

ODOT Highway Design Manual

Revision Summary

The purpose of this document is to summarize the revisions in each version of the ODOT Highway Design Manual (HDM).

The updated version is available on the ODOT Highway Design Manual webpage at:

<https://www.oregon.gov/odot/Engineering/Pages/Hwy-Design-Manual.aspx>

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ODOT Technical Bulletins and Advisories: - These documents are used to publish new policy, standards, and clarifications to existing standards between updates to technical manuals. Guidance and standards from the following bulletins and advisories were incorporated into the 2024 HDM, and the bulletins and advisory will be rescinded in the near future:

- **RD21-01(B) - Location of Crosswalk on State Highways.** Incorporated in the Highway Design Manual, Traffic Manual, and Oregon Bike and Pedestrian Design Guide

Part 100 Design Policies and Procedures:

- **Section 102 Definitions** - Added definition for “Climate Friendly Area” per OAR 660-12 and definition for ADA Ramp.
- **Section 103 Acronyms** - Added Acronyms for Resident Engineer – Consultant Projects (RECP and Transportation Project Manager (TPM).
- **Section 108 Local Agency Guidelines** - Added flow charts for application of general design exceptions on LPA projects and application of accessibility design standards on LPA projects
- **Section 109.2 Planning and Project Development** - Added Oregon ADA Transition Plan to list of statewide planning documents adopted by OTC.
- **Section 109.7 Transportation Planning Rule** - New section.
- **Section 110.2 ADA Requirements for Paving Projects** - New section.
- **Section 113.1 Single Function Projects** - Added information for ADA Program projects.
- **Section 115.7 Miscellaneous/Special Programs** - Added examples of special programs (ADA Program and CQCR construction projects.)
- **Section 121.2 Other References** - Added ODOT CAD Manual and ODOT Roadway CAD Manual to list of references.

Part 200 Geometric Design and Context:

- **Section 201 Introduction** - Added font key.
- **Section 201.2 Acronyms** - Added acronym for Commerce and Compliance Division (CCD).
- **Section 203.1 Urban Context and Roadway Classifications** - Added text on the Urban Context and Roadway Classifications.
- **Section 204.2 Other Roadway Designations or Characteristics** - Added text on Reduction Review Routes and the Mobility Advisory Committee.
- **Section 207.11 Posted Speed** - Revised text regarding 85th percentile speed.
- **Section 207.12 85th Percentile Speed** - Revised text regarding 85th percentile speed.
- **Section 212 Role of Planning Documents and Design Criteria** - Added clarification regarding planning studies and practical design.
- **Section 214 Urban and Rural Expressway Design** - Added clarification on determination of urban contexts.
- **Section 217 Sight Distance** - Added clarification on sight distance requirements.
- **Section 218.4 3R Rural Arterial Horizontal Curvature and Superelevation** - Added clarification that horizontal curve includes spirals and superelevation development. Evaluation revised to be based on comfort speed. Added text regarding consideration of curves in a series along the roadway.

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- **Section 218.5 3R Urban Arterial Horizontal Curvature and Superelevation** - Added clarification that horizontal curve includes spirals and superelevation development. Evaluation revised to be based on comfort speed. Added text regarding consideration of curves in a series along the roadway.
- **Section 218.6.2 Superelevation and Methods for Developing Superelevation** - Added clarifying text when a design exception is required for limiting superelevation to 8% when snow and ice prevail.
- **Section 221.1 General** - Added text on 3R Interstate Highway or Freeway projects grade requirement.
- **Section 221.4 4R Rural Arterial Grades** - Added "...without negatively affecting drainage needs."
- **Section 224 Accommodation of other Modes in Design** - Added clarification text.

Part 300 Cross Section Elements:

- **Section 301 Introduction** - Added Font Key for Standard, Guidance, Option and General Text along with descriptions for each.
- **Section 301.1 Definitions** - Added entry for ADA Ramp.
- **Section 302.2 Urban Design Concurrence Document** - Added text to clarify that urban projects include rural communities.
- **Section 304.3 Pedestrian Realm** - Added paragraph on human factors.
- **Section 305.7 On-Street Parking** - New sections for parallel parking and diagonal parking, based on language in Section 6.2.2 of the 2012 HDM.
- **Section 308.5.1 Median Width** - Added text regarding additional measures to provide conspicuity where a 2-foot raised median traffic separator is used.
- **Section 308.5.7 Type of Curb** - Added text to require use of low profile mountable curb for roundabout design.
- **Section 309 ADA Requirements for Resurfacing, Rehabilitation and Reconstruction Projects** - New section.
- **Section 310.2 Urban and Rural Freeway 1R Resurfacing Standards** - Added text regarding ADA requirements.
- **Table 300-15** - Added requirement for ADA Ramps. Updated to refer to the BDM for the project element "Bridges"
- **Section 310.14.1 Application of 4R Single Function (SF) Project Standards** - Added paragraph regarding ADA Program specific projects.
- **Section 311.6 ODOT 3R Urban Preservation Strategy** - Added statement to clarify that 3R urban projects include 3R urban expressway projects with at-grade intersections.
- **Section 311.8 ODOT 3R Rural Expressway Roadway Widths** - New general text regarding application of Table 300-22.
- **Section 311.14 Rural Expressway Medians** - Added text to clarify what triggers the requirement to comply with ORS 366.215. Added statement that on expressways with at-grade intersections and driveway accesses, fully closing the median to reduce cross-over crashes should be balanced with the needs of local access.
- **Section 311.19 ODOT Rural Expressway Typical Section** - New section.
- **Section 311.20.1 Application of 4R Single Function (SF) Project Standards** - Added paragraph on ADA Program specific projects.

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- **Section 312.10 ODOT 4R Rural Arterial, Collector, and Local Route Lane Width** - Added text regarding the use of 11-foot lanes.
- **Section 312.12.1 Application of 4R Single Function (SF) Project Standards** - Added paragraph on ADA Program specific projects.
- **Section 313.9.1 Application of 4R Single Function (SF) Project Standards** - Added paragraph on ADA Program specific projects.
- **Section 314.3 Freight Route** - Added paragraph regarding projects on highways that Reduction Review Routes.
- **Section 317 Vertical Clearance - Urban and Rural Freeway** - Updated references to the ODOT Statewide Mobility Program.
- **Section 318 Curbs** - Added text that curb and gutter required at most curb ramp locations. Added text that where sidewalk ends, curb endings and transitions to the expected pedestrian access route must be installed.

Part 400 Roadside Design:

- **Section 400 4R Clear Zone** - Defined water with a depth of 2 feet or more as a roadside obstacle.
- **Section 404 Ditches** - Clarified determination of a traversable ditch.
- **Section 405 Culvert End Treatments** - New section.
- **Section 407.3 Evaluation of Sight Lines** - New section. Includes reference to The ODOT Tree Sightline Analysis Flowchart.

Part 500 Intersection Design:

- **Section 501 Introduction** - Added font key.
- **Section 504.7 Indirect Left Turns** - Clarified that STRE approval is required for ICE.
- **Figure 500-17 Travel Lane Offset Layout** - Revised note to refer to current HDM section rather than 2012 HDM section.
- **Section 506.7 Intersections on Curves and Superelevation** - Added text to evaluate pedestrian sight lines.
- **Section 506.10 Left Turn Lanes** - Eliminated former Figure 500-19. Subsequent figures one lower number.
- **Section 506.14 Median Acceleration Lanes** - Clarified that STRE approval is required for median acceleration lane.
- **Section 506.23 Corner Radii** - Added discussion about truck apron and added new exhibit.
- **Section 506.26 Signal Pole and Push Button Placement** - Eliminated former Figure 500-31. Subsequent figures two numbers lower.
- **Section 509 Roundabouts** - Various edits throughout roundabout design section for consistency with NCHRP 1043 - Guide for Roundabouts - including revised numbers in Table 500-45.
- **Section 509.9.1 Approach Alignment** - (Roundabouts) Added text and guidance for approach alignment set-up, offset and tying to existing centerline alignment for smoother transitions.

Part 600 Interchanges and Grade Separations:

- **Section 603.4 Weaving Sections** - Updated text and Figure 600-2 for the points of measure for ramp spacing.
- **Section 604 Interchange Types and Forms** - Updated Figures 600-6 and 600-9.
- **Section 604 Interchange Types and Forms** - Added Interactive Highway Safety Design Model (IHSDM) to the list of evaluation tools.
- **Section 605.2 Interchange Ramp Design** - Updated text on ramp storage length and deceleration requirements.
- **Section 605.5 Horizontal Alignment** - Updated Figure 600-20.

Part 700 Public Transportation and Guidelines:

- **Section 704.2 Sidewalk** - Added text to require connection path to boarding and alighting areas.
- **Section 705.1 Roadway and Intersection Design for Buses** - Added language regarding shoulder width for connecting boarding and alighting areas.
- **Section 705.3 Roadway Intersection Design for Light Rail Transit and Streetcar** - Added bullet to require boarding and alighting are to be accessible.

Part 800 Pedestrian Design:

- **Section 801 Introduction** - Referenced Oregon Transportation Planning Rule related to climate friendly areas OAR660, Division 12.
- **Section 802 Approval Processes** - Entirely new subsection 802.6 discussing Curb Ramp Position Need Status Form 734-5390. Modified subsection 802.4 Crosswalk Determinations and subsection 802.5 Crosswalk Closures referring to Traffic Manual for incorporated material from RD21-01(B). Highway Design Manual content includes requirements for crosswalk closure treatments including detectable treatment attributes.
- **Section 805 Pedestrian Needs** - Referenced Oregon Transportation Planning Rule related to climate friendly areas OAR660, Division 12 and Oregon Bicycle and Pedestrian Modal Plan adopted by Oregon Transportation Commission. Added Subsection 805.1.1 describing ODOT's ADA Transition Plan and how that impacts project scope.
- **Section 815 Curb Ramps** - Entirely new subsection 815.4.11 discussing Snow Curb Return design. Running slope and cross slope requirements for directional curb design Criteria B4 and C4 added to existing text (Section 815.3.7, Section 815.4.4, and Section 815.4.6). Separation of facilities Criteria P was broken into two categories, P1 and P2, Section 815.34 and 815.4.5. Minor updates and clarification language to ADA Curb Ramp Design Checklist No 734-5184 and text within the section.
- **Section 821 Tactile Walking Surface Indicators** - Entirely new section detailing design and installation of detectable warning surface and detectable guide strip.
- **Section 845 Share Use Path - Updated Figure 800-72 Types of Shared Use Paths matching Section 900.** Minor update to reference Section 821 for detectable guide strip.

Part 900 Bikeway Design:

- **Section 911.2 Federal Funding Regulation** - Revised reference to Infrastructure Investment and Jobs Act (IIJA).
- **Section 912.2 Transportation Planning Rule** - Revised section to conform to the 2023 revisions to Transportation Planning Rule and the Climate Friendly and Equitable Communities updates.
- **Section 941.4.3** - clarified that BAT lanes are a type of shared lane when determining the bikeway tier.
- **Section 941.5 Evaluate Feasibility** - Added text to consider maintenance issues.
- **Section 943 The Bike Lane Zone** - Added informational text about typical widths.
- **Section 945 The Street Buffer Zone** - Added guidance and figures for each of the buffer options for separated bike lanes.
- **Section 948.1.2** - added introductory text to first paragraph.
- **Section 953 Protected Intersections** - Added text about the purpose of a protected intersection and revised descriptions of the 10 design elements.
- **Section 960 Shared Use Path Design** - Added text regarding the definition of shared use paths.
- **Section 965.1 Horizontal Sightline Offset** - Corrected equation for Horizontal Sightline Offset.
- **Section 966 Vertical Alignment** - Corrected equation for length of vertical curve.
- **Section 984 Bike Lanes at Transit Stops** - Added information about bike lanes at transit stops.

Part 1000 Design Exceptions:

- **Section 1003.5 Local Agency Projects** - Revised Figure 1000-1 Local Public Agency (LPA) Project General Design Exception Approval Process by adding ADA-related criteria and better identifying approvals.
- **Section 1004 Design Exception Request Process** - Added language to address timelines for review of general design exception requests.
- **Section 1004.2 Design Exception Procedures** - Added step to request general design exception control number from web form. Revised language to consult with Bridge Section for requests related to bridge structures or bridge rail.
- **Section 1005.2 General Design Exception Request Form** - Revised guidance for listing multiple requests on a single form when completing the “Description of Exception” portion of the general DE request form.
- **Section 1006.1.1 Local Agency Projects** - Revised language regarding use of the ADA Curb Ramp Design Exception Request form for certified local agency projects. Revised flowchart in Figure 1000-5 to clarify approval of requests.

Part 1200 Other Technical Disciplines:

- **Section 1201.11 Bridge Design Deviations** - Added section to address bridge design deviations.
- **Section 1202.3 Geotechnical Design Deviations** - Added section to address geotechnical design deviations.
- **Section 1203.3 Archaeology** - Added text regarding archaeological monitoring.

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- **Section 1203.7 Migratory Bird Treaty Act** - Revised language regarding migratory bird treaty act.
- **1203.3.11 Other Areas** - Added paragraph about ensuring environmental justice compliance.
- **Table 1200-5 Hydraulic Design Level of Risk** - Revised level of risk for “Infiltration Facilities” from medium risk to high risk.
- **Section 1214 Temporary and Permanent Erosion and Sediment Control** - Revised language regarding erosion and sediment control and 1200-CA permitting requirements.
- **Section 1215.2.8 Stormwater Report** - Deleted subsection.

Part 1300 Deliverables:

- **Section 1302.9.2 Construction Notes** – Removed quantity rounding table. Revised text to round quantities to nearest whole unit. Added language to match the quantities shown on the plans with the quantities in the estimate.

Appendix L Bicycle and Pedestrian Design:

- **Bicycle and Pedestrian Design Guide Chapter 1:**
 - Added section numbers.
 - Revised information to match information in the Highway Design Manual: bikeway types, bike facility selection, bike lane zone system, two-way and contraflow bikeways.
 - Expanded section about bike lanes and transit – to include floating bus stops.
 - Added information about FHWA experimentation to section on Innovative Designs.
 - Expanded section about Edge Lane Roads/Advisory Bike Lanes.
 - Relocated text from Innovative Designs into other sections and expanded content: bike friendly transit stop, buffered bike lane, cycle track, skinny street.
 - Relocated text from Practices to be Avoided and expanded content: Extruded curbs, Two-way Bike Lane.
 - Clarified text throughout chapter.
- **Bicycle and Pedestrian Design Guide Chapter 5:**
 - Added section numbers.
 - Revised crosswalk diagrams to match content in Traffic Manual.
 - Added text about crosswalk spacing.
 - Clarified text throughout chapter.

January 2023 Revision Summary

As part of the January 2023 update to the ODOT Highway Design Manual (HDM), ODOT significantly changed the structure of the document to improve ease of use for practitioners. In addition, the HDM is now a web-based and accessible document, and more consistent with the ODOT technical manual format being adopted by all technical disciplines. Due to the changes in structure between the 2012 HDM and the 2023 HDM, it is difficult to show all revisions in the text of the document. Most text in the January 2023 version of the Highway Design Manual was moved directly from the 2012 version. However, some sections have been revised and some contain a substantial amount of added text. The intent of this summary is to highlight the revisions and additions in the 2023 HDM. Since future updates will not change the structure of the HDM, changes will be shown as redlines on the document.

Overall, the HDM was restructured from 16 Chapters to 13 Parts. The 2023 HDM contains the following parts:

- Part 100 - Design Policies and Procedures
- Part 200 - Geometric Design and Context
- Part 300 - Cross Section Elements
- Part 400 - Roadside Design
- Part 500 - Intersection Design
- Part 600 - Interchanges and Grade Separations
- Part 700 - Public Transportation and Guidelines
- Part 800 - Pedestrian Design
- Part 900 - Bikeway Design
- Part 1000 - Design Exceptions
- Part 1100 - 3D Design
- Part 1200 - Other Technical Disciplines
- Part 1300 - Deliverables

Revisions included incorporating the content of other standalone technical documents and relevant technical bulletins. Guidance and standards from the following documents and technical bulletins were incorporated into the text of the 2023 HDM:

- **Blueprint for Urban Design (BUD) Volume 1** - The content of the Blueprint for Urban Design Volume 1 has been completely incorporated into the body of the 2023 HDM. The majority of content is now in Part 100, Part 200, and Part 300, with pedestrian-related information now in Part 800 and bicycle-related information now in Part 900.
- **ODOT ADA Curb Ramp Process** - The entire standalone document has been included as Appendix G to the HDM.
- **ODOT Technical Bulletins and Advisories:** - These documents are used to publish new policy, standards, and clarifications to existing standards between updates to technical manuals. Guidance and standards from the following bulletins and advisories were incorporated into the 2023 HDM, and the bulletins and advisory will be rescinded in the near future:
 - RD15-03(B) - Update to Design Exception Form
 - RD15-04(B) - Closing Medians on the Interstate and Non-Interstate Freeways
 - RD15-04(B) - Transition to Use of 31-Inch Midwest Guardrail System
 - RD16-01(B) - ADA Curb Ramp Design Exception Request Form and ADA Curb Ramp Guidance

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- RD16-03(B) - Travel Lane Alignment through Intersections
- RD18-01(B) - Adjusting Guardrail Height
- RD20-01(B) - Highway Design Manual - 1R and 3R Record of Decision and Updates and Clarifications to the 1R Standard

Some technical bulletins and advisories were not incorporated into this version of the HDM, and will remain in effect. The Roadway Unit intends to incorporate all remaining, and applicable, bulletins and advisories into the 2024 HDM.

In addition, the 2023 HDM contains new text that provides new or changed guidance and standards. The following parts contain the most significant revisions from the 2012 version of the HDM:

Part 200 Geometric Design and Context:

- Contents of Appendix J - Alignment Guide and Design Aids from the 2012 HDM were incorporated into the body of the HDM in Part 200.
- Discussion of the ODOT six urban contexts from the Blueprint for Urban Design are included in Part 200.
- Sections 203 through Section 208 cover roadway classification and the urban contexts.
- **Section 207.10 Speed, Context and Design** - Target Speed was added to the discussion about Design Speed, Posted Speed and Target Speed to help differentiate the concepts.

Part 300 Cross Section Elements:

- Cross-section design criteria, including the urban design matrices, for the six urban contexts from the Blueprint for Urban design are included in Part 300 along with other design criteria from the 2012 HDM.
- **Section 304 Cross Section Realms** - Includes the BUD Cross-section Realms.
- **Section 305 Cross Section and Realm Design Guidance** - Includes the design criteria for the six urban contexts.
- **Section 306 Bicycle Facility Selection** - This section is an introduction to the Bicycle Facility Selection Process with reference to the full process in Part 900.
- **Section 307 Pedestrian Crossing Locations** - Includes the BUD discussion for Pedestrian Crossing Locations.

Part 500 Intersection Design:

- **Section 506.4 Travel Lane Alignment** - Technical Bulletin RD16-03(B) for Travel Lane Alignment through Intersections was added to this section.
- **Section 509 Modern Roundabouts:**
 - Table 500-4 Roundabout Inscribed Diameters has been updated to include more current practices. Information about Low Profile Mountable Curb has been added and updated with reference to Standard Drawing RD170.
 - Added Section 509.18 Roundabouts near Rail Crossings.
 - Added Section 509.19 Roundabout Metering.

Part 600 Interchanges and Grade Separations:

Contents of Appendix J - Alignment Guide and Design Aids from the 2012 HDM were incorporated into the body of the HDM.

Part 800 Pedestrian Design:

- Concepts and terms from the Blueprint for Urban Design, *Main Street... when a highway runs through it: A Handbook for Oregon Communities*, and Oregon's Bicycle and Pedestrian Design Guide Appendix L were integrated into the part. Expanded content on pedestrian needs in relation to accessibility in walkways, curb ramps, shared used paths, and pedestrian crossings of streets and railways was added.
- **Section 801 Introduction** - Entirely new section introduces definitions, terms, font key, and acronyms for use in the manual related to pedestrian design.
- **Section 802 Approval Processes** - Entirely new section discussing the Urban Design Concurrence Document, ODOT ADA Curb Ramp Process, ODOT CQCR Process, and Crosswalk Determination and Closure Processes.
- **Section 805 Pedestrian Needs** - New section discussing pedestrian considerations including those with various disabilities covered by the Federal Laws ADA and ABA.
- **Section 810 Walkways** - Merged material from the various existing documents and concepts from the BUD describing the Pedestrian Realm and standards applied for the various zones and attributes of the walkway.
- **Section 815 Curb Ramps** - Entirely new section incorporating curb ramp design terms, standards, and guidance for various curb ramp system configurations.
- **Section 820 Building Ramps** - Revised content to separate criteria for ramp design that effect public entrances to establishments adjacent to the public street right of way.
- **Section 830, 835, 840** - Reorganized and expanded material related to pedestrian crossings including the median, enhanced crossing treatments, bikeways, and railroad pedestrian crossing design requirements.
- **Section 845 and 850** - Reorganized and expanded material for the shared use path and trail design accessibility requirements and considerations for design of the different facilities.

Part 900 Bikeway Design:

New language has been incorporated into several sections in Part 900. The following list summarizes the significant additions to the part:

- **Section 912 Oregon Statutory Requirements** - Expanded text from 2012 HDM section 2.3 (bike bill) and adds transportation planning rule as mentioned in Appendix C of BUD. The 2023 HDM adds a new requirement (also in Part 1000) for design exceptions related to the statute ORS 366.514, which requires documentation about public involvement input received and ODOT responses. If the project did not include public involvement, the alternative documentation is a letter from an organization that represents bicycle and pedestrian needs and ODOT responses to the letter. The section also adds description about the types of work that trigger the requirements of the statute to provide accommodation for pedestrians and bicycles.
- **Section 922 Design Users** - Entirely new section introduces typologies of cyclists per research.
- **Section 924 Design Speed** - This section clarifies that the Region Roadway Manager selects the bikeway design speed and provides more guidance on selecting an appropriate bikeway design speed.
- **Section 930 Bikeway Networks** - Entirely new section discusses the role of an ODOT highway in a bikeway network.

- **Section 940 Bikeway Tiers** - Added explanation that changes the way that cycle tracks were defined in the 2012 HDM to the way they are defined in the BUD and in the 2023 HDM.
- **Section 941 Urban Bikeway Selection Process** - This section elaborates on the process in the BUD by providing a step-by-step overview of the process and by providing content in the new sections 922 and 930. Table 900-8 replaces 2012 HDM Table 13-1 as the minimum bikeway requirement.
- **Section 943 The Bike Lane Zone** - This section clarifies the different bike lane width requirements between Tier 1 versus Tier 2 facilities.
- **Section 944 The Sidewalk Buffer Zone** - New section that talks about separating pedestrians from bikes in separated bike lanes.
- **Section 945 The Street Buffer Zone** - New section that talks about the street buffer for separated bike lanes.
- **Section 953 Protected Intersections** - New section that provides some design principles and layouts for this type of intersection design.
- **Section 964 Stopping Sight Distance, Section 965 Horizontal Alignment, & Section 966 Vertical Alignment** - The 2012 HDM just referenced the AASHTO Bike Guide. The design standard is now in the 2023 HDM.
- **Section 993 Parking Other Micro Mobility Devices** - New section.
- **Section 994 Bike and Scooter Share Station** - New section.
- **Section 995 Trailhead Design** - New section.

Part 1000 Design Exceptions:

- Updated and provided additional detail for the general design exception process.
- **Subsection 1003.5** - Expanded guidance for the general design exception process on local agency projects.
- Updated and provided additional detail for the curb ramp design exceptions process.

Part 1100 3D Design:

Entire part has been rewritten with a focus on the 3D design and preparation of digital design handoff packages for bid and construction.

Part 1200 Other Technical Disciplines:

- **Subsection 1204.3** - Additional guidance added to clarify the Rail Crossing Order process.
- **Section 1211 Hydraulics** - Entire section rewritten to align with current ODOT hydraulic design processes and standards.
- **Section 1212 Pavement** - Minor revisions to highlight the importance of engaging with Pavement Services Section early in the project development process.