I15 Capitol/Cedar Interchange

Steel Bridge Essentials
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- Montana Rail Link (MRL)
- City of Helena
- HDR
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- Sletten Construction

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Front-End Planning Reduces Risk During Construction
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Site Description
• Helena, MT
• Between Capitol & Cedar Street
• Steep grades
• High traffic volumes and weaving

Existing Bridge Crosses
• MRL Rail yard - 14 tracks
• Boulder Avenue

Project Purpose
• Increase Capacity – Need 3 lanes
• Improve Safety – High crash rate
• Replace Bridges
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Project Challenges:

• Railroad
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Project Challenges:

• Railroad
• Maintenance of Traffic
• Winter Shutdown
• Right of Way
• Storm water challenges
• Noise
• Utilities
• City coordination
• Seismic & Geotechnical Issues
• Oversized loads
• Contaminated soils
• State Capitol
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Selecting the Right Bridge Type:

- Comprehensive evaluation of bridge types, risks, and cost.
- Developed set of criteria to evaluate bridge options.
- Phase 1: Initial screening of 23 bridge options
- Phase 2: Detailed evaluation of 6 probable options
- Long Span vs. Short Span options
- Two options prevailed:
  - Spliced PS/PT Concrete Girder
  - Welded Steel Plate Girder
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Selected Bridge Alternate:

- Steel alternate prevailed
- Four spans (180-212-212-180) = 784’
- Two separate bridges providing 4 lanes in each direction
- Weathering Steel
Risk Management & Upfront Planning

Railroad Coordination
- Develop a partnership with MRL early in project development
- Understand Railroad Operations
- Determine Construction Constraints
- Reduced Risk by predetermining requirements during the design phase.
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Risk Management & Upfront Planning

Bridge Foundations

• Bridge foundation construction was a critical element.
• Early Geotechnical Recommendations needed to appropriately evaluate bridge alternatives.
• Pile Capacity Testing during the Design Phase - $3M project cost savings.
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Risk Management & Upfront Planning

Construction Sequencing & Estimating

- Maintenance of Traffic – Need to build one bridge in a single season
- Detailed review of construction sequencing and scheduling.
- Production Based Cost Estimating
Conclusions

- Total Project Cost = $32M
- Bids were within 1% of each other
- Total weight of structural steel = 2,000 tons
- Steel Price ~ $1.10/ lb
- Early investments to mitigate risk resulted in successful construction.