NOTICE OF AVAILABILITY OF DRAFT PUBLIC RIGHTS-OF-WAY ACCESSIBILITY GUIDELINES

The Americans with Disabilities Act (ADA) recognizes and protects the civil rights of people with disabilities and is modeled after earlier landmark laws prohibiting discrimination on the basis of race and gender. To ensure that buildings and facilities are accessible to and usable by people with disabilities, the ADA establishes accessibility requirements for State and local government facilities, places of public accommodation, and commercial facilities. Under the ADA, the Access Board has developed and continues to maintain design guidelines for accessible buildings and facilities known as the ADA Accessibility Guidelines (ADAAG). ADAAG covers a wide variety of facilities and establishes minimum requirements for new construction and alterations.

The Board maintains a similar responsibility for accessibility guidelines under the Architectural Barriers Act (ABA). The ABA requires access to certain facilities designed, built, altered, or leased with Federal funds. Like ADAAG, the Board's ABA accessibility guidelines apply to new construction and alterations.

The Board's guidelines become enforceable when they are adopted by the standard setting agency for the ADA and the ABA. The agencies responsible for standards under the ADA are the Department of Justice (DOJ) and the Department of Transportation (DOT). The agencies responsible for standards under the ABA are the General Services Administration (GSA), the Department of Defense (DOD), the Department of Housing and Urban Development (HUD), and the United States Postal Service (USPS).

The Board plans to undertake rulemaking to supplement its ADA and ABA accessibility guidelines, which primarily cover facilities on sites, by adding new provisions specific to public rights-of-way. The Board's aim is to ensure that access for persons with disabilities is provided wherever a pedestrian way is newly built or altered, and that the same degree of convenience, connection, and safety afforded the public generally is available to pedestrians with disabilities. The guidelines would not require alterations to existing public rights-of-way, but would apply where a pedestrian route or facility is altered as part of a planned project to improve existing public rights-of-way.

BACKGROUND

The Need for Guidelines on Public Rights-of-Way

Local jurisdictions, and other entities covered by the ADA or ABA, must ensure that the facilities they build or alter are accessible to people with disabilities. The Board's ADA and ABA accessibility guidelines specify the minimum level of accessibility in new construction and alteration projects and serve as the basis for enforceable standards maintained by other agencies. Currently, the Board's guidelines, like the industry standards from which they derive, focus mainly on facilities on sites. While they address certain features common to public sidewalks, such as curb ramps, accessible routes, ground and floor surfaces, and bus stops and shelters, further guidance is necessary to address conditions unique to public rights-of-way. Various

constraints posed by space limitations at sidewalks, roadway design practices, slope, and terrain raise valid questions on how and to what extent access can be achieved. Access for blind pedestrians at street crossings and wheelchair access to on-street parking are typical of the issues for which additional guidance is needed. In addition, new trends in roadway design, such as the growing use of traffic roundabouts, pose additional challenges to access, while various technological innovations, particularly those pertaining to pedestrian signaling devices, offer new solutions.

The Board previously proposed guidelines for public rights-of-way under the ADA which were published for public comment in 1992 and 1994. Based on the comments received, the Board determined that it should further coordinate with the transportation industry and State and local governments before continuing its rulemaking. Consequently, the Board undertook an outreach and training program on accessible public rights-of-way. Under this program, the Board developed a series of videos, an accessibility checklist, and a design guide on accessible public rights-of-way. In addition, the Board sponsored research on tactile warnings at street crossings, accessible pedestrian signals, and traffic roundabouts. The Board has made this information widely available to the public. The interest in these materials has underscored the need for criteria for public rights-of-way that are definitive and enforceable so that local jurisdictions and others are clear on their obligations when constructing or altering streets and sidewalks.

Public Rights-of-Way Access Advisory Committee

In resuming its rulemaking effort, the Board chartered an advisory committee in 1999 to develop recommendations on guidelines for accessible public rights-of-way. Use of advisory committees has become a standard practice in the Board's process for developing and updating design requirements. Through such committees, interested groups, including those representing designers, industry, and people with disabilities, play a substantive role in recommending to the Board the content of the guidelines to be developed. These committees provide significant sources of expertise while enhancing the level of consensus among stakeholders in advance of proposing a rule for public comment.

The Public Rights-of-Way Access Advisory Committee was composed of 33 members representing disability organizations, public works departments, transportation and traffic engineering groups, design professionals and civil engineers, government agencies, and standards-setting bodies. The committee coordinated its efforts with leading trade organizations represented on the committee, such as the American Association of State Highway and Transportation Officials, and federal agencies, such as the Federal Highway Administration, to ensure that its recommendations were consistent with generally accepted practice among design professionals. The committee organized several subcommittees focused on key issue areas. The subcommittee structure enabled members to continue work on a tight time schedule between meetings of the full committee and allowed for greater public participation in the process.

The advisory committee met regularly over a year's time, usually in Washington, D.C. but also in Austin and San Francisco. Its work culminated in the issuance of a report, "Building a True Community," which was submitted to the Board in January 2001 (http://www.access-board.gov/prowac/commrept/index.htm). The committee's report provides criteria for the construction or alteration of public rights-of-way that reflects the broad spectrum of expertise

represented by committee members. The report follows a "toolbox" approach to the establishment of guidelines designed to facilitate implementation and to promote an understanding of the needs of all users of public rights-of-ways. The report comprehensively covers the various components of public streets and sidewalks and provides criteria for sidewalks, street fixtures and furnishings, street crossings, vehicular ways, parking, and other components of public rights-of-way. In addition, the report includes advisory notes, figures, and discussion of issues that merit further study or special attention in the Board's rulemaking.

June 17, 2002 Release of Draft Guidelines

An ad hoc group of Board members reviewed the committee's report in depth and crafted a set of draft guidelines based on the committee's recommendations. Because the draft guidelines departed from the advisory committee's report in several areas, the Board made an advance draft of the guidelines available for comment by the public. The notice of availability of the draft guidelines was published in the Federal Register on June 17, 2002. The Board requested information and feedback on the draft guidelines, including usability and cost data. In addition to seeking written comment, the Board held a public hearing in Portland, Oregon.

Over 1,400 comments were received from the public in response to the publication of the draft. Of this total, almost 900 comments were tabulated from persons with disabilities and groups representing them; the great preponderance of comments in this category came from people who indicated that they were blind or had low vision. Slightly over 200 comments were submitted by respondents from the transportation industry: design engineers and consultants, State and local government departments of transportation, and the organizations and groups that represent them. Another 100 were received from State and local government administrative agencies. Comments are posted on the Board's website at http://www.access-board.gov/prowac/comments/index.htm.

Almost all of the commenters from the two major blindness organizations, the American Council of the Blind (ACB) and the National Federation of the Blind (NFB), and persons who were not affiliated with either organization addressed only the use of detectable warnings and/or accessible pedestrian signals (APS) and virtually all of them supported the requirement for these features in at least some locations (detectable warnings at islands and medians and at all low-slope sidewalk connections to the street; APS at complex intersections, irregular intersections, intersections with compound turning movements, and intersections with leading pedestrian intervals). Some commenters misunderstood the effect of the scoping provisions for these features, believing that all intersections would have to be retrofitted at tremendous cost. In fact, only future new projects would be subject to these guidelines. With respect to APS in particular, only pedestrian crossings that provide pedestrian signals would be required to include APS. Some commenters, expressing concerns about the noise output of APS, were apparently unfamiliar with the quiet, pedbutton-integrated devices now available in the United States (these devices are installed at the departure curb, near the listening user, rather than overhead).

Ten key issues from comment were identified for detailed analysis: crosswalk width; on-street parking; walking speed and pedestrian signal phase timing; elevators at pedestrian overpasses and underpasses; same-side alternate circulation routes; cross slope in crosswalks; detectable warnings; accessible pedestrian signals; roundabouts and roundabout signalization; and

alterations. These issues have been addressed in this second draft. Changes include the following:

- referenced Manual on Uniform Traffic Control Devices (MUTCD) for crosswalk width;
- reduced scoping in on-street parking to be consistent with parking lots;
- set walking speed at 3.5 fps (consistent with new recommendations currently under consideration by the National Committee on Uniform Traffic Control Devices);
- eliminated the provision requiring elevators to provide pedestrian access at overpasses and underpasses (either ramps, lifts, or elevators may be used);
- modified scoping and technical provisions for alternate circulation routes to be consistent with current MUTCD requirements and alterations requirements, which would permit opposite side routes if same-side routes are not feasible;
- provided relief (up to 5%) for maximum cross slope limits in pedestrian crosswalks at midblock and through-street locations where the roadway slope will necessarily exceed 2%;
- clarified the placement of detectable warnings on curb ramps, landings, and blended transitions;
- clarified the scoping in new construction and alterations of accessible pedestrian signals (APS);
- limited pedestrian signalization at roundabouts and channelized turn lanes to pedestrian crossings (to the splitter) of two lanes of traffic or more; and
- clarified the scope of alterations to include only that work included in the limits, boundaries, or scope of a planned project; clarified that there is no obligation in the guidelines to expand the scope or limits of a project to include other or adjacent work.

Other changes included the addition of significant advisory material throughout the document. Advisory notes are for informational purposes only.

The Board also considered industry recommendations that the guidelines be re-formatted to use transportation metrics and language and to be better coordinated with industry standards and documents, particularly the Manual on Uniform Traffic Control Devices (MUTCD).

This draft is now formatted as a stand-alone document that expresses its dimensioning requirements first in international units, as is done in other industry documents. Its provisions have been harmonized with current MUTCD standards, support, options, and guidance. Industry terms and phrases have been adopted, and industry practices recognized where feasible.

The Board is placing the revised draft in the docket to facilitate the gathering of cost data necessary for the next step in this rulemaking which is the preparation of a regulatory assessment for government review and approval prior to issuing a Notice of Proposed Rulemaking (NPRM). In order to develop an accurate picture of the potential costs and benefits of this rulemaking, the Board must work closely with the transportation industry representatives who have data on both current cost and industry practices and the knowledge and skills to assess potential effects.

The Board is not seeking comments on this draft. Readers will have an opportunity to provide input when the NPRM is published. Additional figures will be included in the NPRM.

Rulemaking Process
The Board reviewed the comments received to the draft guidelines and revised the guidelines in accordance with the comments received. The revisions are briefly discussed below in the section-by-section analysis.

The proposed rule will provide another opportunity for public comment on the guidelines. The Board will then proceed to finalize the guidelines based on public comments received in response to the proposed rule. The Board's guidelines serve as the basis for enforceable standards maintained by other agencies under the ADA and the ABA. The Department of Justice and the Department of Transportation maintain standards based on the Board's guidelines that apply to facilities covered by the ADA. Design standards for federally funded facilities covered by the ABA are maintained by the Department of Defense, the Department of Housing and Urban Development, the General Services Administration, and the U.S. Postal Service. These enforceable standards must be consistent with the Board's guidelines.

Relationship to ADA and ABA Accessibility Guidelines/Format
On July 23, 2004, the Board completed an update of ADAAG, the first comprehensive revision of the document since its publication in 1991. The revised ADAAG features a new format and numbering system and a host of updated scoping and technical provisions. On the same date, the Board updated its ABA Accessibility Guidelines along similar lines so that both of the documents are more consistent. The revised ADA and ABA Accessibility Guidelines may be found on the Board's website at http://www.access-board.gov/news/ada-aba.htm.

The draft guidelines for public rights-of-way published on June 17, 2002 were formatted to supplement the ADA and ABA guidelines and not as a stand-alone document. The guidelines were intended to ultimately comprise a new chapter on public rights-of-way. The current draft guidelines made available in this document are now formatted as a stand-alone document using transportation industry standards, terms, and measures in response to recommendations in industry comments. The document is identified by the prefix R in its provisions and has four chapters:

Chapter R1: Application and Administration covers purpose, effect on existing facilities, equivalent facilitation, conventions, figures, units of measurement, referenced documents, and definitions, harmonized with transportation industry usage.

Chapter R2: Scoping Requirements address what items of new construction and alteration are covered by this document and references technical sections that follow in Chapters R3 and R4. Key scoping provisions in R2 include: R204 Pedestrian Access Route; R205 Alternate Pedestrian Access Route; R206 Pedestrian Crossings; R207 Curb Ramps and Blended Transitions; R208 Accessible Pedestrian Signals; R209 Protruding Objects; R210 Pedestrian Signs; R211 Street Furniture; R212 Bus Stops; R213 Stairways; R214 Handrails; R215 Vertical Access; R216 On-street Parking; R217 Passenger Loading Zones; R218 Call Boxes; R219 Transit Platforms; R220 Escalators; R221 Detectable Warning Surfaces; and R222 Doors, Doorways, and Gates.

Coverage extends to temporary as well as permanent facilities. Chapter R2 also includes special provisions for historic facilities and contains a limited series of general exemptions from accessibility.

Chapter R3: Technical Provisions contains detailed specifications for new construction and alterations scoping in Chapter R2. Construction detailed in Chapter R3 is specific to public sidewalk, street crossing, and roadway projects, and covers the building blocks of pedestrian accessibility: the pedestrian access route (analogous to the accessible route on a site), curb ramps and blended transitions, pedestrian crossings (including those at roundabouts and channelized turn lanes), pedestrian signals, street furniture, and parking.

Chapter R4: Supplementary Technical Provisions include specifications adapted from the ADA and ABA Accessibility Guidelines (2004) for rights-of-way application, including such features as maneuvering clearances at doorways; drinking fountain, and telephone provisions; reach ranges; operable parts; handrails; and other items of broader application.

DISCUSSION OF PROVISIONS

DRAFT GUIDELINES FOR PUBLIC RIGHTS-OF-WAY

Clarifications, modifications, and changes that have been incorporated in this draft in response to public comment from industry, consumers, and State and local government agencies are briefly discussed below.

R1: APPLICATION AND ADMINISTRATION
R104.2.1 MUTCD. This draft references the 2003 edition of the Manual on Uniform Traffic Control Devices (MUTCD). The Access Board works closely with the MUTCD team at the Federal Highway Administration (FHWA) to harmonize standards and advisory material and to sponsor needed research. Changes in future MUTCD provisions for accessible pedestrian signals, markings (including detectable warnings), and temporary traffic zones are in process. A joint FHWA/ American Traffic Safety Services Association (ATSSA)/Access Board demonstration project identified desirable characteristics for pedestrian channelizing devices. FHWA research projects on pedestrian usability at roundabouts and contrast in detectable warnings are underway, and the Board has proposed a FY 2006 project on pedestrian demand signals for use at multi-lane roundabout crossings.

R105 Definitions. This draft uses definitions drawn from key industry references where they exist.

R2: SCOPING REQUIREMENTS
R201 Application. Text and advisory material has been added to clarify the application of these guidelines to new or altered work (permanent or temporary) put in place within the scope or limits of a planned project in the public right-of-way.

Other requirements, including those for existing facilities, maintenance of accessible features, and effective communication that derive from the ADA title II implementing regulations (28 CFR part 35) or Federal highway-aid funding (49 CFR part 27), are not addressed in these guidelines for new construction and alteration. Advisory notes have been added to clarify this difference.

This draft now includes a reference to the revised ADA and ABA Accessibility Guidelines (36 CFR part 1191) to cover buildings and facilities newly constructed or altered within the public right-of-way.

R202 Alterations and Additions to Existing Facilities. Text and advisory notes have been added to this draft to clarify the application of new construction guidelines to an alteration project. New work put in place within an existing developed right-of-way must comply with these guidelines to the maximum extent feasible; see Advisory R202.3. Transitional segments that connect undisturbed improvements with new work can facilitate compliance (R202.1.1). Where items are placed within an existing developed streetscape and the circulation route is not altered, items required to be accessible shall be located for optimal usability and access (R202.1.2).

An alteration is a change in a space or element that affects, or could affect, the accessibility or usability of that space or element. In general, when a feature in the public right-of-way is altered, the requirements for new construction in this document must be applied to the maximum extent feasible within the scope or boundary of the project that has been planned. This document does not contain a 'path of travel' obligation to expand a given scope of work to include other items or elements that are adjacent to the alteration project nor does it cover an agency's obligations to achieve program access in its existing facilities that are not being altered.

In response to the comments received, the Board has developed answers to frequently asked questions regarding the application of the alterations requirements. Those questions and the Board's responses have been included at the end of this discussion.

R204 Pedestrian Access Route (technical provisions at R301). This draft clarifies the requirement for a 1.2-meter-wide (4 ft) accessible route of travel within a pedestrian circulation path, which may be a wider sidewalk, shoulder (if pedestrian use is not prohibited), shared street, or street crossing. A provision requiring periodic passing spaces 1.5 m (5 ft) in width, omitted in the first draft, has been re-instituted. Because of the constraints imposed by right-of-way width, the pedestrian access route (PAR) is relieved of the slope limits that would apply to an accessible route on a site provided it matches the general grade of the adjacent roadway (R301.4). Where the PAR is supported by structure, as in an underpass, overpass, or bridge, this draft requires compliance with ADAAG requirements for ramps.

Technical provisions in the June 2002 draft that would have required a 30-inch separation between changes in level in the PAR have been replaced in this draft with provisions requiring a planar surface (R305.1) and limiting surface discontinuities (R301.5.2). An advisory note discourages the use of heavily textured, rough, or excessively chamfered unit pavings. Research undertaken by the Research and Rehabilitation Training Center (RRTC) at the University of Pittsburgh, under contract to a group of unit masonry associations, measured the vibration effects of various chamfer spacings on wheeled mobility devices and found that chamfers of less than 1.25 mm (.5 in), if flush, were not distinguishable from cast-in-place concrete sidewalks with a broom finish.

A series of related provisions in the June 2002 draft has been reorganized into R301.7 Horizontal Openings, which now includes walkway joints, gratings, flangeway gaps at rail crossings, and sill gaps at elevators and lifts. (Platform and car gaps at transit facilities are addressed at 36 CFR part 1191).

R205 Alternate Pedestrian Access Route. This draft clarifies that the establishment of an alternate pedestrian route is an alteration that must comply to the maximum extent feasible with technical provisions for the pedestrian access route, including curb ramps or blended transitions. MUTCD requirements and advisory material at Part 6D.01 and 6D.02 are referenced and an advisory note added to highlight the safety benefits of same-side alternate routes. Specifications for pedestrian channelizing devices and barricades at 302.4 include a reference to the MUTCD.

R206 Pedestrian Crossings (technical provisions at R305). This draft omits a provision in the June 2002 draft that would have required 2.4 m-wide (8 ft) markings at crosswalks. The MUTCD minimum of 1.8 m (6 ft) has been proposed at 305.2.1 of this draft.

Measurements on which pedestrian signal phase timing are based have been modified in response to industry comment. Calculations now proposed in R305.3 in the current draft would require the distance to be the full street width and the pedestrian walking speed to be 1.1 m/s (3.5 fps).

The June 2002 draft also proposed that the approaches to overpasses and underpasses be provided with elevators where the grade change was 1.5 m (5 ft) or greater. Both industry and persons with disabilities opposed this requirement with persons with disabilities expressing a preference for ramps, even if lengthy, to ensure the availability of a crossing. Elevators in single installations provide no access at all when out of service. Industry expressed concerns about cost and maintenance requirements. The current draft applies ramp provisions at R305.5 (but permits elevators, LULAs, and lifts).

Newly available research and the comments of both industry and consumer representatives confirm the Access Board's concerns about the usability of pedestrian crossings at roundabouts and channelized turn lanes. However, access to additional data has indicated that well-designed roundabouts and channelized turn lanes with single-lane crossings can provide cues that make non-visual use possible. Accordingly, this draft (R305.6.2) provides that signals (including accessible pedestrian signal features) be required only at multi-lane pedestrian crossings of roundabouts. The Board does not prescribe the signal operation here and has proposed that FHWA conduct research to identify appropriate technologies. Two-head signals that flash amber, then flash red and go to steady red, are in use in Australia and the United Kingdom. US motorists are familiar with pre-emptive signals installed for emergency vehicles. Utah has at least one roundabout that uses standard railway gates across the roadway when light rail cars pass through the roundabout. The Board believes that the occasional use of a properly-designed pedestrian demand signal may actually reduce delay at pedestrian crossings.

R207 Curb Ramps and Blended Transitions (technical provisions at R303). Additional text, advisory, and illustrations have been added to this draft to describe curb ramp types (perpendicular, parallel, and their combination) and to distinguish them from blended transitions, for which a definition has now been provided at R105. Blended transitions are connections between the PAR and the street that have a running slope of 1:20 or less. Level landings, gently sloped transitions, and raised crosswalks fall into this category. Parallel and perpendicular curb ramps have a running slope between 1:20 and 1:12 (steeper slopes are not permitted in new construction).

Non-visual wayfinding cues can be provided by the orientation of curb ramps, particularly if they are in-line with the path of pedestrian travel along a sidewalk. Curb ramps installed at tangent points rather than on the corner radius provide more usable cues and locate the shortest crossing point. The Access Board is collaborating with the Institute of Transportation Engineers (ITE) on a project to standardize sidewalk/ramp/crossing schemes for optimal non-visual cuing based

upon a range of corner radii and attached/separated sidewalk configurations. An advisory note (R303.1) in this draft notes the benefits for pedestrians.

Cross slope provisions at midblock curb ramps (R303) have been revised in response to industry comment to permit warping to meet roadway grade. Similar changes have been made to technical provisions at pedestrian crossings (R305.2.2). Crossings of streets without stop control would be permitted a 1:20 maximum cross slope.

Running slope limits at crosswalks (R305.2.3) are maintained at 1:20 maximum in this draft. Many commenters noted that design practices that approach this limit in new construction may have to mill the roadway crown before resurfacing in order to retain usable crossings.

R208 Accessible Pedestrian Signals (technical provisions at R306). APS provisions in this draft differ only slightly from those of the June 2002 draft. Many commenters to the June 2002 draft expressed concerns about the costs of retrofitting intersections with APS, which is not required by these or prior proposals, which guide only new construction and alterations. Where new pedestrian signals are being installed or added, scoping in this document would require that they incorporate audible and vibrotactile features.

Comments from disability organizations and individuals to the June 2002 draft were diverse. Many who believed that retrofitting was required objected to what they understood to be excessive cost. And even those who did not support a general requirement that all future pedestrian signals incorporate audible and vibrotactile formats nevertheless saw the need for them at certain types of intersections including irregular crossings, lengthy crossings, and at complex intersections with multiple vehicle turning phases or leading pedestrian interval phasing. Although many responders noted the utility of non-visual cues, a clear majority of commenters who identified themselves as blind supported universal pedestrian signals.

R209 Protruding Objects (technical provisions at R401). Advisory notes have been added at several places in this document to remind users of the need to consider projections into the pedestrian circulation route when coordinating the placement of improvements, appurtenances, utilities, or street furniture. Comments from disability organizations and individuals identified blocked or compromised pedestrian routes as a major barrier to independent travel. Protruding objects provisions in this draft have been revised only to accommodate the new format and add advisory information.

R210 Pedestrian Signs (technical provisions at R409). An advisory note has been added to clarify requirements for visual legibility in signs that indicate sidewalk closure, pedestrian detour, and tourist route signage covered in MUTCD. Braille street name signage is required only on APS pedbuttons (R306.4.2).

Signage provisions in this draft have been revised only to accommodate the new format and add advisory information.

R211 Street Furniture (technical provisions at R307). Advisory notes have been added at several places in this document to remind users of the need to consider the dimensions and use of

pedestrian circulation routes when coordinating the placement of improvements, appurtenances, utilities, or street furniture. Comments from disability organizations and individuals identified blocked or compromised pedestrian routes as a major barrier to independent travel.

Street furniture provisions in this draft have been revised only to accommodate the new format and add advisory information.

R212 Bus Stops (technical provisions at R410.2). An advisory note has been added to clarify the difference between establishing a bus stop by installing signage (signage must comply with R210.2) and constructing a bus stop (boarding/alighting areas, if provided, must comply with R410, bus shelters with R410.2).

Bus stop provisions in this draft have been revised only to accommodate the new format and add advisory information.

R213 Stairways (technical provisions at R407). Stairway provisions in this draft have been revised only to accommodate the new format.

R214 Handrails (technical provisions at R408). Handrail provisions in this draft have been revised only to accommodate the new format and add an advisory note on alterations and protruding objects.

R215 Vertical Access (technical provisions in ADAAG). Vertical access provisions in this draft have been revised only to accommodate the new format and add an advisory note on elevator use in extremes of terrain.

R216 On-Street Parking (scoping at Table R216; technical provisions at R308). Table R216 in this draft has been adapted from the table in ADAAG based upon the overall number of spaces provided within a block (or analog). Commenters strongly objected to scoping based upon the numbers of parking spaces on a block face, which could, in many places, require very high numbers of spaces disproportionate to those required in lots.

Additionally, this draft clarifies when, in new construction or alterations, the presence of a sidewalk or border wider than 4.3 m (14 ft) can accommodate an access aisle that is indented into the curb for protected transfer space, a construction that is similar to that of an on-street loading zone provided at an office, hotel, convention center, arena, or airport (R308.2.1).

Advisory notes have been added at several places in this section to convey additional information about indented, end-of-block, perpendicular or angled spaces, and signage.

R218 Call Boxes (technical provisions at R309). Call box provisions in this draft have been revised only to accommodate the new format and add an advisory note at R309.1 about the applicability of accessible call box technology to other types of communications systems, such as on-street security systems.

R219 Transit Platforms (technical provisions at R414). Transit provisions from the ADA and ABA Accessibility Guidelines (204) have been newly incorporated in this draft.

R220 Escalators. Escalator provisions in this draft have been revised only to accommodate the new format.

R221 Detectable Warning Surfaces (technical provisions at R304). Transportation industry and State and local government agency commenters expressed concern about the durability, maintainability, and contrast of detectable warning materials required at curb ramps and blended transitions in the June 2002 draft. Recent research by several State departments of transportation and by the Transportation Research Board identified several high-performing products suitable for both new construction and alterations. Approximately 20 manufacturers now produce detectable warning products in metal, concrete, tile, pavers, resilient sheets, and membrane types. The FHWA is currently overseeing human factors research intended to test the contrast effectiveness of 13 different detectable warning colors when viewed by people who have low vision.

Comments from disability organizations and individuals were divided in much the same way as consumer comments on accessible pedestrian signals. Many expressed concern about cost but, valued detectable warnings as a way to provide a cue at certain locations such as pedestrian waiting areas at roadway medians, islands, and roundabout splitter islands and at low-slope blended transitions to street crossings. A majority of these commenters favored the June 2002 draft provision requiring detectable warnings at flush transitions between sidewalks and street crossings.

The rows of domes in the detectable warning material (technical provisions at R304.2.2) must be aligned with the path of wheelchair travel, which is required to be perpendicular to the grade break at the toe of the ramp to permit tracking between dome rows. On blended transitions, dome orientation is not significant.

A new advisory note (R304.1.1) covers the use of radial dome patterns.

Detectable warnings provisions in this draft have also been clarified with respect to their permitted setback from the grade break marking the face of a curb. One corner of the detectable warning must be within 205 mm (8 in) of the grade break; no other point on the leading edge of the detectable warning may be more than 1.5 m (5 ft) from the grade break (R304.2.1).

R222 Doors, Doorways, and Gates (technical provisions at R411). These provisions have been added to this draft from the ADA and ABA Accessibility Guidelines (2004). Because public sidewalks serve the entrances and other facilities of abutters covered by title III of the ADA, coordination of slope, cross slope, and maneuvering space requirements is typically required. In many places, developers provide sidewalk improvements as part of a project. State and local governments must include accessibility compliance in such work.

TECHNICAL ASSISTANCE Q&A FOR ALTERATIONS PROJECTS

Alterations are projects planned for implementation by a jurisdiction. Program access obligations for existing facilities are not a part of the Board's accessibility guidelines, and the Board's responses to the following questions do not address program access issues (see title II of the ADA at 28 CFR 35.149 and 35.151).

CURB RAMPS

Question: A multi-block length of roadway is being resurfaced. The corners have curb ramps that meet some but not all of the current specifications; for example the cross slope may be too steep or the curb ramps do not have detectable warnings. Must the curb ramps be reconstructed as part of the resurfacing project?
Answer: Yes, if it is technically feasible to provide complying features. The work should be done at the same time the resurfacing is being done.

Question: New curb ramps are being installed at an existing developed corner. New construction standards require the curb ramp to be within the crosswalk, but an existing underground utility vault is located where the ramp should be. Must the utility vault be moved?
Answer: The scope of this project will determine the answer. If utilities are being moved for other reasons within the project limits, it may be possible to alter or relocate the vault. If project construction will not involve the vault, it may be technically infeasible to locate the curb ramp optimally. It may be possible to widen the crosswalk markings to include the curb ramp.

Question: What if the curb ramp can be placed over the vault, but the access cover would be located on the curb ramp?
Answer: If the access cover must be located on the curb ramp, it should meet the surface requirements of the pedestrian access route.

Question: One corner of an intersection is being altered by curb and gutter reconstruction and paired curb ramps are being installed as part of this project. The other three corners of the intersection are not being altered. Must curb ramps be provided at the unaltered corners as part of this work?
Answer: No. The scope of the project requires curb ramps only at the altered corner.

SIDEWALKS

Question: A project will be undertaken to connect a series of sidewalk segments near a school. Must the existing segments of sidewalk be modified if they do not meet width or cross slope provisions?
Answer: Yes, to the maximum extent feasible within the scope of the project. Agencies are not required to expand a planned scope of work to include other items of accessibility.

Question: A new sidewalk is being built along an existing road that contains driveway access points. Must those driveways be modified if their cross slope exceeds 2%?
Answer: Yes, to the maximum extent feasible within the scope of the project.

Question: A city is rebuilding a sidewalk along Main Street. The distance between the edge of the right-of-way and the existing road does not provide sufficient room for a 4-foot-wide pedestrian access route. Does the municipality have to acquire more right-of-way on private property or narrow the roadway to provide the necessary space?
Answer: No, these guidelines do not require the municipality to obtain right-of-way or to narrow roadways. A municipality may decide to do either for other reasons (for instance, the roadway may be narrowed as a larger traffic calming effort or as part of a larger project in the roadway).

SIGNALS

Question: Curb ramps are being installed at a signalized intersection as part of a roadway improvement project. Existing pedestrian signals are pedestrian actuated but the pushbuttons are not accessible or placed in accessible locations. Must accessible pedestrian signals be installed at the existing pedestrian signals?
Answer: If work on pedestrian pushbuttons is not planned as part of this project, there is no need to expand its scope to include APS.

Question: The pedestrian signals in a corridor are being replaced with new combined count-down signals. Must APS be included in the new system?
Answer: Yes. The installation of a new system is an alteration that requires compliance with the new construction guidelines to the maximum extent feasible. However, the addition of a new feature, such as a countdown face or larger display, to an existing installed system does not require that the scope of work be expanded to include other features.

Question: Count-down signal displays are being added to the existing pedestrian signal heads at an intersection, but the software and signal controller are not being altered. Must APS be installed?
Answer: No, simply adding a display to the existing WALK/DON'T WALK signal would not involve the system changes needed to implement APS.

Question: An intersection is being signalized and will include APS. The installation of stub poles on the existing sidewalks to mount the new pedbuttons will not involve disturbing the roadway or sidewalk. Must curb ramps be installed if none existed?
Answer: No. This is a project to install pedbuttons; it is not an alteration to the sidewalk or street that would require the installation of curb ramps, as required by 28 CFR 35.151(e).

Question: The pushbutton on an existing pedestrian signal is being replaced with a sturdier model. Must APS be installed?
Answer: No, but the new pushbutton must meet applicable requirements (i.e., location, height, operable parts).

Question: An intersection with sidewalks and pedestrian signals is being widened to include a right turn lane. Must APS be installed as a consequence of the widening project?

Answer: No, installing APS is not within scope of the project. Any new pedestrian pushbuttons installed in the course of the work must meet applicable requirements. Note that this project is an alteration to the street and sidewalk and thus must provide compliant curb ramps.

GENERAL

Question: The local public transit agency has designated a bus stop by placing a sign in the ground along a roadway with no sidewalk. Must a concrete or other improved surface be installed?

Answer: No, the placement of a bus stop sign alone does not require other site improvements. When other site improvements are provided they should meet the applicable access requirements.

CHAPTER R1: APPLICATION AND ADMINISTRATION

R101 Purpose

R101.1 General. This document contains scoping and technical requirements for accessibility to facilities for pedestrian circulation and use located in the public right-of-way. Advisory notes are for informational purposes only. These requirements are to be applied during the design, construction, additions to, and alterations of facilities in the public right-of-way to the extent required by regulations issued by Federal agencies.

Advisory R101.1 General. Access requirements are also addressed in the Manual on Uniform Traffic Control Devices (MUTCD), FHWA/US DOT, 2003 (http://mutcd.fhwa.dot.gov). MUTCD is a reference standard in this guideline.

Key transportation industry guidance documents also address accessibility in the public right-of-way and can provide useful information on design and construction. They include 'Guide for the Planning, Design, and Operation of Pedestrian Facilities', American Association of State Highway and Transportation Officials, July 2004 (www.aashto.org) and 'Designing Sidewalks and Trails for Access', FHWA/US DOT September 2001 (http://www.fhwa.dot.gov/environment/sidewalk2/index.htm).

R101.2 Effect on Existing Facilities. This document does not address existing facilities unless they are included in the scope of an alteration undertaken at the discretion of a covered entity. The U.S. Department of Justice and U.S. Department of Transportation have issued and enforce separate regulations for existing facilities subject to their requirements for program accessibility under the Americans with Disabilities Act.

Advisory R101.2 Effect on Existing Facilities. The U.S. Department of Justice ADA regulations require that the usability of accessible features be maintained (28 CFR §35.133 and §36.211).

Federal agencies and entities receiving federal funds may also have an obligation for program accessibility under section 504 of the Rehabilitation Act of 1973 as amended. For example, state departments of transportation that receive Federal-aid Highway funds must comply with program accessibility requirements issued by the U.S. Department of Transportation at 49 CFR part 27.

R102 Equivalent Facilitation

Nothing in these requirements prevents the use of designs, products, or technologies as alternatives to those prescribed, provided they result in substantially equivalent or greater accessibility and usability.

R103 Conventions

R103.1 Dimensions. Dimensions that are not stated as "maximum" or "minimum" are absolute.

> **R103.1.1 Construction and Manufacturing Tolerances.** All dimensions are subject to conventional industry tolerances except where the requirement is stated as a range with specific minimum and maximum end points.

Advisory R103.1.1 Construction and Manufacturing Tolerances. Conventional industry tolerances recognized by this provision include those for field conditions and those that may be a necessary consequence of a particular manufacturing process. Recognized tolerances are not intended to apply to design work.

Information on specific tolerances may be available from industry or trade organizations, code groups and building officials, and published references.

R103.2 Calculation of Percentages. Where the required number of elements or facilities to be provided is determined by calculations of ratios or percentages and remainders or fractions result, the next greater whole number of such elements or facilities shall be provided. Where the determination of the required size or dimension of an element or facility involves ratios or percentages, rounding down for values less than one half shall be permitted.

R103.3 Figures. Unless specifically stated otherwise, figures are provided for informational purposes only.

R103.4 Units of Measurement. Measurements are presented in this document in both metric and U.S. customary units and were developed independently within each system. The relationship between the metric and U.S. customary values is neither an exact (soft) conversion nor a completely rationalized (hard) conversion. The metric values are those that would have been used had the requirements been presented exclusively in metric units; the U.S. customary values are those that would have been used had the requirements been presented exclusively in U.S. customary units. Therefore, the user is advised to work entirely in one system and not attempt to convert directly between the two.

R104 Referenced Guidelines and Standards

R104.1 General. The guidelines and standards listed in R104.2 are incorporated by reference in this document and are part of the requirements to the prescribed extent of each such reference. The Director of the Federal Register has approved these guidelines and standards for incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the referenced guidelines and standards may be inspected at the Architectural and Transportation Barriers Compliance Board, 1331 F Street, NW, Suite 1000, Washington, DC 20004; at the Department of Justice, Civil Rights Division,

Disability Rights Section, 1425 New York Avenue, NW, Washington, DC; at the Department of Transportation, 400 Seventh Street, SW, Room 10424, Washington DC; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202) 741-6030, or go to: **http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html**.

R104.2 Referenced Guidelines and Standards. The specific edition of the guidelines and standards listed below are referenced in this document. Where differences occur between this document and the reference, this document applies.

R104.2.1 MUTCD. Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2003 edition. Copies of the referenced standard may be obtained on-line from the Federal Highway Administration at **http://mutcd.fhwa.dot.gov**. (see R205 and R302.4).

R104.2.2 ANSI/BHMA. Copies of the referenced standards may be obtained from the Builders Hardware Manufacturers Association, 355 Lexington Avenue, 17th floor, New York, NY 10017 (http://www.buildershardware.com).

ANSI/BHMA A156.10-1999 American National Standard for Power Operated Pedestrian Doors (see R411.3).

ANSI/BHMA A156.19-1997 American National Standard for Power Assist and Low Energy Power Operated Doors (see R411.3).

ANSI/BHMA A156.19-2002 American National Standard for Power Assist and Low Energy Power Operated Doors (see R411.3).

R104.2.3 ASME. Copies of the referenced standard may be obtained from the American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016 (http://www.asme.org).

ASME A17.1-2000 Safety Code for Elevators and Escalators, including ASME A17.1a-2002 Addenda and ASME A17.1b-2003 Addenda (see R220; R305.5.5).

R105 Definitions

R105.1 General. For the purpose of this document, the terms defined in R105.5 have the indicated meaning.

R105.2 Terms Defined in Referenced Guidelines and Standards. Terms not defined in R105.5 or in regulations issued by Federal agencies, but specifically defined in a referenced guideline or standard, shall have the specified meaning from the referenced guideline or standard unless otherwise stated.

R105.3 Undefined Terms. The meaning of terms not specifically defined in R105.5 or in regulations issued by Federal agencies or in referenced guidelines and standards shall be as defined by collegiate dictionaries in the sense that the context implies.

R105.4 Interchangeability. Words, terms and phrases used in the singular include the plural and those used in the plural include the singular.

R105.5 Defined Terms.

Accessible. Describes a facility in the public right-of-way that complies with this part.

Accessible Pedestrian Signal. A device that communicates information about the WALK phase in audible and vibrotactile formats.

Alteration. A change to a facility in the public right-of-way that affects or could affect access, circulation, or use.

Blended Transition. A connection with a grade of 5 percent or less between the level of the pedestrian walkway and the level of the crosswalk.

Channelization. The separation or regulation of conflicting traffic movements into definite paths of travel by devices such as cones, tubular markers, vertical panels, drums, barricades, temporary raised islands and barriers, to facilitate the orderly movements of traffic, to separate vehicles and pedestrians, and to protect them from construction or hazardous areas.

Channelized Intersection. An at-grade intersection in which traffic is directed into definite paths by islands.

Crosswalk. (Shall have the meaning in MUTCD Section 1A13.18).

Cross Slope. The grade that is perpendicular to the direction of accessible pedestrian travel. On a sidewalk, shoulder, or blended transition, it is measured perpendicular to the curb line or edge of the street or highway; on a curb ramp, it is measured perpendicular to the running grade.

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 perpendicular or parallel ramp and its landing that cuts through or is built up to the curb.

Detectable Warning. A surface feature of truncated dome material built in or applied to the walking surface to advise of an upcoming change from pedestrian to vehicular way.

Element. An architectural or mechanical component of a building, facility, space, site, or public right-of-way.

Facility. All or any portion of buildings, structures, improvements, elements, and pedestrian or vehicular routes located in a public right-of-way.

Grade Break. The meeting line of two adjacent surface planes of different grade.

Highway. (Shall have the meaning in MUTCD Section 1A13.32).

Intersection. (Shall have the meaning in MUTCD Section 1A13.39).

Island. (Shall have the meaning in MUTCD Section 1A13.40).

Median. (Shall have the meaning in MUTCD Section 1A13.48).

Operable Part. A component of an element used to insert or withdraw objects, or to activate, deactivate, or adjust the element.

Pedestrian. (Shall have the meaning in MUTCD Section 1A13.55).

Pedestrian Access Route. A continuous and unobstructed walkway within a pedestrian circulation path that provides accessibility.

Pedestrian Circulation Path. A prepared exterior or interior way of passage provided for pedestrian travel.

Pushbutton Locator Tone. A repeating sound that identifies the pushbutton location and indicates the need to actuate pedestrian timing.

Public Right-of-Way. Public land or property, usually in interconnected corridors, that is acquired for or devoted to transportation purposes.

Roundabout Intersection. (Shall have the meaning in MUTCD Section 1A13.68).

Running Slope. The grade that is parallel to the direction of travel, expressed as a ratio of rise to run or as a percent.

Sidewalk. (Shall have the meaning in MUTCD Section 1A13.73).

Splitter Island. A flush or raised island that separates entering and exiting traffic in a roundabout intersection.

Street. (Shall have the meaning in MUTCD Section 1A13.84).

Street Furniture. Sidewalk equipment or furnishings.

Vibrotactile. A vibrating surface, located on the accessible pedestrian signal button, that communicates information through touch.

Walk Interval. That phase of a traffic signal cycle during which the pedestrian is to begin crossing, typically indicated by a WALK message or the walking person symbol and its audible equivalent.

Walkway. The continuous portion of the pedestrian access route that is connected to street crossings by curb ramps or blended transitions.

CHAPTER R2: SCOPING REQUIREMENTS

R201 Application

R201.1 Scope. All newly designed and newly constructed facilities located in the public right-of-way shall comply with these requirements. All altered portions of existing facilities located in the public right-of-way shall comply with these requirements to the maximum extent feasible.

Advisory R201.1 Scope. This document (see R101.1General) covers facilities for pedestrian circulation and use in the right-of-way. Examples of facilities include, but are not limited to, walkways and sidewalks, street or highway shoulders where pedestrians are not prohibited, crosswalks, islands and medians, overpasses and underpasses, on-street parking spaces and loading zones, and equipment, signals, signs, street furniture, and other appurtenances provided for pedestrians. Examples of facilities not included are manholes and utility vaults.

These requirements are to be applied to all areas of a facility within the scope or limits of the planned project unless expressly exempted or limited with respect to the number of multiple elements required to be accessible. For example, not all benches are required to be accessible; those that are not required to be accessible are not required to comply with these requirements or to be served by a pedestrian access route.

R201.2 Temporary and Permanent Facilities. These requirements shall apply to temporary and permanent facilities.

Advisory R201.2 Temporary and Permanent Facilities. Temporary facilities covered by these requirements include, but are not limited to, temporary routes around work zones, portable toilets in the public right-of-way, sidewalk vending facilities, street fair booths, performance stages and reviewing stands, and the pedestrian access routes that serve them. As permitted in R203.1.1, structures and equipment directly associated with the actual processes of construction are not required to be accessible.

Elements are often placed on a sidewalk without coordination by different agencies or entities. The U.S. Department of Justice ADA regulations require that the usability of accessible features be maintained (28 CFR §35.133 and §36.211).

R201.3 Requirements for Buildings and Structures. Buildings, structures, and similar facilities constructed in the public right-of-way but not specified in this document shall comply with the applicable requirements in 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines).

R201.3.1 Buildings and Structures Covered by the Americans with Disabilities Act. Buildings, structures, and similar facilities covered by the Americans with Disabilities Act (ADA) shall comply with Appendices B and D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines).

R201.3.2 Buildings and Structures Covered by the Architectural Barriers Act. Buildings, structures, and similar facilities covered by the Architectural Barriers Act (ABA) shall comply with Appendices C and D to 36 CFR part 1191.

R202 Alterations and Additions to Existing Facilities

R202.1 General. Additions and alterations to existing facilities shall comply with R202.

Advisory R202.1 General. Alterations include, but are not limited to, renovation, rehabilitation, reconstruction, historic restoration, resurfacing of circulation paths or vehicular ways, or changes or rearrangement of structural parts or elements of a facility.

The U.S. Department of Justice Title II regulation at 28 CFR 35.151(e) requires that curb ramps be installed whenever pedestrian walkways on sidewalks and across streets are newly constructed or altered. A 1993 case, Kinney v. Yerusalim, 9 F.3d 1067 (3d Cir. 1993), cert. denied, 511 U.S. 1033 (1994), held that resurfacing of a street constitutes an alteration that requires the installation of curb ramps (for text see http://www.ada.gov/deldot.htm).

Pavement patching and liquid-applied sealing, lane restriping, and short-term maintenance activities are not alterations.

R202.1.1 Transitional Segments. Transitional segments connecting to existing unaltered segments shall comply with R301 to the maximum extent feasible.

Advisory R202.1.1 Transitional Segments. It is often possible to construct transitional segments that blend between existing undisturbed facilities and newly-altered elements. This may permit the work of the alteration to more nearly meet the new construction standards. At a later time, when other walkway segments are altered, the non-complying transitional segments can be removed and replaced with complying work.

R202.1.2 Added Elements. Where elements are added and the circulation path is not altered, a pedestrian access route is not required.

Advisory R202.1.2 Added Elements. This provision does not eliminate the requirements specified for a particular element. For example, a bench that is installed on an existing sidewalk must have the necessary clearances and clear floor space specified in section 307. Where possible added elements should connect to an existing pedestrian access route.

R202.2 Additions. Each addition to an existing facility shall comply with the requirements for new construction. Where an existing pedestrian circulation path is extended, the extension shall contain a pedestrian access route complying with R301.

R202.3 Alterations. Where existing elements or spaces are altered, each altered element or space within the limits or scope of the project shall comply with the applicable requirements for new construction to the maximum extent feasible.

Advisory R202.3 Alterations. From the U.S. Department of Justice title III regulation at 28 CFR 36.402 Alterations: "The phrase 'to the maximum extent feasible,' … applies to the occasional case where the nature of an existing facility makes it virtually impossible to comply fully with applicable accessibility standards through a planned alteration. In these circumstances, the alteration shall provide the maximum physical accessibility feasible. Any altered features of the facility that can be made accessible shall be made accessible. If providing accessibility in conformance with this section to individuals with certain disabilities (e.g., those who use wheelchairs) would not be feasible, the facility shall be made accessible to persons with other types of disabilities (e.g., those who use crutches, those who have impaired vision or hearing, or those who have other impairments)."

Existing conditions (e.g., underlying terrain, right-of-way availability, underground structures, adjacent developed facilities, drainage, the presence of a notable natural or historic feature) may limit choices in an alterations project. In determining the maximum feasible accessibility that can be achieved for pedestrians with disabilities within a given alterations project, covered entities may consider constructability limits commensurate with those of the project as a whole.

There is no 'path-of-travel' obligation in these guidelines; covered entities shall apply the guidelines to achieve the maximum feasible accessibility within the limits of the planned project boundary or scope. However, the alteration of multiple elements or spaces within a facility may provide a cost-effective opportunity to make the entire facility, or a significant portion of it, accessible. When undertaking right-of-way alterations, jurisdictions should consult their transition plans to determine if related work has been identified as needed to achieve program accessibility in existing facilities at the same location.

Most rights-of-way work occurs as an alteration in a complex environment also regulated for vehicle operation and safety and subject to the well-established industry practice of applying 'engineering judgment'. These techniques can also be used to evaluate the feasibility of accessibility solutions.

R202.3.1 Prohibited Reduction in Required Access. An alteration shall not decrease or have the effect of decreasing the accessibility of a facility or an accessible connection to an adjacent building or site below the requirements for new construction in effect at the time of the alteration.

Advisory R202.3.1 Prohibited Reduction in Access. Sidewalk improvements that correct existing excessive cross slope should be carefully planned to avoid the imposition of barriers elsewhere, as, for example, creating excessive slope in a curb ramp or adding a step at an existing building entrance. Solutions that have been successfully implemented include:

1)split sidewalks that serve entrances and roadway at separate levels;
2)sidewalk widths of greater cross slope at street edge, with a pedestrian access route at lesser cross slope along building entrances;
3)a pedestrian access route along the curb, with ramped entrances along the shop fronts.

Where facilities are newly-constructed or altered along an existing sidewalk, it may not always be possible to provide the required level landing at an entrance or other feature required to be accessible without altering the sidewalk. Often, the jurisdiction will require the developer of a new or altered facility on a site served by the sidewalk to redesign and replace the public sidewalk as a part of the permit for construction. Careful coordination between public and private planning is the usual practice.

R202.3.2 Extent of Application. An alteration of an existing element, space, or area of a facility shall not impose a requirement for accessibility greater than required for new construction.

R202.3.3 Alterations to Qualified Historic Facilities. Where the State Historic Preservation Officer or Advisory Council on Historic Preservation determines that compliance with these requirements would threaten or destroy the historic significance of a qualified facility or element, compliance shall be required to the maximum extent that does not threaten or destroy the historic significance.

Advisory R202.3.3 Alterations to Qualified Historic Facilities. It is the element or facility subject to the alteration which must have historic significance. Furthermore, it must be determined that compliance with these requirements would threaten or destroy the historic significance, not merely alter the appearance.

R202.3.3.1 Historic District. Location of the facility or element within an historic district is not a sufficient condition for qualification as an historic facility.

Advisory R202.3.3.1 Historic District. Altered street crossings, sidewalks, and pedestrian facilities that are not historic but are merely located in historic areas must meet new construction requirements to the maximum extent feasible.

R202.3.3.2 Reproductions or Replications. Reproductions or replications of historic facilities shall not qualify as historic facilities.

R203 General Exceptions

R203.1 General. Facilities, sites, spaces, and elements are exempt from these requirements to the extent specified by R203.

R203.1.1 Construction Sites. Structures and sites directly associated with the actual processes of construction, including but not limited to, scaffolding, bridging, materials hoists, materials storage, portable toilet units provided for use exclusively by construction personnel, and construction trailers, shall not be required to comply with this part.

R203.1.2 Limited Access Spaces. Spaces accessed only by ladders, catwalks, crawl spaces, or very narrow passageways shall not be required to comply with this part.

R203.1.3 Machinery Spaces. Spaces or elements frequented only by service personnel for maintenance, repair, or occasional monitoring of equipment shall not be required to comply with this part. Machinery spaces include, but are not limited to, elevator pits or elevator penthouses; mechanical, electrical or communications equipment cabinets and vaults; electric substations and transformer vaults; and highway and tunnel utility facilities.

R203.1.4 Single Occupant Structures. Single occupant structures accessed only by passageways below grade or elevated above standard curb height, including but not limited to toll booths that are accessed only by underground tunnels, shall not be required to comply with this part.

R204 Pedestrian Access Route

Pedestrian circulation paths shall contain a pedestrian access route complying with R301 which connects to facilities, elements, and spaces required to be accessible by Chapter R2 and to accessible routes required to connect to public streets and sidewalks by section 206.2.1 of appendix B to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines) or section F206.2.1 of appendix C of 36 CFR 1191 (the ADA and ABA Accessibility Guidelines). Where a pedestrian circulation path is provided in the street, along a highway, or within a shoulder, it shall contain a pedestrian access route.

Advisory R204 Pedestrian Access Route. The pedestrian access route is a portion of the general pedestrian circulation path, which may include walkways, sidewalks, street crossings and crosswalks, and overpasses and underpasses, courtyards, elevators, platform lifts, stairs, ramps and landings. Where sidewalks are not provided, pedestrian circulation paths maybe provided in the street, highway, or shoulder unless pedestrian use is prohibited. This provision does not require a pedestrian access route if a pedestrian circulation path is not provided. -

R205 Alternate Pedestrian Access Route

When an existing pedestrian access route is blocked by construction, alteration, maintenance, or other temporary conditions, an alternate pedestrian access route complying to the maximum extent feasible with R301, R302, and Section 6D.01 and 6D.02 of the MUTCD (incorporated by reference; see R104.2.1) shall be provided.

Advisory R205 Alternate Pedestrian Access Route. Same-side travel is preferred because it does not increase pedestrian exposure and risk of accident consequent upon added street crossings. A route that uses vehicle lane width may be shorter, safer, and more usable than one that requires two street crossings, even if the roadway surface is imperfect. Part 6D.01 of the MUTCD requires alternate routes to provide the best elements of accessibility provided in the pedestrian circulation route before its disruption.

R206 Pedestrian Crossings

Where a pedestrian street or rail track crossing is provided, it shall contain a pedestrian access route complying with R301 and the applicable provisions of R305. Where a pedestrian rail crossing is not contained within a street or highway, a detectable warning shall be provided in compliance with R304.

Advisory R206 Pedestrian Crossings. When tracks are located in a street or highway that has a pedestrian route, the detectable warnings at the curb ramps make a second set of detectable warnings at the rail unnecessary in most applications. When rail tracks are not associated with a street or highway, they must have detectable warnings across the pedestrian access route on either side.

R207 Curb Ramps and Blended Transitions

A curb ramp or blended transition complying with R303, or a combination of curb ramps and blended transitions, shall connect the pedestrian access route to each pedestrian street crossing within the width of each crosswalk.

R208 Accessible Pedestrian Signals (APS)

Where pedestrian signals are provided at pedestrian street crossings, they shall comply with R306.

R209 Protruding Objects

Protruding objects along or overhanging any portion of a pedestrian circulation path shall comply with R401 and shall not reduce the clear width required for pedestrian access routes.

Advisory R209 Protruding Objects. Banners, awnings, tree branches, and temporary street or highway signs may also be hazards if not placed or maintained properly.

R210 Pedestrian Signs

R210.1 General. Signs designed primarily for pedestrian use shall comply with R210.

R210.2 Bus Route Identification. Bus route identification signs shall comply with R409.5.1 through R409.5.4, and R409.5.7 and R409.5.8. In addition, to the maximum extent practicable, bus route identification signs shall comply with R409.5.5. Bus route identification signs located at bus shelters shall provide raised and braille characters complying with R409.2, and shall have rounded corners. Signs shall not be required to comply with R409.2 where audible signs are user- or proximity-actuated or are remotely transmitted to a portable receiver carried by an individual. Bus schedules, timetables and maps that are posted at the bus stop or bus shelter are not required to comply.

R210.3 Directional, Informational, and Warning Signs. Directional, informational, and warning signs shall comply with R409.5.

Advisory R210.3 Directional, Informational, and Warning Signs. This provision applies legibility criteria to text signs. Examples of covered signs include, but are not limited to, sidewalk closure and pedestrian detour signing required by MUTCD, tourist information signing, and pedestrian route signing along an historic trail. Standard highway street-name signage is not covered by this part.

Braille identification of street names is a required feature where APS are provided (see R306).

A proximity-,-user-, or button-activated audible sign can provide this information in audible formats for pedestrians who don't read print. Such devices are now being manufactured for rights-of-way applications.

R211 Street Furniture

Street furniture intended for use by pedestrians and installed on or adjacent to a pedestrian circulation path shall comply with R307.

Advisory R211 Street Furniture. This scoping applies usability and operability criteria to certain items intended for pedestrian use in the public right-of-way. Where multiple items of a single type are provided at a single location, only a proportion may be required to be accessible and to be located on a pedestrian access route. Types of street furniture for which usability and operational criteria are provided include elements such as drinking fountains; public telephones; public toilet facilities; and tables, counters, and benches in R211; parking meters in R308.6; bus stops and shelters in R212; and signage, including bus stop signage, in R210. Where applicable, usability and operability provisions shall be satisfied in the design and construction of other items installed on or along a public right-of-way for pedestrian use (see sections R307, R401, and R405).

Some items intended for pedestrian use are installed on private property bounded by a public right-of-way and are intended for use from the right-of-way. Such items include wall-mounted ATMs, overnight mail kiosks, and walk-up service windows. Other items may be placed within a public sidewalk under the terms of a public space permit, such as the tables, chairs, and enclosures used by sidewalk cafes and restaurants or sidewalk vending carts and machines. The ADA and ABA Accessibility Guidelines cover these street furniture items, which should not be permitted to intrude on the required pedestrian access route or to violate protruding objects provisions.

Some street furniture, such as fire hydrants, signal control boxes, signal and sign poles, and overhead awnings and signs, is not intended for pedestrian operation. These and similar items shall not intrude on the required pedestrian access route or violate protruding objects provisions (see sections R301 and R401).

The location of bicycle racks on a public sidewalk should consider their footprint in use, since a bicycle carelessly fixed to a rack can become a barrier to accessible travel along a pedestrian access route or a protruding object along it.

Careful coordination is required between agencies and divisions authorized to install items on and along sidewalks in order to avoid inadvertent conditions that may constitute barriers. The U.S. Department of Justice ADA regulations require that the usability of accessible features be maintained (28 CFR §35.133 and §36.211).

R212 Bus Stops

Where provided, bus boarding and alighting areas shall comply with R410. Where provided, bus shelters shall comply with R410.2.

Advisory R212 Bus Stops. Where bus stops are marked along existing streets by the placement of signage, benches, or shelters, other features necessary to accessibility, such as surface improvements and curb ramps, will be subject to the program access requirements of the U.S. Department of Justice title II regulation at 28 CFR 35.151 or the U.S. Department of Transportation 504 regulation at 49 CFR Part 27. Transportation, public works, and transit agencies should consider including needed improvements in their transition plans and other program accessibility planning.

Furthermore, the placement of such items is subject to usability and protruding objects provisions that apply to street furniture. Bus stop benches and shelters shall not intrude into an existing pedestrian access route.

Signage required at bus stops is scoped at R210.2 Bus Route Identification.

R213 Stairways
Where provided on a pedestrian circulation path, stairways shall comply with R407. Stairways shall not be part of a pedestrian access route.

R214 Handrails
Where provided, handrails shall comply with R408.

Advisory R214 Handrails. It may not be feasible to install handrails with fully complying features on existing developed rights-of-way if the full horizontal handrail extension would narrow a required pedestrian access route or be a hazard to cross traffic. Handrail design should not constitute a protruding object (see R401).

R215 Vertical Access
Where provided, elevators, limited-use/limited-application elevators, and platform lifts shall comply with the applicable requirements in section 407, 408, and 410 of Appendix D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines) and shall provide for independent operation. Vertical access shall remain unlocked during the operating hours of the facility served.

Advisory R215 Vertical Access. Elevators in public and private buildings accessible from the public right-of-way have been successfully used to provide low-effort routes between sidewalk levels in hilly terrain.

R216 On-Street Parking
Where on-street parking is marked or metered, accessible parking spaces complying with R308 shall be provided on the block perimeter in accordance with Table R216.

Advisory R216 On-Street Parking. Accessible on-street parking spaces are best located where the street has the least crown and grade and close to key destinations. Adjacent sidewalk space should be free of obstructions (including curb ramps) to permit deployment of a van side-lift.-

Table R216 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

R217 Passenger Loading Zones
Where passenger loading zones are provided, a minimum of one passenger loading zone complying with R412 shall be provided in every continuous 30 m (100 ft) of loading zone space or fraction thereof.

R218 Call Boxes
Where provided, roadside call boxes shall comply with R309.

R219 Transit Platforms
Where provided, transit platforms shall comply with R414.

R220 Escalators
Where provided, escalators shall comply with sections 6.1.3.5.6 and 6.1.3.6.5 of ASME A17.1 (incorporated by reference; see 104.2.2).

R221 Detectable Warning Surfaces
Detectable warning surfaces shall comply with R304.

Advisory R221 Detectable Warning Surfaces. Detectable warning surfaces are required where curb ramps, blended transitions, or landings provide a flush pedestrian connection to the street. Sidewalk crossings of residential driveways should not generally be provided with detectable warnings, since the pedestrian right-of-way continues across most driveway aprons and overuse of detectable warning surfaces should be avoided in the interests of message clarity. However, where commercial driveways are provided with traffic control devices or otherwise are permitted to operate like public streets, detectable warnings should be provided at the junction between the pedestrian route and the street.

R222 Doors, Doorways, and Gates
Where provided, doors, doorways, and gates shall comply with R411.

CHAPTER R3: TECHNICAL PROVISIONS

R301 Pedestrian Access Route

R301.1 General. Pedestrian access routes shall comply with R301 and shall connect pedestrian elements and facilities required to be accessible.

R301.2 Components. Pedestrian access routes shall consist of one or more of the following components: walkways, ramps, curb ramps (excluding flared sides) and landings, blended transitions, crosswalks, and pedestrian overpasses and underpasses, elevators, and platform lifts. Stairways and escalators shall not be part of a pedestrian access route. All components of a pedestrian access route shall comply with the applicable portions of this document.

R301.3 Width.

R301.3.1 Continuous Width. The minimum continuous and unobstructed clear width of a pedestrian access route shall be 1.2 m (4.0 ft), exclusive of the width of the curb.

Advisory R301.3.1 Continuous Width. The pedestrian access route provides a minimum accessible route of passage within a sidewalk or other walkway that may not comprise the full width of the pedestrian circulation route, particularly in urban areas. Industry-recommended sidewalk widths can be found in 'Guide for the Planning, Design, and Operation of Pedestrian Facilities', American Association of State Highway and Transportation Officials, July 2004 (www.aashto.org). The minimum width must be maintained without obstruction.

Where a pedestrian access route turns or changes direction, it should accommodate the continuous passage of a wheelchair or scooter. As with street or highway design for vehicles, additional maneuvering width or length may be needed at recesses and alcoves, doorways and entrances, and along curved or angled routings, particularly where the grade exceeds 5%. Individual segments of pedestrian access routes should have a minimum straight length of 1.2 m (4.0 ft).

Street furniture, including fixed or movable elements such as newspaper and sales racks, cafe seating and tables, bus shelters, vender carts, sidewalk sculptures, and bicycle racks, shall not reduce the required width of the pedestrian access route.

Provisions for protruding objects apply across the entire width of the pedestrian circulation path, not just the pedestrian access route.

R301.3.2 Width at Passing Spaces. Walkways in pedestrian access routes that are less than 1.5 m (5.0 ft) in clear width shall provide passing spaces at intervals of 61 m (200 ft) maximum. Pedestrian access routes at passing spaces shall be 1.5 m (5.0 ft) wide for a distance of 1.5m (5.0 ft).

R301.3.3 Width at Elevators and Lifts. The pedestrian access route at elevators and platform lifts shall be permitted to comply with the applicable requirements of section 407, 408, and 410 of Appendix D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines).

R301.3.4 Width at Doors, Doorways, and Gates. The pedestrian access route through doors, doorways, and gates shall be permitted to comply with R411.2.3.

R301.4 Walkway Grade and Cross Slope.

R301.4.1 Cross Slope. The cross slope of the walkway of a pedestrian access route shall be 2 percent maximum.

R301.4.2 Street or Highway Grade. Where the walkway of a pedestrian access route is contained within a street or highway border, its grade shall not exceed the general grade established for the adjacent street or highway.

R301.4.3 Supported Slope. Where the walkway of a pedestrian access route is supported by a structure, it shall comply with R305.5.

Advisory R301.4.3 Supported Slope. This provision covers pedestrian access routes on bridges, overpasses, underpasses and similar facilities.

R301.5 Surface. The surface of the pedestrian access route shall be firm, stable and slip resistant.

Advisory R301.5 Surface. The U.S. Department of Justice ADA regulations require that the usability of accessible features be maintained (28 CFR §35.133 and §36.211).-

R301.5.1 Vertical Alignment. Vertical alignment shall be planar within curb ramp runs, blended transitions, landings, and gutter areas within the pedestrian access route, and within clear spaces required for accessible pedestrian signals, street furniture, and operable parts. Grade breaks shall be flush. Where the pedestrian access route crosses rail tracks at grade, the surface of the pedestrian access route shall be level and flush with the top of the rail at the outer edges of the rail. The surface between the rails shall be aligned with the top of the rail.

R301.5.2 Surface Discontinuities. Surface discontinuities shall not exceed 13 mm (0.50 in) maximum. Vertical discontinuities between 6.4 mm (0.25 in) and 13 mm (0.5 in) maximum shall be beveled at 1:2 minimum. The bevel shall be applied across the entire level change.

Advisory R301.5.2 Surface Discontinuities. Surfaces with individual units laid out of plane and those that are heavily textured, rough, or chamfered, will greatly increase rolling resistance and will subject pedestrians who use wheelchairs, scooters, and rolling walkers to the stressful (and often painful) effects of vibration. It is highly desirable to minimize surface discontinuities; when discontinuities on the pedestrian access route are unavoidable, they should be widely separated.

R301.7 Horizontal Openings.

R301.7.1 Walkway Joints and Gratings. Openings shall not permit passage of a sphere more than 13 mm (0.5 in) in diameter. Elongated openings shall be placed so that the long dimension is perpendicular to the dominant direction of travel.

R301.7.2 Clearances at Elevator and Platform Lift Sills. Clearances between elevator car platform sills and associated hoistways and between a platform lift sill and any landing shall comply with the applicable requirements in sections 407.4.3, 408.4.3, and 410.4 of Appendix D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines).

R301.7.3 Flangeway Gaps at Non-Freight Rail Crossings. Openings for wheel flanges at pedestrian crossings of non-freight rail track shall be 64 mm (2.5 in) maximum.

R301.7.4 Flangeway Gaps at Freight Rail Crossings. Openings for wheel flanges at pedestrian crossings of freight rail track shall be 75 mm (3 in) maximum.

R302 Alternate Circulation Path

R302.1 General. Alternate circulation paths shall comply with R302 and shall contain a pedestrian access route complying with R301.

Advisory R302.1 General. Temporary routes are alterations to an existing developed pedestrian environment and are required to achieve the maximum accessibility feasible under existing conditions.

R302.2 Location. To the maximum extent feasible, the alternate circulation path shall be provided on the same side of the street as the disrupted route.

Advisory R302.2 Location. Where it is not feasible to provide a same-side alternate circulation path and pedestrians will be detoured, section 6D.02 of the MUTCD specifies that the alternate path provide a similar level of accessibility to that of the existing disrupted route. This may include the incorporation of accessible pedestrian signals (APS), curb ramps, or other accessibility features.

R302.3 Protection. Where the alternate circulation path is exposed to adjacent construction, excavation drop-offs, traffic, or other hazards, it shall be protected with a pedestrian barricade or channelizing device complying with R302.4.

Advisory R302.3 Protection. When it is necessary to block travel at the departure curb to close a crosswalk that is disrupted by excavation, construction, or construction activity, care must be taken to preserve curb ramp access to the perpendicular crosswalk. This may require additional pedestrian channelization if only a single diagonal curb ramp

serves the corner.

Figures 6H-28 and 6H-29 of the MUTCD specify notification signage for pedestrian closings and detours. Audible signage triggered by proximity switches can provide information to pedestrians who do not use print signs.

R302.4 Pedestrian Barricades and Channelizing Devices. Pedestrian barricades and channelizing devices shall be continuous, stable, and non-flexible and shall consist of a wall, fence, or enclosures specified in section 6F-58, 6F-63, and 6F-66 of the MUTCD (incorporated by reference; see R104.2.4).

R302.4.1 Detectable Base. A continuous bottom edge shall be provided 150 mm (6 in) maximum above the ground or walkway surface.

R302.4.2 Height. Devices shall provide a continuous surface or upper rail at 0.9 m (3.0 ft) minimum above the ground or walkway surface. Support members shall not protrude into the alternate circulation path.

R303 Curb Ramps and Blended Transitions

R303.1 General. Curb ramps and blended transitions shall comply with R303.

Advisory R303.1 General. Curb ramps can be a key source of wayfinding information for pedestrians who travel without vision cues if they are installed in-line with the direction of pedestrian travel at crossings. This is most easily accomplished by locating the ramp at the tangent point of the curb return, using either a small curb radius in an attached sidewalk or, in larger radii, a border or setback from the street edge. The Institute of Transportation Engineers (www.ite.org) has undertaken an industry-wide effort to develop and standardize intersection plans that optimize wayfinding. The challenge for practitioners is to provide usability for pedestrians in wheelchairs and scooters with a rectangular ramp plan that can also be directional.

R303.2 Types. Perpendicular curb ramps shall comply with R303.2.1 and R303.3; parallel curb ramps shall comply with R303.2.2 and R303.3; blended transitions shall comply with R303.2.3 and R303.3.

Advisory R303.2 Types. This provision permits a combination of ramps and blended transitions.

It will sometimes be necessary to limit the run of a parallel or perpendicular ramp in order to avoid 'chasing grade' indefinitely. In new construction at standard curb heights, required level landings can provide a datum for measuring most curb ramp slopes.

Limiting new ramps to an 8.3% slope on steep routes will result in a slight increase in grade on the balance of the route, but will facilitate street crossing and a timely and manageable ascent to the sidewalk, particularly important when crossing in traffic.

R303.2.1 Perpendicular Curb Ramps. Perpendicular curb ramps shall have a running slope that cuts through or is built up to the curb at right angles or meets the gutter grade break at right angles.

R303.2.1.1 Running Slope. The running slope shall be 5 percent minimum and 8.3 percent maximum but shall not require the ramp length to exceed 4.5 m (15.0 ft).

R303.2.1.2 Cross Slope. The cross slope at intersections shall be 2 percent maximum. The cross slope at midblock crossings shall be permitted to be warped to meet street or highway grade.

R303.2.1.3 Landing. A landing 1.2 m (4.0 ft) minimum by 1.2 m (4.0 ft) minimum shall be provided at the top of the curb ramp and shall be permitted to overlap other landings and clear space. Running and cross slopes at intersections shall be 2 percent maximum. Running and cross slope at midblock crossings shall be permitted to be warped to meet street or highway grade.

R303.2.1.4 Flares. Flared sides with a slope of 10 percent maximum, measured parallel to the curb line, shall be provided where a pedestrian circulation path crosses the curb ramp.

Advisory R303.2.1.4 Flares. Sides of ramps may be returned, providing useful directional cues, if protected from cross travel by landscaping, street furniture, poles, or equipment.

R303.2.2 Parallel Curb Ramps. Parallel curb ramps shall comply with R303.2.2, and shall have a running slope that is in-line with the direction of sidewalk travel.

R303.2.2.1 Running Slope. The running slope shall be 5 percent minimum and 8.3 percent maximum but shall not require the ramp length to exceed 4.5 m (15.0 ft).

.

R303.2.2.2 Cross Slope. The cross slope shall be 2 percent maximum.

R303.2.2.3 Landing. A landing 1.2 m (4.0 ft) minimum by 1.2 m (4.0 ft) minimum shall be provided at the bottom of the ramp run and shall be permitted to overlap other landings and clear floor or ground space. Running slope and cross slopes at intersections shall be 2 percent maximum. Running and cross slope at midblock crossings shall be permitted to be warped to meet street or highway grade.

R303.2.2.4 Diverging Sidewalks. Where a parallel curb ramp does not occupy the entire width of a sidewalk, drop-offs at diverging segments shall be protected.

R303.2.3 Blended Transitions. Blended transitions shall comply with R303.3. Running slope shall be 5 percent maximum and cross slope shall be 2 percent maximum.

R303.3 Common Elements. Curb ramps and blended transitions shall comply with R303.3.

R303.3.1 Width. The clear width of landings, blended transitions, and curb ramps, excluding flares, shall be 1.2 m (4.0 ft) minimum.

R303.3.2 Detectable Warnings. Detectable warning surfaces complying with R304 shall be provided, where a curb ramp, landing, or blended transition connects to a street.

R303.3.3 Surfaces. Surfaces of curb ramps, blended transitions, and landings shall comply with R301. Gratings, access covers, and other appurtenances shall not be located on curb ramps, landings, blended transitions, and gutters within the pedestrian access route.

R303.3.4 Grade Breaks. Grade breaks at the top and bottom of perpendicular curb ramps shall be perpendicular to the direction of ramp run. At least one end of the bottom grade break shall be at the back of curb. Grade breaks shall not be permitted on the surface of curb ramps, blended transitions, landings, and gutter areas within the pedestrian access route. Surface slopes that meet at grade breaks shall be flush.

R303.3.5 Counter Slopes. The counter slope of the gutter or street at the foot of a curb ramp, landing, or blended transition shall be 5 percent maximum.

R303.3.6 Clear Space. Beyond the curb face, a clear space of 1.2 m (4.0 ft) minimum by 1.2 m (4.0 ft) minimum shall be provided within the width of the crosswalk and wholly outside the parallel vehicle travel lane.

R304 Detectable Warning Surfaces

R304.1 General. Detectable warnings shall consist of a surface of truncated domes aligned in a square or radial grid pattern and shall comply with R304.

R304.1.1 Dome Size. Truncated domes in a detectable warning surface shall have a base diameter of 23 mm (0.9 in) minimum to 36 mm (1.4 in) maximum, a top diameter of 50 percent of the base diameter minimum to 65 percent of the base diameter maximum, and a height of 5 mm (0.2 in).

Advisory R304.1.1 Dome Size. Where domes are arrayed radially, they may differ in diameter within the ranges specified.

R304.1.2 Dome Spacing. Truncated domes in a detectable warning surface shall have a center-to-center spacing of 41 mm (1.6 in) minimum and 61 mm (2.4 in) maximum, and a base-to-base spacing of 17 mm (0.65 in) minimum, measured between the most adjacent domes.

Advisory R304.1.2 Dome Spacing. Where domes are arrayed radially, they may differ in center-to-center spacing within the range specified.

R304.1.3 Contrast. Detectable warning surfaces shall contrast visually with adjacent gutter, street or highway, or walkway surface, either light-on-dark or dark-on-light.

Advisory R304.1.3 Contrast. Contrast may be provided on the full ramp surface but should not extend to the flared sides. Many pedestrians use the visual contrast at the toe of the ramp to locate the curb ramp opening from the other side of the street.

R304.1.4 Size. Detectable warning surfaces shall extend 610 mm (24 in) minimum in the direction of travel and the full width of the curb ramp (exclusive of flares), the landing, or the blended transition.

R304.2 Location and Alignment.

R304.2.1 Perpendicular Curb Ramps. Where both ends of the bottom grade break complying with R303.3.4 are 1.5 m (5.0 ft) or less from the back of curb, the detectable warning shall be located on the ramp surface at the bottom grade break. Where either end of the bottom grade break is more than 1.5 m (5.0 ft) from the back of curb, the detectable warning shall be located on the lower landing.

Advisory R304.2.1 Perpendicular Curb Ramps. Detectable warnings are intended to provide a tactile equivalent underfoot of the visible curbline; those placed too far from the street edge because of a large curb radius may compromise effective crossing analysis.

R304.2.2 Landings and Blended Transitions. The detectable warning shall be located on the landing or blended transition at the back of curb.

R304.2.3 Alignment. The rows of truncated domes in a detectable warning surface shall be aligned to be perpendicular or radial to the grade break between the ramp, landing, or blended transition and the street.

Advisory R304.2.3 Alignment. Where a ramp, landing, or blended transition provides access to the street continuously around a corner, the vertical rows of truncated domes in a detectable warning surface should be aligned to be perpendicular or radial to the grade break between the ramp and the street for a 1.2 meter-wide (4.0 ft) width for each crosswalk served.

R304.2.3 Rail Crossings. The detectable warning surface shall be located so that the edge nearest the rail crossing is 1.8 m (6 ft) minimum and 4.6 m (15 ft) maximum from the centerline of the nearest rail. The rows of truncated domes in a detectable warning surface shall be aligned to be parallel with the direction of wheelchair travel.

R305 Pedestrian Crossings

R305.1 General. Pedestrian crossings shall comply with R305.

R305.2 Crosswalks. Crosswalks shall comply with R305.2 and shall contain a pedestrian access route that connects to departure and arrival walkways through any median or pedestrian refuge island.

R305.2.1 Width. Marked crosswalks shall be 1.8 m (6 ft) wide minimum.

R305.2.2 Cross Slope.

R305.2.2.1 Crossings with Stop Control. The cross slope shall be 2 percent maximum.

R305.2.2.2 Crossings without Stop Control. The cross slope shall be 5 percent maximum.

R305. 2.2.3 Midblock Crossings. The cross slope at midblock crossings shall be permitted to be warped to meet street or highway grade.

R305.2.3 Running Slope. The running slope shall be 5 percent maximum, measured parallel to the direction of pedestrian travel in the crosswalk.

R305.3 Pedestrian Signal Phase Timing. All pedestrian signal phase timing shall be calculated using a pedestrian walk speed of 1.1 m/s (3.5 ft/s) maximum. The crosswalk distance used in calculating pedestrian signal phase timing shall include the entire length of the crosswalk.

R305.4 Medians and Pedestrian Refuge Islands. Medians and pedestrian refuge islands in crosswalks shall comply with R305.4 and shall contain a pedestrian access route, including passing space, complying with R301 and connecting to each crosswalk.

R305.4.1 Length. Medians and pedestrian refuge islands shall be 1.8 m (6.0 ft) minimum in length in the direction of pedestrian travel.

Advisory R305.4.1 Length. The edges of cut-throughs and curb ramps are useful as cues to the direction of a crossing. This should be considered when planning an angled route through a median or island. Curb ramps in medians and islands can add difficulty to the crossing for some users. There are many factors to consider when deciding whether to ramp or cut-through a median or island. Those factors may include slope and cross slope of road, drainage, and width of median or island.

R305.4.2 Detectable Warnings. Medians and pedestrian refuge islands shall have detectable warnings complying with R304 at curb ramps and blended transitions. Detectable warnings at cut-through islands shall be located at the curbline in-line with the face of curb and shall be separated by a 61 cm (2.0 ft) minimum length of walkway without detectable warnings. Where the island has no curb, the detectable warning shall be located at the edge of roadway.

R305.5 Pedestrian Overpasses and Underpasses. Pedestrian overpasses and underpasses shall comply with R305.5.

R305.5.1 Pedestrian Access Route. Pedestrian overpasses and underpasses shall contain a pedestrian access route complying with R301.

R305.5.2 Approach. Where the approach slope exceeds 5 percent, the approach shall be a ramp 1.2 m (4.0 ft) minimum in width complying with R406 or an elevator, a limited use/limited application elevator, or platform lift complying with the applicable requirements in section 407, 408, and 410 of Appendix D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines) and providing for independent operation.

Advisory R305.5.2 Approach. This provision leaves the decision of type of accessible vertical access up to the jurisdiction. Long ramps can present difficulties for some persons with disabilities and may require snow clearance. Elevators or lifts entail a maintenance obligation.

R305.5.3 Stairs. Stairs shall comply with R407.

R305.5.4 Escalators. Escalators shall comply with sections 6.1.3.5.6 and 6.1.3.6.5 of ASME A17.1 (incorporated by reference; see R104.2.3) and shall have a clear width of 82 cm (32 in) minimum.

R305.6 Roundabout Intersections. Where pedestrian facilities are provided at roundabout intersections, they shall comply with R305.6 and shall contain a pedestrian access route complying with R301.

R305.6.1 Separation. If walkways are curb-attached, there shall be a continuous and detectable edge treatment along the street side of the walkway wherever pedestrian crossing is not intended. Where chains, fencing, or railings are used, they shall have a bottom element 38 cm (15 in) maximum above the pedestrian access route.

Advisory R305.6.1 Separation. Because the pedestrian crossings are located off to the side of the pedestrian route around the street or highway and noise from continuously circulating traffic may mask useful audible cues. Carefully delineated crosswalk approaches with plantings, low enclosures, curbs, or other defined edges can be effective in identifying the crossing location(s). European and Australian roundabout intersections extend a 6- cm (24-inch) width of tactile surface treatment from the centerline of the ramp or blended transition across the full width of the sidewalk to provide an underfoot cue. Several manufacturers make a surface of raised bars for this use. The detectable warning surface should not be used, since it indicates the edge of a street or highway.

Schemes that remove cyclists from the circulating street or highway by means of a ramp that angles from the curb lane to the sidewalk and then provide re-entry by means of a similar ramp beyond the pedestrian crossing may provide false cues about the location of a crossing to pedestrians who are using the edge of the sidewalk for wayfinding. Designers should consider ways to mitigate this hazard.

R305.6.2 Signals. At roundabouts with multi-lane crossings, a pedestrian activated signal complying with R306 shall be provided for each segment of each crosswalk, including the splitter island. Signals shall clearly identify which crosswalk segment the signal serves.

Advisory R305.6.2 Signals. There are many suitable demand signals for this application. Crossings at some roundabout intersections in Australia and the United Kingdom

incorporate such systems, in which the driver first sees a flashing amber signal upon pedestrian activation and then a solid red while the pedestrian crosses to the splitter island (there is no green). These types of signals are also used in some U.S. cities at pedestrian crossings of arterial street or highways. The pedestrian pushbutton should be identifiable by a locator tone, and an accessible pedestrian signal incorporated to provide audible and vibrotactile notice of the gap created by the red signal. If properly signed, it need only be used occasionally by those who do not wish to rely solely on visual gap selection.

Roundabout intersections with single-lane approach and exit legs are not required to provide signals.

R305.7 Channelized Turn Lanes at Intersections. Where pedestrian crosswalks are provided at multi-lane right or left channelized turn lanes at intersections with pedestrian signal indications, a pedestrian activated signal complying with R306 shall be provided.

Advisory R305.7 Channelized Turn Lanes at Intersections. Accessible pedestrian signal devices installed at splitter and 'pork chop' islands must be carefully located and separated so that signal spillover does not give conflicting information about which crossing has the WALK indication displayed.

Additional guidance on signal types is provided in Advisory R305.6.2.

R306 Accessible Pedestrian Signals (APS)

R306.1 General. Pedestrian signals shall comply with R306.

R306.2 Pedestrian Signals. Each crosswalk with pedestrian signal indication shall have an accessible pedestrian signal which includes audible and vibrotactile indications of the WALK interval. Where a pedestrian pushbutton is provided, it shall be integrated into the accessible pedestrian signal and shall comply with R306.2.

Advisory R306.2 Pedestrian Signals. Signals should generally sound and vibrate throughout the WALK interval. Where signals rest in WALK, audible operation may be limited to a repetition at short intervals rather than continuous sounding for several minutes.

R306.2.1 Location. Accessible pedestrian signals shall be located so that the vibrotactile feature can be contacted from the level landing serving a curb ramp, if provided, or from a clear floor or ground space that is in line with the crosswalk line adjacent to the vehicle stop line.

R306.2.1.1 Crossings. Accessible pedestrian signal devices shall be 3.0 m (10.0 ft) minimum from other accessible pedestrian signals at a crossing. The control face of the accessible pedestrian signal shall be

installed to face the intersection and be parallel to the direction of the crosswalk it serves.

R306.2.1.2 Medians and Islands. Accessible pedestrian signals located in medians and islands shall be 1.5 m (5.0 ft) minimum from other accessible pedestrian signals.

R306.2.2 Reach and Clear Floor or Ground Space. Accessible pedestrian pushbuttons shall be located within a reach range complying with R404. A clear floor or ground space complying with R402 shall be provided at the pushbutton and shall connect to or overlap the pedestrian access route.

R306.2.3 Audible Walk Indication. The audible indication of the WALK interval shall be by tone or speech message.

R306.2.3.1 Tones. Tones shall consist of multiple frequencies with a dominant component at 880 Hz. The duration of the tone shall be 0.15 s and shall repeat at intervals of 0.15 s.

Advisory R306.2.3.1 Tones. Many new accessible pedestrian signal installations in the US use speech messages, which are perceived as being more user-friendly than tones. However, such messages may not be intelligible under high-ambient-noise conditions or to non-English speakers. Electronic tones are more universal and unambiguous. Section 4E.06 of the MUTCD specifies content of speech messages.

R306.2.3.2 Volume. Tone or voice volume measured at 92 cm (3.0 ft) from the pedestrian signal device shall be 2 dB minimum and 5 dB maximum above ambient noise level in standard operation and shall be responsive to ambient noise level changes.

Advisory R306.2.3.2 Volume. Where additional volume or beaconing features are available on pedestrian activation, they will momentarily exceed volume limits.

R306.3 Pedestrian Pushbuttons. Pedestrian pushbuttons shall comply with R306.3.

R306.3.1 Operation. Pedestrian pushbuttons shall comply with R405.4.

R306.3.2 Pushbutton Locator Tone. Pedestrian pushbuttons shall incorporate a locator tone at the pushbutton. Pushbutton locator tone volume measured at 92 cm (3.0 ft) from the pushbutton shall be 2 dB minimum and 5 dB maximum above ambient noise level and shall be responsive to ambient noise level changes. The duration of the locator tone shall be 0.15 s maximum and shall repeat at intervals of one second. The locator tone shall operate during the DON'T WALK and flashing DON'T WALK intervals only and shall be deactivated when the pedestrian signal is not operative.

R306.3.3 Size and Contrast. Pedestrian pushbuttons shall be a minimum of 0.5 cm (2 in) across in one dimension and shall contrast visually with their housing or mounting.

R306.3.4 Optional Features. An extended button press shall be permitted to activate additional features. Buttons that provide additional features shall be marked with three braille dots forming an equilateral triangle in the center of the pushbutton.

R306.4 Directional Information and Signs. Pedestrian signal devices shall provide tactile and visual signs complying with 306.4 on the face of the device or its housing or mounting to indicate crosswalk direction and the name of the street containing the crosswalk served by the pedestrian signal.

R306.4.1 Arrow. Signs shall include a tactile arrow aligned parallel to the crosswalk direction. The arrow shall be raised 0.8 mm (.03 inch) minimum and shall be 4 mm (1.5 in) minimum in length. The arrowhead shall be open at 45 degrees to the shaft and shall be 33 percent of the length of the shaft. Stroke width shall be 10 percent minimum and 15 percent maximum of arrow length. The arrow shall contrast with the background.

R306.4.2 Street Name. Accessible pedestrian signals (APS) shall include street name information aligned parallel to the crosswalk direction and shall comply with R409.3 or shall provide street name information in audible format.

R306.4.3 Crosswalk Configuration. Where provided, graphic indication of crosswalk configuration shall be tactile.

R307 Street Furniture

R307.1 General. Street furniture shall comply with R307.

Advisory R307.1 General. Elements are often placed on a sidewalk without coordination by different agencies or entities. Covered entities must ensure that the usability of the pedestrian access route is maintained.

Where items are added to an existing developed streetscape and the pedestrian walkway is not being replaced or altered within the scope of the project, locations should be carefully selected for minimum slope and cross slope and adequate width and maneuvering space to optimize usability.

R307.2 Clear Floor or Ground Space. Street furniture shall have clear space complying with R402 and shall be connected to the pedestrian access route.

R307.3 Drinking Fountains. Where drinking fountains are provided, they shall comply with R413.

R307.4 Public Telephones. Where public telephones are provided, they shall comply with R307.4.

R307.4.1 Single Telephone. Where a single public telephone is provided, it shall comply with sections 704.2 and 704.4 of Appendix D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines).

R307.4.2 Multiple Telephones. Where a bank of public telephones is provided, at least one telephone shall comply with section 704.2 of Appendix D to 36 CFR part 1191, and at least one additional telephone shall comply with section 704.4 of Appendix D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines).

R307.4.3 Volume Controls. All public telephones shall provide volume controls complying with section 704.3 of Appendix D to 36 CFR 1191.

R307.5 Public Toilet Facilities. Permanent or portable public toilet facilities shall comply with section 603 of Appendix D to 36 CFR part 1191. At least one fixture of each type provided shall comply with sections 604 through 610 of Appendix D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines). Operable parts, dispensers, receptacles, or other equipment shall comply with R405. Where multiple single-user toilet facilities are clustered at a single location, at least 5 percent, but no fewer than one single-user toilet at each cluster shall comply with section 603 of Appendix D to 36 CFR part 1191 and shall be identified by the International Symbol of Accessibility complying with R409.7.2.1.

R307.6 Tables, Counters, and Benches. Tables, counters, and benches shall comply with R307.6.

R307.6.1 Tables. Where tables are provided in a single location, at least 5 percent but no fewer than one, shall comply with section 902 of Appendix D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines).

R307.6.2 Counters. Where provided, counters shall comply with section 904 of Appendix D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines).

R307.6.3 Benches.

R307.6.3.1 Clear Space for Wheelchairs at Benches. Where benches without tables are provided at a single location, at least 50 percent, but no fewer than one, shall provide clear space complying with R402 positioned at the end of the bench seat and located for shoulder-to-shoulder seating.

R307.6.3.2 Benches. Where benches without tables are provided at a single location, at least 50 percent, but no fewer than one, shall have a seat

height at the front edge of 43 cm (17 in) minimum and 49 cm (19 in) maximum above the ground or floor space.

Advisory R307.6.3.2 Benches. Benches will be most useful if they have full back support and armrests to assist in sitting and standing.

R308 On-Street Parking

R308.1 General. On-street parking spaces shall comply with R308.

R308.2 Parallel Parking Spaces.

R308.2.1 Wide Walkways. Where the width of the adjacent walkway exceeds 4.3 m (14 ft), an access aisle at least 1.5 m (5.0 ft) wide shall be provided at street level the full length of the parking space and shall connect to a pedestrian access route serving the space. The access aisle shall not encroach on the vehicular travel lane.

Advisory R308.2.1 Wide Walkways. The walkway adjacent to an accessible parallel parking space should be free of obstructions such as signage, plantings, or equipment that would preclude deployment of a vehicle side-lift onto the access aisle or walkway.

A vehicle may park at the curb or at the parking lane boundary in order to locate the access aisle for individual use.

R308.2.2 Narrow Walkways. An access aisle is not required where the width of the adjacent walkway is less than or equal to 4.3 m (14 ft). When an access aisle is not provided, the parking space shall be located at either end of the block face.

Advisory R308.2.2 Narrow Walkways. An end-of-block space can be served by the curb ramps at the street crossing.

R308.3 Perpendicular or Angled Parking Spaces. Where perpendicular or angled parking is provided, an access aisle 2.4 m (8.0 ft) wide minimum shall be provided at street level the full length of the parking space and shall connect to a pedestrian access route serving the space. Access aisles shall be marked so as to discourage parking in them.

Advisory R308.3 Perpendicular or Angled Parking Spaces. All accessible angled and perpendicular on-street parking is treated as van parking with wide access aisles. In many cases, two spaces on either side of a single access aisle will satisfy scoping requirements. Where backing into the space (to locate the access aisle on the side needed) is not permitted, an access aisle for each accessible space should be provided.

R308.4 Curb Ramps or Blended Transitions. A curb ramp or blended transition complying with R303 shall connect the access aisle to the pedestrian access route.

R308.5 Signs. Parking space identification signs shall include the International Symbol of Accessibility complying with R409.5.10. Signs shall be located at the head or foot of the parking space so as not to interfere with the operation of a side lift or a passenger side transfer.

Advisory R308.5 Signs. Accessible parallel parking spaces located at the foot of a block can serve vans that have rear lifts or cars with scooter platforms.

R308.6 Parking Meters. Where parking meters are provided, they shall comply with R308.6. Operable parts shall comply with R405.

R308.6.1 Meters at Parking Spaces. A parking meter shall be located at the head or foot of a parallel parking space so as not to interfere with the operation of a side lift or a passenger side transfer.

R308.6.2 Remote Meters. Where payment for parking in a space is included in a centralized collection box or paying station, the space shall be connected to the centralized collection point with a pedestrian access route.

R308.6.3 Displays and Information. Displays and information shall be visible from a point located 1.0 m (3.3 ft) maximum above the center of the clear floor space in front of the meter.

R309 Call Boxes

R309.1 General. Call boxes shall comply with R309. Where provided, labeling shall comply with R409.2 and R409.3.

Advisory R309.1 General. These provisions may be helpful in making other types of emergency communication devices accessible such as on street security phone systems.

R309.2 Operable Parts.

R309.2.1 Electronic Operation. Operable parts shall comply with R405.

R309.2.2 Mechanical Operation. Operable parts shall comply with R404 and R405.2. Mechanically operated systems in which the signal is initiated by a lever pull shall be permitted to have an activating force of 53.4 N (12 lbs) maximum.

R309.3 Edge Protection. Edge protection complying with R406.8 shall be provided where the use area at the call box is adjacent to an abrupt level change.

R309.4 Motor Vehicle Turnouts. Where provided, a motor vehicle turnout shall have a minimum paved area of 4.9 m (16 ft) wide minimum and 7.0 m (23 ft) long minimum and shall connect to the clear space at the call box with a pedestrian access route complying with R301. Where shoulder texturing is used, it shall be discontinued at the turnout.

R309.5 Two-Way Communication. Where provided, two-way voice communication shall comply with R309.5, and with sections 708.2 and 708.3 of Appendix D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines).

> **R309.5.1 Volume Controls.** Volume controls complying with section 704.3 of Appendix D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines) shall be provided.
>
> **R309.5.2 TTY.** A TTY complying with section 704.4 of Appendix D to 36 CFR part 1191 (the ADA and ABA Accessibility Guidelines) shall be provided.

CHAPTER R4: SUPPLEMENTARY TECHNICAL PROVISIONS

R401 Protruding Objects

R401.1 General. Protruding objects on sidewalks and other pedestrian circulation paths shall comply with R401 and shall not reduce the clear width required for pedestrian access routes.

Advisory R401.1 General. Banners, awnings, tree branches, sidewalk sculpture, and temporary street or highway signs can become protruding objects if not placed or maintained properly.

R401.2 Protrusion Limits. Objects with leading edges more than 685 mm (27 in) and not more than 2 m (80 in) above the finish surface or ground shall protrude 100 mm (4 in) maximum horizontally into the pedestrian circulation path.

R401.3 Post-Mounted Objects. Objects mounted on free-standing posts or pylons, 685 mm (27 inches) minimum and 2030 mm (80 inches) maximum above the finish surface or ground, shall overhang circulation paths 100 mm (4 inches) maximum beyond the post or pylon base measured 150 mm (6 inches) minimum above the finish surface or ground. Where a sign or other obstruction is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 305 mm (12 in), the lowest edge of such sign or obstruction shall be 685 mm (27 in) maximum or 2 m (80 in) minimum above the finish surface.

R401.4 Reduced Vertical Clearance. Guardrails or other barriers shall be provided where the vertical clearance is less than 2 m (80 in) high. The leading edge of such

guardrail or barrier shall be located 685 mm (27 in) maximum above the finish surface or ground.

R402 Clear Space

R402.1 General. Clear space at accessible pedestrian signals (APS), street furniture, and operable parts shall comply with R402.

R402.2 Surface Characteristics. Surfaces of clear spaces shall comply with R301.5 and shall have a slope and cross slope of 2 percent maximum.

R402.3 Size. The clear space shall be 760 mm (30 in) minimum by 1220 mm (48 in) minimum.

R402.4 Knee and Toe Clearance. Unless otherwise specified, clear space shall be permitted to include knee and toe clearance complying with R403.

R402.5.Position. Unless otherwise specified, clear space shall be positioned for either forward or parallel approach to an element.

R402.6 Approach. One full unobstructed side of the clear space shall adjoin a pedestrian access route or adjoin another clear space.

R402.7 Maneuvering Space. Where a clear space is located in an alcove or otherwise confined on all or part of three sides, additional maneuvering space shall be provided in accordance with R402.7.1 and R402.7.2.

> **R402.7.1 Forward Approach.** Alcoves shall be 915 mm (36 in) wide minimum where the depth exceeds 610 mm (24 in).
>
> **R402.7.2 Parallel Approach.** Alcoves shall be 1525 mm (60 in) wide minimum where the depth exceeds 380 mm (15 in).

R403 Knee and Toe Clearance

R403.1 General. Where space beneath an element is included as part of clear space, the space shall comply with R403. Additional space shall not be prohibited beneath an element but shall not be considered as part of the clear space.

Advisory R403.1 General. Clearances are measured in relation to the usable clear space, not necessarily to the vertical support for an element. When determining clearance under an object for required maneuvering space, care should be taken to ensure the space is clear of any obstructions.

R403.2 Toe Clearance.

R403.2.1 General. Space under an element between the finish surface and 230 mm (9 in) above the finish surface shall be considered toe clearance and shall comply with R403.2.

R403.2.2 Maximum Depth. Toe clearance shall extend 635 mm (25 in) maximum under an element.

R403.2.3 Minimum Required Depth. Where toe clearance is required at an element as part of a clear space, the toe clearance shall extend 430 mm (17 in) minimum under the element.

R403.2.4 Additional Clearance. Space extending more than 150 mm (6 in) beyond the available knee clearance at 230 mm (9 in) above the finish surface shall not be considered toe clearance.

R403.2.5 Width. Toe clearance shall be 760 mm (30 in) wide minimum.

R403.3 Knee Clearance.

R403.3.1 General. Space under an element between 230 mm (9 in) and 685 mm (27 in) above the finish surface shall be considered knee clearance and shall comply with R403.3.

R403.3.2 Maximum Depth. Knee clearance shall extend 635 mm (25 in) maximum under an element at 230 mm (9 in) above the finish surface.

R403.3.3 Minimum Required Depth. Where knee clearance is required under an element as part of a clear space, the knee clearance shall be 280 mm (11 in) deep minimum at 230 mm (9 in) above the finish surface, and 205 mm (8 in) deep minimum at 685 mm (27 in) above the finish surface.

R403.3.4 Clearance Reduction. Between 230 mm (9 in) and 685 mm (27 in) above the finish surface, the knee clearance shall be permitted to reduce at a rate of 25 mm (one inch) in depth for each 150 mm (6 in) in height.

R403.3.5 Width. Knee clearance shall be 760 mm (30 in) wide minimum.

R404 Reach Ranges

R404.1 General. Reach ranges shall comply with R404.

R404.2 Forward Reach.

R404.2.1 Unobstructed. Where a forward reach is unobstructed, the high forward reach shall be 1220 mm (48 in) maximum and the low forward reach shall be 380 mm (15 in) minimum above the finish surface.

R404.2.2 Obstructed High Reach. Where a high forward reach is over an obstruction, the clear space shall extend beneath the element for a distance not less than the required reach depth over the obstruction. The high forward reach shall be 1220 mm (48 in) maximum where the reach depth is 510 mm (20 in) maximum. Where the reach depth exceeds 510 mm (20 in), the high forward reach shall be 1120 mm (44 in) maximum and the reach depth shall be 635 mm (25 in) maximum.

R404.3 Side Reach.

R404.3.1 Unobstructed. Where a clear space allows a parallel approach to an element and the side reach is unobstructed, the high side reach shall be 1220 mm (48 in) maximum and the low side reach shall be 380 mm (15 in) minimum above the finish surface. An obstruction shall be permitted between the clear space and the element where the depth of the obstruction is 255 mm (10 in) maximum.

R404.3.2 Obstructed High Reach. Where a clear space allows a parallel approach to an element and the high side reach is over an obstruction, the height of the obstruction shall be 865 mm (34 in) maximum and the depth of the obstruction shall be 610 mm (24 in) maximum. The high side reach shall be 1220 mm (48 in) maximum for a reach depth of 255 mm (10 in) maximum. Where the reach depth exceeds 266 mm (10 in), the high side reach shall be 1170 mm (46 in) maximum for a reach depth of 610 mm (24 in) maximum.

R405 Operable Parts

R405.1 General. Operable parts shall comply with R405.

R405.2 Clear Space. A clear space complying with R402 shall be provided.

R405.3 Height. Operable parts shall be placed within one or more of the reach ranges specified in R404.

R405.4 Operation. Operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 22 N (5 lbs) maximum.

R406 Ramps

R406.1 General. Ramps shall comply with R406.

R406.2 Slope. Ramp runs shall have a running slope between 5 percent minimum and 8.3 percent maximum.

Advisory R406.2 Slope. To accommodate the widest range of users, provide ramps with

the least possible running slope and, wherever possible, accompany ramps with stairs for use by those individuals for whom distance presents a greater barrier than steps, for example, people with heart disease or limited stamina.

R406.3 Cross Slope. Cross slope of ramp runs shall be 2 percent maximum.

R406.4 Surfaces. Ramp run surfaces shall comply with R301.5.

R406.5 Rise. The rise for any ramp run shall be 76 cm (30 in) maximum.

R406.6 Landings. Ramps shall have landings at the top and the bottom of each ramp run. Landings shall comply with R406.6.

R406.6.1 Slope. Perpendicular and parallel ramp landing slopes shall be 2 percent maximum.

R406.6.2 Width. The landing clear width shall be at least as wide as the widest ramp run leading to the landing.

R406.6.3 Length. The landing clear length shall be 1.5 m (5.0 ft) long minimum.

R406.6.4 Change in Direction. Ramps that change direction between runs at landings shall have a clear landing 1.5 m (5.0 ft) minimum by 1.5 m (5.0 ft) minimum.

R406.7 Handrails. Ramp runs with a rise greater than 15 cm (6 in) shall have handrails complying with R408.

R406.8 Edge Protection. Edge protection complying with R406.8.1 or R406.8.2 shall be provided on each side of ramp runs. Edge protection shall not be required on curb ramps and their landings.

R406.8.1 Extended Ramp Surface. The surface of the ramp run or landing shall extend 31 cm (12 in) minimum beyond the inside face of a handrail complying with R408.

Advisory R406.8.1 Extended Ramp Surface. The extended surface prevents wheelchair casters and crutch tips from slipping off the ramp surface.

R406.8.2 Curb or Barrier. A curb or barrier shall be provided that prevents the passage of a 100 mm (4 in) diameter sphere, where any portion of the sphere is within 100 mm (4 in) of the ramp surface.

R407 Stairways

R407.1 General. Stairways shall comply with R407.

R407.2 Treads and Risers. All steps on a flight of stairs shall have uniform riser heights and uniform tread depths. Risers shall be 100 mm (4 in) high minimum and 180 mm (7 in) high maximum. Treads shall be 28 cm (11 in) deep minimum.

R407.3 Open Risers. Open risers are not permitted.

R407.4 Tread Surface. Stairway treads shall comply with R301.5. Stairway treads shall have a 51 mm (2 in) minimum wide strip that contrasts visually with the tread and riser. The strip shall be located at the front of each tread and run the full width of the tread.

R407.5 Nosings. The radius of curvature at the leading edge of the tread shall be 13 mm (0.5 inch) maximum. Nosings that project beyond risers shall have the underside of the leading edge curved or beveled. Risers shall be permitted to slope under the tread at an angle of 30 degrees maximum from vertical. The permitted projection of the nosing shall extend 38 mm (1.5 in) maximum over the tread below.

R407.6 Handrails. Stairs shall have handrails complying with R408.

R408 Handrails

R408.1 General. Handrails provided along walking surfaces complying with R301, required at ramps complying with R406, and required at stairs complying with R407 shall comply with R408.

Advisory R408.1 General. Handrails are required on ramp runs with a rise greater than 150 mm (6 in) and on certain stairways. Handrails are not required on walking surfaces with running slopes less than 5 percent. However, if handrails are provided on walking surfaces with running slopes less than 5 percent, they must comply with R408. Sections R408.2, R408.3, and R408.10 do not apply to handrails provided on walking surfaces with running slopes less than 5 percent as those sections only reference requirements for ramps and stairs.

R408.2 Where Required. Handrails shall be provided on both sides of stairs and ramps.

R408.3 Continuity. Handrails shall be continuous within the full length of each stair flight or ramp run. Inside handrails on switchback or dogleg stairs and ramps shall be continuous between flights or runs.

R408.4 Height. Top of gripping surfaces of handrails shall be 87 cm mm (34 in) minimum and 97 cm (38 in) maximum vertically above walking surfaces, stair nosings, and ramp surfaces. Handrails shall be at a consistent height above walking surfaces, stair nosings, and ramp surfaces.

R408.5 Clearance. Clearance between handrail gripping surfaces and adjacent surfaces shall be 38 mm (1.5 in) minimum.

R408.6 Gripping Surface. Handrail gripping surfaces shall be continuous along their length and shall not be obstructed along their tops or sides. The bottoms of handrail gripping surfaces shall not be obstructed for more than 20 percent of their length. Where provided, horizontal projections shall occur 38 mm (1.5 in) minimum below the bottom of the handrail gripping surface.

Advisory R408.6 Gripping Surface. People with disabilities, older people, and others benefit from continuous gripping surfaces that permit users to reach the fingers outward or downward to grasp the handrail.

R408.7 Cross Section. Handrail gripping surfaces shall have a cross section complying with R408.7.1 or R408.7.2.

R408.7.1 Circular Cross Section. Handrail gripping surfaces with a circular cross section shall have an outside diameter of 32 mm (1.25 in) minimum and 51 mm (2 in) maximum.

R408.7.2 Non-Circular Cross Sections. Handrail gripping surfaces with a non-circular cross section shall have a perimeter dimension of 100 mm (4 in) minimum and 160 mm (6.25 in) maximum, and a cross-section dimension of 57 mm (2.25 in) maximum.

R408.8 Surfaces. Handrail gripping surfaces and any surfaces adjacent to them shall be free of sharp or abrasive elements and shall have rounded edges.

R408.9 Fittings. Handrails shall not rotate within their fittings.

R408.10 Handrail Extensions. Handrail gripping surfaces shall extend beyond and in the same direction of stair flights and ramp runs in accordance with R408.10. Extensions shall not be required for continuous handrails at the inside turn of switchback or dogleg stairs and ramps.

R408.10.1 Top and Bottom Extension at Ramps. Ramp handrails shall extend horizontally above the landing for 31 cm (12 in) minimum beyond the top and bottom of ramp runs. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent ramp run.

R408.10.2 Top Extension at Stairways. At the top of a stair flight, handrails shall extend horizontally above the landing for 31 cm (12 in) minimum beginning directly above the first riser nosing. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent stair flight.

R408.10.3 Bottom Extension at Stairways. At the bottom of a stair flight, handrails shall extend at the slope of the stair flight for a horizontal distance at least equal to one tread depth beyond the last riser nosing. Extension shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent stair flight.

R409 Signs

R409.1 General. Signs shall comply with R409. Where both visual and tactile characters are required, either one sign with both visual and tactile characters, or two separate signs, one with visual, and one with tactile characters, shall be provided.

R409.2 Raised Characters. Raised characters shall comply with R409.2 and shall be duplicated in braille complying with R409.3. Raised characters shall be installed in accordance with R409.4.

Advisory R409.2 Raised Characters. Signs that are designed to be read by touch should not have sharp or abrasive edges.

R409.2.1 Depth. Raised characters shall be 0.8 mm (.03 in) minimum above their background.

R409.2.2 Case. Characters shall be uppercase.

R409.2.3 Style. Characters shall be sans serif. Characters shall not be italic, oblique, script, highly decorative, or of other unusual forms.

R409.2.4 Character Proportions. Characters shall be selected from fonts where the width of the uppercase letter "O" is 55 percent minimum and 110 percent maximum of the height of the uppercase letter "I".

R409.2.5 Character Height. Character height measured vertically from the baseline of the character shall be 16 mm (0.625 in) minimum and 51 mm (2 in) maximum based on the height of the uppercase letter "I". Where separate raised and visual characters with the same information are provided, raised character height shall be permitted to be 13 mm (0.5 in) minimum.

R409.2.6 Stroke Thickness. Stroke thickness of the uppercase letter "I" shall be 15 percent maximum of the height of the character.

R409.2.7 Character Spacing. Character spacing shall be measured between the two closest points of adjacent raised characters within a message, excluding word spaces. Where characters have rectangular cross sections, spacing between individual raised characters shall be 3.2 mm (0.125 in) minimum and 4 times the raised character stroke width maximum. Where characters have other cross sections, spacing between individual raised characters shall be 1.6 mm (.625 in)

minimum and 4 times the raised character stroke width maximum at the base of the cross sections, and 3.2 mm (0.125 in) minimum and 4 times the raised character stroke width maximum at the top of the cross sections. Characters shall be separated from raised borders and decorative elements 9.5 mm (.375 in) minimum.

R409.2.8 Line Spacing. Spacing between the baselines of separate lines of raised characters within a message shall be 135 percent minimum and 170 percent maximum of the raised character height.

R409.3 Braille. Braille shall be contracted (Grade 2) and shall comply with R409.3 and R409.4.

R409.3.1 Dimensions and Capitalization. Braille dots shall have a domed or rounded shape and shall comply with Table R409.3.1. The indication of an uppercase letter or letters shall only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials, and acronyms.

R409.3.1 Braille Dimensions

Measurement Range	Minimum in Millimeters Maximum in Millimeters
Dot base diameter	1.5 mm (0.059 in) to 1.6 mm (0.063 in)
Distance between two dots in the same cell[1]	2.3 mm (0.090 in) to 2.5 mm (0.100 in)
Distance between corresponding dots in adjacent cells[1]	6.1 mm (0.241 in) to 7.6 mm (0.300 in)
Dot height	0.6 mm (0.025 in) to 0.9 mm (0.037 in)
Distance between corresponding dots from one cell directly below[1]	10 mm (0.395 in) 10.2 mm to (0.400 in)

1. Measured center to center.

R409.3.2 Position. Braille shall be positioned below the corresponding text. If text is multi-lined, braille shall be placed below the entire text. Braille shall be separated 9.5 mm (.375 in) minimum from any other tactile characters and 9.5 mm (.375 in) minimum from raised borders and decorative elements. Braille provided on elevator car controls shall be separated 4.8 mm (.1875 in) minimum and shall be located either directly below or adjacent to the corresponding raised characters or symbols.

R409.4 Installation Height and Location. Signs with tactile characters shall comply with R409.4.

R409.4.1 Height Above Finish Floor or Ground. Tactile characters on signs shall be located 1.2 m (4.0 ft) minimum above the finish floor or ground surface, measured from the baseline of the lowest tactile character and 1.5 m (5.0 ft) maximum above the finish floor or ground surface, measured from the baseline of the highest tactile character. Tactile characters for elevator car controls shall not be required to comply with R409.4.1.

R409.5 Visual Characters. Visual characters shall comply with R409.5. Where visual characters comply with R409.2 and are accompanied by braille complying with R409.3, they shall not be required to comply with R409.5.2 through R409.5.9.

R409.5.1 Finish and Contrast. Characters and their background shall have a non-glare finish. Characters shall contrast with their background with either light characters on a dark background or dark characters on a light background.

Advisory R409.5.1 Finish and Contrast. Signs are more legible for persons with low vision when characters contrast as much as possible with their background. Additional factors affecting the ease with which the text can be distinguished from its background include shadows cast by lighting sources, surface glare, and the uniformity of the text and its background colors and textures.

R409.5.2 Case. Characters shall be uppercase or lowercase or a combination of both.

R409.5.3 Style. Characters shall be conventional in form. Characters shall not be italic, oblique, script, highly decorative, or of other unusual forms.

R409.5.4 Character Proportions. Characters shall be selected from fonts where the width of the uppercase letter "O" is 55 percent minimum and 110 percent maximum of the height of the uppercase letter "I".

R409.5.5 Character Height. Minimum character height shall comply with Table R409.5.5. Viewing distance shall be measured as the horizontal distance between the character and an obstruction preventing further approach towards the sign. Character height shall be based on the uppercase letter "I".

R409.5.5 Visual Character Height

Height to Finish Floor or Ground From Baseline of Character	Horizontal Viewing Distance	Minimum Character Height
1.0 m (3.3 ft) to less than or equal to 1.8 m	less than 1.8 m (6 ft)	16 mm (0.625 in)
	1.8 m (6 ft) and	16 mm (0.625 in), plus 3.2 mm (0.125

(5.8 ft)	greater	in) per 0.3 m (one ft) of viewing distance above 1.8 m (6 ft)
Greater than 1.8 m (5.8 ft) to less than or equal to 3.0 m (10 ft)	less than 4.6 m (15 ft)	51 mm (2 in)
	4.6 m (15 ft) and greater	51 mm (2 in), plus 3.2 mm (0.125 in) per 0.3 m (12 in) of viewing distance above 4.6 m (15 ft)
greater than 3.0 m (10 ft)	less than 6.4 m (21 ft)	75 mm (3 in)
	6.4 m (21 ft) and greater	75 mm (3 in), plus 3.2 mm (0.125 in) per 0.3 m (12 in) of viewing distance above 6.4 m (21 ft)

R409.5.6 Height from Finish Floor or Ground. Visual characters shall be 1.0 m (3.25 ft) minimum above the finish floor or ground. Visual characters indicating elevator car controls shall not be required to comply with R409.5.6.

R409.5.7 Stroke Thickness. Stroke thickness of the uppercase letter "I" shall be 10 percent minimum and 30 percent maximum of the height of the character.

R409.5.8 Character Spacing. Character spacing shall be measured between the two closest points of adjacent characters, excluding word spaces. Spacing between individual characters shall be 10 percent minimum and 35 percent maximum of character height.

R409.5.9 Line Spacing. Spacing between the baselines of separate lines of characters within a message shall be 135 percent minimum and 170 percent maximum of the character height.

R409.5.10 The International Symbol of Accessibility. The International Symbols of Accessibility shall comply with Figure 409.5.10.

Figure R409.5.10
International Symbol of Accessibility

R410 Bus Stops

R410.1 Bus Boarding and Alighting Areas. Bus boarding and alighting areas shall comply with R410.

Advisory R410.1 Bus Boarding and Alighting Areas. At bus stops where a shelter is provided, the bus stop pad can be located either within or outside of the shelter.

R410.1.1 Surface. Bus stop boarding and alighting areas shall have a firm, stable, and slip resistant surface.

R410.1.2 Dimensions. Bus stop boarding and alighting areas shall provide a clear length of 2.4 m (8.0 ft) minimum, measured perpendicular to the curb or vehicle street or highway edge, and a clear width of 1.5 m (5.0 ft) minimum, measured parallel to the vehicle street or highway.

R410.1.3 Connection. Bus stop boarding and alighting areas shall be connected to streets, sidewalks, or pedestrian paths by a pedestrian access route complying with R301.

R410.1.4 Grade. Parallel to the street or highway, the grade of the bus stop boarding and alighting area shall be the same as the street or highway, to the maximum extent practicable. Perpendicular to the street or highway, the grade of the bus stop boarding and alighting area shall not be steeper than 2 percent.

R410.2 Bus Shelters. Bus shelters shall provide a minimum clear space complying with R402 entirely within the shelter. Bus shelters shall be connected by pedestrian access route complying with R301 to a boarding and alighting area complying with R410.1.

R411 Doors, Doorways, and Gates

R411.1 General. Doors, doorways, and gates that are part of a pedestrian access route shall comply with R411.

Advisory R411.1 General. This section provides information on minimum width and maneuvering space requirements for doors, doorways, and gates. For additional requirements for accessible doors, doorways, and gates, see 36 CFR part 1191 Appendix D Section 404 (the ADA and ABA Accessibility Guidelines).

R411.2 Manual Doors, Doorways, and Manual Gates. Manual doors and doorways and manual gates intended for user passage shall comply with R411.2.

R411.2.1 Revolving Doors, Gates, and Turnstiles. Revolving doors, revolving gates, and turnstiles shall not be part of a pedestrian access route.

R411.2.2 Double-Leaf Doors and Gates. At least one of the active leaves of doorways with two leaves shall comply with R411.2.3 and R411.2.4.

R411.2.3 Clear Width. Door openings shall provide a clear width of 82 cm (32 in) minimum. Clear openings of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees. Openings more than 61 cm (24 in) deep shall provide a clear opening of 92 cm (36 in) minimum. There shall be no projections into the required clear opening width lower than 87 cm (34 in) above the finish floor or ground. Projections into the clear opening width between 87 cm (34 in) and 2 m (6.7 ft) above the finish floor or ground shall not exceed 100 mm (4 in).

R411.2.4 Maneuvering Clearances. Minimum maneuvering clearances at doors and gates shall comply with R411.2.4. Maneuvering clearances shall extend the full width of the doorway and the required latch side or hinge side clearance.

R411.2.4.1 Swinging Doors and Gates. Swinging doors and gates shall have maneuvering clearances complying with Table R411.2.4.1.

R411.2.4.1 Maneuvering Clearances at Manual Swinging Doors and Gates

Type of Use		Minimum Maneuvering Clearance	
Approach Direction	**Door or Gate Side**	**Perpendicular to Doorway**	**Parallel to Doorway (beyond latch side unless noted)**
From front	Pull	153 cm (60 in)	46 cm (18 in)
From front	Push	122 cm (48 in)	0 mm (0 in)[1]
From hinge side	Pull	153 cm (60 in)	92 cm (36 in)
From hinge side	Pull	137 cm (54 in)	107 cm (42 in)
From hinge side	Push	107 cm (42 in)[2]	56 cm (22 in)[3]
From latch side	Pull	122 cm (48 in)[4]	61 cm (24 in)
From latch side	Push	107 cm (42 in)[4]	61 cm (24 in)

1. Add 305 cm (12 in) if closer and latch are provided.
2. Add 150 mm (6 in) if closer and latch are provided.
3. Beyond hinge side.
4. Add 150 mm (6 in) if closer is provided.

R411.2.4.2 Doorways without Doors or Gates, Sliding Doors, and Folding Doors. Doorways less than 92 cm (36 in) wide without doors or gates, sliding doors, or folding doors shall have maneuvering clearances complying with Table R411.2.4.2.

R411.2.4.2 Maneuvering Clearances at Doorways without Doors or Gates, Manual Sliding Doors, and Manual Folding Doors

	Minimum Maneuvering Clearance	
Approach Direction	**Perpendicular to Doorway**	**Parallel to Doorway (beyond stop/latch side unless noted)**
From Front	122 cm (48 in)	0 mm (0 in)

From side[1]	107 cm (42 in)	0 mm (0 in)
From pocket/hinge side	107 cm (42 in)	56 cm (22 in)[2]
From stop/latch side	107 cm (42 in)	61 cm (24 in)

1. Doorway with no door only.
2. Beyond pocket/hinge side.

R411.2.4.3 Recessed Doors and Gates. Maneuvering clearances for forward approach shall be provided when any obstruction within 46 cm (18 in) of the latch side of a doorway projects more than 205 mm (8 in) beyond the face of the door, measured perpendicular to the face of the door or gate.

Advisory R411.2.4.3 Recessed Doors and Gates. A door can be recessed due to wall thickness or because of the placement of casework and other fixed elements adjacent to the doorway. This provision must be applied wherever doors are recessed.

R411.2.4.4 Floor or Ground Surface. Floor or ground surface within required maneuvering clearances shall comply with R301.5.

R411.2.5 Doors in Series and Gates in Series. The distance between two hinged or pivoted doors in series and gates in series shall be 1.2 m (48 in) minimum plus the width of doors or gates swinging into the space.

R411.2.6 Door and Gate Hardware. Handles, pulls, latches, locks, and other operable parts on doors and gates shall comply with R405. Operable parts of such hardware shall be 87 cm (34 in) minimum and 122 cm (48 in) maximum above the finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides.

R412 Passenger Loading Zones

R412.1 General. Passenger loading zones shall comply with R412.

R412.2 Vehicle Pull-Up Space. Passenger loading zones shall provide a vehicular pull-up space 2.4 m (8 ft) wide minimum and 6.1 m (20 ft) long minimum.

R412.3 Access Aisle. Passenger loading zones shall provide access aisles complying with R412 adjacent to the vehicle pull-up space. Access aisles shall adjoin a pedestrian access route and shall not overlap the vehicular way.

R412.3.1 Width. Access aisles serving vehicle pull-up spaces shall be 1.5 m (5.0 ft) wide minimum.

R412.3.2 Length. Access aisles shall extend the full length of the vehicle pull-up spaces they serve.

R412.3.3 Marking. Access aisles shall be marked so as to discourage parking in them.

R412.4 Floor and Ground Surfaces. Access aisles serving vehicle pull-up spaces shall comply with R301.5. Access aisles shall be at the same level as the vehicle pull-up space they serve.

R412.5 Vertical Clearance. Vehicle pull-up spaces, access aisles serving them, and a vehicular route to and from the passenger loading zone shall provide a vertical clearance of 3 m (9.5 ft) minimum.

R413 Drinking Fountains

R413.1 General. Drinking fountains shall comply with R401 and R413.

R413.2 Clear Floor Space. Units shall have a clear space complying with R402 positioned for a forward approach and centered on the unit. Knee and toe clearance complying with R403 shall be provided.

R413.3 Operable Parts. Operable parts shall comply with R405.

R413.4 Spout Height. Spout outlets shall be 92 cm (36 in) maximum above the finish floor or ground.

R413.5 Spout Location. The spout shall be located 38 cm (15 in) minimum from the vertical support and 125 mm (5 in) maximum from the front edge of the unit, including bumpers.

R413.6 Water Flow. The spout shall provide a flow of water 100 mm (4 in) high minimum and shall be located 125 mm (5 in) maximum from the front of the unit. The angle of the water stream shall be measured horizontally relative to the front face of the unit. Where spouts are located less than 75 mm (3 in) of the front of the unit, the angle of the water stream shall be 30 degrees maximum. Where spouts are located between 75 mm (3 in) and 125 mm (5 in) maximum from the front of the unit, the angle of the water stream shall be 15 degrees maximum.

Advisory R413.6 Water Flow. The purpose of requiring the drinking fountain spout to produce a flow of water 4 inches (100 mm) high minimum is so that a cup can be inserted under the flow of water to provide a drink of water for an individual who, because of a disability, would otherwise be incapable of using the drinking fountain.

R413.7 Drinking Fountains for Standing Persons. Spout outlets of drinking fountains for standing persons shall be 97 cm (38 in) minimum and 109 cm (43 in) maximum above the finish floor or ground.

R414 Rail Platforms

R414.1 General. Rail platforms shall comply with R414. In light rail, commuter rail, and intercity rail systems, platforms shall provide level-entry boarding where structurally and operationally practicable.

R414.2 Slope. Rail platforms shall not exceed a slope of 2 percent in all directions. Where platforms serve vehicles operating on existing track or track laid in existing street or highway, the slope of the platform parallel to the track shall be permitted to be equal to the slope (grade) of the street or highway or existing track.

R414.3 Detectable Warnings. Platform boarding edges not protected by platform screens or guards shall have detectable warnings complying with R304 along the full length of the public use area of the platform.

R414.4 Platform and Vehicle Floor Coordination. Station platforms shall be positioned to coordinate with vehicles in accordance with the applicable requirements of 36 CFR part 1192 (ADA Accessibility Guidelines for Transportation Vehicles). Low-level platforms shall be 205 mm (8 in) minimum above top of rail. Where vehicles are boarded from sidewalks or street-level, low-level platforms shall be permitted to be less than 205 mm (8 in).

*Advisory R414.4 Platform and Vehicle Floor Coordination. The height and position of a platform must be coordinated with the floor of the vehicles it serves to minimize the vertical and horizontal gaps, in accordance with the ADA Accessibility Guidelines for Transportation Vehicles (36 CFR part 1192). The vehicle guidelines, divided by bus, van, light rail, rapid rail, commuter rail, intercity rail, are available at **www.access-board.gov**. The preferred alignment is a high platform, level with the vehicle floor. In some cases, the vehicle guidelines permit use of a low platform in conjunction with a lift or ramp. Most such low platforms must have a minimum height of eight inches above the top of the rail. Some vehicles are designed to be boarded from a street or the sidewalk along the street. The exception permits those boarding areas to be less than eight inches high.*

R415 Rail Station Signs

R415.1 General. Rail station signs shall comply with R415.

Advisory R415.1 General. Emerging technologies such as audible sign systems using infrared transmitters and receivers may provide greater accessibility in the transit environment than traditional braille and raised letter signs. The transmitters are placed

on or next to print signs and transmit their information to an infrared receiver that is held by a person. By scanning an area, the person will hear the sign. This means that signs can be placed well out of reach of pedestrians, even on parapet walls and on walls beyond barriers. Additionally, such signs can be used to provide wayfinding information that cannot be efficiently conveyed on braille signs.

R415.2 Entrances. Where signs identify a station or its entrance, at least one sign at each entrance shall comply with R409.2 and shall be placed in uniform locations to the maximum extent practicable. Where signs identify a station that has no defined entrance, at least one sign shall comply with R409.2 and shall be placed in a central location. Tactile signs shall not be required where audible signs are remotely transmitted to hand-held receivers, or are user- or proximity-actuated.

R415.3 Routes and Destinations. Lists of stations, routes and destinations served by the station which are located on boarding areas, platforms, or mezzanines shall comply with R409.5. Signs covered by this requirement shall, to the maximum extent practicable, be placed in uniform locations within the system. Where sign space is limited, characters shall not be required to exceed 75 mm (3 in). At least one tactile sign identifying the specific station and complying with R409.2 shall be provided on each platform or boarding area. Tactile signs shall not be required where audible signs are remotely transmitted to hand-held receivers, or are user- or proximity-actuated. Route maps are not required to comply.

R415.4 Station Names. Stations covered by this section shall have identification signs complying with R409.5. Signs shall be clearly visible and within the sight lines of standing and sitting passengers from within the vehicle on both sides when not obstructed by another vehicle.