

Pedestrian Accessibility Standards for Facilities in the Public Right of Way

October 2015



**Prepared by
Delaware Department of Transportation**

Jennifer Cohan, Secretary

Acknowledgements

The following groups played key roles in the development of the DelDOT Pedestrian Accessibility Standards for the Facilities in the Public Right of Way:

DelDOT ADA Standards Steering Committee, 2014-2015

John McNeal, ADA Title II/Section 504 Coordinator

James Pappas, PE, Assistant Director, Engineering Support

Javier G. Torrijos, PE, Assistant Director of Transportation Solutions, Construction

Mark Harbeson, PE, Survey Program Manager

Governor's Advisory Council on Pedestrian Awareness and Walkability, 2007-2009; and,

DelDOT Secretary's Technical Advisory Committee, 2007-2009.

**Pedestrian Accessibility
Questions, Requests and Complaints
Contact Information**

**Delaware Department of Transportation
DelDOT ADA Title II Coordinator:**

ADA Title II/Section 504 Coordinator
Office of Civil Rights
Delaware Department of Transportation
Dover, Delaware 19903-0778
Email: dot.adarequest@state.de.us
Phone: (302) 760-2467

Federal Highway Administration

Dover, Delaware 19904
Phone: 302.734.5323

US Department of Justice

US Department of Justice
Civil Rights Division
950 Pennsylvania Avenue, NW
Disability Rights Section NYAV
ADA Information
Washington, DC 25030
Phone: 800.514.0301
TTY: 800.514.0383
Internet Address: www.ADA.gov

US Access Board

ADA Research and Guidelines
U.S. Access Board
1331 F Street, N.W., Suite 1000
Washington, DC 20004-1111
Phone: 800.872.2253
TTY: 800.993.2822
Weekdays 10 - 5:30 EST (Wed. 10 - 2)
Fax: 202.272.0081
E-mail: info@access-board.gov

**GUIDE FOR ACCESSIBLE PEDESTRIAN FACILITIES
PUBLIC TRANSPORTATION RIGHT OF WAY
TABLE OF CONTENTS**

Chapter 1	Introduction	1-1
	I. DelDOT Purpose and Need	1-1
	II. DelDOT Pedestrian Program Commitment.....	1-1
	A. Complete Streets Policy	1-2
	B. Trails and Shared Use Paths	1-2
Chapter 2	Pedestrian Accessibility Complexities and Balance.....	2-1
	I. Transportation Functions.....	2-1
	II. Public Right of Way Complexities.....	2-1
	III. Design Process – Then & Now	2-1
	IV. Balancing Compliance and Disability Challenges	2-2
	V. Engineering Judgment	2-2
Chapter 3	Federal Requirements and Guidance.....	3-1
	I. Agency Responsibilities	3-1
	II. Status of Federal Accessibility Requirements and Guidelines.....	3-1
	III. ADA Program Access	3-2
	IV. Federal Case Law	3-3
Chapter 4	Federal Transportation Accessibility and Safety Focus	4-1
	I. Community Needs & Accessibility	4-1
	II. FHWA Pedestrian and Bicycle Safety	4-1
Chapter 5	DelDOT Project Scoping.....	5-1
	I. Project Scope and Limits.....	5-1
	II. Logical Termini for Accessibility	5-2
Chapter 6	DelDOT Request for Practical Exceptions.....	6-1
	I. Federal and State Background.....	6-1
	II. Intent.....	6-1
	III. Request for Practical Exceptions Approval Process	6-4
Chapter 7	Pedestrian Accessibility Standards.....	7-1
	I. Use of Accessibility Standards.....	7-1
	II. Pedestrian Facility Components	7-1
	III. DelDOT Desired Accessibility Standards	7-3
	A. Sidewalks.....	7-3
	B. Driveway and Entrance Crossings.....	7-8
	C. Obstructions and Protruding Objects.....	7-10
	D. Curb Ramps	7-14
	E. Curb Ramp Locations.....	7-24
	F. Access Ramps.....	7-25
	G. Detectable Warning Surface (DWS)	7-27
	H. Crosswalks.....	7-29
	I. Median and Channelized Island Crossings.....	7-30
	J. Roundabouts	7-33
	K. Railroad Crossings.....	7-33
	L. Bus Stops	7-36
	M. Traffic Signals and Pedestrian Signals	7-38
	N. Stop Bars	7-44

O. On-Street Parking	7-44
P. Park and Ride Facilities and Other On-Site Parking Facilities	7-46
Chapter 8 Pedestrian Access During Construction and Maintenance.....	8-1
Appendix.....	- 1 -
Appendix A DelDOT Request for Practical Exception Form	- 2 -
Appendix B Pedestrian Accessibility Standards Measurement Construction Tolerances.....	- 5 -
Appendix C DelDOT Minimum PAR Standards.....	- 6 -
Appendix D Design Balance Example	- 15 -
Appendix F Examples of Maintenance Project Activities	- 19 -
Appendix G Examples of Alteration Project Activities.....	- 20 -
Appendix H Examples of New Construction Project Activities.....	- 22 -
Appendix I Examples of Limits for Accessibility Improvements	- 24 -
Glossary of Terms.....	- 25 -
References.....	- 28 -

TABLE OF FIGURES

Figure 1 Pedestrian Facility Elements / ADA Compliance Considerations	7-2
Figure 2 Pedestrian Access Route Width Standards	7-4
Figure 3 DelDOT Desired Accessibility Standards / Pinch Point	7-4
Figure 4 Passing Zones and Passing Zone Interval	7-5
Figure 5 Minimum PAR Tie-In Transition Lengths*	7-6
Figure 6 PAR Vertical Elevation Differences	7-6
Figure 7 Elongated Openings in Floor or Ground Surfaces	7-7
Figure 8 PAR Alternative Crossing Driveway or Entrance	7-8
Figure 9 Alternative Driveway/Entrance Designs	7-9
Figure 10 Barriers at Circulation Areas with Reduced Vertical Clearance	7-11
Figure 11 Post-Mounted Objects	7-12
Figure 12 Multiple Obstructions	7-13
Figure 13 Curb Ramp Components	7-14
Figure 14 Alternative Treatments for Perpendicular and Parallel Ramps	7-16
Figure 15 Grade Break at Toe of Ramp / Alternative Curb Ramp Design	7-17
Figure 16 Cross Slope Transition to Roadway	7-19
Figure 17 Diagonal Curb Ramps and Landings Without Buffers	7-20
Figure 18 Counter Slope Limitations	7-21
Figure 19 Parallel Curb Ramp and Combination Parallel and Perpendicular Curb Ramps	7-23
Figure 20 Types of Curb Ramps	7-26
Figure 21 Detectable Warning Surfaces	7-28
Figure 22 Detectable Warning Surface Placement / Perpendicular Curb Ramps	7-29
Figure 23 Cut Through and Ramped Medians	7-32
Figure 24 Railroad Pedestrian Crossing Detail	7-35
Figure 25 Bus Boarding and Alighting Area Requirements	7-37
Figure 26 Recommended Pushbutton Locations for Accessible Pedestrian Signals	7-41
Figure 27 Recommended Pushbutton Locations for Accessible Pedestrian Signals	7-42
Figure 28 Recommended Pushbutton Locations for Accessible Pedestrian Signals	7-43
Figure 29 On-Street Parking Spaces	7-44
Figure 30 Accessible Parallel Parking Spaces*	7-45
Figure 31 Accessible Perpendicular/Angled Parking Spaces*	7-46
Figure 32 Initial Design Containing Several Non-Compliant Features	- 15 -
Figure 33 Redesign Addressing Some Non-Compliant Features	- 16 -
Figure 34 Redesign Addressing Non-Compliant Features to the Maximum Extent Feasible ..	- 17 -

ABBREVIATIONS

AASHTO – American Association of State Highway and Transportation Officials
ADA – Americans with Disabilities Act, 1990
ADAAG – Americans with Disabilities Act Accessibility Guidelines
APS – Accessible Pedestrian Signal
DelDOT – Delaware Department of Transportation
DE MUTCD - Delaware Manual on Uniform Traffic Control Devices
DOJ – US Department of Justice
DWS – Detectable Warning Surface
FHWA – Federal Highway Administration
Max. – Maximum value
Min. – Minimum value
PAR – Pedestrian Access Route
PAS – DelDOT Pedestrian Accessibility Standards
PCP – Pedestrian Circulation Path
PROWAG – Public Right of Way Accessibility Guidelines 2011/2013 (US Access Board)
(R1234.1) – Section of PROWAG 2011/2013
R/W – Right of Way
RPE – Request for Practical Exception
USDOT – United States Department of Transportation
2006 Standards – USDOT ADA Standards for Transportation Facilities, 2006
2010 Standards – DOJ ADA Standards for Accessible Design 2010
(1234.1) – Section of 2006 and 2010 Standards for facilities in the public right of way

Chapter 1

Introduction

I. DelDOT Purpose and Need

The DelDOT *Pedestrian Accessibility Standards for Facilities in the Public Right of Way* (DelDOT Pedestrian Standards) combines into one document the requirements, guidelines and best practices for accessible pedestrian facilities in the public transportation right of way as identified by the:

- Americans with Disabilities Act of 1990 (ADA); (<http://www.ada.gov/>)
- ADA Standards for Transportation Facilities 2006 (2006 Standards) adopted by the US Department of Transportation; (www.dot.gov/accessibility)
- Draft Public Right of Way Accessibility Guidelines (PROWAG 2011) developed by the US Access Board; (<http://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/proposed-rights-of-way-guidelines>)
- Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG Supplement 2013); Shared Use Paths; <http://www.access-board.gov/guidelines-and-standards/streets-sidewalks/shared-use-paths>. The 2013 PROWAG Supplement includes unchanged PROWAG 2011 guidance as well as revised PROWAG 2011 guidance and new guidance on a variety of features.
- US Department of Justice (DOJ); (<http://www.justice.gov/>), and
- US Department of Transportation (USDOT); (<http://www.dot.gov/>).

The standards provided in this document, in concert with the Delaware Manual on Uniform Traffic Control Devices (DE MUTCD), http://deldot.gov/information/pubs_forms/manuals/de_mutcd/) are intended to assist all public and private sector transportation planners and engineers in the effort to achieve a more consistent approach to planning, design, construction and maintenance of accessible pedestrian facilities in the public transportation right of way. The *Pedestrian Accessibility Standards for Facilities in the Public Right of Way* have been developed to meet the spirit and intent of the legislation as well as the regulatory requirements and guidance of ADA, DOJ and USDOT as of the date of this publication. The primary reference documents used are the 2006 US DOT Standards with citations noted as numbers (e.g., 101.1) and the US Access Board's 2011/2013 PROWAG with citations noted as numbers preceded by R (e.g., R101.1). (Please access the hyperlinks above for the latest editions of these reference documents.)

II. DelDOT Pedestrian Program Commitment

In concert with the Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973 (504) and the Americans with Disabilities Act of 1990 as amended, DelDOT is committed to providing compliant pedestrian accessibility for everyone. DelDOT does not discriminate in the provision of any of its programs, services or business activities and is committed to upholding the intent and spirit of the ADA/504, and Title VI of the Civil Rights Act to the fullest extent possible. DelDOT recognizes that much work is required before pedestrian facilities are brought into full

compliance with the DelDOT Pedestrian Standards. DelDOT also recognizes that there are many challenges and complexities involved in providing fully compliant pedestrian facilities in the public right of way.

A. Complete Streets Policy

Background

On April 24, 2009, Governor Jack A. Markell signed into effect Executive Order No. 6. This Executive Order directed the development and adoption of a Statewide Complete Streets Policy. The Complete Streets Policy, effective in January 2010, defines 'Complete Streets' as roadways that accommodate all travelers, particularly public transit users, bicyclists, pedestrians (including individuals of all ages and individuals with mobility, sensory, neurological, and/or hidden disabilities), and motorists, to enable all travelers to use the roadway safely and efficiently.

Purpose

The intent of this policy is to ensure that transportation system modifications are routinely planned, designed, constructed, operated, and maintained so as to enable safe and efficient access for all users. The result should be a system for all users that is comprehensive, integrated, connected, safe and efficient allowing users to choose among different transportation modes both motorized and non-motorized.

B. Trails and Shared Use Paths

Trails

DelDOT uses the American Association of State Highway and Transportation Officials (AASHTO) "Guide for the Development of Bicycle Facilities" (2012) for the design and construction of bicycle trails (AASHTO Guide).

Shared Use Paths

The PROWAG Supplement 2013 provides specific provisions for shared use paths in the proposed accessibility guidelines for pedestrian facilities in the public right-of-way consistent with the design criteria for shared used paths in the AASHTO Guide. The proposed accessibility guidelines for pedestrian facilities in the public right-of-way, if approved by the US Access Board and adopted by USDOT, would require pedestrian access routes to be provided within pedestrian circulation paths located in the public right-of-way, and would establish proposed technical provisions for the width, grade, cross slope, and surface of pedestrian access routes. See R204.2 and R302. Where existing pedestrian circulation paths are altered and existing physical constraints make it impracticable for the altered paths to fully comply with the proposed technical provisions, compliance would be required to the extent practicable. See R202.3.1.

Chapter 2

Pedestrian Accessibility

Complexities and Balance

I. Transportation Functions

Highways and streets typically provide for the movement of cars, trucks, transit vehicles and bicycles while sidewalks, crosswalks, shared use paths and shoulders provide accessibility for pedestrians and bicyclists. Bicyclists with a high skill level typically prefer to ride on shoulders or in a widened outside travel lanes while lower skill level bicyclists typically prefer to ride on trails, shared use paths or sidewalks where permitted.

II. Public Right of Way Complexities

The public transportation rights of way are corridors serving a complex mix of transportation uses and functions while providing for a wide array of overhead and underground public utilities and stormwater management facilities. These facilities may be publicly or privately owned. Ownership and/or jurisdictional authority for the highways and pedestrian facilities within these rights of way may be shared among State, County and Municipal authorities.

Multi-jurisdictional authority and responsibility increases the layers of complexity during the planning, design and construction phases of new construction projects and alteration projects. This complexity of authority and responsibility among the state and local governments frequently carries over to the maintenance of highways and pedestrian facilities and can result in confusion or a lack of clarity as to who is responsible for maintenance of these facilities. Every effort will be made to eliminate or minimize these challenges.

III. Design Process – Then & Now

Then: Historically, highway and street improvements have been developed to accommodate all types of legal motor vehicles with the roadway improvements centered on the available right of way. As a result, provisions for pedestrians and bicyclists were typically only made when the provisions for these modes of travel did not interfere with the needs of the motor vehicles and when sufficient right of way existed.

Now: DeIDOT plans, designs, constructs and maintains its multi-modal facilities by following a Complete Streets Policy. The Complete Streets Policy promotes safe access for all users, including pedestrians, bicyclists, motorists and bus riders of all ages and abilities, to be able to safely move along and across the streets of Delaware. This Policy focuses on the entire right of way to create a comprehensive, integrated and interconnected transportation network that allows users to access and choose between different modes of transportation. The focus of the Complete Streets Policy is to fundamentally change the decision-making processes so that all users are considered on all project types in planning, designing, building, operating and maintaining all DeIDOT roadways

and pedestrian facilities. DelDOT recognizes that all streets are different and user needs should be balanced in order to ensure that the solution will enhance the community. These efforts are being reinforced by ADA-focused design reviews and ADA inspections of construction projects.

IV. Balancing Compliance and Disability Challenges

Pedestrians with disabilities are challenged in different ways and navigate the public transportation right of way with varying degrees of ease. The major types of disabilities which must be accommodated in the available public transportation right of way involve people with mobility, cognitive and hearing impairments. Those with mobility impairments may use wheelchairs, scooters, walkers or canes, or there may be individuals with vision impairments who have multiple mobility or cognitive disabilities.

The challenge to those responsible to plan, design, construct and maintain pedestrian facilities is to provide a balance among the competing factors of selecting the most appropriate accessibility improvements that can be accommodated in the right of way and within the constraints of the adjoining development. Balancing of the improvement requirements must result in the selection of the most appropriate design for users with disabilities. For example, one accessibility improvement may be well suited for the use of a wheelchair but may not be used as easily by a person with vision impairment.

V. Engineering Judgment

As defined by the Public Right of Way Access Advisory Committee in the “Special Report: Accessible Public Right of Way, Planning and Designing for Alterations” (July 2007):

Engineering judgment is defined in industry literature as the evaluation of available pertinent information and the application of appropriate principles, standards, guidance and practices for the purpose of deciding upon the applicability, design, operation or installation of public improvements.

The Pedestrian Accessibility Standards recognize that a number of design elements of pedestrian safety and accessibility, such as wayfinding and smoothness, in the public right of way are still being researched and developed. Until accessibility needs and the most appropriate solutions are further researched and documented, planners and designers need to seek out the latest information and best practices for planning and designing safe and accessible pedestrian facilities. This information must then be applied, using engineering judgment, to the conditions and constraints found within the project scope and the logical termini to provide accessible pedestrian facilities.

Chapter 3

Federal Requirements and Guidance

I. Agency Responsibilities

The US Access Board (Access Board) is a Federal agency charged with developing standards and guidelines for accessibility of the disabled. The mandate for the Access Board is to develop guidelines that can be adopted as ADA compliant Federal standards for new and altered projects. The Access Board guidelines become requirements when they are approved by the Access Board and adopted by the US Department of Justice (DOJ) and/or the US Department of Transportation (USDOT). DOJ and USDOT may amend and adopt as standards all or any portion of the guidelines approved by the Access Board.

II. Status of Federal Accessibility Requirements and Guidelines

The most recent Americans with Disabilities Act Accessibility Guidelines (ADAAG) were approved by the Access Board in 2004 and amended in 2005. USDOT adopted ADAAG 2004/2005, in November, 2006, as the ADA Standards for Transportation Facilities (2006 Standards) covered by Title 28 Code of Federal Regulations Part 35(28 CFR 35). DOJ adopted these standards now known as the ADA Standards for Accessible Design 2010 (2010 Standards) in July, 2010 with an effective date of March 15, 2012. The 2010 Standards replace DOJ's original 1991 ADA Standards. DOJ has delegated responsibility for enforcing the requirements and guidelines of ADA in the public right of way to the USDOT who in turn delegated those responsibilities to the Federal Highway Administration (FHWA).

The DOJ and the Access Board recognize that the 2010 Standards and to a large degree the 2006 Standards (ADAAG) were principally developed for buildings and site work and are not easily applicable to sidewalks, curb ramps, crosswalks, parking and other pedestrian facilities in the public transportation right of way. In recognition of this complex and challenging situation, the Draft Public Right of Way Accessibility Guidelines (PROWAG), 2005 as revised in 2011/2013, were developed and published by the Access Board. While the PROWAG is still in the rulemaking process and has not been approved by the Access Board or adopted by DOJ or the USDOT to date, the FHWA requires the use of the 2006 Standards and recommends use of PROWAG as best practice for new construction and alteration projects in the public transportation right of way where the 2006 Standards do not address pedestrian facilities.

The Pedestrian Standards are key components of meeting the intent of Title II of ADA, and 28 CFR Part 35. Under this legislation and regulations, public entities may not deny the benefits of their programs, activities, and services to individuals with disabilities because its facilities are inaccessible. The DOJ has determined that the standard, known as "Program Access" in ADA applies to all existing facilities of a public entity.

III. ADA Program Access

Program Access in ADA applies to all existing facilities of a public entity. Public entities must make their existing facilities ADA compliant to the “**maximum extent feasible**” or provide alternative means of access, known as “equivalent facilitation”. DOJ considers that a public entity's programs, services or activities, when viewed in their entirety, must be readily accessible to and usable by individuals with disabilities. DOJ considers the provision of a pedestrian circulation system (sidewalks, curb ramps, crosswalks, bus stops, parking, shared use paths and trails) in the public transportation right of way as a program that state and local governments provide to their citizens and therefore these facilities are subject to the requirements of Program Access. The Access Board believes that following the ADA requirements and guidelines can provide public agencies a safe harbor for design, construction and maintenance of accessible pedestrian facilities should an accessibility complaint or lawsuit be filed.

Program Access may be achieved in a variety of ways. State and local governments may choose to make structural changes to existing facilities to achieve access or provide equivalent facilitation to achieve program accessibility. **Nothing in the 2006 Standards (Section 103 and Advisory 103) prevents the use of designs, products, or technologies as alternatives to those prescribed, provided they result in substantially equivalent or greater accessibility and usability. The responsibility for demonstrating equivalent facilitation in the event of a challenge rests with the covered entity. With the exception of transit facilities, which are covered by regulations issued by the USDOT, there is no process for certifying that an alternative design provides equivalent facilitation.**

When choosing between possible methods of program accessibility, however, state and local governments must give priority to the choices that offer programs, services and activities in the most appropriate integrated settings that equally accommodate the disabled and the general population. These requirements are in addition to the accessibility requirements for all newly constructed or altered facilities that are noted in Title 28 CFR Sections 35.149, 35.150, 35.151 and 35.163.

Under Title II of ADA, Program Access requires each state, county and municipal government with 50 or more employees to prepare a “self-evaluation” and a “transition plan”. The transition plan must identify barriers and other non-compliant features on existing pedestrian facilities in the public transportation right of way, prioritize where the non-compliant features need to be made compliant with the requirements and guidelines implementing ADA and program the implementation of the required compliant features at these locations. The DOJ Title II regulations require **State and Local governments to first prioritize the need for compliant pedestrian improvements on existing pedestrian facilities that serve, in ADA priority order, State and Local government offices, transportation facilities and places of public accommodation followed by barrier removal on pedestrian facilities that serve other areas such as providing a missing section of sidewalk that would connect employment, commercial or residential areas in State public right of way.**

All pedestrian facilities must be made compliant on all new construction projects and to the maximum extent feasible on alteration projects and on maintenance projects to the extent that the maintenance projects impact existing pedestrian facilities. Any elements or features of the building

or facility that are being altered and can be made accessible shall be made accessible within the scope of the alteration. Where existing constraints in an alteration project prevent the full implementation of accessibility objectives (whether measured by appropriate standards, where they exist, or by usability if they do not), the ADA and 504 regulations provide a degree of flexibility to designers and agencies. From the ADA Title II regulation:

35.151 New construction and alterations. (b) Alteration. Each facility or part of a facility altered by, on behalf of, or for the use of a public entity in a manner that affects or could affect the usability of the facility or part of the facility shall, to the maximum extent feasible, be altered in such manner that the altered portion of the facility is readily accessible to and usable by individuals with disabilities, if the alteration was commenced after January 26, 1992.

The 2006 Standards define technical infeasibility as follows:

Section 106.5, 2006 Standards, defines the technical infeasibility of providing a fully compliant pedestrian facility with respect to an alteration of a building or a facility, something that has little likelihood of being accomplished because existing structural conditions would require removing or altering a load-bearing member that is an essential part of the structural frame; or because other existing physical or site constraints prohibit modification or addition of elements, spaces, or features that are in full and strict compliance with the minimum requirements.

DelDOT uses the more inclusive term of “practical exceptions” which expands the technical infeasibility definition to include safety, construction and operations requirements and guidelines of AASHTO and DelDOT Design Standards that are not addressed in the 2006 Standards or 2011/2013 PROWAG.

IV. Federal Case Law

In 1993, the United States Court of Appeals for the Third Circuit (Kinney v. Yerusalim) ruled that resurfacing of a roadway is an alteration. The Court ruled, in part, that:

“...if a street is to be altered to make it more usable by the general public, it must also be made more usable by those with ambulatory disabilities. At the same time (a public entity) determines funds will be expended to alter a street, the (public entity) is also required to modify the curbs so that they are no longer a barrier to the usability of the streets by the disabled. This interpretation helps to implement the legislative vision, for Congress felt that it was discriminatory to the disabled to enhance or improve an existing facility without making it fully accessible to those previously excluded.”

In 2004, the United States Court of Appeals for the Ninth Circuit (Barden v. City of Sacramento) found that maintaining the sidewalks in a municipality is a municipal responsibility. The Court ruled in part:

Title II's prohibition of discrimination in the provision of public services applies to the maintenance of public sidewalks, which is a normal function of a municipal entity. The legislative history of Title II indicates that all activities of local governments are subject to this prohibition of discrimination. This conclusion is also supported by the language of § 35.150, which requires the provision of curb ramps. Requiring the City to maintain its sidewalks so that they are accessible to individuals with disabilities is consistent with the tenor of § 35.150, which requires the provision of curb ramps, "giving priority to walkways serving" government offices, "transportation, places of public accommodation, and employers," but then "followed by walkways serving other areas." 28 C.F.R. § 35.150(d)(2). Section 35.150's requirement of curb ramps in all pedestrian walkways reveals a general concern for the accessibility of public sidewalks, as well as a recognition that sidewalks fall within the ADA's coverage, and would be meaningless if the sidewalks between the curb ramps were inaccessible

In 2014, the United States Court of Appeals for the Ninth Circuit (*Fortyune v. City of Lomita*) found that providing accessible on-street parking is the responsibility of state and local governments under program accessibility even though DOJ has not adopted technical requirements for on-street parking. The Court ruled in part:

Our interpretation of 28 C.F.R. § 35.151 is also consistent with the DOJ's interpretation. The DOJ issues a Technical Assistance Manual ("TA Manual") to assist individuals and entities to understand their rights and obligations under the ADA. In a 1994 supplement to the TA Manual, the DOJ offered the following guidance on complying with 28 C.F.R. § 35.151 when neither the UFAS nor the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities ("ADAAG") contained specifications for a type of facility:

In such cases the technical requirements of the chosen standard should be applied to the extent possible. If no standard exists for particular features, those features need not comply with a particular design standard. However, the facility must still be designed and operated to meet other title II requirements, including program accessibility.

*The text of the ADA, the relevant implementing regulations, and the DOJ's interpretation of its own regulations all lead us to conclude that public entities must ensure that all normal governmental functions are reasonably accessible to disabled persons, irrespective of whether the DOJ has adopted technical specifications for the particular types of facilities involved. Accordingly, we hold that *Fortyune* has stated claims under the ADA and the CDPA (California Disabled Persons Act) based on the City's alleged failure to provide accessible on-street diagonal stall parking.*

Chapter 4

Federal Transportation Accessibility and Safety Focus

I. Community Needs & Accessibility

Efforts have been underway over the last 40 years, since the passage of the National Environmental Policy Act of 1969, to help ensure that transportation improvements consider the needs of all users, address the needs of the adjacent communities and address the environmental consequences of the proposed improvements. The need to provide accessible pedestrian facilities to accommodate travel by those with disabilities and the general public, in part, became a requirement for federally funded projects under Section 504 of the Rehabilitation Act of 1973 (504). The Civil Rights Restoration Act of 1987 (CRRRA) obligates all state and local agencies that receive any Federal funds, from any source for any reason, to make all of the programs and services they provide accessible. More recently, passage of the Americans with Disabilities Act of 1990 (ADA) prohibits discrimination against people with disabilities regardless of the source of funding.

Implementing regulations for Title II of ADA prohibits discrimination by state and local governments in the programs, services and activities they provide. Title II requires, in part, that pedestrian accessibility for the disabled is to be provided in the public transportation right of way where it is legal and where there is either a demonstrated or reasonably anticipated need regardless of the source of funding. In support of promoting alternative transportation modes to the automobile, funding for pedestrian and bicycle facilities has increased dramatically with the passage of each Federal transportation act since 1991.

II. FHWA Pedestrian and Bicycle Safety

Background and guidance provided by the Federal Highway Administration (Memorandum from Acting Associate Administrator for Safety July 10, 2008) cites the importance of providing sidewalks and adequate shoulders to improve pedestrian and bicycle safety.

“USDOT policy calls for bicycling and walking facilities to be incorporated into all transportation projects unless exceptional circumstances exist.”
(<http://www.fhwa.dot.gov/environment/bikeped/design.htm#d4>)

Sidewalks

The presence of a sidewalk or pathway on both sides of the street corresponds to approximately an 88 % reduction in “walking along road” pedestrian crashes. Providing paved, widened shoulders (minimum of 4’) on roadways that do not have sidewalks corresponds to approximately a 71% reduction in “walking along the road” pedestrian crashes. “Walking along road” pedestrian crashes typically are

around 7.5% of all pedestrian crashes (with about 37% of the 7.5% being fatal and serious injury crashes).

A number of studies have also shown that widening shoulders reduces all types and all severity of crashes in rural areas. Reductions of 29% for paved and 25% for unpaved shoulders have been found on 2-lane rural roads where the shoulder was widened by 4'. In addition, shoulder widening and paving provides space for safety rumble strips.

Accessible sidewalks or pathways should be provided and maintained along both sides of streets and highways in urban areas, particularly near school zones and transit locations, and where there is frequent pedestrian activity. Walkable shoulders (minimum of 4' stabilized or paved surface) should be provided along both sides of rural highways routinely used by pedestrians."

Background and guidance provided by the Federal Highway Administration (Memorandum from Acting Associate Administrator for Safety January 12, 2012) cites the importance of providing pedestrian refuge areas in medians and channelized islands to improve pedestrian and bicycle safety.

Median and Pedestrian Crossing Islands in Urban and Suburban Areas

Midblock locations account for more than 70 percent of pedestrian fatalities. This is where vehicle travel speeds are higher, contributing to the larger injury and fatality rate seen at these locations. More than 80 percent of pedestrians die when hit by vehicles traveling at 40 mph or faster while less than 10 percent die when hit at 20 mph or less. Installing raised channelization on approaches to multi-lane intersections has been shown to be especially effective. Medians are a particularly important pedestrian safety countermeasure in areas where pedestrians access a transit stop or other clear origins/destinations across from each other. Providing raised medians or pedestrian refuge areas at marked crosswalks has demonstrated a 46 percent reduction in pedestrian crashes. At unmarked crosswalk locations, medians have demonstrated a 39 percent reduction in pedestrian crashes.

Raised medians (or refuge areas) should be considered in curbed sections of multi-lane roadways in urban and suburban areas, particularly in areas where there are mixtures of significant pedestrian and vehicle traffic (more than 12,000 Average Daily Traffic (ADT)) and intermediate or high travel speeds. Medians/refuge islands should be at least 4' wide (preferably 8' wide for accommodation of pedestrian comfort and safety) and of adequate length to allow for the anticipated number of pedestrians to stand and wait for gaps in traffic before crossing the second half of the street."

Chapter 5

DelDOT Project Scoping

I. Project Scope and Limits

DelDOT will make the accommodation of persons with disabilities a routine and integral element of planning, design, construction, operations and maintenance activities for all projects in the State public right of way. The Chief Engineer will ensure that each responsible Program Manager II will take the initiative to maintain, modify or extend the limits or scope of a project in order to maintain existing accessibility, to improve pedestrian accessibility, or to provide logical termini for pedestrian access on all projects in the public right of way, regardless of the funding source or the implementing agency or entity.

The project scope and limits of work for roadway improvements may be the same as or different than the scope and limits of the pedestrian facilities. The scope and limits of the improvements to the roadway and pedestrian facilities in the project should be identified by the Program Manager II based on the purpose and need of the project. The limits for compliant accessibility improvements should not be set arbitrarily. The limits shall be based on safety, connectivity and other factors using engineering judgment.

In an effort to address the significant backlog of existing non-compliant pedestrian system features in the State public right of way and to maximize accessibility for all users, DelDOT provides its own definition for new construction projects and uses the DOJ and US DOT jointly developed definitions for alteration projects and maintenance projects as follows:

- New construction projects including:
 - Construction of transportation facilities on a new alignment;
 - Any reconstruction or rehabilitation acquiring right of way within the scope and limits of the project; or,
 - Any reconstruction within existing right of way that can meet the Desired Accessibility Standards within the scope and limits of the project.
- Alteration projects:
 - Addition of New layer of Asphalt;
 - Cape Seals (combination of Chip Seal and Slurry Seal);
 - Hot In-Place Recycling;
 - Microsurfacing/Thin Lift Overlay;
 - Mill & Fill/Mill & Overlay;
 - Open-graded Surface Course; and,
 - Rehabilitation and Reconstruction projects
- Maintenance
 - Chip Seals
 - Crack Filling and Sealing;
 - Diamond Grinding;
 - Dowel Bar Retrofit;

- Fog Seals;
- Joint Crack Seals;
- Joint Repairs;
- Pavement Patching;
- Scrub Sealing;
- Slurry Seals;
- Spot High-Friction Treatments; and,
- Surface Sealing projects.

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

All projects will accommodate and provide accessibility for persons with disabilities along all State-maintained highways where it is reasonable, feasible and appropriate to do so. The *Pedestrian Accessibility Standards for Facilities in the Public Right of Way* include the need to provide compliant accessible pedestrian facilities meeting the Desired Standards when relocating utilities, installing traffic signs and signals, and granting access permits for improvements in the public transportation right of way and the construction of publicly or privately funded projects along all DeIDOT maintained highways. Where full Desired Standards cannot be met, pedestrian facilities must be constructed to meet those standards to the "maximum extent feasible" within the scope and limits of the project.

Any extension of the termini of the project's pedestrian facilities on a Federal-aid project after the environmental document has been finalized will require revision of the environmental document and may require an amendment to the Transportation Improvement Program or the Statewide Transportation Improvement Program. The functional classification of the roadway on which the pedestrian facilities are proposed to be extended could impact Federal funding. The ability to use Federal funding on extended sidewalk limits or the addition of sidewalk to the contract is subject to the provisions of the current Federal highway funding legislation and coordination with the FHWA.

It is important that the scope or limits of a project not result in a negative impact to existing accessibility. A negative impact is described in the 2006 Standards Section 202.3.1 Prohibited Reduction in Access. An alteration that decreases or has the effect of decreasing the accessibility of a building or facility below the requirements for new construction at the time of the alteration is prohibited. For example, the permanent reduction in the width of the PAR to less than 3' and/or elimination or severing of existing accessibility by creating a barrier to accessibility to adjoining places of public accommodation. **Negative impacts are unacceptable and will not be granted approval of a Request for Practical Exceptions for either existing or future conditions.**

II. Logical Termini for Accessibility

Where pedestrian facility construction is undertaken by, on behalf of, or subject to the Pedestrian Standards, the pedestrian circulation system must have logical termini. Termini are to be determined by the Program Manager II on a case-by-case basis to ensure the removal of barriers and non-compliant features on existing facilities and ensure the connectivity of the pedestrian transportation system with logical pedestrian destinations.

In these efforts, coordination is required with the ADA Title II Coordinator to determine the logical termini for pedestrian system improvements. Examples of logical pedestrian termini in ADA priority order include providing pedestrian access to State and Local government offices, transportation facilities and places of public accommodation followed by barrier removal on pedestrian facilities that serve other areas such as providing a missing section of sidewalk that would connect employment, commercial or residential areas in State right of way.

The area of review for these logical termini should approximate the Federal Transit Administration's (FTA) primary walk zone for transit patrons, which is 1320' +/- (1/4 +/- mile) from the project roadway limits and within State right of way. The rationale for the use of 1/4 +/- mile distance for extending pedestrian system limits are to: ensure the FTA primary walk zone for transit patrons is improved to provide more mobility options for people with disabilities, thereby reducing dependence on paratransit; provide the least cost option to improve the substantial backlog of non-compliant pedestrian features in the State right of way; and, provide logical termini for accessible pedestrian accommodations to support existing and/or proposed land use pedestrian activity.

Typical land uses which should be connected with compliant pedestrian facilities using the Pedestrian Standards include trip generators and destinations such places as State and local government offices to include public use facilities such as government buildings (offices, schools, libraries, community centers); transportation facilities (public transit stops, shared use paths and crosswalks, from existing or new sidewalks); places of public accommodation (hospitals, commercial areas and recreation facilities); places of employment; and residential areas.

Intersection improvements and other spot alteration projects need to address the logical termini for accessible pedestrian facilities as part of DelDOT's commitment to provide accessibility improvements. This requirement is contained in the Program Access as required by ADA/Section 504 and is used to address the existing pedestrian facility needs identified in the DelDOT Sidewalk Inventory and ADA Assessment, DelDOT Transition Plan, and any other needs identified by the ADA Title II Coordinator that are in the immediate vicinity of the planned roadway work.

Prior to beginning design of a project, a Scoping Field View meeting will be held to evaluate the project limits and determine the logical termini and which sites require a detailed design. The results of the Scoping Field View will be evaluated and improvements will be designed during the detailed design phase. If a location is determined to be free of constraints and is judged to be capable of being constructed using Standard Construction Details, then an identifier referencing the curb ramp type on the plans will suffice. If constraints are present, then a detailed design using the Pedestrian Standards that incorporate the required geometric points, grades and cross slopes.

These facilities must be made accessible using Pedestrian Standards for pedestrians who have disabilities. The Pedestrian Standards either meet or exceed ADA requirements and guidelines of the 2006 Standards and PROWAG 2011/2013 as well as other standards and requirements adopted by the DOJ and/or US DOT in compliance with ADA Title II, Subpart A (public transportation right of way). The *Pedestrian Accessibility Standards for Facilities in the Public Right of Way* are intended to address ADA Title II Subpart A and supplement the ADA Title II, Subpart B, requirements for elements of the public transit system administered by the Delaware Transit Corporation (DTC).

Chapter 6

DeIDOT Request for Practical Exceptions

I. Federal and State Background

As noted in Chapter 3, the 2006 Standards define technical infeasibility as follows:

Section 106.5, 2006 Standards, defines the technical infeasibility of providing a fully compliant pedestrian facility with respect to an alteration of a building or a facility, something that has little likelihood of being accomplished because existing structural conditions would require removing or altering a load-bearing member that is an essential part of the structural frame; or because other existing physical or site constraints prohibit modification or addition of elements, spaces, or features that are in full and strict compliance with the minimum requirements.

There are no forms or processes for documenting Technically Infeasible features included in Federal ADA legislation or USDOT's 2006 Standards for the public transportation right of way. While PROWAG recognizes the complexities and challenges in constructing accessible pedestrian facilities in the built environment, and the need to avoid or mitigate the impacts to natural and cultural resources in or adjacent to the public right of way no forms or processes are included in those guidelines. **Neither the 2006 Standards nor PROWAG 2011/2013 requirements and guidelines addresses practical safety and operations issues since they are not inclusive of the requirements and guidelines provided by AASHTO or DeIDOT Roadway Standards. The FHWA recommends but does not provide forms or processes to ensure agencies use a reasonable and consistent approach be used in the review and documentation of ADA issues and decisions that do not strictly meet ADA minimum requirements.**

For these reasons, DeIDOT uses the more inclusive term of "Practical Exceptions" which expands the technical infeasibility definition to include safety and operations requirements and guidelines of AASHTO and DeIDOT Roadway Standards that are not addressed in the 2006 Standards or 2011/2013 PROWAG.

II. Intent

In an effort to reconcile these sometimes conflicting demands, DeIDOT has implemented a Request for Practical Exceptions (RPE) form (Appendix A). The process requires concurrence of the ADA Title II Coordinator and Assistant Director, Engineering Support and approval by the Chief Engineer on pedestrian facility features that do not meet the Minimum Standards for pedestrian facilities in the public transportation right of way. The purpose of the RPE is to demonstrate that appropriate improvements were approved using sound engineering judgment at a given location relative to other similar decisions made concerning accessibility compliance in the public transportation right of way. The Practical Exception concurrence and approval process is intended to have the responsible Program Manager II fully explain and document the constraints

that exist preventing the construction of compliant pedestrian system features to meet or exceed the Minimum Standards in a reasonable and consistent fashion. The Federal accessibility requirements and guidelines must be balanced with the requirements of the DeIDOT and AASHTO design standards and guidelines to provide safe vehicular operations while not causing maintenance issues which can inhibit pedestrian accessibility.

To meet this challenge on alteration or scheduled maintenance projects, DeIDOT or the project sponsor with approval of the Program Manager II, will make every effort to meet Desired Accessibility Standards. Where the Desired Standards cannot be met, pedestrian accessibility must be maximize by providing a clear project scope that meets or exceeds Minimum Standards to the maximum extent feasible. This effort should include researching pedestrian needs and all available alternatives. If the Minimum Standards cannot be met, the Pedestrian Standards must be followed for developing and submitting a RPE for concurrence of the Assistant Director, Engineering Support, and the ADA Title II Coordinator and approval by the Chief Engineer. The RPE will clearly but briefly demonstrate and document the decision-making process regarding the purpose and need for the pedestrian features in question as well as provide an evaluation of the alternatives considered. This documentation is needed to support DeIDOT's actions as being applied in a reasonable and consistent fashion should an ADA complaint be made or an ADA suit be filed in court.

A RPE will be required on all elements of alteration and scheduled maintenance projects involving pedestrian access features that do not meet Minimum Standards while meeting the needs of pedestrians with disabilities to the maximum extent feasible. This documentation shall note all technically infeasible or practical exceptions creating constraints that inhibit DeIDOT's ability to meet Minimum Standards for accessibility compliance.

Accessibility compliance for maintenance projects is usually limited to the area of the facility impacted but the limited improvements must still provide accessible transitions from the project area to the existing system. If the existing facilities cannot be made ADA compliant because of the existence of physical constraints resulting in a practical exception situation, equivalent facilitation must be provided. In addition, signage directing people with disabilities to the accessible features and spaces in a facility should be provided.

The practical exception of providing compliant accessible pedestrian facilities is not usually to be considered on new construction projects since new right of way is being or has been purchased. ADA requires that new construction projects provide accessible pedestrian facilities when there is a demonstrated or probable need and where they are permitted by law or regulation.

The rationale for each RPE shall be documented in the request, and the approved request shall be placed in the project file by the Project Manager II. All decision-making documents must address the constraints for each option considered. The approval of a RPE in the State transportation right of way is determined, in part, by the type of improvement as well as the scope and limits of improvements to be provided.

Request for Practical Exceptions are not intended to exclude the implementation of Desired Standard pedestrian facilities as part of a project. Even with an approved RPE, a project shall still be designed to be safe, convenient and continuous to the maximum extent feasible using sound engineering judgment while striving to at least meet or exceed Minimum Standards to the Effective October 2015

maximum extent feasible with the intent of meeting the Desired Standards wherever possible. No blanket Request for Practical Exceptions will be granted on a project-wide or program-wide basis.

DelDOT will only permit a project to proceed to advertisement or construction if the project provides full accessibility compliance or has been granted an approved RPE for specific pedestrian system features on the project.

During construction and maintenance operations, the Program Manager II may conduct the RPE coordination, recommendations and approval process by voice or e-mail to avoid any delays in providing the needed pedestrian system features. The written RPE submission to the Assistant Director, Engineering Support, and ADA Title II Coordinator, for concurrence and the Chief Engineer for approval must be processed as soon as possible but not later than 10 business days following the verbal approval

The need to provide safety or capacity improvements to the roadway may also be considered for an approved RPE as long as safe, convenient and continuous compliant accessible pedestrian facilities are also provided consistent with 2011/2013 PROWAG R302.5.4 (Physical Constraints) and R302.5.5 (Regulatory Constraints). Approval of a RPE should not be requested until all reasonable alternatives to provide the desired degree of safe, convenient, continuous and accessible pedestrian accommodations have been exhausted, including the consideration of:

- Safety;
- Roadway profile slope;
- Right of way limitations;
- Existing utilities;
- Existing buildings, walls or vaults;
- Historic impacts;
- Environmental or cultural impacts; and,
- Existing and proposed conditions for land use and transportation facilities.

In the instance of providing access impacting a historic preservation program, structure or property, a public entity shall give priority to methods that provide physical access to individuals with disabilities. If it is not feasible to provide physical access to a historic property in a manner that will not threaten or destroy the historic significance of the building or facility, alternative methods of access shall be provided pursuant to the requirements of 28 CFR 35.150.

Community opposition to providing the desirable degree of accessibility compliance will not be grounds to request an approved Request for Practical Exceptions.

In situations where the path of travel in the public transportation right of way is limited by a practical exception or other resource constraints on alteration and maintenance projects, DelDOT is not required to provide a path of travel onto private property beyond the scope and limits of the project. Every effort is to be made to meet full accessibility compliance in the public right of way to the maximum extent feasible within the scope and limits of the project. **On maintenance and alteration projects, DelDOT is prohibited from creating a negative impact by creating a barrier to access or decreasing or having the effect of decreasing the pedestrian accessibility**

of a facility or an accessible connection to an adjacent building or site (R202.3.3 & Advisory R202.3.3).

Requests for Practical Exceptions are not intended to eliminate the requirements for accommodating persons with disabilities. The goal is to construct all projects to the Desired Standards or to the Minimum Standards as determined by the Program Manager II. Even with an approved RPE, alteration and scheduled maintenance projects shall be designed and constructed to meet or exceed Minimum Standards to the maximum extent feasible, to provide the Desired Accessibility accommodations where possible and still provide safe and convenient access to all facilities, including all other modes of transportation. An approved RPE is not needed if pedestrian access is prohibited, or if the pedestrian destination is eliminated by the project or by other means.

III. Request for Practical Exceptions Approval Process

The Federal accessibility requirements and guidelines must be balanced with the requirements of the DeIDOT design standards and guidelines to provide safe vehicular operations while not causing maintenance issues which can inhibit pedestrian accessibility.

The RPE process starts with the identification of a pedestrian system feature or similar group of pedestrian system features which cannot be designed or constructed to either the Desired Standards or the Minimum Standards. Identification of these features can be made by any DeIDOT staff or DeIDOT consultant for resolution actions by the person staffing the Program Manager II position in that division.

The Program Manager II has the responsibility to address these issues by first attempting to find an alternative design that meets the Desired Standards. If those efforts are not successful, the Program Manager II must attempt to develop an alternative design that will meet or exceed the Minimum Standards. Only after exhausting these steps should a RPE be considered.

If compliance with the Minimum Standards cannot be met on an alteration or maintenance project, the Program Manager II is required to complete the RPE form (Appendix A) to document and submit the reasons why the Minimum Standards cannot be met and provide a recommended alternative. The Program Manager II must send the completed RPE to the Assistant Director, Engineering Support and ADA Title II Coordinator for their concurrence on the recommended alternative. The Assistant Director, Engineering Support is responsible for submitting the RPE with the concurred in recommendations to the Chief Engineer for consideration of approval.

In rare situations, a RPE may be considered on a new construction project where needed to avoid impacts to structures, environmental or cultural resources. In those rare situations the Program Manager II is to follow the steps outlined above to obtain concurrence of the Assistant Director, Engineering Support and the ADA Title II Coordinator and approval of the Chief Engineer.

During construction and maintenance operations, the Program Manager II may conduct the RPE coordination, recommendations and approval process by voice or e-mail to avoid any delays in providing the needed pedestrian system features. The written RPE submission to the Assistant Director, Engineering Support and ADA Title II Coordinator must be processed as soon as possible

but not later than 10 business days following the verbal approval. The Assistant Director, Engineering Support must then submit the approved and concurred in RPE to the Chief Engineer.

The RPE review and concurrence responsibilities of the ADA Title II Coordinator are to review the RPE to ensure the requested improvement is procedurally defensible and that it acceptably accommodates the identified need. The responsibilities of the Assistant Director, Engineering Support, are to ensure all alternatives were evaluated to meet the identified need and that all relevant requirements and guidelines were properly addressed to ensure that a balanced approach was followed to achieve the highest level of pedestrian and vehicular safety, accessibility and operations. This coordination will also help ensure that the proposed improvement will be made compliant to the maximum extent feasible with the Minimum Standards within the existing constraints while being reasonable and consistent with other similar approved RPE improvements made throughout the State.

Chapter 7

Pedestrian Accessibility Standards

I. Use of Accessibility Standards

The following Desired Accessibility Standards are to be used to design, construct and maintain all of the highways, streets and roadways under DeIDOT's jurisdiction. In the event that the Desired Standards cannot be met on alteration and maintenance projects, the Program Manager II of the responsible division has the responsibility to develop an alternative to meet the Minimum Standards as detailed in Appendix C. If constraints are such that the Minimum Standards cannot be met at one or more locations, the responsible Program Manager II must request a Practical Exception in accordance with the process outlined in Chapter 6. On the balance of the project, every effort shall be made to meet the Desired Standards to the maximum extent feasible.

The primary reference documents used are the 2006 US DOT Standards with citations noted as numbers (e.g., 101.1) and the US Access Board's 2011/2013 PROWAG with citations noted as numbers preceded by R (e.g., R101.1 or Advisory R101.1). Please note that the 2006 Standards permit the use of construction and manufacturing tolerances as noted in Appendix B as adopted by DeIDOT. All dimensions are subject to conventional industry tolerances except where the requirement is stated as a range with specific minimum and maximum end points. (104.1.1).

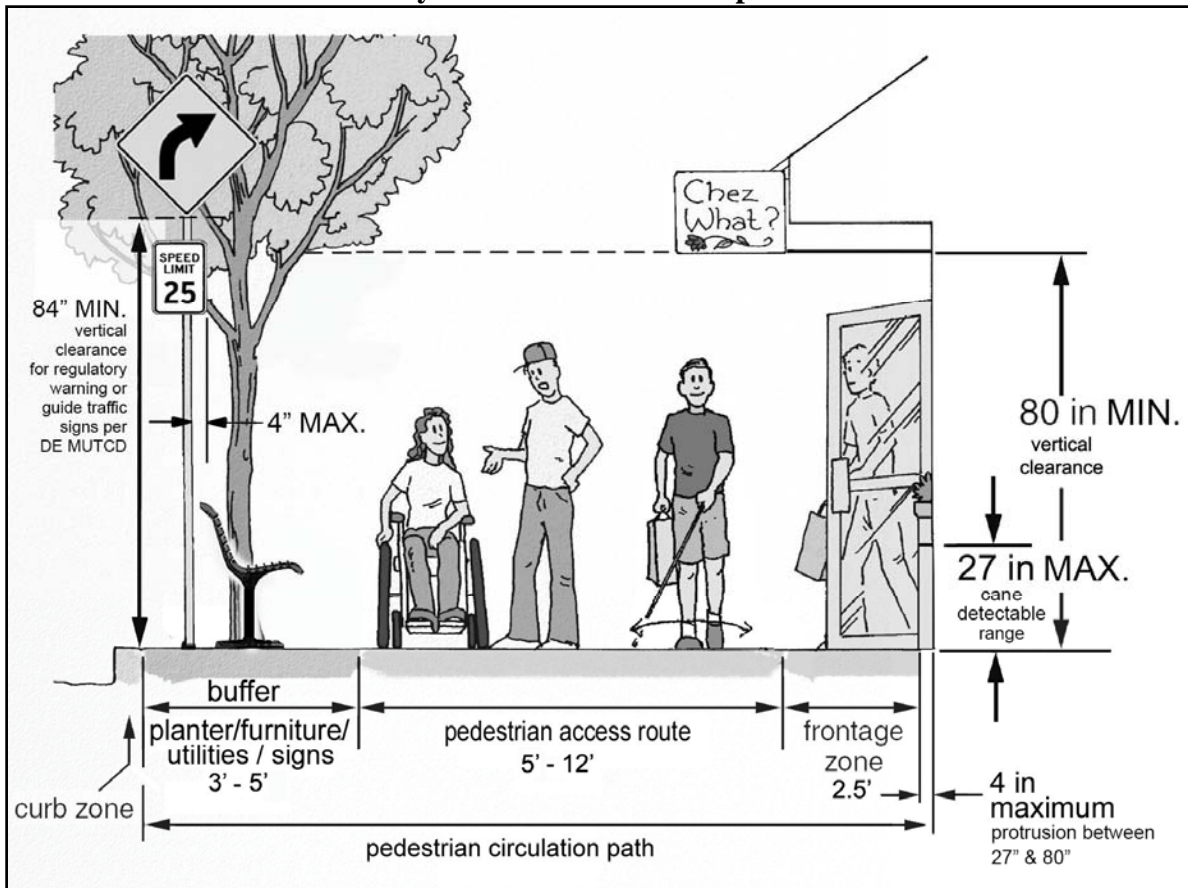
II. Pedestrian Facility Components

The 2006 Standards (206.3 and Advisory 206.3) and PROWAG (R105.5) define a pedestrian access route (PAR) as a continuous and unobstructed path of travel provided for pedestrians with disabilities within or coinciding with a pedestrian circulation path (PCP). A PAR must be provided within sidewalks and other pedestrian circulation paths located in the public right of way. The PAR is the portion of the general PCP in the public right of way that must connect accessible elements, spaces, and facilities located in the public right of way shall be placed to minimize the distance which wheelchair users and other persons who cannot negotiate steps may have to travel compared to the general public. These elements such as accessible pedestrian signals and pedestrian pushbuttons (see R209), street furniture (see R212), boarding and alighting areas and boarding platforms at transit stops (see 810, R213 and R308.1.3.2), transit shelters (see 810.3, R213 and R308.2), accessible on-street parking spaces (see R214 and R309), parking meters and parking pay stations serving accessible parking spaces (see R309.5), and accessible passenger loading zones (see R215 and R310). Where sidewalks are not provided, pedestrian circulation paths may be provided in the street or highway or on the shoulder unless pedestrian use is prohibited. This PROWAG provision does not require a pedestrian access route if a pedestrian circulation path is not provided.

As illustrated in Figure 1, the PCP may contain three areas that may vary in width based on the availability of right of way and the proximity of the adjacent development. These factors are critical to the design and operation of accessible pedestrian facilities. The three areas are:

- **Buffer** – Where warranted and right of way is available, this area is located directly behind the curb and typically is used to locate regulatory and other signs, street lights, fire hydrants, overhead and underground utilities and other street furniture. Of equal importance, is that the buffer provides pedestrians with a separation from moving traffic and a greater level of comfort. This area typically has a contrasting surface such as grass, landscaping or is paved in a contrasting material, color or pattern to distinguish it from the pedestrian access route.
- **Pedestrian-Access Route (PAR)** - The portion of the PCP that provides pedestrians with a safe, convenient, continuous and unobstructed pedestrian route that connects all accessible elements of a pedestrian system in the public transportation right of way.
- **Frontage Zone** – The linear portion of the pedestrian corridor that is adjacent to buildings or the right of way line.

Figure 1
Pedestrian Facility Elements / ADA Compliance Considerations



Notes:

1. Typical dimensions are shown for the buffer and frontage zones where warranted and right of way is available.
 2. Pedestrian Access Route (PAR) dimensions will vary by pedestrian demand, the presence of physical constraints or the presence of a shared use path..
DeIDOT Desired Accessibility Standards minimum PAR width is 5' (60")
 3. Shared use path dimensions: width 8' min., 10' desired; vertical clearance 8' min. 10' desired.
- Sources: PROWAG 2011/2013; AASHTO Guide for Development of Bicycle Facilities 2012; and, Designing Sidewalks and Trails, 2001, FHWA, with DeIDOT modifications*

Figure 1 also illustrates the need for clear vertical head room, clearly defined elements in the cane detectable range for those with vision impairments, as well as guidance on obstructions and protruding objects in the public transportation right of way. Planning, design, construction and maintenance of the compliant pedestrian system must meet all of the Pedestrian Standards for these features among others, to ensure that the PAR can be safely and efficiently navigated by all pedestrians including those with disabilities. When the PAR doubles as a shared use path the minimum width is 8' in constrained areas with 10' the desired minimum width. The vertical clearance is 8' min. and 10' desired (PROWAG Supplement 2013 and AASHTO 2012).

III. DeIDOT Desired Accessibility Standards

A. Sidewalks

PAR shall be planar, smooth and continuous with a surface that is firm, stable and slip resistant. Sudden changes in grade or direction, steep cross slopes, unexpected obstacles, protruding objects, drop-offs, narrow PAR and close adjacent vehicular traffic create a sense of discomfort and are all potential hazards. DeIDOT will adhere to following PAR width standards (Figure 2):

- **PAR Width**
 - **DeIDOT Desired Accessibility Standards** - PAR width is 5' minimum.
 - A pedestrian access route shall be provided for the full width of a shared use path. (R 302.3.2)
 - **New Construction Projects** - The width of the PAR shall be a minimum of 5' not including the top of curb dimension.
 - **Location** - Accessible routes shall coincide with, or be located in the same area as general circulation paths. Where circulation paths are interior, required accessible routes shall also be interior. The accessible route must be in the same area as the general circulation path. This means that circulation paths, such as vehicular ways designed for pedestrian traffic, walks, and unpaved paths that are designed to be routinely used by pedestrians must be accessible or have an accessible route nearby. Additionally, accessible vertical interior circulation must be in the same area as stairs and escalators, not isolated in the back of the facility. (206.3 and Advisory 206.3)
 - **Pinch Points** - PAR pinch points shall not be less than 34" in width (*Anthropometry of Wheel Mobility Project*, US Access Board) and not exceed 24" in the direction of travel as illustrated in Figure 3. The 34" width allowed 95% of the wheel mobility users to pass the obstruction in the study areas. Pinch Points are permitted on maintenance and alteration projects only with prior approval of the Program Manager II in constrained areas. **Pinch points are not permitted on new construction projects.**

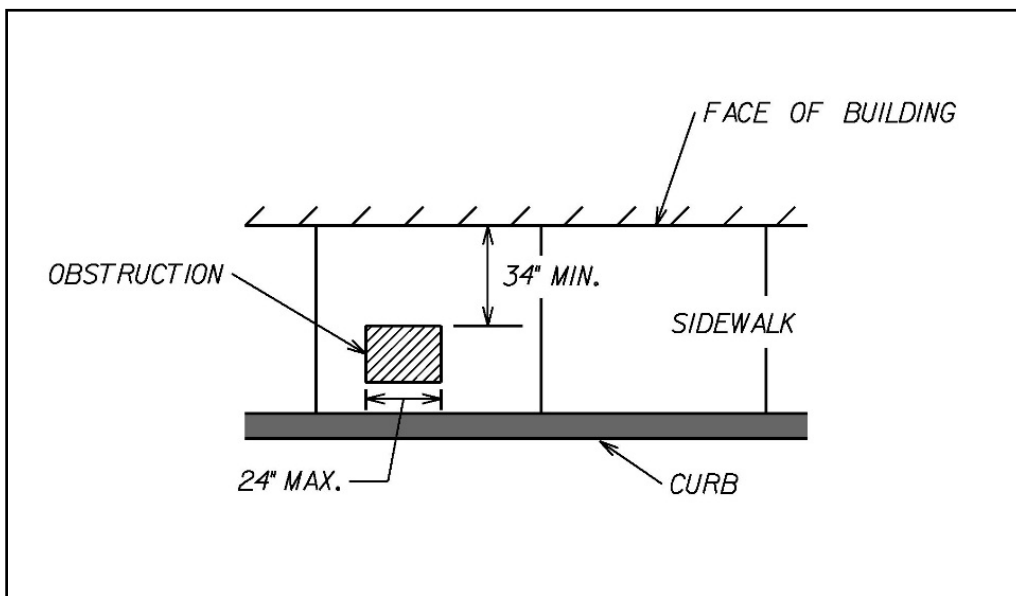
**Figure 2
Pedestrian Access Route Width Standards**

Type of Work	Desired Accessibility Standards Minimum PAR Width	Minimum PAR Standards* Minimum PAR Width
Maintenance	5'*	3'
Alteration	5'*	3'
New Construction	5'***	3' **

* Approval by Program Manager II is required on projects providing a PAR less than 5'. Every effort shall be made to meet the minimum desired accessibility standard PAR width to the maximum extent feasible. A PAR less than 5' wide also requires the placement of 5' X 5' passing areas no further apart than 200' on the PAR.

** Pinch Points are not permitted on new construction projects.

**Figure 3
DelDOT Desired Accessibility Standards / Pinch Point**

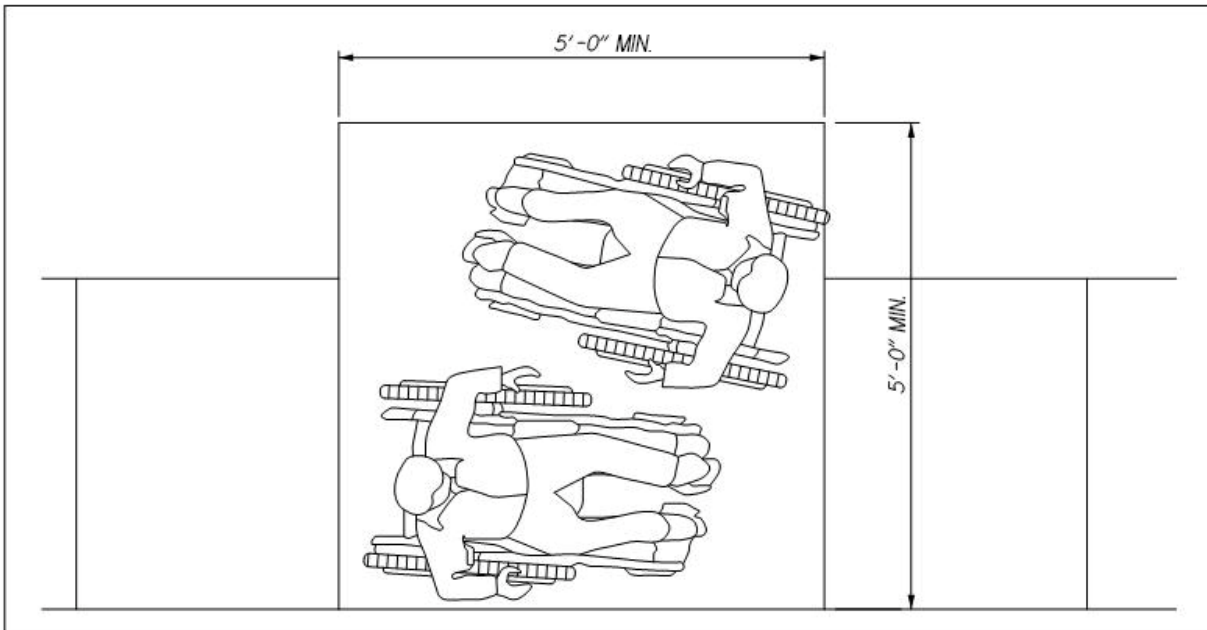


Pinch points are defined as isolated locations with an accessible width of no less than 34" and a running distance of no more than 24".

- **Sidewalks on Structures** – Sidewalks placed on bridges or large culverts should have a minimum PAR width of 5'8" when the curb and sidewalk are monolithic. These sidewalks must comply with 2006 Standards Section 405.2 requirements for placement of ramps on each approach PAR as needed. This width provides the same pedestrian facility width provided by a sidewalk 5' wide with a curb 8" wide. Program Manager II is required to provide a memorandum of explanation to the Assistant Director, Engineering Support, and the ADA Title II Coordinator for their review and file where these conditions cannot be met.

- **Pedestrian Passing Zones** - If an approved PAR width is less than 5' along a roadway, provisions for passing zones a minimum of 5' wide by 5' long with a cross slope of 2.0% maximum are required. **Passing zones shall be provided at intervals no greater than 200'**. Use of driveways and lead walkways serving residences or businesses meeting the length, width and cross slope requirements may be used as passing zones. An example of a passing area is illustrated in Figure 4.

Figure 4
Passing Zones and Passing Zone Interval



Source – Figure 4-8, FHWA Designing Sidewalks and Trails for Access

- **PAR Running Slope** - The grade of pedestrian access routes shall not exceed the general grade established for the adjacent street or highway if the PAR is within street or highway right of way, except on pedestrian street crossings which shall have a maximum grade of 5%. Where pedestrian access routes are not contained within a street or highway right of way, the grade of pedestrian access routes shall be 5 percent maximum. (R302.5, R302.5.1)
- **PAR Cross Slope** – Only one sidewalk PAR cross slope shall be provided. Design shall be a maximum 2.0%, including crossings of driveways or entrances. Refer to Driveway Crossings chapter for further details.
- **Transitions to Existing PAR** - The required length of PAR transitions connecting a new section of PAR to an existing PAR is determined by the difference in the cross slope of each. The transition length should be at least 5' in length per the differences as illustrated in Figure 5.

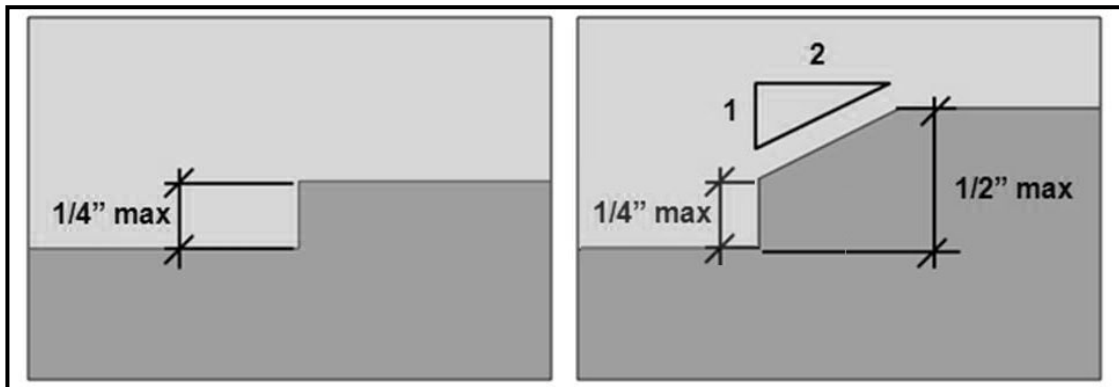
Figure 5
Minimum PAR Tie-In Transition Lengths*

Proposed PAR Cross Slope	Existing PAR Cross Slope					
	1%	2%	3%	4%	5%	6%
1%		5'	5'	10'	10'	10'
2.0%	5'		5'	5'	10'	10'

*Note: Transition length is based on the wheelbase of a standard wheelchair.

- **Compound Cross Slopes** – Only one cross slope shall be provided in the PAR.
- **PAR Cross Slope Measurement Construction Tolerance** – 1.0% (PAR cross slope 3.0% max.).
- **PAR Surface** - The PAR portion of the sidewalk shall be **planar, smooth and continuous** and be constructed of a uniform material that is **firm, stable and slip resistant** (R302.7 and Advisory R302.7). These terms are defined in Section 4.3 Sidewalk Surfaces of the FHWA’s “Designing Sidewalks and Trails for Access; Part II of II: Best Practices Design Guide (2001)”. Typical materials are:
 - Concrete
 - Bituminous Concrete Asphalt
 - Brick Pavers
 - Concrete Pavers
 - Other Materials –as approved for use by DeIDOT.
- **PAR Vertical Elevation Differences** - Vertical elevation differences between adjacent surfaces shall not exceed 1/4". Elevation differences between 1/4" and 1/2" shall be beveled at no steeper than 2:1 slope. Any difference greater than 1/2" shall be sloped no greater than 12:1 (8.33%) as illustrated in Figure 6.

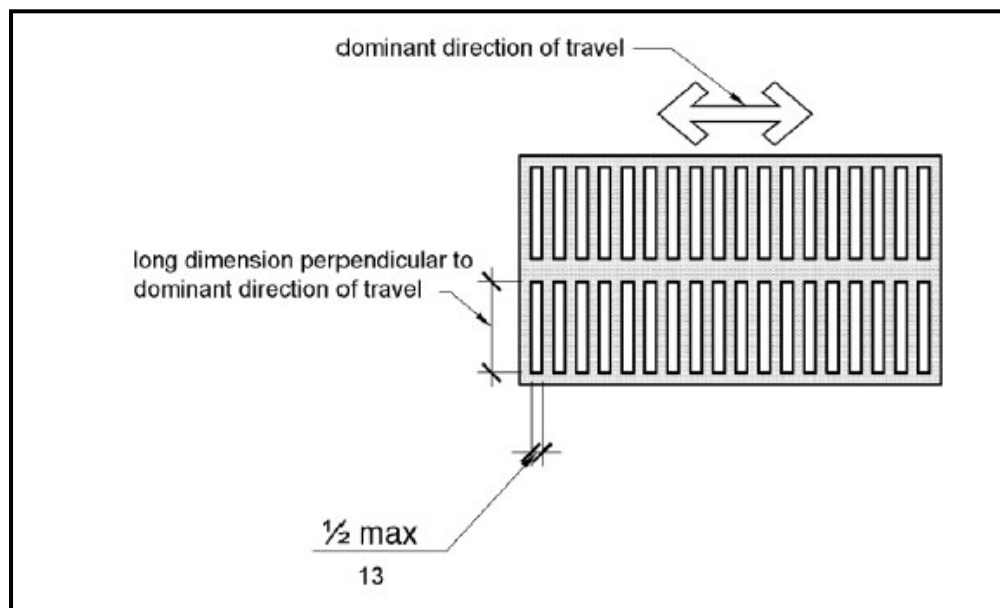
Figure 6
PAR Vertical Elevation Differences



Source – Chapter 3 Floor and Ground Surfaces, Guide to ADA Standards,
US Access Board

- PAR Horizontal Gaps and Joints** - Horizontal and lateral sidewalk joints in the PAR **must not exceed 1/2" in width**. Spaces wider than 1/2" can catch a wheel on a wheelchair, walker or crutches and cause the user to be ejected, turn over, trip or fall. **Elongated openings, like those of most grates in the PAR, must be oriented so that the long dimension is perpendicular to the dominant travel direction as shown in Figure 7.** In locations where there is no dominant flow pattern, openings must be limited to 1/2" in both dimensions. Where an accessible route is available to bypass openings completely, they can be oriented in any direction. In the roadway where the grates are not being relocated, use a grate meeting the DelDOT standard construction detail.

Figure 7
Elongated Openings in Floor or Ground Surfaces



Source – Figure 302.3, ADA Standards for Transportation Facilities 2006

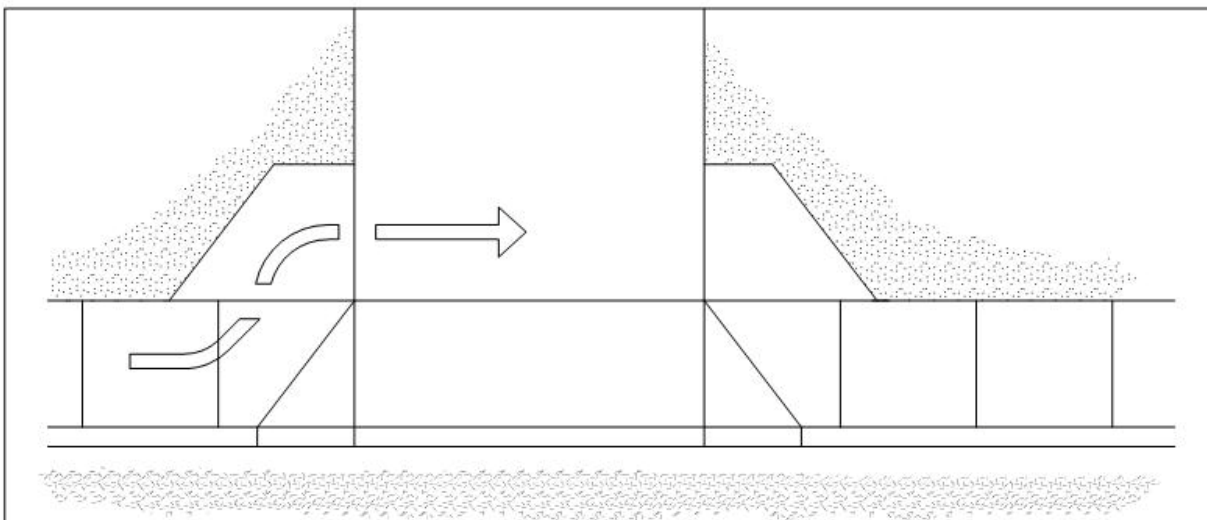
- Utility Covers in the PAR** - Utility covers and property access covers should not be located in the PAR. If utility or property access covers must be located in the PAR, the covers **must be ADA compliant – firm, stable, slip resistant and with no vertical elevations greater than 1/4" with gaps or joints no greater than 1/2 "on the cover or on the approaches.**
- Buffer Area** - Sidewalks should be separated from the back of curb by a buffer area, where right of way is available, and the buffer should be continuous with the sidewalk except at curb ramps. The width of this strip should be 3' minimum without trees and 5' minimum with trees. In areas with limited right of way width, every effort should be made to provide a buffer to the maximum extent possible. Buffers with trees need a wider area for irrigation and to avoid the traffic impact damage to the trees by passing or parking trucks and buses. The types of trees used must be approved by DelDOT Roadside Management so as not to be a hazard to pedestrians.
- Prohibited Crosswalks** - The presence of sidewalks at an intersection implies that a crosswalk exists, whether it is marked or not (DE MUTCD and Delaware Code, Title

21, Section 4143). This requires accessible curb ramps be placed on each crossing. If, in certain cases, it is determined for safety reasons to prohibit pedestrian crossings at one or more legs of an intersection, the designer needs to be aware of these situations and coordinate directly with the Assistant Director, Engineering Support, Pedestrian Coordinator, ADA Title II Coordinator and DeIDOT Traffic Section. When this occurs, the sidewalk shall be physically separated from that leg to effectively communicate this prohibition to pedestrians with vision impairments by providing a physical barrier and/or a grass or landscaped planting strip between the sidewalk and curb (Advisory R208.1).

B. Driveway and Entrance Crossings

Where a sidewalk crosses a driveway or entrance, limitations on the driveway or entrance and sidewalk criteria will still apply. Where a PAR that is at least 5' wide and/or with a 2.0% or flatter cross slope cannot be provided, the design or construction Program Manager II is required to document the constraints and develop detailed designs for a modified driveway or entrance crossings using Minimum PAR Standards. Driveway or entrance operational characteristics for opposing slopes and elevation changes need to be evaluated for vehicular traffic as well as for pedestrian accessibility to ensure that safe operating conditions are provided for both. PAR crossing and apron shall be constructed of concrete in subdivisions. The location of the PAR may be need to be varied across a driveway or entrance to meet slope or property impact limitations. One example of this alternative is illustrated in Figure 8. This alternative routing places the PAR behind the driveway/entrance apron which may require either an easement or additional right of way.

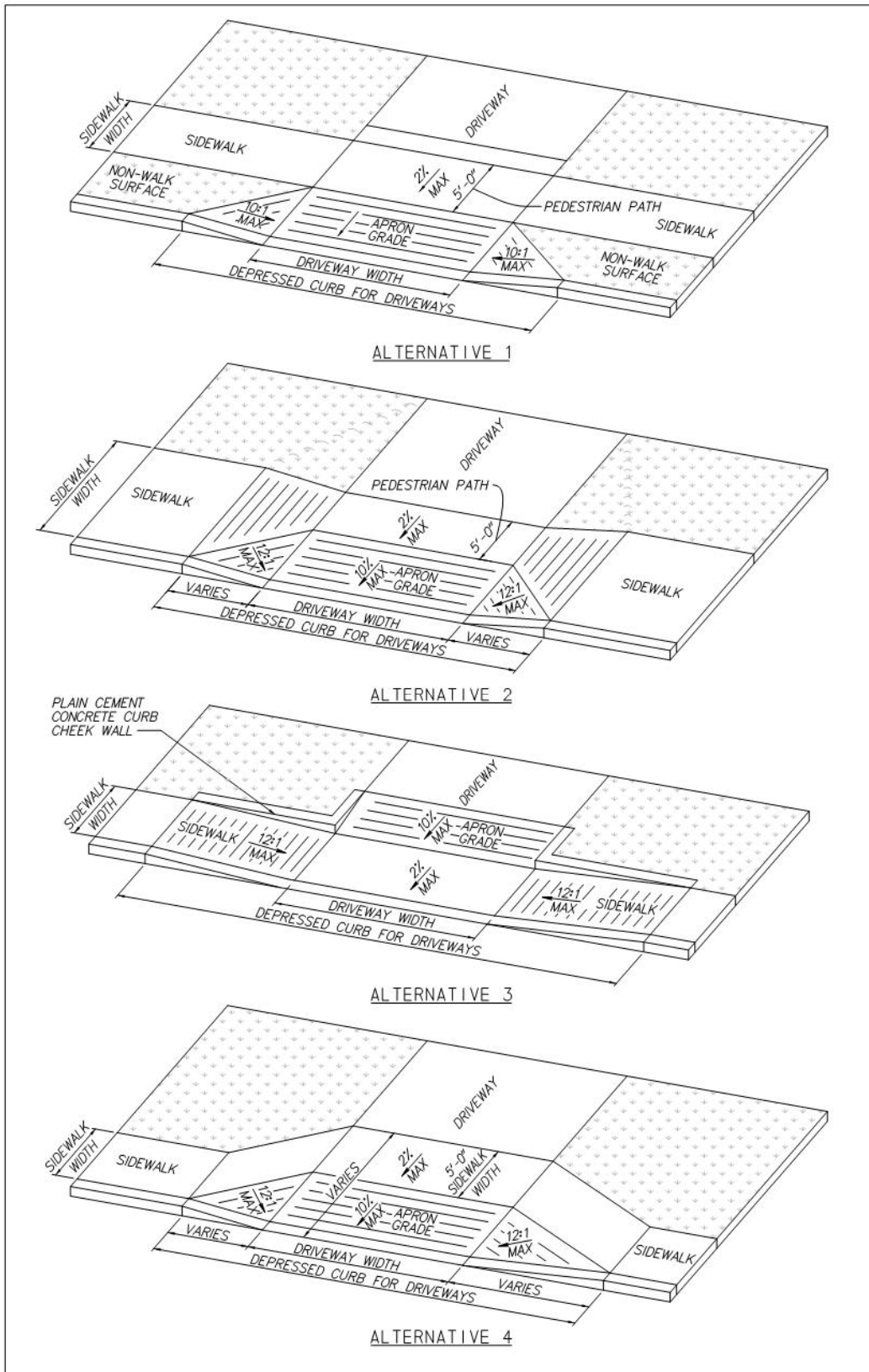
Figure 8
PAR Alternative Crossing Driveway or Entrance



Source – Figure 4-11, FHWA Designing Sidewalks and Trails for Access

Figure 9 offers additional alternatives to provide compliant driveway/entrance crossings that may not require right of way acquisition or easements.

Figure 9
Alternative Driveway/Entrance Designs



The following design issues require an approved Request for Practical Exception:

- **Cross Slope** - The cross slope of pedestrian access routes crossing driveways or entrances greater than 2.0%.
- **Cross Slope Measurement Construction Tolerance**
 - Asphalt
 - With Yield or Stop Control - 1.5% (cross slope 3.5% max.)
 - Without Yield or Stop Control or With Traffic Signal – 1.5% (cross slope 3.5% max.)
 - Concrete
 - With Yield or Stop Control - 1.0% (cross slope 3.0% max.)
 - Without Yield or Stop Control or With traffic Signal – 1.0% (cross slope 3.0% max.)
- **PAR Width** - The PAR width crossing a driveway or entrance is reduced to less than 3' across the driveway required to minimize adjacent property impacts.
- **PAR Location** - Where the PAR crossing is not in alignment with the PAR approaches.

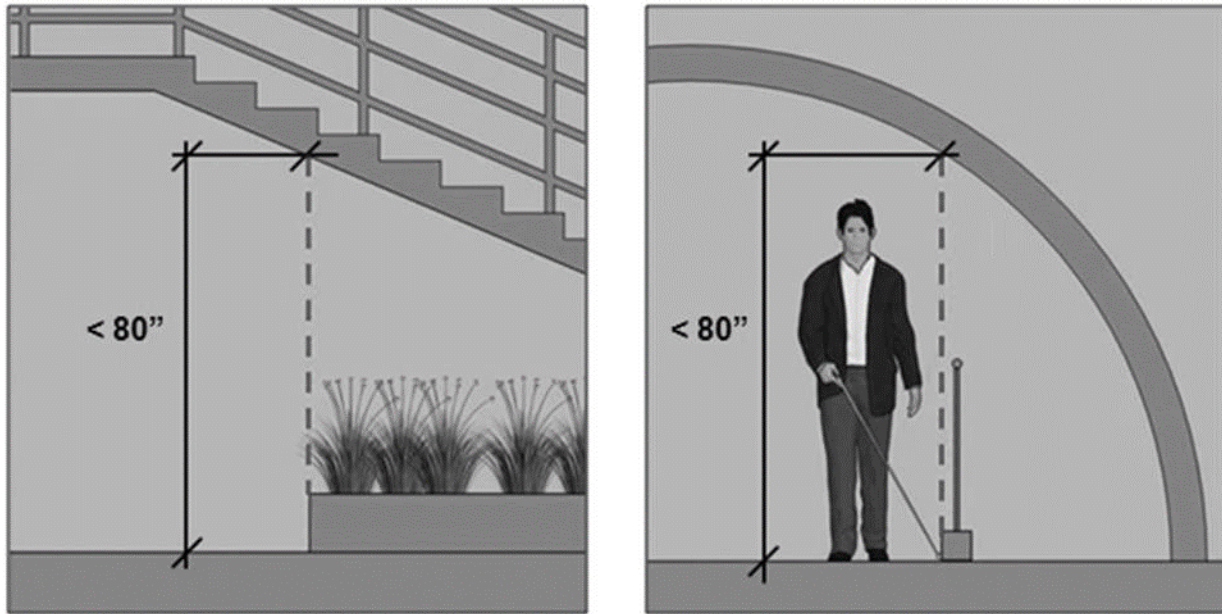
C. Obstructions and Protruding Objects

Obstructions and protruding objects in the PCP and PAR can cause many challenges to people with disabilities, especially those who are visually impaired. The objects may consist of utility poles, mailboxes, signal poles, signal cabinets, signs, trees, shrubs and other obstructions. Locate objects in the PCP and PAR as follows:

- **Cane Detectable Range** – Locate objects between the ground level and a height of 27", known as the cane detectable range.
- **Vertical Clearance** – Locate/clear objects to 80" or more above ground level as illustrated in Figure 1 and Figure 10. Objects with leading edges 27" maximum or above 80" can protrude any amount from posts or pylons. Shared Use Paths minimum vertical clearance is 8'. Regulatory, warning or guide traffic signs shall have a minimum vertical clearance of 84" above ground, in accordance with the DE MUTCD.
- **Protruding Objects** – Objects mounted between 27" and 80" above the ground should protrude no more than 4" maximum from a fixed structure into the PCP.
- **Barriers** - Fixed barriers, such as guardrails, are required where the protruding objects extending more than 4" from a fixed structure exist or where the vertical clearance is less than 80" such as at open stairways and along sloped or curved walls. Barriers must have leading edges no higher than 27" so that they are within cane sweep and high enough not to be mistaken for a step or change in elevation. Fixed planters, benches, and other elements can be used instead of guardrails as illustrated in Figure 10.

These dimensions must be used by the designer, who should provide a pedestrian access route at least 5' wide.

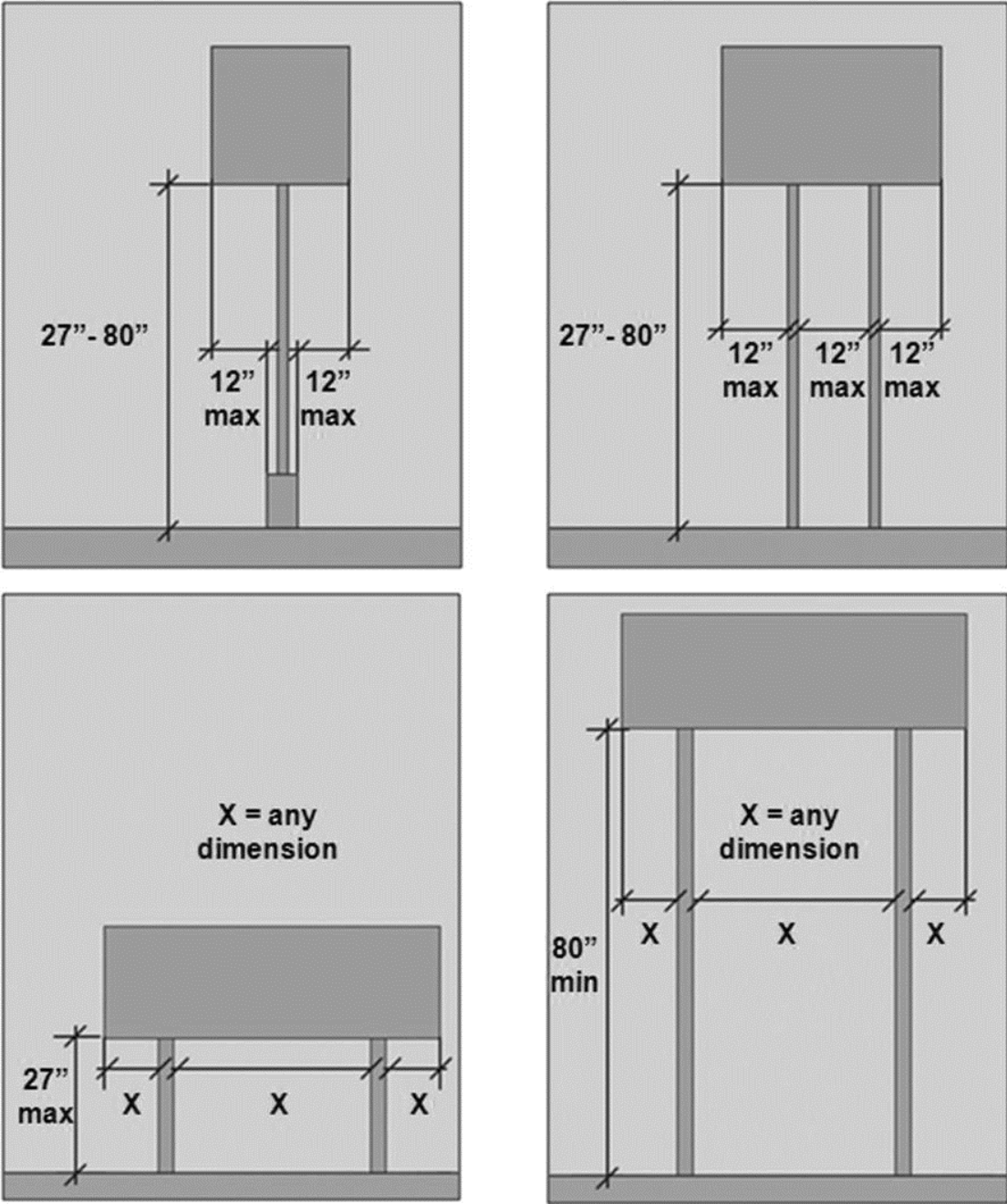
Figure 10
Barriers at Circulation Areas with Reduced Vertical Clearance



Source – Chapter 3 Floor and Ground Surfaces, Guide to ADA Standards,
US Access Board

- **Post-Mounted Objects** - Free-standing objects with leading edges 27” to 80” high that are mounted on posts or pylons cannot protrude more than 12” maximum into the PCP. The 12” limit also applies to the clearance between multiple posts (excluding the sloping portions of handrails). Objects with leading edges 27” maximum or above 80” can protrude any amount from posts or pylons. (307.3) See Figure 11 for examples.
- **Handrails** – Where provided to serve stairs or site access ramps, handrails or handrail extensions shall not reduce the width of the PAR and shall not constitute a protruding object. In alterations where handrail extensions would reduce the clear width required for pedestrian access routes, handrail extensions shall not be required (R217 and R409).
- **Doors, Doorways, and Gates** (R218) Except for shared use paths, doors, doorways, and gates provided at pedestrian facilities shall comply with section 404 of Appendix D to 36 CFR and to 36 CFR Part 1191.
- **Stairways** – Where provided in the public right of way, stairways shall comply with Section 504 of the 2006 Standards.

Figure 11
Post-Mounted Objects



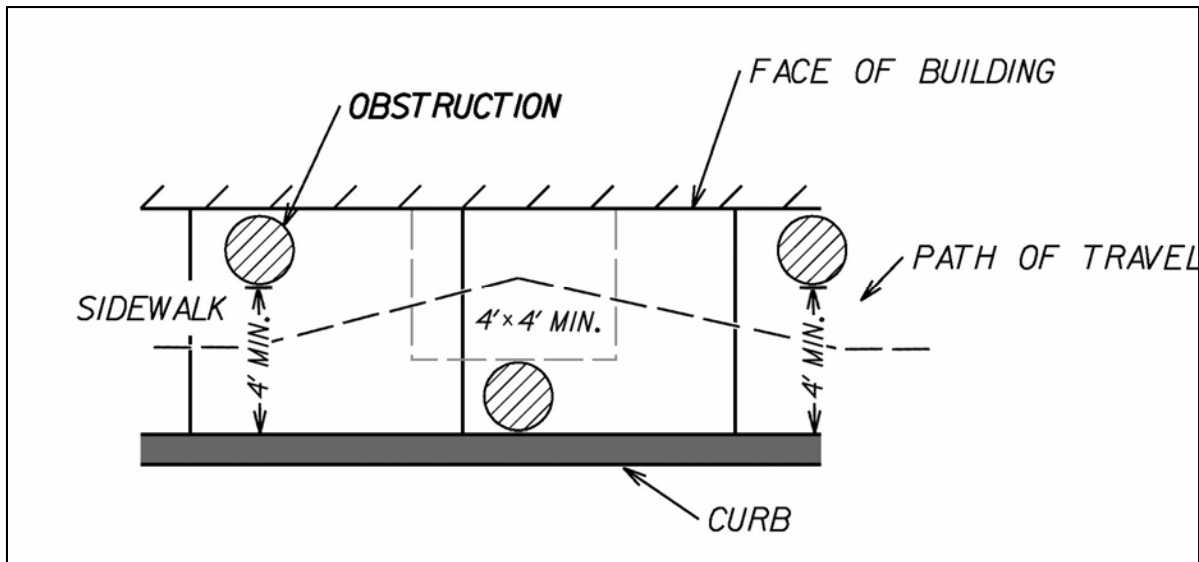
Source – Chapter 3 Floor and Ground Surfaces, Guide to ADA Standards,
US Access Board

Obstructions and protruding objects are typically caused by the placement of utilities, regulatory and other signs as well as tree branches shrubs and other vegetation. In many circumstances, the designer is challenged with finding locations for utility poles, signal poles and cabinets, mailboxes and other required street signs and street furniture outside of the pedestrian access route. There are many ways to deal with these objects and acquiring additional right of way may be necessary.

It is preferred that above ground utilities be located behind the sidewalk. If space behind the sidewalk is not available, utilities may be located within the buffer area between the back of the curb and sidewalk. A minimum horizontal clearance of 18" from curb face to roadside objects is required, per criteria in the AASHTO Roadside Design Guide and DelDOT Road Design Manual. If signs, poles or other obstacles must be located in the sidewalk, they should all be placed either right or left of center to provide a consistent utility and sign corridor. Signs and sign poles may be placed behind the sidewalk to create a clear width PAR if approved by the Traffic Section. Special sidewalk treatments such as brick pavers or stamped concrete are recommended to provide a different surface texture and/or color to differentiate the buffer from the pedestrian access route.

The designer should make every effort to avoid the offset grouping of obstructions in the pedestrian access route. In instances where multiple obstructions are located in or adjacent to the pedestrian access route due to physical constraints, a minimum accessible PAR 4' wide by 4' in length must be provided around each obstruction. (See Figure 12, and refer also to pinch points at single obstructions as discussed earlier in Section III.)

**Figure 12
Multiple Obstructions**



Where multiple obstructions exist on a short section of sidewalk, an accessible PAR with a minimum width of 4' in straight segments that are a minimum of 4' in length must be provided on maintenance and alteration projects. Desired PAR width on new construction projects is 5' minimum.

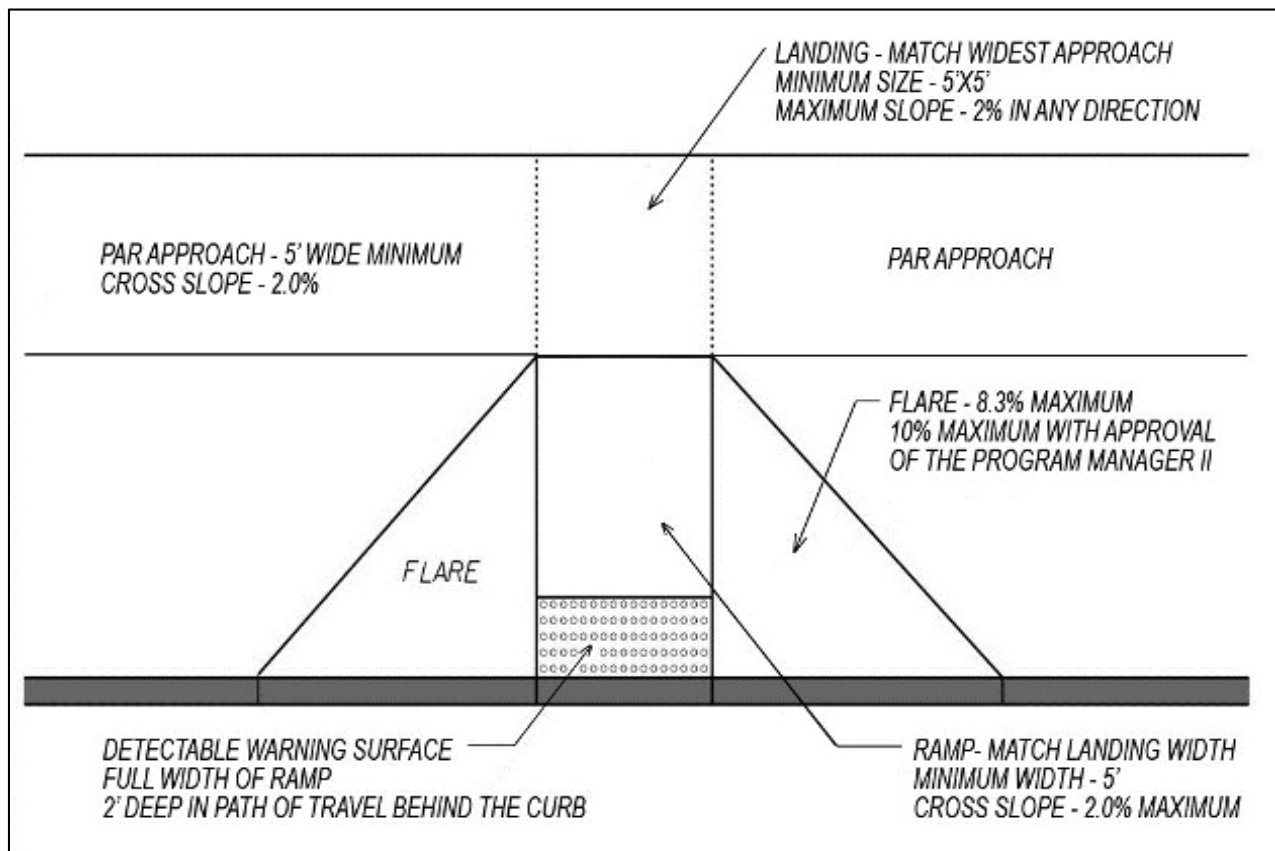
D. Curb Ramps

ADA-compliant curb ramps and blended transitions are essential components of accessible pedestrian facilities. Under Title II of ADA, as enforced by the DOJ, State and Local governments and other public entities are required to provide curb ramps/blended transitions and other compliant pedestrian features as part of new construction and alteration projects where pedestrian facilities are present or are provided.

Blended Transitions are raised pedestrian street crossings, depressed corners, or similar connection between the pedestrian access route at the level of the sidewalk and the level of the pedestrian street crossings that have a grade of 5 percent or less.

Curb Ramps are cut through or are built up to the curb. Curb ramps can be perpendicular or parallel, or a combination of parallel and perpendicular ramps with ramps that range from more than 5% to a maximum of 8.3%. Curb ramp components are illustrated in Figure 13.

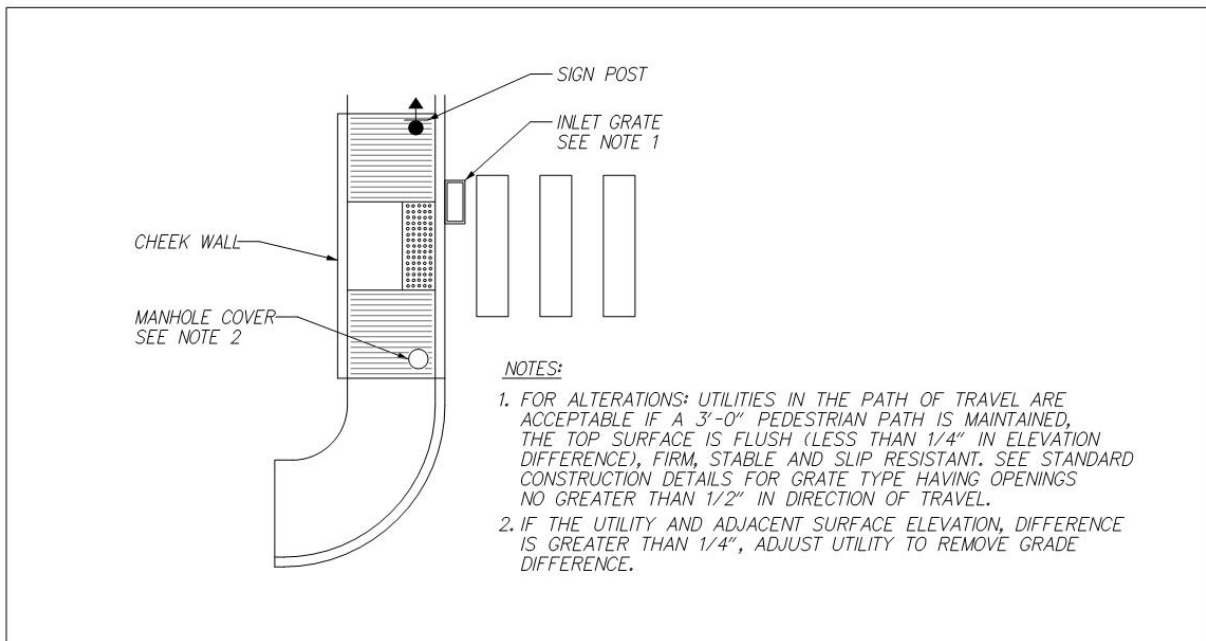
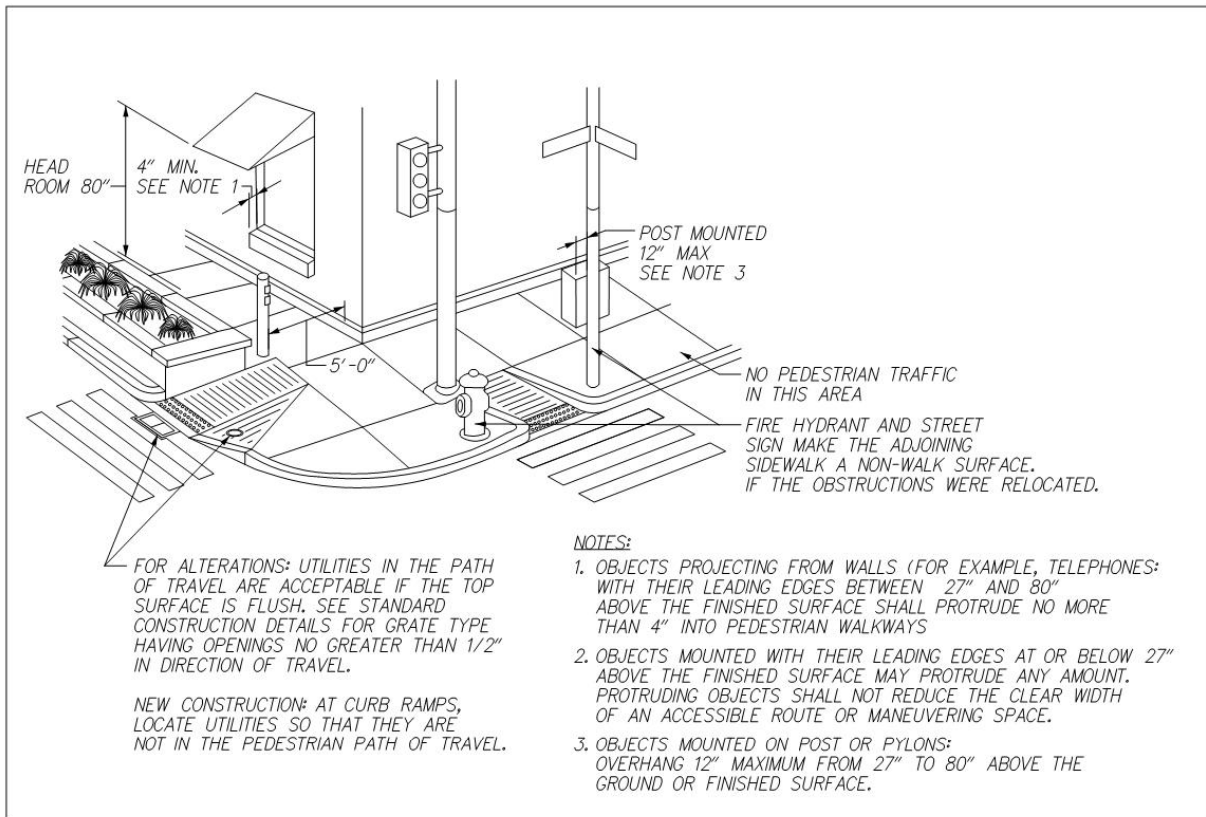
Figure 13
Curb Ramp Components



DOJ Title II regulation at 28 CFR 35.151 requires that curb ramps (or blended transitions) be installed whenever pedestrian walkways on sidewalks or shared use paths that cross streets are newly constructed or altered. Federal case law, *Kinney v. Yerusolim*, 1993, held that resurfacing (and other structural improvements to) a street constitutes an alteration that requires the installation of curb ramps. While *Barden v. City of Sacramento*, 2004, cites the need to remove or modify barriers in the PAR between the curb ramps.

Recognizing these requirements, **compliant curb ramps using the Desired Standards shall be constructed of concrete and provided on all pedestrian facilities that are intersected by curbs where crossing the street is not prohibited.** However, the standards do not address all potential conditions and constraints. In locations with unusual constraints where the DelDOT Standard Construction Details for curb ramp designs are not appropriate, the designer shall provide detailed designs with dimensions and grades that meet Pedestrian Standards for ramps, flares and landing areas on the construction plans to ensure the improvements will be contained within the available right of way or easement. Curb ramp components, illustrated in Figure 14, show alternative treatments for perpendicular ramps and parallel ramps where constraints exist. The use of engineering judgment must be implemented when there are significant constraints that present design challenges. DelDOT considers a ramp that has two or three features slightly out of compliance as a more favorable design as oppose to a design that only has one feature that is extremely out of compliance. Alternative designs can be modified and approved to create a more suitable design. See Appendix C for an example of a design balance exercise.

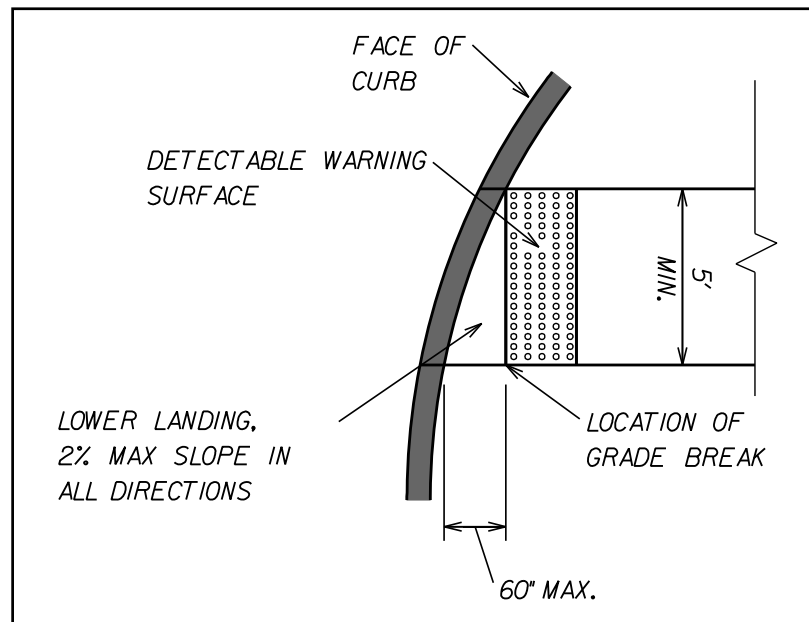
Figure 14
Alternative Treatments for Perpendicular and Parallel Ramps



The following principles shall be followed for the application of standards and guidelines for special designs:

- **Location and Dome Alignment** - Perpendicular and parallel curb ramps and detectable warning surfaces (DWS), when possible, should be installed in-line with the direction of pedestrian travel at crossings to provide smoother travel for wheelchair users (Advisory R305.2.1) However, to ensure wheelchair stability, the ramp shall be perpendicular to the grade break at the toe of the ramp unless an alternative curb ramp design is provided to place the perpendicular grade break behind the curb (Figure 15).

Figure 15
Grade Break at Toe of Ramp / Alternative Curb Ramp Design

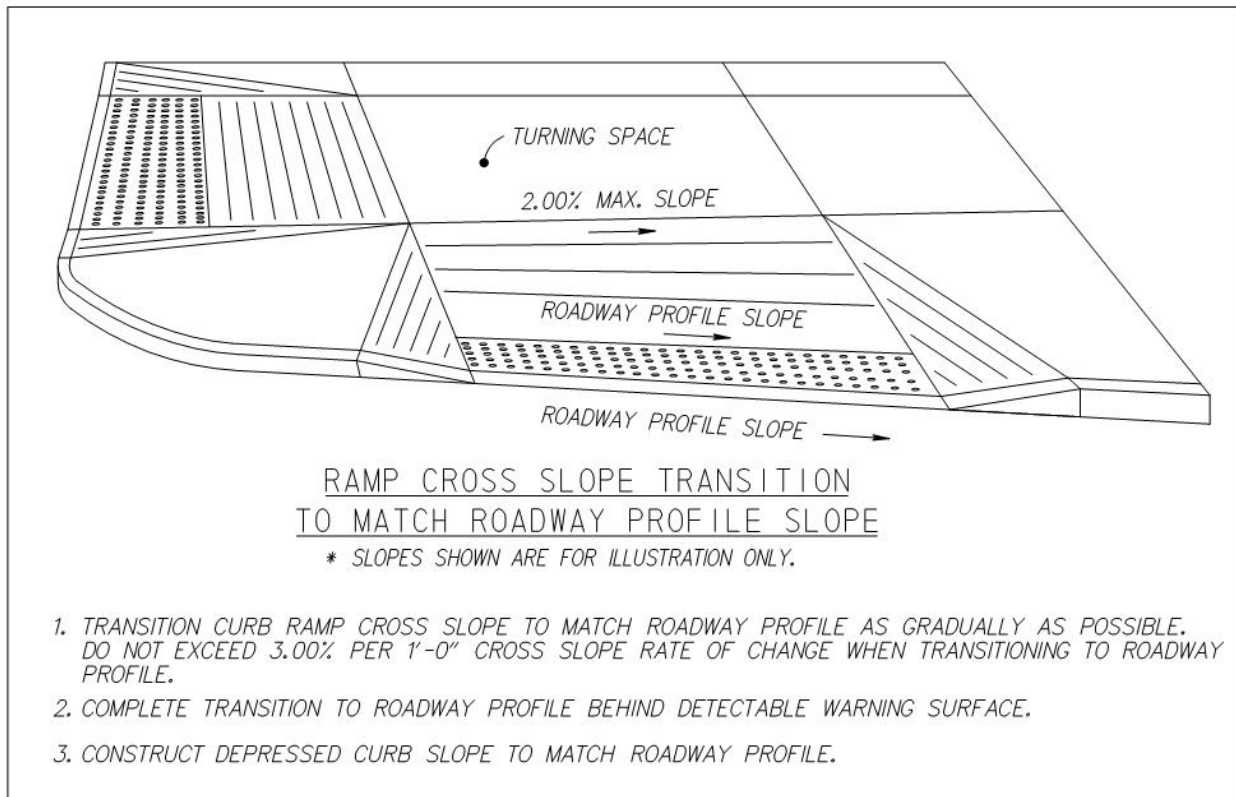


Note: At least one edge of the grade break at the toe of a curb ramp shall be located at the back of curb if the distance from the back of curb is 5' or less. If the grade break behind the curb is more than 5', the DWS is to be placed on the lower landing behind the curb. (PROWAG R305.2.1, Advisory R305.2.1).

- **Curb Ramp Running Slope** - Curb ramp running slopes on new construction projects shall be no steeper than 12:1 (8.3%). The responsible Program Manager II, in constrained situations, may approve a maximum slope of 10:1 (10%) to minimize impacts on structures, natural or cultural resources (including historic sites or structures) with limited right of way. The Program Manager II must provide the documentation of the reasons for the change and the alternatives considered prior to his approval of using the 10% ramp running slope. This documentation must be provided to the Assistant Director, Engineering Support and the ADA Title II Coordinator within 10 days of the approval.
- **Running Slope Measurement Construction Tolerance** – 1.0% (running slope 9.3% max).

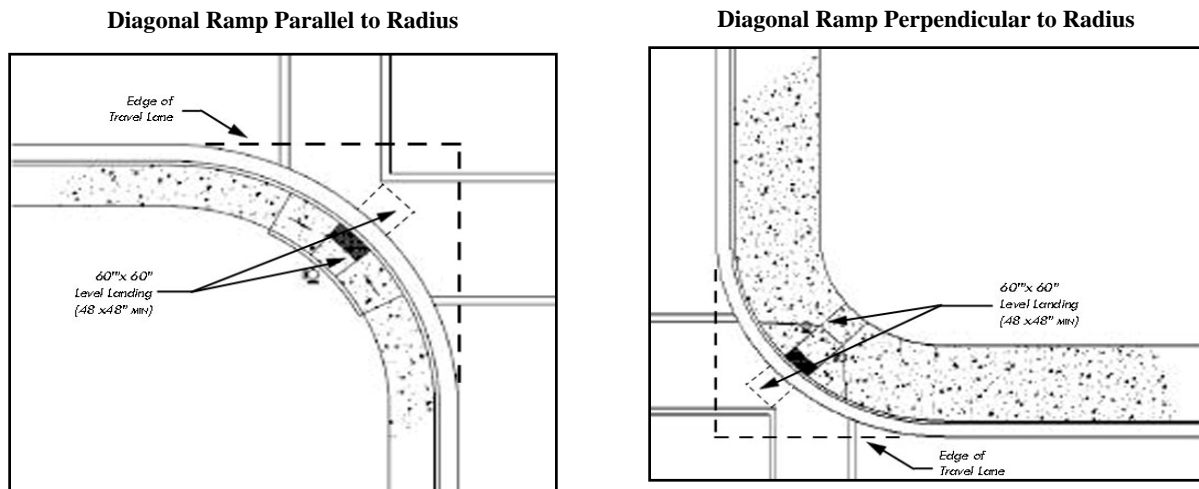
- **Length of Curb Ramp** - The length of the ramp typically depends upon the height of the curb and grade of the adjoining roadway and sidewalk. The length of the ramp may be shorter using a slope not steeper than 12:1 (8.3%) if the adjoining sidewalk grade permits. A curb ramp segment between the landing and the sidewalk can be limited to 15' in length plus a transition 5' long if needed to transition to cross slope or width changes on the sidewalk that matches the running grade of the adjoining roadway.
- **Curb Ramp Width** - Minimum width of curb ramps shall be 5'. Wider ramps may be used in areas of high pedestrian volumes. The minimum width of shared use path or trail ramps shall be at least as wide as the path or trail width. (R304.5.1.2).
- **Side Flares** - Side flares shall be sloped at 12:1 (8.3%) maximum if they are located in the PAR but may be as steep as 10:1 (10%) maximum with the prior approval of the Program Manager II if not located in the PAR. Side flares shall not be used if the ramp is adjacent to a non-walking surface.
- **Grade Brakes** - Grade breaks at the top and bottom of perpendicular ramps shall be perpendicular to the direction of the ramp run. At least one end of the bottom grade break may be at the back of curb if the opposite end is located no more than 5' from the back of curb. If one or both ends of the grade break are more than 5' from the back of curb the DWS must be placed at the back of curb. Grade breaks are not permitted on the surface of curb ramps, blended transitions, landings or gutter areas within the PAR. (R305.2.1)
- **Curb Ramp Landings** - Level landings shall be provided at all ramps where a change in pedestrian travel direction is required or to allow a pedestrian to remain stationary. The length and width of the landings shall equal the width of the largest PAR approach width. The DelDOT Desired Standard minimum landing is 5' wide x 5' long – matching the widest PAR approach width and the width of the ramp.
- **Curb Ramp Cross Slope** - Cross slopes on ramps shall be designed to be 2.0% max. In some cases, the roadway profile grade adjacent to the depressed curb in front of a curb ramp may exceed the maximum 2% cross slope. This may occur when the ramp is located on a leg of an intersection with a traffic signal or without a yield or stop condition which may be remediated as part of a pavement and rehabilitation project. When applicable, it is necessary to gradually transition the ramp's cross slope from the roadway profile slope to a maximum 2% cross slope adjacent to a landing. The transition will begin behind the DWS. The cross slope transition rate shall not exceed 3.00% per 1'-0". For example if the roadway profile slope is 8%, then the transition length must be at least 2' to change to a 2% cross slope adjacent to a landing. The depressed curb shall be constructed to match the roadway profile slope. See Figure 16.
- **Curb Ramp Cross Slope Measurement Construction Tolerance** – 1.0% (cross slope 3.0% max).
- **Curb Ramp to Gutter Transition** - The transition between the ramp and gutter shall be smooth and flush. The top of the depressed curb shall be constructed in accordance with the DelDOT Standard Construction Details to maintain positive drainage and may be as steep as the running slope of the curb ramp.

Figure 16
Cross Slope Transition to Roadway



- **Diagonal Curb Ramp Landings** - A level landing must be provided at the top and bottom of each diagonal ramp where a change in pedestrian travel direction is required. The bottom landing must be located outside of the through travel lanes as illustrated in Figure 17. (406.4 & 406.6)
- **Diagonal Curb Ramps Not Preferred** - Use of diagonal curb ramps on DelDOT highways, streets and roads is not preferred and should not be used unless constraints such as skewed intersections or small corner radii require their use and the Program Manager II approves their use. Alternatively, a Type 3 curb ramp should be designed and installed to allowing pedestrians to make the needed turning movements behind the curb to access the desired crosswalk without requiring a turning movement in the street. Where two Type 2 curb ramps cannot be installed, a Type 3 curb ramp should be designed and installed to allowing pedestrians to use two crosswalks without requiring a turning movement in the street. If a diagonal ramp must be used, it shall be designed and constructed with marked crosswalks in one of the configurations illustrated in Figure 17.

Figure 17
Diagonal Curb Ramps and Landings Without Buffers
 (Use of Diagonal Ramps is not preferred)



Source – Example 12, Accessible Public Right of Way, with modifications

Source – Example 12, Accessible Public Right of Way, with modifications

Curb Ramp Location - Curb ramps, not including the flares, shall be located within the outside edges of the crosswalk striping. Diagonal curb ramps with flares must be located 2' within the outside edges of the crosswalk striping. (406.6) If, in certain cases, it is determined for safety reasons to prohibit pedestrian crossings at one or more legs of an intersection, the designer needs to be aware of these situations and coordinate directly with the Assistant Director, Engineering Support, Pedestrian Coordinator, ADA Title II Coordinator and DelDOT Traffic Section.

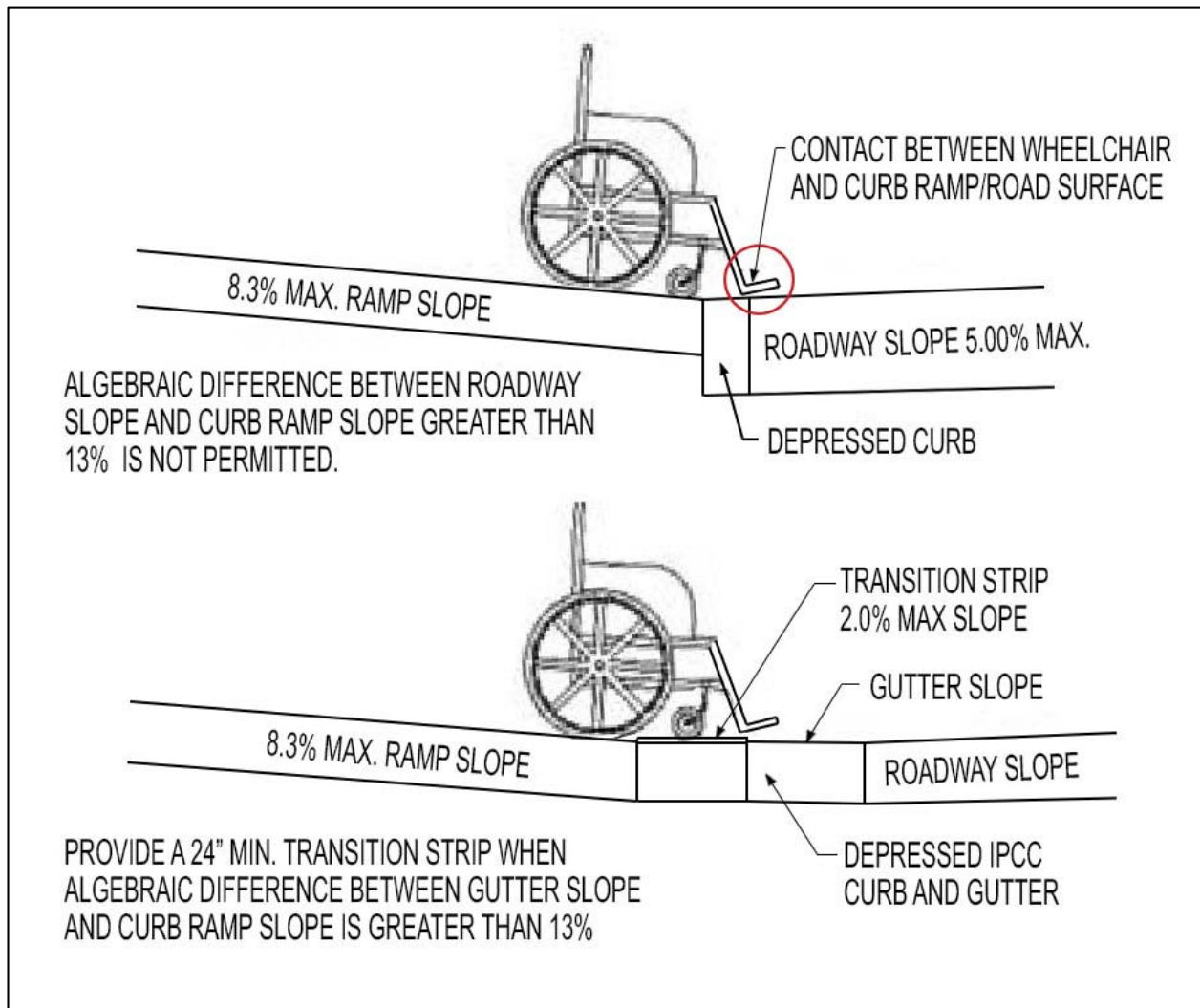
- **Minimize Crossing Distance** - Ramps shall be located to reduce pedestrian crossing lengths and minimize pedestrian exposure to traffic.
- **Drainage Design** - Drainage shall be considered in locating ramps to avoid or correct ponding in the vicinity of the curb ramps and crosswalks. Gutter pans or roadway surface should not exceed 5% in the PAR
- **Drainage Grate Location** - Drainage grates shall not be located in the PAR of a curb ramp unless approved by the Assistant Director, Engineering Support on alteration and maintenance projects. If approved to be in the PAR the drainage grates must be accessible Type 7 grates
- **Surface Utility Covers** - Surface utility covers and property access covers should not be located in the PAR of the crosswalks or curb ramps. If utility or property access covers must be located in the PAR, curb ramp or crosswalk areas, the covers must be ADA compliant.
- **Counter Slopes** - The counter slope is commonly evaluated as the algebraic grade difference (G) of two adjacent slopes. The formula for calculating G is as follows:

$$G = g_2 - g_1$$

With respect to curb ramps, the algebraic grade difference is the difference of the gutter pan or crosswalk slope (g_2), minus the curb ramp running slope (g_1). The +/- value of

the slope is defined as (+) for uphill slopes and (-) for downhill slopes. Grade changes in the path of travel should not exceed the algebraic difference of 13% (maximum running slopes of curb ramps at -8.3% and gutter pans or crosswalks at +5% max.). Counter slopes with an algebraic difference more than 13% are not desirable and will require an approved Request for Practical Exception. Therefore an algebraic difference target value of 11% is preferred with a maximum of 13% counter slope used during design. A measurement tolerance is not allowed on counter slopes. If conditions on a perpendicular curb ramp result in the need to provide a counter slope greater than 13%, a landing must be provided at the bottom of the curb ramp behind the curb. The landing must be as wide as the ramp and a minimum of 2' deep in the path of travel. The DWS area can be included within this transition landing area, as illustrated in Figure 18.

**Figure 18
Counter Slope Limitations**



The slopes of DelDOT's integral P.C.C. curb and gutter types vary as noted below:

Type 1	7.61%
Type 2	9.33%
Type 3	6.82%

Example: Determine if landing adjacent to the depressed flush curb is required for a perpendicular curb ramp having a ramp running slope equal to -7.5% which is being designed for a project proposing integral P.C.C. curb and gutter, type 1-8, a 5' wide P.C.C. sidewalk with a 5' wide grass buffer.

The need for a landing can be determined by following calculation:

$$G = g_2 - g_1$$

$$g_2 = \text{gutter pan slope} = 7.61\%$$

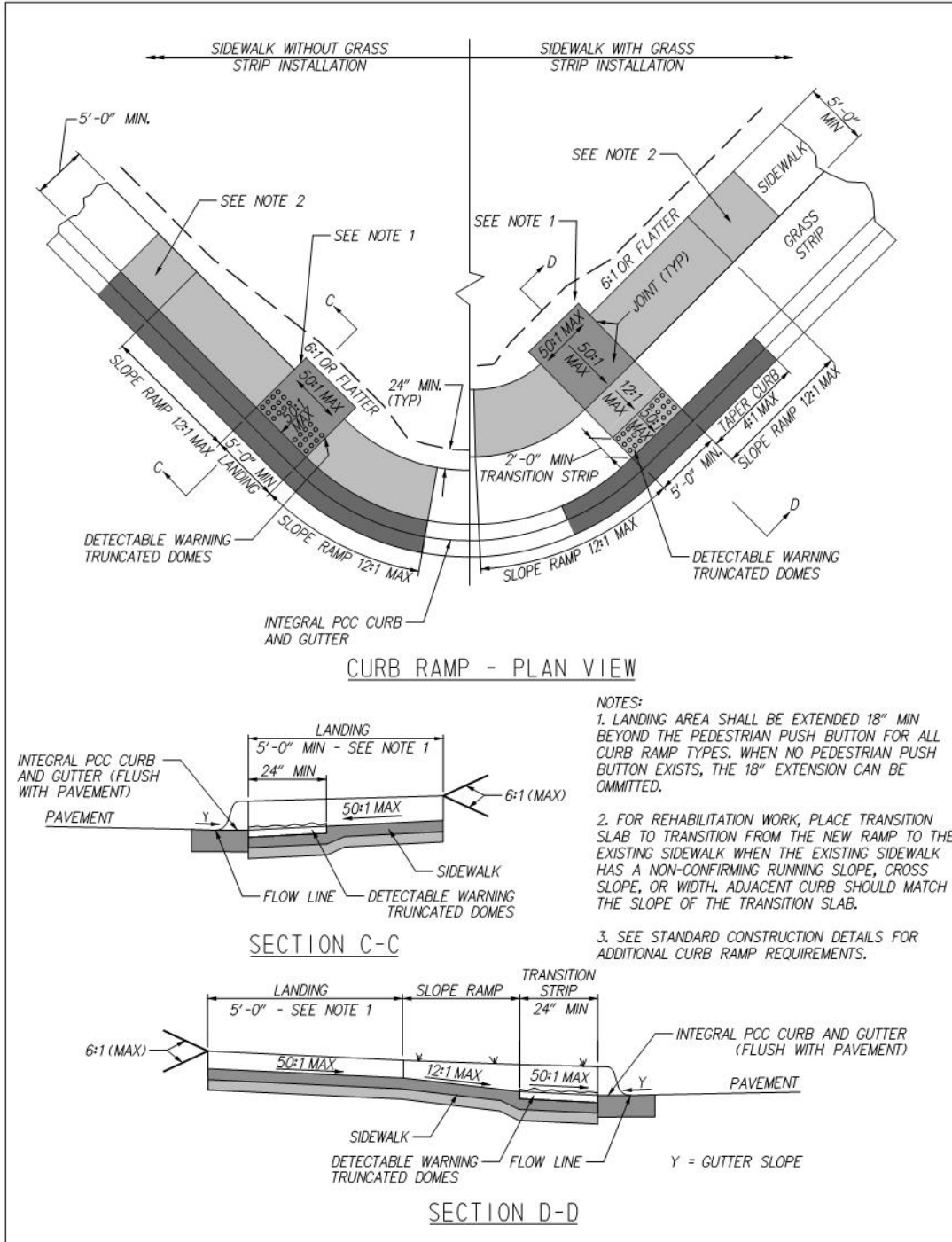
$$g_1 = \text{ramp running slope} = -7.5\%$$

$$G = 7.61\% - (-7.5\%) = 15.11\%$$

Since the 15.11% algebraic difference is greater than the 13% maximum counter slope allowed, a minimum length landing of 2' in the direction of travel is required adjacent to the back of the depressed flush curb (Figure 18).

An alternative solution to the level landing 2' wide is providing either parallel ramps with a 5' x 5' landing adjacent to the back of the depressed curb or a combination of parallel ramps and landing in the PAR and a perpendicular ramp connecting the parallel ramp landing and the depressed curb (Figure 19). See DelDOT Standard Construction Details for requirements.

Figure 19
Parallel Curb Ramp and
Combination Parallel and Perpendicular Curb Ramps
 (See DelDOT Standard Construction Details for requirements)



E. Curb Ramp Locations

Preferred Location

Due to the variability in the challenges and constraints that must be considered in locating ramps, guidelines are provided to assist the designer in the selection of the most appropriate type and location of curb ramps that meet the accessibility compliance requirements. **DelDOT's preference is to use paired perpendicular curb ramps - two curb ramps on each corner.**

Diagonal Curb Ramps - Acceptable, Not Preferred

Diagonal ramps require a landing at the top of the curb ramp for turning movements and a landing in the roadway for turning movement to access the desired crosswalk. A curb ramp on the corner radius that provides a direct connection to a crossing on a channelized island that does not require a landing in the street for turning movements to access the desired crosswalk is not a diagonal curb ramp. Diagonal curb ramps shall not be used unless there are existing physical constraint and approved by the Program Manager II since these ramps:

- Mislead pedestrians who are visually impaired into the center of the intersection rather than guide them to the appropriate crosswalk and receiving curb ramp;
- Typically present a challenge to provide positive drainage; and,
- Typically present a challenge to construct and resurface the street landing area. This minimum landing area is 5' by 5' to accommodate pedestrian turning maneuvers and is located in the roadway outside of the through travel lanes. The initial and continuing challenge is to construct, resurface and otherwise maintain a clear landing with no more than a 2.0% cross slope in any direction in the roadway.

In some situations it may be more appropriate to provide one or more diagonal ramps where, due to constraints, they are the most appropriate solution to provide compliant pedestrian accessibility. These situations typically occur at skewed intersections where paired perpendicular ramps are preferred but they may not be the most appropriate ramp for all corners.

Alternatives to Diagonal Curb Ramps

- Type 3 curb ramps allows for all needed turning movements behind the curb.
- In alteration projects or new construction projects with shoulders or on-street parking and where adequate right of way is available, the use of curb extensions or bulb-outs may be used to avoid the use of diagonal ramps provided that they can accommodate the turning radii of large vehicles and do not impact bike lanes. Bulb-outs provide the following advantages:

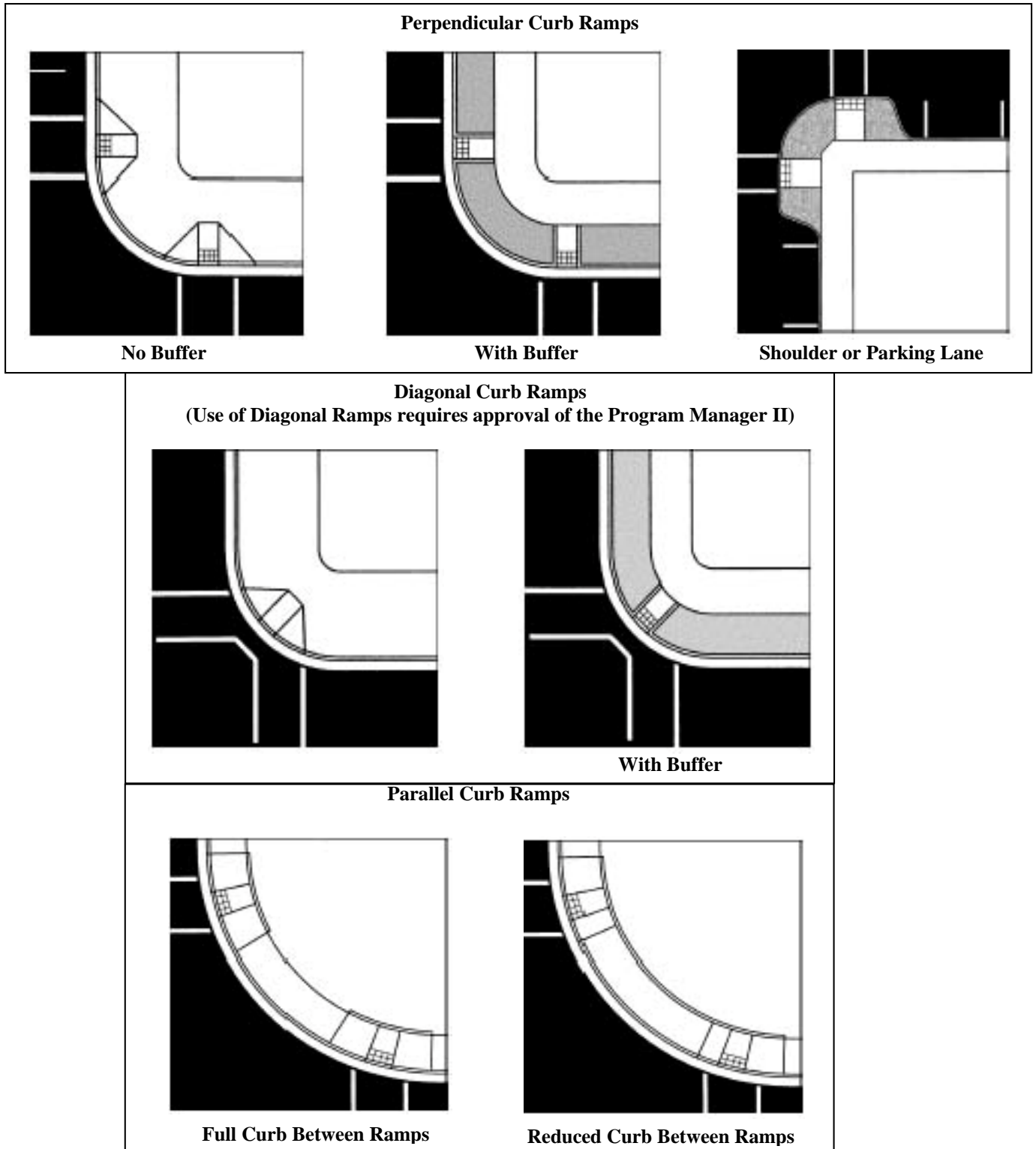
- **Improve pedestrian safety**
 - Increases pedestrian and vehicle visibility
 - Reduces vehicle speeds
 - Shortens the distance and time pedestrians must walk in the roadway
- **Prevents parking at the intersection**
- **Increases sidewalk space for construction of ramps in constrained areas**
- **Increases the area for aesthetics and equipment**
 - Landscaping
 - Traffic signal poles
 - Accessible pedestrian signals

The ramp types illustrated in Figure 20, among other alternatives not illustrated here, are recommended as good design for curb ramps (acceptable design for diagonal curb ramps) according to the Federal Highway Administration's publication *Designing Sidewalks and Trails for Access, Part II of II: Best Practices Design Guide (September 2001)*. These curb ramp examples, in addition to the ramps provided in the DelDOT Standard Construction Details, may be used as guidance in the selection of the most appropriate type of ramp to use given the opportunities and challenges of each proposed curb ramp location.

F. Access Ramps

Where provided in the public right of way, access ramps shall meet or exceed the requirements of Section 405 in the 2006 Standards consistent with the PAR served.

Figure 20
Types of Curb Ramps
 (Source –Table 7.2, FHWA – Designing Sidewalks and Trails for Access,
 Part II of II: Best Practices Design Guide)



G. Detectable Warning Surface (DWS)

Requirements

A detectable warning surface is a standard required feature on all curb ramps or blended transitions at all signalized and unsignalized crosswalk locations and certain driveway entrances. DWS are also required at pedestrian crossings of railroad tracks, as discussed later in Section J. The purpose of the DWS on all curb ramps and rail crossings is to alert visually impaired individuals to stop and determine the hazards prior to crossing the roadway, railroad or controlled commercial driveway entrances.

Location of DWS

The DWS shall extend the full width of the curb ramp and fully depressed curb (exclusive of flared sides). They shall be at least 2' in the path of travel measured from the back of the curb on the ramp surface (406.8 Appendix E, 36 CFR Part 1191). DWS are not permitted on the depressed curb. When possible, DWS should be installed in-line with the direction of pedestrian travel at crossings so pedestrians who use wheelchairs can "track" between the domes.

DWS Design Guidance

DWS shall be installed at sidewalk curb ramps and at uncurbed sidewalks at the following locations:

- Crosswalks (marked & unmarked) and designated places where pedestrians cross roadways.
- Pedestrian refuge medians/islands 6' min length must have DWS behind each curb or 2" from the edge of each roadway extending 2' in the direction of pedestrian travel and separated by a section of smooth pavement extending a minimum of 2' in the direction of pedestrian travel.
- Signalized driveways and entrances;
- Commercial driveways/entrances provided with yield or stop control, detectable warning surfaces shall be provided at the junction between the pedestrian route and the vehicular route; and,
- Railroad crossings in accordance with the requirements in Section K.

Detectable warnings may also be installed in other areas when determined necessary by engineering judgment and approved by the Program Manager II. Factors which present a potentially hazardous situation may also be considered, including locations with inadequate sight distance, complicated turning movements or other situations in which pedestrians with visual impairments should be signaled to stop. They should not be used at all entrances or alleys without consideration of the above criteria, since over use can cause confusion for pedestrians with visual impairments.

Roadway shoulders are designed and constructed to support the roadway and, as a general rule, are not constructed as a PAR and are not required to comply with ADA requirements. DWS should not be installed in the shoulder except as required at railroad crossings as

discussed in Section K when the shoulder is used as the PAR. At intersections without sidewalks, connecting trails, or other accessible pedestrian circulation paths systems, marked or unmarked, crosswalks to shoulders do not require DWS in the shoulder. In the rare case where the shoulder is intended to be a PAR, it should be constructed with a 2% max. cross slope and DWS will be required in the shoulder at crosswalks or railroad crossings in accordance with an approved RPE.

DWS Color Contrast

PROWAG Section R305.1.3 specifies that detectable warning surfaces shall contrast visually with adjacent gutter, street or highway, or pedestrian access route surface, either light-on-dark or dark-on-light.

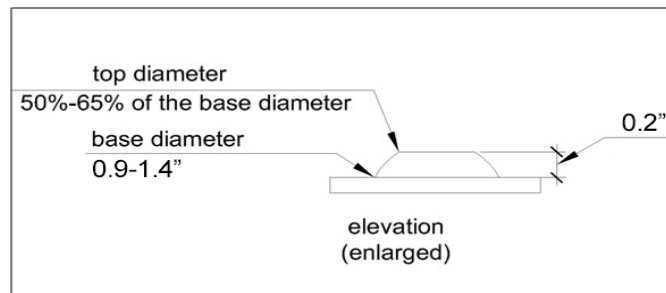
Unless specifically prohibited, curb ramps will be constructed with uncolored Portland cement concrete with red DWS.

DWS Dome Size and Spacing

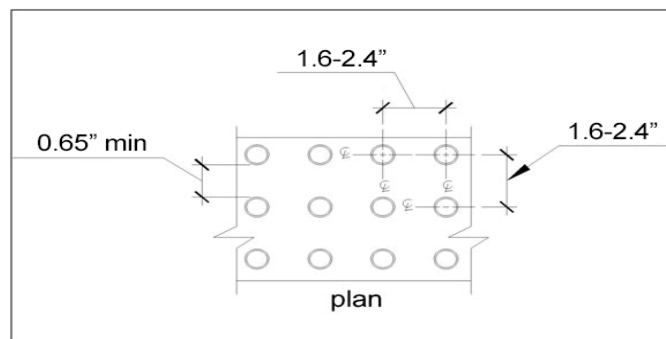
The truncated domes shall have a base diameter of 0.9 in minimum and 1.4 in maximum, a top diameter of 50 percent of the base diameter minimum and 65 percent of the base diameter maximum, and a height of 0.2 in. The truncated domes shall have a center-to-center spacing of 1.6 in minimum and 2.4 in maximum, and a base-to-base spacing of 0.65 in minimum, measured between the most adjacent domes as illustrated in Figure 21.

**Figure 21
Detectable Warning Surfaces**

Dome Size



Dome Spacing

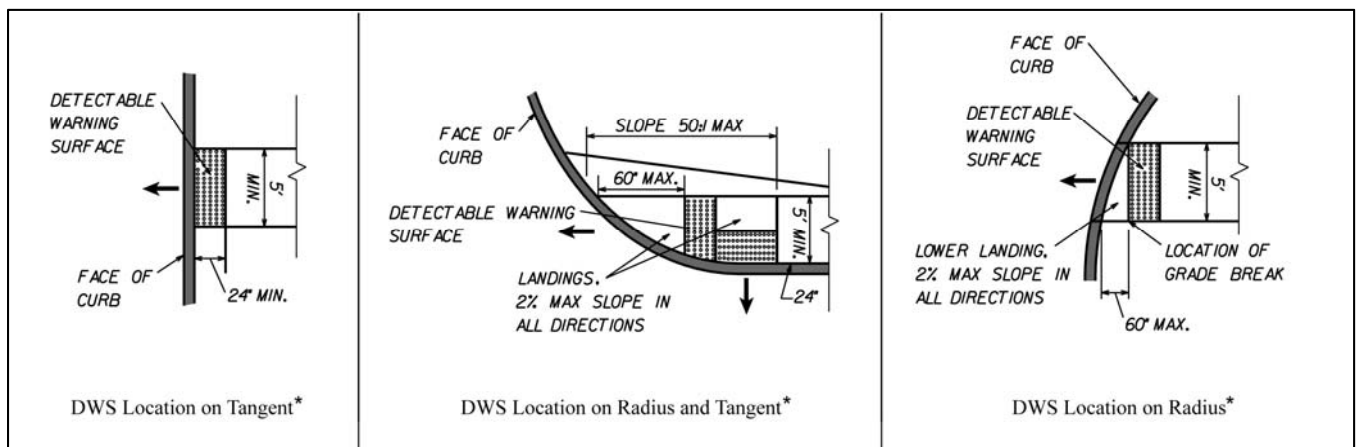


Source: 2006 Standards Section 705

DWS Location on Alternative Designs

For alternative perpendicular curb ramp designs with a grade break behind the curb the leading edge of the DWS shall be adjacent to the grade break, at least 2' min. deep in the path of travel and extend across the full width of ramp excluding any flared sides. One corner of the leading edge of the DWS shall be at the back of curb. No other point of the leading edge of the DWS shall be more than 5' from the back of curb (R305.2.1 and Advisory 305.2.1). Figure 22 illustrates an alternative design that places the grade break behind the curb to provide non-visual wayfinding cues by aligning the ramp with the crosswalk PAR and the receiving curb ramp. If any portion of the ramp grade break is more than 5' from the back of curb, with the approval of the Assistant Director, Engineering Support, in cooperation with the responsible Program Manager II, the DWS shall be placed on the lower landing behind the curb.

Figure 22
Detectable Warning Surface Placement / Perpendicular Curb Ramps



*Note: See DelDOT Standard Construction Details for requirements.

H. Crosswalks

The DE MUTCD and Delaware Code, Title 21 Section 4143 states that crosswalks are located at roadway intersections, whether marked or unmarked, and infers a connection between pedestrian facilities that may be either sidewalks or shoulders.

Crosswalks at intersections are marked primarily to guide pedestrians across the intersection and to warn approaching motorists of a pedestrian crossing location. All marked crosswalks at an intersection should have the same type of markings to provide a consistently marked path of travel in the public right of way.

The crosswalk guidelines are:

- **Width** - At least 6' wide (DE MUTCD) or wider to ensure the approach sidewalk, shared use path or trail is within the crosswalk marking.
- **Cross Slope**
 - With Yield or Stop Control – 2% maximum. (R302.6)
 - Without Yield or Stop Control or with Traffic Signal – 5% maximum. (R302.6.1)
 - Midblock – Equal the roadway grade. (R302.6.2)
- **Cross Slope Measurement Construction Tolerance:**
 - Asphalt
 - With Yield or Stop Control - 1.5% (cross slope 3.5% max.)
 - Without Yield or Stop Control or with Traffic Signal - 1.5% (cross slope 6.5% max.)
 - Concrete
 - With Yield or Stop Control - 1.0% (cross slope 3.0% max.)
 - Without Yield or Stop Control or with Traffic Signal - 1.0% (cross slope 6.0% max.)
- **Running Slope** – 5% maximum in the direction of pedestrian travel or to match the grade of the parallel roadway (R302.5.1). Safety and Operations Exceptions include Pave and Rehabilitation Program projects which shall meet the cross slope criteria to the maximum extent feasible with milling and overlay and without reconstruction of grades (e.g., tabling intersections). On superelevated roadways where the cross slope exceeds 5%, the running slope of the crosswalk shall match the roadway cross slope. For example, if a horizontal curve requires a superelevation rate of 6%, then designers should not lower the superelevation rate to 5% to meet the max 5% crosswalk running slope.
- **Running Slope Measurement Construction Tolerance:**
 - Asphalt - 1.5% (running slope 6.5% max.)
 - Concrete - 1.0% (running slope 6.0% max.)

Crosswalks with special surface treatments, such as brick pavers or stamped concrete shall not exceed ¼" vertical elevation differences between adjacent surfaces. Elevation differences between ¼" and ½" shall be beveled at a maximum 2:1 slope. When choosing a treatment, special attention should be paid to the depth and spacing between the walking surface of each paver to ensure that the spacing is less than or equal to ½".

Pedestrian crossing warning signs, crosswalks, and crosswalk lines shall be designed using the DE MUTCD. Engineering judgment, traffic engineering analysis and coordination among the Traffic Section, ADA Title II Coordinator and Pedestrian Coordinator are required to determine the appropriate method and location to provide the safest passage for pedestrians crossing a street.

I. Median and Channelized Island Crossings

The principal function of a raised median on divided highways is to separate opposing traffic while a channelizing island is intended to control vehicle movement. **Raised medians and channelizing islands may also be used as points of refuge for pedestrians and help pedestrians by crossing only one direction of vehicle travel at a time.**

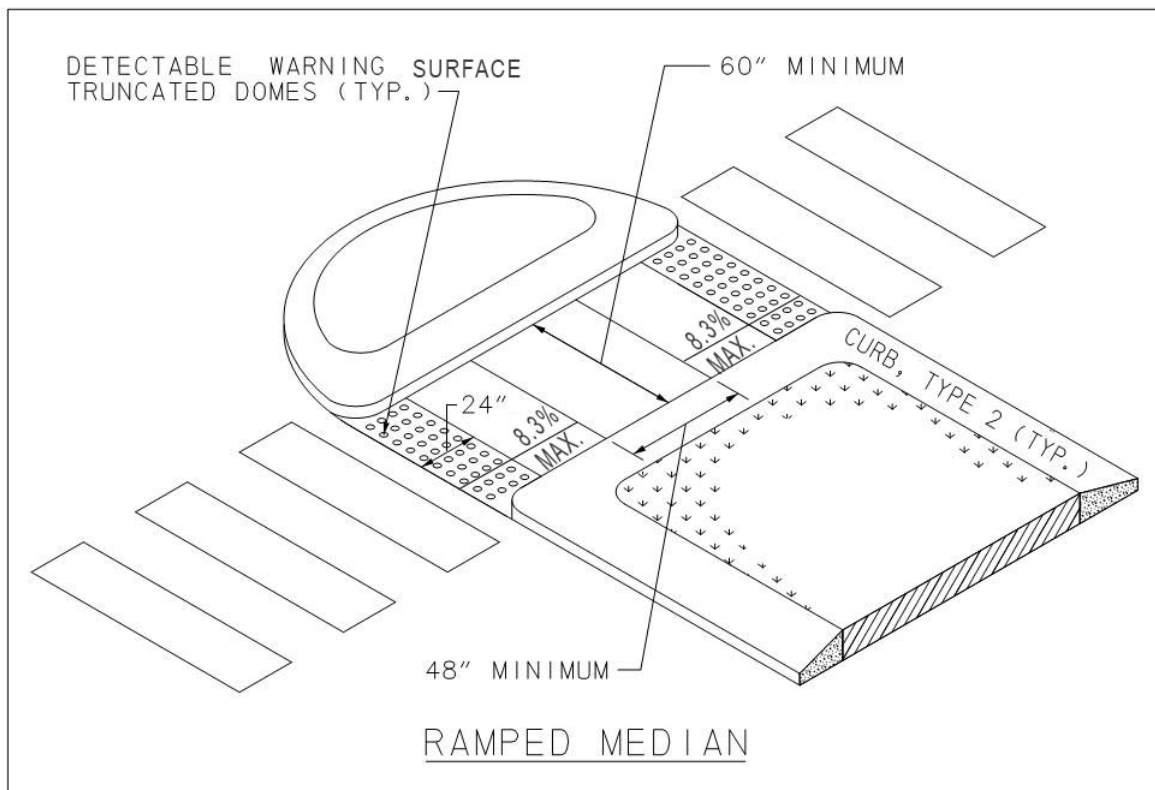
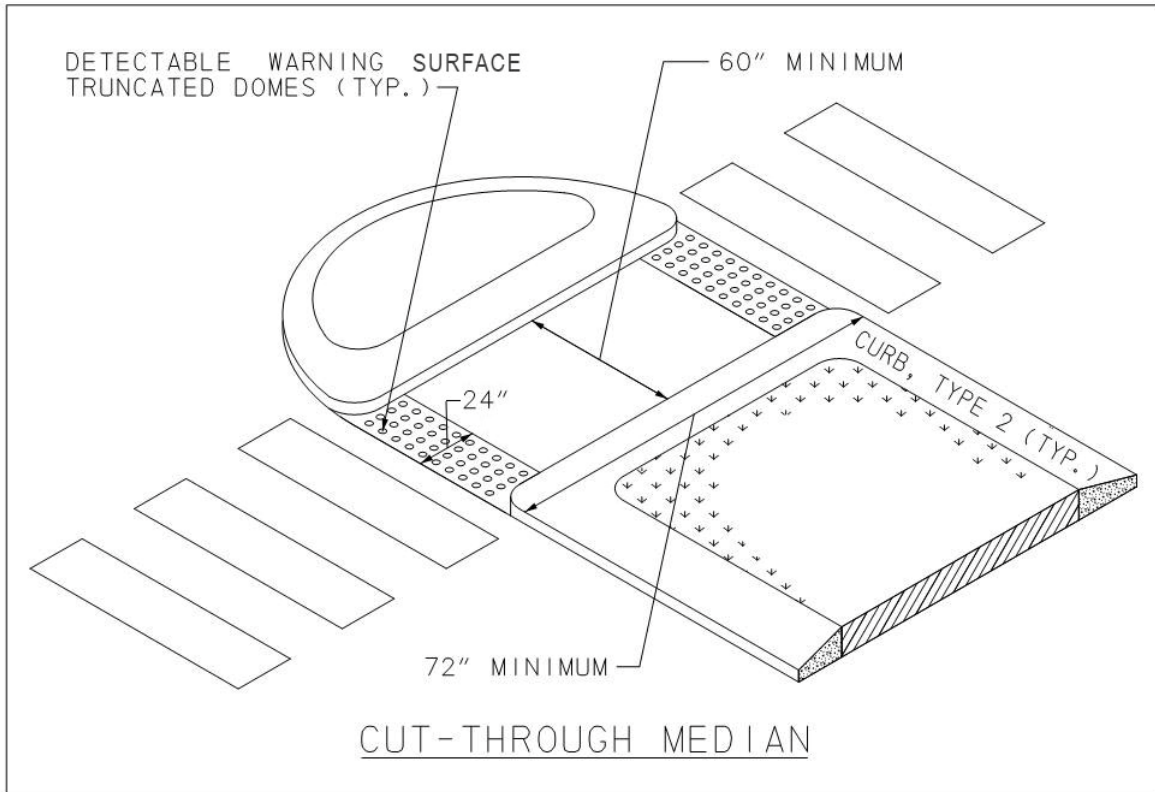
A median or channelizing island that is to be used as a pedestrian refuge shall be 5' wide minimum and shall have a minimum length of 6' in the direction of travel measured from back of curb to back of curb or edge of roadway (R305.2.4) with the cross slope matching the grade of the adjacent roadways at the pedestrian crossing. The median or island crossing length must provide sufficient area for the required:

- **Detectable Warning Surfaces: full width of the crossing**
 - Median or Island With Curbs – from back of curb to 2' min. behind the curb;
 - Median or Island Without Curbs – 2' min. from edge of pavement to 2' min. in the path of travel inside of median. (See DelDOT Standard Construction Detail)
- **PAR Surface:** smooth, flat (planar) and continuous surface constructed of materials that are firm, stable and slip resistant for the full length of the crossing with a smooth surface at least 2' min. in the path of travel separating the DWS sections.
- **Cross Slope**
 - With Yield or Stop Control – 2% maximum. (R302.6)
 - Without Yield or Stop Control or With Traffic Signals – 5% maximum. (R302.6.1)
 - Midblock – Equal the roadway grade. (R302.6.2)
- **Cross Slope Measurement Construction Tolerance**
 - **Asphalt**
 - With Yield or Stop Control - 1.5% (cross slope 3.5% max.)
 - Without Yield or Stop Control or With Traffic Signal- 1.5% (6.5% max.)
 - **Concrete**
 - With Yield or Stop Control - 1.0% (cross slope 3.0% max.)
 - Without Yield or Stop Control or With Traffic Signal – 1.0% (6.0% max.)
- **Running Slope:** 5% maximum or match the grade of the parallel roadway.

While not preferred, the FHWA recognizes medians and islands having a length from 4' to less than 6' in the direction of travel on the pedestrian crossing can be used as pedestrian refuge areas. The median crossing less than 6' shall be made at-grade and without DWS since the typical DelDOT signal timing allows pedestrians to cross the roadway within the corresponding vehicular phase (green phase). Recognizing that vehicular turning movements may require the nose of some medians to be located prior to a crosswalk, the provision of an at-grade crosswalk cutting through a median without DWS is still a preferable pedestrian safety feature as opposed to a crosswalk located beyond the nose of the median.

Consistent with DelDOT Standard Construction Details, as illustrated in Figure 23, pedestrian crossings of raised medians and channelizing islands may either be designed with a cut-through crosswalk that is flush with the adjoining roadways or a ramped crosswalk. The type of median or island crossing selected depends upon the width of the median and the ability to provide positive drainage. Both the cut-through median and ramped median and island crossings shall provide a minimum clear width of 5' for pedestrian travel. If a median or island crossing is ramped, the slope of the ramps shall be no steeper than 12:1 maximum (8.3%) and a level area 5' wide and 4' long is required between the ramps when using a ramped median or island crossing.

Figure 23
Cut Through and Ramped Medians



J. Roundabouts

A roundabout (R306.3 and Advisory R306.3) is a circular intersection with yield control at entry, which permits a vehicle on the circulatory roadway to proceed, and with deflection of the approaching vehicle counter-clockwise around a central island (DE MUTCD section 1A-22).

Pedestrian street crossings at roundabouts can be difficult for pedestrians who are blind or have low vision to identify because the crossings are located off to the side of the pedestrian circulation path around the street or highway. Where sidewalks are flush against the curb at roundabouts and pedestrian street crossing is not intended, a continuous and detectable edge treatment must be provided along the street side of the sidewalk at roundabouts. Detectable warning surfaces must not be used for edge treatment. Where chains, fencing, or railings are used for edge protection, the bottom edge of the treatment must be 15 inches maximum above the sidewalk to be detectable by cane. Prior to determining the appropriate detectable edge treatment, research is required to identify the latest standards or guidance on edge treatments.

The continuous traffic flow at roundabouts removes many of the audible cues that pedestrians who are blind use to navigate pedestrian street crossings. At roundabouts with multi-lane pedestrian street crossings, a pedestrian activated signal must be provided, if warranted, for each multi-lane segment of each crossing, including the splitter island. If warranted, Pedestrian Hybrid Beacons can be used at roundabouts as described in the DE MUTCD sections 4F.01 through 4F.03. Transportation officials may request permission from the Federal Highway Administration to experiment with alternative signals at roundabouts (see MUTCD section 1A-16).

K. Railroad Crossings

PAR Surface

PAR Criteria and Construction Tolerances must be followed. The PAR surface of at-grade pedestrian facility crossings of freight and passenger railroads must be planar, smooth and continuous surface constructed of materials that are firm, stable and slip-resistant. The following requirements for the vertical alignment of the PAR surface and the flangeway gaps (the area adjacent to the inside of each rail that accommodates the wheel flanges of a rail car) are:

- **PAR approach to outer edge of rails** – surface must be level and flush with the top of rail outer edges. (R302.7.1)
- **PAR between the rails:** surface must be aligned with the top of rails
- **Flangeway Gap:** 2.5” maximum (2006 Standards 810.10)

DWS Location

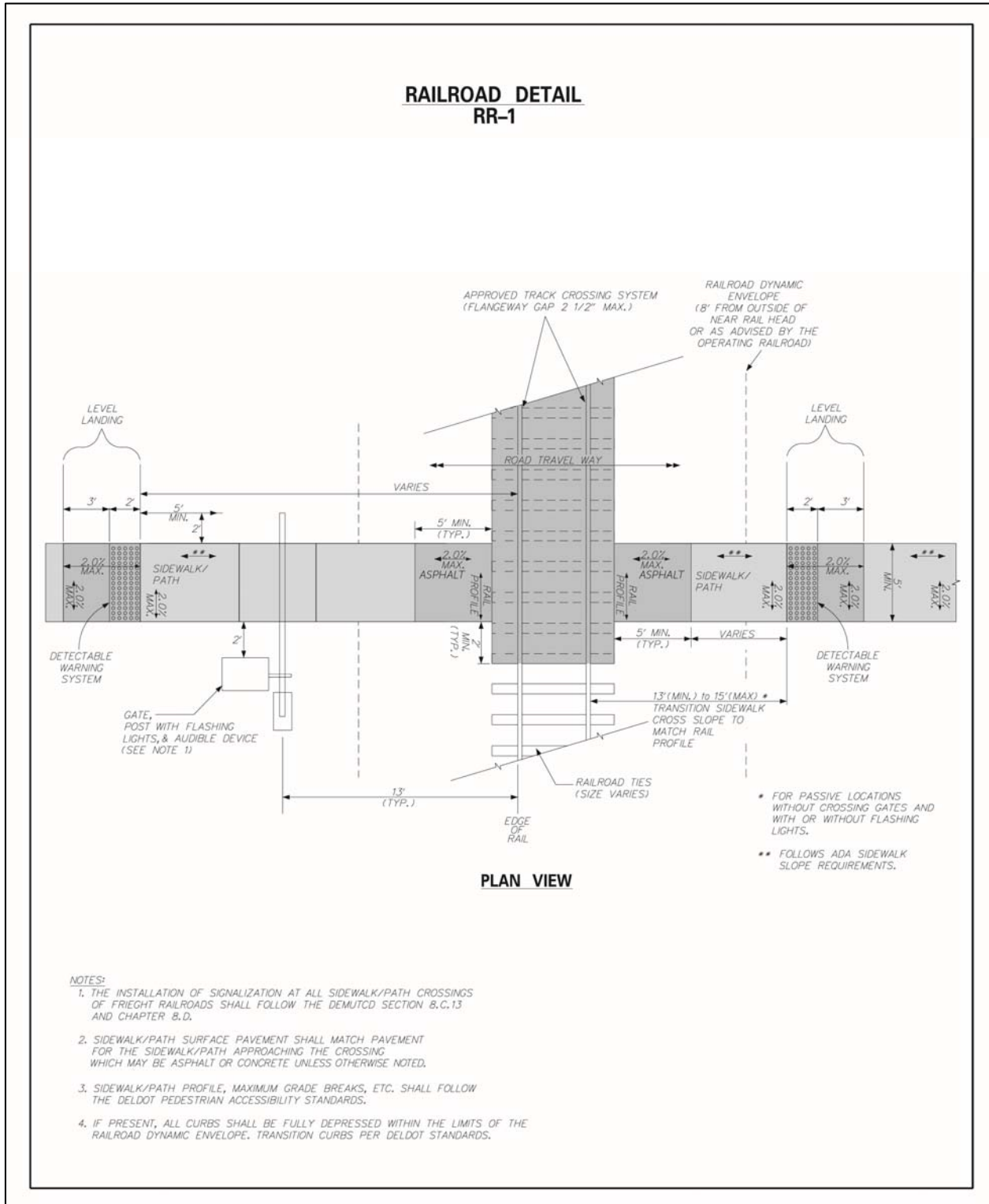
The location of the required DWS shall be 2' wide in the path of travel and across the full width of PAR varies by situation (R208 & R305.2.5):

- **Railroad tracks cross the PAR in the roadway:** DWS on the bottom of the curb ramps serving the crosswalk meet the requirement. A second set of DWS at the tracks in the roadway shall not be installed. However, if the PAR crosses the tracks within a roadway shoulder without DWS, then DWS shall be installed as per Figure 24.
- **Railroad tracks cross the PAR in a median between two roadways without gates:**
 - Place DWS 2' min. width in the path of travel and across the full width of PAR in the median and at least 13' from the edge of the closest rail only if there is a smooth level landing 3' min. width (5' preferable) between the DWS locations at the edge of roadway/behind the median curb and the DWS on the railroad approach.
 - Do not place DWS in the median if there is not at least 20' between the edge of roadway/back of curb and the closest rail.
- **Railroad tracks cross the PAR in a median between two roadways with gates:**
 - Place DWS 2' min. in the path of travel and across the full width of PAR in the median at least 5' prior to the gate in a down position.
 - Minimum of 12' is required from the edge of roadway/back of curb in the median to the gate in the down position to provide a smooth level landing 3' min. in the path of travel (5' preferable) between the DWS locations at the edge of roadway/behind the median curb and the DWS prior to the gate in the down position.
- **Railroad tracks cross the PAR not in a roadway without crossing gates**

DWS are required to be located on the outside edges of the tracks as follows:

 - Full width of the PAR;
 - At least 2' deep in the path of travel; and,
 - DWS edge must be located:
 - At least 13' from the edge of the closest rail but
 - No farther than 15' from the edge of the closest rail.
 - The rows of truncated domes in the DWS should be aligned to be parallel with the direction of wheelchair travel.
- **Railroad tracks cross the PAR not in a roadway with crossing gates**
 - Full width of the PAR;
 - At least 2' deep in the path of travel; and,
 - DWS edge adjacent to the gate must be located 5' min. prior to the face of the crossing gate arm in the down position.
 - The rows of truncated domes in the DWS should be aligned to be parallel with the direction of wheelchair travel.

Figure 24
Railroad Pedestrian Crossing Detail



- **Railroad tracks cross PAR on roadway shoulder without crossing gates**
 - Pave the shoulder PAR with a 2% max. cross slope or
 - Provide a curb and sidewalk bulb-out if the shoulder or parking lane is wide enough
 - DWS are required to be located on the outside edges of the tracks as follows:
 - Full width of the PAR;
 - At least 2' deep in the path of travel; and,
 - At least 13' from the edge of the closest rail but
 - No farther than 15' from the edge of the closest rail.
 - The rows of truncated domes in the DWS should be aligned to be parallel with the direction of wheelchair travel
- **Railroad tracks cross PAR on roadway shoulder with crossing gates**
 - Pave the shoulder PAR with a 2% max. cross slope or
 - Provide a curb and sidewalk bulb-out if the shoulder or parking lane is wide enough
 - DWS edge adjacent to the gate must be located 5' min. prior to the face of the crossing gate arm in the down position.
 - The rows of truncated domes in the DWS should be aligned to be parallel with the direction of wheelchair travel

L. Bus Stops

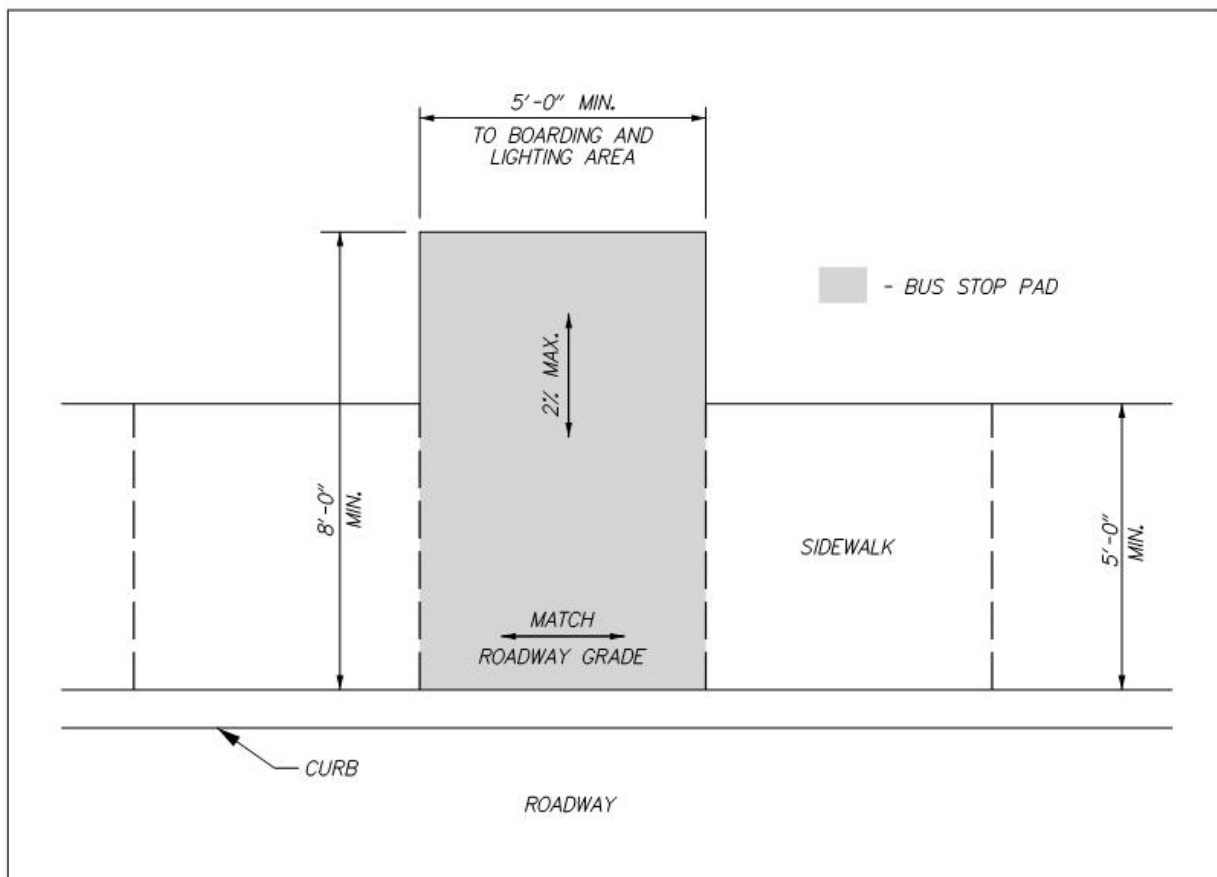
DTC operates fixed-route buses that are fully accessible to those with disabilities while also providing paratransit services statewide for individuals with disabilities who cannot use fixed-route bus service. As part of the fixed-route service, most existing and all new DTC facilities include paved ADA compliant patron waiting pads, either separate pads or paved shoulders, at all bus stop locations.

Bus stops are considered by DOJ to be a part of a compliant pedestrian access route that requires connecting the bus stop to streets, sidewalks, paths or trails. In addition, each bus stop component must be accessible by way of a compliant PAR (R308.1.3.2). As such, bus stops are to be considered as part of the public agency's transition plan under the ADA Program Access. Program Access requires identification of barriers and a schedule to implement compliant access improvements serving bus stops as part of addressing other pedestrian facility barriers or non-compliant features in the public right of way.

When bus stops are being provided, accessibility requirements must be met as required by 2006 Standards 810 Transportation Facilities and codified in 49 CFR Parts 37 and 38 and by cross reference Appendices B and D of 36 CFR Part 1191, as adopted by USDOT in September 2013. Section 810 of the 2006 Standards and PROWAG Section R308 require public entities to construct boarding and alighting areas, as illustrated in Figure 25, which has the following dimensions:

- **Clear Length** – 8’ min. measured perpendicular to the curb or edge of roadway (810.2.2)
 - **Length slope:** Perpendicular to the roadway, the slope of the bus stop boarding and alighting area shall not be steeper than 2% max. (810.2.4)
 - **Length slope measurement tolerance:** 1.0% (cross slope 3.0% max)
- **Clear Width** - 5’ min. measured parallel to the roadway; 8’ min. if the pad is in an isolated location not served by any other pedestrian facilities
 - **Width slope:** Parallel to the roadway, the slope of the bus stop boarding and alighting area shall be the same as the roadway, to the maximum extent practicable. (810.2.4)
- **Accessible Connections:** Bus stops must be connected to streets, sidewalks or pedestrian paths by an accessible route (810.2.3)

Figure 25
Bus Boarding and Alighting Area Requirements



USDOT recognizes that there will be some situations in which the required full dimensions of a bus boarding and alighting pad may not be achievable due to the presence of structures or the severity of terrain. Public entities shall ensure bus boarding and alighting pads comply with these requirements to the extent that the construction specifications are within their control. Where it is not feasible to fully comply with the requirements, the public entities are expected to provide compliant pads to the “greatest extent feasible.”

New and replaced bus shelters shall be installed in a manner to permit someone using a wheelchair or mobility aid to enter from the PAR through an entry point that is not less than 3’ min. width and leads directly to an area that is entirely within the shelter that has a minimum clear floor area of 2.5’ wide by 4’ long as required by 2006 Standards Section 810, Transportation Facilities.

M. Traffic Signals and Pedestrian Signals

A Traffic Justification Study is required to determine if a signal is warranted at an intersection. Included in the study is documentation of the pedestrian movements at the intersection and surrounding area. The study will note which legs of the intersection should be marked for safe and convenient crosswalks.

The PROWAG (R209.1) requires the placement of accessible pedestrian signals (APS) at signalized intersections. APS are especially helpful at intersections that are complex, are irregularly shaped or have compound turning movements and intersections with leading pedestrian intervals. The purpose of APS is to aid pedestrians who have vision impairments, hearing impairments or have other ambulatory impairments to safely cross the street.

The PROWAG (R209.2) guidelines do not require retrofitting all signalized crossings with APS unless signal controller and software are altered or signal head is replaced. Scoping in the PROWAG requires that when new accessible pedestrian signals are provided, they must incorporate audible and vibrotactile features.

The “DelDOT Interim Guidelines for the Installation of Accessible Pedestrian Signals,” dated December 11, 2007, provide a process for DelDOT to evaluate and prioritize APS installations (including HAWK signals) when they are requested. By addressing the requested APS on a prioritized basis, DelDOT can meet the current identified needs for APS while minimizing the potentially significant cost of relocating or replacing APS components at all signalized intersections as may be required by the final Federal rule if the requirements change.

DelDOT Interim APS Guidelines require that the following three basic conditions be met before APS will be considered:

- 1) APS must be requested by a visually impaired person or their representative;
- 2) Intersections must be signalized; and,
- 3) Retrofitting the signal to include APS must be feasible.

DelDOT's Interim Guidelines define Accessible Pedestrian Signals (APS) as:

“devices that are used in conjunction with pedestrian signals that communicates pedestrian signal information in non-visual formats such as (Braille), audible tones, verbal messages, and/or vibrating surfaces. APS let pedestrians who are blind or visually impaired know when the WALK interval begins and terminates. Pedestrians who know when the crossing interval begins are able to start a crossing before turning cars enter the intersection and complete a crossing with less delay. Audible signals can also provide directional guidance, which is particularly useful at non-perpendicular intersections and at wide multi-lane crossings.”

If an existing or proposed traffic signal is in the proposed project limits, the Program Manager II shall contact the Pedestrian Coordinator, Traffic Section and the ADA Title II Coordinator for guidance on existing pedestrian movements and to ensure ADA compliant curb ramps, crosswalks and accessible pedestrian signals, if requested, can be achieved in a safe and convenient manner.

The traffic signal hardware, signal cabinets, utility and signal pole requirements, signing and junction wells should, where possible, be located outside of the clear pedestrian access route.

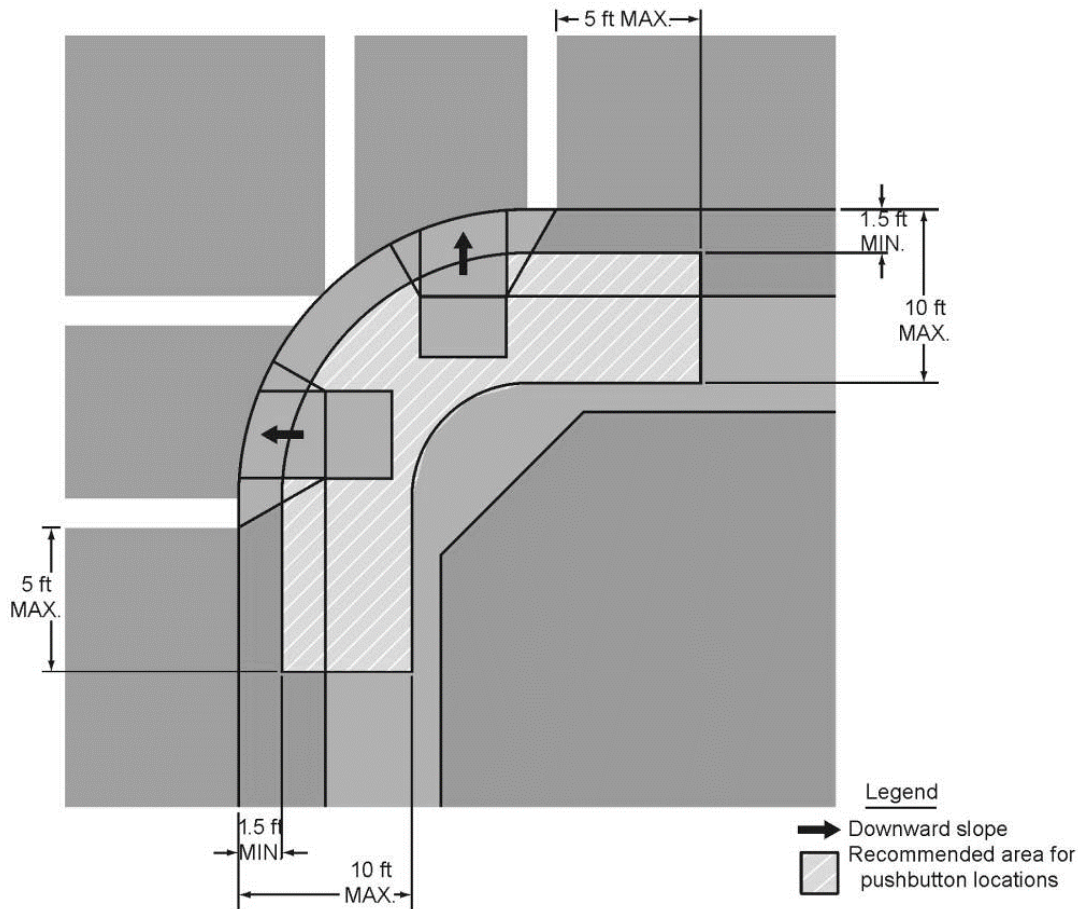
Right of way may need to be purchased to ensure accessibility compliance. The placement of unimpeded accessible ramps with proper crosswalk markings needs to be determined, balancing the needs of the highway designer and the signal designer. Identification is required of significant public use facilities such as government buildings, schools, churches, community centers, hospitals, transit stops, commercial and residential areas that are pedestrian destinations. Pedestrian access by way of the public right of way as well as connections among these destinations outside of the public right of way must be included in the discussions.

If a pedestrian signal is warranted, the pushbuttons should be located to ensure accessibility for pedestrians with disabilities as illustrated in Figure 26, Figure 27, and Figure 28. The following considerations should be evaluated when determining the location of pushbuttons:

- As close to the curb ramp as possible without interfering with clear space requirements.
- Should be separated by a distance of at least 10'. Where physical constraints prevent the separation and there are two pedestrian pushbuttons on the same pole, the housing of each pushbutton shall be marked with an arrow indicating the crossing direction it serves, and the APS message will be modified to give more information about street crossing.
- Should be located no more than 5' beyond the outside edge of the marked crosswalk. Shall be located adjacent to and within 10" of the 5' X 5' level landing serving the curb ramp and extending 1.5' min. beyond the pedestrian push buttons. A smaller landing requires approval of a Request for Practical Exception. When no push button exists, the 1.5' extension can be omitted.
- Pedestrian pushbutton mounts on newly constructed pedestrian signals should be located from 42" to 48" above the level landing serving a curb ramp. The DE MUTCD provides additional requirements and guidelines for the design of APS.
- In locations where there is an increased likelihood of the pedestrian pushbutton pole being struck, the pole should be placed as far as possible from the edge of the traveled way, but not farther than 10' from the edge of curb, shoulder, or pavement. The face of the pedestrian pushbutton shall be aligned with the crossing.

Figure 26
Recommended Pushbutton Locations for Pedestrian Signals
 (Source DE MUTCD, December 2012)

Figure 4E-3. Pushbutton Location Area
 (Delaware Revision)



Notes:

1. In locations where there is an increased likelihood of the pedestrian pushbutton pole being struck, the pole should be placed as far as possible from the edge of the traveled way, but not farther than 10 feet from the edge of curb, shoulder, or pavement.
2. If two pedestrian pushbutton poles are used on a corner, they should be separated by at least 10 feet.
3. This figure is not drawn to scale.
4. Figure 4E-4 shows typical pushbutton locations.

Option:

08 Where there are physical constraints on a particular corner that make it impractical to provide the 10-foot separation between the two pedestrian pushbuttons, the pushbuttons may be placed closer together or on the same pole.

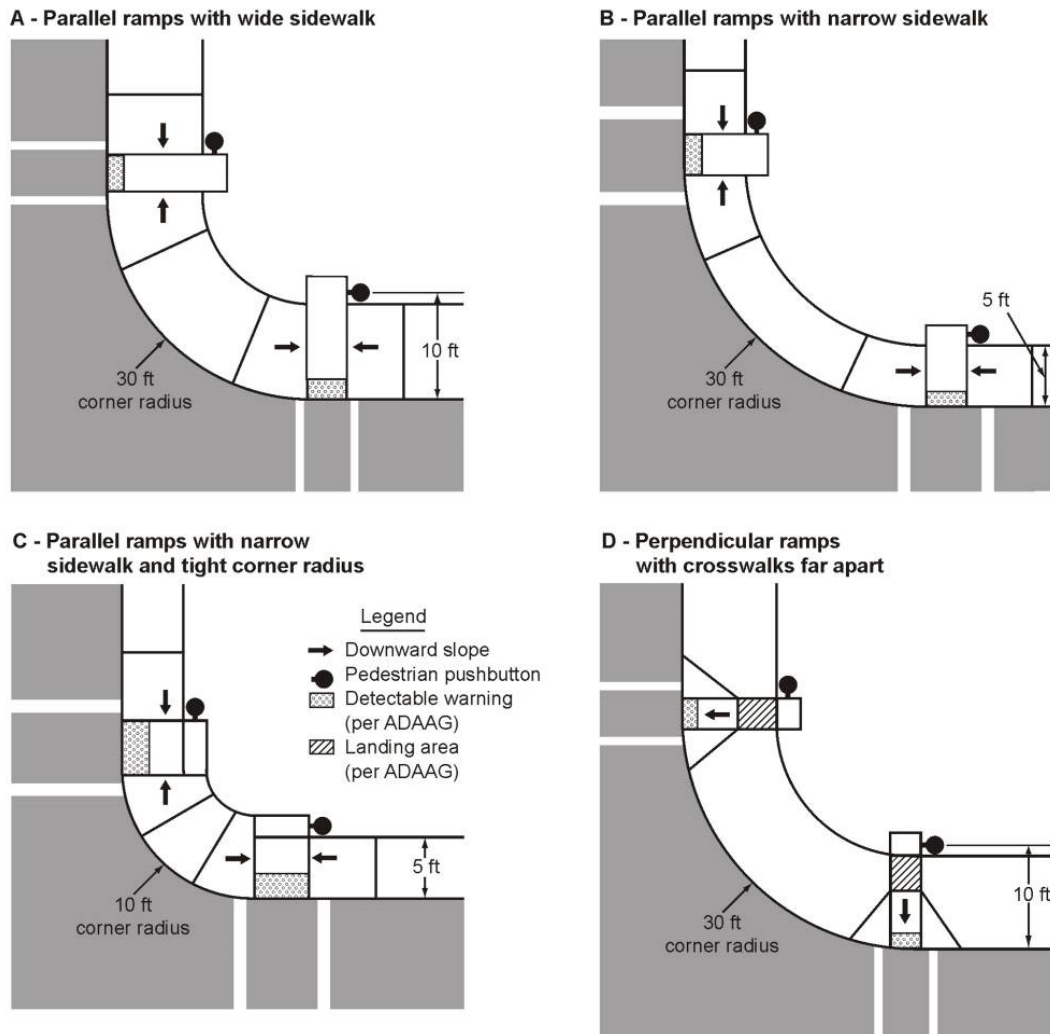
Support:

09 Figure 4E-4 shows typical pedestrian pushbutton locations for a variety of situations.

Revision 1, December 2012

Figure 27
Recommended Pushbutton Locations for Pedestrian Signals
 (Source: DE MUTCD, December 2012)

Figure 4E-4. Typical Pushbutton Locations (Sheet 1 of 2)
 (Delaware Revision)

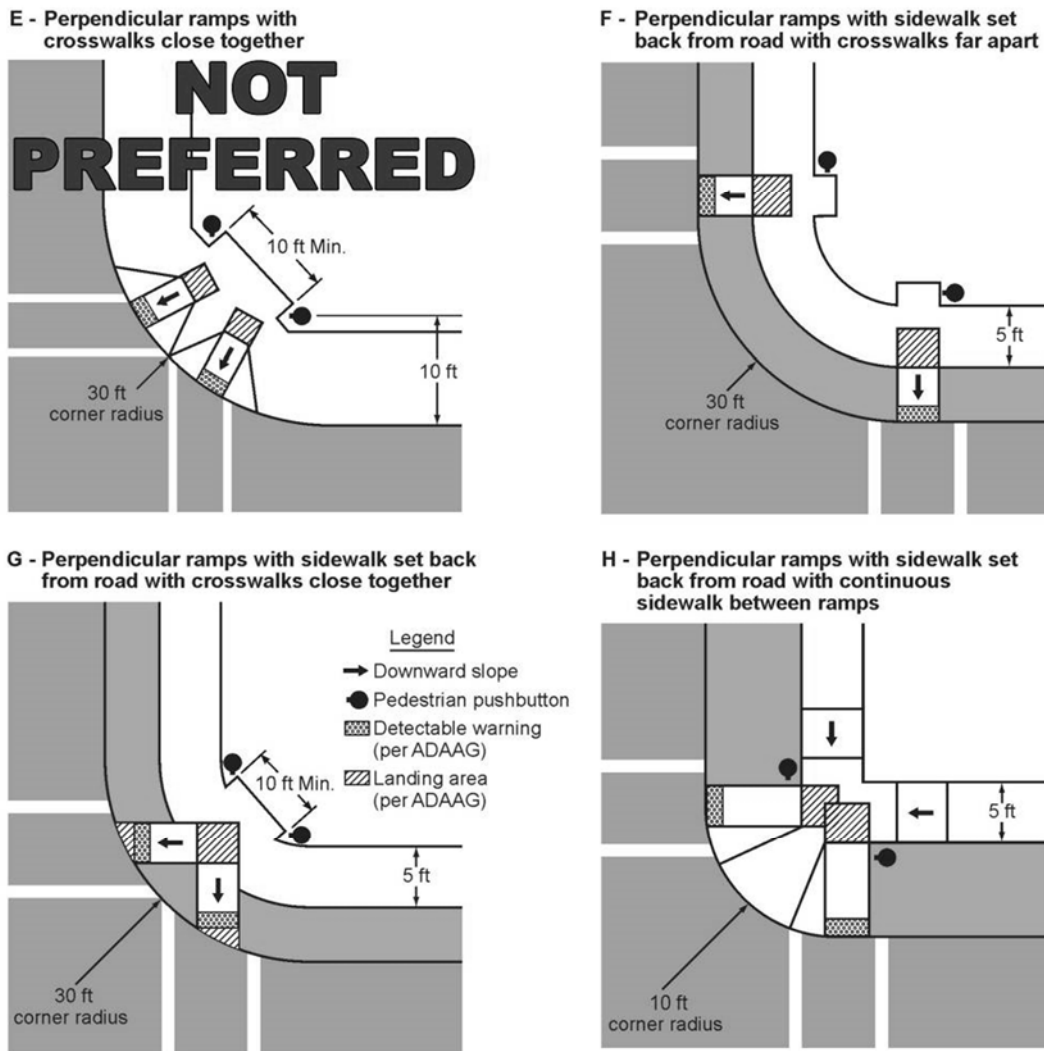


Notes:

1. This figure is not drawn to scale.
2. These drawings are intended to describe the typical locations for pedestrian pushbutton installations. They are not intended to be a guide for the design of curb cut ramps.
3. Figure 4E-3 shows the recommended area for pushbutton locations.

Figure 28
Recommended Pushbutton Locations for Pedestrian Signals
 (Source: DE MUTCD, December 2012)

Figure 4E-4. Typical Pushbutton Locations (Sheet 2 of 2)
(Delaware Revision)



Notes:

1. This figure is not drawn to scale.
2. These drawings are intended to describe the typical locations for pedestrian pushbutton installations. They are not intended to be a guide for the design of curb cut ramps.
3. Figure 4E-3 shows the recommended area for pushbutton locations.

N. Stop Bars

Stop bars are solid white pavement markings that extend across the approach lanes to an intersection on the legs of the intersection that are controlled by a stop sign or traffic signal. These markings identify the location that a vehicle is supposed to stop as indicated by the sign or signal without blocking the pedestrian crossing. Stop bars shall be designed using the most recent DE MUTCD Section 3B.16.

O. On-Street Parking

Pedestrian accessibility for the disabled frequently involves the use of cars or vans for part of their trip making. As a result, the availability and location of accessible parking spaces relative to the location of work, shopping, recreation or other social activities is a key component of trip making and pedestrian safety for the disabled. While **Draft PROWAG (R214) requires that accessible parking spaces are located on the block perimeter where on-street parking is marked or metered but on-street parking is not addressed in the 2006 Standards. DeDOT will follow the guidance in PROWAG 2011 for marked and or metered parking areas.**

Where on-street parking is provided on the block perimeter and the parking is marked or metered, accessible parking spaces complying with R309 shall be provided in accordance with Figure 29. Where parking pay stations are provided and the parking is not marked, each 20' of block perimeter where parking is permitted shall be counted as one parking space. (R214)

**Figure 29
On-Street 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

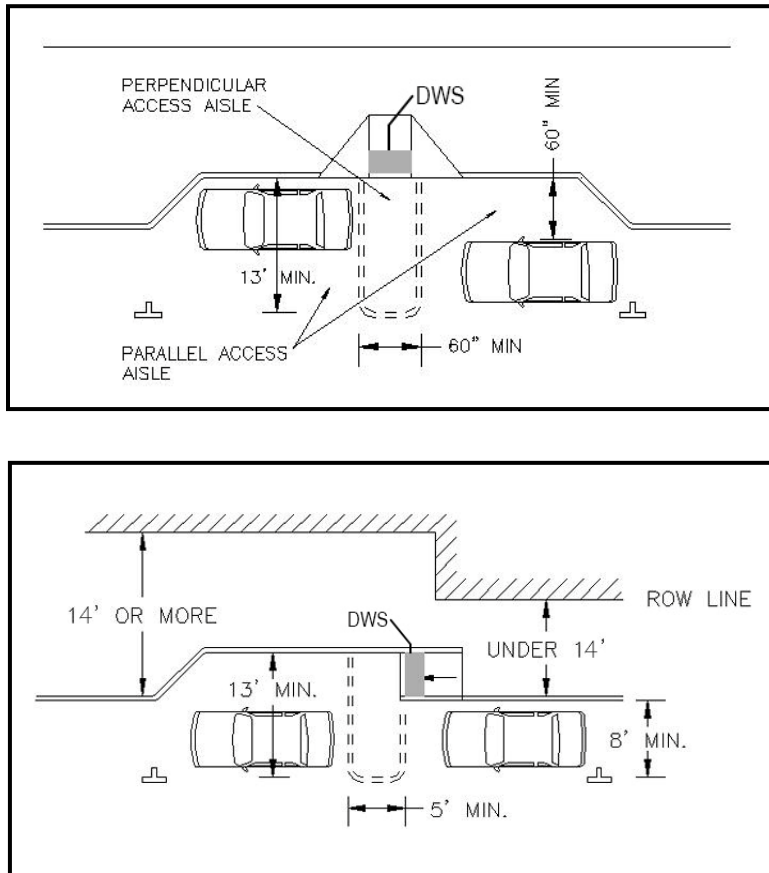
Source: PROWAG 2011, Table R214.

When provided, accessible on-street parking spaces should be located close to high use pedestrian generators. If possible, the spaces should be located where the roadway has a minimal cross slope and grade to make the transition to a wheelchair as easy as possible. In addition, the adjoining sidewalk should be free of any obstructions that would interfere with the deployment of a vehicle lift or ramp.

The design of the accessible parking spaces and PAR must comply with the requirements from PROWAG R309 for on-street parking. The pedestrian access routes must use compliant curb ramps connected directly to access aisles where they are provided.

Parallel parking spaces may be provided in areas of wide right of way or in a narrow right of way. Where the width of the adjacent right of way behind the curb is greater than 14', an access aisle at least 5' wide should 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. In a narrow right of way, an access aisle is not required where the width of the adjacent right of way behind the curb is less than or equal to 14'. See Figure 30. When an access aisle is not provided, the parking space shall be located at either end of the block face. Access to the PAR is to be provided by way of the curb ramp that serves the crosswalk adjacent to the accessible parking space located at the end of the block.

Figure 30
Accessible Parallel Parking Spaces*



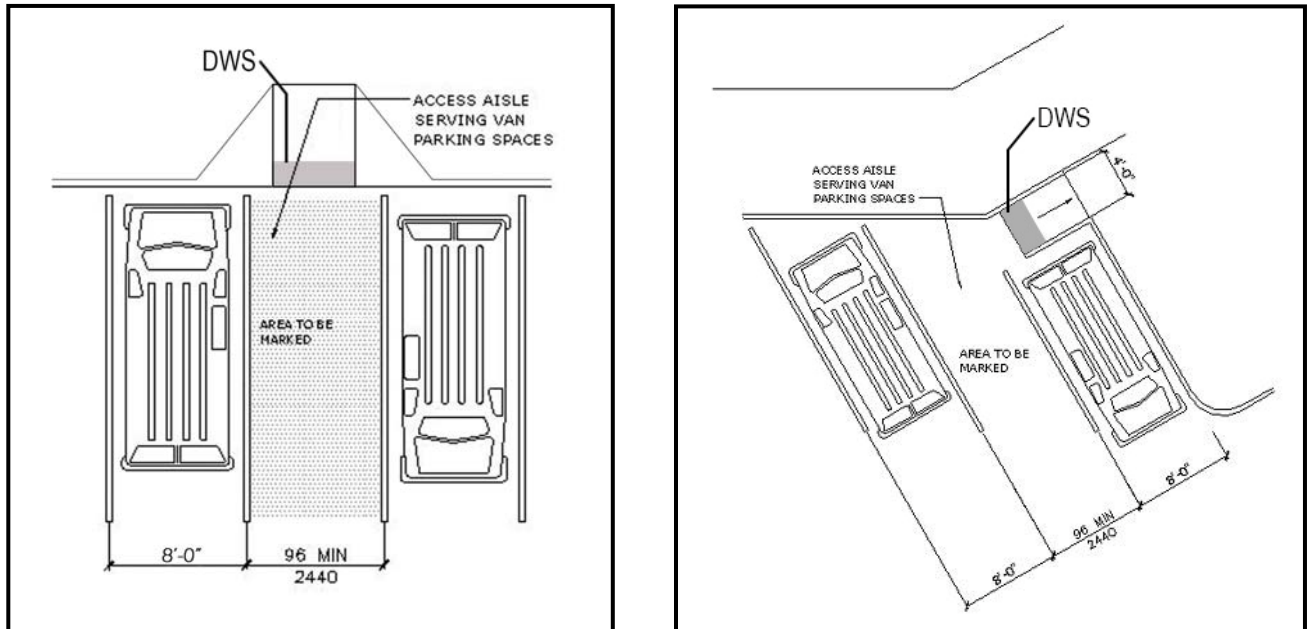
Source –Figures X02.6 A & B, Building a True Community, Final Report, Public Right of Way Access Advisory Committee, with modifications

Note:

*All pavement marking and signage must comply with the DE MUTCD

Where angled parking is provided, an access aisle that has a minimum width of 8' shall be provided at street level the full length of the parking space. The access aisle shall connect to a pedestrian access route serving the parking space. Access aisles shall be marked so as to discourage parking in them. All accessible angled on-street parking is treated as van parking with wide access aisles. Two spaces are permitted to use a single access aisle except where local ordinance prohibits backing vehicles into angled parking spaces. In this instance, an access aisle for each accessible space is to be provided. See Figure 31.

**Figure 31
Accessible Perpendicular/Angled Parking Spaces***



Source –Figures X02.6 C & D, Building a True Community, Final Report,
Public Right of Way Access Advisory Committee, with modifications
*Note: All pavement marking and signage must comply with the DE MUTCD

Each accessible parking space must be signed as such using the International Symbol of Accessibility complying with PROWAG R411 and the DE MUTCD. 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 (R211.4).

Parking meters, where provided, must be served by an accessible PAR. If the meters are provided at each space, they 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. The operations of the parking meters must comply with PROWAG R309.5. All displays and information must be visible from a point no higher than 3.3' above the center of the clear space in front of the meter.

P. Park and Ride Facilities and Other On-Site Parking Facilities

These facilities must comply with the 2006 Standards Sections 208, 209, 502 and 503.

Chapter 8

Pedestrian Access

During Construction and Maintenance

The standards and guidelines in the latest DE MUTCD represent the basis for developing the maintenance of traffic (MOT) plans for both vehicular traffic and pedestrian access (http://www.deldot.gov/information/pubs_forms/manuals/de_mutcd/index.shtml). The focus of these standards and guidelines is to ensure that all pedestrians, including disabled pedestrians, and all vehicular traffic can safely navigate the project site throughout all phases of scheduled maintenance and construction activities.

In the development of contract documents for alteration projects, new construction projects and in the development of scheduled maintenance projects, DelDOT must address both maintenance of traffic for vehicles as well as maintenance of pedestrian access as detailed in the latest DE MUTCD. **Temporary pedestrian facilities must meet or exceed Pedestrian Standards.** If either the standards or guidelines are not followed, an approved Request for Practical Exception is required to document, in the project file, the rationale for not following the standards and or guidelines.

The focus of this effort is to ensure that all pedestrians, including disabled pedestrians, and vehicular traffic can safely navigate the project site throughout all construction phases. Development of the MOT plans must include compliant pedestrian access for each phase of work and be implemented as planned. Pedestrian access must be provided equally for all pedestrians whether by conventional or creative means of providing access. The following principles should be applied:

- Coordinate pedestrian needs and construction activity with the adjoining property owners prior to the start of work;
- Limit sidewalk closures to block-by-block sections;
- Limit sidewalk closures to only one side of the street if there are existing pedestrian facilities on both sides;
- Review pedestrian detours to minimize misdirection of travel and the number of times the pedestrians must cross the roadway;
- Include appropriate signing;
- Provide temporary compliant sidewalks or walkways with curb ramps as required;
- Provide detectable guidance for the visually impaired;
- Provide pedestrian crosswalks at existing locations, preferably at intersections;
- Protect the edges of the PAR with crashworthy physical barriers to separate the PAR from the work area and adjacent travel lanes if the pedestrian access route is temporarily located in the street (other than at existing crosswalks) or if the work area encroaches into the PCP;
- Vehicular transportation may be provided for pedestrians travelling through the project corridor as long as the vehicular transportation is provided equally for all pedestrians and complies with the appropriate FTA standards for vehicles.

Appendix

Appendix A

DeIDOT Request for Practical Exception Form

DELAWARE DEPARTMENT OF TRANSPORTATION
REQUEST FOR PRACTICAL EXCEPTION

Project Information			
Contract Name:			
Contract #:		Project ID:	
County:		Bridge #:	
Designer:		Project Manager:	
Location Map			
Show specific location of non-compliant feature.			
Project Type			
Alteration		Reconstruction	
Resurfacing	<input type="checkbox"/>	New Construction	<input type="checkbox"/>
Maintenance	<input type="checkbox"/>	Existing Roadway Reconstruction	<input type="checkbox"/>
Safety Improvement	<input type="checkbox"/>	Roadway Widening	<input type="checkbox"/>
Drainage Improvement	<input type="checkbox"/>	Pedestrian Improvement Project	<input type="checkbox"/>
Utility Maintenance/Improvement	<input type="checkbox"/>	Recreational Facility Project	<input type="checkbox"/>
Signal Installation/Improvement	<input type="checkbox"/>	Other: _____	<input type="checkbox"/>
Facility Type (Subject to Exception)			
Sidewalk	<input type="checkbox"/>		
Curb Ramp	<input type="checkbox"/>		
Crosswalk	<input type="checkbox"/>		
Pedestrian Signalization	<input type="checkbox"/>		
Other: _____	<input type="checkbox"/>		
Reasons for Non-Compliance			
Right-of-Way	<input type="checkbox"/>		
Utilities	<input type="checkbox"/>		
Existing Topography	<input type="checkbox"/>		
Structural	<input type="checkbox"/>		
Historic Preservation	<input type="checkbox"/>		
Environmental/Permitting	<input type="checkbox"/>		
Other: _____	<input type="checkbox"/>		
Describe reason for non-compliance:			

DELAWARE DEPARTMENT OF TRANSPORTATION
REQUEST FOR PRACTICAL EXCEPTION

Photograph: Existing Conditions	
Recommended Alternative	
Reason for selection:	
Prepared By: _____ (Designer)	Date: _____
Recommended By: _____ (Program Manager II)	Date: _____
With Concurrence: _____ (Assistant Director)	Date: _____
With Concurrence: _____ (ADA Title II Coordinator)	Date: _____
Approved By: _____ (Chief Engineer)	Date: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
REQUEST FOR PRACTICAL EXCEPTION

Alternative Analysis		
Description/Summary of Proposed Alternative:		
Maximum Obtainable Compliance		
Pedestrian Access Route		
	DeIDOT Minimum	Obtained
PAR Width	36" Min.	
PAR Cross-slope	50:1 Max.	
PAR Running Slope	Same as Adjoining Roadway or 5% max on Separate R/W	
Pinch Point	32" Min Width by 24" in direction of travel	
Curb Ramp		
	DeIDOT Minimum	Obtained
Ramp Slope	8.3% Max.	
Ramp Width	36" Min.	
Ramp Cross-slope	50:1 Max.	
Ramp Flares	8.3% Max.	
Landing Dimensions	36" wide by adjoining ramp width	
Landing Slope	50:1 Max.	
Counter Slope	13.0% Max.	
Detectable Warning System	24" X full width of ramp	
Pedestrian Signalization		
	DeIDOT Minimum	Obtained
Distance from PAR	10" Max.	
Elevation above PAR	40" Min. to 44" Max.	
Details/Figures		

Appendix B

Pedestrian Accessibility Standards

Measurement Construction Tolerances

Measurement construction tolerances are needed to address the imperfections encountered when constructing facilities with concrete and asphalt materials. The impacts of not allowing construction tolerances would increase costs for the replacement of features within construction tolerance of the Desired Standards; increased number of claims; result in increased in bid prices; limit DelDOT's ability to address the backlog of non-compliant features; and, the provision of an interconnected pedestrian system.

<u>Pedestrian System Feature</u>	<u>Desired Standard</u>	<u>Construction Tolerance</u>
PAR		
Cross Slope	2.0%	1.0%
Running Slope	5.0% *	1.0%
Curb Ramps		
Cross Slope	2.0%	1.0%
Running Slope	8.3%	1.0%
Counter Slope	13.0%	0.0%
Median/Channelized Island Crosswalks		
Running Slope	5.0% *	1.0%
Roadway Crosswalks		
Asphalt		
with Yield or Stop Control	2.0%	1.5%
without Yield or Stop Control, or with a traffic signal	5.0% **	1.5%
Concrete		
with Yield or Stop Control	2.0%	1.0%
without Yield or Stop Control, or with a traffic signal	5.0% **	1.0%
Roadway Crosswalks Running Slope		
Asphalt	5.0%	1.5%
Concrete	5.0%	1.0%
Driveways/Entrances Crosswalks Running Slope		
Asphalt	5.0% *	1.5%
Concrete	5.0% *	1.0%
Driveways/Entrances Crosswalks Cross Slope		
Asphalt	2.0%	1.5%
Concrete	2.0%	1.0%

* 5.0% plus construction tolerance or maximum profile grade of parallel roadway if greater than 5%

** 5.0% plus construction tolerance or maximum profile grade of roadway if greater than 5%

Appendix C

DeIDOT Minimum PAR Standards

Project Scope and Limits

Scope and Limits: Program Manager II must take the initiative to define, maintain, modify or extend the scope or limits of a project in order to provide access to state and local government offices, transportation facilities and places of public accommodation followed by barrier removal on pedestrian facilities that serve other areas such as providing a missing section of sidewalk that would connect employment, commercial or residential areas in DeIDOT right of way. All newly constructed facilities, altered portions of existing facilities, and elements added to existing facilities for pedestrian circulation and use located in the public right of way shall comply with the requirements of the Desired Standards for compliance unless physical constraints exist.

Existing Physical Constraints: Where existing physical constraints make it impracticable for altered elements, spaces, or facilities to fully comply with the requirements of the Desired Standards, compliance with Minimum PAR Standards is required to meet the Desired Standards to the maximum extent feasible but not less than the Minimum Standards within the scope and limits of the project. Existing physical constraints include, but are not limited to, underlying terrain, right of way availability, underground structures, adjacent developed facilities, drainage, or the presence of a notable natural or historic feature. (R202.3.1)

Where it is not practical to meet Minimum PAR Standards, the feature must be designed and constructed to meet the Minimum Standards to the maximum extent feasible.

Request for Practical Exception (RPE)

Alteration Projects – Program Manager II Responsibilities

Resolve the non-compliance issue or develop a compliant alternative for the pedestrian system feature at issue to meet or exceed Desired Accessibility Standards. If the Desired Standards cannot be met, design the feature to meet the Desired Standards to the maximum extent feasible but not less than the Minimum PAR Standards. Submit a memorandum documenting the reasons for the request and recommended alternative to the Assistant Director, Engineering Support and ADA Title II/Section 504 Coordinator for information.

Document the reasons for a feature not being able to meet the minimum standards on alteration projects only. The reasons for not meeting the minimum standards may include safety, operations issues, or technically-infeasible situations. A completed RPE form must first be submitted for concurrence of the Assistant Director, Engineering Support and ADA Title II Coordinator. The Assistant Director, Engineering Support is responsible for submitting the concurred RPE form to the Chief Engineer for approval. Where alterations are found to have practical exceptions, the improvements must meet the Minimum PAR Standards to the maximum extent feasible. (202.3)

Pedestrian Access Routes (PAR)

Width: 3' min; planar, smooth and continuous (403.5.1)

Running Slope: same as adjoining roadway or 5% max on separate r/w or on shared use path; (R302.5.1)

Running Slope Measurement Construction Tolerance: 1.0% or maximum profile grade of the parallel roadway if greater than 5%

Cross Slope: 2.0% max; (403.3 rounded down)

Cross Slope Measurement Construction Tolerance: 1.0% (PAR cross slope 3.0% max.).

Pinch Points: width 32" min. by 24" max. in the direction of travel; (403.5.1 Exception)

Passing Spaces: 5' x 5' area provided at intervals not to exceed 200 ft. where the PAR is less than 5' wide. (403.5.3)

Surface: must be firm, stable and slip resistant. (302.1)

PAR Vertical Elevation Differences: Vertical elevation differences between adjacent surfaces shall not exceed ¼". Elevation differences between ¼" and ½" shall be beveled at no steeper than 2:1 slope. Any difference greater than ½" shall be sloped no greater than 12:1 (8.33% max.). (303.2)

PAR Horizontal Gaps and Joints: Horizontal and lateral sidewalk joints in the PAR must not exceed ½" in width and depth. Spaces wider than ½" can catch a wheel on a wheelchair, walker or crutches and cause the user to be ejected, turn over, trip or fall. Elongated openings, like those of most grates, must be oriented so that the long dimension is perpendicular to the dominant travel direction. In locations where there is no dominant flow pattern, openings must be limited to ½" in both dimensions. Where an accessible route is available to bypass openings completely, they can be oriented in any direction. (302.3)

Utility covers: should not be located in the PAR; if they are, they must meet PAR requirements

Driveway PAR Crossings

PAR Width: 3' min. (403.5.1)

Running Slope: same as adjoining roadway or 5% max on separate r/w or on shared use path; (R302.5.1)

Running Slope Measurement Construction Tolerance:

Asphalt – 1.5% (running slope 6.5% max. or same as adjoining roadway)

Concrete – 1.0% (6.0% max or same as adjoining roadway)

Cross Slope: 2.0% max. (403.3 rounded down)

Cross Slope Measurement Construction Tolerance:

Asphalt – 1.5% (cross slope 3.5% max.)

Concrete – 1.0% (cross slope 3.0% max.)

PAR Crossing and Apron: shall be constructed of concrete in subdivisions

Obstructions and Protruding Objects

PAR Clear Width: 3' min. (403.5.1)

Protrusion Limits: Objects with leading edges more than 27" and not more than 80" above the finish floor or ground shall protrude 4" max horizontally into the PCP. (307.2)

Cane Detectible Range: surface level up to 27" max

PAR Vertical Clearance: 80" min.

PAR Vertical Surface Discontinuities: Between ¼" and ½" beveled with a slope not steeper than 2:1; difference greater than ½" beveled with a 12:1 (8.33% max.) slope. (303.2)

PAR Horizontal Openings: Grate openings and joints shall not permit passage of a sphere more than ½" in diameter. Elongated openings in gratings shall be placed perpendicular to the dominant direction of travel. (302.3)

Post-Mounted Objects: Free-standing objects with leading edges 27" to 80" high that are mounted on posts or pylons cannot protrude more than 12" into the PCP. The 12" limit also applies to the clearance between multiple posts (excluding the sloping portions of handrails). Objects with leading edges up to 27" maximum or above 80" can protrude any amount from posts or pylons. See Figure 11, for examples.

Handrails: Where provided to serve stairs or site access ramps, handrails or handrail extensions shall not reduce the width of the PAR and shall not constitute a protruding object. In alterations where handrail extensions would reduce the clear width required for pedestrian access routes, handrail extensions shall not be required (R217 and R409).

Barriers: Fixed barriers, such as guardrails, are required where the protruding objects extending more than 4" from a fixed structure exist or where the vertical clearance is less than 80" such as at open stairways and along sloped or curved walls. Barriers must have leading edges no higher than 27" so that they are within cane sweep and high enough not to be mistaken for a step or change in elevation. Fixed planters, benches, and other elements can be used instead of guardrails as illustrated in Figure 10.

Curb Ramps

Curb Ramp Width: 3' min. (405.5)

Running Slope: 8.3% max; 10% with Program Manager II approval for recognized constraints such as existing physical constraints not limited to, underlying terrain, right of way availability, underground structures, adjacent developed facilities, drainage, or the presence of a notable natural or historic features. (R202.3.1)

Running Slope Measurement Construction Tolerance: 1.0% (running slope 9.3% maximum)

Cross slope: 2% max. (405.3 rounded down)

Cross Slope Measurement Construction Tolerance: 1.0% (cross slope 3.0% max.)

Curb Ramps with landings: at top of curb ramp approaches 3' min. and as wide as the adjoining ramp width

Landing: 2% max. in any direction. (304.2 Exception rounded down)

Landing Measurement Construction Tolerance: 1.0% (landing 3.0% max any direction)

Length of Ramp: A curb ramp segment between the landing and the sidewalk can be limited to 15' max. in length plus a transition 5' long max. if needed for cross slope or width changes having a slope steeper than 12:1 to tie into the sidewalk that matches the running grade of the adjoining roadway. (R304.2.2)

Flares: 10% maximum with approval of Program Manager II.

Counter slopes: The +/- value of the slope is defined as (+) for uphill slopes and (-) for downhill slopes. Grade changes in the path of travel should not exceed the algebraic difference of 13%. If conditions result in the need to provide a counter slope greater than 13%, a landing with 2% max. running slope must be provided at the bottom of the ramp behind the curb. The landing must be as wide as the ramp and min. 2' deep in the path of travel. The DWS area can be included within this transition landing area. Alternatively use a parallel ramp with a 5' X 5' landing including DWS behind the depressed curb.

Curb Ramp Locations

Curb Ramp Location: Entirely in the PCP with ramps located behind the curb/edge of roadway and, excluding flares, wholly within the marked crosswalk if provided. (406.5)

Curb Ramps: Shall be provided at the termini of all existing and proposed crosswalks within the project limits if there is existing sidewalk or the project includes proposed sidewalk. Crosswalks may be marked or unmarked. Parking spaces shall not obstruct the accessible route associated with a curb ramp.

Diagonal Ramps Not Preferred: Diagonal ramps require a landing at the top of the curb ramp for turning movements and a landing in the roadway for turning movement to access the desired crosswalk. A curb ramp on the corner radius that provides a direct connection to a crossing on a channelized island that does not require a landing in the street for turning movements to access the desired crosswalk is not a diagonal curb ramp. Use of diagonal curb ramps on DelDOT highways is not preferred because they:

- **Mislead pedestrians who are visually impaired** into the center of the intersection rather than guide them to the appropriate crosswalk and receiving curb ramp;
- **Typically present a challenge to provide positive drainage;** and,
- **Typically present a challenge to construct and resurface the street landing area.** This minimum landing area is 4' by 4' min. to accommodate pedestrian turning maneuvers to access the desired crosswalk and is located in the roadway outside of the through travel lanes. The initial and continuing challenge is to construct, resurface and otherwise maintain a clear landing with no more than a 2.0% cross slope in any direction in the roadway. Diagonal curb ramps should not be used unless constraints such as skewed intersections or small corner radii require their use and the Assistant Director Engineering Support approves their use.

If diagonal curb ramps are used: they must have well-defined edges parallel to the direction of pedestrian flow. The bottom of diagonal curb ramps shall have a clear space 4' by 4' min. outside of the active traffic lanes of the roadway. At marked crossings the 4' by 4' min. clear space must be within the markings where a turning movement is required to access the desired crosswalk. Diagonal curb ramps with flared sides shall have a segment of curb 24" long min located on each side of the curb ramp and within the marked crossing. (406.6)

DelDOT Type 3 curb ramp approved in 2014: is an acceptable ramp to use in place of a diagonal curb ramp since it is designed and installed to allow pedestrians to make the needed turning movements behind the curb to access the desired crosswalk without requiring a turning movement in the street.

Detectable Warning Surface (DWS)

DWS: 2' min in the direction of travel from the back of curb, full width of the curb ramp or blended transition. (406.8)

DWS Format: consist of truncated domes aligned in a square or radial grid pattern (705)

Surface of Truncated Domes: base 0.9" min to 1.4" max, a top diameter of 50 % min to 65% max of the base diameter and a height of 0.2".(705.1)

Dome Spacing: center-to-center spacing of 1.6"min to 2.4" max, and a base-to-base spacing of 0.65" min, measured between domes on a square grid. (705.1.2)

Contrast: either light-on-dark, or dark-on-light with walking surface (705.1.3)

Crosswalks: (marked & unmarked) and designated places where pedestrians cross roadways.

Pedestrian Refuge Medians/Islands: 6' min length must have DWS behind each curb or 2" from the adjacent edge of each roadway extending 2' in the direction of pedestrian travel and separated by a section of smooth pavement extending 2' in the direction of pedestrian travel.

Signalized Driveways and Entrances: commercial driveways/entrances provided with yield, stop control or signal, should be provided with detectable warning surfaces at the junction between the pedestrian route and the vehicular route.

Commercial Driveways/Entrances: provided with yield, stop control or signal, detectable warning surfaces shall be provided at the junction between the pedestrian route and the vehicular route.

Pedestrian At-Grade Rail Crossings: DWS are not required in a roadway where DWS are on the approach curb ramps. See Chapter 7 Section III. J. Railroad Crossings if not located within a street or highway.

Note: The US Department of Transportation's ADA standards require detectable warnings on curb ramps under section 406.8.

Roadway Crosswalks

Connections: PAR street crossings shall be provided, including medians and islands with and without pedestrian refuge areas, and pedestrian at-grade rail crossings. The PAR shall connect departure and arrival sidewalks (and shoulders where applicable). (R204.30)

- **Width** - At least 6' wide (DE MUTCD) or wider to ensure the approach sidewalk, shared use path or trail is within the cross walk marking.
- **Cross Slope**
 - With Yield or Stop Control – 2% maximum. (R302.6)
 - Without Yield or Stop Control or With Traffic Signals – 5% maximum. (R302.6.1)
 - Midblock – Equal the roadway grade. (R302.6.2)
- **Cross Slope Measurement Construction Tolerance:**
 - Asphalt
 - With Yield or Stop Control - 1.5% (cross slope 3.5% max.)
 - Without Yield or Stop Control - 1.5% (cross slope 6.5% max.)
 - Concrete
 - With Yield or Stop Control - 1.0% (cross slope 3.0% max.)
 - Without Yield or Stop Control - 1.0% (cross slope 6.0% max.)
- **Running Slope:** 5% maximum in the direction of pedestrian travel or to match the grade of the parallel roadway (R302.5). Safety and Operations Exceptions include Pave and Rehabilitation Program projects which shall meet the cross slope criteria to the

maximum extent feasible with milling and overlay and without reconstruction of grades (e.g., tabling intersections). On superelevated roadways where the cross slope exceeds 5%, the running slope of the crosswalk shall match the roadway cross slope. For example, if a horizontal curve requires a superelevation rate of 6%, then designers should not lower the superelevation rate to 5% to meet the max 5% crosswalk running slope.

- **Running Slope Measurement Construction Tolerance:**
 - Asphalt - 1.5% (running slope 6.5% max.)
 - Concrete - 1.0% (running slope 6.0% max.)
- **Crosswalk Width:** see DE MUTCD 3B.18 05A

Median and Channelized Island Crosswalks

PAR Clear Width: 5' min (R302.3.1) (to accommodate 2 wheelchairs side by side)

Crossing length: 4' min

Surface: firm, stable and slip resistant

Preferred Treatment: A cut through is the preferred treatment for medians/ islands; ramps can be used where the island width is sufficient to accommodate them.

Continuous Connection: PAR crossings connect adjacent curb ramps, islands and medians.

Cross slope

- With Yield or Stop Control – 2% maximum. (R302.6)
- Without Yield or Stop Control or With Traffic Signals – 5% maximum. (R302.6.1)
- Midblock – Equal the roadway grade. (R302.6.2)

Cross Slope Measurement Construction Tolerance

- Asphalt
 - With Yield or Stop Control - 1.5% (cross slope 3.5% max.)
 - Without Yield or Stop Control or With Traffic Signals - 1.5% (6.5% max.)
- Concrete
 - With Yield or Stop Control - 1.0% (cross slope 3.0% max.)
 - Without Yield or Stop Control or With Traffic Signals - 1.0% (6.0% max.)

Running Slope: 5% max. or match the grade of the parallel roadway.

Running Slope Measurement Construction Tolerance:

- Asphalt - 1.5% (running slope 6.5% max.)
- Concrete - 1.0% (running slope 6.0% max)

DWS in Pedestrian Refuge Areas: are to be installed the full width of the opening at the edges of the median/island extending 2' min. in the path of travel and separated by a smooth surface extending 2' min. in the path of pedestrian travel (R305.2.4 and Standard C-2 Sheet 3). When the length of the median/island in the direction of pedestrian travel is less than 6' no DWS are to be installed.

Railroad/PAR At-grade Crossings

PAR Surface

PAR Criteria and Construction Tolerances must be followed. The PAR surface of at-grade pedestrian facility crossings of freight and passenger railroads must be planar, smooth and continuous surface constructed of materials that are firm, stable and slip-resistant. The following requirements for the vertical alignment of the PAR surface and the flangeway gaps (the area adjacent to the inside of each rail that accommodates the wheel flanges of a rail car) are:

- **PAR approach to outer edge of rails** – surface must be level and flush with the top of rail outer edges. (R302.7.1)
- **PAR between the rails:** surface must be aligned with the top of rails
- **Flangeway Gap:** 2.5” maximum (2006 Standards 810.10)

DWS Location

The location of the required DWS shall be 2’ wide in the path of travel and across the full width of PAR varies by situation (R208 & R305.2.5):

- **Railroad tracks cross the PAR in the roadway:** DWS on the bottom of the curb ramps serving the crosswalk meet the requirement. A second set of DWS at the tracks in the roadway shall not be installed. However, if the PAR crosses the tracks within a roadway shoulder without DWS, then DWS shall be installed as per Figure 24.
- **Railroad tracks cross the PAR in a median between two roadways without gates:**
 - Place DWS 2’ min. in the path of travel and across the full width of PAR in the median and at least 13’ from the edge of the closest rail only if there is a smooth level landing 3’ min. width (5’ preferable) between the DWS locations at the edge of roadway/behind the median curb and the DWS on the railroad approach.
 - Do not place DWS in the median if there is not at least 20’ between the edge of roadway/back of curb and the closest rail.
- **Railroad tracks cross the PAR in a median between two roadways with gates:**
 - Place DWS 2’ min. in the path of travel and across the full width of PAR in the median at least 5’ prior to the gate in a down position.
 - Minimum of 12’ is required from the edge of roadway/back of curb in the median to the gate in the down position to provide a smooth level landing 3’ min. in the path of travel (5’ preferable) between the DWS locations at the edge of roadway/behind the median curb and the DWS prior to the gate in the down position.
- **Railroad tracks cross the PAR not in a roadway without crossing gates**

DWS are required to be located on the outside edges of the tracks as follows:

 - Full width of the PAR;
 - At least 2’ deep in the path of travel; and,
 - DWS edge must be located:
 - At least 13’ from the edge of the closest rail but
 - No farther than 15’ from the edge of the closest rail.
 - The rows of truncated domes in the DWS should be aligned to be parallel with the direction of wheelchair travel.

- **Railroad tracks cross the PAR not in a roadway with crossing gates**
 - Full width of the PAR;
 - At least 2' deep in the path of travel; and,
 - DWS edge adjacent to the gate must be located 5' min. prior to the face of the crossing gate arm in the down position.
 - The rows of truncated domes in the DWS should be aligned to be parallel with the direction of wheelchair travel
- **Railroad tracks cross PAR on roadway shoulder without crossing gates**
 - Pave the shoulder PAR with a 2% max. cross slope or
 - Provide a curb and sidewalk bulb-out if the shoulder or parking lane is wide enough
 - DWS are required to be located on the outside edges of the tracks as follows:
 - Full width of the PAR;
 - At least 2' deep in the path of travel; and,
 - At least 13' from the edge of the closest rail but
 - No farther than 15' from the edge of the closest rail.
 - The rows of truncated domes in the DWS should be aligned to be parallel with the direction of wheelchair travel
- **Railroad tracks cross PAR on roadway shoulder with crossing gates**
 - Pave the shoulder PAR with a 2% max. cross slope or
 - Provide a curb and sidewalk bulb-out if the shoulder or parking lane is wide enough
 - DWS edge adjacent to the gate must be located 5' min. prior to the face of the crossing gate arm in the down position.
 - The rows of truncated domes in the DWS should be aligned to be parallel with the direction of wheelchair travel

Bus Stops

These USDOT standards became effective November 29, 2006.

Surface: boarding and alighting areas must be firm, stable. (810.2.1)

Clear Length: 8' measured perpendicular to the curb or edge of roadway (810.2.2)

Length Slope: Perpendicular to the roadway, the slope of the bus stop boarding and alighting area shall not be steeper than 2% max. (810.2.4)

Length Slope Measurement Construction Tolerance: 1.0% (cross slope 3.0% max)

Clear Width: 5' measured parallel to the roadway; 8' if the pad is in an isolated location not served by any other pedestrian facilities. (810.2.2)

Width Slope: Parallel to the roadway, the slope of the bus stop boarding and alighting area shall be the same as the roadway, to the maximum extent practicable. (810.2.4)

Bus Shelters: Min. clear floor space complying with Section 305 of 2006 Standards (2.5' x 4' min) entirely within the shelter. Bus shelters shall be connected by PAR. (810.3).

Accessible Connections: Bus stops must be connected to streets, sidewalks or pedestrian paths by an accessible route (810.2.3)

Traffic Signals and Pedestrian Signals

Traffic Justification Study: is required to warrant a traffic signal, identify the need and location of safe crosswalks.

DelDOT “Interim Guidelines for the Installation of Accessible Pedestrian Signals,” dated December 11, 2007, provide a process for DelDOT to evaluate and prioritize APS installations (including HAWK signals) when they are requested.

See DE MUTCD, chapter 4.

Pushbuttons:

- As close to the curb ramp as possible without interfering with clear space requirements.
- Should be separated by a distance of at least 10’. Where physical constraints prevent the separation and there are two pedestrian pushbuttons on the same pole, the housing of each pushbutton shall be marked with an arrow indicating the crossing direction it serves, and the APS message, where provided, will be modified to give more information about street crossing.
- Should be located no more than 5’ beyond the outside edge of the marked crosswalk. Shall be located adjacent to and within 10” of the 5’ X 5’ level landing serving the curb ramp and extending 1.5’ min. beyond the pedestrian push buttons. A smaller landing requires approval of a Request for Practical Exception. When no push button exists, the 1.5’ extension can be omitted.
- Pedestrian pushbutton mounts on newly constructed pedestrian signals shall be located from 15” to 48” above the level landing serving a curb ramp. The DE MUTCD provides additional requirements and guidelines for the design of APS.
- In locations where there is an increased likelihood of the pedestrian pushbutton pole being struck, the pole should be placed as far as possible from the edge of the traveled way, but not farther than 10’ from the edge of curb, shoulder, or pavement. The face of the pedestrian pushbutton shall be aligned with the crossing.

Stop Bars

Location: a minimum of 4’ in advance of the nearest crosswalk line at controlled intersections.

See DE MUTCD, Section 3B.16.

On-Street Parking

Where on-street parking is provided on the block perimeter and the parking is marked or metered, accessible parking spaces complying with R309 shall be provided in accordance with Figure 29.

Where parking pay stations are provided and the parking is not marked, each 20’ of block perimeter where parking is permitted shall be counted as one parking space. (R214)

2006 Standards provides the standards for the design and layout of accessible parking spaces for persons with disabilities for on-site parking (including park and ride lots). (208)

Pedestrian MOT During Construction

See DE MUTCD, Part 6, Typical Applications 28 and 29 for guidance.

Appendix D Design Balance Example

The use of engineering judgment must be implemented when there are significant constraints that present design challenges. DelDOT considers a ramp that has two or three features slightly out of compliance as a more favorable design as oppose to a design that only has one feature that is extremely out of compliance. Alternative designs can be modified and approved to create a more suitable design. For example, such modifications include:

- Ramp cross slope transition to roadway profile
- A marginally longer transition zone
- An increase in the ramp slope (Requires an RPE)
- An increase in the landing slope (Requires an RPE)
- Transition zones shall not be constructed that reduce the accessibility of existing building entrances. The designer shall be aware of Building Code requirements for maneuvering clearances adjacent to door openings.

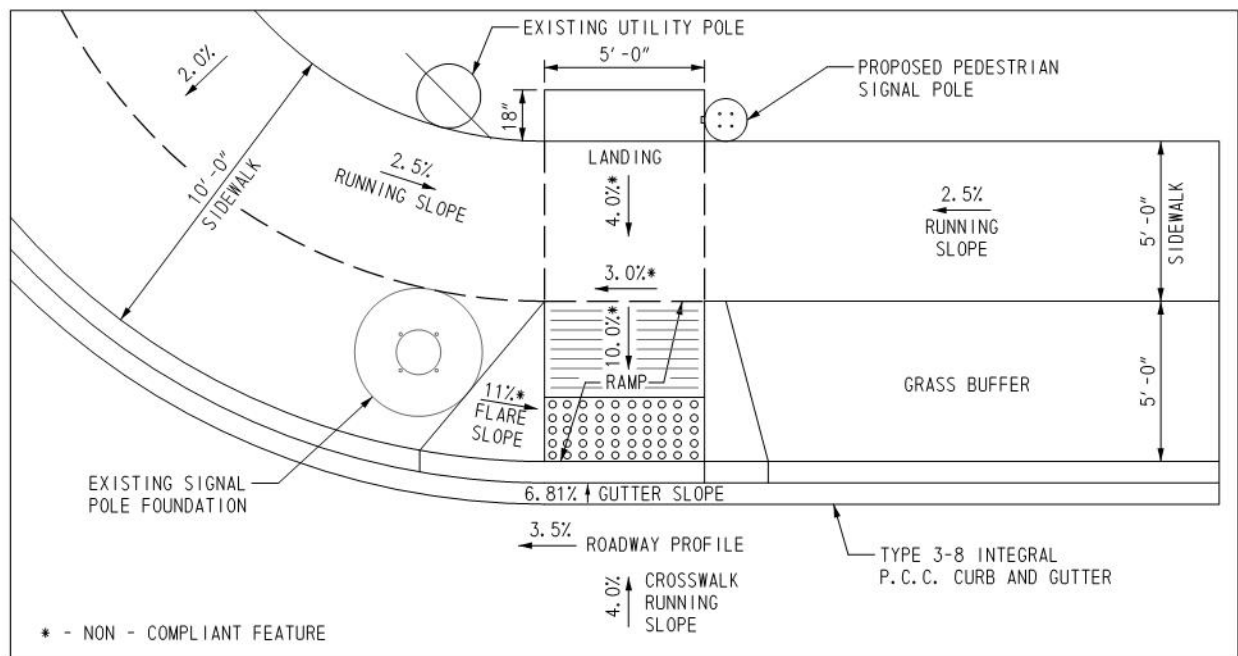
The sample problem shows the iterative process of achieving a balance between all of the curb ramp components (algebraic difference of counter slope, ramp slope, landing slope, transitional slope) in order to provide a design that allows for the greatest possible access and is designed to the maximum extent feasible.

Sample Problem

Project Type: Alteration (e.g., Pave and Rehab)

Intersection: Signalized which is considered without stop or yield control

**Figure 32
Initial Design Containing Several Non-Compliant Features**

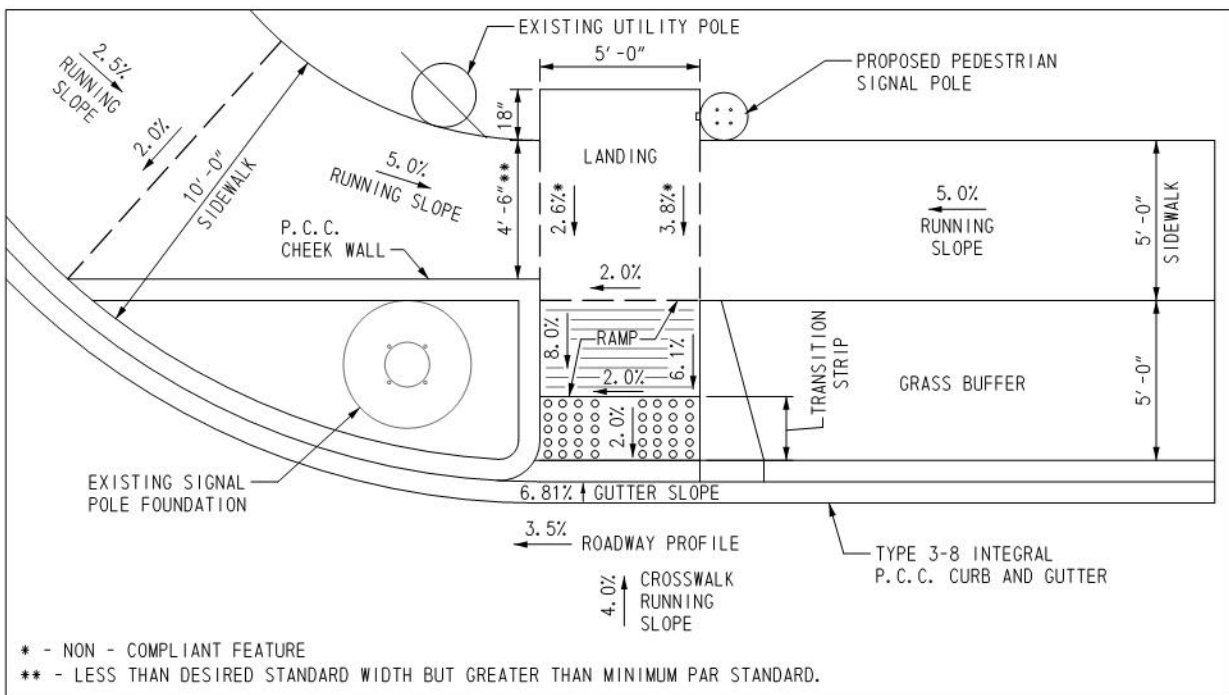


The design in Figure 32 above presents several non-compliant features such as:

- Curb ramp slope greater than 8.33%
- Side flare slope greater than 10%
- Algebraic grade difference greater than 13%
- Cross slope in front of the ramp greater than 2%
- Landing slopes greater than 2%

Although the sidewalk running slopes are compliant, the curb ramp is not compliant and includes several features needing to be redesigned. This can be accomplished by increasing the sidewalk running slope to the maximum 5% slope, adding a cheek wall across the existing signal pole and in place of the side flare, reducing the ramp's running slope within the allowable maximum and introducing a transition strip adjacent to the depressed curb. The cross slope on the transition strip at the curb is greater than the 2% maximum cross slope but because the intersection does not have stop or yield control, this is acceptable. The initial re-design results in the layout shown in Figure 33.

Figure 33
Redesign Addressing Some Non-Compliant Features

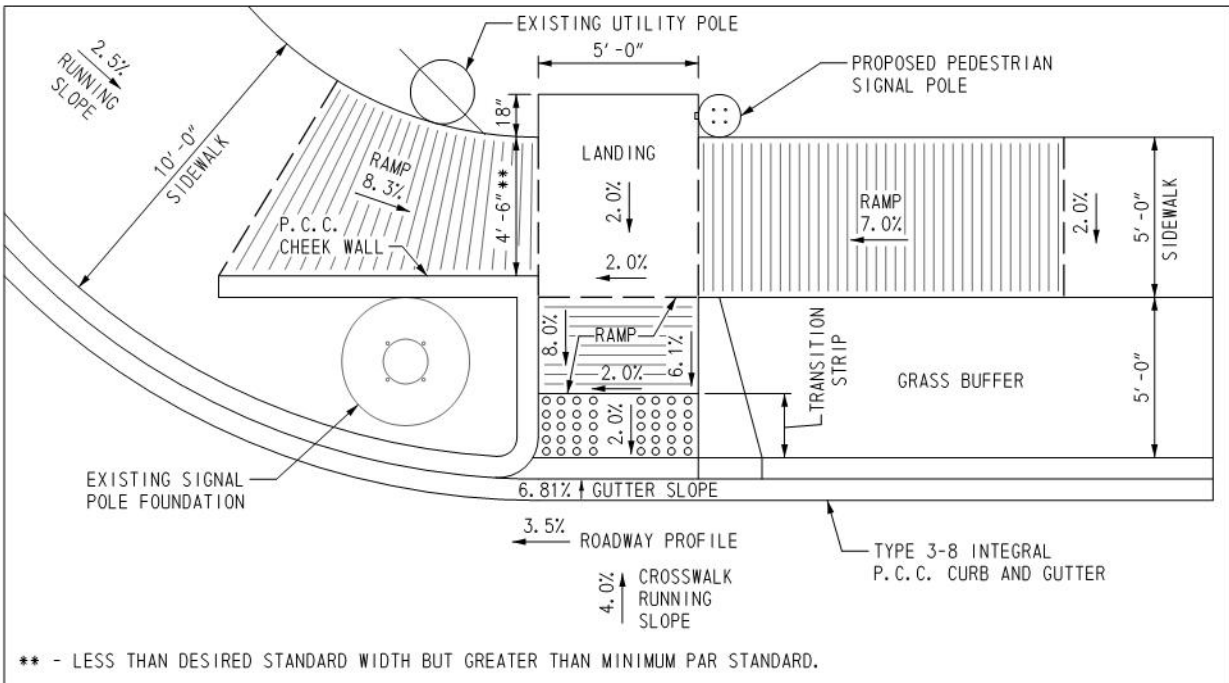


Despite the changes, the curb ramp still includes several non-compliant components listed below and the design requires further evaluation.

- Landing slopes greater than 2%
- Sidewalk width is greater than 3' Minimum PAR Standard but less than 5' Desired Standard width

This design has not been evaluated to the maximum extent feasible and it is not acceptable. Further changes include adding ramps on the sidewalk approaches to the landing. This change allows the elevation of the landing to be lowered further to provide a maximum 2% slope in all directions. The results of the second re-design are shown in Figure 34.

Figure 34
Redesign Addressing Non-Compliant Features
to the Maximum Extent Feasible



The re-design in Figure 34 still presents non-compliant elements such as:

- Curb ramp width is greater than 3' Minimum Standard but less than 60" Desired Standard width. Although the curb ramp width was less than the Desired width, this design was evaluated to the maximum extent feasible and it is acceptable with the following requirements:
- The Project Manager II must be prepare and submit a memorandum of explanation to the Assistant Director, Engineering Support and the ADA Title II Coordinator outlining why the curb ramp width is less than the Desired Standard width of 5'. A RPE is not required since all components of the pedestrian system features meet or exceed the Minimum PAR Standards.

Appendix E

Typical Request for Practical Exception Examples

- Due to physical constraints, sidewalks 5' wide cannot be provided throughout the entire project limits. On new construction projects, a RPE will not be granted to provide sidewalks 4' wide throughout the entire project limits. A RPE Approval will only be provided for the specific location or consolidated locations where the physical constraints are present. Sidewalks 5' wide, or wider as appropriate, must be provided on the remainder of the project.
- As defined by DelDOT, any alterations made to provide an accessible path of travel to the altered area may be deemed to be infeasible for structural or safety reasons. Right of way impacts, community impacts and other geographical, environmental and/or physical constraints must also be considered along with any other mitigating factors.
- Where a number of elements on a project qualify for approval of a RPE under the same set of circumstances, the similar elements may be consolidated into one RPE so long as the same degree of impact, mitigation and compliance holds true for each element.

NOTE: Examples provided within this document represent typical situations and are not intended to be inclusive of all possible situations.

Appendix F

Examples of Maintenance Project Activities

- The extent to which sidewalks and curb ramps must be repaired or replaced when drainage pipes or inlets are repaired or when utility repairs or relocations are made, is at the discretion of the Program Manager II, on a case by case basis, working in concert with the ADA Title II Coordinator and Assistant Director, Engineering Support. This type of work may require only that the sidewalk or curb ramps be repaired in kind or the District Engineer may require that improvements be made to provide fully compliant construction of pedestrian facilities between logical termini.
- Repair of damaged traffic barrier adjacent to sidewalk in an urban area would not require upgrade of the adjacent sidewalk or curb ramps.
- Repair of potholes, patching of roadway or crack sealing of roadway would not require any installation or upgrades to adjacent sidewalks or curb ramps.
- Installation of or modifications to existing traffic signals, pedestrian signals, roadway lighting, or cameras may not require any installation or upgrades to adjacent sidewalks or curb ramps, unless, the Traffic Engineer working in concert with the ADA Title II Coordinator, determine that the modification creates a negative impact to the existing sidewalk, or the existing pedestrian push buttons are not accessible.
- Striping or modifications to the pavement markings on a roadway would not require installation or upgrade of existing sidewalk or curb ramps. This does **not** include projects where the entire roadway surface is being milled to be replaced with a new surface for the purpose of re-striping the roadway. (See Alteration Projects)
- Patching or repair of existing sidewalk to correct heaving, settlement, cracking or other severely deteriorated conditions would not require installation of new or upgrade of existing sidewalk. However, as a rule of thumb, if more than 50% of a run of sidewalk is being repaired, the entire length should be upgraded to DelDOT's requirements and guidelines for pedestrian accessibility compliance, curb ramps should be installed or upgraded, and detectable warning surfaces (DWS) should be provided at all street crossings and signalized entrances.
- Non-structural resurfacing such as slurry seals to correct surface friction or to seal the roadway to address cracking, according to the FHWA, would not require upgrade of the curb ramps.
- Emergency repairs, such as pavement patching for severely distressed pavement due to a harsh winter, natural, or man-made disasters, or spot high-friction treatments to address low surface friction pavement numbers would not require upgrade of the curb ramps.
- Repair or replacement of bridge substructure components would not require upgrade of the curb ramps and sidewalks.
- Changing bus signs, bus schedules or replacing existing amenities.

NOTE: Examples provided within this document represent typical situations and are not intended to be inclusive of all possible situations.

Appendix G

Examples of Alteration Project Activities

- On the following examples:
 - Coordination with the Assistant Director, Engineering Support and ADA Title II Coordinator is required where the Desired Accessibility Standards cannot be met.
 - In those situations, the Program Manager II must prepare and submit a memorandum of explanation to the Assistant Director, Engineering Support and the ADA Title II Coordinator outlining why the curb ramp width is less than the Desired Standard width of 5'.
 - The Program Manager II must submit a RPE to the Assistant Director, Engineering Support and the ADA Title II Coordinator for concurrence and subsequent approval by the Chief Engineer for any element that does not meet DelDOT's Minimum PAR Standards.
- A resurfacing project, including micro-surfacing, including maintenance resurfacing, will trigger the need to include new curb ramps where sidewalks exist or are being provided. Any PAR that crosses a curb requires new cur ramps or the upgrade of the existing curb ramps to the Pedestrian Accessibility Standards. This includes the provision of DWS at all street and railroad crossings and signalized entrances within, or adjacent to, the limits of the project in accordance with the Pedestrian Standards. A RPE is not required since all components of the pedestrian system features meet or exceed the Minimum PAR Standards. An approved RPE is required for any curb ramp or other pedestrian facility that does not meet the Minimum PAR Standards.
- A utility company decides to route its electric lines underground, requiring the reconstruction of a substantial length of existing sidewalk. The newly constructed sidewalk will need to meet the Pedestrian Standards. The limits of the sidewalk to be replaced must be extended to meet logical pedestrian use termini, curb ramps must be installed or upgraded and DWS must be provided at all street and railroad crossings and signalized entrances. The limits will be determined by the District Engineer, on a case by case basis, working in concert with the Assistant Director, Engineering Support and the ADA Title II Coordinator while using sound engineering judgment and considering factors such as ownership of the sidewalk, degree of impact, complexity of the solution and overall project scope. An approved RPE is required for any element that does not meet the Minimum PAR Standards.
- A substantial section of sidewalk is to be reconstructed under an area-wide sidewalk contract. The entire section will be required to be replaced to the Pedestrian Standards. The sidewalk must extend to logical pedestrian use termini and DWS must be installed at all street and railroad crossings and signalized entrances per the Desired Standards. As a rule of thumb, if more than 50% of a run of sidewalk is being replaced, the entire length should be upgraded to the Desired Standards. RPE approval is required for any element that does not meet the Minimum Standards.
- Minor widening or geometric improvements are being made to an open section roadway in a rural area with no evidence of existing pedestrian activity such as worn dirt paths, visual observation of people walking in the roadway, adjacent bus stops, adjacent pedestrian destinations such as public use facilities including commercial uses. The project would not initiate any requirements to install new sidewalks, if it is not within a designated growth area or a pedestrian count study does not support the need. The addition of or the widening of shoulders to a width of at least 4' should be considered outside of the designated growth

areas to provide an added measure of safety for motorists, bicyclists and pedestrians using these roadways.

- Bridge deck resurfacing should include pedestrian accessibility compliant upgrades to approach curb ramps, sidewalks and/or shoulders to the maximum extent feasible.
- Replacing or constructing bus shelter.
- Replace or install new bus boarding/alighting pad at existing bus stop.

NOTE: Examples provided within this document represent typical situations and are not intended to be inclusive of all possible situations.

Appendix H

Examples of New Construction Project Activities

- New construction or major improvements of a roadway requires adding new or upgrading existing sidewalks and curb ramps meeting the Pedestrian Standards including the provision of DWS at all street crossings, railroad crossings and signalized entrances. An approved RPE is required for any element that does not meet the Pedestrian Standards.
- New construction or major improvements of a bridge in an urban area or an area with evidence of existing pedestrian activity such as worn dirt paths, visual observation of people walking in roadway, adjacent bus stops, adjacent public use destinations would require adding new or upgraded sidewalks and curb ramps or shoulders meeting the Pedestrian Standards and providing DWS at all street crossings, railroad crossings and signalized entrances. RPE approval is required for any element that does not meet the Minimum PAR Standards.
- A community enhancement project could be expected to include new sidewalks or improve the existing sidewalks and curb ramps to the Pedestrian Standards within the project limits and extending the limits to logical pedestrian use termini. DWS must be provided at all street crossings, railroad crossings and signalized entrances. If aerial utilities are to be moved to support the project, they must be either relocated entirely outside the new sidewalk or within the sidewalk, as a last resort, in a location that will ensure pedestrian accessibility compliance to the maximum extent feasible using sound engineering judgment. An approved RPE is required for any element that does not meet the Minimum Standards.
- A park and ride lot or an expansion to an existing park and ride lot will be required to provide or upgrade sidewalks and curb ramps that meet the Pedestrian Standards to access adjacent sidewalks, bus stops or transit stations. DWS must be provided at all street crossings, railroad crossings and signalized entrances. Accessible bus loading areas shall be included in the project. An approved RPE is required for any element that does not meet the Minimum PAR Standards or DTC requirements and guidelines for pedestrian accessibility compliance.
- Minor widening or geometric improvements are being made at an intersection with curb, but no existing sidewalk. If there is any evidence of existing pedestrian activity such as worn dirt paths, visual observation of people walking in roadway, adjacent bus stops, adjacent public use facilities, new sidewalks meeting the Pedestrian Standards will need to be installed in the area of the widening and extended to a logical pedestrian use termini with curb ramps installed or upgraded at every leg of each intersection in the project limits of the accessible pedestrian improvements. An approved RPE is required for any element that does not meet the Minimum Standards.
- A resurfacing project on a roadway includes minor widening to add shoulders, parking lanes or provide accommodations for bicyclists. This project must include new or upgraded curb ramps or shoulders meeting DelDOT Pedestrian Standards throughout the project limits and extending to logical pedestrian use termini. DWS must be provided at all street crossings, railroad crossings and signalized entrances. An approved RPE is required for any element that does not meet DelDOT Standards.
- A resurfacing project includes the addition of new sidewalks within the project limits. All new sidewalks and curb ramps within the project limits must meet the Pedestrian Standards. DWS must be provided at all street crossings, railroad crossings and signalized entrances. An approved RPE is required for any element that does not meet the Minimum Standards.

- A developer widens the roadway to provide an auxiliary lane. As a result, the existing sidewalks are impacted. The developer must replace the impacted sidewalk along their frontage and will be required to upgrade any pedestrian facilities including sidewalk and curb ramps within the project limits to meet the Pedestrian Standards. The developer shall provide DWS at all street crossings, railroad crossings and signalized entrances. An approved RPE is required for any element that does not meet the Minimum Standards.
- A developer wants to create a new or modify their existing access onto State right of way. There currently is no sidewalk along the property frontage and there is evidence of existing pedestrian activity and/or an existing sidewalk along the frontage of adjacent businesses. The developer will be required to install new sidewalk, curb ramps and DWS at all street crossings, railroad crossings and signalized entrances along the property frontage in accordance with the Pedestrian Standards. The developer may be required to extend the pedestrian improvements beyond the frontage to logical pedestrian use termini. An approved RPE is required for any element that does not meet the Minimum Standards.
- New construction or major improvements of shared use trails and paths in State right of way or on State easements will be required to meet the Pedestrian Standards, which includes providing curb ramps wherever a trail or path crosses a curb at a roadway crossing. DWS shall be placed at all street crossings, railroad crossings and signalized intersections. An approved RPE is required for any element that does not meet the Minimum Standards.
- Commercial Driveways/Entrances provided with yield or stop control, detectable warning surfaces shall be provided at the junction between the pedestrian route and the vehicular route.
- Creating/constructing a new bus stop.

NOTE: Examples provided within this document represent typical situations and are not intended to be inclusive of all possible situations.

Appendix I

Examples of Limits for Accessibility Improvements

- Based on pavement condition, one limit of a resurfacing project is set mid-block. Even though the pavement work stops short of the intersection, the installation or upgrade of the curb ramps should extend to the next intersection, within a reasonable distance, and include every leg of the intersection.
- A turn lane is added at one quadrant of an intersection with existing sidewalks, requiring realignment of the sidewalk. The adjacent sidewalk and curb ramps must be upgraded to current Pedestrian Standards beyond the limits of the turn lane to the next logical termini, within a reasonable distance. Curb ramps should be installed to meet the Desired Standards, where they do not exist, at every leg of the intersection that is served by sidewalk. Non-compliant curb ramps at the intersection, not adjacent to the turn lane, do not need to be replaced with compliant ramps as a part of the turn lane project.
- One limit of a roadway reconstruction project is set just beyond an intersection. A State or local government office building or other public use facility (school, public library community center or hospital) is located no more than 1320' +/- (1/4 +/- mile) beyond the intersection. If a sidewalk or shoulder between the public use facility and the project limits either does not meet the Pedestrian Standards or a PAR does not exist, a compliant PAR on sidewalks or shoulders (at least 4' wide) should be provided from the project limits to the public use facility. Sidewalks or shoulders must be upgraded to current Pedestrian Standards where they are the designated PAR.
- A utility pole was installed in the center of an existing sidewalk 5' wide making it impassable for a person in a wheelchair. This action creates a barrier and violates Federal and DelDOT Pedestrian Standards. This is an unacceptable negative impact. An acceptable option would be to offset the utility pole to provide a minimum passable width of not less than 32" for a maximum running length not exceeding 24" not including the top of curb. These dimensions, 32" wide by 24" in path of travel, are the criteria for a Minimum Standard pinch point. A pinch point is wide enough to permit one way wheelchair use. Preferably, the Desired Standard of 34" by 24" or an additional section of sidewalk, 5' in width, could be provided around the pole.

Note: Pinch points are not permitted on new construction projects.

- A roadway is to be widened at an intersection to create a left turn lane. In order to not impact right of way, it is suggested that existing sidewalk be reduced from 5' to 3' for a distance of several hundred feet. This is an unacceptable negative impact if the permanent reduction is over 200' long and passing areas 5' by 5' are not provided at a spacing of 200' or less. The preferred solution would be to work with the appropriate DelDOT staff to reduce the lane widths and/or to secure an easement or right of way from the adjacent property owners to construct compliant DelDOT curb ramps and sidewalks.

NOTE: Examples provided within this document represent typical situations and are not intended to be inclusive of all possible situations.

Glossary of Terms

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

Administrative Authority - A governmental agency that adopts or enforces regulations and guidelines for the design, construction, or alteration of buildings and facilities.

Alteration - A change to a facility in the public right of way that affects or could affect pedestrian access, circulation, or use. Alterations include, but are not limited to: resurfacing, rehabilitation, reconstruction, historic restoration, or changes or rearrangement of structural parts or elements of a facility.

American Association of State Highway and Transportation Officials (AASHTO) - AASHTO is a nonprofit, nonpartisan association representing highway and transportation departments in the 50 states, the District of Columbia, and Puerto Rico. It represents all five transportation modes: air, highways, public transportation, rail, and water. Its primary goal is to foster the development, operation, and maintenance of an integrated national transportation system. AASHTO serves as a liaison between state departments of transportation and the Federal government. AASHTO is an international leader in setting technical standards for all phases of highway system development. Standards are issued for design, construction of highways and bridges, materials, and many other technical areas.

Blended Transition - A raised pedestrian street crossing, depressed corner, or similar connection between the pedestrian access route at the level of the sidewalk and the level of the pedestrian street crossing that has a grade of five percent or less.

Characters - Letters, numbers, punctuation marks and typographic symbols.

Code of Federal Regulations - Federal laws become codified in to the Code of Federal Regulations typically by title and part such as 28 CFR 35.150. This is read Title 28 Code of Federal Regulations Part 35.150 which addresses alternative means of providing accessibility to the maximum extent feasible when standards cannot be met involving a historic property or structure.

Components - The individual parts of a pedestrian system feature, such as a typical perpendicular curb ramp which has the following components: landing, ramp, flares, detectable warning surface and counter slope.

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

Crosswalk - Marked or unmarked identified path connecting existing or planned pedestrian access routes and intended for pedestrian use in crossing a vehicular public way.

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

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

Detectable Warning - A standardized surface feature built in or applied to walking surfaces or other elements to warn of hazards on a circulation path.

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

Engineering Judgment - Defined in industry literature as the evaluation of available pertinent information and the application of appropriate principles, standards, guidance and practices for the purpose of deciding upon the applicability, design, operation or installation of public improvements.

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

Features - The elements that make up the pedestrian access route such as sidewalks, curb ramps, crosswalks, among others.

Grade Break - The line where two surface planes with different grades meet.

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

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

Pedestrian Circulation Path - A prepared exterior or interior surface provided for pedestrian travel in the public right of way, typically extending from the back of curb to the building or back of sidewalk.

Practical Exception - DelDOT term to address pedestrian system features and an approval process to address features that cannot be constructed to the Desired or Minimum Accessibility Standards. Practical exceptions include and expand the technical infeasibility definition to include safety and operations requirements and guidelines of AASHTO and DelDOT Roadway Standards that are not addressed in the 2006 Standards or 2011/2013 PROWAG.

Project Limits - The geographic limits of work on a project.

Project Scope - The type work intended to be completed on a specific project.

Public Building or Facility - A building or facility or portion of a building or facility designed, constructed, or altered by, on behalf of, or for the use of a public entity subject to Title II of the ADA and 28 CFR Part 35 or to Title II of the ADA and 49 CFR 37.41 or 37.43.

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

Public Way - Any street, alley or other parcel of land open to the outside air leading to a public street, which has been deeded, dedicated or otherwise permanently appropriated to the public for public use and which has a clear width and height of not less than 10 feet (3050 mm).

Qualified Historic Facility - A facility that is listed in or eligible for listing in the National Register of Historic Places, or designated as historic under an appropriate state or local law.

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

Site - A parcel of land bounded by a property line or a designated portion of a public right of way.

Structural Frame - The columns and the girders, beams, and trusses having direct connections to the columns and all other members that are essential to the stability of the building or facility as a whole.

Tactile - An object that can be perceived using the sense of touch.

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

Undefined Terms - The meaning of terms not specifically defined in 2006 Standards, Section 106.5, or in regulations issued by the US Department of Justice or the US Department of Transportation to implement the Americans with Disabilities Act or in referenced standards shall be as defined by collegiate dictionaries in the sense that the context implies.

Vertical Surface Discontinuities - Vertical differences in level between two adjacent surfaces.

References

In addition to this pedestrian accessibility guide, DelDOT recognizes and uses the following documents with regard to the planning and design of accessible pedestrian facilities.

- The Americans with Disabilities Act of 1990 as amended, US Access Board
- Accessible Right of Way: A Design Guide, 1999, US Access Board
- ADA Standards for Transportation Facilities, 2006, US DOT
- ADA Standards for Accessible Design, 2010, US DOJ
- Frequently Asked Questions About ADAAG, US Access Board
- Public Right of Way Accessibility Guidelines (PROWAG) July 2011/2013, US Access Board
- The Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; Supplementary Material, Final Rule March 2007, US Access Board
- Special Report: Accessible Public Right of Way, Planning and Design for Alterations, Public Rights-of Way Access Advisory Committee (PROWAAC), July 2007
- Anthropometry of Wheel Mobility Project 2010, US Access Board
- ADA Handbook, published by the US Equal Employment Opportunity Commission and the US Department of Justice.
- Americans with Disabilities Act, Title II Technical Assistance Manual, US DOJ
- 49 Code of Federal Regulations Part 37, Final Rule Adopting New Accessibility Standards, November 2006, US Department of Transportation
- Design Guidance, Accommodating Bicycle and Pedestrian Travel: A Recommended Approach, US Department of Transportation Policy Statement
- Designing Sidewalks and Trails for Access – Best Practices Design Guide, Parts I & II, 2001 FHWA
- Questions and Answers About ADA and Section 504, June 2009, FHWA,
- Memorandum Clarification of FHWA Oversight Role in Accessibility, September 2006,
- Memorandum on the Use of the Revised Draft Guidelines, January 2006, FHWA
- Manual on Uniform Traffic Control Device (MUTCD), FHWA
- Memorandum: Consideration and Implementation of Safety Countermeasures, July 2008, FHWA
- A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO)
- Delaware Manual on Uniform Traffic Control Devices (DE MUTCD)
- Guide for the Planning, Design, and Operation of Pedestrian Facilities, AASHTO
- Guide for the Development of Bicycle Facilities, 2012, AASHTO
- Standard Construction Details, Delaware Department of Transportation
- Road Design Manual, Delaware Department of Transportation
- Design Guidance Memorandum 1-16, “Curb Ramps”, DelDOT
- Standards and Regulations for Subdivision Streets and State Highway Access, DelDOT, 2010
- DelDOT Interim Guidelines for the Installation of Accessible Pedestrian Signals, December 2007
- Visual Detection of Detectable Warning Materials by Pedestrians with Visual Impairments, FHWA, May 2006
- Roadside Design Manual, AASHTO 2011 4th Edition

