

Bicycle & Pedestrian



Overview

Legislation

Guidance & Information

Funding

Publications

Meetings & Events

Resources

FHWA Contact

For more information, please contact [Daniel Goodman](#), 202-366-9064.

State Coordinator Contact Information

Each State administers its own program. Contact your [State Bicycle and Pedestrian Coordinator](#) for guidance on State policies and project eligibility requirements.

Designing Sidewalks and Trails for Access

Part II of II: Best Practices Design Guide

[< Previous](#)
[Contents](#)
[Next >](#)

[Disclaimer](#)

UNDERSTANDING THE USER

[Chapter 1: Introduction](#)

[1.1 Guidebook overview](#)
[1.2 Metric verses English units](#)
[1.3 Benefits of sidewalks and trails](#)
[1.4 Legislation and standards](#)
[1.4.1 Accessibility standards for new construction and alterations](#)
[1.4.2 Developing accessibility standards for sidewalks](#)
[1.4.3 Developing accessibility standards for trails](#)

[Chapter 2: Understanding Sidewalk and Trail Users](#)

[2.1 Function, activity and participation](#)
[2.1.1 Function](#)
[2.1.2 Activity](#)
[2.1.3 Participation](#)
[2.1.4 Contextual factors](#)
[2.2 Different abilities for sidewalks and trails](#)
[2.3 Designing for all abilities](#)
[2.3.1 The need for a new approach](#)
[2.3.2 Accessible environments through universal design](#)
[2.3.3 Natural and constructed environmental constraints](#)
[2.4 Barriers create activity and participation limitations](#)
[2.4.1 Movement barriers](#)
[2.4.2 Information barriers](#)
[2.5 Conflicting pedestrian needs](#)
[2.6 Function, activity, participation and technology](#)
[2.6.1 Personal technologies](#)
[2.6.2 Activity-specific technologies](#)

[2.6.3 Environmental technologies and design](#)

[2.6.4 How does technology influence design?](#)

[2.6.5 Limitations of technology](#)

SIDEWALK DEVELOPMENT

Chapter 3: Integrating Pedestrians into the Project Planning Process

[3.1 Recent legislation](#)

[3.1.1 Americans with Disabilities Act \(ADA\).](#)

[3.1.2 Federal transportation legislation \(ISTEA and TEA-21\)](#)

[3.2 Prioritizing pedestrian access](#)

[3.2.1 Sidewalk installation](#)

[3.2.2 Pedestrian oriented detail](#)

[3.2.3 National policy](#)

[3.2.4 State and local sidewalk policies](#)

[3.3 Local land use and zoning](#)

[3.3.1 Traditional land use patterns](#)

[3.3.2 Land use recommendations](#)

[3.4 Comprehensive planning](#)

[3.4.1 Pedestrian master plans](#)

[3.4.2 Pedestrian design guides](#)

[3.5 Prioritizing resources](#)

[3.6 Funding strategies](#)

[3.7 Site development](#)

[3.7.1 Pedestrian level of service](#)

[3.7.2 Access management](#)

[3.7.3 Design constraints](#)

[3.8 Public involvement](#)

[3.8.1 Making accessibility provisions at public meetings](#)

[3.8.2 Outreach strategies for initiating community involvement](#)

[3.8.3 Public involvement strategies](#)

[3.8.4 Community involvement in sidewalk assessments](#)

Chapter 4: Sidewalk Corridors

[4.1 Sidewalk corridor width](#)

[4.1.2 The zone system](#)

[4.1.2.1 Curb zone](#)

[4.1.2.2 Planter/furniture zone](#)

[4.1.2.3 Pedestrian zone](#)

[4.1.2.4 Frontage zone](#)

[4.1.3 Protruding objects](#)[4.1.4 Improving access on narrow sidewalks](#)[4.2 Sidewalk grades and cross slopes](#)[4.2.1 Grade](#)[4.2.2 Cross slope](#)[4.2.2.1 Grade and cross slope construction tolerances](#)[4.2.2.2 Elevation difference between street and building](#)[4.3 Sidewalk surfaces](#)[4.3.1 Surface material](#)[4.3.1.1 Firm and stable](#)[4.3.1.2 Slip resistant](#)[4.3.1.3 Wet or icy surfaces](#)[4.3.1.4 Decorative surface materials](#)[4.3.2 Changes in level](#)[4.3.3 Gaps, grates, and openings](#)[4.4 The impact of trees on the sidewalk corridor](#)[4.5 Well-lit sidewalks](#)[4.6 Grade-separated crossings](#)[4.7 Sidewalks in confined spaces](#)**[Chapter 5: Driveway Crossings](#)**[5.1 Change in cross slope](#)[5.2 Driveway crossings on wide sidewalk corridors](#)[5.3 Jogged driveway crossing](#)[5.4 Built-up driveway crossing](#)[5.5 Parallel ramped driveway crossing](#)[5.6 Rolled curbs](#)**[Chapter 6: Providing Information to Pedestrians](#)**[6.1 Non-visual information](#)[6.2 Pedestrian signs](#)[6.3 Detectable warnings](#)[6.3.0 Detectable warnings update - May 2002](#)[6.3.1 Design specifications for detectable warnings](#)[6.3.2 Installation recommendations for detectable warnings](#)[6.3.3 Recommended locations](#)[6.3.4 Grooves](#)[6.4 Directional surfaces](#)

[6.4.1 Raised directional tiles and pavers](#)

[6.4.2 Intersection guidestrips](#)

[6.5 Accessible pedestrian signals](#)

[6.5.1 Installation recommendations](#)

[6.5.2 Fixed time signals \(pedestrian signal indicators with automated signal phasing\)](#)

[6.5.3 Pedestrian actuated signal devices](#)

[6.5.3.1 Providing information in multiple formats](#)

[6.5.3.2 Physical design characteristics](#)

[6.5.4 Infrared or LED transmitters](#)

[Chapter 7: Curb Ramps](#)

[7.1 The impact of curb ramps](#)

[7.1.1 Impact of curb ramps on people with mobility impairments](#)

[7.1.2 Impact of curb ramps on people with vision impairments](#)

[7.1.3 Ideal design characteristics](#)

[7.2 Curb ramp types](#)

[7.2.1 Perpendicular curb ramps](#)

[7.2.2 Diagonal curb ramps](#)

[7.2.3 Parallel curb ramps](#)

[7.2.4 Combined parallel and perpendicular curb ramp](#)

[7.2.5 Built-up curb ramps](#)

[7.2.6 Depressed corners](#)

[7.2.7 Recommendations for selecting a curb ramp design](#)

[7.3 Curb ramp specifications](#)

[7.3.1 Ramp grade](#)

[7.3.2 Ramp cross slope](#)

[7.3.3 Ramp length](#)

[7.3.4 Ramp width](#)

[7.3.5 Gutter slope](#)

[7.3.5.1 Gutter slope at diagonal curb ramps](#)

[7.3.6 Transition detection](#)

[7.3.7 Change of grade](#)

[7.3.7.1 Impacts of change of grade on people who use wheelchairs](#)

[7.3.7.2 Recommendations for maximum change in grade](#)

[7.3.7.3 Street resurfacing](#)

[7.3.8 Transition height](#)

[7.3.9 Sidewalk approach width](#)

[7.3.10 Landing dimension and slope](#)

[7.3.11 Returned curbs and flares](#)

[7.4 Design considerations for curb ramp installation](#)

[7.4.1 Curb ramp placement at an intersection](#)

[7.4.2 Influence of turning radii on curb ramp design](#)

[7.4.3 Determining sidewalk width at pedestrian crossings](#)

[7.4.3.1 Type of crossing](#)

[7.4.3.2 Curb ramp design](#)

[7.4.3.3 Steep terrain](#)

[7.4.3.4 Volume of pedestrian traffic](#)

[7.4.4 Curb ramps at high curbs](#)

[7.4.5 Curb ramps on narrow sidewalks](#)

[7.4.6 Curb ramps on steep terrain](#)

[7.5 Curb ramp drainage](#)

[Chapter 8: Pedestrian Crossings](#)

[8.1 Barriers to pedestrian access](#)

[8.1.1 Movement barriers](#)

[8.1.2 Information barriers](#)

[8.1.3 Design solutions](#)

[8.2 Midblock crossings](#)

[8.3 Turning radius](#)

[8.4 Right turn on red and turning vehicles](#)

[8.5 Crosswalks](#)

[8.5.1 Crosswalk markings](#)

[8.5.2 Crosswalk research](#)

[8.5.3 Recommendations for enhancing pedestrian safety and access](#)

[8.5.3.1 Flashing signals](#)

[8.5.3.2 Reducing motorist speeds](#)

[8.6 Crossing times](#)

[8.7 Medians](#)

[8.8 Corner islands](#)

[8.9 Improving sight lines at intersections](#)

[8.10 Skewed intersections](#)

[8.11 Railroad crossings](#)

[Chapter 9: Traffic Calming](#)

[9.1 Volume control measures](#)

[9.1.1 Full closures](#)

[9.1.1.1 Impact on pedestrian access](#)

[9.1.1.2 Design recommendations for full closures](#)

[9.1.2 Half closures](#)

[9.1.2.1 Impact on pedestrian access](#)

[9.1.2.2 Design recommendations for half closures](#)

[9.1.3 Median barriers](#)

[9.1.3.1 Impact on pedestrian access](#)

[9.1.3.2 Design recommendations for median barriers](#)

[9.1.4 Forced turn islands](#)

[9.1.4.1 Impact on pedestrian access](#)

[9.1.4.2 Design recommendations for forced turn islands](#)

[9.2 Speed control measures](#)

[9.2.1 Speed humps](#)

[9.2.1.1 Impact on pedestrian access](#)

[9.2.1.2 Design recommendations speed humps](#)

[9.2.2 Speed tables and raised crosswalks](#)

[9.2.2.1 Impact on pedestrian access](#)

[9.2.2.2 Design recommendations for speed tables](#)

[9.2.3 Raised intersections](#)

[9.2.3.1 Impact on pedestrian access](#)

[9.2.3.2 Design recommendations for raised intersections](#)

[9.2.4 Textured pavement](#)

[9.2.4.1 Impact on pedestrian access](#)

[9.2.4.2 Design recommendations for textured pavement](#)

[9.2.5 Roundabouts](#)

[9.2.5.1 Impact on pedestrian access](#)

[9.2.5.2 Design recommendations for roundabouts](#)

[9.2.6 Neighborhood traffic circles](#)

[9.2.6.1 Impact on pedestrian access](#)

[9.2.6.2 Design recommendations for neighborhood traffic circles](#)

[9.2.7 Chicanes, lateral shifts, and chokers](#)

[9.2.7.1 Impact on pedestrian access](#)

[9.2.7.2 Design recommendations for chicanes, lateral shifts, and chokers](#)

[9.2.8 Curb extensions at intersections](#)

[9.2.8.1 Impact on pedestrian access](#)

[9.2.8.2 Design recommendations for curb extensions](#)

[9.2.9 Center island narrowings](#)

[9.2.9.1 Impact on pedestrian access](#)

[9.2.9.2 Design recommendations for center island narrowings](#)

[Chapter 10: Sidewalk Maintenance and Construction Site Safety](#)

[10.1 Facility maintenance](#)

[10.1.1 Assessment techniques](#)

[10.1.2 Sidewalk maintenance problems](#)

[10.1.3 Maintenance responsibilities](#)

[10.2 Information maintenance](#)

[10.3 Citizen reporting](#)

[10.4 Construction safety](#)

[Chapter 11: Sidewalk Assessment](#)

[11.1 Benefits of assessment](#)

[11.2 Sidewalk Assessment Process overview](#)

[11.3 Sidewalk access characteristics](#)

[11.4 Data collection](#)

[11.4.1 Stroll Sheet station measurements](#)

[11.4.2 Stroll Sheet feature measurements](#)

[11.4.3 Stroll Sheet curb ramp measurements](#)

[11.4.4 Intersection Checklist](#)

[11.4.5 Sidewalk Element Analysis Forms](#)

[11.5 Presentation of sidewalk assessment information](#)

TRAIL DEVELOPMENT

[Chapter 12: Trail Planning](#)

[12.1 Commitment to universal design](#)

[12.2 Key players in trail design](#)

[12.3 Types of trails](#)

[12.4 Long-range planning](#)

[12.4.1 Trails versus the built environment](#)

[12.4.2 Developing accessibility standards for trails](#)

[12.4.3 New construction](#)

[12.4.4 Alterations](#)[12.4.5 Routine maintenance](#)[12.4.6 Long-range planning for multiple trail systems](#)[12.5 Providing access and preserving the environment](#)[12.5.1 Potential conflicts between access and preservation](#)[12.5.1.1 Cultural, historic, religious, or significant natural features](#)[12.5.1.2 Nature of the setting or purpose of the trail](#)[12.5.1.3 Federal, State, or local regulations or statutes](#)[12.5.1.4 Terrain, conditions, or prevailing construction practices](#)[12.5.2 Priorities for access to extreme environments](#)[12.5.2.1 Single extreme condition limits access](#)[12.5.2.2 Cumulative conditions limit access](#)[12.6 Trail components](#)[12.6.1 Trail corridor](#)[12.6.2 Trail element access](#)[12.6.3 Trailhead access](#)[12.6.3.1 Facilities and amenities at the trailhead](#)[12.6.3.2 Directing trailhead traffic](#)[12.6.3.3 Information at the trailhead.](#)**[Chapter 13: Universal Trail Assessment Process](#)**[13.1 Overview](#)[13.2 Benefits of assessment](#)[13.3 Trail assessment coordinators](#)[13.4 Data collection and processing](#)[13.5 Presenting trail access information](#)**[Chapter 14: Shared-Use Path Design](#)**[14.1 Background information](#)[14.2 Access to shared-use paths.](#)[14.2.1 Rail trails](#)[14.3 Conflicts between multiple user groups](#)[14.4 Shared-use path surfaces](#)[14.4.1 Surface material](#)[14.4.2 Surface firmness, stability, and slip resistance](#)[14.4.3 Changes in level](#)[14.4.4 Openings](#)

[14.5 Shared-use path grade and cross slope](#)[14.5.1 Grade](#)[14.5.2 Rest areas](#)[14.5.3 Cross slope and drainage](#)[14.6 Shared-use path width](#)[14.6.1 Passing space](#)[14.6.2 Protruding objects](#)[14.7 Railings](#)[14.8 Signs](#)**[Chapter 15: Recreation Trail Design](#)**[15.1 Background information](#)[15.2 Outdoor recreation access routes.](#)[15.3 Trail conflicts between multiple user groups](#)[15.4 Trail surfaces](#)[15.4.1 Surface material](#)[15.4.2 Surface firmness, stability, and slip resistance](#)[15.4.3 Changes in level and tread obstacles](#)[15.4.3.1 Changes in level](#)[15.4.3.2 Tread obstacles](#)[15.4.4 Openings](#)[15.5 Trail grades and cross slopes](#)[15.5.1 Grade](#)[15.5.1.1 Recommended grade specifications.](#)[15.5.1.2 Grades that do not meet accessibility recommendations](#)[15.5.1.3 Grade transitions and rest intervals](#)[15.5.1.4 Trails through steep terrain](#)[15.5.1.5 Change of grade](#)[15.5.1.6 Curvilinear trails](#)[15.5.1.7 Trails with steps](#)[15.5.2 Cross slope and drainage](#)[15.5.2.1 Recommended cross slope specifications](#)[15.5.2.2 Cross slopes that do not meet accessibility recommendations](#)[15.5.2.3 Change of cross slope](#)[15.5.2.4 Minimizing erosion through natural drainage patterns](#)[15.5.2.5 Waterbars](#)[15.5.2.6 Trails in regions with heavy rain](#)

[15.5.3 Rest areas](#)[15.6 Trail tread width](#)[15.6.1 Trails with vegetation](#)[15.6.2 Passing space](#)[15.6.3 Protruding objects and vertical obstructions](#)[15.7 Edge protection](#)[15.8 Signs](#)**[Chapter 16: Trail Crossings](#)**[16.1 Trail crossing another trail](#)[16.2 Bridges](#)[16.3 Trail intersecting a roadway](#)[16.3.1 Use of curb ramps on trails at intersections](#)[16.4 Grade separated crossings](#)[16.5 Trail intersecting a railroad](#)**[Chapter 17: Specialized Trails](#)**[17.1 Viewpoints](#)[17.2 Beach trails](#)[17.2.1 Beach access route specifications](#)[17.2.2 Selecting surface materials](#)[17.2.3 Considering temporary paths](#)[17.2.4 Providing beach wheelchairs](#)[17.3 Trails in extreme climates](#)[17.4 Interpretive trails](#)**[Chapter 18: Trail Maintenance](#)**[18.1 Facility maintenance.](#)[18.1.1 Assessment techniques](#)[18.1.2 Shared-use paths maintenance](#)[18.1.3 Recreation trail maintenance](#)[18.2 Information maintenance](#)[18.3 Citizen reporting](#)**[Chapter 19: Research Recommendations](#)****APPENDICES** [as published September 2001]**[Appendix A: Sidewalk Assessment Process Forms](#)**[Stroll Sheet](#)[Intersection Checklist](#)[Curb Ramp Element Analysis Form](#)

[Driveway Crossing Element Analysis Form.](#)

[Cut-Through Median Element Analysis Form.](#)

[Ramped Median Element Analysis Form.](#)

[Appendix B: Sidewalk Accessibility Checklist](#)

[Appendix C: Contact Information](#)

[Appendix D: Detectable Warning Manufacturers](#)

The US Access Board has an updated list of [Manufacturers of Detectable Warning Products.](#)

[Appendix E: Slope Conversion Chart](#)

[Appendix F: Abbreviations and Acronyms](#)

[Appendix G: Glossary](#)

[Appendix H: Bibliography](#)