




Revvng Up Corridor Solutions

*Lessons Learned from Sturgis'
Lazelle Street Corridor Study*




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Here Today



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Agenda for Today's Presentation

- Study Purpose and Context
- Scope Overview
- Project Challenges
- Corridor Segments Alternatives Analysis
- Lessons Learned
- Questions and Discussion




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Study Purpose and Context


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Regional Transportation Network



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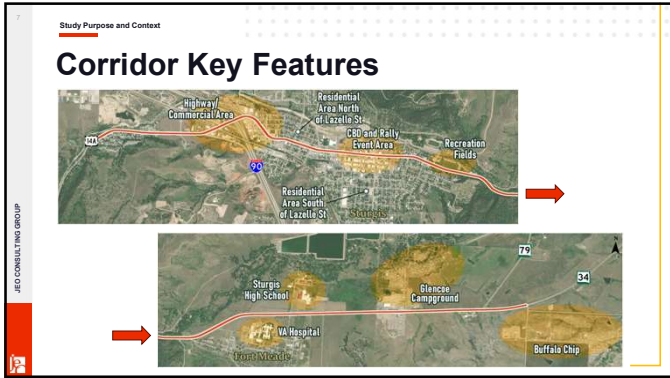
Study Corridor



Study Segment

1. 28th Street
2. 30th Street
3. 32nd Street
4. 34th Street
5. 36th Street
6. 38th Street
7. 40th Street
8. 42nd Street
9. 44th Street
10. 46th Street
11. 48th Street
12. 50th Street
13. 52nd Street
14. 54th Street
15. 56th Street
16. 58th Street
17. 60th Street
18. 62nd Street
19. 64th Street
20. 66th Street
21. 68th Street
22. 70th Street

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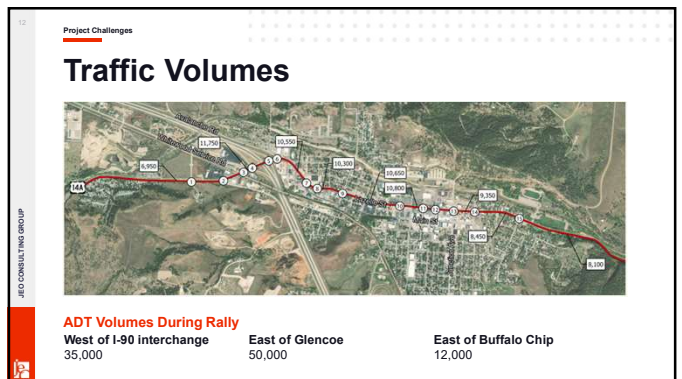
Scope Overview



Project Challenges

Challenges

- Traffic
- Varying Corridor Cross-Sections/Right-of-Way
- Multi-Modal Connectivity
- Diverse Stakeholders
- Environmental/Historic Considerations
- Aesthetics



Project Challenges

Traffic Comparison

Typical Traffic **Rally Traffic**

Project Challenges

Varying Corridor Segments

Figure 12: Existing Roadway Typical Sections

Project Challenges

Varying Right-of-Way

Figure 13: Existing Right-of-Way

Project Challenges

Tight Right-of-Way Constraints

Downtown buildings close to street

Road constrained by bluffs on one side and drainage features on the other side

Project Challenges

Existing Multi-Modal Connectivity

Figure 14: Existing Multi-Modal Connectivity

Project Challenges

Multi-Modal Challenges

Store fronts close to street

Trash cans on sidewalk

Narrow walkways

Vendor tents on edge of sidewalks

Project Challenges

Diversity of Stakeholders

Through community engagement, we met people where they were

- Active project website
- Stakeholder outreach
- Two public meetings
- Attended pop-up event

Community Engagement

Project Challenges

Environmental and Historic Constraints

- Historic buildings
- BLM property
- Roadway shading / flooding
- Cemetery on bluff

Project Aesthetics

Themes

- Gateway locations
- Amenity treatments
- Street trees

Corridor Segment Alternatives Analysis

Corridor Needs

- Surface condition
- Lane width
- Right-of-way width
- Bicycle and pedestrian facilities
- Crashes
- Horizontal curvature
- Intersection sight distance
- Traffic operations
- Access density
- Technology
- Corridor aesthetics

Potential Solutions

- Typical section
- Access management
- Intersection improvements
- Interchange modifications at Avalanche Road
- Horizontal curvature
- Bicycle and pedestrian accommodation
- Corridor aesthetics

Corridor Segment Alternatives Analysis

Corridor Segments and Needs

Segment A
US-14A from West City Limits to Moose Drive
- Reduced safety due to heavy traffic volume
- Highway access to local businesses
- Heavy traffic volume safety from left-turn lanes
- Reduced capacity and safety due to number of highway access locations and lack of left-turn lane

Segment B
Avalanche Road
- Heavy traffic volume safety from left-turn lanes
- Reduced capacity and safety due to number of highway access locations and lack of left-turn lane

Segment C
East St and Avalanche Road Intersections
- Heavy traffic volume safety from left-turn lanes
- Reduced capacity and safety due to number of highway access locations and lack of left-turn lane

Segment D
Lambert Street and Lion Area
- Existing travel lanes and left-turn lanes
- Traffic volume safety from left-turn lanes
- Reduced capacity and safety due to number of highway access locations and lack of left-turn lane

Segment E
St. Charles
- Reduced capacity and safety due to number of highway access locations and lack of left-turn lane

Segment F
Fort Hays/VA Hospital
- Traffic volume safety from left-turn lanes
- Reduced capacity and safety due to number of highway access locations and lack of left-turn lane

Segment G
25th from Fort Middle
- Reduced capacity and safety due to number of highway access locations and lack of left-turn lane

Segment H
Junction from Labette St to Main St
- Reduced capacity and safety due to number of highway access locations and lack of left-turn lane

Segment I
Junction from Labette St to Main St
- Reduced capacity and safety due to number of highway access locations and lack of left-turn lane

Segment J
Junction from Labette St to Main St
- Reduced capacity and safety due to number of highway access locations and lack of left-turn lane

Corridor Segment Alternatives Analysis

Segment A US-14A from West City Limits to Moose Drive

Deficiency

- Reduced capacity and safety due to number of highway access locations and lack of left-turn lane

Alternatives

- 3 lanes
- 5 lanes
- 4-lane divided

Corridor Segment Alternatives Analysis

Segment A US-14A From West City Limits to Moose Drive

A1: Three-Lane
One travel lane in each direction with center left-turn lane
- Improves safety and operations with left-turn lane
- Includes extension of sidewalk to Missouri View Middle Campus
- Requires less pavement area maintenance
- Decreases through-lane capacity

A2: Five-Lane
Two travel lanes in each direction with center left-turn lane
- Improves safety and operations with left-turn lane
- Includes extension of sidewalk to Missouri View Middle Campus
- Requires greater pavement area maintenance

A3: Four-lane with Raised Median
Two travel lanes in each direction with raised center median and center left-turn lane
- Improves safety and operations with left-turn lane and raised median separating opposing lanes of travel
- Includes extension of sidewalk to Missouri View Middle Campus
- Requires greater pavement area maintenance
- Requires side-slope maintenance to right-of-way cut

Corridor Segment Alternatives Analysis

Segment B Avalanche Road Development

Deficiency

- Traffic operations impacts from proposed development activity, including at signalized intersections near I-90 Exit 30

Alternatives

- I-90 viaduct
- Avalanche Road realignment (2 options)

Corridor Segment Alternatives Analysis

Segment B Avalanche Road Development

B1: Interstate 90 (I-90) Viaduct
Viaduct spanning I-90 connecting to development
- Improves traffic operations
- Results in greater safety
- Requires maintenance of additional bridge structures
- Requires side-slope to right-of-way cut requirements

B2: Avalanche Road Realignment No. 1
New roadway along north side of Bear Butte Creek
- Improves traffic operations
- Results in greater safety
- Requires maintenance of additional bridge structures
- Requires side-slope to right-of-way cut requirements

B3: Avalanche Road Realignment No. 2
New roadway connecting to Snow Street
- Improves traffic operations
- Results in greater safety
- Requires maintenance of additional bridge structures
- Requires side-slope to right-of-way cut requirements

Corridor Segment Alternatives Analysis

Segment C Exit 30 and Avalanche Road Intersections

Deficiency

- Poor traffic operations resulting from close signalized intersection spacing and future traffic volumes

Alternatives

- Intersection improvements
- Westbound on-ramp folded diamond
- SPIU
- DDI

Corridor Segment Alternatives Analysis

Segment C Exit 30 and Avalanche Road Intersections

C1: Intersection Improvements

C2: Westbound On-ramp Folded Diamond

C3: Single-point Urban Interchange (SPUI)

C4: Diverging Diamond Interchange (DDI)

Corridor Segment Alternatives Analysis

Segment D Lazelle Street Urban Area (Main St. to Blanche St.)

Deficiency

- Narrow travel lanes
- Poor operations at Junction Avenue signal
- Pedestrian mobility
- Frequent access drives

Alternatives

- 3 lane
- 4-lane undivided
- 5 lane
- 5 lane/4-lane divided
- 5-lane offset alignment

Corridor Segment Alternatives Analysis

Segment D Lazelle Street Urban Area (Main St. to Blanche St.)

D1: 3-Lane
One travel lane in each direction with center left-turn lane

- Increases lane widths to 11 feet
- Adds pedestrian crossing locations
- No impacts to private properties
- Decreases vehicle capacity

Estimated cost: \$13.2 million

D2: 4-Lane
Two lanes in each direction with no center turn lane

- Increases lane widths to 11 feet
- Aligns impacts to private properties
- Decreases vehicle capacity and safety without left turn lane

Estimated cost: \$14.6 million

D3: 5-Lane
Two travel lanes in each direction with center left-turn lane

- Increases lane widths to 11 feet
- Adds pedestrian crossing locations
- Impacts to private properties and render spaces

Estimated cost: \$15.3 million

D4: 5-Lane (west of Middle St) and 4-Lane Divided without turn lanes
4-lane section divided by 4-ft median

- Increases lane widths to 11 feet
- Reduces impacts to residential properties east of Middle St.
- Adds pedestrian crossing locations
- Impacts to private properties and render spaces
- Realigns driveway movements to right-of-way

Estimated cost: \$17.7 million

D5: 5-Lane Offset Alignment

- Increases lane widths to 11 feet
- Adds pedestrian crossing locations
- Impacts to private properties and render spaces

Estimated cost: \$16.8 million

Corridor Segment Alternatives Analysis

Segment E S Curves

Deficiencies

- Horizontal curvature
- Overtopping from adjacent Bear Butte Creek
- Roadway icing due to shade

Alternatives

- Raised vertical profile
- Realignment (2 options)

Corridor Segment Alternatives Analysis

Segment E S Curves

E1: Raised Vertical Profile

E2: S Curves Realignment No. 1

E2: S Curves Realignment No. 2

Corridor Segment Alternatives Analysis

Segment F Fort Meade/VA Hospital

Deficiency

- Delays associated with vehicles exiting Fort Meade/VA Hospital
- Skewed intersections

Alternatives

- Intersection improvements
- Realign Comanche Drive
- Custer Avenue (East)
- RCI

Corridor Segment Alternatives Analysis

Segment F Fort Meade/VA Hospital

F4: Reduced Conflict Intersections

Traffic control that allows left-turn from SD-34 only. Left turn onto SD-34 requires a right-turn and a u-turn

- ✓ Reduces conflict points to improve safety
- ✓ Improves intersection geometry at Comanche Rd intersection
- ✗ Increases travel time resulting from out of direction travel
- ✗ Unfamiliar to local drivers

Estimated cost: \$11.22 million*

Corridor Segment Alternatives Analysis

Segment G SD-34 from Fort Meade to SD-79

Deficiency

- Reduced safety associated with multiple access points and lack of turn lane

Alternatives

- Divided highway with depressed median
- Divided highway with depressed median and cable median barrier

Corridor Segment Alternatives Analysis

Segment G SD-34 From Fort Meade to SD-79

G1: Divided Highway with Depressed Median

Four-lane divided highway with depressed center median

- ✓ Adds left-turn lanes to improve safety and increase vehicle capacity
- ✓ Improves safety with median separating opposing lanes
- ✗ Impacts to private property
- ✗ Restricts some side street/throughways to right-in/right-out movements

Estimated cost: \$13.45 million*

G2: Divided Highway with Depressed Median and Cable Median Barrier

Four-lane divided highway with depressed center median and cable median barrier

- ✓ Adds left-turn lanes to improve safety and increase vehicle capacity
- ✓ Improves safety with median and cable barrier separating opposing lanes
- ✗ Impacts to private property
- ✗ Requires maintenance of cable median barrier
- ✗ Restricts some side street/throughways to right-in/right-out movements

Estimated cost: \$14.6 million*

Corridor Segment Alternatives Analysis

Segment H Junction Avenue from Lazelle St. to Main St.

Deficiency

- Geometrics at Junction Ave. intersection
- Traffic operations along Junction Ave.

Alternatives

- Geometric Improvements at Lazelle and Junction Ave.
- Junction Ave. & Main Street
 - Roundabout
 - Two-way stop control
 - Signalization

Corridor Segment Alternatives Analysis

Segment H Junction Avenue from Lazelle St. to Main St.

H1: Geometric Improvements at Lazelle St & Junction Ave

Modifications to curb return radii to better accommodate paths of turning vehicles

- ✓ Improves sight lines for large vehicles
- ✓ Maximum potential for vehicle tracking on roadways
- ✓ Does not address left-turn traffic operations at Lazelle St and Junction Ave intersection
- ✗ Impacts to private property

Estimated cost: \$1.2 million*

H2: Junction Ave & Main St Roundabout

Construction of a single-lane roundabout at intersection

- ✓ Reduces southbound vehicle idling
- ✓ Improves vehicle and pedestrian safety
- ✗ Does not address left-turn traffic operations at Lazelle St and Junction Ave intersection
- ✗ Impacts to private property

Estimated cost: \$2.2 million*

H3: Junction Ave & Main St Two-way Stop

Removal of existing stop control on the northbound and southbound Junction Ave approaches

- ✓ Reduces southbound idling during non-Rally times
- ✓ Difficult for pedestrians to cross Junction Avenue
- ✓ Does not address left-turn traffic operations at Lazelle St and Junction Ave intersection
- ✗ Could prevent a four-way stop during Rally

Estimated cost: \$1.0 million*

H4: Junction Ave & Main St Signalized Intersection

Construction of a traffic signal at intersection

- ✓ Reduces southbound queuing during non-Rally times
- ✓ Adds controlled pedestrian crossing
- ✓ Does not address left-turn traffic operations at Lazelle St and Junction Ave intersection

Estimated cost: \$3.0 million*

Lessons Learned

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Key Takeaways

Engagement with diverse stakeholders proved essential

Recommendations not based on the Rally but it was an influential element

Traffic was fluid and unpredictable

Phasing of implementation will be key due to shortened seasons



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Questions and Discussion

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Thank You

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