



COLORADO
Department of Transportation



Curb Ramp Measurement Guide

Version 1.0 – January 2020

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Disclaimer:

The information contained in this document does not constitute a CDOT standard and shall be for reference only. This document is to be used in conjunction with existing CDOT design and construction standards.

Purpose of the Curb Ramp Measurement Guide

General Notes

- The purpose of the Curb Ramp Measurement Guide is to standardize the process for measuring curb ramps to collect uniform data.
- It is the responsibility of the engineer, contractor, or inspector to understand the applicable CDOT and PROWAG guidelines as they relate to curb ramps.
- All slope measurements are recorded as a percentage to one decimal place (i.e. 8.3% running slope)
- All distance measurements are recorded to the nearest inch (i.e. 49 IN. curb ramp width)

Required Measuring Equipment

- 2' smart level for all slope measurements taken on the curb ramps.
 - CDOT uses a Stabila 196-2 smart level. Grades shall be measured to the nearest tenth of a percent.
 - All smart levels require calibration to record accurate measurements. Calibration should be done regularly prior to measurement.
 - For Stabila levels refer to the user manual for calibration instructions: [Stabila User Manual](#)
- Metal measuring tape with a minimum length of 25'. Measurements shall be taken to the nearest inch.

Additional CDOT Curb Ramp Resources

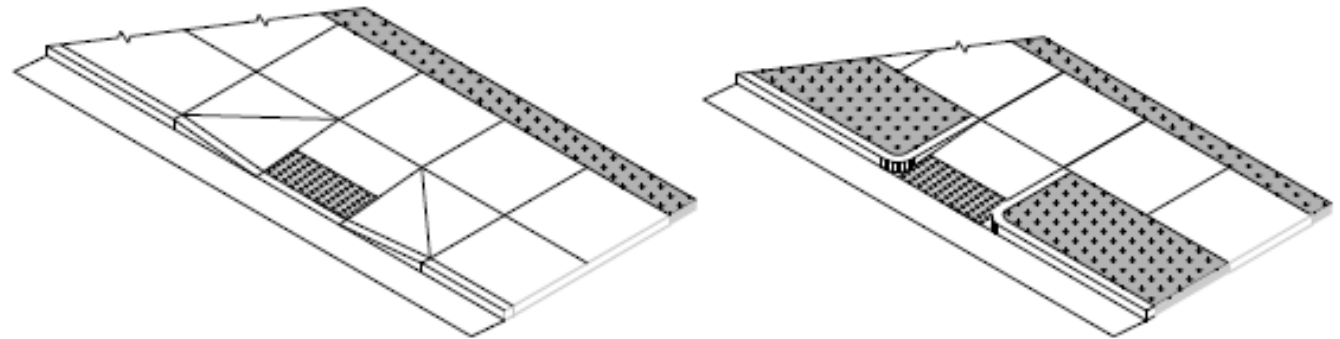
<https://www.codot.gov/business/civilrights/ada/resources-engineers>

<https://www.access-board.gov/prowag/proposed/planning-and-design-for-alterations/chapter6/>

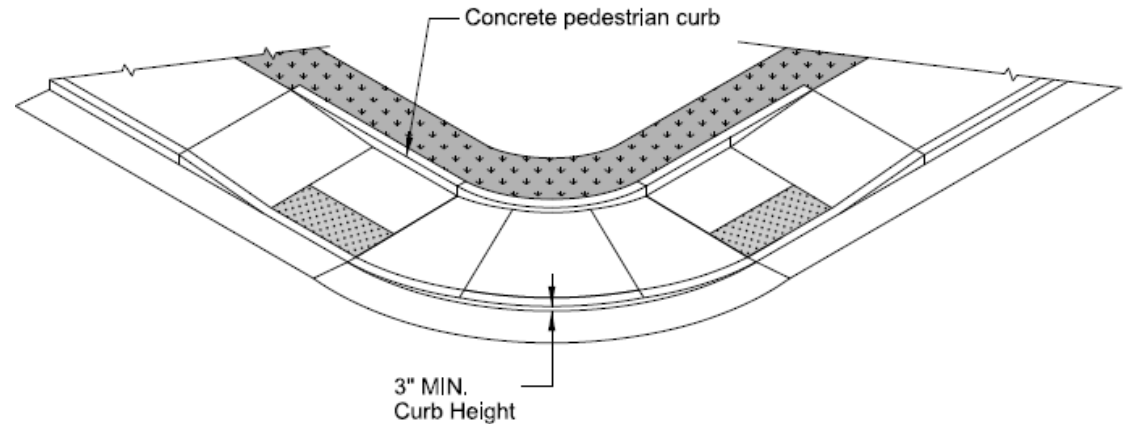
Standard CDOT Curb Ramp Types

There are 3 standard CDOT curb ramp types: perpendicular, parallel, and depressed corner/ blended transitions. Each of these ramp types can be configured to provide accessibility with varying field constraints. Additional detail on dimensions and requirements can be found on CDOT Standard M-608-1 ([M-608-1](#)).

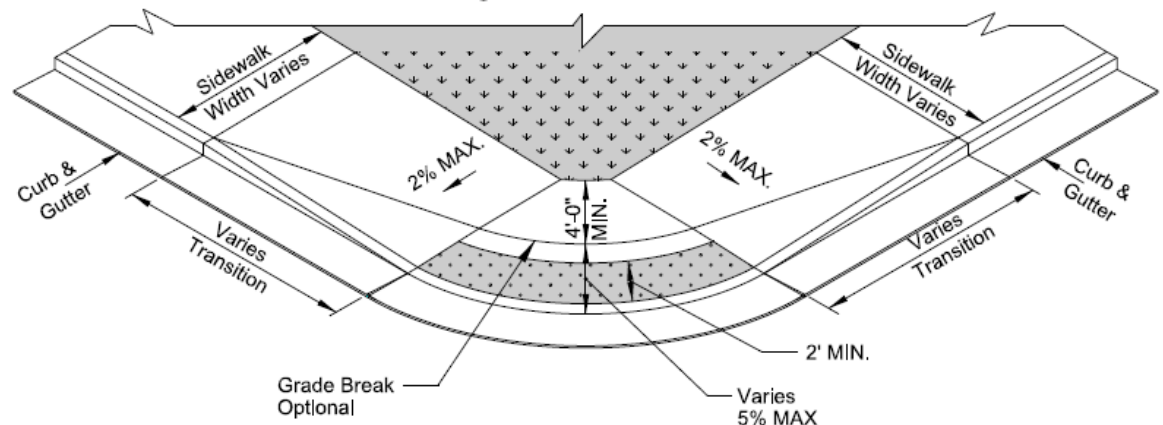
Perpendicular Curb Ramp (Type 1)



Parallel Curb Ramp (Type 2)

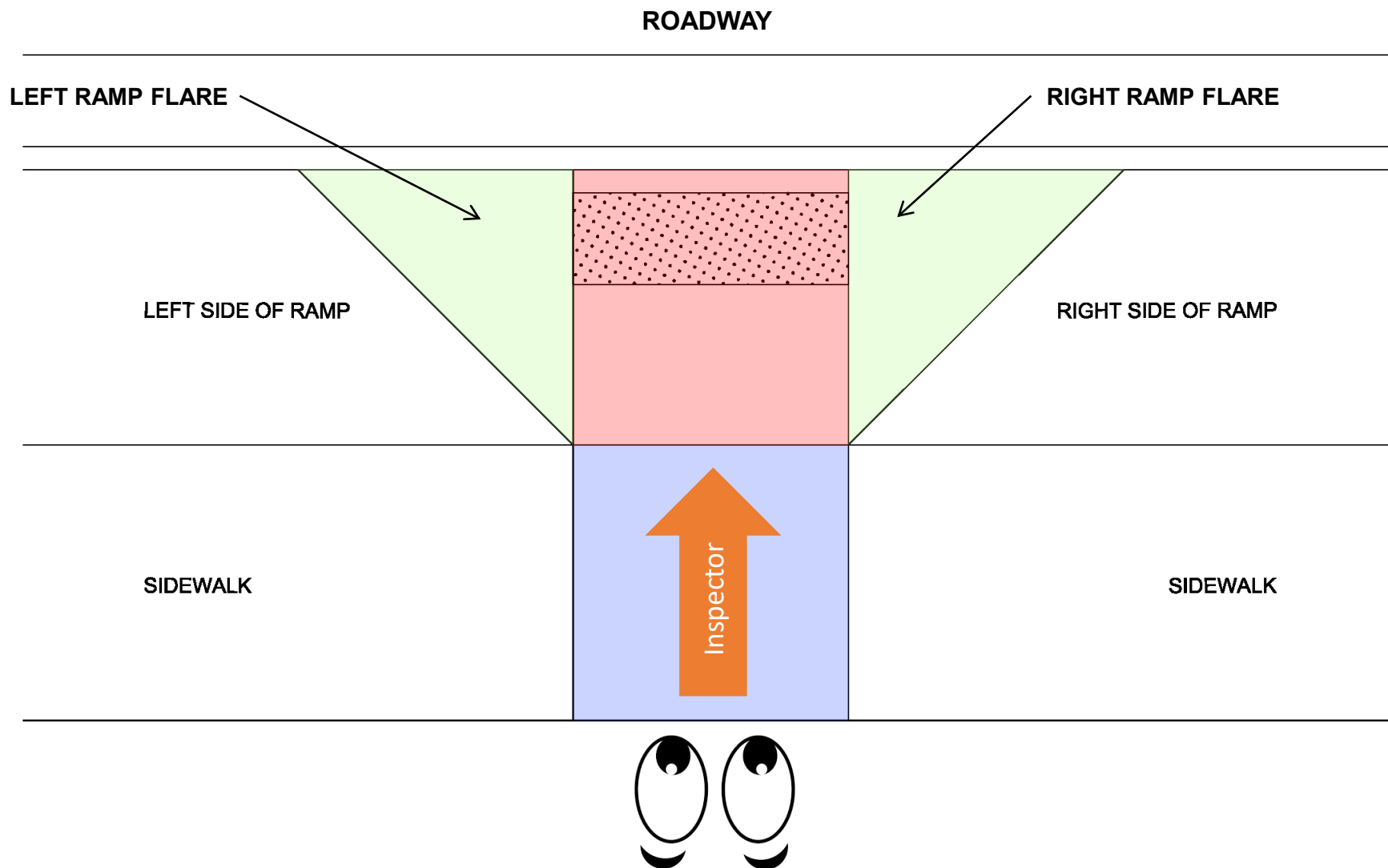


Depressed Corner/ Blended Transitions (Type 5)



Left/Right Ramp Designation

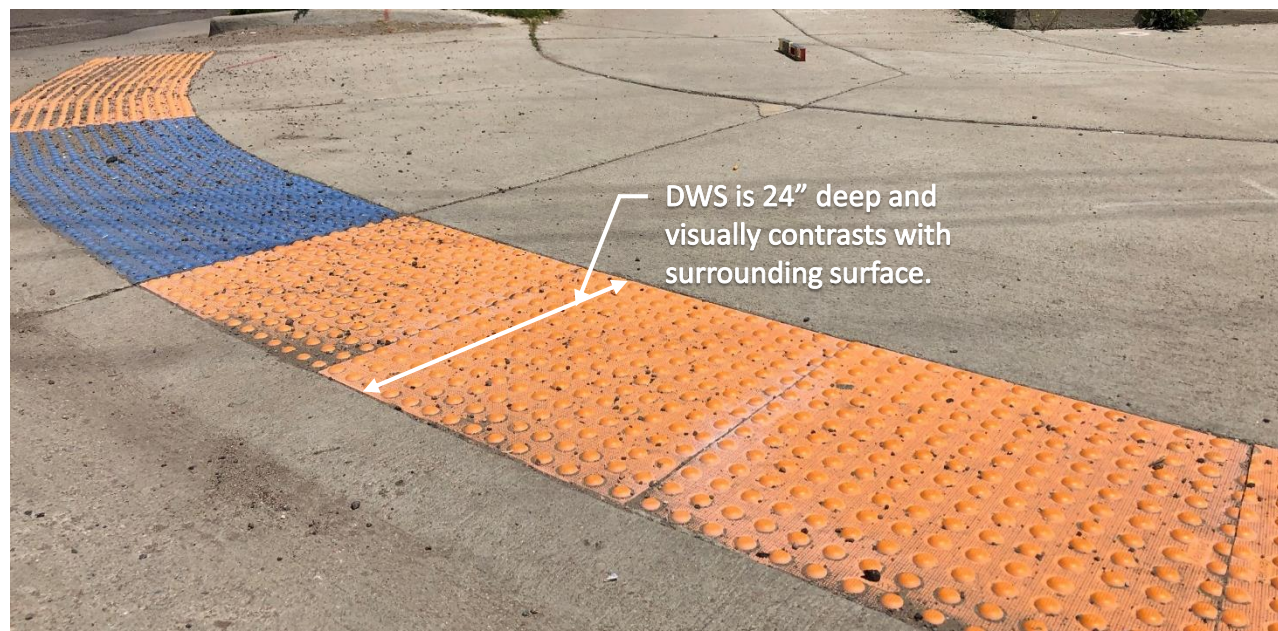
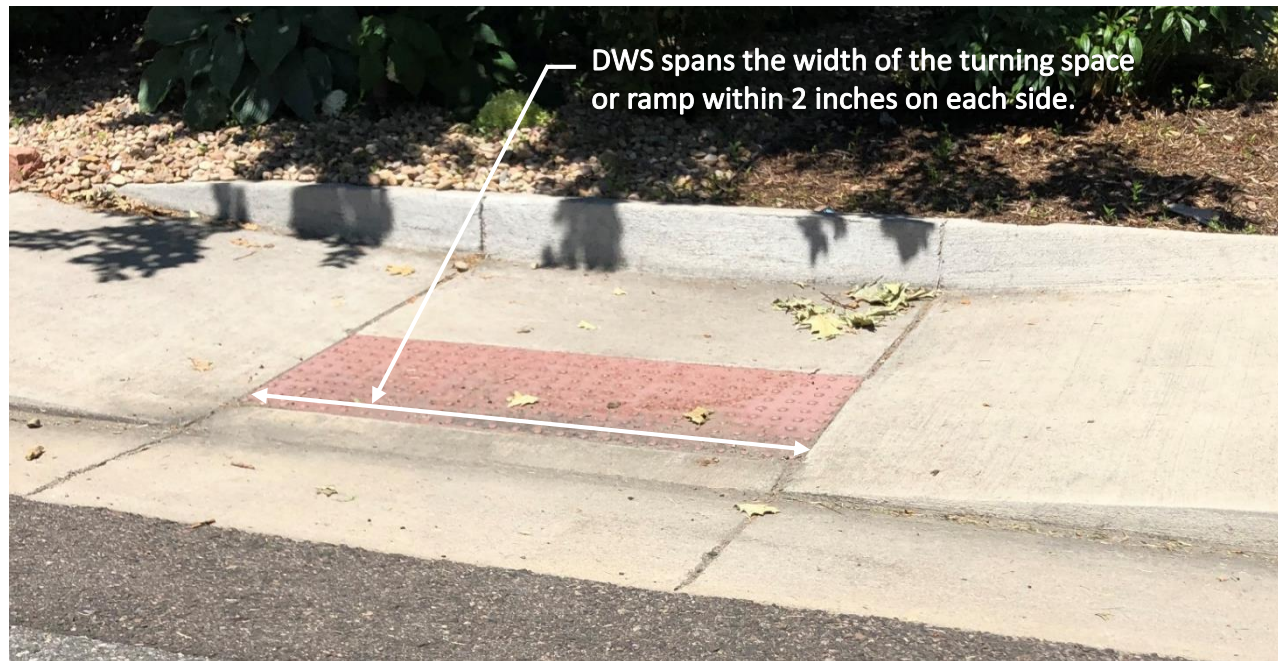
Left and right designations are determined by standing on the turning space and looking in the direction of the roadway, all elements to your left are assigned a “left” designation and all elements to your right are assigned a “right” designation. This applies to all curb ramp types.



Detectable Warning Surface Checks

Detectable Warning Surface (DWS)

- Detectable Warning Surfaces (DWS) must span the width of the curb ramp (Perpendicular Ramp, Blended Transition, Depressed Corner) or turning space (Parallel Ramp). DWS width is compliant when it is within 2" of edge of ramp or turning space on each side.
- DWS must be at least 2' deep.
- DWS must contrast visually with the surrounding surface (light on dark or dark on light).
- DWS are placed at the back of curb for Parallel, Blended Transition, and Depressed Corner ramp types. For Perpendicular ramps see the placement instructions on M-608-1 for detailed requirements.



Ramp Flare Checks

Flares Vs. Return Curbs (All Curb Ramp Types)

Where a curb ramp edge abuts a walkable surface, a flared side shall be provided for that edge of the curb ramp.

Where a curb ramp edge abuts a non-walkable surface (landscaping, traffic signal equipment, etc.) return curbs may be provided.

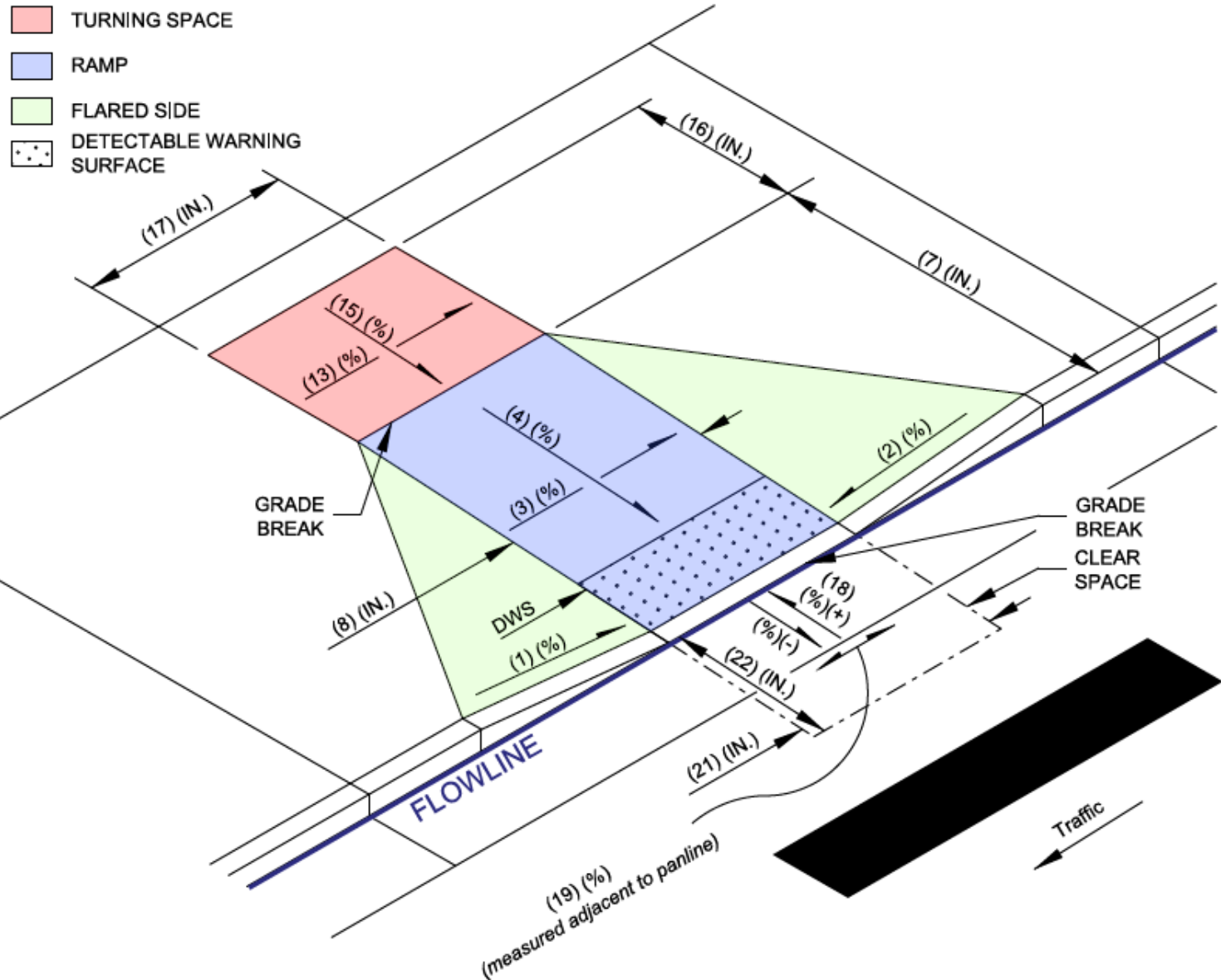


Curb Ramp Measurement Guide

Perpendicular Curb Ramp Components

Perpendicular Ramp Components

- 1 – Right Flare Slope (%)
- 2 – Left Flare Slope (%)
- 3 – Curb Ramp Cross Slope (%)
- 4 – Curb Ramp Running Slope (%)
- 7 – Curb Ramp Length (IN.)
- 8 – Curb Ramp Width (IN.)
- 13 – Turning Space Cross Slope (%)
- 15 – Turning Space Running Slope (%)
- 16 – Turning Space Length (IN.)
- 17 – Turning Space Width (IN.)
- 18 – Gutter Counter Slope (%)
- 19 – Roadway Grade (%)
- 21 – Clear Space Width (IN.)
- 22 – Clear Space Length (IN.)



Perpendicular Curb Ramp Measurements

Right Flare Slope (1)

Measure the slope adjacent the back of curb centered along the right flare (%).



Left Flare Slope (2)

Measure the slope adjacent the back of curb centered along the left flare (%).



Perpendicular Curb Ramp Measurements

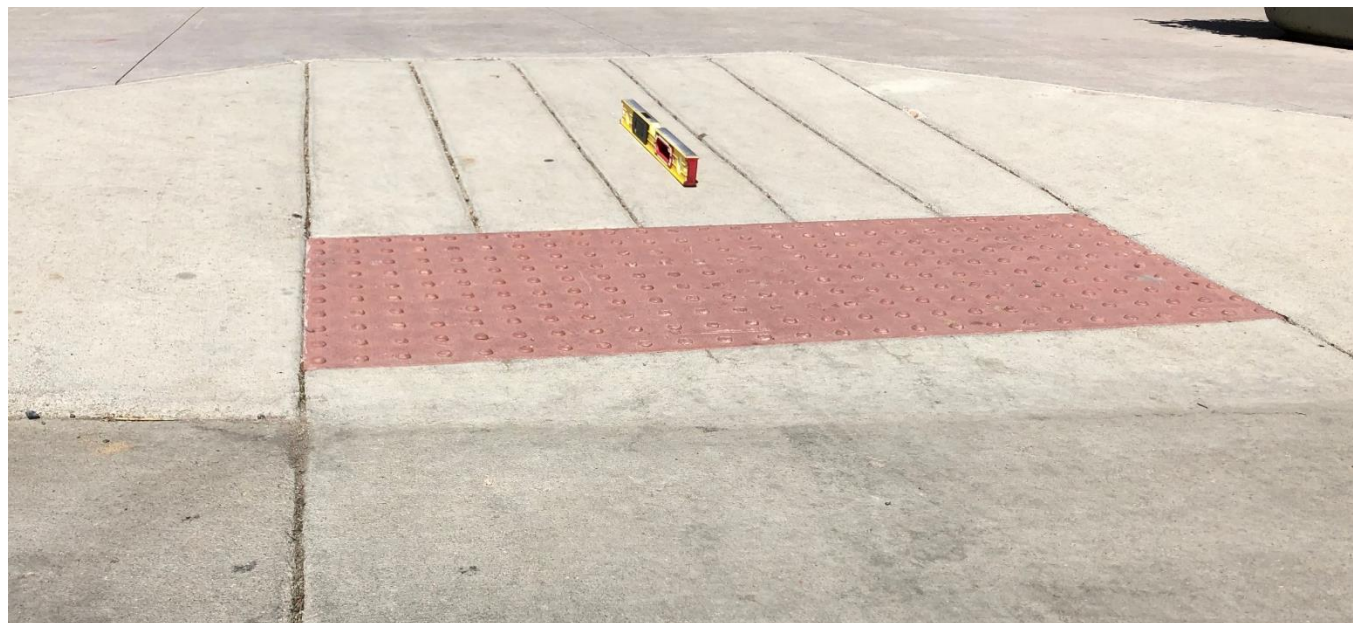
Curb Ramp Cross Slope (3)

Measure the slope perpendicular to the ramp run in the center of the ramp (%).



Curb Ramp Running Slope (4)

Measure the slope along the center line of the ramp run in the center of the ramp (%).



Perpendicular Curb Ramp Measurements

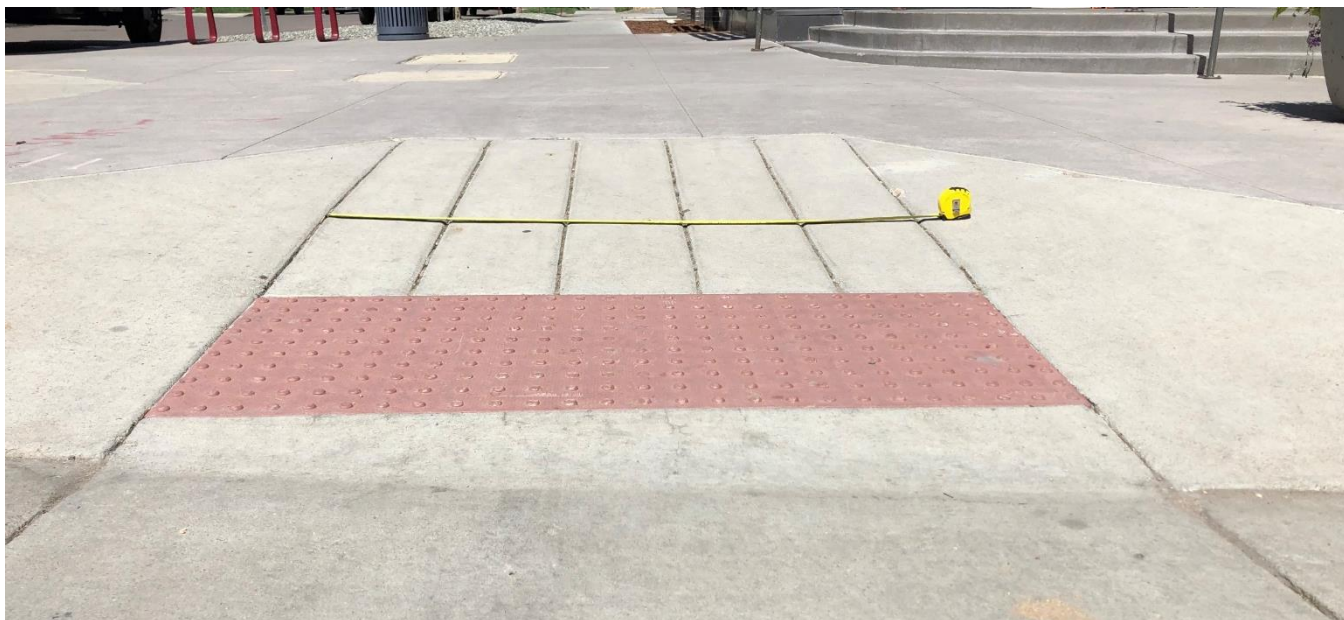
Curb Ramp Length (7)

Measure the distance from the grade break at the top of the ramp to the grade break at the bottom of the ramp along the ramp center line (IN.)



Curb Ramp Width (8)

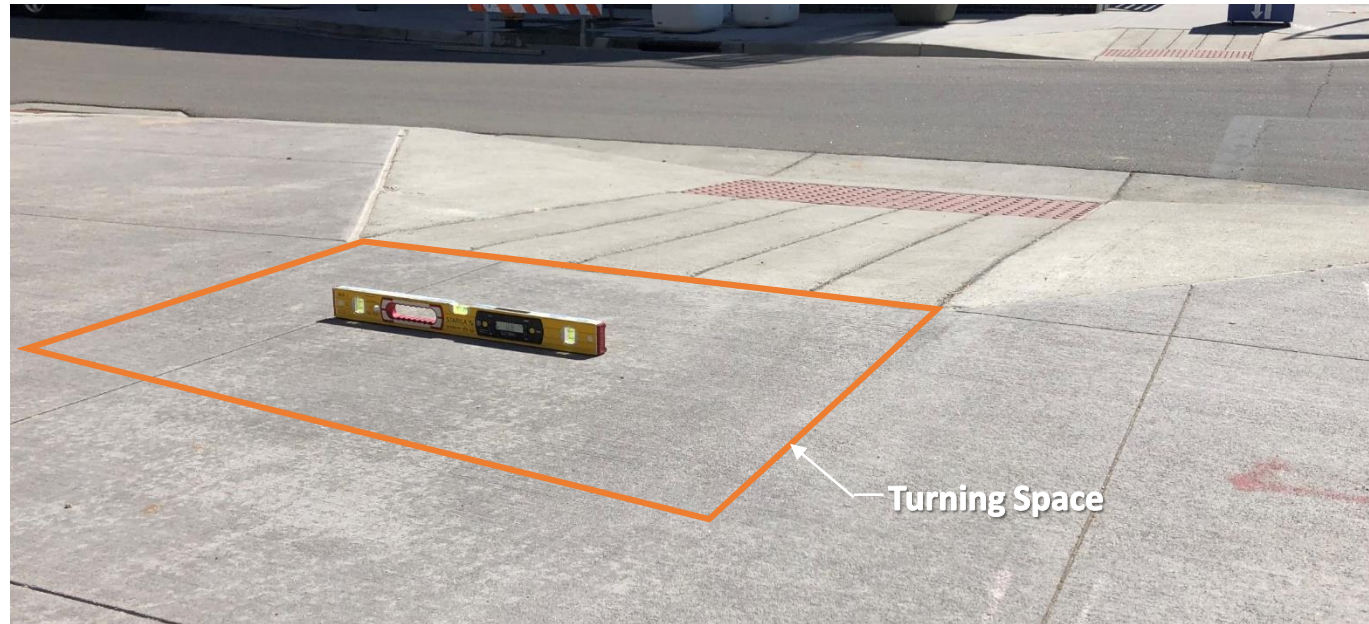
Measure the distance from left edge of the ramp to the right edge of the ramp at the mid point of the ramp run (IN.). Ensure the measurement is perpendicular to the ramp run.



Perpendicular Curb Ramp Measurements

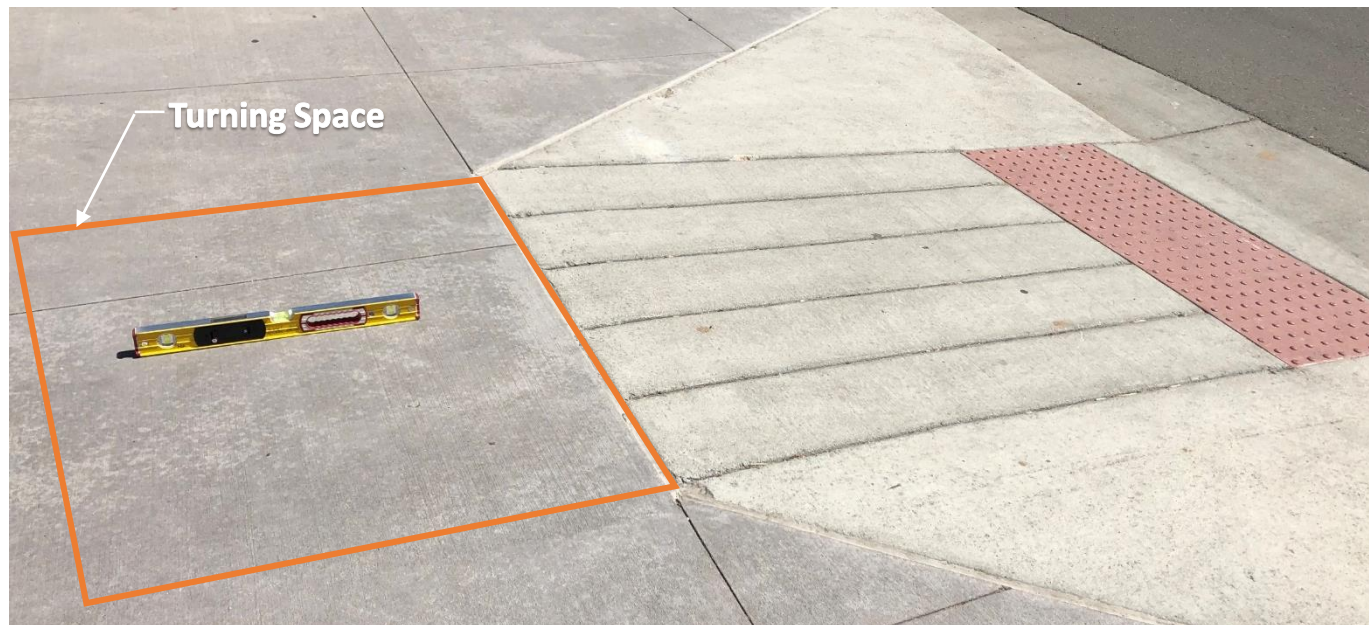
Turning Space Cross Slope (13)

Measure the slope perpendicular to the ramp run in the center of the turning space area (%).



Turning Space Running Slope (15)

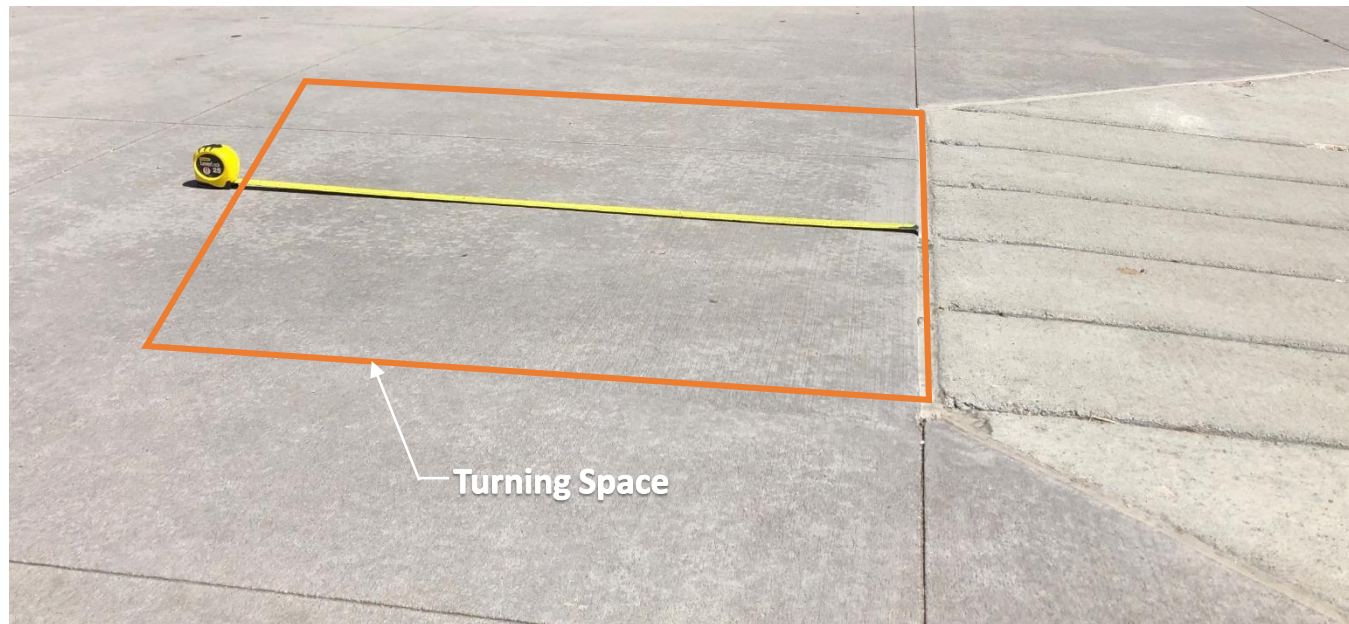
Measure the slope parallel to the ramp run in the center of the turning space area (%).



Perpendicular Curb Ramp Measurements

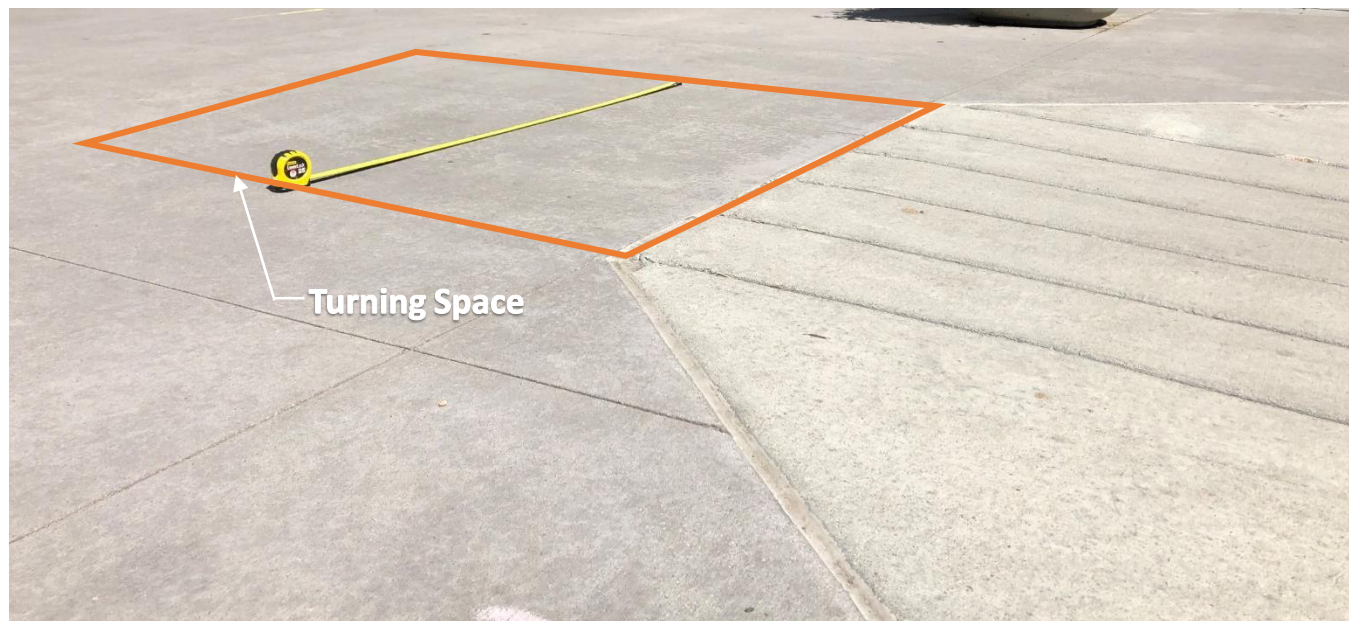
Turning Space Length (16)

Measure the distance from the back of the turning space to the top ramp grade break in line with the ramp run center line (IN.).



Turning Space Width (17)

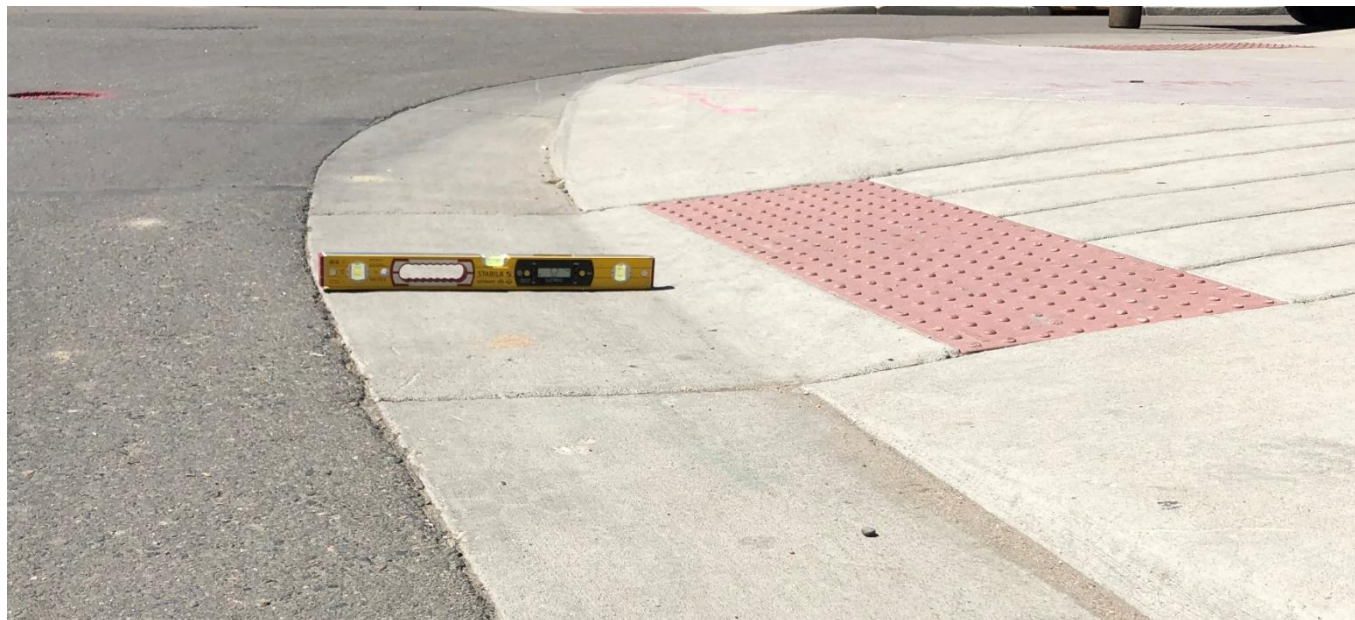
Measure the distance from the left side of the turning space to the right side of the turning space. Measurement should be taken perpendicular to the ramp run at the center of the turning space (IN.).



Perpendicular Curb Ramp Measurements

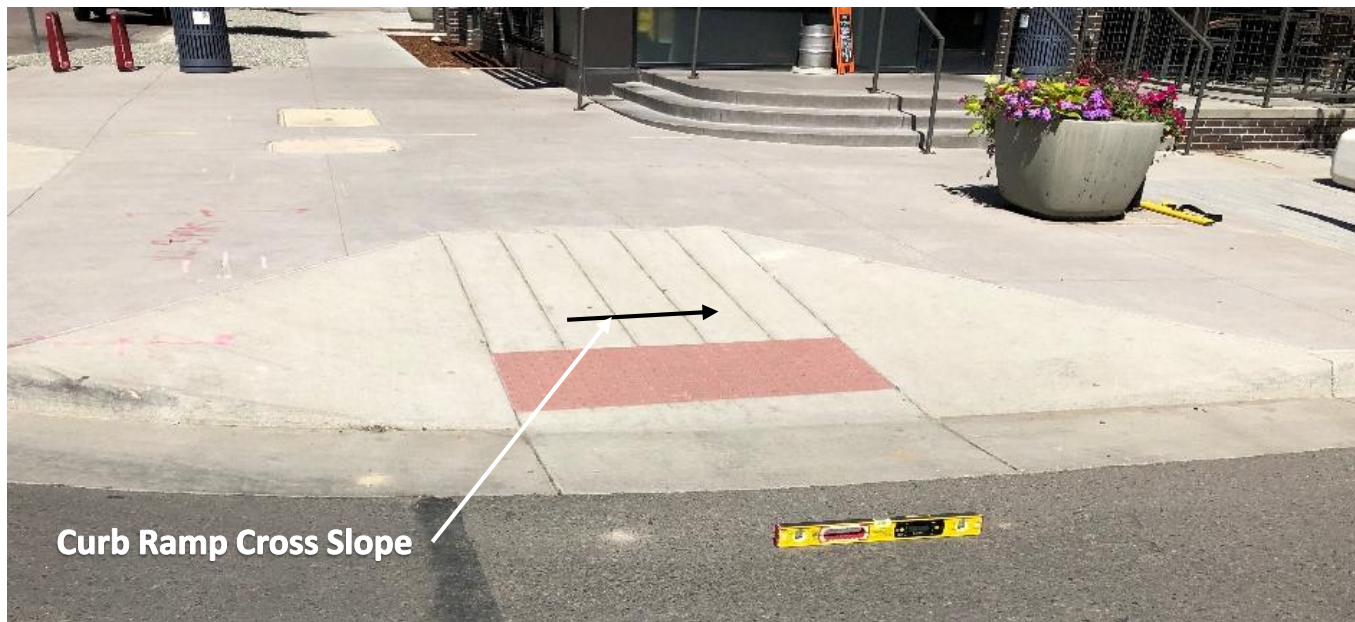
Gutter Counter Slope (18)

Measure the slope of the gutter at the bottom center of the curb ramp (%).



Roadway Grade (19)

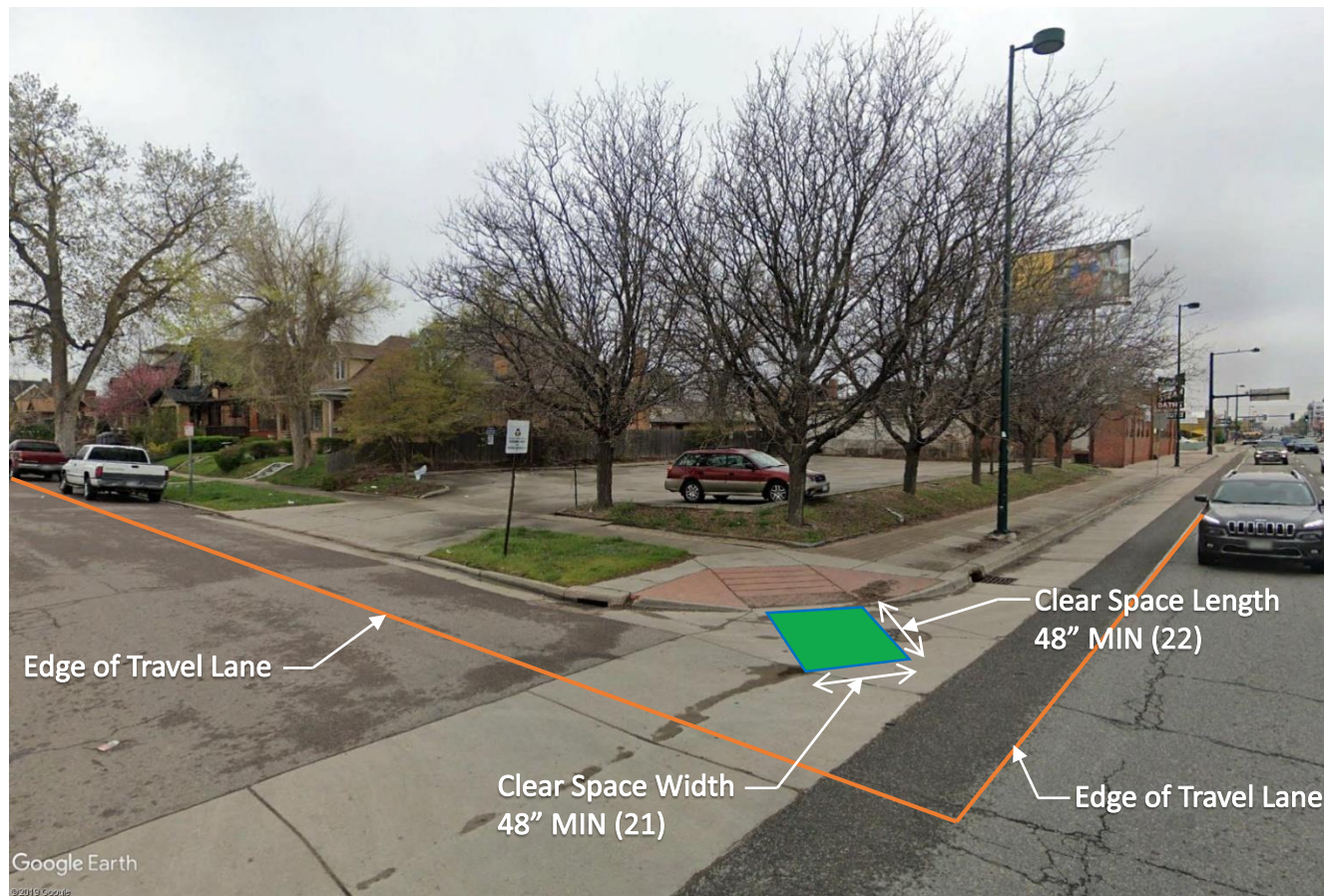
Measure the roadway slope parallel to the curb ramp cross slope in front of the curb ramp (%).



Perpendicular Curb Ramp Measurements

Clear Space Width (21) and Clear Space Length (22)

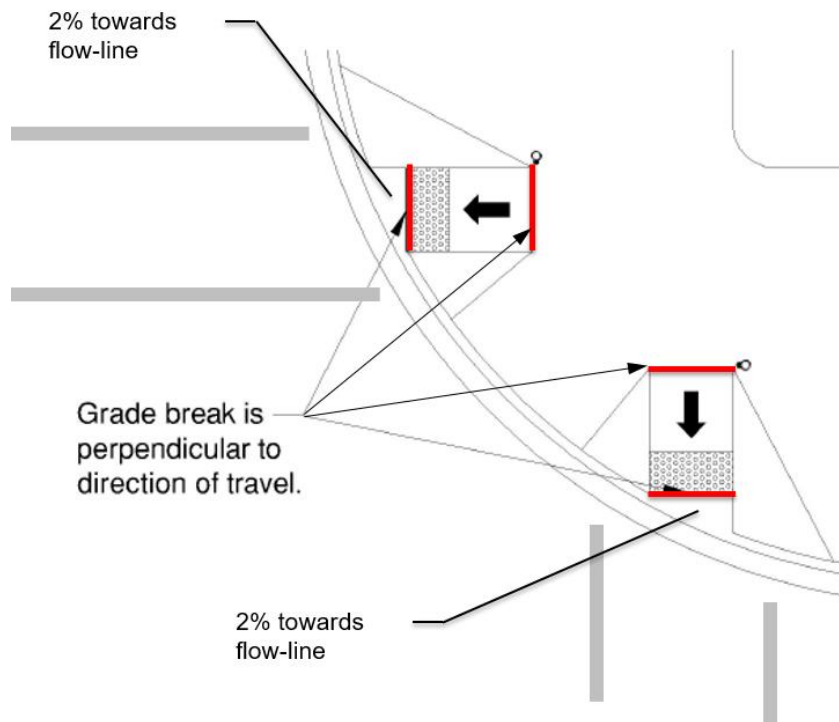
The clear space is an imaginary square at the bottom of the ramp which allows pedestrians to turn and orient themselves in the direction they want to cross. This square needs to be a minimum 48"x48". The Clear Space needs to be located outside of parallel vehicle travel lanes.



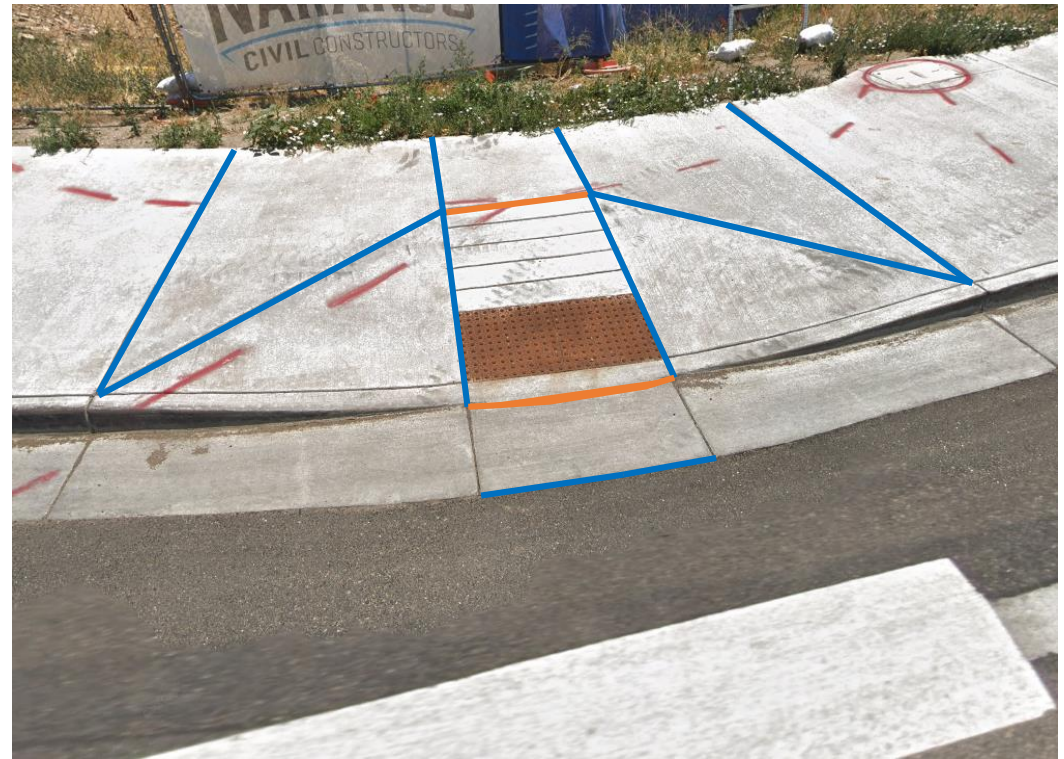
Perpendicular Curb Ramp Measurements

Grade Breaks and Flush Joints

- Ramp grade breaks must be perpendicular to the direction of pedestrian travel.
- Grade breaks and joints must be flush.
 - < 1/2" horizontal gap
 - < 1/4" vertical discontinuity/difference



Parallel grade break example for perpendicular ramps



Blue lines denote joints which need to be flush.

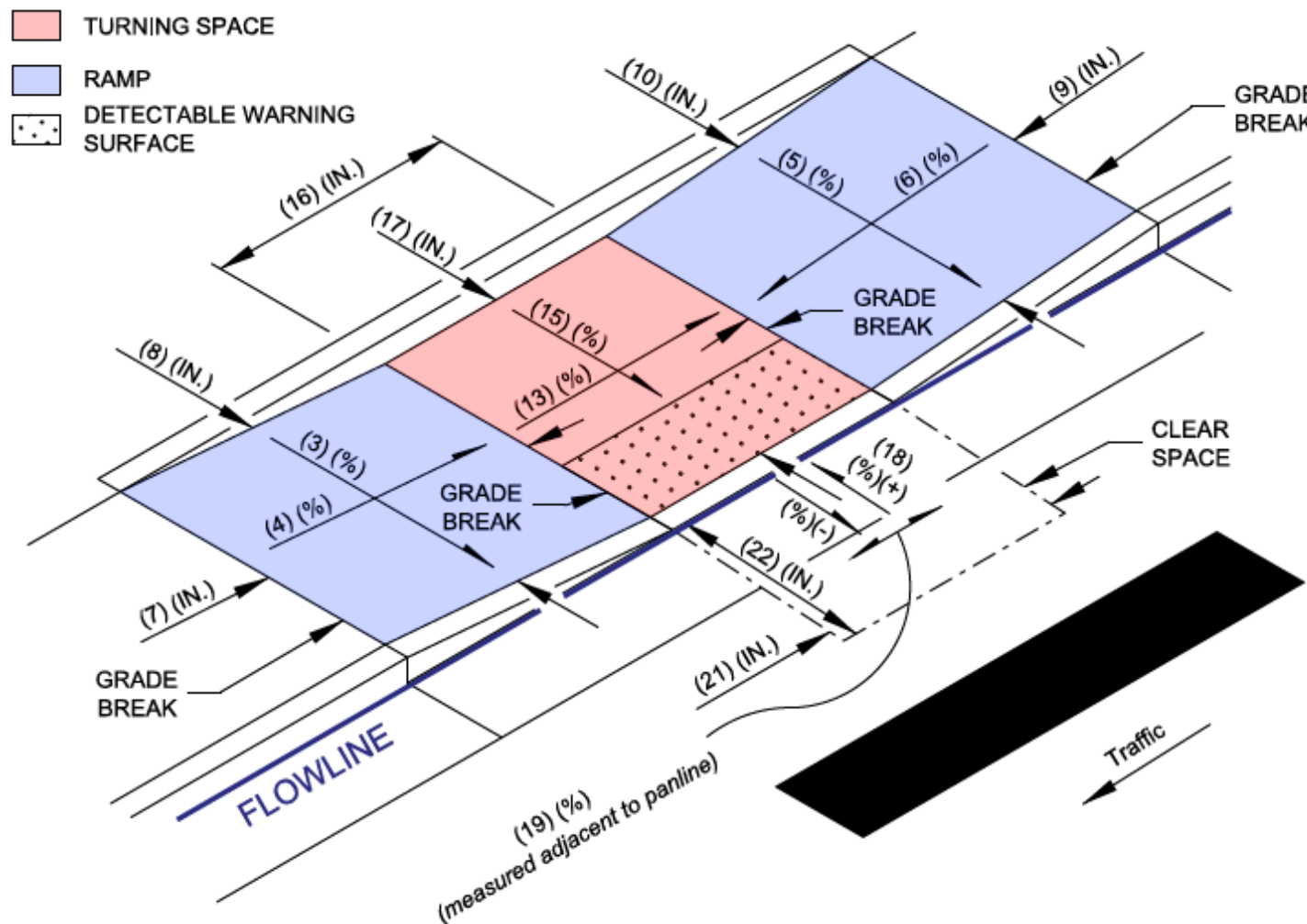
Orange lines denote ramp grade breaks that must be flush and perpendicular to the ramp run.

Curb Ramp Measurement Guide

Parallel Curb Ramp Measurements

Parallel Ramp Components

- 3 – Right Ramp Cross Slope (%)
- 4 – Right Ramp Running Slope (%)
- 5 – Left Ramp Cross Slope (%)
- 6 – Left Ramp Running Slope (%)
- 7 – Right Ramp Length (IN.)
- 8 – Right Ramp Width (IN.)
- 9 – Left Ramp Length (IN.)
- 10 – Left Ramp Width (IN.)
- 13 – Turning Space Cross Slope (%)
- 14 – Turning Space Running Slope (%)
- 16 – Turning Space Length (IN.)
- 17 – Turning Space Width (IN.)
- 18 – Gutter Counter Slope (%)
- 19 – Roadway Grade (%)
- 21 – Clear Space Width
- 22 – Clear Space Length



Parallel Curb Ramp Measurements

Right Ramp Cross Slope (3)

Measure the slope perpendicular to the right ramp run in the center of the ramp (%).



Right Ramp Running Slope (4)

Measure the slope along the center line of the right ramp run in the center of the ramp (%).



Parallel Curb Ramp Measurements

Left Ramp Cross Slope (5)

Measure the slope perpendicular to the left ramp run in the center of the ramp (%).



Left Ramp Running Slope (6)

Measure the slope along the center line of the left ramp run in the center of the ramp (%).



Parallel Curb Ramp Measurements

Right Ramp Length (7)

Measure the distance from the grade break at the top of the right ramp to the grade break at the bottom of the right ramp along the ramp center line (IN.).



Right Ramp Width (8)

Measure the distance from left edge of the ramp to the right edge of the ramp at the mid point of the ramp run (IN.). Ensure the measurement is perpendicular to the ramp run.



Parallel Curb Ramp Measurements

Left Ramp Length (9)

Measure the distance from the grade break at the top of the left ramp to the grade break at the bottom of the left ramp along the ramp center line (IN.)



Left Ramp Width (10)

Measure the distance from left edge of the ramp to the right edge of the ramp at the mid point of the ramp run (IN.). Ensure the measurement is perpendicular to the ramp run



Parallel Curb Ramp Measurements

Turning Space Cross Slope (13)

Measure the slope parallel to the flow line in the center of the turning space area (%).



Turning Space Running Slope (15)

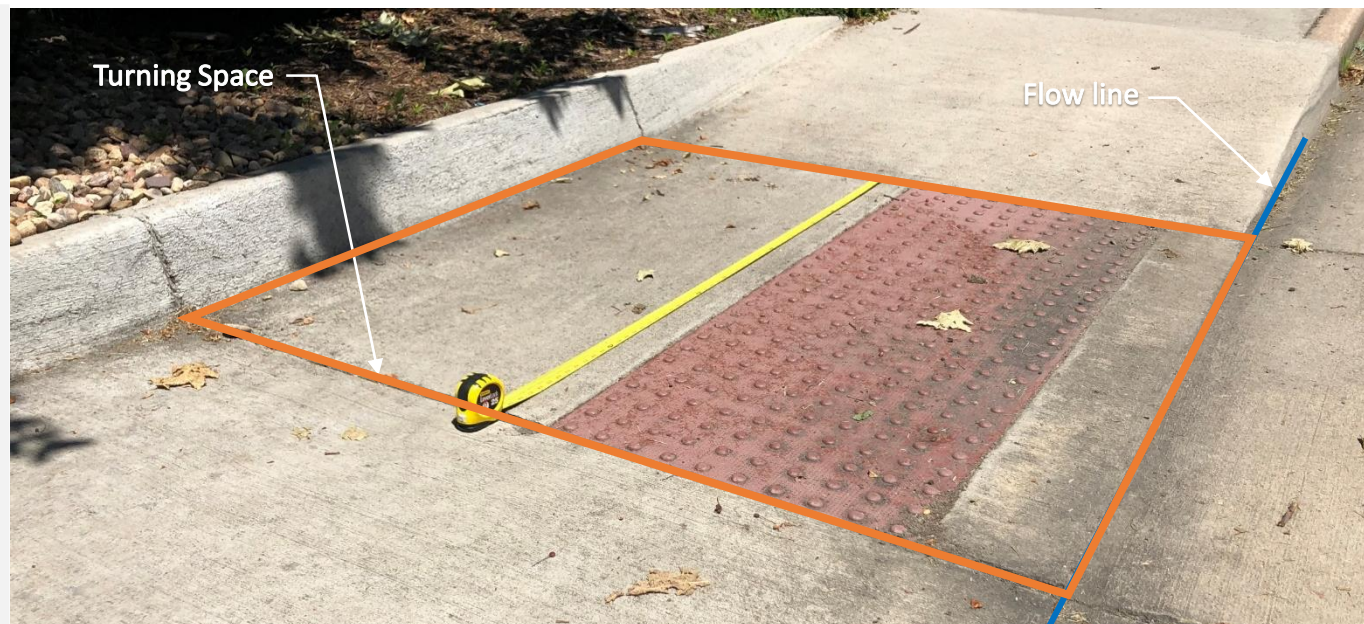
Measure the slope perpendicular to the ramp flow line in the center of the turning space area (%).



Parallel Curb Ramp Measurements

Turning Space Length (16)

Measure the distance from the left side of the turning space to the right side of the turning space. Measurement is taken in the center of the turning space parallel to the flow line (IN.).



Turning Space Width (17)

Measure the distance from the back of the turning space to the flow line. Measurement is taken in the center of the turning space perpendicular to the flow line (IN.).



Parallel Curb Ramp Measurements

Gutter Counter Slope (18)

Measure the gutter slope at the bottom center of the turning space (%).



Roadway Grade (19)

Measure the roadway slope parallel to the gutter pan in front of the turning space (%).



Parallel Curb Ramp Measurements

Clear Space Width (21) and Clear Space Length (22)

The clear space is an imaginary square at the bottom of the ramp which allows pedestrians to turn and orient themselves in the direction they want to cross. This square needs to be a minimum 48"x48". The Clear Space needs to be located outside of parallel vehicle travel lanes.



Parallel Curb Ramp Measurements

Curb Ramp Grade Breaks and Joint Requirements

All ramp grade breaks are perpendicular to the ramp runs.

All joints are flush (less than $\frac{1}{4}$ " vertical discontinuity and less than $\frac{1}{2}$ " horizontal gap).



Blue lines denote joints that must be flush.

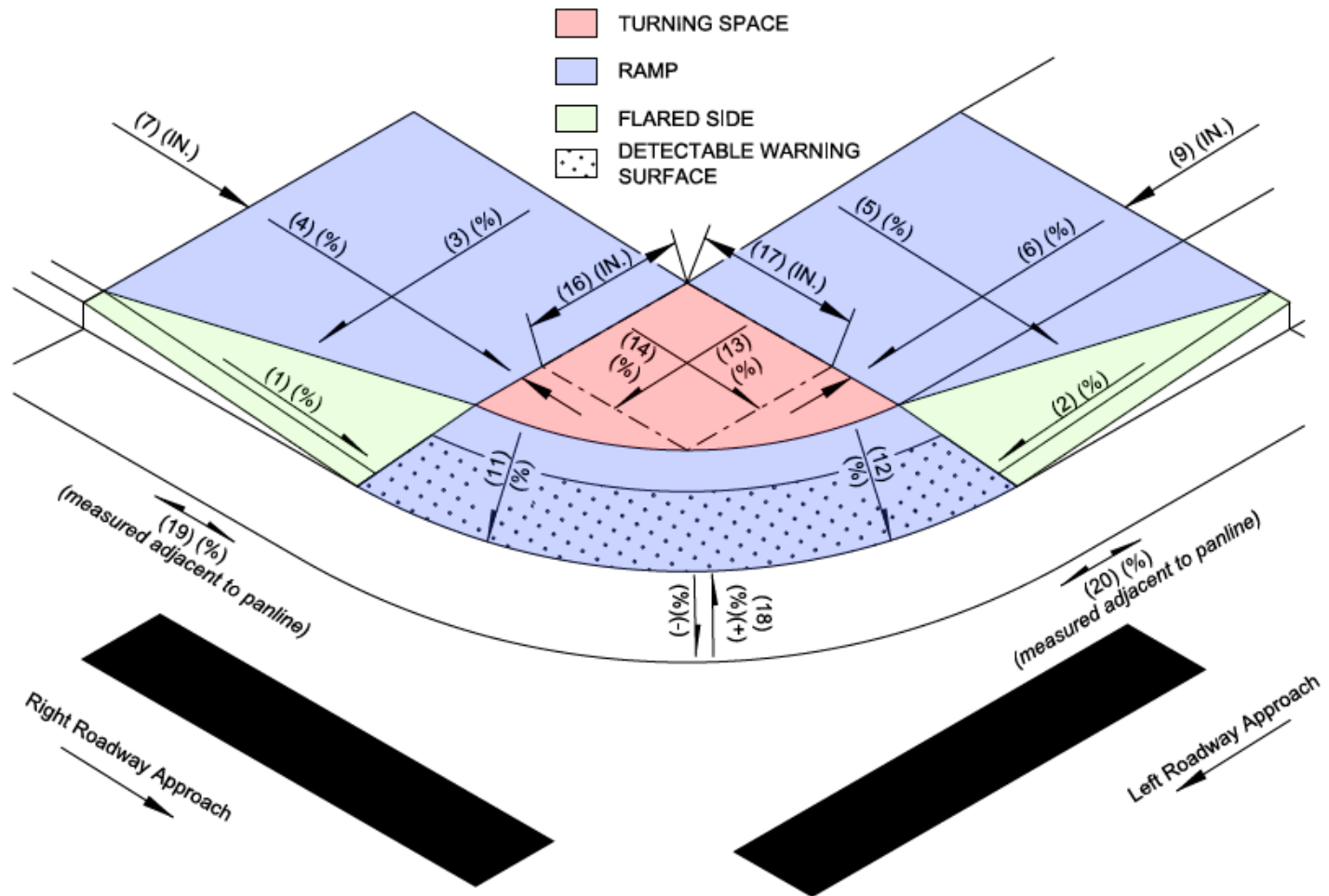
Orange lines denote ramp grade breaks that must be flush and perpendicular to the ramp run(s).

Curb Ramp Measurement Guide

Blended Transition Curb Ramp Measurements

Blended Transition Components

- 1 – Right Flare Slope (%)
- 2 – Left Flare Slope (%)
- 3 – Right Ramp Cross Slope (%)
- 4 – Right Ramp Running Slope (%)
- 5 – Left Ramp Cross Slope (%)
- 6 – Left Ramp Running Slope (%)
- 7 – Right Ramp Length (IN.)
- 9 – Left Ramp Length (IN.)
- 11 – Center Ramp Running Slope 1 (%)
- 12 – Center Ramp Running Slope 2 (%)
- 13 – Turning Space Cross Slope 1 (IN.)
- 14 – Turning Space Cross Slope 2 (IN.)
- 16 – Turning Space Length (IN.)
- 17 – Turning Space Width (IN.)
- 18 – Gutter Counter Slope (%)
- 19 – Right Roadway Grade (%)
- 20 – Left Roadway Grade (%)



Blended Transition Curb Ramp Measurements

Right Flare Slope (1)

Measure the slope adjacent the back of curb centered along the right flare (%).



Left Flare Slope (2)

Measure the slope adjacent the back of curb centered along the left flare (%).



Blended Transition Curb Ramp Measurements

Right Ramp Cross Slope (3)

Measure the slope perpendicular to the right ramp run in the center of the ramp (%).



Right Ramp Running Slope (4)

Measure the slope along the center line of the right ramp run in the center of the ramp (%).



Blended Transition Curb Ramp Measurements

Left Ramp Cross Slope (5)

Measure the slope perpendicular to the left ramp run in the center of the ramp (%).



Left Ramp Running Slope (6)

Measure the slope along the center line of the left ramp run in the center of the ramp (%).



Blended Transition Curb Ramp Measurements

Right Ramp Length (8)

Measure the distance from the grade break at the top of the right ramp to the grade break at the bottom of the right ramp along the ramp center line (IN.)



Left Ramp Length (9)

Measure the distance from the grade break at the top of the left ramp to the grade break at the bottom of the left ramp along the ramp center line (IN.)



Curb Ramp Measurement Guide

Blended Transition Curb Ramp Measurements

Center Ramp Running Slope 1 (11)

Measure the ramp slope at the right side of the center ramp perpendicular to the flow line (%).

The measurement should be taken where pedestrians will traverse the ramp to access the right crosswalk/street crossing.



Center Ramp Running Slope 2 (12)

Measure the ramp slope at the left side of the center ramp perpendicular to the flow line (%).

The measurement should be taken where pedestrians will traverse the ramp to access the left crosswalk/street crossing.



Blended Transition Curb Ramp Measurements

Turning Space Cross Slope 1 (13)

Measure the slope of the turning space area (%).

The measurement should be taken in alignment with the center of the crosswalk/pedestrian street crossing for the right roadway.



Turning Space Cross Slope 2 (14)

Measure the slope of the turning space area (%).

The measurement should be taken in alignment with the center of the crosswalk/pedestrian street crossing for the left roadway.



Blended Transition Curb Ramp Measurements

Turning Space Length (16)

Measure the distance between the back of sidewalk and the edge of the turning space (IN.).

The measurement should be taken parallel to the grade break at the bottom of the right ramp.



Turning Space Width (17)

Measure the distance between the back of sidewalk and the edge of the turning space (IN.).

The measurement should be taken parallel to the grade break at the bottom of the left ramp.



Curb Ramp Measurement Guide

Blended Transition Curb Ramp Measurements

Gutter Counter Slope (18)

Measure the slope of the gutter perpendicular to the flow line at the bottom center of the center ramp (%).



Right Roadway Grade (19)

Measure the slope of the right roadway by placing the level adjacent to the right ramp and parallel with the roadway center line (%).



Blended Transition Curb Ramp Measurements

Left Roadway Grade (20)

Measure the slope of the left roadway by placing the level adjacent to the left ramp and parallel with the roadway center line (%).



Blended Transition Curb Ramp Measurements

Curb Ramp Grade Breaks and Joint Requirements

All ramp grade breaks are perpendicular to the ramp runs.

All joints are flush (less than ¼" vertical discontinuity and less than ½" horizontal gap).

Blue lines denote joints and grade breaks which must be flush.

Orange lines denote ramp grade breaks that must be flush and perpendicular to the ramp run they adjoin.

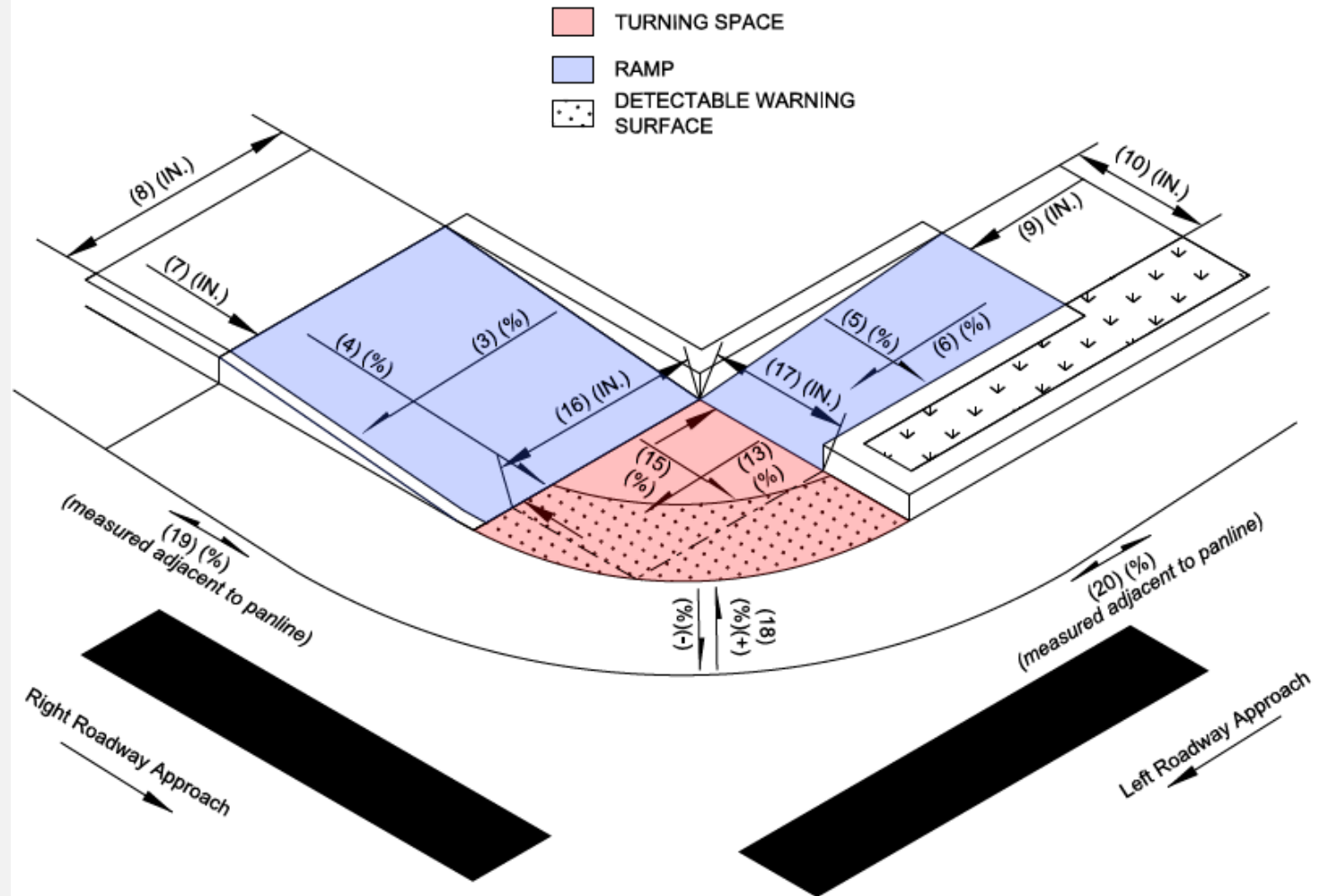


Curb Ramp Measurement Guide

Depressed Corner Curb Ramp Measurements

Depressed Corner Ramp Components

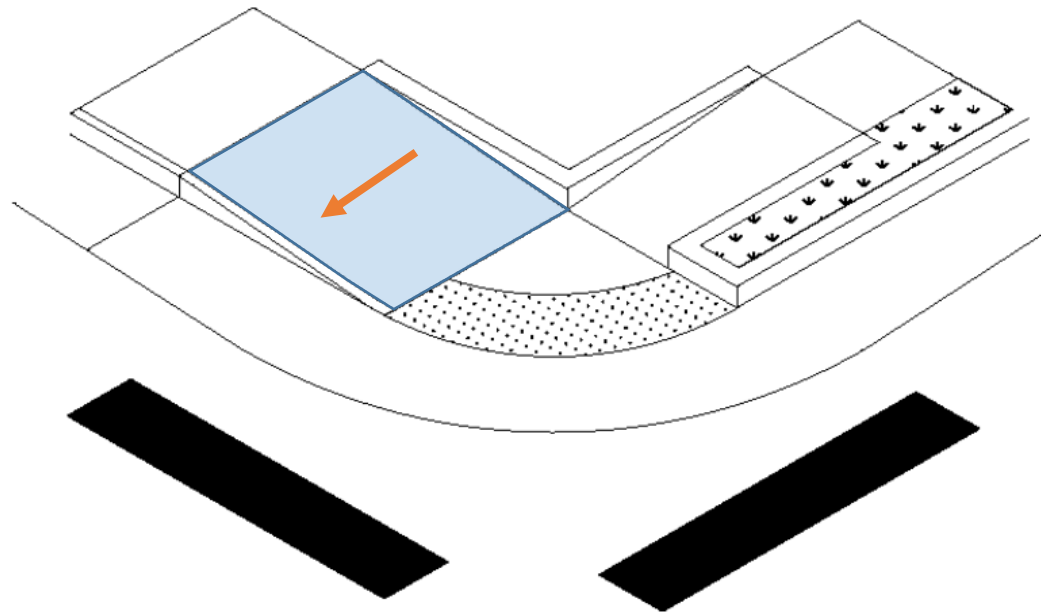
- 3 – Right Ramp Cross Slope (%)
- 4 – Right Ramp Running Slope (%)
- 5 – Left Ramp Cross Slope (%)
- 6 – Left Ramp Running Slope (%)
- 7 – Right Ramp Length (IN.)
- 8 – Right Ramp Width (IN.)
- 9 – Left Ramp Length (IN.)
- 10 – Left Ramp Width (IN.)
- 13 – Turning Space Cross Slope 1 (%)
- 15 – Turning Space Cross Slope 2 (%)
- 16 – Turning Space Length (IN.)
- 17 – Turning Space Width (IN.)
- 18 – Gutter Counter Slope (%)
- 19 – Right Roadway Grade (%)
- 20 – Left Roadway Grade (%)



Depressed Corner Curb Ramp Measurements

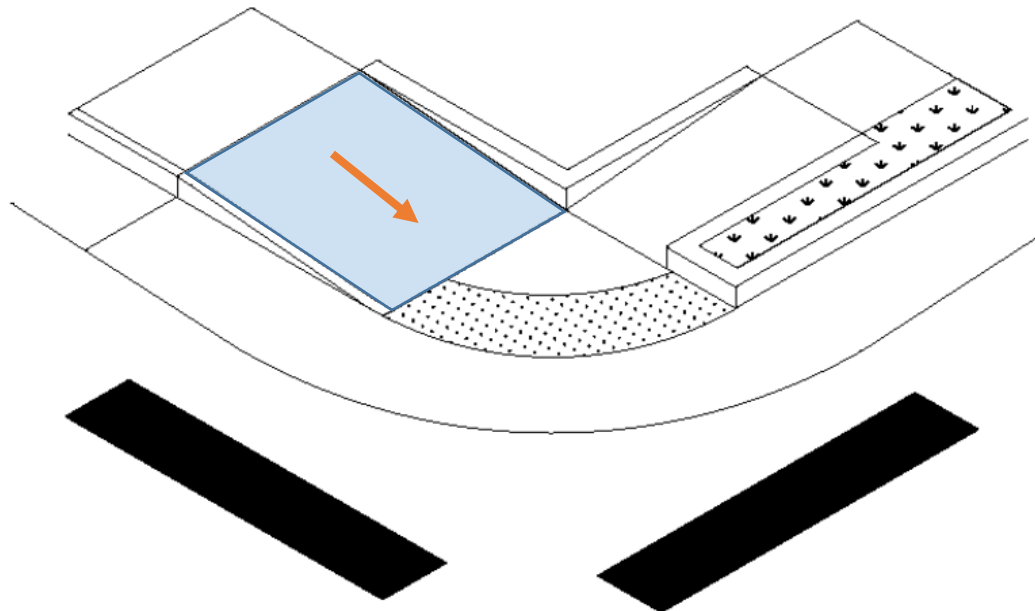
Right Ramp Cross Slope (3)

Measure the slope perpendicular to the right ramp run in the center of the ramp (%).



Right Ramp Running Slope (4)

Measure the slope along the center line of the right ramp run in the center of the ramp (%).

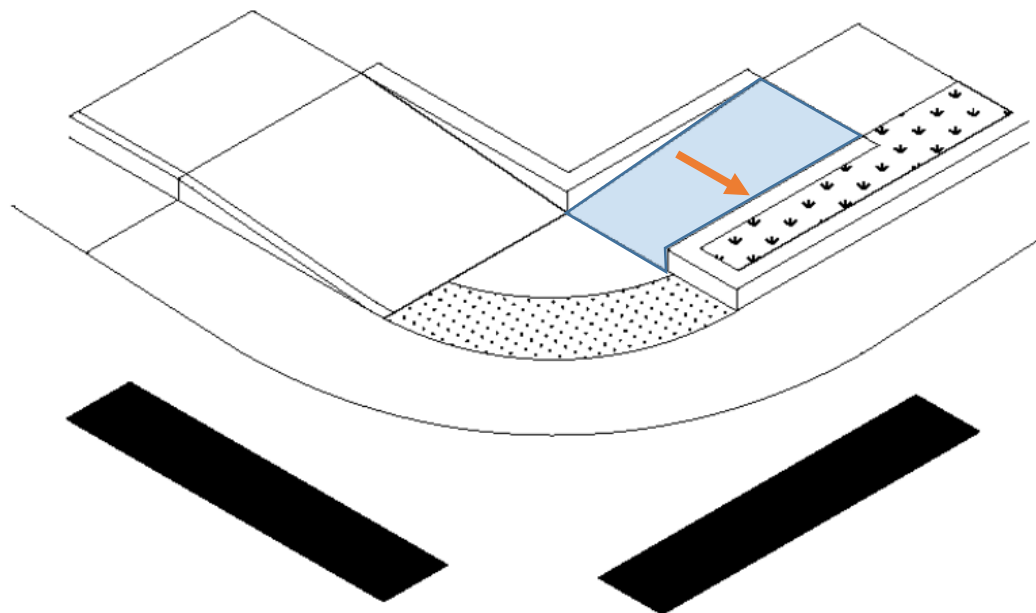


Curb Ramp Measurement Guide

Depressed Corner Curb Ramp Measurements

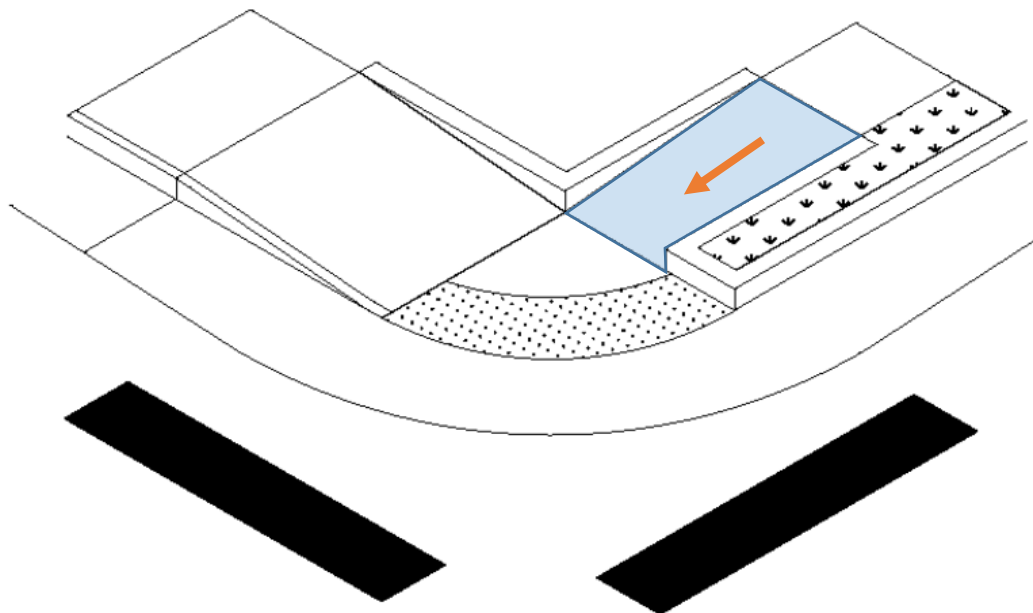
Left Ramp Cross Slope (5)

Measure the slope perpendicular to the left ramp run in the center of the ramp (%).



Left Ramp Running Slope (6)

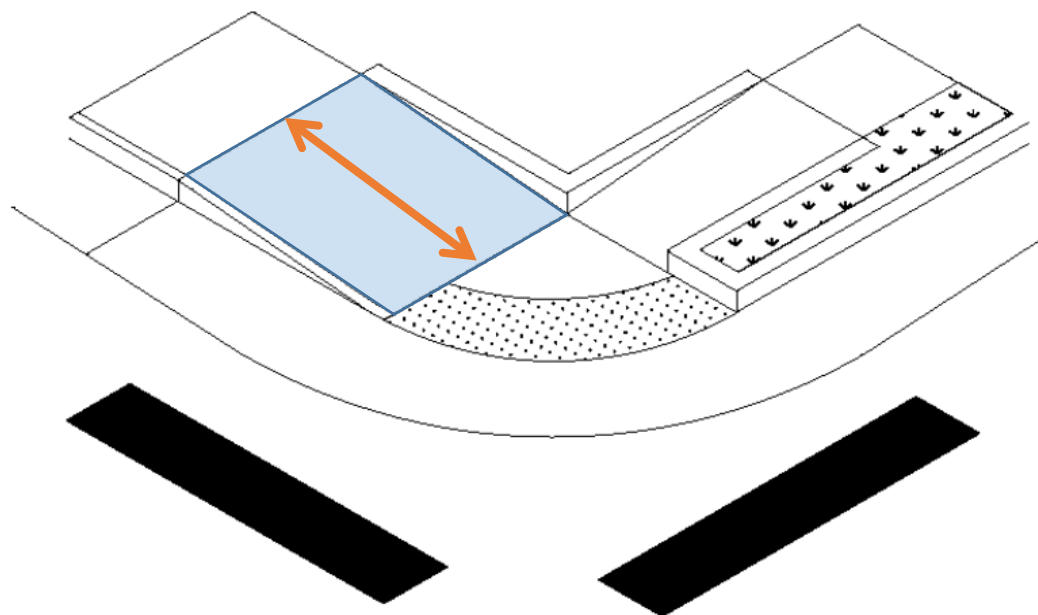
Measure the slope along the center line of the left ramp run in the center of the ramp (%).



Depressed Corner Curb Ramp Measurements

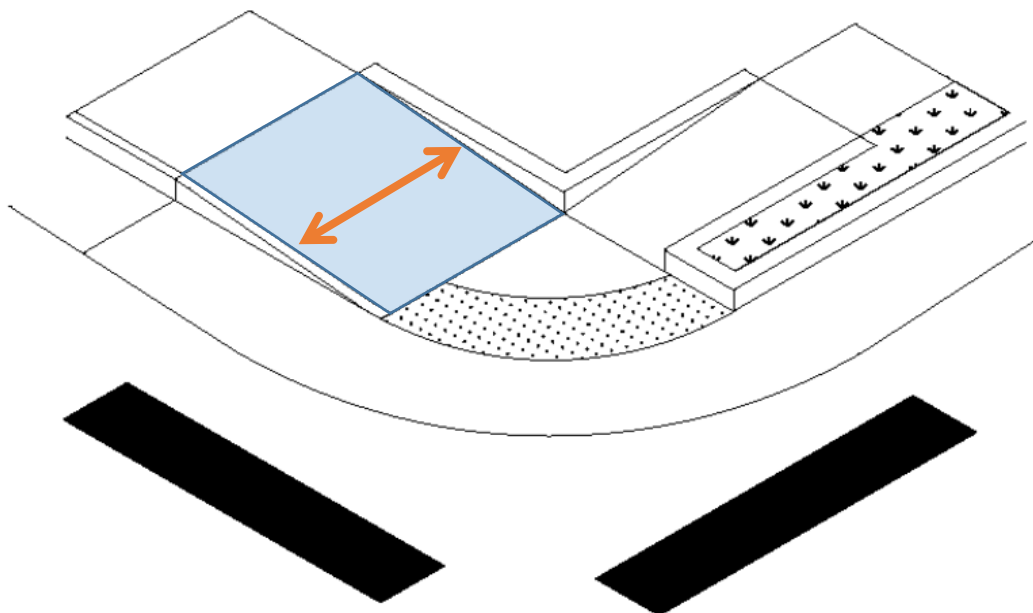
Right Ramp Length (7)

Measure the distance from the grade break at the top of the right ramp to the grade break at the bottom of the right ramp along the ramp center line (IN.)



Right Ramp Width (8)

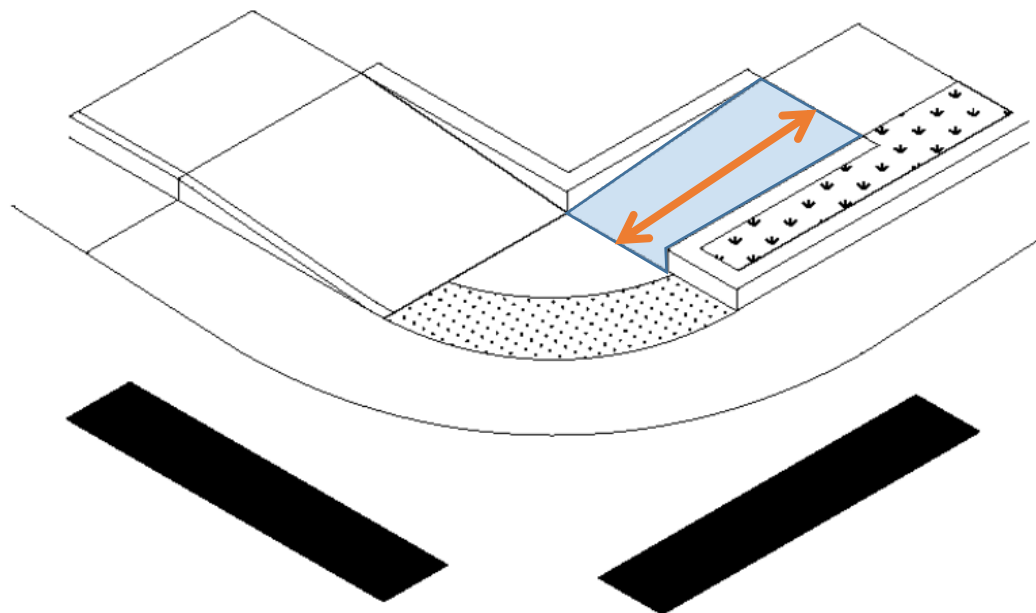
Measure the distance from left edge of the ramp to the right edge of the ramp at the mid point of the ramp run (IN.). Ensure the measurement is perpendicular to the ramp run.



Depressed Corner Curb Ramp Measurements

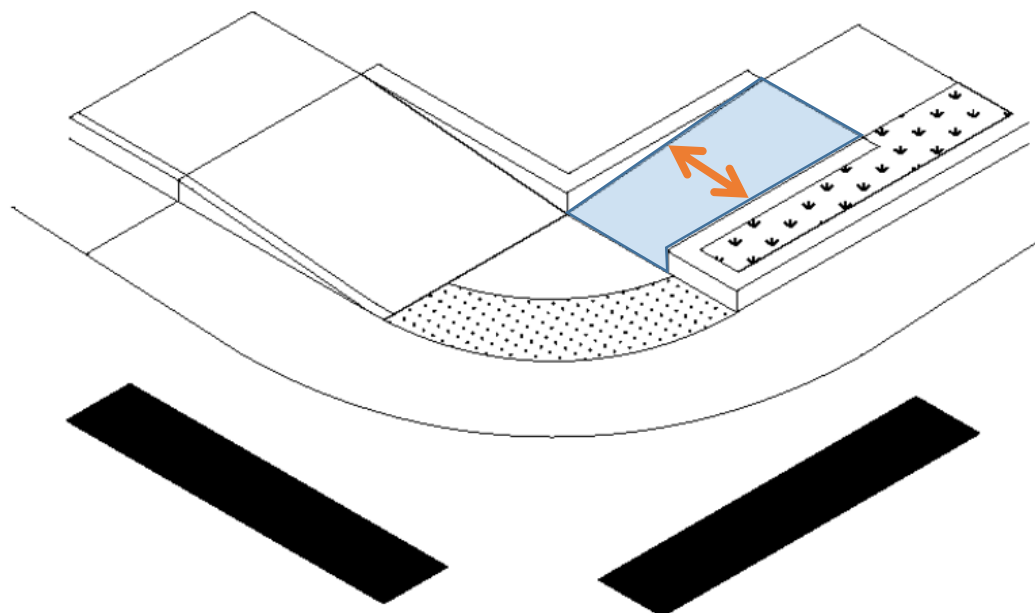
Left Ramp Length (9)

Measure the distance from the grade break at the top of the left ramp to the grade break at the bottom of the left ramp along the ramp center line (IN.)



Left Ramp Width (10)

Measure the distance from left edge of the ramp to the right edge of the ramp at the mid point of the ramp run (IN.). Ensure the measurement is perpendicular to the ramp run.

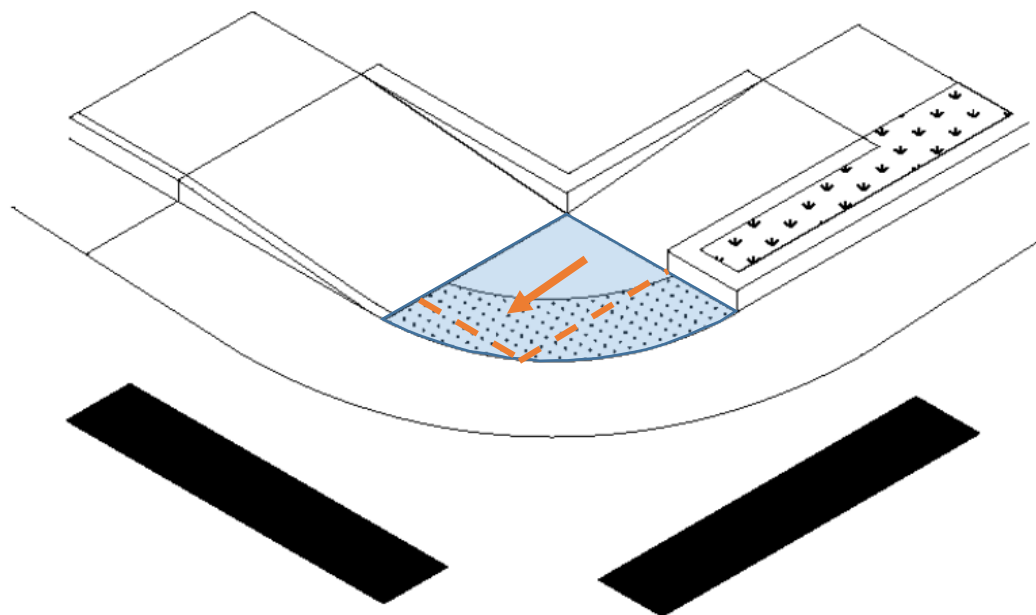


Depressed Corner Curb Ramp Measurements

Turning Space Slope 1 (13)

Measure the slope of the turning space area (%).

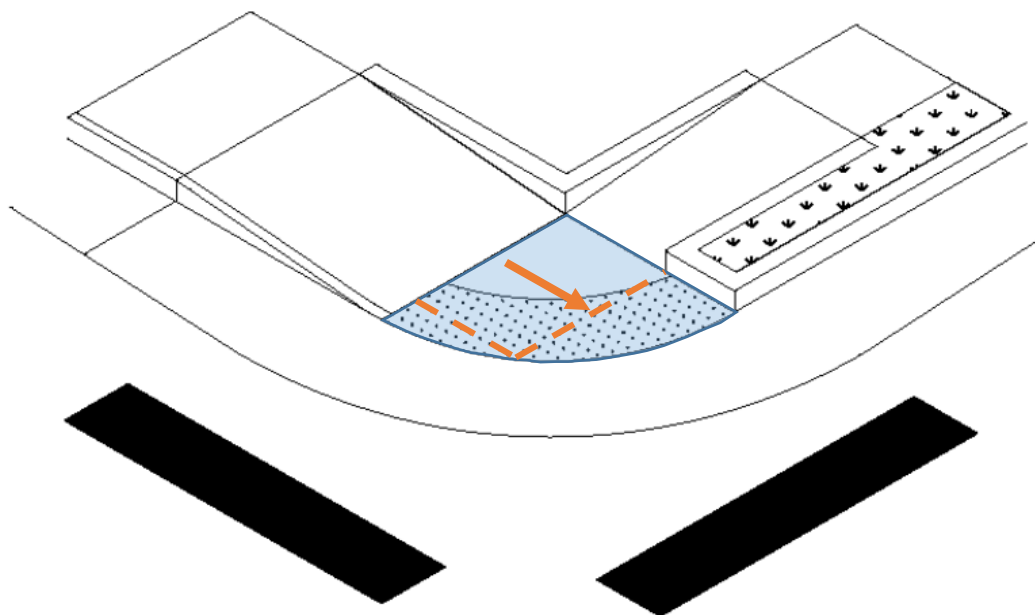
The measurement should be taken in alignment with the center of the crosswalk/pedestrian street crossing for the right roadway.



Turning Space Slope 2 (15)

Measure the slope of the turning space area (%).

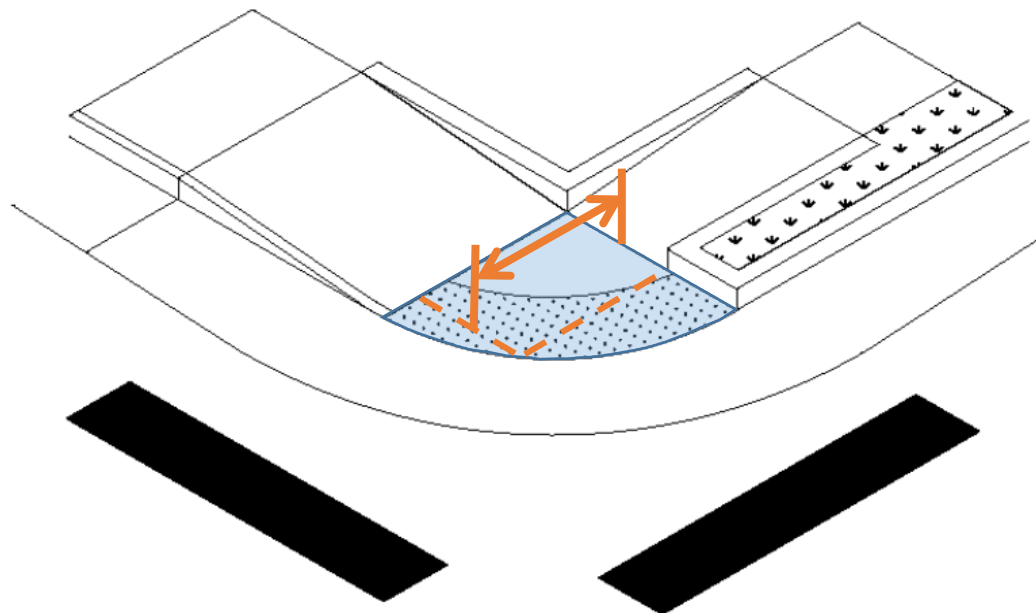
The measurement should be taken in alignment with the center of the crosswalk/pedestrian street crossing for the left roadway.



Depressed Corner Curb Ramp Measurements

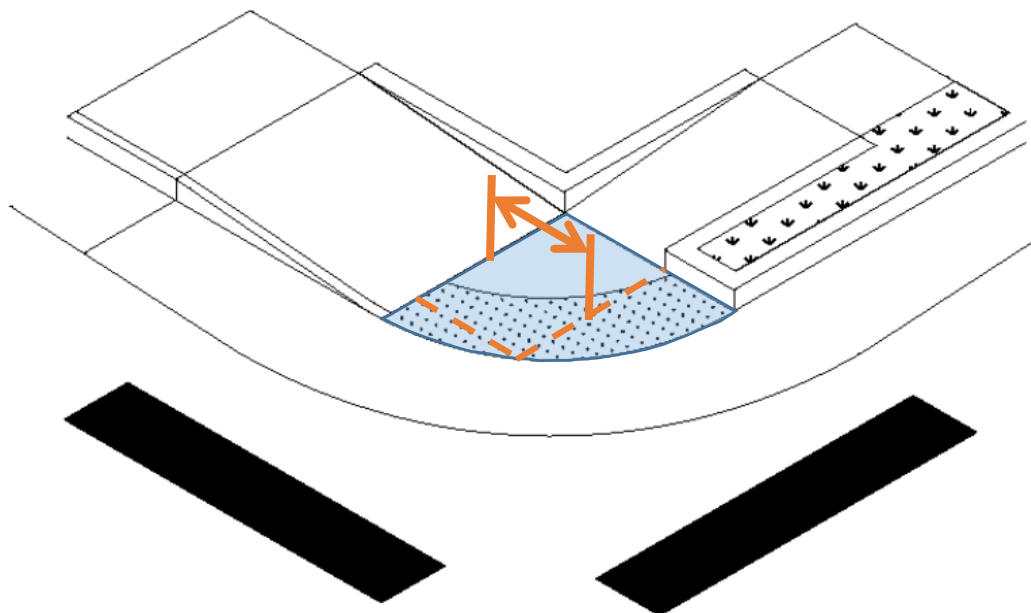
Turning Space Length (16)

Measure the length of the turning space as shown in the diagram to the right (IN.).



Turning Space Width (17)

Measure the length of the turning space as shown in the diagram to the right (IN.).

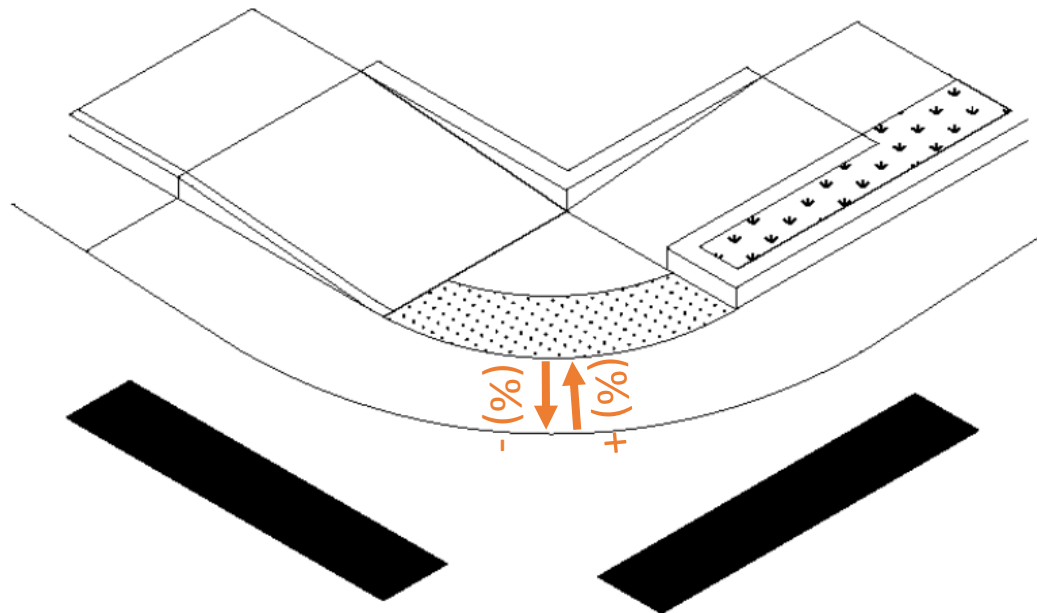


Curb Ramp Measurement Guide

Depressed Corner Curb Ramp Measurements

Gutter Counter Slope (GCS)

Measure the slope of the gutter perpendicular to the flow line at the bottom center of the center ramp (%).

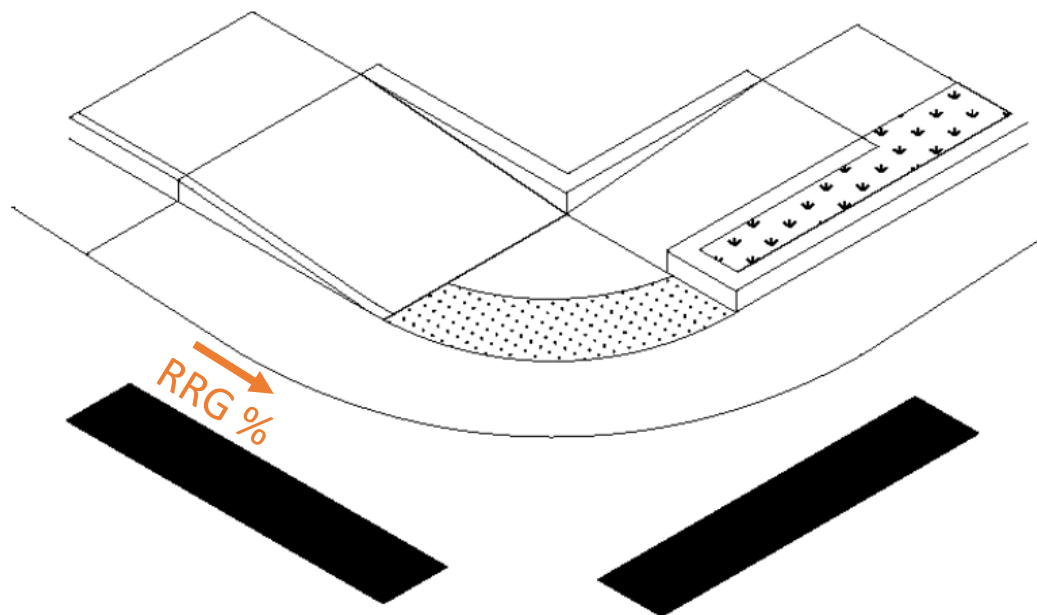


Curb Ramp Measurement Guide

Depressed Corner Curb Ramp Measurements

Right Roadway Grade (19)

Measure the slope of the right roadway by placing the level adjacent to the right ramp and parallel with the roadway center line (%).



Left Roadway Grade (20)

Measure the slope of the left roadway by placing the level adjacent to the left ramp and parallel with the roadway center line (%).

