whenever possible.

**16.10.2.2 Within the Pedestrian Area.** Ideally, the full width of the pedestrian area should be free of protruding objects and the pedestrian access route would be clearly separated from other paved surfaces. However, if some obstacles must be located within the pedestrian area, they should all be placed either right or left of center to provide a consistent pedestrian access route. Figure 16.12 shows an acceptable pedestrian area with obstacles aligned, providing a consistent pedestrian access route. Figure 16.13 shows an undesirable pedestrian area with a poorly defined pedestrian access route. The pedestrian access route within the pedestrian area must meet guidelines defined in this chapter. Special sidewalk treatments (such as brick pavers or stamped concrete) are recommended to provide a different surface texture to differentiate between the object corridor and the pedestrian access route.

**Figure 16.12: Acceptable  
Pedestrian Area**



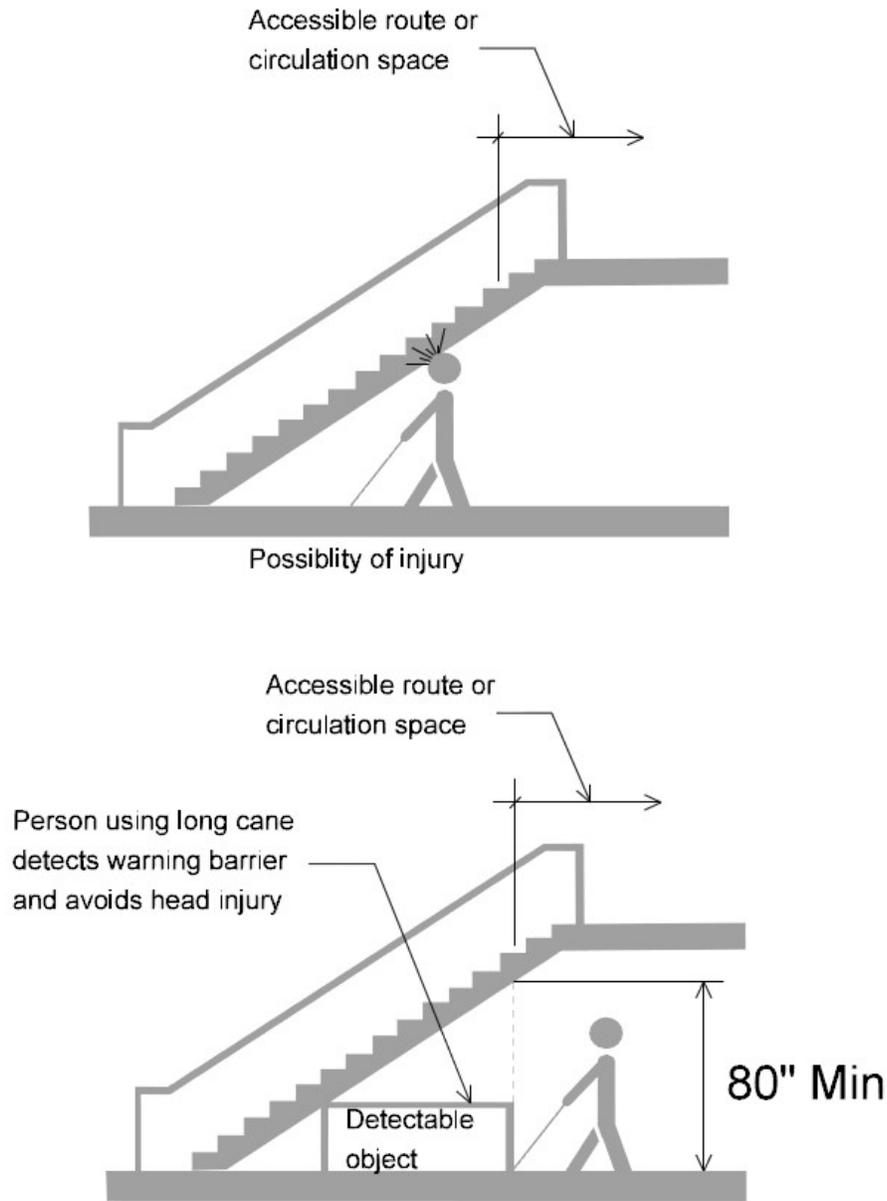
**Figure 16.13: Undesirable  
Pedestrian Area**



### **16.10.3 Clearance.**

**16.10.3.1 Vertical Clearance.** Vertical clearance is minimum unobstructed vertical passage space required along the entire width of the pedestrian corridor. A minimum vertical clearance of 80 inches must be provided or the object must be shielded with a barrier. The leading edge of the barrier shall be a maximum of 27 inches above the finished surface. See Figure 16.14.

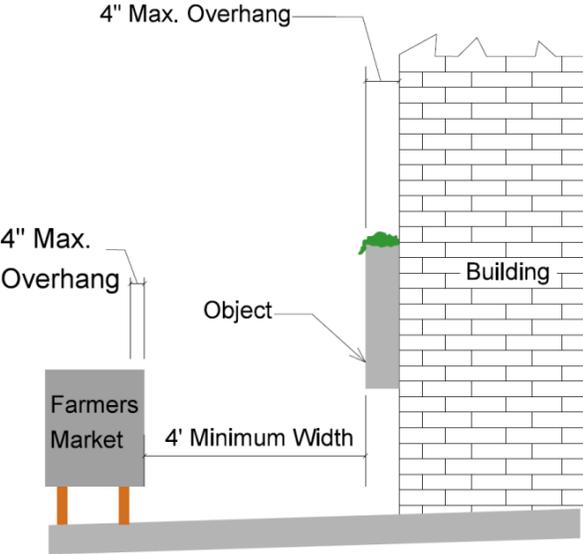
**Figure 16.14: Shielding for Vertical Clearance Obstacles**



**16.10.3.2 Horizontal Clearance.** Objects mounted at or below 27 inches may extend from a fixed structure into the pedestrian area, provided the remaining sidewalk width complies with the other requirements in this chapter. Objects that extend below 27 inches are easily detectable by most pedestrians.

Objects that extend into the pedestrian area at a height above 27 inches are not easily detected with a cane and pedestrians may walk into them. This type of object cannot extend into the pedestrian corridor more than 4 inches from its base. The base shall be at least 2.5 inches in height. See Figure 16.15.

**Figure 16.15: Vertical Clearance**



**16.10.3.3 Objects Mounted Between Posts.** Where an object is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 12 inches, the lowest edge of the object shall be between 0 and 27 inches or 80 inches or more above the ground (see Figure 16.16). For objects mounted on posts closer than 12 inches, follow the requirements for horizontal clearance defined above.

**Figure 16.16: Height Restriction for Signs Mounted Between Posts**

