

MONTANA DEPARTMENT OF TRANSPORTATION

ROAD DESIGN MANUAL

Appendices

January 2026

MDT Road Design Manual

Appendices Introduction

The purpose of the *Road Design Manual (RDM)* is to provide uniform design practices for Montana Department of Transportation (MDT) design teams and consultant personnel preparing contract plans for projects involving MDT facilities. While the majority of the information can be found in the design manual chapters, additional design definitions, details, guidance, and example calculations are provided in the appendices for the design team to reference. The appendices are organized as follows:

- **Appendices A through J** consists of additional chapter content which includes supplemental design guidance, detailed equations and descriptions associated with various manual chapters.
- **Appendix K** consists of example calculations for the design team to reference during project computations. The examples are numbered based on the corresponding chapter content. For example, Example 2-1 corresponds to material in Chapter 2.

The following table summarizes the appendices and associated chapter references.

SUPPLEMENTAL CHAPTER CONTENT		
Appendix A	Definitions	All Chapters
Appendix B	Summary of Website Resources	All Chapters
Appendix C	Quality Assurance/Quality Control Guidance – <i>Reserved</i>	Chapter 1
Appendix D	MDT Internal Coordination - <i>Reserved</i>	Chapter 1
Appendix E	Level of Service Criteria	Chapter 2
Appendix F	Sight Distance <ul style="list-style-type: none"> • Sight Distance Overview • Stopping Sight Distance • Intersection Sight Distance • Passing Sight Distance • Decision Sight Distance 	Chapter 2
Appendix G	Supplemental Horizontal Alignment Information <ul style="list-style-type: none"> • Superelevation Axis of Rotation • Rounding Curve and Alignment Data • Rounding of Stationing and Bearings • Compound Curve Applications 	Chapter 3
Appendix H	Horizontal and Vertical Alignment Equations <ul style="list-style-type: none"> • Spiral Curves • Circular Curves • Compound Curves • Symmetrical Vertical Curves • Asymmetrical Vertical Curves 	Chapters 3, 4
Appendix I	Cross Section Elements <ul style="list-style-type: none"> • Two-Way Left-Turn Lanes • On-Street Parking 	Chapter 5
Appendix J	Supplemental Quantity Summaries Information <ul style="list-style-type: none"> • Quantity Rounding Criteria • Basis of Plan Quantities 	Chapter 13

APPENDIX K: EXAMPLE CALCULATIONS	
<p><u>Sight Distance</u></p> <ul style="list-style-type: none"> • Example 2-1: Horizontal Sight Distance – Middle Ordinate • Example 2-2: Stopping Sight Distance with Vertical Curves • Example 2-3: Combination of Vertical and Horizontal Curves • Example 2-4: Passing Sight Distance • Example 2-5: Intersection Sight Distance – No Traffic Control • Example 2-6: Intersection Sight Distance – Stop Controlled • Example 2-7: Decision Sight Distance 	Chapters 2, 3, 4
<p><u>Horizontal Alignment</u></p> <ul style="list-style-type: none"> • Example 3-1: Spiral Curve • Example 3-2: Circular Curve • Example 3-3: Reverse Curve Superelevation Transition - Continuously Rotating Plane between Two Circular Curves • Example 3-4: Reverse Curve Superelevation Transition - Continuously Rotating Plane between Two Curves with Spiral Transitions • Example 3-5: Broken Back Curve Application • Example 3-6: Compound Curve Application • Example 3-7: Station Equation Applications – Negative (Gap) • Example 3-8: Station Equation Applications – Positive (Overlap) • Example 3-9: Station Equation Applications – Alternate Stationing 	Chapter 3
<p><u>Vertical Alignment</u></p> <ul style="list-style-type: none"> • Example 4-1: Compute Elevations and Stations at Specific Points on a Symmetrical Sag Vertical Curve • Example 4-2: Symmetrical Vertical Curve Through a Fixed Point 	Chapter 4
<p><u>Roadside Safety</u></p> <ul style="list-style-type: none"> • Example 9-1: Clear Zone for Both Sides of the Roadway • Example 9-2: Clear Zone for a Divided Highway • Example 9-3: Guardrail Length of Need for Obstacle Extending Beyond the Clear Zone • Example 9-4: Controlling Length of Need for Multiple Obstacles • Example 9-5: Minimum Length of Culvert 	Chapter 9
<p><u>Quantity Summaries</u></p> <ul style="list-style-type: none"> • Example 13-1: Symmetrical Sections – Width of Subgrade • Example 13-2: Symmetrical Sections – Intermediate Surface Width • Example 13-3: Unsymmetrical Sections – Intermediate Surface Lifts • Example 13-4: W-Beam Guardrail • Example 13-5: Computations of Pay Quantities for W-Beam Guardrail and Intersecting Roadway Terminal (IRT) Sections • Example 13-6: Box Beam Guardrail • Example 13-7: Topsoil Replacement Quantities 	Chapter 13