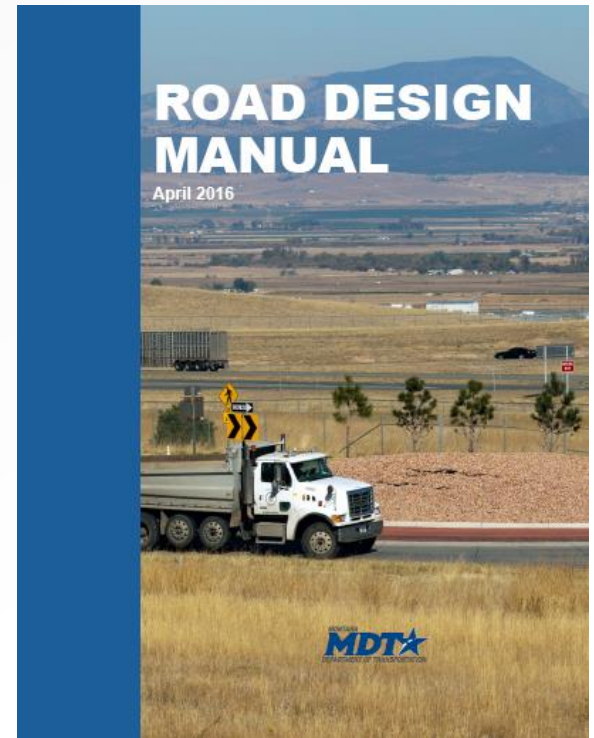


Montana Department of Transportation Road Design Manual

3rd International Conference
on Access Management

Hermanus Steyn

July 2016



Presentation overview

- Project Purpose and Overview
- Access Management Connections
- Chapter Review
- Applications to Other Manuals and Projects

Presentation overview

- **Project Purpose and Overview**
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Project Overview

- Purpose
 - To develop an updated Road Design Manual (RDM), Geometric Design Standards, and Design Exception Template
- Montana Department of Transportation (MDT)
 - Road Design, Consultant Design, Training, Traffic Engineering and Safety, Hydraulics
- Project Schedule
 - Phase I: Annotated Outline, White Papers – September 2014 – March 2015
 - Phase II: Develop the Manual – April 2015 – August 2016

Project Approach

- Work collaboratively to generate design material that reflects current design research, updated project development processes, and best practices for road design
 - Performance Based Design
- Establish an annotated outline upfront (Phase I) to gain consensus on structure and initial content.
 - Resulted in 14 new/reorganized chapters
- Consistent communication and collaboration with MDT staff.
 - Conference calls, video workshops, and in-person workshops
- Bundled chapters to provide smaller, more reasonable deliverables for reviews
 - Six bundles total

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Access Management Connections

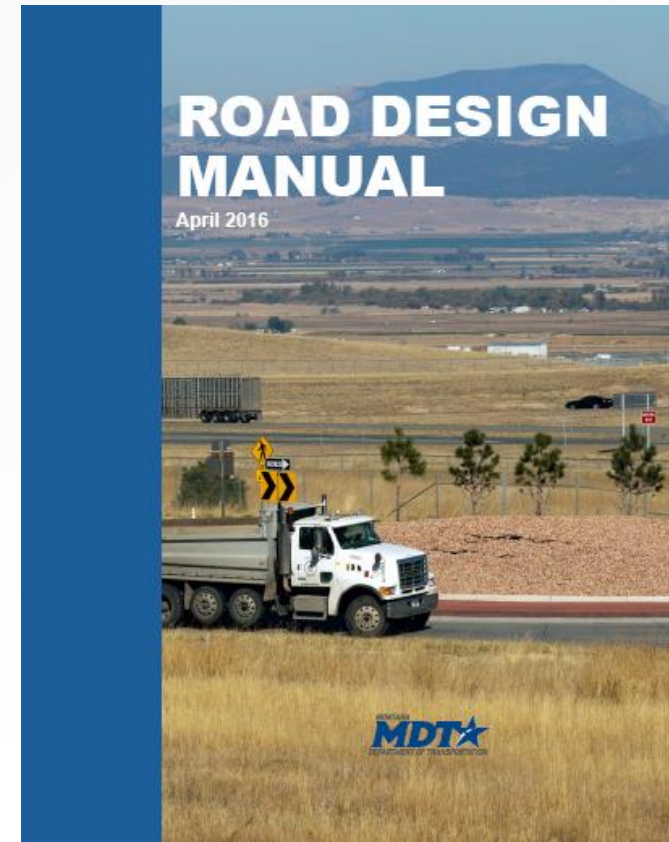
- Coordination with State DOTs and local agencies
- Road design principles to access management
 - Focus on performance vs. dimensions
- Using performance based-design approach to make informed decisions and understand tradeoffs
 - Balance safety, design, and operations
- Working collaboratively to generate ideas and solutions
 - Apply principles to accomplish the goal

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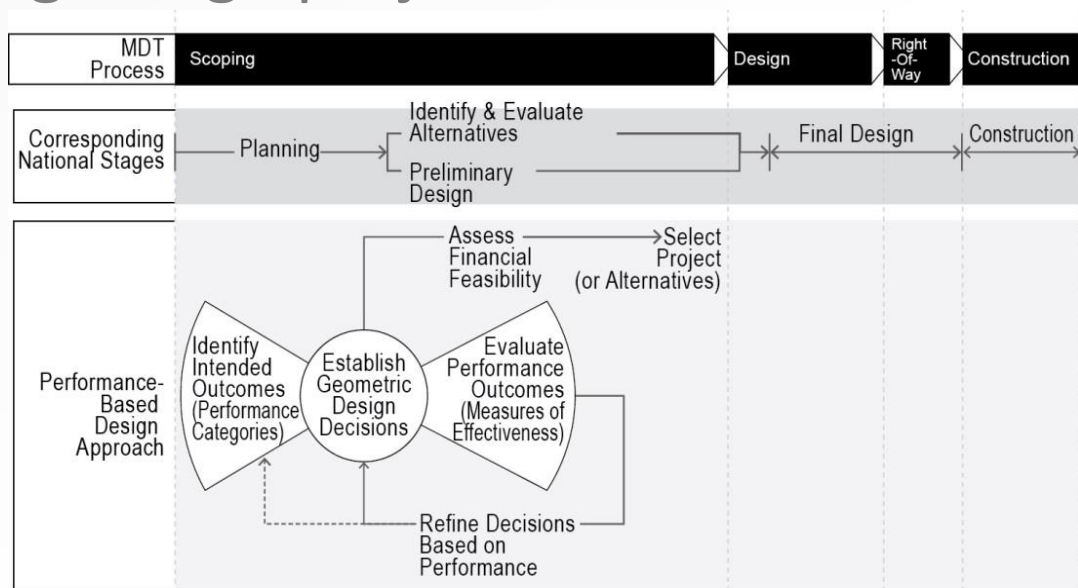
Chapter Review

- Chapter 1 – Road Design Guidelines and Procedures
- Chapter 2 – Basic Design Controls
- Chapter 3 – Horizontal Alignment
- Chapter 4 – Vertical Alignment
- Chapter 5 – Cross Section Elements
- Chapter 6 – Intersections and Interchanges
- Chapter 7 – Multimodal Design Considerations
- Chapter 8 – Urban Design Considerations
- Chapter 9 – Roadside Safety
- Chapter 10 – Work Zone Traffic Control
- Chapter 11 – Drainage and Irrigation Design
- Chapter 12 – Plan Preparation
- Chapter 13 – Quantity Summaries
- Chapter 14 – Specifications/Special Provisions/
Detailed Drawings
- Geometric Design Standards
- Design Exception Template



Chapter 1 – Road Design Guidelines and Procedures

- Comparing the MDT design process with the US nationally recognized project development process
- Understanding the MDT internal structure and process for completing design projects
- Integrating a performance based design approach

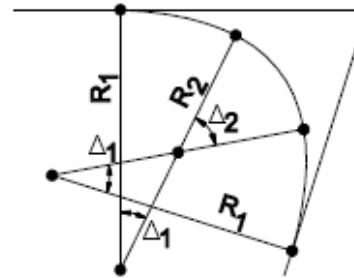
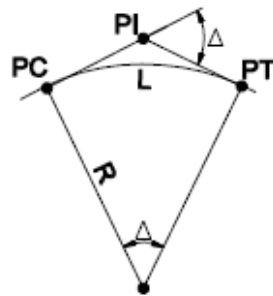


Chapter 2 – Basic Design Controls

- Design controls and associated criteria provide a platform
 - Evaluations of the project needs and context
- Design decisions may result in changing various design criteria
 - Achieve the overall purpose of the project
 - Serve the various users of the facility
- The design exception process
 - Document the design decisions
 - Provide a framework for balancing the importance of geometrics, safety, and operations, as well as considering tradeoffs

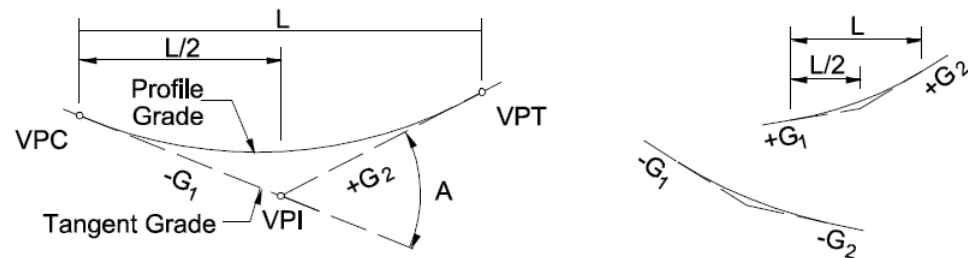
Chapter 3 – Horizontal Alignment

- Updated information to match national standards
 - AASHTO A Policy on Geometric Design of Highways and Streets (Green Book)
- Clarified MDT's recommended method for superelevation axis of rotation
 - Method A rotates the traveled way about the centerline profile of the traveled way.



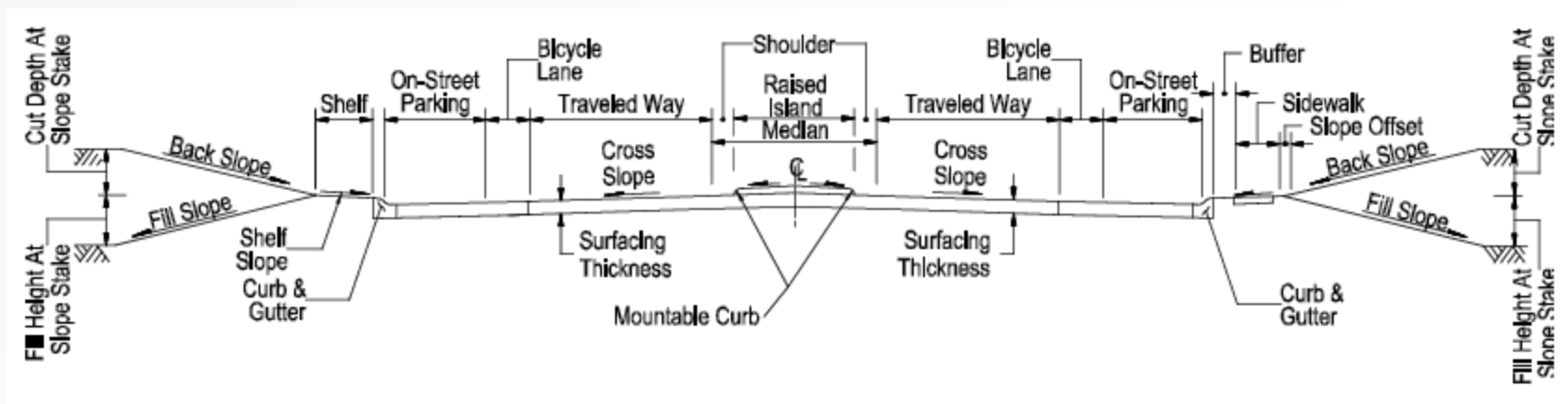
Chapter 4 – Vertical Alignment

- Updated information to match national standards
 - AASHTO A Policy on Geometric Design of Highways and Streets (Green Book)
- Provided a discussion on the coordination of horizontal and vertical alignment that should be integrated to enhance safety and improve operations



Chapter 5 – Cross Section Elements

- Integrated new, enhanced cross sections on key design elements
 - Dedicated bicycle facilities
 - Pedestrian facilities
 - Speed reduction treatments



Chapter 6 – Intersections and Interchanges

- Intersection and interchange design requires close coordination between disciplines
 - Road Design Section
 - Traffic and Safety Bureau
- MDT Traffic and Safety Bureau is responsible for the operational and safety analyses
 - Maintain communication
 - Encourage consistency

Chapter 7 – Multimodal Design Considerations

- New chapter to the RDM
- Provided a toolbox of multimodal design treatments
 - Bicycles
 - Pedestrian
 - Transit
 - Crossings
- Each treatment described, provides different levels of separation
 - Level of separation that appeals to a wide variety of users



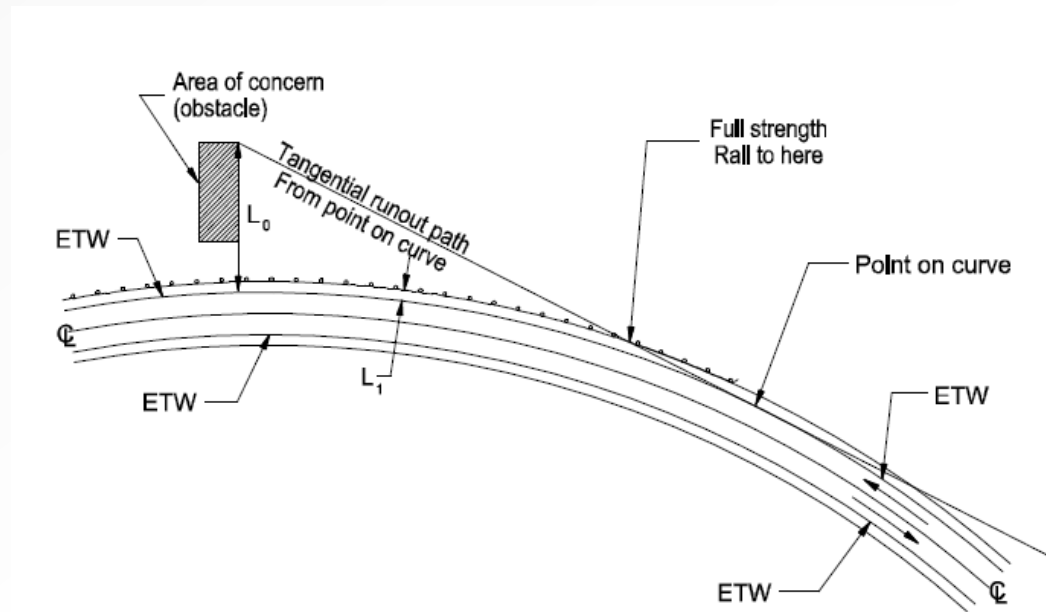
Chapter 8 – Urban Design Considerations

- New chapter in the RDM that highlights unique urban design features
- Considerations for applying geometric design in urban environments
 - Urban cross sections
 - Traffic calming
 - Drainage design
 - Balancing tradeoffs



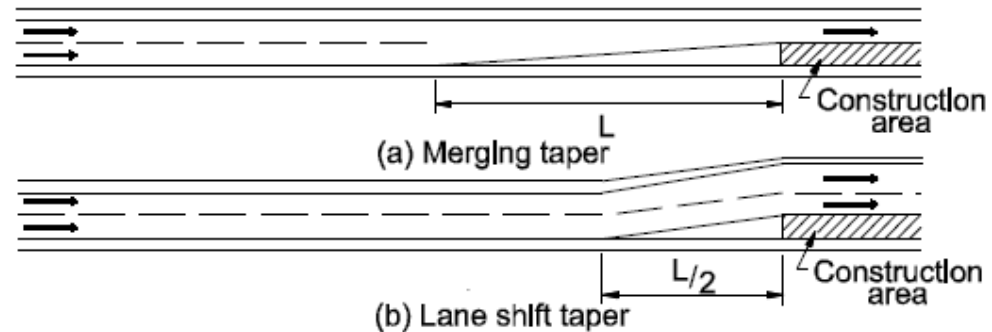
Chapter 9 – Roadside Safety

- Updated information to match national standards
 - AASHTO Roadside Design Guide
- Integrated new information
 - Roadside clear zone
 - Roadside barriers
 - End treatments



Chapter 10 – Work Zone Traffic Control

- Relied heavily on referencing the other chapters for specific design information
 - Applying design guidance within the work zone
- Clarified the design coordination that takes place and confirming this process with MDT's current practice



Chapter 11 – Drainage and Irrigation Design

- Presents principles and criteria for the design and consideration of drainage facilities in collaboration with the roadway design; including:
 - culverts, special-purpose large culverts, storm drains,
 - roadside drainage, miscellaneous drainage facilities,
 - irrigation facilities, and encasement pipes.
- Closely coordinated with the MDT Hydraulics Section

Chapter 12 – Plan Preparation

- Guidelines for the uniform preparation of contract plans including recommended plan sequence, drafting guidelines, plan sheet content, and sample plan sheets.
- Received input from the MDT personnel that conduct the plan reviews and work with the designers on the final development of plan preparation.

Chapter 13 – Quantity Summaries

- Presents detailed information on estimating quantities for highway construction projects
- Most critical chapter for the RDM
 - most often used and referenced by designers

The key objective was to update this chapter to be user/designer-friendly and provide useful guidance

Chapter 14 – Specifications/Special Provisions/Detailed Drawings

- Describes the purpose of the specifications, special provisions, and detailed drawings
- Presents the guidelines for preparing Special Provisions
- Outlines the additional design information that is required and consistently referenced during a design project

Additional Documents

- Appendices
 - Additional supplemental chapter content
 - Example calculations
- Geometric Design Standards
 - Stand alone document that summarizes MDT design criteria: can be regularly updated, if needed
- Design Exception Template
 - Provides guidance for the designer when developing design exceptions
 - *Balancing design, operations and safety*

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Applications to Other Manuals and Projects

- Continual communication
 - Conference calls
 - Video workshops
 - In-person workshops
- Annotated outline prior to content development
 - Lay the foundation
- Collaboration with multiple department staff
 - Designers, training, plan review, managers, consultant design, hydraulics, traffic engineers and more

Questions

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