River Drive North
Feasibility Study

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~ Disclaimer ~

This document was developed to meet a degree requirement for the Transportation Policy, Operations, and Logistics (TPOL) Master’s Degree Program at George Mason University.

The opinions and recommendations in this report are the responsibility of the members of the study team and do not represent the positions of the Montana Department of Transportation, the City of Great Falls, or George Mason University.
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Introduction

In January 2009, the Montana Department of Transportation (MDT) and City of Great Falls agreed to engage in an academic exercise with students of the George Mason University, Transportation Policy, Operations and Logistics (TPOL) Program to research opportunities for improving River Drive North between 15th and 38th streets.

The purpose of this feasibility study is to research and develop alternatives for improving River Drive North between 15th and 38th streets, evaluating the economic and general engineering feasibility of options available to solve or mitigate known corridor problems and constraints. The study corridor is a heavily travelled two-lane urban principal arterial. Traffic volume and vehicle mix on the route currently exceed design capacity and drivers routinely experience significant delays during the morning and afternoon peaks. The road is in poor condition, failing to meet MDT pavement and condition standards despite regular maintenance. There are also a number of rear-end collisions, and crashes involving trucks. Congestion and delays along the corridor, especially at the intersection with 25th Street, are common.

The team has researched improvement options while carefully weighing and measuring them against the corridor needs and study objectives, providing a foundation for successful transportation enhancement. Metrics for selecting and balancing possible corridor solutions include improving safety and capacity, reducing grades, improving intersection operation, and preserving and enhancing the scenic nature and overall environmental health. Recreational components and visual appeal are balanced with safety, vehicular and pedestrian mobility, and residential and business impacts. This is done with an eye toward delivering solutions that meet current design standards and enhance the corridor for all users.

At its conclusion, our study aims to provide viable recommendations that can be implemented by the City of Great Falls and MDT for future River Drive North planning analysis and/or project development. In this report, we present the findings and recommendations from the River Drive North Feasibility Study conducted from January 2009 to April 2009.

In Sections 1 through 8 we summarize the process undertaken to discover the problems, and research and develop possible solutions. The process includes the identification of corridor needs, and analyzing existing infrastructure and environmental concerns that encapsulate the corridor problems. We then detail the development of possible solutions and recommendations, noting possible funding options and the steps necessary to carry them forward.
In the figure below, we summarize this recommendations development process.

Following Sections 1 through 8 of the report we provide Appendices 1 through 8 that heavily detail the individual components in support of our overview and conclusions presented. We use maps and figures throughout the text to assist the reader with visualizing the complexities of the corridor and the extent of impact from various facets of River Drive North transportation infrastructure improvement. Please also reference Appendix 9: Maps for our detailed visual data representation.

1 Corridor Needs & Study Objectives

To understand the demand for the River Drive North feasibility study, we identified and agreed upon the corridor needs with client representatives from the City of Great Falls and the Montana Department of Transportation at the beginning of the process. We slightly refined the initial needs during the course of the study, yet they remained an ever-present basis for our validation of proposed improvement options.

The identified corridor needs and constraints include:
- Improving safety
- Improving capacity
- Safeguarding and enhancing the environmental health of the corridor
- Maintaining business operation and mitigating business/industrial impacts
- Ensuring constructability
- Satisfying public acceptance
- Sustaining maintenance operations
Given these needs, we developed key study objectives to refine the research approach and narrow the focus on particular areas of concern. The study objectives help determine the process by which we engage the problem, enable impartial assessment of the corridor, develop improvement options and advance recommendations.

Our study objectives include:

- Researching existing conditions
  - Identifying and documenting safety, capacity, environmental, business and residential, geometric, maintenance issues and public perception
  - Documenting existing and projected environmental and land use conditions
- Developing and analyzing improvement options for existing and future capacity demands while considering constructability, financial feasibility, and public acceptance
- Modeling traffic flow and volumes given established growth projections
- Recommending improvement options for enhanced safety and operation of the corridor

Any improvement option we proposed and developed, at a minimum, must address the above criteria to the greatest extent possible. In addition, the improvement options must strive to minimize detrimental impact. This defines the delicate balance between impact and needs, while providing a process by which we measure potential improvement options and recommendations.

Having established and refined the needs and objectives with the clients, we began research to determine the extent and condition of the existing roadway.

## 2 Existing Roadway Characteristics

Roadway characteristics impact the functionality, access and usage patterns by all properties along the study corridor. River Drive North must withstand current and future demands while satisfying the needs and constraints identified in Section 1.

The characteristics we researched include:

- Roadway Jurisdiction, Classification & Configuration
- Traffic
- Right of Way
- Physical Characteristics
- Configuration
- Design Standards
- Drainage
- Hydraulic Features
- Rail
- Trucking
- Transit
- Crash Analysis

We identified and researched these characteristics prior to any improvement option development, providing us an objective evaluation of the roadway and corresponding operational demand. In this section we provide a brief summary of the existing River Drive North roadway characteristics. A detailed description of the existing roadway characteristics can be found in Appendix 2.
River Drive North is a heavily-travelled, two-lane highway located in the central Montana urban area of Great Falls and serves as a key route, supporting both local access and regional travel demand. The studied 2.2-mile section of River Drive North, from approximate Reference Post (RP) 3.3 at 15th Street North to approximate RP 5.5 at 38th Street, passes by many important sites and features of the Great Falls community. Directly to the north are the Missouri River, associated River’s Edge pedestrian trail system, and Giant Springs State Park. A low-income housing development (Big Stack Mobile Home Court), a commercial/light-industrial business district, the Montana Veterans Memorial, and the Eagle Falls Golf Course lie to the south.

Maintenance responsibility for all of River Drive North falls upon the Montana Department of Transportation due to its classification as a Principal Arterial on the National Highway System (NHS). It is also a designated by-pass route and is the truck route chosen to circumnavigate the urban area.

From 15th Street to 25th Street, two narrow 12-foot lanes and gravel shoulders carry up to 18,000 vehicles per day, of which almost 6% is large trucks. There are many access points and crashes are more prevalent in this section of River Drive North, evidence of substandard horizontal and vertical curvature. Right of way is typically 50 feet on each side of centerline.

River Drive North from 25th to 38th streets consists of 15-foot lanes and gravel shoulders which carry a reduced Average Annual Daily Traffic (AADT) compared to the section from 15th to 25th streets and with fewer access points. Moving east along the corridor, access to Giant Springs State Park is provided by a dedicated left-turn lane from River Drive North. The at-grade railroad crossing west of 38th Street causes frequent delays and raises safety concerns. Right of way is typically 50 feet on each side of centerline along this corridor section as well, with an increase near Giant Springs Road.

There are four primary intersections in the study corridor. The first is a standard, signalized intersection at 15th with center turn lanes. The second is at River Drive North and 25th Street. 25th Street is stop-controlled with substandard turn lanes. The third is an intersection at Giant Springs Road, with a substandard turn lane exiting River Drive North and stop-control for access onto River Drive North. Lastly, there is a standard, signalized intersection at 38th Street with proper turn lanes on both River Drive North and 38th Streets.

This infrastructure research helps us set the stage for our assessment of impact upon these characteristics. Problem identification and solution development can later be carefully considered when coupled with possible environmental impact, detailed in Section 3 below.
3 Environmental Conditions

Understanding the existing environmental elements and extent to which they may be impacted is an important and required component of our evaluation and development of corridor improvements. Note that in Appendix 3 we provide a detailed environmental study of the elements summarized below. See Map 1 in Appendix 9 for an aerial view and labeled sites within the study area.

The review we present for this study is a high-level scan that evaluates potential environmental impacts and highlights areas of concern. In the end, these concerns may stall projects in the development phases due to prohibitive cost or extent and significance of impacts. Note that significant impact would not necessarily stop a project recommendation from moving forward, however such impacts have associated additional costs and time due to the level of environmental document required. An Environmental Impact Statement (EIS) for example must follow the requirements of the National Environmental Policy Act, as outlined in 23 CFR 771. An EIS would not only add time to a project (estimated at more than two years), it would also add additional cost. Completion of an EIS following the FHWA NEPA process would cost an estimated one to five million dollars depending on complexity and number of alternatives reviewed.

We reviewed many environmental areas, including limited involvement of as many affected parties as was practicable within the feasibility study scope and timeline. Our initial scan area included all potential alignments from 8th Avenue North on the south, 25th Avenue on the north, 15th Street North on the west, and 38th Street North on the east. The study area, existing conditions, and potential affects of any alignment that follow are consistent with rules and regulations outlined in 23 CFR 450.212 and 450.318 per Federal Highway Administration (FHWA) regulations for Statewide Transportation Planning and Programming.

A summary of the potential environmental impacts within the study area, and an overview of considerations that must be undertaken to address, solve or mitigate the known area of concern include:

- Historic structures and features – impact mitigation plan development
- Big Stack Mobile Home Court – environmental justice, relocation, partnerships
- River’s Edge Trail – trail access and viewshed concerns
- Missouri River scenic views – sustain and enhance at all locations
- 4(f) – Recreational features and historic structures – impact mitigation plan development
- 6(f) – Giant Springs State Park – impact mitigation/approval from National Park Service (NPS)
- Storm water system – design and integration with existing system
- City of Black Eagle – increased traffic, community bisection, access

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- ARCO site/Smelter Hill – identified hazardous materials, no known remediation plan
- North shore trail system – trail access and viewshed concerns

Establishing this foundation provides for analysis of potential impact and assessment of mitigation measures necessary for environmental preservation of the study corridor and surrounding area. Public outreach must occur and be documented for any recommendation forwarded for project nomination.

4 Corridor Problems Identified

As noted in Sections 2 and 3 above, existing infrastructure characteristics and environmental concerns play a critical role, and problems along the existing corridor have a significant impact on the development of any recommendation. River Drive North is a geometrically substandard roadway amidst an environmentally sensitive area, where traffic volume and vehicle mix currently exceed design capacity. Drivers routinely experience significant delays during the morning and afternoon peak travel periods. Despite these challenges, the corridor remains a critical component of regional transportation infrastructure.

The road itself is in below average condition, with rutting and sub-grade failures due to heavy loads, narrow shoulders, and it fails to meet the Montana Department of Transportation (MDT) pavement and condition standards despite regular maintenance. This can be attributed to a combination of factors that include its age, AADT, truck traffic, environmental conditions, and a lack of appropriately stabilized base course materials with improper drainage.

The curvilinear route, lack of shoulders, high peak traffic and adjacent development contribute to traffic delays along this major east-west corridor and at intersections, 25th Street in particular. The study corridor also serves as a truck route and bypass, and has carried up to 18,000 vehicles per day in recent years. Commercial truck traffic experience difficulty negotiating the substandard horizontal and vertical curvature throughout the study corridor, intersection turning movements, and delays at the active railroad crossing between 38th Street and Giant Springs Road.

According to information received from the State Highway Traffic Safety Bureau for July 1, 2005 through June 30, 2008, there is a history of accidents along the corridor. The information gathered indicates a prevalence of crashes that, while not higher than average for Montana highways in urban areas, does present some significant concern for safety and traffic flow. As detailed in Appendix 2, Section 2.1.1, this is due to traffic mix, left turns and steep grades. The predominant types of crashes are rear-end collisions and crashes involving trucks. Multiple approaches that lack adequate sight distance and storage for turning movements that occur frequently serve to compound the safety issue. The six sideswipe crashes reported along the corridor are typically a symptom of narrow roadway width and highway curvature. A total of twenty-one crashes occurred on curves, which support the need for improved horizontal alignment. Nine of the 51 total crashes involved trucks, revealing the importance of operational improvements targeted at truck needs. In addition, the majority of crashes (61%) in the
corridor occur between 19th and 25th streets, making this an area for focused safety improvement.

Environmental impact of proposed improvements must be addressed and there may be concerns from affected parties. Corridor considerations include the need to preserve historic features, residential and business access locations, recreational facilities, adjacent trails and the desire to safeguard and even enhance the scenic value of the route and its associated viewing points of the Missouri River and Black Eagle Falls and Dam. We detail known environmentally sensitive areas in Appendix 3 all of which must be researched and possible impacts mitigated.

Problems along the study corridor are abundant and will require innovative solutions and extensive public outreach. In the following sections we explore the improvement options we developed to address the known problems and constraints identified.

5 Improvement Options

During the course of study we considered and first evaluated many improvement options without taking into consideration specific constraints or impact, such as cost or environmental impact, with the objective of increasing the likelihood of including many possible options. In the following, we summarize the process undertaken and options developed, and provide greater detail in Appendix 5.

Given our identified corridor needs and objectives in Section 1, we gauged possible improvement options for maximum benefit and mitigated detriment, providing for three general option categories. For convenience we have labeled them as follows:

- **A options** are improvement options that generally follow the existing corridor with minor alignment shifts.
- **B options** are improvement options that provide a new bridge across the Missouri River and reroute traffic through the community of Black Eagle.
- **C options** are improvement options using the old railroad grade south of the existing alignment.

Within these three general categories of improvements, the team developed and named for differentiation several sub-options. Please refer to the map below for visual reference of the general and associated sub-options listed in the text to follow.
- **Improvement Option A1** generally follows the existing alignment with only minor shifts necessary for the widening provision of 12 foot through-lanes, wider shoulders and turn lanes where appropriate.

- **Improvement Option A2** curves to the south after the 15th Street intersection and passes behind the River’s Edge Dental Office, then cuts through the center of the Big Stack Mobile Home Court and Waylands Taxidermy.

- **Improvement Option A3** is similar to A2, but remains to the north in front of the River’s Edge Dental Office, shifting only far enough south to allow for the necessary fill to *partially* remove the dip in the current alignment.

- **Improvement Option A4** is the only build alternate in Group A east of 25th Street. It follows the existing highway between 25th and 38th Streets with widening to the south to provide for standard eight foot shoulders.

- **Improvement Option B1** (a, b, c) is a bridge crossing extending north from the 25th Street intersection. The bridge would cross north of the Black Eagle Falls Dam and connect with existing infrastructure on the north shore of the Missouri River. B1 sub-options a, b and c would then tie into 15th Street via North River Road, a new alignment, or Smelter Avenue, respectively.

- **Improvement Option B2** is designed to remove the majority of the traffic from the narrow segment west of 25th street by adding a bridge midway between Giant Springs Road and 25th Street. This bridge would cross the southern tip of Tailrace Island and connect into the existing service road for the dam.

- **Improvement Option B3** (a, b) is a bypass alignment to take traffic directly from River Drive North at Giant Springs, across the Missouri River and through undeveloped land to the north of the Missouri River. B3 sub-options a and b would connect to 15th Street via Smelter Ave or 25th Ave. North, respectively.

- **Improvement Option C** generally follows an inactive railroad track to the south, crossing under 25th Street, continuing on and connecting with 38th Street North south of the existing River Drive North intersection.
Based on our research, the team ranked the above improvement options according to the individual criteria we originally established with the client in Section 1. Not all possible improvement options we initially identified for each of the A, B and C option categories survived our scrutiny for advancing feasible alternatives. For example, the team heavily marked down Improvement Option C due its inability to provide for safety and capacity needs while posing possible socio-environmental impact.

We formalized these rankings into numeric scores to narrow the possible options down to recommendations. Values ranging from one (very negative impact) to five (very positive impact) were assigned to each improvement option in the matrix, for each criteria. In this way, the options that scored highly and nicely complimented one another, as in the case of options A2 and A4, were advanced. In Table 5:1 we present the Decision Matrix containing the team collaborative scoring and resulting prioritized alternatives (A2, A4, and B3a).

Note that cost is one component of the constructability category and detailed information can be found in Appendix 5, section 5.3.6.1.

### Table 5:1 Decision Matrix

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<tr>
<th>Location</th>
<th>Alignment</th>
<th>Safety</th>
<th>Capacity</th>
<th>Environmental</th>
<th>Recreation</th>
<th>Business/Residential</th>
<th>Constructability</th>
<th>Public Acceptance</th>
<th>Maintenance</th>
<th>Total</th>
<th>Advanced Options</th>
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<tr>
<td>15th - 25th</td>
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<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>31</td>
<td>★</td>
</tr>
<tr>
<td>15th - 25th</td>
<td>A3</td>
<td>3</td>
<td>4</td>
<td>4</td>
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<tr>
<td>25th - 38th</td>
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<td>4</td>
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<td>4</td>
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<td>2</td>
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<tr>
<td>Cross at 25th</td>
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<td>4</td>
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<td>2</td>
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<tr>
<td>Cross at 25th</td>
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<td>4</td>
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<tr>
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<td>2</td>
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<td>2</td>
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</table>

Scoring: 1 - Very Negative  2 - Slightly Negative  3 - Neutral  4 - Slightly Positive  5 - Very Positive  Total Possible Score = 45

Details of all improvement options, including those not selected for advancement are summarized below.

**Improvement Options Summary**

In this section we briefly summarize the respective improvement option benefits and detriments noted, and provide cost for the selected improvement options only. Appendix 5 provides the reader greater detail.

**Improvement Option A1 (not advanced)**

Limited available width along this alignment fails to provide for curve and grade correction, while retaining business access point limitations. Safety and capacity are likely not improved and with our assigned score of 20, this option is not advanced.
**Improvement Option A2 (advanced)**
Reconstruct River Drive North from 15th-25th by shifting to the south of the existing alignment behind the River’s Edge Dental Office and connecting back to 25th, with associated commercial and residential relocation impacts.

We awarded Option A2 the highest score (31) for this corridor section because it provides a superior alignment option in almost every category. This option reduces the impacts to businesses, but does not fully meet the safety and capacity needs of River Drive North. Pedestrian and recreation features may be sustained and possibly enhanced, though constructability may be a concern. Despite public acceptance and associated residential and businesses impacts remaining unquantifiable, this improvement option does provide improvement over existing conditions. Innovative solutions for business and residential relocations must be investigated. Estimated cost to construct this option is from $8.65 million (2-lane) to $19 million (4-lane). As a result, we selected this option for advancement.

**Improvement Option A3 (not advanced)**
Reconstruct 15th-25th, generally along the existing alignment with some minor business impacts. This alignment stays to the north of the River’s Edge Dental Office and widens to the south to correct for grades. This option still impacts the Big Stack Mobile Home Court and other businesses.

We awarded Option A3 a score of 27 for improving safety and capacity, though to a lesser extent than A2. The intersection control at 25th is still an option for later consideration. A3 would have little effect on natural resources or the viewshed, but does have the potential for added pedestrian features to enhance recreation and trail connectivity, as with A2 above. Business operations would be the largest impact under this alternative although there are potential mitigation features. Innovative solutions for residential relocations must be investigated. Because Option A3 underperformed against Option A2, this option was not selected for advancement.

**Improvement Option A4 (advanced)**
Reconstruct 25th-38th along the existing alignment. It generally follows the existing alignment from 25th to 38th Streets while widening and correcting for horizontal curves.

We awarded an impressive score of 29 to improvement option A4, as it improves safety due to better alignments and increased width. Accommodating capacity is not a significant concern as long as new access points are not added. Environmental impact will be minor, and scenic turnouts would remain with added opportunities for trails. Constructability within this tight section of the corridor remains a concern. Public support for improving a non-critical section of the corridor may be difficult. Estimated cost to construct this option is $5.75 million and we selected this option for advancement.

**Improvement Options B1 & B2 (not advanced)**
Because of negative environmental impact upon the north shore of the Missouri River, community bisection and poor connections with existing infrastructure, combined with little or no perceived community support for bridge options in close proximity to Black Eagle Falls, the group awarded Options B1 & B2 low scores, equating to our no-advance recommendation.
**Improvement Option B3a (advanced)**
Construct new bridge alignment crossing the Missouri River at the west end of Giant Springs Park, connecting to Smelter Avenue through Black Eagle.

With a score of 21, bridge option B3a performed best among its bridge option peers. The sum of our assigned scores for B3a reveals its superior alignment option when compared with all other bridge alignment options, providing improved safety and capacity, recreation and limited business impacts, despite likely environmental hurdles.

This option generally satisfies the safety needs for the corridor. Access locations through Black Eagle and the potential for a signalized intersection at 15th Street North and Smelter Avenue require further review. Thirty-year capacity needs may be met with this option. During the design process, consideration for environmental mitigation and viewshed enhancement is mandatory. Recreational opportunities may be enhanced, yet there may be impacts on business operations south of the Missouri River. Montana Department of Transportation maintenance of the existing corridor between 15th and 25th Streets would remain and additional maintenance of the new bridge is noted. As with the other improvement options, public support must be garnered for a new bridge and a route crossing the Anaconda Hills Golf Course, tying into Smelter Avenue. Extensive investigation and path determination regarding the Missouri River north shore contamination area (ARCO remediation site) are required. Estimated cost to construct this option is from $25 to $39 million. Accordingly, the team selected B3a for advancement.

Note that we scored option B3b low and did not select it to advance. In addition to cost, constructability and environmental concerns, its connection with existing infrastructure further north negates the benefit of a bypass. Truck traffic in particular would have to travel further north, only to have to return south along 15th Street to make the east-west connection.

**Improvement Option C (not advanced)**
We assigned the railroad grade option low scores as it underperformed in many categories and fails in adequately meeting the needs of the project to merit advancement. Safety is not improved as an at-grade rail crossing would be added. Capacity is not improved significantly as connections with all major intersections are troublesome. Environmental impact is likely moderate and public acceptance is likely low. An option remains, however, to utilize portions of the rail corridor for alternate business access points and further investigation is required.

**Other: Impacts/Considerations**

**Access Restrictions or Additions** must be carefully reviewed and addressed. In order to provide necessary capacity without removing businesses, the 25th Street intersection needs modification and some business access points need to be eliminated or modified, but changes may shift traffic and congestion to other routes.

**A Grade-Separated Rail Crossing** should be considered for the crossing west of 38th Street and River Drive North to address safety concerns and traffic delays. Providing a grade separation may be difficult given the current alignment with a sharp curve, nearby signal at 38th Street, and required access to Giant Springs State Park. Consideration may be given to a partnership with BNSF Railway to drop the rail grade approaching River Drive North, in combination with highway grade elevation.
**Pedestrian and Recreational Features** are very important as well. Any improvement options should consider providing non-motorized connections whether via widened shoulders or separated paths.

**25th Street Intersection Improvements** can be carried forward as options in most of the alternatives. A signal would require a warrant study to check for proper geometry, adequate lanes and traffic balance. A roundabout must consider design for truck movements, traffic mix, and available space. Considerations for pedestrians must be included with this option.

Other considerations with any of these alignments would include location of turn lanes, access restrictions, concrete or asphalt surfacing, the need for lighting, and the potential for new trails, bicycle/pedestrian crossing facilities and beautification.

### 6 Recommendations

Generally speaking, to increase capacity of the existing corridor, additional lanes for turning vehicles and shoulder width is required. Modifications to grades and curves are also necessary to improve traffic flow and safety. Recreational and business access points and operations need to be adjusted to ensure traveler safety. Construction difficulties include unstable slopes given the weathered sandstone cliffs along the Missouri River, and underground springs along the corridor.

East of 25th Street entities impacted include the Eagle Falls Golf Club, Montana Veterans Memorial and the Missouri River scenic corridor. West of 25th Street the impact would primarily extend to business operations and residential sites, including River’s Edge Dental Office and Big Stack Mobile Home Court. Public concerns and landowner acceptance will be a critical component of these recommendations.

After we estimated the impacts of safety, capacity, environmental concern, business and residential affects, constructability, public acceptance and maintenance operations, we measured the narrowed corridor improvement options (per the Decision Matrix in Section 5) one against another. In addition, we modeled traffic for the year 2025 to establish objective, forecasted volumes throughout the study area with and without the improvement options. The result of our weighing and measuring exercises produced the following recommendations, found in greater detail in Appendix 6.

#### A Option Recommendations

We grouped the A options recommendations discussed here into the two chosen alignment options, one west of 25th Street (A2) and one east of 25th Street (A4). A 4-lane is necessary for capacity, but impacts likely include many businesses, residences and some cultural resources along the corridor. Based on perceived public sentiment to limit roadway width, the current A options include only two through-lanes with left turn lanes where necessary; a configuration that is not forecasted to fully meet capacity requirements, but helps to reduce business and park impacts.

From the A Options, **Improvement Option A2** remains our primary recommendation for reconstruction between 15th and 25th streets. Capacity and safety are improved with curve and grade correction, while possibly improving recreational access and
maintaining Missouri River viewshed. Maintenance operations are improved, while constructability will need to be reviewed carefully. We also recommend investigating the restriction of access, limiting left turning movements at some locations.

Between 25th and 38th streets, we recommend advancing Improvement Option A4 to maintain corridor consistency. Constructed alone, this option slightly improves safety due to improved alignments and increased roadway width. Accommodating capacity, while not a significant concern as long as no new access points are added, will be addressed. Environmental impact will be minor and scenic turnouts will remain with added opportunities for trail access. Coupling this recommendation with the construction of a grade-separated rail crossing will improve safety and decrease traffic delays experienced on the eastern portion of this section.

**B Option Recommendations**

We recommend the City of Great Falls and the Montana Department of Transportation review Improvement Option B3a as a possible long-term solution. The Bridge option carries with it concerns of environmental impact, viewshed considerations, cost and public acceptance. There remain significant unknowns, including impact to the community of Black Eagle and the Missouri River corridor. Until the contamination areas at the ARCO remediation site (often referred to as Smelter Hill) are known and a cleanup plan determined, we have not forwarded this option for short-term consideration.

**Other Recommendations**

We recommend a more in-depth analysis of traffic control at the intersection of 25th Street and River Drive North, to be completed in later design phases, though likely possibilities include a signal, roundabout and/or changes to the intersection geometry.

We recommend a grade-separated rail crossing west of 38th Street to address safety concerns and traffic delays, and perhaps couple it with Improvement Option A4 or B3a. Providing a grade separation may be difficult given the current alignment with a sharp curve, nearby signal at 38th Street, and required access to Giant Springs State Park. Partnership with BNSF Railway to drop the rail grade approaching River Drive North should be investigated.

### 7 Funding

Funding available for the recommended improvement options can be found in Federal, State, Local and private streams as detailed in Appendix 7. While many funding options are legislatively allowed, the predominant funding sources used for these types of projects will be State and Federal with the added possibility of partnerships.

Of the Federal funding streams available the following most likely that would qualify for parts and pieces of a River Drive North project include:

- National Highway System (NHS) funds
- Surface Transportation Program – Urban System (STPU)
- Surface Transportation Program – Hazard Elimination (STPHS)
- Rail/Highway Crossing Protective Devices Program (STRPR)
- Rail/Highway Crossing – Elimination of Hazard Program (STPRR)
- Community Transportation Enhancement Program (CTEP)
The principal State funding options available to fund River Drive North projects include:
- State Funded Construction Funds (SFC)
- State Fuel Tax

There are also a number of possible Local funding sources which include:
- General Fund
- Special Revenue Funds
- SID Revolving Fund
- Gas Tax Apportionment
- HUD/Community Development Block Grant Program (CDBG)

These State, Cascade County and Local funds are eligible, but are limited and are in ever-present demand to fund multiple simultaneous projects. With elevated estimated costs for most improvement options, a combination of funding sources will likely be required to produce an improved alignment for the public. In addition, there have been very promising initial discussions regarding partnerships with NeighborWorks, and the HUD/CDBG program regarding residential relocation options.

8 Next Steps

In our recommendations for this study, we carry forward implementation options for both short-term improvements to safety and capacity (\textit{Improvement Options A2 and A4}) and the long-term (\textit{Improvement Option B3a}). Since all Improvements Options advanced for recommendation from this study will need additional time and effort, we propose that the City of Great Falls and Montana Department of Transportation collaboratively determine which path to proceed when selecting either short-term or long-term improvement options. As noted throughout the report, mitigation of impact must be balanced with anticipated benefit, while obtaining public sentiment and approval.

In the following we identify the next steps suggested to advance this academic exercise to initial project development phases.

- Determine level of funding available and possible funding partnerships.
- Conduct general public and resource agency outreach to determine concerns and/or perceptions.
- Any project, or group of projects, must gain support by those involved in the Great Falls Transportation Plan and satisfy, to the extent possible, the Missouri River Corridor Plan and Great Falls Growth Policy.
- Further investigate and document existing corridor conditions and constraints for design development.
- Investigate, plan for and implement an origin-destination study for the area.
- Investigate and determine feasibility of partnership opportunity between the Montana Department of Transportation (MDT), the City of Great Falls, and the community development organizations such as NeighborWorks, HUD/CDBG program.
- Either engage in a full corridor study or begin environmental review process for a project.

Any recommendations advanced for project nomination will need to satisfy much or all of the above criteria before a project can be forwarded. Appendix 8 compliments this section in somewhat greater detail.
Appendix 1: Needs & Objectives

To understand the demand for the River Drive North feasibility study, we identified and agreed upon the corridor needs with client representatives from the City of Great Falls and the Montana Department of Transportation at the beginning of the process. We slightly refined the initial needs during the course of the study, yet they remained an ever-present basis for our validation of proposed improvement options.

1.1 Corridor Needs & Objectives
The identified corridor needs and constraints include:

- **Improve safety**
  - Reducing grades where possible
  - Improve intersection and approach operations
  - Reduce crash rates and severity

- **Improve capacity**
  - Determine capacity constraints and review correction options as they relate to the Great Falls transportation plans.
  - Alleviate known link and nodal constraints to reduce congestion and delays

- **Safeguard and enhance the environmental health of the corridor**
  - Missouri River scenic viewshed
  - Historic features
  - Air quality
  - Water quality
  - Wildlife
  - Tourism
  - Social and economic needs
  - Maintain or enhance recreation
  - Pedestrian and bicycle facilities
  - Golf course (Eagle Falls and Anaconda Hills)
  - Baseball park(s)

- **Maintain business operation and mitigate business/industrial impacts**
  - Access
  - Zoning

- **Ensure constructability**
  - Cost
  - Grades
  - Right-of-way
  - Intersections
  - Railroads
  - Slopes
  - Springs
  - Utilities

- **Satisfy public acceptance**
- **Sustain maintenance**
1.2 Objectives

Given these needs, we developed key study objectives to refine the research approach and narrow the focus on particular areas of concern. The study objectives help determine the process by which we engage the problem, enable impartial assessment of the corridor, develop improvement options and advance recommendations.

Our study objectives include:

- Researching existing conditions
- Identifying safety, capacity, environmental, business and residential, geometric, maintenance issues and public perception
- Documenting existing and projected environmental and land use conditions
- Developing and analyzing improvement options for existing and future capacity demands while considering constructability, financial feasibility, and public acceptance
- Modeling traffic flow and volumes given established growth projections
- Recommending improvement options for enhanced safety and operation of the corridor

Any improvement option we proposed and developed, at a minimum, must address the above criteria to the greatest extent possible. In addition, the improvement options must strive to minimize detrimental impact. This defines the delicate balance between impact and needs, while providing a process by which we measure potential improvement options and recommendations.

Having established and refined the needs and objectives with the clients, we began research to determine the extent and condition of the existing roadway, followed here by Appendix 2.
Appendix 2: Existing Roadway Characteristics

Any proposed improvement option must first consider the existing roadway condition. As a result, River Drive North roadway characteristics were identified and researched, providing an objective evaluation of the roadway and corresponding operational demand placed upon it by the traveler.

We identified and researched these characteristics prior to any improvement option development, providing us an objective evaluation of the roadway and corresponding operational demand. In this section we provide a brief summary of the existing River Drive North roadway characteristics.

River Drive North is a heavily-travelled, two-lane highway located in the central Montana urban area of Great Falls and serves as a key route, supporting both local access and regional travel demand. The studied 2.2-mile section of River Drive North from approximate Reference Post (RP) 3.3 at 15th Street North to approximate RP 5.5 at 38th Street passes by many important sites and features of the Great Falls community. Directly to the north are the Missouri River, associated River’s Edge pedestrian trail system, and Giant Springs State Park. To the south of the roadway lie a low-income housing development (Big Stack Mobile Home Court), a commercial/light-industrial business district, the Great Falls Veterans Memorial, and the Eagle Falls Golf Course.

Roadway characteristics impact the functionality, access and usage patterns by all parties along the study corridor, and it must withstand the current and future corridor while satisfying the needs identified. Researched characteristics include:

- Roadway jurisdiction, Classification & Configuration
- Traffic
- Right of Way
- Physical Characteristics
- Configuration
- Design Standards
- Drainage
- Hydraulic features
- Rail
- Trucking
- Transit
- Crash Analysis

The following sections of this appendix detail the bulleted list of roadway characteristics above.
2.1 Roadway Jurisdiction, Classification and Configuration

Figure 2.1 below indicates the Montana Department of Transportation (MDT) classifications for the main roadways, and the maintenance responsibilities.

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Classification</th>
<th>Maintenance Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>River Drive North</td>
<td>Principal Arterial</td>
<td>MDT</td>
</tr>
<tr>
<td>15th Street</td>
<td>Principal Arterial</td>
<td>MDT</td>
</tr>
<tr>
<td>19th Street</td>
<td>Local Road</td>
<td>City</td>
</tr>
<tr>
<td>18th Street</td>
<td>Local Road</td>
<td>City</td>
</tr>
<tr>
<td>25th Street</td>
<td>Urban Minor Arterial</td>
<td>City</td>
</tr>
<tr>
<td>38th Street</td>
<td>Urban Minor Arterial</td>
<td>City</td>
</tr>
<tr>
<td>Giant Springs Road</td>
<td>Urban Major Collector</td>
<td>City</td>
</tr>
<tr>
<td>8th Avenue</td>
<td>Urban Major Collector</td>
<td>City</td>
</tr>
<tr>
<td>Smelter Avenue</td>
<td>Urban Major Collector</td>
<td>City</td>
</tr>
</tbody>
</table>

There are several key adjoining roadways, as noted in Figure 2.2 below. These roadways provide direct access to and from River Drive North, and its associated features, for the traveling public.

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Adjoining Roadway Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>15th Street</td>
<td>69 Feet</td>
</tr>
<tr>
<td>19th Street</td>
<td>24 Feet</td>
</tr>
<tr>
<td>25th Street</td>
<td>34 Feet</td>
</tr>
<tr>
<td>Giant Springs Road</td>
<td>36 Feet</td>
</tr>
<tr>
<td>18th Avenue</td>
<td>24 Feet</td>
</tr>
<tr>
<td>38th Street</td>
<td>25 Feet</td>
</tr>
</tbody>
</table>

2.2 Existing Traffic

The corridor has a mix of traffic from cars to over size trucks. The information presented below is a breakdown of the traffic information. Figure 2.3 below shows a manual count of the vehicle types traveling between 15th Street and 25th Street during approximately 9:00 a.m. and 1:00 p.m. 4.06% of the vehicle traffic is large truck (type 8-13).
Figure 2.3 Four-Hour Manual Count 9:00 a.m. to 1:00 p.m. – March 2\textsuperscript{nd}, 2007
Location - River Drive 0.5 mile west of 25th Street

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Number of Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars</td>
<td>1,997</td>
</tr>
<tr>
<td>Buses</td>
<td>24</td>
</tr>
<tr>
<td>Small Trucks: (Type 5-7)</td>
<td>103</td>
</tr>
<tr>
<td>Large Trucks: (Type 8-13)</td>
<td>90</td>
</tr>
<tr>
<td>RV’s</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,215</strong></td>
</tr>
</tbody>
</table>

Figure 2:4 below shows a manual count of the vehicle types traveling between 25\textsuperscript{th} Street and 38\textsuperscript{th} Street during approximately 9:00 a.m. and 1:00 p.m. 5.74% of the vehicle traffic are large truck (type 8-13).

Figure 2.4 Four-Hour Manual Count 9:00 a.m. to 1:00 p.m. – February 6th, 2007
Location - River Drive just west of Giant Springs Road Junction

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Number of Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars</td>
<td>1,371</td>
</tr>
<tr>
<td>Buses</td>
<td>18</td>
</tr>
<tr>
<td>Small Trucks: (Type 5-7)</td>
<td>122</td>
</tr>
<tr>
<td>Large Trucks: (Type 8-13)</td>
<td>92</td>
</tr>
<tr>
<td>RV’s</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,603</strong></td>
</tr>
</tbody>
</table>

2.3 Right of Way

15\textsuperscript{th} Street – 25\textsuperscript{th} Street
The right-of-way for River Drive North between 15\textsuperscript{th} Street and 25\textsuperscript{th} Street is typically 50 feet on either side of centerline for 100 feet total. There are areas of the right-of-way near the intersections of 15\textsuperscript{th} Street and 25\textsuperscript{th} Street that are extended.

25\textsuperscript{th} Street – 38\textsuperscript{th} Street
The right-of-way for River Drive North between 25\textsuperscript{th} Street and 38\textsuperscript{th} Street is typically 50 feet on either side of centerline for a total width of 100 feet. The right-of-way near the approach to Giant Springs State Park is variable from 50 to 90 feet each side of centerline.

2.4 Physical Characteristics

2.4.1 Accesses Points/Locations
Numerous and varied types of access points increase safety risk and decrease road capacity. The commercial access locations in the business district between 15\textsuperscript{th} and 25th streets currently allow unrestricted turning movements and are problematic. See Figure 2:5 Land Ownership map below for the lot layouts along River Drive North from 15\textsuperscript{th} Street to 25\textsuperscript{th} Street. The remaining section of River Drive North does not have many access points except those leading to the baseball fields and the Eagle Falls Golf Course. Access points on the north side of River Drive North are strictly for the parking area at the caboose and three scenic pullouts.
2.4.2 Configuration

This section briefly details the route, accompanied by photos, including roadway, intersections and noted features. The study corridor begins at the intersection of River Drive North and 15th Street, headed east, and finishes at 38th Street.

River Drive North between 15th Street and 25th Street is a narrow roadway with 12-foot lanes and gravel shoulders. The typical section includes guardrails and drainage ditches parallel to the roadway. The signalized intersection at 15th Street offers separated access and exit turns as illustrated in the photo below. See Figures 2:6-7 below.
Figure 2:6 Intersection of River Drive North and 15th Street – Looking East

Figure 2:7 River Drive North Typical Section

The Big Stack Mobile Home Court access is near the top of the grade between 15th Street and 25th Street. This area has guardrail on the north and multiple access points.
on the south. The roadway lacks pedestrian facilities which results in hazards for pedestrians accessing the recreational trail and park areas. There are no turn lanes onto 19th Street and 18th Avenue and there are no four lane sections on River Drive North.

Figure 2:8 River Drive North, adjacent Big Stack Mobile Home Court

The business district is a commercial/light industrial area just south of roadway nearing the top of the grade. Note the many access points with little room for ingress/egress. See Figures 2:9-10 below.

Figure 2:9 River Drive North, adjacent Business District


River Drive North has two center turn lanes, one at 25th Street and the other a Giant Springs Road (both of these are shorter than recommended). This River Drive segment has two signalized intersections, one at 15th Street and the other at 38th Street. The center turn lane at the 25th Street intersection exits westbound River Drive and the center turn lane at the Giant Springs Road exits eastbound River Drive. The intersection at 15th Street offers separated access and exit turns as illustrated in Figure 2:11-12 below.

Figure 2:10 River Drive North, Nearing the top of the Grade

Figure 2:11 Intersection of River Drive North and 25th Street – Looking East
River Drive between 25th Street and 38th Street is a two-lane section of roadway with twelve-foot wide lanes, gravel shoulders, guardrails and drainage ditches parallel to the roadway. See Figures 2:13-15 below.
Approaching Giant Springs Road, there is a dedicated left-turn lane that exits eastbound River Drive North.

**Figure 2:13 Intersection of River Drive North and Giant Springs Road**
Delays are common at the BNSF Railway crossing just west of the 38th Street intersection. There are no dedicated pedestrian facilities in this section. Access to the recreational trail and Giant Springs State Park must occur at the caboose or at the park. There is not an access point between them due to the grade separation of the roadway and recreational trail. See Figure 2:14 below.

**Figure 2:14** River Drive North, approaching at-grade rail crossing, near curve
The signalized intersection at 38th Street is constructed to current design standards, recently updated as part of the project on the corridor continuing to the east of 38th Street, and includes center turn lanes. This intersection provides a protected pedestrian crossing between residential subdivisions, baseball fields, Giant Spring Park and the River Edge Trail. See Figure 2:15 below of the intersections at Giant Springs Road and 38th Street.

**Figure 2:15 Intersection of River Drive North and 38th Street**

![Intersection of River Drive North and 38th Street](image)

### 2.5 Design Standards

This route is on the National Highway System and will be designed to the Geometric Design Standards for Urban Principal Arterials. These standards call for a design speed between 40 and 50 mph (posted speed can be less than design) with 12 foot travel lanes. The shoulder width can vary from 2 to 8 feet depending on the expected use, available space and possible curb and gutter design. The minimum curve radius is 711 feet for uncurbed sections and 533 feet for curbed 2-lane segments. Part of this route may be considered rolling, so the maximum grade could increase from 6% to 7%.

Turn lanes will require:
- 20:1 entry taper
- 8:1 lane shift
- 250 feet deceleration and storage
- Total of approximately 620 feet

The location of additional turn lanes will need to be determined based on distance from the intersection, location of adjacent approaches and traffic control. Final determination of design criteria for each option will consider roadside development, lane configuration and right-of-way constraints.

---

4 Geometric Design Standards for Urban Principal Arterials.
Figure 2:16 below includes typical MDT Highways and Engineering Division (rev. 4/15/2009) roadway cross-sections that could be reviewed.

Figure 2:16  Typical Sections

TYPICAL SECTION NO. 5

TYPICAL SECTION NO. 6
2.6 Drainage

No storm drain facilities exist along River Drive North. Any future project may require storm drain facilities to contain storm water flows to the preconstruction volumes.

2.7 Hydraulic Structures

Culverts exist along the study corridor. There is limited information currently available. If a project is advanced, further investigation must be completed to determine location, type and function of structures within the corridor.

2.8 Rail

2.8.1 BNSF Railway

BNSF Railway – Fort Benton subdivision is a 45-mile branch line that runs from Fort Benton (RP 74.6) to Great Falls (RP 119.4). The line services two grain elevator facilities – one in Carter, one in Fort Benton – and has a maximum gross car weight limit of 143 tons and permanent speed restrictions of 10 mph. Line operation style is track warrant control, and the line converges with both the Laurel and Sweet Grass main lines in Great Falls. The Fort Benton subdivision has a low density volume of 0.1 millions of gross-ton miles per mile (MGTM/M) and a high density volume of 4.9 MGTM/M. BNSF Railway reports back that on the active line they operate two or three trains daily on average, and up to 4 trains occasionally.

The Malmstrom Air Force Base subdivision is a non-active spur that originally serviced a coal power plant on the north side of the base. The track has not been used in some time and the tracks have been removed west of the active BNSF Railway line.
2.8.2 Malmstrom Subdivision
The Malmstrom Air Force Base subdivision services a few light industrial companies and the Malmstrom coal power plant located on the north side of the base. The Malmstrom subdivision is comprised of two spurs, one active and one inactive. The active spur adjoins the Fort Benton subdivision approximately 200 meters north of the River Drive North crossing. The non-active spur adjoins the Fort Benton subdivision approximately south-center of Eagle Falls Municipal Golf Course. The inactive spur is currently owned by United Materials and has had the tracks moved.

2.8.3 Inactive Leg
An inactive railroad track crosses under 25th Street and continues to the west connecting to 38th Street North, south of the existing River Drive and 38th Street intersection. This line has been partially abandoned. The line drops from ground level at 15th Street to pass under the 25th Street Railroad Bridge and then rises again along the Eagle Falls Golf Course. BNSF Railway owns and controls a segment east of 25th Street for approximately 2,690 feet. From 15th to 25th Street, continuing on to the west of the BNSF Railway property, the ownership was transferred to United Materials, Inc. in 1998 and 2003.

2.9 Trucking
River Drive is a designated truck by-pass route and is within the three mile limit for triple Interstate trucks. Trucking lines that operate in this area include North Park, Mergenthaler Transfer and Storage, USF Reddaway, Highline Motor Carriers, North American Van Lines, and others. Frequently this route experiences oversized truckloads including agriculture and heavy equipment.

2.10 Transit
Great Falls Transit (GFT) does not routinely service this area, as there is a lack of riders. The Qualified Para-transit riders may be picked up along the study areas. The nearest GFT route is the Yellow Route (Northeast Route), which passes through the 15th Street, with the closest stop at 15th Street North and 8th Ave. North.

2.11 Existing Characteristics Summary
As noted, roadway characteristics impact the functionality, access and usage patterns by all properties along the study corridor. River Drive North must withstand current and future demands. The detailed information above helps us set the stage for problem identification and solution development. Evaluation and assessment of impacts upon these roadway characteristics by any improvement option must be carefully considered, and must be coupled with possible environmental impact and public outreach.
Appendix 3: Environmental Conditions

This section of the feasibility study is consistent with 23 CFR 450.212\textsuperscript{5} and 450.318\textsuperscript{6} (FHWA regulations for Statewide Transportation Planning and Programming). The study area, existing conditions, and potential affects of any alignments are consistent with rules and regulations outlined here.

The review we present for this study is a high-level scan that evaluates potential environmental impacts and highlights areas of concern. In the end, these concerns may stall projects in the development phases due to prohibitive cost or extent and significance of impacts.

Significant impacts would not stop a project recommendation from moving forward, however such impacts would have associated additional costs and time due to the higher level of environmental document required. An example would be an Environmental Impact Statement (EIS), which must follow the requirements of the National Environmental Policy Act, as outlined in 23 CFR 771.\textsuperscript{7} Note that the study corridor is a National Highway funded route. An EIS may not only more than two years to a project, it would also add cost. An estimate for completion of an EIS following the FHWA NEPA process would be from $1 million to $5 million dollars, depending on the complexity and the number of alternatives reviewed.

Our initial scan area included all potential alignments from 8\textsuperscript{th} Avenue North on the south, 25\textsuperscript{th} Avenue on the north, 15\textsuperscript{th} Street North on the west, and 38\textsuperscript{th} Street North on the east. See Appendix 9: Map 1 for aerial photo of the study area and locations of concern.

3.1 Demographics

3.1.1 Population

Cascade County and the city of Great Falls experienced many rapid population increases and declines between the years of 1900 and 2000. The first explosion occurred from the early 1900’s through the 1920’s when the first water projects supplied mechanical and electrical power due to the increased demand for copper. The Boston and Montana Consolidated Copper and Silver Mining Company, and later Anaconda Copper Mining Company helped build the City of Great Falls by providing thousands of jobs and homes to its employees. When the smelter closed its doors in 1980, thousands were directly impacted and many were left unemployed.

Cascade County and the City of Great Falls experienced a second explosive population growth in the beginning in the 1940’s with the U.S. involvement in WWII. Malmstrom Air Force Base was constructed and established as a heavy bomber training base, thereby relocating new residents to the Great Falls area.

\textsuperscript{5} Ibid.

\textsuperscript{6} Ibid.

\textsuperscript{7} Ibid.
As shown in Table 3:1, Great Falls population growth, due to its thriving industrial and supply center, has outpaced growth in Cascade County between 1920 and 1960. Also, Great Fall's population has accounted for over 70% of Cascade County’s population since 1930.

### Table 3:1 Historical State, Cascade County, & Great Falls Population

<table>
<thead>
<tr>
<th>Year</th>
<th>Montana</th>
<th>% Change</th>
<th>Cascade</th>
<th>% Change</th>
<th>Great Falls</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900</td>
<td>243,329</td>
<td></td>
<td>25,777</td>
<td></td>
<td>14,930</td>
<td></td>
</tr>
<tr>
<td>1910</td>
<td>376,053</td>
<td>54.5%</td>
<td>28,833</td>
<td>11.9%</td>
<td>13,948</td>
<td>-6.6%</td>
</tr>
<tr>
<td>1920</td>
<td>548,889</td>
<td>46.0%</td>
<td>38,836</td>
<td>34.7%</td>
<td>24,121</td>
<td>72.9%</td>
</tr>
<tr>
<td>1930</td>
<td>537,606</td>
<td>-2.1%</td>
<td>41,146</td>
<td>5.9%</td>
<td>28,822</td>
<td>19.5%</td>
</tr>
<tr>
<td>1940</td>
<td>559,456</td>
<td>4.1%</td>
<td>41,999</td>
<td>2.1%</td>
<td>29,928</td>
<td>3.8%</td>
</tr>
<tr>
<td>1950</td>
<td>591,024</td>
<td>5.6%</td>
<td>53,027</td>
<td>26.3%</td>
<td>39,214</td>
<td>31.0%</td>
</tr>
<tr>
<td>1960</td>
<td>674,767</td>
<td>14.2%</td>
<td>73,418</td>
<td>38.5%</td>
<td>55,244</td>
<td>40.9%</td>
</tr>
<tr>
<td>1970</td>
<td>694,409</td>
<td>2.9%</td>
<td>81,804</td>
<td>11.4%</td>
<td>60,091</td>
<td>8.8%</td>
</tr>
<tr>
<td>1980</td>
<td>785,690</td>
<td>13.3%</td>
<td>80,696</td>
<td>-1.4%</td>
<td>56,884</td>
<td>-5.3%</td>
</tr>
<tr>
<td>1990</td>
<td>799,065</td>
<td>1.6%</td>
<td>77,691</td>
<td>-3.7%</td>
<td>55,125</td>
<td>-3.1%</td>
</tr>
<tr>
<td>2000</td>
<td>902,195</td>
<td>12.9%</td>
<td>80,357</td>
<td>3.4%</td>
<td>56,690</td>
<td>2.8%</td>
</tr>
</tbody>
</table>

Source: US Bureau of the Census; Decennial Census of Population, 1900-2000

The US Census Bureau estimates that Cascade County and the City of Great Falls are steadily increasing in population, as seen in Table 3:2. In 2006, Cascade County experienced its largest population total since 1970, and based on growth trends Great Falls would surpass its 1970 population of 60,091 by 2010 with a 0.7% annual growth rate. The US Census Bureau data reveals an estimated 2.1% population growth in Cascade County between 2000 and 2008. The Great Falls population has grown 3.3% between 2000 and 2006, which is of no surprise due to its historical trend.

Population changes in recent decades are consistent to that elsewhere in Montana and the rest of the nation. Population age profiles are getting older. The median age of Cascade County residents has grown from 25.1 to 36.7 years of age.8

### Table 3:2 Estimated State, Cascade County, & Great Falls Population

<table>
<thead>
<tr>
<th>Year</th>
<th>Montana</th>
<th>Change</th>
<th>Cascade</th>
<th>Change</th>
<th>Great Falls</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>902,195</td>
<td>-</td>
<td>80,357</td>
<td>-</td>
<td>56,690</td>
<td>-</td>
</tr>
<tr>
<td>2002</td>
<td>910,282</td>
<td>0.9%</td>
<td>80,606</td>
<td>0.3%</td>
<td>57,220</td>
<td>0.9%</td>
</tr>
<tr>
<td>2004</td>
<td>926,721</td>
<td>1.8%</td>
<td>81,714</td>
<td>1.4%</td>
<td>57,729</td>
<td>0.9%</td>
</tr>
<tr>
<td>2006</td>
<td>946,721</td>
<td>2.2%</td>
<td>81,898</td>
<td>0.2%</td>
<td>58,536</td>
<td>1.4%</td>
</tr>
<tr>
<td>2008</td>
<td>967,440</td>
<td>2.2%</td>
<td>82,026</td>
<td>0.2%</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: US Bureau of the Census; Decennial Census of Population, 2000-2008

---

8 Great Falls Transportation Plan-2009, 3-2 Travel Demand Forecasting
The 2009 Great Falls Area Transportation Plan predicts that Cascade County and Great Falls will continue to grow through 2030, as seen in Table 3:3. Great Falls maintains 70% of Cascade County’s population, as seen since 1930.

Table 3:3 Projections of State, Cascade County, & Great Falls Population

<table>
<thead>
<tr>
<th>Year</th>
<th>Montana</th>
<th>Change</th>
<th>Cascade</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>968,598</td>
<td>-</td>
<td>85,900</td>
<td>-</td>
</tr>
<tr>
<td>2020</td>
<td>1,022,735</td>
<td>5.6%</td>
<td>91,700</td>
<td>13.7%</td>
</tr>
<tr>
<td>2030</td>
<td>1,044,898</td>
<td>2.2%</td>
<td>94,600</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

Source: 2009 Great Falls Area Transportation Plan

3.1.2 Employment

The City of Great Falls is primarily comprised of private wage and salary workers, including federal, state and local government, Malmstrom Air Base employees, and the self employed, as seen in Figure 3:1 below.

Figure 3:1 Class of Worker in Great Falls (2000)

Of Cascade County’s estimated 49,200 jobs in the 2000 Census, 86% are accounted for within the City of Great Falls, Malmstrom Air Force Base, Black Eagle, Great Falls International Airport, and nearby suburban development. Recent trends suggest that more jobs are becoming available in Cascade County.

According to the US Bureau of the Census, from 1970 to 2000, Cascade County gained 11,900 jobs and lost 2,100 in population. This can be explained when evaluating the age demographic. The median age increase suggests that Cascade County’s population is not just decreasing, but rather that its population is not having as many children. A shrinking younger population and an increasing older population have created a need for expanding employment opportunities.

9 Great Falls Transportation Plan-2009, 3-1 Socioeconomic Trends
More opportunities mean more commuting to work. In 2000, 82% of those commuting to work did so in private vehicles with the remaining, ten and eight percent carpooling or using public transportation, respectively. See Figure 3:2 below.

![Figure 3:2 Commuting to Work in Great Falls (2000)]

### 3.1.3 Development
In the past, urban riverfront lands were developed as industrial areas due to their proximity to the river. The river was a transportation and power source, in addition attracting rail lines. Although the river corridor still contains these industrial areas, there are environmental concerns and logistical problems that have moved many to more desirable areas near major transportation routes.

Today, steps have been taken to ensure the River Drive North corridor will continue to attract new and sustained development in the future. Much of the usable land near the Missouri River corridor is now vacant or underdeveloped. These higher volume traffic areas can be attractive areas for retail businesses and support residential development. It is anticipated that housing needs of the future must cater to the aging demographic and therefore offer low maintenance housing close to shopping, medical, and passive recreation areas.

From a transportation planning perspective, these expansions and development will play an integral part in the increasing traffic numbers along the Missouri River corridor. As an example, the Great Falls Land Use Advisory Committee predicts there will be significant new housing developments in the future that will continue to add traffic to River Drive North North. Specific areas of interest include the area north of Skyline Drive, between 6th Avenue NW and Bootlegger Trail, across the Missouri River in Black Eagle, to the south of lower River Road and 13th Avenue South, also the area west of Malmstrom Air Force Base near 57th Avenue and 10th Avenue South. These will each likely add to increased use of River Drive North.
3.2 History of Improvements

The following is a list of projects known to have occurred along the study corridor since its original construction in 1945. Note that this is not an all-inclusive list of projects to have been completed on the roadway, but constitutes the majority of major projects. Nothing below addresses routing maintenance performed by the Montana Department of Transportation such as guardrail repair, pothole repair, striping and other projects of similar size and scope.

- The roadway was last reconstructed in 1961 and 1962, under project S-386(1), financed by Cascade County.
- In 1988, under Project RTM 5205(4), River Drive North from 15th Street North east was repaved.
- In 1990, under Project RTM 5205(6) a 1.60 mile section between 15th and 25th was repaved.
- In 1999, under Project NH 10-1(15), the reconstruction of intersection at 15th and River Drive North was competed.
- In 2003, Project PLH-STPU 5221(3) was completed, reconstructing the Giant Springs access with River Drive North.
- In 2007, the intersection of River Drive North and 38th was reconstructed as part of a much larger project on River Drive North, from 38th east.
- There have also been many Community Transportation Enhancement Program (CTEP) projects that have impacted the study area, particularly the bicycle/pedestrian trails, and the caboose and boxcar renovation.

3.3 Planned Improvements

The Montana Department of Transportation (MDT) and the City of Great Falls has a planned pavement preservation project scheduled in the near future for the River Drive North study corridor. The project includes a pavement seal and cover from 15th to 25th from approximately reference points 3.4 to 4.3.

In addition, the 2009 Great Falls Area Transportation Plan recommends a total major street network (MSN) project for River Drive North from 15th Street to 38th Street. As recorded in the plan document, the project is needed to meet the anticipated traffic demands of the year 2030.

Planned Improvement excerpt from the Great Falls Area Transit Plan:
- Total Major Street Network, Recommended Projects = $38,900,000
- 11.4 Long Range MSN Improvement Projects

River Drive North – 15th Street North to 38th Street North:
Problem: Limited capacity (both currently and in future years); poor condition.
Recommendation: The existing two-lane facility will be inadequate to handle future traffic volumes. An expansion of the existing facility will be needed by the year 2015 and probably sooner given current travel characteristics exhibited during peak travel hours.
Estimated Cost: (full cost unknown, dependent upon design solution)
Possible Funding Source: NHS

3.4 Recreation

Any impacts to recreational areas must be evaluated to determine impacts. If federal aid highway or transit funds are used on a project then they must in compliance with Section
4(f) (49 U.S.C. 303)\(^{10}\) of the Transportation Act (23 CFR 774)\(^{11}\). Section 4(f) provides protection to publicly-owned public parks, recreation areas, wildlife and waterfowl refuges and significant historical sites. Prior to any 4(f) land use it must be determined that there is no feasible and prudent avoidance alternative. This action must include all possible planning to minimize harm. If the impact is so small and the regulatory agency agrees a de minimis finding may be made; impacts that are not de minimis must be mitigated.

There are numerous recreational sites within the study area, ranging from city owned parks, State parks, golf courses, and the River’s Edge Trail system. All of these facilities are offered protection under 4(f).

The State Park (Giant Springs State Park) and some of the city parks have additional protection as they have Land and Water Conservation Funds, (LWCF) used in their development or purchase. Lands were LWCF funds are used must not be impacted or used, unless the use can be mitigated by additional lands. The LWCF funds are administered by FWP with the final say by the National Park Service. If there is a taking of the property, the land must be replaced by in-kind land of similar value. This would be a concern if there were impacts to the Giant Springs State Park. The state park is administered by FWP and they must agree that there is no feasible or prudent avoidance alternative and the replacement land meets their requirements. This could be a concern for the alignment that crosses the Missouri River. Not only does it impact the land, but it also impacts the visual nature of the park.

### 3.4.1 Bicycle/Pedestrian Facilities

The River’s Edge Trail has an estimated 29,500 individual visits made to that section of the trail per summer, accounting for about 40% of total River’s Edge Trail use. That averages out to monthly use of about 5,900 per month (using a 5-month season with even distribution). On that segment, pedestrians account for about 80% of total use, bicyclists about 20%.

Appendix 9: Map 4 shows an active, designated bike trail (represented with a red circle and line) that extends from River’s Edge Tail, passing through Giant Springs State Park, crossing over River Drive North at the railroad crossing and traveling south along the recreational baseball fields and 38\(^{th}\) Street. The bike trail along 38th Street currently has planned improvements under an active, near-term project.

On the north shore of the Missouri River, there is an actively-used trail system that must be considered should any improvement option propose an impact or alteration.

The caboose and box car serve to mark the River’s Edge trailhead and were placed and rehabilitated under the Rails to Trails sub-program of the Community Transportation Enhancement Program. They serve as a local landmark and attraction and must be considered should any Improvement Option (detailed in Appendix 5) be advanced for project nomination that impact them or the trail system they serve.


3.4.2 Centene Stadium

Centene Stadium (formerly known as Legion Park) was built in 1940, and has served as the home of the Great Falls franchise in the Pioneer League since its opening:

- Great Falls Electrics (1956-1963)
- Great Falls Giants (1969-1983)
- Great Falls Dodgers (1984-2002)
- Great Falls White Sox (2003-present)

In addition it serves as the home field of the Stallions American Legion baseball team, and Great Falls Electrics AA baseball team. Since its unveiling, the ballpark has sported a basic ballpark design, with a grandstand featuring both theater-style seats and bleachers, with additional bleachers located down each line. A renovation project was undertaken in 2002.\(^\text{12}\)

Centene Stadium is located at the intersection of 25\(^{th}\) Street and River Drive North with access to each roadway. Baseball fans’ ingress and egress is a concern. With stadium capacity of 4000-4500, the peak, seasonal impact on transportation infrastructure must be a consideration for any improvement option chosen.

3.5 Visual

The Missouri River area, which can be viewed from River Drive North, is considered to be a tourist attraction and draw for the City of Great Falls. The viewshed is very important to the community and must be considered for any alternative with implementation developed to maintain or enhance the current viewshed. Scenic overlooks are present along River Drive North (see Appendix 9: Map 4) and are widely


used. Pedestrian movement is heavy at all three overlooks, in addition to Giant Springs Park and the caboose monument.

The view below Black Eagle Dam to Rainbow Falls Dam is an area the community is actively working to protect. The River’s Edge Trail system has developed a shared use trail system on the south side of the Missouri River and is working to develop a system on the north side of the Missouri River. Fish Wildlife and Parks manages the Giant Springs State Park and areas on the north side of the Missouri River that has been placed in conservation easements to prevent development.

The Lewis and Clark Interpretive Center is within the Giant Springs State Park and is managed by the United States Department of Agriculture, Forest Service and is dedicated to imparting to the public a personal sense of President Thomas Jefferson’s vision of expanding America to the West. One of the main focuses is imparting the challenges faced by the Lewis and Clark expedition and their portage around the great falls of the Missouri River. Black Eagle Falls can be viewed from the interpretive center grounds.

3.6 Water Quality

The City of Great Falls is an MS4 area (Small Municipal Separate Storm Sewer System). The City requires any construction to minimize impacts from construction sites due to storm water runoff. Sedimentation for the construction area must be contained as not to increase the turbidity of surface waters. Any recommendations that would require additional pavement area, or new alignments, must address runoff of impenetrable surfaces should they be contained to limit flows to pre-existing conditions.

The Missouri River contained within the study area is classified as a Category 5 water body, where one or more applicable beneficial uses are impaired or threatened and a TMDL (Total Maximum Daily Limit) is required to address the factors causing the impairment or threat. According the Montana Department of Environmental Quality 2006 Integrated 305(b)/303(d) Water Quality Report,13 the portion of the Missouri River within the study is impaired with heavy metals, pentachlorobenzene, and sediments. If there are impacts to this Missouri River section, the design will need to address and prevent any further impairment.

3.7 Water Body Modifications and Wildlife

The Missouri River Floodplains are contained in the project area by the old railroad grade (River’s Edge Trail) on the south. The north side is bounded by steep banks; therefore, is not within the floodplain. The floodplain will only be a factor for a river crossing alternative. Executive Order (EO) 11988, Floodplain Management, governs impacts to the floodplain. The EO requires projects to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Any project that uses federal highway funds must also comply with 23 CFR 650.14 Highway projects must avoid longitudinal encroachment, avoid significant encroachments and minimize impacts, which adversely affect base flood plains. The base flood plain uses the base flood (100-year flood event) as the

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regulatory standards, in the State of Montana the floodplain management is administered by the county.

3.8 Waters
The Missouri River is considered to be navigable water by the US Army Corps of Engineers (Corps). Navigable waters of the US are regulated by the Corps using Section 10 of the Clean Water Act. The Corps must permit any crossing or encroachment into or over the river. The US Coast Guard will also need to be contacted concerning navigation issues and their concerns must be addressed. At issue would be the allowance for normal, present boating traffic to continue to use the river. As a result, any recommendation involving a structure must take this into consideration.

3.9 Wetlands
The only area of concern with wetlands is the fringe area of the Missouri River. The U.S. Army Corps of Engineers has jurisdiction over impacts to wetlands that are associated with the river. If an alignment affects wetlands, mitigation must be developed to replace the wetlands affected. The design must minimize impacts. A method to remove wetlands from concern on any alignment is to span the wetland with the river crossing. This would increase the cost of the bridge. The increased length would need to be investigated against the cost of mitigation.

3.10 Utilities
The size, type and amount of utilities in the study corridor have a direct effect on the feasibility of improvements. There are two major utilities of concerns. The first is a major electric transmission line, 72 kilovolt, owned and operated by Northwestern Energy connecting to Black Eagle Dam and crossing the roadway at the ballpark and Eagle Falls Golf Course property abutment. At this time the transmission line does not present vertical or horizontal clearance issues. The second major utility of concern is a major storm water discharge pipe owned and operated by the City of Great Falls and natural gas pipeline owned and operated by Energy West, both located on the north-east corner of the 15th Street intersection. These pipelines, coupled with a limited right of way create limitations to roadway improvements at this intersection. There are no existing fiber-optic cables or major sewer lines that raise concern under or nearby the study corridor. However, there are some areas where alignments of the utilities shift in the right of way and in some areas the utilities may run under the existing paved surface.

3.11 General Vegetation
There is mixed vegetation along River’s Edge Trail system and highway, consisting mostly of grasses and shrubbery. However, there are many trees bordering Big Stack Mobile Home Court and Eagle Falls Golf Course. Any improvement option will require re-vegetation and landscaping plans.

3.12 Wildlife and Endangered Species
The study area is within an urban setting. It is not a preferred habitat for threatened or endangered species. There may be bald eagles in the area; however, they should not be impacted unless a nest is developed. This factor will need to be review if a project is forward that leads to construction.

3.13 Wild and Scenic River
Missouri River at this locale is not on the National Wild and Scenic Rivers system.
3.14 **Farmlands**
The study area is an urbanized setting and does not include soil types that would meet the requirements of prime, unique, prime if irrigated, or of statewide importance.

3.15 **Air Quality**
The study area is outside of the 10th Avenue South maintenance area for Carbon Monoxide, (CO). There are no other non-attainment concerns for the community of Great Falls. Mobile Source Air Toxics (MSATs) will need to be evaluated on any recommendation advanced for project nomination. MSATs are compounds known or suspected to cause cancer or other serious health and environmental effects.

3.16 **Hazardous Waste Areas**
There are several areas of concern regarding this topic, as detailed below.

3.16.1 **North of the Missouri River**
Anaconda Mineral Company – Black Eagle: The undeveloped area east of 15th street is an inactive metal smelter and refinery complex consisting of approximately 250 acres. The Montana Department of Environmental Quality (DEQ) lists the site as a high priority site. The DEQ has requested the Environmental Protection Agency, (EPA) to reevaluate and consider listing the facility for the National Priorities List (NPL). DEQ notes the old railroad grade that runs through the community of Black Eagle has a high probability of significant amounts of material contaminated with heavy metals. There have also been assessments of residential soils in the community of Black Eagle. These assessments reported 275 residences with elevated levels of arsenic, cadmium, lead, and zinc. Prior to advancing any improvement options which may traverse this area, further investigation must be completed. If a project is advanced, the resulting cleanup along the roadway corridor may be the responsibility of the project sponsor.

3.16.2 **South of the Missouri River**
The area to the south of the Missouri River may have pockets of contaminated areas. Further investigation will need to be completed prior to any project advancement. There are no known large areas of known contamination on the south side of the river.

3.16.3 **Underground storage tank sites**
There may be underground petroleum storage tanks in the study area. If there is contamination associated with an underground petroleum storage tank site, the contaminated material must be handled according to DEQ requirements. Normally the contaminated soil may be disposed of in a licensed landfill.

3.17 **Noise**
The existing roadway noise levels have not been determined. Noise will not be of concern if there are only minor improvements (no new alignments, addition of lanes on the existing alignment or changing traffic patterns). Because some of the improvement options are on new alignments, a noise assessment will need to be completed once the alignment and number of lanes are known. If the new alignments or additional lanes result in an increase in noise levels the levels will need to be evaluated and it must be determined is mitigation is appropriate. Depending on the receptor and the increase in the noise levels, noise abatement may be necessary. Any noise abatement must be considered reasonable and feasible prior to implementation. In addition, greater than 50% of the affected residents must agree with the proposed noise abatement measures. **Table 3:4** listed below has the noise abatement criteria for the land use.
Table 3:4 Noise Abatement Criteria (NAC)

<table>
<thead>
<tr>
<th>Activity Category</th>
<th>Leq(h) dBA</th>
<th>DESCRIPTION OF ACTIVITY CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>57</td>
<td>Exterior Lands on which serenity and quiet are of extraordinary significance and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.</td>
</tr>
<tr>
<td>B</td>
<td>67</td>
<td>Exterior Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.</td>
</tr>
<tr>
<td>C</td>
<td>72</td>
<td>Exterior Developed lands, properties, or activities not included in Categories A or B above.</td>
</tr>
<tr>
<td>D</td>
<td>No criterion</td>
<td>Undeveloped lands.</td>
</tr>
<tr>
<td>E</td>
<td>52</td>
<td>Interior Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.</td>
</tr>
</tbody>
</table>

Source: 23 CFR 772

3.18 Historic and Cultural Properties

The study area is developed and the potential for archeological impacts are minimal. This is not the case for historic properties. Any property that is over 50 years old and maintains its characteristics may be considered eligible for the national historic register, and must be evaluated for compliance with Section 106.

Historic and cultural properties and features are protected by Section 106 of the National Historic Preservation Act. The purpose of the Section 106 process requires federal agencies to consider the “effects of their undertakings on historic properties.” (36 CFR 800.1(a)) River Drive North is a federal aid eligible route and as such, any use of federal aid must comply with Section 106. Significant historic or cultural properties are also protected under Section 4(f) (23 U.S.C. 138 and 49 U.S.C. 303). Further information concerning Section 4(f) protection is discussed in the Section 3.4, Recreation.

3.18.1 Rail Structures and Grades

There is a rail overpass structure located south of the intersection of 25th and River Drive North. If this structure is impacted by any improvement option, possible 4(f) and Section 106 implications must be mitigated. All railroad grades could be considered historic. Further review will be required if there are impact to the existing grades.

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3.18.2 Dams
The Dams on the Missouri River have not been listed on the national historic register, but as they were built before 1950 meaning they are eligible and must be afforded protection.

3.18.3 Residences
Many of the residences along 8th Avenue North and Smelter Ave. appear to have been built prior to 1950. As such, they could be afforded protection under Section 10620. If there is a change to the traffic patterns that increase noise, even if there is not a right-of-way take, the constructive use on the property must be evaluated. Any alignment that uses 8th Street North and increases the number of lanes would be difficult to peruse due to the impacts on this residential neighborhood.

3.18.4 Retaining Wall
There is a long, short rock retaining wall to the east of the intersection at River Drive North and 15th Street (see Appendix 9: Map 4 for location), built in the late 1930s by the Works Progress Administration (WPA) relief measure, established by executive order in 1935. The wall may be eligible for registry in the National Register of Historic Places. If the wall is impacted by any improvement option, further investigation of the potential impacts is mandatory.

20 Ibid.
Appendix 4: Corridor Problems

As noted in Appendix 2 and 3 above, existing infrastructure characteristics and environmental concerns play a critical role, and problems along the existing corridor have a significant impact on the development of any recommendation. River Drive North is a geometrically substandard roadway amidst an environmentally sensitive area, where traffic volume and vehicle mix currently exceed design capacity.

Drivers routinely experience significant delays during the morning and afternoon peak travel periods. Despite these challenges, the corridor remains a critical component of regional transportation infrastructure.

4.1 Strategies for Identifying Corridor Problems

Subsequent to the development and understanding of the needs and objectives as identified in Appendix 1, the following strategies were employed to identify problems and perception along the corridor:

- Field review, 02-04-2009
- Met with clients to discuss corridor specifics, 02-04-2009
  - Mick Johnson, Division Administrator, Montana Department of Transportation
  - Andrew Finch, Great Falls MPO Transportation Planner
- Review the Missouri River Urban Corridor Plan – 2004 21
- Review the Great Falls Area Transportation Plan – 2003/2009 Draft 22
- Review the City of Great Falls Growth Policy – 2005 23
- Review the River’s Edge Trail website 24
- Review other studies in process or completed, and pertinent to the study area
- Cadastral search for property ownership and information
- Research generic needs for affected parties
  - MT Department of Environmental Quality
  - MT Fish Wildlife, and Parks
  - Lewis & Clark Interpretive Center
  - Giant Springs State Park
  - City of Great Falls
  - Montana Department of Transportation
- Research existing funding categories and potential partnerships, including:
  - Housing and Urban Development (HUD)/Community Development Block Grant (CDBG) program.
  - NeighborWorks

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23 City of Great Falls Growth Policy. http://www.greatfallsmt.net/people_offices/planning/growthpol.htm
4.2 Problems Identified in the Corridor

The road itself is in below average condition, with rutting and sub-grade failures due to heavy loads, narrow shoulders, and it fails to meet the Montana Department of Transportation (MDT) pavement and condition standards despite regular maintenance. This can be attributed to a combination of factors that include its age, AADT, truck traffic, environmental conditions, and a lack of appropriately stabilized base course materials with improper drainage.

The curvilinear route, lack of shoulders, high peak traffic and adjacent development contribute to traffic delays along this major east-west corridor and at intersections, 25th Street in particular. The study corridor also serves as a truck route and bypass, and has carried up to 18,000 vehicles per day in recent years. Commercial truck traffic experiences difficulty negotiating the substandard horizontal and vertical curvature throughout the study corridor, intersection turning movements, and delays at the active railroad crossing between 38th Street and Giant Springs Road.

The following problems for the study corridor were identified during the feasibility study problem identification process above, and must be reviewed against the recommendation(s) in order to prove relative benefit for specific locations of the problem areas identified below. Refer to Appendix 9: Map 3.

- The roadway is in poor condition and fails to meet minimum Montana Department of Transportation (MDT) pavement and condition standards despite regular maintenance. Rutting and sub-grade failures due to heavy loads and narrow or non-existent shoulders are prevalent.
- The lack of shoulders and clear zones reduce capacity and safety.
- Traffic volumes on the route currently exceed design capacity and drivers routinely experience vehicle traffic delays, especially during the morning and afternoon peaks. Specifically, the corridor has carried up to 18,000 vehicles per day in recent years.
- The study corridor also serves as a truck route and bypass. Commercial truck traffic experiences delays due to safety stops at the active railroad crossing between 38th Street and Giant Springs Road, steep grades and intersection turning movements.
- Multiple approaches that lack adequate sight distance and storage for turning movements.
- Substandard horizontal and vertical curvature throughout the study corridor.

4.3 Crash Analysis

The information gathered indicates a prevalence of crashes that, while not higher than average for Montana highways in urban areas, does present some significant concern for safety and traffic flow.

According to information received from the State Highway Traffic Safety Bureau for July 1, 2005 through June 30, 2008, there is a history of crashes along the corridor. These are likely attributed to traffic mix, left turns and steep grades equating to a number of rear-end collisions and crashes involving trucks near the business district and the intersection of 25th and River Drive North. Table 4:1-2 below outline the recorded crashes on River Drive North between 15th and 38th streets.
Table 4:1 Crash Comparison: Statewide v. Study Area

<table>
<thead>
<tr>
<th>Type</th>
<th>Statewide Average Crash Rate for NHS &amp; Primary Routes through Urban Areas</th>
<th>Study Area Crash Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Vehicles Crash Rate:</td>
<td>5.66</td>
<td>0.96</td>
</tr>
<tr>
<td>All Vehicles Severity Index:</td>
<td>1.67</td>
<td>1.47</td>
</tr>
<tr>
<td>All Vehicle Severity Rate:</td>
<td>9.28</td>
<td>1.41</td>
</tr>
<tr>
<td>Truck Crashes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Recorded Crashes</td>
<td></td>
<td>51</td>
</tr>
<tr>
<td>Total Recorded Injury Crashes</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Total Recorded Fatalities</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4:2 Crash Detail by Location along Study Corridor

<table>
<thead>
<tr>
<th>Crash locations by segment</th>
<th>Recorded Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersections:</td>
<td></td>
</tr>
<tr>
<td>River Dr and 19th St.</td>
<td>1</td>
</tr>
<tr>
<td>River Dr. and 25th St.</td>
<td>6</td>
</tr>
<tr>
<td>River Dr. and Giant Springs Rd.</td>
<td>2</td>
</tr>
<tr>
<td>River Dr. and 38th St.</td>
<td>2</td>
</tr>
<tr>
<td>River Dr. Between:</td>
<td></td>
</tr>
<tr>
<td>11th St and 15th St.</td>
<td>3</td>
</tr>
<tr>
<td>15th St and 19th St.</td>
<td>8</td>
</tr>
<tr>
<td>19th St and 25th St.</td>
<td>17</td>
</tr>
<tr>
<td>25th St and Giant Springs Rd.</td>
<td>8</td>
</tr>
<tr>
<td>East of 38th St.</td>
<td>1</td>
</tr>
<tr>
<td>Giant Springs Rd and 38th St.</td>
<td>1</td>
</tr>
<tr>
<td>Giant Springs Rd and 18th St.</td>
<td>2</td>
</tr>
</tbody>
</table>

The study corridor contains multiple approaches into businesses and one into the Big Stack Mobile Home Court. The high percentage (56%) of rear-end crashes involve multiple vehicles and may be due to turning movements from the through lanes.

The majority of crashes (61%) in the corridor occur between 19th Street and 25th Street making this the focus for safety improvements. The segment near the horizontal and vertical grade between 19th and 25th Streets is considered a crash cluster area. Between 19th Street and 25th Street there were thirteen rear end crashes involving two vehicles and five involving three vehicles. Six accidents in this section involve trucks. The area has a crash trend of rear-end collisions; however, no recommendations have been made for projects to address the issue.

Six sideswipe crashes reported may be a symptom of a narrow roadway width and roadway curvature, while the twenty-one crashes on curves indicate a need for improvements to the horizontal alignment. Nine of the 51 crashes involved trucks showing that any operational improvements also need to target truck traffic.
Problems along the study corridor are abundant and will require innovative solutions and extensive public outreach. In the following Appendix we explore the improvement options we developed to address the known problems and constraints identified.
Appendix 5: Improvement Options

Various alternatives were considered to address the purpose and need of this study. In this section, we provide a detailed description of the evaluation/selection process and improvement options is provided, including those that were not recommended. Given the complexity of the issues, some options are considered stand-alone or additive while others are all-inclusive and multi-part.

Please refer to the feature map below (also in Appendix 9: Map 1) as sites are referenced throughout the Improvement Options discussion that follows.

5.1 Improvement Options Development & Selection Process

Taking into consideration that needs differ along the various segments of the corridor, we first examined possible improvement options along with the respective levels of impact. From these possibilities, the least attractive options with the most negative unmitigated impact were then eliminated to narrow the selection process. This provided support for our determination of the carry-forward recommendations.

Given our identified corridor needs and objectives in Section 1, we gauged possible improvement options for maximum benefit and mitigated detriment, providing for three general option categories. For convenience we have labeled them as follows:

- **A Options**: Generally along existing roadway: These options generally follow the River Drive North corridor with increased width, turning radii, improved grades and intersection improvements.
- **B Options**: Bridge alignment options: These options shift traffic across the Missouri River with a bridge crossing at Giant Springs Road or 25th Street, and a connection at River Road North or Smelter Ave.

- **C Options**: Rail grade alignment option: This option proposes a new alignment to the south following the railroad corridor, currently used infrequently, and connects back at 38th Street.

- **Other Options/Considerations**:
  - 8th Ave North
  - Alternate Truck Routes
  - Access Restrictions or Additions
  - Grade-separated Rail Crossing
  - Pedestrian and Recreational Features
  - 25th Street Intersection Improvements

Below, we discuss each alternative option. Please reference Figure 5:1 that represents all alignment options we considered.

**Figure 5:1 All Improvement Options**
5.1.1 A Options: Generally Along Existing Roadway

The first group we considered was improvement options that generally follow the existing roadway alignment, utilizing the same major intersecting roadways. Figure 5:2 below provides a visual reference for the A Improvement Options: A1, A2, A3 and A4.

**Figure 5:2 A Improvement Options**

Generally speaking, to increase the capacity of the existing route, additional lanes for turning vehicles and shoulder width is required. Modifications to grades and curves are also necessary to improve traffic flow and safety. Recreational and business access points and operations need to be adjusted to ensure the safety of the traveling public. A more in-depth analysis of traffic control at 25th Street and River Drive North would need to be completed in later design phases, and the possibilities could include a signal, roundabout and/or changes to the intersection geometry. Public concerns and landowner acceptance will be a critical component of these improvement options. Construction difficulties would include unstable slopes given the weathered sandstone cliffs along the Missouri River and underground springs along the corridor. Entities impacted would include the Eagle Falls Golf Course, Montana Veterans Memorial and the Missouri River scenic corridor east of 25th. West of 25th, the impact would primarily extend to business operations and residential sites. The alternatives discussed below are grouped into three alignments west of 25th Street and one east of 25th.

**Improvement option A1** generally follows the existing alignment with only minor shifts necessary for the widening provision of 12 foot through-lanes, wider shoulders and turn lanes where appropriate. It may not be possible to correct for the steep grade west of 25th without impacting the Big Stack Mobile Home Court, nor adding retaining walls or a bridge structure due to limited available width. As a result of the remaining grade, a truck climbing lane may still be necessary. However, without some business relocations it may not be possible to provide for turn lanes and increased shoulder width at all
locations that required them for improved safety and capacity on the approach to 25th Street. Access restrictions would be required in order to provide adequate storage for turning vehicles. Adequate shoulder width to accommodate recreational traffic also may not be possible.

**Improvement option A2** curves to the south after leaving the 15th Street intersection and passes behind the River’s Edge Dental Office, then cuts through the center of the Big Stack Mobile Home Court and Waylands Taxidermy. The entire trailer park is likely to be impacted by the fill slopes necessary to provide for adequate grades. The alignment would curve back to the north and widen almost to the business fronts as it connects with the existing alignment at River Drive North and 25th Street.

The grade along the new alignment would be low enough that truck climbing lanes would not be required. Standard shoulder width on NHS routes is eight feet without curb and gutter, or two feet with curb and gutter, so an urban typical with sidewalk on the south side may be designed to reduce width requirements. This may require storm drainage and would still require implementation of some access control and relocation of approaches. Parking for businesses could be combined into joint-use lots where businesses have been relocated. All the residents in the trailer park would need to be relocated. However, property left between the Missouri River and the new alignment could be restored to public recreational use, or developed into a mixed use area. This area could also be used for new housing to replace the displaced residents of the trailer park.

**Improvement option A3** is similar to A2, but remains to the north in front of the River’s Edge Dental Office, shifting only far enough south to allow for the necessary fill to partially remove the dip in the current alignment between 19th Street and the former entrance to the Big Stack Mobile Home Court. Correcting for this grade may eliminate the need for additional truck climbing lanes. The trailer park will still be impacted by the widening and the view from the River’s Edge Dental Office would likely be obstructed by the grade change. This improvement option would still need to accommodate access to the trailhead at the caboose and adjacent parking area. This access may be possible via pedestrian tunnel and connecting trail to a parking lot on the south side of River Drive North. Widening in front of existing businesses and parking accommodations as discussed in Improvement Option A2 would still be required, but most businesses could remain.

**Improvement option A4** is the only build option in Group A east of 25th Street. It follows the existing highway between 25th and 38th Streets with widening to the south to provide for standard eight foot shoulders. Given the lack of approaches or driveways in this segment, turning lanes should not be necessary except at 25th, Giant Springs and 38th. Both Giant Springs and 38th Streets already have turn lanes in place so widening in those locations should be minimal. The addition of new access points along this segment would need to be carefully considered in order to maintain the level of service and not impact safety as their introduction reduces capacity and would require turning lanes. Additional right of way widths may be necessary to allow for a minimal two foot clearance to the guardrail and to correct of some steeper side slopes. A cursory analysis reveals there may be adequate right of way along the Eagle Falls Golf Course to the south, but the stability of slopes on the north side is a concern. A historic rock wall located along this segment (See Appendix 9: Map 4 above) must also be mitigated. The new alignment would be closer to the Montana Veterans Memorial and the Eagle
Falls Golf Course, but the scenic turnouts could be perpetuated. This option may also allow space for wider shoulders or adjacent paths to accommodate recreational users.

Additionally, there is an at-grade railroad crossing just past Giant Springs Road that should be considered for grade separation as this corridor is on the National Highway System. According to US DOT, FHWA Highway/Rail Grade Crossing Technical Working Group (TWG), November 2002, “Highway-rail grade crossings should be considered for grade separation across the railroad right-of-way whenever the cost of grade separation can be economically justified based on fully allocated life cycle costs. The highway is a part of the designated National Highway System”.  

However, given the adjacent curve north of the tracks, grade separation would require a curved structure on a super-elevated section that would have safety and viewshed implications.

5.1.2 Group B: Bridge Alignment Options

With the Group B improvement options we include potential improvement options of constructing a new bridge, crossing the Missouri River in several locations. We considered three possible locations for bridges. Please reference Figure 5:3 below for the locations discussed in this section.

Figure 5:3 B Improvement Options

These bridge improvement options in general will improve the level of service along the existing corridor by providing an alternate route to destinations on the north side of the Missouri River. Safety may also be improved over the existing alignment by reducing traffic volume and mix along the existing route, reducing crashes. Impacted area include the Missouri River and corresponding viewshed, environmental concerns including north shore soil contamination, and recreational or residential zones. It will be essential to consider and design around recreational trails, golf courses and the Missouri River corridor. Businesses along the existing River Drive North alignment may experience a

reduction in traffic, but the improvement in accessibility to their site due to lower volumes may be a benefit. Construction may be difficult and the bridge options are likely to be the most expensive. These options do, however, may constitute a long-term capacity and safety solution for existing local and regional access, and may facilitate recreational access on the north side of the Missouri River.

All options associated with Improvement Options B2 and B3 include crossing through the community of Black Eagle on an existing street network. This unincorporated suburb of Great Falls includes an older, mostly residential zone west of 10th Street on the North side of the Missouri River. Increased traffic and community bisection, along with capacity and safety impacts, should be carefully reviewed prior to the advancement of any improvement option that follows.

**Bridge B1** includes improvement options B1a, B1b and B1c.

Improvement option B1a is a bridge crossing extending north from the 25th Street intersection. The bridge would cross north of the Black Eagle Falls Dam and follow an existing road along the north side of the Missouri River to the intersection of North River Road at 15th Street North which is signalized for increased traffic volumes. A portion of the area north of the Missouri River has been reclaimed and opened for natural trails. Soil contamination and viewshed implications must be considered. Public sentiment may support connecting the trail system on both sides of the river and the bridge may satisfy this concern.

Improvement option B1b follows an abandoned railroad grade, crossing 15th Street North on a bridge, then cutting to the south, connecting with North River Road. The old railroad bridge is not structurally adequate and would need to be replaced. There are also high levels of contamination found along the abandoned the railroad bed. The proposed route would be immediately adjacent to the Black Eagle city park, and bisects the Black Eagle community, making it a less preferred option.

Lastly, the B1c alignment would cut further north and connect to Smelter Avenue in Black Eagle, deriving the same concerns noted in improvement option B1a.

**Bridge B2** is designed to remove the majority of the traffic from the narrow segment west of 25th Street by adding a bridge midway between Giant Springs Road and 25th Street. This bridge would cross the southern tip of Tailrace Island (see Appendix 9: Map 1) and connect to the existing service road for the dam. The existing service road would need to be reconstructed due to tight curves and substandard vertical alignments.

The proposed route would then connect back to the possible B1 improvement option alignments, with similar impacts. The viewshed for the Black Eagle Dam, Lewis and Clark Interpretive Center and the various trails in the area will be impacted. The bridge grade may also be significant due to the high elevation of the Missouri River’s south bank. The connections to and from River Drive North may be difficult to engineer, requiring a curving bridge end with little room for abutments.

**Bridge B3** includes improvement option connections B3a and B3b. This alignment is a bypass alignment to take traffic directly from River Drive North at Giant Springs State

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Park, across the Missouri River and through undeveloped land to the north of the Missouri River. Bridge B3b cuts through the northern edge of Black Eagle and connects to 15th Street at 25th Ave. Option B3a crosses the center of Anaconda Hills Golf Course along an existing service road that parallels the driving range, aligned with Smelter Avenue through Black Eagle. Provisions for pedestrian overpasses and fencing must be provided.

It should be noted that Smelter Avenue is currently a two lane urban route with on-street parking through residential and commercial areas and currently does not function as a major arterial route. Improvement option connections with existing routes may be possible, but high traffic volumes heading west from the Smelter Avenue intersection eliminate routes further north. There is also potential to raise 15th Street North to create an at-grade intersection with Smelter Avenue and eliminate the existing bridge structure. Again, as noted in the general comments, any alignment cutting through the community of Black Eagle may have socio-environmental impacts.

Note that the B3 improvement options would eliminate the connection between the proposed bridge and River Drive North west of Giant Springs Road. The former segment of River Drive east of 25th would provide recreational use and access to the Eagle Falls Golf Course, Montana Veterans Memorial and baseball fields. No direct connection to River Drive North at the end of this new recreational access would be provided. The issue of a rail grade separation is important. If a grade separation is provided with this improvement option, recreational access could continue under the bridge directly to Giant Springs Road. 25th Street would make a direct turn onto River Drive North with the new recreational access road being stop controlled. Removing this corridor section would reduce traffic flow on the remaining portion of the River Drive North while maintaining access points for business operations and trucking to the west. Vehicular traffic between 38th and 25th streets may shift south to 8th Avenue North, the existing urban arterial paralleling River Drive North south of the railroad tracks.
5.1.3 Group C: Rail Grade Alignment Options – Southern Route

The Group C improvement option includes potential solutions that travel along the unused or infrequently used existing railroad grade to the south of the River Drive North. Refer to Figure 5:4 and the text that describe the consideration of such an alternative.

Figure 5:4 C Improvement Options

Improvement option C1

This improvement option is intended to reduce traffic along the existing corridor. It generally follows an inactive railroad track to the south, crossing under 25th Street, continuing on and connecting with 38th Street south of the existing River Drive North intersection. A proposed alignment must drop from ground level at 15th Street to pass under the 25th Street Bridge and then rise again along the south edge of Eagle Falls Golf Course.

The rail line has been partially abandoned, although BNSF Railway still owns and controls a segment east of 25th Street for approximately 2,690 feet, operating two trains regularly Monday through Saturday and sporadically three to four trains weekly. From 15th Street to 25th Street and beyond the BNSF Railway property, ownership was transferred to United Materials, Inc. The track has not been used in some time and the track has been removed west of the active BNSF Railway line.

In addition to the steep slopes and narrow bottom width, General Mills Flour and Pasta Montana are on opposite sides of the line, resulting in a narrowed section even if the depression is filled in. If the right of way along this route could be obtained, investigation into whether this segment is wide enough for dual lanes is required.

Alternatively, segments could be filled in to allow only rear-access to businesses, reducing the accident potential and congestion along River Drive North. This option entails two termini options; one passing to the south of the American’s Little League baseball field and Eagle Falls Golf Course to connect in a roundabout to 38th Street, and one passing west of the golf course to connect to 38th Street at River Drive North in another roundabout configuration. Both options would include a crossing of the active...
rail line and both parallel the residential community to the south. This leads to close-proximity noise, traffic and safety concerns.

Safety needs may not be fully realized given the narrow corridor, rail crossing and added conflict points. Capacity increases may be realized. The impacted entities include residential zones, the Eagle Falls Golf Course, American’s Little League baseball field and the potential contamination along the track line. Construction and maintenance in a lowered section with high retaining walls would be complicated and likely costly. The feasibility of obtaining the right to use the track line, dealing with noise, proximity issues and difficult connections to the existing roadway, also adds complexity.

5.1.4 Other: Alignment Impact Considerations

The following constitute areas of impact for the proposed improvement options above and reveal that specific considerations must be made in forwarding any recommendation.

8th Ave North parallels River Drive North to the south. While it is an urban route with mixed residential and commercial use, public sentiment is that truck traffic be directed elsewhere. Noise complaints are common and the route is currently posted “No-Thru-Trucks” with a reduced truck speed limit. The residential nature and public concerns make this an unfavorable option for use as a couplet or alternate corridor.

Alternate Truck Routes apply to River Drive North as it is currently a designated truck route. There are no alternate routes that provide comparable connectivity without cutting through residential zones. Creating a new alignment for the specific use of trucks would result in more intersections and possible reduced level of service. Re-routing trucks to alternate locations would simply shift congestion to other neighborhoods.

Access Restrictions or Additions must be carefully reviewed and addressed. In order to provide necessary capacity without removing businesses, some business access locations need to be eliminated or modified. Doing so could force a significant amount of traffic, including trucks, to the adjacent 8th Avenue North. Business access restriction would have to be carefully considered and typically are hard to mitigate. For increased capacity and safety, joint parking lots could be considered in order to concentrate access points away from the intersection. Additional direct access to the Eagle Falls Golf Course and Centene Stadium has been requested, but additional access points could impact safety and capacity. For improving efficiency, reducing high speeds and traffic volumes the reconfiguring of existing accesses is preferred over the construction of additional access points.

A Grade-separated Rail Crossing should be considered for the crossing west of 38th Street and River Drive North to address safety concerns and traffic delays. Providing a grade separation may be difficult given the current alignment with a sharp curve, nearby signal at 38th Street, and required access to Giant Springs State Park. Consideration may be given to a partnership with BNSF Railway to drop the rail grade approaching River Drive North, in conjunction with raising the highway grade.

Improvement option B3a may work well with a grade-separated crossing of the tracks and an undercrossing for Giant Springs Road as the alignment continues on a tangent section through the proposed bridge.
Pedestrian and Recreational Features are very important as well. While the River’s Edge Trail parallels this corridor, it is at a lower grade and access is only provided at the trailhead between 15th and 19th Streets and at Giant Springs Road. Users from neighborhoods in the 25th Street vicinity do not currently have direct access to the trail system. Any improvement options should consider providing non-motorized connections whether via widened shoulders or separated paths. Tunnels to connect the southern bicycle and pedestrian traffic to the trail system north of River Drive North may also be safe options due to the heavy traffic. This improvement could be a viable option if the grade is changed on River Drive North.

25th Street Intersection Improvements can be carried forward as options in most of the improvement options. A signal would require a warrant study to check for proper geometry, adequate lanes and traffic balance. A roundabout would need to consider design for truck movements, traffic mix, and available space. Other intersection improvements might be to keep the same general configuration and improve the turning radii, approaches, and lane widths to better accommodate trucks and vehicular traffic. Considerations for pedestrians must be included with this option.

5.2 Decision Matrix

Based on our research, the team ranked the above improvement options according to the individual criteria we originally established with the client in Section 1. Not all possible improvement options we initially identified for each of the A, B and C option categories survived our scrutiny for advancing feasible alternatives. For example, the team heavily marked down Improvement Option C due its inability to provide for safety and capacity needs while posing possible socio-environmental impact.

We formalized these rankings into numeric scores to narrow the possible options down to recommendations. Values ranging from one (very negative impact) to five (very positive impact) were assigned to each improvement option in the matrix, for each criteria. In this way, the options that scored highly and nicely complimented one another, as in the case of options A2 and A4, were advanced. In Table 5:1 we present the Decision Matrix containing the team collaborative scoring and resulting prioritized alternatives (A2, A4, and B3a).

Note that cost is one component of the constructability category and detailed information can be found in Appendix 5, section 5.3.6.1.
Table 5:1 Decision Matrix

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Scoring: 1 - Very Negative  2 - Slightly Negative  3 - Neutral  4 - Slightly Positive  5 - Very Positive  Total Possible Score = 45

Details of all improvement options, including those not selected for advancement are summarized below.

**A Alignment Options to Carry Forward**

Options A2 and A4 appear viable candidates for further investigation and stand as our current recommendations in Appendix 6. Improvement Options A1 and A3 do not fully address the safety, recreational, or business needs and leads to concerns with constructability and long term maintenance, and are therefore not advanced.

**Bridge Options to Carry Forward**

Of the bridge options, B3a appears to provide the most benefit and meet many of the stated feasibility study needs and objectives. B3a bisects the Anaconda Hills Golf Course along an existing access road, ending at a signalized intersection on Smelter Ave. Pedestrian crossings must be designed to provide recreational golf course access. B3a begins directly north of 38th Street, leaving the possibility for a future grade-separated railroad crossing. A B3a project design must consider the viewshed, impacts to the community of Black Eagle and Giant Springs State Park, as well as environmental, capacity and safety concerns.

**Other Impacts/Options to Carry Forward**

As we weighed each of the Other Options, the pedestrian and recreational features, 25th Street intersection improvements and a grade-separated rail crossing are options we recommend carrying forward.

We recommend a grade-separated rail crossing west of 38th Street to address safety concerns and traffic delays, and perhaps coupled with Improvement Option A4 or B3a. Providing a grade separation may be difficult given the current alignment with a sharp curve, nearby signal at 38th Street, and required access to Giant Springs State Park. Partnership with BNSF Railway to drop the rail grade approaching River Drive North should be considered.
5.3 Improvement Options – Detailed

Our decision matrix above resulted in three Improvement Options to be advanced (A2, A4, and B3a). We also included three Other Options as stand-alone or additive improvements to the chosen three. In this section, we evaluate each option based on its ability to meet the stated needs criteria in Appendix 1: Needs and Objectives. Please also review the maps included in this section as a reference to the discussion provided.

Improvement Options Overview (see Figure 5:5-6 below)

- **Improvement Option A2** – Reconstruct River Drive North from 15th-25th streets by shifting to the south of the existing alignment behind the River’s Edge Dental Office and connecting back to 25th, with associated commercial and residential relocation impacts.

- **Improvement Option A4** – Reconstruct River Drive North 25th-38th streets along the existing alignment. It generally follows the existing alignment from 25th to 38th Streets while widening and correcting for horizontal curves.

**Figure 5:5 A Improvement Options**

- **Improvement Option B3a** – Construct new bridge alignment crossing the Missouri River at the west end of Giant Springs State Park, connecting to Smelter Avenue through Black Eagle.
5.3.1 Improved Safety

Safety improvements are fundamental to any proposed improvement project. All options considered need to improve the alignment and grade, incorporate roadside safety features and enhance safe intersection operations. At a minimum, considerations must include features such as updated guardrail, lighting, turning lanes as needed, sight distance improvements and reduction of conflict points.

[A2] Safety is addressed by the A2 option. Steep grades are eliminated and additional room is created between the trailhead turnout at the caboose and the roadway. The addition of access control and combination parking lots would reduce the number of accesses thereby improving safety. The existing businesses however, would remain located directly adjacent to River Drive North where deliveries and clear zones are of concern. With the A2 option, the intersection at 25th Street must be improved for safety with additional storage lengths for left-turning vehicles and reduction in conflict points included in the alternative.

[A4] The A4 alignment would be an improvement in safety due to improved width, better sight distance and added safety features like guardrail and lighting. The
safety improvements would be limited by the constraints of the terrain. Some retaining walls may be necessary in tight spots.

[B3a] The B3a bridge option meets several safety needs. The removal of through traffic from the narrow existing corridor between 25th and 38th street will improve safety for the local recreational traffic. The direct route to the main intersection across the Missouri River, (Smelter Avenue and 10th Street North) may improve safety for the through traffic over the existing curvilinear alignment and its multiple conflict points. With the added option to connect 25th Street North directly with the west portion of River Drive North and add stop control for the remaining minor volume (recreational access) east leg, through-traffic volumes could be reduced on the remaining portion of River Drive North. Lower volumes can increase the number of gaps available for turning vehicles and should address many of the remaining vehicle conflicts and accidents between 25th and 19th Streets. The east leg would continue to serve recreation traffic to the Centene Stadium, Eagle Falls Golf Course and Giant Springs State Park.

Traffic volumes in Black Eagle are expected to increase and intersections may be a design concern. Safety concerns that will need to be addressed with this alternative include pedestrian and vehicle crossings though Black Eagle and design of a new intersection at 15th Street N and Smelter Avenue. The change in Smelter Avenue from an urban low-speed route to a higher speed arterial route could also have a negative impact on safety for the community of Black Eagle. Modeling reveals that additional passenger vehicles may also be shifted to 8th Avenue North between 38th and 25th streets. Public perception must be considered in detail in future studies.

5.3.2 Improved Capacity
Increased capacity can include allowing for wider lanes and shoulders, adding lanes for turning movements, better alignments, reduction in access points and geometric improvements at intersections to increase traffic flow. The Great Falls Area Transportation Plan-2009 notes that River Drive North between 15th and 25th streets carries 14,800 vehicles per day (vpd) - well over the optimal 12,000 vpd for a two-lane highway. Likewise the intersections at 15th and 25th are noted to operate at a Level of Service, LOS D and F – well below the LOS C deemed by MDT to be the minimal standard for this level of route. Given the current limited capacity and expected future needs, the selected improvement option should accommodate peak hour traffic as well as oversize truck loads.

[A2] The A2 alignment would increase capacity by the addition of turn lanes, wider shoulders, improved grades and reduction in conflict points due to business and residential relocations. The intersection control options must be considered to ensure adequate future capacity. Since traffic volumes along River Drive North are far higher than those of 25th Street intersection control may be difficult to implement without reducing arterial capacity and increasing overall delay. Off-peak traffic will experience increased delays at a signal and with truck turning movements a roundabout may make the constrained area infeasible.

[A4] A4 improves capacity through upgraded alignments and added width. Due to the lack of approach roads, turn lanes will not be necessary. Capacity along this segment is limited only by the highway curves and traffic volumes.

[B3a] The B3a bridge option has potential to increase capacity by providing a more direct route to major intersections across the Missouri River for truck and through
traffic. The B3a option would provide new direct access which could be limited to preserve capacity. Ride quality would also be increased if the new route were designed to have smoother grades curves and increased widths. The existing route between 25th and Giant Springs would become a recreational road with reduced speeds and no direct outlet. The 25th Street intersection would also be reconfigured to align 25th directly to River Drive North, thereby reducing the conflict points and increasing capacity over the current stop condition. From 25th to 15th, traffic volumes would be reduced and the level of service at the intersections would increase. Trucks would be routed along the new bridge, so grade-related problems would likely be reduced. Although the conflict points with business accesses would still remain, the remaining portion of the route would serve as more of a local access route rather than a by-pass and capacity should be adequate for the reduced volume of traffic. Capacity would be decreased along Smelter Avenue due to much higher volumes, but a two lane segment will still accommodate the traffic at reasonable level of service.

5.3.3 Protection of Natural Resources, Human Environment, and Scenic Viewshed
A major component of this project includes protecting the diverse natural features along the route. River Drive North parallels the Missouri River and the River’s Edge Trail system, passes by the Black Eagle Dam, Black Eagle Falls, Montana Veterans Memorial, Eagle Falls Golf Course, and Giant Springs State Park. A historic hand built rock wall and scenic overlooks attract tourism and enhance the social and economic potential of the area.

[A2] A2 likely has no negative impacts on viewshed. The removal of Big Stack Mobile Home Court raises concern of asbestos and other contaminants that would need to be treated as hazardous waste and disposed of properly. Environmental justice and business relocations are also likely to be issues. Air quality could be improved with reduced congestion currently due to traffic delays behind left-turning vehicles. Other resources along this alignment are not likely to be impacted.

[A4] The A4 option passes by the Montana Veterans Memorial, Eagle Falls Golf Course, and the Black Eagle Falls and dam. These sites in particular need special consideration during design. Viewshed impact is likely, however, most views would remain unchanged. Improved access to the existing scenic turnouts would accommodate views of the Black Eagle Dam and the Missouri River.

[B3a] B3a option has certain environmental impacts. The views of the river would be affected by the construction of the new bridge. Given the proximity to the Lewis and Clark Interpretive Center, the structure will need to blend into the landscape and promote the river views. The proposed alignment would cross an area of heavy soil contamination on the north side of the Missouri River. This land has been requested to be put on the National Priority Listing (NPL) site list by the Montana Department of Environmental Quality. The southern portion of B3a option is proposed to pass through a portion the Giant Springs State Park. Impacts to Giant Springs State Park must not only be approved by the Department of Fish Wildlife and Parks but also by the United States Department of Agriculture, National Park Service as the property has incorporated Land and Water Conservation Funds into the site. Impacts to the Anaconda Hills Golf Course and historic rock wall, in addition to finding replacement property for 4(f) sites, must be considered. Routing traffic through the community of Black Eagle
is also a concern that must be considered. There would be significant increases in traffic volumes on Smelter Avenue that could lead to a higher level environmental document. The alignment will need to evaluate effects to residences (noise and vibration), historic structures, property access, neighborhood connectivity, and environmental justice issues.

5.3.4 Maintain/Enhance Recreation

One factor the City of Great Falls and MDT are particularly concerned with is protecting and potentially improving the recreational and scenic value of the corridor. Access to the adjacent trails, Eagle Falls Golf Course, Centene Stadium, State Park and scenic turnouts along the corridor must be maintained. The inclusion of additional pedestrian and bicycle friendly facilities could also be considered. While the current trail system parallels the study corridor, there is currently no access to the trail from the neighborhoods adjacent to 25th Street. 25th Street is the only route from the south that crosses the active railroad tracks and below-grade rail line between 15th and 38th streets. More direct access to the existing River’s Edge Trail north of River Drive North could be implemented with tunnels and paths connecting parking areas to the existing trailhead with the caboose. Additionally, there are concerns about the time it takes to empty Centene Stadium following games. Direct access to the Eagle Falls Golf Course and Veterans Memorial has also been requested.

A2) The A2 option leaves room to provide for added pedestrian features adjacent to removed businesses and preserves the existing trailhead at the caboose. Other paths could be added behind existing businesses or trail access could be included from the parking areas. Landscaping in the parking areas and removal of some unsightly businesses and storage would improve the views along the corridor. Some property between the new alignment and the Missouri River could be returned to parklands. There would be some impediment to improving access to the recreational facilities and trailheads due to the terrain, but the existing access can remain.

A4) The A4 option would have varied impacts to recreational opportunities. It could require the use of some existing Eagle Falls Golf Course property, and would move the highway closer to the Montana Veterans Memorial. The addition of retaining walls may also be required. Existing scenic turnouts would remain as long as the alignment is corrected to allow for adequate sight distance. The standard eight-foot wide shoulders could accommodate bicycle traffic, although due to high traffic speeds, a separated trail may be preferred to provide safe recreation. If these amenities were added, provisions for trail access connections across the narrow 25th Street Bridge should be made as well as ensuring trail users access to the system from 8th Avenue South.

B3a) The Bridge improvement option has environmental concerns, but retains potential advantages for recreational enhancements. There are four areas of special concern on the north side of the Missouri River. One is avoidance of the existing trail systems. There are paved and natural trails along the north side of the river and that will need to be perpetuated under or over any new highway route. The second is the crossing through the Anaconda Hills Golf Course adjacent to the driving range. Accommodations for golf course crossing access, either over or under the highway, and fencing would need to be provided. The third concern is the close proximity of the proposed alignment to existing Black Eagle residential areas and the Black Eagle City Park. Pedestrian and vehicular access should be carefully considered. Also, the change from an urban low
speed route to a higher speed arterial route, carrying considerably higher traffic volumes could restrict recreational use in and around Black Eagle.

Benefits to this alignment include possible connection to the northern side of the Missouri River for development of new recreational opportunities. The proposed Smelter Hill Master Plan as referenced in the 2003 Great Falls Growth Policy suggests using the area for trails, an amphitheater, a Native American memorial or an interpretive play area based on the site’s industrial past. With proper and substantial clean up of existing but unknown contamination, this alignment could provide access to the redeveloped area for vehicles, bicyclists and pedestrians and connections to the River’s Edge Trail and the Lewis and Clark Interpretive Center.

This improvement option also serves to reduce the percentage of trucks continuing along River Drive North through Gibson Park to the west. The reduced noise and traffic volume could improve the recreational value of neighborhoods and parks along the southern side of the Missouri River. Shifting through-traffic from the existing River Drive North segment between 25th and 38th would also reduce the noise and traffic adjacent to the scenic turnouts. Additionally, the remaining portion of River Drive North between 25th and Giant Springs Road could be returned to recreational traffic and more direct recreational access could be provided to the Eagle Falls Golf Course, Montana Veterans Memorial and Centene Stadium.

5.3.5 Sustaining Business Operations

Given the proximity of business operations along the project, access and commercial operations, including parking and deliveries must be considered. Current access and business operations between 15th Street and 25th Street negatively impact corridor capacity and safety. Delivery trucks often block River Drive North while backing into and coming out of loading docks, and without turn lanes for left turning vehicles there are often long delays. Most of the accident history (Appendix 2, Section 2.1.1) is concentrated along the commercial segment approaching 25th Street. Sight distance is restricted at some locations and higher traffic speeds make access to businesses difficult in peak hours. Some commercial structures may be non-conforming to city ordinances.

The City of Great Falls has modified the zoning to a mixed-use transitional status in support of a gradual shift of property development from industrial and high traffic commercial use to those more compatible with the scenic corridor. While there are some newer business structures in this segment, it is readily apparent that some businesses are closed and/or used for storage, and other commercial structures may be non-conforming to city ordinances. Business operations are important and relocation sites for any displaced businesses would need to be identified.

[A2] A2 option could have mixed benefits for businesses. With business relocations, it is possible that other sites may be more suitable and operation could be improved. It would be difficult to find sites with the same scenic views and volumes of traffic, and some businesses may oppose relocation. Operations for remaining businesses would also be impacted by the reduction in direct access necessary to improve safety and capacity. Although parking lots and loading
zones are part of the plan, requisite change in operation may not be looked on favorably by the business owners.

[A4] Since A4 option is the only improvement option for the segment east of 25th Street and there are currently no business access points, there is no probable impact. Additional access points are not recommended, in order to maintain the safety and capacity of this section of the corridor.

[B3a] The B3a option does not remove any existing businesses or homes south of the Missouri River. While shifting traffic to the new bridge crossing, pass-by traffic would be reduced. Reduced direct connectivity between 38th and 25th streets could also result in some out-of-direction travel. However, for destination businesses, the reduced traffic volumes could simplify the ingress and egress for deliveries and customers. Additional access locations east of 25th Street could likely be provided for the Eagle Falls Golf Course and Centene Stadium due to the lower traffic volumes. The north side of the Missouri River would also see new access locations and the potential for new recreational or commercial development. Parking along Smelter Avenue adjacent to existing businesses and homes must be examined for adequacy if on-street parking is removed to increase the capacity or add turn lanes for safe and efficient operation. Adding significant traffic volumes, and the corresponding noise impact, may require mitigation for businesses and homes alike.

5.3.6 Constructability
The feasibility of construction from both engineering and financial viewpoints is important. Funding decisions need to consider the longevity of the solution, whether there is a positive cost-benefit and within what timeframe(s) the project(s) can be built. Along the existing corridor, there are engineering difficulties present, including unstable slopes, buried springs, railroad issues and higher volume intersections to contend with.

[A2] The A2 option is shifted away from the Missouri River, with the exception of the 25th Street intersection, and should be simpler to engineer from a pure constructability standpoint than A3 or B3a options. Right-of-way issues could however take time to work address.

[A4] The A4 option is still near the edge of the Missouri River cliffs where slope failures occur. Stabilizing slopes and providing for adequate drainage features will be necessary.

[B3a] The B3a option is expected to be the most expensive solution. Depending on whether an option for a lower, less expensive structure or a taller, more aesthetic one is chosen, the price will vary greatly. This option does, however may provide a more long term capacity solution than other alternatives. Careful engineering of the bridge structure in relation to the slopes and Missouri River corridor would be essential. Crossing though the old smelter property on the north side of the Missouri River would also need careful analysis. The development of the project may need to wait until a mitigation plan is in place and soil disposal options are identified and implemented first. Note that part of the funding for the grade separation may come from an at-grade railroad hazard elimination program. Up to 5% cost sharing, according to Sec. 646.210 Classification of projects and railroad share of the cost and pursuant to 23 U.S.C. 130(b)27, and 49 CFR 1.4828.

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5.3.6.1 Improvement Options: Preliminary Cost Estimates

Cost estimates, with assumptions noted below, were developed to provide a general comparison of improvement options, and used as a tool for developing recommendations. Costs are subject to change with scope modification and time to project delivery. See Figure 5:7 below.

Figure 5:7 Preliminary Cost Estimates

<table>
<thead>
<tr>
<th>Improvement Option</th>
<th>Length (ft)</th>
<th>Bridge Length (ft)</th>
<th># Lanes</th>
<th>Shoulder (ft)</th>
<th>Curb &amp; Gutter</th>
<th>Sidewalk</th>
<th>Width (ft)</th>
<th>Estimated Base</th>
<th>Estimated Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2</td>
<td>4540</td>
<td>3</td>
<td>2</td>
<td>south</td>
<td>none</td>
<td>40</td>
<td>$4,319,697</td>
<td>$8,639,394</td>
<td></td>
</tr>
<tr>
<td>A2 4-lanes</td>
<td>4540</td>
<td>4</td>
<td>8</td>
<td>both</td>
<td>both</td>
<td>64</td>
<td>$9,482,756</td>
<td>$18,965,511</td>
<td></td>
</tr>
<tr>
<td>A4</td>
<td>7050</td>
<td>2</td>
<td>8</td>
<td>none</td>
<td>sep path</td>
<td>40</td>
<td>$2,870,455</td>
<td>$5,740,909</td>
<td></td>
</tr>
<tr>
<td>B3a High Bridge</td>
<td>11380</td>
<td>900</td>
<td>2</td>
<td>8</td>
<td>half proj</td>
<td>40</td>
<td>$19,510,606</td>
<td>$39,021,212</td>
<td></td>
</tr>
<tr>
<td>B3a Low Bridge</td>
<td>11380</td>
<td>900</td>
<td>2</td>
<td>8</td>
<td>half proj</td>
<td>40</td>
<td>$12,510,606</td>
<td>$25,021,212</td>
<td></td>
</tr>
</tbody>
</table>

Estimated total includes: relocation costs; 10% each for mobilization, traffic control and construction engineering; 14.06% indirect costs; 25% contingencies and inflation at 3.5% for 8 years.

5.3.7 Feasibility and Public Acceptability

While public acceptance is difficult to gauge without extensive outreach, there is some evidence available to gauge public desires for improvements to the River Drive North corridor. The feasibility study goals have been set in conjunction with the local government and based on public desires presented in planning level documents. There is a faction that has voiced a preference for the arterial route to be moved away from the Missouri River, enhancing recreational and scenic uses. Drivers traveling the corridor also have a desire for improved safety and efficiency. Businesses and recreational facilities within the study area have requested better access. Government agencies desire that recreational components and visual appeal be balanced with traffic mobility, safety and business operations.

[A2] Businesses and residences will be impacted with the A2 option. Improved safety and efficiency may prove favorable to the commuting public, however cooperation with business entities is unknown and potential solutions for residential relocations will need to be coordinated. Increased cost is likely.

[A4] Accident history and capacity along this segment are not as problematic, so there may be some public concern with re-building and widening in the absence of critical need.

[B3a] Designing a bridge structure with visual appeal that fits in with the viewshed will be a primary concern for acceptance of the B3a option. The public has expressed the desire for some of the above components of this improvement option, such as shifting traffic away from the Missouri River, improving safety and efficiency and improved recreational opportunities. The cost of this alignment will be a concern, as well as the crossing though the community of Black Eagle. The existing route though the community of Black Eagle is currently in the preconstruction process to rebuild, and will include new sidewalk, surfacing, utilities and even adjustments to correct for an under-height bridge over 15th Street. There may be some opportunity to coordinate project needs for future construction. Considerations for crossing safety, landscaping and other amenities can reduce the impact to the community. A significant change in traffic volumes may require a higher-level environmental document considering a no-
build option and all other viable options for improvements to the corridor. Extensive public involvement will be required for project advancement.

5.3.8 Maintenance
Given the heavy traffic volume and high-percentage commercial vehicle use of this narrow two-lane corridor, the existing surface is in poor condition. It fails to meet MDT pavement and condition standards despite regular maintenance. Some slopes behind the guardrail are failing, lighting poles must be replaced, and the pavement condition and subgrade are no longer structurally adequate for the traffic loads.

[A2] A2 option would provide a newly constructed surface and safety features that would reduce maintenance needs. Possible increases in needed maintenance might be the potential tunnel crossings, included paths, intersection control and drainage features.

[A4] Reduced maintenance would also occur on the A4 option, with the exception of any new bicycle/pedestrian paths or tunnels. The existing at-grade railroad crossing would remain at this time.

[B3a] Maintenance of a new bridge structure would be an additional cost as compared to maintaining the existing route between 25th and 15th Streets. Maintenance responsibility for the new recreational segment leading to Giant Springs State Park would likely be shifted to another entity. This option does not include any rehabilitation of the existing River Drive North roadway. Despite lower volumes anticipated, some level of on-going maintenance will be necessary.

5.4 Traffic Modeling (See Appendix 9: Traffic Modeling, Maps 5-8)

5.4.1 Modeling Assumptions & Process

Growth projections for the Traffic Modeling were based on 2002 data with a growth rate applied to get to 2005. One-half percent per year growth rate was used to project the control totals as well (new housing and employment to be added to existing). Then a land use committee meeting was held with local planners, commissioners among others, to distribute the new growth to the study area. It was then added to the employment and housing already in the model, in the proper Travel Analysis Zone (TAZ), and the 2025 model was based on that. The model was completely rerun on the housing and employment totals for 2025 to get the new traffic volumes that are presented.

The growth rate used to compute 2025 housing and employment was 0.5% per year. This growth rate used was between 0.1% and 0.25%. New highway speed set at 45 mph with a capacity of 15,000 vehicles per day.

- **Existing conditions run**: No changes or improvements modeled.
- **Improvement Option A2**: 4-lane between 15th and 25th Streets.
  - 15th to 25th set at 35 mph and capacity of 23,000 vehicles per day
  - 25th to 38th set at 45 mph and capacity of 15,000 vehicles per day
- **Improvement Option A4**: 4-lane between 15th and 38th.
  - 15th to 25th set at 35 mph and capacity of 23,000 vehicles per day
  - 25th to 38th set at 45 mph and capacity of 23,000 vehicles per day
- **Improvement Option B3a**: New bridge connecting 38th to Smelter Ave. NE and eliminate River Drive North connection between 25th and 38th.
Intersection on Smelter Drive set at 19th Ave., with no other intersections modeled.
Smelter Drive remains a two lane and lane additions would only occur at intersections.
First half of new bridge set at 45mph and capacity of 15,000 vehicles per day
Second half set at 25mph and capacity of 15,000 vehicles per day

5.4.2 Traffic Modeling Results

Improvement Option A2
The traffic flow on River Drive North between 15th and 25th streets experienced a slight increase with the addition of 4 lanes, however the additional lanes should provide adequate capacity. The surrounding area would experience very little change in traffic flow. They include:
- Flow on River Drive North between 25th and 38th street shows a slight increase
- Flow on 15th Street between River Drive North and 8th Street has a slight decrease
- Flow on 25th Street between 8th Street and River Drive North has slight increase
- Flow on 38th Street between River Drive North and 8th Street has slight increase
- Flow on 8th Street between 15th and 25th streets shows slight to moderate decrease
- Flow on 8th Street between 25th and 38th street shows slight decrease

Improvement Option A4
The A4 Model forecasted very similar results as compared with the A2 Improvement Option. Traffic flow increased on River Drive North between 25th and 38th streets and increased on 38th Street between River Drive North and 8th Street.

Bridge B3a Improvement Option
The major change to traffic flow is the diversion of through-traffic across the new bridge. Traffic modeling predicts 8,709 AADT across the Missouri River. The diversion creates several distinct traffic transformations including a dramatic increase of traffic on Smelter road through the community of Black Eagle, (8 times greater 8,586), and the traffic flow on River Drive North between 15th and 25th street is cut in half (19,192 to 9,154 AADT).

Other changes in traffic patterns include: (Based on 2025 committed conditions)
- Flow on 8th East of 25th almost doubles in some areas (1,120 to 2,196 AADT, 1,609 to 3,193 AADT, 1,894 to 3,507 AADT)
- Flow on 38th between River Drive North and 8th shows slight reduction in traffic (4,292 to 3,613 AADT)
- Flow on 8th Street west of 25th Street shows slight increase
- Flow on 25th Street from 8th Street to River Drive North shows slight increase
- Flow across the 15th Bridge decreases from 14,907 to 11,744 AADT.
5.5 Other Options – Intersection Improvements at 25th Street

The Average Daily Traffic (ADT) traffic volumes on River Drive between 15th and 25th streets vary by year of count, but ranges between 18,400 and 14,800. While the optimal volume for a two-lane road is 12,000 vehicles per day (vpd), two-lanes often can carry 15,000 vehicles per day before the level of service drops to an unacceptable level. A four lane can carry up to 23,000 vpd. A general rule of thumb when planning for the needed number of lanes is to keep each lane volume below 450 vehicles per hour. When existing peak hour volumes exceed available capacity, or when heavy volumes of trucks are included in the mix, speed and mobility are reduced.

Using a growth rate of 0.5% per year, volumes are expected to increase to over 19,000 vehicles per day by 2025. The A options will experience a very low level of service under these projected volumes without the addition of through and turning lanes. However, a four or five lane section would impact virtually all existing businesses along the corridor, the Montana Veterans Memorial, and require significantly more property from the Eagle Falls Golf Course. Any structures remaining would be too close to the travel lanes for safety and access to shop doors and business fronts will be severely limited. The B3a bridge option is projected to split these volumes almost equally between the two existing two-lane routes, leaving both well under theoretical capacity for a two lane at 8,000 – 10,000 vpd.

The existing storage lane on River Drive North for left turns onto 25th Street is too short and often turning vehicles will block through traffic. Additionally, there is not enough width for a truck to make a left turn from River Drive North. The approach to the Eagle Falls Golf Course and Montana Veterans Memorial are too close to the intersection for proper function and additional conflict points with turning vehicles are created. While some geometric changes may correct some of the issues at 25th and River Drive, a signal or roundabout should also be analyzed.

Roundabouts can accommodate up to 8000 vehicles per hour and reduce delays especially in non-peak hours. Maintenance costs are low and there are additional safety benefits over traffic signals. Roundabouts however may not work as well when traffic flows are unbalanced or with heavy volumes of large trucks due to maneuverability issues. A single lane roundabout can typically carry up to 20,000 vehicles per day. If designed to accommodate a WB-67 standard highway semi-truck, the outside diameter would be between 130 and 150 feet and the circulating speed would range from 22-27 mph. Due to the large size of the existing intersection, it appears a single lane roundabout could be constructed in the available area.

Access to Eagle Falls Golf Course and Montana Veterans Memorial would be limited to right-in right-out due to its proximity to the intersection, but exiting traffic could utilize the roundabout for changing direction. Potentially a right-in access could be built to the east of the intersection. See Figure 5:8 below.

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29 WB-67 Design
http://www.ent.ohiou.edu/~trans/CE566/PDF%20Files%20for%20Web/Design%20Vehicles.pdf
An AM peak hour traffic count was collected on April 17th, 2009 and a preliminary capacity check was completed for a single lane roundabout. (The calculations are shown in the end of this section). The results showed the roundabout can handle the circulating and entering volumes, but the west leg would be nearing a volume-to-capacity ratio of 0.82. This means that a secondary right turn lane would be necessary to accommodate the high volumes of turning traffic on the west leg. Without this addition, the west leg would experience more delay. Given the projected traffic growth, the current volumes should be adjusted for a more in-depth look at long term lane needs and capacity.

The data was then analyzed to compare the existing conditions to the options of a signal or roundabout based on delay, level of service and the projected number of vehicles in the queue. The higher delay (55.6 seconds) and number of vehicles in the queue (28 and 13 seconds on River Drive North, and 10 seconds on 25th) without separate turn lanes would make the intersection non-functional. Given the volumes in the queue, some turn lanes would need to be 300 feet long in order to allow turning traffic to clear around vehicles waiting at a red light.

<table>
<thead>
<tr>
<th></th>
<th>Delay (sec/veh)</th>
<th>Queue (veh)</th>
<th>LOS</th>
<th>Q85 (veh)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EXISTING CONDITIONS</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>East/West</td>
<td>10.4</td>
<td>0.06</td>
<td>B</td>
<td>0</td>
</tr>
<tr>
<td>NE LT</td>
<td>22.2</td>
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<td>C</td>
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</tr>
<tr>
<td>NE RT</td>
<td>12.7</td>
<td>0.03</td>
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<td><strong>ROUNDABOUT</strong></td>
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<td></td>
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<tr>
<td>West</td>
<td>15</td>
<td>0.32</td>
<td>B</td>
<td>10</td>
</tr>
<tr>
<td>East</td>
<td>6.6</td>
<td>0.52</td>
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<td>4</td>
</tr>
<tr>
<td>South</td>
<td>5.2</td>
<td>0.2</td>
<td>A</td>
<td>1</td>
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<td><strong>SIGNAL</strong></td>
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</tr>
<tr>
<td>Eastbound</td>
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<td>Northbound</td>
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<td><strong>SIGNAL WITH TURN LANES</strong></td>
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<td></td>
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<td>0.18</td>
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</table>

Although further and more detailed analysis should be completed, these preliminary results show that a signal would increase delay over the existing conditions. The average queue consists of 2 vehicles and the delay is minimal compared to a signal. A roundabout could be considered if there is space to add the dual right turning lane for
eastbound traffic, allowing the intersection to operate at a higher level of service overall. See Figure 5:10 below.

**Figure 5:10 Roundabout Configuration**

![Roundabout Configuration Diagram]

### 5.6 Other Options - Pedestrian Access

Pedestrian and Recreational Features are very important as well. While the River’s Edge Trail parallels this corridor, it is at a lower grade and access is only provided at the caboose trailhead between 15th and 19th Streets and at Giant Springs Road. Users from neighborhoods in the 25th Street vicinity do not currently have direct access to the trail system. Any improvement options should consider providing non-motorized connections whether via widened shoulders or separated paths. Tunnels to connect the southern bicycle and pedestrian traffic to the trail system north of River Drive North may also be safe options due to the heavy traffic. This improvement could be a viable option if the grade is changed on River Drive North.

### 5.7 Other Options - Grade-separated rail crossing

We recommend a grade-separated rail crossing for the crossing west of 38th Street to address safety concerns and traffic delays. Providing a grade separation may be difficult given the current alignment with a sharp curve, nearby signal at 38th Street, and required access to Giant Springs State Park. Consideration may be given to a partnership with BNSF Railway to drop the rail grade approaching River Drive North, in combination with highway grade elevation.

Improvement option B3a may work well with a grade-separated crossing of the tracks and an undercrossing for Giant Springs Road as the alignment continues on a tangent section through the proposed bridge.
5.8 Improvement Options: Summary

Improvement Option A2 reduces the impacts to businesses, but does not fully meet the safety and capacity needs of River Drive North. Pedestrian and recreation features may be sustained and possibly enhanced, though constructability may be a concern. Despite public acceptance and associated residential and businesses impacts remaining unquantifiable, this improvement option does provide improvement over existing conditions and will remain an improvement option. Innovative solutions for residential relocations must be investigated.

Improvement Option A4 improves safety due to better alignments and increased width. Accommodating capacity is not a significant concern as long as new access points are not added. Environmental impact will be minor, and scenic turnouts would remain with added opportunities for trails. Constructability within this tight section of the corridor remains a concern. Public support for improving a possibly non-critical section of the corridor may be difficult.

Improvement Option B3 generally satisfies the safety needs for the corridor. Access locations through Black Eagle and the potential for a signalized intersection at 15th Street North and Smelter Avenue require further review. Thirty-year capacity needs are likely met with this option. During the design process, consideration for environmental mitigation and viewshed enhancement is mandatory. Recreational opportunities may be enhanced, and there are few impacts on business operations south of the Missouri River. Montana Department of Transportation maintenance of the existing corridor between 15th and 25th Streets would remain and additional maintenance of the new bridge is noted. As with the other improvement options, public support must be garnered for a bridge crossing and route crossing the Anaconda Hills Golf Course, tying into Smelter Avenue. Extensive investigation and path determination regarding the Missouri River north shore contamination area are required.

Other Options include, at a minimum, intersection improvements, pedestrian access, and rail grade separated crossings. Additional concerns include location of turn lanes, access restrictions, concrete or asphalt surfacing, the need for lighting, and the potential for new trails and possible beautification.

The feasibility of mitigation measures, funding and public acceptance as well as a more refined level of analysis will ultimately determine the preferred solution.
Appendix 6: Recommendations

6.1 Recommended Corridor Improvements Process and Details

After we researched and developed the Improvement Options above, we then effectively scored each against the corridor needs and objectives to determine the proposed benefit and detriment of each. The Recommendations below constitute the result of our exercise.

Provided various levels of estimated impacts of safety, capacity, environmental health, business and residential affects, constructability, public acceptance and maintenance operations, the narrowed corridor improvement options were measured one against another. In addition, we modeled traffic for the year 2025 to establish objective, forecasted volumes throughout the study area with and without the improvement options. The result of these weighing and measuring exercises produced the following discussion of advantages and disadvantages supporting the recommendations we established.

Option A2 Advantages
- Safety aspects are improved with the new alignment that reduces steep grades, and provides additional access control and combination parking lots to reduce the number of access points.
- Capacity is enhanced with this option by reducing vertical curves and the upgrade to standard lane and shoulder widths. Additional turn lanes can be provided at some locations.
- Truck traffic could more easily navigate the corridor with the reduction of the vertical and horizontal curves.
- Partnerships to assist in mitigating impacts to the affected low-income housing development seem very promising in their infancy.
- Property remaining between the Missouri River and new alignment could be restored to recreational use and/or developed into a mixed-use area. This area may also serve to replace the displaced residents of the Big Stack Mobile Home Court.
- Recreational users may enjoy adjacent travel lanes and enhanced trail system access.
- Bicycle and pedestrian travel may be enhanced with the possibility of tunnels connecting southern traffic to the River’s Edge Trail system north of River Drive North.
- Improvements to the intersection at 25th Street and River Drive North will be required, though the impact is not known.
- Missouri River scenic views and scenic turnouts will be sustained.
- No known historic features are impacted.
- This development is in line with recent efforts to alter the type and quantity of urban development in this area from light commercial/industrial to mixed use residential/light commercial.
- No additional MDT maintenance is required.
Option A2 Disadvantages
- Safety aspects that are not fully implemented include conflict points necessary to maintain some business access, and unknown impacts related to the design and operation of the intersection at 25th Street and River Drive North.
- Business impacts will occur. Because the new alignment would require additional right-of-way in an already compact corridor, business will be adversely impacted but to an unknown extent. This alignment requires some established businesses(s) be relocated. In order to successfully implement this improvement option, additional access points and parking provisions will be necessary. Business operations at remaining sites will be affected by access control and the intersection improvements.
- Environmental impacts are an issue and provisions for study and mitigation are required.
- Environmental justice is an issue with this improvement option as all Big Stack Mobile Home Court residents would be relocated.
- Cost will likely be a factor, including land, residential and business property acquisition and environmental impact mitigation.

Option A4 Advantages
- Scenic turnouts would be perpetuated and even enhanced by added visibility and sight distance.
- Capacity would be slightly increased due to added shoulders and improved alignments.
- Recreational features connecting to existing shared-use paths and River’s Edge Trails could be added or enhanced along the corridor.
- Maintenance of guardrail, lighting and surfacing would be reduced.

Option A4 Disadvantages
- Safety improvements will be limited by the constraints of the terrain and some retaining walls may be necessary in tight spots.
- Constructability due to slopes, springs and geotechnical issues is a concern.
- The Eagle Falls Golf course will be impacted, with additional right-of-way needed, though minimal. 4(f) implications must be considered as a result.
- An historic rock retaining wall at the intersection of 25th Street and River Drive North will likely be impacted by improvements and must be mitigated.
- Feasibility and inclusion of a grade separated rail crossing west of 38th Street should be carefully considered including local access requirements, adjacent curve, safety and viewshed needs.

Option B3a Advantages
- The bridge option provides safety advantages in several ways. First, by adding the structure, the at-grade railroad crossing west of 38th Street can be eliminated. Second, eliminating through-traffic from 25th to 38th streets, reduces the number and severity of crashes as does reducing the traffic volumes between 15th and 25th streets. Third, safety is improved by traffic volume reduction from 25th to 15th streets. Lastly, the majority of the truck traffic will be diverted across the Missouri River, reducing safety issues caused by vehicle mix.
- This option increases capacity to a level more than adequate with 20 year projected traffic volumes, while reducing high traffic volumes on River Drive North.
- May shift truck traffic to the new infrastructure and reduce through-truck volumes on 8th Avenue North.
- Business access along River Drive North may be enhanced due to reduced traffic volumes.
- Recreational access to the north side of the Missouri River may be enhanced for bicycles and pedestrians using the bridge crossing.
- No relocation of residences or businesses will be expected with this option.

Option B Disadvantages
- Safety concerns increase by placing more traffic on Smelter Ave. and 8\textsuperscript{th} Ave North. Safety problems are compounded by narrow, highly residential existing roadways and limited shoulder widths. Intersection conflicts also increase along Smelter Ave.
- Capacity along Smelter Ave. will be reduced.
- More vehicular traffic will be shifted to 8\textsuperscript{th} Ave. North and Smelter Ave.
- Businesses along River Drive North will experience a reduction in pass-by travel but access will be improved for deliveries and existing customers.
- The cost of building a structure to span the Missouri will likely be the most expensive option. Depending on the selection of alignment and structure type the cost could be prohibitive.
- Environmental impact with this option is a serious concern. The extent and magnitude of contamination on the north side of the Missouri River is unknown. After determination, a clean up plan approved by MT DEQ and EPA will be required and completed prior to any project start. A crossing at Giant Springs State Park must satisfy 4(f) and 6(f) requirements and may be disallowed if any feasible or practicable improvement option is present. In addition, the National Park Service must approve the crossing and will require appropriate mitigation. The Army Corps of Engineers will also be involved and require the bridge to be the least damaging Missouri River crossing improvement option available. Residential impacts, including possible community disunity, due to increased Smelter Ave. traffic will need to be planned for and mitigated. In addition, this alignment crosses through the approximate center of the Anaconda Hills Golf Course, prompting the provision for 4(f) impact mitigation. Viewshed concerns for the Black Eagle community, River’s Edge Trail users group, Giant Springs State Park, and Lewis & Clark Interpretive Center must be considered.
- Additional MDT maintenance will be required with the addition of bridge and highway infrastructure.

6.2 Recommendations Summary

Generally speaking, to increase the capacity of the existing route, additional lanes for turning vehicles and shoulder width is required. Modifications to grades and curves are also necessary to improve traffic flow and safety. Recreational and business access points and operations need to be adjusted to ensure the safety of the traveling public. Construction difficulties include unstable slopes given the weathered sandstone cliffs along the Missouri River and underground springs along the corridor.
Entities impacted include the Eagle Falls Golf Club, Montana Veterans Memorial and the Missouri River scenic corridor east of 25th streets. West of 25th streets the impact would primarily extend to business operations and residential sites, including River’s Edge Dental Office and Big Stack Mobile Home Court Trailer Park. Public concerns and landowner acceptance will be a critical component of these alternatives.

After we estimated the impacts of safety, capacity, environmental concern, business and residential affects, constructability, public acceptance and maintenance operations, we measured the narrowed corridor improvement options (per the Decision Matrix in Appendix 5, Table 5:1) one against another. In addition, we modeled traffic for the year 2025 to establish objective, forecasted volumes throughout the study area with and without the improvement options. The result of these weighing and measuring exercises produces the following recommendations.

**A Option Recommendations**

The recommendations we discuss here, known as the A options, are grouped into the two chosen alignment options, one west of 25th Street (A2) and one east of 25th street (A4). A 4-lane is necessary for capacity, but impacts likely include many businesses, residences and some cultural resources along the corridor. Based on perceived public sentiment to limit the roadway width, the current A options include only two through-lanes with left turn lanes where necessary; a configuration that is not forecasted to fully meet capacity requirements, but reduces impacts to businesses and parks.

From the A Options, **Improvement Option A2** remains our primary recommendation for reconstruction between 15th and 25th streets. Capacity and safety are improved with curve and grade correction, while possibly improving recreational access and maintaining Missouri River viewshed. Maintenance operations are improved, while constructability will need to be reviewed carefully. We also recommend investigating the restriction of access, limiting left turning movements at some locations.

Note that for A2 Recommendations, Big Stack Mobile Home Court consists of older mobile homes that do not meet current building codes and may not be able to withstand the stress of relocation. Also, because the trailers do not meet current building codes, they cannot simply be moved to new locations within the city limits. Relocation of the residents living in these low-income trailer homes would need an innovative plan for affordable housing. Funding partnerships and options to relocate residents to existing rentals, build new low income homes or apartments using HUD funds or advance purchase lots as they become available, must be considered. The public will be acutely aware of the impact on their businesses and residences requiring input, coordination and impact mitigation.

Between 25th and 38th streets, we recommend **Improvement Option A4** to maintain corridor consistency. Constructed alone, this option slightly improves safety due to improved alignments and increased roadway width. Accommodating capacity, while not a significant concern as long as no new access points are added, will be addressed. Environmental impact will be minor and scenic turnouts will remain with added opportunities for trail access. Coupling this recommendation with the construction of a grade-separated rail crossing will improve safety and decrease traffic delays experienced on the eastern portion of this section.
B Option Recommendations
We recommend the City of Great Falls and the Montana Department of Transportation review Improvement Option B3a as a possible long-term solution. The Bridge option carries with it concerns of environmental impact, viewshed considerations, cost and public acceptance. There remain significant unknowns, including impact to the community of Black Eagle and the Missouri River corridor. Until the contamination areas at the ARCO remediation site (often referred to as Smelter Hill) are known and a cleanup plan determined, we have not forwarded this option for short-term consideration.

Other Recommendations
We recommend a more in-depth analysis of traffic control at the intersection of 25th Street and River Drive North, to be completed in later design phases, though likely possibilities include a signal, roundabout and/or changes to the intersection geometry.

A grade-separated rail crossing is recommended west of 38th Street and River Drive North to address safety concerns and traffic delays, and perhaps coupled with Improvement Option A4 or B3a. Providing a grade separation may be difficult given the current alignment with a sharp curve, nearby signal at 38th Street, and required access to Giant Springs State Park. Partnership with BNSF Railway to drop the rail grade approaching River Drive North should be considered.

Recommendations Comments
Sufficient mitigation effort and public support must be garnered for all recommendations. Further research and analysis is required for these mitigation measures, funding and public acceptance. A more refined level of analysis will ultimately determine project-level details, again balancing the greatest benefit with least impact.
Appendix 7: Funding

Funding available for the Improvement Options in Appendix 5 and Recommendations in Appendix 6 can be found in Federal, State, Local and private funding streams. While many funding options are legislatively allowed, the predominant sources of the funds used to fund these types of projects will be State and Federal.

The following information is excerpted almost entirely from the Great Falls Transportation Plan 2009, Chapter 14 Financial Analysis. It provides an excellent, all-inclusive overview of funding options available. Following this section there is additional discussion of possible partnerships, relating in particular to the Environmental Justice needed for residential impacts in some of the Improvement Options.

7.1 Overview of Traditional Funding Sources

7.1.1 Federal Funding Sources

NHS – National Highway System
STPU – Surface Transportation Program – Urban
STPHS – Surface Transportation Program – Hazard Elimination
STPRP – Rail/Highway Crossing Protective Devices Program
STPRR – Rail/Highway Crossing Elimination of Hazard Program
CTEP – Community Transportation Enhancement Program
CMAQ – Congestion Mitigation & Air Quality Improvement Program
   A) Montana Air & Congestion Initiative (MACI) – Discretionary Program
   B) Montana Air & Congestion Initiative (MACI) – Guaranteed Program
ICAP – Indirect Cost Allocation Plan – Impact upon available resources

NHS - National Highway System

The purpose of the National Highway System (NHS) is to provide an interconnected system of principal arterial routes that will serve major population centers; international border crossings; intermodal transportation facilities and other major travel destinations; meet national defense requirements; and serve interstate and interregional travel.

The National Highway System is composed of all interstate routes, a large percentage of urban and rural principal arterials, the defense strategic highway network, and strategic highway connectors. The Federal share for any eligible NHS project is 86.58 percent; the State is responsible for the remaining share of 13.42 percent. The State share is funded through the State Special Revenue account.

Activities eligible for NHS funding include construction, reconstruction, resurfacing, restoration, and rehabilitation of segments of the National Highway System. Operational improvements as well as highway safety improvements are also eligible. Other miscellaneous activities that may qualify for NHS funding include: research; planning; carpool projects; bikeways; and pedestrian walkways.
The Montana Transportation Commission approves the fund apportionment to the National Highway System projects. The NHS funds are distributed throughout the Montana Department of Transportation’s financial districts based solely on need. However, consideration is given to balancing needs against existing and future construction manpower when distributing the funds.

**STPU - Surface Transportation Program - Urban**

Since River Drive is an NH route, STPU (funds for urban system routes) is not an available funding stream for work just on River Drive North. The caveat is that STPU funds may be eligible for intersection improvements when an NH route crosses with an urban system route. These cases must be heavily justified to demonstrate improvement and/or benefit to the urban system.

In the case of River Drive North:
- 15th is an NHS route and does not qualify
- 25th is an Urban route (U-5217) and may qualify
- Giant Springs Road is an Urban route (U-5221) and may qualify
- 38th is an Urban route (U-5219) and may qualify

**STPHS - Surface Transportation Program - Hazard Elimination**

The purpose of the Federal Hazard Elimination Program is to identify hazardous locations throughout the states’ highway system, assign benefit-to-cost ratio priorities for the correction of these hazards, and implement a schedule of projects for their improvements. Hazard elimination projects are funded with 90 percent Federal funds, and 10 percent State funds.

Projects eligible for funding under the hazard elimination program include any safety improvement project on any public road; any public surface transportation facility or any publicly owned bicycle or pedestrian pathway or trail; or any traffic calming measure. The MDT Safety Bureau selects the projects by identifying high hazard sites through the analysis of law enforcement accident reports. Sites with a cluster of accidents over time are field reviewed, with an ensuing determination of an appropriate type of corrective action. The cost of the proposed hazard elimination project is compared with the potential benefit of the action. Once the benefit-to-cost ratio is calculated for all high hazard sites statewide, the projects are prioritized from highest to lowest need. The projects are then funded in order of priority until the yearly funds are exhausted.

**STPRP - Rail/Highway Crossing Protective Devices Program**

The purpose of the Federal Rail/Highway Crossing – Protective Devices Program is to identify high hazard rail crossing sites and install new rail crossing signals.

The MDT’s Rail/Highway Safety Manager is responsible for surveying, identifying and prioritizing those railroad crossings that require new protective devices, or upgrading of existing devices. The funds are distributed on a statewide basis determined by a priority list ranked by a hazard index. The Federal/State ratio is 90 percent Federal and 10 percent State.
**STPRR - Rail/Highway Crossing-Elimination of Hazard Program**

The purpose of the Federal Rail/Highway Crossing—Elimination of Hazard Program is to identify high hazard rail crossing sites, and to construct new rail/highway grade crossings. The Program also utilizes funds to rehabilitate existing grade separations.

Possible expenditures include the separation or protection of at-grade crossings, reconstruction of existing crossings, and relocation of highways to eliminate crossings. Projects for this program are selected by identifying those sites where only a grade separation will eliminate an identified hazard, or where a grade separation exists but needs rehabilitation or replacement. Since funding for this program is limited, STPRR funds are often used in combination with other Federal funding sources (i.e., NHS, STPP, etc.), in order to accomplish costly grade separation projects.

Grade separation projects are funded with 90 percent Federal funds and 10 percent State funds.

**CTEP - Community Transportation Enhancement Program**

The Federal funds available under this Montana program are used to finance transportation projects that enhance the present surface transportation system. These funds come from a ten percent (10%) set aside of the STPU program described earlier in this section. Projects must be located on public property or on property to be procured for public use. Eligible activities, or categories, may include:

- Pedestrian and bicycle facilities;
- Acquisition of scenic easements and historic or scenic sites;
- Scenic or historic highway programs;
- Landscaping and other scenic beautification;
- Rehabilitation and operation of historic transportation buildings, structures or facilities (including railroads);
- Historic preservation;
- Archaeological planning and research;
- Mitigation of water pollution due to highway runoff;
- Preservation of abandoned railway corridors (including the conversion and use for pedestrian or bicycle trails);
- Control and removal of outdoor advertising.
- Safety education activities for pedestrians and bicyclists;
- Establishment of transportation museums; and
- Projects that reduce vehicle-caused wildlife mortality.

The Federal share for CTEP projects and activities is 86.58 percent, with a required local match of 13.42 percent.

**CMAQ – Congestion Mitigation & Air Quality Improvement Program**

Federal funds available under this program are used to finance transportation projects and programs to help meet the requirements of the Clean Air Act. Eligible activities include transit improvements; traffic signal synchronization; bike/pedestrian projects; intersection improvements; travel demand management strategies; traffic flow improvements; and public fleet conversions to cleaner fuels. At the project level, the use of CMAQ Funds is not constrained to a particular system (i.e. Primary, Urban, and NHS). Of the total received, 86.58 percent is federal and 13.42 percent is non-Federal match.
A requirement for the use of these funds is the estimation of the reduction in pollutants resulting from implementing the program or project. These estimates are reported yearly to the FHWA.

The Transportation Equity Act for the 21st Century (TEA-21) provided for significantly more flexibility in the use of CMAQ funds. Prior to TEA-21, almost all CMAQ funds had to be used in Missoula – Montana’s only moderate carbon monoxide (CO) non-attainment area. Although Missoula continues to receive the CMAQ funds that come to Montana by virtue of the Federal formula, MDT has directed approximately 90 percent of CMAQ apportionment to several new State programs.

A) Montana Air & Congestion Initiative (MACI) – Discretionary Program
   The MACI – Discretionary Program provides funding for projects in areas of the state that are designated non-attainment or recognized as being “high-risk” for becoming non-attainment. District Administrators and local governments nominate projects cooperatively. Projects are prioritized and selected based on air quality benefits and other factors.

B) Montana Air & Congestion Initiative (MACI) – Guaranteed Program
   MACI – Guaranteed funds are distributed to Billings and Great Falls at a level equivalent to what Missoula receives each year in CMAQ funds. Projects are prioritized through the MPO planning process.

7.1.2 State Funding Sources
There are two principal State funding programs available to potentially finance some of the improvements recommended in this Plan. These programs are described below.

SFC – State Funded Construction Funds
State Fuel Tax Funds - City and County

SFC – State Funded Construction Funds
The Pavement Preservation Program, funded totally with State fuel tax dollars, provides funding for State construction projects. Projects that are typically ineligible for Federal funding participation are funded with these dollars. The program funds projects on the Primary and Secondary highway systems to preserve the condition, and to extend the service life of the pavement. The type of work consists entirely of overlays and/or seal and covers. Eligibility requirements specify that the highway be maintained by the State. The Transportation Commission establishes the priorities for the program. This State-funded program requires no match. The MDT staff selects the projects based on pavement preservation needs.

State Fuel Tax
The State of Montana assesses a tax of $0.2775 per gallon on gasoline and diesel fuel used for transportation purposes. According to State law, each incorporated city and town within the State receives an allocation of the total tax funds based upon:

1) the ratio of the population within each city and town to the total population in all cities and towns in the State, and
2) the ratio of the street mileage within each city and town to the total street mileage in all incorporated cities and towns in the State. The street mileage is exclusive of the Federal-Aid Interstate and Primary Systems.
State law also establishes that each county be allocated a percentage of the total tax funds based upon:

1) the ratio of the rural population of each county to the total rural population in the state, excluding the population of all incorporated cities or towns within the county and State;

2) the ratio of the rural road mileage in each county to the total rural road mileage in the State, less the certified mileage of all cities or towns within the county and State; and

3) the ratio of the land area in each county to the total land area of the State.

For State Fiscal Year 2008, the City of Great Falls was allocated $1,004,077 and Cascade County was allocated $214,259 in State fuel tax funds. The amount varies annually, but the current level provides a reasonable base for projection throughout the planning period.

All fuel tax funds allocated to the city and county governments must be used for the construction, reconstruction, maintenance, and repair of rural roads or city streets and alleys. The funds may also be used for the share that the city or county might otherwise expend for proportionate matching of Federal funds allocated for the construction of roads or streets that are part of the primary, secondary or urban system.

Priorities for the use of these funds are established by each recipient jurisdiction.

7.1.3 Local Funding Sources

Local governments generate revenue through a variety of funding mechanisms. Typically, several local programs related to transportation exist for budgeting purposes and to disperse revenues. These programs are tailored to fulfill specific transportation functions or provide particular services. The following text summarizes programs that are or could be used to finance transportation improvements by the city and county.

City Funds
County Funds
Private Funding Sources
Future Potential Funding Sources

7.1.3.1 City of Great Falls

General Fund
This fund provides revenue for most major city functions like the administration of local government, and the departments of public services, including police, fire, and parks. Revenues for the fund are generated through the general fund mill levy on real and personal property and motor vehicles; licenses and permits; State and Federal intergovernmental revenues; intergovernmental fund transfers; and charges for services.

Several transportation-related services are supported by this fund including public services (engineering and streets) and the City of Great Falls Police Department. The street department is responsible for maintaining the city streets and alleys including: pavement repair, street cleaning, striping and signing, lighting and traffic signal maintenance, and plowing and sanding during the winter. In addition to revenue from the General Fund, some revenue used to operate the street department is generated
from gas tax funds and street maintenance district funds. The police department is obviously responsible for enforcing traffic laws on the street system.

Although most of the highway-designated monies are oriented toward maintenance activities, some new construction and street-widening projects may be financed through the General Fund. This revenue source has been used in conjunction with other resources to finance local street and highway projects.

**Special Revenue Funds**
These funds are used to budget and distribute revenues that are legally restricted for a specific purpose. Several such funds that benefit the transportation system are discussed briefly in the following paragraphs.

**Special Improvement District (SID) Revolving Fund**
This fund provides financing to satisfy bond payments for special improvement districts in need of additional funds. The city can establish street SID’s with bond repayment to be made by the adjoining landowners receiving the benefit of the improvement. The city has provided labor and equipment for past projects through the General Fund, with an SID paying for materials.

**Gas Tax Apportionment**
Revenues are generated through State gasoline taxes apportioned from the State of Montana. Transfers are made from this fund to the General Fund to reimburse expenditures for construction, reconstruction, repair and maintenance of streets. Half of the City’s allocation is based upon population, and half is based on the miles of streets and alleys in the City. The Street District Fund received a Gas Tax allocation of $1,012,152 for FY 2009. Also, $385,969 was received from the State Entitlement HB 124 for FY 2009.

**Community Development Block Grant Program (CDBG)**
Authorized in 1974, the CDBG program replaced a number of individual or categorical Federal assistance programs to cities, the Model Cities Program and Urban Renewal among the major ones. The funds are provided to metropolitan areas and urban counties with populations of 50,000 and above on an entitlement basis, with individual allocations determined by a formula of poverty, population, overcrowded housing, growth lag, and age of housing stock factors.

In Great Falls and Cascade County, the city is a direct recipient of the funds from the U.S. Department of Housing and Urban Development, whereas the County receives funds through the Montana Department of Commerce on a competitive basis. The State administers the block grant program and allocates funds to projects in small urban areas and counties based on a state adopted selection and priority program.

In planning for and using CDBG funds, recipients must ensure that no less than 51 percent of the funds must be used for activities that benefit low- and moderate-income persons, over a period specified by the grantee, but not to exceed three years.

There are numerous eligible activities for use of the funds, including construction of public facilities, which would include transportation improvements.
7.1.3.2 Cascade County

Motor Vehicle License Fee
The fees collected by counties from the licensing of motor vehicles are available for construction, maintenance, and repair of highways and streets within the transportation study area. The revenue collected is distributed among the jurisdictional areas of the county based on vehicle registration. In 1987, the State of Montana changes its method of licensing motor vehicles of ¾ ton or less. The flat fee tax on light vehicles was replaced by a 2 percent tax on the assessed value of the vehicle, using average trade-in or wholesale value. An ad valorem tax is still issued for all vehicles in excess of ¾ ton. A use tax of 1.5 percent is imposed on the list price of all newly licensed vehicles. The proceeds of this tax are credited to the State highway account of the State Special Revenue Fund. The funds from the 2 percent tax are distributed in the relative proportions required by the levies for State, County, School District and municipal purposes in the same manner personal property taxes are distributed. Additionally, counties have the option of imposing a 0.5 percent local vehicle tax that is distributed, with some restrictions, in the same manner as the base vehicle tax.

Urban Transportation Districts
Urban Transportation Districts are another method of providing local funds for transportation improvements. The creation of an urban transportation district is initiated by a petition of at least 20 percent of the registered voters within the proposed district. A formal public hearing must be held after which the creation of the district is put to a vote. The county commissioners determine whether a special election is necessary, or if a vote can take place at the next general election. Urban Transportation Districts are governed by an elected board, which is responsible for all operations of the district. The Great Falls Transit District was created under and operates under the guidelines for Urban Transportation Districts.

County Elderly Activities Tax
Counties are allowed to levy up to one mill to promote, establish, and maintain recreational, educational, and other activities of the elderly. Funds from this source could be used to match the FTA Section 5310 funds for providing transportation services to the elderly and disabled.

Special Revenue Funds
Special revenue funds may be used by the county to budget and distribute revenues legally restricted to a specific purpose. Several such funds that benefit the transportation system are discussed briefly in the following paragraphs.

Capital Improvements Fund
This fund is used to finance major capital improvements to county infrastructure. Revenues are generated by loans from other county funds, and must be repaid within ten years. Major road construction projects are eligible for this type of financing.

Special Bond Funds
A fund of this type may be established by the county on an as-needed basis for a particularly expensive project. The voters must approve authorization for a special bond fund. The county is not currently using this mechanism.
7.1.4 Private Funding Sources

Private financing of roadway improvements, in the form of right-of-way donations and cash contributions, has been successful for many years. In recent years, the private sector has recognized that better access and improved facilities can be profitable due to increases in land values and commercial development possibilities. Several forms of private financing for transportation improvements used in other parts of the United States are described in this section.

**Cost Sharing**
The private sector pays some of the operating and capital costs for constructing transportation facilities required by development actions.

**Transportation Corporations**
These private entities are non-profit, tax exempt organizations under the control of state or local government. They are created to stimulate private financing of highway improvements.

**Road Districts**
These are areas created by a petition of affected landowners, which allow for the issuance of bonds for financing local transportation projects.

**Private Donations**
The private donation of money, property, or services to mitigate identified development impacts is the most common type of private transportation funding. Private donations are very effective in areas where financial conditions do not permit a local government to implement a transportation improvement itself.

**Private Ownership**
This method of financing is an arrangement where a private enterprise constructs and maintains a transportation facility, and the government agrees to pay for public use of the facility. Payment for public use of the facility is often accomplished through leasing agreements (wherein the facility is rented from the owner), or through access fees whereby the owner is paid a specified sum depending upon the level of public use.

**Privatization**
Privatization is either the temporary or long-term transfer of a public property or publicly owned rights belonging to a transportation agency to a private business. This transfer is made in return for a payment that can be applied toward construction or maintenance of transportation facilities.

**General Obligation (G.O.) Bonds**
The sale of general obligation bonds could be used to finance a specific set of major highway improvements. A G.O. bond sale, subject to voter approval, would provide the financing initially required for major improvements to the transportation system. The advantage of this funding method is that when the bond is retired, the obligation of the taxpaying public is also retired. State statutes limiting the level of bonded indebtedness for cities and counties restrict the use of G.O. bonds. The present property tax situation in Montana, and recent adverse citizen responses to proposed tax increases by local government, would suggest that the public may not be receptive to the use of this funding alternative.
Tax Increment Financing (TIF)
Increment financing has been used in many municipalities to generate revenue for public improvements projects. As improvements are made within the district, and as property values increase, the incremental increases in property tax revenue are earmarked for this fund. The fund is then used for improvements within the district. Expenditures of revenue generated by this method are subject to certain spending restrictions and must be spent within the district. Tax increment districts could be established to accomplish transportation improvements in other areas of the community where property values may be expected to increase. A TIF is currently being utilized in downtown Bozeman. Additional TIF districts could be established in other areas of the city and county to accomplish a variety of transportation-related improvements.

Multi-Jurisdictional Service District
This funding option was authorized in 1985 by the State Legislature. This procedure requires the establishment of a special district, somewhat like an SID or RSID, which has the flexibility to extend across city and county boundaries. Through this mechanism, an urban transportation district could be established to fund a specific highway improvement that crosses municipal boundaries (e.g., corporate limits, urban limits, or county line). This type of fund is structured similar to an SID with bonds backed by local government issued to cover the cost of a proposed improvement. Revenue to pay for the bonds would be raised through assessments against property owners in the service district.

Local Improvement District
This funding option is only applicable to counties wishing to establish a local improvement district for road improvements. While similar to an RSID, this funding option has the benefit of allowing counties to initiate a local improvement district through a more streamlined process than that associated with the development of an RSID.

7.1.5 Funding Consideration

ICAP – Indirect Cost Allocation Plan – Impact upon Available Resources
The Montana Department of Transportation has instituted a program to apply an overhead charge to all non-state funds that it receives, and has applied it at the project level since FY 2007. For State Fiscal Year 2008-09, all non-state funds that are received by the state must be accompanied by cash in the amount of 14.06% of the amount. This applies to all segments of a project, and also includes locally owned and funded improvements that are constructed as part of a State-managed project. For example, underground utility replacements, as well as local funds provided to match federal funds, all must provide an additional 14.06% of the expense amount (FY 09 rate).

The ICAP rate is applied at the rate that is current at the time a project phase is programmed. Because transportation projects managed by the Montana Department of Transportation can take up to ten years to develop, a project may have multiple overhead rates applied to its various phases. This rate has increased since its establishment in 2007. In FY07 the rate was 10.91%; in FY08 it was 12.25%; and, in FY09 it is 14.06%. While overhead rates have been increasing, and Federal program allocations available to local governments (STPU, MACI and CTEP, for example) have not been increased commensurately. Other funds received locally from the state have
also decreased, such as state gas tax funds, while project costs and overhead increases.

7.1.6 Partnerships
The following constitute possible partnership options concerning the relocation of residents of the Big Stack Mobile Home Court.

The City of Great Falls receives funds from the U.S. Department of Housing and Urban Development’s Homes and Communities. These funds are provided as annual grants (Community Development Block Grants) on a formula basis. The grants may be used to develop viable urban communities by expanding opportunities for principally low- and moderate-income persons by providing decent housing and a suitable living environment and expanding economic opportunities. The amount of funding is limited; however, the City of Great Falls Community Development Department is interested in looking at ways to assist residents of the Big Stack Mobile Home Court improve their living conditions.

The NeighborWorks – Great Falls is a non-profit organization. Their mission is rebuilding historic Great Falls neighborhoods and creating homeownership opportunities for hard-working families. NeighborWorks creates active partnerships with residents, financial institutions, the business community and governmental and non-profit agencies. Neighborhood Works has multiple options that may benefit the residents of the Big Stack Mobile Home Court to update their living environment. Some of the options include: Low Income Energy Assistance Program (LIEAP) funds, HOME funding used for deferred mortgages for low income families, partnering with mobile home manufacturers, and Resident-Owned Community (ROC) funds.

FHWA and MDT must comply with Federal Laws concerning relocation of individuals and businesses. All lands needed for right-of-way for a proposed project that are in private ownership would be acquired in accordance with both the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (P.L. 91-646) and the Uniform Relocation Act Amendments of 1987 (P.L. 100-17).

There may be opportunities to work with others to combine the relocation funds with other funding sources to improve options for the residents. All funding source requirements would need to be met. If either the A2 or A3 options are advanced for project nomination, further investigation and coordination would be necessary to determine all potential funding opportunities that would be the best for all parties.
Appendix 8: Next Steps

In our recommendations for this study, we carry forward implementation options for both short-term improvements to safety and capacity (Improvement Options A2 and A4) and the long-term (Improvement Option B3a). Since all Improvements Options advanced for recommendation from this study will need additional time and effort, we propose that the City of Great Falls and Montana Department of Transportation collaboratively determine which path to proceed when selecting either short-term or long-term improvement options. As noted throughout the report, mitigation of impact must be balanced with anticipated benefit, while obtaining public sentiment and approval.

In the following we identify the next steps suggested to advance this academic exercise to initial project development phases.

- Determine level of funding available and possible funding partnerships
- Conduct general public and resource agency outreach to determine concerns and/or perceptions
- Any project, or group of projects, must gain support by those involved in the Great Falls Transportation Plan and satisfy, to the extent possible, the Missouri River Corridor Plan and Great Falls Growth Policy.
- Further investigate and document existing corridor conditions and constraints for design development.
- Investigate, plan for and implement an origin-destination study for the area.
- Investigate and determine feasibility of partnership opportunity between the Montana Department of Transportation (MDT), the City of Great Falls, and the community development organizations such as NeighborWorks, HUD/CDBG program.
- Either engage in a full corridor study or begin environmental review process for a project.

Any recommendations advanced for project nomination will need to satisfy much or all of the above criteria before a project can be forwarded.
Appendix 9: Maps

Map 1: Study corridor and area with noted features
Map 2: Study corridor and all Improvement Options
Map 3: Study corridor – Travelling the roadway and associated features
Map 4: Land Ownership & Features
Map 5: Traffic Modeling – Existing conditions, no improvements, 2025 Predicted
Map 6: Traffic Modeling – A2 Improvement Option, 2025 Predicted
Map 7: Traffic Modeling – A4 Improvement Option, 2025 Predicted
Map 8: Traffic Modeling – Bridge B3a Improvement Option, 2025 Predicted
Bibliography


3) Federal Highway Administration (FHWA) regulations for Statewide Transportation Planning and Programming:


5) Great Falls Transportation Plan-2009, 3-2 Travel Demand Forecasting & 3-1 Socioeconomic Trends, and Great Falls Transportation Plan – 2003 http://www.greatfallsmt.net/people_offices/planning/tranplan.htm.


7) FHWA 4(f) site: http://www.environment.fhwa.dot.gov/projdev/4fnetbenefits.asp


9) Centene Stadium.


18) City of Great Falls 2005-2010 Consolidated Plan  
http://www.greatfallsmt.net/people_offices/cdev/cdbg/consolidatedplan.pdf

19) Missouri River Corridor Plan – 2004  
http://www.greatfallsmt.net/people_offices/planning/mrucp.pdf

20) FHWA Highway/Rail Grade Crossing Technical Working Group (TWG), November 2002  

21) Contaminated rail bed information  

22) 49 CFR 1.48  

23) 23 U.S.C. 130(b)  

24) WB-67 Design  

Other Generally Utilized/Referenced Resources

25) Great Falls Growth Policy – 2005  
http://www.greatfallsmt.net/people_offices/planning/growthpol.htm

26) Great Falls Zoning Map  
http://www.greatfallsmt.net/city_codes/zonemap.pdf

27) 6(f) Sites by County  
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28) Housing in Montana, The White Paper  

29) Mobile Home Decommissioning & Replacement and Mobile Home Park Acquisition Strategies for Montana  

30) FEMA Floodplain Map  
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