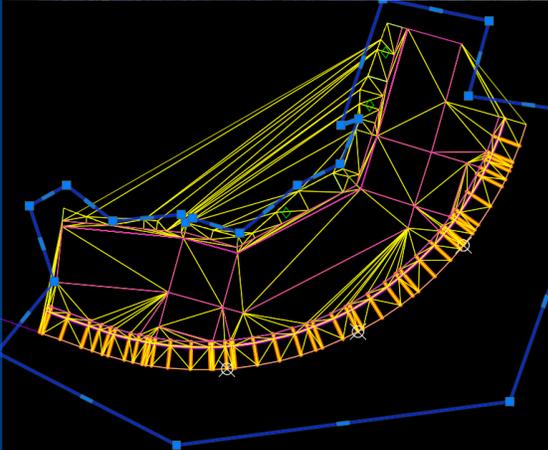


# Pedestrian Accessibility Standards Manual



2021 Edition



The creation and subsequent maintenance of the contents of the DeIDOT Pedestrian Accessibility Standards Manual (PAS Manual) is overseen by the Department's PAS Manual Executive Committee. The PAS Manual Executive Committee is further supported by the Department's PAS Manual Update Committee. The PAS Manual Update Committee assists the Executive Committee by providing technical input and approving the changes recommended by the PAS Manual Executive Committee.

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# Pedestrian Accessibility Standards Manual



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Date	Update from Previous Version	Section
11/2022	Created and inserted a list of committee members tasked with generating and maintaining the content of the DeIDOT PAS Manual.	NA
11/2022	Updated Figure 3.3.2.1 to imply a grade break at the bottom of the truncated dome detectable warning surface.	3.3.2.1
11/2022	Removed the term “debris” from Section 4.5.1.1.2 and Section 4.5.3.1.4.	4.5.1.1.2 4.5.3.1.4
11/2022	Created Section 3.1.6. Updated Section 4.4 and Table 4.6 to reflect creation of Section 3.1.6.	3.1.6 4.4 4.6
11/2022	Updated 3.1.1 paragraph 2 to clarify the required continuous clear width of pedestrian street crossings. Updated Section 4.6.3.1 to reflect language update to 3.1.1 paragraph 2.	3.1.1 4.6.3.1
11/2022	Removed paragraph 3 of Section 3.2 and adjusted paragraph numbering accordingly.	3.2

## Preface

DelDOT's mission is to provide excellence in transportation for every trip, every mode, every dollar, and everyone. In the effort to achieve this mission, the Department actively reviews its policies, practices, and standards to create continual process improvements. In the Fall of 2020, the Department began reviewing its pedestrian accessibility standards, design practices, inspection processes, and other related policies for this purpose. This review ultimately resulted in the decision to create a new edition of the Department's Pedestrian Accessibility Standards (PAS) Manual.

The update process began by performing an in-depth analysis of the pertinent Federal accessibility standards and guidelines in accordance with the written guidance provided by the Federal stewards tasked with ensuring that the Department's project planning, design, and construction programs provide pedestrian access for persons with disabilities. This initial analysis resulted in the creation of a set of minimum accessibility standards and supplementary accessibility guidance. The Department complemented this endeavor by performing a national literature search to assess the current state of the practice for designing and constructing accessibility features in the public right-of-way. This search identified additional best practices and procedures that offered potential improvements to DelDOT's current business practices. The end result was the creation of a set of clear and objective minimum accessibility standards that are supplemented with pertinent design guidance that is in line with United States Department of Transportation's encouragement to transportation agencies "to go beyond the minimum requirements, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages and abilities, and utilize universal design characteristics when appropriate."

Updating the PAS Manual has implications across multiple other documents and processes at DelDOT. Accordingly, those items were also updated to ensure consistency and uniformity. The following items are considered the large changes that the end user should be made aware of:

- The Department's adopted accessibility standards are contained in Chapter 3 of the manual as "Standard" statements. The standards are supplemented with Exceptions, Guidance, Options, and Advisory statements. Each statement in Chapter 3 contains a citation to the Federal source document in which the statement originates to make for easy cross-referencing.
- A new chapter entitled "Design Considerations" has been added to the manual. This Chapter serves as a compendium to the Chapter 3 standards and organizes the content of the manual into sections that fully describe the individual components of the pedestrian access route.
- The Department has incorporated a design and construction layout standard that is intentionally set below the accessibility limit to create an "accessibility buffer".
- The Department's Standard Construction Details have been updated to be consistent with the content of the updated 2021 PAS Manual.
- The Department's accessibility inspection and acceptance processes have been updated and documented as the new Chapter 5 in the manual.
- The Department's Request for Practical Exception creation and approval process has been updated and documented as Chapter 6 in the manual.
- Engineering Instruction *PM-18-001: Pedestrian Connection Plan Preparation and Documentation* has been reviewed and updated to better capture Department preferences for how much detail should be shown on contract plans to better support the needs of construction.
- A new section of the manual has been added that establishes the roles and responsibilities of the DelDOT Title II Coordinator.

The Department is confident that the updated manual and updated supplementary documents and processes will further the Department with the mission to provide excellence in transportation.

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## Definitions and Abbreviations

**AASHTO** – An acronym for American Association of State Highway and Transportation Officials. AASHTO is a nonprofit, nonpartisan association representing highway and transportation departments in the 50 states, the District of Columbia, and Puerto Rico. AASHTO serves as a liaison between state departments of transportation and the Federal government. AASHTO is instrumental in providing technical standards and guidance documents that are commonly used for design, construction of highways and bridges, materials, and many other technical areas.

**Accessible** – Describes a facility in the public right-of-way that complies with the requirements of Chapter 3 of this manual.

**Accessible Pedestrian Signal (APS)** – Devices that communicate information about the WALK and DON'T WALK intervals at signalized intersections in non-visual formats to pedestrians.

**Accessibility Barrier** – Conditions or obstacles that prevent individuals from using or accessing a portion of the intended pedestrian access route.

**ACIA** – Acronym for the ADA Construction Inspection Application. This is the application in which the Department enters the accessibility data collected during the ADA Inspection.

**ADA** – Acronym for Americans with Disabilities Act of 1990 which prohibits discrimination against people with disabilities.

**ADAAG** – Acronym for the Americans with Disability Act Accessibility Guidelines. These standards were written by the US Access Board and have been adopted by the US Department of Justice and the US Department of Transportation as the regulatory accessibility standards.

**Alteration** – A change to a facility in the public right-of-way that affects or could affect pedestrian access, circulation, or use. Alteration projects include activities such as reconstruction, rehabilitation, resurfacing, widening, and projects of similar scale and effect.

**Blended Transition** – A street level pedestrian connection with a sloped segment that has a running grade of 5.0% or less. Locations that could be considered a blended transition include raised pedestrian street crossings, depressed corners, or curb ramp configurations where the running slope is less than 5.0%.

**Buffer Strip** – A recommended space that is located between the face of curb and the pedestrian access route that is intended to improve operation.

**Cane Detectable Range** – A region extending from the ground surface to a height 2'-3" above the surface where a visually impaired user can detect an obstruction through the use of a cane.

**Clear Space** – A required element for certain accessibility components which is clear of physical obstructions.

**Code of Federal Regulations or CFR** – Federal laws that are 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.

**Components** – The individual parts of a larger network. For example, the components that comprise the pedestrian access route can consist of sidewalks, shared use paths, street level pedestrian connections, pedestrian street crossings, at-grade rail crossings, pedestrian overpasses and underpasses, ramps, elevators and limited use/limited application elevators, platform lifts, doors, doorways, and gates.

**Continuous Clear Width** – The unobstructed width of the pedestrian path along the pedestrian corridor.

**Counter Slope** – The angle point or grade change where the slope of the street level pedestrian connection meets the opposing slope of the adjacent gutter or street.

**Cross Slope** – The grade (or slope) that is perpendicular to the direction of pedestrian travel.

**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 street level pedestrian connection with a sloped segment that has a running slope that is greater than 5.0%. Curb ramps can be perpendicular or parallel, diagonal, or a combination of parallel and perpendicular ramps.

**Cut-Through Pedestrian Island** – A location where the pedestrian crossing traverses a traffic island and the path through the pedestrian island contains no sloped segment to elevate the pedestrian path to that of the traffic island.

**DE MUTCD** – An acronym for the *Delaware Manual on Uniform Traffic Control Devices*. The *DE MUTCD* is a regulatory document that serves as a comprehensive set of standards for all traffic control devices. References to the *DE MUTCD* in this manual are to the 2011 edition.

**Depressed Corner** – Depressed corners gradually lower the level of the approach pedestrian access route to that of the street crossing and are a subset of blended transitions.

**Detectable Warning Surface (DWS)** – A tactile surface built into or applied to a walking surface intended to provide a clear message to the user of the path.

**DGM** – An acronym for Design Guidance Memorandum. DelDOT maintains these documents to provide specific design guidance.

**Diagonal Curb Ramp** – A curb ramp that is located at the apex of a corner radius and is intended to serve two independent street crossings. Diagonal curb ramps are termed diagonal ramps because they are oriented toward the center of the intersection rather than toward the crosswalk.

**Directional Street Level Pedestrian Connection** – A street level pedestrian connection that is designed to be directly in-line with the alignment of the pedestrian street crossing.

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

**Engineering Judgment** – The evaluation of pertinent information available at the time of the design, and the implementation of appropriate principles, standards, guidance, and current best practices related to the applicability, design, operation, and/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.

**FHWA** – An acronym for the Federal Highway Administration which is a division of the US Department of Transportation.

**Flared Side** – A depressed area that connects an adjacent pedestrian circulation path to the elevation of the sloped segment of a street level pedestrian connection.

**Frontage Zone** – A desirable linear feature that can be provided along a pedestrian corridor to provide a shy distance parallel to buildings, walls, or other structures.

**Grade Break** – The line where two surface planes with different slopes or grades meet.

**ITE** – An acronym for the Institute of Transportation Engineers.

**Maintenance Projects** – Actions that are intended to preserve the system, retard future deterioration, and maintain the functional condition of the roadway without increasing the structural capacity.

**New Construction** – Activities which construct new pedestrian facilities or adds new accessibility components to existing networks.

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

**Parallel Curb Ramp** – A curb ramp that has a ramped segment that is in-line with the direction of pedestrian travel that lowers the pedestrian access route to a lower turning space.

**Passing Space** – A required element along a pedestrian access route that is less than 5'-0" wide that allows mobility device users to maneuver past each other.

**Pedestrian Access Route (PAR)** – A continuous and unobstructed path of travel provided for pedestrians with disabilities within or coinciding with a pedestrian circulation path.

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

**Pedestrian Street Crossing** – A location where the pedestrian access route leaves the approach sidewalk or shared use path and enters the roadway. This feature is commonly referred to as a crosswalk.

**Perpendicular Curb Ramp** – Perpendicular curb ramps have a ramp running slope that cuts through or is built up to the curb at approximately right angles to the curb line.

**PROWAG** – An acronym for the proposed Public Right-of-Way Accessibility Guidelines 2011 and 2013 (Supplement: Questions and Answers). This document was written by the US Access Board and is considered the best practices by the Federal Highway Administration where the ADAAG is silent for applications in the public right-of-way.

**Public Right-of-Way** – Land, property, or an interest therein possessed by the Department or other entity acquired for, or devoted to, use by the public for transportation purposes.

**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.

**Raised Pedestrian Street Crossing** – A speed table that is built into the vehicular traveled way and is intended to allow pedestrians to cross a street while also acting as a traffic calming measure.

**Ramped Pedestrian Island** – A location where the pedestrian crossing traverses a traffic island and the path through the pedestrian island contains a sloped segment to elevate the pedestrian path to that of the traffic island.

**Request Practical Exception (RPE)** – A DelDOT process to document compliance efforts attempted when the work to be performed is required but unable to meet the Standards contained in this manual because impractical.

**Running Slope** – The grade (or slope) that is parallel to the direction of pedestrian travel.

**Shared Use Path (SUP)** – A multi-use path designed primarily for use by bicyclists and pedestrians, including pedestrians with disabilities, for transportation and recreation purposes. Shared use paths are physically separated from motor vehicle traffic by an open space or barrier, and are either within the highway right-of-way or within an independent right-of-way.

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

**Street Level Pedestrian Connection** – A connection between the pedestrian access route at the level of the sidewalk or shared use path to the level of the pedestrian street crossing that features a sloped segment to transition the elevation of the pedestrian access route.

**Tactile** – Capable of being perceived using the sense of touch.

**Truncated Domes** – A type of detectable warning surface that is used to indicate the boundary between pedestrian and vehicular routes where there is a flush rather than a curbed connection.

**Turning Space** – A location along a pedestrian access route which provides a place for users to change their primary direction of travel.

**US Access Board** – A Federal agency that is devoted to accessibility for people with disabilities. The Access Board develops and maintains design criteria, performs research, and provides technical support and training.

**Vertical Surface Discontinuities** – Vertical differences in level between two adjacent surfaces.

**Wayfinding** – The practice of providing navigational tools that assist pedestrians reach their intended destination.

## Chapter 1 Introduction

The Delaware Department of Transportation (DelDOT) has developed this manual to document all pertinent pedestrian accessibility standards as well as subsequent guidance and best practices to be used in the design, construction, and maintenance of pedestrian facilities within the public right-of-way along streets and highways under DelDOT's jurisdiction. It is the intention of the Department that all permitted work to be performed inside of the public right-of-way by third parties also follow the requirements of this manual by making compliance to this manual a condition of permit approval. Solely achieving the accessibility standards contained in this manual does not alleviate the contractor or any other entity performing permitted work inside of the public right-of-way from any other contract requirements or contract terms.

This manual was written to specifically apply to facilities within the public right-of-way and accordingly, is not intended to apply to the following situations:

- **Buildings and Structures** – Building and structures in the public right-of-way that are not explicitly covered in this manual must adhere to the applicable Federal standards as well as all applicable requirements in the Delaware State Code, Delaware Building Code, or State of Delaware Architectural Accessibility Standards.
- **Site Work Performed Outside of the Public Right-of-Way** – Site work to be performed outside of public right-of-way must adhere to the applicable Federal standards as well as all applicable requirements in the Delaware State Code or Delaware Building Code.
- **Recreational Trails** – Guidance on accessible trails is provided in the Federal Highway Administration (FHWA) publication, *Designing Sidewalks and Trails for Access - Part II of II: Best Practices Design Guide*, as well as the US Access Board's publication, *Outdoor Developed Areas*.
- **Parking Facilities** – Parking facilities that are not considered on-street parking must adhere to the applicable Federal standards.
- **Machinery Spaces** – Machinery spaces that are not intended to be accessed by the public and could include vaults, tunnels, and other spaces used by service personnel only for maintenance, repair, or monitoring are not required to follow the requirements of this manual.

### 1.1 Hierarchy of Contributing Documents

The standards contained in this manual are derived primarily from the US Department of Transportation's 2006 *ADA Standards for Transportation Facilities* and the US Department of Justice's 2010 *ADA Standards for Accessible Design* which are commonly referred to as the ADAAG as well as the US Access Board's *Proposed Shared Use Path Supplement to: Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way* 2011 with 2013 supplement incorporated which is commonly referred to as the proposed PROWAG. Accordingly, the contents of this manual are subject to any changes made to the Federal source documents. This manual has been developed in accordance with the FHWA's both past and current policy in regard to the hierarchy of these accessibility documents. On January 23<sup>rd</sup>, 2006, the FHWA published a memo to the Division Administrators, Resource Centers and Federal Lands Highway Division Engineers that stated the following:

The Draft Guidelines (the PROWAG) are not standards until adopted by the U.S. Department of Justice and the U.S. Department of Transportation. The present standards to be followed are the ADA Accessibility Guidelines (ADAAG) standards. However, the Draft Guidelines are the currently recommended best practices, and can be considered the state of the practice that could be followed for areas not fully addressed by the present ADAAG standards.

The language contained in the January 23<sup>rd</sup>, 2006 memo has been updated over time and at time of publication of this manual currently states the following:

Until the proposed guidelines are adopted as standards, FHWA considers the proposed guidelines to represent best practices for accessibility issues in the PROW not covered by DOJ's or DOT's currently adopted standards.

Accordingly, this manual has been developed in recognition that the ADAAG is the regulatory standard and that the proposed PROWAG represents best practices where the ADAAG is silent for applications in the public right-of-way.

## 1.2 Elements of the Pedestrian Circulation Path

A pedestrian circulation path is a prepared exterior or interior surface provided for pedestrian travel. A pedestrian circulation path can be comprised of multiple elements or features including the pedestrian access route. The pedestrian access route is a continuous and unobstructed path of travel provided to pedestrians including those with disabilities and is used to connect to various accessible pedestrian origins and destinations.

Figure 1.2 provides a visual representation of several of the possible components of the pedestrian circulation path which may vary in width based on the adjacent land use.

- **Buffer Zone** – This is a recommended buffer area that is located between the face of the curb or edge of pavement and the pedestrian access route and can be used to locate traffic signs, street lights, fire hydrants, overhead and underground utilities and street furniture where permitted. The buffer strip provides pedestrians with a separation from moving traffic and therefore 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)** – This portion of the pedestrian circulation path provides pedestrians with a safe, convenient, continuous, and unobstructed pedestrian route that connects the accessible components of a pedestrian system.
- **Frontage Zone** – This is a desirable linear feature that can be provided along a pedestrian corridor. This frontage zone is intended to provide a shy distance parallel from walls to offer an area for shoppers to stop and look into windows and afford space to avoid conflicts with doors opening and pedestrians entering and exiting the adjacent buildings. The frontage zone can be eliminated when the pedestrian access route is adjacent to open areas.

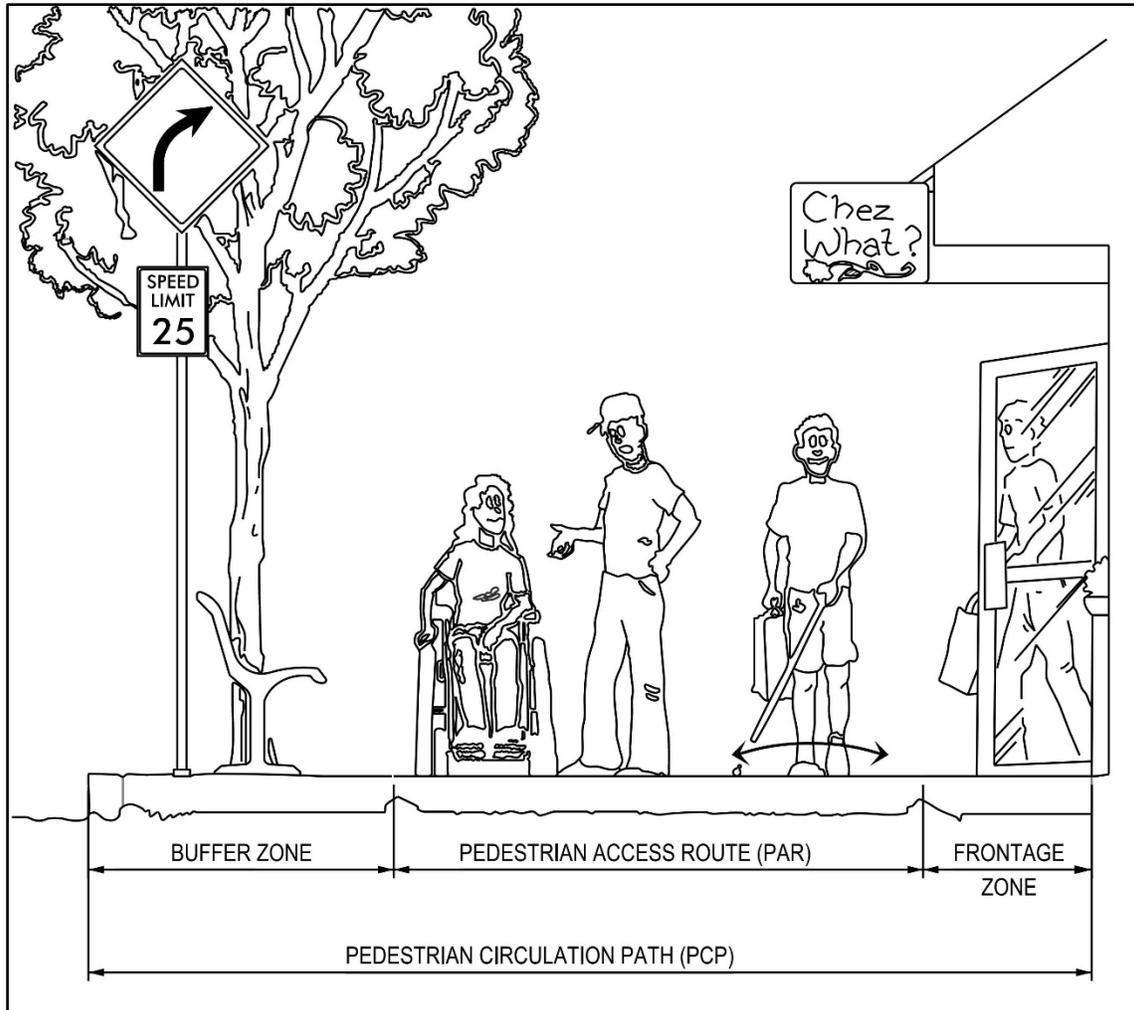


Figure 1.2 Elements of the Pedestrian Circulation Path

### 1.3 Accessibility User Groups

Title II of the Americans with Disabilities Act (ADA) requires that state and local governments provide access to all persons including those with disabilities to the pedestrian routes located in the public right-of-way. There are many different types of accessibility user groups with varying needs and challenges which should be considered throughout the planning, design, and construction process. Common disabilities which must be accommodated involve mobility, vision, and hearing impairments. Persons with mobility impairments may rely on wheelchairs, scooters, walkers, canes, or no mobility device at all to traverse pedestrian facilities. Persons with sensory and cognitive impairments may experience challenges related to interacting with, or perception of, their surroundings. In some cases, the challenges experienced may be the result of a combination of disabilities.

The needs of persons with different types of disabilities may come into conflict. For example, flush curbs are beneficial to mobility device users as vertical differences may be difficult to traverse, while flush curbs remove a tactile and distinguishable feature for the visually impaired user. When the standards contained in this manual are unable to be met, the underlying accessibility principles and science should be applied to create a balanced accessibility solution.

## 1.4 Jurisdictional Authority

Jurisdictional authority and ownership of pedestrian facilities within the public right-of-way may be shared across State, County, and Municipal agencies. Multi-party authority and responsibility can increase the layers of complexity during the planning, design, and construction phases. When work is to be performed and the scope of that work requires accessibility upgrades in accordance with [Chapter 2](#) of this manual, the entity performing the work is required to obtain all necessary right-of-way required to comply with this manual. This complexity of overlapping jurisdiction and shared responsibility frequently continues into the maintenance programs and activities that are necessary along roadways and pedestrian facilities.

## 1.5 Summary Chart of Minimum Accessibility Standards

Table 1.5 summarizes several of the more common accessibility standards that apply to facilities within the public right-of-way. **The user is encouraged to use Table 1.5 in conjunction with reading the full accessibility standard contained in the [Chapter 3](#) to ensure that accessibility compliance is achieved.** Additionally, the values contained in Table 1.5 are considered the minimum accessibility standards and may not reflect the Department’s design preferences or contract requirements.

Accessibility Criteria	Accessibility Standard	Section Reference
<b>3.1.1 Continuous Width</b>		
Continuous width of pedestrian access route (except as specified elsewhere)	4'-0" min.	<a href="#">3.1.1</a>
Width of pedestrian access route at pinch point	2'-8" min.	<a href="#">3.1.1</a>
Continuous width of pedestrian access route within median and pedestrian refuge islands	5'-0" min.	<a href="#">3.1.1.1</a>
Width of curb ramps, blended transitions and turning spaces (pinch points are not allowed in these locations)	4'-0" min.	<a href="#">3.2.5.1</a>
<b>3.1.2 Passing Spaces</b>		
Passing space interval	200'-0" max.	<a href="#">3.1.2</a>
Minimum passing space dimension	5'-0" min. x 5'-0" min.	<a href="#">3.1.2</a>
<b>3.1.3 Grade</b>		
Within street or highway right-of-way	Not to exceed the general grade established for the adjacent street or highway	<a href="#">3.1.3.1</a>
Not within street or highway right-of-way	5% max.	<a href="#">3.1.3.2</a>
Within pedestrian street crossings	5% max.	<a href="#">3.1.3.3</a>
<b>3.1.4 Cross Slope</b>		
Cross slope (except as specified elsewhere)	2% max.	<a href="#">3.1.4</a>
Pedestrian street crossings without yield or stop control (includes traffic signals)	5% max.	<a href="#">3.1.4.1</a>
Midblock pedestrian street crossings	Equal the street or highway grade	<a href="#">3.1.4.2</a>
Cross slope of blended transitions, curb ramps, and turning spaces without yield or stop control and at midblock pedestrian street crossings	Permitted to equal the street or highway grade	<a href="#">3.2.5.2</a>
<b>3.1.5 Surface</b>		
Ground surface	Firm, stable, and slip resistant	<a href="#">3.1.5</a>
Changes in level between 0" to 1/4"	Permitted to be vertical	<a href="#">3.1.5.2.1</a>

Accessibility Criteria	Accessibility Standard	Section Reference
Changes in level between 1/4" to 1/2"	Beveled at no steeper than 2:1 (H:V)	<a href="#">3.1.5.2.2</a>
Changes in level greater than 1/2"	Ramped at 8.3% max.	<a href="#">3.1.5.2.3</a>
Horizontal openings	Shall not allow the passage of a 0.5" diameter sphere	<a href="#">3.1.5.3</a>
Flangeway gaps on non-freight rail track	2.5" max.	<a href="#">3.1.5.4</a>
Flangeway gaps on freight rail track	3.0" max.	<a href="#">3.1.5.4</a>
<b>3.2.1 Perpendicular Curb Ramps</b>		
Turning space to be provided at the top of the curb ramp at an unconstrained location	4'-0" min. x 4'-0" min.	<a href="#">3.2.1.1</a>
Turning space to be provided at the top of the curb ramp at a constrained location (long dimension in the direction of the ramp run)	5'-0" min. x 4'-0" min.	<a href="#">3.2.1.1</a>
Turning space running slope	2% max.	<a href="#">3.2.1.2</a>
Ramp running slope	8.3% max. (shall not be required to exceed 15'-0" in length)	<a href="#">3.2.1.2</a>
Flared sides	Sloped 10% max., measured parallel to the curb line	<a href="#">3.2.1.3</a>
Grade breaks at the top and bottom of the curb ramp runs	Perpendicular to the direction of the ramp run	<a href="#">3.2.1.4</a>
Counter slope of the gutter or street at the foot of the curb ramp run, blended transition and turning space	5% max.	<a href="#">3.2.5.3</a>
Clear space beyond the bottom grade break	4'-0" min. x 4'-0" min.	<a href="#">3.2.5.4</a>
<b>3.2.2 Parallel Curb Ramps</b>		
Turning space to be provided at the bottom of the curb ramp at an unconstrained location	4'-0" min. x 4'-0" min.	<a href="#">3.2.2.1</a>
Turning space to be provided at the bottom of the curb ramp at a constrained location (long dimension in the direction of the pedestrian street crossing)	5'-0" min. x 4'-0" min.	<a href="#">3.2.2.1</a>
Turning space running slope	2% max.	<a href="#">3.2.2.2</a>
Ramp running slope	8.3% max. (shall not be required to exceed 15'-0" in length)	<a href="#">3.2.2.2</a>
Grade breaks at the top and bottom of the curb ramp runs	Perpendicular to the direction of the ramp run	<a href="#">3.2.2.3</a>
Counter slope at the gutter or street at the foot of the curb ramp run, blended transitions and turning spaces	5% max.	<a href="#">3.2.5.3</a>
Clear space beyond the bottom grade break	4'-0" min. x 4'-0" min.	<a href="#">3.2.5.4</a>
<b>3.2.3 Diagonal Curb Ramps</b>		
Turning space to be provided at the top of the curb ramp at an unconstrained location	4'-0" min. x 4'-0" min.	<a href="#">3.2.3.1</a>
Turning space to be provided at the top of the curb ramp at a constrained location (long dimension in the direction of the ramp run)	5'-0" min. x 4'-0" min.	<a href="#">3.2.3.1</a>
Turning space running slope	2% max.	<a href="#">3.2.3.2</a>

Accessibility Criteria	Accessibility Standard	Section Reference
Ramp running slope	8.3% max. (shall not be required to exceed 15.0 in length)	<a href="#">3.2.3.2</a>
Flared sides	Sloped 10% max., measured parallel to the curb line	<a href="#">3.2.3.3</a>
Grade breaks at the top and bottom of the curb ramp runs	Perpendicular to the direction of the ramp run	<a href="#">3.2.3.4</a>
Counter slope at the gutter or street at the foot of the curb ramp run, blended transitions and turning spaces	5% max.	<a href="#">3.2.5.3</a>
Clear space beyond the bottom grade break within the markings	4'-0" min. x 4'-0" min.	<a href="#">3.2.5.4</a>
<b>3.2.4 Blended Transitions</b>		
Running slope	5% max.	<a href="#">3.2.4.1</a>
Counter slope at the gutter or street at the foot of the curb ramp run, blended transitions and turning spaces	5% max.	<a href="#">3.2.5.3</a>
Clear space beyond the bottom grade break	4'-0" min. x 4'-0" min.	<a href="#">3.2.5.4</a>
<b>3.4 Protruding Objects</b>		
Protrusion limit of objects that are protruding between 2'-3" to 6'-8" in height above the pedestrian circulation path	0'-4"	<a href="#">3.4.1</a>
Post-mounted objects that are protruding between 2'-3" to 6'-8" in height above the pedestrian circulation path	1'-0"	<a href="#">3.4.2</a>
Vertical clearance	6'-8"	<a href="#">3.4.3</a>
<b>3.5 Operable Parts</b>		
<a href="#">3.5</a>		
<b>3.6 Clear Spaces</b>		
<a href="#">3.6</a>		
<b>3.7 Reach Ranges</b>		
<a href="#">3.7</a>		
<b>3.8 Pedestrian Street Crossings</b>		
<a href="#">3.8</a>		
<b>3.9 Accessible Pedestrian Signals and Pedestrian Pushbuttons</b>		
<a href="#">3.9</a>		
<b>3.10 Transit Stops</b>		
<a href="#">3.10</a>		
<b>3.11 Parking</b>		
<a href="#">3.11</a>		
<b>3.12 Passenger Loading Zones</b>		
<a href="#">3.12</a>		
<b>3.13 Facilities Not Common in the Public Right-of-Way</b>		
<a href="#">3.13</a>		

Table 1.5 Minimum Accessibility Standards

## 1.6 The Role of the DeIDOT Title II Coordinator

28 CFR 35.107 requires that all public entities that employ 50 or more persons designate an employee to coordinate and carry out the ADA compliance efforts required of public entities under Title II of the Americans with Disabilities Act of 1990. To meet this requirement, the Department has established the position of the DeIDOT Title II Coordinator inside of the Department's Office of Civil Rights Section.

The DeIDOT Title II Coordinator is specifically tasked with the following activities:

- Investigate all complaints alleging noncompliance with the ADA,
- Track and update the Department's ADA Transition Plan,
- Serve as an accessibility resource to Department staff,
- Review and ensure that Department programs are accessible,
- Coordinate the Department's accessibility related efforts with outside agencies and entities as deemed necessary,

- Review and approve locations where compliance with this manual or other applicable Federal standards is required but not considered practical,
- Review and offer pedestrian facility acceptance recommendations, and
- Review Department administered contracts for accessibility compliance in accordance with the requirements in this manual.

In accordance with these responsibilities, the DeIDOT Title II Coordinator or their appointed designee will provide recommendations during project scoping along with the review of all Department administered contracts at major plan submission milestones for accessibility compliance in accordance with this manual. The level and detail of the review will be commensurate with the current plan development milestone. The Department's Title II Coordinator or their designee will be solely responsible for performing these accessibility reviews. Staff other than the Department's Title II Coordinator or their designee may offer accessibility related comments for consideration; however, the Department's Title II Coordinator will make final or clarifying recommendations on ADA compliance matters. The DeIDOT Title II Coordinator or their appointed designee will also review all plan revisions and field adjustments that have the potential to affect the usability of the pedestrian access route. The Office of Civil Rights will retain all completed accessibility review documents as an archival record and may provide that record to other entities at their sole discretion.

## Chapter 2 Project Type and Application of Standards

The extent that an improvement is required to meet the standards and requirements contained in this manual is directly related to the type of work that is to be performed. The project types as well as the application of standards discussed in this chapter apply to all public entities regardless of the funding allocations of an individual project. The project types defined in this manual are derived directly from the terminology and subsequent Americans with Disabilities Act (ADA) requirements contained in 49 CFR Part 37, 28 CFR Part 35 and Part 36 and as supplemented with supporting US Department of Justice and US Department of Transportation publications. A project's scope and limits cannot be intentionally manipulated or meandered to avoid pedestrian facilities that would otherwise be within the limits of work described by this chapter. In all cases where compliance to this manual is required but determined to be impracticable, a Request for Practical Exception (RPE) must be processed in accordance with the process outlined in [Chapter 6](#) of this manual.

### 2.1 Project Scoping

The intent of this chapter is to outline the obligations of state and local governments to provide ADA features when work is performed within the public right-of-way. Accordingly, the requirements in this chapter do not fully address the scoping considerations that must be undertaken during the planning and design phase.

During the planning and design phase, it is necessary to balance the purpose and need of the improvement to the work that is proposed. As with other design elements, practitioners are urged to consider the condition, the connectivity, and the presence of accessibility barriers of adjacent pedestrian facilities when scoping an improvement. This is a subjective and iterative process that must be performed and considered on a project-by-project basis.

The specific state law that governs the installation of sidewalks is Title 17, Section 132(f), of the Delaware Code. In essence, the Department is to reconstruct disturbed sidewalks or install new sidewalks when constructing in an urbanized area, if there is a demonstrated present need or a reasonably anticipated future need. The Project Development process determines whether such need for sidewalks does or will exist for all or any part of a project.

All ADA work that is required by this manual should be evaluated as early as possible during the planning and design phases to provide ample time to mitigate potential conflicts with existing features and for the acquisition of right-of-way where required.

### 2.2 Project Types

The project types that are defined in this section have been specifically derived from the obligations and requirements that state and local governments have to provide ADA features when work is performed. In March of 2012 and March of 2013, the US Department of Justice and US Department of Transportation collaborated to provide additional clarifying guidance to state and local governments as to their requirements to provide ADA features on resurfacing type projects. The result of the US Department of Justice and US Department of Transportation collaboration when combined with 49 CFR Part 37, 28 CFR Part 35 and Part 36 is a uniform Federal policy regarding ADA obligations for the defined project types. If a project type for an improvement is not readily apparent during the scoping phase, coordination should be performed with the DelDOT Title II Coordinator.

The following excerpts are the basis of the project types that are defined in this chapter:

#### 28 CFR 35.151 (b) Alterations (1):

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.

#### 28 CFR 35.151(i) Curb ramps (1):

Newly constructed or altered streets, roads, and highways must contain curb ramps or other sloped areas at any intersection having curbs or other barriers to entry from a street level pedestrian walkway.

#### 28 CFR 35.151(i) Curb ramps (2):

Newly constructed or altered street level pedestrian walkways must contain curb ramps or other sloped areas at intersections to streets, roads, or highways.

### 2.2.1 New Construction

All newly constructed facilities and components added to existing facilities for pedestrian circulation and use located in the public right-of-way shall comply with the requirements of this manual.

### 2.2.2 Alteration Projects

Alteration projects include activities such as reconstruction, rehabilitation, resurfacing, widening and projects of similar scale and effect. Maintenance activities that do not affect the usability of the facility are not considered alteration projects. Pavement overlays that involve milling an existing road, and then overlaying the road with material, regardless of whether it exceeds the height of the road before milling, falls within the definition of “alteration” because it is a change to the road surface that affects or could affect the usability of the pedestrian route. These project types are required to add new compliant or replace existing non-compliant curb ramps at locations where an existing prepared surface intended for pedestrian use crosses a curb. Below are the specific work activities that are recognized as alterations by the US Department of Justice and the US Department of Transportation:

- **Reconstruction** – Reconstruction refers to removing all or a significant portion of the pavement material and replacing it with new or recycled materials. This may include full-depth reclamation, where the pavement surface is demolished in place and new pavement surface is applied. In addition, reconstruction may also include grinding up a portion of the pavement surface, recycling it and placing it back, and then adding a wearing surface, such as in cold in-place asphalt recycling. Reconstruction often includes widening or geometrical changes to the roadway profile.
- **Rehabilitation** – Rehabilitation refers to significant repairs made to a road or highway surface, including activities such as full slab replacement, filling voids under slabs (slabjacking), widening, and adding additional structural capacity.
- **Pavement Overlay** – Pavement overlays of additional material to the road surface, with or without milling.
- **Open-Graded Surface Course** – Open-graded surface course, also known as “open-graded friction course,” involves a pavement surface course that consists of a high-void, asphalt concrete mix that permits rapid drainage of rainwater through the course and off the shoulder of the road. The mixture consists of either Polymer-modified or rubber-modified asphalt binder, a large percentage of one-sized coarse aggregate, and a small amount of fibers. This treatment prevents tires from hydroplaning and provides a skid-resistant pavement surface with significant noise reduction.

- **Microsurfacing** – Microsurfacing involves spreading a properly proportioned mixture of polymer modified asphalt emulsion, mineral aggregate, mineral filler, water, and other additives, on a paved surface. Microsurfacing differs from slurry seal in that it can be used on high volume roadways to correct wheel path rutting and provide a skid resistant pavement surface.
- **Thin Lift Overlays** – Thin lift overlays are thin applications of mixtures of hot mix asphalt. Thin lift overlays may also require some milling along curbs, manholes, existing curb cuts, or other road structures to assure proper drainage and cross slopes.
- **Cape Seal** – A cape seal is a thin surface treatment constructed by applying a slurry seal or microsurfacing to a newly constructed chip seal. It is designed to be an integrated system where the primary purpose of the slurry is to fill voids in the chip seal.
- **In-Place Asphalt Recycling** – In-place asphalt recycling is a process of heating and removing around 1-2 inches of existing asphalt and remixing the asphalt with the addition of a binder additive and possible aggregate to restore the wearing surface for placement and compaction. All of this is performed in a train of equipment.
- **Signal Installation and Upgrades**

#### 2.2.2.1 Work Limits

Alteration type projects are required to add new compliant or replace existing non-compliant curb ramps at locations where an existing prepared surface intended for pedestrian use crosses a curb. The required ADA work can be contracted separately from the alteration work, but the work must be coordinated in a way that the required accessibility work is either completed prior to or as part of the same contract as the completion of the rest of the alteration work.

In general, alteration projects trigger the requirement to add curb ramps if it involves work on a street or roadway spanning from one intersection to another. The key consideration is whether any of the proposed work will affect a portion of the crosswalk. If the alteration affects the crosswalk, even if it is not the full roadway width, then compliant curb ramps must be provided at both ends of the crosswalk in accordance with [Section 2.2.2](#) criteria. The required ADA work is limited to the intersecting curb ramps as other accessibility barriers on the existing sidewalks, such as steep cross slopes or obstructions are not required to be upgraded.

#### 2.2.3 Maintenance Projects

Maintenance projects consist of actions that are intended to preserve the system, delay future deterioration, and maintain the functional condition of the roadway without increasing the structural capacity. Maintenance projects are not required to add new compliant or replace existing non-compliant curb ramps at locations where an existing prepared surface intended for pedestrian use crosses a curb provided that the scope of the work does not result in a lesser level of usability. Surface treatments that serve solely to seal and protect the road surface, improve friction, and control splash and spray are considered to be maintenance projects because they do not significantly affect the public's access to or usability of the road. In some cases, the combination of several maintenance treatments occurring at or near the same time may qualify as an alteration project type discussed in [Section 2.2.2](#) which would trigger an obligation to provide curb ramps or upgrade existing curb ramps. In cases where multiple maintenance activities are to be performed at or near the same time, close coordination with the DeIDOT Title II Coordinator is required. Below are the work activities that are recognized as maintenance work activities by the US Department of Justice and the US Department of Transportation:

- **Crack Filling and Sealing** – Crack filling and sealing involves placing elastomeric material directly into cracks in pavement.

- **Surface Sealing** – Surface sealing involves applying liquid sealant to pavement surface in order to stop water penetration and/or reduce oxidation of asphalt products. Sand is sometimes spread over liquid to absorb excess material.
- **Chip Seals** – Chip Seals involve placing graded stone (chips) on liquid emulsified asphalt sprayed on pavement surface. The surface is rolled to enable seating of chips.
- **Slurry Seal** – Slurry seals involve spraying a mixture of slow setting emulsified asphalt, well graded fine aggregate, mineral filler, and water on the pavement surface. It is used to fill cracks and seal areas of old pavements, to restore a uniform surface texture, to seal the surface to prevent moisture and air intrusion into the pavement, and to improve skid resistance.
- **Fog Seals** – Fog seals are a type of surface sealing.
- **Scrub Sealing** – Scrub sealing is type of surface sealing.
- **Joint Crack Seals** – Joint crack seals are usually associated with concrete pavement. This work consists of routing and cleaning existing cracks and joints and resealing to prevent water and non-compressibles from entering into the pavement joints and subgrade materials.
- **Joint Repairs** – Joint repairs are usually associated with concrete pavement. This work consists of selectively repairing portions of the pavement where the slabs are generally in good condition, but corners or joints are broken. The depth of the patch could be full depth or partial depth.
- **Dowel Retrofit** – Dowel retrofits are usually associated with concrete pavement. This work involves the installation of dowel bars connecting slabs in existing pavements. Pavement with dowel bar retrofits can have life extensions of as much as 20 years.
- **Spot High-Friction Treatments** – Spot high-friction treatments involve using epoxy based resin liquids as a binder for an aggregate with high-friction properties. These are used in locations where drivers are frequently braking and the pavement surface has less resistance to slipping.
- **Diamond Grinding** – Diamond grinding involves using a gang saw to cut grooves in the pavement surface to restore smoothness and eliminate any joint faulting.
- **Pavement Patching (Filling Potholes)** – Pavement patching involves selectively repairing portions of the pavement where the slabs are generally in good condition, but corners or joints are broken. The depth of the patch could be full depth or partial depth. If the pavement patching impacts the curb at a pedestrian street crossing where no curb ramp exists, the work affecting the curb falls within the definition of an “alteration,” and a curb ramp must be constructed rather than simply replacing the curb.
- **Utility Trenching and Patching** – Utility trenching and patching is typically performed to expose a utility to perform work and then the facility is re-covered, and the roadway patched. If the subsequent pavement patching impacts the curb at a pedestrian street crossing where no curb ramp exists, the work affecting the curb falls within the definition of an “alteration,” and a curb ramp must be constructed rather than simply replacing the curb.
- **Shoulder Repair**
- **Signing, Striping and Minor Signal Upgrades**
- **Repairs to Drainage Systems**

### 2.3 Temporary Pedestrian Access During Construction

Work that is proposed inside of the public right-of-way is required to maintain the usability and accessibility of the existing pedestrian network during the construction phase. The following excerpts are Standards from the *DE MUTCD* which is a regulatory document and are intended to summarize the accessibility requirements for temporary pedestrian access routes:

Section 6D.01 DE MUTCD, Paragraph 4:

If the TTC [Temporary Traffic Control] zone affects the movement of pedestrians, adequate pedestrian access and walkways shall be provided. If the TTC [Temporary Traffic Control] zone affects an accessible and detectable pedestrian facility, the accessibility and detectability shall be maintained along the alternate pedestrian route.

Section 6D.02 DE MUTCD, Paragraph 3:

When existing pedestrian facilities are disrupted, closed, or relocated in a TTC [temporary traffic control] zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Where pedestrians with visual disabilities normally use the closed sidewalk, a barrier that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.

Accordingly, an improvement's Maintenance of Traffic and temporary traffic control plans must make the required accommodations for facilities that are either directly or indirectly impacted by a proposed improvement. See [Section 4.9](#) for additional information in regard to the design and layout of temporary pedestrian access routes through and around work zones. Maintenance of Traffic planning shall be coordinated with the DeIDOT Traffic section.

## Chapter 3 Accessibility Standards

This chapter defines the accessibility standards that the Department has adopted for facilities in the public right-of-way. The accessibility standards contained in this chapter do not alleviate the contractor or any other entity that is performing any Department permitted work inside of the public right-of-way of any and all other contract requirements or contract terms. The contents of this chapter are classified as either Standard, Exception, Guidance, Option, and Advisory defined as follows:

- **Standard** – a statement of required, mandatory, or specifically prohibited practice. All Standard statements are labeled, and the text appears in bold type. The verb “shall” is typically used. The verbs “should” and “may” are not used in Standard statements. Standard statements are sometimes modified by Exceptions or Options.
  - ***Exception*** – a statement, a location, or a condition where a Standard may not apply. All Exception Statements are labeled, and the text appears in bold and italicized font.
- **Guidance** – a statement of a recommended practice to optimize facility operation. All Guidance statements are labeled, and the text appears in italicized type. The verb “should” is typically used. The verbs “shall” and “may” are not used in Guidance statements. Guidance statements are sometimes modified by Options.
- **Option** – a statement of practice that is a permissive condition and carries no requirement or recommendation. Option statements sometimes contain allowable modifications to a Standard or Guidance statement. All Option statements are labeled. The verb “may” is typically used. The verbs “shall” and “should” are not used in Option statements.
- **Advisory** – an informational statement used to clarify a Standard, Exception, Guidance, or Option. An Advisory statement does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition. Advisory statements are labeled. The verbs “shall,” “should,” and “may” are not used in Advisory statements.

Where the standards defined in this chapter cannot be met and the work is within the scoping requirements of a project as defined in [Chapter 2](#), a Request for a Practical Exception (RPE) must be processed in accordance with [Chapter 6](#). In all cases, where compliance is not practical due to existing constraints, compliance is required to the extent practicable and must not result in a detriment to the usability or accessibility of the feature. Formal documentation is not required when the guidance in this chapter is not able to be met.

This manual uses parenthetical documentation placed at the end of paragraphs to cite the Federal source that was used to derive the referenced text when applicable. The most typical Federal sources cited in this manual are the US Access Board’s [ADAAG](#) and proposed [PROWAG](#). The acronym PROWAG refers to the US Access Board’s *Proposed Shared Use Path Supplement to: Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way* 2011 with 2013 supplement incorporated. The acronym ADAAG refers to Appendix D to 36 CFR part 1191, commonly referred to as the US Access Board’s *Americans with Disability Act Accessibility Guidelines*. Text from the proposed PROWAG will be shown with the letter R preceded by a section number reference (RXXX.X.X) and text from the ADAAG will be shown without an R (XXX.X).

### 3.1 Pedestrian Access Route Components

Advisory:

- 01 Pedestrian access routes consist of one or more of the following components:
  1. Sidewalks and other pedestrian circulation paths, or a portion of sidewalks and other pedestrian circulation paths, complying with [Section 3.1.1](#) through [Section 3.1.5](#);
  2. Pedestrian street crossings and at-grade rail crossings complying with [Section 3.1.1](#) through [Section 3.1.5](#) and [Section 3.8](#);
  3. Pedestrian overpasses and underpasses and similar structures complying with [Section 3.1.1](#) through [Section 3.1.5](#);
  4. Curb ramps and blended transitions complying with [Section 3.1.5](#) and [Section 3.2](#);
  5. Ramps complying with [Section 3.13.1](#);
  6. Elevators and limited use/limited application elevators complying with [Section 3.13.8](#);
  7. Platform lifts complying with [Section 3.13.9](#); and
  8. Doors, doorways, and gates complying with [Section 3.13.6](#). (R302.2)

#### 3.1.1 Continuous Clear Width

Standard:

- 01 Except as provided in [Section 3.1.1.1](#), the continuous clear width of pedestrian access routes shall be 4'-0" minimum, exclusive of the width of the curb. (R302.3)

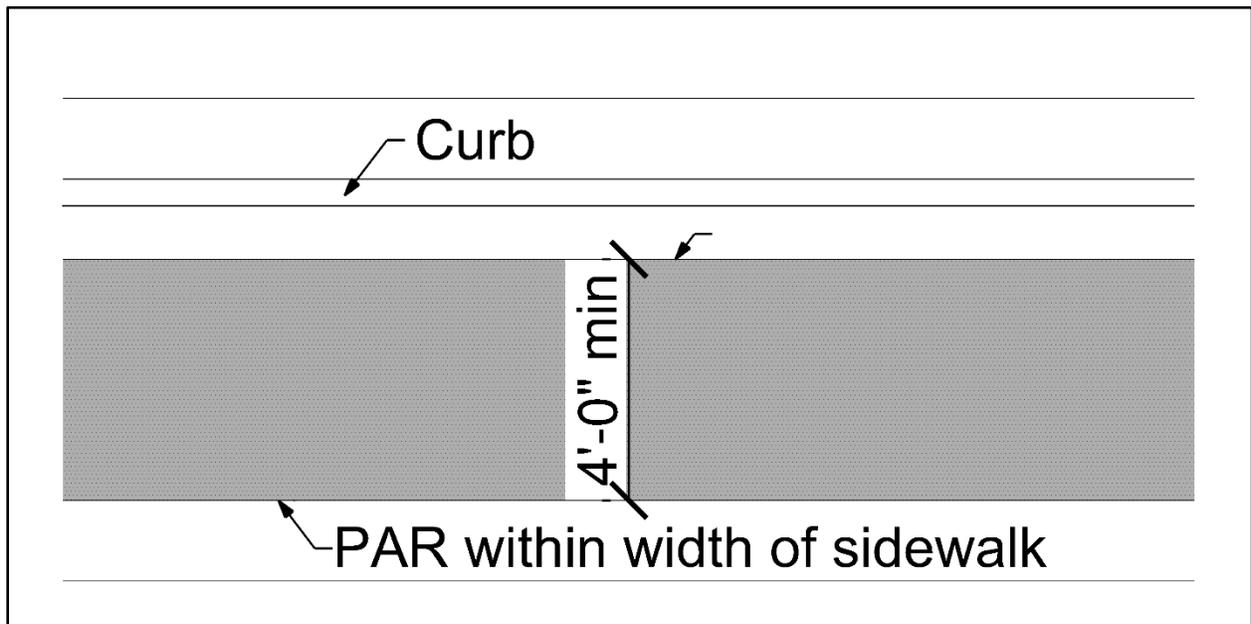


Figure 3.1.1-a Continuous Clear Width (R302.3)

***Exception: The continuous clear width shall be permitted to be reduced to 2'-8" minimum for a length of 2'-0" maximum provided that reduced width segments are separated by segments that are 4'-0" long minimum and 4'-0" wide minimum. (403.5.1)***

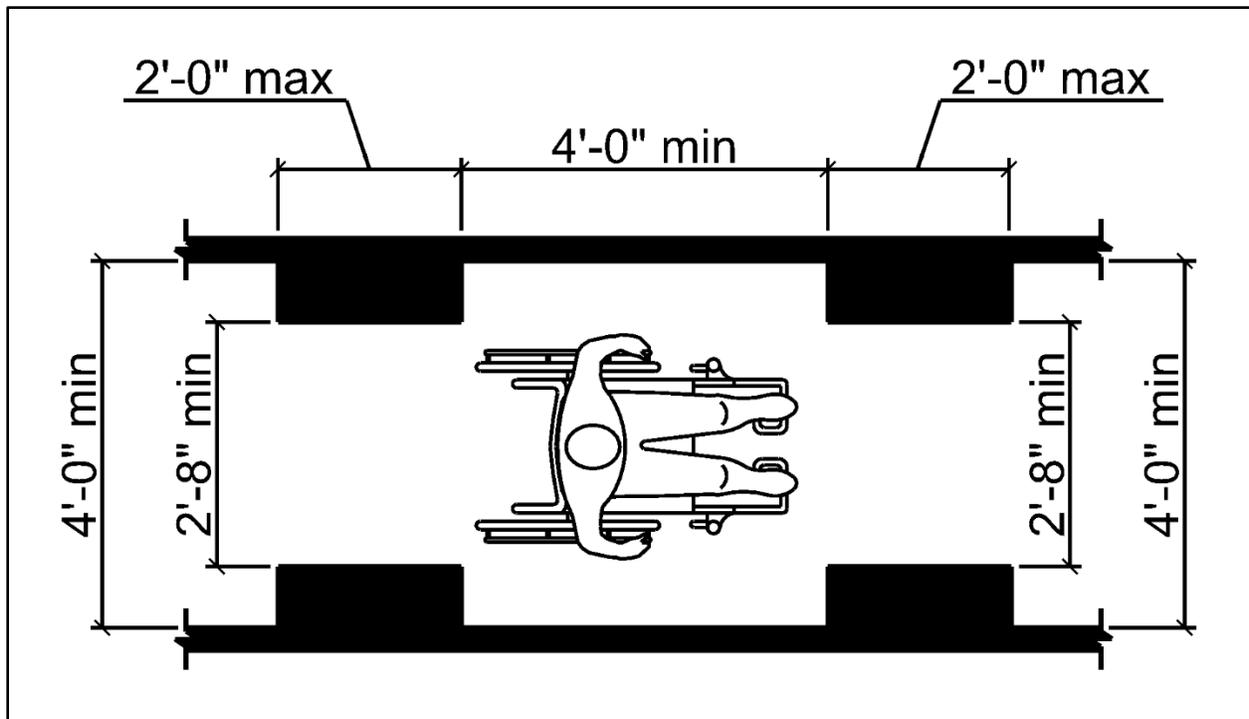


Figure 3.1.1-b Clear Width Reduction (403.5.1)

Advisory:

02 The continuous clear width requirements in [Section 3.1.1](#) apply to sidewalks and other pedestrian circulation paths, pedestrian street crossings and at-grade rail crossings, and pedestrian overpasses and underpasses and similar structures (see [Section 3.1](#) paragraph 1). Component specific clear width requirements are contained in [Section 3.2.5.1](#) for curb ramps and blended transitions, and in [Section 3.13.1](#) for ramps. Where sidewalks and other pedestrian circulation paths, pedestrian street crossings and at-grade rail crossings, and pedestrian overpasses and underpasses and similar structures are wider than 4'-0", only a portion of the pedestrian circulation path is required to comply with the requirements in [Section 3.1.1](#) through [Section 3.1.5](#). (Advisory R302.3)

03 Pedestrian access route widths that are narrower than 2'-8" for any length are not accessible and will not be permitted.

Guidance:

04 *The full width of the pedestrian access route should meet the requirements contained in [Section 3.1.1](#) through [Section 3.1.5](#).*

05 *Additional maneuvering space above the 4'-0" required continuous clear width should be provided at turns or changes in direction, transit stops, recesses and alcoves, building entrances, and along curved or angled routes, particularly where the grade exceeds 5 percent. (Advisory R302.3)*

06 *In low pedestrian traffic volume locations, the pedestrian access route should be 5'-0" wide. At locations with narrow right-of-way, consideration should be given to re-allocating space in the right-of-way (i.e., narrower vehicular lanes) in order to provide this desired 5'-0" width.*

07 *The pedestrian access route width should be increased to 6'-0" at locations where no buffer strip is provided between the roadway and the pedestrian access route.*

08 *At locations where high pedestrian traffic is anticipated such as central business districts, stadiums, and schools, additional width should be added to the pedestrian access route to accommodate the*

*anticipated extra pedestrian volume. The Institute of Transportation Engineers' Highway Capacity Manual provides procedures to assess the width needed to accommodate particular volumes at a desired level of service.*

#### *3.1.1.1 Medians and Pedestrian Refuge Islands*

**Standard:**

01 **The clear width of pedestrian access routes within medians and pedestrian refuge islands shall be 5'-0" minimum. (R302.3.1)**

Advisory:

02 Pinch points that reduce the required continuous clear width below the required 5'-0" are not allowed for these locations.

03 Additional continuous clear width is required at these facilities to provide adequate width for two passing wheelchairs.

*Guidance:*

04 *The continuous clear width of pedestrian access routes within medians and pedestrian refuge islands should match the width of the pedestrian access route which it connects.*

05 *The continuous clear width should be expanded an additional 2'-0" along the whole pedestrian path length up to a width of 10'-0" at locations where pedestrian pushbuttons are to be placed.*

Advisory:

06 The additional width prescribed along facilities with pedestrian pushbuttons allows for easier field placement of pedestrian signal poles that will not reduce the required continuous clear width of the pedestrian access route.

#### 3.1.2 Passing Spaces

**Standard:**

01 **Where the clear width of pedestrian access routes is less than 5'-0", passing spaces shall be provided at intervals of 200'-0" maximum. Passing spaces shall be 5'-0" minimum by 5'-0" minimum. Passing spaces are permitted to overlap pedestrian access routes. (R302.4)**

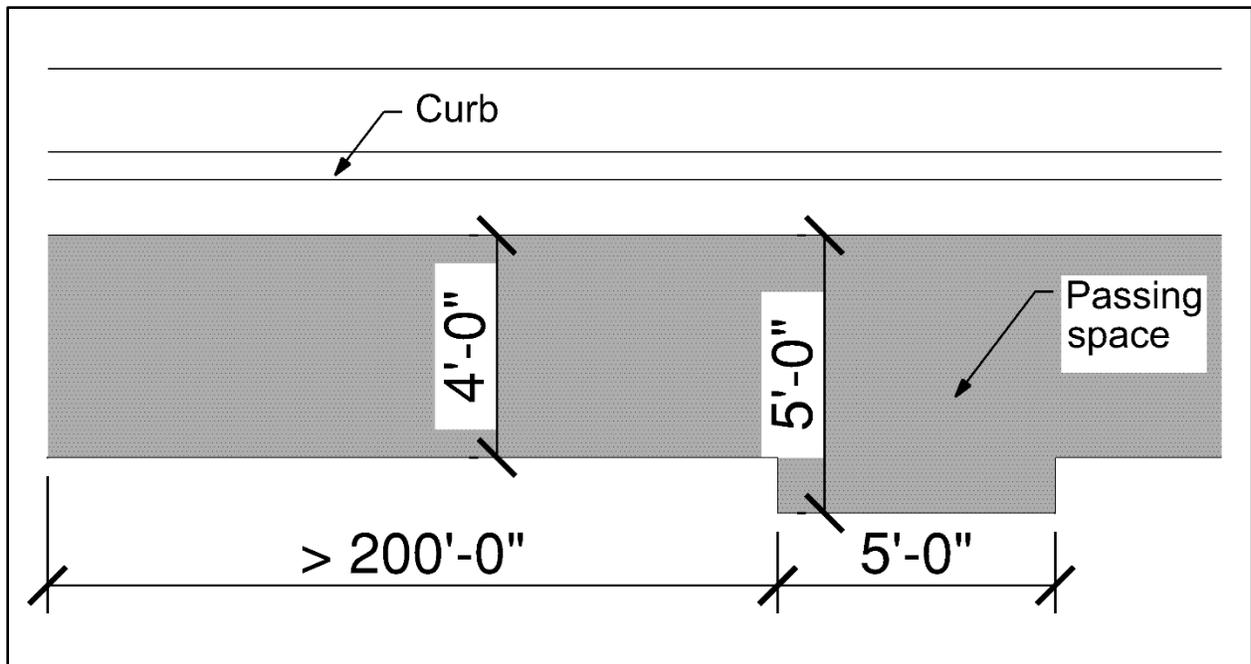


Figure 3.1.2-a Passing Spaces (R302.4)

Advisory:

02 The additional width required at passing spaces provides an opportunity for mobility device users to maneuver past each other on a pedestrian access route.

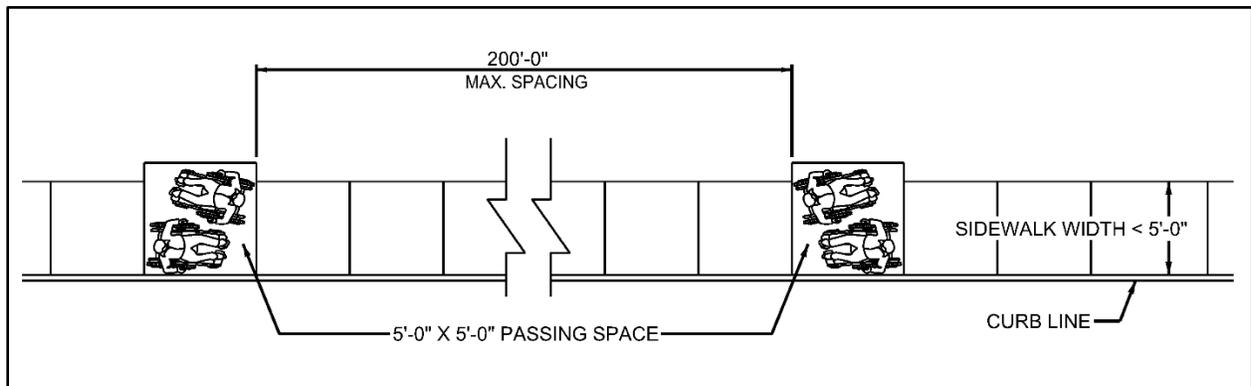


Figure 3.1.2-b Passing Space Layout

Option:

03 Driveways and intersecting walkways may be used as passing spaces provided that these facilities meet the Standard requirements for length, width, running slope, and cross slope.

*Guidance:*

04 *Passing spaces should be considered and laid out during the design phase to ensure that all required property rights are acquired before the construction phase.*

05 *The pedestrian access route width should follow the guidance contained in [Section 3.1.1](#). Accordingly, facilities that require passing spaces should be avoided.*

### 3.1.3 Grade

#### **Standard:**

01 **The grade of pedestrian access routes shall comply with [Section 3.1.3](#). (R302.5)**

#### Advisory:

02 The grade requirements in [Section 3.1.3](#) apply to sidewalks and other pedestrian circulation paths, pedestrian street crossings and at-grade rail crossings, and pedestrian overpasses and underpasses and similar structures (see [Section 3.1](#) paragraph 1). (Advisory R302.5)

03 The grade of the pedestrian access route is measured parallel to the direction of pedestrian travel. (Advisory R302.5)

04 Running slope requirements are contained in [Section 3.2.1.2](#) for perpendicular curb ramps, in [Section 3.2.2.2](#) for parallel curb ramps, [Section 3.2.3.2](#) for diagonal curb ramps, [Section 3.2.4.1](#) for blended transitions, and in [Section 3.13.1](#) for ramps. (Advisory R302.5)

#### *3.1.3.1 Within Street or Highway Right-of-Way*

#### **Standard:**

01 **Except as provided in [Section 3.1.3.3](#), where pedestrian access routes are contained within a street or highway right-of-way, the grade of pedestrian access routes shall not exceed the general grade established for the adjacent street or highway. (R302.5.1)**

#### *3.1.3.2 Not Within Street or Highway Right-of-Way*

#### **Standard:**

01 **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. (R302.5.2)**

#### Guidance:

02 *The pedestrian access route should be designed at a 4.5 percent maximum grade.*

#### Advisory:

03 The 4.5 percent design grade incorporates allowances for potential irregularities or variances due to construction methods or materials.

#### *3.1.3.3 Within Pedestrian Street Crossings*

#### **Standard:**

01 **Where pedestrian access routes are contained within a pedestrian street crossing, the grade of pedestrian access routes shall be 5 percent maximum. (R302.5.3)**

#### Guidance:

02 *The pedestrian access route should be designed at a 4.5 percent maximum grade where possible based on roadway geometrics.*

#### Advisory:

03 The 4.5 percent design grade incorporates allowances for potential irregularities or variances due to construction methods or materials.

04 This criterion will often be controlled by the geometrics and grades of the street that the pedestrian access route it is crossing.

05 Allowable maximum superelevation rates in Delaware are permitted to exceed the 5 percent maximum grade value provided in [Section 3.1.3.3](#). More information on Department policies regarding superelevation is contained in the DelDOT *Road Design Manual*.

06 Existing shoulders or other pedestrian street crossing areas could have locations that exceed the 5 percent maximum grade value.

#### 3.1.4 Cross Slope

##### **Standard:**

01 **Except as provided in [Section 3.1.4.1](#) and [Section 3.1.4.2](#), the cross slope of pedestrian access routes shall be 2 percent maximum. (R302.6)**

##### Advisory:

02 The cross slope requirements in [Section 3.1.4](#) apply to sidewalks and other pedestrian circulation paths, pedestrian street crossings and at-grade rail crossings, and pedestrian overpasses and underpasses and similar structures (see [Section 3.1](#) paragraph 1). (Advisory R302.6)

03 The cross slope of the pedestrian access route is measured perpendicular to the direction of pedestrian travel. Cross slope requirements are contained in [Section 3.2.5.2](#) for curb ramps and blended transitions, and in [Section 3.13.1](#) for ramps. (Advisory R302.6)

##### *Guidance:*

04 *The pedestrian access route should be designed at a 1.5 percent cross slope except as provided in [Section 3.1.4.1](#) and [Section 3.1.4.2](#) where the cross slope of the facility is controlled by the intersecting roadway.*

##### Advisory:

05 The 1.5 percent design cross slope incorporates allowances for potential irregularities or variances due to construction methods or materials.

##### *Guidance:*

06 *The cross slope should be 1.0 percent minimum, except as provided in [Section 3.1.4.1](#) and [Section 3.1.4.2](#) where the cross slope of the facility is controlled by the intersecting roadway.*

##### Advisory:

07 The 1.0 percent minimum cross slope is intended to facilitate positive drainage.

#### *3.1.4.1 Pedestrian Street Crossings Without Yield or Stop Control*

##### **Standard:**

01 **Where pedestrian access routes are contained within pedestrian street crossings without yield or stop control, the cross slope of the pedestrian access route shall be 5 percent maximum. (R302.6.1)**

##### Advisory:

02 Pedestrian street crossings without yield or stop control are crossings where there is no yield or stop sign, or where there is a traffic signal that is designed for the green phase. (Advisory R302.6.1)

03 At pedestrian street crossings without yield or stop control, vehicles can proceed through the intersection without slowing or stopping. (Advisory R302.6.1)

##### *Guidance:*

04 *The pedestrian access route should be designed at a 4.5 percent cross slope where possible based on roadway geometrics.*

Advisory:

05 The 4.5 percent design cross slope incorporates allowances for potential irregularities or variances due to construction methods or materials.

06 This criterion will often be controlled by the geometrics and grades of the street that the pedestrian access route is crossing.

07 Where pedestrian access routes are contained within pedestrian street crossings with yield or stop control, the cross slope of the pedestrian access route must be 2 percent maximum (see [Section 3.1.4](#)). At pedestrian street crossings with yield or stop control, vehicles slow or stop before proceeding through the intersection. (Advisory R302.6.1)

#### 3.1.4.2 Midblock Pedestrian Street Crossings

**Standard:**

01 **Where pedestrian access routes are contained within midblock pedestrian street crossings, the cross slope of the pedestrian access route shall be permitted to equal the street or highway grade. (R302.6.2)**

*Guidance:*

02 *Pedestrian crossings at roundabouts that are located outside of the direct influence of the vehicular yield should be treated as a midblock pedestrian street crossing with the cross slope of the pedestrian crossing permitted to equal the street or highway grade.*

#### 3.1.5 Surfaces

**Standard:**

01 **The surfaces of pedestrian access routes and elements and spaces required to comply with [Section 3.1.5](#) that connect to pedestrian access routes shall be firm, stable, and slip resistant and shall comply with [Section 3.1.5](#). (R302.7)**

Advisory:

02 The minor accumulation of sediment at the time of inspection alone does not constitute a violation of this Standard. Locations prone to sediment accumulation will require maintenance to ensure that the accumulation of sediment does not jeopardize the firm, stable, and slip resistant surface requirements. Maintenance requirements for accessible features are contained in 28 CFR 35.133.

03 28 CFR 35.133 provides the following statement:

Maintenance of accessible features.

(a) A public entity shall maintain in operable working condition those features of facilities and equipment that are required to be readily accessible to and usable by persons with disabilities by the Act or this part.

(b) This section does not prohibit isolated or temporary interruptions in service or access due to maintenance or repairs.

(c) If the 2010 Standards reduce the technical requirements or the number of required accessible elements below the number required by the 1991 Standards, the technical requirements or the number of accessible elements in a facility subject to this part may be reduced in accordance with the requirements of the 2010 Standards. (28 CFR 35.133)

04 The Department maintains Policy Implement number O-02 which establishes the Department's sidewalk and shared use path maintenance policy.

05 The surface requirements in [Section 3.1.5](#) apply to sidewalks and other pedestrian circulation paths, pedestrian street crossings and at-grade rail crossings, pedestrian overpasses and underpasses and similar structures, and curb ramps and blended transitions (see [Section 3.1](#) paragraph 1). The surface requirements in [Section 3.1.5](#) also apply to surfaces at the following accessible elements and spaces that connect to pedestrian access routes:

- Clear spaces (see [Section 3.6.1](#)), including clear spaces at operable parts (see [Section 3.5.1](#)) such as accessible pedestrian signals and pedestrian pushbuttons (see [Section 3.9](#)), clear spaces at street furniture such as benches (see [Section 3.13.7.5](#)), and clear spaces within transit shelters (see [Section 3.10.2](#));
- Boarding and alighting areas and boarding platforms at transit stops (see [Section 3.10.1.3.1](#));
- Access aisles at accessible parking spaces (see [Section 3.11.2](#)) and accessible passenger loading zones (see [Section 3.12.2.4](#)); and
- Ramp runs and landings (see [Section 3.13.1](#)). (Advisory R302.7)

#### 3.1.5.1 Vertical Alignment

##### Standard:

01 **No accessibility standard has been adopted.**

##### Guidance:

02 *Vertical alignment should be generally planar and smooth within pedestrian access routes (including curb ramp runs, blended transitions, turning spaces, and gutter areas within pedestrian access routes) and surfaces at other elements and spaces required to comply with [Section 3.1.5](#) that connect to pedestrian access routes. (R302.7.1)*

03 *Surfaces should be chosen for easy rollability. Surfaces that are heavily textured, rough, or chamfered and paving systems consisting of individual units that cannot be laid in plane will greatly increase rolling resistance and subject pedestrians who use wheelchairs, scooters, and rolling walkers to the stressful and often painful effects of vibration. Such materials should be reserved for borders and decorative accents located outside of or only occasionally crossing the pedestrian access route. (Advisory R302.7.1)*

04 *Vertical alignments should not include any rapid grade changes with an absolute algebraic difference greater than 11.0 percent.*

#### 3.1.5.2 Vertical Surface Discontinuities

##### Standard:

01 **Where changes in level are permitted in ground surfaces, they shall comply with [Section 3.1.5.2](#). (303.1)**

##### Advisory:

02 The allowance for vertical surface discontinuities is for occasional expansion joints and objects such as utility covers, vault frames, and gratings that cannot be located outside the pedestrian access route. (Advisory R302.7.2)

##### Guidance:

03 *Objects such as utility covers, vault frames, and gratings should not be located on curb ramp runs, blended transitions, turning spaces, or gutter areas within the pedestrian access route. This may not always be possible in alterations, but should be avoided wherever possible. (Advisory R302.7.2)*

### 3.1.5.2.1 Vertical

**Standard:**

01 Changes in level of 0'-0.25" high maximum shall be permitted to be vertical. (303.2)

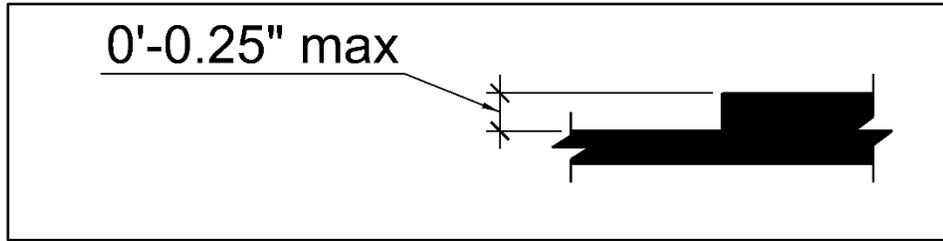


Figure 3.1.5.2.1 Vertical Change in Level (303.2)

### 3.1.5.2.2 Beveled

**Standard:**

01 Vertical surface discontinuities between 0'-0.25" and 0'-0.50" shall be beveled with a slope not steeper than 50 percent. The bevel shall be applied across the entire vertical surface discontinuity (R302.7.2)

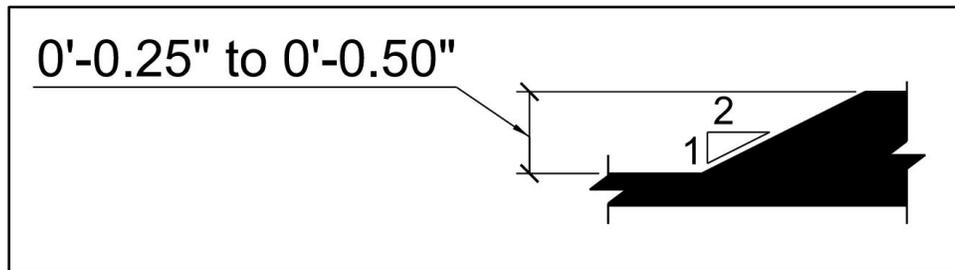


Figure 3.1.5.2.2 Beveled Change in Level (R302.7.2)

### 3.1.5.2.3 Ramps

**Standard:**

01 Changes in level greater than 0'-0.50" high shall be ramped, and shall comply with [Section 3.13.1](#). (303.4)

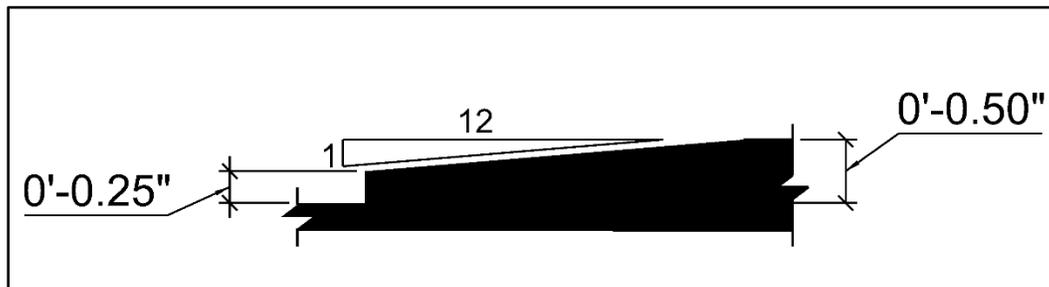


Figure 3.1.5.2.3 Ramped Change in Level

**Option:**

02 Changes in level greater than 0'-0.50" high may be beveled at no more than 5 percent. No additional landings are required for this 5 percent bevel.

### 3.1.5.3 Horizontal Openings

#### Standard:

01 Horizontal openings in gratings and joints shall not permit passage of a sphere more than 0'-0.50" in diameter. Elongated openings in gratings shall be placed so that the long dimension is perpendicular to the dominant direction of travel. (R302.7.3)

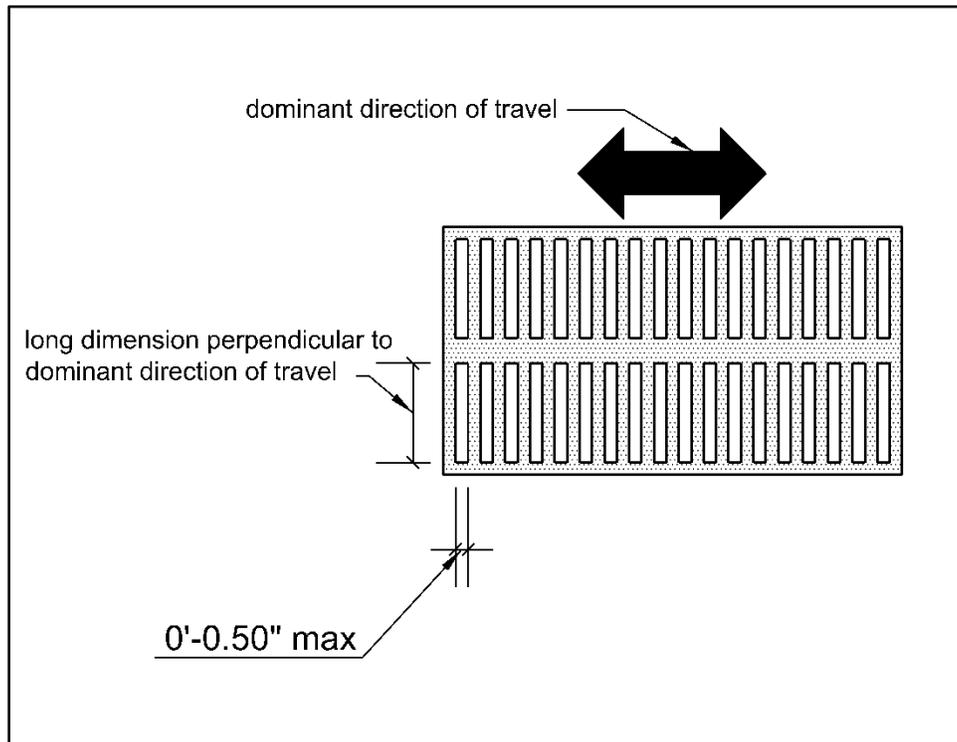


Figure 3.1.5.3 Horizontal Openings (R302.7.3)

#### Guidance:

02 Objects such as utility covers, vault frames, and gratings should not be located on curb ramp runs, blended transitions, turning spaces, or gutter areas within the pedestrian access route. This may not always be possible in alterations but should be avoided wherever possible. (Advisory R302.7.2)

03 Drainage grates that are located in the pedestrian access route should utilize the Type 7 grate shown in *DelDOT Standard Construction Detail D-5 Sheet 2* as this grate meets the horizontal openings requirements of [Section 3.1.5.3](#). Caution should be used in placing Type 7 grates due to poor hydraulic efficiency.

### 3.1.5.4 Flangeway Gaps

#### Standard:

Flangeway gaps at pedestrian at-grade rail crossings shall be 0'-2.5" maximum on non-freight rail track and 0'-3" maximum on freight rail track. (R302.7.4)

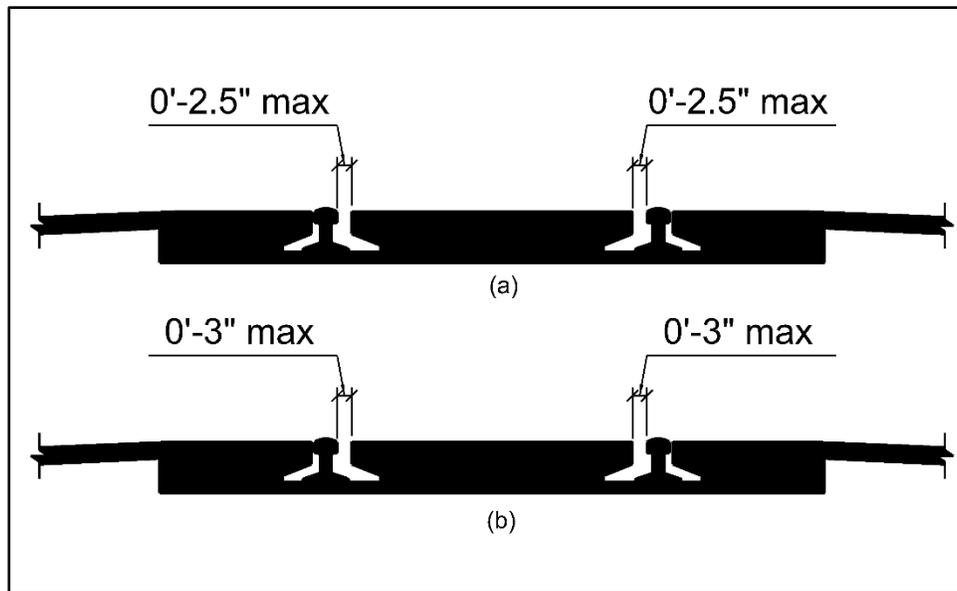


Figure 3.1.5.4 Flangeway Gaps (R302.7.4)

**Advisory:**

02 Flangeway gaps are necessary to allow the passage of train wheel flanges. Flangeway gaps pose a potential hazard to pedestrians who use wheelchairs because the gaps can entrap the wheelchair casters. (Advisory R302.7.4)

3.1.6 Separation

**Standard:**

01 **Dedicated pedestrian circulation paths shall provide a continuously detectable separation between the pedestrian access route and the vehicle travel lane at locations where pedestrian street crossing is not intended.**

*Exception: Driveways and other vehicle entrance locations are permitted to remove the separation between the pedestrian access route and the vehicle travel lane.*

**Advisory:**

02 Continuously detectable separation between the pedestrian access route and the vehicle travel lane serves to delineate appropriate street crossing locations for all users, including visually impaired users.

03 Truncated dome detectable warning surfaces in accordance with Section 3.3 are not to be used to create this separation.

04 Acceptable continuously detectable separation methods include but are not limited to: curb, buffer strips that contrast both visually and tactilely underfoot, chains, fencing, railings, planters, or landscaping.

05 Where chains, fencing, or railings are used for separation, they are to have a bottom edge 1'-3" maximum above the pedestrian circulation path. (Advisory R206)

3.2 Curb Ramps and Blended Transitions

**Standard:**

01 **A curb ramp, blended transition, or a combination of curb ramps and blended transitions complying with [Section 3.2](#) shall connect the pedestrian access routes at each pedestrian street crossing. The curb**

**ramp (excluding any flared sides) or blended transition shall be contained wholly within the width of the pedestrian street crossing served. (R207.1)**

Advisory:

02 There are three types of curb ramps:

- Perpendicular curb ramps have a running slope that cuts through or is built up to the curb at right angles or meets the gutter break at right angles where the curb is curved. On large corner radiuses, it will be necessary to indent the gutter break on one side of the curb ramp in order for the curb ramp to meet the gutter break at right angles. (Advisory R304.1)
- Parallel curb ramps have a running slope that is in-line with the direction of sidewalk travel and lower the sidewalk to a level turning space where a turn is made to enter the pedestrian street crossing. (Advisory R304.1)
- Diagonal curb ramps are located at the apex of a corner radius and are designed to serve two independent street crossings. Diagonal curb ramps are termed diagonal ramps because they are oriented toward the center of the intersection rather than toward the crosswalks. The use of diagonal ramps is discouraged.

03 Parallel and perpendicular curb ramps can be combined. A parallel curb ramp is used to lower the sidewalk to a mid-turning space and a short perpendicular curb ramp connects the turning space to the street. Combination curb ramps can be provided where the sidewalk is at least 6'-0" wide. (Advisory R304.1)

04 Blended transitions are raised pedestrian street crossings, depressed corners, or similar connections between pedestrian access routes at the level of the sidewalk and the level of the pedestrian street crossing that have a grade of 5 percent or less. Blended transitions are suitable for a range of sidewalk conditions. (Advisory R304.1)

*Guidance:*

05 *The installation of blended transitions is preferred over the installation of curb ramps as local site conditions allow.*

Advisory:

06 Blended transitions provide a smoother and more continuous transition to the street crossing for the user and provides additional accessibility compliance flexibility.

07 In 1999, the US Access Board established a Public Rights-of-Way Access Advisory Committee (PROWAAC) that was tasked with researching and creating recommendations for applying the ADA to a public right-of-way setting. The committee's work ultimately led to the creation of a Final Report issued in 2001 which would serve as the foundation of the 2002 Draft Guidelines for Accessible Public Rights-of-Way. Section X02.4.1.3 entitled *Number* from the report states the following: "the committee strongly discourages the use of shared curb ramps, formerly called diagonal curb ramps, or shared flush landings, formerly called single parallel curb ramps, unless there is no alternative."

### 3.2.1 Perpendicular Curb Ramps

**Standard:**

01 **Perpendicular curb ramps shall comply with [Section 3.2.1](#) and [Section 3.2.5](#). (R304.2)**

### 3.2.1.1 Turning Space

#### Standard:

01 A turning space 4'-0" minimum by 4'-0" minimum shall be provided at the top of the curb ramp and shall be permitted to overlap other turning spaces and clear spaces. Where the turning space is constrained at the back-of-sidewalk, the turning space shall be 4'-0" minimum by 5'-0" minimum. The 5'-0" dimension shall be provided in the direction of the ramp run. (R304.2.1)

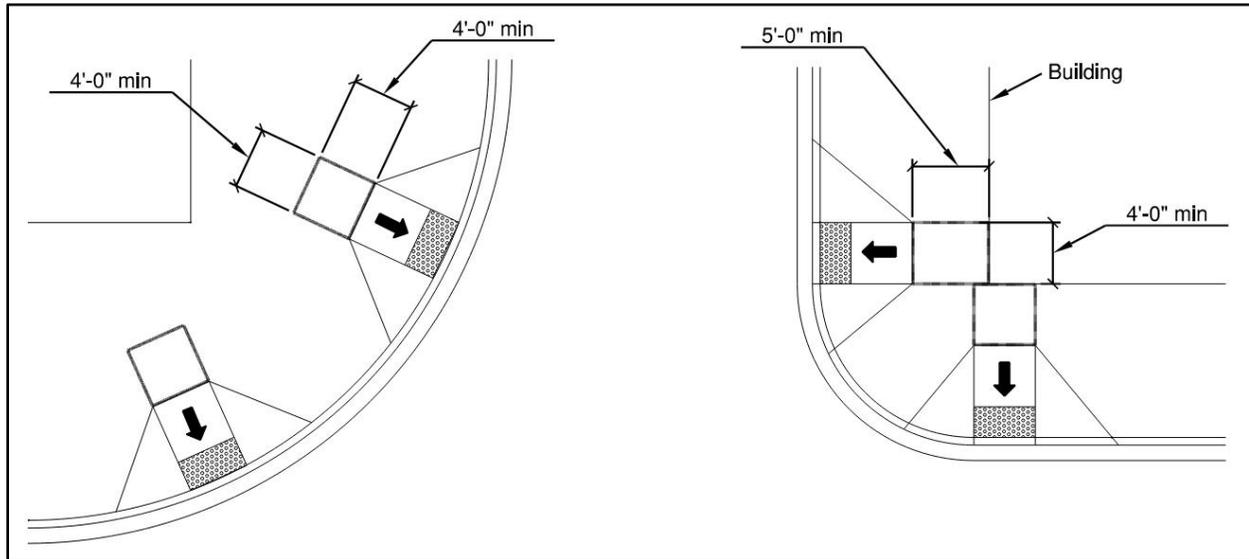


Figure 3.2.1.1 Perpendicular Curb Ramp Turning Space (R304.2.1)

#### Advisory:

- 02 Turning spaces provide a location for users to orient themselves.
- 03 Turning spaces are not required on single approach perpendicular curb ramps at the top of the ramp provided that no turning movement is required to enter or exit the ramp.
- 04 Turning spaces are a separate concept from landings. Landings are a function of ramps. See [Section 3.13.1](#) for additional information regarding ramps.
- 05 A constraint is any feature that projects more than 0'-2" above the pedestrian access route surface.

### 3.2.1.2 Running Slope

#### Standard:

01 The running slope of the curb ramp shall cut through or shall be built up to the curb at right angles or shall meet the gutter grade break at right angles where the curb is curved. The running slope of the curb ramp shall be 5 percent minimum and 8.3 percent maximum but shall not require the ramp length to exceed 15'-0". The running slope of the turning space shall be 2 percent maximum. (R304.2.2)

#### Guidance:

02 The running slope of the curb ramp should be designed at a 7.5 percent maximum and the turning space should be designed for a 1.5 percent maximum.

#### Advisory:

03 The 7.5 percent and 1.5 percent design grades incorporate allowances for potential irregularities or variances due to construction methods or materials.

### 3.2.1.3 Flared Sides

#### Standard:

01 **Where a pedestrian circulation path crosses the curb ramp, flared sides shall be sloped 10 percent maximum, measured parallel to the curb line. (R304.2.3)**

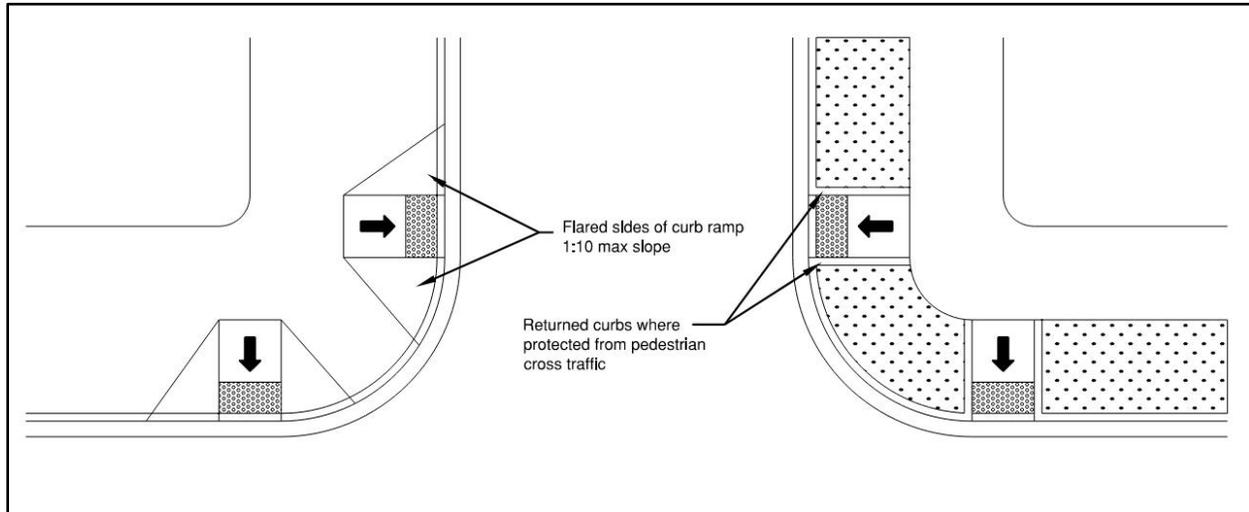


Figure 3.2.1.3 Flared Sides (R304.2.3)

#### Advisory:

02 The flared sides are part of the pedestrian circulation path, but are not part of the pedestrian access route. Curb ramps whose sides have returned curbs provide useful directional cues where they are aligned with the pedestrian street crossing and are protected from cross travel by landscaping, street furniture, chains, fencing, or railings. (Advisory R304.2.3)

03 Flared sides are the Department preferred application as returned curbs present a vertical obstruction that has the potential to catch snowplow blades.

#### Guidance:

04 *The flared sides should be designed at a 9.5 percent maximum, measured parallel to the curb line.*

#### Advisory:

05 The 9.5 percent design grade incorporates allowances for potential irregularities or variances due to construction methods or materials.

### 3.2.1.4 Grade Breaks

#### Standard:

01 **Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush. (R304.5.2)**

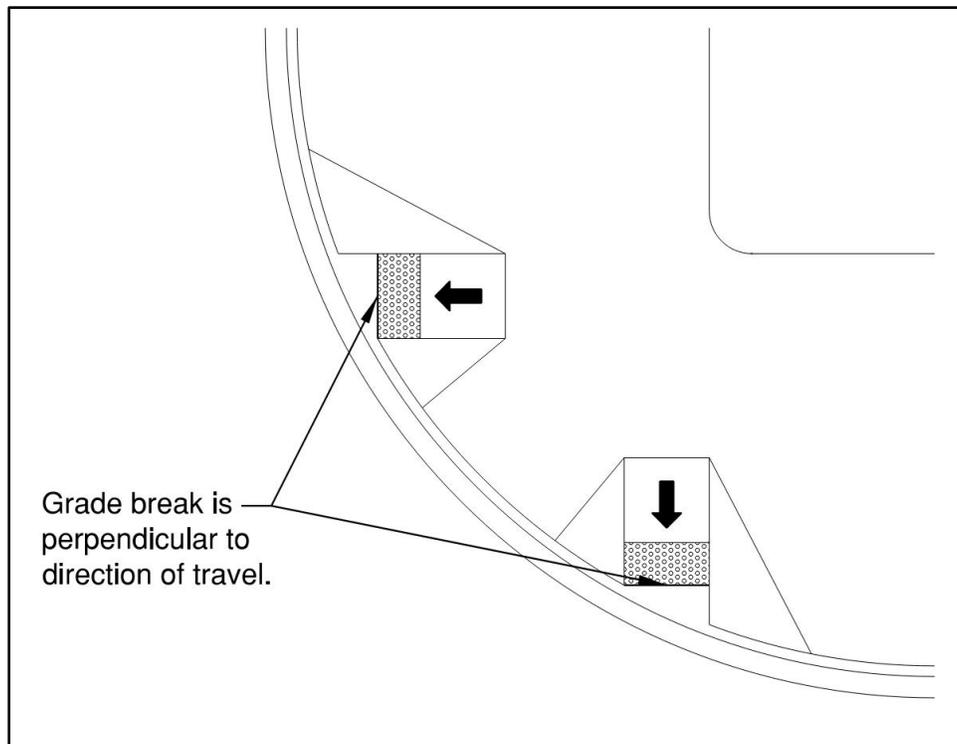


Figure 3.2.1.4 Perpendicular Curb Ramp Grade Breaks (R304.5.2)

Advisory:

02 Grade breaks at the top or bottom of a curb ramp create maneuverability difficulties for mobility device users. Accordingly, the grade break at the top and bottom of a curb ramp run is required to be perpendicular to the path of travel.

### 3.2.2 Parallel Curb Ramps

**Standard:**

01 **Parallel curb ramps shall comply with [Section 3.2.2](#) and [Section 3.2.5](#). (R304.3)**

#### 3.2.2.1 Turning Space

**Standard:**

01 **A turning space 4'-0" minimum by 4'-0" minimum shall be provided at the bottom of the curb ramp and shall be permitted to overlap other turning spaces and clear spaces. If the turning space is constrained on 2 or more sides, the turning space shall be 4'-0" minimum by 5'-0". The 5'-0" dimension shall be provided in the direction of the pedestrian street crossing. (R304.3.1)**

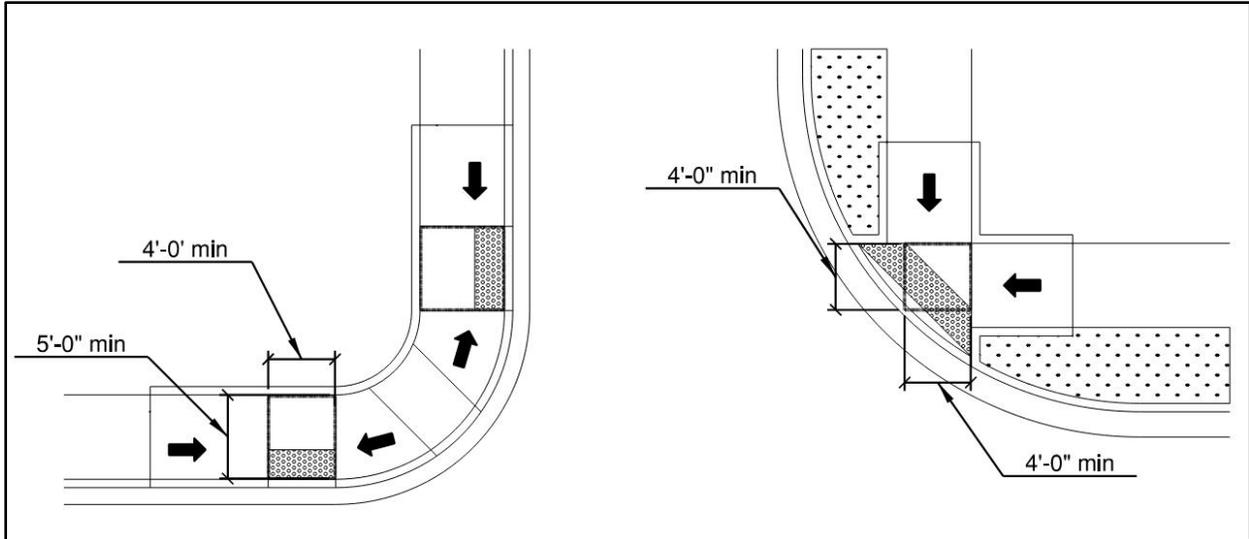


Figure 3.2.2.1 Parallel Curb Ramp Turning Space (R304.3.1)

**Advisory:**

- 02 Turning spaces provide a location for users to orient themselves.
- 03 Turning spaces are a separate concept from landings. Landings are a function of ramps. See [Section 3.13.1](#) for additional information regarding ramps.
- 04 A constraint is any feature that projects more than 0'-2" above the pedestrian access route surface.

*3.2.2.2 Running Slope*

**Standard:**

- 01 **The running slope of the curb ramp shall be in-line with the direction of sidewalk travel. The running slope of the curb ramp shall be 5 percent minimum and 8.3 percent maximum but shall not require the ramp length to exceed 15'-0". The running slope of the turning space shall be 2 percent maximum. (R304.3.2)**

*Guidance:*

- 02 *The running slope of the curb ramp should be designed at a 7.5 percent maximum and the turning space should be designed for a 1.5 percent maximum.*

**Advisory:**

- 03 The 7.5 percent and 1.5 percent design grades incorporate allowances for potential irregularities or variances due to construction methods or materials.

*3.2.2.3 Grade Breaks*

**Standard:**

- 01 **Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush. (R304.5.2)**

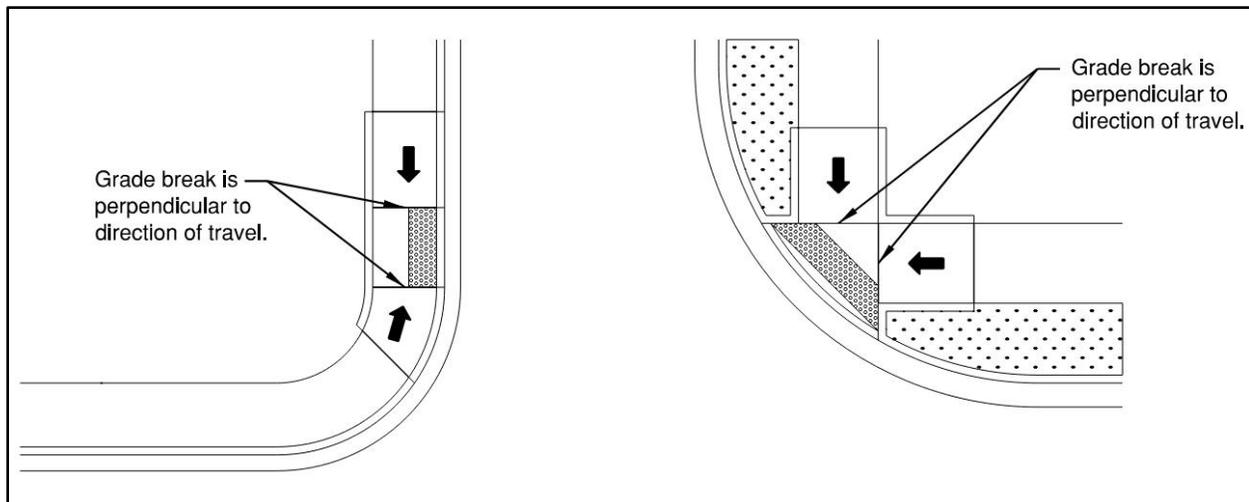


Figure 3.2.2.3 Parallel Curb Ramp Grade Breaks

**Advisory:**

02 Grade breaks at the top or bottom of a curb ramp create maneuverability difficulties for mobility device users. Accordingly, the grade break at the top and bottom of a curb ramp run is required to be perpendicular to the path of travel.

**3.2.3 Diagonal Curb Ramps**

**Standard:**

01 **Diagonal curb ramps shall comply with [Section 3.2.3](#) and [Section 3.2.5](#).**

02 **Diagonal or corner type curb ramps with returned curbs or other well-defined edges shall have the edges parallel to the direction of pedestrian flow. Diagonal curb ramps with flared sides shall have a segment of curb 2'-0" long minimum located on each side of the curb ramp and within the marked crossing. (406.6)**

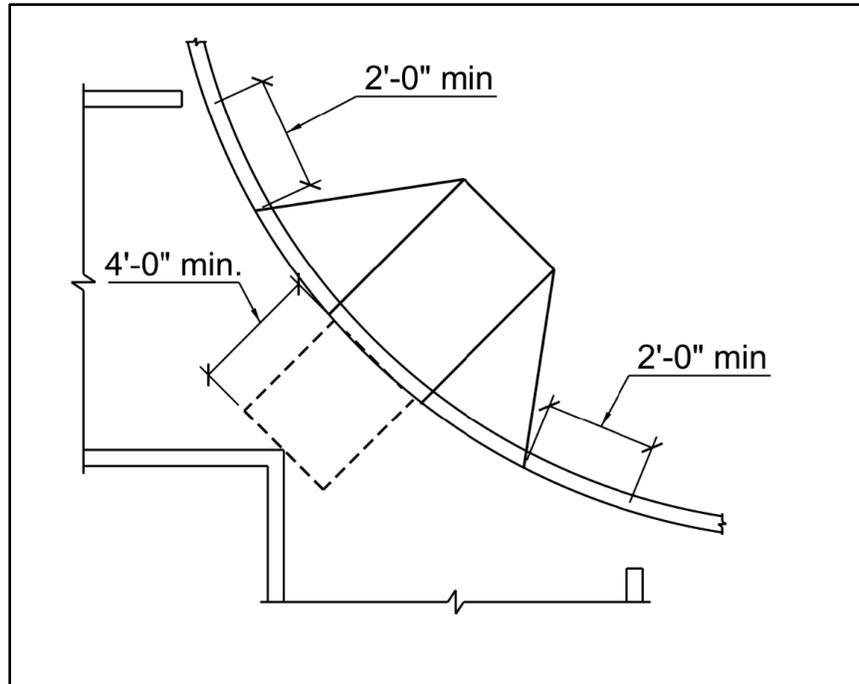


Figure 3.2.3 Diagonal Curb Ramps (406.6)

**Advisory:**

03 The use of diagonal curb ramps is discouraged.

**Option:**

04 In alterations where existing physical constraints prevent compliance with [Section 3.2](#) paragraph 01, a single diagonal curb ramp may be permitted to serve both pedestrian street crossings. (R207.2)

*3.2.3.1 Turning Space*

**Standard:**

01 **A turning space 4'-0" minimum by 4'-0" minimum shall be provided at the top of the curb ramp and shall be permitted to overlap other turning spaces and clear spaces. Where the turning space is constrained at the back-of-sidewalk, the turning space shall be 4'-0" minimum by 5'-0" minimum. The 5'-0" dimension shall be provided in the direction of the ramp run.**

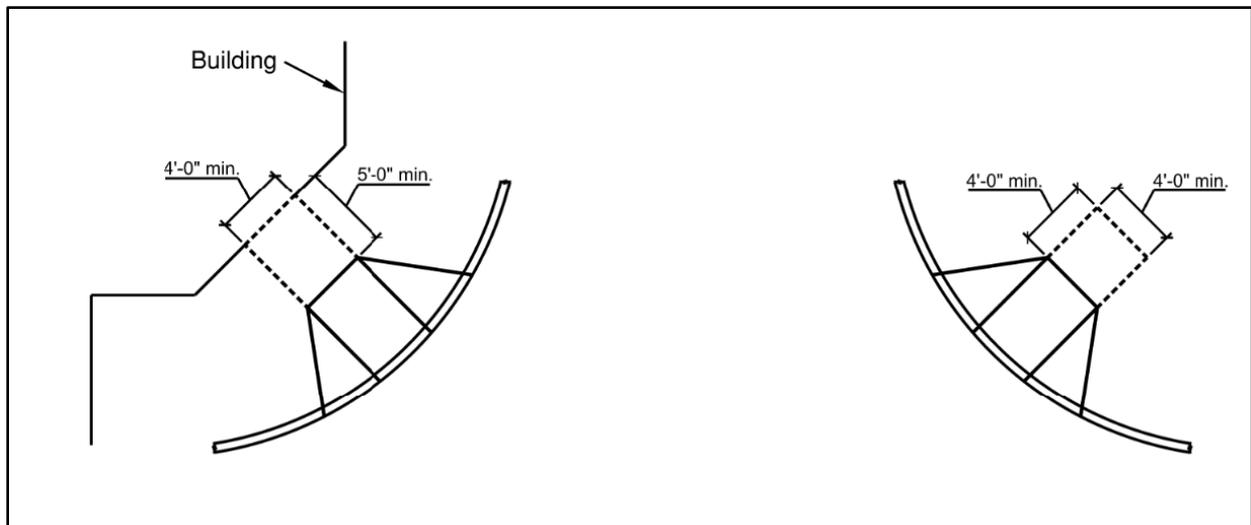


Figure 3.2.3.1 Diagonal Curb Ramp Turning Space

Advisory:

- 02 Turning spaces provide a location for users to orient themselves.
- 03 Turning spaces are a separate concept from landings. Landings are a function of ramps. See [Section 3.13.1](#) for additional information regarding ramps.
- 04 A constraint is any feature that projects more than 0'-2" above the pedestrian access route surface.

### 3.2.3.2 Running Slope

**Standard:**

- 01 **The running slope of the curb ramp shall cut through the curb at right angles or shall be built up to the curb at right angles or and shall meet the gutter grade break at right angles. The running slope of the curb ramp shall be 5 percent minimum and 8.3 percent maximum but shall not require the ramp length to exceed 15'-0". The running slope of the turning space shall be 2 percent maximum.**

*Guidance:*

- 02 *The running slope of the curb ramp should be designed at a 7.5 percent maximum and the turning space should be designed for a 1.5 percent maximum.*

Advisory:

- 03 The 7.5 percent and 1.5 percent design grades incorporate allowances for potential irregularities or variances due to construction methods or materials.

### 3.2.3.3 Flared Sides

**Standard:**

- 01 **Where a pedestrian circulation path crosses the curb ramp, flared sides shall be sloped 10 percent maximum, measured parallel to the curb line. (R304.2.3)**

Advisory:

- 02 The flared sides are part of the pedestrian circulation path, but are not part of the pedestrian access route. Curb ramps whose sides have returned curbs provide useful directional cues where they are aligned

with the pedestrian street crossing and are protected from cross travel by landscaping, street furniture, chains, fencing, or railings. (Advisory R304.2.3)

03 Flared sides are the Department preferred application as returned curbs present a vertical obstruction that has the potential to catch snowplow blades.

*Guidance:*

04 *The flared sides should be designed at a 9.5 percent maximum, measured parallel to the curb line.*

*Advisory:*

05 The 9.5 percent design grade incorporates allowances for potential irregularities or variances due to construction methods or materials.

### 3.2.3.4 Grade Breaks

**Standard:**

01 **Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush. (R304.5.2)**

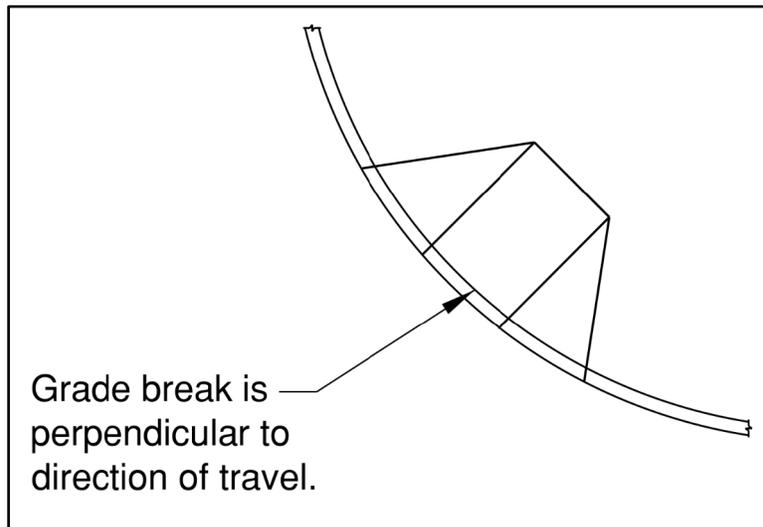


Figure 3.2.3.4 Diagonal Curb Ramp Grade Breaks

*Advisory:*

02 Grade breaks at the top or bottom of a curb ramp create maneuverability difficulties for mobility device users. Accordingly, the grade break at the top and bottom of a curb ramp run is required to be perpendicular to the path of travel.

### 3.2.4 Blended Transitions

**Standard:**

01 **Blended transitions shall comply with [Section 3.2.4](#) and [Section 3.2.5](#). (R304.4)**

#### 3.2.4.1 Running Slope

**Standard:**

01 **The running slope of blended transitions shall be 5 percent maximum. (R304.4.1)**

**Guidance:**

02 The running slope of blended transitions should be designed at a 4.5 percent maximum.

**Advisory:**

03 The 4.5 percent design grade incorporates allowances for potential irregularities or variances due to construction methods or materials.

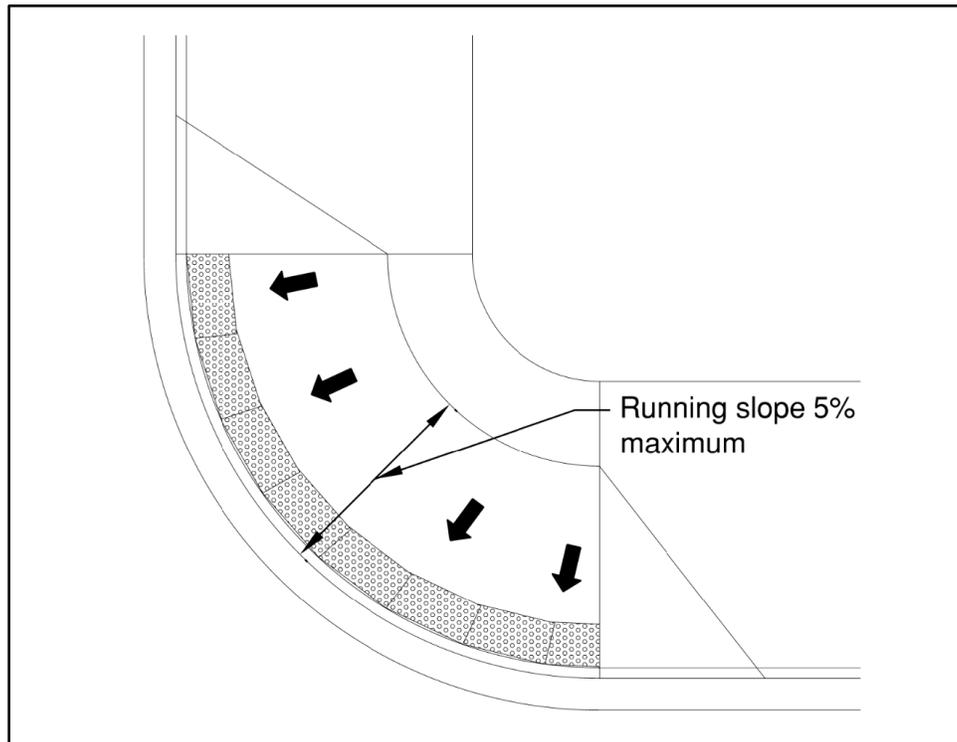


Figure 3.2.4.1 Running Slope (R304.4.1)

**Option:**

04 Where blended transitions are constructed and the running slope is found to exceed 5 percent, the facility may be evaluated for accessibility compliance as a curb ramp.

**3.2.5 Common Requirements**

**Standard:**

01 Curb ramps and blended transitions shall comply with [Section 3.2.5](#). (R304.5)

**3.2.5.1 Width**

**Standard:**

01 The clear width of curb ramp runs, blended transitions, and turning spaces shall be 4'-0" minimum. (R304.5.1.1)

02 If provided, flared sides of curb ramp runs and blended transitions shall be located outside the width of the curb ramp run or blended transition. (R304.5.1)

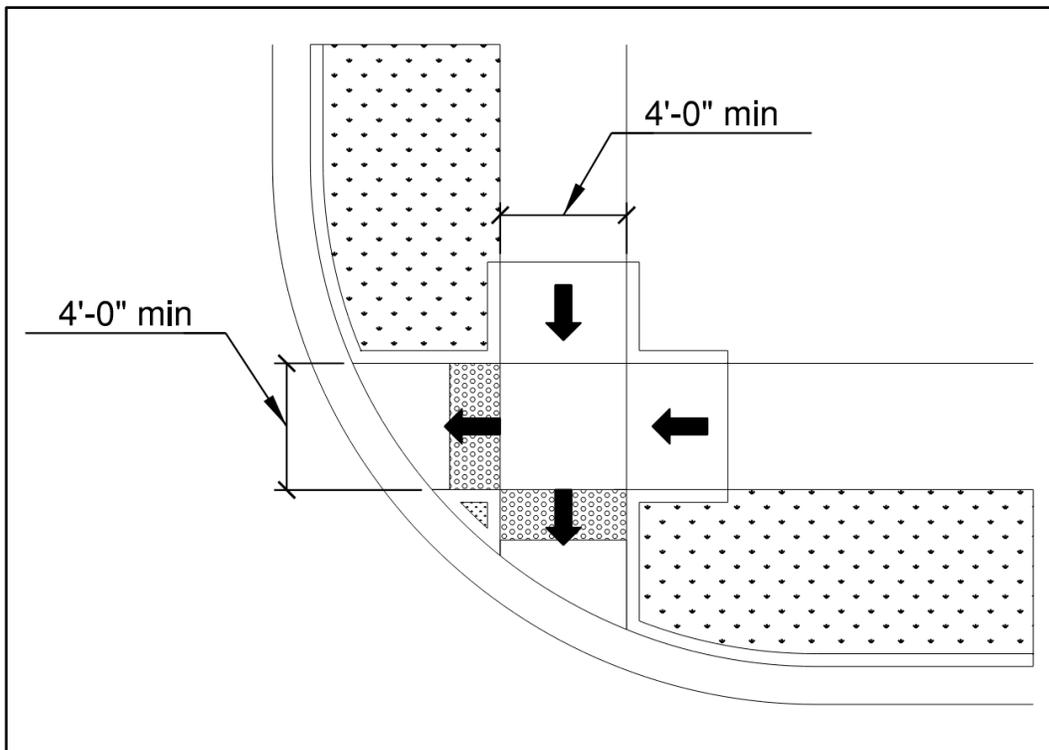


Figure 3.2.5.1 Width (R304.5.1)

*Guidance:*

03 *The width of the curb ramp or the blended transition should be equal to the width of the connecting pedestrian access route. (R304.5.1.2)*

*Advisory:*

04 Clear width reductions in accordance with [Section 3.1.1](#) is not permitted on curb ramps or blended transitions.

*3.2.5.2 Cross Slope*

**Standard:**

01 **The cross slope of curb ramps, blended transitions, and turning spaces shall be 2 percent maximum. At pedestrian street crossings without yield or stop control and at midblock pedestrian street crossings, the cross slope shall be permitted to equal the street or highway grade. (R304.5.3)**

*Advisory:*

02 Pedestrian street crossings without yield or stop control are crossings where there is no yield or stop sign, or where there is a traffic signal that is designed for the green phase. At pedestrian street crossings without yield or stop control, vehicles can proceed through the intersection without slowing or stopping. (Advisory R304.5.3)

*Guidance:*

03 *The pedestrian access route should be designed at a 1.5 percent cross slope except at pedestrian street crossings without yield or stop control and at midblock crossings where the cross slope is permitted to equal the street or highway grade.*

Advisory:

04 The 1.5 percent design cross slope incorporates allowances for potential irregularities or variances due to construction methods or materials.

### 3.2.5.3 Counter Slope

**Standard:**

01 **The counter slope of the gutter or street at the foot of curb ramp runs, blended transitions, and turning spaces shall be 5 percent maximum. (R304.5.4)**

*Guidance:*

02 *The counter slope of the gutter or street at the foot of curb ramp runs, blended transitions, and turning spaces should be designed at a 4.5 percent maximum.*

Advisory:

03 The 4.5 percent design grade incorporates allowances for potential irregularities or variances due to construction methods or materials.

*Guidance:*

04 *The algebraic difference between the counter slope of the gutter or street and the intersecting ramp should not exceed 13.3 percent.*

Advisory:

05 Previous Department standards were based upon a 13.3 percent algebraic difference between the gutter or street slope and the intercepting ramp. Additional discussion on the significance of the algebraic difference is contained in [Chapter 4](#) of this manual.

### 3.2.5.4 Clear Space

**Standard:**

01 **The bottom of diagonal curb ramps shall have a clear space 4'-0" minimum outside active traffic lanes of the roadway. Diagonal curb ramps provided at marked crossings shall provide the 4'-0" minimum clear space within the markings. (406.6)**

Advisory:

02 The clear space requirements contained in [Section 3.6](#) are for clear spaces at operable parts, benches, and within transit shelters and are a separate concept from clear spaces for curb ramps and blended transitions.

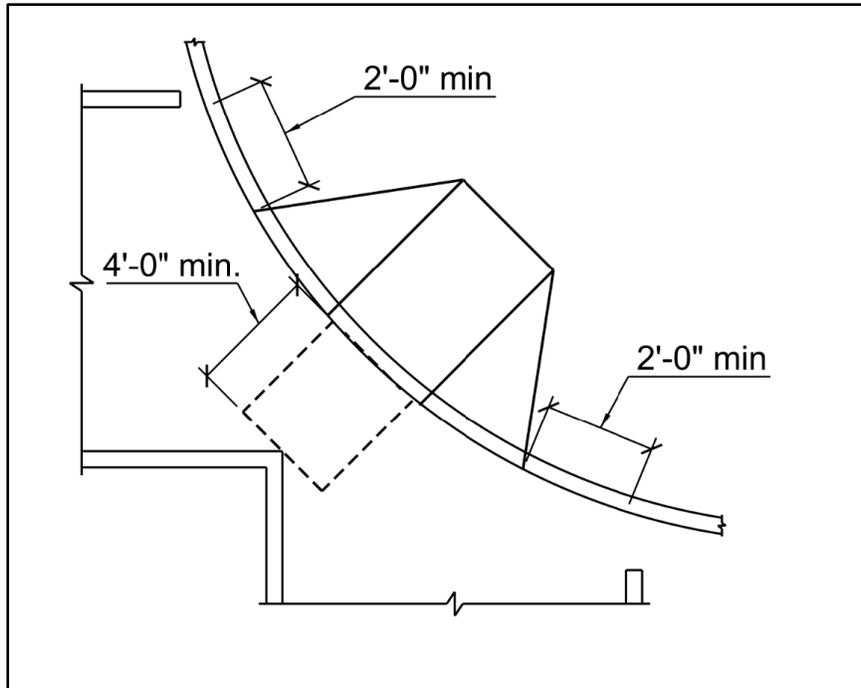


Figure 3.2.5.4-a Diagonal Curb Ramp Clear Space (406.6)

**Guidance:**

03 On all curb ramp and blended transition applications other than diagonal curb ramps, a clear space 4'-0" minimum by 4'-0" minimum should be provided beyond the bottom grade break within the width of the pedestrian street crossing and wholly outside the parallel vehicle travel lane. (R304.5.5)

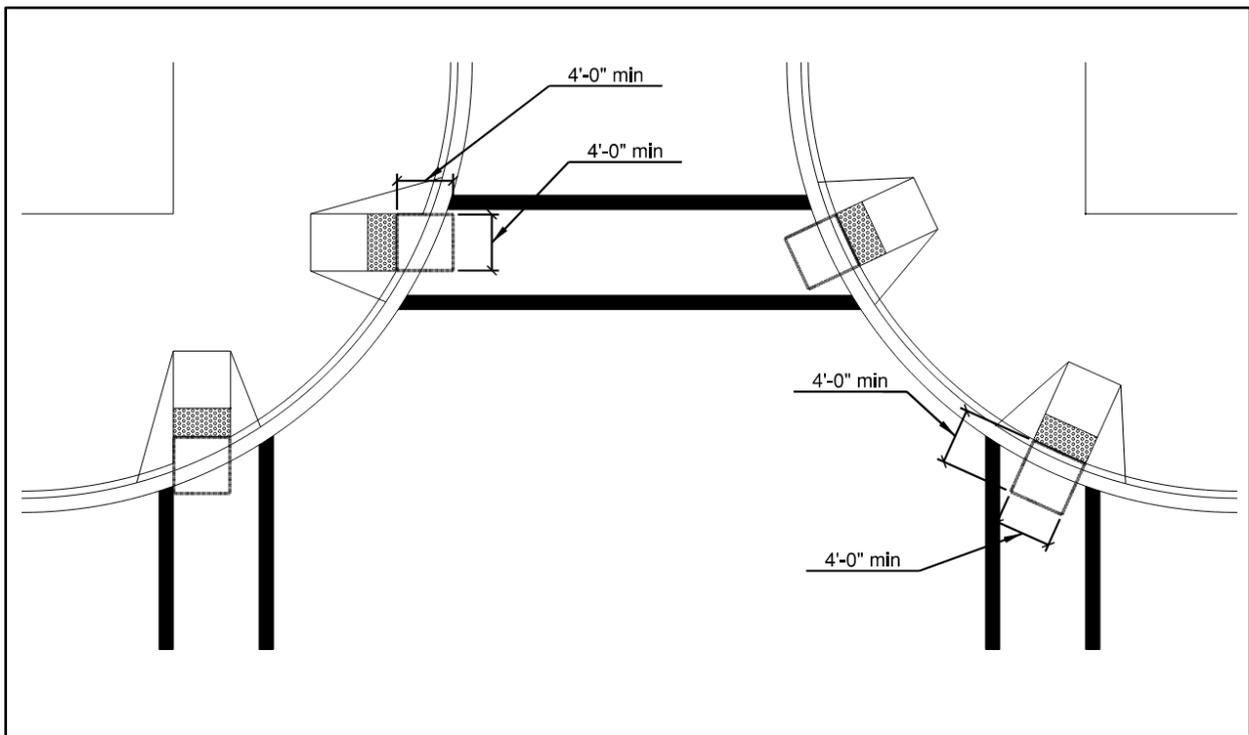


Figure 3.2.5.4-b Clear Space (R304.5.5)

Advisory:

04 The clear space is not intended to serve the same function as a turning space, and it is not intended as a designated waiting area. The clear space provides an area for mobility device users to adjust and line up with the crosswalk. Clear space is not a critical element when the street level pedestrian connection is directional with the crosswalk i.e. no mobility device adjustment is needed to line up with the crosswalk.

05 The clear space is to be located outside the parallel vehicle travel lane for pedestrian safety.

#### 3.2.5.5 Drainage Consideration

**Standard:**

01 **Curb ramps and blended transitions shall be designed to prevent the accumulation of water. (405.10)**

*Guidance:*

02 *Positive drainage for the facility should be considered during the design phase.*

Advisory:

03 Facilities that collect water and which do not have a means to positively convey water creates operational difficulties during and after a storm event.

### 3.3 Detectable Warning Surfaces

**Standard:**

01 **Detectable warning surfaces complying with [Section 3.3](#) shall be provided at the following locations on pedestrian access routes and at transit stops:**

1. **Curb ramps and blended transitions at pedestrian street crossings;**
2. **Pedestrian refuge islands except as provided in [Section 3.3.2.4](#);**
3. **Pedestrian at-grade rail crossings not located within a street or highway;**
4. **Boarding platforms at transit stops for buses and rail vehicles where the edges of the boarding platform are not protected by screens or guards; and**
5. **Boarding and alighting areas at sidewalk or street level transit stops for rail vehicles where the side of the boarding and alighting areas facing the rail vehicles is not protected by screens or guards. (R208.1 & R208.2)**

Advisory:

02 On pedestrian access routes, detectable warning surfaces indicate the boundary between pedestrian and vehicular routes where there is a flush rather than a curbed connection. (Advisory R208.1)

03 Boarding platforms are structures where the platform is located higher than the DeIDOT standard curb types. Bus stops that are located behind a raised curb in accordance with DeIDOT Standard Construction Detail M-9 do not require detectable warning surfaces.

04 Detectable warning surfaces are not intended to provide wayfinding for pedestrians who are blind or have low vision. (Advisory R208.1)

05 Additional way-finding considerations are provided in [Chapter 4](#) of this manual.

*Guidance:*

06 *Detectable warning surfaces should not be provided at crossings of residential driveways since the pedestrian right-of-way continues across residential driveway aprons. However, where commercial driveways are provided with yield or stop control, detectable warning surfaces should be provided at the junction between the pedestrian route and the vehicular route. (Advisory R208.1)*

Advisory:

07 Where pedestrian at-grade rail crossings are located within a street or highway, detectable warning surfaces at the curb ramps or blended transitions make a second set of detectable warning surfaces at the rail crossing unnecessary. (Advisory R208.1)

### 3.3.1 General

#### Standard:

01 Detectable warning surfaces shall consist of truncated domes aligned in a square or radial grid pattern and shall comply with [Section 3.3](#). (R305.1)

Option:

02 Where the truncated domes are arrayed radially, they may differ in diameter and center-to-center spacing within the ranges specified in [Section 3.3.1.1](#) and [Section 3.3.1.2](#). (Advisory R305.1)

#### 3.3.1.1 Dome Size

#### Standard:

01 The truncated domes shall have a base diameter of 0'-0.9" minimum and 0'-1.4" 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'-0.2". (R305.1.1)

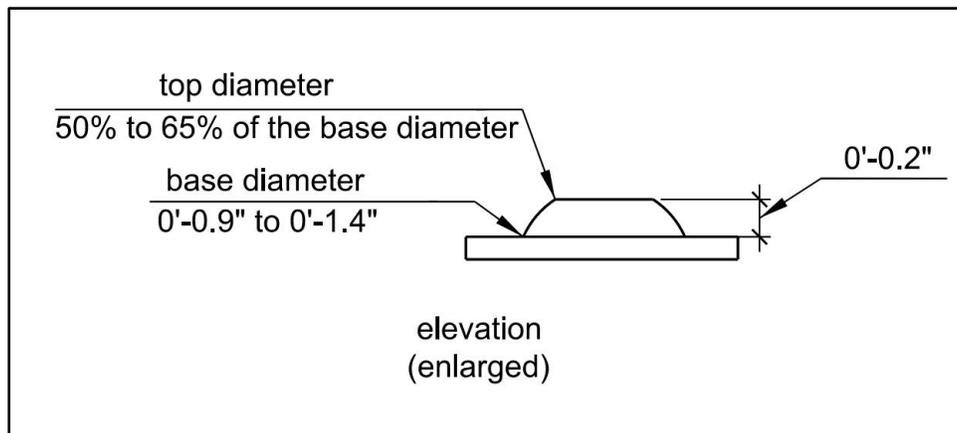


Figure 3.3.1.1 Dome Size (R305.1.1)

#### 3.3.1.2 Dome Spacing

#### Standard:

01 The truncated domes shall have a center-to-center spacing of 0'-1.6" minimum and 0'-2.4" maximum, and a base-to-base spacing of 0'-0.65" minimum, measured between the most adjacent domes. (R305.1.2)

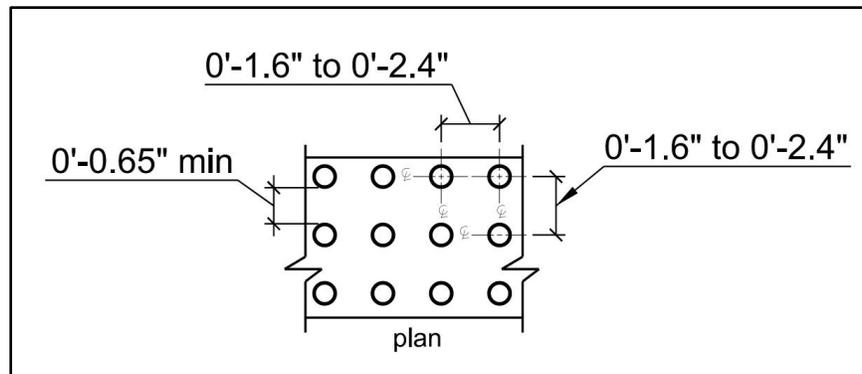


Figure 3.3.1.2 Dome Spacing (R305.1.2)

### 3.3.1.3 Contrast

#### Standard:

01 **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. (R305.1.3)**

#### Advisory:

02 Visual contrast also helps pedestrians who use wheelchairs to locate the curb ramp from the other side of the street. (Advisory R305.1.3)

#### Option:

03 Visual contrast may be provided on the full surface of the curb ramp. (Advisory R305.1.3)

#### Guidance:

04 *Where visual contrast is provided on the full surface of the curb ramp, the contrast should not extend to flared sides. (Advisory R305.1.3)*

### 3.3.1.4 Size

#### Standard:

01 **Detectable warning surfaces shall extend 2'-0" minimum in the direction of pedestrian travel. At curb ramps and blended transitions, detectable warning surfaces shall extend the full width of the ramp run (excluding any flared sides), blended transition, or turning space. At pedestrian at-grade rail crossings not located within a street or highway, detectable warnings shall extend the full width of the crossing. At boarding platforms for buses and rail vehicles, detectable warning surfaces shall extend the full length of the public use areas of the platform. At boarding and alighting areas at sidewalk or street level transit stops for rail vehicles, detectable warning surfaces shall extend the full length of the transit stop. (R305.1.4)**

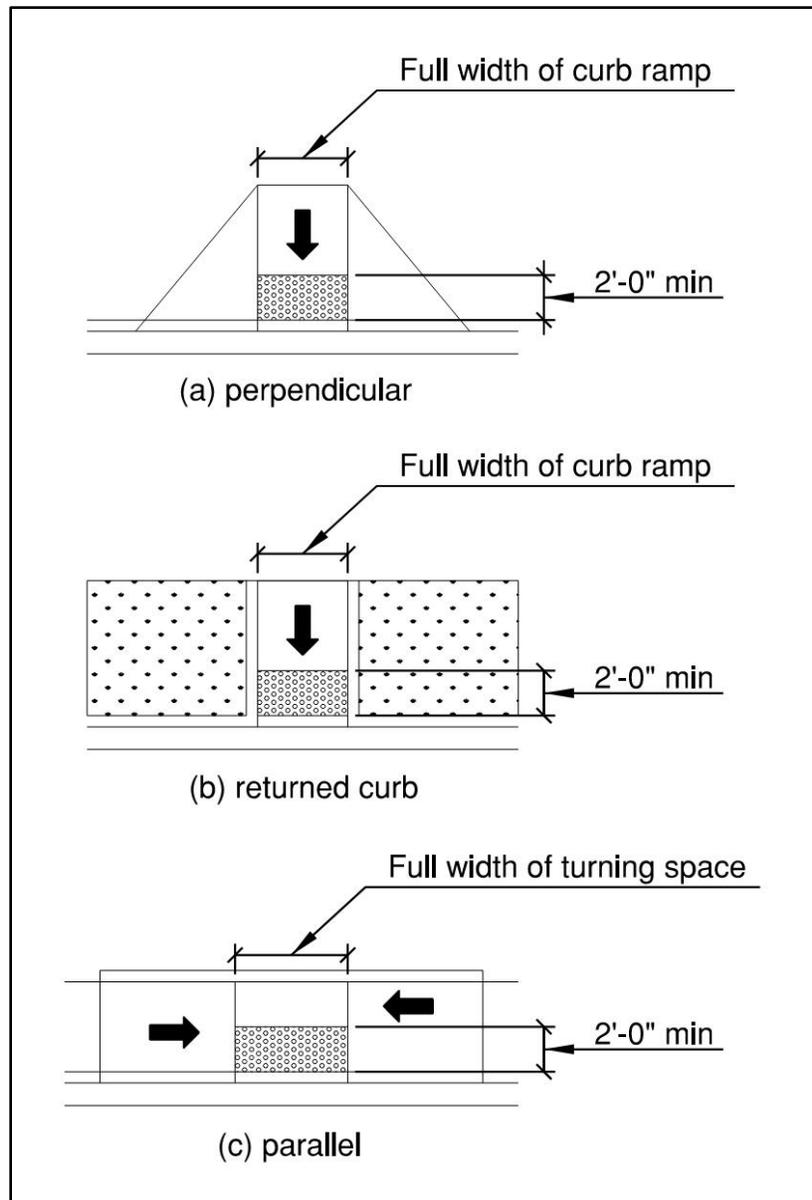


Figure 3.3.1.4 Size (R305.1.4)

### 3.3.2 Placement

#### Standard:

01 **The placement of detectable warning surfaces shall comply with [Section 3.3.2](#). (R305.2)**

#### Advisory:

02 Some detectable warning products require a concrete border for proper installation. (Advisory R305.2)

#### Guidance:

03 *The concrete border should not exceed 0'-2". Where the back of curb edge is tooled to provide a radius, the border dimension should be measured from the end of the radius. (Advisory R305.2)*

### 3.3.2.1 Perpendicular Curb Ramps

#### Standard:

- 01 **On perpendicular curb ramps, detectable warning surfaces shall be placed as follows:**
1. **Where the ends of the bottom grade break are in front of the back of curb, detectable warning surfaces shall be placed at the back of curb.**
  2. **Where the ends of the bottom grade break are behind the back of curb and the distance from either end of the bottom grade brake to the back of curb is 5'-0" or less, detectable warning surfaces shall be placed on the ramp run within one dome spacing of the bottom grade break.**
  3. **Where the ends of the bottom grade break are behind the back of curb and the distance from either end of the bottom grade brake to the back of curb is more than 5'-0", detectable warning surfaces shall be placed at the back of curb. (R305.2.1)**

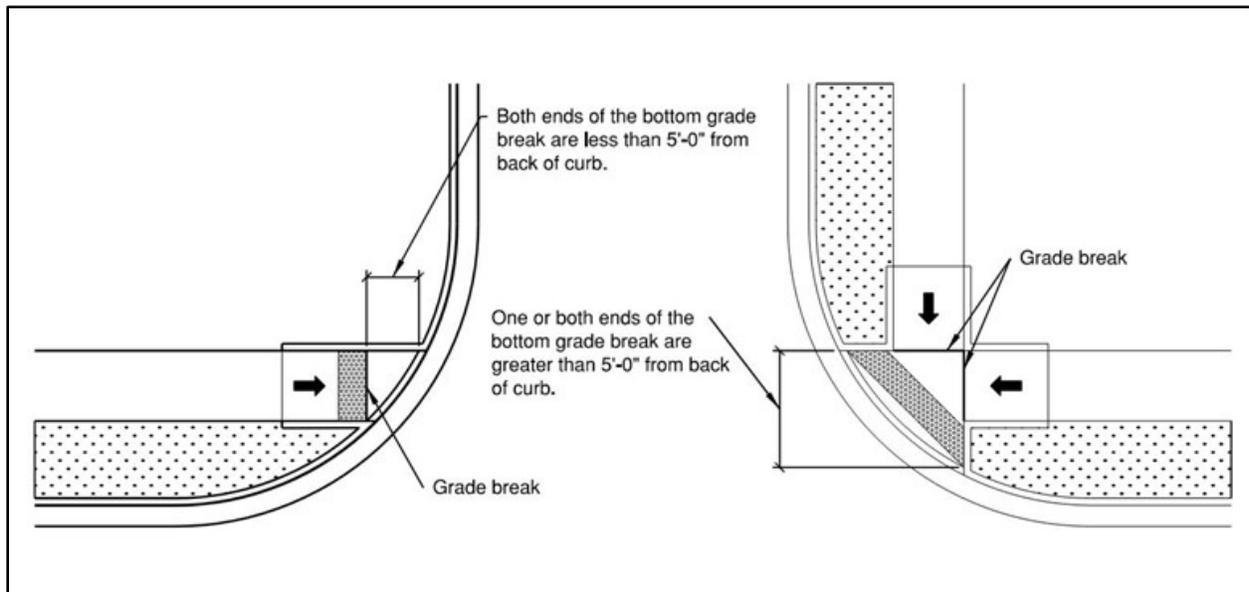


Figure 3.3.2.1 Perpendicular Curb Ramps (R305.2.1)

#### Advisory:

- 02 Detectable warning surfaces are intended to provide a tactile equivalent underfoot of the visible curb line. If detectable warning surfaces are placed too far from the curb line because of a large curb radius, the location could compromise effective crossing. (Advisory R305.2.1)

#### Guidance:

- 03 *Detectable warning surfaces should not be placed on paving or expansion joints. (Advisory R305.2.1)*
- 04 *The rows of truncated domes in detectable warning surfaces should be aligned perpendicular to the grade break between the ramp run and the street so pedestrians who use wheelchairs can "track" between the domes. (Advisory R305.2.1)*

#### Advisory:

- 05 Where detectable warning surfaces are provided on a surface with a slope that is less than 5 percent, dome orientation is less critical. (Advisory R305.2.1)

### 3.3.2.2 Parallel Curb Ramps

**Standard:**

- 01 **On parallel curb ramps, detectable warning surfaces shall be placed on the turning space at the flush transition between the street and sidewalk. (R305.2.2)**

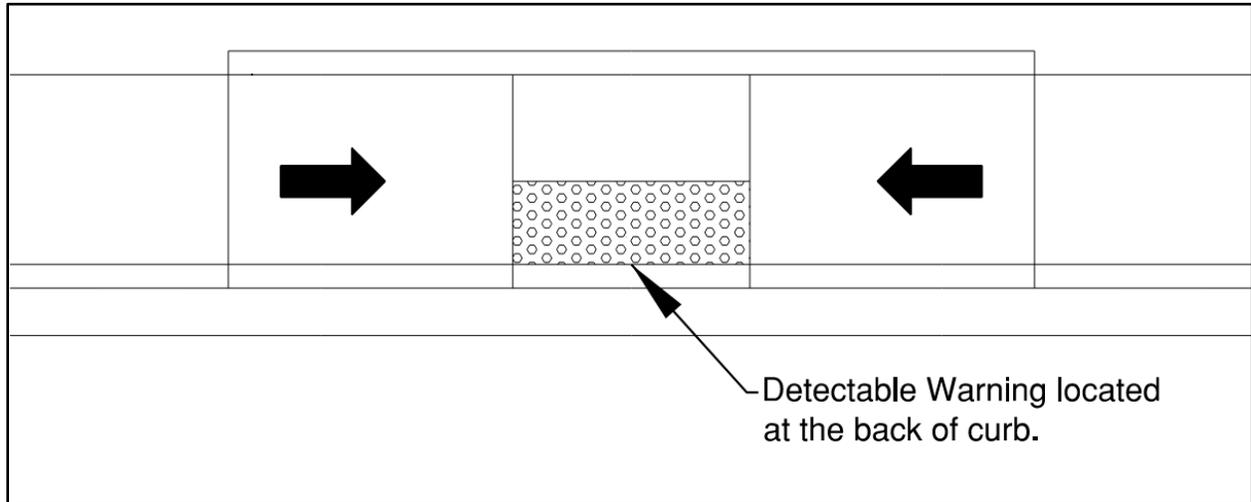


Figure 3.3.2.2 Parallel Curb Ramps (R305.2.2)

### 3.3.2.3 Blended Transitions

**Standard:**

- 01 **On blended transitions, detectable warning surfaces shall be placed at the back of curb. Where raised pedestrian street crossings, depressed corners, or other level pedestrian street crossings are provided, detectable warning surfaces shall be placed at the flush transition between the street and the sidewalk. (R305.2.3)**

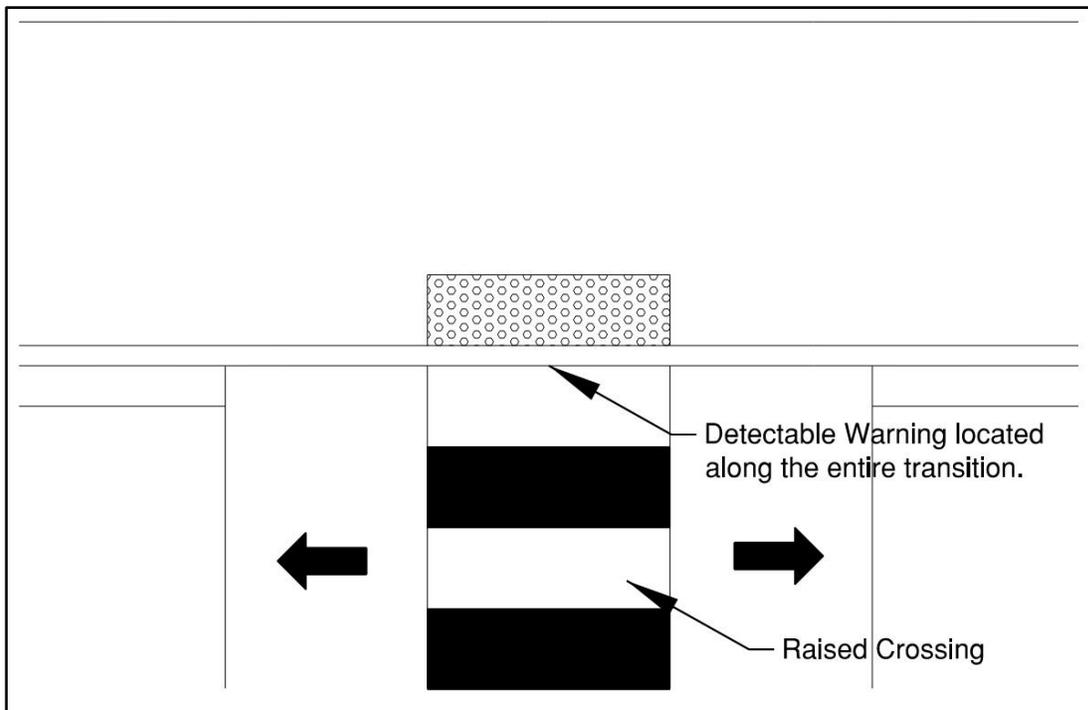


Figure 3.3.2.3 Blended Transitions (R305.2.3)

#### 3.3.2.4 Pedestrian Refuge Islands

##### Standard:

01 **At cut-through pedestrian refuge islands, detectable warning surfaces shall be placed at the edges of the pedestrian island and shall be separated by a 2'-0" minimum length of surface without detectable warnings. (R305.2.4)**

***Exception: Detectable warning surfaces are not required at pedestrian refuge islands that are cut-through at street level and are less than 6'-0" in length in the direction of pedestrian travel. (R208.2)***

##### Advisory:

02 Installing detectable warning surfaces at cut-through pedestrian islands that are less than 6'-0" in length would compromise the effectiveness of detectable warning surfaces. (Advisory R208.2)

##### Guidance:

03 *Where a cut-through pedestrian refuge island is less than 6'-0" in length and the pedestrian street crossing is signalized, the signal should be timed for a complete crossing of the street. (Advisory R208.2)*

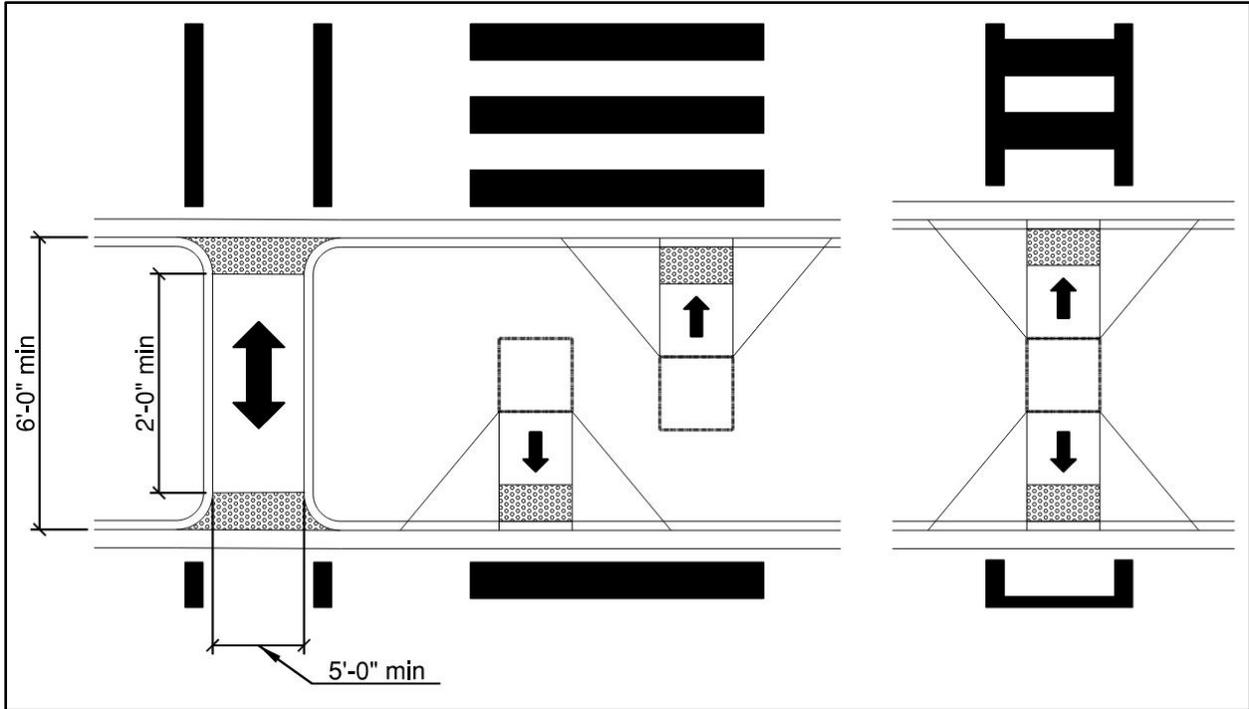


Figure 3.3.2.4 Pedestrian Refuge Island (R305.2.4)

**Advisory:**

04 The edges of cut-through pedestrian refuge islands can provide useful cues to the direction of the crossing. (R305.2.4 Advisory)

**3.3.2.5 Pedestrian At-Grade Rail Crossings**

**Standard:**

01 **At pedestrian at-grade rail crossings not located within a street or highway, detectable warning surfaces shall be placed on each side of the rail crossing. (R305.2.5)**

**Advisory:**

02 Where pedestrian at-grade rail crossings are located within a street or highway, detectable warning surfaces at the curb ramps or blended transitions make a second set of detectable warning surfaces at the rail crossing unnecessary. (Advisory R208.1)

**Guidance:**

03 *The edge of the detectable warning surface nearest the rail crossing should be 6'-0" minimum and 15'-0" maximum from the centerline of the nearest rail. (R305.2.5)*

**Standard:**

04 **Where pedestrian gates are provided, detectable warning surfaces shall be placed on the side of the gates opposite the rail. (R305.2.5)**

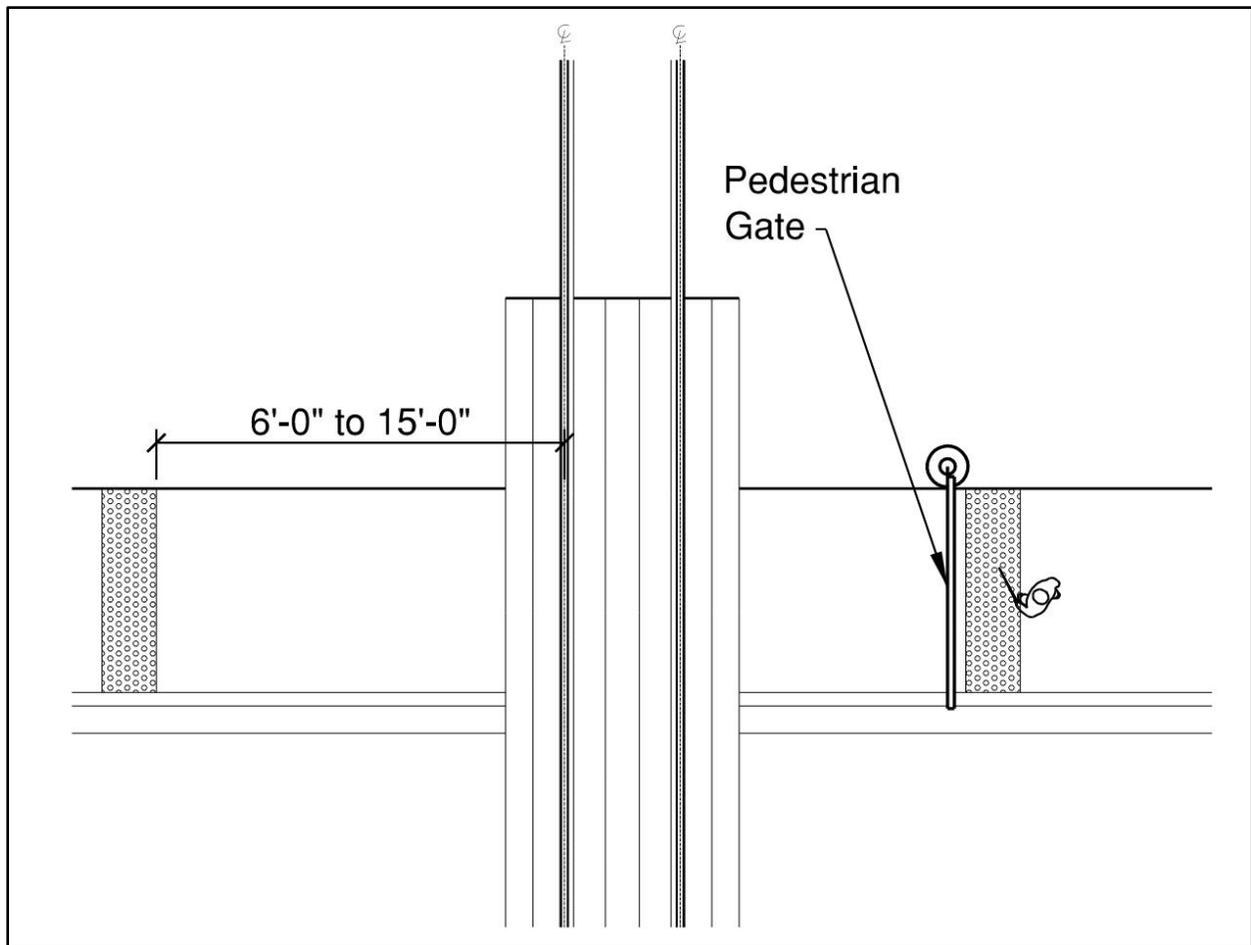


Figure 3.3.2.5 Pedestrian At-Grade Rail Crossings (R305.2.5)

### 3.3.2.6 Boarding Platforms

#### Standard:

- 01 **At boarding platforms for buses and rail vehicles, detectable warning surfaces shall be placed at the boarding edge of the platform. (R305.2.6)**

### 3.3.2.7 Boarding and Alighting Areas

#### Standard:

- 01 **Boarding and alighting areas at sidewalk or street level transit stops for rail vehicles, detectable warning surfaces shall be placed at the side of the boarding and alighting area facing the rail vehicles. (R305.2.7)**

## 3.4 Protruding Objects

#### Standard:

- 01 **Protruding objects shall comply with the applicable requirements in [Section 3.4](#). (R210.1)**

Advisory:

02 Protruding objects can be hazardous for pedestrians, especially pedestrians who are blind or have low vision. (Advisory R210.1)

### 3.4.1 Protrusion Limits

**Standard:**

01 **Objects with leading edges more than 2'-3" and not more than 6'-8" above the finish floor or ground shall protrude 0'-4" maximum horizontally into the circulation path. (307.2)**

***Exception: Handrails shall be permitted to protrude 0'-4.5" maximum. (307.2)***

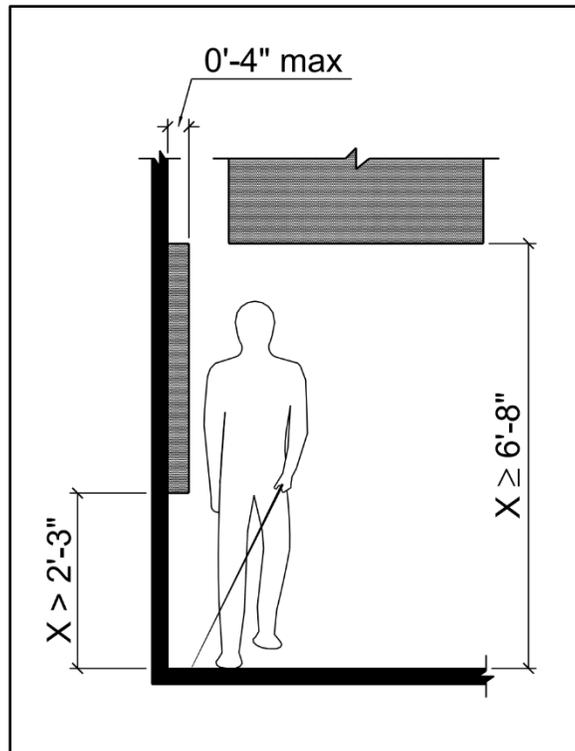


Figure 3.4.1 Limits of Protruding Objects (307.2)

Advisory:

02 When a cane is used and the element is in the detectable range, it gives a person sufficient time to detect the element with the cane before there is body contact. Elements located on circulation paths, including operable elements, must comply with requirements for protruding objects. For example, awnings and their supporting structures cannot reduce the minimum required vertical clearance. Similarly, casement windows, when open, cannot encroach more than 0'-4" into circulation paths above 2'-3". (Advisory 307.2)

### 3.4.2 Post-Mounted Objects

**Standard:**

01 **Free-standing objects mounted on posts or pylons shall overhang circulation paths 1'-0" maximum when located 2'-3" minimum and 6'-8" maximum above the finish floor or ground. Where a sign or other obstruction is mounted between posts or pylons and the clear distance between the posts or**

pylons is greater than 1'-0", the lowest edge of such sign or obstruction shall be 2'-3" maximum or 6'-8" minimum above the finish floor or ground. (307.3)

*Exception: The sloping portions of handrails serving stairs and ramps shall not be required to comply with [Section 3.4.2](#). (307.3)*

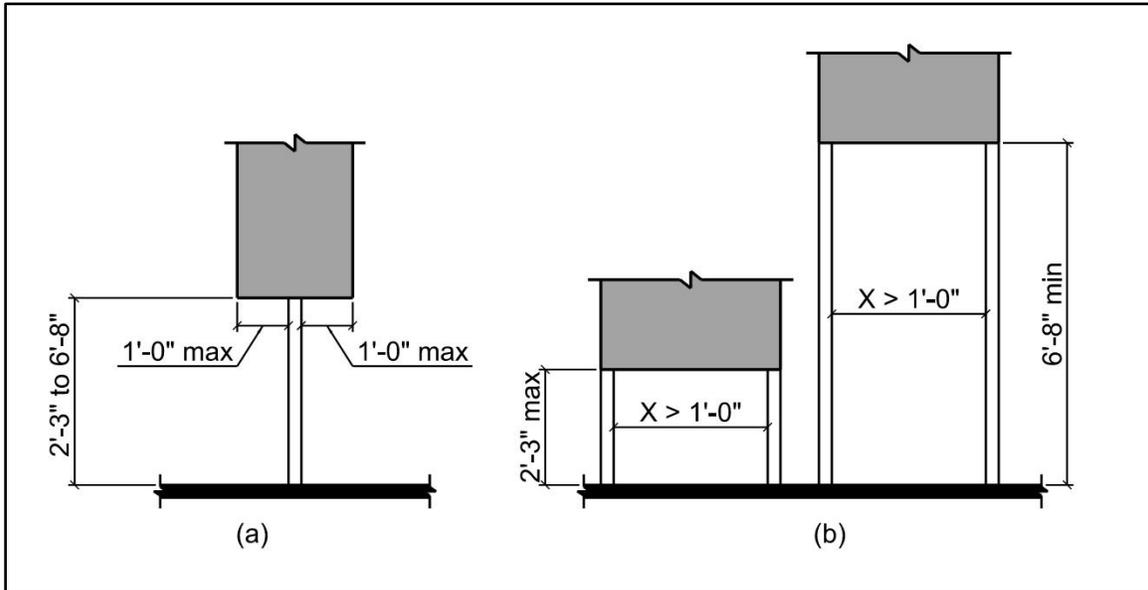


Figure 3.4.2 Post-Mounted Protruding Objects (307.3)

**Guidance:**

02 For safety considerations, post-mounted object overhangs should be limited to 0'-4" maximum.

**Advisory:**

03 Section 2A.18 of the DE MUTCD requires that secondary signs that are mounted lower than 7'-0" above a pedestrian sidewalk or pathway not protrude more than 0'-4" into the pedestrian facility.

### 3.4.3 Vertical Clearance

**Standard:**

01 **Vertical clearance shall be 6'-8" high minimum. Guardrails or other barriers shall be provided where the vertical clearance is less than 6'-8" high. The leading edge of such guardrail or barrier shall be located 2'-3" maximum above the finish floor or ground. (307.4)**

*Exception: Door closers and door stops shall be permitted to be 6'-6" minimum above the finish floor or ground. (307.4)*

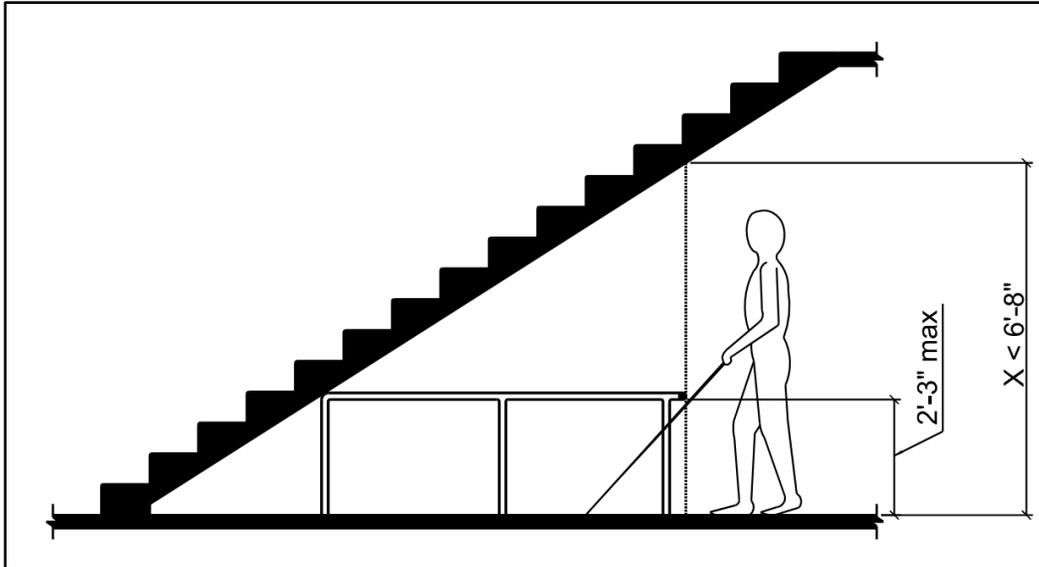


Figure 3.4.3 Vertical Clearance (307.4)

*Guidance:*

02 *The vertical clearance to obstructions for shared use paths should be 10'-0".*

*Option:*

03 *The vertical clearance to obstructions for shared use paths may be limited to 8'-0" in constrained areas.*

*Advisory:*

04 *Section 201 of the Standard Specifications requires that trees or shrubs adjacent to and above the pedestrian access route are pruned "to achieve a vertical clearance of 10'-0" above and 2'-0" adjacent to the sidewalk, trail, or shared-use path on either side."*

### 3.4.4 Required Clear Width

**Standard:**

01 **Protruding objects shall not reduce the clear width required for accessible routes. (307.5)**

### 3.5 Operable Parts

**Standard:**

01 **Operable parts shall comply with [Section 3.5](#). (R403.1)**

*Advisory:*

02 *Operable parts are defined by the US Access Board as "a component of an element used to insert or withdraw objects, or to activate, deactivate, or adjust the element".*

03 *Operable parts include but are not limited to pedestrian pushbuttons, parking meters, and transit kiosks.*

#### 3.5.1 Clear Space

**Standard:**

01 **A clear space complying with [Section 3.6](#) shall be provided at operable parts. (R403.2)**

### 3.5.2 Height

#### **Standard:**

01 **Operable parts shall be placed within one or more of the reach ranges specified in [Section 3.7](#). (R403.3)**

### 3.5.3 Operation

#### **Standard:**

01 **Operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 5 lbs maximum. (R403.4)**

## 3.6 Clear Spaces

#### **Standard:**

01 **Clear Spaces shall comply with [Section 3.6](#). (R404.1)**

#### *Advisory:*

02 Clear spaces are required at operable parts (see [Section 3.5.1](#)), including accessible pedestrian signals and pedestrian pushbuttons (see [Section 3.9](#)) and parking meters and parking pay stations that serve accessible parking spaces (see [Section 3.11.3](#)). Clear spaces are also required at benches (see [Section 3.13.7.5](#)) and within transit shelters (see [Section 3.10.2](#)). (Advisory R404.1)

03 The clear space requirements contained in [Section 3.2.5.4](#) are for clear spaces at curb ramps and blended transitions and are a separate concept from clear spaces at operable parts, benches, and within transit shelters.

### 3.6.1 Surfaces

#### **Standard:**

01 **Surfaces of clear spaces shall comply with [Section 3.1.5](#) and shall have a running slope consistent with the grade of the adjacent pedestrian access route and cross slope of 2 percent maximum. (R404.2)**

### 3.6.2 Size

#### **Standard:**

01 **Clear spaces shall be 2'-6" minimum by 4'-0" minimum. (R404.3)**

#### *Guidance:*

02 *To accommodate a larger user population, clear spaces should be 2'-8" minimum by 4'-10" minimum.*

### 3.6.3 Knee and Toe Clearance

#### **Standard:**

01 **Unless otherwise specified, clear spaces shall be permitted to include knee and toe clearance complying with [Section 3.13.5](#). (R404.4)**

### 3.6.4 Position

**Standard:**

01 **Unless otherwise specified, clear spaces shall be positioned for either forward or parallel approach to an element. (R404.5)**

### 3.6.5 Approach

**Standard:**

01 **One full unobstructed side of a clear space shall adjoin a pedestrian access route or adjoin another clear space. (R404.6)**

### 3.6.6 Maneuvering Space

**Standard:**

01 **Where a clear space is confined on all or part of three sides, additional maneuvering space shall be provided in accordance with [Section 3.6.6.1](#) and [Section 3.6.6.2](#). (R404.7)**

#### 3.6.6.1 Forward Approach

**Standard:**

01 **The clear space and additional maneuvering space shall be 3'-0" wide minimum where the depth exceeds 2'-0". (R404.7.1)**

*Guidance:*

02 *To accommodate a larger user population, the clear space should be 3'-4" wide minimum where the depth exceeds 2'-0".*

#### 3.6.6.2 Parallel Approach

**Standard:**

01 **The clear space and additional maneuvering space shall be 5'-0" wide minimum where the depth exceeds 1'-3". (R404.7.2)**

## 3.7 Reach Ranges

**Standard:**

01 **Reach ranges shall comply with [Section 3.7](#). (308.1)**

*Guidance:*

02 *All pushbuttons on pedestrian signals should be designed for unobstructed side reach.*

### 3.7.1 Forward Reach

**Advisory:**

01 The finish floor or ground is to extend to the vertical projection limit of the element being served.

02 Consideration is to be given to any turning spaces that may be required to access the element being served.

### 3.7.1.1 Unobstructed

#### Standard:

01 Where a forward reach is unobstructed, the high forward reach shall be 4'-0" maximum and the low forward reach shall be 1'-3" minimum above the finish floor or ground. (308.2.1)

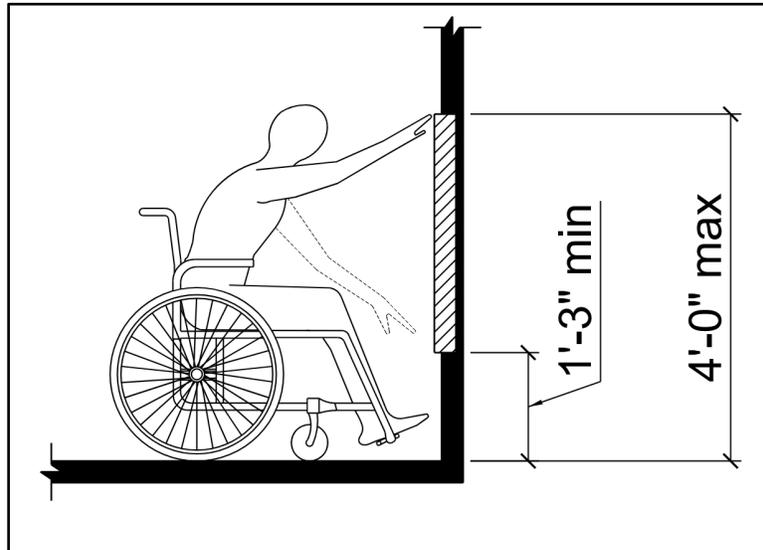


Figure 3.7.1.1 Unobstructed Forward Reach (308.2.1)

### 3.7.1.2 Obstructed High Reach

#### Standard:

01 Where a high forward reach is over an obstruction, the clear floor space shall extend beneath the element for a distance not less than the required reach depth over the obstruction. The high forward reach shall be 4'-0" maximum where the reach depth is 1'-8" maximum. Where the reach depth exceeds 1'-8", the high forward reach shall be 3'-8" maximum and the reach depth shall be 2'-1" maximum. (308.2.2)

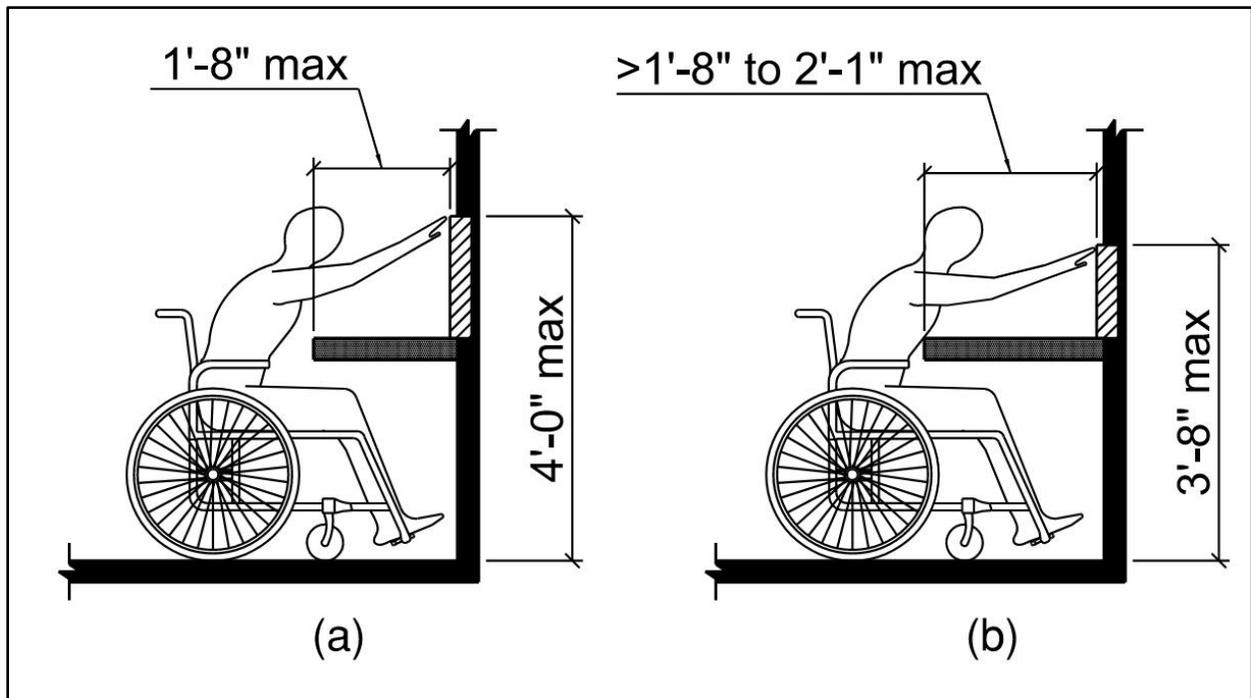


Figure 3.7.1.2 Obstructed Forward Reach (308.2.2)

## 3.7.2 Side Reach

### 3.7.2.1 Unobstructed

#### Standard:

01 **Where a clear floor or ground space allows a parallel approach to an element and the side reach is unobstructed, the high side reach shall be 4'-0" maximum and the low side reach shall be 1'-3" minimum above the finish floor or ground. (308.3.1)**

***Exception: An obstruction shall be permitted between the clear floor or ground space and the element where the depth of the obstruction is 0'-10" maximum. (308.3.1)***

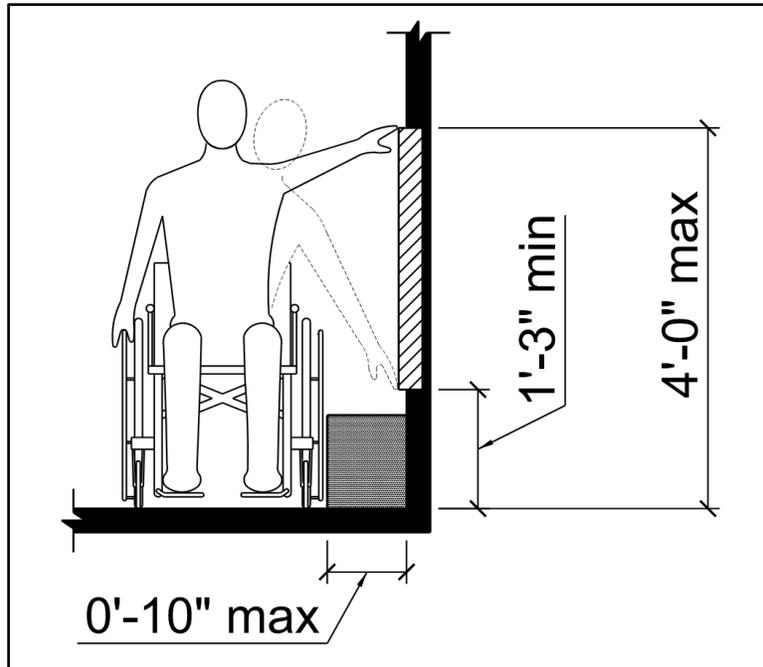


Figure 3.7.2.1 Unobstructed Side Reach (308.3.1)

*Guidance:*

02 Surfaces that do not meet the requirements of [Section 3.1.5](#) should be considered as an obstruction when evaluating reach ranges.

*3.7.2.2 Obstructed High Reach*

**Standard:**

01 Where a clear floor or ground space allows a parallel approach to an element and the high side reach is over an obstruction, the height of the obstruction shall be 2'-10" maximum and the depth of the obstruction shall be 2'-0" maximum. The high side reach shall be 4'-0" maximum for a reach depth of 0'-10" maximum. Where the reach depth exceeds 0'-10", the high side reach shall be 3'-10" maximum for a reach depth of 2'-0" maximum. (308.3.2)

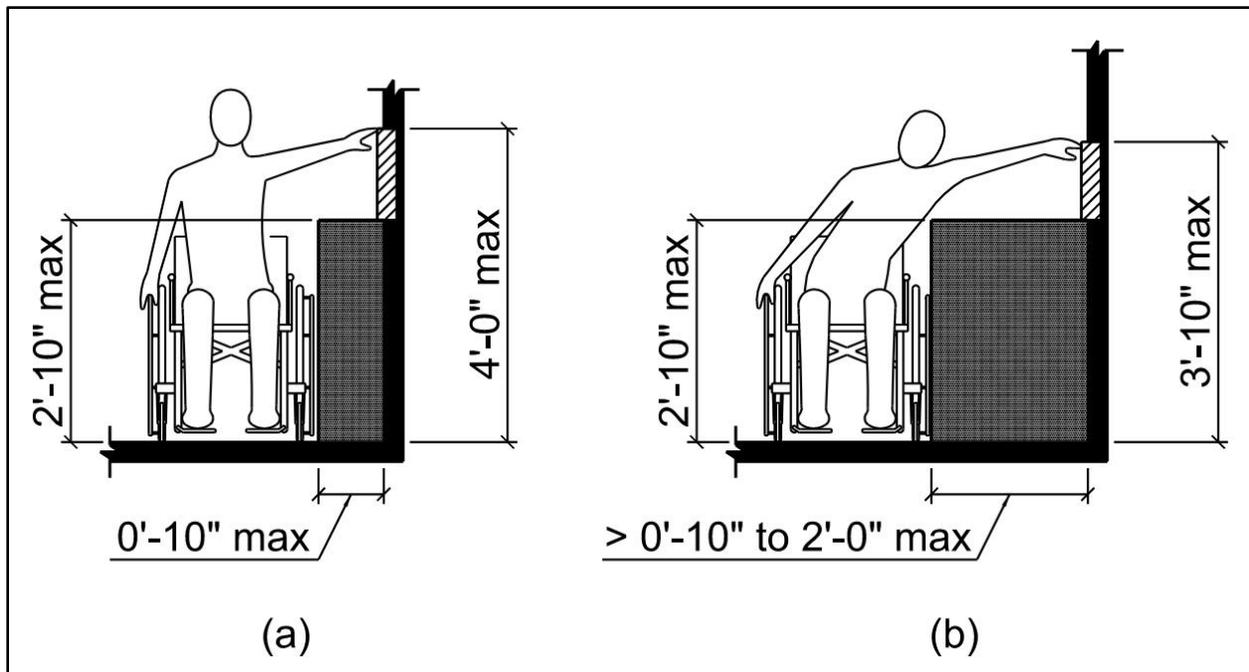


Figure 3.7.2.2 Obstructed High Side Reach (308.3.2)

*Guidance:*

02 Surfaces that do not meet the requirements of [Section 3.1.5](#) should be considered as an obstruction when evaluating reach ranges.

### 3.8 Pedestrian Street Crossings

**Standard:**

01 A pedestrian access route shall be provided within pedestrian street crossings, including medians and pedestrian refuge islands, and pedestrian at-grade rail crossings. The pedestrian street crossing shall connect departure and arrival pedestrian access routes. (R204.3)

*Guidance:*

02 If pedestrian crossing is prohibited at certain locations, “No Pedestrian Crossing” signs should be considered in accordance with the DE MUTCD along with detectable features, such as grass strips, landscaping, planters, chains, fencing, railings, or other barriers. (Advisory R206)

#### 3.8.1 Pedestrian Signal Phase Timing

**Standard:**

01 No accessibility standard has been adopted.

*Guidance:*

02 All pedestrian signal phase timing should comply with the DE MUTCD and should be based on a pedestrian clearance time that is calculated using a pedestrian walking speed of 3.5 ft/s or less. (R306.2)

#### 3.8.2 Roundabouts

**Standard:**

01 No accessibility standard has been adopted.

Advisory:

02 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. The continuous traffic flow at roundabouts removes many of the audible cues that pedestrians who are blind use to navigate pedestrian street crossings. Multi-lane pedestrian street crossings at roundabouts involve an increased risk of pedestrian exposure to accident. (Advisory R306.3)

Guidance:

03 *Water fountains and other features that produce background noise should not be placed in the middle island of a roundabout because pedestrians who are blind use auditory cues to help detect gaps in traffic. (Advisory R306.3)*

#### 3.8.2.1 Separation

**Standard:**

01 **No accessibility standard has been adopted.**

Guidance:

02 *Where sidewalks are flush against the curb and pedestrian street crossing is not intended, a continuous and detectable edge treatment should be provided along the street side of the sidewalk. Detectable warning surfaces should not be used for edge treatment. Where chains, fencing, or railings are used for edge treatment, they should have a bottom edge 1'-3" maximum above the sidewalk. (R306.3.1)*

Advisory:

03 Carefully delineated pedestrian street crossing approaches with plantings or other defined edges provide effective non-visual cues for identifying pedestrian street crossings at roundabouts. (Advisory R306.3.1)

Guidance:

04 *Detectable warning surfaces should not be used to guide pedestrians who are blind or have low vision to pedestrian street crossings. (Advisory R306.3.1)*

Advisory:

05 Detectable warning surfaces indicate the flush transition between the sidewalk and the street or highway. (Advisory R306.3.1)

06 Schemes that remove cyclists from the street or highway by means of a ramp that angles from the curb lane to the sidewalk and then provide re-entry by means of a similar ramp beyond pedestrian street crossings can provide false cues to pedestrians who are using the edge of the sidewalk for wayfinding about the location of pedestrian street crossings. Additional information on this topic is contained in Design Guidance Memorandum 1-28 entitled *Directional Tactile Surface Indicators (DTSI) for Bicycle Ramps*. (Advisory R306.3.1)

07 Additional guidance and best practices are contained in NCHRP Report 674 entitled *Crossing Solutions at Roundabouts and Channelized Turn lanes for pedestrians with Vision Disabilities*.

#### 3.8.2.2 Pedestrian Activated Signals

**Standard:**

01 **No accessibility standard has been adopted.**

*Guidance:*

02 *At roundabouts with multi-lane pedestrian street crossings, a pedestrian activated signal complying with [Section 3.9](#) should be provided for each multi-lane segment of each pedestrian street crossing, including the splitter island. Signals should clearly identify which pedestrian street crossing segment the signal serves. (R306.3.2)*

*Advisory:*

03 Roundabouts with single-lane approach and exit legs are not required to provide pedestrian activated signals. (Advisory R306.3.2)

*Guidance:*

04 *Where pedestrian activated signals are installed at splitter islands, they should be carefully located and separated so that signal spillover does not give conflicting information about which pedestrian street crossing has the WALK indication displayed. (Advisory R306.3.2)*

*Option:*

05 Pedestrian Hybrid Beacons may be used at roundabouts (see [DE MUTCD](#)). (Advisory R306.3.2)

*Advisory:*

06 Pedestrian Hybrid Beacons are traffic signals that consist of a yellow signal centered below two horizontally aligned red signals. The signals are normally not illuminated. The signals are initiated only upon pedestrian activation and can be timed to minimize the interruption of traffic. The signals cease operation after the pedestrian clears the crosswalk. When activated by a pedestrian, the following signals are displayed to drivers: a flashing yellow signal, then a steady yellow signal, then two steady red signals during the pedestrian walk interval, and then alternating flashing red signals during the pedestrian clearance interval. The following signals are displayed to pedestrians: a steady upraised hand (symbolizing DON'T WALK) when the flashing or steady yellow signal is operating, then a walking person (symbolizing WALK) when the steady red signals are operating, and then a flashing upraised hand (symbolizing DON'T WALK) when the alternating flashing red signals are operating. (Advisory R306.3.2)

*Option:*

07 Rectangular Rapid Flashing Beacons (RRFBs) may be used at roundabout crossings. Contact DelDOT Traffic for more information regarding site suitability.

### 3.8.3 Channelized Turn Lanes at Roundabouts

**Standard:**

01 **No accessibility standard has been adopted.**

*Guidance:*

02 *At roundabouts with pedestrian street crossings, pedestrian activated signals complying with [Section 3.9](#) should be provided at pedestrian street crossings at multi-lane channelized turn lanes. (R306.4)*

### 3.8.4 Channelized Turn Lanes at Other Signalized Intersections

**Standard:**

01 **No accessibility standard has been adopted.**

*Guidance:*

02 At signalized intersections other than roundabouts with pedestrian street crossings, pedestrian activated signals complying with [Section 3.9](#) should be provided at pedestrian street crossings at multi-lane channelized turn lanes. (R306.5)

### 3.9 Accessible Pedestrian Signals and Pedestrian Pushbuttons

**Standard:**

01 Where installed, the operable parts shall comply with [Section 3.5](#). (R209.1)

*Advisory:*

02 An accessible pedestrian signal and pedestrian pushbutton is an integrated device that communicates information about the WALK and DON'T WALK intervals at signalized intersections in non-visual formats (i.e., audible tones and vibrotactile surfaces) to pedestrians who are blind or have low vision. Accessible pedestrian signals offer access to the same information provided to fully sighted pedestrians. (Advisory R209)

03 Refer to the [DE MUTCD](#) for additional placement information.

04 The Department maintains a document entitled [DeIDOT Interim Guidelines for the Installation of Accessible Pedestrian Signals](#), that provides additional information on the use and application of accessible pedestrian signals and pushbuttons.

### 3.10 Transit Stops and Transit Shelters

**Standard:**

01 Where provided, transit stops and transit shelters shall comply with [Section 3.10](#). (R213)

*Advisory:*

02 Transit stops in the public right-of-way typically serve fixed route bus systems, including bus rapid transit systems, and light rail transit systems. Signs that identify the routes served by the transit stop must comply with the technical requirements for visual characters on signs unless audible sign systems or other technologies are used to provide the information (see [Section 3.13.4](#)). (Advisory R213)

03 DelDOT Standard Construction Detail M-9 details 5 different bus stop pad types.

#### 3.10.1 Transit Stops

**Standard:**

01 Transit Stops shall comply with [Section 3.10.1](#). (R308.1)

*Guidance:*

02 Transit stops should be located so that there is a level and stable surface for boarding vehicles. (Advisory R308.1)

03 Transit stops should be located near signalized intersections to increase usability for pedestrians with disabilities and improve operation and ridership. (Advisory R308.1)

Advisory:

04 Locating transit stops at signalized intersections increases the usability for pedestrians with disabilities. (Advisory R308.1)

05 Where security bollards are installed at transit stops, they must not obstruct the clear space at boarding and alighting areas or reduce the required clear width at pedestrian access routes (see [Section 3.4](#)). (Advisory R308.1)

### 3.10.1.1 Boarding and Alighting Areas

**Standard:**

01 **Boarding and alighting areas at sidewalk or street level transit stops shall comply with [Section 3.10.1.1](#) and [Section 3.10.1.3](#). Where transit stops serve vehicles with more than one car, boarding and alighting areas serving each car shall comply with [Section 3.10.1.1](#) and [Section 3.10.1.3](#). (R308.1.1)**

02 **Detectable warning surfaces shall comply with [Section 3.3](#).**

Advisory:

03 Where a transit shelter is provided, the boarding and alighting area can be located either within or outside of the shelter. (Advisory R308.1.1)

#### 3.10.1.1.1 Dimensions

**Standard:**

01 **Boarding and alighting areas shall provide a clear length of 8'-0" minimum, measured perpendicular to the curb or street or highway edge, and a clear width of 5'-0" minimum, measured parallel to the street or highway. (R308.1.1.1)**

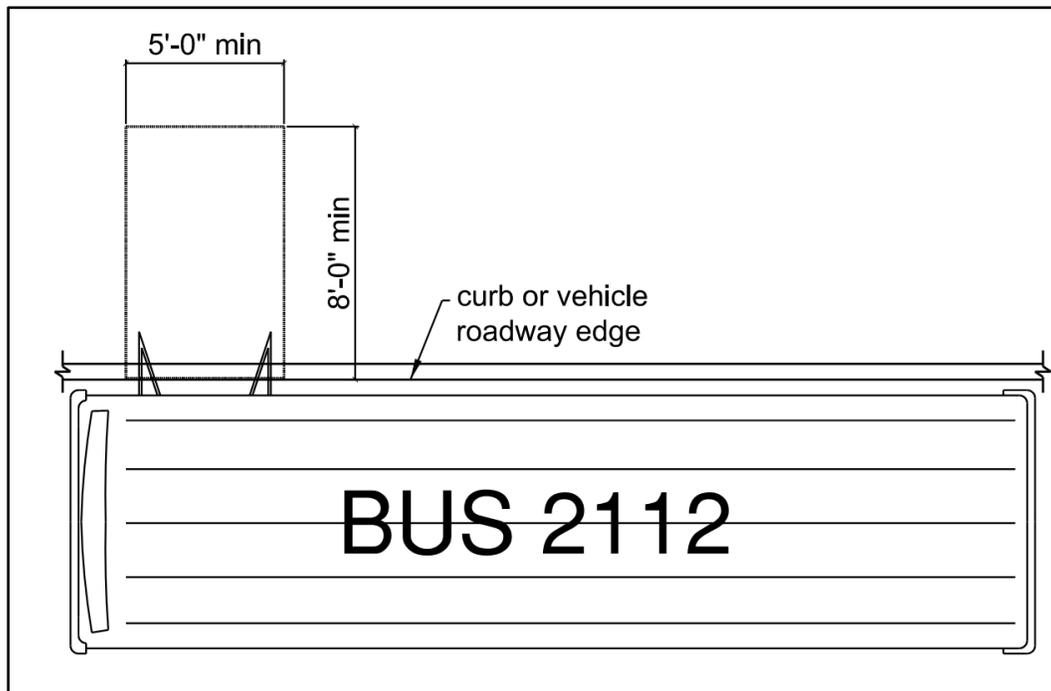


Figure 3.10.1.1.1 Dimensions (R308.1.1.1)

#### 3.10.1.1.2 Grade

##### **Standard:**

01 **Parallel to the street or highway, the grade of boarding and alighting areas shall be the same as the street or highway, to the extent practicable. Perpendicular to the street or highway, the grade of boarding and alighting areas shall not be steeper than 2 percent. (R308.1.1.2)**

##### *Guidance:*

02 *The grade perpendicular to the street or highway should be designed to a 1.5 percent cross slope.*

##### *Advisory:*

03 The 1.5 percent design cross slope incorporates allowances for potential irregularities or variances due to construction methods or materials.

#### 3.10.1.2 Boarding Platforms

##### **Standard:**

01 **Boarding platforms at transit stops shall comply with [Section 3.10.1.2](#) and [Section 3.10.1.3](#). (R308.1.2)**

##### 3.10.1.2.1 Platform and Vehicle Floor Coordination

##### **Standard:**

01 **Boarding platforms shall be positioned to coordinate with vehicles in accordance with the applicable requirements in 49 CFR parts [37](#) and [38](#). (R308.1.2.1)**

##### *Advisory:*

02 The Department of Transportation regulations (49 CFR parts [37](#) and [38](#)) require the height of the vehicle floor and the station platform to be coordinated so as to minimize the vertical and horizontal gaps. Requirements vary based on application. (Advisory R308.1.2.1)

##### 3.10.1.2.2 Slope

##### **Standard:**

01 **Boarding platforms shall not exceed a slope of 2 percent in any direction. Where boarding platforms serve vehicles operating on existing track or existing street or highway, the slope of the platform parallel to the track or the street or highway is permitted to be equal to the grade of the track or street or highway. (R308.1.2.2)**

##### *Guidance:*

02 *Boarding Platforms should be designed to a 1.5 percent slope in any direction; however, where boarding platforms serve vehicles operating on existing track or existing street or highway, the slope of the platform parallel to the track or the street or highway is permitted to be equal to the grade of the track or street or highway.*

##### *Advisory:*

03 The 1.5 percent design slope incorporates allowances for potential irregularities or variances due to construction methods or materials.

3.10.1.3 Common Requirements

**Standard:**

01 **Boarding and alighting areas and boarding platforms shall comply with [Section 3.10.1.3](#). (R308.1.3)**

3.10.1.3.1 Surfaces

**Standard:**

01 **The surfaces of boarding and alighting areas and boarding platforms shall comply with [Section 3.1.5](#). (R308.1.3.1)**

**Advisory:**

02 Detectable warning surfaces are required at boarding and alighting areas for rail vehicles and at boarding platforms for buses and rail vehicles (see [Section 3.3](#) paragraph 1). (Advisory R308.1.3.1)

3.10.1.3.2 Connection

**Standard:**

01 **Boarding and alighting areas and boarding platforms shall be connected to streets, sidewalks, or pedestrian circulation paths by pedestrian access routes complying with [Section 3.1](#). (R308.1.3.2)**

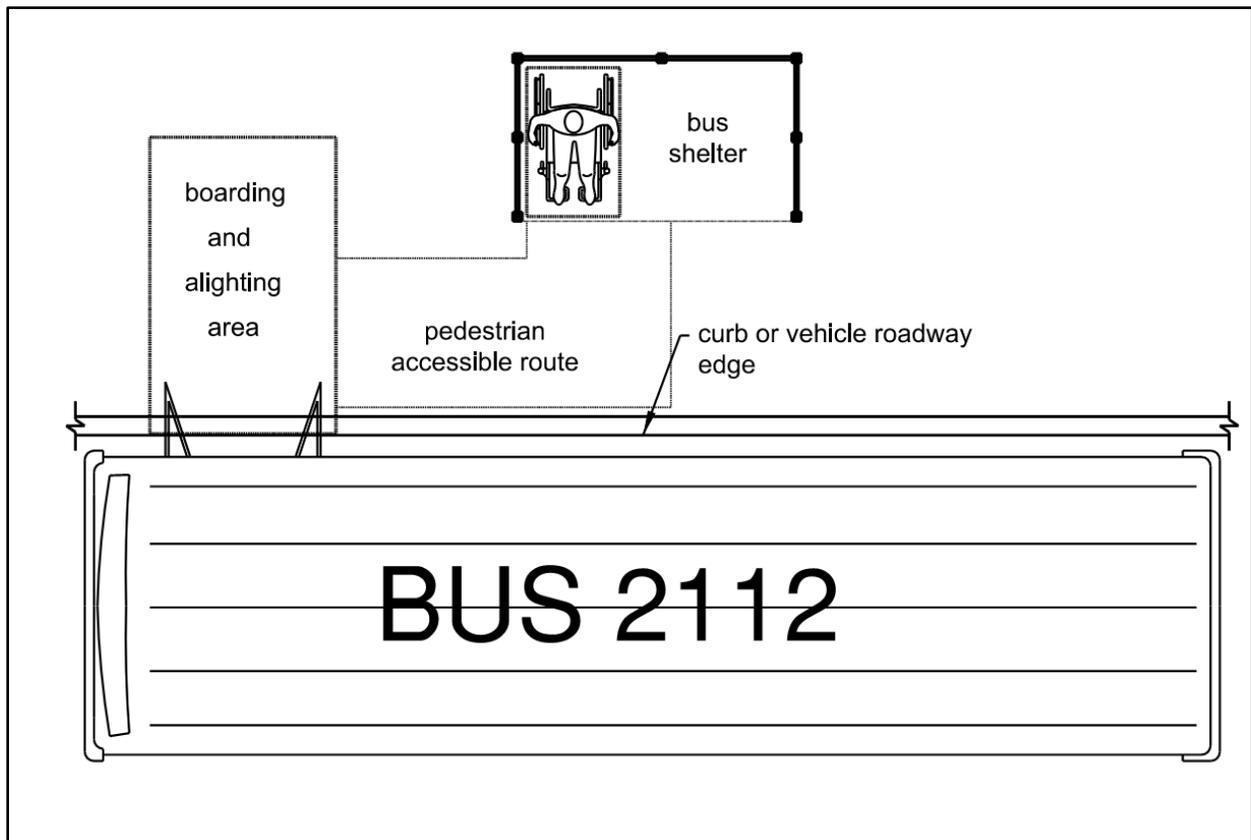


Figure 3.10.1.3.2 Connection (R308.1.3.2)

### 3.10.2 Transit Shelters

#### Standard:

01 Transit shelters shall be connected by pedestrian access routes complying with [Section 3.1](#) to boarding and alighting areas or boarding platforms complying with [Section 3.10.1](#). Transit shelters shall provide a minimum clear space complying with [Section 3.6](#) entirely within the shelter. Where seating is provided within transit shelters, the clear space shall be located either at one end of a seat or shall not overlap the area within 1'-6" from the front edge of the seat. Environmental controls within transit shelters shall be proximity-actuated. Protruding objects within transit shelters shall comply with [Section 3.4](#). (R308.2)

#### Advisory:

02 The clear space is required to be located entirely within the transit shelter and not interfere with other persons using the seating. (Advisory R308.2)

03 Design Guidance Memorandum 1-14 entitled *Bus Shelter Setback*, provides additional information regarding shelter setbacks.

### 3.11 On-Street Parking Spaces

#### Standard:

01 On-street parking spaces shall comply with [Section 3.11](#). (R309.1)

#### Advisory:

02 The US Department of Justice's guidance document entitled *ADA Guide for Small Towns*, states the following, "the ADA Standards have technical requirements for parking lots and garages but no technical requirements for the design of on-street parking." However, the US Department of Justice as well as court rulings have established that public entities are still required to provide accessible on-street parking even though there are no technical standards for on-street parking. This section of the manual modifies the established accessibility Standards initially developed for parking lots and garages with proposed PROWAG language which is considered to represent the best practices for accessibility issues in the public right-of-way for issues not covered in the adopted standards. In all cases, the guiding principle in the evaluation of public parking for accessibility is the connection from the public parking to the pedestrian access route. The connection must be accessible and as direct as possible.

03 Parking is generally regulated through municipal ordinance. Maintenance responsibility for on-street parking is typically defined within standing agreements between DeIDOT and the municipality.

#### Guidance:

04 Accessible parking spaces should be located where the street has the least crown and grade and close to key destinations. (Advisory R309.1)

05 Accessible parking should be located close to known high use pedestrian generators and/or community centers.

#### 3.11.1 Required Accessible Parking Spaces

##### Standard:

01 Where on-street parking is provided on the block perimeter and the parking is marked or metered, accessible parking spaces complying with [Section 3.11](#) shall be provided in accordance with Table 3.11.1. Where parking pay stations are provided and the parking is not marked, each 20'-0" of block perimeter where parking is permitted shall be counted as one parking space. (R214)

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

Table 3.11.1 On-Street Parking Spaces (R214)

**Advisory:**

02 Metered parking includes parking metered by parking pay stations. Where parking on part of the block perimeter is altered, the minimum number of accessible parking spaces required is based on the total number of marked or metered parking spaces on the block perimeter. (Advisory R214)

03 The US Access Board provided clarification to the Department for the term “block perimeter”. The block perimeter is defined as the pedestrian access route located continuously without having to cross a street. Figure 3.11.1 is provided to clarify the term. Additional discussion is also included in [Chapter 4](#) of this manual.

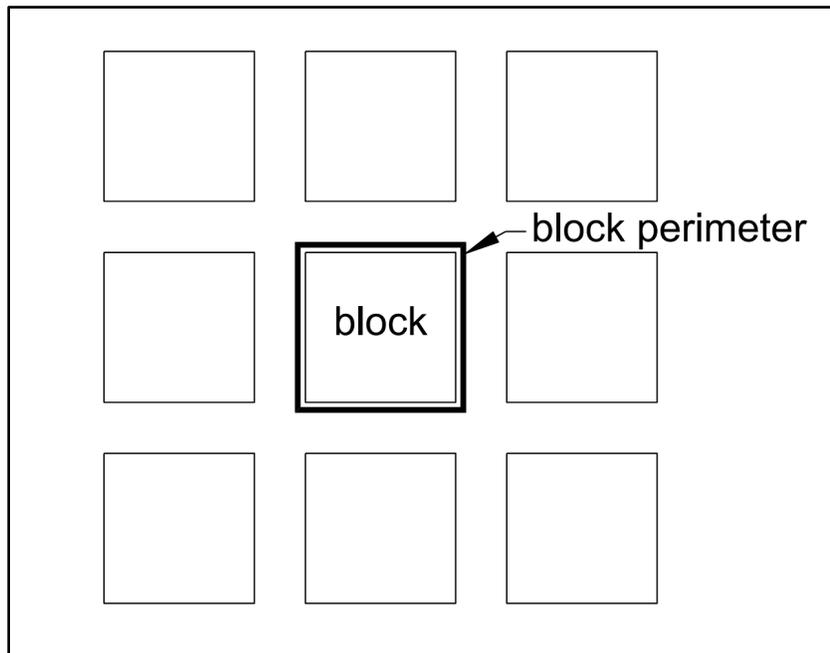


Figure 3.11.1 Block Perimeter

*3.11.1.1 Required Van Parking Spaces*

**Standard:**

01 For every six or fraction of six parking spaces required by [Section 3.11.1](#) to comply with [Section 3.11.2](#), at least one shall be a van parking space complying with [Section 3.11.2](#). (208.2.4)

Advisory:

- 02 In cases where there are less than six parking spaces, [Section 3.11.1.1](#) requires that at least one parking space be van accessible.
- 03 Parallel parking spaces that meet all the applicable requirements of [Section 3.11](#) will be considered van accessible.

### 3.11.2 Parking Spaces

#### 3.11.2.1 General

**Standard:**

- 01 **Car and van parking spaces shall comply with [Section 3.11.2](#). Where parking spaces are marked with lines, width measurements of parking spaces and access aisles shall be made from the centerline of the markings. (502.1)**

***Exception: Where parking spaces or access aisles are not adjacent to another parking space or access aisle, measurements shall be permitted to include the full width of the line defining the parking space or access aisle. (502.1)***

*Guidance:*

- 02 *In locations where a physical feature like a curb is used to delineate the parking space, the width of the parking space should be measured to the face of the physical barrier.*
- 03 *The width of the parking space should be measured perpendicular to the markings.*

#### 3.11.2.2 Vehicle Spaces

**Standard:**

- 01 **Car parking spaces shall be 8'-0" wide minimum and van parking spaces shall be 11'-0" wide minimum, shall be marked to define the width, and shall have an adjacent access aisle complying with [Section 3.11.2.3](#). (502.2)**

***Exception 1: Van parking spaces shall be permitted to be 8'-0" wide minimum where the access aisle is 8'-0" wide minimum. (502.2)***

***Exception 2: All accessible parallel parking spaces including car and van shall be permitted to be 8'-0" wide where [3.11.2.2](#) Exception 3 and [3.11.2.3.1](#) apply.***

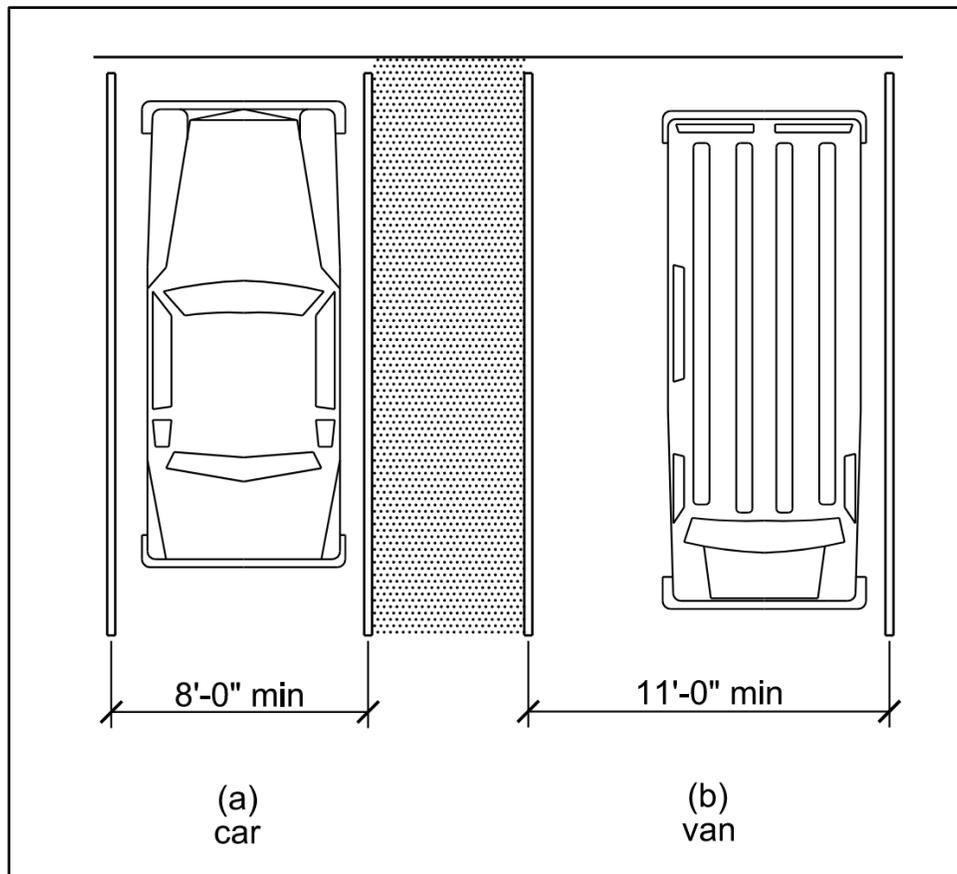


Figure 3.11.2.2-a Vehicle Parking Spaces (502.2)

***Exception 3: An access aisle is not required in parallel parking applications with narrow sidewalks where the width of the adjacent sidewalk or the available right-of-way is less than or equal to 14'-0". When an access aisle is not provided, the parking spaces shall be located at the beginning or end of the block face. A clear area 8'-0" in width shall be provided along the length of the accessible parallel parking space. (R309.2.2)***

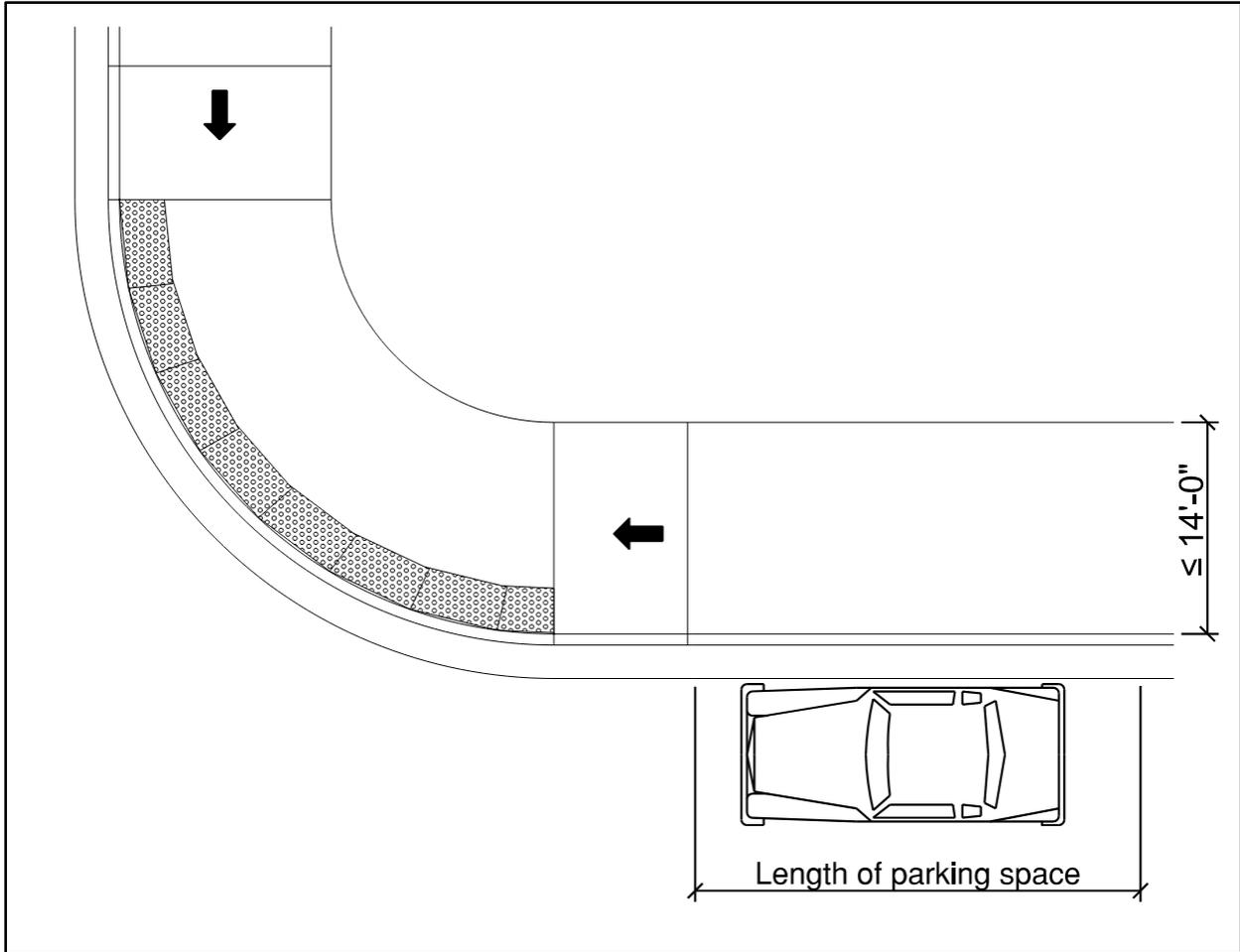


Figure 3.11.2.2-b Narrow Sidewalks (R309.2.2)

*Guidance:*

02 *Exception 2. Perpendicular and angled parking that is to be provided on-street should provide 8'-0" wide parking space and a 8'-0" wide access aisle. (R309.3)*

*Advisory:*

03 *Exception 3. Accessible parallel parking spaces located at the beginning or end of the block face are usable by vans that have rear lifts and cars that have scooter platforms. (Advisory R309.2)*

04 *Exception 3. Vehicle lifts or ramps can be deployed on a 8'-0" sidewalk if there are no obstructions such as signs, utilities, and street furniture. (Advisory R309.2.2)*

*3.11.2.3 Access Aisle*

**Standard:**

01 **Access aisles serving parking spaces shall comply with [Section 3.11.2.3](#). Two parking spaces shall be permitted to share a common access aisle. (502.3)**

*Advisory:*

02 *Accessible routes must connect parking spaces to accessible entrances. (Advisory 502.3)*

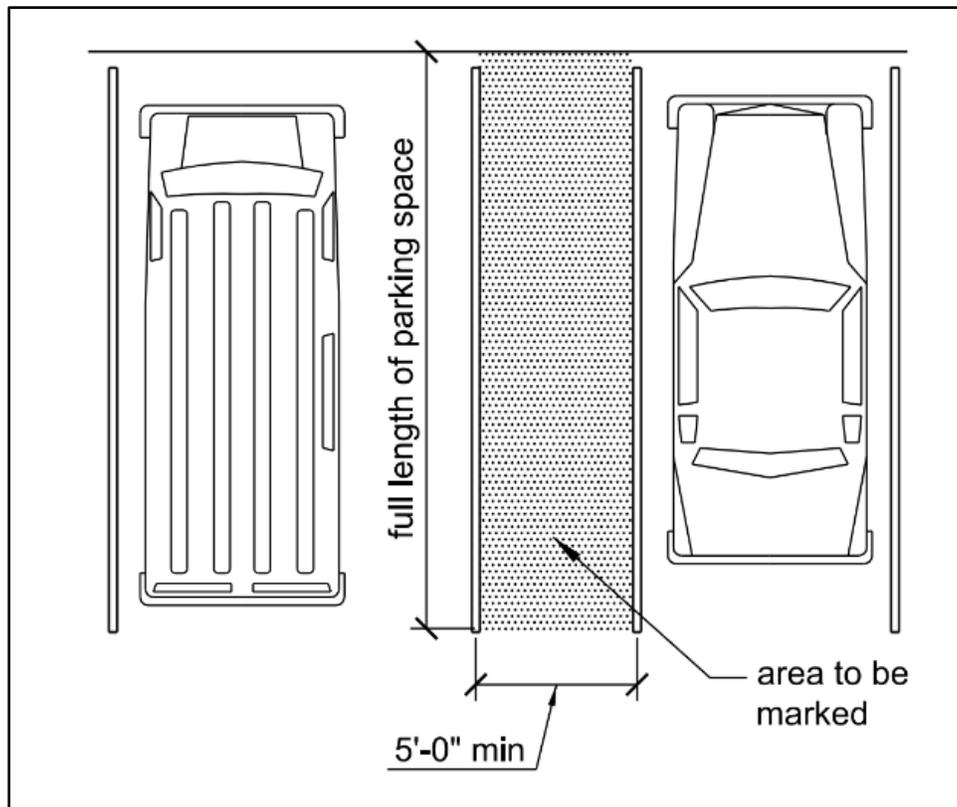


Figure 3.11.2.3 Parking Space Access Aisle (502.3)

03 Access aisles are not required for parallel parking applications where the width of the adjacent sidewalk or the available right-of-way is less than or equal to 14'-0". When an access aisle is not provided, the parking spaces are to be located at the beginning or end of the block face. A clear area 8'-0" in width is to be provided along the length of the accessible parallel parking space (see [Section 3.11.2.3](#) Paragraph 01, Exception 3). (R309.2.2)

#### 3.11.2.3.1 Access Aisles Serving Parallel Parking

##### **Standard:**

01 **Where the width of the adjacent sidewalk or available right-of-way exceeds 14'-0", an access aisle 5'-0" wide minimum shall be provided at street level the full length of the parking space and shall connect to a pedestrian access route. (R309.2.1)**

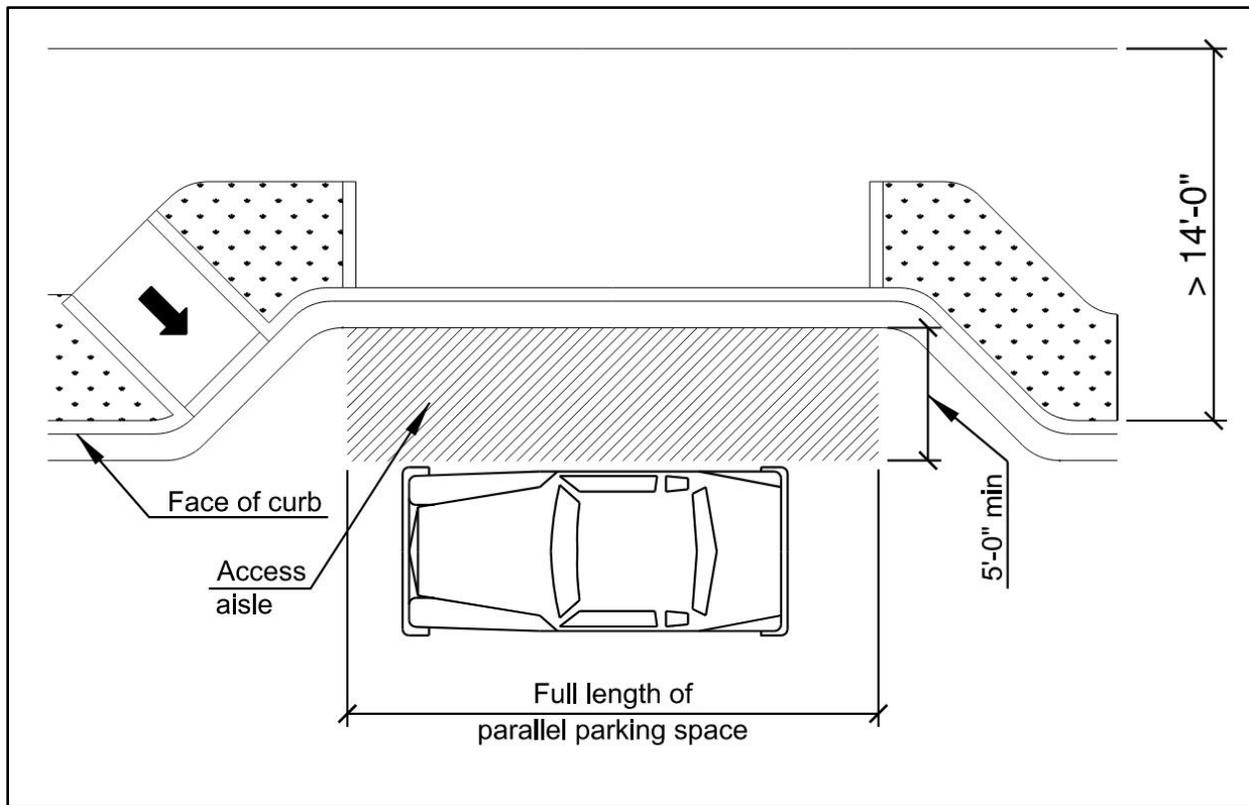


Figure 3.11.2.3.1 Wide Sidewalks (R309.2.1)

**Advisory:**

02 Vehicles can park at the curb or at the parking lane boundary and use the space required by [Section 3.11.2.3.1](#) on either the driver or passenger side of the vehicle to serve as the access aisle. (Advisory R309.2.1)

**Guidance:**

03 *The sidewalk adjacent to accessible parallel parking spaces should be free of signs, street furniture, and other obstructions to permit deployment of a van side-lift or ramp or the vehicle occupant to transfer to a wheelchair or scooter.* (Advisory R309.2)

**Advisory:**

04 Accessible parallel parking spaces located at the beginning or end of the block face are usable by vans that have rear lifts and cars that have scooter platforms. (Advisory R309.2)

05 Access aisles are not required for parallel parking applications where the width of the adjacent sidewalk or the available right-of-way is less than or equal to 14'-0". ([Section 3.11.2.2](#) Paragraph 1, Exception 3). (R309.2.2)

06 In alterations where the street or sidewalk adjacent to the existing parallel parking spaces is not altered, an access aisle is not required provided the parking spaces are located at the beginning or end of the block face. (R309.2.1.1)

[3.11.2.3.2 Connection](#)

**Standard:**

01 **Curb ramps or blended transitions complying with [Section 3.2](#) shall connect the access aisle to the pedestrian access route. Curb ramps shall not be located within the access aisle.** (R309.4)

*Guidance:*

02 *At parallel parking spaces, curb ramps and blended transitions should be located so that a van side-lift or ramp can be deployed to the sidewalk and the vehicle occupant can transfer to a wheelchair or scooter. (Advisory R309.4)*

03 *Accessible parallel parking spaces should be located at the beginning or end of the block face so that they can be served by curb ramps or blended transitions at the pedestrian street crossing. (Advisory R309.4 & R309.2.2)*

*Advisory:*

04 Detectable warning surfaces are not required on curb ramps and blended transitions that connect the access aisle to the sidewalk, including where the sidewalk is at the same level as the parking spaces, unless the curb ramps and blended transitions also serve pedestrian street crossings (see [Section 3.3](#)). (Advisory R309.4)

### 3.11.2.3.3 Width

**Standard:**

01 **Where required, access aisles serving car and van parking spaces shall be 5'-0" wide minimum. (502.3.1)**

### 3.11.2.3.4 Length

**Standard:**

01 **Where required, access aisles shall extend the full length of the parking spaces they serve. (502.3.2)**

### 3.11.2.3.5 Marking

**Standard:**

01 **Where required, access aisles shall be marked so as to discourage parking in them. (502.3.3)**

***Exception: Access aisles required for parallel parking applications are not required to be marked.***

*Advisory:*

02 Vehicles can park at the curb or at the parking lane boundary and use the space required by [Section 3.11.2.3.1](#) on either the driver or passenger side of the vehicle to serve as the access aisle. (Advisory R309.2.1)

03 See Section 3B.19 Parking Space Markings of the DE MUTCD for additional information on the method and color of marking.

### 3.11.2.3.6 Location

**Standard:**

01 **Where required, access aisles shall not overlap the vehicular way. Access aisles shall be permitted to be placed on either side of the parking space except for angled van parking spaces which shall have access aisles located on the passenger side of the parking spaces. (502.3.4)**

*Advisory:*

02 Wheelchair lifts typically are installed on the passenger side of vans. Many drivers, especially those who operate vans, find it more difficult to back into parking spaces than to back out into comparatively unrestricted vehicular lanes. For this reason, where a van and car share an access aisle, consider locating the van space so that the access aisle is on the passenger side of the van space. (Advisory 502.3.4)

#### 3.11.2.4 Floor or Ground Surfaces

##### **Standard:**

- 01 **Parking spaces and access aisles serving them shall comply with [Section 3.1.5](#). Access aisles shall be at the same level as the parking spaces they serve. Changes in level are not permitted. (502.4)**
- 02 **Built-up curb ramps are not permitted within the access aisle.**

##### Advisory:

- 03 Access aisles serving on-street parking are to meet the grade requirements contained in [Section 3.1.3.1](#) and the cross slope requirements in [Section 3.1.4](#).
- 04 Access aisles are required to be nearly level in all directions to provide a surface for wheelchair transfer to and from vehicles. (Advisory 502.4)

#### 3.11.2.5 Vertical Clearance

##### **Standard:**

- 01 **Parking spaces for vans and access aisles and vehicular routes serving them shall provide a vertical clearance of 8'-2" minimum. (502.5)**

##### Advisory:

- 02 Signs provided at entrances to parking facilities informing drivers of clearances and the location of van accessible parking spaces can provide useful customer assistance. (Advisory 502.5)

#### 3.11.2.6 Identification

##### **Standard:**

- 01 **Accessible parking spaces shall be identified by signs displaying the International Symbol of Accessibility (see [Section 3.13.4](#)). (Advisory R309.1)**

##### Guidance:

- 02 *Signs identifying van parking spaces should be placed at locations which are considered best suited to van parking.*

#### 3.11.2.7 Relationship to Accessible Routes

##### **Standard:**

- 01 **Parking spaces and access aisles shall be designed so that cars and vans, when parked, cannot obstruct the required clear width of adjacent accessible routes. (502.7)**

##### Advisory:

- 02 Wheel stops are an effective way to prevent vehicle overhangs from reducing the clear width of accessible routes. (Advisory 502.7)

### 3.11.3 Parking Meters and Parking Pay Stations

##### **Standard:**

- 01 **Parking meters and parking pay stations that serve accessible parking spaces shall comply with [Section 3.11.3](#). Operable parts shall comply with [Section 3.5](#). (R309.5)**

##### Advisory:

- 02 Parking meters and pay stations are typically owned and operated by municipal governments.

### 3.11.3.1 Location

#### Standard:

01 **At accessible parallel parking spaces, parking meters shall be located at the head or foot of the parking space. (R309.5.1)**

#### Advisory:

02 Locating parking meters at the head or foot of the parking space permits deployment of a van side-lift or ramp or the vehicle occupant to transfer to a wheelchair or scooter. (Advisory R309.5.1)

### 3.11.3.2 Displays and Information

#### Standard:

01 **Displays and information shall be visible from a point located 3'-3.6" maximum above the center of the clear space in front of the parking meter or parking pay station. (R309.5.2)**

## 3.12 Passenger Loading Zones

#### Standard:

01 **Where passenger loading zones other than transit stops are provided, at least one accessible passenger loading zone complying with [Section 3.12](#) shall be provided for each 100'-0" of continuous loading zone space or fraction thereof. (R215)**

02 **Accessible passenger loading zones shall be identified by signs displaying the International Symbol of Accessibility (see [Section 3.13.4](#)). (Advisory R310.1)**

#### Advisory:

03 Passenger loadings zones could be present at valet parking areas, school drop off zones, hospitals, or long-term care facilities.

### 3.12.1 Vehicle Pull-Up Space

#### Standard:

01 **Passenger loading zones shall provide a vehicular pull-up space 8'-0" wide minimum and 20'-0" long minimum. (R310.2)**

### 3.12.2 Access Aisle

#### Standard:

01 **Passenger loading zones shall provide access aisles complying with [Section 3.12.2](#) adjacent to the vehicle pull-up space. Access aisles shall be at the same level as the vehicle pull-up space they serve and shall not overlap the vehicular travel lane. Curb ramps or blended transitions complying with [Section 3.2](#) shall connect the access aisle to the pedestrian access route. Curb ramps are not permitted within the access aisle. (R310.3)**

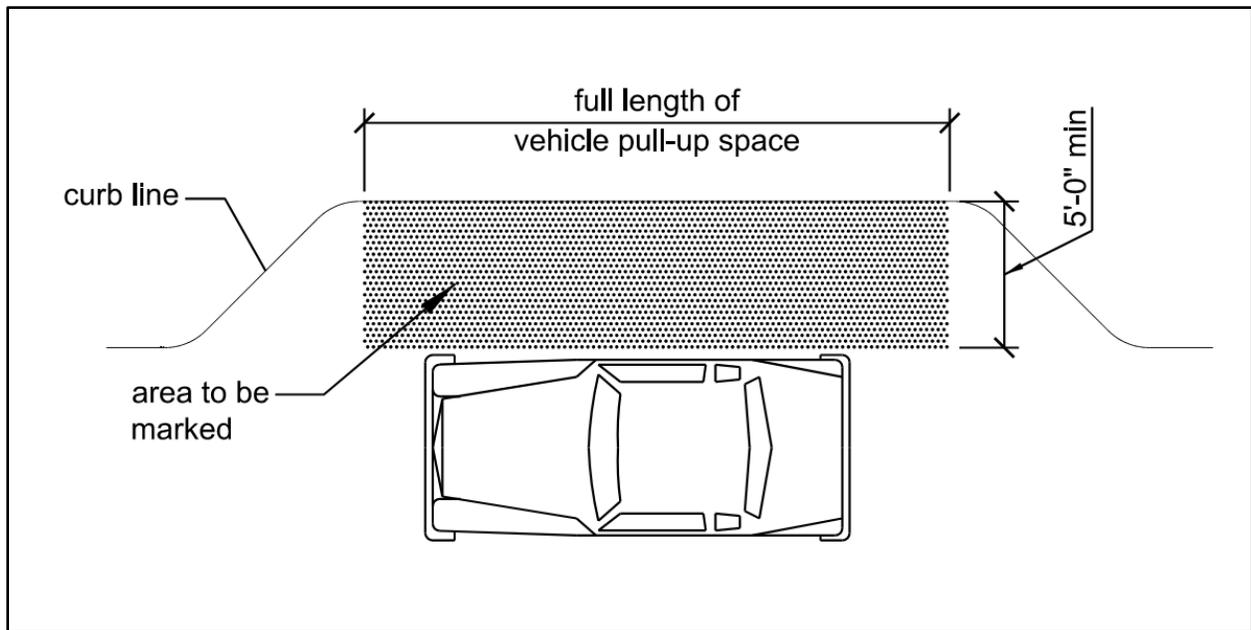


Figure 3.12.2 Access Aisle (R310.3)

#### 3.12.2.1 Width

##### Standard:

- 01 Access aisles serving vehicle pull-up spaces shall be 5'-0" wide minimum. (R310.3.1)

#### 3.12.2.2 Length

##### Standard:

- 01 Access aisles shall extend the full length of the vehicle pull-up spaces they serve. (R310.3.2)

#### 3.12.2.3 Marking

##### Standard:

- 01 Access aisles shall be marked so as to discourage parking in them. (R310.3.3)

#### 3.12.2.4 Surfaces

##### Standard:

- 01 Surfaces access aisle surfaces shall comply with [Section 3.1.5](#). (R310.3.4)

#### 3.12.2.5 Vertical Clearance

##### Standard:

- 01 Vehicle pull-up spaces, access aisles serving them, and a vehicular route from an entrance to the passenger loading zone, and from the passenger loading zone to a vehicular exit shall provide a vertical clearance of 9'-6" minimum. (503.5)

### 3.13 Facilities Not Common in the Public Right-of-Way

#### Advisory:

01 The following section contains standards for elements that are not commonly in public right-of-way. For these items, accessibility standards have been adopted by reference.

02 For purposes of this section, the acronym PROWAG refers to the US Access Board's *Proposed Shared Use Path Supplement to: Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way 2011 with 2013 supplement incorporated*. The acronym ADAAG refers to Appendix D to 36 CFR part 1191, commonly referred to as the US Access Board's *Americans with Disability Act Accessibility Guidelines*.

#### 3.13.1 Ramps

01 Ramps to comply with proposed PROWAG R407.

#### 3.13.2 Stairways

01 Stairways to comply with proposed PROWAG R408.

#### 3.13.3 Handrails

01 Handrails to comply with proposed PROWAG R409.

#### 3.13.4 Signs

01 Signs to comply with proposed PROWAG R211.

##### 3.13.4.1 Visual Characters on Signs

01 Visual Characters on Signs to comply with proposed PROWAG R410.

##### 3.13.4.2 International Symbol of Accessibility

01 Internal Symbol of Accessibility to comply with proposed PROWAG R411.

#### 3.13.5 Knee and Toe Clearance

01 Knee and Toe Clearance to comply with proposed PROWAG R405.

#### 3.13.6 Doors, Doorways and Gates

01 Doors, doorways, and gates to comply with ADAAG 404.

#### 3.13.7 Street Furniture

##### 3.13.7.1 Drink Fountains

01 Drink fountains to comply with ADAAG 602.1 to 602.6.

##### 3.13.7.2 Public Toilet Facilities

01 Public toilet facilities to comply with proposed PROWAG R212.3.

##### 3.13.7.3 Tables

01 Tables to comply with proposed PROWAG R212.4.

#### *3.13.7.4 Counters*

01 Counters to comply with ADAAG 904.

#### *3.13.7.5 Benches*

01 Benches to comply with proposed PROWAG R212.6.

#### *3.13.8 Elevators and Limited Use/ Limited Application Elevators*

01 Elevators to comply with ADAAG 407.

02 Limited-Use / Limited-Application Elevators to comply with ADAAG 408.

#### *3.13.9 Platforms Lifts*

01 Platforms lifts to comply with ADAAG 410.

#### *3.13.10 Escalators*

01 Escalators to comply with ADAAG 810.9.

## Chapter 4 Design Considerations

Pedestrian accessibility design can be a complex task with many variables involved; accordingly, engineering judgement must be exercised throughout the design process. Achieving the accessibility standards contained in this manual becomes increasingly complex in congested urban areas and in particular at constrained retrofit locations. This chapter provides a discussion of the items that should be considered during the design process in order to provide a pedestrian network that not only meets the applicable accessibility standards but also optimizes the accessibility components.

The contents of this chapter primarily relate to new construction-type projects and to work required on alteration-type projects. Additional information regarding the accessibility work that is required based on a project's scope is included in [Chapter 2](#). This chapter is intended to supplement the accessibility standards contained in [Chapter 3](#) and to provide additional design considerations regarding their implementation. Reference must be made to the Department's accessibility standards throughout the design process to ensure accessibility compliance.

This chapter summarizes the applicable design considerations for several of the more typical accessibility components and is not intended to capture all pertinent accessibility design guidance. Therefore, the practitioner is encouraged to research accessibility topics on a per project basis especially in areas where this chapter is silent. Where guidance documents outside of this manual are utilized on a project, engineering judgement must be used to ensure that the guidance is implemented properly and within the conditions and constraints found at the project location. Several of the commonly used resources available for reference include:

- AASHTO's *Guide for the Planning, Design, and Operation of Pedestrian Facilities*,
- The FHWA's *Designing Sidewalks and Trails for Access – Part 2, Best Practices Guide*,
- The US Access Board's *Accessible Public Rights-of-Way: Planning and Designing for Alterations*,
- The Institute of Transportation Engineers' (ITE) *Proposed Recommended Practice: Designing Walkable Urban Thoroughfares*,
- AASHTO's *Guide for the Development of Bicycle Facilities*,
- The US Access Board's *Public Rights-of-Way Access Advisory Committee Final Report*,
- The US Access Board's *Outdoor Developed Areas*,
- Various research reports, guidance documents, journal articles, and
- Other DelDOT manuals and design guidance memorandums (DGMs).

### 4.1 Components of the Pedestrian Access Route

The pedestrian access route is defined by the US Access Board as “a continuous and unobstructed path of travel provided for pedestrians with disabilities within or coinciding with a pedestrian circulation path”. The pedestrian access route is used to link accessible features located within the public right-of-way including on-street parking, transit facilities, passenger loading zones as well as various adjacent land uses connected to the public right-of-way.

The pedestrian access route is comprised of various accessible components each with their own unique design considerations. Figure 4.1 portrays several of the more common components of the pedestrian access route. These components include:

- **Sidewalks and Shared Use Paths** – These are common linear components that usually run parallel to a roadway when located within the public right-of-way. See [Section 4.4](#) for additional discussion.

- **Curb Ramps and Blended Transitions** – These components are used to create a connection between the pedestrian sidewalk or shared use path to a pedestrian street crossing or to parking and passenger loading zones. See [Section 4.5](#) for additional discussion.
- **Pedestrian Street Crossings** – These components are commonly referred to as crosswalks and occur where the pedestrian access route crosses a roadway at grade. See [Section 4.6](#) for additional discussion.

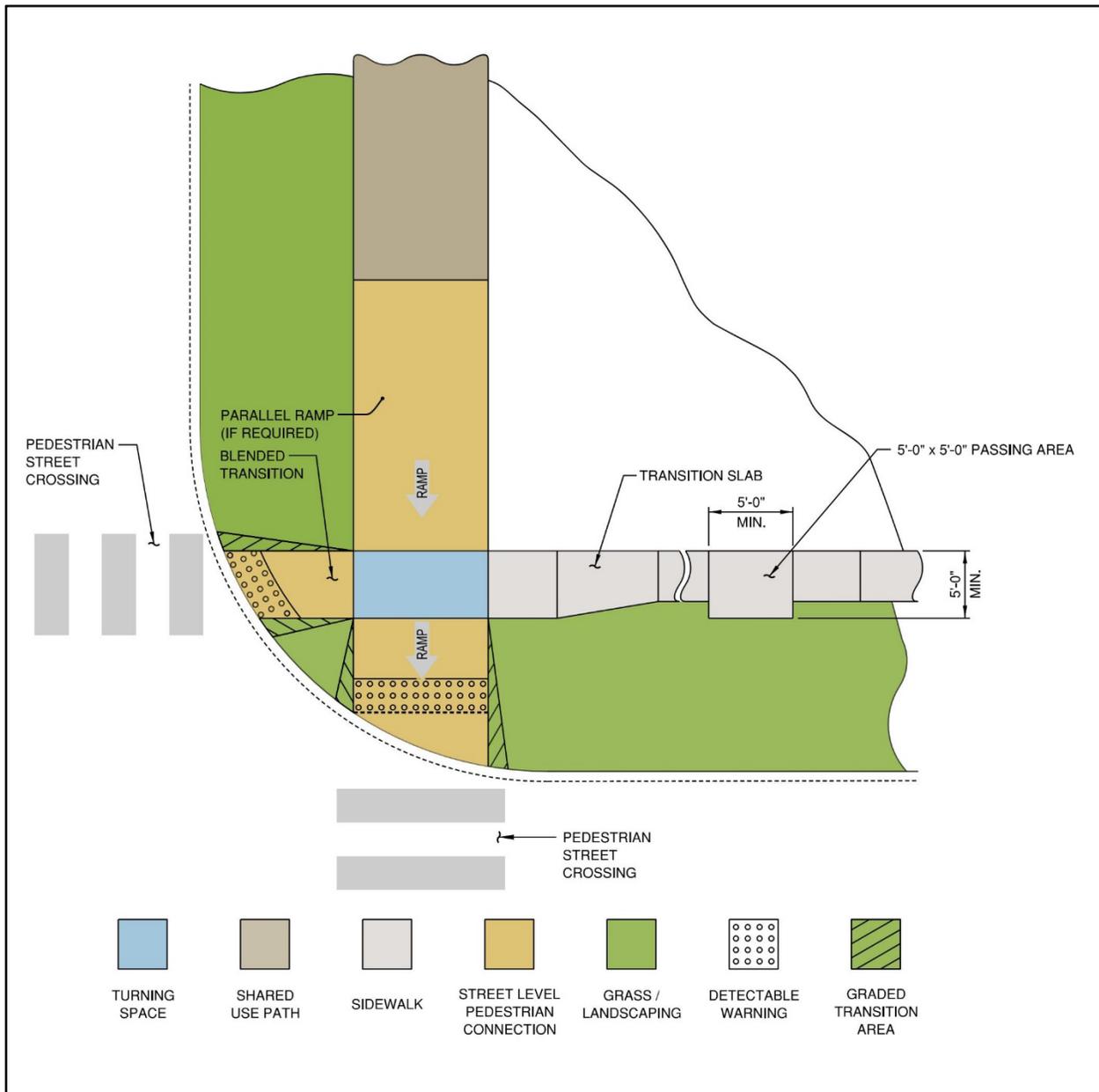


Figure 4.1 Typical Components of the Pedestrian Access Route

[Chapter 3](#) contains additional accessibility standards for atypical applications in the public right-of-way in addition to the typical components described above and discussed in more detail within this chapter. Additional accessibility standards contained in [Chapter 3](#) include the following:

- At-grade rail crossings,

- Pedestrian overpasses and underpasses,
- Ramps,
- Elevators and limited use/limited application elevators,
- Platform lifts, and
- Doors, doorways, and gates.

## 4.2 Plan Documentation Considerations

Properly capturing the engineer’s intent for the various accessibility components into the contract documents is paramount to the successful construction of pedestrian accessibility components. As contract documents are generated, it is important to consider whether enough information is present to portray the engineer’s intent. If the answer is no, more information should be added to the contract documents. Engineering Instruction *PM-18-001 Pedestrian Connection Plan Preparation and Documentation* provides further instructions on how to properly capture design information into a contract document.

In general, the amount of information required to be presented in the contract documents is commensurate with the unique challenges and constraints presented at an individual location. On larger earth moving projects, less information is generally required as the scope of the project allows for easier implementation of the DelDOT Standard Construction Details. Locations where accessibility components are being retrofitted into existing networks will require more detail be provided in the contract documents to show the existing constraints in the built environment and provide proper tie in information. Accordingly, retrofit locations could require additional drawings that show detailed layout designs with coordinate points, dimensions, elevations, and slopes for the various accessibility components.

The following items are considered best practices to be performed when developing the contract documents:

- Review the limits and the point density of the topographic survey to ensure that sufficient existing information was captured ahead of detailed design plan development.
- Perform adequate design to ensure that all proposed construction can be performed “per plan”. This includes performing adequate design of street level pedestrian connections that are planned to be constructed with DelDOT’s Standard Construction Details.
- Perform adequate design to ensure that the proposed accessibility components and any impacted facilities that will be reconstructed or relocated can be contained within public right-of-way or appropriate easements.
- Ensure that all components that will deviate from the standards contained in [Chapter 3](#) and that are considered within the scope of the project have a Request for Practical Exception (RPE) created during the design phase. All processed RPEs must be identified in the contract documents with the element which required an RPE being defined to assist during construction and inspection activities. Additional information on RPEs is contained in [Chapter 6](#).
- All plans, especially those for retrofit locations, should provide adequate information including relevant coordinates, elevations, slopes, and distances to assist the administering construction staff and the contractor in creating positive drainage.

## 4.3 All Components

The following section discusses the accessibility standards with which all components of the pedestrian access route are required to comply.

### 4.3.1 Surfaces

All components of the pedestrian access route are required to provide surfaces that comply with the applicable requirements contained in [Chapter 3](#) and which are summarized in Table 4.3.1. Where considered within the reasonable scope of the project, objects that do not meet these accessibility requirements such as utility covers, vault frames, and drainage grates should be located outside of the accessible pedestrian access route. Street level pedestrian connections are to be constructed of concrete (Portland cement concrete) to provide a smooth and easily traversable facility. Pedestrian facilities outside of street level pedestrian connections can be constructed with other materials including the following:

- Concrete (Portland Cement Concrete),
- Bituminous Concrete,
- Brick Pavers, and
- Concrete Pavers.

Other materials may be considered provided that the material meets the applicable surface requirements contained in [Chapter 3](#).

Surfaces	
Element	Section
Surface	<a href="#">3.1.5</a>
Vertical Alignment	<a href="#">3.1.5.1</a>
Vertical Surface Discontinuities	<a href="#">3.1.5.2</a>
Horizontal Openings	<a href="#">3.1.5.3</a>
Flangeway Gaps	<a href="#">3.1.5.4</a>

Table 4.3.1 Accessible Surfaces

### 4.3.2 Protruding Objects

Protruding objects can be hazardous for pedestrians, especially pedestrians who are visually impaired. Accordingly, the accessibility requirements contained in [Chapter 3](#) should be applied across the entire pedestrian circulation path and not just the pedestrian access route. Table 4.3.2 summarizes the accessibility standards with which protruding objects are required to comply.

Protruding Objects	
Element	Section
Protrusion Limits	<a href="#">3.4.1</a>
Post-Mounted Objects	<a href="#">3.4.2</a>
Vertical Clearance	<a href="#">3.4.3</a>
Required Clear Width	<a href="#">3.4.4</a>

Table 4.3.2 Protruding Objects

Objects that are located between 0'-0" to 2'-3" from the ground surface are considered to be within the cane detectable range and are not considered protrusion hazards but will reduce the continuous clear width of the facility. Objects that are mounted above this cane detectable range are considered non-detectable protrusion hazards that also reduce the continuous clear width of the facility. Objects in this non-detectable range are only permitted to protrude 0'-4" maximum horizontally into the pedestrian circulation path when measured from the face of the fixed structure. The protrusion of free-standing objects mounted on posts or pylons should be limited to 0'-4" into the adjacent pedestrian circulation path; however, these objects may protrude up to 1'-0" into the adjacent pedestrian circulation path when absolutely necessary. Mailboxes are one of the common features that present protrusion hazards that should be considered during the design phase. Shared use path facilities should additionally provide a 2'-0" graded area adjacent to the path for clearance from lateral obstructions such as bushes, large rocks, bridge piers, abutments, and poles. If adequate clearance cannot be provided between the path and lateral obstructions, then warning signs, object markers, or enhanced conspicuity and reflectorization of the obstruction should be used.

Section 2A.18 of the *DE MUTCD* requires that signs be mounted at a minimum height of 7'-0" in urban areas where pedestrian movements are likely to occur. Section 2A.18 of the *DE MUTCD* additionally requires that secondary signs that are mounted lower than 7'-0" above a pedestrian sidewalk or pathway not protrude more than 0'-4" into the pedestrian circulation path. At locations where signs or post mounted objects protrude into the adjacent pedestrian circulation path, consideration can be given to adding an additional signpost to reduce the protrusion distance.

Pedestrian facilities are required to provide a 6'-8" vertical clearance measured from the ground surface. It is desirable that this vertical clearance be increased to 10'-0" on shared use path facilities. This recommended vertical clearance can be reduced to a recommended 8'-0" minimum vertical clearance in constrained areas. Consideration should be given to providing vertical clearances in excess of 10'-0" at locations where maintenance and emergency vehicles may require access. Additionally, Section 201 of the Standard Specifications requires that trees or shrubs adjacent to and above the pedestrian access route are pruned to achieve a vertical clearance of 10'-0" above and 2'-0" adjacent to the sidewalk, trail, or shared use path on either side. Objects that protrude into the overhead space above the required vertical clearance is permissible. Projects that may require pruning should have an appropriate pay item included to pay for this work.

Detectable indicators or detectable surface changes must be used to delineate locations where the protrusion limits and vertical clearance limits are unable to be met. The detectable indicators may be any element that is considered continuous, cane detectable, and is mounted within the 0'-0" to 2'-3" cane detectable range. The detectable indicators must be placed so that all applicable protrusion limits are met. Fixed planters, benches, curb, railing and other continuous elements can be used for this purpose.

Figure 4.3.2-a portrays a pedestrian circulation path with objects protruding into the pedestrian circulation path causing hazards. Figure 4.3.2-b portrays an alternate pedestrian circulation path where protrusions have been either eliminated or made compliant with the protrusion requirements of this section.

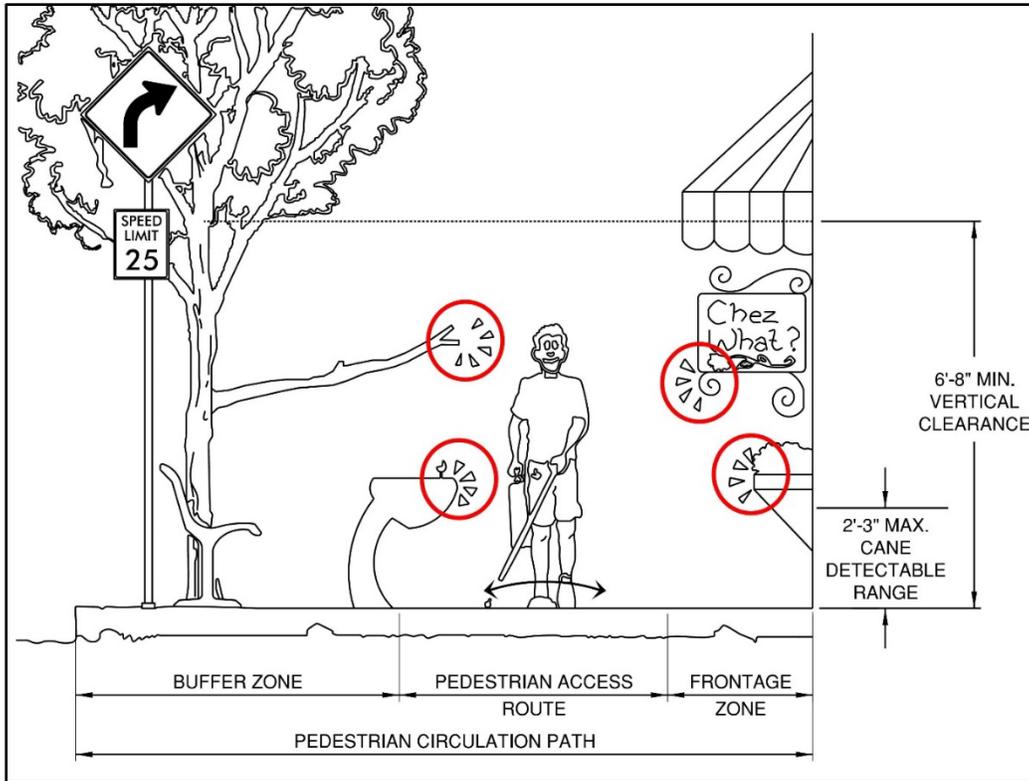


Figure 4.3.2-a Protruding Objects

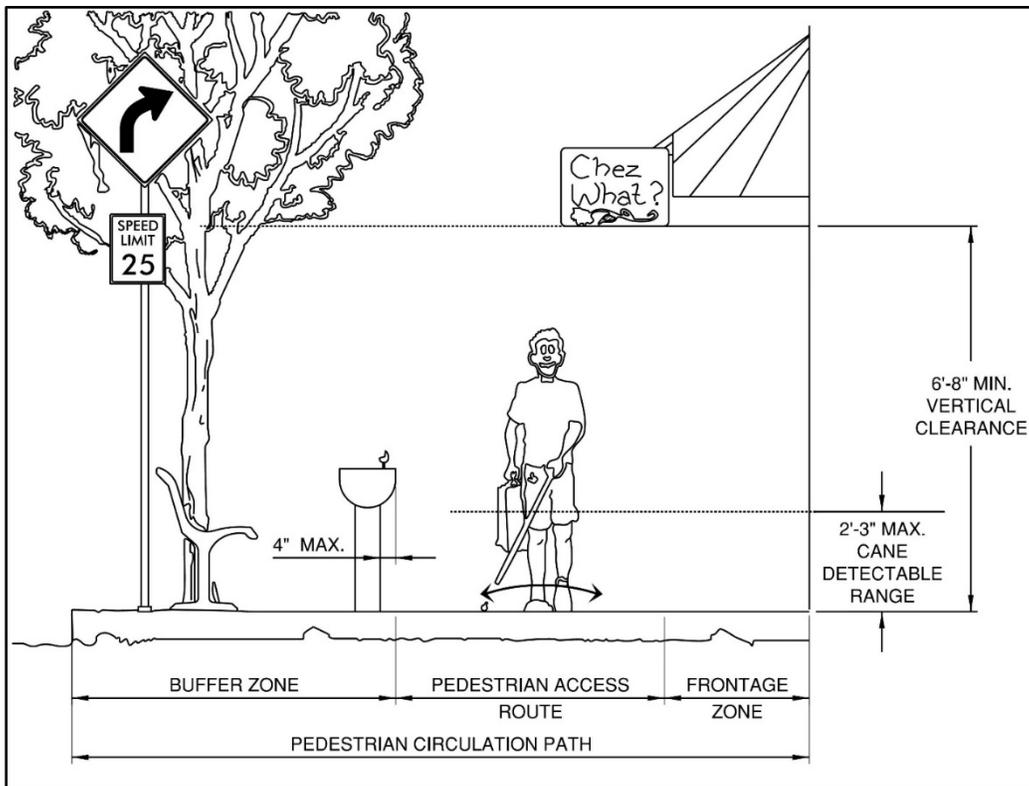


Figure 4.3.2-b Protruding Objects

## 4.4 Sidewalks and Shared Use Paths

The most common pedestrian circulation paths are sidewalks and shared use paths. Newly constructed pedestrian circulation paths are required to provide an accessible pedestrian access route in accordance with [Chapter 3](#). This section highlights the relevant design considerations for these facilities that are located within the public right-of-way and which serve as part of the transportation network. This section of the manual does not apply to recreational “trail-type” facilities where different design standards apply. Table 4.4 summarizes the accessibility standards with which sidewalks and shared use paths located within the public right-of-way and which serve as part of the transportation network are required to comply. It should be noted that the standards and design considerations presented in this section also apply to the other less common linear pedestrian access route facilities.

Sidewalks and Shared Use Paths	
Element	Section
Continuous Clear Width	<a href="#">3.1.1</a>
Passing Spaces	<a href="#">3.1.2</a>
Grade	<a href="#">3.1.3</a>
Cross Slope	<a href="#">3.1.4</a>
Surfaces	<a href="#">3.1.5</a>
Separation	<a href="#">3.1.6</a>
Protruding Objects	<a href="#">3.4</a>

Table 4.4 Accessible Sidewalks and Share Use Paths

Dedicated linear pedestrian circulation paths that are alongside of roadways are to be separated from the vehicle travel lane at locations where pedestrian street crossing is not intended. This separation is provided to delineate the locations of appropriate pedestrian street crossings for visually impaired users. The preferred separation between the vehicle travel lane and the pedestrian circulation path is a buffer strip in accordance with [Section 4.4.3](#) of this manual; however, the following treatments are also considered acceptable in creating this separation: curb, chains, fencing, railing, planters, or landscaping. Additionally, DE MUTCD compliant signage which further indicates that crossings are not permitted can be considered. All roadside features used to create separation are to be designed in accordance with the most recent edition of the AASHTO Roadside Design Guide.

In general, the pedestrian access route should be laid out in a manner that persons with mobility impairments and other persons with disabilities have to travel an equal distance to that of an able-bodied user. Utility covers, drainage grates and other similar access covers may pose accessibility challenges. Accordingly, new construction type projects should locate these elements outside of the proposed pedestrian access route when possible. On alteration type projects, consideration should be given to relocating the pedestrian access route or the utility covers to mitigate the accessibility challenges that these features present when this work is inside of the reasonable scope of a project. When the utility covers cannot be relocated outside of the pedestrian access route within the reasonable scope of the project, consideration can be given to upgrading the covers to a more ADA compliant application.

### 4.4.1 Width

A pedestrian facility’s desired width is based upon the facility type; accordingly, [Section 4.4.1.1](#) and [Section 4.4.1.2](#) contain a discussion on path width requirements for sidewalks and shared use paths, respectively. In addition to the guidance presented in this section, investigation should be performed to determine if there are any local ordinances that may dictate the required width of a pedestrian path. The pedestrian facility widths described in this section do not include the width of any adjacent curbing. If a pedestrian facility is monolithic with the adjacent curb, then the width of the pedestrian path excludes the curb zone.

In addition to the facility widths contained in [Section 4.4.1.1](#) and [Section 4.4.1.2](#), DeIDOT best practice is to include a 2'-0" wide 6:1 grading area from the edge of the sidewalk or shared use path. This grading best practice is shown in DeIDOT Standard Construction Detail M-3.

#### *4.4.1.1 Sidewalks*

DeIDOT's standard sidewalk width should be 5'-0" when a buffer strip in accordance with [Section 4.4.3](#) is provided. At locations where no buffer strip is provided, the standard sidewalk width should be 6'-0" exclusive of the curb. These widths are appropriate for low volume pedestrian traffic facilities. At locations where high volume pedestrian traffic is anticipated, such as central business districts, stadiums, and schools, additional width should be added to the pedestrian access route to accommodate the anticipated extra pedestrian volume. The Institute of Transportation Engineers' *Highway Capacity Manual* provides procedures to assess the sidewalk width needed to accommodate particular pedestrian volumes at a desired level of service.

Current Federal standard allows the minimum continuous clear width of a pedestrian access route to be 3'-0". DeIDOT has adopted a minimum accessibility standard width of 4'-0" exclusive of the curb to meet current recommended accessibility best practices for facilities located in the public right-of-way. Accordingly, DeIDOT will allow the pedestrian access route to maintain a clear continuous width of 3'-0" in constrained areas through use of a Request for Practical Exception. Passing spaces that comply with [Section 4.4.4](#) are required at an interval of 200'-0" maximum when the continuous clear width of the pedestrian access route is less than 5'-0".

Additionally, DeIDOT allows pinch points along sidewalk facilities to be a minimum width of 2'-8" for a maximum length of 2'-0". Pinch points should be considered as a last resort where additional width cannot be added around an obstruction. Widths less than 2'-8" are not accessible and therefore will not be permitted. Additional information regarding the grouping of obstructions is contained in [Section 4.4.6](#).

#### *4.4.1.2 Shared Use Paths*

DeIDOT's minimum shared use path width should be 10'-0" exclusive of any provided curb width. At locations where high user traffic is anticipated such as central business districts, stadiums, and schools, additional width should be added to the pedestrian access route to accommodate the anticipated extra pedestrian volume. The Institute of Transportation Engineers' *Highway Capacity Manual* provides procedures to assess the width needed to accommodate particular volumes at a desired level of service. Shared use path widths may be reduced to 8'-0" at locations in accordance with the guidance contained in the AASHTO *Guide for the Development of Bicycle Facilities*.

#### *4.4.2 Running Slope and Cross Slope*

Sidewalks and shared use paths are to be designed to a maximum running slope of 4.5% except at locations where the sidewalk or shared use path is within the right-of-way and the adjacent roadway's running grade exceeds this 4.5% value. In these instances, the running slope of the facility is permitted to match the general running slope of the adjacent roadway. Minimum and maximum running slope requirements for roadways are contained in the DeIDOT *Road Design Manual* for cases where the pedestrian facility's running slope is controlled by the adjacent roadway.

The vertical alignment of the pedestrian access route should be smooth and avoid rapid grade changes with an absolute algebraic difference in excess of 11.0% that could cause snagging between a mobility device and the pedestrian access route surface. When rapid grade changes in excess of 11.0% are

required, a 2'-0" level strip as discussed in [Section 4.5.3.1.7](#) can be considered to mitigate this snagging potential.

Sidewalks and shared use paths are to be designed to maintain a continuous 1.5% cross slope. Noticeably crowned facilities may affect a mobility aid's ability to maintain full wheel contact across the entire pedestrian access route.

When sidewalks or shared use paths are altered in the built environment, consideration should be given to how the replacement of the steep cross slope may affect adjacent land uses. Figure 4.4.2-a portrays a steep existing cross slope and Figure 4.4.2-b shows a barrier that is created to an adjacent facility when the steep cross slope is removed. Applications that remove one accessibility barrier but create additional accessibility barriers should be avoided and will require the creation of a Request for Practical Exception.

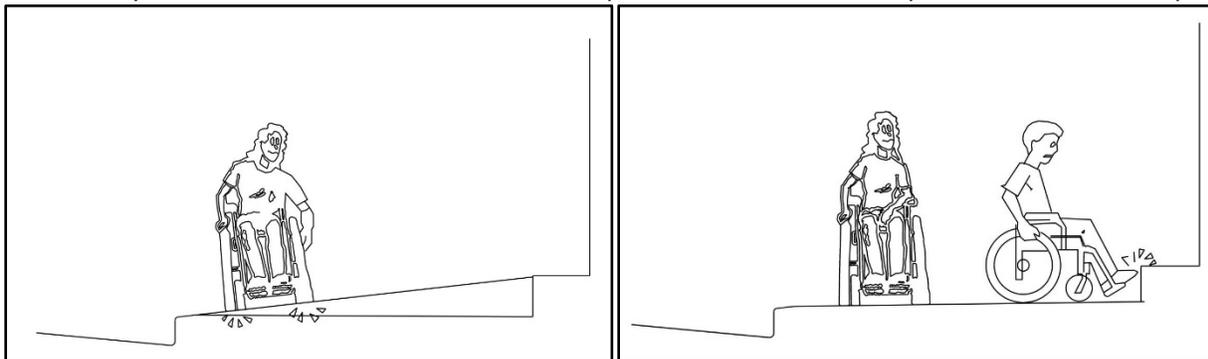


Figure 4.4.2-a Existing Steep Cross Slope

Figure 4.4.2-b Removal of Steep Cross Slope

#### 4.4.3 Buffer Strips

A buffer strip is a recommended space that is intended to improve operation. The buffer strip is located between the face of the curb or edge of pavement and the beginning of a sidewalk or shared use path. The buffer strip can be either turfed or paved and should contrast both visually and tactilely underfoot to distinguish it from the adjacent accessible pedestrian access route. Where turf is used as the buffer strip material, the buffer strip is to be graded in a way that does not prevent positive drainage that could create ponding issues.

A buffer space provides additional user safety and comfort by separating the facility from moving vehicular traffic and can be used as an area for placing underground and aboveground utilities such as traffic signal equipment, streetlights, parking meters, utility poles, guy wires, and fire hydrants. The buffer strip and associated lateral offsets and clear zone should be designed consistent with the most recent edition of the AASHTO *Roadside Design Guide*. Buffer strips can also serve to provide a snow storage area, splash protection for pedestrians, a location for trash pickup, as well as a suitable area to place traffic signs, mailboxes, street level pedestrian connections, and street furniture where allowed.

The optimal buffer strip width varies depending on the character of an area and the traffic conditions present on the adjacent roadway. The current AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities* recommends a buffer strip width of at least 4'-0". Additional width should be provided on higher speed, higher volume roadways to increase the pedestrian's sense of safety and comfort along the facility. A buffer zone with of 7'-0" will allow for the installation of curb ramps outside the pedestrian access route in most circumstances. AASHTO provides further guidance on preferred buffer strip widths based on the presence of curb:

- **Curb present** – A minimum 2'-0" buffer should be provided. The buffer should be widened to accommodate the space occupied by any objects placed there, and still provide 2'-0" clear to both the roadway and the sidewalk or shared use path.
- **Curb not present** – Buffer widths equal to or greater than the clear zone appropriate for the roadway are desirable. Buffer widths should not be less than the width of the shoulder appropriate to the sidewalk or shared use path.

Adding plantings to the buffer strip can increase the pedestrian's sense of security, add to the overall aesthetics of the area, and provide additional splash protection; however, plantings in the buffer strip also create additional maintenance, can lower sight distance values, and create additional fixed obstructions that can become roadside obstacles. Additional design considerations regarding the use of buffer zone plantings can be found in the latest edition of the *AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities*. Buffer strips that are planted should generally be wider to be able to provide space for irrigation and sufficient area for the planting to grow. If trees are planted in the buffer strip, the buffer should be wide enough so trunks (at mature width) are at least 4'-0" clear of the roadway face of curb and 2'-0" clear from the pedestrian access route. The resulting required width would therefore be greater than 6'-6" for most species commonly used as street trees. Surfaces at the base of a tree should either be open or have adjustable openings to allow for the widening of the trunk at ground level over time.

#### 4.4.4 Passing Spaces

5'-0" by 5'-0" passing spaces are required where new or reconstructed sidewalk narrower than 5'-0" wide is proposed. Passing areas are required to be provided every 200'-0" maximum. Passing areas are intended to provide mobility device users a location to maneuver past each other on a pedestrian access route. Driveways and intersecting walkways may be used as passing spaces provided that these facilities meet the standard requirements for length, width, and cross slope. Proposed bridges or other structures that are greater than or equal to 200'-0" in length should be designed to provide a minimum 5'-0" wide sidewalk to avoid having to provide passing spaces. Figure 4.4.4 demonstrates the maximum passing space separation.

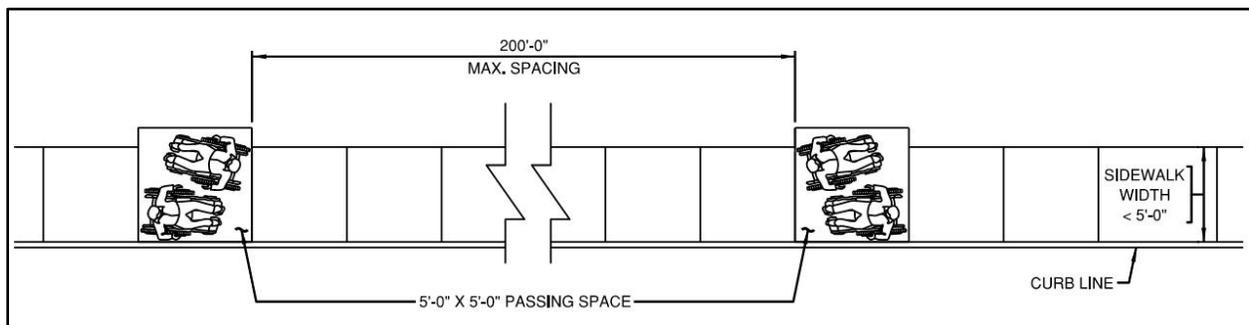


Figure 4.4.4 Passing Spaces

#### 4.4.5 Transitional Segments

Transitional segments are used to transition the cross slope and width of a proposed pedestrian facility to match that of an existing pedestrian facility. The cross slope transition between the two surfaces should be as gradual as possible and should not exceed a cross slope transition rate of 3.0% per foot. The Department's minimum transition segment length to connect proposed pedestrian facilities to existing pedestrian facilities is 5'-0" in the direction of pedestrian travel. This 5'-0" length promotes a gradual cross

slope transition and creates a slab length consistent with the Department's Standard Specifications. Figure 4.4.5 demonstrates a 5'-0" transitional segment connecting an existing and proposed sidewalk.

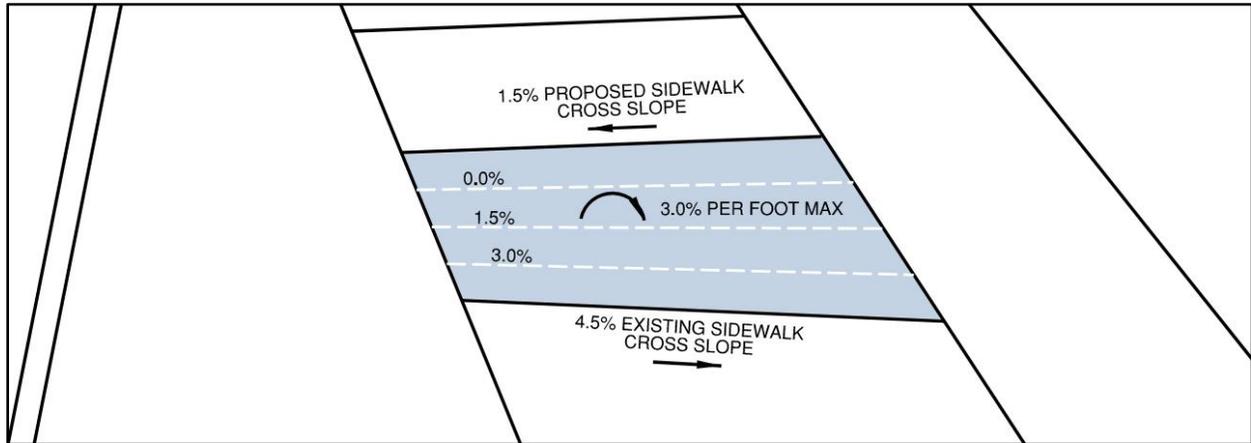


Figure 4.4.5 Transitional Segment Example

#### 4.4.6 Grouping of Obstructions

Obstructions that reduce the clear width of the pedestrian access route should be limited to the extent reasonable within the context of the project scope. Obstructions that can reduce the clear width of a pedestrian access route can include but is not limited to the following elements: utility poles, fire hydrants, signal poles, traffic equipment cabinets, utility cabinets, mailboxes, street furniture, plantings, and street signs. Priority should be given to placing new obstructions behind the sidewalk or shared use path where possible. If space behind the pedestrian access route is not available, these obstructions may be placed in the buffer strip once the obstructions' effect on the lateral offset and clear zone has been considered. If there is no available space behind the sidewalk or the shared use path and there is no buffer strip present, obstructions may be placed inside the pedestrian access route in a manner that maximizes the path's clear width and provided that the obstruction does not create a pinch point where the path width is reduced below 2'-8" for longer than 2'-0" in length.

If obstructions must be placed in the pedestrian access route, the design priority should be to place these objects consistently on either the left or right side of the path to provide a consistent pedestrian corridor. Where placing consistently on either the right or left side of the pedestrian access route isn't possible, a 4'-0" by 4'-0" space as shown in Figure 4.4.6 is required to provide for a maneuvering space between the obstructions. If possible, it is desirable to provide a 5'-0 by 5'-0" maneuvering area.

An additional alternative to creating pinch points is to widen the pedestrian access route around the obstruction to maintain the required 4'-0" width of the pedestrian access route. When the pedestrian access route is widened around an obstruction, it is recommended that the pedestrian access route be tapered at a 2:1 rate as shown in Figure 4.4.6.

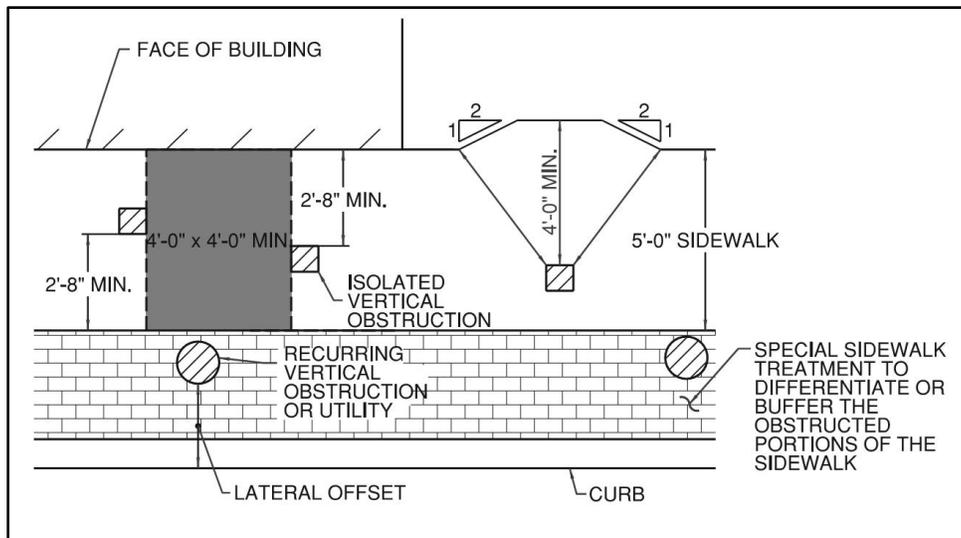


Figure 4.4.6 Grouping of Obstructions

#### 4.4.7 Driveways

Where a driveway crosses a sidewalk or a shared use path, the section of driveway that is considered part of the pedestrian access route must meet the applicable accessibility requirements. DeIDOT Standard Construction Detail C-3 details the Department's standard driveway configurations. These standard drawings may need to be supplemented when field conditions do not permit their use. Figure 4.4.7-a and Figure 4.4.7-b show two potential alternatives that can be considered at locations where DeIDOT Standard Construction Detail C-3 is not applicable. Figure 4.4.7-a portrays an alternative that can be considered where the pedestrian access route is placed behind a steep driveway apron. This application may require either an easement or additional right-of-way but may be required at physically constrained locations. Figure 4.4.7-b incorporates a pedestrian access route at a driveway that is narrower than either side of the abutting path but still maintains the minimum clear continuous width.

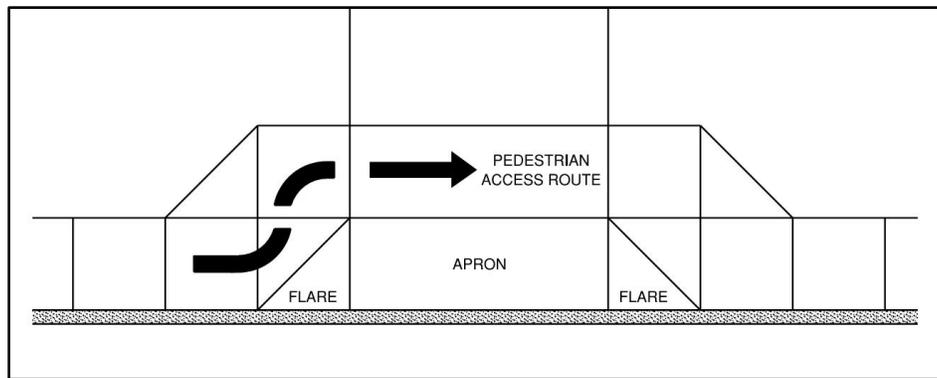


Figure 4.4.7-a Alternate Driveway Configuration with Narrow Sidewalk

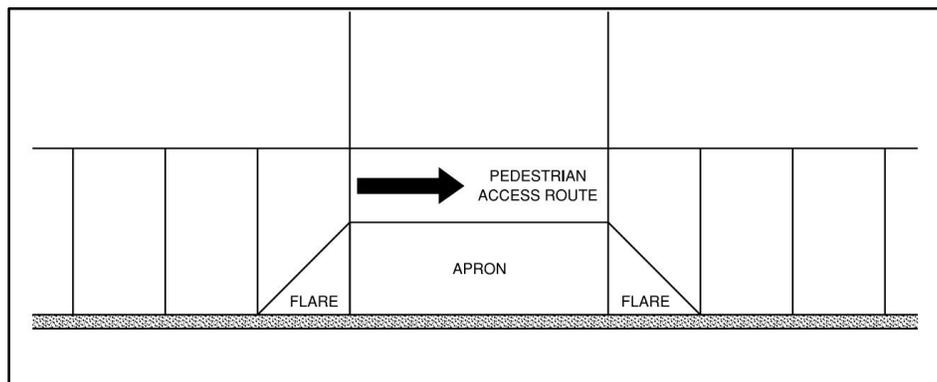


Figure 4.4.7-b Alternate Driveway Configuration with Wide Sidewalk

Truncated dome detectable warning surfaces are not typically used at driveways as overuse can cause confusion for pedestrians with visual impairments. [Section 4.7](#) of this manual contains a discussion of the circumstances which could warrant the placement of truncated dome detectable warning surfaces.

Entrances for large traffic generating facilities are typically designed similarly to an intersection with curb returns, street level pedestrian connections, and crosswalks. These facilities should follow the requirements of [Section 4.6](#) of this manual.

#### 4.4.8 Pedestrian Facilities on Bridges

Pedestrian access routes on bridges and other similar structures should match the width of the approach path. At locations where pedestrian access routes approach a structure along both sides of the road and the structure can only support a pedestrian access route on one side, consideration should be given to widening the one provided pedestrian access route. Additionally, in these circumstances, consideration must be given to safely crossing pedestrians ahead of the discontinuation of the path that is not to be carried across the bridge.

#### 4.4.9 Path Termination into the Roadway Shoulder

Sidewalks and shared use paths that run parallel with the roadway can terminate into the roadway's shoulder to continue the pedestrian circulation route. In these occurrences where the shoulder is intended to act as the pedestrian circulation route, it is important to consider the operational and safety impacts of this practice as well as the suitability of the shoulder to act as the pedestrian access route.

## 4.5 Street Level Pedestrian Connections to Street Crossings

A transition in a pedestrian access route’s elevation and, in some cases, direction may be required at locations where the pedestrian access route connects to a street level pedestrian crossing. These facilities are generally referred to as street level pedestrian connections and are critical components for providing access to mobility device users who would otherwise be excluded from the crossing because of the presence of a raised curb. Pedestrian connections to the street level can also be found at locations with on-street parking, passenger loading zones, and bus stops. DeIDOT Standard Construction Detail C-2 details the Department’s standard configurations for these components of the pedestrian access route. All street level pedestrian connections that are intended to provide access to a street crossing are required to have a truncated dome detectable warning surface as described in [Section 4.7](#) to provide a warning for visually impaired users.

### 4.5.1 Street Level Pedestrian Connection Types

Street level pedestrian connections are classified as either curb ramps or blended transitions based on the running slope of the sloped segment of the facility.

- **Curb ramps** are street level pedestrian connections with a sloped segment having a running slope that is greater than 5.0%.
- **Blended transitions** are street level pedestrian connections with a sloped segment having a running grade of 5.0% or less.

#### 4.5.1.1 Curb Ramps

Curb ramps are categorized and structured based on the orientation of the ramped segment relative to the pedestrian’s travel in the approach sidewalk or shared use path and the adjacent street level crossing.

##### 4.5.1.1.1 Perpendicular Curb Ramps

Perpendicular curb ramps have a ramp running slope that cuts through or is built up to the curb at approximately right angles to the curb line. Perpendicular curb ramps are most applicable at locations where there is a buffer strip present or where the back of the pedestrian access route provides sufficient width to accommodate the development of a ramped segment that is perpendicular to the curb line. The orientation of a perpendicular curb ramp requires the user on the approach pedestrian access route to change direction at the top of the curb ramp to enter or exit the ramped segment. Accordingly, a turning space is required at the top of the curb ramp when a turning movement is required. Flared sides are required if cross travel is permitted from an adjacent pedestrian circulation path. Table 4.5.1.1.1 summarizes the accessibility standards with which perpendicular curb ramps are required to comply. Figure 4.5.1.1.1-a portrays an isometric view of a perpendicular curb ramp and Figure 4.5.1.1.1-b contains several common configurations of perpendicular curb ramps in plan view. Below are the overall advantages and disadvantages of a perpendicular curb ramp configuration.

Perpendicular Curb Ramps	
Element	Section
Surfaces	<a href="#">3.1.5</a>
Protruding Objects	<a href="#">3.4</a>
Turning spaces	<a href="#">3.2.1.1</a>
Running Slope	<a href="#">3.2.1.2</a>
Flared Sides	<a href="#">3.2.1.3</a>
Grade Breaks	<a href="#">3.2.1.4</a>
Width	<a href="#">3.2.5.1</a>
Cross Slope	<a href="#">3.2.5.2</a>
Counter Slope	<a href="#">3.2.5.3</a>
Clear Space	<a href="#">3.2.5.4</a>
Drainage Considerations	<a href="#">3.2.5.5</a>

Table 4.5.1.1.1 Accessible Perpendicular Curb Ramps

Advantages:

- Does not require a turning space at the street level which limits water and potential sediment accumulation,
- The street level pedestrian connection can be aligned to provide directionality (see [Section 4.5.3.1.2](#)), and
- Motorists can easily determine what direction the pedestrian is intending to cross thereby increasing safety.

Disadvantages:

- Requires additional approach pedestrian circulation path width compared to parallel type ramps, and
- Large radius applications can present directionality challenges for designers.

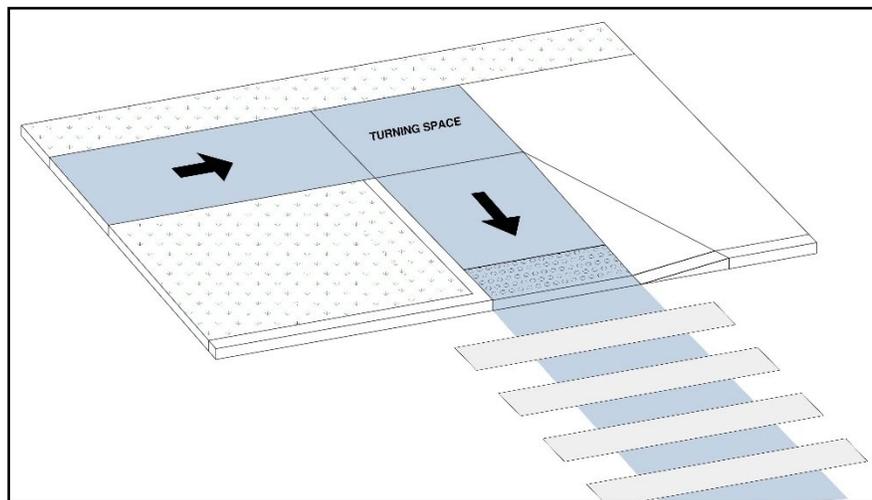
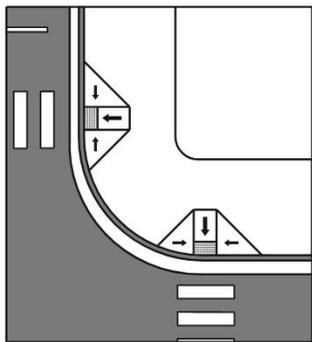
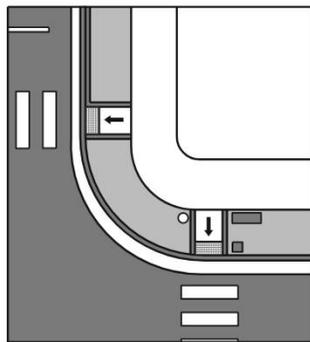


Figure 4.5.1.1.1-a Isometric Perpendicular Curb Ramp

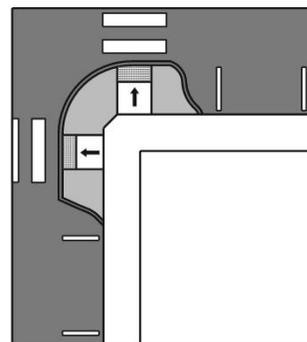
### PERPENDICULAR CURB RAMPS



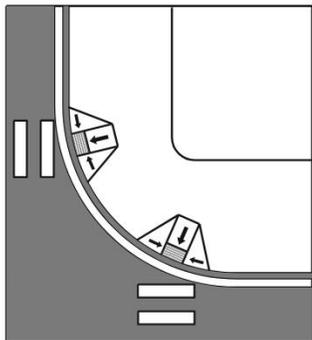
DIRECTIONAL RAMP ON SMALL RADIUS WITH NO BUFFER



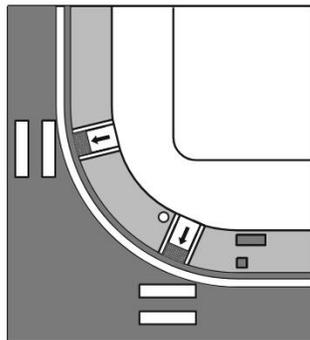
DIRECTIONAL RAMP ON SMALL RADIUS WITH BUFFER



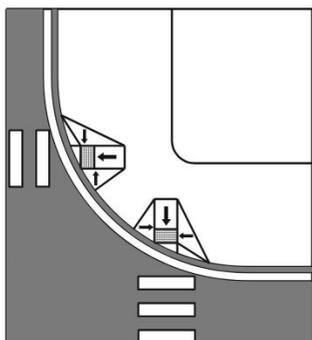
SHOULDER OR ON STREET PARKING



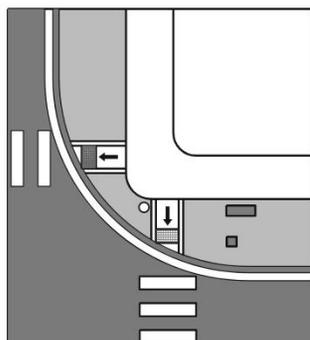
RAMP ON LARGE RADIUS WITH NO BUFFER



RAMP ON LARGE RADIUS WITH BUFFER



DIRECTIONAL RAMP ON LARGE RADIUS WITH NO BUFFER



DIRECTIONAL RAMP ON LARGE RADIUS WITH BUFFER

Figure 4.5.1.1.1-b Perpendicular Curb Ramps

#### 4.5.1.1.2 Parallel Curb Ramps

Parallel curb ramps have a ramped segment that is in-line with the direction of pedestrian access route travel which thereby lowers the pedestrian access route to a lower turning space. Parallel curb ramps are primarily used where the approach pedestrian access route's width does not support the development of a perpendicular type curb ramp. The design of a parallel curb ramp may include paired or single ramped segments and is required to provide a turning space at the bottom of the ramped segment to allow the user to either continue along the pedestrian access route without using the street level pedestrian crossing or orient themselves to enter or exit the crossing.

Parallel Curb Ramps	
Element	Section
Surfaces	<a href="#">3.1.5</a>
Protruding Objects	<a href="#">3.4</a>
Turning spaces	<a href="#">3.2.2.1</a>
Running Slope	<a href="#">3.2.2.2</a>
Grade Breaks	<a href="#">3.2.2.3</a>
Width	<a href="#">3.2.5.1</a>
Cross Slope	<a href="#">3.2.5.2</a>
Counter Slope	<a href="#">3.2.5.3</a>
Clear Space	<a href="#">3.2.5.4</a>
Drainage Consideration	<a href="#">3.2.5.5</a>

Table 4.5.1.1.2 Accessible Parallel Curb Ramps

The turning space at the bottom of the curb ramp should be sloped toward the street to reduce ponding potential. A turning space is not required at the top of the ramped segment unless a turning movement is required at the top of the ramped segment. Table 4.5.1.1.2 summarizes the accessibility standards with which parallel curb ramps are required to comply. Figure 4.5.1.1.2-a portrays an isometric view of a parallel curb ramp and Figure 4.5.1.1.2-b contains several common configurations of parallel curb ramps in plan view. Below are the overall advantages and disadvantages of a parallel curb ramp configuration.

#### Advantages:

- Requires minimal approach pedestrian circulation path width, which is ideal for constrained locations,
- Ramps can be easily lengthened when required to “chase grade”, and
- Enhances detectability for the visually impaired users as the ramped segment leads to a turning space area ahead of the street crossing.

#### Disadvantages:

- Requires pedestrians who are not using the street level crossing to traverse multiple ramped segments when using the sidewalk or shared use path, and
- Can more readily accumulate water because the turning space is located on the street level.

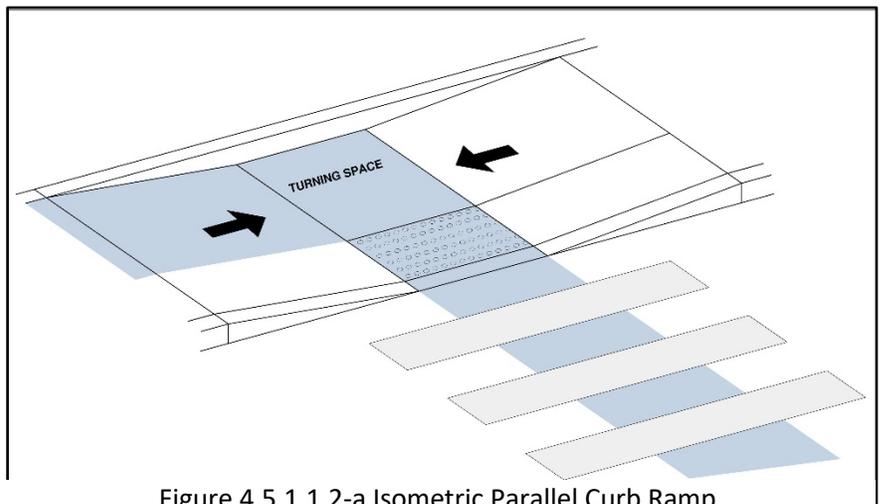


Figure 4.5.1.1.2-a Isometric Parallel Curb Ramp

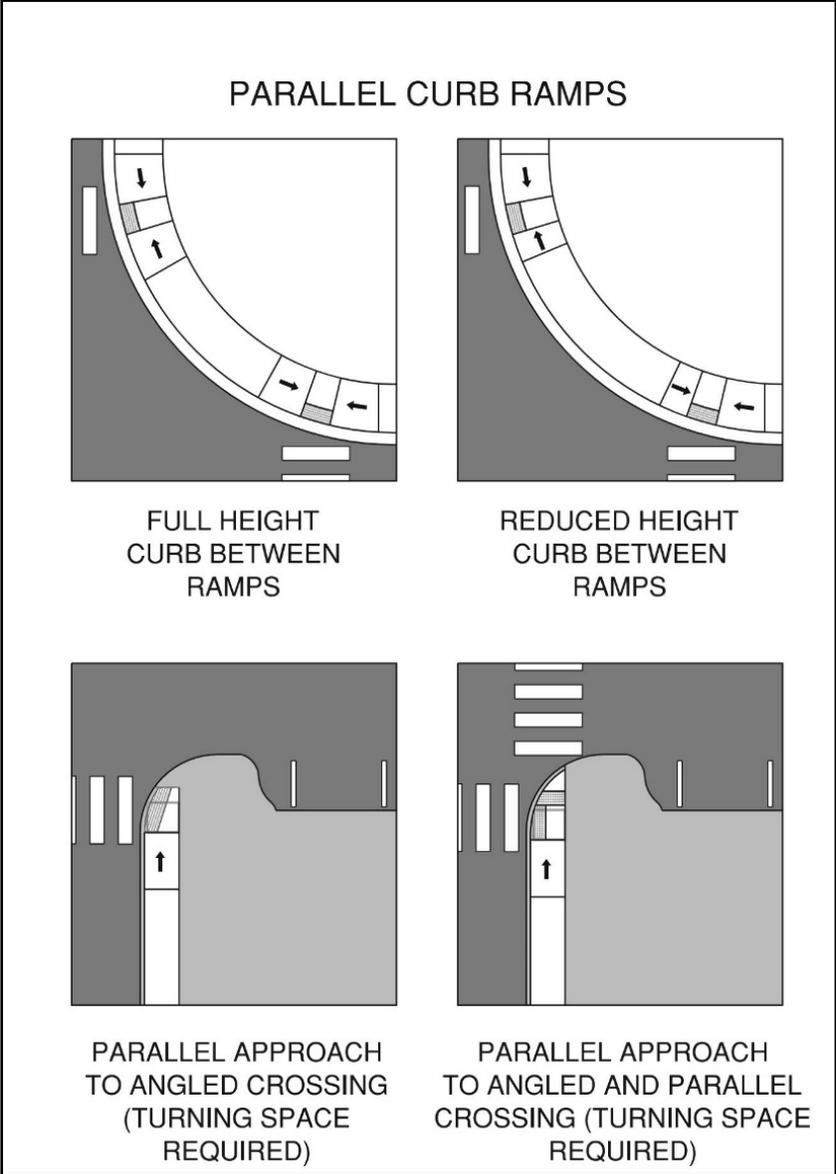


Figure 4.5.1.1.2-b Parallel Curb Ramps

#### 4.5.1.1.3 Diagonal Curb Ramps

A diagonal curb ramp is a perpendicular type curb ramp that is located at the apex of a corner radius and is designed to serve two independent street crossings. Diagonal curb ramps are termed diagonal ramps because they are oriented toward the center of the intersection rather than toward the crosswalk. Table 4.5.1.1.3 summarizes the accessibility standards with which diagonal curb ramps are required to comply. Figure 4.5.1.1.3 contains two plan view images of a diagonal curb ramp.

The use of diagonal ramps is discouraged because their alignment does not serve either crosswalk well. This configuration is difficult for mobility device users to navigate and can be extremely challenging for persons who are visually impaired. Additionally, it is difficult for motorists to assess the direction the pedestrian is preparing to cross when approaching the intersection. Accordingly, these ramp types should not be used on new construction. Diagonal curb ramps are permitted on alteration type projects to serve both pedestrian street crossings; however, their use should be limited to locations where conditions prohibit the use of other street level pedestrian connection types that can better separate the pedestrian movements to the individual street crossing that they are servicing. Where the constraints of the location make it unreasonable to separate the pedestrian movements on alteration type projects that are required to upgrade the street level pedestrian connections, consideration should be given to creating a depressed corner configuration as discussed in [Section 4.5.1.2.1](#).

#### 4.5.1.1.4 Combination Curb Ramps

Combination curb ramps utilize characteristics of both perpendicular and parallel curb ramps which are discussed in [Section 4.5.1.1.1](#) and [Section 4.5.1.1.2](#),

Diagonal Curb Ramps	
Element	Section
Surfaces	<a href="#">3.1.5</a>
Protruding Objects	<a href="#">3.4</a>
Turning spaces	<a href="#">3.2.3.1</a>
Running Slope	<a href="#">3.2.3.2</a>
Flared Sides	<a href="#">3.2.3.3</a>
Grade Breaks	<a href="#">3.2.3.4</a>
Width	<a href="#">3.2.5.1</a>
Cross Slope	<a href="#">3.2.5.2</a>
Counter Slope	<a href="#">3.2.5.3</a>
Clear Space	<a href="#">3.2.5.4</a>
Drainage Consideration	<a href="#">3.2.5.5</a>

Table 4.5.1.1.3 Accessible Diagonal Curb Ramps

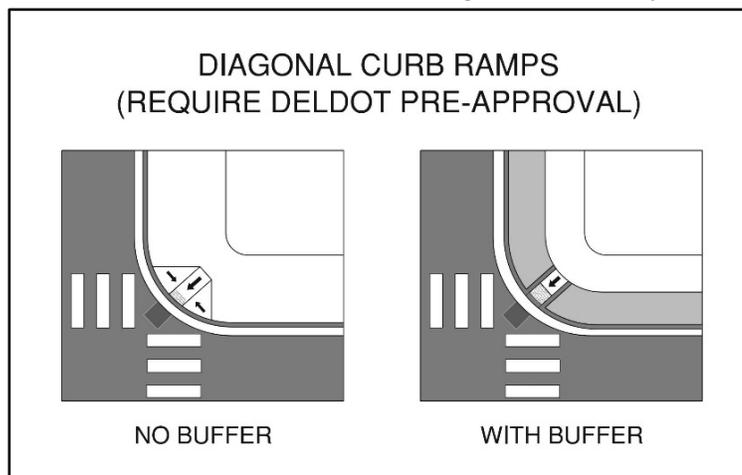


Figure 4.5.1.1.3 Diagonal Curb Ramps

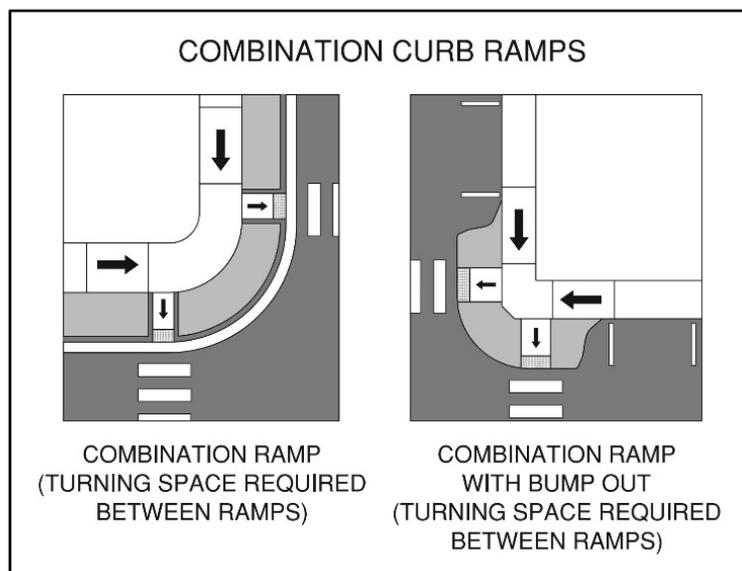


Figure 4.5.1.1.4 Combination Curb Ramps

respectively. This configuration typically utilizes an approach parallel type curb ramp to lower the path elevation to a turning space and then uses a perpendicular ramp to bridge the remaining elevation gap between the turning space and the street as shown in Figure 4.5.1.1.4. This curb ramp type is particularly useful where the sidewalk is narrow and has either a steep approach grade or a high curb.

#### 4.5.1.2 Blended Transitions

A blended transition is the generic definition for a sloped segment between two surfaces that has a running grade of less than 5.0%. A blended transition’s maximum allowable running slope of 5.0% matches the accessibility requirements for a pedestrian access route and therefore is not required to have the same turning space element that curb ramps are required to have unless a turning movement is required to enter or exit the facility. Additionally, consideration must be given to the user not accessing the street

Blended Transitions	
Element	Section
Surfaces	<a href="#">3.1.5</a>
Protruding Objects	<a href="#">3.4</a>
Running Slope	<a href="#">3.2.4.1</a>
Width	<a href="#">3.2.5.1</a>
Cross Slope	<a href="#">3.2.5.2</a>
Counter Slope	<a href="#">3.2.5.3</a>
Clear Space	<a href="#">3.2.5.4</a>
Drainage Consideration	<a href="#">3.2.5.5</a>

Table 4.5.1.2 Accessible Blended Transitions

level pedestrian connection so that all pertinent accessible route requirements are met. Blended transitions can be laid out similar to the curb ramp types that are specified in [Section 4.5.1.1](#). The two prime advantages of blended transitions are that the gradual running slope is easier for a user to traverse and that a turning space is not required to support the sloped segment. Table 4.5.1.2 summarizes the accessibility standards with which blended transitions are required to comply.

##### 4.5.1.2.1 Depressed Corners

A subset of blended transitions are depressed corners. Depressed corners gradually lower the level of the approach pedestrian access route to that of the street crossing. The layout of a depressed corner provides poor directionality and can allow adjacent turning vehicles to track into the depressed corner. When depressed corners are to be used, consideration should be given to using planters or bollards to prevent cars from traveling into the facility. Detectable elements such as curbs or other features can also be used to help provide directional cues to align the pedestrian with the street crossing. An isometric view of a depressed corner is shown in Figure 4.5.1.2.1. Below are the overall advantages and disadvantages of a depressed corner configuration.

##### Advantages:

- Better than parallel curb ramps at alleviating drainage concerns because a level turning space is not required at the bottom of the sloped segment,
- No turning space is required unless turning movements are required,
- Can be used at locations where there is not enough available space to construct two separate parallel or perpendicular curb ramps, and
- The geometry and accessibility requirements are ideal retrofit options for existing diagonal curb ramp locations where the pedestrian circulation path width is constrained by existing features.

##### Disadvantages:

- Application provides poor directionality,
- The boundary between the sidewalk and the street is much more difficult to detect for persons with vision impairments,
- Depressed corners are more difficult to drain than perpendicular curb ramps,

- Depressed corners may encourage motorists to encroach on to the sidewalk or turn at higher speeds since there is no vertical separation between the sidewalk and street at the corner, and
- It is difficult for motorists to determine the direction the pedestrian intends to cross the street which could create safety issues.
- Any required turning space slope will be controlled by the roadway that the street level pedestrian connection serves which may lead to challenges for users who are not using the crosswalk.

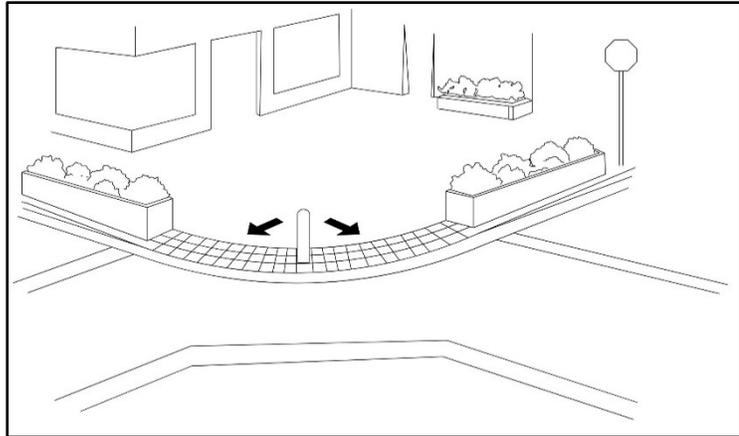


Figure 4.5.1.2.1 Depressed Corners

#### 4.5.2 Street Level Pedestrian Connection Selection

Determining the appropriate street level pedestrian connection type for a location is dependent on the exact condition and constraints of a site. The guidance provided in this section is general and all locations of pedestrian connections to street level crossings must be evaluated on a site-by-site basis. In most cases, the element that will drive the selection of the appropriate street level pedestrian connection is the location of the required turning space. The following list is intended to summarize several of the Department’s preferences for street level pedestrian connection selection:

- Separate street level pedestrian connections should be provided for each street level crossing.
- Perpendicular type street level pedestrian connections are the generally preferred street level pedestrian connection type.
- Parallel type street level pedestrian connections are the preferred treatment at the following locations:
  - Constrained locations that preclude the ability to construct ramped segments that are perpendicular to the curb line.
  - Locations with steep approach sidewalks or shared use paths which will require a 15’-0” ramp segment to avoid the grade chasing scenario presented in [Section 4.5.3.2.1](#). Combination type curb ramps should also be considered in these chasing grade scenarios.
- Depressed corners are acceptable but should be considered after perpendicular and parallel curb ramps have been evaluated and determined not to be practical. All applicable safety criteria must be evaluated before installation to ensure their intended function.
- Diagonal curb ramps and parallel curb ramps that serve multiple pedestrian street crossings shall not be used unless existing constraints prevent the use of other street level pedestrian connection types and should only be considered on alteration-type projects as defined in Chapter 2.

#### 4.5.3 Street Level Pedestrian Connection Design Elements

The design of accessibility components is governed by many of the same considerations as a typical roadway design. These considerations include horizontal and vertical alignments, surface transitions, and connection and access to adjacent networks. The main difference is that the scale of accessibility components is based on a pedestrian’s mobility characteristics rather than a vehicle’s. This section of the manual is intended to assist the user in understanding the various design elements associated with

accessible street level pedestrian connections to support informed decision making throughout the planning, design, and construction process.

#### *4.5.3.1 Curb Ramp and Blended Transition Common Elements*

The following section discusses design elements that apply to both curb ramps and to blended transitions.

##### *4.5.3.1.1 Street Level Pedestrian Connection Layout*

Street level pedestrian connections should be laid out to provide a clear contrast between the separate street crossing movements. This contrast in layout will provide clarity and predictability to both the motorist and to the pedestrian user, including those with disabilities, which will increase the safety of the crossing. This clear contrast can be accomplished by providing separate street level pedestrian connections to each street level crossing direction being served. Paired parallel curb ramps should be separated by a minimum of 4'-0" in the direction of pedestrian travel to create this physical separation. Paired perpendicular curb ramps can be separated by curb or other detectable features to create physical separation.

Additionally, street level pedestrian connections should be laid out to reduce pedestrian crossing lengths and pedestrian exposure to traffic. This criterion should be balanced with the other accessibility standards and design practices presented in this chapter.

##### *4.5.3.1.2 Street Level Pedestrian Connection Directionality*

Street level pedestrian connections should be oriented so that the direction of the sloped segment creates a pedestrian pathway that is generally in-line with the direction of the pedestrian travel through the street crossing. This "directionality" reduces the amount of maneuvering that wheeled mobility users must perform to cross the street and assists users with vision impairments with orientation. This task is much more challenging at locations with larger radii. Street level pedestrian connections that are aligned identically to the street level crossing are termed "directional ramps" and their use is preferred when feasible.

A common misconception is that street level pedestrian connections that are not perfectly aligned with the street crossing are unacceptable from an accessibility standpoint. Rather than alignment or directionality, the accessibility standard requires that a 4'-0" by 4'-0" clear space be provided at the base of street level pedestrian connection. This clear space is to be located within the pedestrian street crossing and preferably wholly outside the parallel vehicle travel lane for safety purposes; however, the clear space is required to be located wholly outside the parallel vehicle travel lane for diagonal type curb ramps. The accessibility standards require that the clear space for diagonal curb ramp configurations be within the pedestrian street crossings and wholly outside the parallel vehicle travel lane. Figure 4.5.3.1.2 demonstrates several potential alignments for perpendicular type street level pedestrian connections.

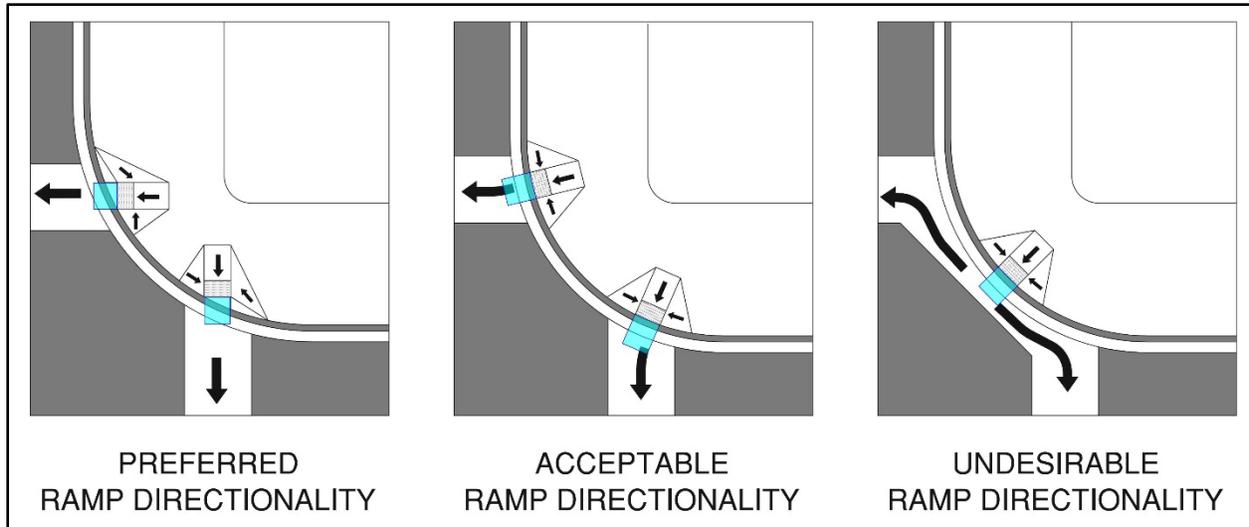


Figure 4.5.3.1.2 Street Level Pedestrian Connection Directionality

When directional ramps are provided on an intersection's curb return radius, the grade break requirements contained in [Section 4.5.3.2.3](#) will require a triangular transition area at the bottom of the ramp which should slope toward the flowline.

#### 4.5.3.1.3 Street Level Pedestrian Connection Width

The width of the street level pedestrian connection should match the width of the sidewalk or shared use path being served. If this is determined to be impractical, the street level pedestrian connection width can be reduced to 4'-0" before a request for a practical exception is required.

#### 4.5.3.1.4 Drainage Considerations

Street level pedestrian connections are typically used to lower the elevation of the pedestrian access route to that of the street level pedestrian street crossing and requires the gutter pan slope or the road slope at the base of the street level pedestrian be flattened. The combination of these two features creates an opportunity to trap water. The pedestrian access route is to be designed to prevent the accumulation of water. Drainage collection features should be located on the upstream side of all street level pedestrian connections. Depending upon the scope of the work, consideration can be given to adding additional drainage collection features, modifying the configuration of the street level pedestrian connection, or adjusting the location of the crossing. The running slope and cross slope of the pertinent elements of the street level pedestrian connection should be maintained at a 1.0% minimum to support positive drainage and designed in a manner that prevents water from entering the street level pedestrian connection. It is also important to establish a consistent flowline along the curb at street level pedestrian connections to prevent sediment buildup. In some cases, this may require additional paving to blend back to the existing pavement.

#### 4.5.3.1.5 Depressed Curb

The effect of vertical differences to the mobility device user is even more pronounced at street level pedestrian connections as device maneuvering is typically required over grade and cross slope changes. This combination of maneuvering and terrain has the potential to compromise the dynamic stability of the mobility device. Accordingly, the curb at the base of pedestrian street level crossing must be flush with no lips in accordance with DeDOT Standard Construction Detail C-1. The slope of the top of the curb should match the running slope of the adjacent street level pedestrian connection.

#### 4.5.3.1.6 Street Level Pedestrian Connection Cross Slope

The connection between street level pedestrian connections and the pedestrian street crossing is to be flush. Meeting this standard causes the street level pedestrian connection's cross slope to be controlled by the profile of the roadway that the street level pedestrian connection serves. The scope of the work and the traffic control present at the intersection will determine the required cross slope of the pedestrian street crossing. The following is a brief discussion of the cross slope requirements for the various project types identified in [Chapter 2](#) of this manual:

- **New Construction-Type Projects** – These project types are required to provide pedestrian street crossing cross slopes in accordance with the criteria contained in [Section 4.6.4.1](#). The criteria contained in [Section 4.6.4.1](#) is a function of the traffic control present at the intersection.
- **Alteration-Type Projects** – These project types may or may not require corrections to an existing roadway's longitudinal profile to meet the criteria contained in [Section 4.6.4.1](#). Longitudinal profiles are required to be corrected when inside the feasible scope of a project but not required when considered outside of the feasible scope. Regardless of project scope, pedestrian street crossing cross slopes exceeding 5.0% should be avoided where practicable.
- **Maintenance-Type Projects** – These project types are not required to upgrade street level pedestrian connections.

The cross slope criteria for pedestrian street crossings combined with the 1.5% design cross slope requirement for sidewalks and shared use paths creates a need to transition cross slopes at street level pedestrian connections. This need is most pronounced for perpendicular type street level pedestrian connections where the ramped segment has a running slope that cuts through or is built up to the curb. To provide a facility that is compliant to the maximum extent feasible, it is desirable to place the cross slope transition entirely on the ramped segment so that a compliant turning space can be provided at the top of the ramped segment when a turning space is required. Rapid cross slope transitions could create instability for some users; therefore, it is desirable to make the cross slope transition as gradual as possible. Cross slope transition rates should not exceed a transition rate of 3.0% per foot. For constructability purposes, the cross slope transition should begin at the back of the truncated dome detectable warning surface.

Figure 4.5.3.1.6 details several possible configurations of cross slopes on perpendicular type curb ramps on alteration type projects in a plan view.



#### 4.5.3.1.7 Counter Slope

Counter slope is the angle point or grade change where the down slope of the street level pedestrian connection meets the up slope of the adjacent gutter or street. Large differences between the slope of the street level pedestrian connection and the adjacent gutter or street may cause some mobility devices to catch on back rollers and lose drive wheel traction and may catch the footrests of other users. The accessibility standards require that the counter slope of the gutter or street at the bottom of the street level pedestrian connection be 5.0%. Accordingly, the Department has adopted a design and layout standard for this criterion as 4.5% to account for potential irregularities or variances due to construction methods or materials. This counter slope criterion is accounted for in DelDOT Standard Construction Detail C-1.

The underlying accessibility principle for the counter slope requirement is the algebraic difference between the two surfaces. Accordingly, many entities have adopted a counter slope accessibility criterion of a maximum algebraic difference of 13.3% (8.3% maximum ramp running slope and 5.0% counter slope). This flexibility can be utilized at locations where it is determined that violation of the 5.0% counter slope is deemed necessary. A Request for a Practical Exception will need to be generated at these locations and the algebraic difference between the two surfaces should not exceed 13.3% as shown in Figure 4.5.3.1.7-a. The algebraic difference can be calculated using the following formula:

$$G = |g_2 - g_1|$$

Where:

G = the algebraic difference between grades

$g_2$  = grade of the gutter pan or side slope of the street

$g_1$  = grade of the adjoining ramp run, blended transition, or turning space

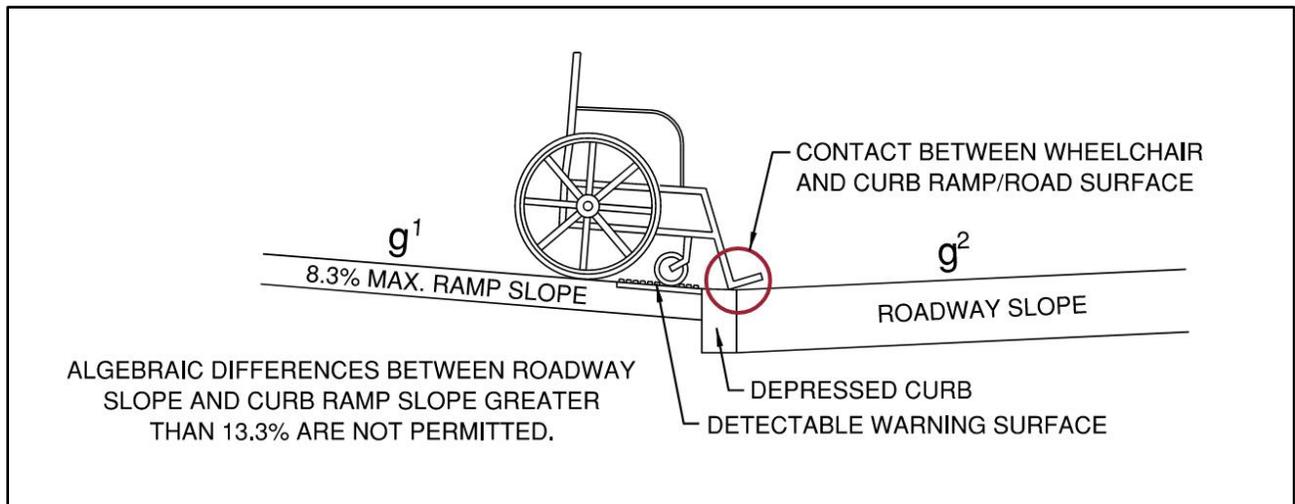


Figure 4.5.3.1.7-a 13.3% Counter Slope

A mitigating technique that can be used if the algebraic difference will exceed 13.3% is to install a 2'-0" level strip that is the same width as the street level pedestrian connection that it serves. The level strip's running slope should be 2.0% toward the street crossing and shall not exceed 5.0%. The required

truncated dome detectable warning surface area can be included within this level strip area, as illustrated in Figure 4.5.3.1.7-b.

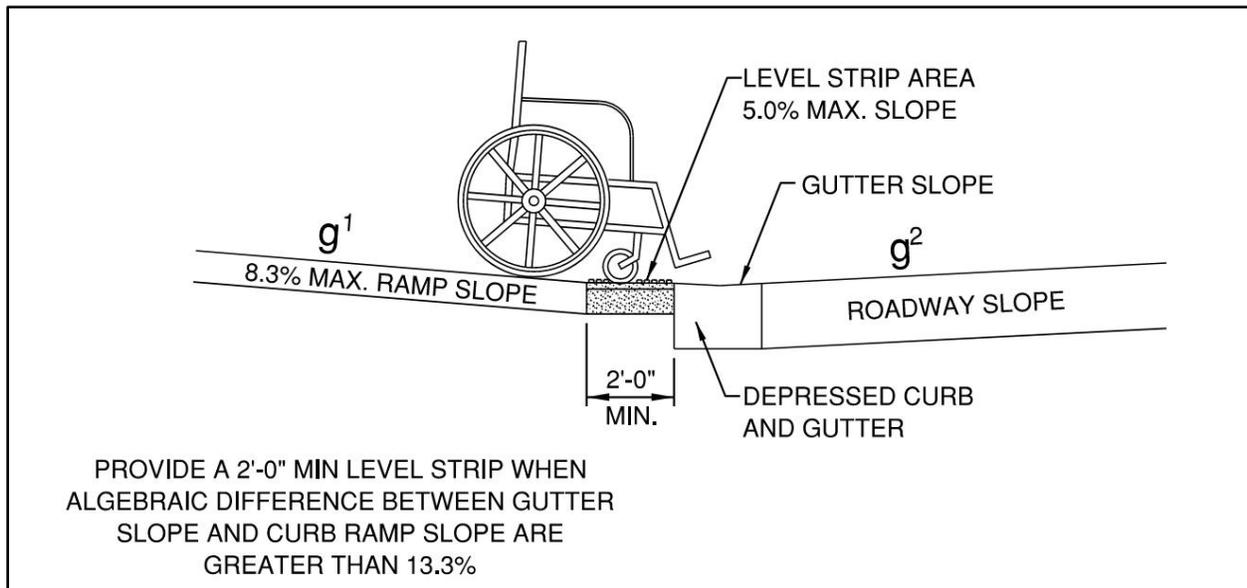


Figure 4.5.3.1.7-b Counter Slope Alternative

#### 4.5.3.1.8 Flared Sides

Flared sides or returned curbs are required at locations where the street level pedestrian connection’s change in elevation is built up at an angle to the pedestrian circulation path. Flared sides are required where side travel may be permitted. The flared side is intended to provide a gradual transition between the two surfaces to mitigate the tripping hazard presented by the vertical difference created by the ramped segment, as shown in Figure 4.5.3.1.8. Returned curbs are permitted when the grade change does not abut a walkable surface such as at a buffer strip or when street furniture is present. Returned curbs offer the advantage of being more clearly detectable for users with vision impairments; however, returned curbs create a vertical obstruction that has the potential to catch snowplow blades and are therefore not the Department preferred treatment. Flared sides are not considered part of the pedestrian access route and therefore cannot be included in the continuous clear width of a facility. For accessibility compliance, flared side slopes are required to be installed at a slope of 10.0% maximum when measured parallel with the back of curb. Accordingly, the Department has adopted a 9.5% design and layout criterion to account for potential irregularities or variances due to construction methods or materials.

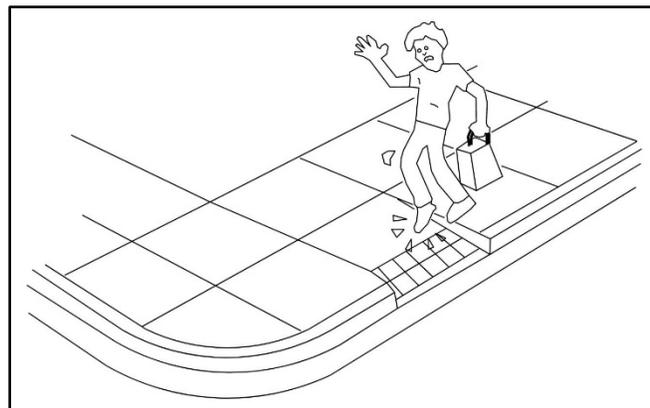


Figure 4.5.3.1.8 Curb Return in Pedestrian Path

#### 4.5.3.1.9 Medians and Channelized Islands

Pedestrian crossings that travel through medians and channelizing islands can be designed as either a cut-through facility as shown in Figure 4.5.3.1.9-a or can be ramped as shown in Figure 4.5.3.1.9-b. The running slope of the pedestrian path should follow the guidance contained in [Section 4.6.4.2](#) except at

locations where curb ramps are introduced at the street level connection to the islands which should follow the applicable guidance in [Section 4.5](#). The cross slope provided for the pedestrian path should meet the guidance contained in [Section 4.6.4.1](#). Where the pedestrian refuge island is less than 6'-0" in length and the pedestrian street crossing is signalized, the signal should be timed for a complete crossing of the street.

Two of the key design considerations when determining whether to construct the pedestrian access route through a median or channelizing island as either a cut-through facility or a ramped facility are the drainage and the vertical alignment of the path:

- **Drainage** – Drainage conditions should be evaluated to ensure that positive drainage can be provided. Ramped facilities have more opportunity to provide positive drainage than cut-through facilities. When the facility is constructed as a cut-through, the path must be graded in a manner to prevent water from flowing through the pedestrian access route.
- **Vertical Alignment** – As with other elements of the pedestrian access route, the vertical alignment should be made smooth. When a ramped facility is created, a 4'-0" separation in the direction of pedestrian travel is required to be placed between the tops of the ramped segments. Caution should be exercised in using these facilities as they have the effect of "building small hills" or "creating a roller coaster effect" which forces all users to exert unnecessary effort to proceed along the path of travel. Gradually sloping blended transitions could be used at these locations instead to mitigate this effect.

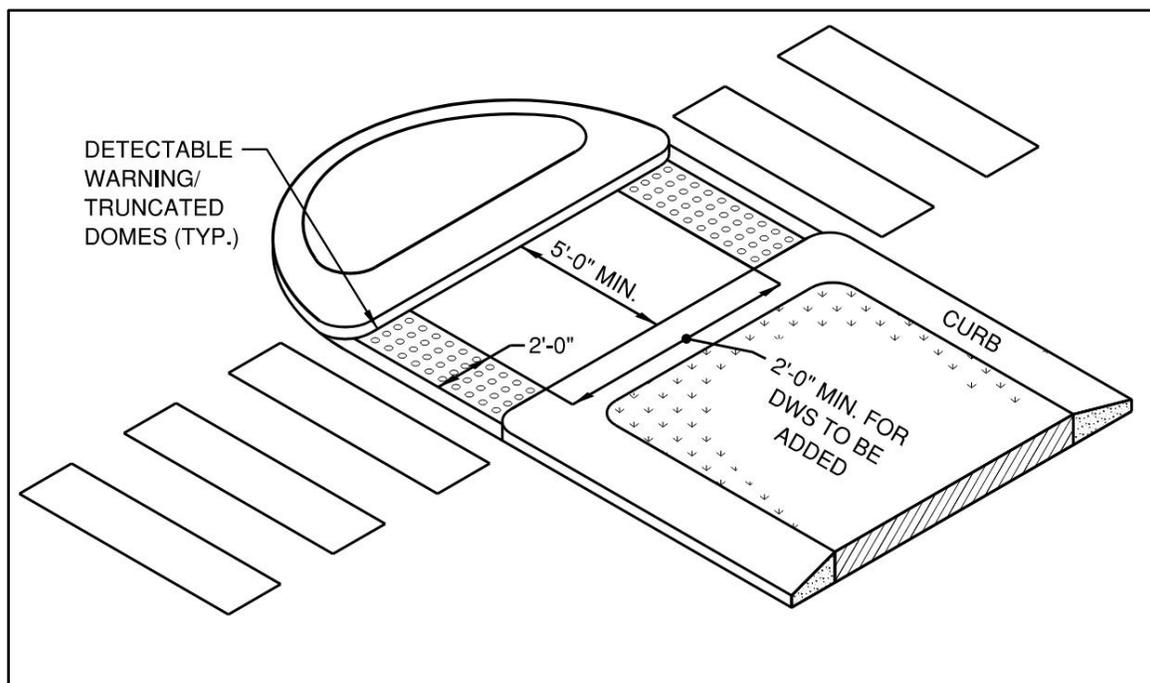


Figure 4.5.3.1.9-a Cut-Through Median

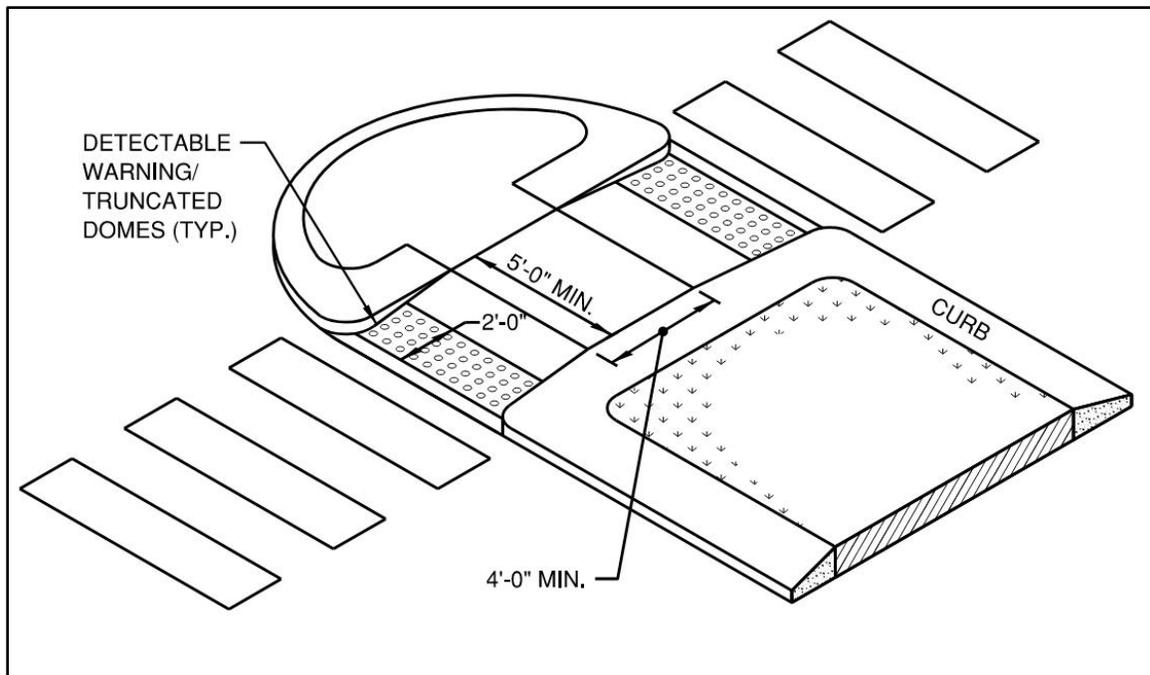


Figure 4.5.3.1.9-b Ramped Median

#### 4.5.3.2 Curb Ramps

Curb ramps have several specific design requirements that do not apply to blended transitions. This section of the manual outlines the design considerations that pertain to curb ramps and not to blended transitions.

##### 4.5.3.2.1 Running Grade of Ramp Segment

The ramped segment of the curb ramp is the primary tool used to transition the height of an approach sidewalk or shared use path to that of the pedestrian street crossing. The length of the ramped segment required is directly impacted by the height of the curb present, the elevation of the turning space, and the running grade of the approach sidewalk or shared use path. The running grade of the ramped segment is required to not exceed a running grade of 8.3%; however, the ramped segment is permitted to be limited to a length of 15'-0" at a grade steeper than 8.3% in a grade chasing scenario. The 8.3% ramp running slope is the maximum grade permitted to meet accessibility standards; therefore, the Department has adopted a maximum running grade for design and field layout purposes of 7.5% to account for potential irregularities or variances due to construction methods or materials.

##### 4.5.3.2.2 Curb Ramp Turning Space

Turning spaces are intended to allow users to change their primary direction of travel on to and off of a ramped segment. The turning space should be provided in-line with the connecting ramp segment. Turning spaces also provide users a level location to wait before entering the pedestrian street crossing. A turning space can have up to a maximum running slope of 2.0%. Accordingly, the Department has adopted a maximum running slope for design and layout purposes of 1.5% to account for potential irregularities or variances due to construction methods or materials.

Turning spaces should be designed as a 5'-0" by 5'-0" area that is in-line with the ramped segment of the curb ramp; however, the accessibility requirements permit turning spaces to be a 4'-0" by 4'-0" area in unconstrained locations. The accessibility standards require the turning space for constrained locations

to be a 4'-0" by 5'-0" area with the 5'-0" dimension location varying based on the curb ramp type, as shown in Figure 4.5.3.2.2. Constrained locations are locations where adjacent obstructions may limit the maneuvering of a mobility device and may include curbs, street furniture, landscaping, buildings, aboveground utility features, and any other feature that projects over 0'-2" above the pedestrian access route surface. The location of the required turning space and the definition of a constrained location varies based on the ramp type:

- Perpendicular Curb Ramps** – The turning space is required at the top of the ramp. If a turning space cannot be provided in accordance with the accessibility requirements, consideration should be given to providing a parallel type curb ramp. Where the turning space is constrained at the back of the adjoining pedestrian access route, a 4'-0" by 5'-0" turning space is required with the 5'-0" dimension being provided in the direction of the ramp run.
- Parallel Curb Ramps** – The turning space is required at the bottom of the ramp. If the turning space is constrained on two or more sides, a 4'-0" by 5'-0" turning space is required with the 5'-0" dimension being provided in the direction of the pedestrian street crossing.

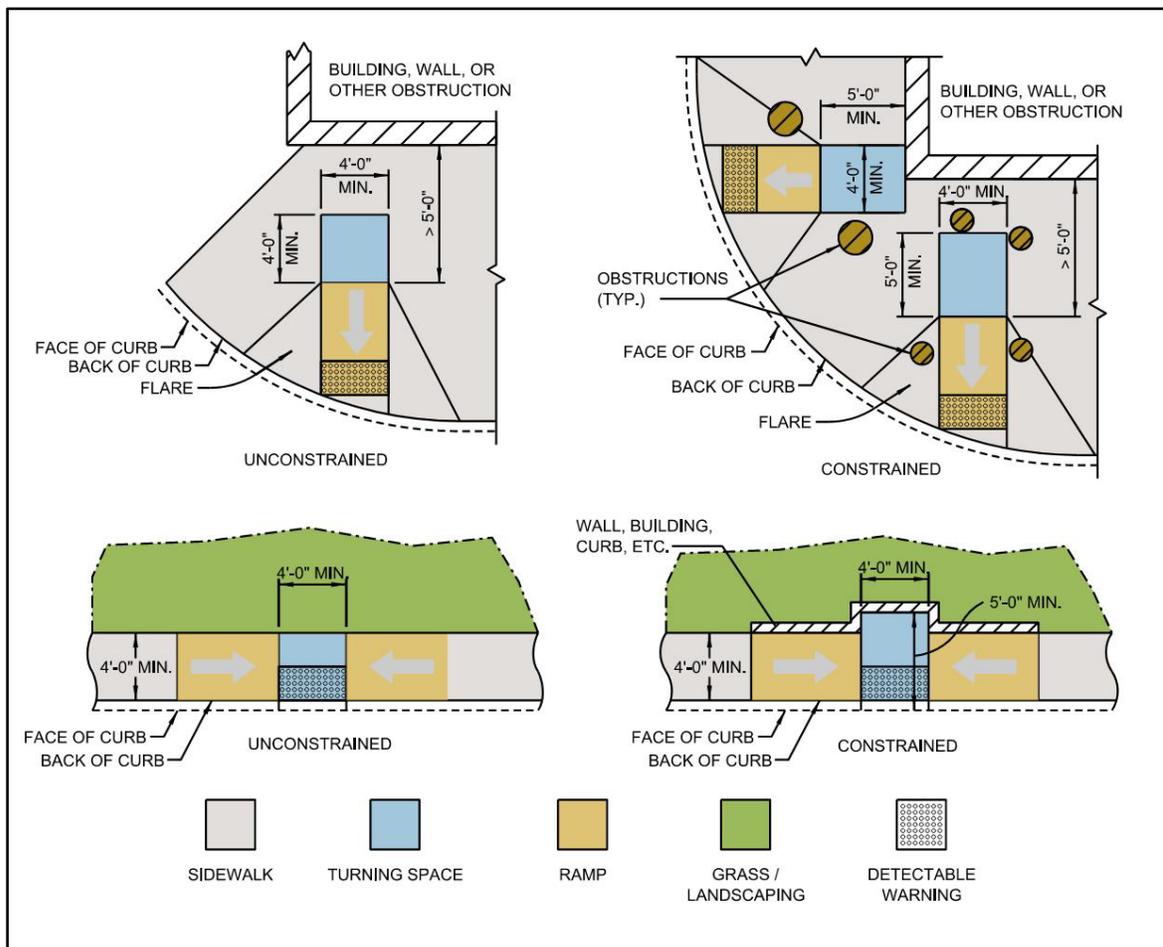


Figure 4.5.3.2.2 Turning Space Locations

#### 4.5.3.2.3 Curb Ramp Grade Breaks

Grade breaks at the top and bottom of ramped segments where the running slope exceeds 5.0% are required to be flush and perpendicular to the direction of travel along the ramped segment. This practice allows mobility device users to smoothly transition from the approach pedestrian access route to the ramp and then to the street. Abrupt or improperly placed grade breaks create a tipping hazard for mobility device users and create a tripping hazard for visually impaired users.

When placed on corners with larger turning radii, this requirement can conflict with the directional street level pedestrian connections concept presented in [Section 4.5.3.1.2](#). In this situation, priority must be given to ensuring that the grade breaks are perpendicular to the direction of travel. Figure 4.5.3.2.3-c demonstrates the following two options to ensure compliance with this criterion:

- **Option 1** – Place the grade break at the face of the curb. In this option, the user must ensure that the required 4'-0" by 4'-0" clear space at the bottom of the ramp is provided wholly within the pedestrian street crossing. This alternative provides poorer directionality but does reduce potential drainage issues associated with providing a flattened triangular area at the bottom of the ramp.
- **Option 2** – Create a directional ramp which has a small triangular shaped area at the bottom of the ramped segment sloped toward the flowline to promote positive drainage and prevent water from entering the facility. The triangular area should slope 2.0% toward the flowline and shall not exceed a 5.0% slope. This option creates excellent directionality but may present drainage challenges by creating a flat area at the base of the curb ramp.

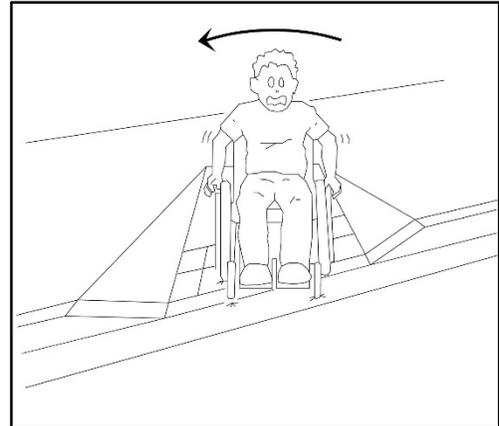


Figure 4.5.3.2.3-a Grade Break Not Perpendicular to Travel

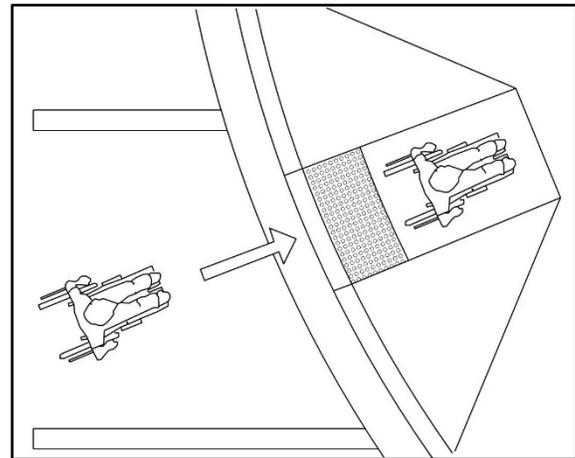


Figure 4.5.3.2.3-b Grade Break Perpendicular to Travel

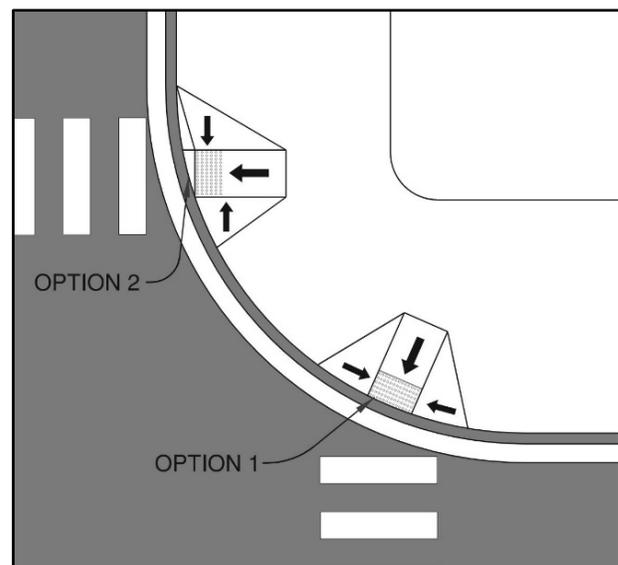


Figure 4.5.3.2.3-c Grade Break Alternatives

#### 4.5.3.3 Blended Transitions

Blended transitions are not required to have a turning space for users to maneuver ahead of the running slope of the facility; however, a turning space should be provided at locations where the user is required to change direction to access the facility.

Blended transitions are not required to meet the grade break requirements of [Section 4.5.3.2.3](#); however, achieving a perpendicular grade break to the running slope of the sloped segment is still a recommended practice to prevent creating tipping and tripping hazards.

#### 4.5.4 Placement of Detectable Warning Surfaces

Truncated dome detectable warning surfaces are required to be provided at street level pedestrian connections. The placement of the truncated dome detectable warning surface is dependent upon the street level pedestrian connection type that is utilized at a location as well as the location of the street level pedestrian connection in relation to the intersection's curb return radius. Additional information regarding truncated dome detectable warning surfaces is provided in [Section 4.7](#).

The following criteria applies to all truncated dome detectable warning surfaces applied to street level pedestrian connections:

- The truncated dome detectable warning surface is required to extend the full width of the street level pedestrian connection and where the curb is fully depressed.
- The truncated dome detectable warning surface is required to extend 2'-0" in length, measured in the direction of pedestrian travel.
- The truncated dome detectable warning surface is not permitted to be placed in the footprint of the depressed curb and must be installed at the effective back of curb. This practice prevents cracking which may be caused by rolling or compaction equipment used during construction or from vehicles tracking onto the truncated dome detectable warning surface and causing potential damage after construction.

##### 4.5.4.1 Perpendicular Street Level Pedestrian Connections

The location of the truncated dome detectable warning surface on perpendicular type street level pedestrian connections to street crossings is directly related to its location relative to the intersection's curb return radius. Table 4.5.4.1 summarizes the accessibility standards with which blended transitions are required to comply.

Perpendicular Curb Ramp Detectable Warning Surface Placement	
Element	Section
Perpendicular Curb Ramps	<a href="#">3.3.2.1</a>

Table 4.5.4.1 Detectable Warning Surface Placement for Perpendicular Curb Ramps

Truncated dome detectable warning surfaces are intended to provide a tactile equivalent underfoot of the visible curb line. If the truncated dome detectable warning surface is placed too far from the curb line because of a large curb radius, the location could compromise the effective crossing. The following criteria is to be applied when determining the placement of the truncated dome detectable warning surface:

- Where the ends of the bottom grade break are in front of the back of curb, truncated dome detectable warning surfaces are to be placed at the back of curb.
- Where the ends of the bottom grade break are behind the back of curb and the distance from either end of the bottom grade brake to the back of curb is 5'-0" or less, truncated dome detectable warning surfaces are to be placed on the ramp run within one dome spacing of the bottom grade break.

- Where the ends of the bottom grade break are behind the back of curb and the distance from either end of the bottom grade brake to the back of curb is more than 5'-0", truncated dome detectable warning surfaces are to be placed at the back of curb.

The rows of truncated domes in the detectable warning surface should be aligned perpendicular to the grade break between the ramp run and the street so pedestrians who use wheelchairs can "track" between the domes.

Figure 4.5.4.1 is provided to graphically represent the truncated dome detectable warning surface placement criteria.

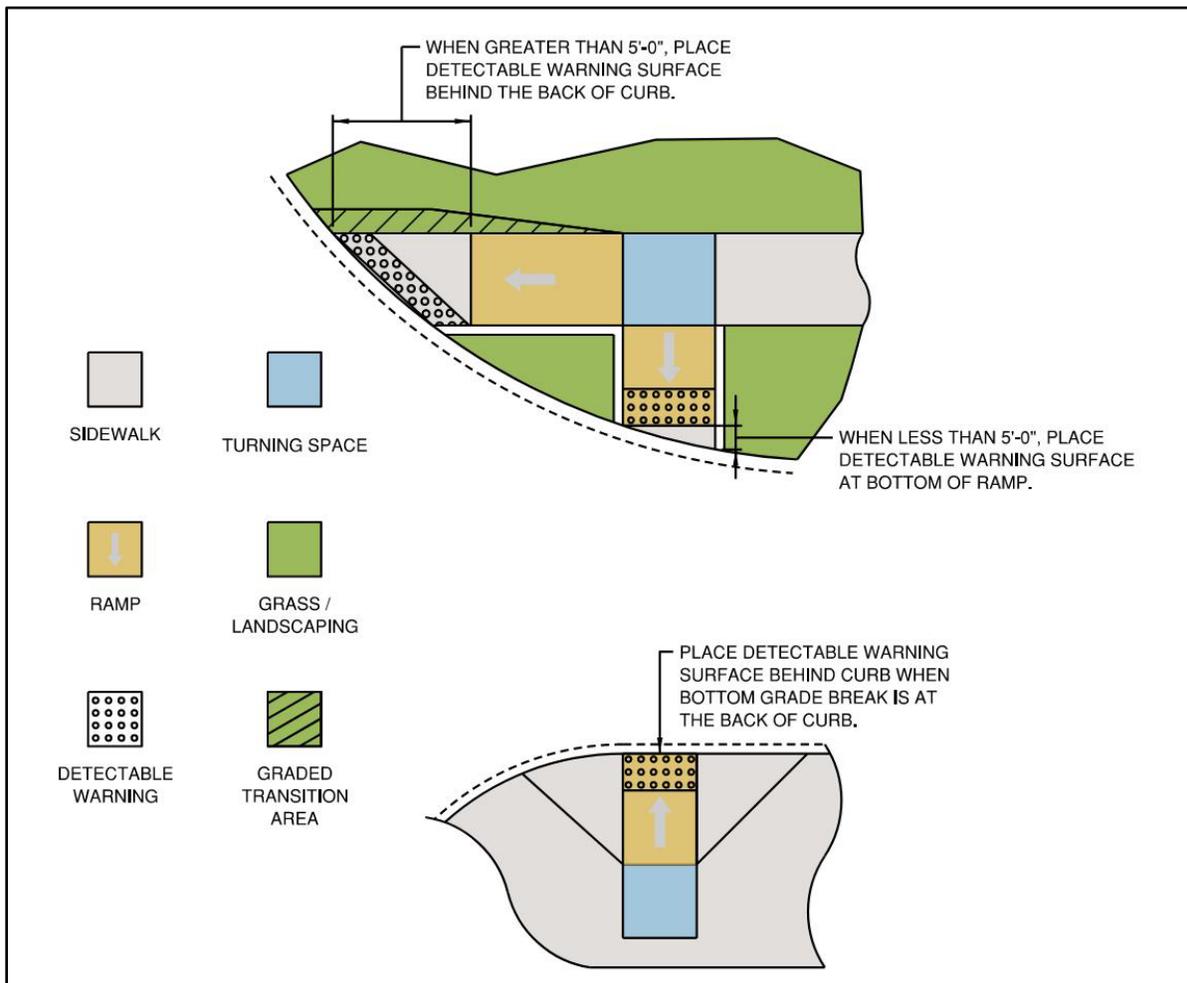


Figure 4.5.4.1 Detectable Warning Placement on Perpendicular Street Level Pedestrian Connections

4.5.4.2 Parallel Street Level Pedestrian Connections

Truncated dome detectable warning surfaces are to be installed behind the curb line on parallel type street level pedestrian connections as shown in Figure 4.5.4.2. Table 4.5.4.2 summarizes the accessibility standards with which parallel curb ramps are required to comply.

Parallel Curb Ramp Detectable Warning Surface Placement	
Element	Section
Parallel Curb Ramps	<a href="#">3.3.2.2</a>

Table 4.5.4.2 Detectable Warning Surface Placement for Parallel Curb Ramps

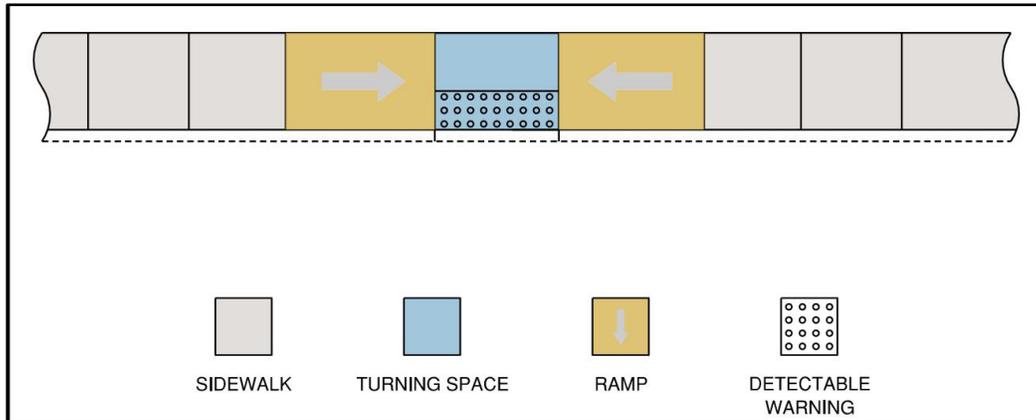


Figure 4.5.4.2 Detectable Warning Placement on Parallel Street Level Pedestrian Connections

4.5.4.3 Diagonal Street Level Pedestrian Connections

Diagonal type street level pedestrian connections that are installed at the apex of the radius of the intersection’s curb return should follow the criteria for perpendicular street level pedestrian connections presented in [Section 4.5.4.1](#).

Diagonal Curb Ramp Detectable Warning Surface Placement	
Element	Section
Perpendicular Curb Ramps	<a href="#">3.3.2.1</a>

Table 4.5.4.3 Detectable Warning Surface Placement for Diagonal Curb Ramps

4.5.4.4 Depressed Corners

Depressed corners are required to have the truncated dome detectable warning surface applied at the back of the curb along the entire length of the depressed curb. Table 4.5.4.4 summarizes the accessibility standards with which blended transitions are required to comply.

Depressed Corners Detectable Warning Surface Placement	
Element	Section
Blended Transitions	<a href="#">3.3.2.3</a>

Table 4.5.4.4 Detectable Warning Surface Placement for Depressed Corners

4.5.4.5 Medians and Channelized Islands

Medians and channelized islands which contain street level crossings are required to have truncated dome detectable warning surface placed behind the back of the curb at the edge of the street level crossing. The truncated dome detectable warning surface is to be located 0’-8” from the roadway at cut-through locations where there is no depressed curb present. Truncated dome detectable warning surfaces are not required at locations where the cut-through distance is less than 6’-0” in length measured from the edges

of the truncated dome detectable warning surface closest to the pedestrian street crossing as the truncated dome detectable warning surfaces are required to be separated by a distance of at least 2'-0". Table 4.5.4.5 summarizes the accessibility standards with which medians and channelized islands are required to comply.

Medians and Channelized Islands Detectable Warning Surface Placement	
Element	Section
Pedestrian Refuge Islands	<a href="#">3.3.2.4</a>

Table 4.5.4.5 Detectable Warning Surface Placement for Medians and Channelized Islands

#### 4.6 Pedestrian Street Crossings (Crosswalks)

Pedestrian street level crossings occur where the pedestrian walkway leaves the approach sidewalk or shared use path and enters the roadway. Pedestrian street crossings are commonly referred to as crosswalks. Crosswalks create conflicting movements between pedestrians and motorists and therefore must be designed to be clear, predictable, and visible to both the motorist and the pedestrian user to promote a safe crossing. Table 4.6 summarizes the accessibility standards with which pedestrian street crossings are required to comply. This section also applies to entrances to commercial and industrial sites that function similar to an intersection with returned curbs and street crossings. The presence of a pedestrian access route at an intersection with a roadway implies that a crosswalk exists, regardless of whether it is marked. Reference should be made to the *DE MUTCD* and Delaware Code, Title 21, Section 4142 and Section 4143 for additional explanation. All new midblock crosswalks must be approved by the DeIDOT Traffic Section.

Pedestrian Street Crossings	
Element	Section
Continuous Clear Width	<a href="#">3.1.1</a>
Grade	<a href="#">3.1.3</a>
Cross Slope	<a href="#">3.1.4</a>
Surfaces	<a href="#">3.1.5</a>
Separation	<a href="#">3.1.6</a>
Pedestrian Street Crossings	<a href="#">3.8</a>

Table 4.6 Accessible Street Crossings

Table 4.6 summarizes the accessibility standards with which pedestrian street crossings are required to comply. This section also applies to entrances to commercial and industrial sites that function similar to an intersection with returned curbs and street crossings. The presence of a pedestrian access route at an intersection with a roadway implies that a crosswalk exists, regardless of whether it is marked. Reference should be made to the *DE MUTCD* and Delaware Code, Title 21, Section 4142 and Section 4143 for additional explanation. All new midblock crosswalks must be approved by the DeIDOT Traffic Section.

##### 4.6.1 Access Restriction

Close coordination is required to be performed with the DeIDOT Traffic Section when safety or operational reasons create the need to prohibit pedestrian crossings at one or more legs of an intersection. Where it is decided that the crossing should be prohibited, it is preferable to physically separate the pedestrian access route from the intersection leg. Additionally, signage that complies with the *DE MUTCD* should be provided to warn users and direct them to an accessible route. If physical separation is not possible, other detectable features such as planters, chains, fencing, railing, raised curb, or other similar barriers can be utilized to physically separate the user from the pedestrian crossing. The effect of a detectable feature on vehicular roadside safety should be considered when determining the appropriate detectable treatment.

##### 4.6.2 Crossing Alignment

Street level pedestrian connections should be aligned to make the street level crossing perpendicular. Skewed crossings create greater exposure time for pedestrians, reduce operational capacity, and create additional accessibility challenges; therefore, skewed crossings should be avoided where possible within the project scope. However, skewed crossings are preferable to pushing crosswalks back from the intersection which would lead to pedestrians crossing the intersection in a way that is unexpected to motorists. Kinked alignments where no pedestrian refuge islands are provided to skew the crossing should not be utilized.

### 4.6.3 Striping and Signage of Crosswalks

Crosswalks at intersections, when marked, are done so primarily to guide pedestrians across the intersection and secondarily to warn approaching motorists of the potential for pedestrians to cross at that location. All marked crosswalks at a specific intersection should be designed and maintained using the same type of DE MUTCD compliant markings to provide a consistently marked path of travel in the right-of-way. Signage, striping, and traffic control devices used at pedestrian crossings such as: warning signs, crosswalks, and crosswalk lines are to be designed using the DE MUTCD.

#### 4.6.3.1 Crosswalk Width

Crosswalk striping widths are to be prescribed in accordance with part 3 of the DE MUTCD and must contain the full width of the depressed curb for non-diagonal curb ramp type street level pedestrian connections. The crosswalk should contain a surface compliant width that is at least as wide as the connecting pedestrian access route it serves to allow opposing pedestrian movement within the crosswalk. At a minimum, the crosswalk must contain a pedestrian access route with a compliant surface continuous clear width of 4'-0" with allowances to reduce the minimum continuous clear width to 2'-8" for a maximum length of 2'-0". Diagonal type curb ramps with flared sides are additionally required to have a segment of curb 2'-0" long minimum located on each side of the curb ramp and within the marked crosswalk. The clear space required at the bottom grade break should be placed in accordance with the requirements contained in [Section 3.2.5.4](#).

### 4.6.4 Pedestrian Street Crossing Running Slope and Cross Slope

This section highlights the running slope and cross slope requirements for accessible pedestrian street crossings.

#### 4.6.4.1 Cross Slope

The required cross slope is dependent upon the location of the crossing and the traffic control that is present.

##### 4.6.4.1.1 Pedestrian Street Crossings Without Stop or Yield Control

Pedestrian street crossings without stop or yield control allow a vehicle to proceed through the intersection without having to slow or stop. These crossings are permitted to have a maximum cross slope of 5.0% per the accessibility standards. The Department has adopted a 4.5% design and layout criterion to account for potential irregularities or variances due to construction methods or materials. Signalized intersections are considered pedestrian street crossings without stop or yield control and are therefore permitted to utilize a 5.0% cross slope.

##### 4.6.4.1.2 Pedestrian Street Crossings With Stop or Yield Control

Pedestrian street crossings with stop or yield control are required to maintain a maximum cross slope of 2.0% to meet accessibility standards. The Department has adopted a 1.5% design and layout criterion to account for potential irregularities or variances due to construction methods or materials.

##### 4.6.4.1.3 Midblock Pedestrian Street Crossings

The cross slope for pedestrian street crossings that occur midblock are permitted to equal that of the running grade of the highway. Pedestrian crossings at roundabouts that are located outside of the direct influence of the vehicular yield are to be treated as a midblock pedestrian street crossing with the cross slope of the pedestrian crossing permitted to equal the street or highway grade.

#### 4.6.4.2 Running Slope

The running slope of the pedestrian street crossing is permitted to have a maximum running slope of 5.0% to meet accessibility standards. The Department has adopted a 4.5% design and layout criterion to account for potential irregularities or variances due to construction methods or materials. This criterion will often be controlled by the geometrics and grades of the street that the pedestrian access route is crossing. Reference should be made to the DeIDOT *Road Design Manual* for applicable cross slope and superelevation criteria.

#### 4.6.5 Medians and Channelized Islands

Pedestrian street crossings may include median or channelizing islands that contain pedestrian street crossing movements. Medians and channelizing islands assist pedestrians in crossing the intersection by reducing the crossing distance from a curb to a protected area and can help align the user properly across the roadway. The width of the pedestrian path through the island should match that of the approach pedestrian path, except in cases with a narrow approach path as the pedestrian path through the island is required to provide a minimum continuous clear width of 5'-0" and pinch points are not permitted. To make for easier field location, an additional 2'-0" should be added to the entire pedestrian path's width up to a width of 10'-0" at locations where pedestrian pushbuttons are to be placed. This additional 2'-0" will allow the pedestrian pushbutton to be placed in the cut-through path without creating any pinch points. The cross slope provided for the path through the refuge island should follow the guidance contained in [Section 4.6.4.1](#).

#### 4.6.6 Pedestrian Signals

Modifications to, or creation of, traffic signals and/or pedestrian signals must be coordinated and scoped through DeIDOT's Traffic Engineering Section. Pedestrian signal installations at street crossings, including accessible pedestrian signals (APS) which incorporate audible and vibrotactile features, must comply with the requirements provided in the *DE MUTCD*. Additionally, DeIDOT maintains a guidance document entitled *DeIDOT Interim Guidelines for the Installation of Accessible Pedestrian Signals*, that provides designers with an understanding of the process that DeIDOT uses to evaluate and prioritize APS installations (including High Intensity Activated Crosswalk - HAWK signals) when they are requested. Table 4.6.6 summarizes the accessibility standards with which pedestrian signals are required to comply.

Pedestrian Signals	
Element	Section
Accessible Pedestrian Signals and Pedestrian Pushbuttons	<a href="#">3.9</a>
Operable Parts	<a href="#">3.5</a>
Clear Space	<a href="#">3.6</a>
Reach Ranges	<a href="#">3.7</a>

Table 4.6.6 Accessible Pedestrian Signals

When pedestrian signals are installed, the pushbuttons should be designed for unobstructed side reach as fully described in [Section 3.7.2.1](#) and shown in DeIDOT Standard Construction Detail T-18. The pedestrian signal is to be placed in accordance with the requirements of the *DE MUTCD* (see Figures 4E-3 and 4E-4 of the *DE MUTCD* for more information). A clear space in accordance with the criteria presented in [Section 3.6](#) is required at locations where pedestrian pushbuttons are provided.

#### 4.7 Truncated Dome Detectable Warning Surfaces

A truncated dome detectable warning surface is used to indicate the boundary between pedestrian and vehicular routes where there is a flush connection. Table 4.7 provides the pertinent accessibility standards for truncated dome detectable warning surfaces. The placement of truncated dome detectable warning surfaces are described in detail in the pertinent sections of this chapter in which their use is required.

Truncated dome detectable warning surfaces should be placed with discretion as overuse can cause confusion for pedestrians with visual impairments. Truncated dome detectable warning surfaces are not intended as way-finding devices which are briefly discussed in [Section 4.10](#). Truncated dome detectable warning surfaces are required at the following locations:

- Pedestrian connections to street level crossings,
- Median and channelizing islands that allow for pedestrian crossing (except crossings where the truncated dome detectable warning surfaces would be separated by less than 2'-0" in length measured in the direction of travel),
- Where the pedestrian access route crosses at-grade rail crossings, and
- At the edge of transit platforms where the edges of the boarding platform are not protected by screens or guards.

Truncated Dome Detectable Warning Surfaces	
Element	Section
General	<a href="#">3.3.1</a>
Dome Size	<a href="#">3.3.1.1</a>
Dome Spacing	<a href="#">3.3.1.2</a>
Contrast	<a href="#">3.3.1.3</a>
Size	<a href="#">3.3.1.4</a>

Table 4.7 Accessible Truncated Dome Detectable Warning Surfaces

Entrances for large traffic generating facilities are typically designed as an intersection type application with curb returns, street level pedestrian connections, and crosswalks. These facilities should provide truncated dome detectable warning surfaces. Typical residential driveways or other minor entrances or alleys should not provide a truncated dome detectable warning surface to prevent overuse.

Truncated dome detectable warning surfaces may be added with engineering judgement to hazardous locations where pedestrians with visual impairments should be signaled to stop. These locations may include the following:

- Entrances with yield or stop control.
- Locations with inadequate sight distance for pedestrian access route users or oncoming vehicles,
- Complicated turning movements where driver or pedestrian access route user decision making may be more challenging, and
- Entrances with characteristics similar to minor streets (e.g., speeds of 25 mph or greater and/or ADT greater than about 400 vehicles per day).

#### 4.7.1 Color Contrast

Truncated dome detectable warning surfaces are required to contrast visually with the pedestrian access route in which they are placed. [Section 3.3.1.3](#) defines the required visual contrast as needing to either be a light-on-dark or a dark-on-light application. Table 4.7.1 has been developed to document the Department's preference for creating the required color contrast between the pedestrian access route and the truncated dome detectable warning surface. The AMS number referenced in the table is an acronym for "Aerospace Material Specification" which refers to a standardized color assigned by the US Government General Services Administration as part of AMS-STD-595. AMS-STD-595 is typically referenced to establish the standard colors used in government procurement. All truncated dome detectable warning surfaces are anticipated to have a matte finish.

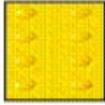
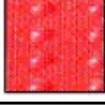
Detectable Warning Color		Surface Material Surrounding Detectable Warning		
		Asphalt/ Bituminous Concrete	Brick (Red)	Concrete (Un-pigmented)
Bright white <a href="#">[*AMS 37875]</a>		Acceptable	Acceptable	Not Permitted
Federal yellow <a href="#">[*AMS 33538]</a>		Preferred	Preferred	Acceptable
Orange-red <a href="#">[*AMS 22144]</a>		Not Permitted	Not Permitted	Acceptable
Bright red <a href="#">[*AMS 11120]</a>		Acceptable	Not Permitted	Preferred

Table 4.7.1 Color Contrast

Color chips that can be used for quality control inspection purposes are available through SAE International and links are provided to the color chips in Table 4.7.1.

#### 4.8 On-Street Parking

Accessible parking spaces connected to the accessible pedestrian access route are required to be provided at locations where on-street parking is marked or metered within the public right-of-way. The accessible parking spaces should ideally be located where the street has the least crown and grade and close to key destinations. This section of the manual pertains to on-street parking facilities. Parking facilities like parking garages and parking lots must comply with the ADAAG. Table 4.8

On-Street Parking	
Element	Section
Surfaces	<a href="#">3.1.5</a>
Required Accessible Parking Spaces	<a href="#">3.11.1</a>
Parking Spaces – General	<a href="#">3.11.2.1</a>
Vehicle Spaces	<a href="#">3.11.2.2</a>
Access Aisle	<a href="#">3.11.2.3</a>
Parking Meters and Parking Pay Stations	<a href="#">3.11.3</a>

Table 4.8 Accessible On-Street Parking

summarizes the accessibility standards with which on-street parking is required to comply. Parking spaces may only be provided and marked within the right-of-way with DelDOT’s pre-approval.

Parking is generally regulated through municipal ordinance with maintenance responsibility typically being defined within standing agreements between DelDOT and the municipality. However, if a DelDOT contract effects on-street parking, the Department is obligated to coordinate the pertinent accessibility requirements based on the project type defined in [Chapter 2](#) of this manual. All on-street parking obligations should be thoroughly investigated during the design phase and party obligations should be documented in the town agreement.

##### 4.8.1 Required Number of Accessible Spaces

The required number of accessible parking spaces is based upon the amount of marked or metered parking spaces that are provided on the block perimeter. [Section 3.11.1](#) of this manual summarizes the requirements for providing accessible parking.

#### 4.8.2 Parallel Parking

The sidewalk adjacent to accessible parallel parking spaces should be free of signs, street furniture, and other obstructions. This permits the deployment of van side-lifts or ramps that allow the vehicle occupant to transfer to a wheelchair or scooter. Parallel parking spots are required to be at least 8'-0" in width when measured from the centerline of the marking to the face of the physical barrier that is typically used to delineate the parking space. Section 3B.19 of the *DE MUTCD* provides additional information on the method and color of markings.

The requirements for parallel parking are divided into two categories based on the width of the adjacent sidewalk or available right-of-way:

- **Width > 14'-0"** – An access aisle that has a minimum width of 5'-0" and a length that is equivalent to the full length of the parking space is required to be provided at street level. The access aisle is required to connect to the adjacent pedestrian access route with the use of compliant street level pedestrian connections as needed. The access aisle is not permitted to encroach into the vehicular travel lane. The access aisle is not required to be striped to allow users to either park at the curb face or at the edge of the parking boundary. Consideration must be given to providing parking spaces of sufficient length to allow the user vehicle to be able to pull into the space as far as desired from the edge line striping.
- **Width ≤ 14'-0"** – An access aisle is not required. The accessible parking spaces are to be located at the beginning or end of the block face so the space can be served by the street level pedestrian connection that is serving the pedestrian street crossing. Accessible parking spaces located at the beginning or end of the block face are usable by vans that have rear lifts and cars that have scooter platforms. In these instances, it is intended that vehicle lifts or ramps can be deployed on the adjacent sidewalk as long as a clear area of 8'-0" is provided.

Street level pedestrian connections connecting the access aisle to the pedestrian access route are not permitted to be located in a way that could interfere with the vehicle side-lift or ramp. The street level pedestrian connection at these locations is not required to have a truncated dome detectable warning surface unless the street level pedestrian connection also serves a pedestrian street crossing. Where provided, parking meters are to be located at the head or foot of the parking space to prevent the parking meter from blocking the operation of a vehicle side-lift or ramp. Additional information on the accessibility requirements for meters is contained in [Section 4.8.4](#). Parallel parking requirements are portrayed in Figure 4.8.2.

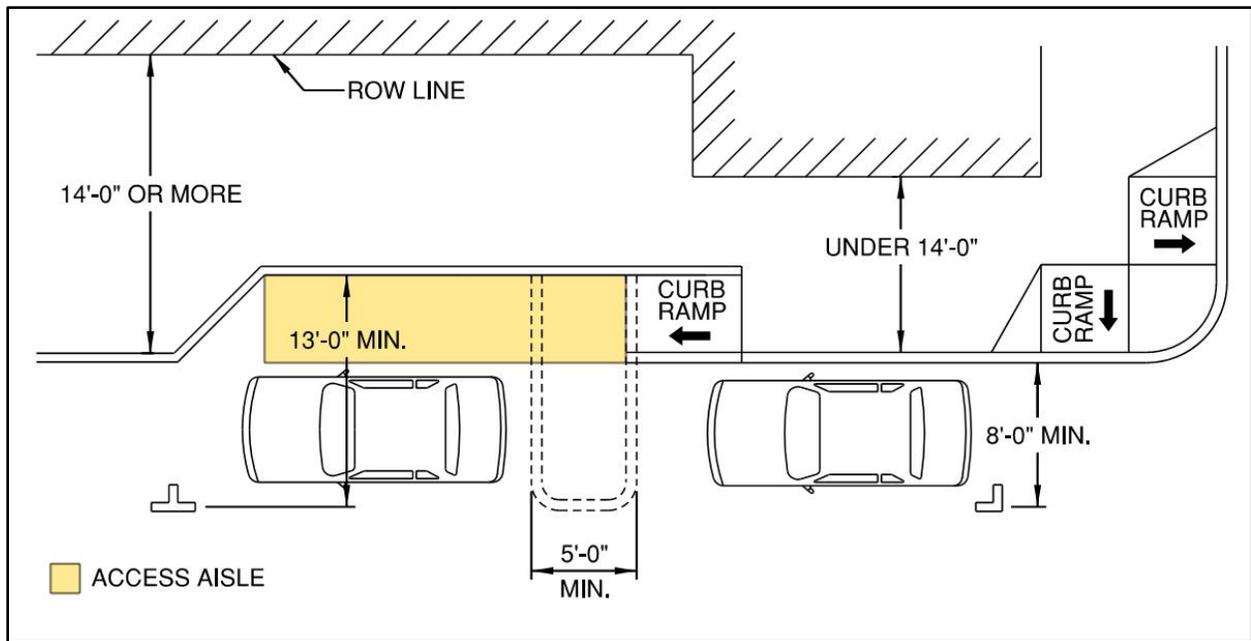


Figure 4.8.2 Parallel Parking Requirements

#### 4.8.3 Perpendicular and Angled Parking

All perpendicular and angled parking is required to be at least 8'-0" in width when measured from center to center of the edge line markings. In locations where a physical feature like a curb is used to delineate the parking space, the width of the parking space should be measured to the face of the physical barrier. Where perpendicular or angled parking is provided, an access aisle that has a minimum width of 8'-0" measured perpendicularly from the parking space stripe is to be provided the full length of the parking space. The access aisle must not overlap the vehicular way and must connect to the accessible pedestrian access route. The access aisle is required to be marked to discourage parking in the access aisle. Section 3B.19 of the *DE MUTCD* provides additional information on the method and color of markings.

Street level pedestrian connections connecting the access aisle to the pedestrian access route are not permitted to be located in a way that could interfere with a vehicle's side-lift or ramp. These street level pedestrian connections are not required to have a truncated dome detectable warning surface. Figure 4.8.3-a and Figure 4.8.3-b portray perpendicular and angled parking requirements.

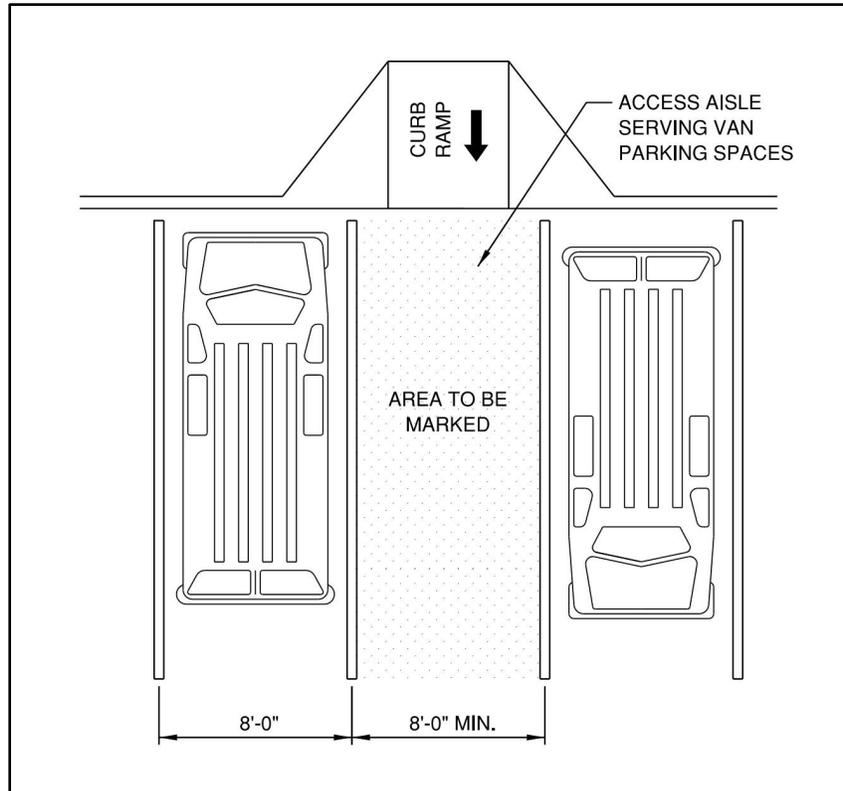


Figure 4.8.3-a Perpendicular Parking Requirements

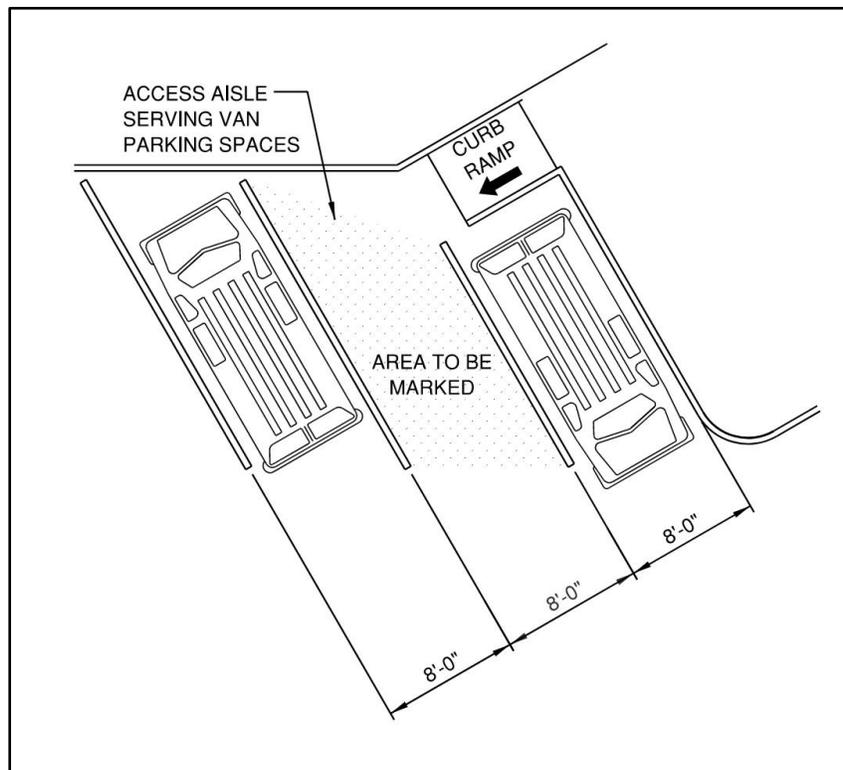


Figure 4.8.3-b Angled Parking Requirements

#### 4.8.4 Signing and Metering of On-Street Accessible Parking Spaces

Accessible parking spaces are to be identified with sign R7-8 of the DE MUTCD. Spaces that are considered best suited to van parking may be supplemented with sign R7-8P.

Parking spaces and access aisles are to be designed so that cars and vans, when parked, cannot obstruct the required clear width of adjacent accessible routes. Curbs or parking bumpers can be used to prevent vehicle overhangs from reducing the continuous clear width of the adjacent accessible route.

Parking meters and parking pay stations are to be connected to the accessible parking spaces they serve through an accessible route and are required to comply with the operable parts criteria contained in [Section 3.11.3](#). All operable parts also require that a clear space be provided in accordance with the criteria contained in [Section 3.6](#). Displays and information provided at parking meters and pay stations are to be visible from a point located 3'-3.6" above the center of the clear space in front of the parking meter or parking pay station.

#### 4.9 Pedestrian Maintenance of Traffic

The needs of pedestrians, including those with disabilities, must be addressed during the temporary traffic control conditions presented in a work zone. The temporary conditions are required to maintain facility usability in accordance with the Americans with Disabilities Act of 1990 (ADA), Title II, Paragraph 35.130. Accordingly, all work that affects existing pedestrian access routes are required to provide an alternate pedestrian access route with consistent accessibility features to that of the existing route. When new temporary structures are built to act as a temporary pedestrian access route, the temporary structure is required to comply with all applicable standards for new construction. Where existing physical constraints make it impractical to comply with the applicable accessibility requirements, compliance is required to the maximum extent practicable. Temporary pedestrian maintenance of traffic is not required if the pre-construction conditions do not have defined and designated pedestrian circulation paths or accessible routes.

By their nature, work zones present a variety of hazards and challenges to pedestrian traffic that must be accounted for during the planning and design phases and mitigated during the construction phase of an improvement. The guidelines contained in this section provide a variety of measures that can be taken to reduce potential safety hazards and promote accessibility at or near construction sites.

There are three primary considerations regarding pedestrian safety in work zones:

1. Separate pedestrians from conflicts with work site vehicles, equipment, and operations.
2. Separate pedestrians from conflicts with mainline traffic moving through or around the work site.
3. Provide pedestrians with a safe, accessible, and convenient travel path that duplicates as nearly as possible, the most desirable characteristics of the existing paths.

All pedestrian maintenance of traffic must be coordinated through the DeIDOT Traffic Safety section and must comply with the DE MUTCD. The level of the pedestrian maintenance of traffic required on a project will be based on the complexity of the proposed work, the extent of the existing pedestrian network, and the duration and phasing of the proposed work. There are several best practices that should be considered during the design process. These best practices include the following:

- Providing same-side travel is preferred because it does not require additional pedestrian exposure to traffic and helps maintain access to adjacent land uses.

- Construction traffic control signage should not be placed where it would block access along the pedestrian access route or at a location where it would be considered a protruding object.
- Outreach to the community can be performed as deemed appropriate to supplement on-site information sources described within this chapter.

In general, pedestrian traffic can be maintained either on-site or can be detoured around the proposed work.

#### 4.9.1 Temporary Access Route in Close Proximity to the Work Zone

Additional consideration must be given to the needs of pedestrians with disabilities in and around work zones as they may not have the same ability to improvise on provided temporary narrow paths or for using unofficial alternatives like an adjacent grassed surface. The intended pedestrian access route should be detectable to ensure people with vision impairments are able to stay within the intended pedestrian access route through the work zone to avoid hazardous elements of the construction site and must be accessible and free of barriers for mobility device users. Smooth and apparent transitions should be provided from the permanent pedestrian access route to any temporary pedestrian access routes.

Pedestrian channelization devices in accordance with the DE MUTCD can be used to enhance safety and to establish a detectable and continuous pedestrian access route through constrained locations. Off alignment temporary boardwalks or temporary pedestrian paths can also be provided around the work area when required. Temporary paths may require temporary construction easements.

When a parking lane or a shoulder of considerable width is located next to a pedestrian access route that is closed, consideration should be given to using a portion of the roadway's shoulder or parking lane for the temporary pedestrian access route. On multilane streets, a travel lane may also be closed to provide a continuous pedestrian access route, depending on the characteristics of the traffic and the surrounding environment. The temporary pedestrian access route provided in this condition will need to be detectable. Pedestrian channelization barricades may be used on low-speed applications and temporary traffic barriers can be used on higher-speed applications and where additional protection is desired. This practice is included in the DE MUTCD as Typical Application 28. Providing a pedestrian access route in this method provides a shorter diversion distance and may be more effective and safer than requiring two street crossings even when the roadway surface being used for the temporary pedestrian access route is imperfect.

Pedestrian flaggers may also be provided to assist pedestrians in navigating the work zone. Pedestrian flaggers are required for the full duration that the usability of the accessibility component is affected by the work.

#### 4.9.2 Detoured Temporary Access Route

A pedestrian detour can be considered when a section of the pedestrian access route is required to be closed and there is no logical location to support a local diversion or a temporary pedestrian access route adjacent to the existing pedestrian access route. All pedestrian detours along state-maintained roadways are required to have a pedestrian detour plan approved by DelDOT Traffic Safety. In all cases, the detoured route is required to provide equal accessibility features to that of the existing pedestrian access route. Accordingly, some locations may require upgrades to the proposed detour route ahead of the implementation of the detour.

The proposed detour route must be adequately signed to provide warning to pedestrians so they can avoid the closed area. The warning signage should be placed at logical locations like street corners to prevent pedestrians from reaching the closure and having to turn around and retrace their steps. This logical sign distribution should also be applied to affected side streets as well. Typical Application 28 and 29 of the DE MUTCD provides additional guidance on the development of crosswalk closures and pedestrian detours.

There may be cases, especially for existing structure replacements in rural areas, where no adequate detour route is available. In these cases, the designer has three options:

- **Option 1** – Phase the construction to maintain pedestrian travel during construction. This method would typically involve half-width construction. This option must also consider the potential impact to vehicular travel as well.
- **Option 2** – Construct a pedestrian access route including a potential temporary pedestrian bridge when required that ties into the existing pedestrian access route.
- **Option 3** – If the methods described in Option 1 and Option 2 are not feasible, pedestrian escorts or a free shuttle service around the project area may be provided. The escort and bus service must be provided for the full duration that the usability of the accessibility component is affected by the work. This option will require additional coordination with the public, DTC, and other stakeholders to determine how it could be implemented on a particular project.

#### 4.10 Wayfinding

Pedestrian wayfinding is the practice of providing navigational tools that assist pedestrians in reaching their intended destination. In general, pedestrian wayfinding devices can be categorized into the following three groups:

- **Signage** – Pedestrian wayfinding signage can be placed along the pedestrian path. This method of wayfinding assistance is limited for the visually impaired user.
- **Directional Tactile Surface Indicators** – Detectable cues can be added to the pedestrian path to provide wayfinding information to pedestrians with vision impairments. Directional surfaces can be used to help guide pedestrians through complex pathways or at locations where unexpected movements are required. To be beneficial, these systems must be identifiable and easy to understand. The Department maintains Design Guidance Memorandum 1-28, titled Directional Tactile Surface Indicators (DTSI) for Bicycle Ramps, which describes the directional tactile surface that the Department provides for bike ramps at roundabouts. ISO 23599 – Assistive Products for Blind and Vision-Impaired Persons – Tactile Walking Surface Indicators provides additional information on these devices. Any use of these devices outside of the use prescribed in Design Guidance Memorandum 1-28 must be coordinated with DeIDOT’s Title II Coordinator. Directional tactile surface indicators should contrast visually with pedestrian access route. Additional information about visual contrast is provided in [Section 4.7.1](#).
- **Technology** – Wayfinding systems can also include products that utilize technology like GPS systems, web connectivity, and mobile applications to assist pedestrians in reaching their destination.

Truncated dome detectable warning surfaces are not intended to be used to assist vision impaired users with wayfinding. [Section 4.7](#) provides a larger discussion on the purpose of truncated dome detectable warning surfaces. In general, pedestrian wayfinding can be made easier through the following practices:

- Provide pedestrian access routes that are clear of street furniture,
- Provide visual contrast between walking and non-walking areas (e.g., planted borders),

- Provide route edges that are clear and detectable by cane,
- Provide direct pedestrian street crossings and curb ramps that are in-line with the direction of travel,
- Provide small corner radii that permit pedestrian street crossings to be as short and direct as possible,
- Provide perpendicular intersections that facilitate navigation using parallel and perpendicular vehicle sound cues, and
- Provide barriers where pedestrian travel or crossing is not permitted.

Technology and research are ongoing on the topic of pedestrian wayfinding. As such, the user is encouraged to research wayfinding techniques on a per application basis when warranted.

## Chapter 5 ADA Inspection and Acceptance Criteria

Once proposed pedestrian features have been constructed, the Department will perform an ADA Inspection to verify that the constructed pedestrian features meet the minimum accessibility standards contained in this manual. The ADA Inspection is intended to determine the accessibility compliance of the constructed features and is not intended as a review of the constructed facilities for compliance with the contract documents. The results of the ADA Inspection and the contractual requirements of the contract documents will be considered as part of the acceptance process of a project which will occur after the ADA Inspection is complete. Figure 5 provides a graphical representation of the ADA Inspection and acceptance process.

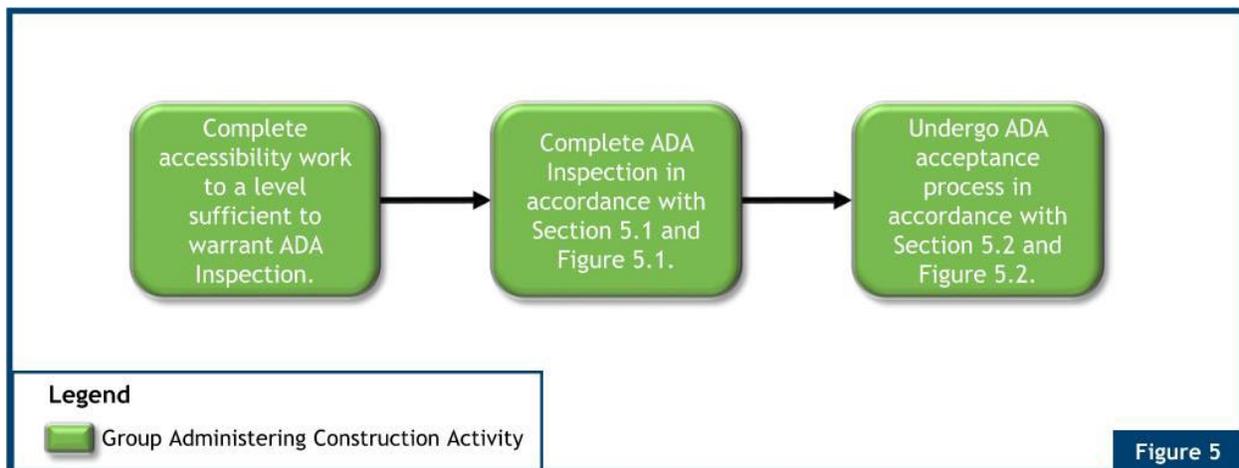


Figure 5 ADA Inspection and Acceptance Process

### 5.1 ADA Inspection Process

The goal of the Department’s ADA Inspection is to measure and subsequently document all of the required accessibility measurements into the Department’s ADA Construction Inspection Application (ACIA Application) for all newly constructed or reconstructed pedestrian features. DeIDOT’s current practice is to perform an “Initial Inspection” and a “Primary Inspection” for all projects that are to be accepted into the Department’s maintenance inventory. It is the goal of the Department that the ADA Inspection occur prior to or at the same time as the Initial Inspection. Performing the ADA Inspection at this time will permit the results of the ADA Inspection to be documented with the punch list that is generated from the Initial Inspection and will allow the contractor to address the documented deficiencies prior to demobilization from the site. It is advisable for the group administering construction and the designer be present at the ADA Inspection to assist in verifying the project scope, the limits of construction, and in determining potential remedies for discovered accessibility deficiencies. All ADA Inspections must be performed prior to the Primary Inspection.

The group administering construction is responsible for requesting all ADA Inspections. On larger projects and open-end construction contracts, consideration should be given to submitting requests for ADA Inspections to be performed as geographic groups or phases of work are completed. All approved Requests for Practical Exceptions (RPEs) should be submitted to the Engineering Support section at the time of the request for an ADA Inspection. The Engineering Support section will then upload all RPEs received to the ACIA application. If there is a question on when or whether an ADA Inspection is needed, the group administering construction should contact the Engineering Support section.

Once the ADA Inspection is complete, the Engineering Support section will issue a report notifying the group administering construction that all field measurements have been entered into the ACIA application and that all measurements or features determined to be deficient have been highlighted. If a feature fails ADA Inspection, the Engineering Support section is required to provide a reference to the applicable [Chapter 3](#) standard which the feature failed. The group administering construction, through coordination with the designer and the contractor, can then make field corrections to the facilities or respond to each deficiency through the ACIA application with responses being either written or uploaded pictures as deemed appropriate. If during this process it is determined that an RPE is necessary, an RPE should be completed in accordance with [Chapter 6](#). Once all the highlighted deficiencies have been addressed or responded to, the group administering construction should notify the DeIDOT Title II Coordinator that the location is ready for review.

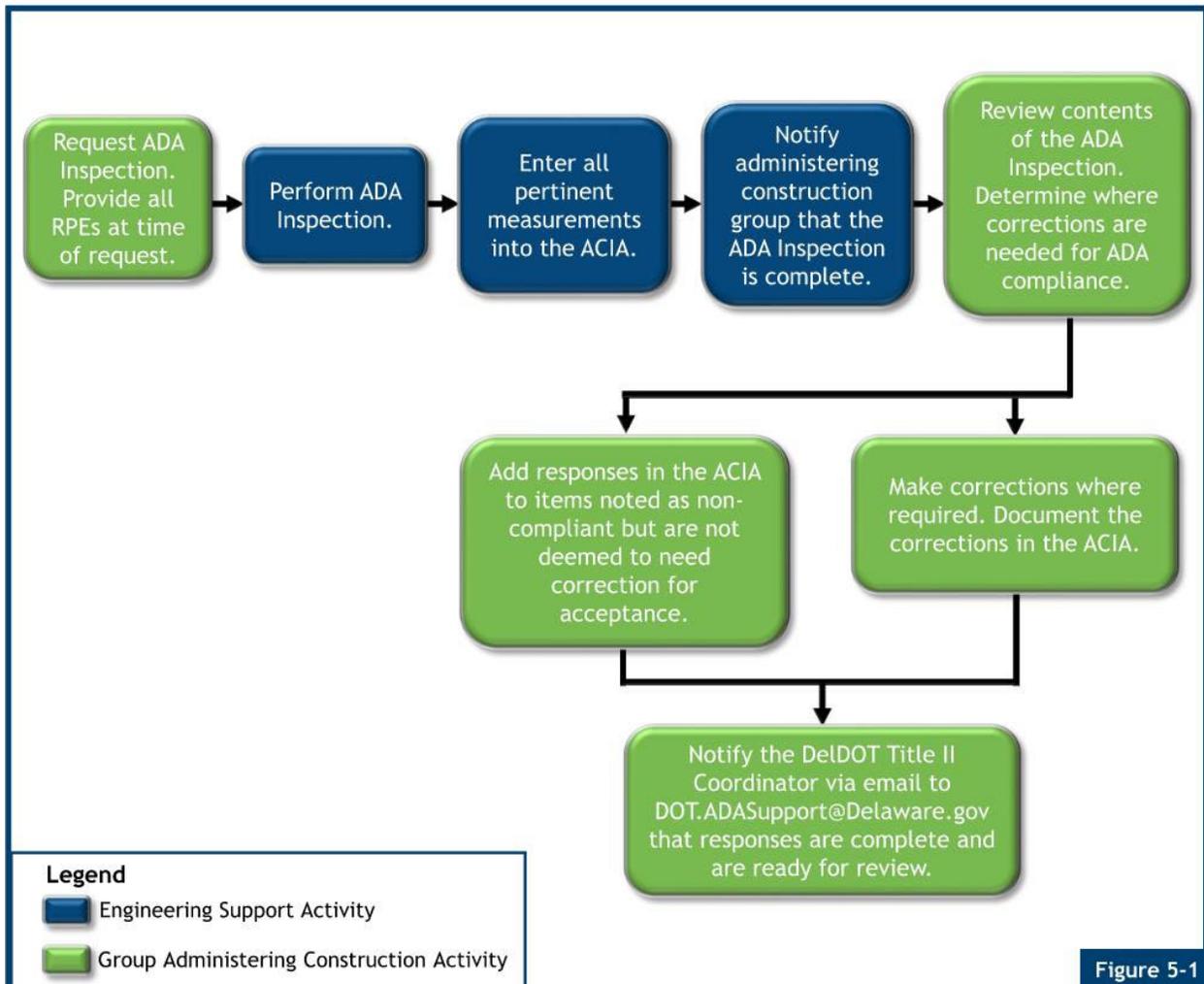


Figure 5.1 Inspection Process

## 5.2 Accessibility Feature Acceptance Process

Once the group administering construction has finished reviewing and correcting or responding to the deficiencies highlighted in the ADA Inspection report, the group administering construction must notify the DeIDOT Title II Coordinator by email to [DOT.ADASupport@delaware.gov](mailto:DOT.ADASupport@delaware.gov) that the items identified as

deficient or needing justification have been addressed. The DeIDOT Title II Coordinator will review the ADA Inspection report and all comments and actions performed by the group administering construction to ensure that the facilities meet the requirements of this manual as well as all other applicable Federal and State accessibility requirements. The review must also consider whether or not the contract requirements were met. The process from this point forward will vary based on the result of the review performed by the DeIDOT Title II Coordinator.

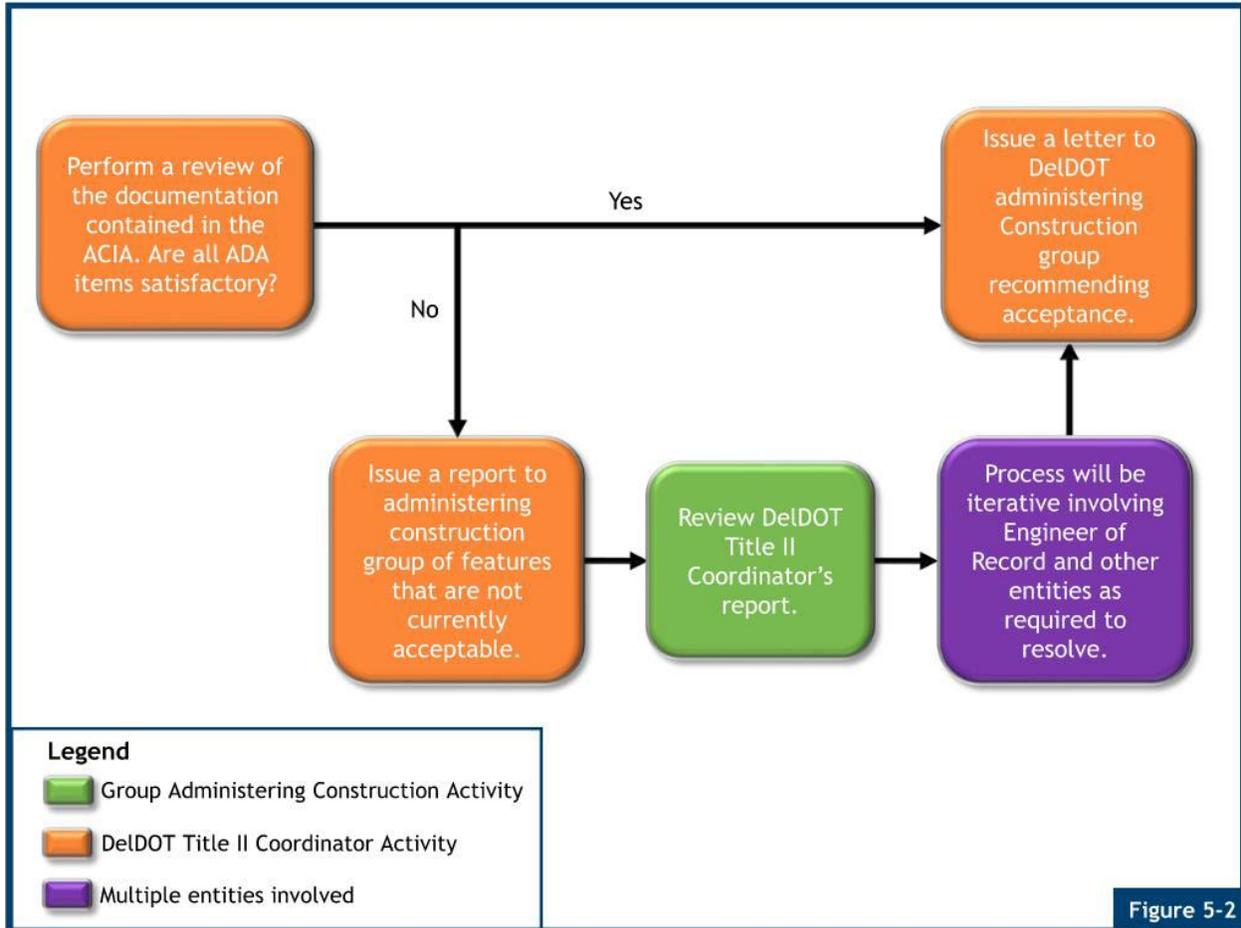


Figure 5.2 Acceptance Process

In the event that the DeIDOT Title II Coordinator determines that the proposed pedestrian features do not meet the requirements of this manual or other applicable Federal and State laws and regulations, and also did not meet the contract requirements, the DeIDOT Title II Coordinator will generate a Findings Report that will be issued to the group administering construction highlighting the features that are not currently acceptable. The group administering construction should work in conjunction with the DeIDOT Title II Coordinator, the Engineer of Record, and with other entities as required to resolve all noted accessibility deficiencies in the DeIDOT Title II Coordinator’s report.

Once all accessibility items outlined in the DeIDOT Title II Coordinator’s report have been sufficiently addressed or in the event that the DeIDOT Title II Coordinator’s review generated no exceptions, the DeIDOT Title II Coordinator will issue a notification to the group administering construction

recommending that the accessibility features included at the location be accepted into DeIDOT's maintenance inventory.

### 5.3 Facility Inspection

The accessibility components and subsequent facility measurements that are to be recorded as part of the Department's ADA Inspection are contained in the Department's ADA Construction Inspection Application (ACIA Application). This section of the manual is intended to supplement the ACIA Application by further detailing the required measurements, the required measurement precision, and the measurement locations for several of the more common components of the pedestrian access route. The measurement precision requirements contained in this section does not apply to the accessibility standards for "Surfaces" contained in [Section 3.1.5](#) of this manual as those measurements require additional precision to ensure accessibility compliance.

The typical field inspection equipment required to perform an ADA Inspection will include a steel tape measure and a smart level. The smart level that is used to perform the inspection shall follow the calibration requirements of the manufacturer. All recorded measurements of the inspected components of a pedestrian access route should be recorded as follows:

- All distance measurements will be recorded to the nearest inch.
- All slope measurements will be recorded to the nearest 10<sup>th</sup> of a percent. For example, a measurement of 8.27% will round to 8.3%.

#### 5.3.1 Parallel Curb Ramp

Figure 5.3.1 shows an isometric view of a parallel curb ramp with the required accessibility measurement locations transposed on the component. Table 5.3.1 further describes the required measurement locations and recommended best practices to follow.

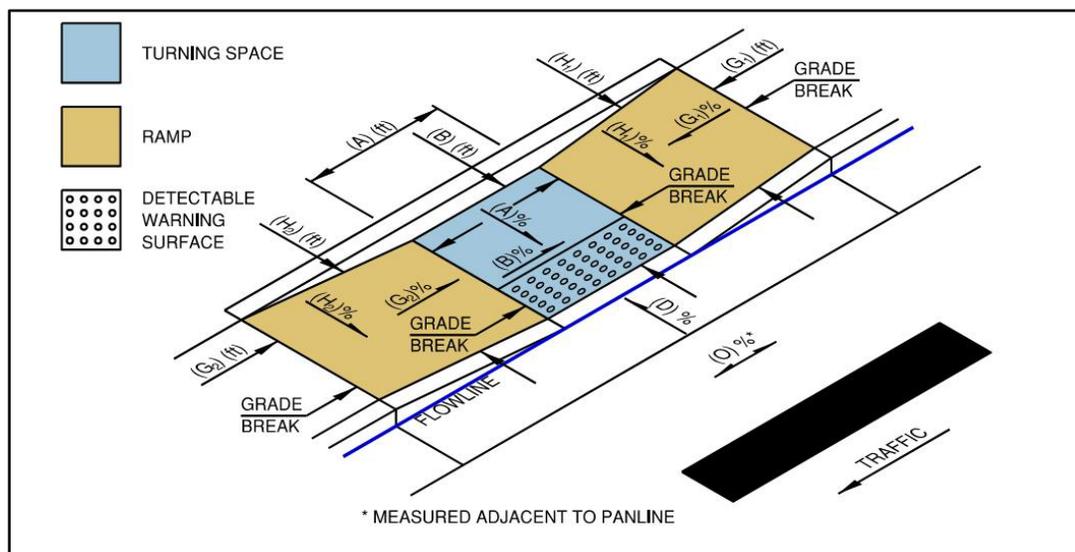


Figure 5.3.1 Parallel Curb Ramp

Dimension	Measure	Measurement Notes	Required
A (%)	Turning Space Running Slope	Record at middle of turning space	2.0% max.
A (ft)	Turning Space Length	Record at middle of turning space	4'-0" min.
B (%)	Turning Space Cross Slope	Record at middle of turning space	Equal to the street or highway grade
B (ft)	Turning Space Width	Record at middle of turning space	4'-0" min. if unconstrained. 5'-0" min. if constrained.
D (%)	Gutter Counter Slope	Record at middle of turning space	5.0% max.
G <sub>1</sub> (%)	Left Ramp Running Slope	Record at middle of ramp	8.3% max.
G <sub>1</sub> (ft)	Left Ramp Length	Record at middle of ramp	NA
G <sub>2</sub> (%)	Right Ramp Running Slope	Record at middle of ramp	8.3% max.
G <sub>2</sub> (ft)	Right Ramp Length	Record at middle of ramp	NA
H <sub>1</sub> (%)	Left Ramp Cross Slope	Record at middle of ramp	2.0% max.
H <sub>1</sub> (ft)	Left Ramp Width	Record at middle of ramp	4'-0" min.
H <sub>2</sub> (%)	Right Ramp Cross Slope	Record at middle of ramp	2.0% max.
H <sub>2</sub> (ft)	Right Ramp Width	Record at middle of ramp	4'-0" min.
O (%)	Roadway Grade	Record in front of the middle of the turning space	NA

Table 5.3.1 Parallel Curb Ramp

### 5.3.2 Perpendicular Curb Ramp

Figure 5.3.2 shows an isometric view of a perpendicular curb ramp with the required accessibility measurement locations transposed on the component. Table 5.3.2 further describes the required measurement locations and recommended best practices to follow.

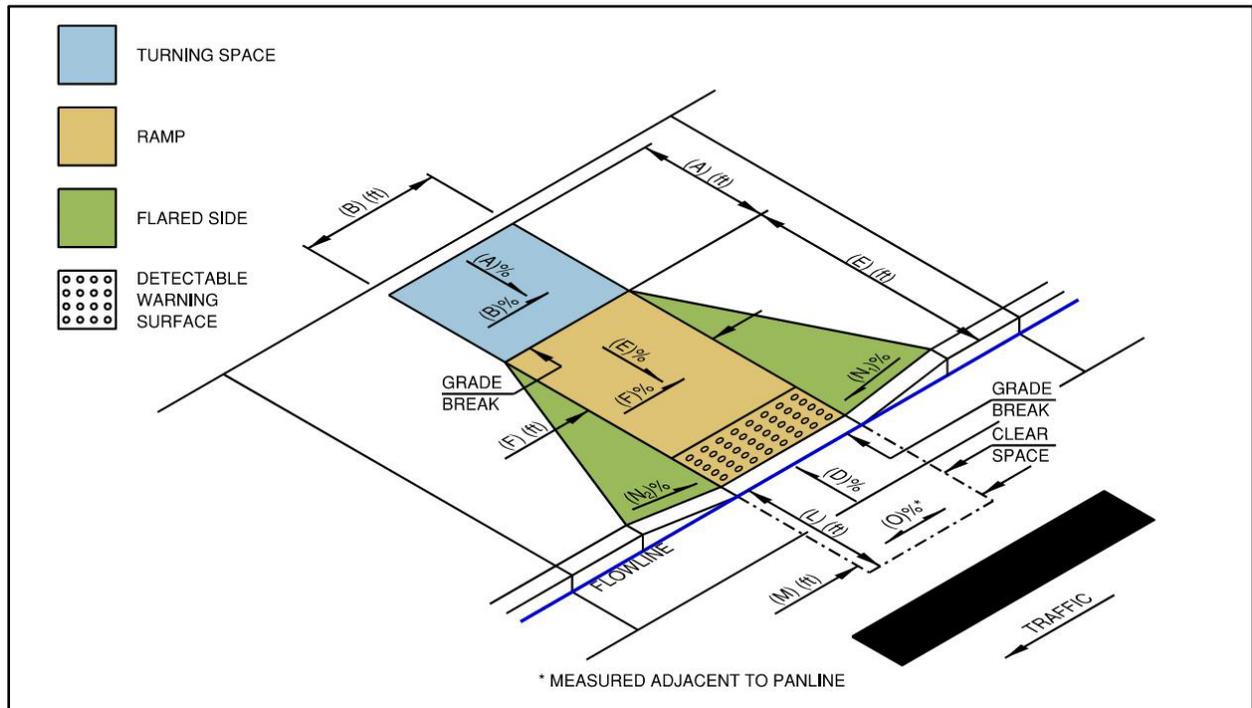


Figure 5.3.2 Perpendicular Curb Ramp

Dimension	Measure	Measurement Notes	Required
A (%)	Turning Space Running Slope	Record at middle of turning space	2.0% max.
A (ft)	Turning Space Length	Record at middle of turning space	4'-0" min. if unconstrained. 5'-0" min. if constrained.
B (%)	Turning Space Cross Slope	Record at middle of turning space	2.0% max.
B (ft)	Turning Space Width	Record at middle of turning space	4'-0" min.
D (%)	Gutter Counter Slope	Record at middle of curb ramp	5.0% max.
E (%)	Curb Ramp Running Slope	Record at middle of ramp	8.3% max.
E (ft)	Curb Ramp Length	Record at middle of ramp	NA
F (%)	Curb Ramp Cross Slope	Record at middle of ramp	Equal to the street or highway grade
F (ft)	Curb Ramp Width	Record at middle of ramp	4'-0" min.
L (ft)	Clear Space Length	Record in front of the bottom curb ramp grade break	4'-0" min.
M (ft)	Clear Space Width	Record in front of the bottom curb ramp grade break	4'-0" min.
N <sub>1</sub> (%)	Left Flare Slope	Record at back of the depressed curb	10.0% max.
N <sub>2</sub> (%)	Right Flare Slope	Record at back of the depressed curb	10.0% max.
O (%)	Roadway Grade	Record in front of the middle of the curb ramp	NA

Table 5.3.2 Perpendicular Curb Ramp

### 5.3.3 Diagonal Curb Ramp

Figure 5.3.3 shows an isometric view of a diagonal curb ramp with the required accessibility measurement locations transposed on the component. Table 5.3.3 further describes the required measurement locations and recommended best practices to follow. Additionally, diagonal curb ramps with flared sides shall have a segment of curb 2'-0" long minimum located on each side of the curb ramp within the marked crossing.

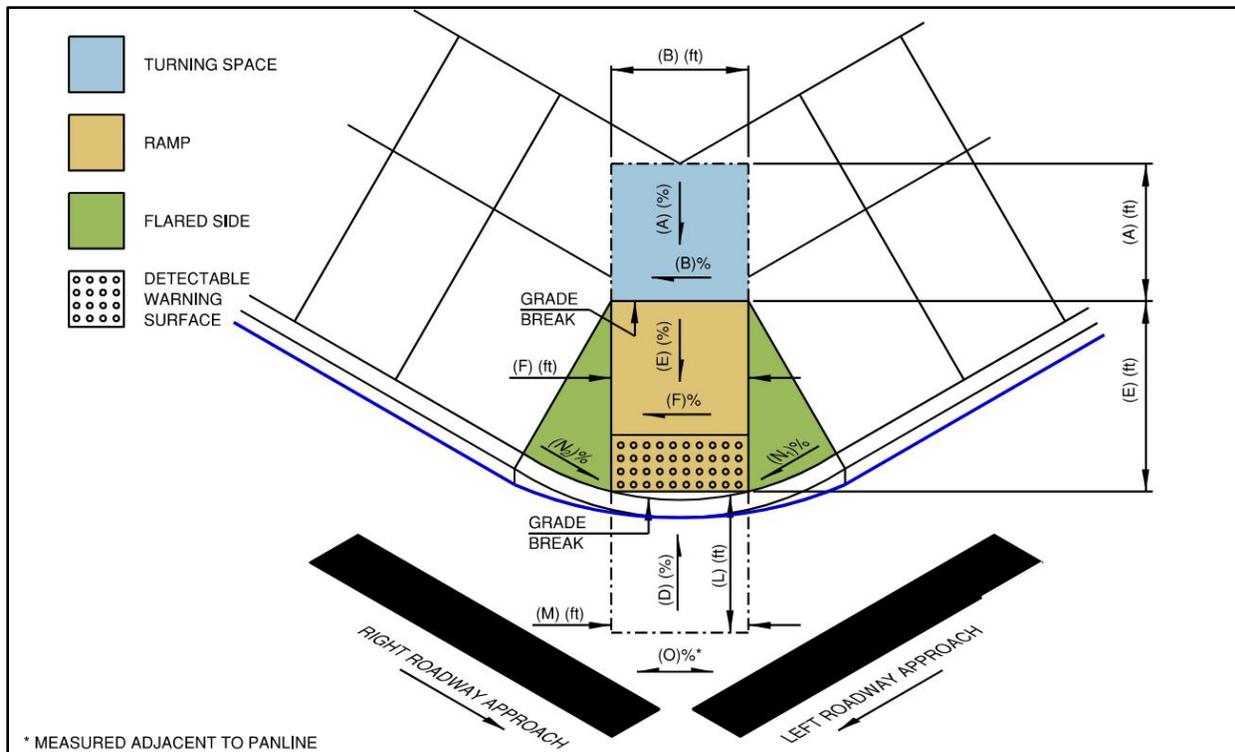


Figure 5.3.3 Diagonal Curb Ramp

Dimension	Measure	Measurement Notes	Required
A (%)	Turning Space Running Slope	Record at middle of turning space	2.0% max.
A (ft)	Turning Space Length	Record at middle of turning space	4'-0" min. if unconstrained. 5'-0" min. if constrained.
B (%)	Turning Space Cross Slope	Record at middle of turning space	2.0% max.
B (ft)	Turning Space Width	Record at middle of turning space	4'-0" min.
D (%)	Gutter Counter Slope	Record at middle of curb ramp	5.0% max.
E (%)	Curb Ramp Running Slope	Record at middle of ramp	8.3% max.
E (ft)	Curb Ramp Length	Record at middle of ramp	NA
F (%)	Curb Ramp Cross Slope	Record at middle of ramp	Equal to the street or highway grade
F (ft)	Curb Ramp Width	Record at middle of ramp	4'-0" min.
L (ft)	Clear Space Length	Record in front of the bottom curb ramp grade break	4'-0" min.
M (ft)	Clear Space Width	Record in front of the bottom curb ramp grade break	4'-0" min.
N <sub>1</sub> (%)	Left Flare Slope	Record at back of the depressed curb	10.0% max.
N <sub>2</sub> (%)	Right Flare Slope	Record at back of the depressed curb	10.0% max.
O (%)	Roadway Grade	Record in front of the middle of the curb ramp	NA

Table 5.3.3 Diagonal Curb Ramp

### 5.3.4 Depressed Corner

Figure 5.3.4 shows an isometric view of a depressed corner with the required accessibility measurement locations transposed on the component. Table 5.3.4 further describes the required measurement locations and recommended best practices to follow.

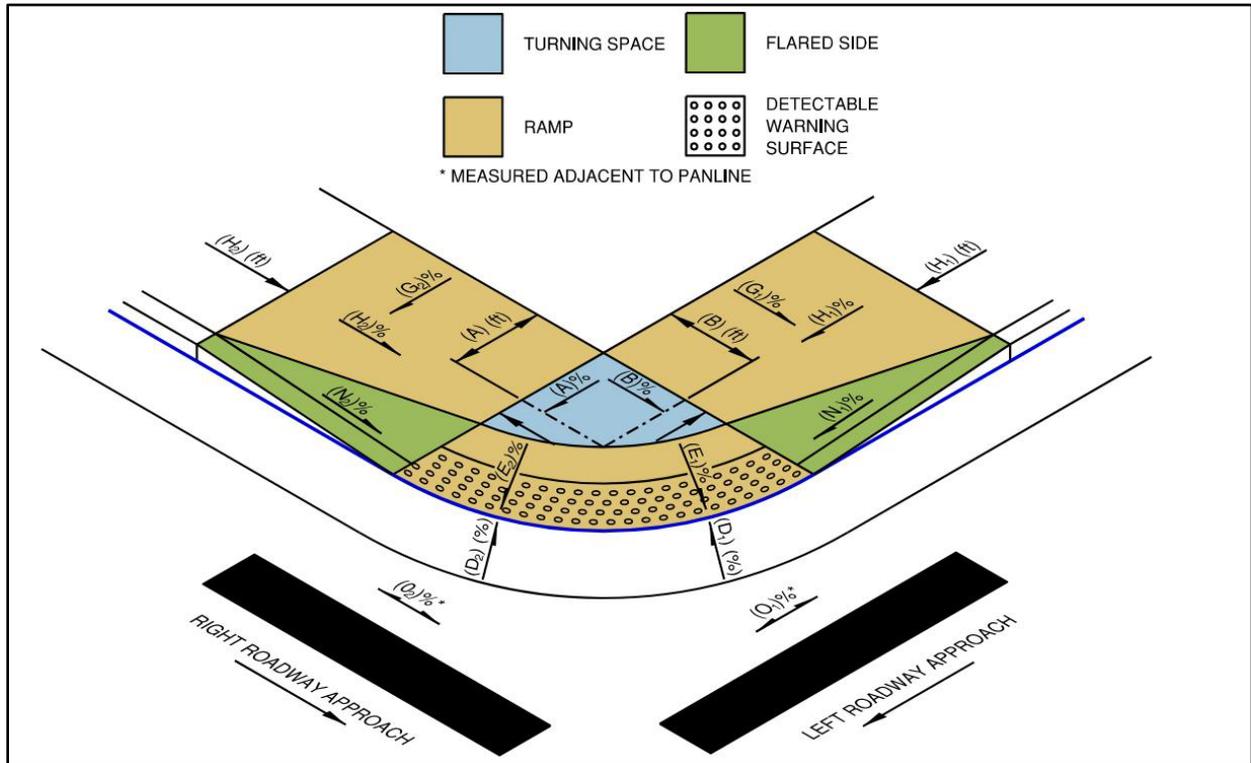


Figure 5.3.4 Depressed Corners

Dimension	Measure	Measurement Notes	Required
A (%)	Turning Space Cross Slope 1	Record at middle of curb ramp	2.0% max.
A (ft)	Turning Space Length	Record at middle of turning space	4'-0" min.
B (%)	Turning Space Cross Slope 2	Record at middle of curb ramp	2.0% max.
B (ft)	Turning Space Width	Record at middle of turning space	4'-0" min.
D <sub>1</sub> (%)	Gutter Counter Slope	Record in front of the middle of the curb ramp	5.0% max.
D <sub>2</sub> (%)	Gutter Counter Slope	Record in front of the middle of the curb ramp	5.0% max.
E <sub>1</sub> (%)	Running Slope 1	Record in the direction of pedestrian travel to crosswalk	5.0% Max.
E <sub>2</sub> (%)	Running Slope 2	Record in the direction of pedestrian travel to crosswalk	5.0% Max.
G <sub>1</sub> (%)	Left Ramp Cross Slope	Record at middle of ramp	2.0% max.
G <sub>2</sub> (%)	Right Ramp Cross Slope	Record at middle of ramp	2.0% max.
H <sub>1</sub> (%)	Left Ramp Running Slope	Record at middle of ramp	8.3% max.
H <sub>1</sub> (ft)	Left Ramp Length	Record at middle of turning space	NA
H <sub>2</sub> (%)	Right Ramp Running Slope	Record at middle of ramp	8.3% max.
H <sub>2</sub> (ft)	Right Ramp Length	Record at middle of turning space	NA
N <sub>1</sub> (%)	Left Flare Slope	Record at back of the depressed curb	10.0% max.
N <sub>2</sub> (%)	Right Flare Slope	Record at back of the depressed curb	10.0% max.
O <sub>1</sub> (%)	Left Roadway Grade	Record in front of the middle of the curb ramp	NA
O <sub>2</sub> (%)	Right Roadway Grade	Record in front of the middle of the curb ramp	NA

Table 5.3.4 Depressed Corners

### 5.3.5 Linear Paths

Linear paths are considered sidewalks, and shared use paths. The following practices have been adopted for inspecting these features:

- Segments that are greater than 25'-0" in length are to be evaluated as part of the ADA Inspection. Shorter segments between components will be evaluated according to pertinent accessibility standards that have been affected by the work.
- Measurements along new sidewalks and shared use paths should be taken and recorded at 50'-0" increments. If the recorded measurement does not meet the running slope or cross slope accessibility standard at that increment, then an additional measurement should be taken both 5'-0" in front and behind the previous measurement and recorded.

## Chapter 6 Request For Practical Exceptions

Where work is within the scoping requirements of a project as defined in [Chapter 2](#) and the standards defined in [Chapter 3](#) cannot be met, a Request for a Practical Exception (RPE) must be processed in accordance with this chapter. Practical exceptions to the standards in this manual may be considered when physical constraints are encountered or when public safety considerations, or operational issues make compliance with standards in this manual impractical. In all cases, where compliance is not practical, compliance is required to the maximum extent practicable and must not result in a detriment to the usability or accessibility of the feature.

### 6.1 Request for Practical Exception Warrants

An RPE should not be submitted until all reasonable alternatives to provide convenient, continuous, and accessible pedestrian accommodations have been exhausted using sound engineering judgment. All RPEs submitted must be site specific to the conditions and constraints encountered at the location. The Department will not grant RPEs as blanket approvals on a project-wide or program-wide basis.

The following list comprises the constraints or considerations that could warrant the creation of an RPE:

- **Pedestrian and Vehicular Safety** – A location where adopting the minimum standard contained in this manual could present a safety hazard to the public, both driver and/ or pedestrian.
- **Operational Effects** – A location where adopting the minimum standard contained in this manual could severely hinder the operation of the transportation network.
- **Existing Site Topography** – A location where adopting the minimum standard contained in this manual is not practical due to the natural terrain or manmade surfaces of the adjacent street, sidewalk, or other adjacent land uses.
- **Right-of-Way Availability** – A location where adopting the minimum standard contained in this manual would require purchasing additional right-of-way and the project scope would not otherwise require the purchase of additional right-of-way.
- **Structures** – A location where adopting the minimum standard contained in this manual would result in detrimental impacts to existing structural facilities including bridges, foundations, buildings, vaults, or other underground structures.
- **Utilities** – A location where adopting the minimum standard contained in this manual would require the relocation of existing utility facilities and the relocation is considered infeasible.
- **Drainage** – A location where adopting the minimum standard contained in this manual would be impractical due to the presence of adjacent drainage facilities, including to drainage structures and drainage pipe.
- **Environmental or Cultural Impacts** – A location where adopting the minimum standard contained in this manual would threaten or adversely affect any of the following: air quality, Clean Water Act permits, endangered species, underground storage tanks, and hazardous materials.
- **Historic Features and Historic Property Impacts** – A location where adopting the minimum standard contained in this manual would threaten, adversely affect, or destroy historically significant features of a qualified historic facility. In these cases, coordination must be performed with the State Historic Preservation Office or Advisory Council on Historic Preservation and compliance is required to the extent that it does not threaten or destroy historically significant features of the facility.
- **Other Physical Constraints** – A location where other physical constraints prevent adopting the minimum standard contained in this manual.

In accordance with Federal guidance, cost is not a contributing factor in the RPE process. Additionally, community opposition to providing the required degree of accessibility compliance is not an adequate RPE warrant.

## 6.2 Request for Practical Exception Documentation and Approval

The Department classifies RPEs based on the phase of the project development process in which they are generated. Accordingly, the Department has classified Design Phase, Construction Phase and Administrative RPEs. This manual provides a separate discussion on each of these different RPE types to provide more explicit and usable guidance. RPEs are intended to become an archivable document that summarizes the challenges, the decision-making process, and the rationale used at a specific location. Accordingly, RPEs must be written so that a reader with limited knowledge of the location can come to the same reasonable conclusion. In general, all RPEs should be written clearly and succinctly and must sufficiently document the following items:

- A discussion of the project scope,
- The site-specific warrant(s) for the creation of an RPE,
- The feature(s) that will not meet the applicable accessibility standards contained in this manual,
- The alternative proposed for implementation as well as a discussion of any other alternatives that were considered,
- The analysis and subsequent decision-making process that led to the selection of the alternative that is proposed for implementation, and
- A discussion that summarizes how the proposed solution does not lead to a decrease in facility usability.

When applicable, the RPE documentation should also provide consideration for a “no build alternative”. A no build alternative may be appropriate where the current configuration of the accessibility feature offers the maximum amount of usability given the site’s constraints.

The standard DelDOT RPE form is available on DelDOT’s Design Resource Center website. The standard form is meant as a cover letter and executive summary. All documentation required by this manual and other support information required to convey the intent of the preparer of the RPE must be captured in supporting appendices or enclosures. Sample RPEs are available on DelDOT’s Design Resource Center website.

The Department’s Office of Civil Rights is tasked with overseeing the Department’s RPE process and approving all individual RPEs. Accordingly, the Department’s Office of Civil Rights can be used as a resource during the RPE development process to ensure timely reviews and approvals.

### 6.2.1 Design Phase Request for Practical Exception

As with all elements of design, it is ideal to identify, mitigate and subsequently document locations where the applicable accessibility standard is not able to be practically met within the scope of a project during the design phase. Accordingly, it is the Department’s goal that all RPEs required during the life of a project be developed and approved during the design phase. All RPEs developed during the design phase must be adequately documented in the contract documents to alert all necessary entities to the presence of the RPE.

It is recommended that part of a project’s scoping include reviewing the existing site for locations that could create accessibility challenges. These early-stage investigations are a useful tool to determine

locations which may require additional attention during the design phase. On a typical design project, detailed project grades and geometrics are not established until the semi-final plan submission; accordingly, it should be the goal of the design team to submit all required RPEs to the Title II Coordinator for review and approval by this design phase milestone.

All design phase RPEs must be prepared by or under the direct supervision of the Engineer of Record. Once the RPE and all associated documentation has been completed, a DeIDOT quality control review will take place. The quality control review shall be performed by a staff member who is professionally competent in the subject matter of accessibility standards. It is preferable that this quality control review be performed by a staff member in the administering DeIDOT section. Once the Engineer of Record and quality control reviewer agree to the content and recommendations of the document, the Engineer of Record and quality control reviewer shall sign the standard RPE form as the “Prepared by” and “Reviewed by” respectively and submit to the DeIDOT Title II Coordinator for review and approval. The Title II Coordinator shall review the content of the document to ensure that the RPE reached a logical conclusion and provides sufficient documentation for the Department’s record.

#### 6.2.2 Construction Phase Request for Practical Exception

The RPE process is intended to be undertaken during the design phase; however, there may be instances where an RPE may need to be processed during the construction phase. As soon as it becomes apparent in the field that a pedestrian facility cannot be constructed to meet the standards required in this manual, it is imperative that communication occur between the administering construction section and the design team. Once the design team reviews the location and concurs that the site will not allow for the installation of a facility that meets the requirements of this manual, then the design team must facilitate the development of a construction phase RPE.

All construction phase RPEs must be prepared by or under the direct supervision of the Engineer of Record. Once the RPE and all associated documentation has been completed, a DeIDOT quality control review will take place. The quality control review shall be performed by a staff member who is professionally competent in the subject matter of accessibility standards. It is preferable that this quality control review be performed by a staff member in the administering DeIDOT design section. Once the Engineer or Record and quality control reviewer agree to the content and recommendations of the document, the Engineer of Record and quality control reviewer shall sign the standard RPE form as the “Prepared by” and “Reviewed by” respectively and submit to the DeIDOT Title II Coordinator for review and approval. The Title II Coordinator shall review the content of the document to ensure that the RPE reached a logical conclusion and provides sufficient documentation for the Department’s record.

#### 6.2.3 Administrative Request for Practical Exception

The Department also classifies Administrative RPEs. Administrative RPEs may only be created by and approved by the DeIDOT Civil Rights Section and are only to be processed at locations where an RPE is required but does not readily fit the category of a Design Phase RPE or a Construction Phase RPE. The creation and approval of Administrative RPEs are at the sole discretion of the DeIDOT Civil Rights Group.