ADA Curb Ramp Design Guidance

Fran Hanney
District ADA Coordinator
PennDOT District 6-0

Types of Disabilities

- Vision Disabilities
- Hearing Disabilities
- Physical Disabilities
ADA Law Requirements

1. New construction must be accessible and usable by persons with disabilities.

2. Alterations to existing facilities, within the scope or limits of a project, must provide usability to the maximum extent feasible.

3. Existing facilities that have not been altered shall not deny access to persons with disabilities.

Department ADA Policy

- PennDOT’s ADA policy on installing curb ramps has been approved by the Federal Highway Administration and the U.S. Access Board.

- Alteration projects such as reconstruction, milling, resurfacing, must assess pedestrian needs and must upgrade altered existing facilities to the latest ADA standards.

- Where existing site constraints limit the ability to fully meet the latest ADA standards, the upgrades must be done to provide access to the maximum extent feasible.

- New construction must meet standards.
Department ADA Policy

**Major Alteration Projects.**

Major alteration projects can affect access, circulation, or use of existing facilities within the existing right-of-way. These alterations can include 4R projects such as resurfacing, restoration, rehabilitation and reconstruction and other alterations such as major widening, bridge projects, interstate safety rest area / welcome center restorations and certain transportation enhancements.

- Transportation Enhancements (TE) and other Federal-aid Programs.
- Highway Occupancy Permits.

**Minor Alteration Projects.**

Minor or Betterment alteration projects can affect access, circulation, or use of existing facilities within the existing right-of-way.

- Milling, resurfacing, restoration, rehabilitation and reconstruction for pavement improvements and widening, intersection improvements and utility adjustments
- Roadway signalization – Placement of poles and control panels
- Pedestrian signalization – Placement of poles and control panels
- Signing – Placement of poles or posts
- Roadway lighting – Placement of poles, junction boxes and control panels
- Construction of grade separation structures – Overpasses and underpasses
Department ADA Policy

**Minor Alteration Projects.**
- Rehabilitation or replacement of any length bridge structure
- Shoulder rebuilding and widening – Adjoining or part of a pedestrian access route
- Inlet replacement – Inlet locations affecting pedestrian routes
- Guide rail replacements – Adjoining or part of a pedestrian access route
- Fringe parking areas – Parking and pedestrian circulation
- Safety rest areas and welcome centers – Work affecting parking and pedestrian circulation
- Transportation Enhancements – Projects relating to public use of highway facilities and streetscapes

**Non-Alteration Projects.**
Minor or Betterment Projects that in all likelihood will not affect access, circulation, or use of existing facilities within the existing right-of-way are listed below:
- Truck escape ramps
- Guide rail removal or replacement not affecting pedestrian access routes
- Roadside slope flattening
- Pavement markings and line striping
- Shoulder rebuilding in areas not affecting pedestrian access routes
- Signal maintenance / signal head replacement
- Sign maintenance / replacement
- Roadway lighting maintenance including luminaire and bracket arm replacements
- Truck weigh stations
- Wetland replacement mitigation
- Safety hardware upgrades
- Drainage – replacement of manholes, endwalls, pipes, culverts and inlets not affecting pedestrian access routes
- Bridge painting
ADA Design Specifications

- PennDOT Publication 13M (Design Manual Part 2), Chapter 6 and Chapter 7
- Standard Drawings RC-67M (June 1, 2010)
- PennDOT Publication 72M, Roadway Construction Standards
- Publication 408, PennDOT Specifications
- Publication 149, Traffic Signal Design Handbook (Chapter 19)
- Code of Federal Regulations, 28 CFR part 36 (ADAAG)

Basic ADA Requirements

- Surface must be Stable, Firm and Slip Resistant
- Elevation differences must be less than ¼”
- Grate openings or gaps must be less than ½”
- Ramp slopes 12:1 (8.33%) or flatter
- Detectable Warning Surface (DWS)
- Minimum 3’-0” wide accessible path (5’-0” for new construction)
- All newly constructed curb ramps must meet RC-67M Standards. Minimum and Maximum dimensions cannot be exceeded.
Basic ADA Requirements

- Sidewalks, curb ramps and roadway drainage features must be designed and constructed to prevent surface drainage from ponding at the bottom of the curb ramp. Edge of road elevations at the flow line must be graded to ensure positive drainage. For new construction, additional inlets may be required to prevent drainage issues. A TIF may be required to provide positive drainage.

- The sidewalk must slope towards the road to avoid drainage issues or ponding.

- Cross slope of 2% (max) and longitudinal slope of 5% (max) for sidewalk or Pedestrian Accessible Ramp (PAR)

Elevation Differences

Unexpected vertical drops or rises in grade within the pedestrian path can cause falls and wheel chairs to bottom out or flip over backwards.
Grate Openings and Horizontal Gaps

- ADA Compliant Grates are in RC-45M
- Bicycle Safe Grates in RC-45M are **not ADA compliant**

Flare Slopes and Landings

- Ramp Slope 8.33% max
- Land 2.00% max (longitudinal and cross slopes)
- 4'-0" min width landing 10.00% flares
- Less than 4'-0" width 8.33% flares
- 10.00% max
- 8.33% max
Algebraic Grade Difference

- Download the Reference Guide and District-specific CS4401 and Technically Infeasible Forms from the District 6 website
  - Located under: District Services, ADA Curb Ramp Design
- Also available on the SharePoint Portal

District Design Guidance
District Design Guidance

- Help stakeholders by improving overall understanding of the ADA design-review process
- Tool to provide guidance to contractors, engineers and all those involved with the design and construction of Americans with Disabilities (ADA) compliant curb ramps.
- Not exact instructions nor is it to be taken as official Department “policy”
- Expedite ramp design approval
- Partners in the development included the City of Philadelphia, Central Office, and design consultants
- Reflects District 6-0’s expectations and practices
- Does not super-cede nor in any way invalidate any ADA standards, policies or laws that are applicable on both the State and Federal levels

Coordination with Property Owners

**Liaison with local government and private property owners (See PUBLICATION 13M (Design Manual Part 2), Chapter 6, Section 6.4)**

Property owners must be contacted at the start of the design stage by the designer if the limits of the proposed curb ramp designs extend beyond the Department’s Right-of-Way and impact their property.

Each project requiring pedestrian access requires an appropriate negotiated and finalized construction agreement among the parties involved that addresses financial and maintenance responsibilities.
Curb Ramp Inspection Form (CS-4401)

- District 6-0 specific form should be used
- Documents and provides guidance for curb ramp inspections
- All newly constructed curb ramps must meet RC-67M Standards. Minimum and Maximum dimensions cannot be exceeded.
- The CS-4401 records all measurements and will serve as a record that PennDOT constructed the curb ramp to current standards or to the maximum extent feasible
- Insert Technically Infeasible Form when applicable

Curb Ramp Inspection Form (CS-4401)

- District 6-0 specific uses the CS-4401 forms as a design tool
- The inspectors use the CS-4401 to inspect the ramp compliance and to generate “as-built CS-4401”
- As-built inspection forms must be jointly completed by the contractor and the resident engineer/inspector.
Technically Infeasible Form (TIF)

Project scope, not cost, determines when existing site constraints justify the Technical Infeasibility.

In certain situations, existing site constraints may justify the use of a design that provides access to the maximum extent feasible if removing the existing site constraints would require additional work that is not included as part of the project scope.

For example, a resurfacing project may not include removal of existing site constraints in the project scope and may be justification for installing a facility that provides access to the maximum extent feasible. However, for a widening project that includes right-of-way acquisition, utility relocations and removing underground vaults as part of the project scope, these constraints will not be satisfactory justification for installing a facility that does not meet PennDOT's standards since they are part of the project scope. The existing site constraints must be evaluated on. (See Publication 13M (DM-2) p6-7)

Technically Infeasible Form (TIF)

- Submit and approve (ADE) prior to construction
- Indicate the constraints preventing compliance
- Provide access to the maximum extent feasible
- Existing Site Constraints include, but are not limited to:
  - ROW, Utilities, vaults
  - Roadway profile, historic sites
  - Environmental, safety
- Attach to CS-4401
Technically Infeasible Form (TIF)

- Circumstances may exist where full compliance of the standards is "Technically Infeasible".
- If a particular element of the curb ramp cannot fully meet the standards and requires a TIF, all other elements of the curb ramp must be evaluated and designed to meet the standards to the maximum extent feasible.
- Having a TIF for one element does not mean that the other elements can be included on the TIF without sound engineering evaluation.
- Document design decisions that may be open to interpretation.
Construction

- Construction work must be **stopped** if unforeseen physical limitations are found in the field.
- If required the design must be revised to address constraints and revised documentation (inspection forms and TIF’s) must be resubmitted.
- Changes which do not result in non-compliance or improve a non-compliant feature (even if it remains non-compliant) may be approved in the field by the Department representative.
- All other changes must be approved by the District’s ADA coordinator.
- As-built inspection forms must be jointly completed by the contractor and the resident engineer/inspector.

Alternative Pedestrian Route During Construction

- A safe, alternate and accessible route around construction must be provided, if possible on the same side of the street.
- The alternative route should provide a similar level of accessibility as the disrupted route and should be as close to the construction as possible.
- This may require the installation of temporary facilities, including pedestrian signals, curb ramps, or other facilities.
Alternative Pedestrian Route During Construction

- Pedestrian Route blocked and/or signage to far from alternate
- Provide temporary facilities to ensure accessible route

Highway Occupancy Permits

- ADA Curb Ramps will be required when the proposed development directly impacts the existing pedestrian path on a particular intersection or driveway. Receiving ends (other side of crosswalk) must be included as part of the project only if the proposed development is a pedestrian generator and exceeds the number of pedestrians utilizing the existing facility.

- For those HOP permits that have been issued but not yet constructed, the contractor/designer is to provide the CS-4401 inspection forms and TIF’s (if applicable) to the District’s HOP inspector prior to construction of the ramps. The CS-4401 inspection forms and TIF’s (if applicable) must be approved before construction or permit close-out.
Highway Occupancy Permits

The Department reserves the right to review all pedestrian facilities reflected on the HOP Plans. If the Department determines that pedestrian facilities located outside of PennDOT ROW are not subject to review, the following note must be added to the plan:

ALL PROPOSED PEDESTRIAN FACILITIES REFLECTED ON THESE PLANS THAT ARE OUTSIDE OF THE PENNDOT LEGAL RIGHT-OF-WAY SHALL BE CONSTRUCTED TO COMPLY WITH THE FOLLOWING STANDARDS:

PENNDOT DESIGN MANUAL 2, CHAPTER 6, PENNDOT STANDARDS FOR ROADWAY CONSTRUCTION, PUB 72M, RC-67M, U.S. ACCESS BOARD, PUBLIC RIGHT OF WAY ACCESSIBILITY GUIDELINES

Submission and Review Process

- Fully complete the CS-4401 inspection forms to show the design parameters for each proposed curb ramp.
- Note the locations and include photos of the existing conditions.
- Attached comments explaining the design as needed.
- Submit four (4) color hard copies of the CS-4401 forms with the design drawing details for review and approval.
- Electronic Excel version of the forms must be submitted for the District’s records once the design and the forms are deemed acceptable.
Submission and Review Process

• In order to expedite the review process the following must be included:

  – Project Type Identification

  – Scope of Work

  – Pertinent plans to include but not limited to: Traffic signal permit plans, pavement marking plans, construction plans, etc.

Submission and Review Process

• Submission must include detail drawings for each intersection. The drawings must include the following three sheets:

  – An overall intersection sheet which includes the intersection layout, curb ramp alignment, pedestrian crosswalks, utilities, right-of-way lines, pavement edge and type, existing features (buildings, entryways, steps, walls, trees, shrubs/hedges) and traffic control devices (traffic signal poles, equipment, stop signs).

  – A sheet showing all pertinent spot elevations, and

  – A sheet showing all the Curb Ramp Details.
Submission and Review Process

The design drawing details must conform to the following requirements:

**Example 1: Location of required spot elevations**

![Diagram of location of required spot elevations]

**Example 2: Location of required slopes**

![Diagram of location of required slopes]
Diagonal Curb Ramps

• Diagonal ramps may be considered for approval if, and only if, other alternatives have been fully evaluated and found to be infeasible. The diagonal ramp must provide the best alternative available.

• The designer must provide adequate justification that other alternatives were fully exhausted.

• All diagonal ramps require ADE approval. A TIF form with the ADE signature is the only valid proof that a diagonal ramp is approved.
Diagonal Curb Ramp (Curb Ramp serves 2 Directions)

Two Curb Ramps
- Preferred design
- Turning Maneuver on the sidewalk

Diagonal Curb Ramp
- Turning Maneuver in the street
- Requires ADE approval
SAMPLE PHOTOS

Not Flush

Sidewalk and top of curb must be flush in Pedestrian Path

Unexpected Vertical Face in PAR
Unexpected Vertical Face

Reduces sidewalk width – Not Necessary
Pedestrian Pole in center of sidewalk – not good

Traffic signal foundation flush with sidewalk - good

Not acceptable
Maintain a PAR and blend transition
Provide at least 2” reveal between ramps

Unexpected Vertical Face
Reduces sidewalk width
Steep longitudinal slope @ transition sidewalk - Not acceptable

Increase length of the transition sidewalk (Max. 15')

Solution

Add a non-walkable surface
Where is the foundation?

Needs a 2” reveal

Parking lot
Steep slope 26%

Compliant flare slope

DWS Not compliant

Compliant flare slope

Avoid asphalt wedge. Alterations are to the maximum extent feasible. Depressed curb must be flush with roadway.
Quick Notes

**Positives**
- ADA Compliant Facilities
- Adequate Justiciation and Documentation

**Obstacles**
- Retrofits
- Coordination with property owners

**Frustrations**
- Lack of coordination from contractors and designers
- Lack of adequate field information (Survey)

**Success**
- The District has eliminated hundreds of TIF’s with our review process.
- Reduced the number of submissions after issuance of guidance.
ADA Review Team

Scott Fletcher, P.E., District ADE Services

Fran Hanney, District ADA Coordinator

Bernard B. McGowen, District ADA Construction Inspector
Phone: 610- 205-6718 | Fax: 610-205-6672 | E-mail: bmcgowen@state.pa.us

Kevin Lewis, Civil Engineer Transportation, ADA Reviewer
Phone: 610- 205-6689 | Fax: 610-205-6598 | E-mail: kelewis@state.pa.us

Tom Chin, Traffic Control Specialist, ADA Reviewer
Phone: 610- 205-6585 | Fax: 610-205-6598 | E-mail: TCHIN@state.pa.us

ADA Consulting Review Team
Ben Senger, E.I.T  c-bsenger@state.pa.us  (AECOM)
Carlos G. Garcia, P.E.  c-cgarcia@state.pa.us  (Dawood)
Rebecca Christman, E.I.T  c-christm@state.pa.us  (Dawood)
Lori Bickerdyke, E.I.T  lbickerdyke@dawood.cc  (Dawood)
Scott Bechard  sbechard@dawood.cc  (Dawood)