Billings Bypass EIS
NCPD 56(55)CN 4199

Final Environmental Impact Statement

Billings Bypass

March 2014

NCPD 56 (55) Control Number 4199

VOLUME 1 OF 3: EXECUTIVE SUMMARY AND REPORT

MONTANA MDT DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation
Federal Highway Administration

FHWA-MT-EIS-12-01-F

Billings Bypass
NCPD 56(55)
Control Number 4199
Yellowstone County, Montana

Final Environmental Impact Statement

Submitted pursuant to 42 USC 4332(c) (and, where applicable, 499 USC 303, 23 CFR 774), Sections 2-3-104 and 75-1-201 MCA, 23 CFR 771 and Executive Orders 11990, 11988, and 12898.

By the

U.S. Department of Transportation
Federal Highway Administration

Montana Department of Transportation

Cooperating Agency

United States Army Corps of Engineers

3/18/2014	
Date Reviewed and Approved	Federal Highway Administration
3/18/2014	
Date Reviewed and Approved	Montana Department of Transportation

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ABSTRACT:

The Federal Highway Administration (FHWA) and the Montana Department of Transportation (MDT) have jointly prepared this environmental impact statement (EIS) to evaluate alternatives for a new principal arterial connecting Interstate 90 (I-90) east of Billings with Old Highway 312 (Old Hwy 312). The U.S. Army Corps of Engineers (COE) is a Cooperating Agency. The purpose of the proposed project is to improve access and connectivity between I-90 and Old Hwy 312 to improve mobility in the eastern area of Billings. This EIS addresses several transportation-related issues that stem from a lack of connectivity and a lack of mobility due to major physical barriers for north-south transportation connections in the eastern Billings area. Each of the three action alternatives considered for development begins at the Johnson Lane interchange with I-90 and uses a similar alignment north and west towards the Yellowstone River. North of the river, three corridors have been identified to complete the connection to Old Hwy 312. The Mary Street Option 1 Alternative would cross the river south of Five Mile Creek and

parallel the north side of Mary Street to its intersection with Main Street/Old Hwy 312. Secondary improvements (consisting of shoulder and slope improvements) to Five Mile Road would be necessary to meet traffic and safety design objectives, and would consist of reconstructing portions of Five Mile Road and building a new segment between Dover Road and Old Hwy 312. The Mary Street Option 2 Alternative would be similar, but would cross the Yellowstone River north of Five Mile Creek. The Five Mile Road Alternative would use the same river crossing as the Mary Street Option 2 Alternative, but would follow the existing Five Mile Road alignment north. A new road segment would extend north of Dover Road to connect with Old Hwy 312. Secondary improvements would primarily involve reconstruction of Mary Street and its connection to Five Mile Road. The Mary Street Option 2 Alternative has been identified as the preferred alternative in this Final EIS (FEIS).

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES A – I (Volume 2)

APPENDIX J (Volume 3)

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LIST OF ACRONYMS AND ABBREVIATIONS

- +/-   approximately
- AADT   Average Annual Daily Traffic
- AASHTO   American Association of State Highway and Transportation Officials
- ACM   Asbestos Containing Material
- ACS   American Community Survey
- ADT   Average Daily Traffic
- AICP   American Institute of Certified Planners
- APE   Area of Potential Effect
- ARPA   Archeological Resources Protection Act
- AST   Above-ground Storage Tank
- BBAC   Billings Bypass Advisory Committee
- BBWA   Billings Bench Water Association
- BCM   Billings and Central Montana Railroad
- BGEPA   Bald and Golden Eagle Protection Act
- BLM   U.S. Bureau of Land Management
- BMP   Best Management Practice
- BRR   Biological Resources Report
- BTU   British thermal unit
- CAA   Clean Air Act
- CDP   Census Designated Place
- CECRA   Comprehensive Environmental Cleanup and Responsibility Act
- CEI   Cost-Effectiveness Index
- CEIC   Census and Economic Information Center
- CEQ   Council on Environmental Quality
- CERCLA   Comprehensive Environmental Response, Compensation, and Liability Act
- CFR   Code of Federal Regulations
- CIP   Capital Improvement Program
- CMP   Comprehensive Management Plan
- CMP   Corrugated Metal Pipe
- CO   Carbon monoxide
- COE   U.S. Army Corps of Engineers
- CS   Cross section
- CSS   Context Sensitive Solutions
- CWA   Clean Water Act
- dB   Decibel
- dBA   A-weighted decibel
- DBA   Downtown Billings Association
- DBP   Downtown Billings Partnership
- DEIS   Draft Environmental Impact Statement
- DOE   U.S. Department of Energy
- DOI   U.S. Department of the Interior
- EA   Environmental Assessment
- EEC   Environmental Education Center

- EIS Environmental Impact Statement
- EJ Environmental Justice
- EO Executive Order
- EPA U.S. Environmental Protection Agency
- ESA Endangered Species Act
- FAC Facultative
- FACU Facultative-Upland
- FACW Facultative Wetland
- FEIS Final Environmental Impact Statement
- FEMA Federal Emergency Management Agency
- FHWA Federal Highway Administration
- FIRM Flood Insurance Rate Maps
- FONSI Finding of No Significant Impact
- FPPA Farmland Protection Policy Act
- FR Federal Register
- FTA Federal Transit Administration
- FY Fiscal Year
- GIS Geographic Information Systems
- GHG Greenhouse Gas
- GLO General Land Office
- GMP General Management Plan
- GPS Global Positioning System
- GWIC Ground Water Information Center
- HC Highway Commercial
- HEI Health Effects Institute
- I-90 Interstate 90
- I-94 Interstate 94
- IPM Integrated Pest Management
- IRIS Integrated Risk Information System
- ISA Initial Site Assessment
- KOP Key Observation Point
- LEP Limited English Proficient
- Leq(h) dBA hourly equivalent noise level
- LOS Level of Service
- LPP Land Protection Plan
- LRFD Lockwood Rural Fire Department District
- LRTP Long-Range Transportation Plan
- LU Landscape Unit
- LUST Leaking Underground Storage Tank
- LWCF Land and Water Conservation Fund
- MAAQS Montana Ambient Air Quality Standards
- MBTA Migratory Bird Treaty Act
- MCA Montana Code Annotated
- MDA Montana Department of Agriculture
- MDH Montana Department of Highways

- MDEQ Montana Department of Environmental Quality
- MDLI Montana Department of Labor and Industry
- MDNRC Montana Department of Natural Resources and Conservation
- MDT Montana Department of Transportation
- MEPA Montana Environmental Policy Act
- MET Metropolitan Transit System
- MHI Median Household Income
- MMtCO2e Million metric tons of carbon dioxide equivalent
- MOU Memorandum of Understanding
- MP Milepost
- MPDES Montana Pollutant Discharge Elimination System
- mph miles per hour
- MPO Metropolitan Planning Organization
- MRL Montana Rail Link
- MS4 Municipal Storm Sewer System
- MSA Metropolitan Statistical Area
- MSATs Mobile Source Air Toxics
- MST MET Special Transit
- MT Montana
- MT 3 Montana State Highway 3
- MTFWP Montana Fish, Wildlife and Parks
- MTNHP Montana Natural Heritage Program
- MTP Metropolitan Transportation Plan
- MTSHPO Montana State Historic Preservation Office
- MUTCD Manual on Uniform Traffic Control Devices
- MVM Million Vehicle Miles
- NAAQS National Ambient Air Quality Standards
- NAC Noise Abatement Criteria
- NCDP National Corridor Planning and Development Program
- NCHRP National Cooperative Highway Research Program
- NEPA National Environmental Policy Act
- NFRAP No Further Remedial Action Planned
- NHPA National Historic Preservation Act
- NHS National Highway System
- NOI Notice of Intent
- NPDES National Pollutant Discharge Elimination System
- NPOMA National Parks Omnibus Management Act
- NPS National Park Service
- NRCS Natural Resources Conservation Service (U.S. Department of Agriculture)
- NRHP National Register of Historic Places
- O_3 ozone
- OBL Obligate
- Old Hwy 312 Old Highway 312
- OSHA Occupational Safety and Health Administration
- OTR Ozone Transport Region

- PCBs Polychlorinated Biphenyls
- PCC Policy Coordinating Committee
- PE Professional Engineer
- PEPC Planning, Environment, and Public Comment
- PHT Peak Hour Traffic
- PL Public Law
- PM Particulate Matter
- ppm parts per million
- QQLL Quarter of a Quarter Latitude/Longitude
- R&RP Research and Resource Planning
- RACM Regulated Asbestos Containing Material
- RC&D Resource Conservation and Development
- RCP Reinforced Concrete Pipe
- RCRA Resource Conservation and Recovery Act
- RMP Resource Management Plan
- ROD Record of Decision
- ROW Right-of-Way
- RP Reference Milepost
- RTE Rare, Threatened, and Endangered Species
- RTEP Regional Transmission Expansion Plan
- RTO Regional Transmission Operator
- S Secondary (as in Secondary Highway)
- SAFETEA-LU Safe, Accountable, Flexible & Efficient Transportation Equity Act - A Legacy for Users
- SHPO State Historical Preservation Officer
- SIP State Implementation Plan
- SPA Stream Protection Act
- SPCC Spill Prevention, Control, and Countermeasure
- SQG Small Quantity Generator
- STIP State Transportation Improvement Plan
- SWMP Stormwater Management Program
- SWPPP Stormwater Pollution Prevention Plan
- TCP Transportation Control Plan
- THPO Tribal Historic Preservation Officer
- TIP Transportation Improvement Program
- TMDL Total Maximum Daily Load
- TNM Traffic Noise Model
- TSP Total Suspended Particulates
- UPA Urban Planning Area
- US 87 United States Highway 87
- USC U.S. Code
- USDA U.S. Department of Agriculture
- USDOT U.S. Department of Transportation
- USFWS U.S. Fish and Wildlife Service
- USGS U.S. Geological Survey

- UST Underground Storage Tank
- UZJ Unified Zoning Jurisdiction
- VFD Volunteer Fire Department
- VHT Vehicle Hours Traveled
- VMT Vehicle Miles Traveled
- VOC Volatile Organic Compounds
- WQA Water Quality Act
- YRPA Yellowstone River Parks Association
- YVEC Yellowstone Valley Electric Cooperative

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EXECUTIVE SUMMARY

WHAT IS THE BILLINGS BYPASS PROJECT?

The Billings Bypass Project proposes to construct a new principal arterial connecting Interstate 90 (I-90) east of Billings with Old Highway 312 (Old Hwy 312). The study area includes an approximately 18-square-mile area between these two corridors. The proposed project is located in Yellowstone County in the northeastern portion of the Billings urban area. The Billings Heights neighborhood and the unincorporated community of Lockwood are both located partially within the study area, as illustrated in **Figure ES.1**. The Billings Heights neighborhood is located within the city limits of Billings and contains a combination of residential, agricultural, and commercial land uses. Lockwood has a large residential district, but the portion of Lockwood within the study area is predominantly agricultural and industrial.

WHO IS LEADING THE PROJECT?

The Federal Highway Administration (FHWA) and the Montana Department of Transportation (MDT) are the lead agencies for compliance with the National Environmental Policy Act of 1969, as amended (NEPA), the Montana Environmental Policy Act (MEPA), the Council on Environmental Quality NEPA implementing regulations (40 Code of Federal Regulations [CFR] 1500-1508), and FHWA NEPA implementing regulations (23 CFR 771).

WHAT IS THE PURPOSE OF THE BILLINGS BYPASS PROJECT?

The purpose of the proposed project is to improve access and connectivity between I-90 and Old Hwy 312 to improve mobility in the eastern area of Billings.

NEPA and EIS

The National Environmental Policy Act (NEPA) requires that environmental impacts be considered in federal decisions, including the use of federal funds.

NEPA requires an environmental impact statement (EIS) be prepared for major projects that have the potential for adverse impacts to the community and environment.

Key Project Terms

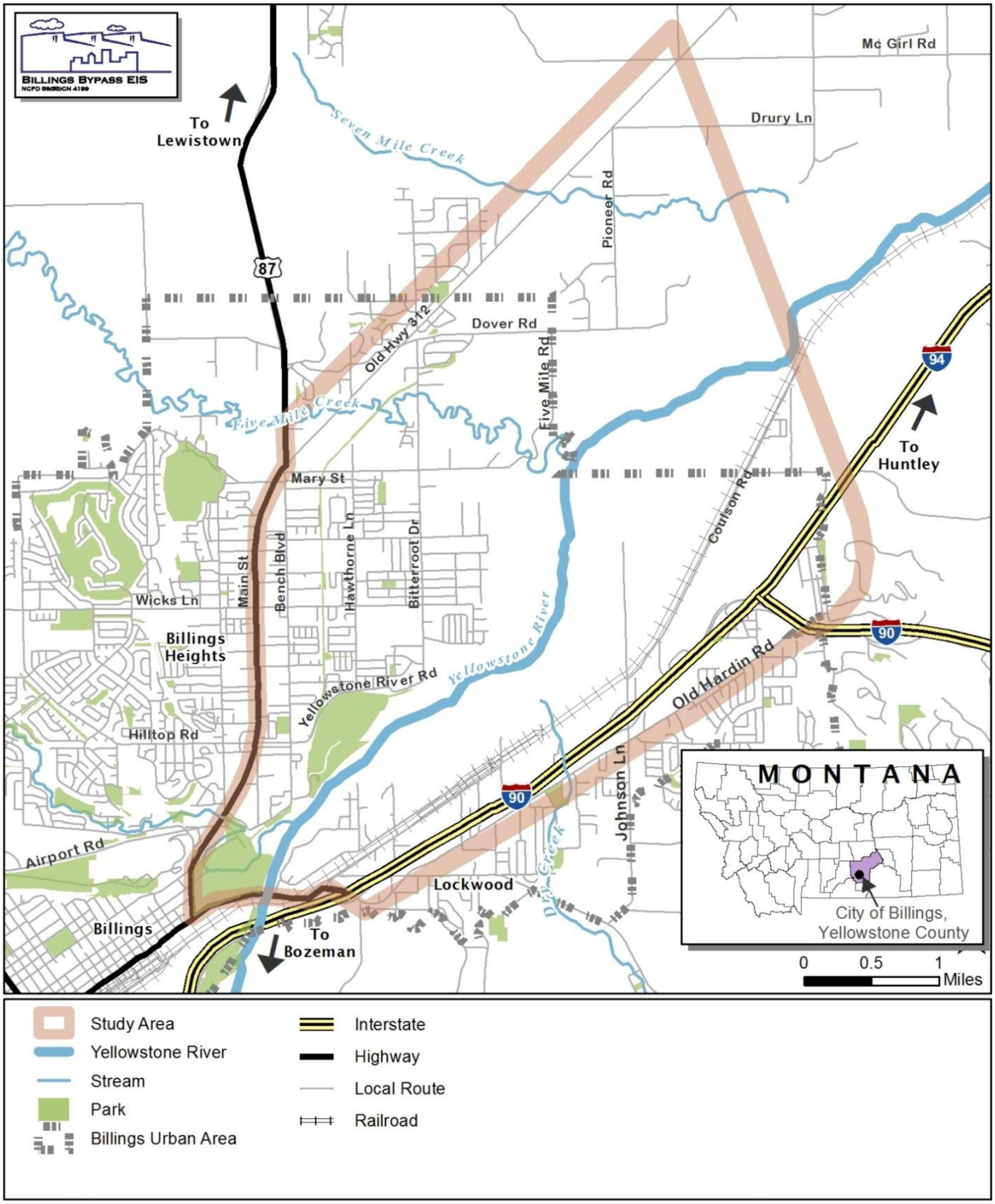
A **principal arterial** road delivers traffic to highways. Main Street and Bench Boulevard are examples of principal arterial roads in the Billings area.

The **study area** is a defined geographic area that could potentially be impacted by the project.

A **corridor** is a strip of land between two endpoints within which a roadway is placed and conditions are evaluated.

Purpose is a statement of goals and objectives that MDT intends to fulfill by taking action.

Figure ES.1 Study Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/13/2013

WHY IS THE PROJECT NEEDED?

The project is needed to:

- Reduce physical barrier impacts to the transportation system.
  - The rimrocks, the Yellowstone River and the railroad, and I-90 create barriers for north-south connections in the Billings area, which affect local traffic and regional traffic.
  - The challenging topography in the Billings area, coupled with limited connections across the river, the railroad tracks, and the interstate, results in both local and regional north-south traffic being funneled through the US 87/Main Street corridor in the urban area of Billings.

- Improve connectivity between Lockwood and Billings.
  - The segment of US 87 that crosses I-90 and the Yellowstone River serves as the only connection between Billings and Lockwood.

- Improve mobility to and from Billings Heights.
  - Traffic issues are a key concern of Billings Heights residents, particularly with respect to travel to and from the Billings Heights neighborhood.
  - Limited mobility to and from Billings Heights is also an issue that affects emergency response.

- Improve truck/commercial vehicle access to and through Billings.
  - Improving the truck and commercial vehicle access to state highways and major facilities serving the Billings area is a need identified in the *Billings Urban Area Long-Range Transportation Plan* (2009 Update).

Key Project Terms

Purpose

Purpose is a statement of goals and objectives that MDT intends to fulfill by taking action.

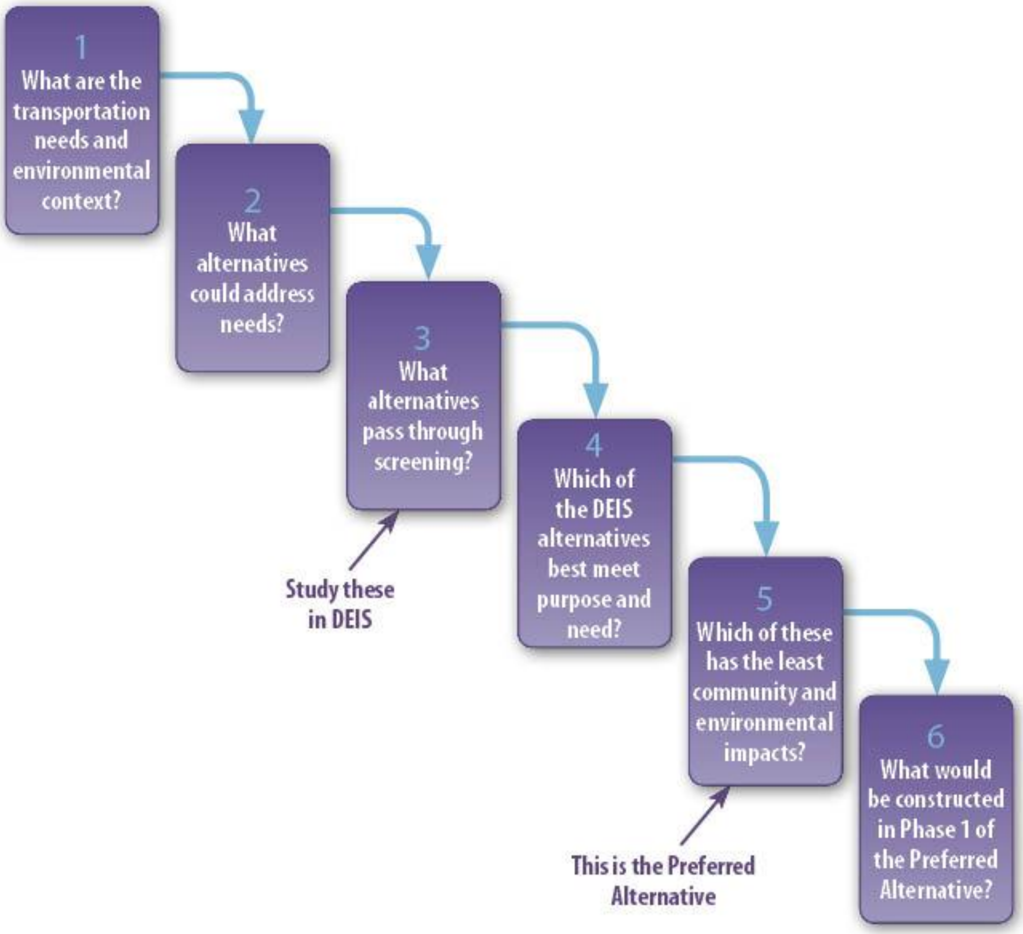
Need

Needs are existing conditions that need to be changed, problems that need to be remedied, and policies or mandates that need to be implemented. They explain why MDT is proposing this action at this time.

HOW WAS THE PROJECT DEVELOPED?

Figure ES.2 graphically portrays the major steps in developing the Billings Bypass project and its evaluation through the NEPA process. Details are provided in subsequent chapters of the FEIS.

Figure ES.2 Project Development and Evaluation Process



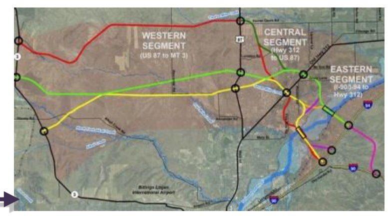
HOW DID WE GET HERE?

2001 *Billings North Bypass Feasibility Study* investigated a bypass in the Billings area using a 5-mile-wide corridor north of Billings to assess the feasibility of a bypass route connecting the I-90/I-94 interchange area east of Billings with MT 3 west of Billings.

2003 FHWA issued the Notice of Intent (NOI) that MDT would prepare an EIS on a proposal to construct a bypass route north of Billings in Yellowstone County, Montana, which would connect between I-90 and MT 3.

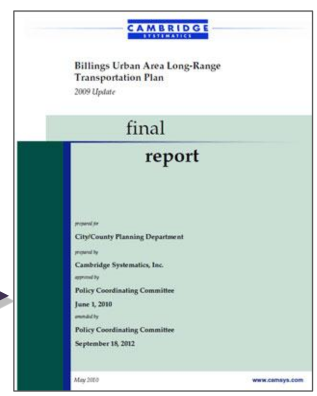
2004 Scoping process began. Local, state, and federal agencies and the public were provided with opportunities to comment on the purpose and need and voice issues and concerns related to the proposed project.

2005 The *Billings Urban Area Long-Range Transportation Plan Update*, which is the fiscally constrained Metropolitan Transportation Plan (MTP), included the Billings Bypass as a "regionally significant project" in the process of being implemented.



2006 2007 2008 The project team developed preliminary alternatives and provided agencies and the public with opportunities for input.

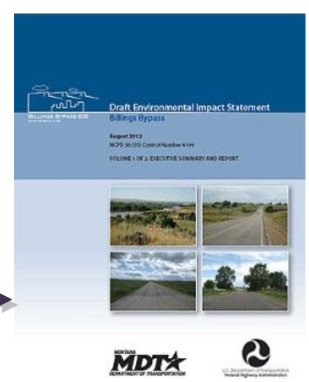
2008 FHWA released guidance requiring that all project phases planned within the life of the MTP must be included in the "fiscally constrained" *Billings Urban Area Long-Range Transportation Plan*. As proposed, the project did not have sufficient funding to be included in the plan.



2009 The local Policy Coordinating Committee (PCC) voted to re-scope the Billings Bypass Project to focus only on the eastern segment between I-90 and Old Hwy 312.

2010 FHWA reissued the NOI. The purpose and need statements were revised based on input from agencies and the public.

2011 2012 2013 2014 The agencies completed the Draft EIS (DEIS) and released it for public review and comment in August 2012. The project was subsequently modified to include provision for phased implementation, and this Final EIS was prepared.



WHAT ALTERNATIVES ARE CONSIDERED IN THIS EIS?

Three build alternatives and a No Build Alternative are analyzed in this Final EIS (FEIS). Each of the build alternatives begins at the Johnson Lane Interchange with I-90 and uses approximately the same alignment north across the railroad to one of two potential locations for crossing the Yellowstone River. North of the river, three corridors have been identified to complete the connection to Old Hwy 312:

- Mary Street Option 1 Alternative
- Mary Street Option 2 Alternative
- Five Mile Road Alternative

Each build alternative consists of a "primary" corridor, which is the new alternative alignment, and a "secondary" corridor, which is an existing roadway that would be improved to accommodate traffic generated by the project. **Figure ES.3** shows the three build alternatives.

WHAT ARE THE BENEFITS OF THE PROJECT?

In general, the Billings Bypass Project would result in decreased congestion and improved mobility, specifically as follows.

- The project would address the lack of connectivity resulting from four major physical barriers located within eastern Billings that impede movement in the study area, especially from Lockwood to Billings Heights.
- The project would help alleviate the regional north-south traffic that is currently funneled through the US 87/Main Street corridor in the urban area of Billings, thus reducing congestion in downtown Billings and reducing the amount of commercial truck traffic through the city.
- The shift in vehicles from existing roadways to the bypass would alleviate congestion and decrease travel times along existing corridors.
- Vehicle hours traveled (VHT) would decrease 1,300 hours under the Preferred Alternative compared to the No Build Alternative as vehicles use the proposed bypass to circumvent congestion and avoid longer travel times.
- Vehicle miles traveled (VMT) would decrease along most principal roadway corridors within the study area, resulting in decreased congestion and improved roadway and intersection performance. A decrease of 10% or more is expected along six roadways:
  - Old Hwy 312 (US 87/Main Street to Five Mile Road).
  - Mary Street (Bench Boulevard to Five Mile Road).
  - Main Street (1st Avenue to US 87/Old Hwy 312).
  - Bench Boulevard (Main Street/6th Avenue to Mary Street).

Key Project Terms

Connectivity

Connectivity relates to both the number of intersections along a segment of street and how an entire area is connected by the transportation system.

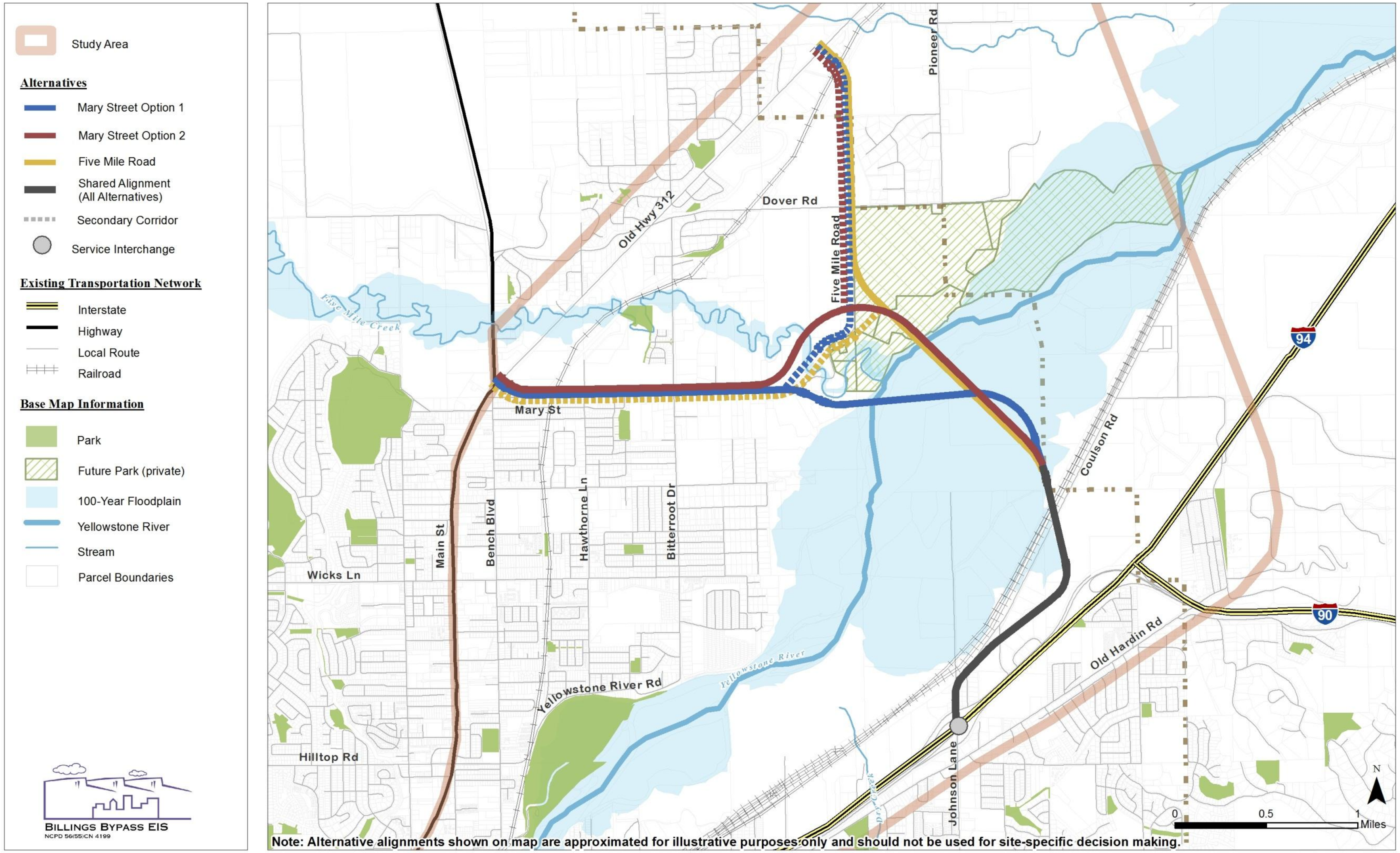
Vehicle Hours Traveled

The total number of vehicle hours spent traveling on the roadway within a specific geographic area over a given period of time.

Vehicle Miles Traveled

The total number of vehicle miles traveled within a specific geographic area over a given period of time.

Figure ES.3 Build Alternatives



Sources: DOWL HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010
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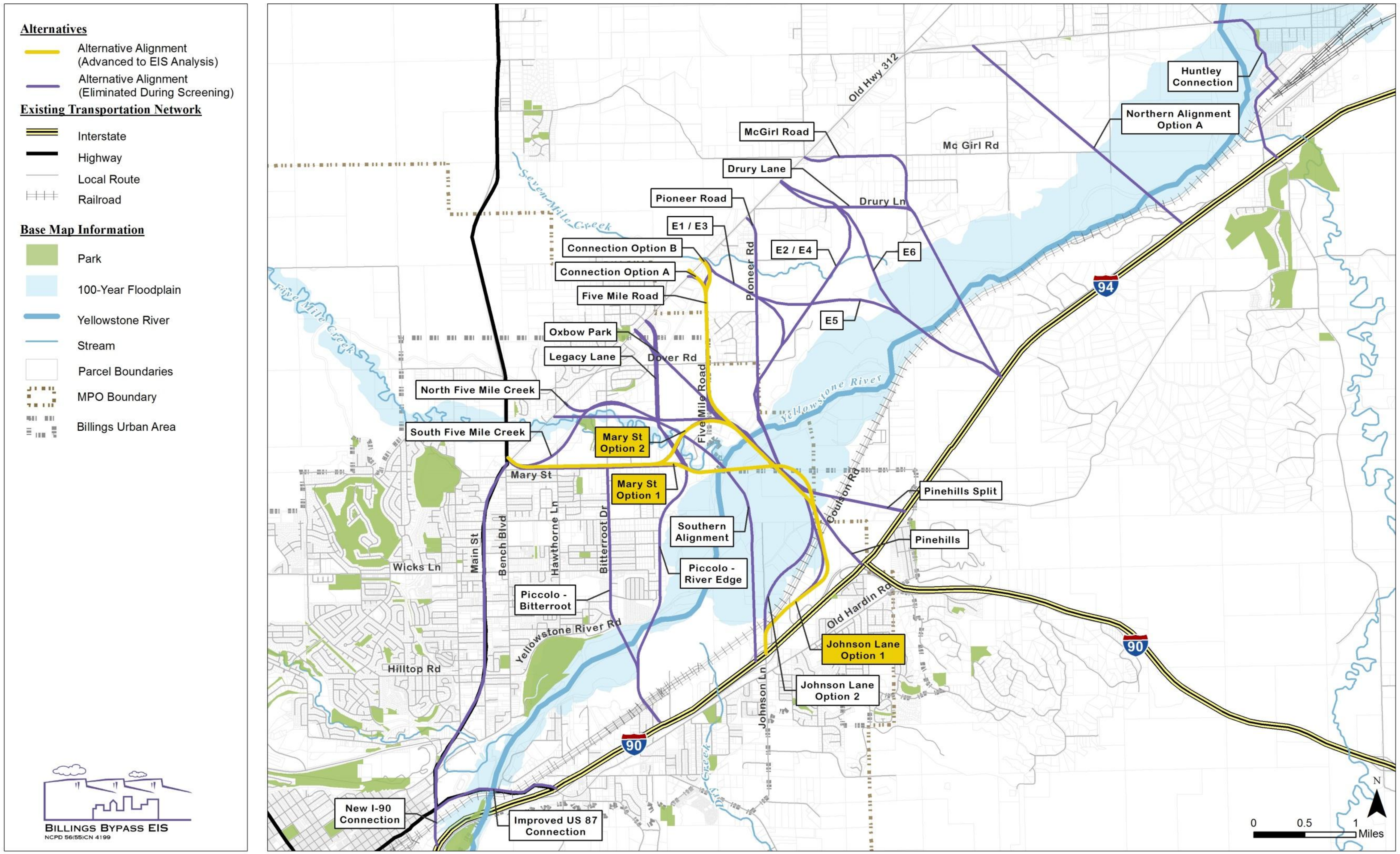
Date Plotted: 3/12/2014

Figure ES.4 All Alternatives Considered Under Re-scoped Project



Sources: DOWL HKM August 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/16/2013

- US 87 (1^{st} Avenue to Lockwood Interchange).
- I-94 (Pinehills Interchange to Huntley Interchange).

WHAT WOULD HAPPEN IF THIS PROJECT WERE NOT BUILT?

If this project were not built, increasing transportation demands would result in increased congestion and decreased mobility as the Billings area continues to grow.

- Traffic would continue to be funneled through the US 87/Main Street corridor in the urban area of Billings, including regional commercial truck traffic.
- The segment of US 87 that crosses I-90 and the Yellowstone River would continue to serve as the only connection between Billings and Lockwood, affecting mobility in the area.
- Travel to and from the Billings Heights neighborhood would remain a main traffic concern of residents of that area. Emergency response in Billings Heights would continue to be hampered by limited mobility.

WHAT OTHER PROJECTS ARE PROPOSED IN THIS AREA?

The *Billings Area I-90 Corridor Planning Study* published in March 2012 recommends near- and long-term improvements to the I-90 corridor from the Laurel Interchange (southwest of Billings) to the Pinehills Interchange (where I-90 and I-94 connect), including:

- Interstate widening and interchange reconstruction to address capacity needs and traffic operations within the 2035 planning horizon.
- Bridge reconstruction.
- Safety improvements to reduce conflicts at interchange ramps.
- Geometric improvements to bring the interstate into compliance with current MDT design standards (MDT n.d.).

MDT is currently reconstructing Bench Boulevard from Lincoln Lane to Hilltop Road. The road is being widened to two driving lanes and a center turn lane, with parking and sidewalks available along most of the alignment. Construction was primarily complete in 2013 (MDT n.d.). A second phase of the project will involve the reconstruction of the intersection of Hwy 312 and Hwy 87, and is anticipated in 2016.

MDT has identified safety improvements for intersections along Old Hwy 312, including the intersection of Pioneer Road and Drury Lane in the northeast section of the study area. The purpose of the improvements is to reduce the number and severity of crashes on Old Hwy 312. Design is nearly complete, and MDT is in the process of obtaining environmental permits (MDT n.d.).

Big Sky Economic Development Authority, a public agency evolved from the Montana TradePort Authority, is preparing a master plan to develop the Gateway Expansion area for hospitality and entertainment uses adjacent to the southwest corner of the study area. The area has been identified as providing a major opportunity for full-scale redevelopment. The master plan is expected to address recommendations for easing traffic congestion at 6^{th} and Main Streets, and may include a grade-separated overpass to ease traffic congestion (City of Billings 2009; Billings Gazette 2012). The plan will include the transportation corridor from the I-90/Lockwood Interchange to the Airport Road/Main Street intersection and the land along its corridor (City of Billings 2011a).

WHAT IS THE PREFERRED ALTERNATIVE AND WHY DID WE CHOOSE IT?

Mary Street Option 2 Alternative is recommended as the Preferred Alternative based on its ability to meet the purpose and need (as defined in Chapter 1) and a number of other factors. Detail on the rationale for selecting the Preferred Alternative is provided in Chapter 2. A complete description of the social, economic, and environmental impacts associated with the alternatives is found in Chapter 4, as well as a detailed comparison of these alternatives. Based on a consideration of the range of impacts and benefits associated with the build alternatives, the lead agencies determined that the Mary Street Option 2 Alternative would provide the best, most cost-effective long-term solution to meet the project's purpose and need while minimizing impacts to the surrounding community.

Performance Compared to the Purpose and Need

The first step in selecting a Preferred Alternative was to compare the performance of each alternative for the purpose and need. The No Build Alternative does not meet the purpose and need for this project, because it would not reduce physical barriers to movement, improve connectivity between Lockwood and Billings, or improve mobility to and from Billings Heights. Therefore, it was not selected as the Preferred Alternative.

Results of the FEIS analysis demonstrate that the Mary Street alternatives perform better than the Five Mile Road Alternative (see **Table ES.1**). Thus, in terms of the purpose and need, either of the Mary Street alternatives would be preferable to the Five Mile Road Alternative.

Key Project Terms

Preferred Alternative

The alternative identified by the lead agencies that would provide the best, most cost-effective long-term solution to meet the project's purpose and need while minimizing impacts to the surrounding community.

No Build Alternative

Generally, this is a "do nothing" option that does not involve construction of any of the project elements. It is always included in NEPA studies as a benchmark against which the impacts of other alternatives can be compared.

Table ES.1 Performance Improvements, Build Alternatives (2035)

PERFORMANCE CATEGORY/ PROJECT NEED	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD	SIGNIFICANT DIFFERENCE?
Reduced physical barrier impacts on traffic operations	15,900 Average Daily Traffic (ADT)*	15,600 ADT*	13,000 ADT*	Mary Street Options outperform Five Mile Road
Connectivity improvements between Lockwood and Billings	30% reduction in ADT**	29% reduction in ADT**	23% reduction in ADT**	Mary Street Options outperform Five Mile Road
Mobility improvements	12% reduction in accidents in study area	Same as Mary Street Option 1	9% reduction in accidents in study area	Mary Street Options outperform Five Mile Road
	Reduction from 11 to 4 intersections operating at Level of Service (LOS) E/F	Same as Mary Street Option 1	Reduction from 11 to 5 intersections operating at LOS E/F	Mary Street Options outperform Five Mile Road
Travel time between Old Hwy 312/US87 and I-90 at Johnson Lane	7.4 minutes travel time	7.6 minutes travel time	9.9 minutes travel time	Mary Street Options outperform Five Mile Road

*Higher numbers indicate fewer physical barriers. **High reduction in ADT is beneficial.

Performance Relative to Impacts

After consideration of performance compared to the purpose and need, the next analysis in determining the Preferred Alternative was to consider environmental impacts associated with the build alternatives, with the focus on those impacts that indicate which Mary Street option is better. **Table ES.2** shows the overall impacts associated with each of the build alternatives, omitting those resources where differences in impacts were minor. As discussed in Chapter 4, there is no substantial difference among all three build alternatives regarding impacts to air quality; hazardous materials; wild and scenic rivers; floodplains; vegetation; and wildlife (including threatened and endangered species); land use (including local plans, social conditions, and environmental justice); ROW and utilities; cultural resources; visual resources and noise; farmlands; irrigation; and energy. Thus these resources are not presented in **Table ES.2**.

The focus of the comparisons in **Table ES.2** was between the Mary Street Option 1 and Mary Street Option 2 alternatives, because those alternatives better met the purpose and need of the project than the Five Mile Road Alternative. The Mary Street Option 2 Alternative is preferred over the Mary Street Option 1 Alternative for the following reasons:

- Lower total cost ($111.1 million compared to $122.7 million, respectively).
- Two fewer residential properties relocated (13 compared to 15, respectively).
- Fewer total impacts to water resources (no crossing of river side channel and fewer riparian impacts despite a new crossing of Five Mile Creek).
- Fewer impacts to wetlands (4.8 acres compared to 5.7 acres, respectively).

Table ES.2 Comparison of Differentiating Impacts

RESOURCE	EFFECT TYPE	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD	BEST MARY STREET ALTERNATIVE
Right-of-Way	Residential Structures Impacted	15	13	11	Option 2
Wetlands	Wetlands Impacted	5.71 acres	4.84 acres	5.02 acres	Option 2
Water Crossing	Yellowstone River	185 feet across side channel	No side channel crossing	No side channel crossing	Option 2
Vegetation	Riparian Impacts	11.9 acres	6.0 acres	5.9 acres	Option 2
Economic	Total Cost	$122.7 million	$111.1 million	$111.6 million	Option 2

The results in **Table ES.2** were also reviewed to see if Five Mile Road had lower impacts than Mary Street Option 1 which might affect the recommendation on Preferred Alternative. Although Five Mile Road has 11 residential relocations compared to 13 for Mary Street Option 2, the lead agencies determined that the advantage the Mary Street Option 2 Alternative has in improved traffic operations outweighed its two additional relocations. Thus, Mary Street Option 2 is recommended as the Preferred Alternative for the Billings Bypass.

WHAT OTHER ALTERNATIVES DID WE CONSIDER?

A wide range of alternatives was considered during the alternatives development process. All of the alternatives considered during the alternatives screening process are depicted in the **Figure ES.4** on page E-8. Those alternatives that were eliminated either did not meet the project's purpose and need, and/or did not achieve important criteria, or would result in substantial impacts or costs. A detailed explanation for each alternative eliminated is included in Chapter 2 of this FEIS.

HOW WOULD THE PROJECT AFFECT ME AND MY COMMUNITY?

The construction and operation of the Preferred Alternative would physically impact the following structures, and could potentially include their relocation:

- 13 residential structures.
- 8 structures would experience potential access issues.
- 7 outbuildings.
- 1 commercial structure.
- 2 major irrigation ditches and several minor irrigation ditches.
- 1 center-point pivot system.
- 1 drainage ditch.

In addition, the following impacts would occur:

- Acquisition of 254 acres of right-of-way.
- Noise impacts above selected state and federal thresholds to 8 residences (4 residences at Johnson Lane would experience noise impacts that equal or exceed the "approach noise impact criterion," and 4 residences at Mary Street would "substantially exceed" existing ambient noise levels).

HOW WOULD THE NATURAL ENVIRONMENT BE AFFECTED?

The natural environment would be affected in the following ways under the Preferred Alternative:

- Loss of wildlife habitat, particularly along the Yellowstone River, as a result of bridge construction.
- Direct mortality to small animal species, and minor impacts to aquatic species.
- Impacts to the black-billed cuckoo, great blue heron, veery, hoary bat, and smaller, less mobile species during construction.
- Potential for impacts to a bald eagle roosting site.
- Impacts to 4.8 acres of wetlands and 6.0 acres of riparian vegetation.
- 55.6 acres of impervious surface would be added to the study area, which can increase runoff.

WHAT ARE THE OVERALL IMPACTS?

Table ES.3 shows the overall impacts associated with each of the build alternatives, focusing on those especially relevant to environmental approvals and permits, and to determining a Preferred Alternative. The Mary Street Option 2 Alternative is the Preferred Alternative. Chapter 4 discusses impacts for all social, economic, and environmental factors that were evaluated.

Key Project Term

Impact

To understand a project's potential benefit or harm to the environment, NEPA requires an assessment of potential impacts to the environment. Different types of impacts and different impact levels (i.e., significant or not significant) must be examined in this evaluation. Impacts can be negative or beneficial.

Table ES.3 Summary of Impacts

RESOURCE	EFFECT TYPE	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD
Transport-ation	Change in Vehicle Miles Traveled (VMT) in 2035 from No Build in study area	Increase of 3,600 VMT	Increase of 3,480 VMT	Increase of 7,450 VMT
	Change in Vehicle Hours Traveled (VHT) in 2035 from No Build in study area	Decrease of 1,315 VHT	Decrease of 1,300 VHT	Decrease of 1,080 VHT
	Level of Service (LOS) in 2035	All movements at intersections along the Bypass and Secondary Corridor operate at LOS C or better. Traffic operations at other select study area intersections are most improved under the Mary Street options.		
	Accessibility under Alternative	Lockwood to Billings/Billings Heights: Improved Lockwood to Mary Street and north along US 87: Improved	Same as Mary Street Option 1	Lockwood to Billings/Billings Heights: Improved Lockwood to Mary Street and north along US 87: Improved To areas north along Old Hwy 312: Improved
	Accessibility During Construction	Temporary impacts to: I-90/Johnson Lane Interchange, Coulson Road, Five Mile Road, Mary Street, US 87/Old Hwy 312/Main Street intersection.		
	Projected Crashes along Bypass and Secondary Corridor	19 crashes/year	18 crashes/year	12 crashes/year
	Pedestrian and Bicycle Safety	Provides designated crosswalks at signalized intersections and 8-foot-wide shoulders for pedestrian and bicycle safety.		Same as Mary Street Option 1 and Mary Street Option 2, plus: • Separated sidewalk and designated bike lane along improved Mary Street.
	Bike Route Features and Connections	Added/changed -- Increased features and connections: • Mary Street/Main Street connection improved to connect with arterial bike route. • 8-foot shoulder on Johnson Lane and bridge structure to connect with Five Mile Road. • 8-foot shoulder along Five Mile Road as informal bike travel lane. • Possible direct connection to Seven Mile Creek off-street paths from Five Mile Road. Maintained connections: • Secondary bike routes.		Same as Mary Street Option 1 and Mary Street Option 2, plus: • 4-foot-wide bike lane along improved Mary Street.

RESOURCE	EFFECT TYPE	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD
		• Kiwanis Trail and arterial bike routes (Main Street, Johnson Lane). Removed features: • Existing secondary bicycle route on Coulson Road would be interrupted for 1,000 ft, sending users on indirect route.		
Right-of-Way	Land Converted to Roadway Right-of-Way	261 acres	254 acres	221 acres
	Residential Structures Impacted	15	13	11
	Commercial Structures Impacted	1	1	1
Visual	Change in Visual Quality	Decrease of visual quality overall, but increase at north end of Firth Street near Johnson Lane. Larger decreases in quality at subdivision near Dover and Pioneer Roads, and at intersection of Five Mile Road and Old Hwy 312.	Similar to Mary Street Option 1, except with substantial decrease for viewers toward the road at the Yellowstone River crossing.	Similar to Mary Street Option 2, except more loss in visual quality at subdivision near Dover and Pioneer roads.
Wetlands	Wetlands Impacted	5.71 acres	4.84 acres	5.02 acres
	U.S. Army Corps of Engineers Jurisdictional Wetlands Impacted	4.40 acres	3.68 acres	3.67 acres
Water Quality	Increase in impervious surface	56.0 acres additional impervious surface	55.6 acres additional impervious surface	46.8 acres additional impervious surface
Vegetation	Riparian Impacts	11.9 acres	6.0 acres	5.9 acres
	Pond Impacts	0.1 acre	0 acre	2.2 acres
	Cliff Impacts	0.1 acre	0.1 acre	0 acre
	Sage Steppe Impacts	0.01 acre	0 acre	0 acre
Noise	Receptors That Are Equal to or Exceed "Approach" Impact Criterion	4 residences	4 residences	3 residences
	Receptors That "Substantially Exceed" Existing Ambient Noise Level	3 residences	4 residences	3 residences

RESOURCE	EFFECT TYPE	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD
	Residences that would be impacted but would be relocated (and are not counted above)	2 residences	2 residences	2 residences

ARE THERE IMPACTS TO PROPERTIES PROTECTED BY SECTION 4(f)?

Yes, but they are minimal. Section 4(f) is a regulation that protects parks, recreation areas, wildlife refuges, and cultural resources from impacts from transportation projects. FHWA has found that the Billings Bypass would have a *de minimis* use for 4(f) resources. A *de minimis* finding may be made for historic sites when no historic property is affected by the project or when the project will have "no adverse effect" on the historic property in question. For parks, recreation areas, and wildlife and waterfowl refuges, a finding of *de minimis* use may be made when impacts will not adversely affect the activities, features, and attributes that qualify the resource for protection under Section 4(f). For the analysis related to parks and recreational resources, see Sections 3.3.2.2 and 4.3.2.3 of the FEIS, and for cultural resources, see Sections 3.3.6.6 and 4.3.6.3 of the FEIS.

ARE THERE CUMULATIVE EFFECTS OF THE PROJECT?

Yes. The improved mobility provided by the Preferred Alternative and the other planned transportation improvements in the study area would likely expedite already planned growth, including subdivisions and retail. This improved mobility would likely not induce growth beyond what has been identified in local plans. Property values could increase for nearby properties, which have limited access to activity centers, but which would have easier access to these places with the Preferred Alternative. Because the City of Billings has an Urban Planning Area and outlined growth policies, it is not anticipated that these impacts would result in significant effects to the Billings community. The net impact to safety associated with the new roadway coupled with the planned development would be cumulatively insignificant.

Expediting planned growth and enhancing access to developable land may provide a positive economic impact to the study area. The Preferred Alternative would also provide enhanced access to existing employment centers. Enhanced access to community facilities throughout the study area would occur, including enhanced access to parks and recreation resources. In combination with other planned transportation improvement projects, the Preferred Alternative may promote more concentrated development near the roadways, thus reducing the need for extensive infrastructure systems and reducing less efficient development patterns—a beneficial effect.

Key Project Term

Cumulative Effects

The combined effects of all past, present, and reasonably foreseeable projects (not just the current project and not just roadway projects) on a given resource (e.g., wetlands), regardless of who has built the project (includes developers, localities, etc., not just state departments of transportation or federal agencies).

WHAT MITIGATION IS PROPOSED?

Proposed mitigation for **traffic operations and accessibility**:

- Develop traffic management plans during final design in accordance with the Manual on Uniform Traffic Control Devices.
- The traffic management plan would ensure maintenance of access to local businesses/residences.

Proposed mitigation for **safety**:

- No mitigation required.

Proposed mitigation for **pedestrian and bicycle facility safety**:

- Develop traffic management plans during final design in accordance with the Manual on Uniform Traffic Control Devices. The traffic management plan would minimize access restrictions to existing bike routes and trails and provide safe and travel-efficient detours with appropriate signage to the extent practicable.

Proposed mitigation for **land use**:

- No mitigation is required or proposed for any of the alternatives.

Proposed mitigation for **parks and recreation**:

- Coordinate with the City of Billings throughout final design to ensure that the final project provides for safe and effective pedestrian and bicycle movement across the project corridor at the Kiwanis Trail crossing.
- Include appropriate signage and/or public notifications regarding temporary trail closures.
- If the Five Mile Creek Alternative is constructed, MDT would accommodate a new pedestrian crossing at the intersection of the existing Kiwanis Trail with Mary Street.
- Coordinate with park planners regarding impacts to the planned John H. Dover Memorial Park during final design.
- Design of bridge across Five Mile Creek would consider accommodating the potential trail crossing under the bridge.

Proposed mitigation for **socioeconomics**:

- Use existing roadway alignments and vacant lands.
- Design proposed intersection improvements in coordination with the City of Billings.
- Coordinate with emergency services and school districts to minimize disruption during construction.

Key Project Term

Mitigation

Federal agencies shall to the fullest extent possible:

Use all practicable means, consistent with the requirements of NEPA and other essential considerations of nation policy, to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions on the quality of the human environment.

Proposed mitigation for **Environmental Justice** (EJ):

- No disproportionately high and adverse impacts to EJ populations are anticipated; and thus no mitigation measures are required.

Proposed mitigation for **right-of-way and utilities**:

- Reconfigure access, steepen side slopes adjacent to the roadway, construct retaining walls, or shift the alignment to avoid or minimize impacts to structures to the extent practicable.
- Relocate utilities as needed in consultation with utility providers.
- Comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, 42 USC 4601 et. seq., 49 CFR Part 24, if acquisition of land is necessary.

Proposed mitigation for **cultural and historic resources**:

- Although no adverse impacts to cultural or historic resources are anticipated, should evidence of historic or pre-historic sites be discovered during construction, in accordance with MDT Standard Specifications 107, the contractor would be required to immediately stop work in the area until the significance of the site is determined and appropriate measures implemented.

Proposed mitigation for **visual resources**:

- In accordance with Standard Specification 201, clearing and grubbing activities would occur only within staked construction limits in order to minimize disturbances to native plant communities and specimen trees.
- Select seed mixtures that include native grasses and forbs to blend cut and fill slopes and other construction-related disturbances with adjacent land uses.
- Maintain as many trees as possible, set clearing and grading limits, and plant trees at key locations.
- Select bridge type that is low and horizontal, with low-contrast materials.
- Use wall treatments that blend with the colors and textures of surrounding landscapes to the extent practicable.
- Use low-profile guardrails with a weathering finish to blend into the setting.
- If used, blend luminaires with natural colors; shield fixtures to minimize glare and spillover to the extent practicable.

Proposed mitigation for **noise**:

- No feasible or reasonable mitigation measures were found for the impacts associated with the project.
- Coordination between local officials and developers is suggested to require setbacks for future developments, or development of noise-compatible uses near the roadway.

Proposed mitigation for **farmlands**:

- No mitigation to important farmlands is required or proposed for any of the alternatives.

Proposed mitigation for **irrigation**:

- Design and construct irrigation modifications in consultation with irrigation users, and perpetuate existing irrigation to all end-users to the extent practicable.

- Contractors would be required to adhere to all applicable water quality laws and regulations in accordance with MDT standard specifications.

Proposed mitigation for **energy**:

- No mitigation to this resource is required or proposed for any of the alternatives.

Proposed mitigation for **air quality**:

- In accordance with MDT Standard Specification 107, the contractor would be required to adhere to applicable air quality rules and regulations, which may require the use of dust suppression and emission control measures to minimize short-term construction-related impacts.

Proposed mitigation for **hazardous materials**:

- Sites in the immediate proximity of the preferred alternative alignment would receive further investigation under a Phase II assessment before any property acquisition to determine the magnitude and extent of contamination, if any. This would include a site visit, review of agency documents, and interviews with agency personnel.
- Where appropriate, surface soil, subsurface soil, and/or groundwater samples would be collected and analyzed for probable contaminants of concern.
- Hazardous materials associated with acquired structures:
  - Before construction, all buildings that have been or would be acquired for the project and proposed for demolition would be surveyed by a state-licensed inspector for asbestos and other sources of contamination.
  - A National Emissions Standards for Hazardous Air Pollutants Demolition/Renovation Notification form would be filed with MDEQ for all relocated or demolished structures.
  - Asbestos removal would be performed in accordance with the OSHA requirements, Montana Department of Labor and Industry occupational safety and health requirements, and MDEQ rules and permit requirements for demolitions/renovations.
- During construction, soils would be monitored for presence of contaminants, and those soils that are found to be contaminated would be handled by Sections 107.23 and 107.24 of MDT Standard Specifications for Road and Bridge Construction.

Proposed mitigation for **water quality**:

- Design bridges and culverts to minimize impacts to rivers, floodplain, hydraulics, river riffle/pool complexes, and channel migration zone, as practical.
- If practicable, direct drainage of bridge deck runoff would be eliminated.
- In accordance with MDT Standard Specifications 107 and 208, the contractor would be required to adhere to applicable water quality rules, regulations, and permit conditions.
- Follow applicable water quality rules, regulations, and permit conditions, including existing municipal storm sewer system (MS4) permit requirements including inclusion of low impact development practices as practicable.
- Erosion and sediment control(s) would be required as necessary to minimize damage to the highway and adjacent properties and abate pollution of surface and ground water resources. Routine site monitoring would be conducted as necessary to ensure all pollution control measures are installed, maintained, and functioning correctly.

Proposed mitigation for **water body modifications**:

- New structures would be designed to minimize disturbance to stream hydrology and banks and to minimize channel alterations.
- All stream crossings would be designed in accordance with 23 CFR 650 Subpart A and in coordination with the appropriate regulatory agencies
- Modifications to irrigation facilities would be designed and constructed in coordination with the irrigation owners/operators. (See Irrigation section, above, for more information.)
- All work would be performed in accordance with state and federal guidelines regarding water quality and permit conditions. These include the applicable regulations under the federal Clean Water Act of 1972, as amended (i.e., Section 404 Permit), Section 10 of the Rivers and Harbors Act, and specific permit requirements from the Montana Stream Protection Act (SPA) 124 authorization; Montana Floodplain and Floodway Management Act, Section 402/MPDES permit; MS4 permit, and utilization of the current BMPs.
- To re-establish permanent vegetation and to reduce the spread and establishment of noxious weeds, disturbed areas within MDT right-of-way and easements would be seeded with desirable plant species, as soon as practicable, as recommended and determined feasible by the MDT Botanist.

Proposed mitigation for **floodplains**:

- Crossing of the Yellowstone River would require substantial fill (and some removal of fill) to achieve the backwater requirements for the floodplain.
- Mitigation would be in accordance with permitting requirements of Yellowstone County.
- The proposed project would be designed in compliance with Executive Order (E.O.) 11988, Floodplain Management. State of Montana drainage design standards would be applied to achieve results that would not increase or significantly change the flood elevations and/or limits.

Proposed mitigation for **wetlands**:

- Mitigation would be provided in accordance with Executive Order #11990 and the US Army Corps of Engineers Clean Water Act permit requirements. Appropriate monitoring would be conducted to ensure that any wetland mitigation site functions as intended.

Proposed mitigation for **vegetation**:

- In accordance with Standard Specification 201, clearing and grubbing activities would occur only within staked construction limits. To control the spread of noxious weeds, the contractor would be required to wash

Key Project Terms

Best Management Practices (BMPs)

Best management practices are schedules of activities, practices, and procedures to prevent or reduce pollution of waters of the United States. Such practices include planning strategies, operating procedures, and physical practices to control site runoff.

all equipment prior to transport into the project area as specified in the Supplemental Specifications.

- To re-establish permanent vegetation, disturbed areas within MDT right-of-way or easements would be seeded with desirable plant species, as recommended by the MDT botanist. Revegetation would be conducted in accordance with MDT Standard Specifications.
- Post-construction, the site would be monitored until final stabilization is met.

Proposed mitigation for **wildlife and aquatic species**:

- Compliance with Section 208 of MDT's *Standard Specifications, Water Pollution Control and Stream Preservation* (MDT 2006), and adherence to resource agency conditions.
- MDT would continue to evaluate the appropriateness and necessity of additional wildlife crossings measures near the Yellowstone River, Five Mile Creek, or other locations.
- Conduct preconstruction surveying for bald eagle nests and follow seasonal construction restrictions for bald eagle nests.
- In accordance with the Migratory Bird Treaty Act (MBTA) of 1918 and the Bald and Golden Eagle Protection Act of 1940, impact to known breeding locations such as avian nests or burrows would be avoided or minimized as required. In conformance to the MBTA, seasonal restrictions or deterrent methods are used to ensure that active nests are not harmed during the breeding season.
- Design bridges to optimize the shape, size, number, and placement of pier locations in a manner that would maintain uninterrupted fish passage.
- Schedule in-water work for bridge construction during low water levels to minimize impacts during spawning periods.

Proposed mitigation for **State Species of Concern**:

- Follow Section 208 of MDT's Standard Specifications and adhere to resource agency conditions.
- Implementation of the "Recommended Conservation Measures" particularly in regard to the MBTA would avoid the majority of breeding schedules.
- The location of eagle nests and communal roosts need to be verified within ½ mile of the project prior to construction. If present, construction schedule and construction buffers would comply with the Bald and Golden Eagle Protection Act.
- For the Mary Street Option 1 Alternative, the location of the heron rookery needs to be verified by a pre-construction survey or coordination with resource agencies or organizations. If it is located within the 900-foot recommended buffer area, coordination with MTFWP should be completed to avoid potential impacts during the March 1 to mid-August nesting season.

Proposed mitigation for **Threatened and Endangered Species**:

- No conservation measures are likely to be necessary with respect to Threatened and Endangered Species. However, if any whooping cranes are observed in or adjacent to the study area during construction, work would be halted, and MDT would contact the United States Fish and Wildlife Service. Whooping crane migration peaks are in April and October.

WHAT PERMITS AND APPROVALS ARE REQUIRED?

Federal, state, and local permits and approvals are required if one of the build alternatives is constructed, as identified below.

- Clean Water Act (CWA) Section 402/Montana Pollutant Discharge Elimination System (MPDES) authorization from Montana Department of Environmental Quality (MDEQ) Permitting and Compliance Division. The MPDES permit requires a stormwater pollution prevention plan that includes a temporary erosion and sediment control plan.
- Compliance with the existing municipal storm sewer system (MS4) permit.
- CWA Section 404 permit from the U.S. Army Corps of Engineers (COE) for any activities that may result in the discharge or placement of dredged or fill materials in waters of the United States, including wetlands.
- Federal Rivers and Harbors Act (Section 10 Permit) from the COE for the construction of any structure in or over any federally listed navigable waters of the United States (e.g., the Yellowstone River).
- A Montana Department of Natural Resources and Conservation (MDNRC) land use license or easement application and the Application for Licensing Structures & Improvements on Navigable Water Bodies (Form DS 432) for the construction, placement, or modification of a structure or improvements in, over, below, or above a navigable stream.
- Montana Stream Protection Act (SPA 124) from Montana Fish, Wildlife and Parks (MFWP) Fisheries Division. The Montana SPA 124 is required for projects that may affect the bed or banks of any stream in Montana.
- Short-Term Water Quality Standard for Turbidity related to construction activity (318 Authorization) from the MDEQ - Water Quality Bureau for any activities that may cause unavoidable violations of state surface water quality standards for turbidity, total dissolved solids, or temperature.
- Floodplain Development Permit from the Yellowstone County Floodplain Administrator.

HOW WAS THE LENGTH OF THE DEIS COMMENT PERIOD DETERMINED?

The comment period for the DEIS was determined based upon the overall project schedule and the nature of the comments received by the project team. The comment period for the DEIS, as published in the Federal Register, began on August 17, 2012, and ended on October 1, 2012. This 45-day comment period is consistent with federal requirements. As stated in the Federal Register notice, comments received after the end of the comment period were considered to the extent practical. The comments that were submitted in the month after the close of the comment period are not included in the FEIS because they generally brought up the same themes and questions as those comments received during the formal comment period.

HOW HAVE WE ENGAGED THE PUBLIC AND KEPT PEOPLE INFORMED?

Since the project inception in 2003, MDT has made a concerted effort to be as inclusive as possible in identifying and engaging affected stakeholders in the project process. A Billings Bypass Advisory Committee (BBAC), composed of approximately 25 individuals representing a broad spectrum of stakeholders, was established to provide advice and facilitate involvement in community interests. The BBAC met 11 times throughout the life of the project. There have been four public meetings (the final public meeting was the public hearing for the DEIS), an active website, and six newsletters sent to study area residents. MDT made additional efforts to involve the general public in the decision-making process, including small group or one-on-one meetings with individual property owners, tenants, neighborhood associations, and businesses to discuss specific issues and gain insight. A timeline of the public involvement process is depicted in **Figure ES.5**.

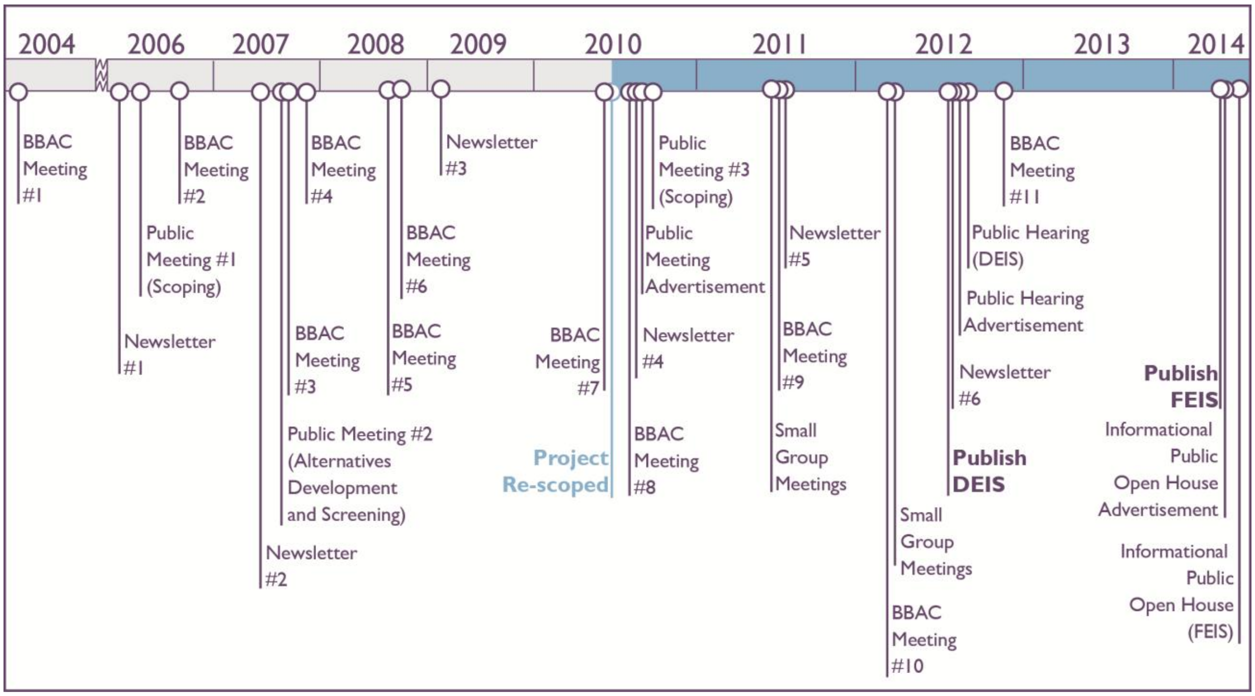
An informal open house will be held on April 9, 2014 at the Bitterroot Elementary School in Billings. A summary of the public involvement throughout the project is provided on the Billings Bypass website at http://www.billingsbypass.com/public.htm.

Public Involvement

Newsletters

All six project newsletters are available for viewing on the Billings Bypass website: http://www.billingsbypass.com/news.htm.

Figure ES.5 Public Involvement Process Timeline



WHAT KEY POINTS DID WE HEAR DURING THE COMMENT PERIOD AND OTHER OUTREACH EFFORTS?

MDT received a wide variety of public comments on the project. During the public comment period for the DEIS, MDT received 124 separate written communications in the form of letters, email, and project comment forms, and 16 people provided oral testimony at the public hearing. One of the comment letters was a petition signed by 370 people stating their opposition to any of the build alternatives.

Each comment was numbered, recorded, and distributed among the project team. Comments were considered individually and collectively. Comments were addressed in the content of this FEIS where applicable, and Appendix J includes responses to each comment.

Many of the written and oral comments fell into the following general categories:

- Preferences and supporting reasoning for or against a specific alternative.
- Requests for new alternatives to be studied, or for modification of an alternative from the DEIS.

Of the comments received from agencies and the public in opposition to or with concerns about one or more of the build alternatives, four primary issues were apparent: (1) expansion or creation of roadway near residences; (2) adequacy of the public involvement process; (3) questions about the alternatives themselves, including how access to housing would be preserved; and (4) general objections to impacts associated with the project (e.g., traffic, development, and change in the rural character of the Billings Heights area). The majority of comments with concerns about the project focused on the area north of the proposed Yellowstone River crossing.

WHAT ADDITIONAL INFORMATION DID WE ADD TO THE FEIS THAT WAS NOT IN THE DEIS?

Many changes were made in response to comments on the DEIS that was distributed in August 2012. Additional information from supplemental studies conducted since the DEIS was distributed is also provided. Some changes make the document easier to read and handle. Changes include:

Reader-Friendly Revisions

This Executive Summary has been completely revised to make it more reader-friendly.

- Some figures have been revised to a portrait format to improve legibility.
- Additional figures have been added to help clarify information.
- The impacts summary tables in this Executive Summary and Chapter 2 have been revised and simplified.

Phasing Considerations

Approximately $90 million in funding has been identified for the Billings Bypass Project, but the estimated cost for the Preferred Alternative is $111.1 million. Under certain circumstances, FHWA guidance allows the issuance of phased Records of Decision (RODs) from a single EIS. Consistent with this approach, FHWA and MDT evaluated splitting the Preferred Alternative into separate phases. The project would be implemented in two phases, and Phase 1 would not have substantially different effects than the Full Buildout.

Phase 1 would design and construct an initial two-lane road along the preferred alignment, and acquire the right-of-way needed for the final four-lane road (Full Buildout). Phase 1 meets the traffic needs for the 20-year planning horizon in the FEIS. The Full Buildout would be the long-term solution that meets the project's purpose and need as the city of Billings continues to grow. Improvements included in the Full Buildout can be re-evaluated through NEPA, as necessary, based on future safety needs, available funding, and transportation needs, and they would be authorized in a subsequent ROD.

Although the footprint of Phase 1 would be narrower than the footprint of the Full Buildout, the right-of-way needed for the Full Buildout would be purchased during development of Phase 1, and Phase 1 would be built along the same alignment and with generally the same access control and any pedestrian and bicycle facilities as the final four-lane road that may be included in the Full Buildout.

Based on the differences in the project's footprint, construction, and operation for Phase 1 and the Full Buildout, additional analysis regarding the impacts associated with Phase 1 is presented in Chapter 4 for the following resources: transportation, water resources, water body modifications, floodplains, wildlife and aquatic species, and wetlands. For the other topics, Chapter 4 simply states that the differences in the impacts associated with Phase 1 and the Full Buildout are minor and are not analyzed further.

Examples of Phase 1 information in this FEIS that was not in the DEIS include:

- **Figure ES.6** through **Figure ES.13** at the end of this summary show several birds-eye views of the build alternatives on recent aerial imagery (inner lines represent surface width for Phase 1, outer lines represent approximate right-of-way limits).
- Section 2.6 in Chapter 2 of this FEIS illustrates how the first phase (Phase 1) of the Preferred Alternative would be consistent with the fiscally constrained Billings Urban Area Long-Range

Transportation Plan and the State Transportation Improvement Plan (STIP). It also describes the project elements included in Phase 1, and discloses potential impacts and possible mitigation measures.

- Chapter 4 presents summaries of potential impacts associated with Phase 1, and Appendices A and H have been updated to include graphics illustrating Phase 1 design.

Technical Changes

Additional discussion has been added in response to comments on the DEIS or to present updated information.

- Section 2.3.2 has been updated to present expanded information regarding access to the residences along Mary Street. Private accesses would be maintained.
- Additional analysis of groundwater resources and potential impacts was conducted and expanded descriptions were added to Chapters 3 and 4.
- Consultation with SHPO was finalized and the document was revised to reflect the current findings. Additional properties were surveyed for cultural significance; none were found to be eligible for listing on the National Register of Historic Places (see Section 3.3.6). Appendix D was updated with letters documenting the consultation with SHPO.
- The right-of-way section of Chapters 3 and 4 was modified to clarify the analysis and revised to reflect 2013 conditions.
- Appendices B and D were updated to include documentation of additional agency coordination.
- The Alternatives Report was moved from supplemental information to the DEIS to Appendix I of the FEIS. Additionally, after the DEIS was published, members of the public requested more information regarding the Five Mile Creek Alternatives, so supplemental documentation was added to Appendix I regarding the screening process for the Five Mile Creek Alternatives.
- Appendix J has been added to provide responses to individual comments received on the DEIS.

WHAT HAPPENS NEXT?

Record of Decision

FHWA and MDT will carefully consider all comments received on this FEIS. No fewer than 30 days after the publication of this FEIS, they will then decide which alternative best meets the purpose and need and best balances social, economic, and environmental impacts. The Record of Decision (ROD) signed by FHWA documents this decision, and includes mitigation and environmental commitments.

Engineering Design

Once a ROD is issued, final design of the selected alternative can begin. This design phase would include the primary and secondary corridors, interchange and intersection options, and related facilities such as the Yellowstone River and Five Mile Creek bridges. It would also include the final Wetland Mitigation Plan that is needed to obtain related permits. Results of final design are plans, specifications, and estimates used to advertise for bids and negotiate the construction contract(s).

Property Acquisition

Early in the design phase, MDT right-of-way specialists would contact landowners whose property is needed for the selected alternative. More detailed design of the project footprint would be needed to confirm the right-of-way required for the project and identify the properties to be acquired. During property acquisition, MDT right-of-way specialists explain acquisition procedures and all applicable laws and landowner rights. Then property values are determined, and acquisition offers begin.

Phased Implementation and NEPA

Since the required funds for the entire project are not available in a single appropriation, the Billings Bypass FEIS proposes to implement the Preferred Alternative in two phases. Phase 1 would construct the first two lanes of the four-lane road along the entire length of the Preferred Alternative alignment and would include the secondary improvements described in this FEIS. The Full Buildout would require another ROD in the future to expand the roadway to four lanes. Before a second ROD could be issued, changes in regulations or site conditions would be evaluated.

HOW IS THIS FEIS ORGANIZED?

The FEIS is organized by chapters, as shown below:

- Chapter 1, Project Purpose and Need: includes a description of the need for and purpose of the proposed project.
- Chapter 2, Alternatives: describes the alternatives development process, the proposed alternatives, including the No Build Alternative, the selection of the Preferred Alternative, and discussion of funding constraints and proposed phasing of the project.
- Chapter 3, Affected Environment: describes the environment that would be affected by the proposed alternatives.
- Chapter 4, Environmental Consequences: describes the environmental consequences that would result from the proposed alternatives.
- Chapter 5, Permits and Authorizations: identifies the permits required for project implementation.
- Chapter 6, Comments and Coordination: describes public, stakeholder, and agency outreach.
- Chapter 7 through 11 present the list of EIS preparers, the FEIS distribution list, references, a glossary, and an index.

HOW CAN I LEARN MORE?

The CD provided with this document contains PDF files of the entire FEIS. The Table of Contents from the FEIS can help the reader decide which chapters or sections are of greatest interest.

MDT's project website is updated regularly. It is an excellent source of current information on the project, and is located online at: http://www.billingsbypass.com.

If you have further questions about the project, you can contact the MDT Project Manager:

Fred Bente
MDT Consultant Design
2701 Prospect Avenue
P.O. Box 201001
Helena, MT 59620-1001
(406) 444-7634
fbente@mt.gov

Figure ES.6 Phase 1 Design Simulations, Looking Northeast Near Johnson Lane Interchange

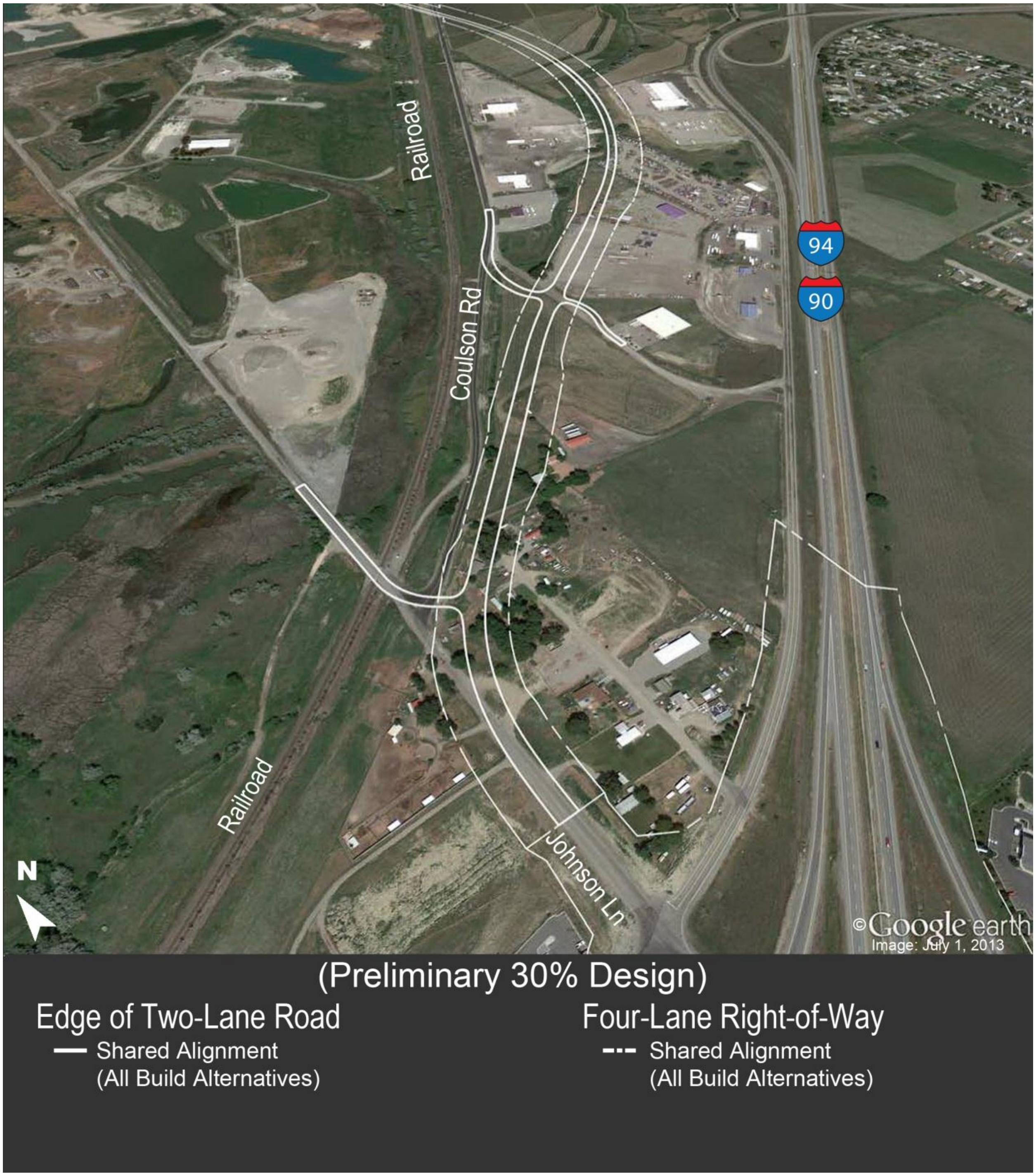


Figure ES.7 Phase 1 Design Simulations, South of Yellowstone River Looking Northwest

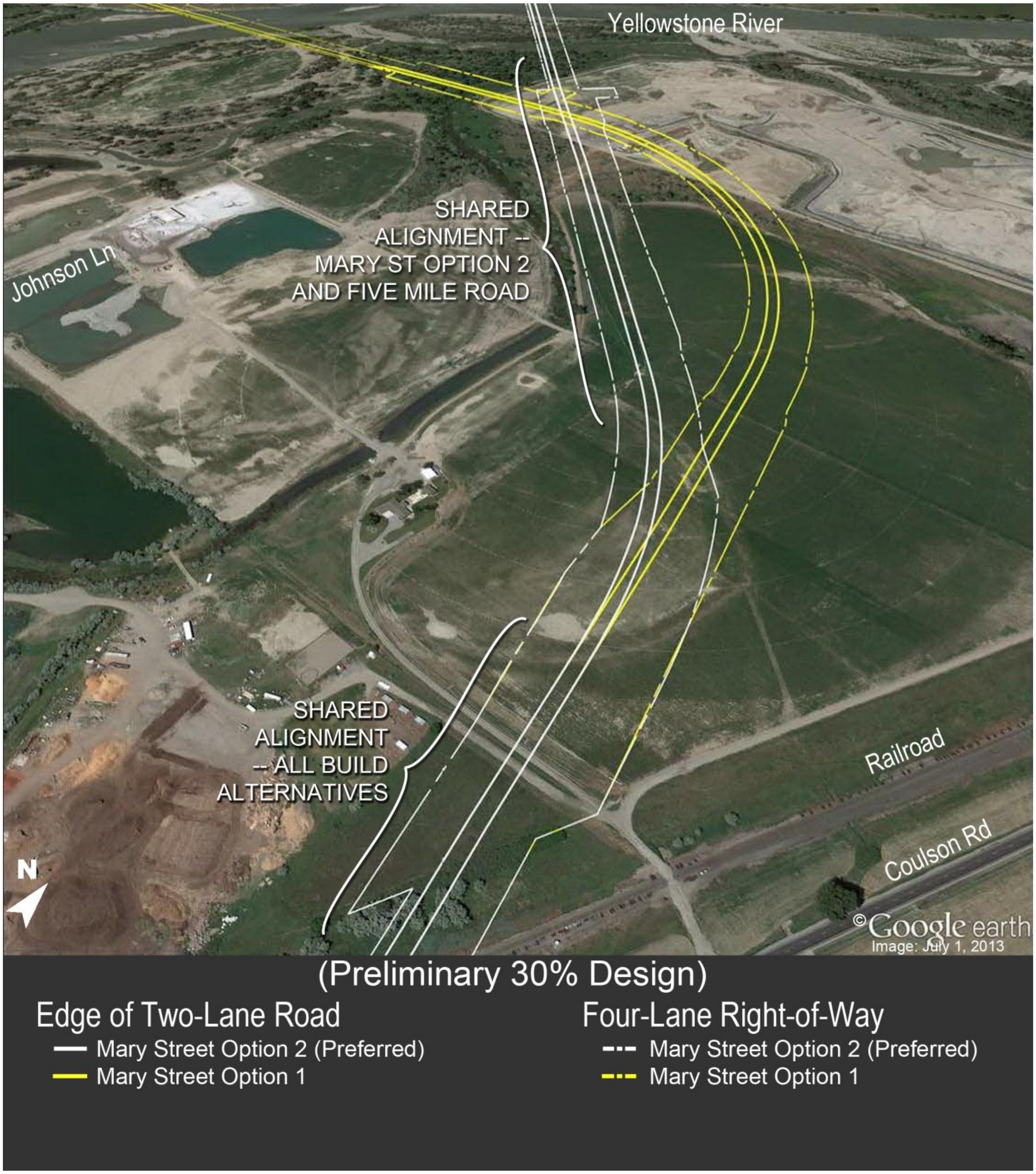


Figure ES.8 Phase 1 Design Simulations, Bridge Over Yellowstone River Looking Northwest

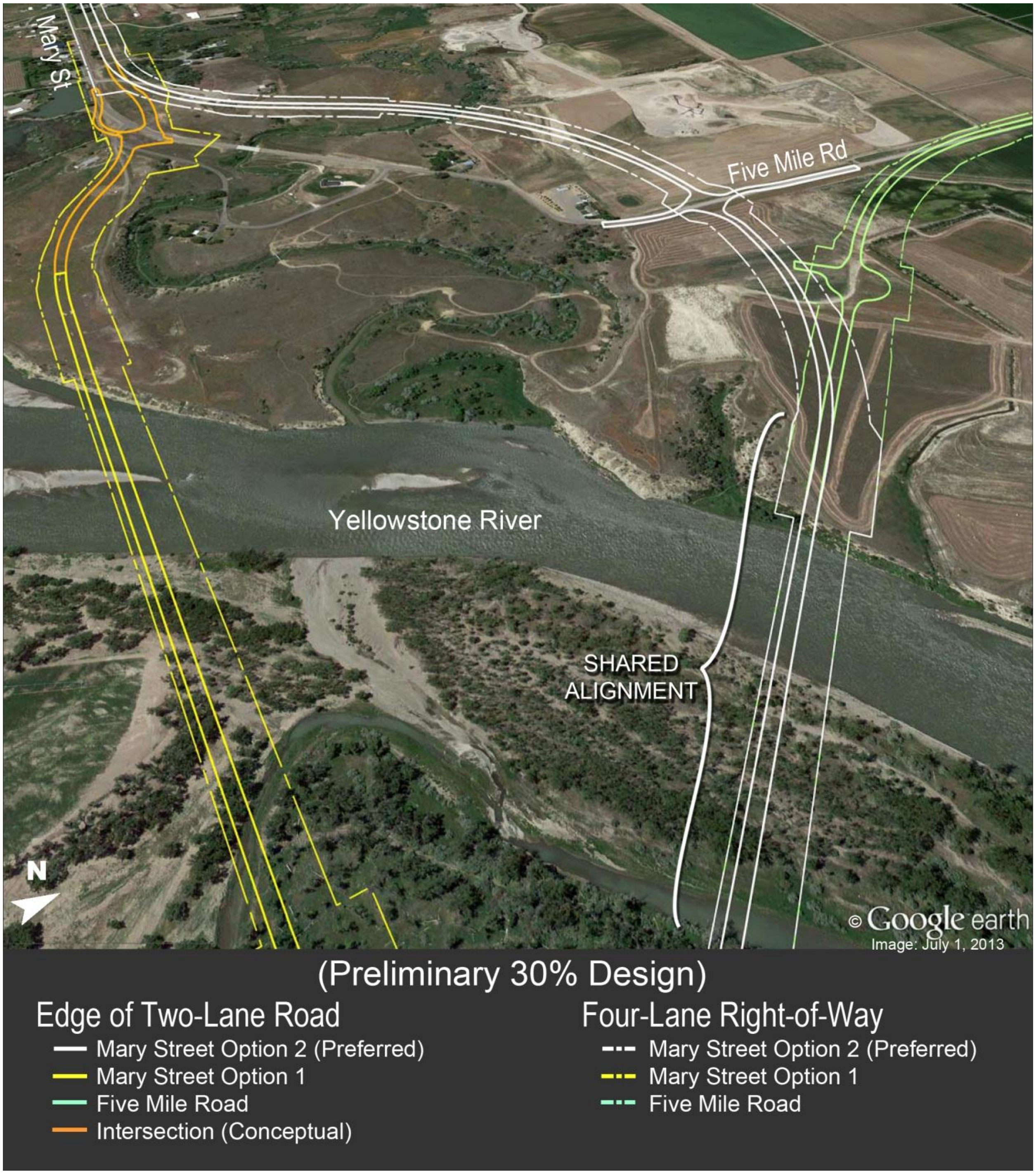


Figure ES.9 Phase 1 Design Simulations, Crossing Yellowstone River Looking South

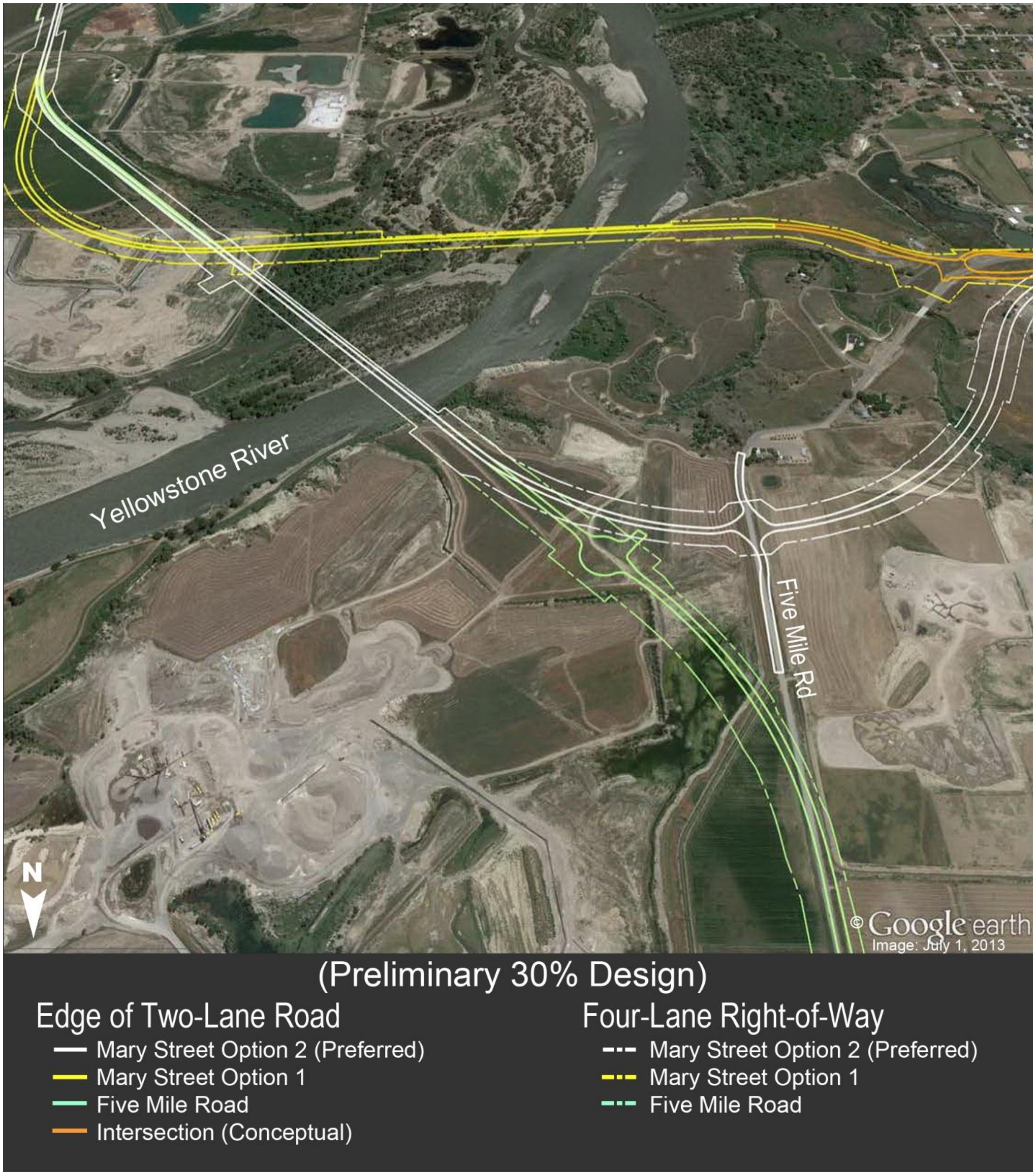


Figure ES.10 Phase 1 Design Simulations, Looking Northeast at Mary Street/Five Mile Road Convergence

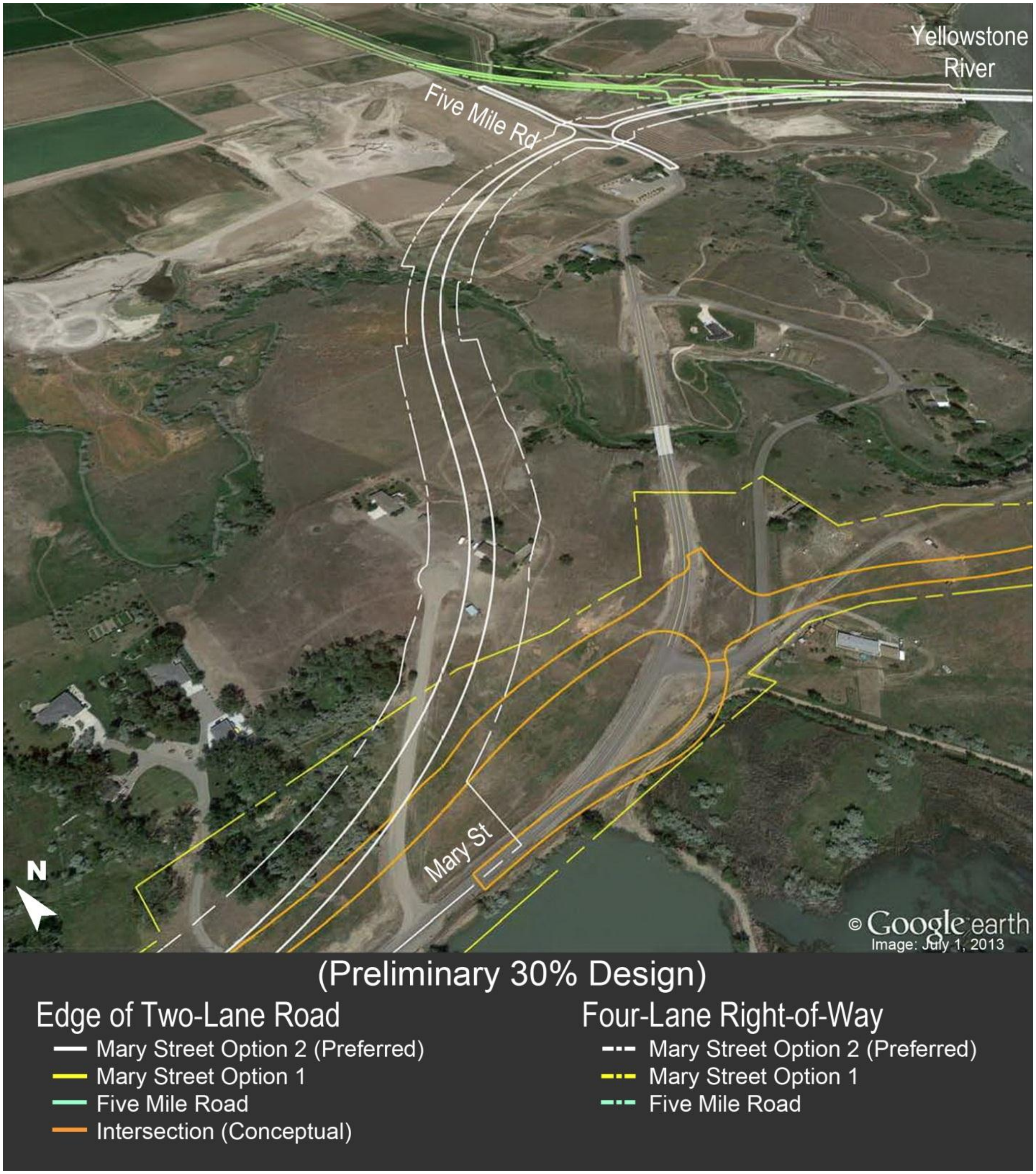


Figure ES.11 Phase 1 Design Simulations, Looking West Near Flaming Creek Drive

Figure ES.12 Phase 1 Design Simulations, Mary Street Looking East from US 87 and Main Street

Figure ES.13 Phase 1 Design Simulations, Five Mile Road Looking South Near Old Hwy 312

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1 PURPOSE AND NEED

1.1 INTRODUCTION

This environmental impact statement (EIS) has been prepared in accordance with the National Environmental Policy Act of 1969, as amended (NEPA), the Montana Environmental Policy Act (MEPA), the Council on Environmental Quality NEPA implementing regulations (40 Code of Federal Regulations [CFR] 1500-1508), and Federal Highway Administration (FHWA) NEPA implementing regulations (23 CFR 771). This project includes federal funding, and as such must follow the NEPA process. NEPA is a decision-making process that evaluates the social, environmental, and economic impacts associated with the project. Projects with the potential to result in significant impacts are evaluated in an EIS. Federal regulations require that actions evaluated in such a study (1) connect logical termini and be of sufficient length to address social, economic, and environmental issues on a broad scope, (2) have independent utility and be a reasonable expenditure even if no additional transportation improvements in the area are made, and (3) not restrict consideration of other reasonably foreseeable transportation improvements (23 CFR 771.111(f)). As stated above, the project limits of transportation projects must be of sufficient length to allow the full impacts of the proposed actions to be studied to ensure a meaningful evaluation of alternatives.

FHWA and the Montana Department of Transportation (MDT) jointly prepared a Draft Environmental Impact Statement (DEIS) to improve access and connectivity between I-90 and Old Hwy 312. The U.S. Army Corps of Engineers (COE) is the only cooperating agency for this Billings Bypass project. FHWA published the Notice of Availability for the DEIS on August 17, 2012. The 45-day public comment period ended on October 1, 2012. The lead agencies solicited written and oral comments from the public, agencies, and organizations during the comment period. A public hearing, held at Lockwood Middle School on September 12, 2012, gave citizens an opportunity to learn more about the project and comment on the DEIS. In addition to comments received in person at the public hearing, MDT accepted comments by mail, email, and through the project website. This Final EIS (FEIS) revises the DEIS and responds to comments made during the public comment period.

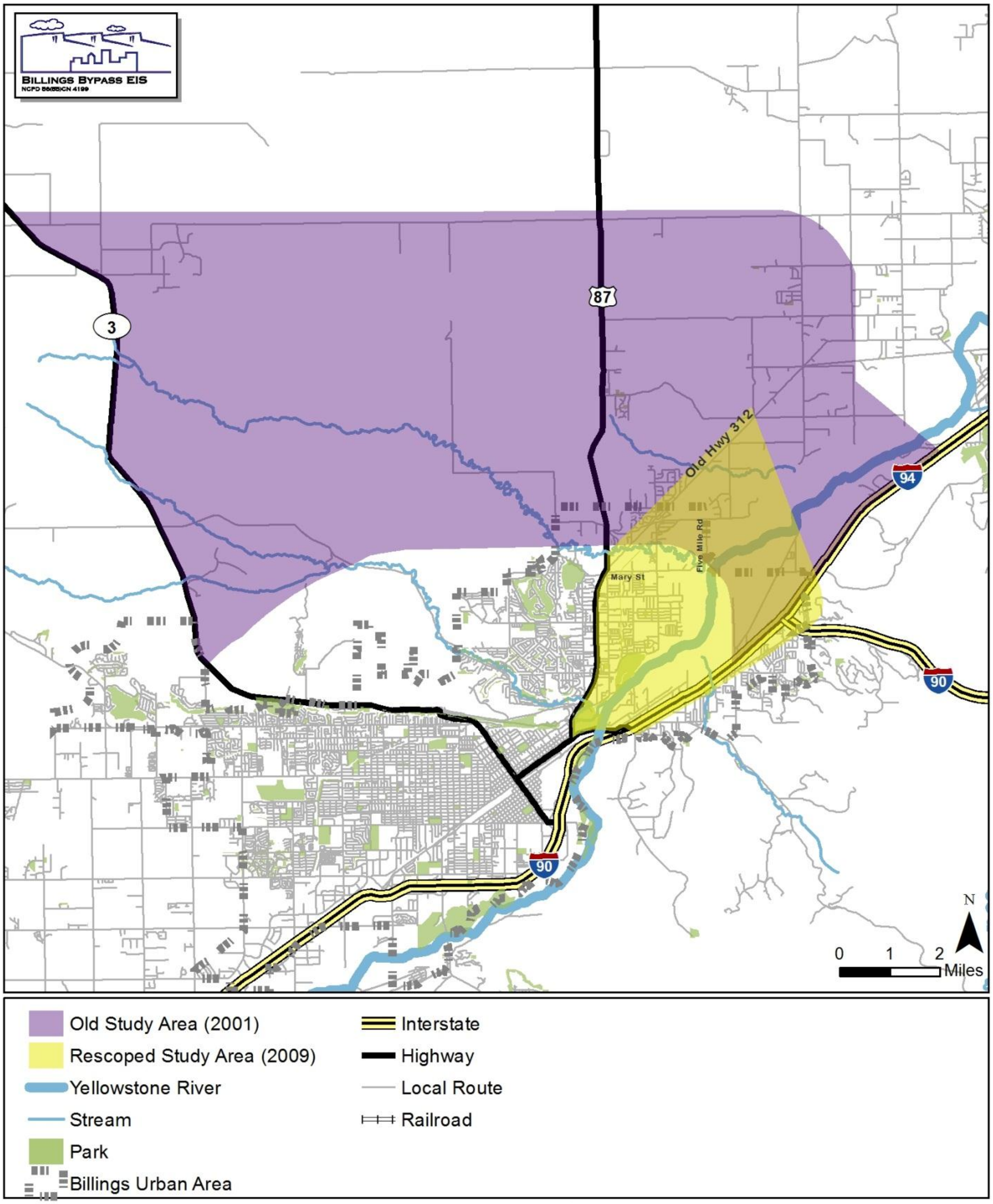
This chapter describes why the project is proposed. During the project development process, regulatory agencies; an advisory committee established for this project, deemed the Billings Bypass Advisory Committee (BBAC); and the general public were asked to provide input on the proposed project. That input was used to develop the project purpose and need and a series of design objectives, all of which are outlined in this chapter. The project purpose explains the intended outcomes of this project. The project need explains why this project is necessary. The design objectives are intended to provide a basis for determining whether the alternatives meet the project's purpose and need, and are consistent with MDT standards and local planning guidance.

1.1.1 PROJECT HISTORY

1.1.1.1 2001 BILLINGS NORTH BYPASS FEASIBILITY STUDY

The *Billings North Bypass Feasibility Study*, which was completed by HKM Engineering (now DOWL HKM) in 2001, investigated a bypass in the Billings area as part of the Camino-Real International Trade Corridor connecting Canada to Mexico. The study used a 5-mile-wide corridor north of Billings in order to assess the feasibility of a bypass route connecting the I-90/I-94 interchange area east of Billings with MT 3 west of Billings. This study area was selected by a consultant team and approved by the project steering committee. The feasibility study concluded that the bypass was feasible from an economic and engineering perspective and should be advanced for environmental analysis and refinement.

Figure 1.1 Original Project Study Area and Re-scoped Project Study Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/1/2013

1.1.1.2 PRELIMINARY ALTERNATIVES FOR PROPOSED BYPASS ROUTE NORTH OF BILLINGS

On August 13, 2003, FHWA issued the Notice of Intent (NOI) that MDT would prepare an EIS on a proposal to construct a bypass route north of Billings in Yellowstone County, Montana. The proposed bypass route north of Billings would connect between I-90 and MT 3. The scoping process began in 2006 following the 2005 update to the *Billings Urban Area Long-Range Transportation Plan*. Local, state, and federal agencies and the public were engaged in the scoping process and provided with opportunities to comment on the purpose and need and voice issues and concerns related to the proposed project. In 2007, the project team developed preliminary alternatives and again provided agencies and the public with opportunities for input.

1.1.1.3 2008 FHWA GUIDANCE AND PROJECT RE-SCOPING

In 2008 FHWA issued guidance clarifying requirements for signing decisions completing the NEPA process (FHWA 2008, supplemented 2011). Projects must (1) meet air quality conformity regulations, (2) be consistent with the fiscally constrained Metropolitan Transportation Plan (MTP), and (3) be consistent with the fiscally constrained State Transportation Improvement Plan (STIP). Based on this guidance, all project phases planned within the life of the MTP must be included in the fiscally constrained MTP in order for FHWA to sign a Record of Decision (ROD). As proposed, the Billings Bypass project did not have sufficient funding to be included in the fiscally constrained *Billings Urban Area Long-Range Transportation Plan* (2005).

The funding constraints prompted MDT to coordinate with the local Policy Coordinating Committee (PCC) of the Billings urban area transportation planning process on potential approaches to proceed with the project. In November 2009, the PCC voted to re-scope this project to focus only on the eastern segment between I-90 and Old Hwy 312. **Figure 1.1** shows the old and new study area for the project. A new purpose and need was developed to address the issues specific to the revised study area.

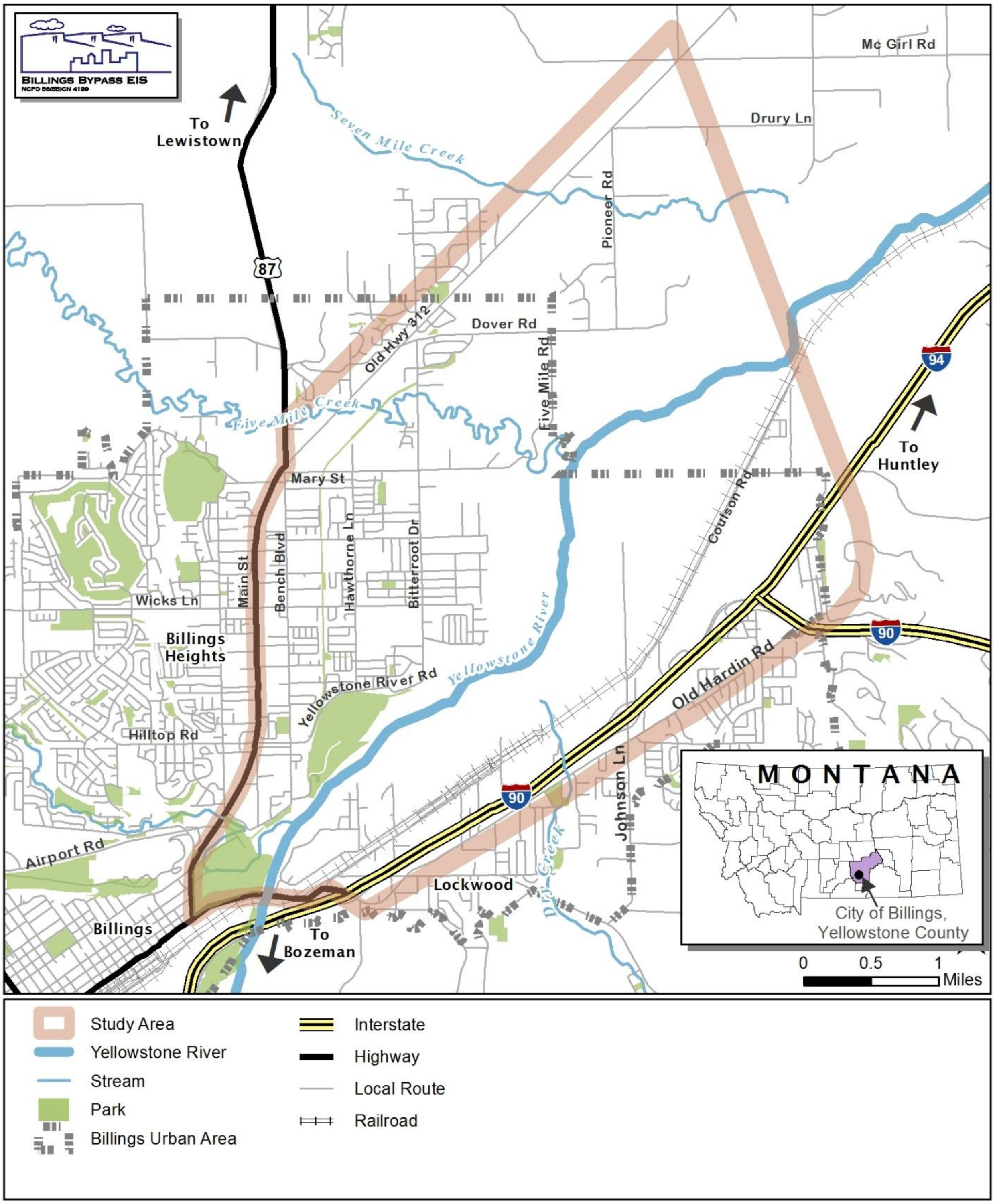
Although the re-scoped project was restricted to just the eastern segment, the federal earmarks set aside for the project required that the Billings Bypass name be retained in order to qualify for the funding. FHWA reissued the NOI for the re-scoped Billings Bypass project on September 7, 2010. The purpose and need statement was then revised based on input from agencies and the public.

1.2 PROJECT DESCRIPTION/BACKGROUND

1.2.1 PROJECT LOCATION AND STUDY AREA

The proposed project is located in Yellowstone County in the northeastern portion of the Billings urban area (see **Figure 1.2**). The Billings Heights neighborhood and the unincorporated community of Lockwood are both located partially within the study area, as defined below and illustrated in **Figure 1.2**. The Billings Heights neighborhood is located within the city limits of Billings and contains a combination of residential, agricultural, and commercial land uses. Lockwood has a large residential district, but the portion of Lockwood within the study area is predominantly agricultural and industrial.

Figure 1.2 Project Study Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

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The study area includes an approximately 18-square-mile area between Old Hwy 312 and the Interstate 90/Interstate 94 (I-90/I-94) corridors. The south and west portions of the study area are mostly developed land consisting of residential, commercial, and industrial uses. The north and east portions of the study area are more rural in nature consisting of predominantly agricultural uses. The Yellowstone River flows in a northeasterly direction through the length of the study area. It is flanked by a broad floodplain and in some locations by steep sandstone cliffs, known locally as the "rimrocks." In the southern portion of the study area, the land on the northwest side of the river is between 43 and 115 feet higher than the land on the south side of the river. Tributaries of the Yellowstone River within the study area include North Fork Alkali Creek, Five Mile Creek, and Seven Mile Creek.

There are three roadways that bound the study area: United States Highway 87 (US 87)/Main Street, Old Hwy 312, and the I-90/I-94 corridor. US 87 intersects I-90 at exit 452 in Lockwood and becomes Main Street as it heads north through Billings, before leaving the urban area and proceeding towards Roundup and Lewistown. Old Hwy 312 spurs off of US 87 on the north side of Billings and heads northeast through Huntley before connecting with I-94 near Pompeys Pillar. Old Hwy 312 is a former United States Highway that was taken off-system and is currently a state-maintained route classified as a minor arterial by MDT. The I-90/I-94 corridor roughly parallels the southern boundary of the study area.

Within the study area, there are a number of north-south routes including Johnson Lane, Bench Boulevard, Hawthorne Lane, Bitterroot Drive, Five Mile Road, and Pioneer Road. The primary east-west routes include Yellowstone River Drive, Wicks Lane, Mary Street, and Dover Road. There are two local routes that parallel the Montana Rail Link (MRL) railroad corridor: Lockwood Drive and Coulson Road. None of these routes cross the Yellowstone River.

The study area was selected to connect logical termini and be of sufficient length to evaluate potential impacts to environmental resources. The project was based on logical termini that address the lack of connectivity in the study area resulting from four major physical barriers located within eastern Billings that impede movement in the study area, especially from Lockwood to Billings Heights. As discussed in Section 1.4.1, the rimrocks, the Yellowstone River, the MRL railroad tracks, and I-90 create barriers for north-south connections in the Billings area that cause local and regional traffic to be funneled through the US 87/Main Street corridor in the urban area of Billings. The existing traffic volumes on study area roadways are discussed in Section 3.2.3.1, "Roadway and Intersection Operations." Interstate 90 and Old Hwy 312/U.S. 87 serve as logical termini for the proposed project.

The segment of US 87 that crosses I-90 and the Yellowstone River serves as the only connection between Billings and Lockwood. The Billings Bypass project would provide transportation system redundancy and mobility between Billings Heights and the interstate, which are limited by a lack of Yellowstone River crossings.

The study area was also selected to have "independent utility," i.e., to provide a "usable" project that would not require future transportation expenditures to justify the current investment. Independent utility can be demonstrated if the project does not result in traffic bottlenecks or safety problems on adjacent sections of the roadway, even if the project is phased over a period of time. Each of the build alternatives begins at the Johnson Lane Interchange with I-90 and uses approximately the same alignment north across the railroad towards one of two potential locations for crossing the Yellowstone River. North of the river, three corridors have been identified to complete the connection to Old Hwy 312. Each of the build alternatives includes a primary corridor (reconstructed/new alignment) and a "secondary" corridor, which is an existing roadway that will undergo improvements to accommodate traffic generated by the alternative as well as intersection/interchange improvements.

In conjunction with other plans, the Billings Bypass project would result in a cumulative beneficial effect to adjacent roadways. These benefits are detailed in Section 4.2.1, "Traffic Operations." Interstate 90 and Old Hwy 312/U.S. 87 serve as logical termini from the proposed project. No additional transportation projects or future expenditures are necessary to ensure the project operates and functions appropriately, as it is proposed. Therefore, this project demonstrates independent utility and significance.

The selected alternative must not preclude other projects currently under evaluation. None of the build alternatives would restrict construction of the projects currently identified for the area.

1.3 PURPOSE FOR TRANSPORTATION IMPROVEMENTS

The purpose and need statement establishes the benchmark against which the project alternatives are evaluated. The "purpose" essentially states the reason for the project. The "need" presents the current and projected issues that the project must address. The purpose and need for this project were developed with input from local governments, agencies, stakeholders, and the public.

1.3.1 PROJECT PURPOSE

The purpose of the proposed project is to improve access and connectivity between I-90 and Old Hwy 312 to improve mobility in the eastern area of Billings.

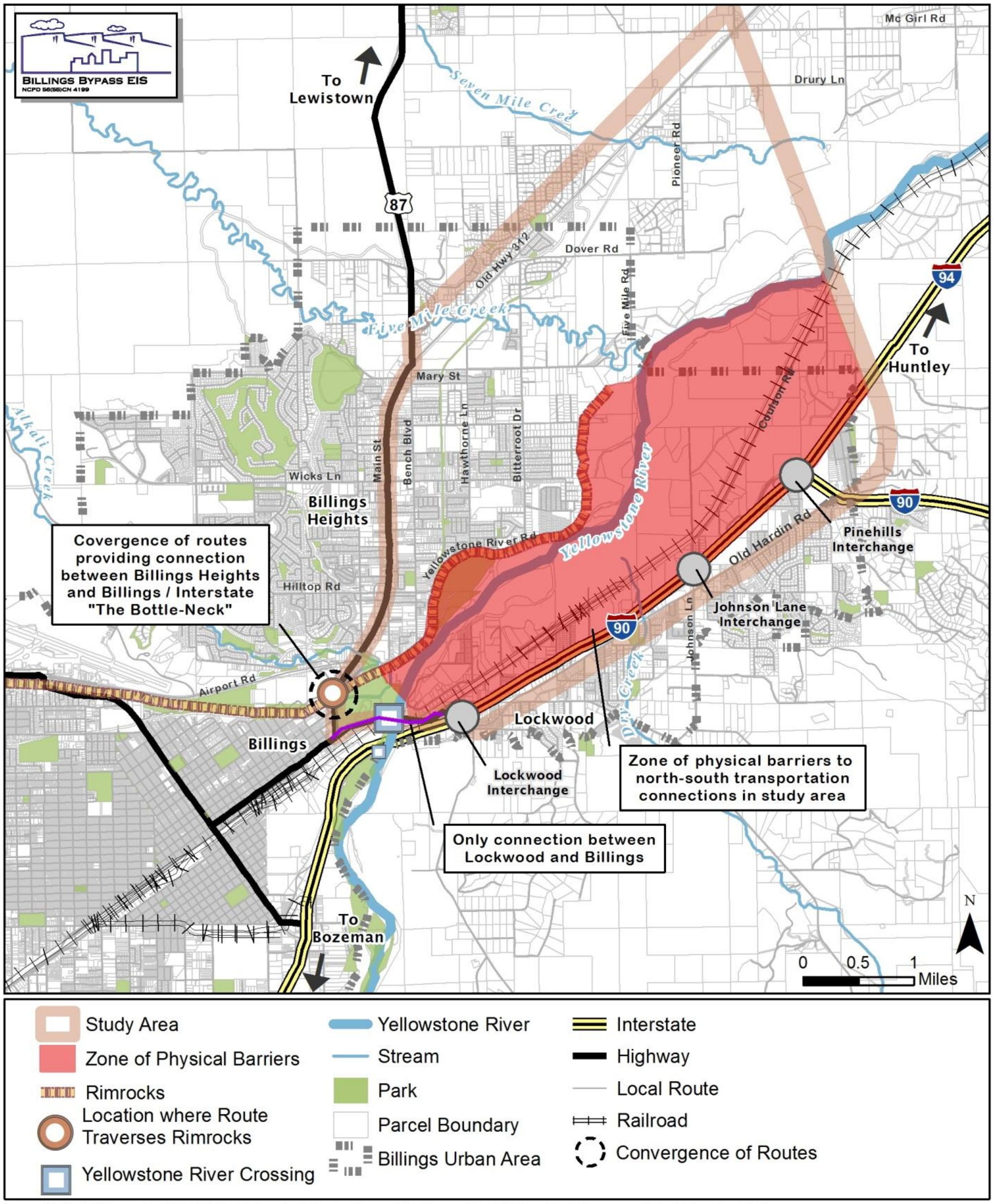
1.4 NEED FOR PROJECT

This study addresses several transportation-related issues in the study area that were identified through previous studies, public scoping, and agency involvement. These issues stem from a lack of connectivity and a lack of mobility resulting from four major physical barriers located within eastern Billings that impede movement and north-south connections in the study area, especially from Lockwood to Billings Heights (see **Figure 1.3**). These issues, detailed in the sections that follow, have been summarized into succinct need statements that helped formulate reasonable alternatives.

1.4.1 REDUCE PHYSICAL BARRIER IMPACTS TO THE TRANSPORTATION SYSTEM

The rimrocks, the Yellowstone River and the railroad, and I-90 create barriers for north-south connections in the Billings area, which affect local traffic and regional traffic. Reduction of physical barrier impacts to transportation is one of the key transportation goals for the region, as documented in the *Billings Urban Area Long-Range Transportation Plan* (2009 Update). Both I-90 and US 87 cross the Yellowstone River near downtown Billings, and the next river crossing is more than 9 miles north at Huntley. The challenging topography in the Billings area, coupled with limited connections across the river, the railroad tracks, and the interstate, results in both local and regional north-south traffic being funneled through the US 87/Main Street corridor in the urban area of Billings.

Figure 1.3 Physical Barriers to North-South Connections in the Billings Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

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1.4.2 IMPROVE CONNECTIVITY BETWEEN LOCKWOOD AND BILLINGS

The segment of US 87 that crosses I-90 and the Yellowstone River serves as the only connection between Billings and Lockwood. The need for improved connectivity to Billings is documented in the *Lockwood Community Plan* (August 2006) and the *Lockwood Transportation Study* (November 2008).

1.4.3 IMPROVE MOBILITY TO AND FROM BILLINGS HEIGHTS

A survey completed for the *Billings Heights Neighborhood Plan* (2006) identified traffic issues as a key concern of residents, with one of the main traffic concerns being traveling to and from the Billings Heights neighborhood. This is also one of the key transportation issues for the region cited in the *Billings Urban Area Long-Range Transportation Plan* (2009 Update). The *City of Billings Capital Improvement Plan* (2006 - 2011) includes 16 projects that would address transportation issues in Billings Heights. Only one of these projects (the Billings Bypass EIS) would address transportation system redundancy and mobility between Billings Heights and the interstate, which are limited by a lack of Yellowstone River crossings. Limited mobility to and from Billings Heights is also an issue affecting emergency response. Main Street is currently the only emergency route between downtown Billings and the Billings Heights neighborhood. Incidents affecting traffic operations on Main Street have been an impediment to emergency response, which is a concern expressed by the Yellowstone County Disaster and Emergency Services Department.

1.4.4 IMPROVE TRUCK/COMMERCIAL VEHICLE ACCESS TO AND THROUGH BILLINGS

In the 1990s, the City of Billings and Yellowstone County began to pursue federal funds to study options for improving conditions on the segment of the Camino-Real International Trade Corridor through Billings. After completion of the feasibility study in 2001, federal funds were appropriated for a bypass route connecting between I-90 and MT 3 north of Billings. Although funding constraints prompted a reduction in the scope of the project, improved truck/commercial vehicle access to state highways and major facilities serving the Billings area is a need identified in the *Billings Urban Area Long-Range Transportation Plan* (2009 Update). The Billings Bypass project is intended to address this need, and the segment of this facility that would provide a connection between I-90 and Old Hwy 312 is included in the list of fiscally constrained long-range projects identified in the plan.

1.5 DESIGN OBJECTIVES

During the project development process, regulatory agencies, the BBAC, and the general public were asked to provide input on the proposed project. That input was used to develop a series of design objectives, which are outlined below. These objectives are divided into five categories: (1) roadway functionality, (2) Yellowstone River crossing (for applicable alternatives), (3) safety considerations, (4) community and environmental considerations, and (5) cost considerations. These design objectives served as guidelines in the development of an initial range of alternatives.

1.5.1 ROADWAY FUNCTIONALITY

- Design for National Highway System (NHS) Principal Arterial standards.
- Incorporate access control measures that balance through mobility and local access needs.
- Consider existing and future land use in a context-sensitive manner.
- At a minimum, provide service-level interchanges at the interstate.

- Locate the western terminus of the route so that it supports a future connection to US 87 and MT 3.

1.5.2 YELLOWSTONE RIVER CROSSING (FOR APPLICABLE ALTERNATIVES)

- Minimize impacts to the Yellowstone River and floodplain to the extent practicable.
- Locate the river crossing to provide flexibility for future expansion of the bridge (i.e., local physical constraints would not preclude possible expansion during the lifespan of the bridge, if future demands exceeded capacity planned for 2035).

1.5.3 SAFETY CONSIDERATIONS

- Improve emergency access to the Billings Heights neighborhood.
- Provide grade-separated railroad crossings.
- Improve or maintain safety on connecting routes.
- Meet MDT standards based on the projected traffic volumes and vehicle mix.

1.5.4 COMMUNITY AND ENVIRONMENTAL CONSIDERATIONS

- Maintain or improve traffic conditions in the eastern area of Billings.
- Accommodate crossings for planned bicycle/pedestrian routes documented in adopted local plans.
- Include pedestrian and bicycle facilities where appropriate along the proposed facility.
- Minimize social, environmental, and economic impacts to the extent practicable.

1.5.5 COST CONSIDERATIONS

- Accommodate phased construction to match funding availability.
- Limit the use of frontage roads to areas where they are essential.
- Minimize supporting infrastructure costs.

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2 ALTERNATIVES

2.1 INTRODUCTION

This chapter describes the alternatives evaluated in detail in this document, including the proposed alignments and typical sections, preliminary estimated costs, proposed funding, and proposed project phasing and implementation. Section 2.2 describes the development and screening process used to identify the alternatives carried forward for detailed evaluation in this FEIS, each of which is described in Section 2.3. Section 2.4 compares and contrasts the impacts associated with the various build alternatives and provides the rationale for selecting the Preferred Alternative, and Section 2.5 presents alternatives that were considered but were eliminated from further study in the EIS.

Finally, Section 2.6 presents an option for phased implementation of the project due to funding constraints. This section explains the funding available for the project, how and when phased implementation might occur, and construction sequencing.

Selection of the Preferred Alternative was based on the Full Buildout of the project, and thus impacts associated with the Full Buildout of the project are summarized first in this chapter for each of the build alternatives. However, a summary of the impacts and mitigation associated with Phase 1 of the Preferred Alternative is provided in the discussion of phased implementation in **Table 2.7**. Impacts associated with a phased project for the other build alternatives are presented in Chapter 4.

Public and stakeholder involvement is described in Chapter 6.

2.2 ALTERNATIVES DEVELOPMENT AND SCREENING

Through public involvement activities and interdisciplinary coordination with federal, state, and local transportation officials and resource agencies, a number of alternatives were developed and analyzed for their operational benefits and general impacts to the surrounding built and natural environment. To determine which alternatives would best meet the project purpose and need while minimizing impacts to the community and environment, the project team completed a three-step screening process described below. **Figure 2.1** is a graphic representation of the screening process. The specific screening criteria used during each step are summarized in **Table 2.1**. Additional information on the alternatives and the screening process can be found in the *Billings Bypass Alternatives Report* (DEA 2011b), attached as Appendix I. More than 60 alternatives were screened using this process, and numerous alternatives were eliminated from further consideration; these alternatives are described in Section 2.5, "Alternatives Considered But Eliminated."

Figure 2.1 Alternatives Development and Screening Process

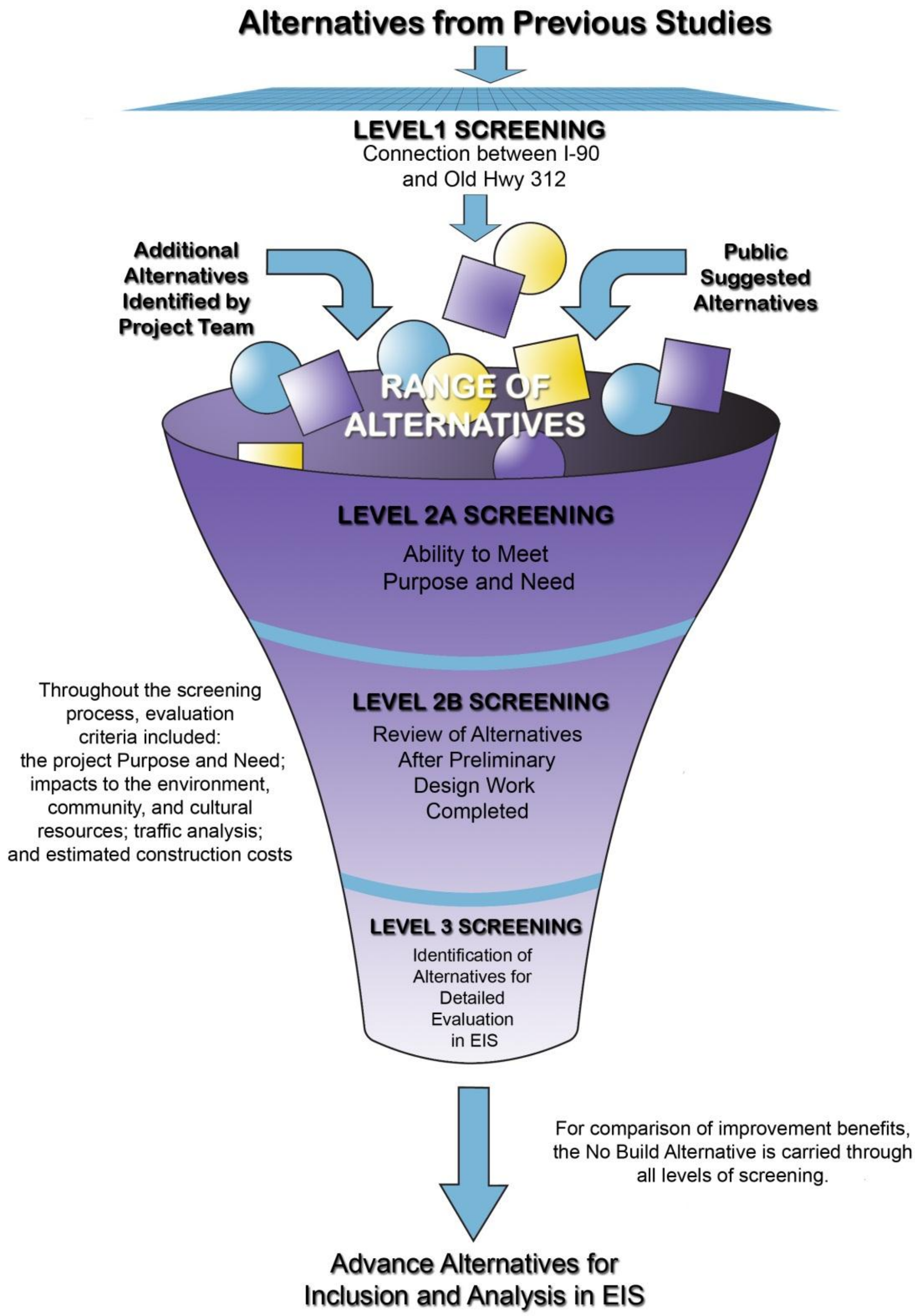


Table 2.1 Alternatives Screening Criteria

SCREENING CRITERIA
LEVEL 1: REVIEW OF ALTERNATIVES FROM PREVIOUS PURPOSE AND NEED
Does the alternative make a connection between the interstate and Old Hwy 312?
LEVEL 2A: ABILITY TO MEET PURPOSE AND NEED
How well does the alignment meet the project purpose and need? (Rate High, Moderate, or Poor) - Reduce physical barrier impacts (Does alternative traverse physical barriers?) - Improve connectivity between Lockwood and Billings (How does alternative route distance between Johnson Lane interchange and intersection of Wicks Lane and Main Street compare with existing route distance?) - Improve mobility to and from Billings Heights (Would alternative provide an alternate route between Billings Heights and interstate?) - Improve truck/commercial vehicle access to and through Billings (Would alternative provide new truck/commercial vehicle access to and through Billings with direct connection to US 87? Would alternative easily extend west from US 87 to MT 3 in the future?)
General Cultural and Floodplain Impacts: - Known Cultural/Historic Sites - Potential for Floodplain Impacts (linear feet across or adjacent to floodplain)
LEVEL 2B: REVIEW OF ALTERNATIVES AFTER PRELIMINARY DESIGN WORK COMPLETED
Travel Time Benefits
Right-of-Way (ROW) Impacts (number of parcels and structures)
Potential for Floodplain Impacts (linear feet across or adjacent to floodplain)
Other Potential Issues (impacts to community resources, such as schools, churches, cemeteries, parks and recreational facilities, and neighborhoods)
LEVEL 3: IDENTIFICATION OF ALTERNATIVES FOR DETAILED EVALUATION IN EIS
Traffic Data - Projected Average Daily Traffic (ADT) for 2035 - Origin-Destination: The preliminary traffic data was evaluated to identify the percentage of trips using the proposed alternative alignments that were traveling to or from Billing Heights versus to or from the outlying area northeast of Billings. - Project-Generated Traffic: Traffic patterns were evaluated to determine how the alternatives would affect traffic volumes on existing connecting streets. - ADT Reduction on Main Street.
Construction Cost Estimated cost of mainline, bridges, interchanges, and channel crossings, as well as ROW, preliminary engineering, construction engineering, mobilization, and an additional amount for contingency and miscellaneous items.

2.2.1 LEVEL 1 SCREENING: REVIEW OF ALTERNATIVES FROM PREVIOUS PURPOSE AND NEED

The project team started the process of identifying potential alternatives by reviewing all of the previously identified alternatives. Because the scope of the original project was much larger, the project team isolated the relevant segment of the previously identified alternatives: the segment between the interstate and Old Hwy 312. Alignments that would provide a connection between the interstate and Old Hwy 312 were advanced for further consideration. Alternatives and segments of alternatives that did not make this connection were screened out, because they would not meet the revised purpose and need.

2.2.2 LEVEL 2 SCREENING AND IDENTIFICATION OF RANGE OF ALTERNATIVES

Based on public and agency input, the design team developed a wide range of alternatives that could potentially be feasible under the purpose and need. These alternatives, along with the previously identified alternatives advanced from the Level 1 screening, were compared to one another to determine how well they met the identified purpose and need of the project. This step focuses on the alignments without consideration of typical sections or the type of connection to existing routes. Due to the large number of conceptual alternatives under consideration, this screening was completed in two parts.

2.2.2.1 LEVEL 2A SCREENING: ABILITY TO MEET PURPOSE AND NEED

Level 2A considered potential alignments only. Design work was not completed for any of the alternatives at this point in the process. This level focused on key benefits related to the purpose and need as well as cultural and floodplain impacts that could be a fatal flaw.

2.2.2.1.1 KEY BENEFITS RELATED TO THE PURPOSE AND NEED

- **Reduce Physical Barrier Impacts** – The rimrocks, the Yellowstone River, the railroad, and I-90 create barriers for north-south connections in the Billings area, which affect local traffic and regional traffic. The degree to which each alternative would reduce the impacts of these barriers was assessed. In general, provision of new routes traversing these barriers was assessed as a greater benefit than improvements to existing routes traversing these barriers.
- **Improved Connectivity between Lockwood and Billings** – To gauge how well the alternatives would improve connectivity between Lockwood and Billings, the project team measured route distances between common points to compare the proposed alternatives to the existing conditions. The two common points used were the Johnson Lane Interchange in Lockwood and the intersection of Wicks Lane and Main Street in Billings Heights (which is a common destination for commercial services). Alternatives with longer route distances were deemed to provide less benefit and received a lower rating.
- **Improved Mobility between Billings Heights and the Interstate** – There are two primary factors that currently impact mobility for Billings Heights residents: (1) there is only one route in and out of Billings Heights, and when this route is incapacitated, there are no alternate routes, and (2) the existing route is highly congested. To gauge how well the alternatives would improve mobility to and from the Billings Heights area, the project team assessed how the alternatives would improve the convenience and consistency with which people in Billings Heights could travel to and from their neighborhood.
- **Improve Truck/Commercial Vehicle Access to and through Billings** – Improved truck/commercial vehicle access to state highways and major facilities serving the Billings area is a need identified in the *Urban Area Long-Range Transportation Plan 2009 Update* (Cambridge Systematics 2010). The alternatives were assessed to determine how well they would support the plan for a future bypass route between I-90 and MT 3 north of Billings.

2.2.2.1.2 POTENTIAL ENVIRONMENTAL AND COMMUNITY IMPACTS

- **Cultural/Historic Sites** – The National Register of Historic Places (NRHP) was reviewed to identify resources in the study area. Additionally, cultural surveys were completed in 2007 for areas along the preliminary alternatives identified under the original purpose and need for the project. No sites listed on the NRHP were identified in proximity to the conceptual alternatives currently under consideration, but one site identified during the 2007 cultural surveys (a historic battlefield site) was identified as a resource that must be avoided due to the high cultural significance of the site. As such, previously identified alternatives crossing through this historic site were screened out.
- **Floodplain Impacts** – Delineated floodplains within the study area (described and pictured in Chapter 1) are associated with the Yellowstone River, Five Mile Creek, Alkali Creek, and Dry Creek. The Yellowstone River has a broad floodplain through most of the study area, and there are relatively few places in the vicinity of Billings where a cost-effective bridge over the river could be built without substantial impacts to the floodplain. Therefore, the linear feet across or adjacent to the 100-year floodplain were measured for each alternative to identify alignments with a higher potential for impacts to the river and floodplain.

2.2.2.2 LEVEL 2B SCREENING: REVIEW OF ALTERNATIVES AFTER PRELIMINARY DESIGN WORK COMPLETED

For the alternatives advanced from Level 2A, preliminary horizontal design work was completed to facilitate development of travel time estimates and assessment of impacts to private property. For the alternatives involving new roadway alignments, two right-of-way (ROW) widths (130 feet and 200 feet) were screened to provide a range of impacts for each alternative. The screening criteria consisted of travel time benefits, private property impacts, and other potential issues that could be a fatal flaw.

- **Travel Time Benefits –** Travel times between Lockwood and Billings Heights were estimated in order to identify the reduction or increase in travel time on the proposed alignment in comparison to existing conditions. Travel time relates to the mobility and connectivity needs of the project.
- **ROW Impacts –** Analysis was performed to determine the number of parcels and structures that would be impacted by the proposed ROW limits for each alternative.
- **Other Potential Issues –** The project team also reviewed available data to identify community resources that could be impacted by the alternatives. This included such resources as schools, churches, cemeteries, parks and recreational facilities, and neighborhoods. The potential for floodplain impacts was also carried forward as a screening criterion from Level 2A.

2.2.3 LEVEL 3 SCREENING: IDENTIFICATION OF ALTERNATIVES FOR DETAILED EVALUATION IN EIS

The alternatives advanced from the Level 2B screening were evaluated to determine the appropriate design standards for each section based on factors such as the surrounding land use and zoning, whether the alternative fell within or outside of the Metropolitan Planning Organization (MPO) or Billings Urban Area boundaries, terrain, access needs, safety, and the speed and functional classification of connecting roads. Design standards are a set of criteria that act as a guideline in the development of a new roadway and are used to develop typical sections—or cross sections—that represent the roadway design for a particular segment of the proposed roadway (see Section 2.3.3, "Typical Sections," for a discussion of design standards). Additional conceptual level of design was completed for each alternative using the appropriate design standards in order to develop construction cost estimates and traffic projections.

During this level of screening, alternatives were evaluated as complete alignments; i.e., each alignment option north of the Yellowstone River was paired with an alignment option south of the Yellowstone River for a total of 24 complete alignments. The alignments were compared to each other using criteria from the Level 2 screening process, in addition to traffic data and construction cost estimates. These additional criteria are discussed in detail below. Alternatives that would provide similar benefits to other alternatives but with more impacts or higher cost were screened out.

The additional criteria for this level of screening were:

- **Projected Average Daily Traffic (ADT) for 2035** – The traffic loadings on the proposed alternative alignments were projected by examining the directional traffic demand on the existing US 87 crossing of the Yellowstone River using turning movements counts at a number of key junctions and data from previous origin-destination studies.
- **Origin-Destination** – The preliminary traffic data was evaluated to identify the percentage of trips utilizing the proposed alternative alignments that were traveling to or from Billing Heights versus those traveling to or from the outlying area northeast of Billings.
- **Project-Generated Traffic –** Traffic patterns were evaluated to determine how the alternatives would affect traffic volumes on existing connecting streets.
- **ADT Reduction on Main Street** – Although reducing traffic congestion is not the purpose of this project, the potential benefits to Main Street were examined. For each alternative alignment, the reduction of traffic on Main Street was estimated.

Construction Costs – The project team estimated the construction costs for each alignment. The cost estimates include construction of the mainline, bridges, interchanges, and channel crossings, as well as ROW, preliminary engineering, construction engineering, mobilization, and an additional amount for contingency and miscellaneous items.

2.2.3.1 NEED FOR SECONDARY CORRIDOR IMPROVEMENTS

The need for secondary corridors was identified during Level 3 of the alternatives screening process. The Level 3 screening included a preliminary analysis of traffic impacts to the existing street network that would occur if any of the alternatives were to be implemented. This analysis revealed that each alternative would generate an increase in traffic on connecting routes at a level that could not be accommodated by the current roadway design. The traffic impacts would need to be mitigated in order to meet design objectives for operations and safety, as discussed in the *Billings Bypass Alternatives Report* (DEA 2011b), attached as Appendix I to this FEIS. Therefore, improvements to existing routes north of the Yellowstone River were incorporated into each alternative as a "secondary" corridor. These improvements would not be required right away but would be necessary for design year traffic (2035). Graphic depictions of the primary and secondary corridor improvements required for each alternative are shown in **Figure 2.3**, **Figure 2.4**, and **Figure 2.5**.

2.3 ALTERNATIVES ADVANCED TO EIS ANALYSIS

This section outlines the three build alternatives and the No Build Alternative. Each of the build alternatives begins at the Johnson Lane Interchange with I-90 and uses approximately the same alignment north across the railroad towards one of two potential locations for crossing the Yellowstone River. North of the river, three corridors have been identified to complete the connection to Old Hwy 312:

- Mary Street Option 1 Alternative
- Mary Street Option 2 Alternative
- Five Mile Road Alternative

Project Elements Considered

The project team analyzed multiple project elements including alternative cross sections, alignments, and intersection locations and configurations. Cross sections were developed based on projected traffic volumes. At the interstate, connections at both existing and new interchange locations were considered, and multiple interchange configurations were developed. For intersections requiring signalization, roundabouts were also considered. Alternatives were further refined, as appropriate, using the purpose and need statement, design objectives, and data analysis.

Interchanges and Intersections for the Primary Corridor Improvements

Multiple preliminary conceptual designs for the interchange and intersections have been evaluated in this FEIS. These concepts are presented in Appendix H and discussed in further detail in Section 2.3.3. The precise configuration of the Johnson Lane Interchange and other intersections with existing roadways would be determined during final design; therefore, the impact analysis documented in Chapter 4 accounts for the maximum potential impact anticipated in the vicinity of the interchange and intersections.

2.3.1 NO BUILD ALTERNATIVE

Consistent with NEPA requirements, this FEIS considers an alternative that assesses what would happen to the environment in the future if the proposed project was not built. This alternative, called the No Build Alternative, includes the routine maintenance and operations of the existing roads in the study area. The No Build Alternative does not include any elements associated with the proposed build alternatives described in this FEIS.

Although the No Build Alternative does not meet the purpose and need, it provides a baseline condition against which to compare and measure the effects of the build alternatives. Modeling assumptions used for the No Build Alternative include: historic traffic patterns, land use changes contained in the *Billings Urban Area Long-Range Transportation Plan 2009 Update* (Cambridge Systematics 2010), and implementation of committed projects that would be constructed by 2035. These assumptions were used to calculate traffic projections for the No Build Alternative. Detailed information on the No Build Alternative traffic projections can be found in the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013).

2.3.2 BUILD ALTERNATIVES

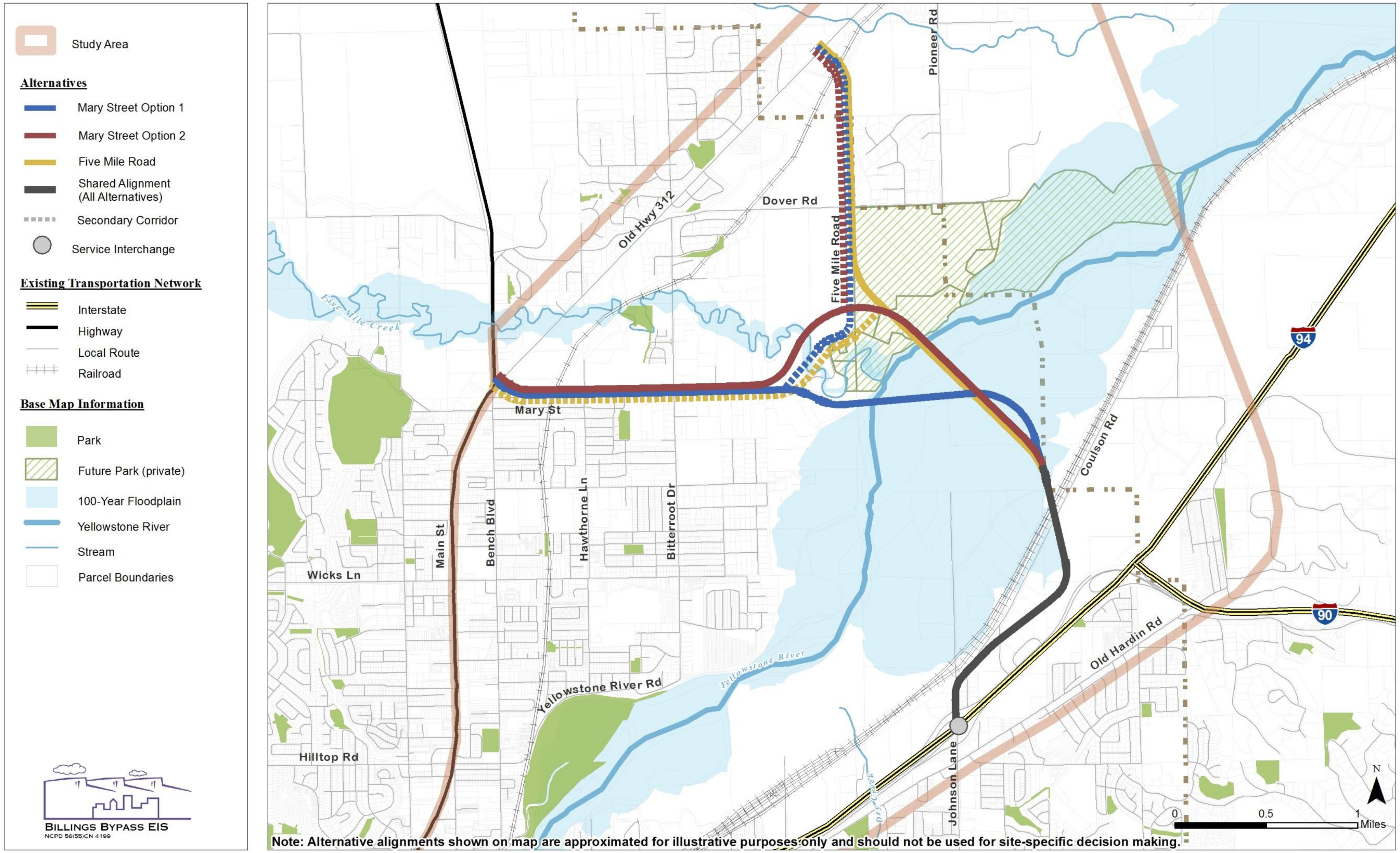
Three build alternatives are presented in this FEIS. **Figure 2.2** shows the alignments of the build alternatives. The primary corridor improvements for each of the build alternatives are four-lane principal arterial roadways across the Yellowstone River between the I-90/Johnson Lane Interchange and Old Hwy 312. The secondary corridor improvements address additional traffic on connecting routes and are necessary to meet traffic and safety design objectives within the 20-year planning horizon. These improvements may also involve the construction of new facilities to connect the existing corridor to the new build alternative alignment.

The following elements are described for each of the three build alternatives:

- Primary Corridor Improvements – descriptions of the primary corridor between the I-90 Johnson Lane Interchange, bridging across the Yellowstone River and other waters, and connecting to Old Hwy 312.
- Secondary Corridor Improvements – descriptions of proposed modifications to existing roads, or construction of new roads.
- Typical Sections – roadway design for a particular segment of the proposed roadway.
- Access to Adjacent Properties – planned accommodations for local access to the primary corridor.
- Interchange and Intersection Improvements – introduction of conceptual designs and options.

For any of the bridge crossings, the descriptions in this FEIS are based on preliminary design. During final design, bridge types would be evaluated based on current conditions and available technology.

Figure 2.2 Build Alternatives



Sources: DOWL HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010
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2.3.2.1 MARY STREET OPTION 1 ALTERNATIVE

This alternative would provide a 4.89-mile-long connection across the Yellowstone River between I-90 and Old Hwy 312 traversing land zoned for residential, agricultural, and commercial use. The improvements proposed under Mary Street Option 1 are depicted in **Figure 2.3** and described below.

2.3.2.1.1 PRIMARY CORRIDOR IMPROVEMENTS

South of the Yellowstone River, the Mary Street Option 1 alignment would:

- Connect to I-90 at Johnson Lane, requiring reconstruction of the existing interchange.
- Proceed north from I-90 along Johnson Lane and follow the existing Coulson Road alignment northeast for approximately 0.3 mile.
- Veer off of the existing Coulson Road alignment and continue northeast roughly along the boundaries of parcels with industrial use. This alignment would include an at-grade connection with Coulson Road approximately 0.35 mile northeast of Johnson Lane. The existing segment of Coulson Road between Johnson Lane and this new connection would be removed.
- Cross over Coulson Road and the Montana Rail Link (MRL) railroad via grade-separated, side-by-side bridge structures.
- Proceed northwest toward the Yellowstone River traversing agricultural land and the Yellowstone River floodplain.

North of the Yellowstone River, the alignment would:

- Proceed west toward the Mary Street corridor.
- Parallel the north side of Mary Street approximately 80 to 100 feet north of the existing Mary Street corridor for approximately 1.6 miles, traversing land with residential and agricultural uses.
- Connect to the local street network at four locations: east end of Mary Street, Bitterroot Drive, Hawthorne Lane, and Bench Boulevard.
- Terminate at Old Hwy 312 near the intersection with Bench Boulevard.

Aside from improvements to implement the four intersection connections to the Mary Street Option 1 alignment, Mary Street would not be altered as part of this alternative.

Yellowstone River Crossing

To cross the Yellowstone River, this alternative would construct side-by-side bridges in two locations: the main channel and a side channel. The main channel structures are estimated at approximately 2,010 feet long with up to eight piers in the water, and the side channel structures are estimated at 185 feet long with two piers in the water. This alternative would cross the Yellowstone River south of its confluence with Five Mile Creek.

2.3.2.1.2 SECONDARY CORRIDOR IMPROVEMENTS

For the Mary Street Option 1 Alternative, secondary corridor improvements to existing roads would include: reconstruction of Five Mile Road to MDT standards. This would include shoulder and slope improvements to the existing roadway and the connection between Mary Street and Five Mile Road.

Additional secondary corridor improvements that would involve construction of new facilities are:

- New bridge over Five Mile Creek.
- New segment of Five Mile Road from Dover Road, terminating at Old Hwy 312 approximately 1 mile north of Dover Road, directly north of Westgate Machinery Company.

2.3.2.1.3 TYPICAL SECTIONS

Typical sections for the primary corridor for the Mary Street Option 1 Alternative are shown in **Figure 2.3**. The primary corridor would be four lanes wide with a median or median turn lane and 8-foot shoulders, and design speeds would be 55 mph. The secondary corridor would be two lanes with 8-foot shoulders with design speeds of 60 mph. Typical sections are described in more detail in Section 2.3.3.

2.3.2.1.4 ACCESS TO ADJACENT PROPERTIES

Under this alternative, the existing Mary Street corridor would continue to be used for local resident access. Residents currently living on the north side of Mary Street with access to Mary Street would be provided an access to the new arterial route. The new access would be either at the same location or in some cases would be realigned to the safest access point.

2.3.2.1.5 INTERCHANGE AND INTERSECTION IMPROVEMENTS

Primary Corridor

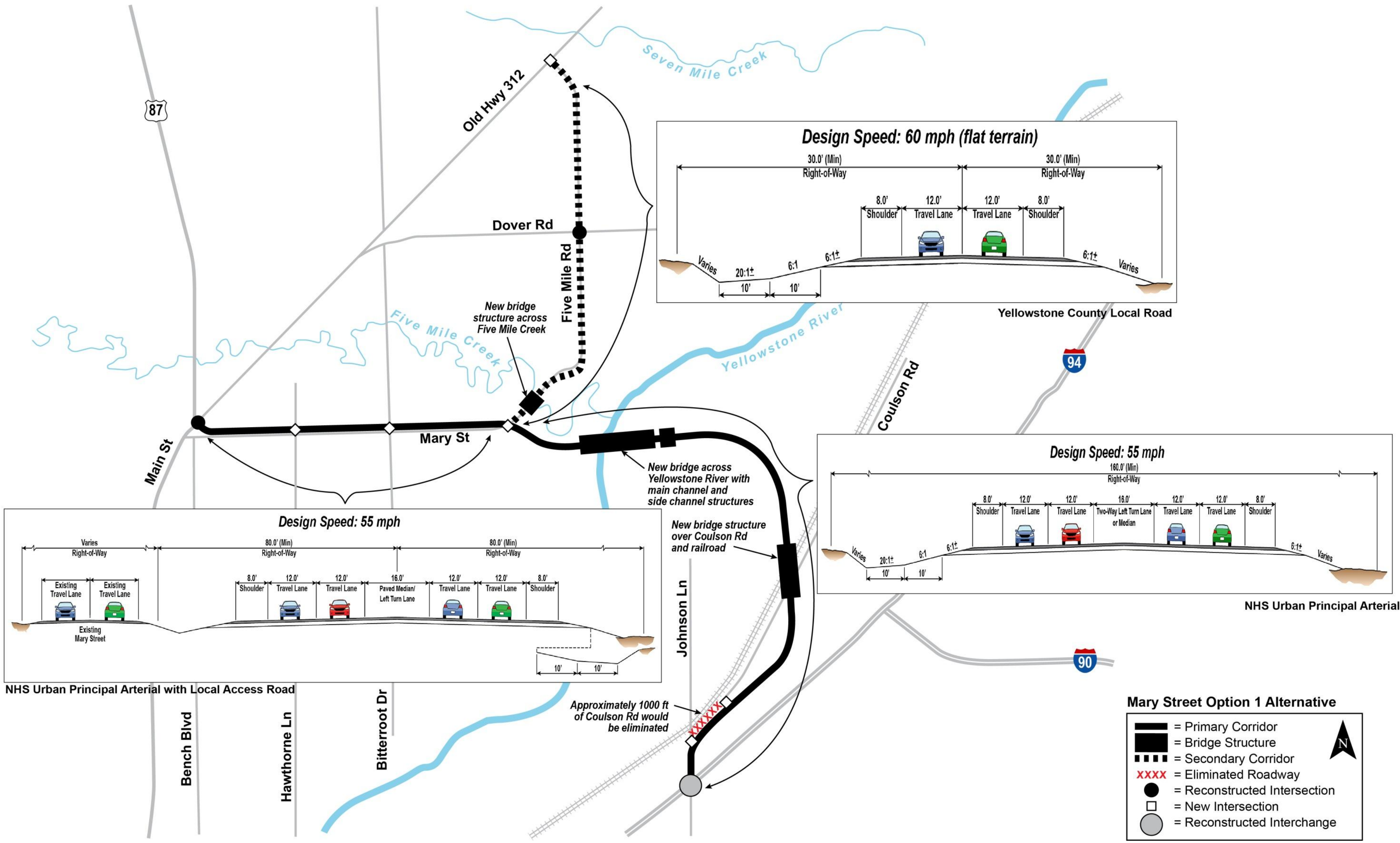
The precise configuration of the Johnson Lane Interchange and intersections with existing roadways would be determined during final design. Multiple preliminary conceptual designs for the interchange and intersections have been evaluated. These concepts are presented in Appendix H and discussed in further detail in Section 2.3.4. The impact analysis documented in Chapter 4 accounts for the maximum potential impact anticipated in the vicinity of the interchange and intersections.

Secondary Corridor

For the Mary Street Option 1 Alternative, secondary corridor intersection improvements would include:

- A stop-controlled intersection on Dover Road at its intersection with Five Mile Road. This includes exclusive left-turn lanes on both Five Mile Road approaches.
- A proposed signalized intersection or a roundabout for the intersection with Old Hwy 312. A signalized intersection at this location would have left- and right-turn lanes on all legs of the intersection.

Figure 2.3 Mary Street Option 1 Alternative



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2.3.2.2 MARY STREET OPTION 2 ALTERNATIVE

This alternative would provide a 5.15-mile-long connection across the Yellowstone River between I-90 and Old Hwy 312, traversing land zoned for residential, agricultural, and commercial use, as well as a tract of future park land that is privately owned. The improvements proposed under Mary Street Option 2 are depicted in **Figure 2.4** and described below.

2.3.2.2.1 PRIMARY CORRIDOR IMPROVEMENTS

South of the Yellowstone River, this alternative would be very similar to Mary Street Option 1, except the alignment would:

- Cross the river to the north of the Five Mile Creek confluence, requiring an approach located slightly northeast of that identified for the Mary Street Option 1 Alternative.

North of the Yellowstone River, the alignment would:

- Proceed northwest through undeveloped private land that is planned as a regional park.
- Arc to the southwest toward the Mary Street corridor from the new intersection with Five Mile Road.
- Add a new bridge crossing over Five Mile Creek.
- Parallel the north side of Mary Street approximately 80 to 100 feet north of the existing Mary Street corridor for approximately 1.6 miles and traverse land with residential and agricultural uses.
- Aside from improvements to implement the four intersection connections to the Mary Street Option 2 alignment, Mary Street would not be altered as part of this alternative.
- Terminate at Old Hwy 312 near the intersection with Bench Boulevard.

Yellowstone River Crossing

To cross the Yellowstone River, this alternative would construct side-by-side bridges at one location. The structures are estimated at approximately 1,890 feet long and would have up to nine piers in the water. This alternative would cross the Yellowstone River north of its confluence with Five Mile Creek.

2.3.2.2.2 SECONDARY CORRIDOR IMPROVEMENTS

For the Mary Street Option 2 Alternative, secondary corridor improvements to existing roads would include reconstruction of Rive Mile Road to MDT standards. This would require shoulder and slope improvements to the existing roadway north of the primary corridor.

Unlike Mary Street Option 1 Alternative, reconstruction of the existing roadway connection between Mary Street and Five Mile Road would not be required, because traffic on that segment of road is not anticipated to increase as a result of this alternative.

An additional secondary corridor improvement that would involve construction of new facilities would be:

- New segment of Five Mile Road from Dover Road, terminating at Old Hwy 312 approximately 1 mile north of Dover Road, directly north of Westgate Machinery Company.

2.3.2.2.3 TYPICAL SECTIONS

Typical sections for the primary corridor for the Mary Street Option 2 Alternative are shown in Figure 2.4. The primary corridor would be four lanes wide with a median or median turn lane and 8-foot shoulders, and design speeds would be 55 mph. The secondary corridor would be two lanes with 8-foot shoulders with design speeds of 60 mph. Typical sections are described in more detail in Section 2.3.3, "Typical Sections."

2.3.2.2.4 ACCESS TO ADJACENT PROPERTIES

Under this alternative, the existing Mary Street corridor would continue to be used for local resident access. Residents currently living on the north side of Mary Street with access to Mary Street would be provided an access to the new arterial route. The new access would be either at the same location or in some cases would be realigned to the safest access point.

2.3.2.2.5 INTERCHANGE AND INTERSECTION IMPROVEMENTS

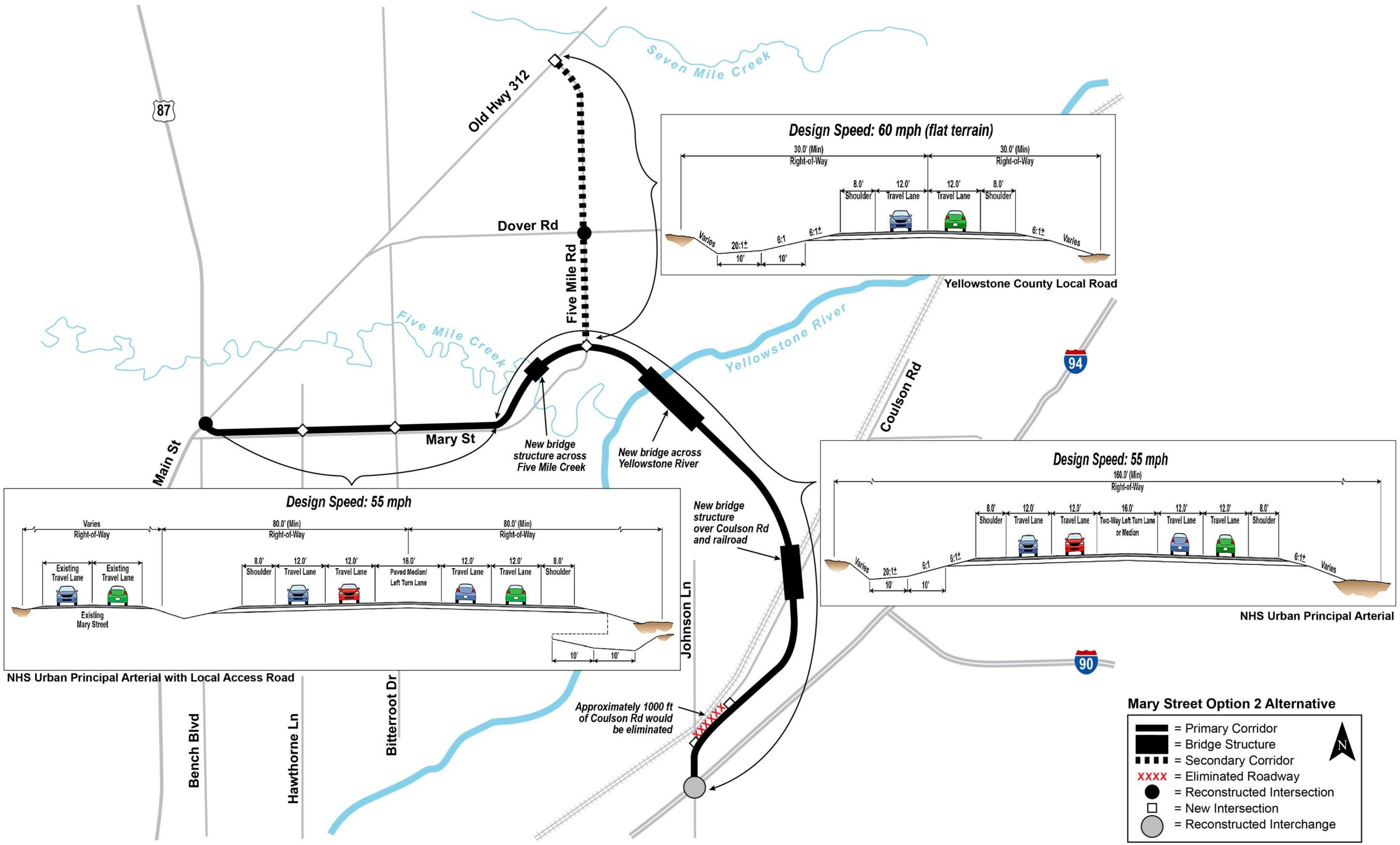
Primary Corridor

The precise configuration of the Johnson Lane Interchange and intersections with existing roadways would be determined during final design. Multiple preliminary conceptual designs for the interchange and intersections have been evaluated. These concepts are presented in Appendix H and discussed in further detail in Section 2.3.4. The impact analysis documented in Chapter 4 accounts for the maximum potential impact anticipated in the vicinity of the interchange and intersections.

Secondary Corridor

For the Mary Street Option 2 Alternative, secondary corridor intersection improvements would be the same as those described for the Mary Street Option 1 secondary corridor.

Figure 2.4 Mary Street Option 2 Alternative



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2.3.2.3 FIVE MILE ROAD ALTERNATIVE

This alternative would provide a 4.4-mile connection across the Yellowstone River between I-90 and Old Hwy 312, traversing land zoned for agricultural, commercial, and residential use, as well as a tract of future park land that is privately owned (see **Figure 2.5**).

2.3.2.3.1 PRIMARY CORRIDOR IMPROVEMENTS

South of the Yellowstone River, this alternative is the same as described for the Mary Street Option 2 Alternative.

North of the Yellowstone River, the Five Mile Road Alternative alignment would:

- Proceed northwest through undeveloped private land that is planned as a regional park.
- Arc to the northwest from a new intersection with the existing alignment of Five Mile Road. The existing Five Mile Road alignment south of this new intersection would be realigned.
- Follow the existing Five Mile Road alignment north.
- Reconstruct the existing segment of Five Mile Road north to Dover Road from a two-lane arterial to a four-lane principal arterial.
- Extend the four-lane principal arterial north from Dover Road to terminate at Old Hwy 312 approximately 1 mile north of Dover Road, directly north of Westgate Machinery Company.

Yellowstone River Crossing

To cross the Yellowstone River, this alternative would use the same side-by-side bridges as described for the Mary Street Option 2 Alternative. This alternative would cross the Yellowstone River north of its confluence with Five Mile Creek.

2.3.2.3.2 SECONDARY CORRIDOR IMPROVEMENTS

For the Five Mile Road Alternative, secondary corridor improvements to existing roads would include:

- Reconstruction of the existing roadway connection between Mary Street and Five Mile Road, including the existing bridge over Five Mile Creek, using MDT standards for a two-lane rural local road. This would require shoulder and slope improvements.
- Reconstruction of Mary Street along its existing alignment to City of Billings standards for an urban arterial roadway (see **Figure 2.7** through **Figure 2.11**). This would include:
    - Two travel lanes and a two-way left-turn lane (based on projected traffic volumes).
    - Curb and gutter.
    - Stormwater collection.
    - Bike lanes (based on recommendations in trails plan).
    - Intersection control, as necessary.
    - Lighting at intersections (if signalized).
    - No lighting along corridor, unless requested by residents.
    - Accommodations for the crossing at Kiwanis Trail.
    - Pedestrian facility on both sides of the road.

2.3.2.3.3 TYPICAL SECTIONS

Typical sections for the primary corridor for Five Mile Road Alternative are shown in **Figure 2.5**. The primary corridor would be four lanes wide with a median or median turn lane and 8-foot shoulders, and design speeds would be 55 mph from the interstate across the Yellowstone River and 70 mph for the north-south section of Five Mile Road, slowing to 55 mph in the approach to Old Hwy 312. The secondary corridor would be two lanes with 8-foot shoulders with design speeds of 60 mph from the primary corridor across Five Mile Creek. Along Mary Street, the secondary corridor would be two lanes with a two-way left-turn lane or median, bike lanes, boulevards, and sidewalks, and a design speed of 45 mph. Typical sections are described in more detail in Section 2.3.3.

2.3.2.3.4 ACCESS TO ADJACENT PROPERTIES

Under this alternative, residents currently living on the east or west side of Five Mile Road with access to Five Mile Road would be provided an access to the reconstructed arterial route. Access would be either at the same location or in some cases would be realigned to the safest access point. Access to the new Five Mile Road segment extending north from Dover Road to Old Hwy 312 would be determined during final design.

2.3.2.3.5 INTERCHANGE AND INTERSECTION IMPROVEMENTS

Primary Corridor

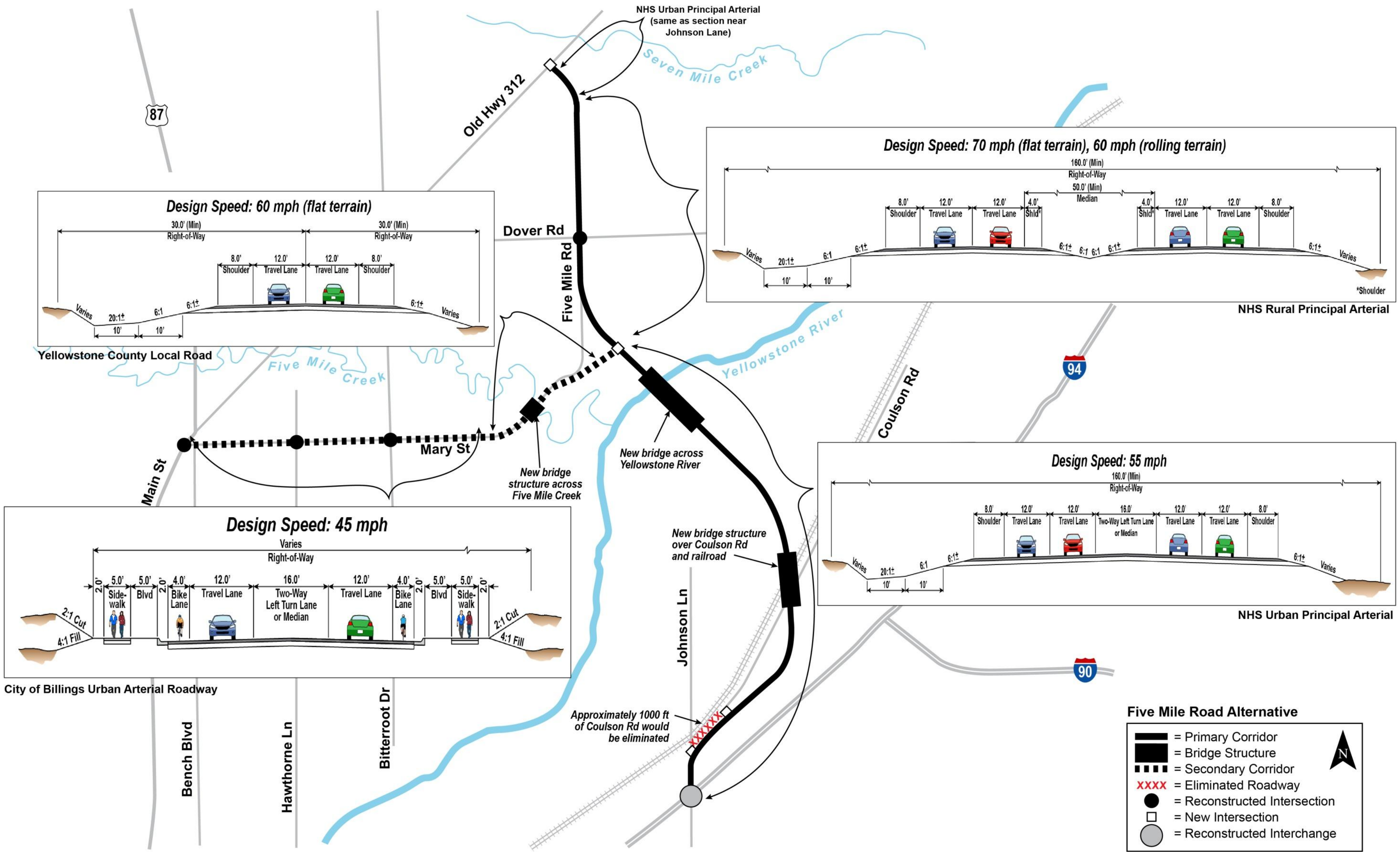
The precise configuration of the Johnson Lane Interchange and intersections with existing roadways would be determined during final design. Multiple preliminary conceptual designs for the interchange and intersections have been evaluated. These concepts are presented in Appendix H and discussed in further detail in Section 2.3.4. The impact analysis documented in Chapter 4 accounts for the maximum potential impact anticipated in the vicinity of the interchange and intersections.

Secondary Corridor

For the Five Mile Road Alternative, secondary corridor intersection improvements would include:

- An improved intersection between US 87/Old Hwy 312/Main Street and Mary Street to accommodate high demand for the Mary Street to/from Main Street movements.
- Either a traffic signal with left-turn lanes on all approaches or a roundabout at the intersection of Bitterroot Drive intersection with Mary Street.

Figure 2.5 Five Mile Road Alternative



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2.3.3 TYPICAL SECTIONS

Design standards are a set of criteria that act as a guideline in the development of a new roadway. These criteria are used to develop typical sections, also known as cross sections, that represent the roadway design for a particular segment of the proposed roadway. Typical sections for the alternatives are composed of several different elements, including but not limited to travel lanes, shoulders, medians, and pedestrian elements. Considered as a single unit, all of the cross section elements define the road right-of-way (ROW), which is the publicly owned parcel of land that encompasses all the various roadway elements.

A principal arterial with National Highway System (NHS) rural and/or urban standards is proposed for this project. An arterial road delivers traffic to highways, and a principal arterial is a major arterial road. A principal arterial would best serve the purpose of improving connectivity between I-90 and Old Hwy 312 and improving mobility in the eastern area of Billings. The NHS standards provide a good range of criteria that can be used to develop context-sensitive design. Principal arterial standards reflect the design objective of balancing through mobility and local access needs. The use of rural standards or urban standards was applied for this project based on the character of each corridor under consideration. More information on the application of design standards for specific project corridors and segments can be found in the *Billings Bypass Alternatives Report* (DEA 2011b).

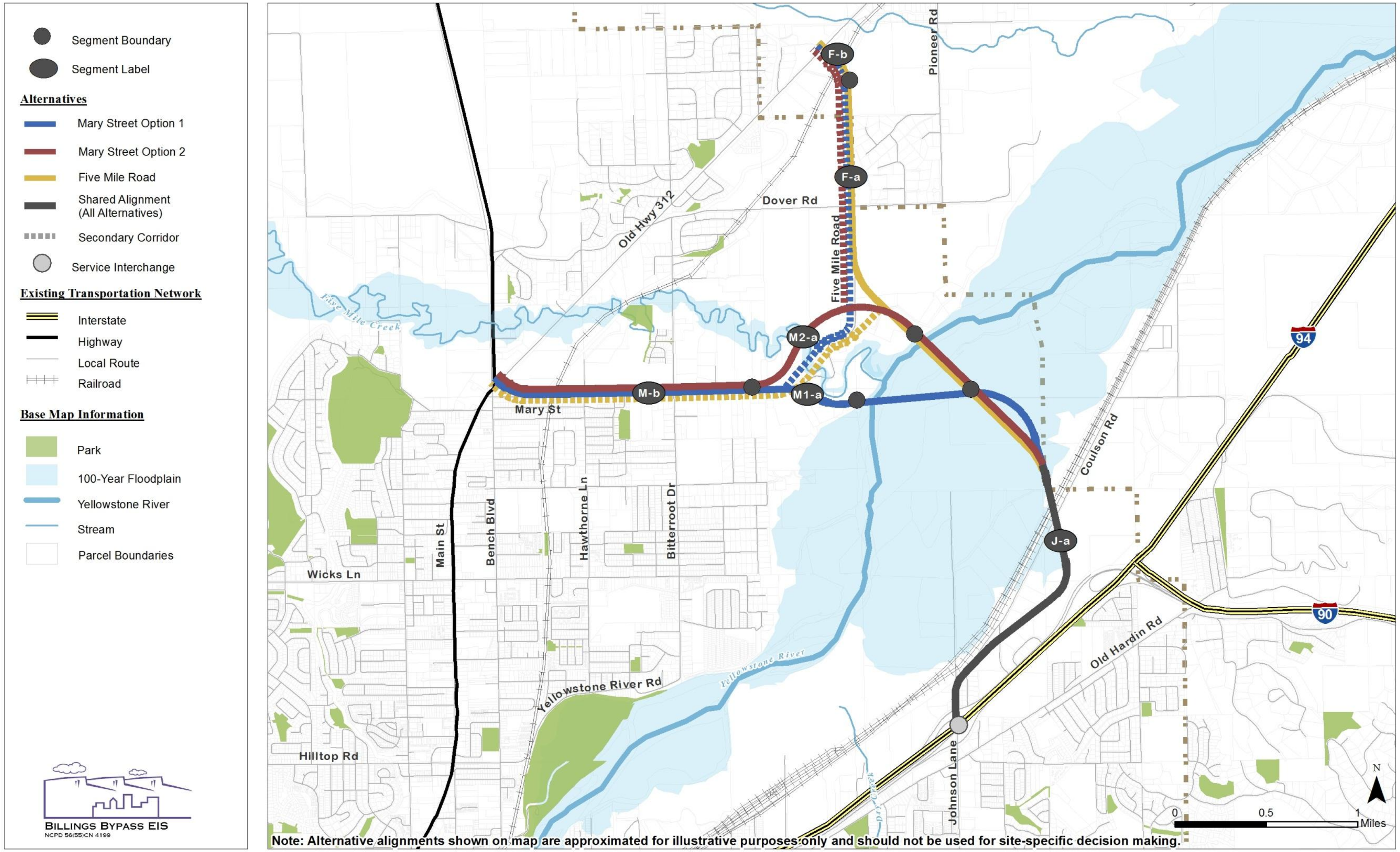
The typical sections to be used for the alternatives are based on the design standards for each segment, as identified in **Table 2.2** and shown below in **Figure 2.6**. The typical sections to be used for the build alternatives are depicted graphically in **Figure 2.7** through **Figure 2.11.** The lane widths and configurations are displayed for illustrative purposes. This FEIS analysis is built on the assumption that these typical sections would be used, and that final design and ROW acquisition would occur to satisfy these requirements.

Table 2.2 Design Standards of Build Alternatives

BUILD ALTERNATIVE	PRIMARY OR SECONDARY CORRIDOR	SEGMENT NUMBERS FOR ROADWAY SECTION	DESIGN STANDARDS
Mary Street Option 1	Primary Corridor	J-a	NHS Urban Principal Arterial
		M1-a	
		M-b	NHS Urban Principal Arterial with Frontage Road[1]
	Secondary Corridor	Connection between Mary Street and Five Mile Road	Yellowstone County Local Road
		Five Mile Road and extension of Five Mile Road	Yellowstone County Local Road
Mary Street Option 2	Primary Corridor	J-a	NHS Urban Principal Arterial
		M2-a	
		M-b	NHS Urban Principal Arterial with Frontage Road[1]
	Secondary Corridor	Five Mile Road and extension of Five Mile Road	Yellowstone County Local Road
Five Mile Road	Primary Corridor	J-a	NHS Urban Principal Arterial
		F-a	NHS Rural Principal Arterial
		F-b	NHS Urban Principal Arterial
	Secondary Corridor	Mary Street	City of Billings Urban Arterial Roadway
		Connection between Mary Street and Five Mile Road	Yellowstone County Local Road

[1] The existing Mary Street would provide local access to adjacent residents. Aside from minor intersection improvements, no improvements of the existing Mary Street are anticipated.

Figure 2.6 Primary Corridor Alignment Segments



Sources: DOWL HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010
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Primary Corridor Typical Sections

Figure 2.7 NHS Rural Principal Arterial (F-a)

Design Speed: 70 mph (flat terrain), 60 mph (rolling terrain)

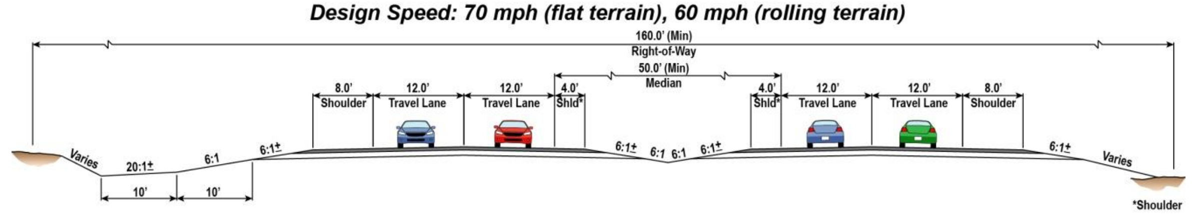


Figure 2.8 NHS Urban Principal Arterial (J-a, F-b, M1-a, M2-a)

Design Speed: 55 mph

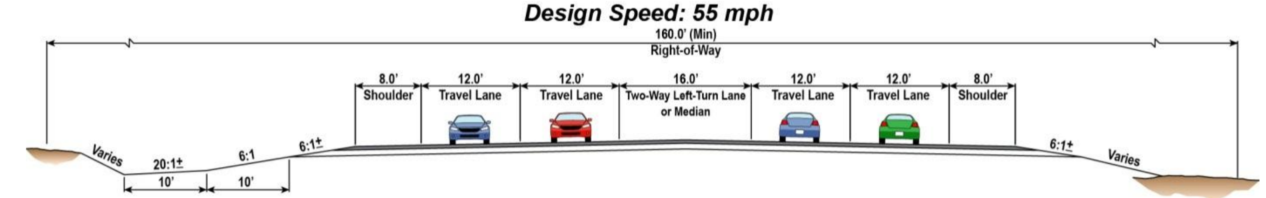
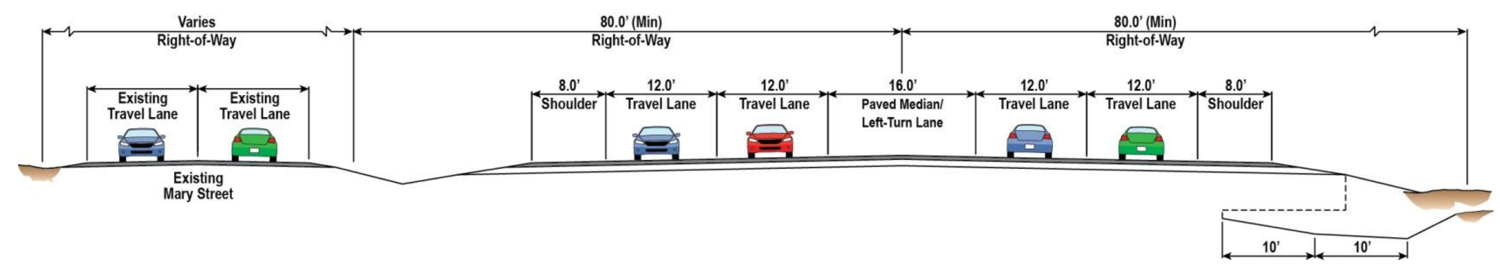


Figure 2.9 NHS Urban Principal Arterial with Local Access Road (M-b)

Design Speed: 55 mph



Secondary Corridor Typical Sections

Figure 2.10 Yellowstone County Local Road (Mary St., Five Mile Rd.)

Design Speed: 60 mph (flat terrain)

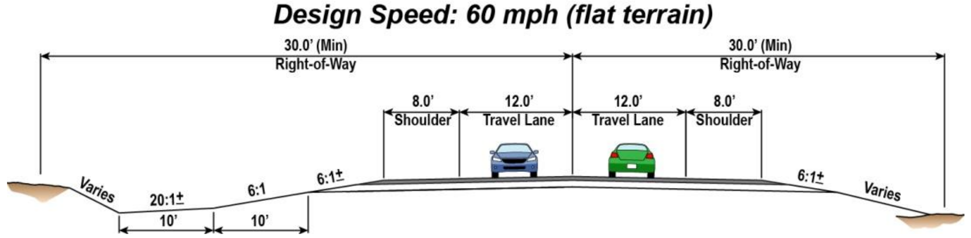
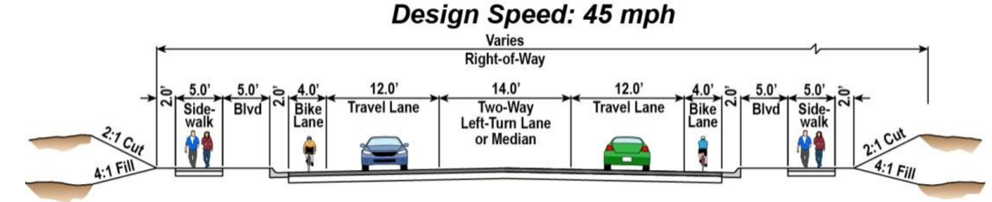


Figure 2.11 City of Billings Urban Arterial Roadway (Mary St., Five Mile Rd.)

Design Speed: 45 mph



2.3.4 INTERCHANGE AND INTERSECTION OPTIONS

For each build alternative advanced to EIS analysis, multiple intersection and interchange options were considered. Performance at each intersection or interchange option was analyzed in the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013). Analysis included measuring the intersection or interchange option Level of Service (LOS), which is a standardized grading system used to determine the effectiveness of operations. LOS can be defined in terms of the average total vehicle delay of all movements through an intersection or interchange. The following grades are used:

- A - Free flow (no delay)
- B - Stable flow (slight delays)
- C - Stable flow (acceptable delays)
- D - Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
- E - Unstable flow (intolerable delay)
- F - Forced flow (jammed)

All of the intersection options were reviewed, and a worst case footprint was ultimately used in the evaluation of the impacts in Chapter 4. Specific intersection treatments have not been selected at this time; the options would be analyzed further during final design. The intersection locations with multiple intersection configuration options under consideration are discussed below.

2.3.4.1 JOHNSON LANE INTERCHANGE OPTIONS – ALL BUILD ALTERNATIVES

There are five proposed options for the Johnson Lane/I-90 Interchange area. The options all include improvements to the Johnson Lane intersections with North Frontage Road, the I-90 on-/off-ramps, and Old Hardin Road, as well as the Old Hardin Road/Becraft Lane intersection.

2.3.4.1.1 OPTION 1 – MODIFIED DIAMOND WITH ROUNDABOUTS

The Johnson Lane/I-90 Interchange would be replaced with a modified diamond interchange that includes a single, elongated roundabout replacing the Johnson Lane/I-90 ramp intersections. Additionally, the three adjacent intersections would be replaced with roundabouts. Benefits of this option include improved levels of service at all five roundabouts compared to stop-controlled and signalized intersections. Detriments of this option include drivers' unfamiliarity with roundabout function and tight turn radii for large vehicles, including truck traffic.

2.3.4.1.2 OPTION 2 – SINGLE-POINT URBAN INTERCHANGE WITH SIGNALIZED INTERSECTIONS

The two Johnson Lane/I-90 ramp intersections would be replaced with a single intersection beneath the I-90 bridge structure. Additionally, the three adjacent intersections would be signalized, and a new connector street would be provided to improve access between Old Hardin Road and Becraft Lane. Benefits of this option include improved traffic flow through the area by replacing the two ramp intersections with a single intersection. Detriments of this option include worse performance at the Single-Point Urban Interchange intersection than that of other options.

2.3.4.1.3 OPTION 3 – SINGLE-POINT URBAN INTERCHANGE WITH ROUNDABOUTS

The two Johnson Lane/I-90 ramp intersections would be replaced with a single roundabout beneath the I-90 bridge structure. Additionally, the three adjacent intersections would be replaced with roundabouts. Benefits of this option include improved levels of service at all four roundabouts compared to stop-controlled and signalized intersection options. Detriments of this option include drivers' unfamiliarity with roundabout function, tight turn radii for large vehicles, including truck traffic, and potentially higher construction costs associated with a longer I-90 bridge structure to span the roundabout.

2.3.4.1.4 OPTION 4 – DOUBLE CROSSOVER DIAMOND WITH SIGNALIZED INTERSECTIONS

The Johnson Lane/I-90 Interchange would remain a diamond interchange; however, the Johnson Lane through lanes of traffic would cross over at the ramp intersections, so that northbound lanes would be on the west and southbound lanes would be on the east between the interchange intersections. The three adjacent intersections would be signalized, and a new connector street would be provided to improve access between Old Hardin Road and Becraft Lane. Benefits of this option include improved traffic flow throughout the area. Detriments of this option include intersection levels of service that are not as improved as under other options as well as drivers' unfamiliarity with the traffic lane crossover design.

2.3.4.1.5 OPTION 5 – DOUBLE CROSSOVER DIAMOND WITH ROUNDABOUTS

As with Option 4, the Johnson Lane through lanes of traffic would cross over at the ramp intersections, so that northbound lanes would be on the west and southbound lanes would be on the east. The three adjacent intersections would be roundabouts. Benefits of this option include improved traffic flow throughout the area. Detriments of this option include intersection levels of service at the interchange that are not as improved as under other options, as well as drivers' unfamiliarity with roundabouts and the traffic lane crossover design.

2.3.4.2 BITTERROOT DRIVE INTERSECTION OPTIONS (MARY STREET OPTION 1 AND 2 ALTERNATIVES)

For the Mary Street Option 1 and 2 alternatives, three intersection options are under consideration for the intersections of Mary Street, Bitterroot Drive, and the Billings Bypass. The options are:

2.3.4.2.1 OPTION 1 – SIGNALIZED INTERSECTION PLUS SHIFTED MARY STREET ALIGNMENT

Under this option, the Billings Bypass/Bitterroot Drive intersection would be signalized. The existing Mary Street/Bitterroot Drive intersection would be shifted south to provide enough distance between the intersections for proper performance. Benefits of this option include fewer ROW impacts to properties north of Mary Street compared to other options. Detriments include impacts to ROW and property south of Mary Street adjacent to Bitterroot Drive.

2.3.4.2.2 OPTION 2 – ROUNDABOUT PLUS UNCHANGED MARY STREET ALIGNMENT

Under this option, the Billings Bypass/Bitterroot Drive intersection would be a roundabout north of the existing Mary Street/Bitterroot Drive intersection. The Mary Street/Bitterroot Drive intersection would remain in its current location. Benefits of this option include better performance of the roundabout compared to the signalized intersection options and no ROW impacts to properties south of Mary Street. Detriments include a larger overall project footprint and ROW, and greater property impacts north of Mary Street.

2.3.4.2.3 OPTION 3 – SIGNALIZED INTERSECTION PLUS SHIFTED MARY STREET ALIGNMENT

Under this option, the Billings Bypass/Bitterroot Drive intersection would be signalized north of the existing Mary Street/Bitterroot Drive intersection. The Mary Street/Bitterroot Drive intersection would remain in its current location. Benefits of this option include no ROW impacts to properties south of Mary Street. Detriments include greater ROW and property impacts north of Mary Street than the other options.

2.3.4.3 US 87/OLD HWY 312/MAIN STREET/MARY STREET INTERSECTION OPTIONS (MARY STREET OPTION 1 AND 2 ALTERNATIVES)

For the Mary Street Option 1 and Option 2 alternatives alignments, there are three proposed options for the US 87/Old Hwy 312/Main Street/Mary Street intersection:

2.3.4.3.1 OPTION 1 – PRIMARY ROUNDABOUT PLUS T-INTERSECTIONS

The US 87/Old Hwy 312/Mary Street/Bench Boulevard intersections would be replaced with a primary roundabout with connections to US 87, Old Hwy 312, Main Street, and the proposed Billings Bypass alignment. East of the roundabout along the Billings Bypass alignment, a T-intersection would provide access to Mary Street and Bench Boulevard. Benefits of this option include fewer impacts to adjacent properties than the other options. Detriments include an expected LOS of D for vehicles approaching the stop-controlled intersection onto the Billings Bypass alignment from Mary Street and Bench Boulevard.

2.3.4.3.2 OPTION 2 – PRIMARY ROUNDABOUT PLUS SECONDARY ROUNDABOUT

The US 87/Old Hwy 312/Mary Street/Bench Boulevard intersections would be replaced with a primary roundabout with connections to US 87, Old Hwy 312, Main Street, and the proposed Billings Bypass alignment, and a secondary roundabout to the south. The secondary roundabout would have connections to Mary Street and Bench Boulevard. Benefits of this option include an expected LOS of A or B at the roundabouts in 2035. Detriments include greater property and ROW impacts and the need for modified access points for properties along the west end of Mary Street.

2.3.4.3.3 OPTION 3 – DUAL ROUNDABOUTS

The US 87/Old Hwy 312/Mary Street/Bench Boulevard intersections would be replaced with two roundabouts. The first roundabout would connect US 87, Old Hwy 312, and Main Street, and the second roundabout to the south would connect the Billings Bypass alignment, Mary Street, and Bench Boulevard. A short four-lane roadway segment would connect the two roundabouts. Benefits of this option include an expected LOS of A or B at the roundabouts in 2035. Detriments include greater property and ROW impacts, minor access modification for properties at the west end of Mary Street, and two roundabouts for Billings Bypass traffic to negotiate.

2.3.4.4 FIVE MILE ROAD/OLD HWY 312 INTERSECTION OPTIONS

For the Five Mile Road Alternative, a signalized intersection and a roundabout are under consideration for the Billings Bypass/Old Hwy 312 intersection. The signalized intersection and roundabout perform at LOS A. The roundabout would require more ROW than the signalized intersection.

2.3.5 PRELIMINARY COST ESTIMATE

Table 2.3 presents the preliminary cost estimate of each of the three build alternatives advanced to the FEIS. Estimates are expressed in 2012 dollars for consistency with the DEIS, and because the timing of construction stages cannot be precisely forecasted. The longer it takes for an alternative to be constructed, the higher the actual total costs would be, due to normal inflation factors.

Table 2.3 Preliminary Cost Estimate (in 2012 dollars, not adjusted for inflation)

PRELIMINARY COST ESTIMATE	
ALTERNATIVE	**COST**
Mary Street Option 1	$122.7 million
Mary Street Option 2	$111.1 million
Five Mile Road	$111.6 million

2.4 PREFERRED ALTERNATIVE

The Preferred Alternative was selected based on the ability to meet the purpose and need (as defined in Chapter 1) and a number of other factors. A complete description of the social, economic, and environmental impacts associated with the alternatives is found in Chapter 4, as well as a detailed comparison of these alternatives. Based on a consideration of the range of impacts and benefits associated with the build alternatives, the lead agencies determined that the Mary Street Option 2 Alternative would provide the best, most cost-effective long-term solution to meet the project's purpose and need while minimizing impacts to the surrounding community.

2.4.1 PERFORMANCE COMPARED TO THE PURPOSE AND NEED

The No Build Alternative does not meet the purpose and need for this project, because it would not reduce physical barriers to movement, improve connectivity between Lockwood and Billings, or improve mobility to and from Billings Heights. Therefore, it was not selected as the Preferred Alternative.

The first step in selecting a preferred alternative was to compare the performance of each alternative for the purpose and need. Results of the FEIS analysis demonstrate that the Mary Street alternatives perform better than the Five Mile Road Alternative (see **Table 2.4**).

Table 2.4 Performance Improvements, All Alternatives (2035)

PERFORMANCE CATEGORY/ PROJECT NEED	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD	SIGNIFICANT DIFFERENCE?
Reduced physical barrier impacts on traffic operations	15,900 Average Daily Traffic (ADT)*	15,600 ADT*	13,000 ADT*	Mary Street Options outperform Five Mile Road

PERFORMANCE CATEGORY/ PROJECT NEED	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD	SIGNIFICANT DIFFERENCE?
Connectivity improvements between Lockwood and Billings	30% reduction in ADT**	29% reduction in ADT**	23% reduction in ADT**	Mary Street Options outperform Five Mile Road
Mobility improvements	12% reduction in accidents	Same as Mary Street Option 1	9% reduction in accidents	Mary Street Options outperform Five Mile Road
	Reduction from 11 to 4 intersections operating at Level of Service (LOS) E/F	Same as Mary Street Option 1	Reduction from 11 to 5 intersections operating at LOS E/F	Mary Street Options outperform Five Mile Road
Travel time between Old Hwy 312/US 87 and I-90 at Johnson Lane	7.4 minutes travel time	7.6 minutes travel time	9.9 minutes travel time	Mary Street Options outperform Five Mile Road

*Higher numbers indicate fewer physical barriers. **High reduction in ADT is beneficial.

Thus, in terms of the purpose and need, either of the Mary Street alternatives would be preferable to the Five Mile Road Alternative.

2.4.1.1 PERFORMANCE ACROSS RANGE OF TRANSPORTATION AND ENVIRONMENTAL IMPACTS

After consideration of performance compared to the purpose and need, the next analysis was to consider environmental impacts associated with each of the alternatives, and consider which was preferable. **Table 2.5** shows the overall impacts associated with each of the build alternatives, omitting those resources where differences in impacts were minor. As discussed in Chapter 4, there is no discernible difference among all three build alternatives regarding impacts to air quality; hazardous materials; wild and scenic rivers; floodplains; vegetation; and wildlife (including threatened and endangered species); land use (including local plans, social conditions, and environmental justice); ROW and utilities; cultural resources; visual resources and noise; farmlands; irrigation; and energy. These resources are not presented in the table below.

Table 2.5 Summary of Direct Impacts

RESOURCE	EFFECT TYPE	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD
Transport-ation	Change in Vehicle Miles Traveled (VMT) in 2035	Increase of 3,600 VMT	Increase of 3,480 VMT	Increase of 7,450 VMT
	Change in Vehicle Hours Traveled (VHT) in 2035	Decrease of 1,315 VHT	Decrease of 1,300 VHT	Decrease of 1,080 VHT
	Level of Service (LOS) in 2035	15 intersections with all approaches at LOS C or better	Same as Mary Street Option 1	Same as Mary Street Option 1

RESOURCE	EFFECT TYPE	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD
Transport-ation Cont.	Accessibility During Transportation Operation	Lockwood to Billings/Billings Heights: Improved Lockwood to Mary Street and north along US 87: More improved	Same as Mary Street Option 1	Lockwood to Billings/Billings Heights: Improved Lockwood to Mary Street and north along US 87: Improved To areas north along Old Hwy 312: Improved
	Accessibility During Construction	Temporary impacts to: I-90/Johnson Lane Interchange, Coulson Road, Five Mile Road, Mary Street, US 87/Old Hwy 312/Main Street intersection		
	Projected Crashes	19 crashes/year	18 crashes/year	12 crashes/year
	Pedestrian and Bicycle Safety	Improved pedestrian safety with designated crosswalks at signalized intersections and improved bicycle safety with 8-foot-wide shoulders.		Same as Mary Street Option 1 and Mary Street Option 2 including: • Separated sidewalk and designated bike lane along improved Mary Street.
	Bike Route Features and Connections	Added/changed -- Increased features and connections: • Mary Street/Main Street connection improved to connect with arterial bike route. • 8-foot shoulder on Johnson Lane and bridge structure to connect with Five Mile Road. • 8-foot shoulder along Five Mile Road as informal bike travel lane. • Possible direct connection to Seven Mile Creek off-street paths from Five Mile Road. Maintained connections: • Secondary bike routes. • Kiwanis Trail and arterial bike routes (Main Street, Johnson Lane).		Same as Mary Street Option 1 and Mary Street Option 2 including: • 4-foot-wide bike lane along improved Mary Street.
Right-of-Way	Land Converted to Right-of-Way	261 acres	254 acres	221 acres
	Residential Structures Impacted	15	13	11
	Commercial Structures Impacted	1	1	1

RESOURCE	EFFECT TYPE	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD
Visual	Change in Visual Quality Rating	Decrease of visual quality overall, but increase at north end of Firth Street near Johnson Lane. Larger decreases in quality at subdivision near Dover and Pioneer Roads, and at intersection of Five Mile Road and Old Hwy 312.	Similar to Mary Street Option 1, except with substantial decrease for viewers toward the road at the Yellowstone River crossing.	Similar to Mary Street Option 2, except more loss in visual quality at subdivision near Dover and Pioneer roads.
Wetlands	Wetlands Impacted	5.71 acres	4.84 acres	5.02 acres
	U.S. Army Corps of Engineers Jurisdictional Wetlands Impacted	4.40 acres	3.68 acres	3.67 acres
Water Quality	Increase in impervious surface	56.0 acres additional impervious surface	55.6 acres additional impervious surface	46.8 acres additional impervious surface
Vegetation	Riparian Impacts	11.9 acres	6.0 acres	5.9 acres
	Pond Impacts	0.1 acre	0 acre	2.2 acres
	Cliff Impacts	0.1 acre	0.1 acre	0 acre
	Sage Steppe Impacts	0.01 acre	0 acre	0 acre
Noise	Receptors That Are Equal to or Exceed “Approach” Impact Criterion	4 residences	4 residences	3 residences
	Receptors That “Substantially Exceed” Existing Ambient Noise Level	3 residences	4 residences	3 residences
	Residences that would be impacted but would be relocated (and are not counted above)	2 residences	2 residences	2 residences

The focus of the comparisons was between Mary Street Option 1 and Mary Street Option 2 alternatives, because those alternatives better met the purpose and need of the project than the Five Mile Road Alternative. Considering cost, transportation, and environmental factors, the Mary Street Option 2 Alternative was selected as the Preferred Alternative. It is expected to perform better than the Five Mile Road Alternative. Although Five Mile Road has 11 residential relocations compared to 13 for Mary Street Option 2, the lead agencies determined that the advantage the Mary Street Option 2 Alternative has in improved traffic operations outweighed its two additional relocations.

The Mary Street Option 2 Alternative demonstrates the following advantages over the Mary Street Option 1 Alternative:

- Lower total cost ($111.1 million compared to $122.7 million, respectively).
- Two fewer residential properties relocated (13 compared to 15, respectively).
- Fewer total impacts to water resources (slightly less additional impervious surface and fewer riparian impacts despite a new crossing of Five Mile Creek).
- Fewer impacts to wetlands (4.8 acres compared to 5.7 acres, respectively).

For these reasons, Mary Street Option 2 is more favorable than Mary Street Option 1, and is recommended as the Preferred Alternative for the Billings Bypass.

2.4.2 ENVIRONMENTALLY PREFERABLE ALTERNATIVE

40 CFR Section 1505.2(b) requires that, in cases where an EIS has been prepared, the Record of Decision (ROD) must identify all alternatives that were considered, ". . . specifying the alternative or alternatives which were considered to be environmentally preferable." Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.

As illustrated in Section 2.4.1 above, based on a consideration of the range of impacts and benefits associated with the build alternatives, the Mary Street Option 2 Alternative would provide the best, most cost-effective long-term solution to meet the project's purpose and need while minimizing impacts to the environment and surrounding community. Chapter 4 of this FEIS includes detailed descriptions of potential impacts associated with the No Build and build alternatives.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED

As explained in Section 2.2.2 more than 60 alternatives were evaluated and screened. Numerous alternatives were suggested that were not carried forward into detailed analysis. These alternatives and the reasons for their elimination are briefly discussed in this section.

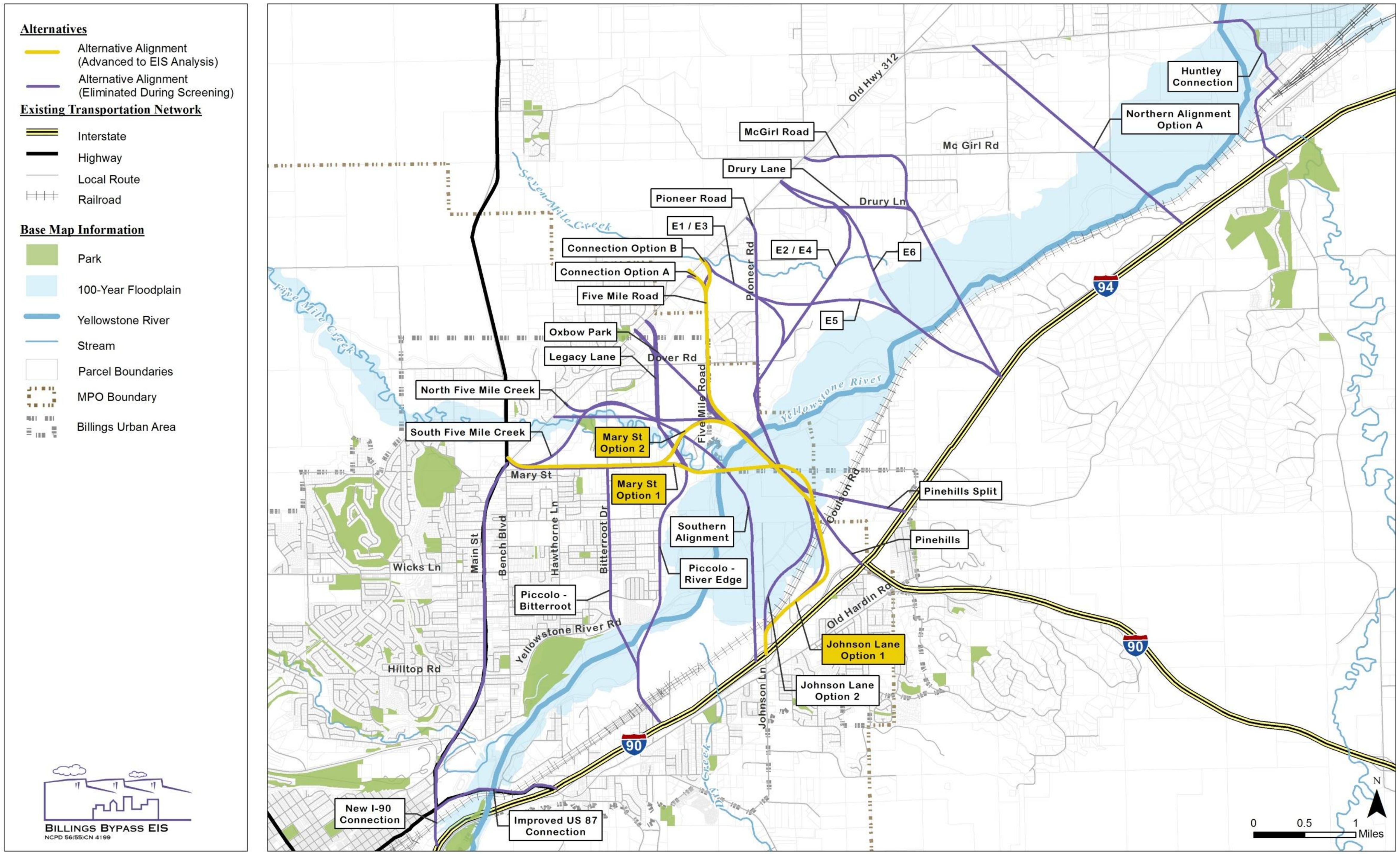
This project was originally scoped to provide an interstate-level facility that would function as a bypass route north of Billings between the interstate and MT 3. Although the current scope of the project focuses on a smaller area and proposes a different type of facility, the project team considered alternatives developed throughout the history of the project.

Because the scope of the original project was much larger than the current scope, many of the early alternatives extended far beyond the limits of the current project or were completely outside the current study area. These alternatives, or the segments of these alternatives not providing a connection between the interstate and Old Hwy 312, were screened out in the Level 1 screening because they would not meet the current purpose and need. Some of the early alternatives are partially within the current study area. For these alternatives, the project team isolated the relevant segment—between the interstate and Old Hwy 312—and these segments were advanced as alternatives for further consideration.

Some of the alternatives considered for this project are refined versions of early concepts suggested by the public. The most refined version of each alternative is listed and described in this section. However, to provide a complete record of the alternatives screening process, the earliest versions of each alternative, if any, are also identified in the table.

Figure 2.12 and **Table 2.6** present the alternatives that were considered but were eliminated. A brief explanation of the reasons the alternative was eliminated is provided in the table. Alternatives are grouped by the location from which they originate at I-90. More detailed information and maps regarding these alternatives can be found in the *Billings Bypass Alternatives Report* (DEA 2011b), which is included as Appendix I of this FEIS.

Figure 2.12 All Alternatives Considered Under Re-Scoped Project



Sources: DOWL HKM August 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/16/2013

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Table 2.6 Alternatives Screening: Alternatives Eliminated from Analysis

ALTERNATIVE	DESCRIPTION	LEVEL ELIMINATED				REASON FOR ELIMINATION
		LEVEL 1	LEVEL 2A	LEVEL 2B	LEVEL 3	
ALTERNATIVES DEVELOPED UNDER THE CURRENT PROJECT PURPOSE AND NEED						
Alternatives Originating from Piccolo Lane						
Piccolo - Bitterroot Drive	From I-90 at Piccolo Lane, proceed north adjacent to refinery across the Yellowstone River and follow Bitterroot Drive north to Mary Street. Proceed west along Mary Street to Old Hwy 312.			✓		• Would cause substantial impacts to the refinery, residential properties, and the active channel of the Yellowstone River.
Piccolo - River Edge	From I-90 at Piccolo Lane, proceed north adjacent to refinery across the Yellowstone River and north along the rimrocks. Proceed west along Mary Street to Old Hwy 312.			✓		• Would have substantial direct impacts to an established neighborhood and the Yellowstone River. Would also have direct and operational impacts to the Exxon Mobil refinery.
Alternatives Originating from Johnson Lane Interchange						
Johnson Lane Option 1 - Legacy Lane	From the existing Johnson Lane Interchange at I-90, proceed north to Coulson Road and follow Coulson Road northeast before proceeding west across the railroad and to the Yellowstone River. Veer northwest across Mary Street and Five Mile Creek, then north between agricultural parcels 0.5 mile west of Five Mile Road. Continue northwest to Old Hwy 312 between the Madsen and View Crest subdivisions.				✓	• Similar benefits to other alternatives, but more costly and with more floodplain impacts; the Old Hwy 312 connection location performs poorly in support of future planning for a connection to US 87 and MT 3.

ALTERNATIVE	DESCRIPTION	LEVEL ELIMINATED				REASON FOR ELIMINATION
		LEVEL 1	LEVEL 2A	LEVEL 2B	LEVEL 3	
Johnson Lane Option 1- Oxbow Park	From the existing Johnson Lane Interchange at I-90, proceed north to Coulson Road and follow Coulson Road northeast before proceeding west across the railroad and to the Yellowstone River. Proceed directly northwest to Old Hwy 312 between the Madsen and View Crest subdivisions.				✓	• Poor geometrics at connecting routes; the Old Hwy 312 connection location performs poorly in support of future planning for a connection to US 87 and MT 3.
Johnson Lane Option 1 - Pioneer Road	From the existing Johnson Lane Interchange at I-90, proceed north to Coulson Road and follow Coulson Road northeast before proceeding west across the railroad and to the Yellowstone River. Follow the Pioneer Road alignment to connect to Old Hwy 312 near Drury Lane.			✓		• The Johnson Lane Option 1 - Five Mile Road Alignment provides similar travel time benefits with fewer private property impacts.
Johnson Lane Option 1 - E1/E3	From the existing Johnson Lane Interchange at I-90, proceed north to Coulson Road and follow Coulson Road northeast before proceeding west across the railroad and to the Yellowstone River. Follow along the Pioneer Road alignment north for approximately 0.5 mile, and veer northeast then northwest to Old Hwy 312.				✓	• Provides the same connection to Old Hwy 312 as the Five Mile Road Alignment, but provides less travel time savings. The segment between Old Hwy 312 and Dover Road is redundant to Pioneer Road and would draw very little traffic.

ALTERNATIVE	DESCRIPTION	LEVEL ELIMINATED				REASON FOR ELIMINATION
		LEVEL 1	LEVEL 2A	LEVEL 2B	LEVEL 3	
Johnson Lane Option 1 - Five Mile Creek North	From the existing Johnson Lane Interchange at I-90, proceed north to Coulson Road, follow Coulson Road northeast before proceeding west across the railroad and to the Yellowstone River. Continue west along the north side of Five Mile Creek to Old Hwy 312.			✓		• This alternative would draw very little traffic west of Five Mile Road and would perform poorly in support of a future connection to US 87 and MT 3.
Johnson Lane Option 1 – South Five Mile Creek	From the existing Johnson Lane Interchange at I-90, proceed north to Coulson Road, follow Coulson Road northeast before proceeding west across the railroad and to the Yellowstone River. Continue west along the north side of Five Mile Creek. West of Bitterroot Drive, curve southwest to cross Five Mile Creek, roughly following the old BCMR railroad corridor and west to connect with Old Hwy 312.				✓	• This alternative would have more traffic impacts to existing routes, the potential for greater impact to a Section 4(f) resource, greater ROW impacts, and higher construction costs than other alternatives.
Johnson Lane Option 2 - Mary Street Option 1[1]	From the existing Johnson Lane Interchange at I-90, proceed north across railroad and along edge of Yellowstone River floodplain. Proceed west across the Yellowstone River and along Mary Street to Old Hwy 312.				✓	• Mary Street options using Johnson Lane Option 1 Alignment provide similar benefits with less floodplain impact. Based on the updated floodplain delineation provided by Federal Emergency Management Agency (FEMA), nearly the entire length of Johnson Lane Option 2 would be within the floodplain, creating a longitudinal encroachment.

[1] The recommendation for this alternative changed subsequent to the Level 3 screening, based on new information.

ALTERNATIVE	DESCRIPTION	LEVEL ELIMINATED				REASON FOR ELIMINATION
		LEVEL 1	LEVEL 2A	LEVEL 2B	LEVEL 3	
Johnson Lane Option 2 - Mary Street Option 2[2]	From the existing Johnson Lane Interchange at I-90, proceed north across railroad and along edge of Yellowstone River floodplain. Proceed west across the Yellowstone River to Five Mile Road, then veer south across Five Mile Creek and follow Mary Street to Old Hwy 312.				✓	• Mary Street options using Johnson Lane Option 1 Alignment provide similar benefits with less floodplain impact. Based on the updated floodplain delineation provided by FEMA, nearly the entire length of Johnson Lane Option 2 would be within the floodplain, creating a longitudinal encroachment.
Johnson Lane Option 2 - Legacy Lane	From the existing Johnson Lane Interchange at I-90, proceed north across railroad and along edge of Yellowstone River floodplain. Proceed west across the Yellowstone River and veer northwest across Mary Street and Five Mile Creek. Continue north between agricultural parcels 0.5 mile west of Five Mile Road and proceed northwest to Old Hwy 312 between the Madsen and View Crest subdivisions.				✓	• Similar benefits to other alternatives, but more costly and with more floodplain impacts; the Old Hwy 312 connection location performs poorly in support of future planning for a connection to US 87 and MT 3.
Johnson Lane Option 2 - Oxbow Park	From the existing Johnson Lane Interchange at I-90, proceed north across railroad and along edge of Yellowstone River floodplain. Proceed west across the Yellowstone River, then directly northwest to Old Hwy 312 between the Madsen and View Crest subdivisions.				✓	• Low traffic volumes between Old Hwy 312 and Five Mile Road; poor geometrics at connecting routes; the Old Hwy 312 connection location performs poorly in support of future planning for a connection to US 87 and MT 3.

[2] The recommendation for this alternative changed subsequent to the Level 3 screening, based on new information.

ALTERNATIVE	DESCRIPTION	LEVEL ELIMINATED				REASON FOR ELIMINATION
		LEVEL 1	LEVEL 2A	LEVEL 2B	LEVEL 3	
Johnson Lane Option 2 - Five Mile Road[3]	From the existing Johnson Lane Interchange at I-90, proceed north across railroad and along edge of Yellowstone River floodplain. Proceed west across the Yellowstone River and north along Five Mile Road to Old Hwy 312.				✓	• The Five Mile Road Alignment using Johnson Lane Option 1 provides similar benefits with less floodplain impact. Based on the updated floodplain delineation provided by FEMA, nearly the entire length of Johnson Lane Option 2 would be within the floodplain, creating a longitudinal encroachment.
Johnson Lane Option 2 - Pioneer Road	From the existing Johnson Lane Interchange at I-90, proceed north across railroad and along edge of Yellowstone River floodplain. Proceed west across the Yellowstone River and follow the Pioneer Road alignment to connect to Old Hwy 312 near Drury Lane.			✓		• The Johnson Lane Option 2 - Five Mile Road Alignment provides similar travel time benefits with fewer private property impacts.
Johnson Lane Option 2 - E1/E3	From the existing Johnson Lane Interchange at I-90, proceed north across railroad and along edge of Yellowstone River floodplain. Proceed west across the Yellowstone River and follow the Pioneer Road alignment north for approximately 0.5 mile. Veer northeast then northwest to Old Hwy 312.				✓	• Provides the same connection to Old Hwy 312 as the Five Mile Road Alignment, but provides less travel time savings. The segment between Old Hwy 312 and Dover Road is redundant to Pioneer Road and would draw very little traffic.

[3] The recommendation for this alternative changed subsequent to the Level 3 screening, based on new information.

ALTERNATIVE	DESCRIPTION	LEVEL ELIMINATED				REASON FOR ELIMINATION
		LEVEL 1	LEVEL 2A	LEVEL 2B	LEVEL 3	
Five Mile Road Alternative Connection Option B	Where the proposed Five Mile Road Alternative meets Old Hwy 312, connect approximately 800 feet north of the proposed Five Mile Road Alternative connection, near the crossing of Seven Mile Creek with Old Hwy 312.				✓[4]	• Requires a series of reverse curves in the Five Mile Road Alignment to provide a perpendicular connection to Old Hwy 312, which could impede sight distance and clear zones. Requires crossing the old railroad alignment at a skew, with potential safety issues. Would have impacts to Seven Mile Creek and Kline Swamp. If a roundabout were constructed, would require realigning Seven Mile Creek. Requires acquiring approximately 4.4 acres of prime farmland. Two residential accesses, one commercial access, and one agricultural road access would be impacted, and there is potential for impacts to one commercial structure.
Alternatives Originating from Pinehills Interchange (I-90/I-94)						
Pinehills - Mary Street Option 1	From the existing I-90/I-94 Interchange, proceed northwest across the railroad and the Yellowstone River. Follow Mary Street to Old Hwy 312.				✓	• Mary Street options using the Johnson Lane Interchange provide more travel time savings with lower costs and fewer private property impacts.
Pinehills - Mary Street Option 2	From the existing I-90/I-94 Interchange, proceed northwest across the railroad and the Yellowstone River. Continue west to Five Mile Road, then veer south across Five Mile Creek and follow Mary Street to Old Hwy 312.				✓	• Mary Street options using the Johnson Lane Interchange provide more travel time savings with lower costs and fewer private property impacts.

[4] The recommendation for this alternative changed subsequent to Level 3 screening, based on new information.

ALTERNATIVE	DESCRIPTION	LEVEL ELIMINATED				REASON FOR ELIMINATION
		LEVEL 1	LEVEL 2A	LEVEL 2B	LEVEL 3	
Pinehills - Legacy Lane	From the existing I-90/I-94 Interchange, proceed northwest across the railroad and the Yellowstone River. Veer northwest across Mary Street and Five Mile Creek, then north between agricultural parcels 0.5 mile west of Five Mile Road. Continue northwest to Old Hwy 312 between the Madsen and View Crest subdivisions.				✓	• Similar benefits to other Pinehills Interchange alternatives, but more costly and with more floodplain impacts. The Old Hwy 312 connection location performs poorly in support of future planning for a connection to US 87 and MT 3. Is 52% more costly than Johnson Lane Interchange - Legacy Lane Alignment, but has less travel time benefit and higher private property impacts.
Pinehills - Oxbow Park	From the existing I-90/I-94 Interchange, proceed northwest across the railroad and the Yellowstone River. Proceed directly northwest to Old Hwy 312 between the Madsen and View Crest subdivisions.				✓	• Travel time savings is marginal; low traffic volumes between Old Hwy 312 and Five Mile Road; poor geometrics at connecting routes. The Old Hwy 312 connection location performs poorly in support of future planning for a connection to US 87 and MT 3. More costly than Johnson Lane Interchange - Oxbow Park Alignment and has higher private property impacts.
Pinehills - Five Mile Road	From the existing I-90/I-94 Interchange, proceed northwest across the railroad and the Yellowstone River. Continue north along Five Mile Road to Old Hwy 312.				✓	• Travel time benefits are very limited; other alternatives provide more benefit with lower costs and fewer private property impacts.
Pinehills - Pioneer Road	From the existing I-90/I-94 Interchange, proceed northwest across the railroad and the Yellowstone River. Follow the Pioneer Road alignment to connect to Old Hwy 312 near Drury Lane.			✓		• The Pinehills - Pioneer Road Alignment would be very close to Pioneer Elementary School, and an identified State Historic Preservation Officer (SHPO) historic site. Higher costs due to alignment and bridge lengths. The Five Mile Road Alignment provides similar travel time benefits with fewer private property impacts.

ALTERNATIVE	DESCRIPTION	LEVEL ELIMINATED				REASON FOR ELIMINATION
		LEVEL 1	LEVEL 2A	LEVEL 2B	LEVEL 3	
Alternatives Originating from Pinehills Split (North of I-90/I-94 Interchange)						
Pinehills Split - Mary Street Option 1	From I-94 approximately 0.5 mile north of the existing I-90/I-94 Interchange, proceed west across the Yellowstone River and follow Mary Street to Old Hwy 312.				✓	• Mary Street options using the Johnson Lane Interchange provide more travel time savings with lower costs and fewer private property impacts.
Pinehills Split - Mary Street Option 2	From I-94 approximately 0.5 mile north of the existing I-90/I-94 Interchange, proceed west across the Yellowstone River. Continue west to Five Mile Road, then veer south across Five Mile Creek and follow Mary Street to Old Hwy 312.				✓	• Mary Street options using the Johnson Lane Interchange provide more travel time savings with lower costs and fewer private property impacts.
Pinehills Split - Legacy Lane	From I-94 approximately 0.5 mile north of the existing I-90/I-94 Interchange, proceed west across the Yellowstone River. Veer northwest across Mary Street and Five Mile Creek, then north between agricultural parcels 0.5 mile west of Five Mile Road. Continue northwest to Old Hwy 312 between the Madsen and View Crest subdivisions.				✓	• Travel time benefits are marginal; 35% more costly than Johnson Lane Option 1 - Legacy Lane Alignment, but has less travel time benefit and higher private property impacts; the Old Hwy 312 connection location performs poorly in support of future planning for a connection to US 87 and MT 3.
Pinehills Split - Oxbow Park	From I-94 approximately 0.5 miles north of the existing I-90/I-94 Interchange, proceed west across the Yellowstone River. Proceed directly northwest to Old Hwy 312 between the Madsen and View Crest subdivisions.				✓	• Travel time benefits are marginal; low traffic volumes between Old Hwy 312 and Five Mile Road; poor geometrics at connecting routes; 49% more costly than Johnson Lane - Oxbow Park Alignment, with higher private property impacts; the Old Hwy 312 connection location performs poorly in support of future planning for a connection to US 87 and MT 3.

ALTERNATIVE	DESCRIPTION	LEVEL ELIMINATED				REASON FOR ELIMINATION
		LEVEL 1	LEVEL 2A	LEVEL 2B	LEVEL 3	
Pinehills Split - Five Mile Road	From I-94 approximately 0.5 mile north of the existing I-90/I-94 Interchange, proceed west across the Yellowstone River. Continue north along Five Mile Road to Old Hwy 312.				✓	• Travel time benefits are very limited; other alternatives provide more benefit with lower costs and fewer private property impacts.
Pinehills Split - Pioneer Road	From I-94 approximately 0.5 mile north of the existing I-90/I-94 Interchange, proceed west across the Yellowstone River. Follow the Pioneer Road alignment to connect to Old Hwy 312 near Drury Lane.			✓		• Travel time benefits are very limited; other alternatives provide more benefit with lower costs and fewer private property impacts.
Alternatives Originating from NE of Pinehills Interchange						
Drury Lane	From I-94 approximately 2 miles north of the existing I-90/I-94 Interchange, proceed west across the Yellowstone River and follow Drury Lane for approximately 0.5 mile, then veer north to Old Hwy 312.		✓			• Connectivity benefits would be negligible, because the interstate and Old Hwy 312 connections are too far north of the urban area to address traffic needs.
McGirl Road	From I-94 approximately 2 miles north of the existing I-90/I-94 Interchange, proceed west across the Yellowstone River and north to McGirl Road. Follow McGirl Road to Old Hwy 312.		✓			• Connectivity benefits would be negligible, because the interstate and Old Hwy 312 connections are too far north of the urban area to address traffic needs.
Alternatives without a New Yellowstone River Bridge						
New I-90 Connection	From I-90, proceed north to the Main Street/US 87 corridor and follow the alignment north to the US 87/Old Hwy 312 intersection.			✓		• Does not provide more travel time benefits than other alternatives under consideration and would have substantial impacts to commercial properties along the Main Street corridor.

ALTERNATIVE	DESCRIPTION	LEVEL ELIMINATED				REASON FOR ELIMINATION
		LEVEL 1	LEVEL 2A	LEVEL 2B	LEVEL 3	
Improved US 87 Connection	From the I-90/US 87 Interchange, proceed northwest across the Yellowstone River on the existing bridge and follow the existing alignment of US 87/Main Street to the US 87/Old Hwy 312 intersection.			✓		• Provides negligible travel time benefits while causing substantial impacts to commercial properties in Lockwood and along the Main Street corridor.
I-94 to Old Hwy 312 Connection at Huntley	From I-94 at Northern Avenue, proceed north along Northern Avenue across the railroad and continue northwest along Nahmis Avenue to Old Hwy 312. From this point, veer west across the Yellowstone River using the existing Old Hwy 312 bridge.		✓			• Route does not reduce physical barrier impacts, because it uses an existing corridor. Connectivity and mobility benefits would be negligible, because the interstate and Old Hwy 312 connections are too far north of the urban area to address traffic needs and the route does not provide access to or through Billings.
ALTERNATIVES DEVELOPED UNDER THE 2001 PURPOSE AND NEED (BEFORE THE PROJECT WAS RE-SCOPED)						
Early Alternatives Providing a Connection between I-90/I-94 and Old Hwy 312						
Two Bypass Routes	Two bypasses along the Southern Alignment and Northern Alignment - Option A.		✓			• For the southern bypass route: The alignment would result in a substantial longitudinal encroachment of the Yellowstone River floodplain. • For the northern bypass route: Connectivity benefits would be negligible, because the interstate and Old Hwy 312 connections are too far north of the urban area.
Northern Alignment - Option A & Shepherd Acton Alignment - Option 3 (Eastern Segment)	From I-94 approximately 4.5 miles from the existing I-90/I-94 Interchange, proceed northwest across the river to Old Hwy 312. Note: These two alignments are identical in the eastern segment.		✓			• Connectivity benefits would be negligible, because the interstate and Old Hwy 312 connections are too far north of the urban area.

ALTERNATIVE	DESCRIPTION	LEVEL ELIMINATED				REASON FOR ELIMINATION
		LEVEL 1	LEVEL 2A	LEVEL 2B	LEVEL 3	
E1 & Shepherd Acton Alignment - Option 1 (Eastern Segment) (E1 is a refined version of the eastern segment of the Feasibility Alignment and the Yellow Alignment)	From the I-90/I-94 Interchange, proceed northwest across the Yellowstone River near Mary Street, veer northeast to avoid existing development, then connect with Old Hwy 312 south of Seven Mile Creek. Note: E1 and the eastern segment of the Shepherd Acton Alignment - Option 1 are identical.				✓	• Travel time benefits are very limited; other alternatives provide more benefit with lower costs and fewer private property impacts.
E2 (E2 is a refined version of the eastern segment of the Purple Alignment using an alternate eastern terminus)	From the I-90/I-94 Interchange, proceed northwest across the Yellowstone River near Mary Street, then northeast across Drury Lane to Old Hwy 312 north of Drury Lane.		✓			• Would impact a historic battlefield site; connectivity and mobility benefits would be negligible, because the connection to Old Hwy 312 is too far north of the urban area.
E3 & Shepherd Acton Alignment - Option 1A (Eastern Segment) (E3 is a refined version of the eastern segment of the Yellow Alignment using an alternate eastern terminus)	From I-94 approximately 0.5 miles north of the existing I-90/I-94 Interchange, proceed west across the Yellowstone River near Mary Street, veer northeast to avoid existing development, then connect with Old Hwy 312 south of Seven Mile Creek. Note: E3 and the eastern segment of Shepherd Acton Alignment - Option 1A are identical.				✓	• Travel time benefits are very limited; other alternatives provide more benefit with lower costs and fewer private property impacts.
E4 (E4 is a refined version of the eastern segment of the Purple Alignment)	From I-94 approximately 0.5 mile north of the existing I-90/I-94 Interchange, proceed west across the Yellowstone River near Mary Street and northeast across Drury Lane to Old Hwy 312 north of Drury Lane.		✓			• Would impact a historic battlefield site; connectivity and mobility benefits would be negligible, because the connection to Old Hwy 312 is too far north of the urban area.

ALTERNATIVE	DESCRIPTION	LEVEL ELIMINATED				REASON FOR ELIMINATION
		LEVEL 1	LEVEL 2A	LEVEL 2B	LEVEL 3	
E5 (E5 is a refined version of the eastern segment of the Orange Alignment)	From I-94 approximately 2 miles north of the existing I-90/I-94 Interchange, proceed west across the Yellowstone River and west across Pioneer Road to Old Hwy 312 south of Seven Mile Creek.		✓			• Would impact a historic battlefield site; connectivity and mobility benefits would be negligible, because the connection to Old Hwy 312 is too far north of the urban area.
E6 & Shepherd Acton Alignment - Option 2 (Eastern Segment) (E6 is a refined version of the eastern segment of the Green Alignment and the Northern Alignment - Option B)	From I-94 approximately 2 miles north of the existing I-90/I-94 Interchange, proceed west across the Yellowstone River and northwest across Drury Lane to Old Hwy 312 north of Drury Lane. Note: E6 and the eastern segment of Shepherd Acton Alignment - Option 2 are identical.		✓			• Would impact a historic battlefield site; connectivity and mobility benefits would be negligible, because the connection to Old Hwy 312 is too far north of the urban area.
Early Alternatives under Original Project That Do Not Provide a Connection between the I-90I-94 and Old Hwy 312						
The following suggested alignments from the public: 72nd Street Alignment; Bypass Route South of Billings; Bypass Route West of Billings; US 87 to Roundup Alignment; US 87 to Shepherd Acton Alignment; US 87 Alignment		✓				• Would not provide a connection between I-90 and Old Hwy 312 and therefore would not meet the project purpose and need.
Central and Western Segments of the following alignments: Southern Alignment; Feasibility Alignment; Northern Alignment - Option A; Northern Alignment - Option B; Pink Alignment; Red Alignment; Modified Southern Alignment; Yellow Alignment; Green Alignment; Dark Green Alignment; Shepherd Acton Alignment - Options 1, 1A, 2, and 3; Alternate MT 3 Connection Options 1, 2, and 3		✓				• Would not provide a connection between I-90 and Old Hwy 312 and therefore would not meet the project purpose and need.
The following preliminary alignment segments that were located in the central and western areas of the old study area: C1, C2, C3, C4, W1, W2, W3, W4		✓				• Would not provide a connection between I-90 and Old Hwy 312 and therefore would not meet the project purpose and need.

2.6 PROJECT FUNDING AND PHASED IMPLEMENTATION

2.6.1 FUNDING AND THE NEED FOR PHASED IMPLEMENTATION

As described in this FEIS, the lead agencies have identified the Mary Street Option 2 Alternative as the Preferred Alternative. Current funding limitations and federal regulations require the project to be included in the fiscally constrained long-range transportation plan before a ROD can be signed. Sufficient funding for construction of the Preferred Alternative has not yet been identified.

FHWA provided guidance to MDT in 2012 regarding the funding gap between identified project funds and the total estimated cost for the Preferred Alternative for the project. The long-range transportation plan, the *Billings Urban Area Long-Range Transportation Plan*, *2009 Update* (Cambridge Systematics, Inc. 2010), identified approximately $90 million in funding for the Billings Bypass project, but the $111.1 million estimated cost for the Preferred Alternative would exceed this amount.

FHWA guidance allows for the issuance of phased Record of Decisions (RODs) from a single EIS document. This approach allows FHWA to issue a NEPA decision document (a ROD) for only a section or portion of the proposed project (for example, construction of a 2-mile section of a proposed 10-mile-long highway) and issue subsequent RODs for additional phases of the project, as funding is identified. The Preferred Alternative has been separated into two phases, which are referred to throughout this document as Phase 1 (an initial two-lane road) and the Full Buildout (a final four-lane road). Phase 1 meets the traffic needs for the 20-year planning horizon identified in the FEIS. The Full Buildout meets the project's purpose and need and is recommended as a long-term solution for the project corridor as the City of Billings continues to grow. This long-term solution would meet the traffic needs beyond the 20-year planning horizon.

The total cost for the four-lane, Full Buildout of the Preferred Alternative is estimated to be $111.1 million. Approximately $22.3 million has been "earmarked" for construction of the roadway by state and federal agencies, and a total of $89.5 million was allocated for the project in the *Billings Urban Area Long-Range Transportation Plan (2009 Update).* Thus the total cost of the Full Buildout exceeds the amount allocated by approximately $21.6 million.

The total cost for a two-lane facility along the Preferred Alternative alignment is estimated to be $82.1 million. As mentioned previously, approximately $22.3 million has been "earmarked" for construction of the roadway by state and federal agencies. The additional $59.8 million required for construction of Phase 1 could be allocated from a combination of local, state, and federal funds. The Full Buildout would be implemented following issuance of another ROD and additional NEPA documentation if necessary as additional funding is identified and included in the long-range transportation plan. The identification of a preferred alternative for the entire project in this FEIS is consistent with FHWA's objective of analyzing and identifying transportation solutions on a broad enough scale to provide meaningful analysis and to avoid segmentation. The identification of an initial phase for implementation of the project is consistent with FHWA requirements to have funding for projects identified before final decisions are made. As funds become available, it is the intent of the lead agencies to work toward implementation of the Preferred Alternative in its entirety through this phased approach.

This FEIS describes two phases of implementation for the project, and documents the applicable environmental laws and requirements that would be adhered to for each phase before and during construction. It also illustrates how Phase 1 of the Preferred Alternative would be consistent with the fiscally constrained long-range transportation plan and the State Transportation Improvement Plan (STIP).

The cost to construct Phase 1 of the Preferred Alternative would be consistent with the identified funds in the fiscally constrained long-range transportation plan. Phase 1 would cost approximately $82.1 million. The Full Buildout would cost an additional $29.0 million, bringing the total cost for the Preferred Alternative to $111.1 million. All costs are presented in 2012 dollars.

Funding sources for construction of Phase 1 would include, but are not limited to: Interstate Maintenance, National Highway System, Surface Transportation Program, and Bridge Program funds. Most of the federal funding programs include a state or local matching requirement; that is, the recipient of the funds must contribute a specified amount or percentage of the total cost to supplement federal assistance received.

2.6.2 PHASED IMPLEMENTATION

The potential impacts associated with the Full Buildout of each of the build alternatives were disclosed in the DEIS. Although the preferred alternative was selected based on the impacts for the Full Buildout, this FEIS presents additional analysis describing the potential impacts associated with building Phase 1 before the construction of the Full Buildout.

In general, Phase 1 would not have substantially different effects than the Full Buildout. Although the footprint of Phase 1 would be narrower than the footprint of the Full Buildout, the ROW needed for the Full Buildout would be purchased (to the extent possible) during development of Phase 1, and Phase 1 would be built along the same alignment with generally the same access control and pedestrian and bicycle facilities as with the final four-lane road. The bridge across the Yellowstone River initially would be constructed as a two-lane bridge with sufficient ROW acquired on the bridge approaches to accommodate the later construction of a second, adjacent two-lane bridge. The other bridges and the culverts that would be required for the project would be built wide enough to allow for the eventual expansion to a four-lane road, and thus the impacts associated with those improvements would be similar when comparing Phase 1 to the Full Buildout.

Additionally, traffic volumes and performance would be similar on both the primary and secondary corridors for Phase 1 and the Full Buildout throughout most of the 20-year design period. Thus, for most of the resources considered, the impacts from Phase 1 would be similar to or fewer than the impacts from the Full Buildout. Thus, the impacts associated with the Full Buildout should be considered the “worst-case scenario” for Phase 1. **Table 2.7** summarizes the Phase 1 impacts and mitigation.

For the following resources, differences between the footprint, construction, and operation of Phase 1 and the Full Buildout warrant additional analysis regarding the impacts associated with Phase 1:

- Transportation
- Water resources
- Water body modifications
- Floodplains
- Wetlands
- Wildlife and aquatic species

For the other resource topics, differences in the impacts associated with Phase 1 and the Full Buildout are minor and are not analyzed further.

Analysis in this FEIS discloses impacts to traffic operations, community resources, and natural resources that are associated with Phase 1 of the build alternatives, where they differ from the Full Buildout. The Phase 1 impacts were evaluated in this FEIS to identify the full extent of long-term impacts and benefits. These resource impacts are described in Chapter 4.

2.6.2.1 DIFFERENCES IN PRIMARY CORRIDOR BETWEEN PHASE 1 AND THE FULL BUILDOUT OF THE PREFERRED ALTERNATIVE

The only differences between Phase 1 and the Full Buildout would be as follows:

- Phase 1 would construct the first two lanes of the full Preferred Alternative alignment, while the Full Buildout would expand the roadway to the final four lanes.
- Under Phase 1, the crossings of the MRL railroad and the Yellowstone River would each be constructed as a two-lane bridge with sufficient ROW acquired to accommodate the later construction of a second two-lane bridge during the Full Buildout.
- All other bridges and culverts required for the project would be designed and constructed to be large enough to allow for the eventual expansion to a four-lane road without the need for modifications.
- Typical sections for Phase 1 of the Preferred Alternative are presented in **Figure 2.13** through **Figure 2.17**.

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Primary Corridor Typical Sections

Figure 2.13 NHS Rural Principal Arterial (F-a)

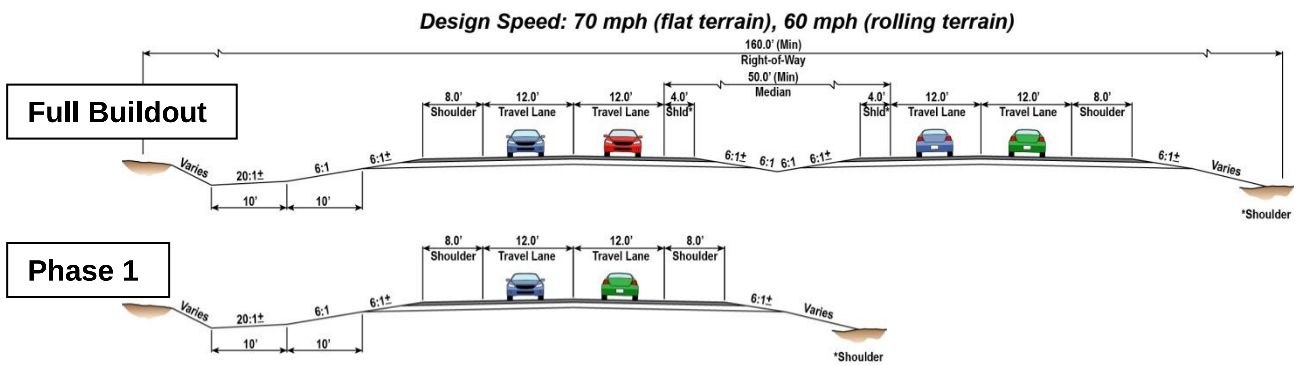


Figure 2.14 NHS Urban Principal Arterial (J-a, F-b, M1-a, M2-a)

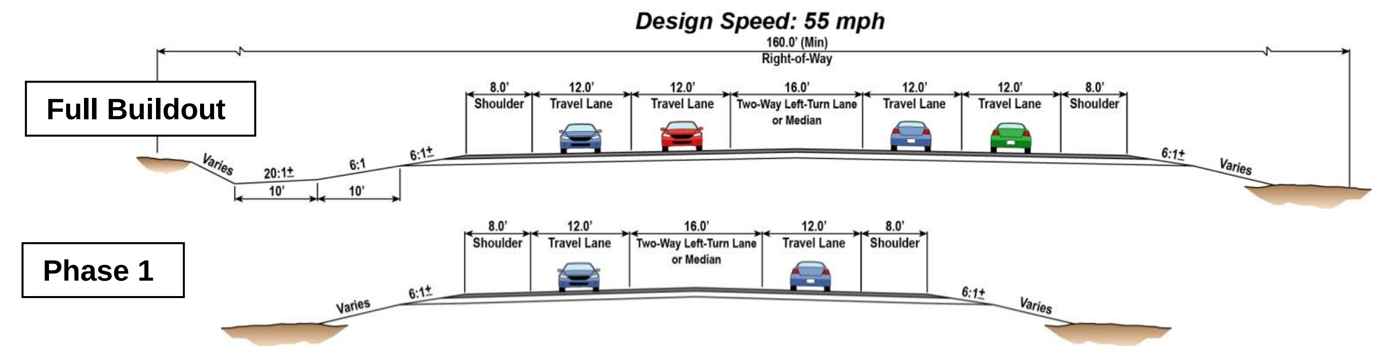
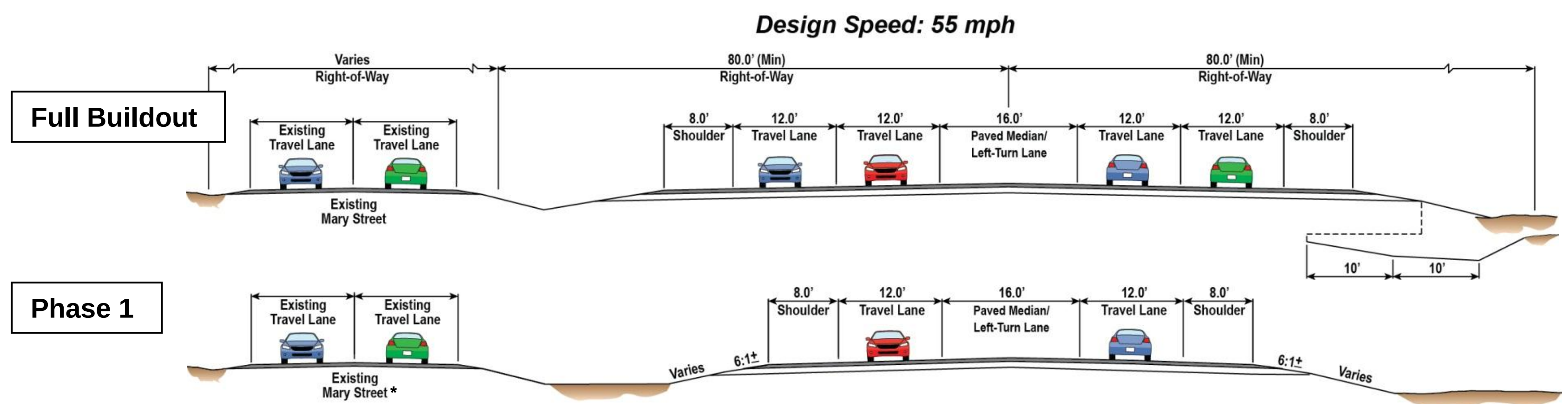


Figure 2.15 NHS Urban Principal Arterial with Local Access Road (M-b)



*Existing Mary Street would be improved in accordance with the typical section depicted in Figure 2.16

Secondary Corridor Typical Sections

Figure 2.16 Yellowstone County Local Road (Mary St., Five Mile Rd.)

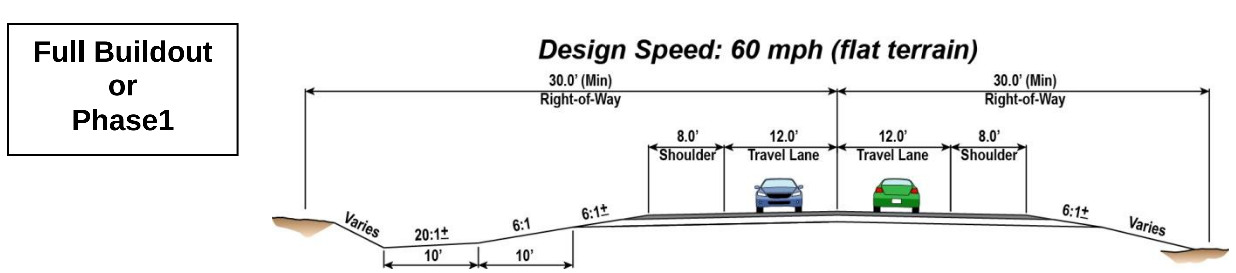
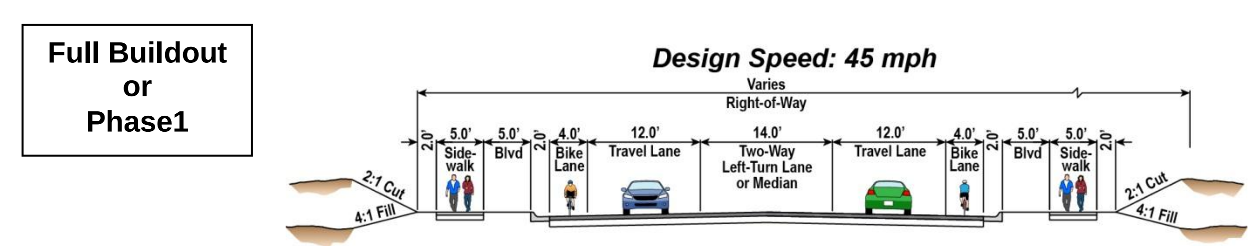


Figure 2.17 City of Billings Urban Arterial Roadway (Mary St., Five Mile Rd.)



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2.6.2.2 DIFFERENCES IN SECONDARY CORRIDOR BETWEEN PHASE 1 AND THE FULL BUILDOUT

All of the secondary corridor improvements are anticipated to be completed during Phase 1. The improvements described may not all be necessary on the opening day of Phase 1 of the proposed new roadway. It is anticipated that these improvements would be needed within the design horizon (2035) of the project, and thus they are included in the build alternatives for the purposes of estimating cost and impacts in this document.

2.6.2.3 DIFFERENCES IN INTERCHANGE AND INTERSECTION OPTIONS BETWEEN PHASE 1 AND THE FULL BUILDOUT

Additional interchange and intersection options were developed for the traffic expected on the Phase 1 two-lane road, using the methods described in Section 2.3.4. These options are included in Appendix H and discussed in further detail in the following sections.

2.6.2.3.1 JOHNSON LANE INTERCHANGE (ALL BUILD ALTERNATIVES) – TEMPORARY USE OF EXISTING STRUCTURES

With the Phase 1 option, the existing overpass structures at the Johnson Lane/I-90 Interchange would remain in place. Johnson Lane would be widened to accommodate a second northbound lane but would maintain a single lane in the southbound direction. The three adjacent intersections (Old Hardin Road, North Frontage Road, and Becraft Lane) would be improved to match one of the proposed concepts for these intersections as described in the Full Buildout options discussion in Section 2.3.4, because it was anticipated that those improvements would be required before the year 2035.

2.6.2.3.2 BITTERROOT DRIVE (MARY STREET OPTIONS 1 AND 2) – TWO-LANE ROUNDABOUT PLUS UNCHANGED MARY STREET ALIGNMENT

The Full Buildout Option 2 – Roundabout Plus Unchanged Mary Street Alignment option was evaluated to determine whether a two-lane alignment would operate efficiently. This Phase 1 concept intersection was evaluated using single approach lanes and single circulation lanes within the roundabout, and a two-way stop-controlled intersection on Mary Street and Bitterroot Drive adjacent to the alignment intersection. This concept was found to provide sufficient capacity and operating performance.

2.6.2.3.3 US 87/OLD HWY 312/MAIN STREET/MARY STREET (MARY STREET OPTIONS 1 AND 2) – ADJACENT SIGNALIZED INTERSECTIONS

This option is substantially different than the Full Buildout option concepts described in Section 2.3.4.3, since it incorporates two adjacent signalized intersections. MDT is currently in the process of finalizing plans for reconstruction and signalization of the Main Street and Bench Boulevard intersection, and the anticipated implementation date is within the next two years. One feature of that project is the construction of a raised median in Bench Boulevard, which would change traffic operations at the intersection of Mary Street and Bench Boulevard. Because it is anticipated that the Phase 1 alignment would be constructed after the Main Street and Bench Boulevard intersection is complete, it was decided that the intersection of the Mary Street Option 1 Alternative or Mary Street Option 2 Alternative with Old Hwy 312 could be designed to incorporate the majority of improvements that are associated with the Main Street and Bench Boulevard project.

Therefore, it was determined that northbound and southbound traffic could be split, so that southbound traffic on US 87 would enter Bench Boulevard, directly at the Main Street intersection, and would access the Mary Street Option 1 or Mary Street Option 2 Alternative alignment, directly at the Hwy 312 intersection. Northbound US 87 traffic would originate from the Mary Street Option 1 or Mary Street Option 2 Alternative Alignment as a through movement at the Old Hwy 312 intersection and as a left-turn movement from Main Street. Travel distance for northbound US 87 traffic originating at Bench Boulevard would be approximately the same as with the roundabout concepts for the Full Buildout intersection options.

2.6.2.3.4 FIVE MILE ROAD/OLD HWY 312 INTERSECTION (FIVE MILE ROAD ALTERNATIVE) – SIGNALIZED INTERSECTION

For the purposes of analyzing the Phase 1 Five Mile Road/Old Hwy 312 intersection, it was assumed that a signalized intersection would be the most likely intersection control that would be implemented for the Full Buildout. It was also assumed that Old Hwy 312 would be reconstructed to extend east beyond its intersection with Five Mile Road. The Phase 1 intersection concept incorporates a two-lane section of the Five Mile Road Alternative alignment with an auxiliary right-turn lane at its intersection with Old Hwy 312. Capacity calculations indicate that a traffic signal would likely be warranted before the year 2035, even if the intersection were stop-controlled near the opening date of the Phase 1 roadway.

2.6.3 PHASE 1 IMPACTS AND MITIGATION

In general, Phase 1 would not have substantially different effects than the Full Buildout. Although the footprint of Phase 1 would be narrower than the footprint of the Full Buildout, the ROW needed for the Full Buildout would be purchased (to the extent possible) during development of Phase 1, and Phase 1 would be built along the same alignment with generally the same access control and pedestrian and bicycle facilities as with the final four-lane road. The bridge across the Yellowstone River initially would be constructed as a two-lane bridge with sufficient ROW acquired on the bridge approaches to accommodate the later construction of a second, adjacent two-lane bridge. The other bridges and the culverts that would be required for the project would be built wide enough to allow for the eventual expansion to a four-lane road, and thus the impacts associated with those improvements would be similar when comparing Phase 1 to the Full Buildout.

Additionally, traffic volumes and performance would be similar on both the primary and secondary corridors for Phase 1 and the Full Buildout throughout most of the 20-year design period. Thus, for most of the resources considered, the impacts from Phase 1 would be similar to or less than the impacts from the Full Buildout. Thus, the impacts associated with the Full Buildout should be considered the "worst-case scenario" for Phase 1. **Table 2.7** summarizes the Phase 1 impacts and mitigation for the Mary Street Option 2 Alternative. Descriptions of the impacts and mitigation for Phase 1 and the Full Buildout of all three Build Alternatives for each of these resources can be found in Chapter 4 of this FEIS.

Table 2.7 Mary Street Option 2 Phase 1 Impacts and Mitigation

RESOURCE	MARY STREET OPTION 2 PHASE 1 IMPACTS	PHASE 1 MINIMIZATION MEASURES AND MITIGATION
TRANSPORTATION		
Traffic Operations		
Project adds new arterial roadway and adds connection to Five Mile Road	Increase of 3,360 Vehicle Miles Traveled (VMT) compared to the No Build in 2035 (<1%).	None.
	Time spent traveling decreases: 1,270 fewer vehicle hours traveled (VHT) than the No Build in 2035.	No mitigation required.
Project improves existing intersections and distributes traffic more evenly through project area	Corridor Intersections have same or improved operations in terms of delay: Levels of Service (LOS) C or better on all study intersections, compared to 6 with worse performance in No Build.	No mitigation required.
Project construction would disrupt traffic operations	Temporary impacts including reduced speeds and construction at intersections and along the new alignment.	Develop traffic management plans during final design in accordance with the Manual on Uniform Traffic Control Devices.
Accessibility		
Project provides new connection between Lockwood and Billings, and through and within Billings Heights	Improved accessibility between Lockwood and Billings/Billings Heights. Much improved accessibility between Lockwood and Mary Street and north along US 87.	No mitigation required.
Project construction would impede traffic at existing intersections	Temporary impacts to: I-90/Johnson Lane Interchange, Coulson Road, Five Mile Road, Mary Street, US 87/Old Hwy 312/Main Street intersection.	Develop traffic management plans during final design in accordance with the Manual on Uniform Traffic Control Devices. The traffic management plan would ensure maintenance of access to local businesses/residences.
Safety		
Vehicle Safety *Project would move traffic from existing streets to newer, safer facilities, and would have positive impact to vehicular safety*	37 fewer crashes within the project area compared to the no build in 2035 (7% decrease in crashes).	No mitigation required.

RESOURCE	MARY STREET OPTION 2 PHASE 1 IMPACTS	PHASE 1 MINIMIZATION MEASURES AND MITIGATION
Pedestrian and Bicycle Safety *Project would accommodate pedestrian and bicycle traffic at designated crossings and with shoulders*	Project would maintain and/or improve existing bicycle routes with signalized intersections and use of signage.	Develop traffic management plans during final design in accordance with the Manual on Uniform Traffic Control Devices. The traffic management plan would minimize access restrictions to existing bike routes and trails and provide safe and travel-efficient detours with appropriate signage to the extent practicable.
Pedestrian and Bicycle Facilities		
Bike Route Features and Connections, Long-Term Changes *Planned 8-ft shoulders would accommodate bike travel* *Five Mile Road improvements would include 4-ft bike lanes*	Maintains connection to secondary bike routes. Maintains connection to Kiwanis Trail. Adds shoulders to Five Mile Road, a primary bike route, and provides connection to primary bike routes along Mary Street and Dover Road. The existing secondary bicycle route on Coulson Road would be interrupted for 1,000 feet, sending users on another indirect route.	No mitigation required.
Pedestrian Facilities, Long-Term Impacts *Project would provide sidewalks along entire length of Five Mile Road*	Improved pedestrian facilities along Five Mile Road. No changes to other existing roadways.	No mitigation required.
Construction Impacts: *Project construction would interrupt travel and may require detours for bicycles and pedestrians*	Temporary impacts due to construction (slower travel times and longer trip distances possible).	Traffic management plans (noted above) would address construction impacts.
SOCIAL AND ECONOMIC		
Land Use and Local Plans		
Land Use *Alignment is inside Urban Planning Area (UPA).*	Provides improved access to planned future residential development along Mary Street. Compatible with planned land uses south of the Yellowstone River.	No mitigation required.

RESOURCE	MARY STREET OPTION 2 PHASE 1 IMPACTS	PHASE 1 MINIMIZATION MEASURES AND MITIGATION
Parks and Recreation		
Kiwanis Trail (existing and planned) *Project places arterial roadway in between the terminus of the existing trail and the start of the planned Kiwanis Trail Extension*	Maintains connection to existing Kiwanis Trail. Project uses 0.43 acres right-of-way of the planned extension of Kiwanis Trail. The project would not preclude the planned extension of Kiwanis Trail north of Mary Street.	MDT would coordinate with City of Billings throughout final design to ensure that the final project provides for safe and effective pedestrian and bicycle movement across the project corridor at the Kiwanis Trail crossing. The following steps would be taken to minimize impacts to parks and recreational facilities during construction: • MDT would coordinate with City of Billings to include appropriate signage and/or public notifications regarding temporary trail closures.
Planned trail along Five Mile Creek	Alignment crosses planned trail along Five Mile Creek (primary corridor) via a bridge.	Bridge design would consider accommodating potential trail crossing under the bridge.
Planned John H. Dover Memorial Park	Alignment crosses southern portion of planned John H. Dover Memorial Park.	Coordinate with park planners regarding impacts to John H. Dover Memorial Park during final design.
Socioeconomic Conditions		
Access to adjacent neighborhoods and/or communities *Project expands access and mobility in the study area (see Transportation, above)*	No change in existing access to neighborhoods. Adjacent communities would benefit from proximity to an improved travel way and maintenance of existing access. Wide shoulders and a clear zone on the arterial would improve operations, access and response time for police, fire protection, and emergency ambulance services.	Use existing roadway alignments and vacant lands to minimize the amount of property required for acquisition. Proposed intersection improvements would be designed in coordination with the City of Billings. To mitigate construction impacts before and during construction, coordination with emergency services and school districts would be undertaken to minimize disruption to services.
Community cohesion	Localized impacts resulting from physical or perceived isolation or separation, bridges, structures, or other barriers. Potential disruptions to community during construction. Billings Heights neighborhood would retain character of development, allowing for planned growth.	
Changes in neighborhood travel patterns	Adjacent communities would benefit from proximity to an improved travel way and maintenance of existing access.	

RESOURCE	MARY STREET OPTION 2 PHASE 1 IMPACTS	PHASE 1 MINIMIZATION MEASURES AND MITIGATION
Population changes	Enhanced mobility and access in the study area may expedite planned growth and convert vacant or agricultural lands to higher density land uses.	
Environmental Justice		
Environmental Justice	No disproportional impacts to Environmental Justice populations.	No mitigation required.
Right-of-Way and Utilities		
Land Converted to Right-of-Way	254.4 acres 13 residential structures impacted 3 commercial structures Impacted	Reconfigure access points, steepen side slopes adjacent to the roadway, construct retaining walls, and/or shift the alignment to avoid or minimize impacts to structures to the extent practicable. Comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, 42 USC 4601 et. seq., 49 CFR Part 24, if acquisition of land is necessary.
Railroads The project crosses the MRL with a bridge	No impact to the railroad right-of-way. Project would require an easement for crossing over railroad right-of-way.	No mitigation required.
Utilities	Multiple utilities may require relocation.	Relocate utilities as needed in consultation with utility providers.
Historic and Cultural Resources		
Northern Pacific Railway (NP) Mainline	No Adverse Effect to Northern Pacific Railway Mainline (Site 24YL277).	No mitigation required.
Billings Bench Water Association Canal	No Adverse Effect to Billings Bench Water Association Canal (Site 24YL0161).	No mitigation required.
Billings and Central Montana Railroad	Billings and Central Montana Railroad (Site 24YL1592) is covered under terms of MDT's Abandoned Historic Railroad Grade Programmatic Agreement.	No mitigation required.
Cultural and Historic Resources *No archaeological resources were identified in the project area.*	No impacts to archaeological resources or materials subject to cultural patrimony are anticipated.	Although no adverse impacts to cultural or historic resources are anticipated, should evidence of historic or pre-historic sites be discovered during construction, in accordance with MDT Standard Specifications 107, the contractor would be required to immediately stop work in the area until the significance of the site is determined and appropriate measures implemented.

RESOURCE	MARY STREET OPTION 2 PHASE 1 IMPACTS	PHASE 1 MINIMIZATION MEASURES AND MITIGATION
Visual		
Change in Visual Quality	- Decrease of visual quality overall, but with increase in visual quality toward the road at the north end of Firth Street near Johnson Lane. - Larger decrease in visual quality for viewers toward the road at residential subdivision north of Dover Road and east of Pioneer Road. - Larger decrease in visual quality for viewers toward the road at intersection of Five Mile Road extension with Old Hwy 312. - Substantial decrease in visual quality for viewers toward the road of the Yellowstone River bridge crossing, although views would remain moderately high. Viewers would be recreationists at the proposed park. (Note: If the bridges were built before the park, there would be no visual change from existing conditions.)	In accordance with Standard Specification 201, clearing and grubbing activities would occur only within staked construction limits in order to minimize disturbances to native plant communities and specimen trees. Maintain as many trees as possible by allowing minimal fill around the base of trees. During final design retaining walls, "do not disturb areas" would be incorporated into the plans as needed. Select seed mixtures that include native grasses and forbs to blend cut and fill slopes and other construction-related disturbances with adjacent land uses. Maintain as many trees as possible, set clearing and grading limits, and plant trees at key locations. Select bridge type that is low and horizontal, with low-contrast materials. Use wall treatments that blend with the colors and textures of surrounding landscapes to the extent practicable. Use low-profile guardrails with a weathering finish to blend into the setting. If used, blend luminaires with natural colors; shield fixtures to minimize glare and spillover to the extent practicable.
Noise		
Project would result in noise increases due to increased traffic volumes and speed	10 residences would experience noise impacts above federal thresholds; two of these would be acquired for right-of-way, leaving 8 residences experiencing noise impacts above federal thresholds.	No feasible or reasonable mitigation measures were found for the impacts associated with the project. Coordination between local officials and developers is suggested to require setbacks for future developments, or development of noise-compatible uses near the roadway.
Farmlands		
The project area contains prime and important farmland, as valued by the National Resource Conservation Service	Project would use 43 acres of important farmland, with the majority of impacts south of the Yellowstone River.	No mitigation required.

RESOURCE	MARY STREET OPTION 2 PHASE 1 IMPACTS	PHASE 1 MINIMIZATION MEASURES AND MITIGATION
Irrigation		
Coulson Ditch *Project would require: a new mainline crossing of Coulson Ditch, a new culverted approach crossing, and relocation of two sections of the ditch to the north (650 and 1,400* ft)	Potential for construction impacts to ditch when construction occurs outside of existing ROW. Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	Ditch modifications would be designed and constructed in coordination with the ditch owners/operators. Contractors would be required to adhere to all applicable water quality laws and regulations in accordance with MDT standard specifications.
24 Acre Center Pivot	Roadway would impact approximately 12 acres of the 24 irrigated acres, resulting in a loss of irrigated land.	Coordination with landowner to identify necessary system modifications.
Minor Irrigation Features *Project would install new approach and crossing culverts* *Project may require minor channel changes*	Temporary impacts to several minor privately owned irrigation supply ditches. Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	Irrigation structures would be designed and constructed in coordination with the irrigation owners/operators. Contractors would be required to adhere to all applicable water quality laws and regulations in accordance with MDT standard specifications.
Billings Bench Water Association (BBWA) Lateral *Project would replace one substandard corrugated metal pipe crossing culvert*	Culvert replacement would be improvement to infrastructure Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	See above mitigation for other irrigation features.
Drainage Ditch near Five Mile Road	Potential for construction impacts to ditch when construction occurs outside of existing ROW. Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	See above mitigation for other irrigation features.
Energy		
Energy Use: Operations *Energy use includes vehicle fuel consumption in the project area and electrical power for lighting*	Project would result in approximately 0.5% more energy use from vehicles in the study area than would occur with the No Build.	No mitigation required.

RESOURCE	MARY STREET OPTION 2 PHASE 1 IMPACTS	PHASE 1 MINIMIZATION MEASURES AND MITIGATION
Energy Use: Construction *Energy would be required to construct the project (supplies, transport, operation of machinery)*	Energy would be used to generate and transport construction materials, and from operation of construction equipment.	No mitigation required.
Section 4(f)		
Recreational Resources	*De minimis* impact to Kiwanis Trail and planned Kiwanis Trail extension.	MDT would coordinate with the City of Billings throughout final design to ensure that the final project provides for safe and effective pedestrian and bicycle movement across the project corridor at the Kiwanis Trail crossing. MDT would coordinate with the City of Billings to include appropriate signage and/or public notifications regarding temporary trail closures.
Cultural Resources	No adverse effects determination by SHPO, and *de minimis* determination by FHWA.	See Cultural Resources section.
Wildlife and Waterfowl Refuges	None present in the project area.	No mitigation required.
ENVIRONMENTAL		
Air Quality		
Carbon Monoxide (CO)	Projected CO levels are below national standards.	In accordance with MDT Standard Specification 107, the contractor would be required to adhere to applicable air quality rules and regulations, which may require the use of dust suppression and emission control measures to minimize short-term construction-related impacts. Operation of all equipment including, but not limited to, hot-mix paving plants and aggregate crushers must meet the minimum air quality standards established by federal, state, and local agencies in accordance with MDT Standard specification 107.11.3.
Particulate Matter (PM)	No hot-spot analysis required; project is not a project of concern due to area attainment status.	
Mobile Source Air Toxics (MSATs)	Project has "low potential" for MSATs effects.	
Greenhouse Gases	No contribution at a cumulatively considerable level.	

RESOURCE	MARY STREET OPTION 2 PHASE 1 IMPACTS	PHASE 1 MINIMIZATION MEASURES AND MITIGATION
Hazardous Materials		
Permanent Impacts: *Disturbing contaminated ground or waters can cause release of hazardous materials into the environment* *Right-of-way acquisition of contaminated properties can require expensive cleanup.*	Potential impacts at four UST/LUST sites, three AST sites, one automotive site, two "Other" sites, one spill site, and one substation. Three groundwater monitoring wells would be relocated or protected in place.	• Sites in the immediate proximity of the alignment would be further investigated under a Phase II assessment before property acquisition to determine the magnitude and extent of contamination, if any. This would include a site visit, review of agency documents, and interviews with agency personnel. • Where appropriate, surface soil, subsurface soil, and/or groundwater samples would be collected and analyzed for probable contaminants of concern.
	Structures being acquired and removed within proposed ROW may contain asbestos, lead paint, or other hazardous materials.	Hazardous materials associated with acquired structures: • Before construction, all buildings that have been or would be acquired for the project and proposed for demolition would be surveyed by a state-licensed inspector for asbestos and other sources of contamination. • A National Emissions Standards for Hazardous Air Pollutants Demolition/Renovation Notification form would be filed with MDEQ for all relocated or demolished structures. • Asbestos removal would be performed in accordance with the OSHA requirements, Montana Department of Labor and Industry occupational safety and health requirements, and MDEQ rules and permit requirements for demolitions/renovations.
Construction: *Due to the urban nature of portions of the project, there is potential to encounter previously undiscovered hazardous materials, substances, and/or solid waste and contaminated groundwater.*	Previously undiscovered hazardous materials, substances, and/or solid waste and contaminated groundwater may be discovered during construction.	• Contaminated soils, groundwater, hazardous substances, and USTs encountered during construction would be handled by Sections 107.23 and 107.24 of MDT Standard Specifications for Road and Bridge Construction.
Water Quality		
Permanent Impacts: *Impervious surface causes runoff which can increase delivery of pollutants to waterways and thus decrease water quality.*	55.6 acres additional impervious surface compared to existing conditions.	Design bridges and culverts to minimize impacts to rivers, floodplain, hydraulics, river riffle/pool complexes, and channel migration zone, as practical. If practicable, direct drainage of bridge deck runoff would be eliminated. In accordance with MDT Standard Specifications 107 and 208, the contractor would be required to adhere to applicable water quality rules, regulations, and permit conditions.

RESOURCE	MARY STREET OPTION 2 PHASE 1 IMPACTS	PHASE 1 MINIMIZATION MEASURES AND MITIGATION
Temporary impacts: *Construction activities would expose new areas to wind and water erosion and bridge and culvert work would disturb waterways*	Potential increases in runoff during construction activities and prior to restoration of disturbed areas.	In accordance with MDT Standard Specifications 107 and 208, the contractor would be required to adhere to applicable water quality rules, regulations, and permit conditions. The design would be prepared in accordance with the existing municipal storm sewer system (MS4) permit requirements including inclusion of low impact development practices as practicable. Erosion and sediment control(s) would be required as necessary to minimize damage to the highway and adjacent properties and abate pollution of surface and ground water resources. Routine site monitoring would be conducted as necessary to ensure all pollution control measures are installed, maintained, and functioning correctly.
Wild and Scenic Rivers		
Wild and Scenic Rivers *The Yellowstone River and its tributaries are not designated as National Wild and Scenic Rivers*	No impacts.	No mitigation required.
Water Body Modifications		
Water Body Modifications: Permanent Impacts *Project requires new crossings of Yellowstone River and Five Mile Creek, and several irrigation facilities.*	Placement of bridges in/over the Yellowstone River would directly impact hydrology and channels of the Yellowstone River. New bridge over Five Mile Creek would span the bed and bank of the waterway. Replacement, relocation, and/or construction of irrigation and drainage ditches throughout the project corridors.	New structures would be designed to minimize disturbance to stream hydrology and banks and to minimize channel alterations. All stream crossings would be designed in accordance with 23 CFR 650 Subpart A and in coordination with the appropriate regulatory agencies Modifications to irrigation facilities would be designed and constructed in coordination with the irrigation owners/operators. (See Irrigation section, above, for more information.)
Water Body Modifications: Construction Impacts *For the Yellowstone River crossing, construction impacts would occur during both the construction of the Phase 1 improvements and again during construction of the Full Buildout.* *For the Five Mile Creek crossing, all construction impacts would occur during Phase 1*	Impacts to water quality due to construction activities.	All work would be performed in accordance with state and federal guidelines regarding water quality and permit conditions. These include the applicable regulations under the federal Clean Water Act of 1972, as amended (i.e., Section 404 Permit), Section 10 of the Rivers and Harbors Act, and specific permit requirements from the Montana Stream Protection Act (SPA) 124 authorization; Montana Floodplain and Floodway Management Act, Section 402/MPDES permit; MS4 permit, and utilization of the current BMPs. To re-establish permanent vegetation and to reduce the spread and establishment of noxious weeds, disturbed areas within MDT right-of-way and easements would be seeded with desirable plant species, as soon as practicable, as recommended and determined feasible by the MDT Botanist.

RESOURCE	MARY STREET OPTION 2 PHASE 1 IMPACTS	PHASE 1 MINIMIZATION MEASURES AND MITIGATION
Floodplains		
Yellowstone River *Project would require new structure crossing the Yellowstone River (second structure to be built during Full Buildout)*	Less than a 0.5-foot rise in the base flood elevation.	The crossing of the Yellowstone River would require a substantial amount of fill and some removal of fill from within the floodplain to achieve the backwater requirements of no rise above 0.5 feet in base flood elevation. The proposed project would be designed in compliance with Executive Order (E.O.) 11988, Floodplain Management. State of Montana drainage design standards would be applied to achieve results that would not increase or significantly change the flood elevations and/or limits. Mitigation would be in accordance with permitting requirements of Yellowstone County.
Five Mile Creek *Project would construct new bridge across Five Mile Creek; bridge would be constructed to accommodate the future Full Buildout.*	Less than a 0.5-foot rise in the base flood elevation.	No mitigation required.
Culverts *Project would require multiple new culverts; culverts would be constructed to accommodate the future Full Buildout.*	No roadway overtopping for the 50-year design flood. No backwater damage to adjacent property.	No mitigation required.
Wetlands		
Wetlands Impacted *Wetland areas would be impacted during construction of the roadways, bridges, culverts, and landscaping due to the placement of fill in the form of soil, riprap, concrete, various sizes of rock, and other construction materials. The area of loss was minimized to the extent practicable during preliminary design.*	Estimated total wetland impacts of 4.36 acres.	Impacts to wetlands would be avoided and minimized to the maximum extent practicable. For unavoidable wetland impacts, mitigation would be provided in accordance with Executive Order #11990 and the US Army Corps of Engineers Clean Water Act permit requirements. Appropriate monitoring would be conducted to ensure that any wetland mitigation site functions as intended.

RESOURCE	MARY STREET OPTION 2 PHASE 1 IMPACTS	PHASE 1 MINIMIZATION MEASURES AND MITIGATION
U.S. Army Corps of Engineers Jurisdictional Wetlands Impacted	Of the 4.36 acres of wetlands impacted, an estimated 3.36 acres have preliminarily been deemed jurisdictional under Section 404 of the Clean Water Act.	Same as above for wetlands impacted.
Vegetation		
Riparian Impacts *The project would cross multiple riparian areas*	6.0 acres	To re-establish permanent vegetation and to reduce the spread and establishment of noxious weeds, disturbed areas within MDT right-of-way and easements would be seeded with desirable plant species, as soon as practicable, as recommended and determined feasible by the MDT Botanist. Post-construction, the site would be monitored until final stabilization is met. In accordance with Standard Specification 201, clearing and grubbing activities would occur only within staked construction limits. To control the spread of noxious weeds, the contractor would be required to wash all equipment prior to transport into the project area as specified in the Supplemental Specifications.
Cliff Impacts *Cliff areas are part of the native vegetation*	0.1 acre	Same as Riparian Impacts.
Pond Impacts *Project avoids pond areas*	0 acre	No mitigation required.
Sage Steppe Impacts *Project avoids sage steppe areas*	0 acre	No mitigation required.
Wildlife and Aquatic Species		
Wildlife Species Impacts	Loss of habitat due to construction and increased habitat fragmentation (barrier effect).	Compliance with Section 208 of MDT's *Standard Specifications, Water Pollution Control and Stream Preservation* (MDT 2006), and adherence to resource agency conditions. MDT would continue to evaluate the appropriateness and necessity of additional wildlife crossings measures near the Yellowstone River, Five Mile Creek, or other locations. In accordance with the Migratory Bird Treaty Act (MBTA) of 1918 and the Bald and Golden Eagle Protection Act of 1940, impact to known breeding locations such as avian nests or burrows would be avoided or minimized as required. In conformance to the MBTA, seasonal restrictions or deterrent methods are used to ensure that active nests are not harmed during the breeding season.

<table>
<tr><th>RESOURCE</th><th>MARY STREET OPTION 2
PHASE 1 IMPACTS</th><th>PHASE 1 MINIMIZATION MEASURES AND MITIGATION</th></tr>
<tr><td>Aquatic Species Impacts</td><td>Direct mortality and loss of habitat at ground-disturbed or pier locations.
Minor impact to aquatic habitat associated with canals and ditches.</td><td>Mitigation for substantive negative impacts to aquatic species is anticipated during final design of the bridge crossing and culverts for this project and the implementation of standard specifications and BMPs. Bridge crossings are planned for the fish-bearing streams.
Avoidance and minimization of impacts to aquatic species is anticipated through measures including the following:
Design bridges to optimize the shape, size, number, and placement of pier locations in a manner that would maintain uninterrupted fish passage.
Schedule in-water work for bridge construction during low water levels to minimize construction during spawning periods.
Adhere to Section 208 of MDT’s Standard Specifications for Road and Bridge Construction (2006).
Adhere to special conditions set forth by the resource agencies.</td></tr>
<tr><td colspan="3">State Species of Concern</td></tr>
<tr><td>Grasshopper Sparrow</td><td>None.</td><td rowspan="5">No mitigation required.
MBTA requirements would apply (see below).</td></tr>
<tr><td>Pinyon Jay</td><td>None.</td></tr>
<tr><td>Brewer’s Sparrow</td><td>None.</td></tr>
<tr><td>Greater Short Horned Lizard</td><td>None.</td></tr>
<tr><td>Loggerhead Shrike</td><td>None.</td></tr>
<tr><td>Common Sagebrush Lizard</td><td>Direct mortality may occur due to inability to disperse during construction.</td><td rowspan="5">Compliance with Section 208 of MDT’s Standard Specifications and adherence to resource agency conditions.
Implementation of the “Recommended Conservation Measures” for general wildlife species
Complying with the conditions of the resource agencies would avoid or minimize impacts to species of concern.</td></tr>
<tr><td>Milksnake</td><td>Direct mortality may occur due to inability to disperse during construction.</td></tr>
<tr><td>Western Hog-nosed Snake</td><td>Direct mortality may occur due to inability to disperse during construction.</td></tr>
<tr><td>Spiny Softshell</td><td>Negligible direct impacts.</td></tr>
<tr><td>Snapping Turtle</td><td>Negligible direct impacts.</td></tr>
<tr><td>Sauger</td><td>Potential for disruption of spawning locations.</td><td rowspan="2">Complying with the conditions of the resource agencies would avoid or minimize impacts to species of concern. The Fish and Wildlife Recommendations for Subdivisions address state species of concern.</td></tr>
<tr><td>Yellowstone Cutthroat Trout</td><td>Negligible direct impacts.</td></tr>
</table>

<table>
<tr><th>RESOURCE</th><th>MARY STREET OPTION 2
PHASE 1 IMPACTS</th><th>PHASE 1 MINIMIZATION MEASURES AND MITIGATION</th></tr>
<tr><td>Black-billed Cuckoo</td><td>May experience direct mortality in nesting locations within riparian areas, wetlands, or ditches that are affected by construction activities.</td><td rowspan="3">Compliance with Section 208 of MDT’s Standard Specifications and adherence to resource agency conditions.
Implementation of the “Recommended Conservation Measures” particularly in regard to the MBTA would avoid the majority of breeding schedules.
Complying with the conditions of the resource agencies would avoid or minimize impacts to species of concern.</td></tr>
<tr><td>Veery</td><td>May experience direct mortality in nesting locations within the riparian areas, wetlands, or ditches that are affected by construction activities.</td></tr>
<tr><td>Hoary Bat</td><td>May experience direct mortality in rearing locations within the riparian areas, wetlands, or ditches that are affected by construction activities.</td></tr>
<tr><td rowspan="2">Eagle</td><td>Long-term:
Potential increases in wildlife/vehicle collisions could attract scavenging eagles and put them at risk</td><td>MDT would continue to evaluate the appropriateness and necessity of wildlife crossings locations and other measures to minimize the potential increase of available carrion for bald eagles.</td></tr>
<tr><td>Construction:
May experience temporary disturbance during construction if roosting area and/or nests are found within 0.5 mile of project limits.</td><td>Implementation of the “Recommended Conservation Measures” particularly in regard to the MBTA and the Bald and Golden Eagle Protection Act, would avoid the majority of breeding schedules, if necessary.
Complying with the conditions of the resource agencies would avoid or minimize impacts to species of concern, in particular, The Montana Bald Eagle Guidelines Addendum, 2010 addresses the bald eagle buffers, seasonal construction restrictions, and habitat conservation.
The location of the eagle nests and communal roosting sites would be verified by a preconstruction survey or through coordination with resource agencies or organizations.
Coordination with the USFWS and MTFWP is required if blasting is to occur within ½ mile of nests or roosts.</td></tr>
<tr><td>Great Blue Heron</td><td>No anticipated impacts to documented rookeries in the project area.</td><td>No mitigation required.</td></tr>
<tr><td>Small burrowing animals, hibernating reptiles, and amphibians</td><td>May experience direct mortality in the riparian areas, wetlands, or ditches that are affected by construction activities.</td><td>Compliance with Section 208 of MDT’s Standard Specifications and adherence to resource agency conditions. Implementation of the “Recommended Conservation Measures” for general wildlife species.</td></tr>
</table>

RESOURCE	MARY STREET OPTION 2 PHASE 1 IMPACTS	PHASE 1 MINIMIZATION MEASURES AND MITIGATION
Threatened and Endangered Species		
Whooping crane	Not likely to adversely affect	No conservation measures are likely to be necessary with respect to threatened and endangered species. However, if any whooping cranes are observed in or adjacent to the study area during construction, work would be halted and MDT would contact the USFWS. Migration peaks for whooping crane are in April and October.
Black-footed ferret	No Effect	
Greater sage-grouse	Not likely to jeopardize continued existence	
Sprague's pipit	Not likely to jeopardize continued existence	

For the following resources, differences between the footprint, construction, and operation of Phase 1 and the Full Buildout warrant additional analysis regarding the impacts associated with Phase 1:

- Transportation
- Water resources
- Water body modifications
- Floodplains
- Wetlands
- Wildlife and aquatic species

For the other resource topics, differences in the impacts associated with Phase 1 and the Full Buildout are minor and are not analyzed further.

Analysis in this FEIS discloses impacts to traffic operations, community resources, and natural resources that are associated with Phase 1 of the build alternatives, where they differ from the Full Buildout. The Phase 1 impacts were evaluated in this FEIS to identify the full extent of long-term impacts and benefits. These resource impacts are described in Chapter 4.

2.6.4 CONSTRUCTION SEQUENCING

Phase 1 would be constructed sequentially during a 20-year time frame. Construction could begin as soon as 5 years after issuance of the ROD, but could take up to 20 years to complete as specific funding becomes available for the project. Construction sequencing strategies are required for a project of this size and would take into account minimization of related impacts. The construction schedule would take into account various construction activities, grouped into categories of mobilization, utility relocation, site preparation, interchange and structure construction, and lane construction. Staging of built components would be determined as final design work is completed to allow for components to be constructed with the available funding, while still providing independent utility. Because the project is at a preliminary level of design, project details and construction methods have not been fully defined, and these may change somewhat as the design evolves and funding becomes available. Due to the availability and type of funding, the Yellowstone River bridge, Johnson Lane Interchange, MRL Railroad crossing structure, alignment north of Lockwood, and connections north of the Yellowstone River bridge are likely to be constructed as separate projects during the implementation of Phase 1.

The Full Buildout would be implemented after completion of Phase 1, contingent on funding and in coordination with local agencies and the public. Implementation would be staged based on level of service and operational needs.

3 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes existing transportation, social and economic, and environmental conditions in the Billings Bypass study area. The study area is approximately 18 square miles and is roughly bounded by US 87/Main Street, Old Hwy 312, and the I-90/I-94 interstate corridor. Describing the affected environment creates a baseline that can be used to understand and compare the potential direct, indirect, and cumulative effects of each of the project alternatives. Environmental consequences are discussed in Chapter 4 of this document.

Guidance provided by the National Environmental Policy Act (NEPA), Montana Environmental Policy Act (MEPA), MDT, and FHWA was used to identify the resources of concern that required analysis, as discussed in the sections that follow.

3.2 TRANSPORTATION CONDITIONS

This section describes existing transportation conditions in the Billings Bypass study area between I-90 and Old Hwy 312. The three roadways that bound the study area—US 87/Main Street, Old Hwy 312, and the I-90/I-94 corridor—are an integral part of a regional highway system. This system accommodates a high volume of commercial and through traffic passing through Billings, as well as residential traffic from outlying areas destined to or originating from Billings. As a result of several physical barriers in and around Billings, local and regional north-south traffic is funneled through the US 87/Main Street corridor in the urban area of Billings, resulting in increased congestion and limited mobility. **Figure 3.1** illustrates the existing roadway network within the study area, as described in Chapter 1 (Section 1.2.1).

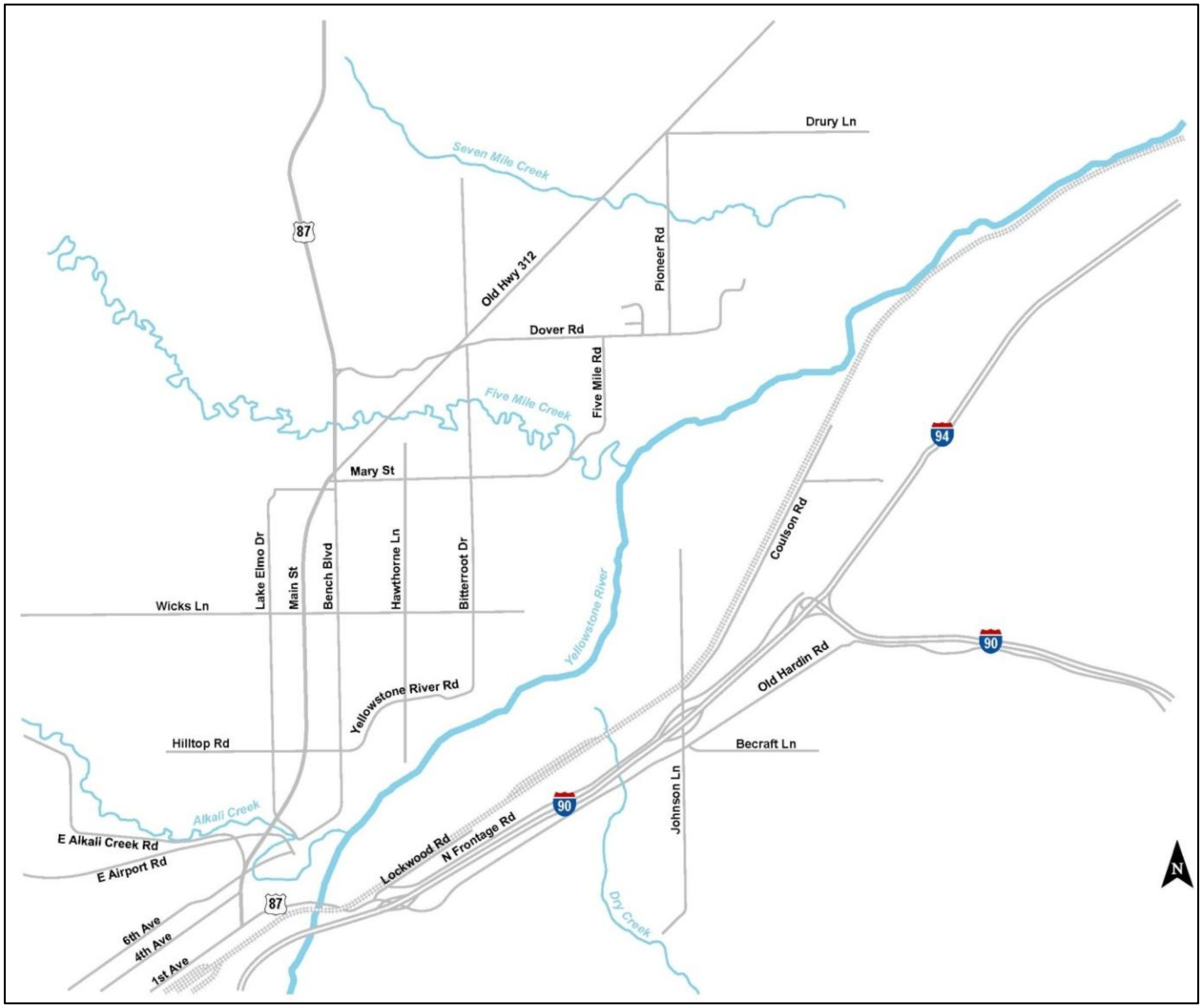
3.2.1 EXISTING ROADWAYS

The Billings Bypass, the proposed arterial roadway connection between Billings Heights and Lockwood, would most affect transportation conditions on the following roadways, shown on **Figure 3.1**:

- Main Street (US 87)
- Bench Boulevard
- Old Hwy 312
- US 87 River Crossing between Main Street and I-90
- I-90
- I-94

Main Street (US 87) is a six-lane, principal arterial street within the City of Billings. The roadway is the main north-south roadway in Billings Heights and is a principal route for vehicles entering the Billings area from the north and northeast. The roadway's southern terminus is 1st Avenue North and its northern terminus is the US 87/Old Hwy 312 junction. US 87 continues north of this intersection as a two-lane highway toward the small town of Roundup before turning west toward Great Falls. Main Street has ten signalized intersections along its route, and an additional signal is in the planning stages. Key signalized intersections along Main Street include 1st Avenue North, 6th Avenue North/Bench Boulevard, Airport Road, Hilltop Road, and Wicks Lane. Numerous residential and commercial driveways access Main Street, especially south of Wicks Lane. However, raised medians along Main Street, between 1st Avenue North and US 87/Old Hwy 312, limit access from driveways and some side streets.

Figure 3.1 Existing Major Roadway Network



Source: Billings Bypass Combined Traffic Reports, August 2013.

Bench Boulevard is a principal arterial street paralleling Main Street between 6th Avenue North and the US 87/Old Hwy 312 junction. The roadway is a two-lane facility with limited access to Main Street, though there are numerous driveways for local residences and businesses along its length. In 2011, Bench Boulevard was extended from Lincoln Lane, across Alkali Creek, to 6th Avenue North at Main Street. In addition, two MDT projects are planned to improve Bench Boulevard to three lanes from the Alkali Creek crossing to the US 87/Old Hwy 312 junction. Additionally, a grade-separated intersection is under consideration for Main Street and Bench Boulevard/6th Avenue North. One purpose of these projects is to draw traffic to Bench Boulevard in order to relieve congestion on Main Street.

Old Hwy 312 provides access to residential subdivisions and small communities northeast of Billings. The roadway's southern terminus is the intersection with Main Street (US 87), and its northern terminus is at I-94 near Pompey's Pillar. Old Hwy 312 is classified as an off-system route maintained by MDT. Old Hwy 312 has two travel lanes in each direction and a two-way left-turn lane from the US 87/Main Street intersection to approximately 1 mile northeast of Dover Road. Northeast of this section the roadway is a two-lane facility.

Along the southwest boundary of the study area is a segment of US 87 running between the I-90 Lockwood Interchange and the Main Street/1st Avenue North intersection. The roadway is generally four lanes, with raised median and limited access points, including two intersections. This segment of US 87 features an elevated crossing of both the Yellowstone River and the Montana Rail Link (MRL) railroad. It is the main entry to Billings for traffic with origins and destinations east of Billings on I-90 and I-94.

I-90 enters the study area from the east, parallels the Yellowstone River and the MRL on the southeast, and crosses the Yellowstone River just east of downtown Billings. The interstate turns south and then west as it travels along the eastern and southern edges of Billings. Three I-90 interchanges are within the study area boundaries: the I-90/I-94 Interchange, the Johnson Lane Interchange, and the Lockwood Interchange.

The I-90/I-94 junction, commonly known as the Pinehills Interchange, is located in Lockwood in the eastern portion of the study area. The Pinehills Interchange is a trumpet-style interchange that requires eastbound I-90 traffic to exit on a single-lane ramp before merging with I-94 traffic and continuing eastbound on I-90. The geometrics of this interchange are considered to be substandard, according to current American Association of State Highway and Transportation Officials (AASHTO) criteria and guidelines.

The Johnson Lane Interchange is located approximately 1.3 miles southwest of the Pinehills Interchange. This interchange provides access to Johnson Lane, a principal north-south arterial roadway in Lockwood. The interchange is configured as a standard diamond interchange. The westbound ramps are stop controlled, while the eastbound ramps are controlled by a traffic signal. The eastbound off-ramp approach to Johnson Lane has two lanes. All other ramps have single lanes.

Johnson Lane extends from south of Lockwood, under I-90, and across the MRL railroad, and terminates at a dead-end south of the Yellowstone River. South of the eastbound I-90 ramps, Johnson Lane intersects Old Hardin Road, a principal arterial street located south of and parallel to I-90. The Johnson Lane/Old Hardin Road intersection is signal controlled. Immediately north of the I-90 westbound interchange ramps, Johnson Lane intersects with the I-90 North Frontage Road. The Johnson Lane/North Frontage Road intersection is stop controlled. Just south of the MRL railroad, Johnson Lane intersects Coulson Road, a rural roadway paralleling the railroad tracks. The Johnson Lane/Coulson Road intersection is stop controlled.

The Lockwood Interchange, approximately 2.5 miles southwest of the Johnson Lane Interchange, provides access to US 87 east of downtown Billings. The interchange is configured as a standard diamond with single-lane ramps and a five-lane crossroad (US 87). The US 87 roadway has two traffic lanes in each direction and left-turn lanes within a raised median section at the ramp intersections. Both the eastbound and the westbound ramps are signalized.

Other roadways within the study area that may be affected by the proposed arterial roadway connection and that are discussed further in this analysis include:

- Bitterroot Drive – A two-lane, north-south principal arterial street extending from Yellowstone River Road on the south to Dover Road on the north. The roadway intersects with numerous roadways including Wicks Lane and Mary Street. There is no intersection with Old Hwy 312 from the south as Bitterroot Drive ends at Dover Road. Vehicles on Bitterroot Drive can travel a few hundred feet west along Dover Road to access Old Hwy 312. Bitterroot Drive does intersect with Old Hwy 312 from the north, providing access to residential developments north of the highway.

- Five Mile Road – A rural, two-lane, north-south minor arterial street extending from Mary Street on the south to Dover Road on the north. The roadway has only a few roadway and driveway access points, generally just north of Mary Street.

- Mary Street – A rural, two-lane, east-west principal arterial street in northern Billings Heights extending from a dead-end at the Yellowstone River on the east to Main Street/Bench Boulevard on the west. The roadway intersects with four other roadways, including Five Mile Road and Bitterroot Drive, and has numerous driveway access points.

- Pioneer Road – A rural, two-lane, north-south minor arterial street extending from Dover Road on the south to Old Hwy 312 on the north. The roadway has relatively few roadway and driveway access points along its extents.

- Wicks Lane – A two- to four-lane east-west principal arterial street in Billings Heights. The roadway is a primary east-west access road. The roadway has numerous roadway intersections, including Main Street and Bench Boulevard, as well as residential and commercial driveway access points.

3.2.2 PLANNED ROADWAY IMPROVEMENTS

The following is a list of future, committed transportation improvement projects within the study area:

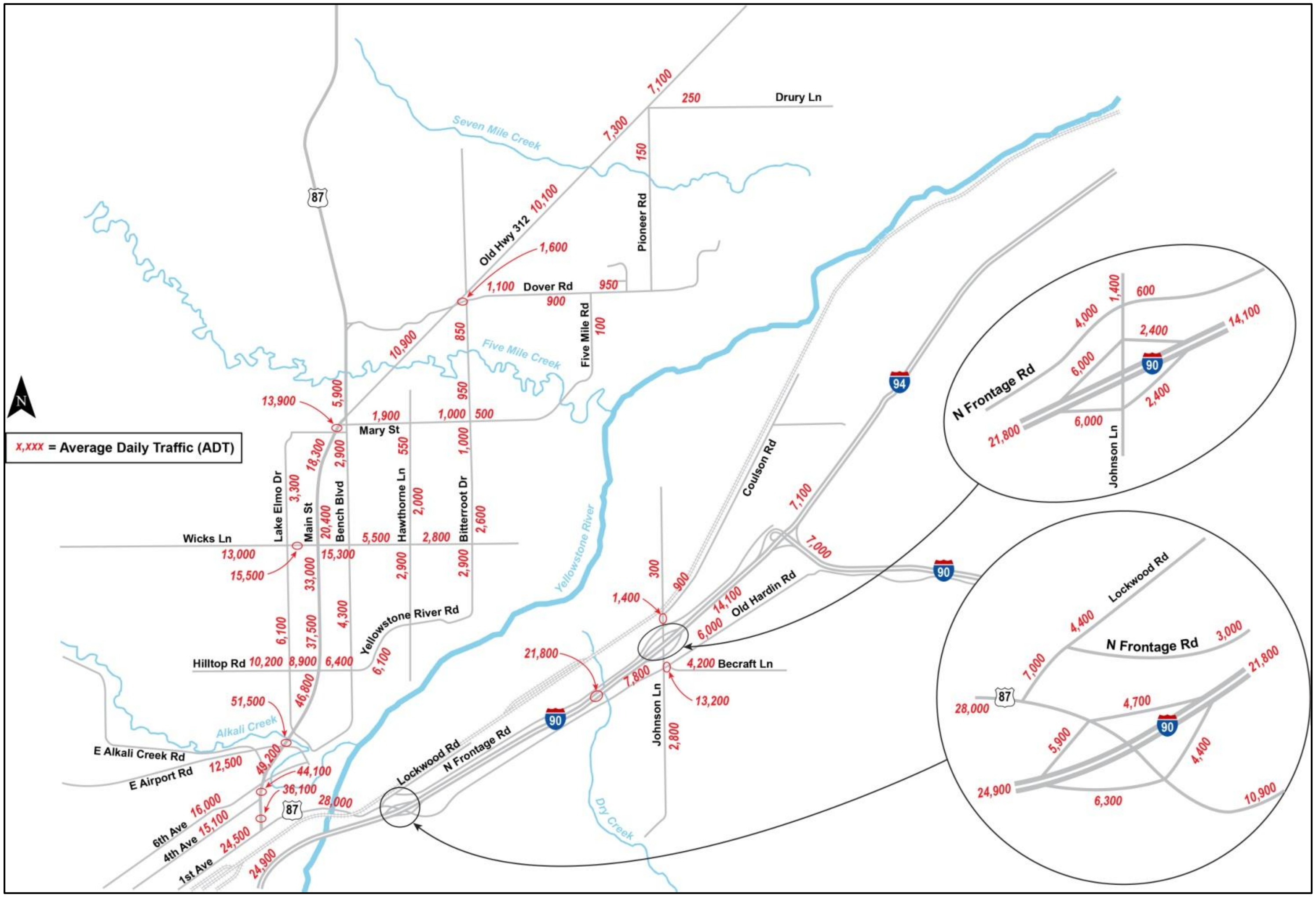
- Bench Boulevard from Lincoln Lane to Hilltop Road – widen to two driving lanes and a two-way left-turn lane, with parking available along most of the alignment.
- Old Hardin Road from the Lockwood Interchange to Johnson Lane – widen to three lanes as a "super collector" facility.
- Old Hardin Road from Johnson Lane to Becraft Lane – create a new connection south of the existing connection to eliminate a "double intersection."
- Main Street/Hilltop Road – make intersection capacity improvements.
- Old Hwy 312/Dover to Bitterroot Drive – reconstruct and add signs/markings.

3.2.3 TRAFFIC OPERATIONS

3.2.3.1 ROADWAY AND INTERSECTION OPERATIONS

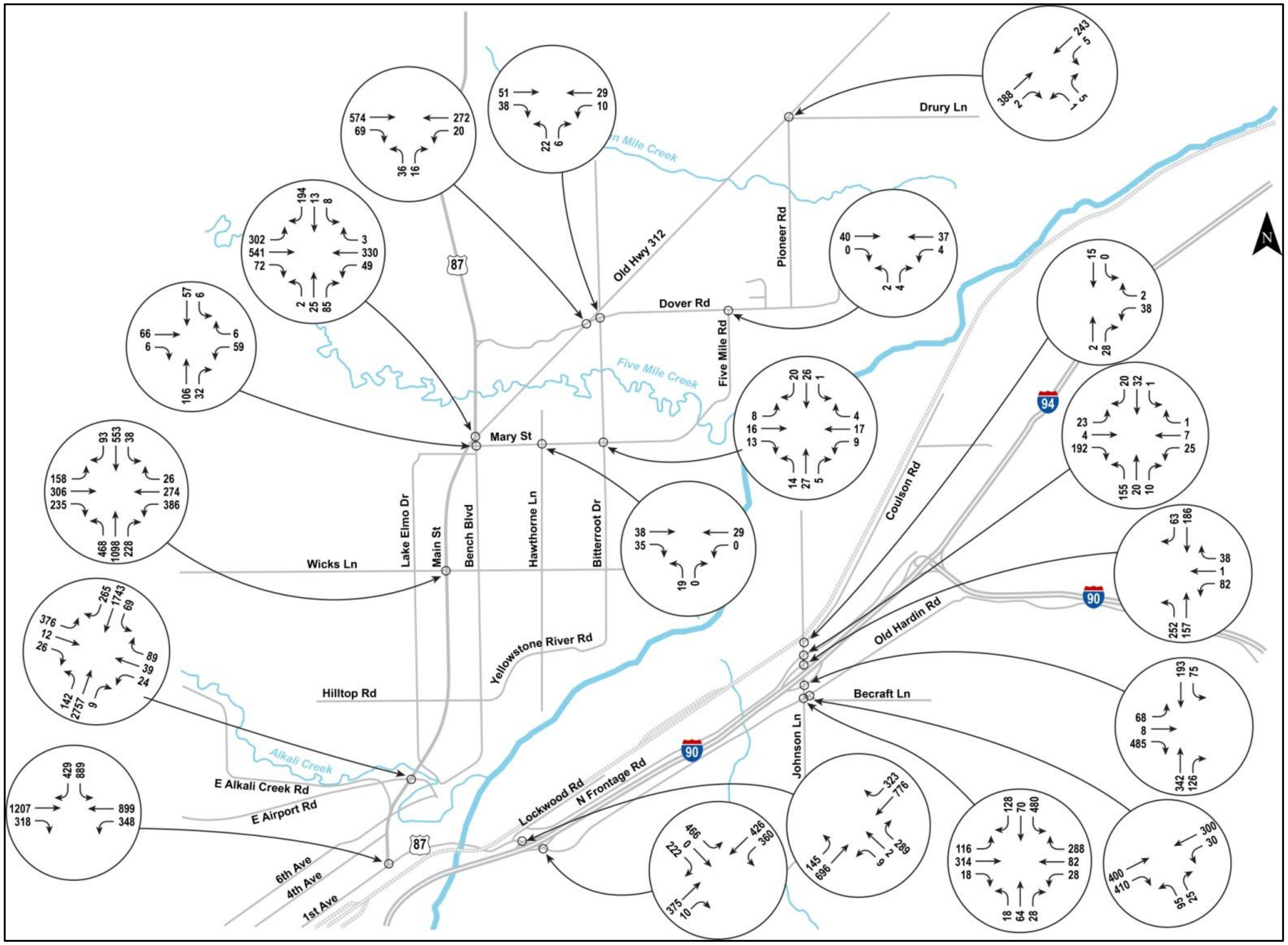
The Billings Bypass Combined Traffic Reports (Marvin & Associates 2013), dated July 2013, analyzed existing traffic volumes and operations. The report includes a compilation of traffic volume data gathered from several sources including MDT, the City of Billings, Yellowstone County, and the *Lockwood Transportation Study* (Marvin & Associates 2008). Additionally, peak hour traffic movement counts were collected at intersections in 2010 and 2011, as documented in the report. **Figure 3.2** illustrates the existing year Average Daily Traffic (ADT) volumes, and **Figure 3.3** illustrates existing year PM peak hour traffic volumes within the study area.

Figure 3.2 2010 Average Daily Traffic Volumes



Source: Billings Bypass Combined Traffic Reports, August 2013.

Figure 3.3 2010 PM Peak Hour Traffic Volumes

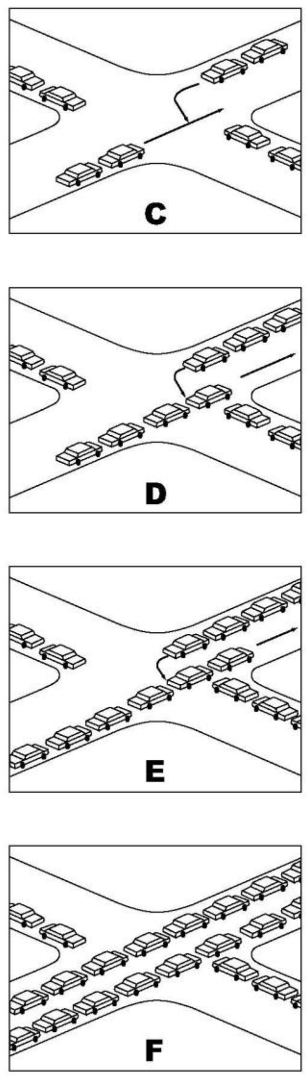


Source: Billings Bypass Combined Traffic Reports, August 2013.

The relationship between the volume and capacity of a facility is reported through level of service (LOS). Level of service is a qualitative measure that ranges from LOS A to LOS F. LOS A represents the highest quality of traffic flow in which vehicles experience minimal to no delay under essentially free-flow conditions. LOS F represents stop-and-go traffic conditions in which long delays are experienced by most vehicles in the traffic system. The general characteristics of the LOS categories for intersections are described in **Figure 3.4**.

Figure 3.4 Intersection Level of Service Characteristics

LOS	Signalized Intersections
A	No vehicle waits longer than one signal indication
B	On a rare occasion vehicles wait through more than one signal indication
C	Intermittently vehicles wait through more than one signal indication, occasionally backups may develop, traffic flow still stable and acceptable
D	Delays at intersections may become extensive, but enough cycles with lower demand occur to permit periodic clearance, preventing excessive backups
E	Very long queues may create lengthy delays
F	Backups from locations downstream restrict or prevent movement of vehicles through the intersection creating a "gridlock" condition



Source: Highway Capacity Manual, 2000, Transportation Reseach Board, 2000

Source: Billings Bypass Combined Traffic Reports, August 2013.

Existing operational performance along each segment of I-90 within the study area, as well as along on- and off-ramps at the Lockwood and Johnson Lane interchanges, was measured. All interstate segments and ramps in the areas noted above currently operate at LOS C or better. The traffic analysis summaries for these facilities can be found in the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013).

The operational performance of 18 intersections within the study area was measured during the PM peak hour. **Figure 3.5** illustrates the operational performance of the critical intersections within the study area in the existing year (2010).

As **Figure 3.5** illustrates, only 5 of the 18 intersections have approaches that operate worse than LOS C:

- Old Hardin Road and Becraft Lane (northbound approach).
- Johnson Lane and I-90 westbound ramps (westbound off-ramp).
- Main Street and Airport Road (northbound, eastbound, and westbound approaches).
- Main Street and Wicks Lane (all approaches).
- US 87/Main Street/Old Hwy 312/Bench Boulevard (northbound approach).

At the Old Hardin Road/Becraft Lane intersection, the northbound Becraft Lane approach is stop controlled. This approach currently operates at LOS E during the PM peak hour. While the approach volume is fairly low (200 vehicles) during the PM peak hour, it is double that of the approach volume during the AM peak hour. This intersection is located approximately 300 feet northeast of the Johnson Lane/Old Hardin Road intersection. The proximity of the Johnson Lane/Old Hardin Road intersection would make signalization of this intersection difficult. The *Lockwood Transportation Study* suggests relocating Becraft Lane to enable coordinated operations between the two intersections, but no projects are currently planned or funded (Marvin & Associates 2008).

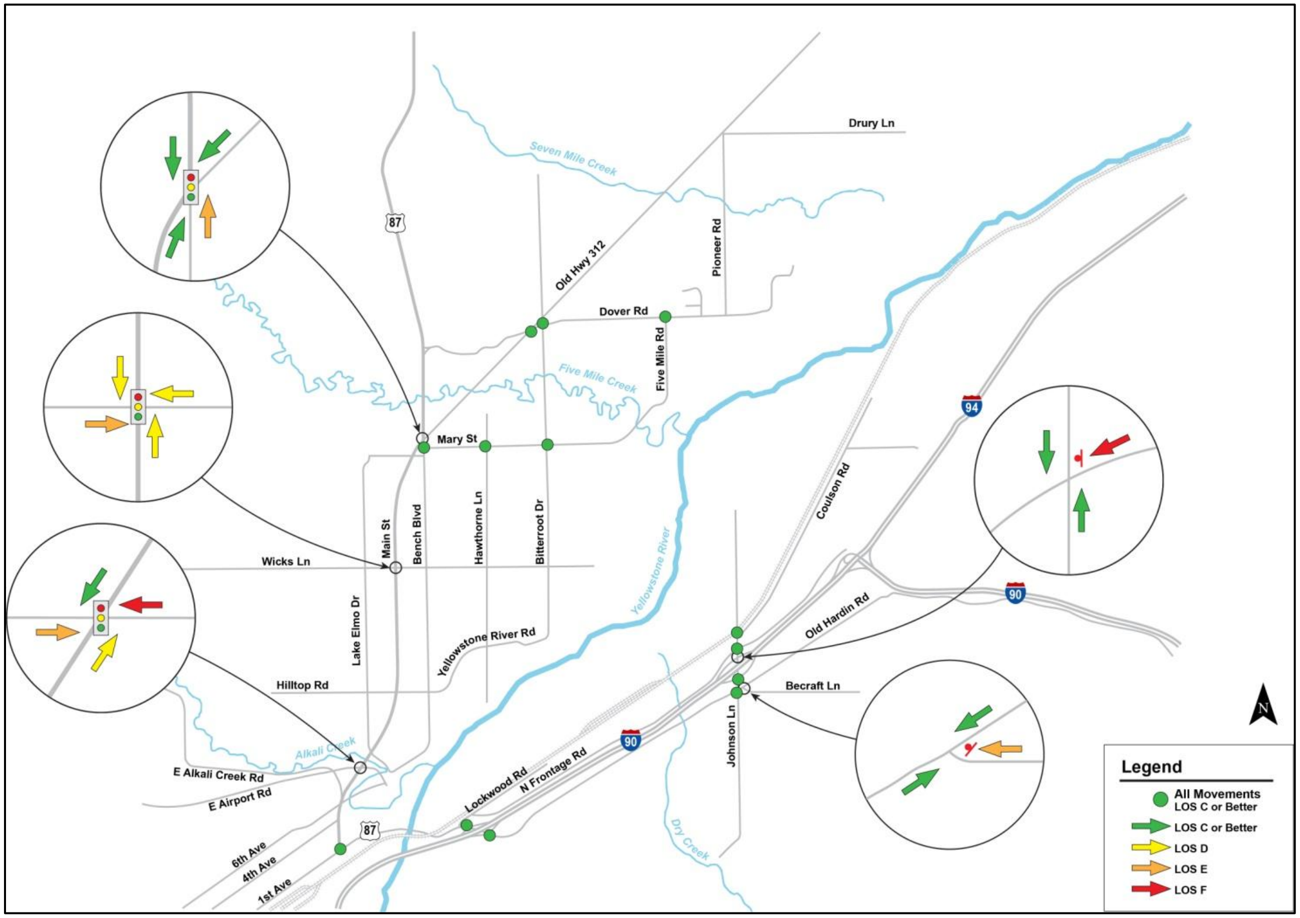
At the Johnson Lane/I-90 westbound ramps intersection, the westbound off-ramp approach is stop controlled. This approach currently operates at LOS F during the PM peak hour. High truck traffic volume on the off-ramp and along Johnson Lane contributes to the poor performance. Vehicle queues on the off-ramp generally reach only four or five vehicles because of low traffic volumes on the ramp.

At the Main Street/Airport Road intersection, the northbound approach currently operates at LOS D. Traffic volumes along this approach exceed 3,000 vehicles during the PM peak hour. Along Airport Road, the eastbound and westbound approaches operate at LOS E and LOS F, respectively. The high traffic volumes and coordinated signal timing along Main Street result in greater delay on cross streets. Airport Road operations are greatly improved during off-peak hours.

At the Main Street/Wicks Lane intersection, both northbound and southbound approaches currently operate at LOS D. Along Wicks Lane, the eastbound approach currently operates at LOS E. As with the Airport Road approaches to Main Street, the Wicks Lane approaches experience greater delay because of the high traffic volumes and coordinated signal timing along Main Street.

At the US 87/Old Hwy 312/Main Street/Bench Boulevard intersection, the northbound approach of Bench Boulevard currently operates at LOS E. Signalization of this intersection is currently being designed.

Figure 3.5 2010 PM Peak Hour Intersection Performance



Source: Billings Bypass Combined Traffic Reports, August 2013.

3.2.3.2 TRUCK TRAFFIC

Commercial vehicle traffic throughout the Billings urban area contributes to overall traffic volumes and congestion. The physical constraints of the roadway network and high truck traffic to and from Billings and traveling through Billings result in relatively high truck traffic as a percentage of overall traffic on area roadways.

I-90 and I-94 have the greatest truck volumes of area roadways and the greatest percentage of trucks, ranging from 14.6% on I-94 to 22.1% on I-90 east of Johnson Lane. Truck traffic on Johnson Lane within the I-90 interchange area ranges from 11.7% to 16.3% of total traffic. Two large truck plazas to the north and south of the I-90 Johnson Lane Interchange contribute to the high truck volumes.

Both Main Street and US 87 carry a substantial relative volume of commercial vehicle traffic, ranging from 300 to 550 ADT. The relative percentage of truck traffic ADT along Main Street is less than 1% of total ADT because of the high volumes of overall traffic. On US 87 north of the Old Hwy 312 junction, the relative percentage of trucks is 5.2% of ADT.

According to the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013), the percentage of local truck traffic (short-haul trucks) compared to regional truck traffic (long-haul trucks) along Main Street corridor intersections ranges from 65% to 85% of all truck traffic. An average of approximately 75% of truck traffic on Main Street (US 87) is local or short-haul trips. The remaining 25% of truck traffic is regional or long-haul trips.

In spite of the relatively small number of truck trips along the Main Street corridor, a reduction in long-haul truck traffic on Main Street would improve traffic operation and community character. Commercial businesses are the primary land use adjacent to Main Street, and they provide destination shopping for residents of Billings. The slow stop-start movements of trucks along this arterial increase noise levels and reduce air quality, thus impacting the community character.

East-west roadways within the study area generally have the lowest truck traffic volumes. Rural roadways, such as Dover Road, Five Mile Road, and Pioneer Road, have relatively higher truck traffic percentages as a result of low overall traffic volumes.

3.2.4 ACCESS

As discussed in Chapter 1, Purpose and Need, several transportation-related issues in the study area stem from a lack of connectivity and access resulting from four major physical barriers for north-south transportation connections in the Billings area. These barriers include the rimrocks, the Yellowstone River, the MRL railroad, and the I-90 corridor (see **Figure 1.2**). The challenging topography and the limited connections across the river, the railroad tracks, and the interstate create access issues for both local and regional north-south traffic.

The segment of US 87 that crosses I-90 and the Yellowstone River serves as the only direct connection between Lockwood and the Billings Heights neighborhood. Interstate 90 crosses the Yellowstone River just south of the US 87 crossing, providing the only alternative to the US 87 connection. However, this route is not as direct between Lockwood and Billings and results in a significant detour between Lockwood and Billings Heights. The only other river crossing for this area/region is approximately 10 miles northeast of the study area at the town of Huntley.

According to the *Lockwood Transportation Study,* the lack of connectivity between Lockwood and Billings Heights may be a limiting factor in the growth and economic development of Lockwood (Marvin & Associates 2008). Additionally, the US 87 crossing and Main Street corridor serve as the main connection for traffic originating from or destined for areas external to the Billings urban area. Traffic originating from north and northeast of the urban area must use the US 87/Main Street corridor to connect with Lockwood or areas east of Lockwood. Conversely, traffic originating from east of Lockwood and the urban area on I-90 and I-94 must use the US 87/Main Street corridor to connect with Billings Heights and areas north and northeast of Billings Heights. As a result, both local and regional north-south traffic is funneled through the US 87/Main Street corridor in the urban area of Billings.

Compounding the issue of limited connectivity to and from Lockwood is the limited connectivity between Billings and Billings Heights. Main Street is the only direct connection between downtown Billings and the Billings Heights neighborhood. Traffic volumes are at their highest along Main Street at Airport Road, the pinch point between the two neighborhoods. Traffic volumes along this roadway are the highest in the state at approximately 50,000 vehicles daily. The result is a negative effect on connectivity and mobility, travel times, and emergency response.

The physical constraints of the transportation system are compounded by a high volume of through vehicle traffic, including a high volume of commercial vehicles. Through traffic is forced to use the US 87/Main Street corridor or use a lengthy alternative route. Truck traffic and through vehicles are discussed further in the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013). The report includes truck percentage estimates as well as details regarding an origin-destination study performed in 2000.

3.2.5 SAFETY

Roadway safety was identified as an issue through previous studies, public scoping, and agency involvement. Roadway safety is affected by the lack of connectivity and a lack of mobility resulting from the major physical barriers to transportation connections in the Billings area. Increased traffic congestion may contribute to unsafe roadway conditions. Additionally, limited mobility between downtown Billings and Billings Heights has a negative effect on emergency response times. Main Street is currently the only emergency route between these areas. Incidents affecting traffic operations on Main Street have been an impediment to emergency response, a concern expressed by the Yellowstone County Disaster and Emergency Services Department.

The *Billings Bypass Final Alternatives Report* (DEA 2013b) discusses crash history within the project study area. Traffic crash data was collected for select roadways for a five-year time period between January 1, 2006, and December 31, 2010. The data, provided by MDT Traffic Safety Section, includes all crash types, including wildlife-related crashes. A summary of crash statistics along select roadway segments is shown in **Table 3.1**.

Crash rates, the severity index, and the severity rate for select roadways within the study area were compared to statewide averages. The crash rate is a measure of the number of crashes per million vehicle miles (MVM) travelled along a given roadway segment. The severity index is a weighted measure of crashes, with greater value given to injury and fatal crashes. The severity rate is a measure of the severity of crashes per MVM travelled. Severity rate is a product of the crash rate and severity index.

Table 3.1 Five-Year Crash History

ROADWAY	FROM	TO	NO. ACC.	INJURY CRASH	FATAL CRASH	CRASH RATE	SEVERITY INDEX	SEVERITY RATE
Montana State Urban Interstate Averages			-	-	-	1.18	-	2.11
I-94	Huntley Interchange	Pinehills Interchange	79	18	0	1.00	1.41	1.40
I-90	Pinehills Interchange	Johnson Lane Interchange	7	1	0	0.11	1.26	0.14
I-90	Johnson Lane Interchange	Lockwood Interchange	74	20	0	1.49	1.49	2.22
NHS Routes and Primary Highways Within City Limits			-	-	-	4.86	-	8.16
Old US 87	Old Hardin Rd	Lockwood I-90 Interchange	17	8	0	1.50	1.85	2.77
US 87	Lockwood I-90 Interchange	1st Ave North	176	50	0	2.81	1.51	4.24
US 87 (Main St)	1st Ave North	6th Ave North	146	45	0	5.82	1.55	9.04
US 87 (Main St)	6th Ave North	Airport Rd	107	34	0	3.27	1.57	5.14
US 87 (Main St)	Airport Rd	Hilltop Rd	335	115	0	5.69	1.62	9.21
US 87 (Main St)	Hilltop Rd	Wicks Ln	290	110	2	4.45	2.02	8.99
US 87 (Main St)	Wicks Ln	Old Hwy 312	146	31	0	4.15	1.38	5.73
US 87	Old Hwy 312	Independ-ence Rd	35	8	0	3.44	1.41	4.86
Old Hwy 312	US 87	Dover Rd	20	3	1	0.78	3.72	2.89
Old Hwy 312	Dover Rd	Pioneer Rd	51	21	1	1.79	2.70	4.83
Old Hwy 312	Pioneer Rd	S-522 Huntley	96	38	1	1.61	2.22	3.59
Mary St	Five Mile Rd	Bench Blvd	9	0	0	1.97	1.00	1.97
Wicks Ln	Bitterroot Dr	Bench Blvd	33	6	0	6.46	1.33	8.57
Wicks Ln	Bench Blvd	Main St	45	16	0	6.85	1.64	11.23
Wicks Ln	Main St	Lake Elmo Dr	19	4	0	2.85	1.38	3.94
Johnson Ln	Old Hardin Rd	I-90 Interchange	10	2	0	2.69	1.36	3.65
Johnson Ln	I-90 Interchange	Coulson Rd	20	3	0	8.22	1.27	10.43
Bench Blvd	Wicks Ln	US 87	60	21	0	11.01	1.63	17.94

ROADWAY	FROM	TO	NO. ACC.	INJURY CRASH	FATAL CRASH	CRASH RATE	SEVERITY INDEX	SEVERITY RATE
Dover Rd	Pioneer Rd	Old Hwy 312	6	1	0	1.76	1.30	2.28
Bitterroot Dr	Wicks Ln	Mary St	17	3	0	7.17	1.32	9.44
Bitterroot Dr	Mary St	Dover Rd	0	0	0	0	0	0
Five Mile Rd	Mary St	Dover Rd	1	1	0	5.62	2.80	15.74
Pioneer Rd	Dover Rd	Old Hwy 312	5	3	0	9.13	2.08	19.00

Note: Five-year crash data collected from January 1, 2006 to December 31, 2010.
Source: Billings Bypass Combined Traffic Reports, August 2013.

The 2006 to 2010 statewide average crash rate for urban interstate routes was 1.18 and the average severity rate was 2.11. Only the I-90 segment from the Johnson Lane Interchange to the Lockwood Interchange exceeded the state averages with a crash rate of 1.49 and a severity rate of 2.22. Neither of these rates is substantially above the state averages.

For National Highway System (NHS) roadways and primary highways within city limits, the average crash rate was 4.86 and the average severity rate was 8.16. No other statewide urban crash statistics are available for city streets.

The highest crash rate on any one roadway segment was 11.01 on Bench Boulevard between US 87 and Wicks Lane. The majority of those crashes occurred at the US 87 intersection and at the Wicks Lane intersection located on either end of the roadway segment. This roadway segment also had a very high severity rate of 17.94.

The second highest crash rate (9.13) was on Pioneer Road from Dover Road to Old Hwy 312. Despite having only five crashes during the five-year period, the roadway had a high crash rate because of the low traffic volume. This segment also had the highest severity rate (19.0), with three of the five crashes resulting in injuries.

The third highest crash rate (8.22) was on Johnson Lane between the I-90 Interchange and Coulson Road. High traffic volumes, heavy truck traffic, and restrictive geometry at the interchange may have contributed to the high accident rate.

Crash rates on Old Hwy 312 were fairly low, ranging between 0.78 and 1.79. However, three fatal crashes occurred along the roadway during the five-year period: one east of Pioneer Road, one between Pioneer Road and Dover Road, and one between Dover Road and US 87. Despite this, the severity rates along the roadway were relatively low, ranging between 2.89 and 4.83. The recent improvements to Old Hwy 312, including widening the roadway from two to four lanes, may have resulted in the low crash rate of 0.78 on Old Hwy 312 from Dover Road to US 87.

Crash rates along the US 87/Main Street corridor during the five-year period ranged between 2.81 and 5.82, while severity rates ranged between 4.24 and 9.21. None of these rates are substantially above the state averages. However, two fatal crashes occurred along the roadway between Hilltop Road and Wicks Lane.

3.2.6 PEDESTRIANS AND BICYCLES

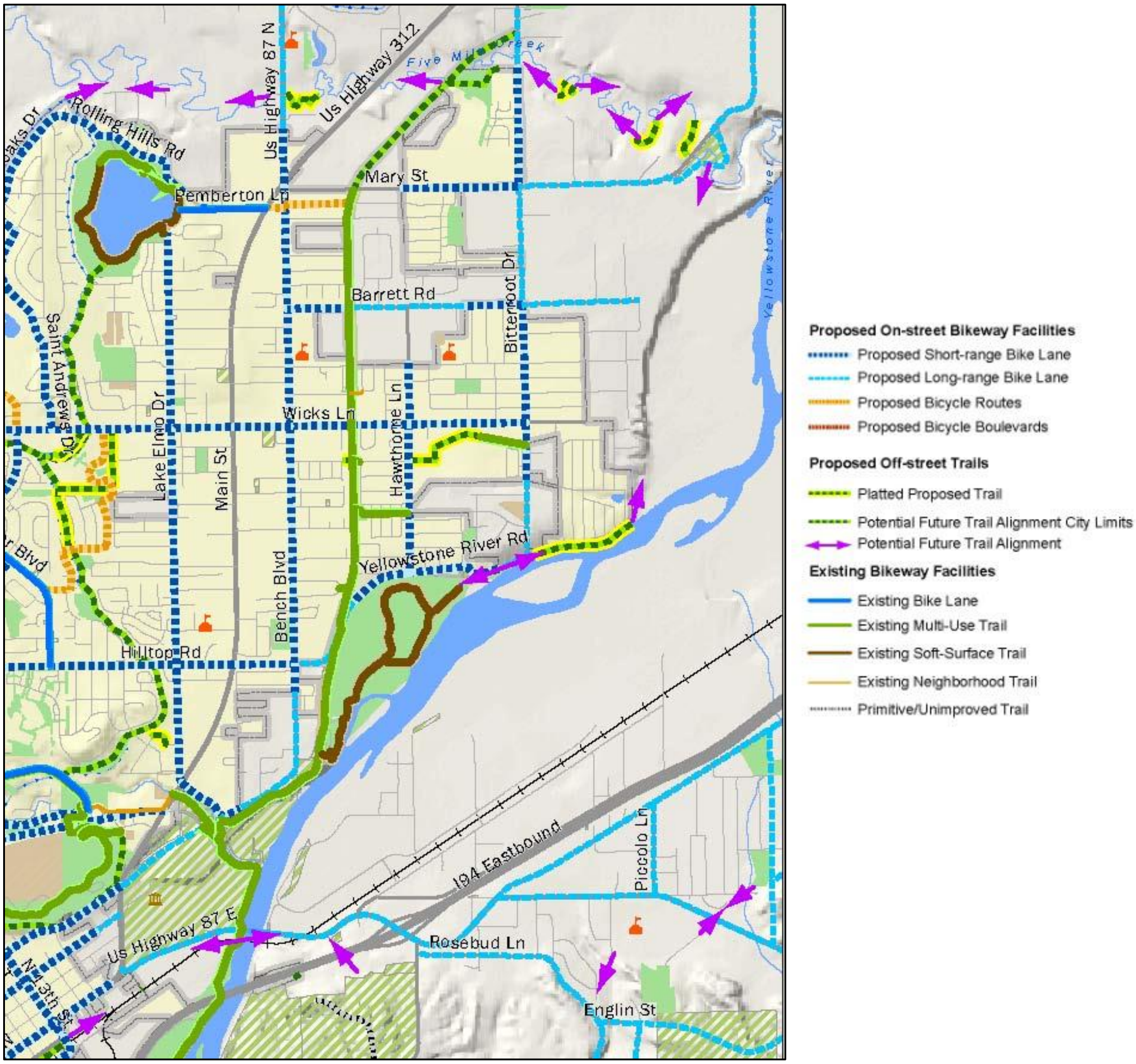
Pedestrian and bicycle movement is an important element of overall transportation in the study area and the Billings urban area. The *2011 Billings Area Bikeway and Trail Master Plan* (Alta 2011) states that Billings has added more than 35 miles of multi-use trails since 1994, with 25 of those miles added since 2004. Billings has also recently begun to increase its efforts to develop the city's on-street bicycle network. A total of 3 miles of bike lane was provided between 1994 and 2004. From 2004 through 2009, a further 2.5 miles were provided, while 2010 has seen an additional 6 miles of bike lanes implemented (Alta 2011). Roughly 6.5 miles of the paved multi-use trails are continuous, creating an off-street corridor from Billings Heights to the Yellowstone River near Mystic Park. Several soft-surface trails are located along the Yellowstone River, the Rimrocks, and Alkali Creek, including 3.39 miles of soft-surface trail throughout Two Moon Park—the longest trail in the city. Existing and proposed on-street bikeway and trail facilities within the study area are shown in **Figure 3.6,** the source of which is the *2011 Billings Area Bikeways and Trail Master Plan* (Alta 2011). The vision of the plan is for Billings to have "one of the most comprehensive bicycle and trail networks in the State of Montana" (Alta 2011).

Yellowstone County accounts for 7% and 8% of Montana residents that walk and bike to work, respectively. A very high percentage of these people reside in the City of Billings (74% of walkers and 91% of bicyclists live in Billings) (Alta 2011). It is estimated that approximately 850 bicyclists ride on the city's roadways and trails daily for nonrecreational purposes, and they account for approximately 1,500 daily trips and ride a total of 3,300 daily miles. It is estimated that nearly 4,600 pedestrians make 12,000 nonrecreational trips daily, accounting for approximately 7,000 miles walked. An estimated additional 12,000 walking trips are made daily for social/recreational purposes, and these trips total 10,500 miles. The total number of daily walking trips is estimated at 24,000 (Alta 2011). Within the study area, the primary nonmotorized work trip mode is "work at home," with bicycle comprising a small work trip mode, according to the *Billings Urban Area Long-Range Transportation Plan* (Cambridge Systematics 2010).

Local bicycle master plans and regional bicycle system plans include facility design, ongoing multi-jurisdictional coordination, and improvements in the existing bicycle and pedestrian network. Traffic engineering design of local roadways to enhance bicycle and pedestrian mobility includes bike lanes, improved at-grade pedestrian crossings, and above- or below-grade crossings to ensure pedestrian safety.

The entire street network, excluding the urban freeways, is generally considered open to bicycle and pedestrian traffic either directly on the street, on road shoulders, or on sidewalks. Many of these routes are on-street routes that use lower volume, local roads for bicycle and pedestrian movements.

Figure 3.6 Bike and Trail Facilities



Source: City of Billings 2010.

3.2.6.1 EXISTING FACILITIES

There are multiple bicycle and pedestrian facilities, identified as the Heritage Trail System, in the study area. Many are discontinuous and some include delineated sidewalks for pedestrian use. Existing bicycle and pedestrian facilities within the study area are shown in **Figure 3.7**.

3.2.6.1.1 RECREATIONAL TRAILS

Multi-use Trails:

Jim Dutcher Trail: This 10-foot-wide concrete trail starts in Billings Heights on Mary Street on the old railroad bed east of Bench Boulevard. It extends approximately 6.5 miles, passing by Two Moon Park and trailhead, dropping down off the Rims by Metrapark, going along the Yellowstone River through Coulson Park, and ending in Mystic Park. The trail features an underpass on Main Street. The Kiwanis Trail is a component of this trail that runs approximately 1.95 miles between Mary Street and Two Moon Park.

Neighborhood Trails:

Heights East Paved Trails: These are two paved trails within the Heights East neighborhood. One extends west from Bitterroot Drive into open space area south of Wicks Lane. The second paved trail extends east from the Kiwanis Trail to Hawthorne Lane just south of Hemingway Avenue.

Unimproved Trails:

Two Moon Park is located south of Yellowstone River Road and west of Bitterroot Drive. The park consists of 3.4 miles of dirt and gravel trails that connect to the Kiwanis Trail.

3.2.6.1.2 ON-STREET BIKE FACILITIES

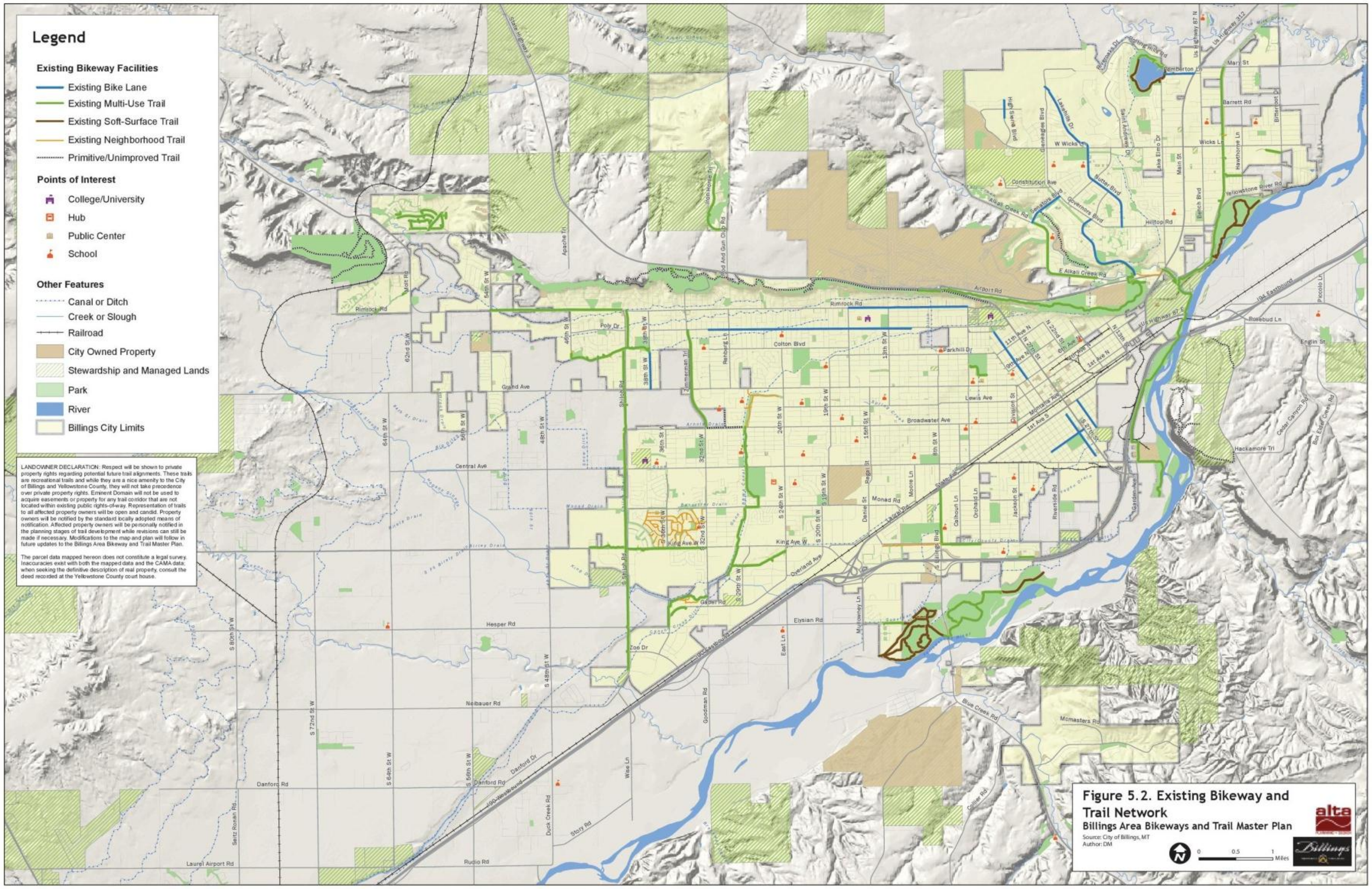
Bike Lanes:

- Hilltop Road: Main Street (US 87) to Bench Boulevard.
- Bench Boulevard: Hilltop Road to Old Hwy 312.
- Mary Street: Hawthorne Lane to Bitterroot Drive; north on Five Mile Road.
- Wicks Lane: Main Street to Bitterroot Drive.
- Bitterroot Drive: Mary Street north to Five Mile Creek; Barrett Road south to Shannon Street.
- Barrett Road: Bench Boulevard east to end of roadway.
- Hawthorne Lane: City limits south to Yellowstone River Road.
- Yellowstone River Road: Kiwanis Trail east to Bitterroot Drive.

Bike Routes:

- Mary Street/Crist Drive: Extend from existing route on Pemberton Lane east to Kiwanis Trail.

Figure 3.7 Existing Bikeway and Trail Network



Source: Billings Urban Area Long-Range Transportation Plan, 2009 Update.

3.2.6.1.3 OFF-STREET TRAILS

Platted Proposed Trails:

- Portions of trail along Five Mile Creek east of Bitterroot Drive. (These are components of the largely conceptual Heights Upper Loop Trail.)
- Along north side of Yellowstone River west of Bitterroot Drive. (This is a portion of the planned Two Moon Park to Five Mile Creek Trail.)
- Heights East Trail Extension: Extend existing path west from Bitterroot Drive into open space area south of Wicks Lane to Hawthorne Lane.

Future Trail Alignments:

- Kiwanis Trail from north terminus extending past Five Mile Creek to Bitterroot Drive (Kiwanis Extension).
- Trail connection/linkages along Five Mile Creek east connection to Five Mile Road (Heights Upper Loop Trail).
- Along north side of Yellowstone River, west connection to Two Moon Park; east along river (Two Moon Park to Five Mile Creek Trail).

3.2.7 TRANSIT

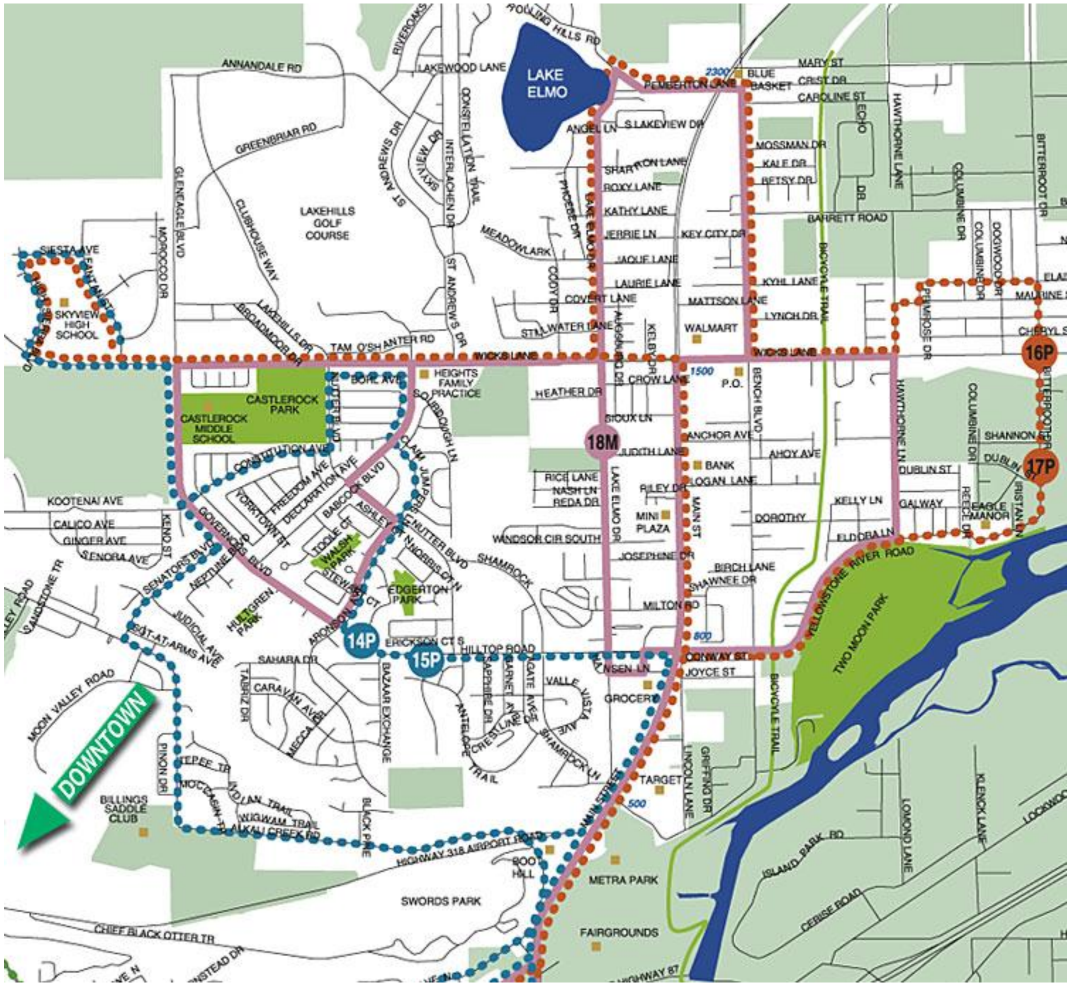
The city-operated Metropolitan Transit System (MET) in Billings provides service Monday through Friday on 18 fixed routes within the Billings city limits. MET also provides service on Saturday with nine fixed routes. The MET operates on a “pulse” system that has a group of buses depart from the transfer centers at the same times to allow convenient transfers from one route to another. After a decline in ridership in the late 1990s and early 2000s, MET ridership began to level off and then increase between 2004 and 2006. After a small dip in 2007, ridership has begun to slowly increase. The current route structure is very comprehensive throughout the city and provides bus service within a two- to three-block walk for a very large proportion of the entire Billings population. The routes also serve a large number of employment and other activity centers. However, the primary MET patrons (74%) are transit-dependent (i.e., those persons who do not have an automobile or other means to make their trips). All of the buses that are part of the MET’s fixed-route fleet are 100% handicapped-accessible. Fixed-route ridership by wheelchair users continues to increase, from 3,475 in 2004 to 4,407 in 2009. Besides the fixed-route service, the MET also operates the MET Special Transit (MST) service, a specialized, demand-responsive paratransit service. This service makes public transportation available for those persons whose disabling condition prevents the use of fixed-route transit. Average MST ridership is about 62,000 rides per year (Cambridge Systematics 2010).

MET provides both midday and peak period bus service within the study area (see **Figure 3.8**). The following routes operate fixed-route bus service in the study area: 14P, 15P, 16P, 17P, and 18M. Peak service routes (P) typically operate from 6 AM to 8 AM, and 4 PM to 6 PM. Midday service routes (M) typically operate from 7 AM to 2:30 PM. Service start/end times and frequencies differ according to the route. MET allows bicycles on the buses for all its bus routes. The routes within the study area are:

- <u>14P (Alkali)</u>: Weekday peak service route that provides service within the study area on a portion of Main Street (US 87) between Hilltop Road and Alkali Creek Road. This route intersects the Kiwanis Trail on Wicks Lane and Yellowstone River Road, and provides service to Two Moon Park.

- 15P (Hilltop): Weekday peak service route that provides service within the study area on a portion of Main Street (US 87) between Hilltop Road and south past Alkali Creek Road. This route intersects the Kiwanis Trail on Wicks Lane and Yellowstone River Road, and provides service to Two Moon Park.
- 16P (Main): Weekday peak service route that provides service within the study area along Bench Boulevard, Wicks Lane, Elaine Street, Bitterroot Drive, Yellowstone River Road, and Hilltop Road.
- 17P (Bench): Weekday peak service route that provides service within the study area along Bench Boulevard, Wicks Lane, Elaine Street, Bitterroot Drive, Yellowstone River Road, and Hilltop Road.
- 18M (Heights): Midday route that provides service within the study area along Main Street (US 87), Yellowstone River Road, Hawthorne Lane, Wicks Lane, Bench Boulevard, and Pemberton Street. This route intersects the Kiwanis Trail on Yellowstone River Road and provides service to Two Moon Park.

Figure 3.8 Existing Transit Service Within the Study Area



Source: MET 2012.

3.3 SOCIAL AND ECONOMIC CONDITIONS

3.3.1 LAND USE AND LOCAL PLANS

This section discusses the local plans that provide land use guidance in the study area and describes existing and future conditions in the project corridor in order to ascertain the compatibility of the proposed alternatives with local community plans. The project corridor is defined as all lands within 1,000 feet of the centerline of the alignment and 2,000 feet around the Johnson Lane Interchange.

As discussed in Section 1.2.1, the proposed project is located in Yellowstone County and encompasses portions of the City of Billings and the unincorporated community of Lockwood. The study area is approximately 18 square miles and is roughly bounded by US 87/Main Street, Old Hwy 312, and the I-90/I-94 interstate corridor.

The south and west portions of the study area are mostly developed land consisting of residential, commercial, and industrial uses. The north and east portions of the study area are predominantly agricultural. Approximately 14% of land in the study area falls within City of Billings limits, while the remaining land falls under county jurisdiction.

3.3.1.1 LOCAL PLANS

The city and county have jointly developed several planning documents that provide guidance on land use and zoning within the study area. These documents are discussed in further detail below.

3.3.1.1.1 YELLOWSTONE COUNTY AND CITY OF BILLINGS 2008 GROWTH POLICY UPDATE

This plan was prepared by the Billings Planning and Community Services Department in 2008 as an update to the 2003 City/County Growth Policy. The primary purpose of the document is to guide local officials and community members in making decisions that will affect the future of the community. The document also seeks to identify how communities within Yellowstone County have changed since the 2003 City/County Growth Policy.

3.3.1.1.2 THE BILLINGS HEIGHTS NEIGHBORHOOD PLAN

This plan was prepared by the Billings Planning and Community Services Department and was adopted by the Billings City Council and Yellowstone County for planning purposes in 2006. The plan is not a regulatory document but is intended to "assist the governing agencies, planners, developers and residents make the right choices when determining future growth patterns and development in the Heights." The plan contains general and specific recommendations and implementation strategies for public and private actions.

3.3.1.1.3 LOCKWOOD COMMUNITY PLAN

This plan was prepared by the Lockwood Steering Committee and was adopted by Yellowstone County in 2006. The plan is not a regulatory document. The primary purpose of the document is to "assist residents…and developers in making informed choices when determining how to…address changes in land use in Lockwood."

3.3.1.1.4 BILLINGS AREA BIKEWAY AND TRAIL MASTER PLAN

This plan was prepared by Alta Planning and Design for the City of Billings and Yellowstone County and was approved in 2011. The plan is intended to supplement previous bicycle plans and to emphasize on-street facilities.

3.3.1.2 LAND USE IN THE STUDY AREA

The *Yellowstone County and City of Billings 2008 Growth Policy Update* (the *Growth Policy Update*) identifies five general categories of land use in Yellowstone County, in order from most to least prevalent: agricultural, residential, commercial, industrial, and recreational (City of Billings 2008). Land use in the study area is predominantly residential and agricultural. Residential use is generally located in the southern portion of the study area within Billings city limits and along the Old Hwy 312 and I-90 corridors, although residential parcels are scattered throughout the study area. Agricultural use is primarily located in the northeast half of the study area. Commercial uses are concentrated along the corridors of US 87/Main Street and I-90, and several commercial parcels are located throughout the northeast half of the study area. Industrial use is found south of the Yellowstone River in Lockwood according to MT National Resource Information System Yellowstone County Geographic Information Systems (GIS) parcel assessor data (Yellowstone County, 2011). Recreational uses are mostly located in the western half of the study area and within Lockwood. Existing land use conditions are depicted in **Figure 3.9**.

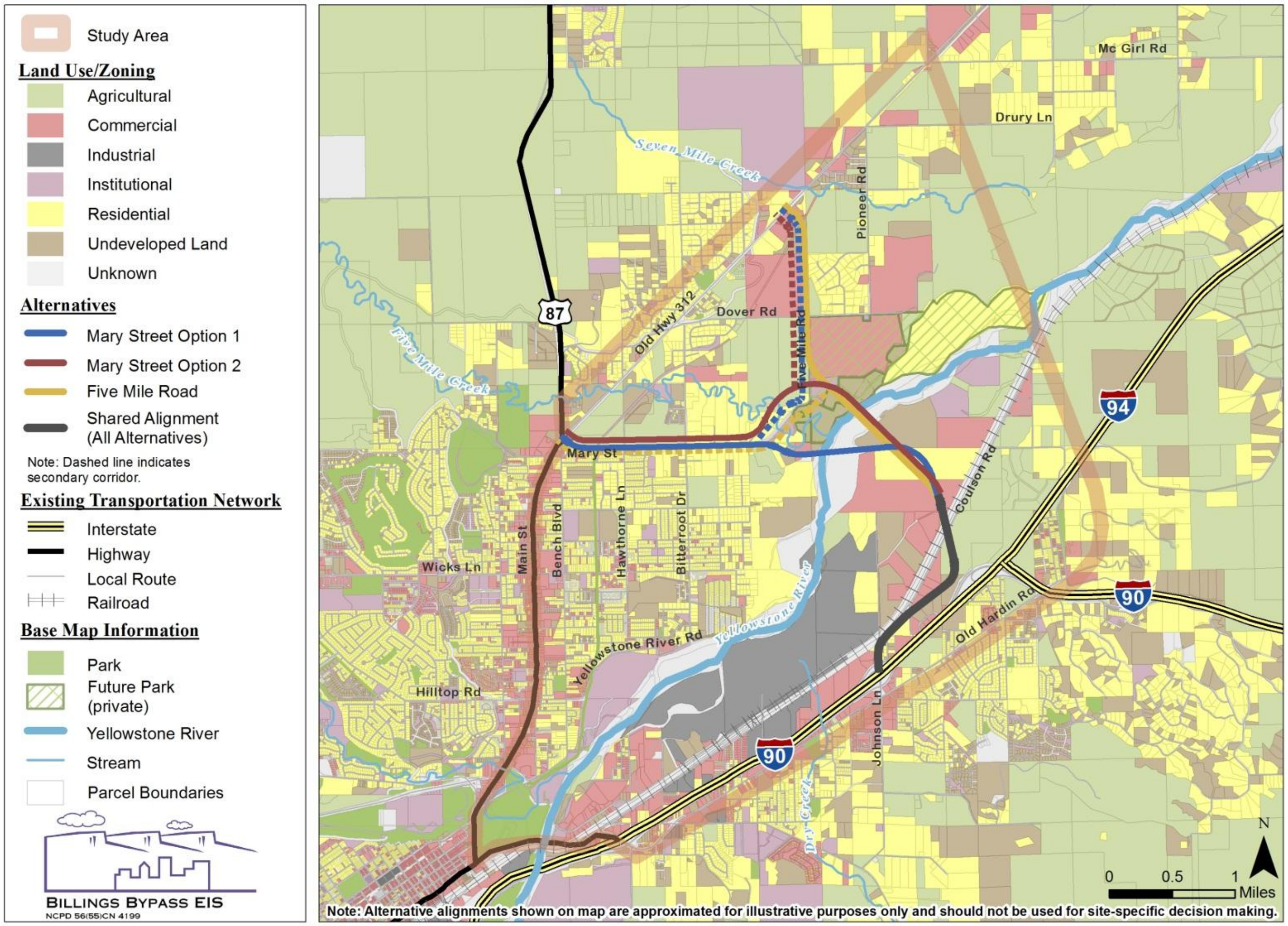
Yellowstone County and the City of Billings share Unified Zoning Regulations that apply within a Unified Zoning Jurisdiction (UZJ). The UZJ encompasses most of the Lockwood community, and the majority of the study area is within the UZJ boundary. Zoning regulations were established in accordance with the 1990 Yellowstone County Comprehensive Plan and are administered separately by the city and county. The city is responsible for zoning administration within the city limits, while the county administers the remainder of land (City of Billings 2008).

As discussed in Section 3.3.3, the city and county are experiencing increases in population and residential development. In order to contain development, the city established an Urban Planning Area (UPA) around the city limits in 1967. City services are not provided outside the UPA boundary, and development outside of the boundary is much more rural in nature. The city's area nearly tripled in size since 1970 as the city annexed surrounding developed and vacant land inside of the UPA boundary. Although the Lockwood community is within the UPA, the Lockwood Steering Committee does not anticipate that Lockwood would be annexed in the near future due to requirements specified in the City of Billings Annexation Policy, according to the *Lockwood Community Plan* (Yellowstone County 2006).

Figure 3.10 depicts the jurisdictional boundaries in and surrounding the study area, including the cities of Billings and Lockwood, the Billings Urban Area, and the Metropolitan Planning Organization (MPO) boundary.

The Lockwood community has also experienced an increase in residential development but has faced limitations in accommodating development due to the lack of a community sewer system. The sewer system was approved in 2008 and began offering services in 2010. Population growth and subdivision activity are anticipated to increase now that the sewer system is in place (Yellowstone County 2006).

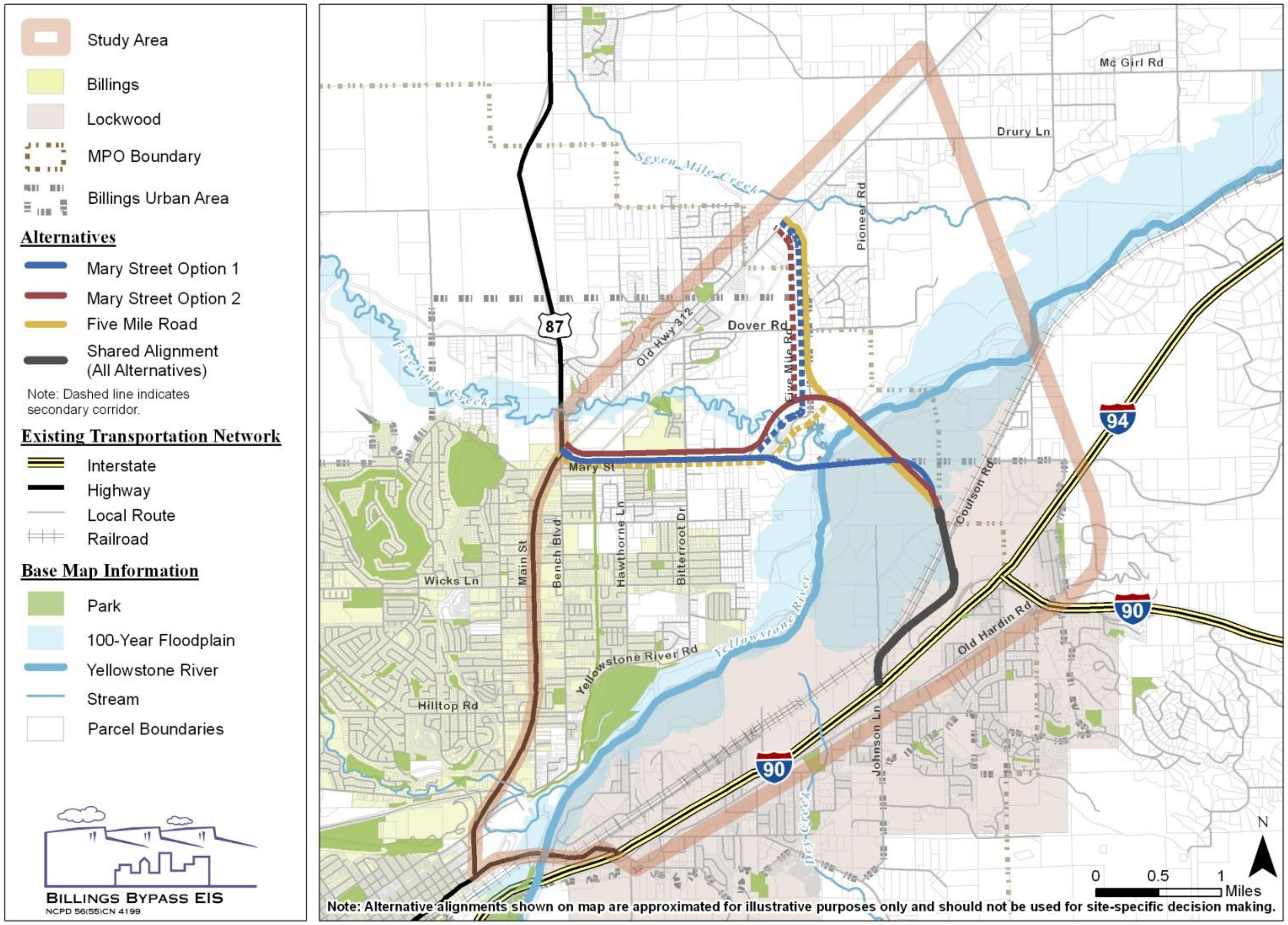
Figure 3.9 Existing Land Use



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/21/2013

Figure 3.10 Jurisdictional Boundaries in and Surrounding the Study Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 6/16/2012

3.3.1.3 LAND USE IN THE PROJECT CORRIDOR

This section describes specific existing and future conditions in the project corridor.

South of the Yellowstone River

South of the Yellowstone River, the project corridor passes through mostly commercial, agricultural, and undeveloped land. A large residential parcel sits southeast of the Yellowstone River, and pockets of residential use are present near Johnson Lane and along Coulson Road. The Johnson Lane Interchange is surrounded by commercial uses and some residential uses to the south and southeast. The *Lockwood Community Plan* (Yellowstone County 2006) identifies land along the Yellowstone River as a potential area of acquisition for riverfront park land, although no specific parcels have been identified at this time. The *Growth Policy Update* (City of Billings 2008) anticipates a mix of residential and highway commercial/controlled industrial uses in the project corridor. Future developments include a commercial subdivision north of the railroad tracks east of Johnson Lane, and a sewer lift station to be constructed at the Johnson Lane/Coulson Road intersection (W. Friday pers. comm. 2011).

North of the Yellowstone River

Mary Street

The project corridor along Mary Street begins approximately 0.2 mile west of the Old Hwy 312/US 87/Mary Street/Bench Boulevard intersection and traverses land zoned for commercial use surrounding the intersection. From Old Hwy 312 to Bitterroot Drive, land along Mary Street is mostly residential to the south and agricultural to the north, with some undeveloped parcels. Primarily residential uses and some agricultural, undeveloped, and commercial uses are present from Bitterroot Drive to the Yellowstone River.

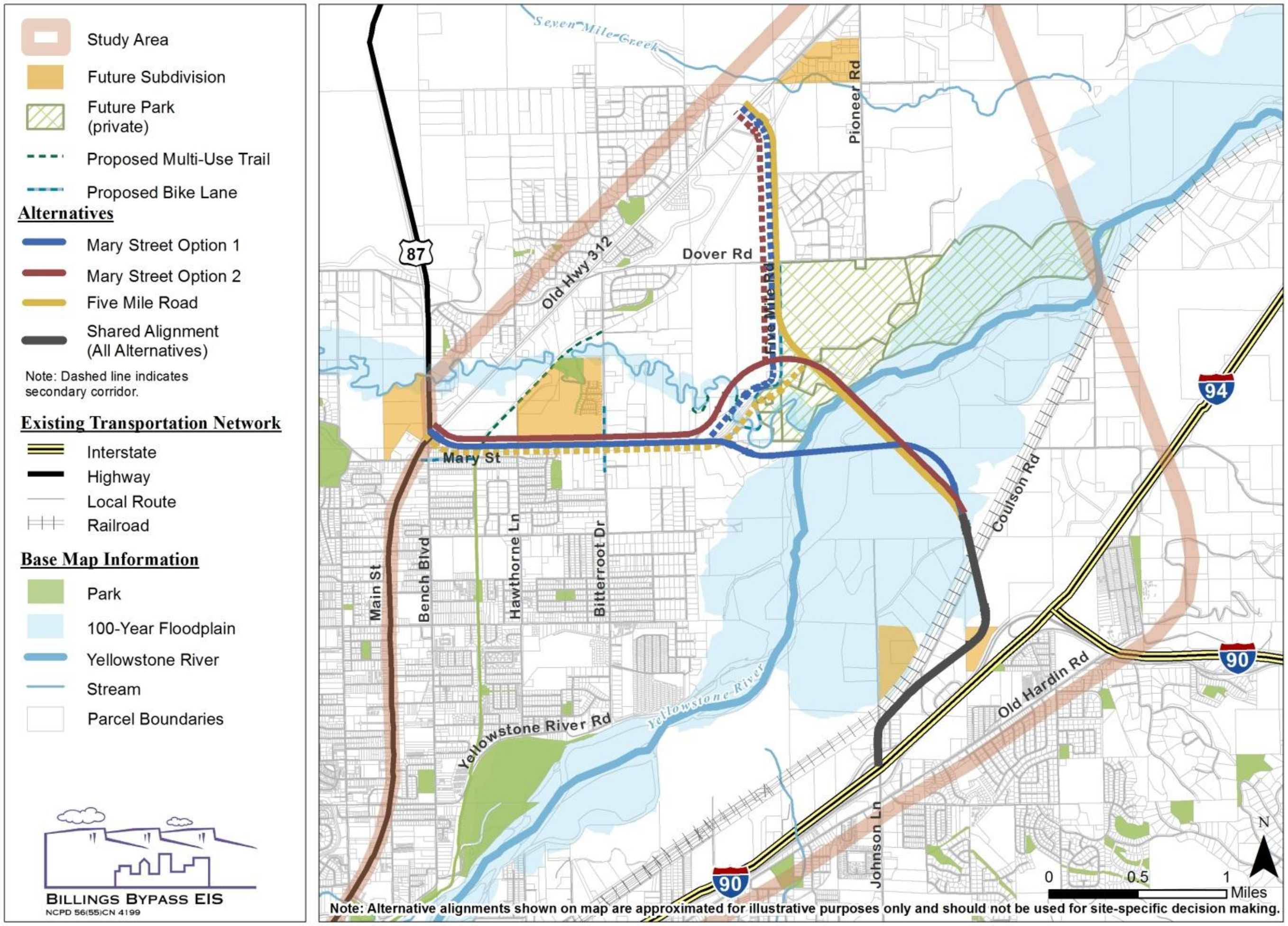
The *Growth Policy Update* projects that the area along Mary Street from Old Hwy 312 to the Kiwanis Trail will have highway commercial uses in the future. The City of Billings plans to extend the Kiwanis Trail north across Mary Street along the old railroad corridor to Five Mile Creek. Light retail could be located at the northeastern corner of the Mary Street/Bitterroot Drive intersection, as identified in the *Billings Heights Neighborhood Plan* (City of Billings 2006). Land to the north between Hawthorne Lane and Bitterroot Drive is master planned for a subdivision, but there has been little construction activity to date (W. Friday pers. comm., 2011). Bike lanes are proposed along Crist Drive from US 87 to the Kiwanis Trail, along Mary Street from Hawthorne Lane to Five Mile Road, and north along Bitterroot Drive (Alta 2011). A tract of land currently used for active gravel mining operations has been master planned for a private park development (YRPA 2011). This land sits east of Five Mile Road along the Yellowstone River.

Five Mile Road

Land uses along the project corridor south from Old Hwy 312 to Dover Road include mostly commercial and industrial uses to the west and agricultural and residential uses to the east. South of Dover Road, the project corridor is composed of agricultural uses to the west and commercial uses to the east. The project corridor veers off the existing roadway alignment through an active gravel operation before crossing the Yellowstone River.

The *Growth Policy Update* projects that land surrounding Old Hwy 312 will have highway and community commercial and controlled industrial land uses in the future. As shown in **Figure 3.11**, a future residential subdivision is recorded along Old Hwy 312 near the intersection with Five Mile Road, but little construction activity has occurred to date (W. Friday pers. comm., 2011). The tract of land used for gravel mining operations has been master planned for a private park development.

Figure 3.11 Future Growth Within Study Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/21/2013

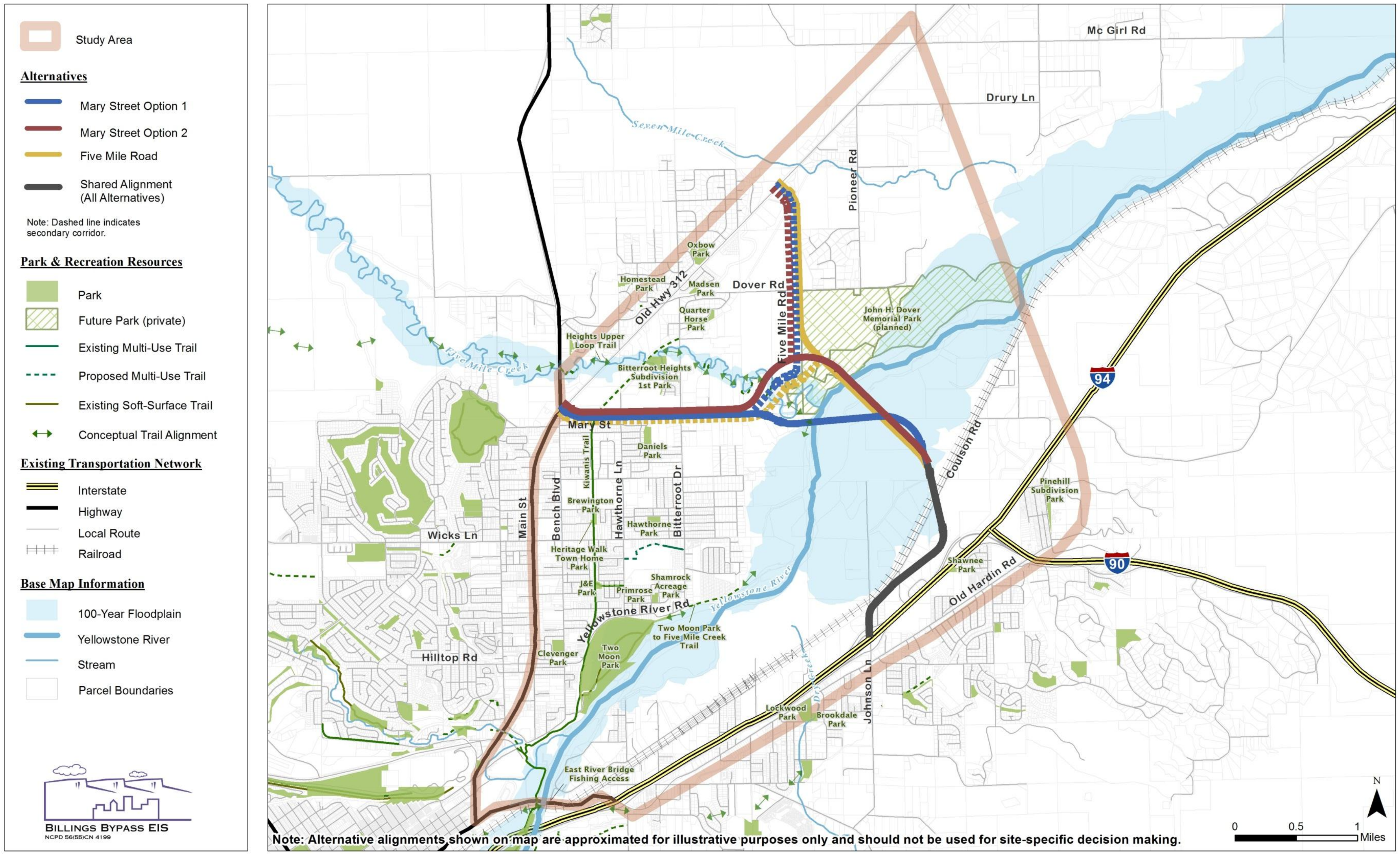
3.3.2 PARKS AND RECREATIONAL FACILITIES

All of the park land, open space, and recreational sites within the study area are administered and maintained by either the City of Billings or Yellowstone County. Yellowstone County park land is classified into 11 categories according to size, service area, and degree of development (Yellowstone County 2008). City of Billings park land falls into two broad categories: Recreation Parks and Natural Resources Areas (Yellowstone County 2008). Recreation Parks are the centers of activity and host to many community and neighborhood events. Natural Resources Areas are set aside and managed for preservation of significant natural resources, remnant landscapes, open space, visual aesthetics, and/or buffering.

Parks and recreational facilities within the study area are illustrated in **Figure 3.12** and include:

- Bitterroot Heights Subdivision 1st Park: Located west of Bitterroot Drive and accessed via Empire Drive, this 11-acre city park property is undeveloped and is intended to serve the Bitterroot Heights residential subdivision.
- Brewington Park: Located east of the Kiwanis Trail at the terminus of Lynch Drive, this 1.7-acre city park property is currently undeveloped.
- Clevenger Park: Located at Bench Boulevard and Radford Lane, this city park provides a softball/baseball field (City of Billings 2011b).
- Daniels Park: Located north of Mossman Street with access points from Hyacinth Drive, this 6-acre city park provides open space to the Daniels residential subdivision.
- East River Bridge Fishing Access: Located at the terminus of Island Park Road accessed via Cerise Road, this boat launch provides fishing access to the Yellowstone River near the Lockwood Bridge off I-90, at river mile 360.6 (Yellowstone County 2008).
- Hawthorne Park: Located at Janie Street and Columbine Drive, the park provides horseshoe courts, a picnic shelter, a playground, restrooms, a soccer/rugby field, and a wading/spray pool (City of Billings 2011b).
- Heritage Walk Town Home Park: Located north of Lynch Drive and west of the Kiwanis Trail, this 0.26-acre property is currently undeveloped.
- Homestead Park: Accessed via Redwing Circle west of Old Hwy 312, this 4.15-acre county park property is currently undeveloped open space.
- J&E Park: Located on Hemingway Avenue, this 2.1-acre city park serves the J&E residential subdivision.
- Kiwanis Trail: The trail is a 10-foot-wide concrete trail, approximately 1.95 miles in length (Alta 2011). The trail extends from Mary Street south to Yellowstone River Road near Two Moon Park, connecting to the Metra and Coulson trails to serve as the longest segment of trail in Billings (part of the Jim Dutcher trail system).
- Lockwood Park: Located on Old Hardin Road and Woodland Road, this 10.15-acre county park includes four baseball fields (Yellowstone County 2008).

Figure 3.12 Existing and Planned Parks and Trails Within the Study Area and Region



Sources: DOWL HKM August 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/22/2013

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- Madsen Park: Located between Prescott Drive and Dover Road, this 1.26-acre county park property is currently undeveloped open space (Yellowstone County 2008).
- Oxbow Park: Located on Old Hwy 312 between Clint Road and Oxbow Circle, this 10.42-acre county park property is currently undeveloped open space (Yellowstone County 2008).
- Pinehill Subdivision Park: Located on Dickie Road, this 8.31-acre county park property is currently undeveloped open space with a network of informal trails (Yellowstone County 2008).
- Primrose Park: Located at Reece Drive and Galway Drive, this 0.94-acre city park includes a playground and softball/baseball field (City of Billings 2011b).
- Quarter Horse Park: Located on Oklahoma Star Trail, this 4.98-acre county park property is currently undeveloped open space (Yellowstone County 2008).
- Shamrock Acreage Park: Located on Columbine Drive, this 1.45-acre county park property is currently undeveloped open space, adjacent to Primrose Park (Yellowstone County 2008).
- Shawnee Park: Located at the end of Wasco Avenue in Lockwood, this 1.42-acre county park is currently undeveloped open space (Yellowstone County 2008).
- Two Moon Park: Located in Billings Heights on Bench Boulevard, the park is 172.94 acres of undeveloped park land that provides habitat for birds and wildlife and includes 3.4 miles of dirt and gravel trails that connect to the Kiwanis Trail (YRPA 2011, Yellowstone County 2008).

A master plan for the John H. Dover Memorial Park was drafted by the Yellowstone River Parks Association (YRPA) in December 2010. The planned park would be located on the Yellowstone River, off Mary Street, with Five Mile Creek running through it, and would include three scenic overlooks along the banks of the Yellowstone River. The conceptual master plan includes a shelter house, restrooms, parking, trailhead and trail system, an 18-hole disc course, campgrounds, a wilderness study area, a dog park, soccer fields, horseshoe pits, boat docks, and a boat launch.

3.3.2.1 PEDESTRIAN AND BICYCLE FACILITIES

Pedestrian traffic throughout the Billings area is accommodated by sidewalks on one or both sides of most city streets (Cambridge Systematics 2010). The sidewalk network provides relatively continuous walking routes in the older and more densely urbanized portions of Billings. There are approximately 5.5 miles of striped on-street bikeways throughout the city. While the number of designated bike lanes is limited, wide curb lanes and paved shoulders also provide informal bike lanes. There are approximately 36 miles of hard-surface multi-use trails within the greater Billings area, all of which have been added since 1994 (Alta 2011). Roughly 6.5 miles of the paved multi-use trails are continuous, creating an off-street corridor from Billings Heights south to the Yellowstone River near Mystic Park, south of the project area. Several soft-surface trails are located along the Yellowstone River, the Rimrocks, and Alkali Creek, including 3.39 miles of soft-surface trails throughout Two Moon Park—the longest soft-surface trail in the city. Existing and proposed on-street bikeway and trail facilities within the study area are shown in **Figure 3.6**, above (from the *Billings Area Bikeways and Trail Master Plan*). The vision of the plan is for Billings to have "one of the most comprehensive bicycle and trail networks in the State of Montana" (Alta 2011).

3.3.2.2 SECTION 4(f)

Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 was set forth in Title 49 United States Code (USC), Section 303. In 2008, the Section 4(f) Final Rule was moved to 23 CFR Part 774.

Section 4(f) of the USDOT Act states that the Secretary of the USDOT "shall not approve any transportation program or project which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from an historic site of national, State, or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use."

Existing and planned parks, recreation areas, and recreational trails were identified within the study area. No wildlife or waterfowl refuges are present in the study area.

Data on parks and recreation sites were gathered from the City of Billings by requesting data on properties, including parks and recreation areas, open space and trails, and wildlife and waterfowl refuges. A GIS database was created using this information, and was verified with the use of relevant comprehensive plans, parks and recreation master plans, and open space management plans.

The current and planned public parks, recreation areas, and wildlife and waterfowl refuge areas were identified within the study area. The complete list of all public parks, recreation areas, and wildlife and waterfowl refuge areas identified within the study area is provided in **Table 3.2** below. For purposes of this Section 4(f) evaluation, only Section 4(f) resources having a Section 4(f) use by any of the build alternatives are discussed in detail.

Table 3.2 and **Figure 3.13** show all of the park and recreational resources in the study area.

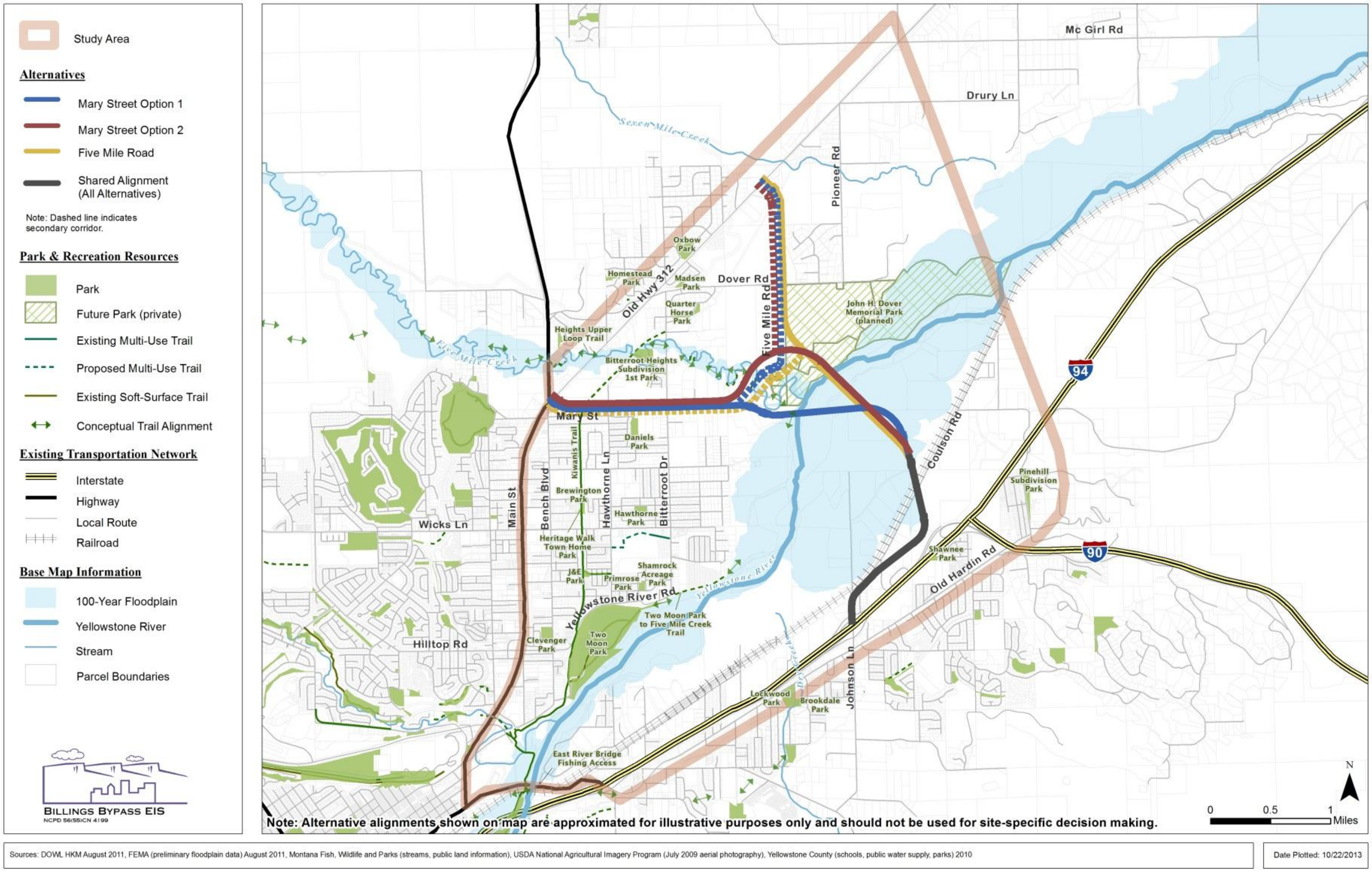
Table 3.2 lists all existing and planned park and recreational resources within the study area and discloses their status related to Section 4(f) and whether they are within the potential construction limits of the project. In order to be considered a Section 4(f) resource, the park or recreation facility must be both publicly owned *and* publicly accessed. There are 20 park and recreational facilities in the study area that are subject to the protection of Section 4(f). Based on the proposed construction footprint of the build alternatives, there are two park and recreational resources within the project area (i.e., within the construction footprint of one or more of the proposed alternatives) that may be affected by the project. Correspondence with the City of Billings Department of Parks, Recreation and Public Lands in December of 2011 indicated its concurrence that of the resources in the study area potentially affected by the project, only the existing Kiwanis Trail and the planned Kiwanis Trail extension are protected by Section 4(f), as shown in **Table 3.2**. The Heights Upper Loop Trail is largely conceptual. However, the city has obtained easements in limited sections of property along Five Mile Creek. These sections with easements do not coincide with any of the planned improvements for the Billings Bypass, under any of the build alternatives. See Chapter 4 for a detailed image of the easements obtained by the city in relation to the build alternatives.

Table 3.2 Park and Recreational Resources: Section 4(f) Applicability

PROPERTY	PUBLICLY OWNED	PUBLICLY ACCESSED	SECTION 4(f)	IN PROJECT FOOTPRINT?
Existing Parks and Trails				
Bitterroot Heights Subdivision 1st Park	Yes	Yes (undeveloped)	Yes	No
Brewington Park	Yes	Yes (undeveloped)	Yes	No
Clevenger Park	Yes	Yes	Yes	No
Daniels Park	Yes	Yes	Yes	No
East River Bridge Fishing Access	Yes	Yes	Yes	No
Hawthorne Park	Yes	Yes	Yes	No
Heights East Trails	Yes	Yes	Yes	No
Heritage Walk Town Home Park	Yes	Yes (undeveloped)	Yes	No
Homestead Park	Yes	Yes (undeveloped)	Yes	No
J&E Park	Yes	Yes	Yes	No
Kiwanis Trail	**Yes**	**Yes**	**Yes**	**Yes**
Lockwood Park	Yes	Yes	Yes	No
Madsen Park	Yes	Yes (undeveloped)	Yes	No
Oxbow Park	Yes	Yes (undeveloped)	Yes	No
Pinehill Subdivision Park	Yes	Yes (undeveloped)	Yes	No
Primrose Park	Yes	Yes	Yes	No
Quarter Horse Park	Yes	Yes (undeveloped)	Yes	No
Shamrock Acreage Park	Yes	Yes (undeveloped)	Yes	No
Shawnee Park	Yes	Yes (undeveloped)	Yes	No
Two Moon Park	Yes	Yes (undeveloped)	Yes	No
Planned Parks and Trails				
John H. Dover Memorial Park	No	No	No	Yes
Heights Upper Loop Trail	No (portions have public easement)	No	No	Yes
Heights East Trail Extension	Portions	No	Yes	No
Kiwanis Trail Extension	**Yes**	**Yes**	**Yes**	**Yes**
Two Moon Park to Five Mile Trail	No (portions have public easement)	No	No	Yes

* Resources shown **in bold** are included in the 4(f) analysis in Chapter 4.
Source: City of Billings Parks and Recreation, December 2011.

Figure 3.13 Section 4(f) Parks and Recreation Areas



3.3.2.3 SECTION 6(f)

Selected parks and recreation projects are funded through the federal Land and Water Conservation Fund (LWCF). Grant funding for LWCF projects is administered through state programs. Generally, Section 6(f) of the LWCF Act directs the U.S. Department of the Interior (DOI) (National Park Service [NPS]) to ensure that replacement lands of equal value, location, and usefulness are provided as conditions to approval of any land conversions. Where a Section 6(f) land conversion is proposed for a highway project, equivalent replacement land is required.

There is one Section 6(f) resource in the study area: the East River Bridge Fishing Access. The site is located in the southwestern corner of the study area and would not be affected by any of the build alternatives. Thus, there would be no Section 6(f) impacts associated with the project, and Section 6(f) is not discussed in the remainder of this document.

3.3.3 SOCIOECONOMIC CONDITIONS

3.3.3.1 COMMUNITY RESOURCES

The project is located in Yellowstone County in the northeastern portion of Billings. The study area for community resources is generally bounded by I-90 and I-94 to the southeast, Main Street and US 87 to the west, and Old Hwy 312 to the north (see **Figure 1.1**). The study area is located entirely within Yellowstone County and intersects the city of Billings and the unincorporated community of Lockwood. The study area is primarily located within the Billings Heights and Lockwood neighborhoods; however, all six neighborhoods intersected by the study area are illustrated in **Figure 3.15**.

3.3.3.1.1 POPULATION GROWTH AND TRENDS

Yellowstone County and the City of Billings are the most populated county and city in Montana. As shown in **Table 3.3**, the population of Yellowstone County is 147,972 and the population of Billings is 104,170 (U.S. Census Bureau 2010). The population of Billings constitutes 70% of the total county population; this percentage has fluctuated from 62% to 75% from 1980 to 2010 (Cambridge Systematics 2010). New residents are attracted to the Billings urban area by its quality of life, economic and recreational opportunities, and small town atmosphere with the amenities of a large urban center (Cambridge Systematics 2010).

Yellowstone County has enjoyed steady growth for the past several decades, as shown in **Table 3.3** and **Figure 3.14** (Yellowstone County 2008). Growth in Billings has been more gradual but steady since the 1980s, with growth rates ranging from 11% to 21% each decade. The Billings growth rate declined to 8% between 1970 and 1980, reflecting changes in the oil and gas industries and the agricultural industry. Because of their historical reliance on extractive resources, Billings and Yellowstone County have experienced repeated boom/bust economic cycles. This economic pattern is reflected in the population changes of the county, which has growth rates ranging from 5% to 24% each decade.

Table 3.3 Population Trends and Projections

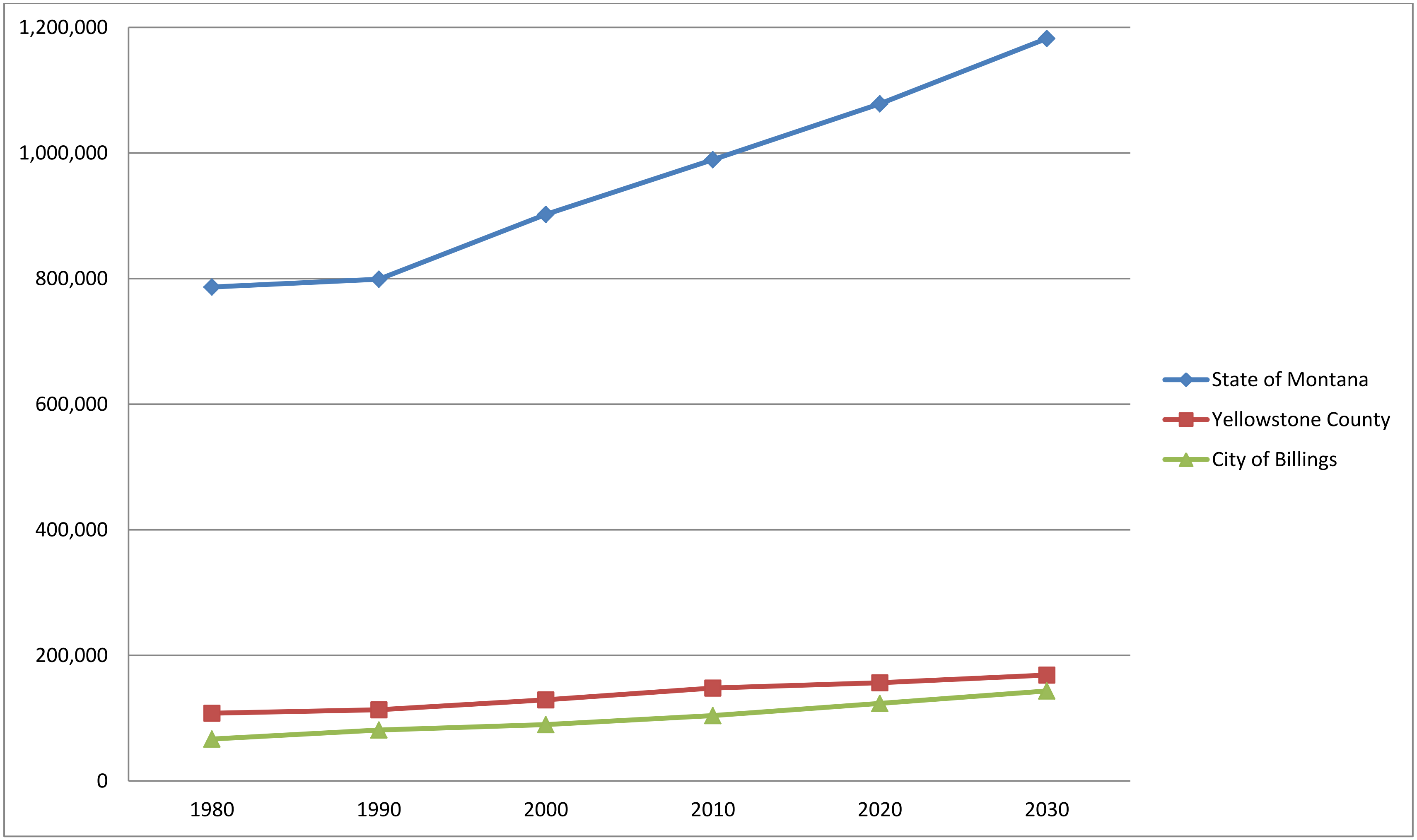
	1980	1990	2000	2010	2015	2020	2025	2030
MONTANA[1]	786,690	799,065	902,195	989,415	1,031,610	1,078,460	1,128,460	1,182,440
YELLOWSTONE COUNTY[1]	108,035	113,419	129,352	147,972	150,610	156,570	162,570	168,820
BILLINGS[2]	66,798	81,125	89,847	104,170	-	123,631	-	143,478
LOCKWOOD	-	3,967	4,306	6,797	-	-	-	-

Population source for all 1980-2010 figures: U.S. Census Bureau 2010 and 2011.
Data or projections not available for entries with “-“ in table.
[1]Projections source: CEIC 2011.
[2]Projections source: Cambridge Systematics 2010.

The community of Lockwood grew by 9% between 1990 and 2000, with dramatic population growth of over 50% occurring between 2000 and 2010 (see **Table 3.3**). Lockwood’s location as the eastern gateway to the city of Billings, its significant commercial and industrial business presence, and its community-oriented residential areas make the community a place where continued growth and change is expected to occur (Yellowstone County 2006).

The Census and Economic Information Center (CEIC), a department within the Montana Department of Commerce, released population projections for counties up to the year 2030. Yellowstone County is expected to grow an average of 0.7% per year. At this rate, the population will reach approximately 156,570 by 2020 and 168,820 by 2030. The city of Billings is expected to grow by nearly 40,000 people over the next 20 years, reaching approximately 143,478 by 2030 (Cambridge Systematics 2010). It would be consistent with historical development trends to assume that a higher percentage of growth will take place at or near the city limits than anywhere else in Yellowstone County (Yellowstone County 2008). Population densities are decreasing from the residential core of Billings outward to the newly annexed territories such as Billings Heights.

Figure 3.14 Regional Population Growth and Projections



Source for 1980-2010 data: U.S. Census Bureau 2010 and 2011. Projections source: CEIC 2011; Cambridge Systematics 2010.

3.3.3.1.2 DEMOGRAPHICS

A demographic profile for Yellowstone County, Billings, and Lockwood is shown in **Table 3.4**. According to the 2010 Census, approximately 70% of the population of Yellowstone County resides in Billings. The city is very dense, at 2,665 people per square mile, while constituting only 1% of the geographic area of the county.

Table 3.4 Regional Demographics (2008 - 2010)

	YELLOWSTONE COUNTY		BILLINGS		LOCKWOOD	
POPULATION	**NUMBER**		**NUMBER**		**NUMBER**	
Total Population	147,972		104,170		6,797	
Square Miles of Land[1, 2]	2,635		40		8	
Population/Square Mile	56		2,604		863	
GENDER	**NUMBER**	**%**	**NUMBER**	**%**	**NUMBER**	**%**
Male	72,385	49%	50,266	48%	3,467	51%
Female	75,587	51%	53,904	52%	3,330	49%
AGE	**NUMBER**	**%**	**NUMBER**	**%**	**NUMBER**	**%**
Under 5	10,122	7%	7,293	7%	517	8%
5-19	28,528	19%	18,852	18%	1,596	24%
20-64	88,454	60%	62,419	60%	4,065	60%
65 and Up	20,868	14%	15,606	15%	619	9%
Median Age	38		38		36	
RACE AND ETHNICITY	**NUMBER**	**%**	**NUMBER**	**%**	**NUMBER**	**%**
White	134,228	91%	93,313	90%	6,084	90%
Black or African American	935	0.6%	828	0.8%	25	0.4%
American Indian and Alaska Native	5,881	4%	4,619	4%	331	5%
Asian	939	0.6%	778	0.7%	10	0.1%
Other Race	1,763	1%	1,467	1%	92	1%
Hispanic or Latino	6,955	5%	5,456	5%	410	6%
EDUCATION[3]	**NUMBER**	**%**	**NUMBER**	**%**	**NUMBER**	**%**
No High School Diploma	8,481	9%	6,037	9%	400	16%
High School Graduate	29,838	32%	20,450	30%	1,066	42%
Some College, No Degree	22,546	24%	16,848	25%	434	17%
Associates Degree	7,148	8%	5,018	7%	263	10%
Bachelor's Degree or Higher	26,097	28%	20,463	30%	394	15%

Source: U.S. Census Bureau 2011, 2010 Summary File 1, except as noted:
[1]U.S. Census Bureau 2010, 2000 GCT-PH1.
[2]Yellowstone County 2008.
[3]U.S. Census Bureau 2010, 2005-2009 American Community Survey 5-Year Estimates.

Yellowstone County and Billings have experienced a shift in age distribution during the last 40 years (Yellowstone County 2008). In 1970, the median age of persons in the city and county was 26 to 27 years. According to the 2010 Census, the median age has risen to 38 years in both the city and the county (see **Table 3.4**). The Lockwood population is also growing older (Yellowstone County 2006). The increase in median age is a reflection of an aging population nationwide, as the baby boomers reach retirement. The proportion of the county at retirement age (65 years and older) has nearly doubled since 1970. The county has also experienced an increase in the population that constitutes a large part of the workforce, particularly the baby boom generation aged 45 to 64 years. This portion of the population increased from 20% in 1970 to 28% in 2010. The only substantial decrease of an age group in Billings and the county since 2000 occurred in the population aged 35 to 44 years. This portion of the population decreased by approximately 25% between 2000 and 2010. These trends indicate, in addition to an aging population, a potential loss of an important workforce component without significant immigration (Yellowstone County 2008).

The racial diversity of Yellowstone County and Billings has increased gradually over the last 40 years (Yellowstone County 2008). In 1970, 98% of the city and county population was white. In 2010, the U.S. Census Bureau reported a decrease in the all-white population to approximately 90% in both jurisdictions. The Hispanic or Latino population has also increased throughout the region. The total Hispanic population in 2010 was between 5% and 6% of the total population for Yellowstone County, Billings, and Lockwood (see **Table 3.4**). This represents an increase in the Hispanic population of approximately 120% in both the city and county between 1990 and 2010. All three jurisdictions in 2010 had an American Indian population between 4% and 5%, demonstrating the recent increase in racial diversity.

The Yellowstone County and Billings population is becoming more educated (Yellowstone County 2008). The percentage of the population with a four-year college degree or higher has increased substantially over the last 40 years. In 1970, 12% of the county and 16% of the city had completed a four-year college degree or higher, increasing to 28% and 30%, respectively, in 2009 (see **Table 3.4**). The Lockwood population is less educated than the Billings and Yellowstone County population. Approximately 42% of Lockwood's population received a high school diploma as their highest level of educational attainment, while only 15% of Lockwood's population has a four-year degree.

Limited English Proficiency

Presidential EO 13166 on Improving Access to Services for Persons with Limited English Proficiency is intended to improve access to federal programs and activities for persons who, as a result of national origin, are limited in their English proficiency. Recipients of federal financial assistance have the responsibility to ensure meaningful access to their programs and activities by limited English proficient (LEP) persons. EO 13166 directs each federal agency that is subject to its requirements to publish guidance for its respective recipients clarifying that obligation. The USDOT published policy guidance in the Federal Register on December 14, 2005 (Vol. 70, No. 239). The guidance defines a "safe harbor" for recipients to ensure that they comply with their obligation to provide written translations in languages other than English. The guidance considers a recipient within the safe harbor if that person provides the written translation of vital documents for each eligible language group that constitutes either 1,000 persons or 5% of the population of persons eligible to be served or likely to be affected or encountered.

In order to identify LEP persons within the study area, data was collected from the U.S. Census Bureau regarding the characteristics of the non-English speaking population within the study area. The percentage of the population within the study area that speak a language other than English at home and the percentage of the population that speak English less than "very well" are shown in **Table 3.5**. Census tracts 7.01, 7.03, and 8 have a greater percentage of the population that speak a language other than English than do Billings and Yellowstone County. However, speaking a language other than English at home isn't necessarily an indicator of a LEP person. The ability to speak English is a more accurate indicator of a LEP person. Tract 7.01 is the only tract within the study area that has a higher proportion of its population speaking English less than very well (9%) than do the city and county. Of the 434 persons in tract 7.01 that speak English less than very well, 379 speak Korean or Vietnamese.

Table 3.5 Language Spoken at Home and Ability to Speak English

GEOGRAPHY	LANGUAGE OTHER THAN ENGLISH SPOKEN AT HOME		SPEAK ENGLISH LESS THAN "VERY WELL"	
	POP.	%	POP.	%
Montana	41,742	5%	8,659	1%
Yellowstone County	6,196	5%	1,865	1%
Billings	4,863	5%	1,497	2%
Lockwood Census Designated Place (CDP)	220	6%	0	0%
CENSUS TRACT	**POP.**	**%**	**POP.**	**%**
2	154	5%	45	1%
7.01	545	11%	434	9%
7.02	137	2%	41	1%
7.03	508	7%	44	1%
7.04	62	2%	22	1%
8	220	6%	0	0%
14	258	2%	75	1%
15	158	2%	63	1%
16	294	4%	61	1%
Total/Average of all Census Tracts	**2,336**	**4%**	**785**	**1%**

Source: Data from U.S. Census Bureau, ACS 2005-2009 (emphasis added).

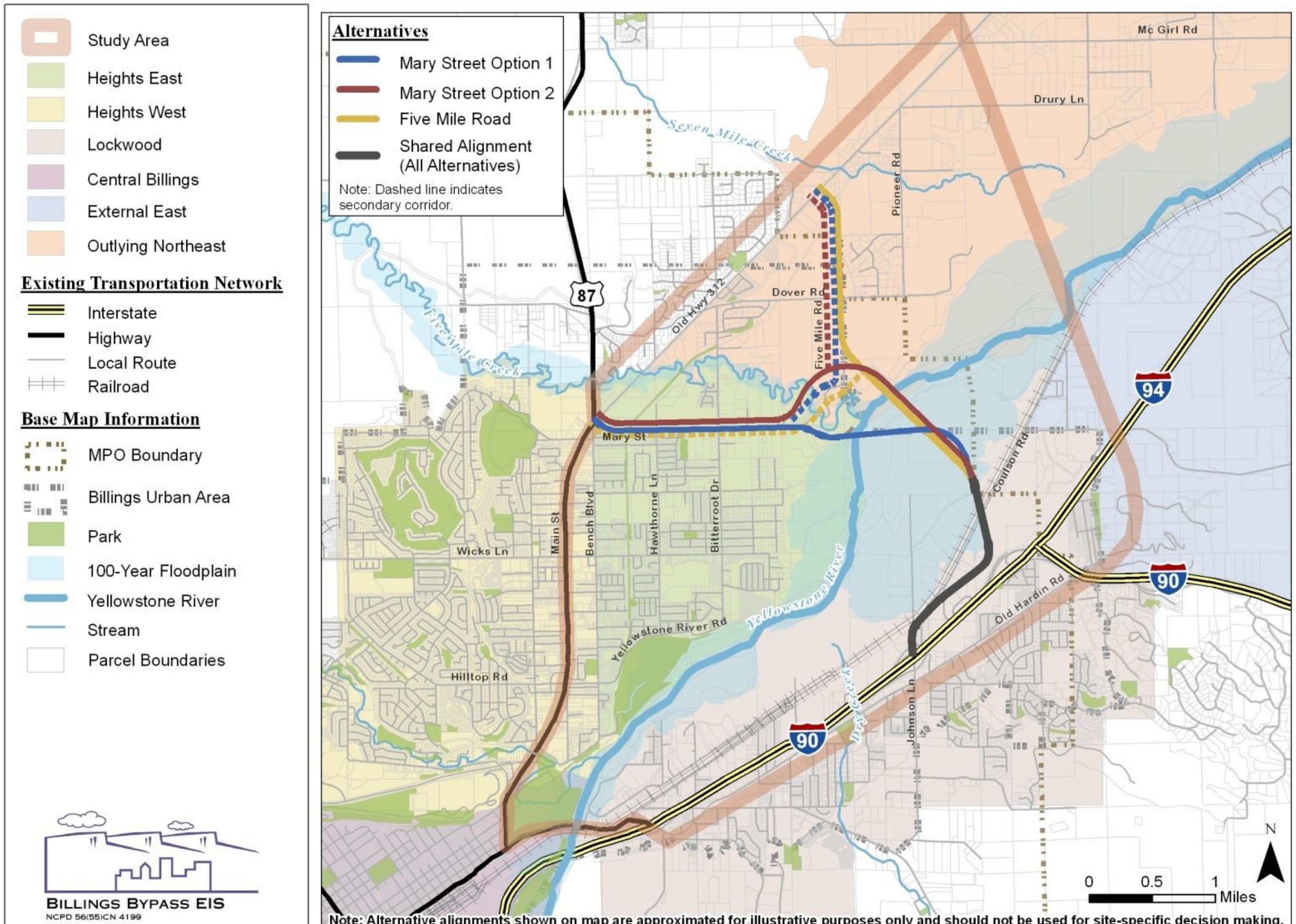
USDOT policy guidance on implementing LEP requirements suggests the written translation of documents for eligible language groups that constitute either 1,000 persons or 5% of the population to be affected by the project. According to **Table 3.5**, 785 persons or 1% of the study area speaks English less than very well. Therefore, the translation of vital documents is not required for the proposed project.

3.3.3.1.3 NEIGHBORHOODS AND COMMUNITIES

The study area intersects six distinct neighborhoods, as shown in **Figure 3.15.** The study area intersects a very small portion of the Central Billings, External East, and Heights West neighborhoods; therefore, the remaining three neighborhoods—the Billings Heights (East), Lockwood, and Outlying Northeast neighborhoods—are the focus of this section.

Public school facilities in Yellowstone County provide a variety of community services in addition to education (Yellowstone County 2008). Most schools provide meeting spaces for local civic and community groups and recreational play fields open for public use. In some communities, schools are

Figure 3.15 Neighborhoods in the Study Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information) USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 6/15/2012

considered the "center" of most civic activity. Approximately 7,100 school and community activities were held in Billings Public Schools during the 2009-2010 school year (Billings Public Schools 2011).

Billings Heights

Billings Heights, located within the Billings city limits, is characterized as "an extensive suburban Billings neighborhood offering diverse housing and quality schools with high quality of life amenities" (City of Billings 2006). The Billings Heights neighborhood, or the "Heights," was annexed into Billings in the 1980s. Before annexation, the population of the Heights neighborhood was 5,496 people. In 1980 the number increased to 15,276, an increase of 177%. The Heights had the greatest amount of growth in Yellowstone County between 1980 and 1990, growing to 17,883 in 1990. The population was 19,713 in 2000 (City of Billings 2006) and increased to 24,184 in 2010 (U.S. Census Bureau 2011). Since annexation, the Heights has experienced growth residentially and commercially, with numerous businesses being added along Main Street.

Billings Heights is divided into neighborhoods of "East" and "West," generally separated by Bench Boulevard. The study area primarily intersects portions of Billings Heights "East," which has a population of 6,765 (U.S. Census Bureau 2011 [census tract 7.02]).

Billings Heights has a neighborhood task force, a community group designed to improve the quality of life and promote community spirit through the improvement of the Heights neighborhood, the planning of new developments, the upgrading of housing and streets, and the development of public infrastructure and facilities (City of Billings 2011d). The task force identified the top three neighborhood issues, which are: construction of a swimming pool, input into an alternate route to and from the Heights area, and growth of the Heights to include increased traffic and commercial construction.

There are five elementary schools, one middle school, and one high school in Billings Heights (City of Billings 2006). However, only two of these schools (Bitterroot and Beartooth elementary schools) are located within the study area (see **Figure 3.16**). Beartooth Elementary School closed in 2003 and became home to Young Families Head Start, a program offering teen parents an opportunity to stay in school, providing quality daycare for infants and toddlers. The school reopened in 2007 and currently functions as a kindergarten through sixth grade (K-6) elementary school. Based upon the role of local schools and the presence of a neighborhood task force and neighborhood plan, the level of community cohesion[1] in Billings Heights appears to be high.

Lockwood

The Lockwood community has a population of 6,797, making it the largest unincorporated urbanized area in Yellowstone County and the state of Montana (U.S. Census Bureau 2011). According to the *Yellowstone County and City of Billings 2008 Growth Policy Update*, Lockwood encompasses about 8 square miles and is generally located within the Billings urban area. However, the *Lockwood Community Plan* indicates that the community is approximately 25 square miles, extending to Emerald Hills in the east and the rolling hills and rangeland along the Crow Indian Reservation to the south (Yellowstone County 2008, 2006). Although Lockwood borders the city of Billings to the west, the presence of significant residential, commercial, and industrial activity, along with its various service districts, enhances its identity as a quasi-independent community in Yellowstone County (Yellowstone County 2006).

[1] Community cohesion is the level of interaction among individuals, groups, and institutions in a community.

Lockwood has a large residential district (east of Old Hardin Road), but the portion of Lockwood within the study area is predominantly agricultural and industrial. Most of Lockwood between the Yellowstone River and I-90 is zoned Heavy Industrial and Controlled Industrial. These two land uses comprise slightly more than half of the land area (52%) (Yellowstone County 2008). Approximately 3% of Lockwood is zoned for commercial uses, and the remaining 45% of the land area of Lockwood is zoned for residential uses. Though most of the land in the Lockwood area is zoned industrial, residents consider Lockwood a small, rural town.

Lockwood School District #26 is considered by many residents to be a very important pillar in the community (Yellowstone County 2006). The people of Lockwood consider the quality education provided at the elementary, middle, and high schools—all located outside the study area—to be a vital part of the community for both students and adults. It is not uncommon for between 700 and 800 people to attend the annual Family Fun Night at the school facilities, indicating a high level of community cohesion.

Outlying Northeast

The Outlying Northeast neighborhood is located in unincorporated Yellowstone County, northeast of the Billings city limits. Within the study area, the Outlying Northeast neighborhood is generally bounded by Old Hwy 312 to the west, the Yellowstone River to the east, Five Mile Creek to the south, and McGirl Road to the north. The neighborhood is characterized by low-density residential development interspersed with agricultural land uses, with pockets of higher-density residential development on Bitterroot Drive (within the Billings urban area) and Pioneer Road. The neighborhood is not formally organized and does not have a community plan or a community task force. Based upon the rural nature of the neighborhood and the presence of only one school (Pioneer School) within the study area, the level of community cohesion within the Outlying Northeast neighborhood is considered low.

3.3.3.1.4 COMMUNITY AND PUBLIC FACILITIES

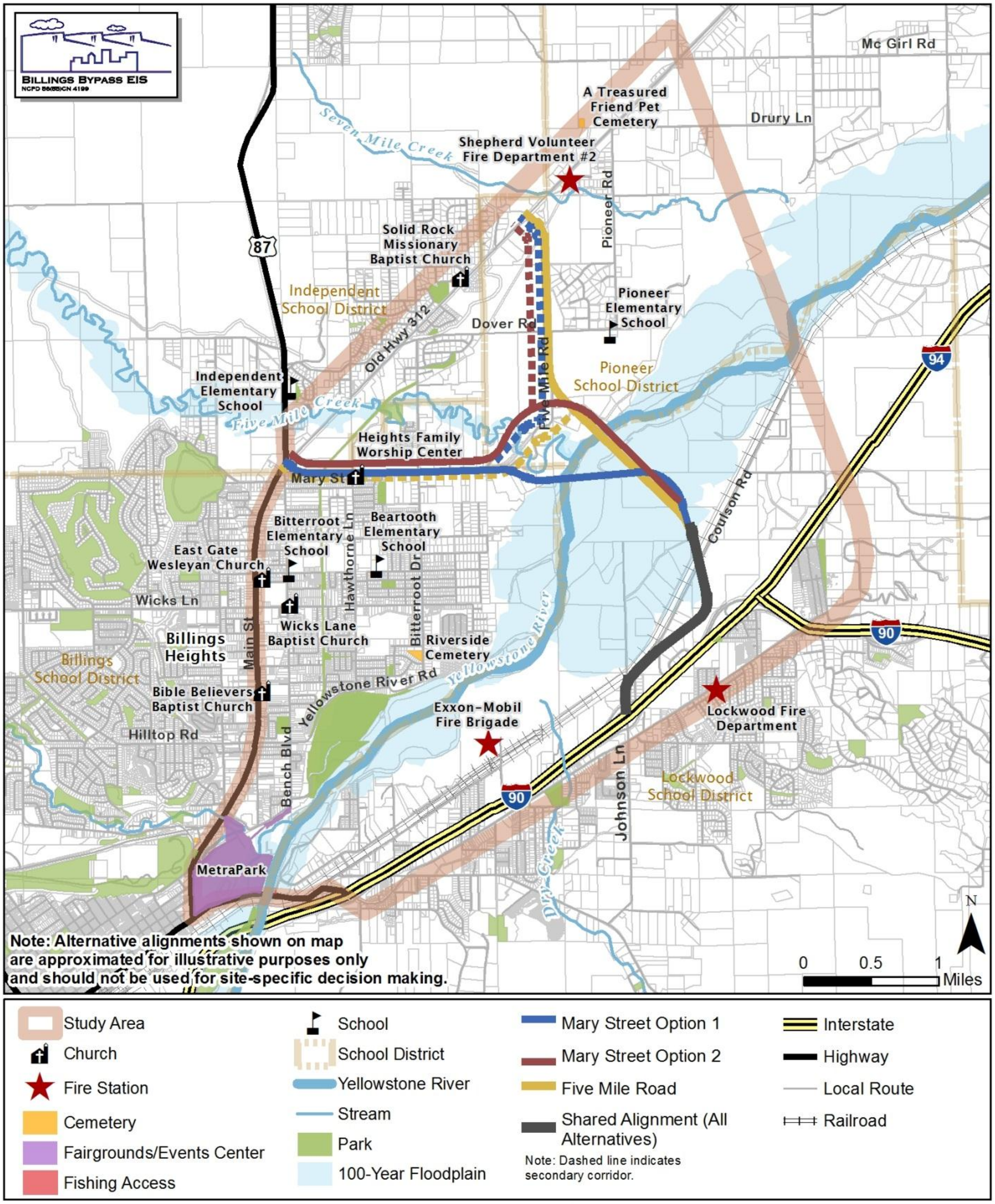
Community and public facilities include educational facilities, religious institutions, medical institutions, fire and police stations, community centers, cemeteries, government institutions, public services, and any other type of community or social services.

The study area intersects four elementary school districts, as shown in **Figure 3.16.** Three of the districts (Independent, Billings, and Lockwood) are part of the Billings Public School District, the largest school district in the county and state, which is made up of 30 schools serving approximately 15,714 students (Billings Public Schools 2011). Schools and other community and public facilities within the study area are shown in **Figure 3.16** and are listed by neighborhood below.

Billings Heights

- Bitterroot Elementary School: Located at 1801 Bench Boulevard, Bitterroot is a K-6 grade school that is one of 22 elementary schools in the Billings Public School District. Bitterroot had an enrollment of 342 students in 2009 (Billings Public Schools 2011).
- Beartooth Elementary: Located at 1345 Elaine Street, Beartooth is a K-6 grade school that is part of the Billings Public School District. After being closed in 2003 and transitioning to the Young Families Early Head Start program (City of Billings 2006), the school reopened in 2007 and now serves 414 students (Billings Public Schools 2011).
- Riverside Cemetery: Located on Bitterroot Drive.

Figure 3.16 Community and Public Facilities



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/2/2013

- MetraPark: Located off US 87, this multi-facility events campus includes the Rimrock Auto Arena, grandstand, Expo Center, Montana Pavilion, and a 0.5-mile track used for horse racing and motor sports (MetraPark 2011).
- Heights Family Worship Center: Located at 2345 Hawthorne Street, the worship center is a Christian faith church serving the Billings Heights neighborhood.
- East Gate Wesleyan Church: Located at 625 Mattson Lane.
- Wicks Lane Baptist Church: Located at 1605 Bench Boulevard.
- Bible Believers Baptist Church: Located at 1111 Main Street, #15.

Lockwood

- Exxon-Mobil Fire Brigade: Located on ExxonMobil Road within the Billings Refinery, the 24-member fire brigade is a volunteer unified emergency response team (ExxonMobil 2011).
- Lockwood Fire Department: Located at 3329 Driftwood Lane, the station is the only fire station in the Lockwood Rural Fire Department District (LRFD). LRFD is a special district and political subdivision of Yellowstone County, made up of over 80 square miles, protecting 235 commercial properties and over 3,100 residences (Lockwood Fire 2011). LRFD also provides fire-based, paramedic-level ambulatory services. The Yellowstone River serves as the dividing line between the City of Billings Fire Department and the LRFD.

Outlying Northeast Neighborhood

- Shepherd Volunteer Fire Department Station #2: Located at 2520 Back Road/Old Hwy 312, the Shepherd Volunteer Fire Department Station #2 provides fire, emergency medical services, and wildfire protection services to the Shepherd area through 39 volunteer members (Shepherd VFD 2011).
- Pioneer School: Located at 1937 Dover Road, Pioneer School is an independent school district serving kindergarten through 6th grade and averaging 60 students per year (Pioneer School 2011).
- A Treasured Friend Pet Cemetery: Located west of Old Hwy 312 and Pioneer Road.
- Solid Rock Missionary Baptist Church: Located at 1846 Wagon Wheel Road.

3.3.3.2 ECONOMIC CONDITIONS

Economic issues of concern for transportation improvement projects include the overall economy, such as employment, personal income, and housing. Economic issues are addressed by reviewing published data describing the strength of the local economy, including population growth, job creation and unemployment, and the availability and cost of housing. Data sources used to document existing conditions for the proposed project primarily include the U.S. Census Bureau and the Montana Department of Labor and Industry. The study area for economic conditions is the same as the study area for community resources, as illustrated in **Figure 3.16**.

The Billings urban area lies at the western edge of the northern High Plains. It serves as the most important center for a large region composed of eastern Montana, northern Wyoming, and the western Dakotas. Billings is the largest city between Minneapolis and Spokane, and between Denver and Calgary. Because of its location, Billings has developed as an important economic, cultural, educational, and transportation urban center for the entire region (Cambridge Systematics 2010). Billings serves as a commercial and transportation hub for the state and is the medical and educational center for the region. The city has three colleges (Montana State University-Billings, Montana State University-Billings College of Technology, and Rocky Mountain College) and two major hospitals (MDLI 2010a). The two hospitals employ more than 3,400 people and have almost 560 beds (Yellowstone County 2008). Several clinics also operate in Billings.

Billings benefits from having a diversified economy where oil and gas, health care, livestock, and banking play significant roles. There are three oil refineries in Yellowstone County: ConocoPhillips in Billings, ExxonMobil in Lockwood, and the CHS Refinery in nearby Laurel (Yellowstone County 2008). A Western Sugar Cooperative refinery is also located in Billings. About 360 Montana farmers supply sugar beets to the refinery, which has a direct impact of $50 million per year on the county's economy.

3.3.3.2.1 INCOME AND EMPLOYMENT

The number of people that are working in the community is an indicator of whether or not the local economy is growing (Yellowstone County 2008). Particularly when the historical employment figures are compared to population changes, it indicates whether more of the local population is working and whether workers are living elsewhere but working in the community. When categorized by industry type, it shows what industries have grown or declined over the study period.

The civilian labor force in Yellowstone County and the Billings Metropolitan Statistical Area (MSA) has grown steadily over the past 30 years, and unemployment rates in the Billings MSA and the county have consistently been lower than in both the state and nation (Yellowstone County 2008, MDLI 2010b). The employment growth rate in Yellowstone County was 31% between 1980 and 2010, and the population grew by 30% over the same period (Yellowstone County 2008). The rate of growth for the working age population nearly equals the general population growth rate. Therefore, the rate of employment in Yellowstone County is keeping pace with the rate of population growth.

Current employment data for the Billings MSA, Yellowstone County, and the state is provided in **Table 3.6**. The Billings MSA has a larger labor force than Yellowstone County, illustrating the economic significance of the Billings urban area. Unemployment rates in Billings and the county are substantially lower than the state rates and have been consistently lower for the past ten years (BEA 2011). Unemployment rates in both Yellowstone County and Billings reached a low of 2.5% in 2007 and have been steadily increasing since then, reaching highs of 5.5% in the county and 5.6% in the Billings MSA in 2010 (MDLI 2010b).

Table 3.6 Regional Employment

GEOGRAPHY	2010 CIVILIAN LABOR FORCE	2010 LABOR FORCE EMPLOYED	2010 UNEMPLOYMENT RATE
MONTANA	497,395	461,337	7.2%
YELLOWSTONE COUNTY	81,110	76,641	5.5%
BILLINGS MSA	86,305	81,515	5.6%

Source: MDLI 2010b.

Based upon employment and income rates, the Yellowstone County and Billings economies are keeping pace with surrounding states and appear to be doing better than the remainder of Montana.

Employment by Industry

Employment by industry in Yellowstone County is shown in **Table 3.7**. The largest employment industries in the county are retail trade, health care and social assistance, and the government. Several industry sectors grew rapidly between 2000 and 2009. Government employment grew by 8%, primarily in the state government sector, which grew by 23% (Yellowstone County 2008; MDLI 2010a). Local government increased by 7%, while the federal government declined by 0.3%. The largest increases were in the construction industry and the agricultural sector, with increases of 30% and 60%, respectively. The construction industry is recognized as having a significant impact on the area economy, which goes beyond the first year that construction is taking place. The Montana Department of Labor and Industry produced job growth projections that are based on labor force data through 2014. The retail trade industry grew by 17% between 2000 and 2009 and is predicted to grow by the greatest numbers through 2014, along with the service sector.

Table 3.7 Employment by Industry in Yellowstone County

INDUSTRY	NUMBER OF ESTABLISHMENTS	AVERAGE ANNUAL EMPLOYMENT	AVERAGE ANNUAL WAGES PER JOB
Agriculture, Forestry, Fishing, and Hunting	38	318	$24,842
Mining	58	333	$90,879
Utilities	17	364	$75,508
Construction	748	4,419	$44,536
Manufacturing	182	3,287	$55,940
Wholesale Trade	485	5,143	$48,110
Retail Trade	705	10,598	$25,458
Transportation and Warehousing	217	2,913	$33,938
Information	97	1,294	$41,207
Finance and Insurance	342	3,045	$53,241
Real Estate and Rental and Leasing	282	1,043	$28,012
Professional and Technical Services	610	3,974	$48,979
Management of Companies and Enterprises	26	341	$48,198
Administrative and Waste Services	335	4,789	$23,122
Educational Services	53	632	$23,677
Health Care and Social Assistance	486	12,082	$46,581
Arts, Entertainment, and Recreation	164	1,845	$14,886
Accommodation and Food Services	369	7,921	$14,258
Other Services	502	3,131	$24,388
Government	109	8,596	$45,666

Source: MLDI 2010a.

Statewide, the fastest-growing industries include administrative and support services; waste management and remediation service; arts, entertainment, and recreation; and professional and technical services

(MDLI 2011). A 26% to 32% increase in employment is projected in these occupations between 2008 and 2018.

The top five fastest-growing jobs in Yellowstone County are social and human services assistants, computer software engineers, environmental engineers, physician assistants, and milling machine operators (Yellowstone County 2008). The top five fastest-growing jobs in the state are forensic science technicians, medical assistants, industrial engineers, food preparation and serving workers, and physical therapist assistants (MDLI 2011). An increase in employment in the range of 28% to 34% is projected in these occupations between 2008 and 2018. The highest-paying industries in Yellowstone County are mining and utilities, with annual wages ranging from $75,000 to $90,000 (see **Table 3.7**). However, these industries also represent two of the smallest sectors in Yellowstone County, employing less than 700 persons.

Personal Income

Personal income is an important economic indicator for the local economy, because it plays a major role in determining local retail sales. Sources of personal income include salaries; property-related income such as rent; and transfer payments such as Social Security, welfare, and Medicare payments. Per capita income is a major determinant of the goods and services purchased by a typical person. Per capita income is calculated by dividing total personal income by the number of people in the subject population.

In 1989, the annual per capita income for the Billings MSA was $16,352, while the per capita income for Yellowstone County was higher than that, at $16,503 (Yellowstone County 2008). Throughout the 1990s, the per capita income for the entire county population continued to exceed that for the Billings MSA. The annual per capita income in 2000 was $26,249 for the Billings MSA and $26,412 for the entire county (BEA 2011). In 2009, the per capita income increased in Billings to $39,212, almost on par with the county per capita income, which was $39,412 (see **Table 3.8**). The increase in per capita income in Billings may have been due to the 2002 annexations of the Blue Creek area and Yellowstone Club Estates subdivision. The average per capita income of the county exceeds the statewide and national averages, which in 2009 were $39,004 and $39,138, respectively.

Table 3.8 Regional Income and Poverty (2005-2010)

GEOGRAPHY	MEDIAN HOUSEHOLD INCOME*	PER CAPITA PERSONAL INCOME**	TOTAL PERSONS BELOW POVERTY LEVEL*	PERCENTAGE OF POP. BELOW POVERTY LEVEL*
MONTANA	$43,089	$39,004	136,969	15%
YELLOWSTONE COUNTY	$46,967	$39,412	15,463	11%
BILLINGS MSA	$45,004	$39,212	12,050	12%
LOCKWOOD	$41,210	N/A	351	9%

*Source: U.S. Census Bureau 2010, American Community Survey 2005-2009.

**Source: Bureau of Economic Analysis, CA30 Regional Economic Profiles 2009.

As shown in **Table 3.8**, the median household income (MHI) for Yellowstone County in 2009 is $46,967. This compares with the Billings MHI of $45,004 in the same year. In 2009, the county poverty rate was at 11%, and the Billings poverty rate was at 12%, both of which were lower than the statewide poverty rate of 15%. In 2009, Lockwood had a lower MHI than Billings and Yellowstone County, at $41,210, but also had the lowest poverty rate in the region, at 9%.

With respect to per capita income and earnings per job, Billings has a lower cost of living and higher income/earnings than most Montana cities (Yellowstone County 2008).

3.3.3.2.2 BUSINESS ENTITIES AND DISTRICTS

The FHWA has identified highway-oriented categories of retail businesses for which highway development is related to economic conditions. Traffic-serving retail businesses—such as gasoline service stations/convenience stores, lodging and eating establishments, and tourism specialty stores—are considered to be primarily highway-oriented. Two corridors containing highway-oriented commercial businesses are located within the study area: Main Street/Old Hwy 312 in Billings Heights and I-90 and Old Hardin Road in Lockwood. These properties are zoned Highway Commercial (HC), as shown in **Figure 3.9** in Section 3.3.1. The HC zone is intended to provide areas for commercial and service enterprises that are intended primarily to serve the needs of the tourist, traveler, recreationist, or the general traveling public (City of Billings and Yellowstone County 2005).

Billings Heights includes all classes of commercial zoning, including low intensity Residential Professional to high intensity HC (City of Billings 2006). The types of businesses in Billings Heights are primarily General Contractors (30%), Service (21%), Miscellaneous (19%), and Retail Sales (15%), many of which are located within the HC corridor along Old Hwy 312.

Lockwood is home to several large industrial and commercial businesses and many smaller trucking and transportation firms (Yellowstone County 2006). Lockwood serves travelers on the I-90 corridor with several highway-oriented businesses, including Flying J truck stop, Fly In Lube, Holiday Inn Express, ExxonMobil Blue Basket convenience store, and several restaurants. The ExxonMobil Billings Refinery is located in the study area between Lockwood and the Yellowstone River. Beall Corp., a company that manufactures custom tank trailers for customers nationwide, has two facilities in Lockwood on both sides of the I-90 corridor. FedEx Ground has its main distribution facility north of the I-90 corridor in Lockwood, and the Billings Livestock Commission and the headquarters of R-CALF United Stock Growers of America, representing 18,000 members in 47 states, are both located in Lockwood.

There are a number of economic development organizations in Yellowstone County and Billings dedicated to attracting and retaining business, including (Yellowstone County 2008):

- Big Sky Economic Development Authority/Corporation: The corporation has 1,000 member investor companies that assist with business recruitment and retention, finance, and legislative issues. The agency is responsible for creating and implementing the strategic plan for economic development.
- Billings Area Chamber of Commerce: The chamber is a membership organization with approximately 1,100 members whose core functions are to provide government affairs leadership, promote Billings as a preferred travel destination, and provide membership services.
- Downtown Billings Association and Downtown Billings Partnership: These organizations promote Billings's downtown businesses and coordinate downtown redevelopment. The Downtown Billings Association is a membership organization that promotes downtown businesses and activities. The Downtown Billings Partnership is a nonprofit corporation focused on downtown revitalization that serves as a clearinghouse for redevelopment grants and loans, beautification projects, and efforts to increase downtown housing.
- Beartooth Resource Conservation and Development District: Covering a five-county region that includes Yellowstone County, the district primarily assists smaller towns and counties with obtaining grants and loans that support business development and employment, technical assistance, and training.

These organizations are all dedicated to building a strong business climate in the region. The Billings MSA has been cited as one of the top locations in the nation to launch a new business. In 2009, Billings was ranked as the number one small metropolitan area for small business startups (CNN 2009). This was based on the presence of diverse local industries, an eclectic mix of businesses, low unemployment, short commute times, and steady population growth. In 2011, Billings was recognized as the number one small city in America to launch and grow your business (Big Sky Business Journal 2011). Billings was identified as a good place to do business for reasons such as quality of life, healthy environment, nationally known medical facilities, proximity to airport, cultural activities, retail centers, and diverse employment opportunities.

3.3.3.2.3 HOUSING

A housing profile for Yellowstone County, Billings, and Lockwood is provided in **Table 3.9**. This 2010 data indicates that housing characteristics between Billings and the county are very similar, with comparable household size, percentage of owner-occupied housing units, and vacancy rates. More than 70% of the housing units in the county are within the Billings city limits, reinforcing the economic significance of the Billings area. The Lockwood community is much smaller in comparison, with a higher percentage of owner-occupied housing units and a lower percentage of vacant housing units. Approximately 11% of all housing units in Yellowstone County are mobile homes, compared to 7% in Billings and the statewide average of 11% (U.S. Census Bureau 2011, 2010 1-year ACS estimates).

Table 3.9 Regional Housing Characteristics (2010-2011)

GEOGRAPHY	TOTAL HOUSEHOLDS	AVERAGE HOUSEHOLD SIZE	TOTAL HOUSING UNITS	OWNER-OCCUPIED HOUSING UNITS	RENTER-OCCUPIED HOUSING UNITS	VACANT HOUSING UNITS
YELLOWSTONE COUNTY	60,672	2.38	63,943	68%	32%	5%
BILLINGS	43,945	2.29	46,317	64%	36%	5%
LOCKWOOD	2,566	2.64	2,651	81%	19%	3%

Source: 2011 U.S. Census Bureau, 2010 Census Summary File 1.

In 2002, the Billings urban area contained approximately 48,000 dwelling units (Cambridge Systematics 2010). The number of dwelling units is expected to grow from 46,317 in 2010 to 78,455 in 2035. The number of dwelling units in the Heights East neighborhood area is expected to increase by 78.4%, from 2,040 units in 2002 to 3,640 units in 2035.

Analysis of recent and upcoming residential development in Lockwood showed that there was an 11% increase in housing units in Lockwood between 1990 and 2000, adding about 164 housing units to the community over the 10-year period (Yellowstone County 2006). Estimates from the 2010 U.S. Census show a more than 50% increase in housing units (987 units) in Lockwood between 2000 and 2010. Lockwood continues to be an attractive place for middle and lower income individuals and families, given the home prices in the area and the number of manufactured homes and rental units available. The number of housing units in Lockwood is projected to increase to 2,917 units by 2035 (Cambridge Systematics 2010).

A comparison of housing prices and affordability in Billings and Yellowstone County is provided in **Table 3.10**. The median value of owner-occupied homes in the county and city are comparable at

$178,600 for the county and $181,700 for the city in 2010 (U.S. Census Bureau 2011, 2010 1-year ACS estimates). Median monthly rental prices in 2010 are also comparable, at $671 for the county and $675 for the city. The generally accepted definition of affordability is for a household to pay no more than 30% of its annual income on housing (HUD 2011). Families that pay more than 30% of their income for housing are considered cost burdened and may have difficulty affording necessities such as food, clothing, transportation, and medical care. Based upon this generally accepted definition of affordability, approximately 78% of all housing units in the city and county were considered "affordable" in 2010. Rental affordability rates are lower, at 57% for the county and 58% for the city. Yellowstone County was identified by Bloomberg Business Week as the "Best Affordable Place in Montana" in 2011, indicating that only 28.6% of households spend more than 30% of their income on housing (Bloomberg Businessweek 2011).

Table 3.10 Regional Housing Prices and Affordability (2010-2011)

GEOGRAPHY	MEDIAN HOME VALUE	MEDIAN RENTAL PRICE	AFFORDABLE HOUSING UNITS[1]	AFFORDABLE RENTAL UNITS[2]
YELLOWSTONE COUNTY	$178,600	$671	78%	57%
BILLINGS	$181,700	$675	78%	58%

Source: 2011 U.S. Census Bureau, ACS 2010 1-year estimates.

[1]Based upon selected monthly owner costs as a percentage of household income, including both housing units with and without a mortgage. Affordability is based upon percentage of household income less than 30%.

[2]Based upon gross rent as a percentage of household income. Affordability is based upon percentage of household income less than 30%.

3.3.4 ENVIRONMENTAL JUSTICE

Environmental justice (EJ) acknowledges that the quality of our environment affects the quality of our lives, and that adverse environmental effects should not disproportionately burden low-income or minority communities. Presidential Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was signed by the President on February 11, 1994, and requires that federal agencies administer and implement their programs, policies, and activities that affect human health or the environment to identify and avoid "disproportionately high and adverse" effects on minority populations and low-income populations. Therefore, every agency undertaking a transportation project that is fully or partially funded by the federal government must consider the impact of such a project on minority populations and/or low-income groups. The President's Council on Environmental Quality and several federal agencies, including the U.S. Department of Transportation (USDOT) Order 5610.2 and the FHWA Order 6640.23, have since issued guidance on how to implement EO 12898 and conduct an EJ analysis. The FHWA order ensures that agency actions do not have disproportionately high and adverse effects on EJ populations. A disproportionately high and adverse effect is defined as an adverse effect that:

- Is predominantly borne by a minority population and/or a low-income population; or
- Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or non-low-income population (FHWA 1998).

The following three fundamental principles are at the core of the EJ requirements:

- Ensure full and fair participation by all potentially affected communities in the decision-making process.
- Avoid, minimize, or mitigate disproportionately high or adverse effects on minority and low-income populations.
- Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

The primary source for information on the racial, ethnic, and low-income composition of the community is the U.S. Census Bureau. Whatever is the smallest geographic entity from the Census Bureau is what is used to document existing conditions in order to identify small pockets of concern that may be masked by the overall characteristics of a larger area such as a city or county. A census tract consists of cluster of block groups and a block group consists of clusters of blocks within the same census tract. Race and ethnicity data are available at the block group level from the 2010 Decennial Census; income and poverty data are available at the census tract level through the Census Bureau's American Community Survey (ACS) for 2005 through 2009.[2] The study area intersects 9 census tracts and 16 census tract block groups, which are utilized to describe the affected environment for the proposed project. The local school district is utilized as a secondary source of information to document EJ populations within the study area.

3.3.4.1 MINORITY POPULATIONS

As defined by the USDOT Order on Environmental Justice, a minority person is a person who is Black, Asian American, American Indian and Alaska Native, or Hispanic. A minority population is defined as any readily identifiable group of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons who would be similarly affected by a proposed project (FHWA 1998).

The study area intersects 16 census tract block groups. Block groups are the smallest geographic area available to provide data on race and ethnicity. Minority populations (2005 – 2009) within each of the 16 block groups, in Lockwood, Billings, and Yellowstone County, are shown in **Table 3.11**. While the average of all block groups that intersect the study area contain lower proportions of minority persons than Billings and the county, there are a handful of block groups that have elevated populations, as highlighted with bold text and a green background in **Table 3.11**. Block group 2-3 contains larger proportions of Black, American Indian, and Hispanic persons, at 2%, 15%, and 7%, respectively. Block groups 7.02-3, 7.06-1, and 7.06-3 contain higher percentages of American Indian persons, and block groups 7.06-3 and 8-3 contain slightly higher percentages of Hispanic persons.

Table 3.11 Minority Populations (2005-2009)

GEOGRAPHY	BLACK		ASIAN AMERICAN		AMERICAN INDIAN/ ALASKA NATIVE		HISPANIC	
	%	POP.	%	POP.	%	POP.	%	POP.
Yellowstone County	0.6%	935	0.6%	939	4%	5,881	5%	6,955
Billings	0.8%	828	0.7%	778	4%	4,619	5%	5,456
Lockwood	0.4%	25	0.1%	10	5%	331	6%	410

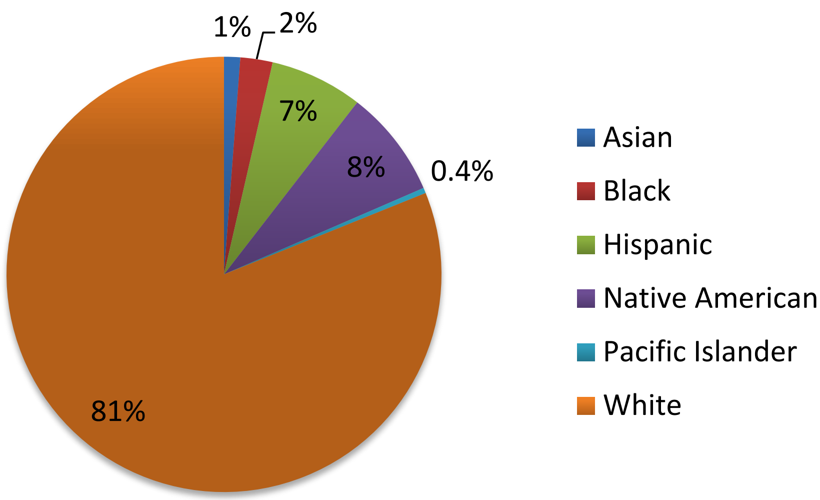
[2]ACS data for 2005 through 2009 is based upon census tract boundaries from the 2000 Decennial Census.

GEOGRAPHY	BLACK		ASIAN AMERICAN		AMERICAN INDIAN/ ALASKA NATIVE		HISPANIC	
	%	POP.	%	POP.	%	POP.	%	POP.
CENSUS TRACT - BLOCK GROUP								
2-3	**2%**	**14**	0.9%	8	**15%**	**126**	**7%**	**61**
7.01-3	0.6%	7	0.9%	11	4%	49	5%	64
7.02-1	0.7%	9	0.8%	10	2%	27	4%	47
7.02-2	0.3%	5	0.8%	12	2%	30	3%	41
7.02-3	0.5%	10	0.3%	7	**7%**	**145**	5%	105
7.02-4	0.5%	3	0.2%	1	2%	11	2%	12
7.02-5	1%	22	0.7%	13	3%	58	5%	93
7.06-1	0.1%	1	0.8%	6	**6%**	**44**	5%	37
7.06-3	0.6%	6	1%	10	**9%**	**89**	**7%**	**72**
8-1	0.6%	7	0%	0	4%	43	6%	69
8-2	0.3%	4	0.4%	6	5%	79	5%	71
8-3	0.2%	4	0.1%	1	5%	82	**7%**	**118**
14.02-2	0.1%	1	0.6%	7	3%	34	1%	16
15.01-1	0.2%	5	0.8%	17	2%	39	3%	52
9400-1	0.1%	1	0.4%	4	2%	17	2%	23
9400-3	0.1%	2	0.5%	9	2%	38	4%	70
Avg./Total of all Block Groups	**0.5%**	**101**	**0.6%**	**122**	**4%**	**911**	**4%**	**951**

Source: U.S. Census Bureau 2011, 2010 Census Summary File 1 (emphasis added).

The ethnic composition of students attending the Billings Public School District in the 2010-2011 school year is illustrated in **Figure 3.17.** This data provides a secondary source of information to document the potential presence of minority populations within the study area. The proportion of minority students is higher than Billings and Yellowstone County population rates for each ethnicity. Approximately 8% of the students are American Indian, which is twice as high as the percentage of the American Indian population in the city and county. Enrollment data for Bitterroot and Beartooth elementary schools, both located within the study area, reflect the overall ethnic composition of the Billings Public School District. Approximately 8% and 11% of the students enrolled in 2009 were American Indian or Alaska Native, respectively (Billings Public Schools 2011). The percentage of Hispanic students at these schools is lower than the District average but is consistent with city and county rates, which are 4% and 5%, respectively.

Figure 3.17 Ethnic Composition of Billings Public Schools



Source: Billings Public Schools 2011.

Based upon data from the U.S. Census Bureau and the Billings Public School District, there are minority populations of Hispanic and Native American persons within the study area.

3.3.4.2 LOW-INCOME POPULATIONS

The term low-income refers to a household income that is at or below the poverty guidelines established by the U.S. Department of Health and Human Services. Low-income population means any readily identifiable group of low-income persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient persons who would be similarly affected by a proposed project (FHWA 1998). U.S. Census data on these established poverty levels for the nine census tracts that intersect the study area were used to determine whether low-income populations live within the study area.

Census tracts are the smallest geographic area available to provide data on income and poverty. The population living below the poverty level (2005 – 2009) within each of the nine census tracts, in Lockwood, Billings, and Yellowstone County, are shown in **Table 3.12**. Approximately 11% of the population living within all nine census tracts is living below the poverty level, a rate which is consistent with Billings and Yellowstone County rates of 12% and 11%, respectively. Census tracts with percentages of population living below the poverty level that are higher than the percentages for Billings and the county are highlighted with bold text and a green background in **Table 3.12**. The percentage of the population living in poverty in census tracts 2 and 7.03 is substantially higher than the city and county rates, at 31% and 21%, respectively.

Table 3.12 Population Below Poverty Level (2005-2009)

GEOGRAPHY	TOTAL PERSONS	TOTAL PERSONS BELOW POVERTY LEVEL	PERCENTAGE OF POP. BELOW POVERTY LEVEL
Yellowstone County	137,317	15,463	11%
Billings	99,138	12,050	12%
Lockwood	3,960	351	9%
CENSUS TRACT			
2	3,434	**1,052**	**31%**
7.01	5,103	**673**	**13%**
7.02	6,015	508	8%
7.03	8,279	**1,728**	**21%**
7.04	3,640	197	5%
8	3,983	351	9%
14	11,523	690	6%
15	7,620	468	6%
16	6,997	757	11%
Total of all Census Tracts	**56,594**	**6,424**	**11%**

Source: Data from U.S. Census Bureau, ACS 2005-2009 (emphasis added).

Enrollment data from the Billings Public School District provides a secondary source of information to document the potential presence of low-income populations within the study area. In the 2010-2011 school year, approximately 28% of students in the district qualified for free meals (Billings Public Schools 2011). This represents an increase from the 2009-2010 school year, in which 22% of students qualified for free meals. An additional 8% of students qualified for reduced-price meals. In 2009, more than 40% of students enrolled in Bitterroot and Beartooth elementary schools, both of which are within the study area, were considered economically disadvantaged (Billings Public Schools 2011).

Based upon data from the U.S. Census Bureau and Billings Public School District, there is a readily identifiable low-income population within the study area.

3.3.5 RIGHT-OF-WAY AND UTILITIES

This section describes the existing right-of-way (ROW), easements, and location of utilities within the project corridor. For the topic of ROW and utilities, the project corridor is defined as the area within 500 feet of the proposed alignment centerlines, 600 feet around intersections with existing roads along the proposed alignments, 1,000 feet around the intersection with Old Hwy 312, and 1,500 feet around the Johnson Lane Interchange.

3.3.5.1 RIGHT-OF-WAY

The existing ROW throughout the project corridor is a combination of city and MDT ROW. Some existing public roadways in the project corridor are not within public ROW. Discussions with

Yellowstone County revealed that road petitions from the late 1800s and early 1900s are still in effect. The road petitions granted the county rights to use private land for the construction of new public roadways without transferring ownership to the county. As a result, portions of Mary Street, Five Mile Road, and Johnson Lane are located on public easements, and land ownership rights are maintained by the parcel owner (Swenson D. pers. comm., 2011). The project corridor also contains railroad tracks owned and operated by Montana Rail Link (MRL).

Existing ROW widths and the presence of easements are detailed in **Table 3.13**.

Table 3.13 Existing Right-of-Way Widths and Easements

SEGMENT	JURISDICTION	DESIGNATION	APPROXIMATE EXISTING ROW/EASEMENT WIDTH
JOHNSON LANE			
Edge of project corridor to North Frontage Road	MDT	Public ROW	60 feet
North Frontage Road to edge of project corridor	MDT	Public Easement	60 feet
OLD HARDIN ROAD			
Within project corridor boundaries	MDT	Public ROW	40 feet
BECRAFT LANE			
Within project corridor boundaries	MDT	Public Easement	30 feet
NORTH FRONTAGE ROAD			
Within project corridor boundaries	MDT	Public ROW	40 feet
COULSON ROAD			
Within project corridor boundaries	MDT	Public Easement	60 feet
MARY STREET			
East from Old Hwy 312 to east edge of Kiwanis Trail corridor	City of Billings	Public ROW	40 feet
East edge of Kiwanis Trail corridor to Hawthorne Lane	Yellowstone County	Public ROW	40 feet
Hawthorne Lane to Bitterroot Drive	City of Billings	Public ROW	100 feet
Bitterroot Drive to approximately Flaming Creek Drive	Yellowstone County	Public Easement	60 feet
Flaming Creek Drive to approximately 2,000 feet northeast	Yellowstone County	Public Easement	120 feet
2,000 feet northeast of Flaming Creek Drive to Five Mile Road	Yellowstone County	Public Easement	60 feet

SEGMENT	JURISDICTION	DESIGNATION	APPROXIMATE EXISTING ROW/EASEMENT WIDTH
FIVE MILE ROAD			
Within project corridor boundaries	Yellowstone County	Public Easement	60 feet
MRL RAILROAD			
Within project corridor boundaries	BNSF Railway	BNSF Railway	350 feet

Source: Yellowstone County Legal Maps 2012; Montana Cadastral Data 2011; Swenson D. personal communication, November 30, 2011.

3.3.5.2 UTILITIES

Utility providers in Yellowstone County were contacted to identify major utilities located within the project corridor. Of the 14 utility providers contacted, six responded; four providers indicated they maintain active infrastructure within the project corridor, and one provider met with project representatives to discuss plans. Information provided by these utility providers is summarized below.

3.3.5.2.1 YELLOWSTONE VALLEY ELECTRIC COOPERATIVE

South of the Yellowstone River, Yellowstone Valley Electric Cooperative (YVEC) has a substation located at the intersection of Johnson Lane and Old Hardin Road. Overhead power lines extend east along Old Hardin Road from the substation, then north along Johnson Lane underneath I-90, and branch northeast along North Frontage Road. Additional power and service lines extend along Firth Street, Sannon Boulevard, and Coulson Road.

North of the Yellowstone River, YVEC provides electricity via overhead power lines and service lines that extend from Main Street to Bitterroot Drive along the north side of Mary Street. Overhead power lines cross Mary Street at Bench Boulevard and run north along US 87. Overhead power lines extend across Five Mile Road at the intersection of Five Mile Road and Dover Road, and a service line is present approximately 0.27 mile north of Dover Road (K. Richard, pers., comm. 2011).

3.3.5.2.2 NORTHWESTERN ENERGY

Northwestern Energy maintains overhead power lines along Mary Street. A single phase overhead line extends northeast across the intersection of Old Hwy 312 and Mary Street. An overhead line runs adjacent to Mary Street on the north side from Hawthorne Street to Bitterroot Drive, where it crosses to the south side of Mary Street and continues straight east, veering off the alignment of Mary Street (M. Inabnit, pers. comm., 2011).

3.3.5.2.3 QWEST COMMUNICATIONS

Qwest Communications maintains small distribution cables along Johnson Lane and a fiber optic cable extending south along Johnson Lane from North Frontage Road to Old Hardin Road. Additional distribution cables extend along the south side of Coulson Road and the east side of Firth Street. Small distribution cables extend east along the south side of Mary Street and cross to the north side near the Five Mile Creek Bridge. The cables terminate at the intersection with Five Mile Road. Distribution and fiber optic cables run along the south side of Old Hwy 312 in the vicinity of Seven Mile Creek (L. Manchester, pers. comm., 2011).

3.3.5.2.4 COUNTY WATER DISTRICT OF BILLINGS HEIGHTS

The County Water District of Billings Heights maintains water distribution facilities along the southern side of Mary Street from Old Hwy 312 to Columbine Drive (Neiskens D., pers. comm., June 6, 2011). Pipes range in size from 8 feet to 16 feet. No water mains are present along Five Mile Road, but the area is a proposed service area (D. Neiskens, pers. comm., 2011).

3.3.5.2.5 LOCKWOOD WATER AND SEWER

Lockwood Water and Sewer does not maintain any facilities in the project corridor. A lift station is planned for construction along the east side of Johnson Lane near the Coulson Road intersection. Plans are in place for a new 8-inch sewer main along the east side of Johnson Lane between the lift station and North Frontage Road, and a 6-inch main is planned along the west side of Johnson Lane between the lift station and Old Hardin Road (W. Woody, pers. comm., 2011. Lockwood Water and Sewer 2011).

3.3.6 CULTURAL RESOURCES

This section describes the cultural resources within the Area of Potential Effect (APE). According to 36 Code of Federal Regulations (CFR) 800.16(d), “Protection of Historic Properties,” the APE is “the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist.” The APE is shown in **Figure 3.18**.

Because this project is considered a federal undertaking, Section 106 of the National Historic Preservation Act (NHPA) applies, which requires federal agencies to take into account the effects of their actions on historic properties in the APE. For the EIS for this project, the requirements of Section 106 are addressed through the NEPA process. This section of Chapter 3 describes the affected environment and the corresponding section in Chapter 4 describes the environmental consequences. Section 106 requires that the responsible federal agency first determine whether the undertaking is a type of activity that could affect historic properties. Historic properties are properties that are included in the National Register of Historic Places (NRHP) or that meet the criteria for listing on the NRHP, the official list of America’s historic places worthy of preservation. An effect to a historic property is “an alteration to the characteristics of a historic property qualifying it for inclusion or eligibility for the National Register of Historic Places” (36 CFR 800.16). If an effect is expected (discussed in Chapter 4), the responsible federal agency must identify the appropriate State Historic Preservation Officer/Tribal Historic Preservation Officer (SHPO/THPO), American Indian Tribes, and other interested parties to consult with during the process. If the agency determines that its undertaking would have no potential to effect historic properties, the agency has no further Section 106 obligations (ACHP 2002).

Implementation of the proposed alternatives could affect historic properties; therefore, a review of cultural resource inventories was conducted in 2007, 2009, and 2011. These inventories included a records search of the study area provided by the Montana State Historic Preservation Office. General Land Office (GLO) maps and topographic maps were consulted for site leads. Other research included review of historic maps, newspaper articles, local histories, directories, journal articles, and county and city records, as well as relevant online sources such as census records. Site leads were plotted in a geographic information system (GIS) and used to conduct field work. Field work consisted of examining potential sites to determine eligibility for listing in the NRHP as defined by federal guidance. MDT

Figure 3.18 Area of Potential Effect and Sites Eligible for NRHP Listing

Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/14/2013

requested access to the potential sites to determine eligibility; at six sites, access was not granted. For these sites, determinations of eligibility were made from public vantage points. The cultural resources inventory report (Ethnoscience 2011) identified 19 cultural resource sites within the APE and their eligibility for listing in the NRHP. These sites include 13 historic building properties, 2 historic irrigation ditches, 2 historic railroads, 1 bridge, and 1 isolated find. Because isolated finds are not considered eligible for listing on the NRHP, the isolated find is not included for analysis in this EIS. In addition, no evidence of archeological remains or tribal use within the study area was identified. Three of the historic properties were determined to be eligible for listing, with concurrence from the SHPO. These properties are shown in the following figure and described below.

3.3.6.1 HISTORIC PROPERTIES IN THE AREA OF POTENTIAL EFFECT

The majority of properties within the APE are modern residential, commercial, and industrial properties. All properties 45 years of age or older[3] (i.e., dating from 1966 or earlier) were recorded during the cultural resources survey, except for fence lines, stock ponds, and properties where landowners denied access. Landowner permission was denied for all but three historic building properties of the residential properties within the APE. In cases where access was denied, a preliminary examination was conducted based on observations from public vantage points and a review of historic literature and deeds associated with the properties. Recommendations for NRHP eligibility for all sites within the study area, including those for which access was denied, were determined based on federal guidance and are described below. All sites were also examined collectively for potential NRHP eligibility as a historic district (Ethnoscience 2011).

During preparation of the DEIS, landowner permission to access the residential properties identified within the APE was denied for ten potentially historic residences and preliminary determinations of eligibility were listed in the DEIS, with intent to make formal determinations in this FEIS. Therefore, a cultural resources survey was conducted on these ten properties in October 2012 to complete the analysis for the FEIS. Although access was still denied for six properties, sufficient architectural information was obtained from public vantage points. All properties were documented, mapped, and photographed. One property, 1118 Firth Street (previously noted as 1112 Firth Street), has been demolished since the initial survey. The remaining nine have undergone modifications and new buildings have been added since original development. All nine properties were recommended as not eligible for listing in the NRHP (Ethnoscience 2012).

Table 3.14 Potential Historic Properties in the APE

	ACCESSED DURING SURVEY?	DETERMINATION OF ELIGIBILITY	SHPO CONCURRENCE
Northern Pacific Railway Mainline (Site 24YL277)	Yes	Eligible	Eligible
Billings Bench Water Association Canal (Site 24YL161)	Yes	Eligible	Eligible
Billings and Central Montana Railroad (Site 24YL1592) [1]	Yes	Eligible	Eligible

[3] Historic properties must be old enough to be considered historic (generally at least 50 years old) (NPS n.d.). Forty-five years was used as a conservative baseline (J. Axline, pers. comm., 2011).

	ACCESSED DURING SURVEY?	DETERMINATION OF ELIGIBILITY	SHPO CONCURRENCE
Coulson Ditch (Site 24YL272)	Yes	Not eligible	Not eligible
1805 Mary Street (Site 24YL0998)	Yes	Not eligible	Not eligible
2206 Mary Street (Site 24YL0999)	Yes	Not eligible	Not eligible
2411 Bench Boulevard (Site 24YL1000)	Yes	Not eligible	Not eligible
Five Mile Creek Bridge (Site 24YL1867)	Yes	Not eligible	Not eligible
1045 Firth Street (Site 24YL1871)	Yes	Not eligible	Not eligible
1101 Firth Street (Site 24YL1872)	No, access denied	Not eligible	Not eligible
1110 Firth Street (Site 24YL1873)	No, no response	Not eligible	Not eligible
1112/1118 Firth Street	No, property demolished in 2012	Not eligible	Not eligible
1207 Johnson Lane (Site 24YL1874)	No, no response	Not eligible	Not eligible
812 Mary Street (Site 24YL1869)	Yes	Not eligible	Not eligible
818 Mary Street (Site 24YL1870)	No, no response	Not eligible	Not eligible
2401 Mary Street (Site 24YL1875)	No, no response	Not eligible	Not eligible
2547 Roundup Road (Site 24YL1876)	No, no response	Not eligible	Not eligible
2551 Roundup Road (Site 24YL1877)	Yes	Not eligible	Not eligible

[1] Covered under the terms of MDT's Abandoned Historic Railroad Grades Programmatic Agreement.

3.3.6.2 ELIGIBLE HISTORIC PROPERTIES

3.3.6.2.1 NORTHERN PACIFIC RAILWAY MAINLINE (SITE 24YL277)

Site 24YL277 is the Northern Pacific Railway mainline (see **Figure 3.19**). A 6,000-foot segment can be observed along Coulson Road, traveling in a northeast-southwest direction. The track rails and modern creosote-treated wooden cross-ties sit atop ballast composed of crushed rock. The top of the ballast measures 20 feet wide. The ballast sits atop sub-ballast of earthen fill that measures at least 30 feet wide at the base. The sub-ballast and ballast have a combined height above the earthen grade of 4.0 feet.

The condition of the linear site is excellent and retains integrity of location, design, setting, materials, workmanship, feeling, and association. This segment of the railroad retains its original function and association. The site was previously recommended eligible for listing in the NRHP because of its importance in the development of transportation and settlement in Montana. Nothing within the study area appeared to warrant a re-evaluation of the site's eligibility.

3.3.6.2.2 BILLINGS BENCH WATER ASSOCIATION CANAL (SITE 24YL161)

Site 24YL161 is the Billings Bench Water Association canal (see **Figure 3.20** and **Figure 3.21**). The canal begins at its diversion point near Laurel, a city that is part of the Billings MSA in the Yellowstone Valley near Main Street and First Avenue, and travels in a northeasterly direction along the south-sloping benches above the Yellowstone River valley bottom.

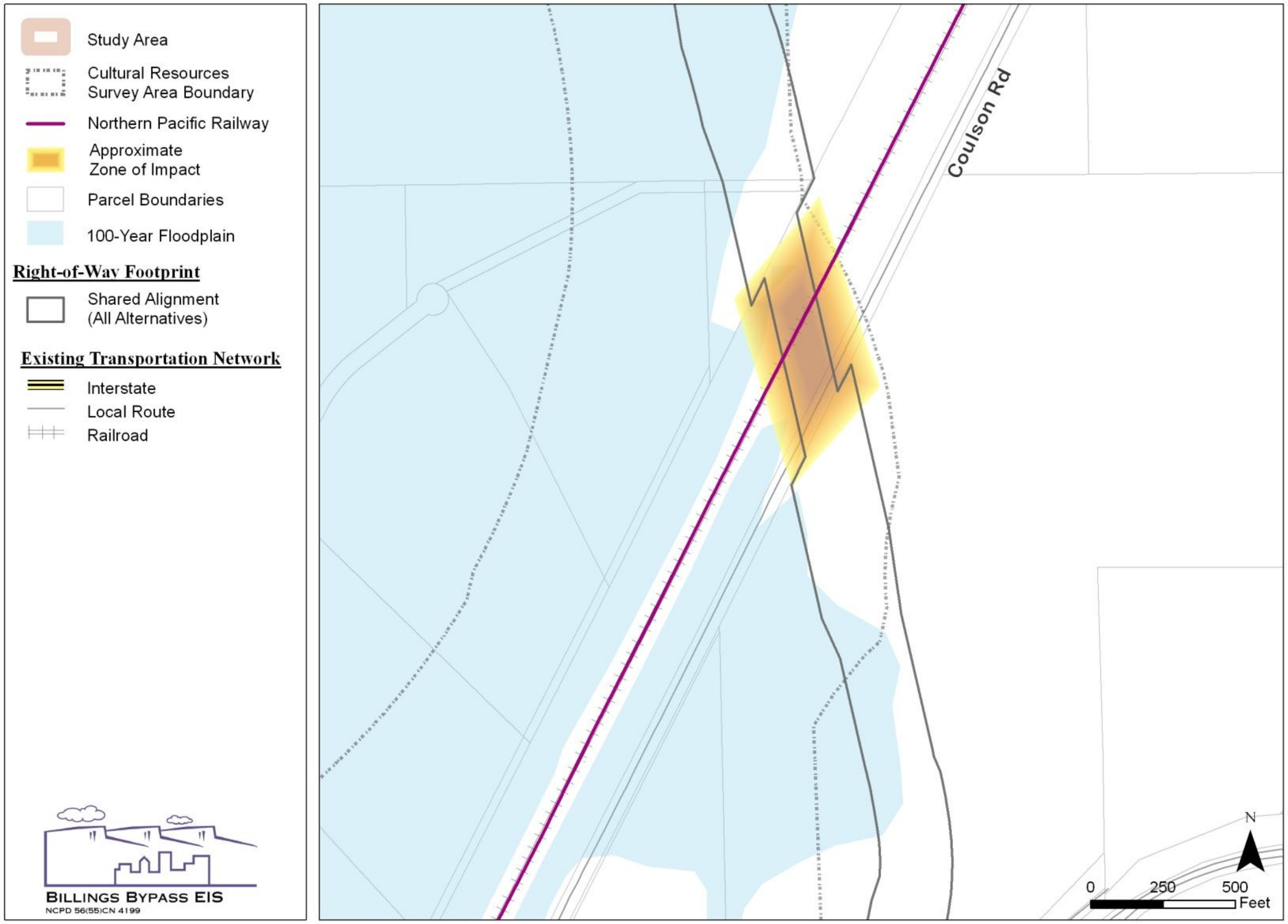
The portion of the canal examined for the cultural resources investigation retains good integrity. Although it is likely the site has been periodically excavated and maintained, it retains its original character, function, and association. Site 24YL0161 was previously determined NRHP-eligible with MTSHPO concurrence. Nothing within the study area appeared to warrant a re-evaluation of the site's eligibility.

3.3.6.2.3 BILLINGS AND CENTRAL MONTANA RAILROAD (SITE 24YL1592)

Site 24YL1592 is an abandoned segment of the Billings and Central Montana Railroad (see **Figure 3.22** and **Figure 3.23**). Within the area investigated, vegetation was dense and consisted of bunch grasses, milkweed, cheat grass, and elm and cottonwood trees. This decreased ground surface visibility to less than 10%. Historically the railroad crossed the proposed alignment, but no evidence of the railroad grade was visible due to cultivation and construction. In 2004 all that remained of the site was the grade. The rails, ballast, and ties were removed after the line was abandoned in the 1970s. A 1,500-foot segment of the railroad grade can be observed on either side of Mary Street. The grade measures approximately 12 feet across at the top and is relatively level, and generally oriented as parallel to Old Hwy 312. This segment has no rails, ballast, or ties. A bike path and walkway have eliminated portions of the railroad grade on the south side of Mary Street.

Overall integrity of the site is poor to fair. Although the rails and other structures were removed, portions of the grade remain just northeast of Mary Street. Some sections of the railroad grade no longer exist due to cultivation and urban development. Only a small portion of the site can be identified as to location and function within the study area. Site 24YL1592 was previously determined eligible for the NRHP with SHPO concurrence, because of its association with the development of the Billings Bench and Shepherd areas. Results of the cultural resource inventory recommend that only the grade that can be discerned is NRHP-eligible; the non-existing segments are noncontributing to NRHP eligibility.

Figure 3.19 Northern Pacific Railway Mainline



Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

Date Plotted: 6/22/2012

Figure 3.20 Billings Bench Water Association Canal

Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

Date Plotted: 6/22/2012

Figure 3.21 Billings Bench Water Association Canal

Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

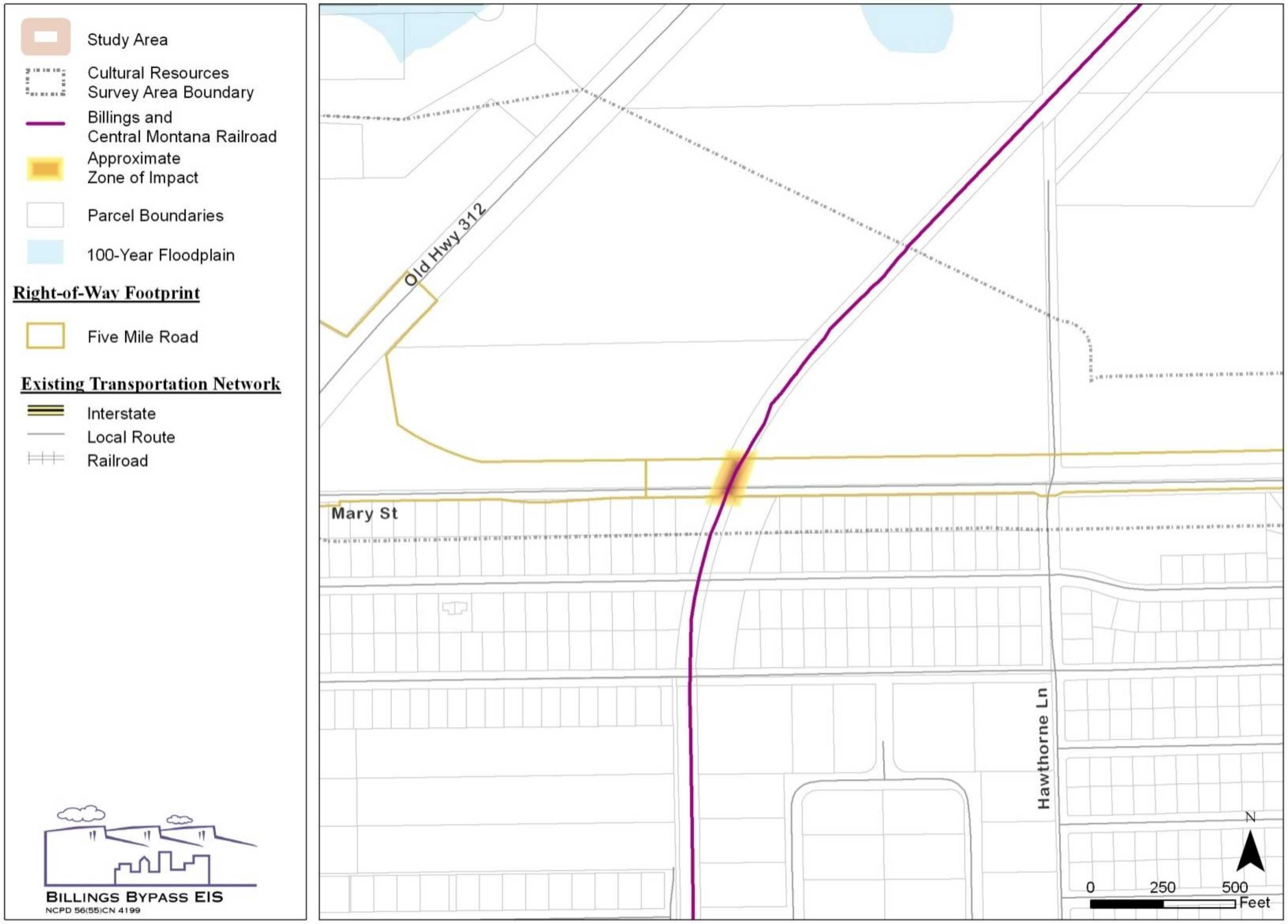
Date Plotted: 6/22/2012

Figure 3.22 Billings and Central Montana Railroad

Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

Date Plotted: 6/21/2012

Figure 3.23 Billings and Central Montana Railroad



Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

Date Plotted: 6/21/2012

3.3.6.3 OTHER PROPERTIES

Nine properties along the south side of Mary Street outside of the APE but within the study area were reviewed for their possible eligibility for inclusion in the NRHP due to the potential of visual and noise impacts from the proposed project. For the DEIS these properties were assessed from public vantage points, and information was obtained from public records. Additional analysis for the FEIS is based on historical research and a preliminary architectural assessment, including access to four of the properties, indicates that all nine properties have lost integrity of design, material, workmanship, and setting, and have no significant association or research potential that would make them eligible for inclusion in the NRHP (J. Axline, pers. comm, 2013). SHPO (2013) concurred that they are not eligible.

3.3.6.4 HISTORIC DISTRICT EVALUATION

The study area was surveyed for evidence of a historic district. According to the NRHP, the identity of a historic district results from "the interrelationship of its resources, which can convey a visual sense of the overall historic environment or be an arrangement of historically or functionally related properties" (NPS 1997). The importance of a historic district is derived from its "being a unified entity, even though it is often composed of a wide variety of resources" (NPS 1997). In addition to being an identifiable entity, a historic district must also have significance under NRHP Criteria guidelines (NPS 1997). Based on these guidelines, the study area is recommended not eligible as a historic district because it lacks integrity as a unified entity and because it lacks collective distinction.

3.3.6.5 SECTION 4(f): CULTURAL RESOURCES

Section 4(f) of the Department of Transportation (USDOT) Act of 1966 was set forth in Title 49 United States Code, Section 303. In 2008, the Section 4(f) Final Rule was moved to 23 CFR Part 774.

Section 4(f) of the USDOT Act states that the Secretary of the USDOT "shall not approve any transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state or local significance, or land of an historic site of national, state or local significance, as determined by the federal, state or local officials having jurisdiction over the park area, refuge or site unless a determination is made that:

1. There is no prudent or feasible alternative to using that land, and
2. The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife or waterfowl refuge, or historic site resulting from that use."

In accordance with the USDOT regulations, Section 4(f) requirements are applicable only to significant historic resources (i.e., those sites listed on or eligible for listing on the NRHP, or sites otherwise determined significant by the FHWA Administrator [23 CFR Section 774.17] and the FHWA Section 4(f) Policy Paper [3. Historic sites, Section 4(f) Significance]) that are subject to use by the transportation project. The historic resources considered in this evaluation include all resources that were listed on the NRHP or determined officially eligible for listing on the NRHP. **Table 3.15** lists resource specifics, including location and type of resource, and the reason each property is considered a Section 4(f) resource. Chapter 4 contains a description of the 4(f) analysis.

Table 3.15 Section 4(f) Resources – Historic Properties

ID NO.	RESOURCE	TYPE	NRHP ELIGIBILITY STATUS
24YL277	Northern Pacific Railway Mainline	Railroad	Eligible
24YL1592	Billings and Central Montana Railroad	Railroad	Eligible
24YL0161	Billings Bench Water Association Canal	Canal	Eligible

Source: Ethnoscience 2011.

3.3.7 VISUAL RESOURCES

This section describes the study area's existing visual quality condition. Visual quality is inherently subjective; that is, each person holds individual perceptions of what constitutes visual quality. However, the FHWA visual assessment methodology provides a process of evaluation that reduces subjectivity by using a qualitative and quantitative approach to analyzing existing and proposed views of the study area. FHWA's guidance stresses the importance of comprehensively describing the:

1. Visual characteristics of a project.
1. People who will view the project.
2. Visual resources of the project (FHWA 1998).

These three elements were used to define the affected environment for the study area. The study area is the boundary within which the alternatives were considered, and includes viewpoints from which specific changes resulting from the alternatives would be seen. The methods for determining these viewpoints are described in Section 3.3.7.3, "Visual Resources," below.

3.3.7.1 VISUAL CHARACTERISTICS

The city of Billings is located in south central Montana in the valley of the Yellowstone River. The city limit encompasses a land area of 39.6 square miles. Yellowstone County contains 2,646 square miles. Both the city and the county are the most heavily populated in the state (Billings Chamber of Commerce 2008).

Billings is framed on three sides by mountain ranges, and is a blend of plains and mountain geographies. Fed by numerous tributaries, the Yellowstone River flows in a northeasterly direction through the Yellowstone Valley. The valley measures from a few yards to 12 miles in width. Sandstone cliffs, from 300 to 500 feet high, form a landmark border known as the "Rimrocks." Above the Rimrocks, the land is primarily rolling hills. South of Billings, the terrain is characterized by rolling to moderately steep hills with high, flat tablelands (Billings Chamber of Commerce 2008).

3.3.7.2 VIEWER CHARACTERISTICS

Predicting viewer response to visual impacts requires understanding who those viewers are. The visual impacts of a project depend on the viewers' expectations and degree of sensitivity, which have been shown to vary by location and by user group.

3.3.7.2.1 VIEWER GROUPS

Viewers differ in their response to proposed changes based on viewer location, activity, and values. For example, residents would be more aware of the visual features of their surroundings than visitors, and would likely be more sensitive to changes than travelers to and from the area. Viewer groups can be primarily distinguished based on whether they are experiencing views *from* the road (e.g., drivers and passengers) or views *toward* the road (local residents, recreationists, etc.) (FHWA 1998).

3.3.7.2.2 VIEWER EXPOSURE AND SENSITIVITY

Viewer exposure is defined as the degree to which people are exposed to a view by:

- Their physical location.
- The numbers of people viewing.
- The duration and frequency of the view (FHWA 1998).

Viewer sensitivity is strongly related to visual preference and is defined as the degree to which viewers are likely to be receptive to the visual details, character, and quality of the surrounding landscape. In general, a person residing in proximity to the proposed changes will be more sensitive to visual changes than a traveler driving through once, because the resident's duration or frequency of view (i.e., exposure) will be greater. Two primary factors that affect viewer sensitivity include:

- Type of activity in which the viewers are engaged (e.g., recreational use versus commercial traffic).
- Level of awareness of the viewers (e.g., the cultural significance of a resource or expectations about the setting) (FHWA 1998).

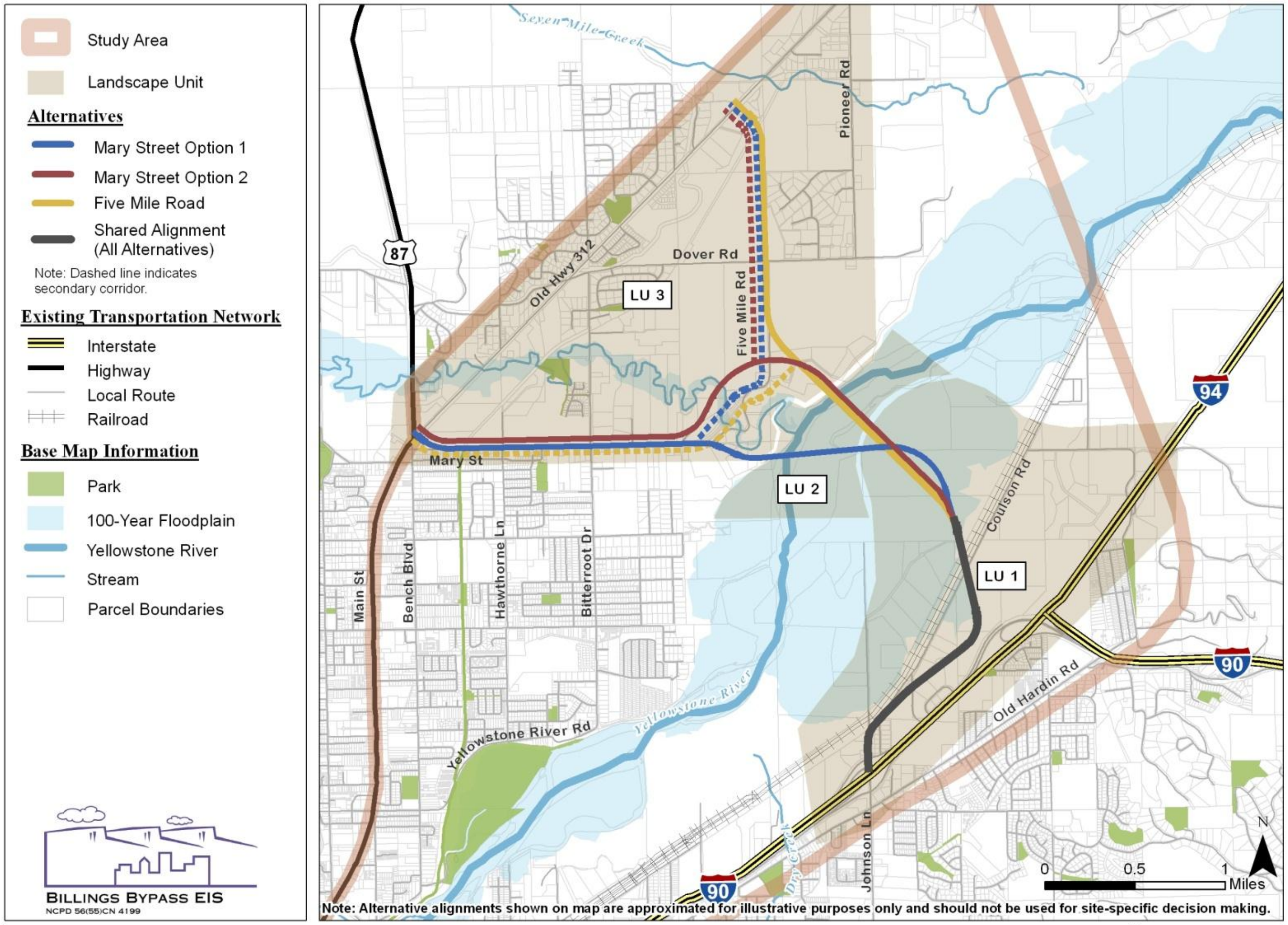
The types of viewer groups that would be affected by this project were identified and described with respect to the location and general characteristics (including viewer exposure and sensitivity) of the people who would be able to see the completed project both *toward* the road and *from* the road. These groups are identified by specific visual resources described below.

3.3.7.3 VISUAL RESOURCES

The proposed roadway alignments were used to establish a baseline of the visual resources that would be affected by the project. U.S. Geological Survey (USGS) Quadrangle maps were reviewed to determine existing topography, site lines, landscape boundaries, natural features, and general site character. Major human and natural visual features encountered along the proposed alternative alignments were identified and recorded. Site surveys were conducted to observe and document the existing visual environment and resources in the study area. Site reconnaissance was limited to areas accessible or visible from public roads, public facilities or lands, and residential areas.

To provide a framework for comparing the visual effects of project alternatives, the regional landscape (described in Section 3.3.7.1,"Visual Characteristics," above) can be divided into distinct landscape units (LUs) by identifying characteristic combinations of regional landscape components (landform, or topography, and land cover) that distinguish one regional landscape from another. Landscape units are "outdoor rooms" that are delineated by geographic location and distinct landscape character (FHWA 1998). For this project, the study area was divided into three LUs to facilitate visual resource analysis. These LUs are defined around the Yellowstone River corridor: LU1 is southeast of the river corridor, LU2 includes the river itself, and LU3 is northwest of the river corridor. These landscape units are shown in **Figure 3.24** and described in the text below.

Figure 3.24 Landscape Units



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 6/18/2012

3.3.7.3.1 LU1: SOUTH OF YELLOWSTONE RIVER

LU1 consists predominantly of vacant brush rangeland between the I-90/I-94 corridor and the Yellowstone River. Horizon lines are distant and somewhat flat or gently rolling. Few human-made developments exist, and they consist of small residential areas and small industrial facilities, generally in the southern end of the LU. Areas of cropland also exist throughout LU1. The brush rangeland/cropland and grasses provide pale green, beige, and tan colors, as well as coarse texture. Few trees occur in this LU; they are confined mostly to drainages or landscaped areas, providing contrasting vegetation.

Figure 3.25 Landscape Unit 1 Existing Conditions

View from Yellowstone Trail looking west onto LU1. Cropland exists to the left (south) side of the frame.

Similar view looking farther north. Small residential area in foreground, with large industrial area in middle ground. The horizontal row of trees beyond the industrial area represents the western edge of the LU at the Yellowstone River.

Looking northwest from small residential area on Firth Street near intersection of Johnson Lane and I-90.

Looking west from south end of Coulson Road near Firth Street. Vegetation primarily restricted to drainages.

Looking northeast from north end of Johnson Lane. Vacant land in foreground. Industrial facility in middle ground.

Similar view looking more directly east from north end of Johnson Lane. Cropland and/or vacant land in foreground; small industrial facility in middle ground.

Looking west from east end of Coulson Road (near Dickie Road). Residential area to the foreground right. Industrial facility in middle ground.

Similar view looking farther south. Cropland occupies most of the view.

Looking west from I-90. Mostly cropland/vacant land. Railroad tracks create horizontal line beyond row of trees in middle ground.

Similar view looking farther north. Cropland/ vacant land occupy most of the view.

Starting from the southern end of LU1, a small residential area composed primarily of mobile homes exists along Firth Street. Slightly farther north, Coulson Road intersects Johnson Lane from the east. The railroad parallels Coulson Road in this area. Traveling northeast on Coulson Road, small industrial/ commercial facilities exist primarily to the southeast, with a few also to the northwest. Most of the landscape is rangeland, cropland, or vacant. Where Coulson Road makes a right turn, some small residential areas exist. A handful of residences are scattered in the vicinity of Coulson Road farther north.

Viewer groups *from* the road would be local residents and local commercial traffic, as well as regional traffic (which may include tourists). Tourists and vehicle passengers (not drivers) would have the highest sensitivity. Local traffic would be moderately sensitive, and interstate traffic would have the lowest sensitivity.

Viewer groups *toward* the road would be from adjacent residential and industrial areas within the LU, as well as residents who live east of the I-90/I-94 corridor at higher elevations along Yellowstone Trail. The primary viewer groups would include residents, agricultural landowners, and employees of the industrial areas. These groups would have moderate to high viewer sensitivity. Residents would have the highest sensitivity.

3.3.7.3.2 LU2: Yellowstone River Corridor

LU2 consists of the landscape within the Yellowstone River corridor where the proposed alternatives would cross the river. The river provides a scale for the large trees and few structures in this LU. The land slopes gently towards the river or abruptly drops to the river where cliffs have formed. Close-up views of the river would be readily seen from the proposed roadway. The dominant elements are the river itself and the riparian vegetation that flanks and helps delineate it. The river and its associated riparian corridor also provide continuity, creating an uninterrupted flow. These elements increase the visual diversity in this area, which otherwise consists of brush rangeland interspersed with agricultural uses, as in LU1 and LU3. The reflected water and dark green of the deciduous trees add color and texture that contrasts with the drier rangeland and the agricultural land that abuts the floodplain. Five Mile Creek enters the river from the west, providing an expanse of lush green vegetation that contrasts with the drier cliffs on either side.

Agricultural land use approaches the riverbanks in some areas, adding a human-made element that also provides color and texture. Other land uses also occur along the river, such as a quarry pit. However, the built element is not a substantial component of this LU. Yellowstone River Parks Association (YRPA) owns land along the Yellowstone River where the proposed bridge crossings would be located. YRPA has developed a master plan for the John H. Dover Memorial Park in this location. When developed, the park will be a primarily natural area with trails and a nonmotorized boat launch (YRPA 2010). As of fall 2011, no development has occurred, and it is not known when the park will be developed.

Figure 3.26 Landscape Unit 2 Existing Conditions

West side of the Yellowstone River looking south. Riparian areas flank the river. Five Mile Creek is in the middle ground.

West side of Yellowstone River looking south where Five Mile Creek enters the river. Land slopes gently toward the river or ends in abrupt cliffs.

West side of Yellowstone River looking north. A rock quarry operation is visible to the left.

West side of Yellowstone River looking northeast. Sandstone cliffs, tall green deciduous trees, and a broad expanse of reflective water provide visual contrast and interest.

Looking north from Five Mile Creek tributary on west side of Yellowstone River. Land slopes gently toward the river or ends in abrupt cliffs.

West side of Yellowstone River looking southeast. Trees are more prominent on east bank; cliffs more prominent on west bank.

Viewer groups *from* the road would be local residents and local commercial traffic, as well as regional traffic (which may include tourists). Tourists and vehicle passengers (not drivers) would have the highest sensitivity. Local traffic would be moderately sensitive, and roadway traffic would have the lowest sensitivity.

No residences or commercial/industrial areas occur within the river corridor itself. Therefore, viewer groups *toward* the road would be primarily hikers on the proposed Dutcher Trail within the YRPA's John H. Dover Memorial Park, boaters on the river, and those using the proposed boat river access ramp, as planned for by the YRPA for the future Dover Park in this area.

3.3.7.3.3 LU3: NORTHWEST OF THE YELLOWSTONE RIVER

LU3 consists predominantly of residential and agricultural areas between Old Hwy 312 and the Yellowstone River. As in LU1, horizon lines are distant and somewhat flat or gently rolling. Residential areas exist on the south side of Mary Street, more densely clustered to the west end of the street where it intersects Old Hwy 312. Agricultural lands, with a few residences, comprise the north side of Mary Street. Five Mile Creek passes under Five Mile Road near Mary Street, creating a green riparian area that slopes downward. The vivid green colors and varied vegetation create visual contrast in this section of the LU. Agricultural and industrial facilities (e.g., a quarry site) comprise the majority of land uses along Five Mile Road. A residential subdivision exists northeast of the intersection of Five Mile Road and Dover Road. Agricultural uses are located west of this subdivision. Some industrial and commercial uses exist where the proposed Five Mile Road Alternative would intersect Old Hwy 312. Trees in this LU are primarily limited to those along drainages, creeks, and canals, and those planted for landscaping purposes.

Figure 3.27 Landscape Unit 3 Existing Conditions

Old Hwy 312 looking south toward intersection with Mary Street (traffic light to far right of photo). Residences along Mary Street are at the left of the photo.

South side of Mary Street at Hawthorne Lane looking east. Residence to far right of photo. Agricultural land on north side of Mary Street. Trees in the foreground are part of landscaping.

Bridge over Five Mile Creek on Five Mile Road near intersection with Mary Street, looking northwest.

Looking south toward Five Mile Creek and Mary Street from Five Mile Road. Some small residences to the far right and middle left of photo.

Looking southwest from backyard on Summerfield Circle. Large deciduous trees indicate the presence of a canal.

Looking northwest from same backyard. Cattle can be seen on the horizon.

Looking east from Old Hwy 312 near proposed Five Mile Road intersection.

Looking northeast from backyard of residence near proposed intersection of Five Mile Road and Old Hwy 312.

Viewer groups *from* the road would be local residents and local commercial traffic, as well as regional traffic (which may include tourists). Local residents and vehicle passengers (not drivers) would have the highest sensitivity. Local traffic would be moderately sensitive, and freeway traffic would have the lowest sensitivity.

Viewer groups *toward* the road would be from adjacent residential and agricultural areas within the LU. The primary viewer groups include residents, agricultural landowners, and employees of the commercial areas. These groups would have moderate to high viewer sensitivity. Residents would have the highest sensitivity.

3.3.8 NOISE

MDT is required by FHWA noise standards to evaluate whether a highway development project requires a noise analysis, and if so, whether predicted noise levels could result in traffic noise impacts. For federal-aid projects such as this one, if noise impacts are identified, then reasonable and feasible noise abatement measures must be considered (FHWA 2011a).

MDT has implemented FHWA's Noise Standard at 23 CFR Part 722 under the *MDT Traffic Noise Analysis and Abatement Policy*. Both the federal and state agencies describe noise policies for "Type I" transportation projects, which are those that involve construction of a highway on a new location, as well as the physical alteration of an existing highway, addition of through-traffic lanes, and addition or relocation of interchange lanes or ramps. If any segment or component of an alternative meets the definition of a Type I project, then the entire alternative is considered to be Type I and is subject to the noise analysis requirements. The Billings Bypass project qualifies as a Type I project. A Type I traffic noise analysis consists of the following steps (MDT 2011):

1. Identify study area and receptors by land use Activity Category (described below) and distance to the edge of the closest travel lane of the proposed project.
2. Determine existing noise levels at a representative subset of receptors.
3. Predict future "build" noise levels at a larger representative subset of receptors.
4. Determine traffic noise impacts.

5. Evaluate abatement feasibility and reasonableness if there are traffic noise impacts.
6. Address coordination with local officials.
7. Address construction noise.

This section of Chapter 3 addresses steps 1 and 2. The Noise section in Chapter 4, Environmental Consequences, addresses the remaining steps. The noise study report conducted for this project is included in Appendix E, Traffic Noise.

3.3.8.1 NOISE FUNDAMENTALS

Noise is generally defined as unwanted sound. The volume or intensity of sound is measured in decibels (dB). The decibel scale is designed to match the upper and lower limits of human hearing. Generally an increase or decrease in sound of 10 dB is perceived as twice or half as loud. A 3 decibel change is imperceptible, and a 35 decibel difference is readily perceptible by most people. A-weighted decibels (dBA) measure sound levels that best approximate sound frequencies that can be heard by the human ear (FHWA 2011a). **Table 3.16** depicts common sound sources and their associated dBA levels.

Table 3.16 Common Sound Sources and Sound Levels

SOURCE	LEVEL (dBA)
Normal breathing	10
Rustling leaves	20
Whisper	20–30
Quiet rural area at night	32–35
Ambient noise in an average home	50
Normal conversation at 3 feet	60–65
Vacuum cleaner	60–82
Freeway traffic at 165 feet	70
Noisy urban area during daytime	70–80
Garbage disposal at 3 feet	80
Pickup truck (55 mph at 50 feet)	80–82
Chainsaw	85
Rock concert	90–115
Jet flyover at 1,000 feet	110
Apollo space shuttle liftoff	188

Source: CPUC 2009; Michael Minor and Associates 2001.

Noise intensity fluctuates over time. The most common descriptor of noise in the United States is the equivalent (energy average) sound level. For a time period of one hour, the descriptor is the hourly equivalent sound level, Leq(h), which is widely used by highway agencies as a descriptor of highway traffic noise (FHWA 2011a).

The "equivalent noise level during a one-hour period," Leq(h) (measured in dBA) is used to identify sound levels for traffic noise studies. The Leq(h) metric uses a single number that is similar to an average to describe the constantly fluctuating noise levels at a specific location as vehicles pass by during a one-hour period (Big Sky Acoustics 2011; MDT 2011).

The level of highway traffic noise depends primarily on three things:

1. The volume of the traffic,
2. The speed of the traffic, and
3. The number of trucks in the flow of the traffic.

Generally, heavier traffic volumes, higher speeds, and greater numbers of trucks increase the loudness of highway traffic noise. Vehicle noise is primarily a combination of the noises produced by the engine, exhaust, and tires. Defective mufflers or other faulty equipment on vehicles can increase the loudness of highway traffic noise. Any condition (such as a steep incline) that causes heavy laboring of motor vehicle engines also increases highway traffic noise levels. Additionally, other, more complicated factors affect the loudness of highway traffic noise. For example, as a person moves away from a highway, distance, terrain, vegetation, and natural and human-made obstacles reduce highway traffic noise levels. Highway traffic noise is not usually a serious problem for people who live more than 500 feet from heavily traveled freeways or more than 100 to 200 feet from lightly traveled roads. In quiet settings, however, such as rural areas, people notice highway traffic noise over greater distances. Pavement type can also affect noise generated at the tire/pavement interface (FHWA 2011a).

The primary noise sources from highways are the tire/pavement and the engine and exhaust systems. At speeds greater than 30 mph, the tire/pavement noise is dominant, and noise increases as speed increases. Vehicle mix is another important factor in traffic noise. A higher percentage of trucks results in a noisier roadway. Traffic volume is a major contributor to noise levels. Combining high traffic volume with high speeds and a high percentage of trucks results in the noisiest roadway (MDT 2008).

3.3.8.2 CONSTRUCTION NOISE

Construction equipment noise levels are usually measured at 50 feet from the source. Construction equipment noise levels typically decrease 6 to 8 dBA per doubling of distance if there is a clear view of the equipment, and more if there is shielding that interrupts that view. For example, a bulldozer creating 80 dBA of noise at 50 feet would have a value of approximately 72 to 74 dBA at 100 feet, and approximately 64 to 68 dBA at 200 feet.

Typical highway construction equipment sound levels range from a low of 73 dBA (for a generator) to a high of 101 dBA (for a vibratory pile driver). Noise from construction equipment can vary from intermittent to nearly continuous. Assuming that a truck (90 dBA), scraper-grader (87 dBA), movable crane (82 dBA), tractor (85 dBA), and two power saws (78 dBA) are operating in the same area, peak construction period noise would generally be about 93 dBA at 50 feet from a construction site (USEPA 1971). As distance from the noise source doubles, the decibel level would decrease by 7.5 dBA. Therefore, using this scenario, peak construction noise would be approximately 40 dBA at a distance of 6,400 feet (1.2 miles) from the source.

However, construction equipment does not usually operate at its maximum sound levels 100% of the time. For example, a generator typically operates at its maximum sound level of 73 dBA 50% of the time; a vibratory pile driver operates at its maximum sound level 20% of the time (MDT 2011). In addition, the construction of a highway is accomplished in several different phases, requiring different types of equipment in each. These phases include (FHWA 2011b):

- Mobilization,
- Clearing and grubbing,
- Earthwork,
- Foundations,
- Bridge construction,
- Base preparation,
- Paving, and
- Cleanup.

Construction noise levels would vary based on the type of phase being conducted.

3.3.8.3 STUDY AREA AND ACTIVITY CATEGORIES

Noise-sensitive receptors within approximately 500 feet of the proposed alternatives (the noise study area), such as residences, hotels, schools, churches, libraries, and recreational areas, were identified using aerial photography and site visits. Ambient noise levels were measured to establish the existing noise conditions and verify that the computer model used to predict traffic noise was reasonably accurate.

Highway traffic noise impacts occur when the predicted highway traffic noise levels approach or exceed noise abatement criteria (NAC), which are based on interference of speech communication, or when the predicted highway traffic noise levels substantially exceed the existing highway traffic noise levels. To determine under what conditions noise impacts occur, FHWA has designated land use Activity Categories A through G. Noise abatement must be considered whenever the NAC is approached or exceeded, or when noise levels substantially exceed existing levels. **Table 3.17** defines the activity categories and their associated NAC (FHWA 2011a).

Table 3.17 Land Use Activity Categories and Noise Abatement Criteria

ACTIVITY CATEGORY	NAC Leq(H) (dBA)	EVALUATION LOCATION	ACTIVITY DESCRIPTION
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	Exterior	Residential.
C	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio stations, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.

ACTIVITY CATEGORY	NAC Leq(H) (dBA)	EVALUATION LOCATION	ACTIVITY DESCRIPTION
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D, or F.
F	---	---	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	---	---	Undeveloped lands that are not permitted.

Source: FHWA 2011a.

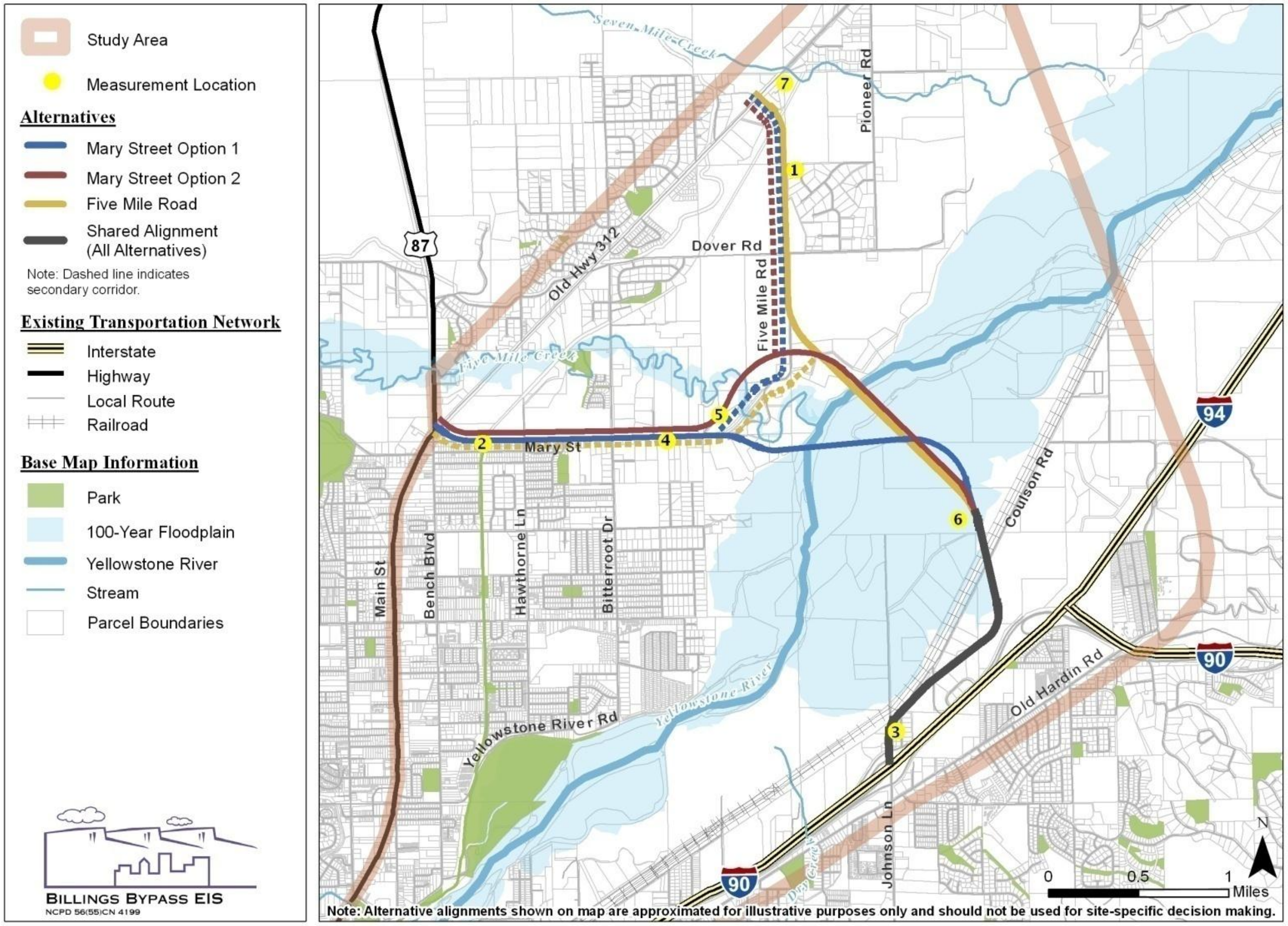
The majority of the noise study area is residential and includes one church, which falls under Categories B and C for exterior locations, with a NAC of 67 dBA. Churches also fall under Category D for interior locations, with a NAC of 52 dBA, which is used when exterior abatement measures are not feasible and reasonable (described in more detail in Chapter 4).

3.3.8.4 EXISTING NOISE LEVELS

Noise level measurements were conducted to help determine the existing ambient noise levels at representative locations near noise-sensitive receptors. In accordance with MDT and FHWA guidance, noise-sensitive receptors were identified within approximately 500 feet of the existing roadway centerlines using aerial photographs and site observations. The approximate receptor locations for this project include single-family residences, mobile homes, a school, and planned/proposed subdivisions.

Figure 3.28 through **Figure 3.31** and **Table 3.18** show the noise measurement locations, the noise receptor locations, and the existing ambient noise levels recorded at the noise measurement locations.

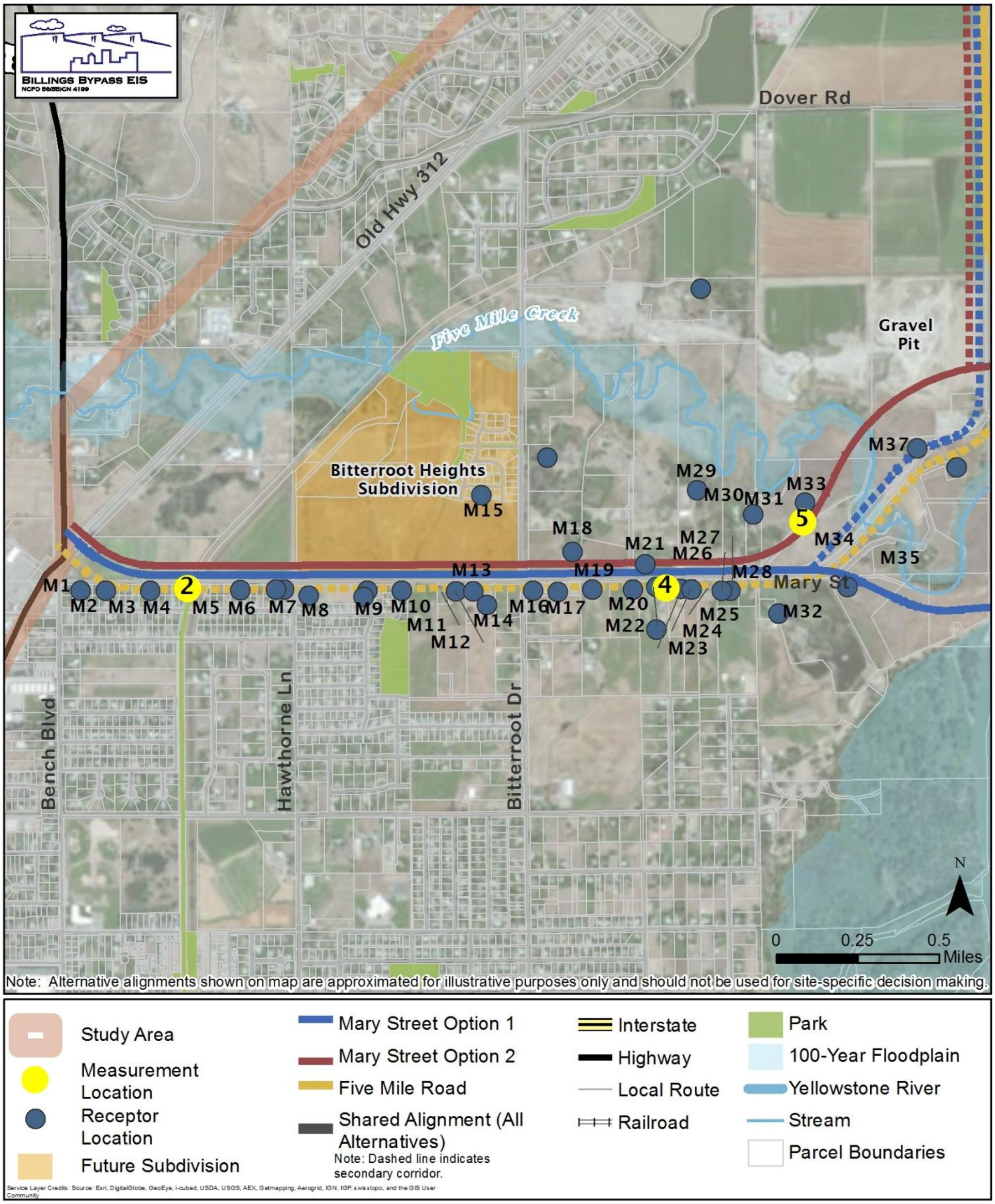
Figure 3.28 Noise Measurement Locations



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Big Sky Acoustics (noise receptor and measurement information) 2011

Date Plotted: 6/16/2012

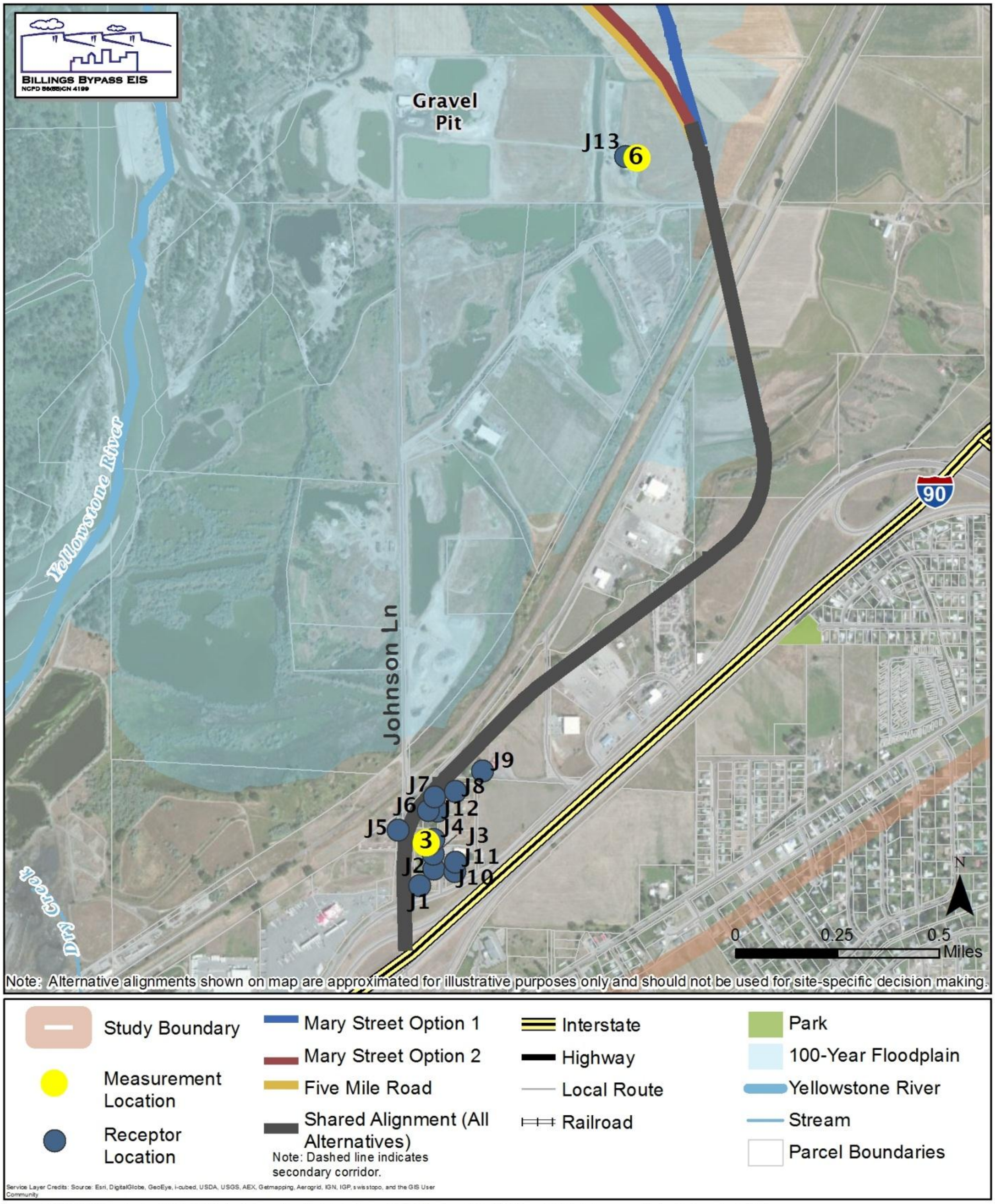
Figure 3.29 Mary Street Noise Receptor Locations



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/11/2013

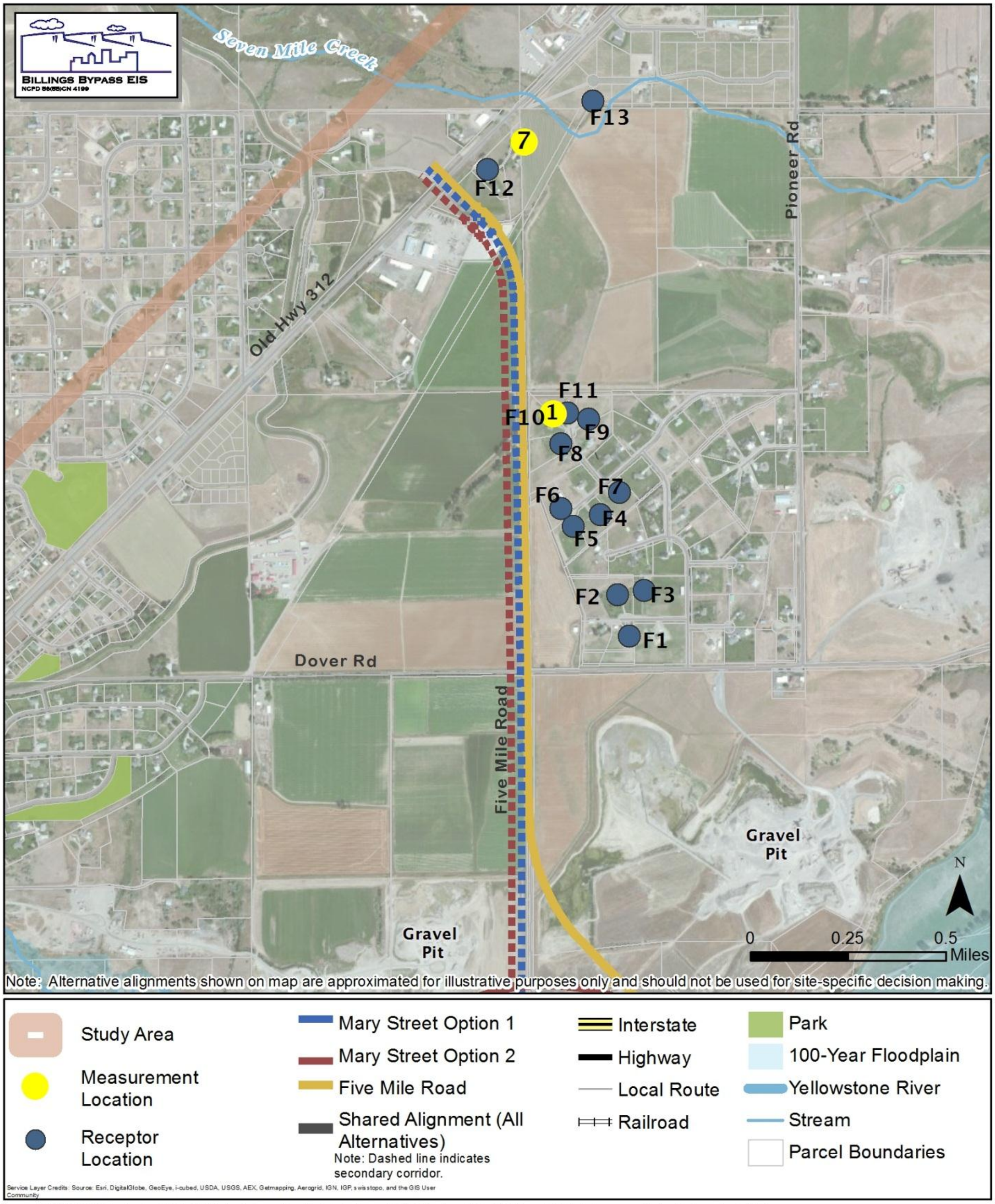
Figure 3.30 Johnson Lane Noise Receptor Locations



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/11/2013

Figure 3.31 Five Mile Road Noise Receptor Locations



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/11/2013

Table 3.18 Existing Ambient Noise Levels at Measurement Locations

LOCATION NO.	DESCRIPTION	Leq(H) (dBA)	DOMINANT NOISE SOURCES
1	Backyard at 3576 Summerfield Circle	40	Heavy equipment trucks in the distance, and Old Hwy 312 traffic (faint). Other audible sources, including breeze in trees, birds, children playing at neighbors, and lawnmower in the distance, were brief.
2	Intersection of Mary Street with bike/pedestrian path	56	Mary Street traffic. Other audible sources, including birds, dog barking in distance, breeze in trees, propeller plane overhead, and an All-Terrain Vehicle, were brief or intermittent.
3	North of I-90 on Johnson Lane	57	Traffic on Johnson Lane and I-90. Other audible sources, including westbound on-ramp traffic, vehicles in/out of the Town Pump Inc. facility, insects, and birds, were faint or intermittent.
4	Mary Street, east of Bitterroot Drive, aligned with Ida Street	49	Traffic on Mary Street. Other audible sources, including birds, gravel pit crusher, backup alarms to northeast, and tractor to west, were faint or intermittent.
5	Flaming Creek cul-de-sac, Lot 115a	43	Gravel pit crusher and backup alarms to northeast. Other audible sources, including birds, were intermittent.
6	Residence at end of Johnson Lane	50	Train whistle and gravel pit operations. Other audible sources, including aircraft, insects, and birds, were intermittent.
7	Residence at intersection Five Mile Road alignment and Old Hwy 312	57	Old Hwy 312 traffic.

Source: Big Sky Acoustics 2011.

The City of Billings noise ordinance addresses motor vehicle noise. According to the noise ordinance, noise from a noise source within a public ROW must be measured at a distance of at least 25 feet from the center of the nearest traffic lane. The maximum permissible noise levels for motor vehicles are shown in **Table 3.19**.

Table 3.19 City of Billings Motor Vehicle Maximum Permissible Noise Levels

SOURCE	dBA AT 50 FEET	dBA AT 25 FEET
Trucks and buses over 10,000 pounds	82	88
Trucks and buses under 10,000 pounds	74	80
Passenger cars and motorcycles	74	80

Source: City of Billings n.d.

3.3.9 FARMLANDS

As discussed in Section 3.3.1, the proposed project would cross land used for agricultural purposes. According to data obtained from the U.S. Department of Agriculture (USDA) Natural Resources

Conservation Service (NRCS), Yellowstone County contains 1,519,479 acres of private land in agricultural use. Grazing land is the largest agricultural use classification in the county, representing 75% of the total land in agricultural use. Another 14% is classified as fallow (uncultivated) cropland. Irrigated land and nonqualified agricultural land each represent 4% of total land in the county. Nonqualified agricultural land is not eligible for valuation, assessment, and taxation as agricultural land. It is defined as parcels of land between 20 and 160 acres in size, under one owner and not devoted to commercial or industrial purposes. Timber land and wild hay land make up the remaining 3% of land in the county.

Although no state or federal law explicitly prohibits conversion of agricultural land to other uses, the state and federal governments, and many local jurisdictions, have established policies and programs to encourage and support preservation of farmland for agricultural use. The federal regulatory process authorized by the Farmland Protection Policy Act (FPPA) outlines the procedure for analyzing and addressing potential farmland impacts of projects with federal involvement. The FPPA provides important protections to farmland, but does not authorize the federal government to regulate the use of private or nonfederal land or affect the property rights of owners. The FPPA's stated purpose is:

> …to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to assure that Federal programs are administered in a manner that, to the extent practicable, will be compatible with State, unit of local government and private programs and policies to protect farmland (MDT 2010).

Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency, including state highway construction projects through the FHWA (NRCS 2011a). FPPA regulations define criteria for identifying the effects of such projects on the conversion of farmland to nonagricultural uses. For this project, MDT is required to (MDT 2010):

- Use the criteria to identify and take into account the adverse effects of the proposed alternatives on the preservation of farmland;
- Consider alternative actions, as appropriate, that could lessen adverse effects; and
- Ensure that the proposed alternatives, to the extent practicable, are compatible with state, units of local government, and private programs and policies to protect farmland.

The FPPA defines the term "farmland" only as prime farmland, unique farmland, and farmland of statewide or local importance. MDT strives to minimize impacts to prime, prime if irrigated, unique, and locally important farmland. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pasture land, cropland or other land, but not water or urban developed land (MDT 2010). Only farmland identified and mapped by the NRCS as important based on soil type is analyzed in this FEIS. Relevant characteristics of important farmland are defined as follows (MDT 2010):

Prime Farmland – Land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (i.e., land that could be cropland, pasture land, rangeland, forest land or other land, but not urban built-up land or water). In addition, prime farmland has an adequate and dependable water supply from precipitation or irrigation. Approximately 28,535 acres of prime farmland, if irrigated, exists within Yellowstone County.

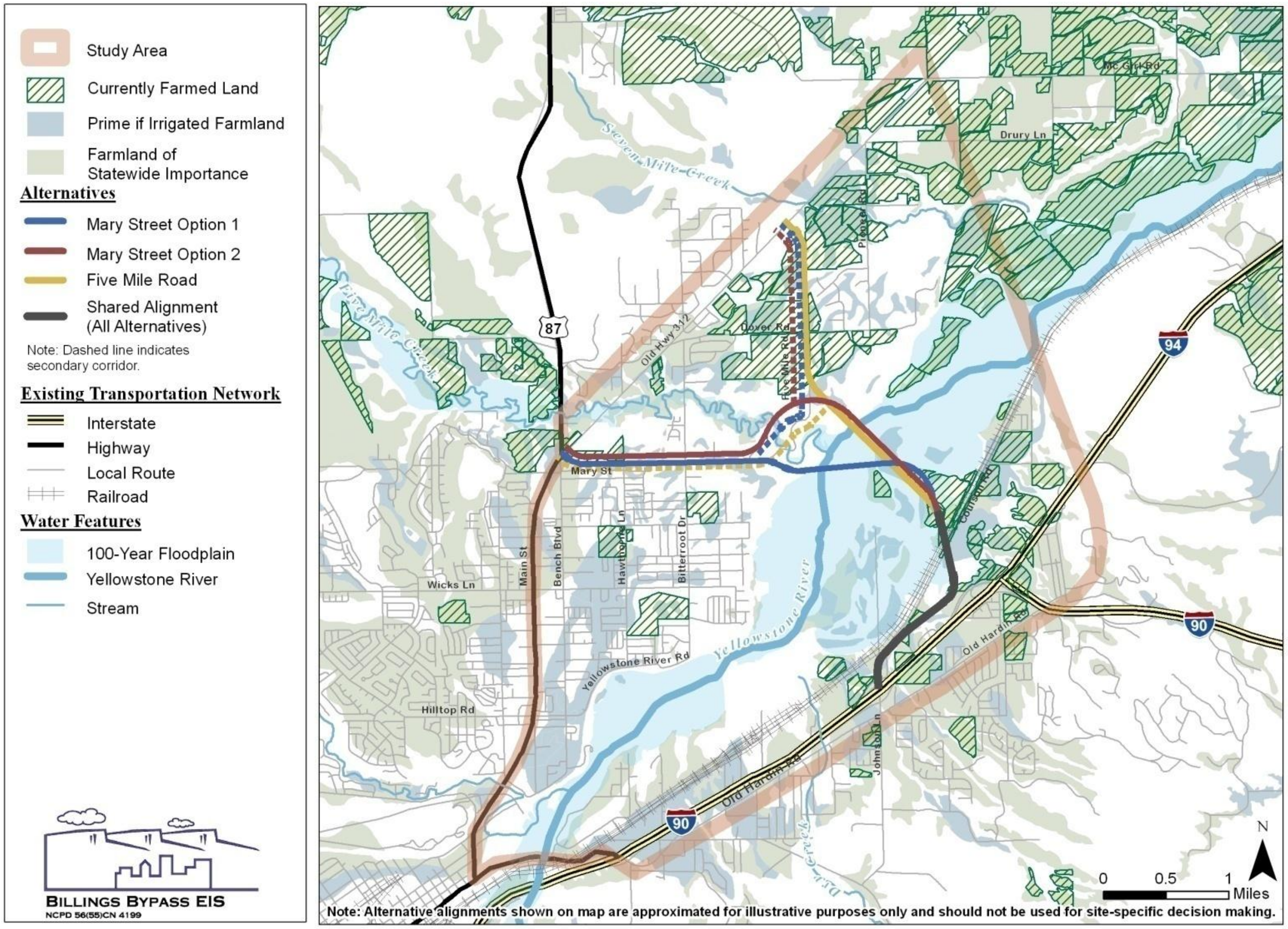
Unique Farmland – Land other than prime farmland that is used for production of specific high-value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods. No unique farmland exists within Yellowstone County.

Statewide Importance – Land in addition to prime farmland and unique farmland that is of statewide importance for the production of food, feed, fiber, forage, or oilseed crops. Generally, this category includes those lands that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmland if conditions are favorable. Approximately 26,272 acres of farmland of statewide importance exists within Yellowstone County.

Local Importance – In some local areas, there is concern for certain additional farmland for the production of food, feed, fiber, forage, and oilseed crops, even though these lands are not identified as having national or statewide importance. No farmland of local importance exists within Yellowstone County.

The NRCS National Cooperative Soils Survey for Yellowstone County, Montana (2011) was used to identify important farmland within the study area based on soil type, as shown in **Figure 3.32**. Areas on **Figure 3.32** outlined as "Currently Farmed Land" are those that are currently in use for farming purposes.

Figure 3.32 Important Farmland in the Study Area and Region



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 6/15/2012

3.3.10 IRRIGATION

This section describes the irrigation facilities within the study area. Irrigation facilities were identified through a combination of topographic maps, aerial photographs, and field investigations. The *Billings Bypass Hydraulics Report* (DOWL HKM 2011a) documents the irrigation facilities in the study area. Some of these ditches are historic, and information regarding the history of the ditches is discussed in Section 3.3.6 and documented in the *Billings Bypass Cultural Resource Inventory* (Ethnoscience 2011). There are three major irrigation ditches, several minor irrigation culverts, and two center-pivot sprinkler systems present in the study area.

3.3.10.1 MAJOR IRRIGATION DITCHES

The Billings Bench Water Association (BBWA) Canal originates from the Yellowstone River in Laurel, Montana, and terminates at the Yellowstone River near Old Hwy 312 in Shepherd, Montana. The canal is the longest irrigation ditch within the study area and, as discussed in Section 3.3.6, is the only irrigation facility within the study area determined eligible for listing on the National Register of Historic Places (Ethnoscience 2011). Approximately 30,000 acres of land are irrigated by the canal, and water is also provided to various water users within the city limits for non-irrigation purposes. The canal crosses Five Mile Road approximately 0.4 mile south of Dover Road. The culvert is 3.0 feet by 25.7 feet and has a capacity of 56 cubic feet per second.

The Coulson Ditch is a major irrigation ditch that extends northeast from the Yellowstone River roughly along the alignment of the BNSF railroad and ends at the Yellowstone River near the termination of Coulson Road. The Lockwood Irrigation District supplies water for the ditch. The ditch irrigates approximately 700 acres but could supply water for an additional 800 acres if necessary. The ditch crosses Johnson Lane directly north of Coulson Road. The culvert is 4.0 feet by 122 feet and has a capacity of 36 cubic feet per second.

An unnamed irrigation ditch originating from Lake Elmo runs along the north side of Mary Street from Bench Boulevard to the west side of Bitterroot Drive, then extends north along Bitterroot Drive approximately 600 feet. The ditch crosses Mary Street at the Bench Boulevard/Old Hwy 312 intersection. The culvert is 1.5 feet by 44 feet and has a capacity of 6.5 cubic feet per second.

3.3.10.2 MINOR IRRIGATION FACILITIES

Several minor field culverts lie within the study area and provide irrigation water to agricultural fields. North of the Yellowstone River, two field culverts cross Old Hwy 312 at the US 87 intersection, and four cross Mary Street in the vicinity of Bitterroot Drive. A minor field culvert would be crossed by the connection between Five Mile Road and Old Hwy 312. Three culverts currently cross Five Mile Road at the Dover Road intersection.

There are no minor field culverts in the project corridor south of the Yellowstone River. Two privately owned, center-pivot sprinkler systems are located approximately 0.3 mile north of the railroad. These systems could be impacted by construction of the proposed alignments and the associated overpass structure at the railroad.

3.3.11 ENERGY CONSUMPTION

This section describes the affected environment related to energy resources.

The following regulations and guidelines require MDT to evaluate energy use associated with highway infrastructure projects:

- **National Environmental Policy Act of 1969**: The NEPA of 1969 was established to minimize or eliminate damage to the environment caused by actions funded or taken by the federal government. NEPA establishes policy, sets goals, and provides means for carrying out the policy. In order to comply with NEPA, an energy analysis is appropriate for proposed transportation projects.
- **FHWA Technical Advisory T 6640.8**: The FHWA Technical Advisory T 6640.8, dated February 24, 1982, states that EISs "should discuss in general terms the energy requirements and conservation potential of various alternatives under consideration."

3.3.11.1 BASELINE ENERGY CONSUMPTION

Operational energy is estimated based on average daily traffic (ADT) data for the transportation study area. The formula for the calculation of operational energy use is:

E = V x L x FCR x CF

Where E = energy in British thermal units (BTUs)

V = number of vehicles (ADT)

L = length of roadway segment within transportation study area (in miles)

FCR = fuel consumption ratio (gallon/mile), weighted fleet average

CF = BTU/gallon conversion factor

Energy use associated with transportation projects in the study area is a result of fuel consumption by vehicles and electrical energy used in street lighting and signalization. Based on the traffic analysis presented in Section 3.2.1, estimated Vehicle Miles Traveled (VMT) within the study area in 2010 was 434,000 miles per day (the transportation study area includes some roadway segments along I-90 and I-94). Using the equation above, estimated fuel consumption under current conditions is 8,559,000 gallons per year, or 1,070 trillion BTUs per year. The amount of energy currently consumed for street lighting and signalization was not estimated, because the energy use would not vary substantially among alternatives, and thus the calculation would not substantially inform the selection of a preferred alternative.

3.4 ENVIRONMENTAL CONDITIONS

3.4.1 AIR QUALITY

Use of the transportation system is an influential factor in a region's air quality. Therefore, the estimated emission of pollutants from motor vehicles is a key consideration in transportation planning. Because the Billings area has been out of compliance with air quality standards in the past, the proposed project must demonstrate transportation conformity. Transportation conformity means that the air pollutant emissions associated with the project would be consistent with air quality goals in the State Implementation Plan (SIP). This section describes existing air quality conditions in the study area and how air quality regulations apply to the proposed project.

3.4.1.1 AIR QUALITY REGULATIONS

To protect the public from health hazards associated with air pollution, the U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six pollutants in association with the Clean Air Act of 1990 (CAA). These criteria pollutants include ozone (O_3), carbon monoxide (CO), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), sulfur oxides, lead, and nitrogen dioxide.

Air quality in the project area is regulated by the EPA and Montana Department of Environmental Quality (MDEQ). MDEQ and the EPA designate regions as being attainment or nonattainment for hazardous air pollutants. Attainment status is a measure of whether air quality in an area complies with the NAAQS. Areas that do not meet the NAAQS are designated as nonattainment areas. Areas meeting NAAQS may be considered as attainment or unclassified areas. Air quality maintenance areas are regions with a history of nonattainment that have recently attained compliance with the NAAQS. The project study area is located in the Billings area of Yellowstone County, which is currently considered a maintenance area for CO.

Air quality emissions in the region are currently being managed under the provisions of the SIP, which identifies the policies and programs used to attain and maintain NAAQS. On April 22, 2002, the EPA approved the Governor of Montana's request to designate the Billings CO area to attainment for the NAAQS. This action changed the designation of the Billings area from unclassified nonattainment for CO to a limited maintenance plan attainment area and approved the Billings CO Limited Maintenance Plan, which is designed to keep the area in attainment for CO for the next ten years. This EPA approval revises the SIP to include the Billings CO Limited Maintenance Plan. Since CO levels are strongly influenced by roadway motor vehicle exhaust, the maintenance plan focuses on reducing emissions from vehicles, reducing the total miles traveled by vehicles in the area, and reducing congestion.

3.4.1.2 CRITERIA POLLUTANTS

In general, the main pollutants of concern in Montana for transportation projects are CO and particulate matter. Vehicle exhaust is a source of CO, and tailpipe emissions and fugitive dust (e.g., road dust) are sources of particulate matter.

Carbon Monoxide (CO): CO results from incomplete combustion of fuels and other carbon-containing substances, such as motor vehicle exhaust. Exposure at low levels can contribute to a reduced tolerance for exercise and impairment of mental function. Human exposure to higher levels of CO can cause death. The area is currently considered a maintenance area for CO.

Particulate Matter: Fine particulate matter ($PM_{2.5}$) and particulate matter less than 10 microns in diameter (PM_{10}) result from fuel combustion in motor vehicles, stationary equipment, and industrial sources. Residential and agricultural burning and industrial processes can also generate particulate matter. Human exposure to higher levels of particulate matter can increase respiratory disease.

Billings was designated as a nonattainment area for Total Suspended Particulates (TSP) on March 3, 1978 (Federal Register [FR], Vol. 44, No. 150, page 45421, August 2, 1979). As such, Billings was required to prepare a Transportation Control Plan (TCP). The TCP identified strategies to mitigate the TSP problems.

In 1987 the standard for TSP was dropped, and a new standard for PM_{10} was adopted (July 1, 1987, at 52 FR 24854). EPA has also adopted the $PM_{2.5}$ standard, and Billings is considered to be in compliance with both of these new standards. As of October 2009, the EPA has designated all of Montana (with the exception of the Libby area) as in attainment for $PM_{2.5}$.

3.4.1.3 TRANSPORTATION CONFORMITY

The Transportation Conformity Rule of 1993 was developed as required by the CAA Amendments of 1990 and applies to transportation plans, transportation improvement programs, and highway and transit projects funded or approved by FHWA and the Federal Transit Administration. Conformity is required in areas that do not meet, or previously have not met, air quality standards for specific air pollutants. Because the Billings area has been out of compliance with air quality standards in the past, the proposed project must meet conformity rules on a regional level and on a localized (project) level.

To meet conformity at a regional level, a project must be in an approved Transportation Improvement Program (TIP). The TIP for the Billings metropolitan planning area is the Billings urban area TIP, Fiscal Year 2010-2014, as amended. The TIP is a short-range program of highway and transit projects in the Billings area. The TIP was developed in conjunction with the *Billings Area Long-Range Transportation Plan* (2009 Update), which includes an update of projects, cost data, demographic information, and traffic projections for a 20-year planning time frame.

The proposed Billings Bypass is included in the *Billings Area Long-Range Transportation Plan* (2009 Update) as a New Link (Table 4.2 Long-Range Plan Project Table (Fiscally Constrained)) and is listed in the TIP as a regionally significant project (Table 2: Regionally Significant Projects) as shown in the November 2010 Update. Since the proposed project is included in the conforming transportation plan, emissions are accounted for within the SIP. Therefore, the project would comply with the transportation conformity program of the CAA (Section 176 (c) of the CAA (42 USC 7521 (a)), as amended.

To meet conformity at the project level, a project must not cause or contribute to new violations of the NAAQS, increase the frequency or severity of NAAQS violations, or delay timely attainment of the NAAQS or maintenance of the standards. To determine whether a proposed project meets project-level conformity, traffic conditions at local intersections must be examined. The EPA requires a quantitative CO concentration or "hot-spot" analysis at all intersections affected by a proposed project operating or expected to operate at a LOS D or worse. According to the *Billings Bypass Combined Traffic Reports* (Marvin and Associates 2013), there are four intersections in the transportation study area that currently operate at LOS D or worse (US 87/Main Street/Old Hwy 312/Bench Boulevard, Main Street/Airport Road, Main Street/Wicks Lane, and Old Hardin Road/ Becraft Lane). Several more intersections would reach this level of performance by 2035 for either the No Build Alternative or any of the build alternatives (see Chapter 4). Because several of the intersections show an LOS of D or worse, a hot-spot analysis needs to be performed to demonstrate local conformity. This analysis and results are presented in Chapter 4, "Environmental Consequences."

Billings is in compliance with $PM_{2.5}$ and PM_{10} NAAQS standards. Since Billings is in attainment for particulate matter air quality standards, a conformity determination for particulate matter is not required. Billings is located in a nonattainment area for sulfur dioxide. Sulfur dioxide is not a criteria pollutant for transportation conformity (40 CFR 93.102) and has not been identified by the EPA or MDEQ as a $PM_{2.5}$ precursor.

3.4.1.4 MOBILE SOURCE AIR TOXICS (MSATS)

The CAA Amendment of 1990 identified 188 air toxics that may cause cancer or other serious health effects. The EPA assessed this list of toxics and identified a group of 21 Mobile Source Air Toxics

(MSATs). From the list of 21 MSATs, EPA identified six toxics as the priority MSATs. These are benzene, formaldehyde, acetaldehyde, diesel exhaust (particulate matter/diesel exhaust), acrolein, and 1,3-butadiene. To date, there are no NAAQS for MSATs, and there are no established criteria for determining when MSAT emissions should be considered a significant issue. To address stakeholders' concerns and requests for MSAT analysis during project development and alternative analysis, FHWA developed the *Interim Guidance on Air Toxic Analysis in NEPA Documents*. The guidance provides a tiered approach for analyzing MSATs in NEPA documents. According to FHWA interim guidance, three levels of MSAT analysis have been identified:

1. No analysis for projects with no potential for meaningful MSAT effects;
2. Qualitative analysis for projects with a low potential for MSAT effects; or
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

FHWA guidance on analyzing MSATs (FHWA, 2012) suggests that for projects where the ultimate traffic volume (Annual Average Daily Traffic – AADT) is greater than 150,000 AADT, there is a greater potential for MSAT effects. The Billings Bypass has a low potential for MSAT effects, with traffic volumes of less than 20,000 AADT on any of the proposed bypass links, which is below the threshold for a quantitative analysis under the guidance. Therefore, a qualitative analysis is provided for the project. This analysis and results are presented in Chapter 4, "Environmental Consequences."

3.4.1.5 GREENHOUSE GASES

"Greenhouse gases" (so called because of their role in trapping heat near the surface of the earth) emitted by human activity are implicated in global climate change, commonly referred to as "global warming." The principal greenhouse gases (GHGs) are carbon dioxide, methane, nitrous oxide, ozone, and water vapor. Fossil fuel consumption in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) is the single largest source of GHG emissions, accounting for approximately half of GHG emissions globally. Industrial and commercial sources are the second largest contributors of GHG emissions with about one-fourth of total emissions.

The U.S. Council on Environmental Quality has issued preliminary guidance on how federal agencies should analyze the environmental effects of GHG emissions and climate change in NEPA documents. While the guidance indicates that climate change issues can arise in the consideration of GHG emissions with respect to the effects of a proposed action and alternative actions, the guidance suggests that a quantitative and qualitative assessment of GHG emissions would be warranted if the proposed action would cause direct emissions of 25,000 million metric tons of carbon dioxide equivalent (MMtCO2e) annually. This threshold is consistent with CAA reporting requirements (Public Law 110-161), which impose GHG accounting requirements on stationary sources (i.e., suppliers of fossil fuels or industrial GHGs, and manufacturers of vehicles and engines) that directly emit 25,000 MMtCO2e annually. Examples of actions that may warrant a discussion of GHG impacts of various alternatives, as well as possible measures to mitigate climate change impacts, include: approval of a large solid waste landfill, approval of energy facilities such as a coal fired power plant, or authorization of a methane venting coal mine. Given the characteristics of the project, no such accounting would be required pursuant to CAA reporting rules. Although the proposed project would allow greater traffic flow, the project itself would not create additional traffic or associated vehicle emissions.

According to the U.S. Council on Environmental Quality, climate change is a global problem that results from global GHG emissions. From a quantitative perspective, the adverse impact of any one project on GHG emissions, even in the cumulative effects evaluation, is minuscule within the global context of the overall climate change problem. The U.S. Council on Environmental Quality recommends that environmental documents reflect this global context and be realistic in focusing on ensuring that useful information is provided for those actions that the agency finds are a significant source of GHGs.

Given the scope of the proposed project, it does not seem reasonable that a quantitative assessment of GHG emissions of the project and its alternatives would be a meaningful exercise in evaluating project alternatives. Although GHG emissions will not be evaluated for this project, it should be noted that FHWA has various strategies to reduce GHG emissions from transportation. These strategies include, but are not limited to: improving system and operational efficiencies through traffic flow improvements; reducing growth of VMT by implementing land use and transit strategies that concentrate development and offer alternative transportation options (e.g., providing high-occupancy vehicle lanes, transit options, bicycle facilities, and pricing mechanisms to motivate people to drive less); transitioning to lower GHG fuels; and improving vehicle technologies.

3.4.2 HAZARDOUS MATERIALS

MDT evaluated the potential for harm from hazardous materials by identifying the presence of hazardous materials on properties within the hazardous materials study area centered around the build alternatives (survey area, see **Figure 3.33** and **Figure 3.34**). Hazardous materials/substances are materials/substances that, because of their quantity, concentration, or physical, chemical or infectious characteristics, may:

- Cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or
- Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed, or otherwise managed.

Several methods were used to identify and locate known or potential environmental liabilities that exist within the survey area. These methods were: an environmental records search and review; a review of historical documents such as aerial photographs, Sanborn fire insurance maps, and city directories; a review of monitor, petroleum, and injection well data; and a visual assessment. The *Hazardous Materials/Substances Initial Site Assessment* (ISA) prepared for the proposed project (DOWL HKM 2011b) identified sites within the survey area that might contain hazardous materials. The survey area that was investigated for potential liabilities is shown in **Figure 3.33** and **Figure 3.34**, which appear at the end of this Hazardous Materials section. Hazardous materials sites identified within the survey area are summarized by type below and shown in **Table 3.20** and **Figure 3.33** and **Figure 3.34**. More detailed information on each of these sites is available in the *Hazardous Materials/Substances ISA* included as an attachment to Volume 2.

- **Groundwater monitor wells**: The presence of monitor wells may indicate a possible contaminant release that impacted local soil and/or groundwater or the potential for such to occur. Twenty-three monitor wells are located within the survey area (Site Nos. MW 1-23).

- **Petroleum pipelines**: The contaminants of concern associated with pipelines are petroleum hydrocarbons that can be released due to equipment failure. Three pipelines are located within the survey area: a pipeline that runs parallel to Coulson Road (Site No. Pipe 3/3b); a pipeline that runs along Bitterroot Drive (Site No. Pipe 2); and a pipeline that runs along Mary Street (Site No. Pipe 1).

- **Aboveground storage tanks (ASTs)**: ASTs are often used to store petroleum products such as heating oil, waste, diesel, gasoline, fertilizers, pesticides, or herbicides. It is typical for small releases to occur due to overflow or drips from dispensers that impact surface soils in the immediate vicinity of the AST. Approximately nine ASTs are located within the survey area, the majority of which are located between Coulson Road and I-90.

- **Automotive facilities**: The contaminants of concern associated with automotive facilities include petroleum hydrocarbons, metals, antifreeze, and solvents that can be released during operation or as a result of the presence of ASTs and/or underground storage tanks (USTs). Five automotive facilities are located within the survey area, including the Truck Shop (Site No. 22), Big Sky Auto Repair (Site No. 2), JZ Auto Sales (Site No. 3), Overland Automotive Service (Site No. 17), and Booth Trucking (Site No. 33).

- **Electrical substations and transmission lines**: Substations may include oil-filled equipment, such as transformers, and commonly use mineral oil that may contain polychlorinated biphenyls (PCBs) that can be released into the environment due to an overfill or leaking equipment. One substation (Site No. 31) is located south of Old Hardin Road in the southernmost portion of the survey area. Transmission lines are also present in the survey area, crossing I-90 just northeast of the Johnson Lane interchange.

- **Gravel pits**: Fill materials used in the reclamation process can be from many varied sources and may include debris, refuse, and/or otherwise contaminated fill. Gravel pits can store diesel and/or asphalt in ASTs and/or USTs and operate equipment that can result in contaminant releases. Sixteen gravel pits are located within the survey area (Site No. GP 1-16), including eleven north of the Yellowstone River and five south of the river.

- **Industrial facilities**: Contaminants of concern at industrial facilities vary depending on the exact use of each site but may include petroleum hydrocarbons, metals, coal, and solvents, which can be released by accident spills or intentional dumping. In addition to the gravel pits mentioned above, four industrial facilities are located within the survey area. Two industrial sites along Coulson Road, Oily Waste Processors (Site No. 20) and Ducks Painting Shop Inc. (Site No. 19), are identified as small quantity generators (SQGs) under the Resource Conservation and Recovery Act (RCRA). No RCRA violations have been reported at Oily Waste Processors. Ducks Painting Shop reported RCRA violations that were remedied in 1998. A used oil fuel marketer, R Three Inc. Billings (Site No. 27), is identified as an RCRA nongenerator facility, meaning that the site does not presently generate hazardous waste and lists no violations. The fourth facility, Concrete Materials of Montana LLC (Site No. 14), is located in the western portion of gravel pit 4.

- **Spills**: Spill sites are typically locations of onetime releases, such as a release caused by a motor vehicle accident. Seven spills at four sites were identified within the survey area. A release of raw sewage was reported at a convenience store (Site No. 28) in 2009. The store also reported a diesel spill in 2010 that impacted surface water. An oil spill was reported at Flying J Travel Plaza (Site No. 29) in 2001. The site was closed with no violations. Fly In Lube Inc. (Site No. 32) reported releases of used oil and solvents from 1998 to 2009, impacting soils and groundwater. The concrete materials company mentioned under industrial facilities (Site No. 14) reported the release of several hundred gallons of diesel from an AST in 2008 that impacted soils. Three other documented spills within the survey area include a diesel release to land (Site No. 2), a gas release to surface water (Site No. 1), and a fly ash emission (Site No. 13).

- **USTs**: UST sites are often impacted by petroleum hydrocarbons released as a result of tank or piping leaks, overfill, and/or spills. Seven USTs, including four leaking underground storage tanks (LUSTs), are located within the survey area. Only tanks registered MDEQ are listed in the UST and/or LUST database; therefore, additional unregistered UST sites may be present within the survey area. The Flying J Travel Plaza (Site No. 29), located south of the I-90/Johnson Lane Interchange, reported seven releases of LUSTs. Of those, one is closed, five are pending closure, and one is characterized as medium priority. The remaining UST and LUST sites are identified in **Table 3.20** and **Figure 3.33** and **Figure 3.34**.

- **Junkyard**: The primary contaminants of concern at junkyards include petroleum hydrocarbons, other automotive fluids such as antifreeze, and metals. The contaminants may be released through spills or leaks from the vehicles and equipment stored there. There is one junkyard located within the survey area near the I-90/Johnson Lane Interchange (Site No. 26).

- **Other**: Sites identified as "other" do not fall into any of the other categories for potential environmental concerns. Three "other" sites are located within the survey area. An animal rendering plant (Site No. 11), located at the east end of Mary Street, was closed in 2000, and all buildings have been removed. Two other sites include a possible air monitoring station (Site No. 8) and a facility of unknown use (Site No. 5) that may be the location of a former Kmart store. The contaminants of concern and environmental risks associated with these facilities are unknown.

- **Hazardous building materials**: Dwellings built before the use of lead-based paint and asbestos was discontinued have the potential for lead and asbestos contamination. Other hazardous building materials that may be present in older structures include PCB-containing equipment, and mercury-filled switches. The location of potentially hazardous material buildings within the survey area has not been determined.

Table 3.20 Sites with Potential Environmental Concerns within the Survey Area

SITE NO.*	SITE NAME	SITE ADDRESS	TYPE OF SITE
1	Billings 3990 Hwy 312	3990 Hwy 312	Spill
2	Big Sky Auto Repair	3954 Hwy 312	Automotive/Spill
3	JZ Auto Sales/Westate	3809 Hwy 312	Automotive
4	Knife River Mountain Region	1927 Dover Rd	Gravel Pit
5	Kmart	2376 Main St	Other
6	Blue Basket Market Store	2347 Main St	UST/LUST
7	JTL Group Inc – Mary Street Shop/Empire Sand and Gravel Co.	1215 Mary St	Gravel Pit/UST/LUST/ Industrial
8	Clarence Kembel	2620 Five Mile Rd	Other
9	Clarence Kembel	2401 Mary St	UST
10	Lohof Gravel Pit	South of Mary St – East End	Gravel Pit/Waste Disposal Area
11	Billings Rendering Plant	East end of Mary St	Other
12	Gravel Pit	3530 Coulson Rd	Gravel Pit/ASTs
13	Reinhold Kembel/Billings MPC Facility	3306 Coulson Rd	UST/Spill
14	Concrete Materials of Montana LLC	1938 Johnson Ln	Industrial/Spill

SITE NO.*	SITE NAME	SITE ADDRESS	TYPE OF SITE
15	Material Yard	Farley Ln	AST
16	Material Yard	Farley Ln	AST
17	Overland Automotive Service	1500 Johnson Ln	Automotive/AST
18	ASTs	Unknown	ASTs
19	Ducks Painting Shop Inc.	1443 Coulson Rd	Industrial
20	Oily Waste Processors	1560 Coulson Rd	Industrial
21	Field	Unknown	AST
22	The Truck Shop	3145 North Frontage Rd	Automotive
23	Unknown Fueling Facility	Unknown	ASTs
24	Shop	3050 North Frontage Rd	AST
25	Agricultural	Unknown	AST
26	Residence	Unknown	AST/Junkyard
27	R Three Inc. Billings Terminal	1046 Johnson Ln	Industrial
28	Town Pump Inc. Billings 4	2711 North Frontage Rd	UST/Spill
29	Flying J Travel Plaza	2775 Old Hardin Rd	UST/LUST/Spill
30	Blue Basket 3/Casey's Corner Store #8	2816 Old Hardin Rd	UST/LUST
31	Electrical Substation	750 Johnson Ln	Substation
32	Fly In Lube Inc.	705 Johnson Ln	Spill
33	Booth Trucking	2566 Old Hardin Rd	Automotive
MW 1-23	Groundwater Monitor Wells	Various	Groundwater Monitor Wells
GP 1-16	Gravel Pits	Various	Gravel Pits
Pipelines 1-3b	Pipelines	Various	Pipelines

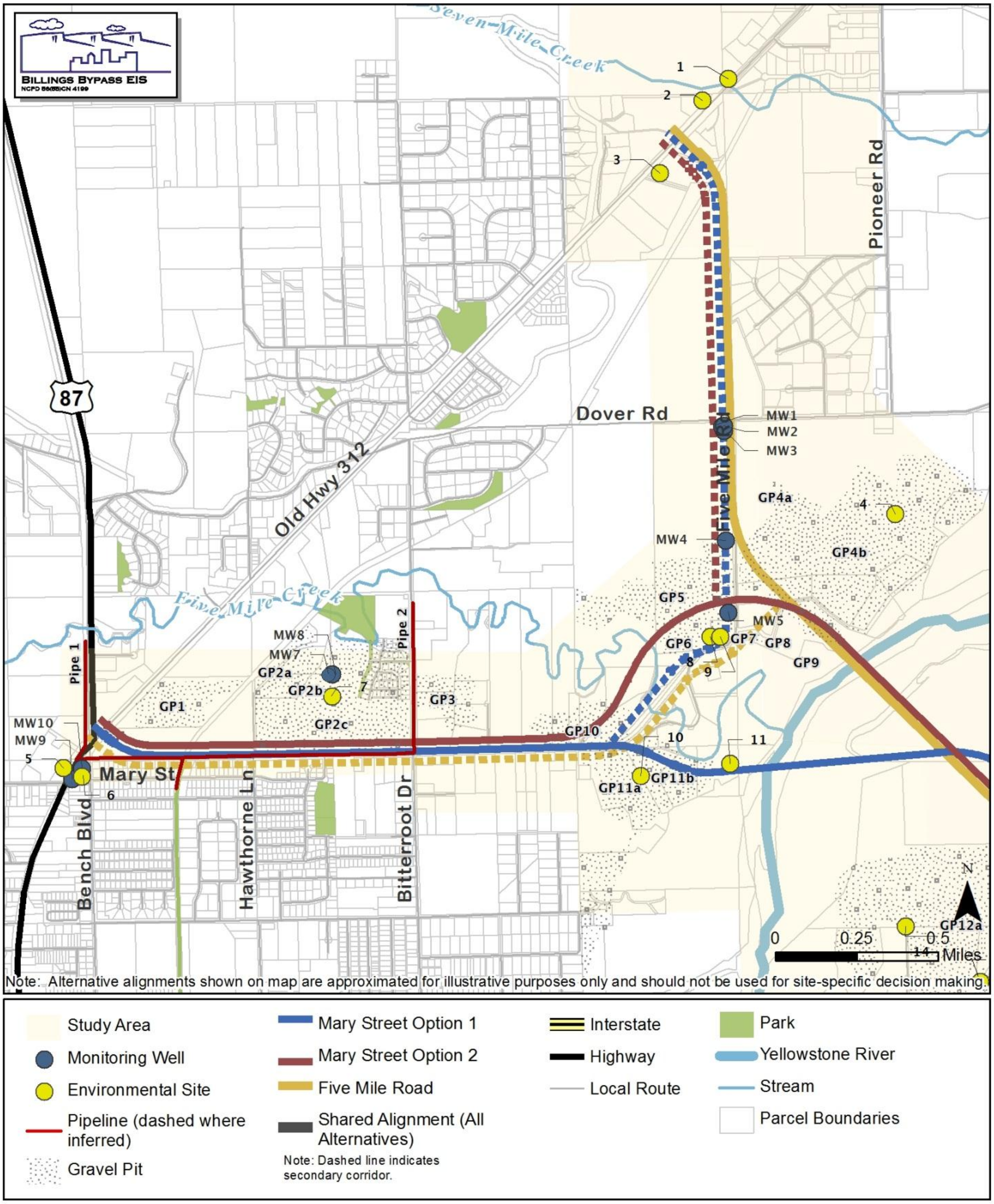
Source: DOWL HKM 2011b.

*Site No. corresponds to sites illustrated in **Figure 3.33** and **Figure 3.34**.

No active abandoned hazardous waste sites identified for priority remedial actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; i.e., Superfund) are located within the survey area. The Empire Sand and Gravel Co. (Site No. 7 and Site No. GP 2) was listed with CERCLA in 1984. A No Further Remedial Action Planned (NFRAP) was issued in 1998, and the site was subsequently delisted. The facility no longer exists. The Lohof Gravel Pit (Site No. GP 11), located on the east end and south of Mary Street, was listed with CERCLA in 1981. An NFRAP was issued in 1991, and the site was delisted in 1998. The facility no longer exists.

No Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA) sites are located in the survey area. The state CECRA program is similar to the federal Superfund program.

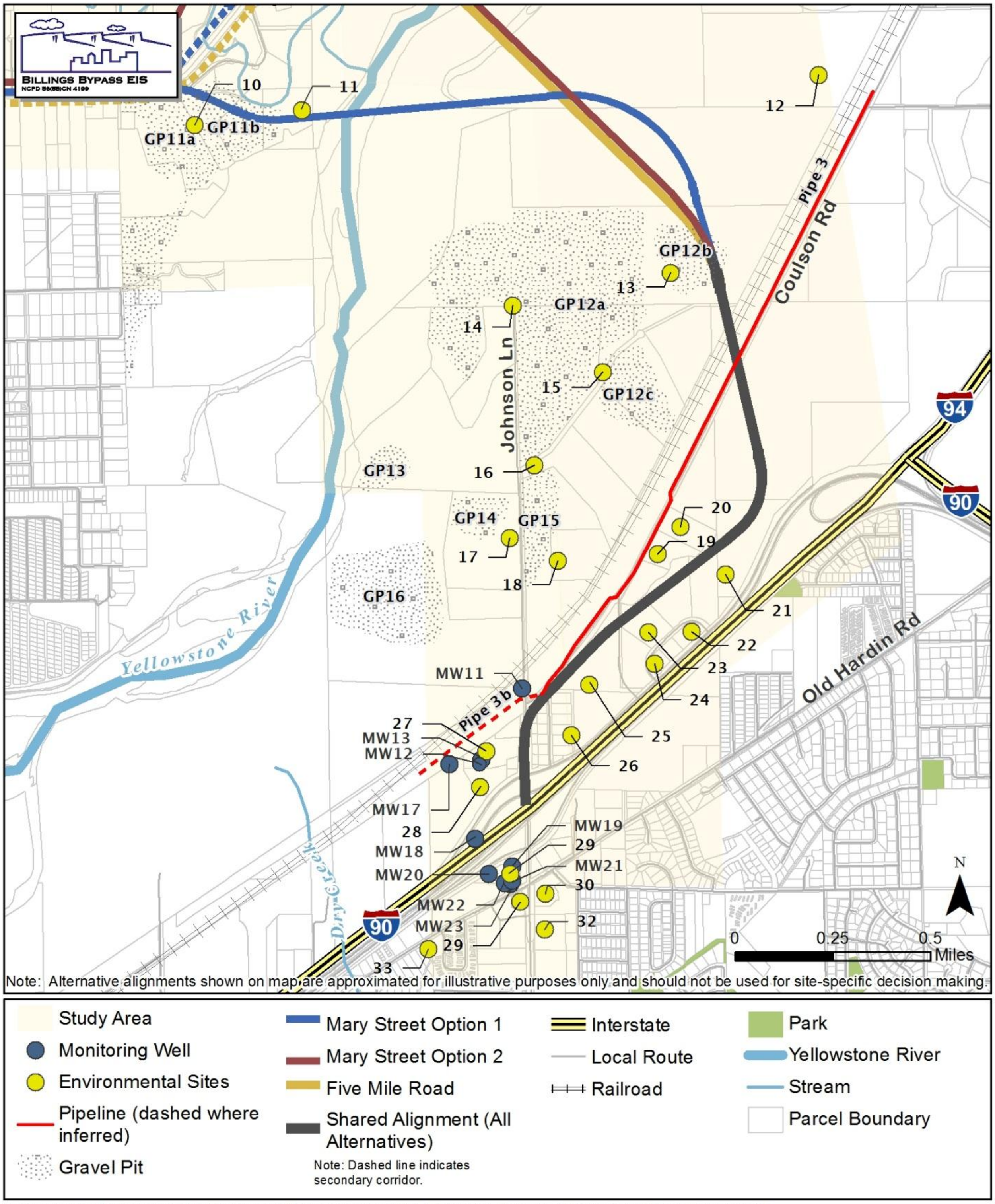
Figure 3.33 Hazardous Material Sites - North



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/13/2013

Figure 3.34 Hazardous Material Sites - South



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/13/2013

3.4.3 WATER RESOURCES AND WATER QUALITY

The study area is located within the Upper Missouri Drainage Basin and the Middle Yellowstone Watershed, Yellowstone Basin. The Yellowstone River originates at Yellowstone Lake in Yellowstone National Park, Wyoming, and flows north into Montana through Paradise Valley, between Gardiner and Livingston. At Livingston, the river flows east through Billings, eventually flowing into the Missouri River near the Montana/North Dakota border. The Yellowstone River has a drainage area of 11,795 square miles and is a navigable waterway through the study area.

All of Yellowstone County is drained by the Yellowstone River and its tributaries. East of Billings, the Yellowstone River has cut through resistant sandstone, which has formed prominent rimrocks on both sides of the valley. The river flows northeastward through a moderately steep-walled valley (Stagliano 2005). It ranges from a few hundred feet to more than half a mile in width, carrying a large volume of water (USGS 2011). The Yellowstone River includes the floodplain and channel migration areas. More information on the surface waters in the study area can be found in Section 3.4.5, "Water Body Modifications" and in Section 3.4.9, "Wildlife and Aquatic Species."

3.4.3.1 WATER QUALITY

Section 303(d) of the Clean Water Act (CWA) and related regulations require states to assess the condition of their waters to determine where water quality is impaired (does not fully meet standards) or threatened (is likely to violate standards in the near future). The result of this review is the 303(d) list. Section 303(d) also requires states to prioritize and target water bodies on their list for development of water quality improvement strategies, for example, total maximum daily loads (TMDLs) which define how much of a pollutant a water body can tolerate and still meet water quality standards, and to develop such strategies for impaired and threatened waters. The 303(d) list is defined by the EPA as waters with Category 5 designations, that is, "Waters where one or more applicable beneficial uses have been assessed as being impaired or threatened, and a TMDL is required to address the factors causing the impairment or threat." These categories include:

- Waters that are fully supporting all beneficial uses (Category 1).
- Waters where available data and/or information indicate that some, but not all, of the beneficial uses are supported (Category 2A).
- Waters where available data and/or information indicate that a water quality standard is exceeded due to an apparent natural source in the absence of any identified anthropogenic sources (Category 2B).
- Waters that have not been assessed or have insufficient data to evaluate their use support levels (Category 3).
- Waters where one or more beneficial uses have been assessed as being impaired or threatened; however, either all necessary TMDLs have been completed (Category 4A) or are not required (Category 4C).
- Waters where one or more applicable beneficial uses have been assessed as being impaired or threatened, and a TMDL is required to address the factors causing the impairment or threat (Category 5).

In the study area, the Yellowstone River is listed with a water quality Category 5 and 2B designation. The river's beneficial use support information indicates "fully supporting" agriculture and industrial use, but is "not supporting" aquatic life, drinking water, primary contact recreation, and warm water fishery. Probable causes of impairment include natural source arsenic, agriculture and municipal source impacts to benthic-macroinvertebrates, dissolved oxygen saturation, excess algal growth, nutrient eutrophication (overloading), periphyton indicators (water quality indicators such as algae and bacteria), and suspended/bedload solids (MDEQ 2010). No other water bodies in the study area were included in the Water Quality Integrated Report 303(d) list or Section 305(b) Report, required under the Clean Water Act.

3.4.3.2 GROUNDWATER

Assessing groundwater resources provides information about the potential contamination in the study area. The following section describes groundwater conditions and information on monitoring wells and regulated sites under Montana's Water Quality Act, addressed through the Groundwater Remediation Program. The study area is not part of a designated sole source aquifer or a wellhead protection area. Groundwater charging and recharging is also related to wetlands, as described in Section 3.4.7, "Wetlands."

3.4.3.2.1 EXISTING CONDITIONS

Perched, unconfined groundwater appears to be present in the alluvial terrace gravels that lie above the river floodplain near Mary Street. The perched aquifer is underlain by shale and sandstone bedrock. The water does not readily percolate into the shale bedrock, thus is perched in the gravelly units. The depth to groundwater typically ranges from 3 to 20 feet below ground surface depending on the elevation of the ground surface above the water table, local irrigation practices, and past gravel pit operations. These groundwater elevation variations are very hard to predict without further subsurface investigation. In areas where the contact between the terrace gravels and bedrock is exposed in slopes, the perched water may discharge as springs in the face or near the toe of the slope.

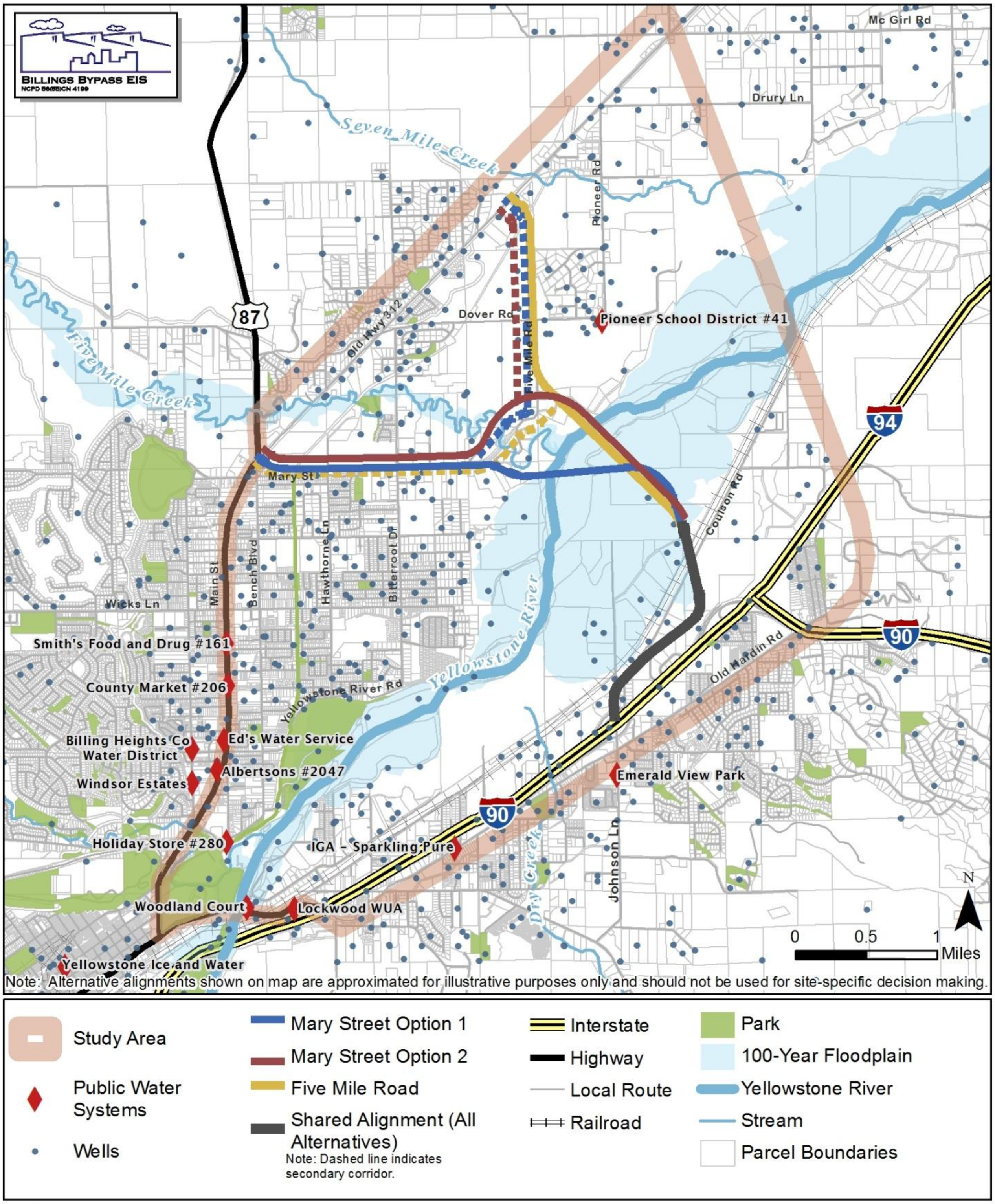
The primary recharge sources for the perched groundwater are likely precipitation, canal leakage, and excess irrigation water percolating downward through the gravels to the contact with the underlying bedrock. The perched, unconfined groundwater in the alluvial terrace gravels is not a regional aquifer. In general, the aquifer is locally controlled by irrigation seepage, canal leakage, and precipitation. Below the perched aquifer is shale and sandstone bedrock, which does not appear to be a viable source of groundwater. Water from irrigation sources will continue to be available, because existing irrigation facilities will be perpetuated. Further recharge of the groundwater may occur as a result of stormwater collection.

3.4.3.2.2 MONITORING WELLS

Groundwater monitoring well information was retrieved from databases maintained at the Ground Water Information Center (GWIC) at the Montana Bureau of Mines and Geology. The main purpose for utilizing the GWIC database is to identify existing monitor wells within the study area. Monitoring wells are typically installed to monitor water quality and/or water levels in an area. The presence of monitoring wells may indicate a possible contaminant release that impacted local soil and/or groundwater or the potential for such to occur. There are multiple groundwater wells located throughout the project area, as shown on **Figure 3.35**. Since the GWIC database does not distinguish between different types or uses of monitoring wells, information on all monitoring wells identified within the study area was downloaded from the GWIC database.

These are monitoring or test wells and are not used for public water supplies.

Figure 3.35 Groundwater Monitoring Well Locations



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/11/2013

3.4.3.2.3 STATE WATER QUALITY ACT SITE RANKING LIST

The Water Quality Act (WQA) Site Ranking List is a MDEQ compilation of sites regulated by the Groundwater Remediation Program, which typically requires long-term remediation and monitoring of soil, surface water, and/or groundwater. No WQA sites were identified within the study area (DOWL HKM 2011b).

3.4.3.3 PUBLIC WATER SUPPLIES

The Yellowstone River is the source of all drinking water for the City of Billings. The Gerald D. Underwood Water Treatment Plant has two raw water intake structures: Intake No. 1 is a side channel diversion and is the primary intake, and Intake No. 2 is a brick structure in the middle of the river and is designed primarily for emergency use. These are located upstream of the study area.

In addition to the city water supplies, there are multiple wells serving as public water supplies in and near the project area, as shown on **Figure 3.35**. These wells are considered "public water systems" and serve 25 or more people or have 15 or more service connections, and operate at least 60 days per year. The public water system closest to any of the alternatives is located near the intersection of Dover and Pioneer Roads. It is owned by the Pioneer School District and serves the Pioneer Elementary School.

3.4.4 WILD AND SCENIC RIVERS

The National Wild and Scenic Rivers System was created by Congress in 1968 (Public Law 90-542; 16 USC 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The National Wild and Scenic Rivers Act safeguards the special character of these rivers, while also recognizing the potential for their appropriate use and development. It encourages river management that crosses political boundaries and promotes public participation in developing goals for river protection. Rivers may be designated by Congress or, if certain requirements are met, by the Secretary of the Interior. Each river is administered by either a federal or a state agency.

There are no designated Wild and Scenic Rivers in the study area, and therefore this topic is dismissed from further analysis in this document.

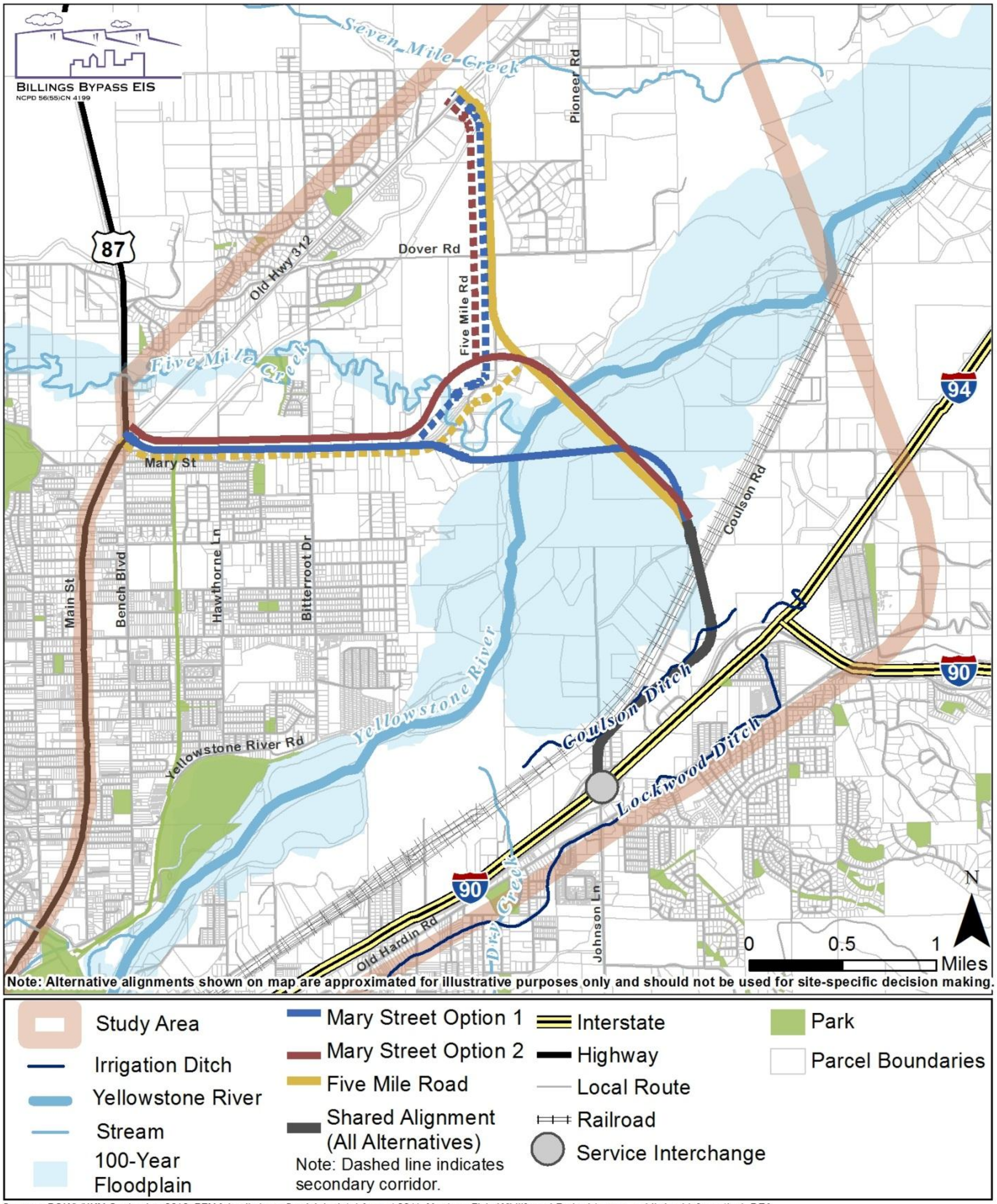
3.4.5 WATER BODY MODIFICATIONS

The three major surface water bodies in the study area are the Yellowstone River, Five Mile Creek, and Seven Mile Creek. The flow of Seven Mile Creek to the Yellowstone River is interrupted by a flume. Other surface water bodies include smaller unnamed tributaries, ponds in wetlands, and gravel pit ponds. Special aquatic sites of the major surface waters include dynamic riffle and pool complexes. There were no mudflats, vegetated shallows, or other special aquatic sites identified in the study area. The study area also includes irrigation ditches, among them Coulson Ditch and numerous smaller side ditches. In addition, Miller McGirl Ditch is located outside of the study area but receives waters from other ditches within the study area. The hydrology of the study area, including the irrigation systems and gravel pit ponds, is detailed in the *Billings Bypass Hydraulics Report* (DOWL HKM 2011a). **Table 3.21** lists the major surface water features in the study area, the existing crossings, and the alternatives that intersect them. **Figure 3.36** shows the resources on a map.

Table 3.21 Major Surface Water Features in the Study Area

NAME	PROJECT SECTION, TOWNSHIP (T), RANGE (R)	TYPE	EXISTING CROSSINGS	ALTERNATIVES
Yellowstone River	Section 7 and 18 T1N, R27E	Perennial	No existing bridge crossings in the study area (US 87, I-90, and a railroad bridge cross immediately southwest of study area)	All
Five Mile Creek	Section 12 T1N, R26E	Perennial	Two existing bridge crossings in vicinity of junction of Mary Street and Five Mile Road	Crossed by Mary Street Option 2 and secondary corridors for Mary Street Option 1 and Five Mile Road
Seven Mile Creek	Section 11 T1N, R26E	Perennial	Passes under a bridge on Old Hwy 312	Five Mile Road (at northern connection with Old Hwy 312)
Coulson Ditch	Section 19 T1N, R27E	Irrigation canal	Multiple private and local roads cross in culverts	All (near Johnson Lane interchange; Coulson Ditch roughly parallels Coulson Road)

Figure 3.36 Major Surface Water Features in the Study Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

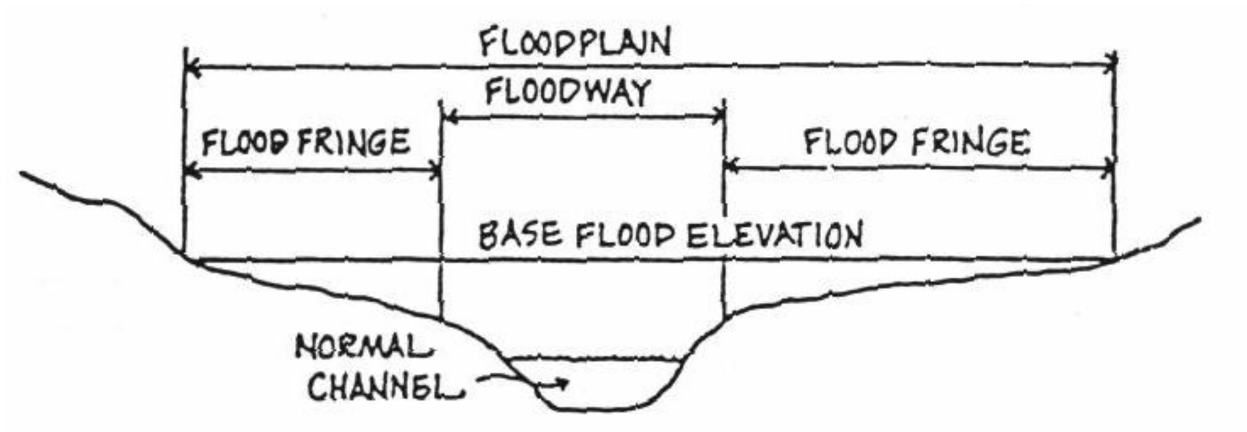
Date Plotted: 9/14/2013

3.4.6 FLOODPLAINS

Floodplains are “any land area susceptible to being inundated by flood waters from any source.” Floodplains are important to consider when planning new infrastructure such as roads and bridges, to ensure that the constructed resources are protected. It is also important to preserve floodplains for natural processes of handling storm flows.

Figure 3.37 shows a diagram of the different terms used in the floodplain analysis, as defined by Yellowstone County in its floodplain regulations. The floodway is channel of a stream and the adjacent overbank areas that must be preserved in order to discharge a base flood without cumulatively increasing the water surface elevation more than one-half (1/2) foot. The “flood fringe” is the area between the floodway and the floodplain, and the 100-year floodplain is also known as the “base flood” and is the flood having a 1% chance of being equaled or exceeded in any given year (FEMA 2011).

Figure 3.37 Floodplain Terminology



Source: Yellowstone County 2005.

Executive Order 11988, Floodplain Management, requires federal agencies to avoid direct or indirect support of floodplain development whenever a practicable alternative exists. Executive Order 11988 and 23 CFR 650 Subpart A require evaluation of project alternatives to determine the extent of any encroachment into the base floodplain. The base flood (100-year flood) is the regulatory standard used by federal agencies and most states to administer floodplain management programs. A “100-year floodplain” is defined as lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, with a 1% or greater chance of flooding in a given year. As described in FHWA’s floodplain regulation (23 CFR 650 Subpart A), floodplains provide natural and beneficial values, serving as areas for “fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and ground water recharge.”

The potential project impacts on the Yellowstone River Floodplain (presented in Chapter 4) were evaluated using a delineation based on a study of the Yellowstone River Floodplain initiated by the Federal Emergency Management Agency (FEMA). This study has been completed, but has not yet been adopted. The current regulatory floodplain delineation was developed in 1981 and published with revisions in March 2000. This floodplain is being modified to include new data on stream flows.

The Five Mile Creek Floodplain Analysis has been completed and was approved by the Montana Department of Natural Resources and Conservation in 2004. This flood study is still pending approval by FEMA. Although not currently adopted by FEMA, the Five Mile Creek Floodplain Analysis will likely be adopted along with the Yellowstone River Floodplain Analysis discussed above.

Floodplains for the Yellowstone River and Five Mile Creek are shown on **Figure 3.36** in Section 3.4.5, Water Body Modifications.

The 100-year water surface elevation increases and decreases by roughly 1 foot in certain areas, which consequently changes the corresponding extents of the floodplain. Near the proposed bridge crossings of the Yellowstone River, the modified floodplain shows an increase in 100-year water surface elevation. The limits of the 100-year floodplain are now wider and the floodway is now narrower.

3.4.7 WETLANDS

Wetlands provide a number of important and beneficial functions. During periods of heavy rainfall, wetlands serve as flood storage areas, where water can dissipate without damage to developed uplands. As the water passes through the wetlands, pollutants are filtered out. Wetlands also stabilize shorelines, thereby preventing the harmful effects of erosion. Wetlands produce the basic food material used by fish and aquatic life. Some wetlands also serve as nursery grounds for fish and rookery areas for birds. Many wildlife species, some of which are threatened or endangered, need to live in wetlands for all or part of their life.

Federal regulations that pertain to the protection of wetlands include the Clean Water Act (CWA) of 1972, Section 404, including the 2008 Rapanos Guidance, EO 11990 (Protection of Wetlands), and EO 11988 (Protection of Floodplains).

Under both COE regulations at 33 CFR 328.3 and EPA regulations at 40 CFR 230.0, the term “wetlands” refers to those areas that are inundated or saturated by surface water or groundwater at a frequency and duration that are sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands are defined by the COE as areas that possess the three mandatory parameters described in Section 404 of the CWA, which are hydrophytic vegetation, hydric soils, and wetland hydrology. Wetlands generally include swamps, marshes, bogs, and similar areas.

The COE *Jurisdictional Determination Form Instruction Guidebook* (2007), which addresses jurisdiction over waters of the United States under the CWA, asserts agency jurisdiction over the following waters:

- Traditional navigable waters.
- Wetlands adjacent to traditional navigable waters.
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (typically three months).
- Wetlands that directly abut such tributaries.

Wetlands in this report are documented whether or not they have connectivity to, abut, or are adjacent to potentially jurisdictional waters, and whether these waters are relatively permanent or not relatively permanent. The COE will determine whether the wetlands are under its jurisdiction.

Wetlands are also protected by EO 11990, which directs federal agencies to avoid new construction in wetlands unless there is no practicable alternative. EO 11990 makes no distinction between wetlands under the jurisdiction of the COE and isolated, intrastate wetlands. If the COE agrees that a wetland is not under its jurisdiction, FHWA and MDT must still decide under EO 11990 whether there is a practicable alternative to using the wetland area. If avoidance is not possible, then FHWA and MDT must determine that all practicable mitigation to the wetland is considered and ultimately implemented.

3.4.7.1 RESEARCH METHODS

Both preliminary research and a site-specific investigation were conducted to determine the presence of wetlands. Biologists with DEA conducted site visits on July 12 through 14, 2011, and August 24 through 26, 2011, and earlier investigations in the fall of 2007. Reconnaissance-level biological surveys and wetland delineations were conducted within the study area, as part of the *Billings Bypass Biological Resources Report* (*BRR*) (DEA 2011c) completed for this project.

The wetlands study area surveyed for the presence of wetlands is approximately 100 feet beyond the anticipated construction limits of the project. The wetlands survey area was expanded from this wetlands study area in several locations to account for the conceptual level of design at this point in the project. Delineations were completed using the routine (on-site) methodology and criteria in accordance with the COE *Wetlands Delineation Manual* (Environmental Laboratory 1987) and subsequent *Regional Supplement Great Plains Region*, *Version 2.0* (COE 2010). These methods require that evidence of three parameters (a dominance of hydrophytic vegetation, hydric soils, and wetland hydrology) be simultaneously present for a wetland determination under normal circumstances. Areas that possessed the three mandatory parameters are identified as wetlands. The supplement includes criteria for determining wetlands in problematic or atypical situations where indicators may be missing due to natural processes or recent disturbances.

3.4.7.1.1 VEGETATION

Vegetation was considered hydrophytic (adapted to wet conditions) when over 50% of the dominant plant species had an indicator status of facultative (FAC), facultative wetland (FACW), or obligate (OBL), variations of the dominance test, or when facultative-upland (FACU) species were directly observed in saturated soil conditions during the growing season. **Table 3.22** describes indicator statuses given to plant species.

Table 3.22 Wetland Indicator Status System

CODE	WETLAND TYPE	COMMENT
OBL	Obligate Wetland	Occurs almost always (estimated probability 99%) under natural conditions in wetlands.
FACW	Facultative Wetland	Usually occurs in wetlands (estimated probability 67% - 99%) but occasionally found in non-wetlands.
FAC	Facultative	Equally likely to occur in wetlands or non-wetlands (estimated probability 34% - 66%).
FACU	Facultative Upland	Usually occurs in non-wetlands (estimated probability 67% - 99%), but occasionally found in wetlands (estimated probability 1% - 33%).
UPL	Obligate Upland	Plants that occur rarely (estimated probability <1%) in wetlands under natural conditions.

Source: Reed 1988.

3.4.7.1.2 SOILS

In accordance with the methodology, soil samples were taken at all sampling plots and other points on the site, and were examined for indicators of hydric conditions. Hydric soils are those that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth of hydrophytic vegetation.

3.4.7.1.3 HYDROLOGY

Wetland hydrology was evaluated at each data plot location and other locations throughout the site. Evaluation of hydrology included observation of surface water, soil saturation, groundwater depth, ponding, or evidence of drainage patterns.

3.4.7.2 DESCRIPTION OF EXISTING WETLANDS IN PROJECT CORRIDORS

The Yellowstone River corridor includes the Yellowstone River and its naturally occurring tributaries: Five Mile Creek and Seven Mile Creek. Multiple irrigation canals and ditches intersect the study area, and many have associated wetlands. More than 50 wetlands were identified during field investigations. Of those, 27 wetlands were located within or partially within the project corridors, which are defined as the areas within the construction limits of all three build alternatives. Additional wetlands were identified during the course of field work but are not within the construction limits of any of the build alternatives; these wetlands are documented in the *BRR* (DEA 2011c).

3.4.7.2.1 FUNCTIONAL VALUE ASSESSMENT

The specific functions a wetland provides, and the degree to which it performs those functions, depend on several factors including type, size, plant diversity, and the location of the wetland. A qualitative assessment of wetland functions was performed for the following functions:

- Wildlife habitat – includes habitat for big game, small mammals, birds, amphibians, reptiles, and other species.
- Fish/aquatic habitat – includes habitat for fish and other aquatic species.
- Flood attenuation and surface water storage – the ability to detain moving water for a short duration when the flow is outside of its channel.
- Sediment/toxicant retention and removal – the ability to remove or retain sediment, nutrients, and/or toxicants; requires proximity to a source of these constituents and an avenue for transport.
- Sediment/shoreline stabilization – the ability to dissipate flow or wave energy, reducing erosion.
- Production export/food chain support – the potential to produce and export food/nutrients for living organisms.
- Groundwater discharge/recharge – the ability to add or remove groundwater from the local system.
- Uniqueness – special values based on rarity, replacement potential, and condition.
- Recreation/education potential – the ability to provide recreational or educational opportunities.

Based on the functional value of the wetland, MDT classifies wetlands into one of four wetland functional categories. According to the MDT Montana Wetland Assessment Method, Category I wetlands are of exceptionally high quality and are generally rare to uncommon in the state. Category II wetlands are more common than Category I, and are those that provide habitat for sensitive plants or animals, function at very high levels for wildlife/fish habitat, are unique in a given region, or are assigned high ratings for many of the assessed functions and values. Category III wetlands are more common, generally less diverse, and often smaller and more isolated than Category I or II wetlands. They still can provide many functions and values, although may not be assigned high ratings for as many functions and values as Category I and II wetlands. Category IV wetlands are generally small and isolated, and lack vegetative diversity. These sites provide little in the way of wildlife habitat, and are often directly or indirectly disturbed (Berglund et al. 2008). In the study area, most of the wetlands were Category III and IV. There were no Category I wetlands. Only two wetlands met the criteria as Category II wetlands: These were naturally occurring wetlands associated with the Yellowstone River with high ratings in habitat and ecological function and had negligible influence from development or disturbances. The Category III wetlands had some habitat or ecological function but at lower ratings. Project Category IV wetlands had the lowest functional value because of their close association with irrigation ditches or gravel pit operations.

In 2011, the project team updated wetlands ratings for those wetlands delineated in the study area in 2007 to reflect any changes in wetland vegetation, hydrology, size, or nearby land use changes.

3.4.7.2.2 Wetlands Description

The following is a description of the 27 delineated wetlands that intersect the project corridors and a summary of the MDT assessment ratings for their functions.

Wetland A is located between Mary Street and Old Hwy 312 at an old gravel pit. It is surrounded by agricultural use. The dominant wetland plant species was water sedge (*Carex aquatilis*). The NRCS soil for Wetland A is listed as gravel pit, not hydric in Yellowstone County (NRCS 2011b). Waters from Wetland A discharge north to an unnamed tributary of Five Mile Creek. The most prominent functions have high ratings in sediment/shoreline stabilization, Montana (MT) Natural Heritage program species habitat, production export, and groundwater discharge.

Wetland AA is located along a small, narrow, lateral irrigation waste ditch that is located north of Mary Street. The dominant wetland plant species are reed canarygrass *(Phalaris arundinacea*) and cattail (*Typha latifolia*). It is surrounded by irrigated hayfields and pasture. The NRCS soils listed for Wetland AA are Shonkin loam, 0% to 1% slope, listed as hydric in Yellowstone County, and Keiser silty clay loam, 1% to 4% slope, not listed as hydric (NRCS 2011b). Irrigation waters associated with Wetland AA discharge into a natural drainage to Five Mile Creek. This wetland's most prominent functions have a high rating for sediment/shoreline stabilization and a medium rating for sediment, nutrient, and toxicant removal. The remaining functions are rated low.

Wetland AC is along an irrigation canal that runs south to the Yellowstone River. The dominant wetland plant species are cattail, hardstem bulrush *(Scirpus acutus)*, and reed canarygrass. There are isolated areas dominated by shrubs. It is surrounded by irrigated hayfields and pasture. The NRCS soils listed for Wetland AC are Bew silty clay loam, 0% to 1% slope, and Keiser silty clay loam, 1% to 4% slope, neither of which is listed as hydric in Yellowstone County (NRCS 2011b). Wetland AC and its associated irrigation canal discharge into a natural drainage to the Yellowstone River. The most prominent functions have moderate ratings in Montana Natural Heritage Program (MTNHP) species habitat, sediment/shoreline stabilization, production export/food chain support, and general wildlife habitat categories.

Wetland AD is along two segments of an irrigation canal south of Old Hwy 312. The dominant wetland plant species are reed canarygrass and watercress (*Rorippa nasturtium-aquaticum).* It is surrounded by irrigated cropland, hayfields, and grazing. The NRCS soil listed for Wetland AD is Lohmiller silty clay, 0% to 1% slope, which is not listed as hydric in Yellowstone County (NRCS 2011b). The two segments (north- and south-flowing) join and flow east in a canal for potential agricultural end use and/or to Seven Mile Creek or the Miller McGirl Ditch. Wetland AD is rated low in most wetland functions except for a moderate rating in sediment, nutrient, and toxicant removal.

Wetland AF is a naturally occurring wetland located within the channel migration zone of the Yellowstone River, located along the south bank. Dominant wetland plant species were Plains cottonwood (*Populus deltoids*) and reed canarygrass. It is bordered on the east by cropland and a gravel pit operation. To the west are the riparian areas of the Yellowstone River. The NRCS soil listed for Wetland AF is Haverson loam, 0% to 1% slope, not listed as hydric in Yellowstone County (NRCS 2011b). Wetland AF has a natural drainage that discharges to the Yellowstone River. The most prominent functions have high ratings in sediment/shoreline stabilization, MTNHP species habitat, general wildlife habitat, general fish habitat, and production export/food chain support. All other functions are rated high or moderate.

Wetland AG is a naturally occurring wetland located within the channel migration zone of the Yellowstone River, along the south bank. Dominant wetland plant species are sedge (*Carex sp.*) and spikerush (*Eleocharis palustris).* It is bordered on the east by the Yellowstone River riparian areas and on the west by the Yellowstone River channels. The NRCS soil listed for Wetland AG is Riverwash, listed as hydric in Yellowstone County (NRCS 2011b). The boundary of this wetland is transitory and subject to channel changes. Wetland AG is located within the Yellowstone River channel. The most prominent functions have high ratings in sediment/shoreline stabilization, MTNHP species habitat, general wildlife habitat, general fish habitat, and production export/food chain support. All other functions are rated high or moderate.

Wetland C is associated with an irrigation canal that intersects Mary Street. The dominant wetland plant species were reed canarygrass and watercress. It is surrounded by irrigated cropland and hayfields. The NRCS soil listed for Wetland C is Keiser silty clay loam, 0% to 1% slope, not listed as hydric in Yellowstone County (NRCS 2011b). Wetland C abuts the canal, which flows north to Five Mile Creek. It rated low in most wetland functions except for a moderate rating in sediment, nutrient, and toxicant removal.

Wetland D is associated with an irrigation lateral supply ditch located north of Mary Street. The dominant wetland plant species in Wetland D was reed canarygrass. It is surrounded by irrigated cropland. The NRCS soil listed for Wetland D is Keiser silty clay loam, 0% to 1% slope, not listed as hydric in Yellowstone County (NRCS 2011b). Wetland D discharges into cropland. It rated low in most wetland functions except for a moderate rating in sediment, nutrient, and toxicant removal.

Wetland D9 is located in a lateral irrigation ditch north of the BNSF railroad. The dominant wetland plant species in Wetland D9 was Nebraska sedge (*Carex nebrascensis)* and three-square bulrush (*Scirpus pungens*). The primary NRCS soil listed for Wetland D9 is Wanetta clay loam, 0% to 1% slope, not listed as hydric in Yellowstone County (NRCS 2011b). The Wetland D9 ditch flows to agricultural end use.

Wetland E is a wetland south of Mary Street. It is part of a wetland complex abutting and within a gravel pit pond that was naturalized in the 1980s. The dominant wetland plant species in Wetland E is cattail. It is bordered by residential use and irrigated hayfields. The NRCS soil listed for Wetland E is gravel pit, not listed as hydric in Yellowstone County (NRCS 2011b). Wetland E pond source water is a pipe from Lake Elmo, and the pond discharges into the Yellowstone River. The most prominent functions have high ratings in sediment/shoreline stabilization and sediment, nutrient, and toxicant removal; and moderate ratings in general wildlife habitat, short- and long-term water storage, and production export/food chain support.

Wetland F is a naturally occurring wetland along Five Mile Creek and tributaries, north and south of Mary Street/Five Mile Road. Five Mile Creek receives water from various waste irrigation ditches upstream of this location. The dominant wetland plant species in Wetland F is reed canarygrass. It is surrounded by pasture and hayfields. The NRCS soil listed for Wetland F is Haverson and Lohmiller soils, 0% to 4% slope, not listed as hydric in Yellowstone County (NRCS 2011b). Water from Wetland F flows into the Yellowstone River. The most prominent functions have high ratings in sediment/shoreline stabilization; sediment, nutrient, and toxicant removal; general fish habitat; and production export/food chain support.

Wetlands I and J are located along irrigation waste ditches that are located north of Mary Street. The dominant wetland plant species are reed canarygrass, cattail, and American speedwell *(Veronica americana).* They are surrounded by pasture and hayfields. The NRCS soil listed for Wetlands I and J was Keiser silty clay loam, 0% to 1% slope, not listed as hydric in Yellowstone County (NRCS 2011b). Wetlands I and J and the associated irrigation ditches discharge into natural drainages to Five Mile Creek. The most prominent functions have a high rating for in sediment/shoreline stabilization and a moderate rating for sediment, nutrient, and toxicant removal. The remaining functions are rated low.

Wetland K is a naturally occurring, spring fed wetland, north of Mary Street. The dominant wetland plant species in Wetland K are Plains cottonwood, Russian olive, reed canarygrass, and cattail. It is bordered by residential use and irrigated hayfields. The NRCS soil listed for Wetland K is gravel pit, not listed as hydric in Yellowstone County (NRCS 2011b). The adjacent land use is currently residential, and what was a gravel pit has been landscaped, converted to agricultural use, and somewhat naturalized in low areas. The end use of waters associated with Wetland K is land-applied irrigation of a residential property. Its most prominent functions have high ratings in sediment, nutrient, and toxic removal; and groundwater discharge/recharge; and medium ratings in general wildlife habitat, MTNHP species habitat, and uniqueness.

Wetland L1 is a naturally occurring wetland with numerous lateral irrigation ditches. It is associated with Seven Mile Creek, located south of Old Hwy 312. The dominant wetland plant species in Wetland L1 is reed canarygrass. It is surrounded by irrigated cropland and hayfields. The NRCS soil listed for Wetland L1 is alluvial land, seeped, listed as hydric in Yellowstone County (NRCS 2011b). Waters associated with Wetland L1 are used for land-applied irrigation, and water also flows to Seven Mile Creek or Miller McGirl Ditch. Its most prominent functions have high ratings in sediment, nutrient, and toxic removal; sediment/shoreline stabilization; and groundwater discharge/recharge. The remaining functions are rated low.

Wetland L2 is a depressional wetland from canal overflow from an unnamed ditch, located south of Old Hwy 312. The dominant wetland plant species in Wetland L2 is meadow foxtail (*Alopecurus pratensis).* The wetland is in a heavily grazed area. The surrounding habitat is irrigated cropland. Wetland L2 is part of a larger wetland to the west (L4) to which it is connected through a culvert. The NRCS soil listed for Wetland L2 is McRae loam, 0% to 1% slope, not listed as hydric in Yellowstone County (NRCS 2011b). Wetland L2 connects to a larger canal wetland to the south (Wetland AD), which potentially drains to Seven Mile Creek or the Miller McGirl Ditch. The most prominent functions have a high rating in groundwater discharge/recharge and moderate ratings in sediment, nutrient, and toxicant removal and short- and long-term water storage.

Wetland L4 is a large, naturally occurring wetland area bisected by Old Hwy 312 that extends beyond the survey area to the BBWA Canal. It is primarily a depressional wetland that drains through an irrigation ditch to the south. The dominant wetland plant species are cattail and three-square bulrush. The surrounding habitat is irrigated hayfields and grazing. The NRCS soil listed for Wetland L4 is Alluvial land, seeped, listed as hydric in Yellowstone County (NRCS 2011b). Wetland L4 connects to Wetland AD, which potentially drains to Seven Mile Creek or the Miller McGirl Ditch. The most prominent functions have high ratings in sediment/shoreline stabilization; sediment, nutrient, and toxicant removal; and groundwater discharge/recharge. Moderate ratings were in short- and long-term water storage and production export/food chain support.

Wetland M is a fringe wetland along an irrigation ditch north of and paralleling Mary Street. The dominant wetland plant species is reed canarygrass. It is bordered by irrigated cropland and hayfields. The primary NRCS soil listed for Wetland M is Keiser silty clay loam, 0% to 1% slope, not listed as hydric in Yellowstone County (NRCS 2011b). Wetland M discharges into cropland. The most prominent function was a high rating in sediment/shoreline stabilization. The remaining functions were rated low.

Wetland O is a natural occurring wetland located on the north shore channel of the Yellowstone River. The dominant wetland plant species are reed canarygrass and cattail. It is separated from another wetland to the east by a headgate. The NRCS soil listed for Wetland O is Hilly, gravelly land, not listed as hydric in Yellowstone County (NRCS 2011b). Wetland O is located within the Yellowstone River channel. All the wetland functions are rated low.

Wetland P is along an irrigation canal primarily south of Coulson Road. The dominant wetland plant species were cattail, rough fescue (*Festuca scabrella*), and Russian olive. It is bordered by irrigated hayfields and commercial use. The NRCS soil listed for Wetland P is Hysham-Laurel silty clay loams, 0% to 2% slope, not listed as hydric in Yellowstone County (NRCS 2011b). Wetland P is associated with an irrigation canal that is a supply/waste ditch that potentially flows to the Yellowstone River. The most prominent functions were moderate ratings in MTNHP species habitat, sediment/shoreline stabilization, production export/food chain support, and general wildlife habitat.

Wetland R is located along a small, narrow, lateral irrigation waste ditch that is located south of Coulson Road. The dominant wetland plant species were cattail and small-fruited bulrush (*Scirpus microcarpus).* It is surrounded by irrigated hayfields. The NRCS soil listed for Wetland R is Hysham-Laurel silty clay loams, 0% to 2% slope, not listed as hydric in Yellowstone County (NRCS 2011b). Wetland R and its associated ditch discharges into a larger ditch (Wetland P) that potentially flows to the Yellowstone River. The most prominent functions have a high rating for sediment/shoreline stabilization and moderate rating for sediment, nutrient, and toxic removal. The remaining functions are rated low.

Wetland S is a fringe wetland along Coulson Ditch. The dominant wetland plant species are reed canarygrass and Canada thistle (*Cirsium arvense*). Shrubs were dominant in isolated locations. It is surrounded primarily by irrigated hayfields. The primary NRCS soil listed for Wetland S area is Hysham-Laurel silty clay loams, 0% to 2% slope, not listed as hydric in Yellowstone County (NRCS 2011b). Wetland S is associated with Coulson Ditch, which potentially discharges into the Yellowstone River. The most prominent function has a high rating in sediment/shoreline stabilization. The remaining functions are rated low.

Wetland T is group of small, connected ditch wetlands within the I-90/Johnson Lane intersection. The water sources are an irrigation waste ditch and highway runoff. The dominant wetland plant species are reed canarygrass and cattail. It is surrounded by maintained highway ROW. The NRCS soil listed for Wetland T is Thurlow clay loam, 4% to 7% slope, not listed as hydric in Yellowstone County (NRCS 2011b), but is most likely fill materials. Wetland T flow was fully infiltrated at the lowest elevation, with no hydrology evident beyond the north wetland boundary. The most prominent functions have a high rating in sediment/shoreline stabilization and a moderate rating for flood attenuation. The remaining functions are rated low.

Wetland W is a large, natural wetland mosaic that has been modified and reduced in expanse over the years by dikes, berms, and commercial development in the area. It is located north of I-90 and the BNSF railroad. The dominant wetland plant species are cattail and isolated shrub components in the perimeter. The surrounding area is commercial land use. The NRCS soil listed for Wetland W is Alluvial land, seeped, listed as hydric in Yellowstone County (NRCS 2011b). Wetland W waters discharge into an unnamed drainage to Yellowstone River. The most prominent functions have a high rating in short- and long-term water storage and moderate ratings in MTNHP species habitat, flood attenuation, and production export/food chain support.

Wetland Y abuts a small roadside ditch on the east side of US 87, north of Mary Street. The dominant wetland plant species for Wetland Y was wooly sedge *(Carex lanuginose)* and cottonwood saplings. It is surrounded by development and pasture. The NRCS soil listed for Wetlands Y is Keiser silty clay loam, 0% to 1% slope, not listed as hydric in Yellowstone County (NRCS 2011b). Water from Wetland Y flows to an agricultural end use. The most prominent function has a high rating in sediment/shoreline stabilization. The remaining functions are rated low.

Wetland Z abuts small roadside ditches on either side of US 87 north of Mary Street. The dominant species are cattail and Kentucky bluegrass (*Poa pratensis*). The wetland is surrounded by development and pasture. The NRCS soil listed is Keiser silty clay loam, 0% to 1% slope, not listed as hydric in Yellowstone County (NRCS 2011b). Waters associated with Wetland Z flow north and end in an agricultural property's roadside ditch. The most prominent function has a high rating in sediment/shoreline stabilization. The remaining functions are rated low.

Table 3.23 summarizes information about these wetlands including wetland class, MDT rating, preliminary jurisdictional determination, associated water body, and delineated acres within the study area. Wetland classes are based on geomorphic position and hydrologic characteristics. **Figure 3.38** depicts the locations of wetlands within the study area.

Table 3.23 Jurisdictional and Nonjurisdictional Wetlands: Description and Size

WETLAND FIELD ID	WETLAND CLASS[1]	MDT RATING[2]	LIKELY JURISDICTIONAL	JUSTIFICATION	DELINEATED ACRES[3]
A	PEM	III	Yes	Unnamed drainage and irrigation waste ditch that flow northeast to Five Mile Creek	1.00
AA	PEM	IV	Yes	Supply/waste ditch for agricultural use, outlet to Five Mile Creek	0.08

WETLAND FIELD ID	WETLAND CLASS[1]	MDT RATING[2]	LIKELY JURISDICTIONAL	JUSTIFICATION	DELINEATED ACRES[3]
AC	R2EM	III	Yes	Wetland associated with irrigation canal that discharges to natural drainage to Yellowstone River	0.94
AD	PEM	IV	Yes	Wetland associated with two canals that join and flow east for agricultural end use and/or to Seven Mile Creek or the Miller McGirl Ditch	1.15
AF	PFO	II	Yes	Wetland has a natural drainage to the Yellowstone River	1.82
AG	R2UB	II	Yes	Wetland located within the Yellowstone River channel	10.32
C	R2SBHx	IV	Yes	Wetland abuts the canal that flows north to Five Mile Creek	0.18
D	PEM	IV	No	Wetland abuts lateral supply ditch; agricultural end use	0.09
D9	PEM	IV	No	Wetland abuts lateral supply ditch; agricultural end use	0.83
E	PEM	III	Yes	Wetland source water is a pipe from Lake Elmo; the wetland pond discharges into the Yellowstone River	0.89
F	PEM	III	Yes	Wetland along Five Mile Creek	1.11
I	PSS	IV	Yes	Wetland along irrigation ditch that discharges into natural drainages to Five Mile Creek	0.39
J	PSS	IV	Yes	Wetland along irrigation ditch that discharges into natural drainages to Five Mile Creek	0.19
K	PFO	III	No	Subsurface flow from gravel pit ponds from SE of Mary Street; end use is cistern, domestic landscape irrigation; potential intermittent flow to Five Mile Creek without surface connectivity	0.29
L1	R2EM	III	No	Seven Mile Creek drainage and supply/waste ditch to Seven Mile Creek or the Miller McGirl Ditch for end use in agricultural fields	0.08

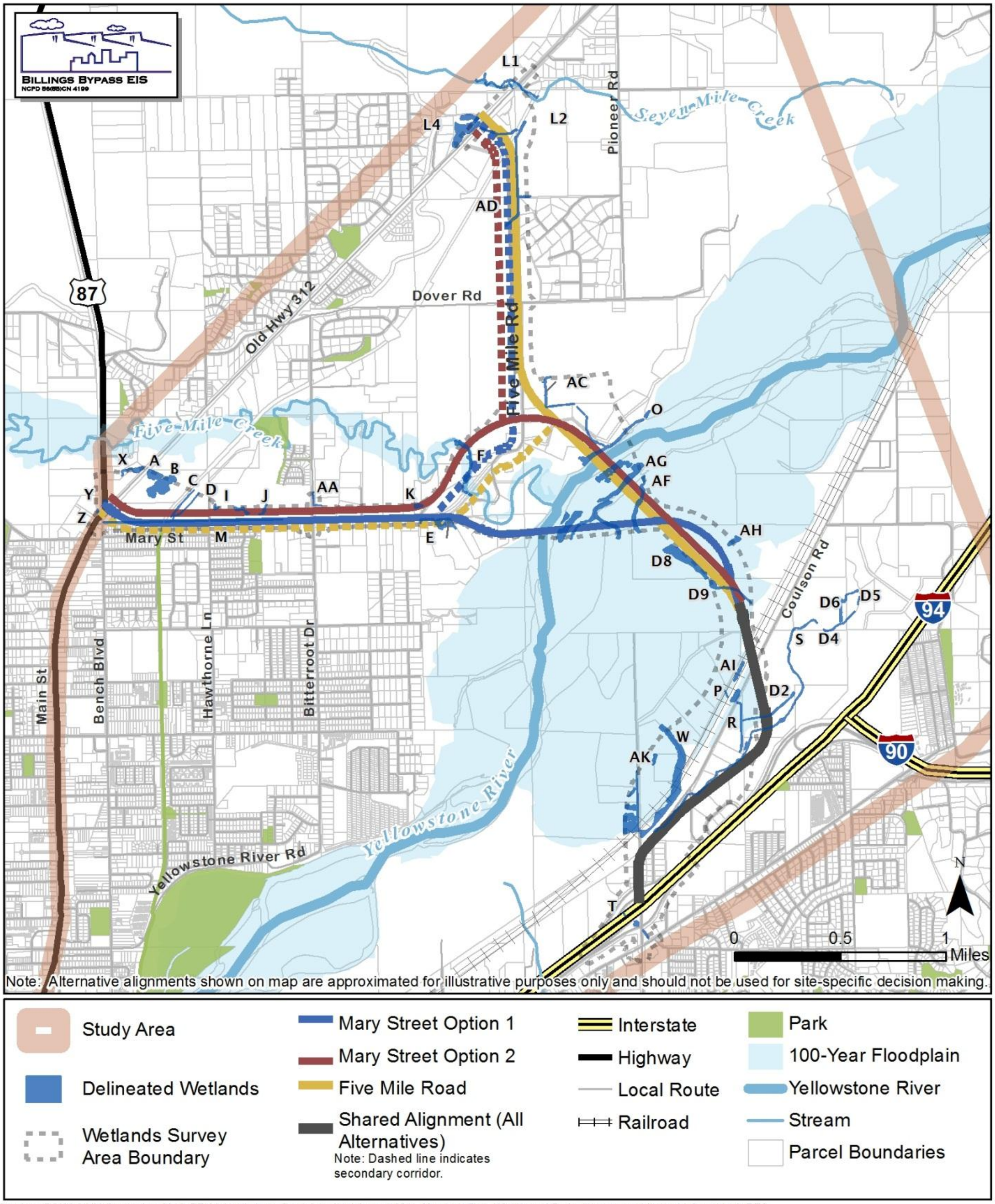
WETLAND FIELD ID	WETLAND CLASS[1]	MDT RATING[2]	LIKELY JURISDICTIONAL	JUSTIFICATION	DELINEATED ACRES[3]
L2	PEM	IV	Yes	Wetland connects to larger canal wetland to the south (Wetland AD), which potentially drains to Seven Mile Creek or the Miller McGirl Ditch	0.3
L4	PEM	III	Yes	Wetland connects to Wetland AD, which potentially drains to Seven Mile Creek or the Miller McGirl Ditch	1.31
M	PEM	IV	No	Wetland abuts supply ditch; agricultural end use	0.68
O	R2UB	IV	Yes	Wetland located within the Yellowstone River channel	1.79
P	PEM	III	Yes	Wetland abuts supply/water ditch that potentially flows to the Yellowstone River	0.94
R	PEM	IV	Yes	Wetland abuts irrigation lateral supply/waste ditch that potentially flows to the Yellowstone River	0.02
S	PEM	IV	Yes	Wetland associated with Coulson Ditch, which potentially discharges into the Yellowstone River	1.12
T	PEM	IV	No	Roadside ditch wetlands with fully infiltrated flow	0.37
W	PEM	III	Yes	Wetland discharges into an unnamed drainage to Yellowstone River	12.2
Y	PEM	IV	No	Wetland abuts lateral supply ditch; agricultural end use	0.04
Z	PEM	IV	No	Ditch at intersection, intermittent flow, and small pond; flow north from culvert to culvert that ends in agricultural land roadside ditch	0.04

[1] Wetland Classes from Cowardin et al. 1979: PEM - palustrine emergent; PFO - palustrine forested; PSS - palustrine scrub-shrub; R2UB – riverine unconsolidated bottom; R2EM – riverine emergent vegetation; R2SBHx – riverine streambed, permanently flooded, excavated.

[2] MDT Ratings: I-IV scale, with I being of highest quality.

[3] Delineated acres within study area.

Figure 3.38 Location of Wetlands



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/11/2013

3.4.8 VEGETATION

3.4.8.1 GENERAL VEGETATION

The study area crosses a variety of land cover types. Much of the study area has been developed for agricultural, residential, commercial, and industrial use. The agricultural uses in the study area are predominantly irrigated hayfields, with some nonirrigated hayfields, pasture, and cultivated croplands. The native habitats observed during 2011 biological surveys completed for this project, including streams, riparian areas, sagebrush steppe, cliffs, and wetlands, were primarily associated with the river corridors and nearby undisturbed upland areas. Biologists with DEA conducted site visits July 12 through 14, 2011, and August 24 through 26, 2011, and earlier investigations in the fall of 2007. Reconnaissance-level biological surveys were conducted within the study area, as part of the *BRR* (DEA 2011c) completed for this project.

Riparian areas identified in the study area were primarily associated with the Yellowstone River, with isolated patches along the tributaries. These habitats had moderate plant diversity but little to no buffers due to the proximity of the agricultural, commercial, and residential land use. In these areas, the riparian habitat quality was reduced and, in some cases, the habitat was fragmented.

The most prevalent tree species in the study area include: Plains cottonwood *(Populus deltoides*) and crack willow *(Salix fragilis).* In the Yellowstone River Floodplain, the riparian area had higher habitat quality, with mature, large-diameter Plains cottonwood trees and snags. Russian olive (*Elaeagnus angustifolia),* ash (*Fraxinus latifolia*), and boxelder *(Acer negundo)* were found along Five Mile Creek and other tributaries. Typical shrub species included smooth sumac *(Rhus trilobata)* and silver buffaloberry *(Shepherdia argentia)*.

Sagebrush steppe areas were located in the study area north of the Yellowstone River, adjacent to the Five Mile Creek drainage. These areas had generally moderate to low habitat quality because of the presence of introduced species, fragmentation, and lack of buffers to agricultural or developed areas. The most prevalent species include big sage *(Artemesia tridentata)*, common rabbit-brush *(Chrysothamnus nauseosus)*, western wheatgrass *(Agropyron smithii)*, bluebunch wheatgrass, *(Agropyron spicatum)*, and Idaho fescue *(Festuca idahoensis)*.

The native habitats found within the project corridors are the same as in the larger study area: streams, riparian areas, sagebrush steppe, cliffs, and wetlands. Segments of the project corridors that are not already developed for transportation use are composed primarily of hayfields, pasture land, and cultivated cropland.

3.4.8.2 NOXIOUS WEEDS/INVASIVE SPECIES

Executive Order (EO) 13112, *Invasive Species*, addresses federal agency responsibilities with respect to noxious weeds. As a federally-funded action, this project is subject to the provisions of EO 13112. Yellowstone County manages noxious weeds within the study area. The Montana Department of Agriculture (MDA) defines noxious weeds as "any exotic plant species established or that may be introduced into the state that may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses or that may harm native plant communities and that is designated as a statewide noxious weed by rule of the department; or as a district noxious weed by a board, following public notice of intent and public hearing." In addition to the state-declared noxious weed list, each county weed district can declare additional non-native plants to be noxious within the county (DEA 2011c). Noxious weeds are broken into five priority levels by Yellowstone County as follows.

- Priority 1A: These weeds are not present in Montana. Management criteria will require eradication if detected, education, and prevention.
- Priority 1B: These weeds have limited presence in Montana. Management criteria will require eradication or containment and education.
- Priority 2A: These weeds are common in isolated areas of Montana. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts.
- Priority 2B: These weeds are abundant in Montana and widespread in many counties. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts.
- Priority 3 – Regulated Plants (Not Montana Listed Noxious Weeds): These regulated plants have the potential to have significant negative impacts. The plant may not be intentionally spread or sold other than as a contaminant in agricultural products. The state recommends research, education, and prevention to minimize the spread of the regulated plant.

Generally, the study area and corridors have well-maintained roadside grassy areas and agricultural areas with very few weed species. Species and quantity of noxious weeds are similar throughout the project corridors. Priority 1A, 1B, and 2A noxious weeds were either not found or only found as individual plants in small, isolated occurrences. The weed locations are predominantly Priority 2B, including Canada thistle *(Cirsium arvense)* infestations and, to a lesser extent, Russian knapweed (*Centaurea repens)* and houndstongue *(Cynoglossum officianale).* Leafy spurge (*Euphorbia esula)* was located only along the Yellowstone River south channel noxious weed area. Russian olive, a Priority 3 species (not Montana listed noxious weeds), was found to be a dominant and prevalent species along Five Mile Creek, its tributaries, and wetlands in the study area.

3.4.9 WILDLIFE AND AQUATIC SPECIES

This section describes fish and wildlife and their habitats known or potentially present in the study area. Reconnaissance-level biological surveys were conducted within the study area as part of the *BRR* (DEA 2011c) completed for this project. The *BRR* includes a list of birds, mammals, reptiles, and amphibians observed during biological surveys or reported by landowners.

3.4.9.1 WILDLIFE

Based on the habitats present in the study area, numerous wildlife species are likely to occur. Because the project corridors are primarily agricultural or developed, species that are adapted to the human environment are highly likely to occur project-wide. Areas such as the Yellowstone River corridor, with habitat such as riparian, cliffs, and wetlands, may have a high diversity of species. Irrigation canals and ditches in the agricultural areas provide wildlife with a human-made water and habitat source. Species that prefer sagebrush steppe habitats would be found in fewer numbers because the percentage of this habitat in the study area is very low and the habitat is very fragmented. Species that do not tolerate human disturbance would likely be found in fewer numbers near the developed areas of the study area.

3.4.9.1.1 BIRDS

A total of 63 bird species were identified by sight or song during biological surveys of the study area in July and August 2011, including, but not limited to, waterfowl, shorebirds, raptors, passerines, game birds, and woodpeckers. All but five of these species are protected by the Migratory Bird Treaty Act (MBTA). Most of these species are cosmopolitan, associated with many habitat types, and adapted to human activities and human-made environs. Additional species not detected during field reconnaissance are expected, because field surveys took place in the late portion of the breeding season. Since the study area is within the North American Central Flyway bird migration route, innumerable species of birds migrate through the area.

3.4.9.1.2 TERRESTRIAL MAMMALS

According to the *BRR*, a total of 17 mammal species were documented by sight or sign during site visits. Landowner accounts support general observations that many mammal species known to occur in Yellowstone County use the Yellowstone River and its tributaries as travel corridors and for food, cover, and water. Most of these species are associated with altered habitat, have adapted to human activities, and are common in the study area in a variety of human-made environs. Species include but are not limited to big game, carnivores, bats, and rodents. Other small mammals that were not observed during field investigations but may occur in the study area, based on habitat and range, include little myotis bat (*Myotis sp)*, meadow vole (*Microtus pennsylvanicus*), deer mouse (*Peromyscus maniculatus*), house mouse (*Mus musculus*), and Norway rat (*Rattus norvegicus*). Domestic animals include cattle, horses, cats, and dogs.

3.4.9.1.3 TERRESTRIAL AMPHIBIANS AND REPTILES

Three terrestrial reptile species and one terrestrial amphibian were observed in the study area. These species were found in agricultural and riparian areas and are as follows: common sagebrush lizard (*Sceloporus graciosus*), gopher snake (*Pituophis catenifer*), terrestrial garter snake (*Thamnophis elegans*), and Woodhouse's toad (*Bufo woodhousii*). Other species that were not observed during field investigations but may occur include Western rattlesnake (*Crotalus viridis*), plains spadefoot (*Spea bombifrons*), and Great Plains toad (*Bufo cognatus*).

3.4.9.2 AQUATIC SPECIES

The MTNHP classifies the Yellowstone River as a Large Valley River, Aquatic Ecological System Type A001 and A002. It is a large warm-water river with a moderate gradient and is characterized by long, deep runs and pools with depths of less than 6 feet, mid-stream islands, and side channels and interspaced riffles. Substrate generally consists of cobble in the riffles, with sand and gravel in the runs and pools, and gravel or finer-textured substrates in side channels.

The three major surface water bodies in the study area are the Yellowstone River, Five Mile Creek, and Seven Mile Creek. The flow of Seven Mile Creek to the Yellowstone River is interrupted by a flume. Other surface water bodies are smaller unnamed tributaries, ponds with wetlands, and gravel pit ponds. The project corridors also include two major irrigation ditches, Coulson Ditch and Miller McGirl Ditch, as well as numerous smaller side ditches. The Miller McGirl Ditch is located outside of the study area but receives waters from other ditches within the study area.

3.4.9.2.1 FISH SPECIES

A total of 33 fish species have been confirmed as occurring in the Yellowstone River and Five Mile Creek within the study area. Potential fish occurrences in the study area include species of minnows, suckers, catfish, cod, sticklebacks, pike, sunfish, and trout. The Seven Mile Creek flow to the Yellowstone River is interrupted by a flume and the Miller McGirl Ditch; therefore, no fish species are listed for this subarea.

Fourteen of the species listed as present in the study area are classified by Montana Fish, Wildlife and Parks (MTFWP) as game fish, and fishing for these species is regulated. The rest of the species are classified as non-game and are not regulated. Two species are Montana Species of Concern: sauger and Yellowstone cutthroat trout. Two aquatic reptiles and two aquatic amphibians were observed in the study area.

3.4.10 STATE SPECIES OF CONCERN

Species discussed in this section have been documented by MTNHP and/or during field investigations conducted as part of the *BRR* (DEA 2011c). MTNHP collects information on Montana's species and assigns each of them a rank to indicate its relative degree of rarity or imperilment on a five-point scale, with 1 being the highest concern and 5 the lowest (1 = critically imperiled because of extreme rarity; 2 = imperiled because of rarity; 3 = very rare locally or restricted range vulnerable to extinction because of other factors; 4 = apparently secure; 5 = demonstrably secure). Each rank is assigned in relation to species abundance over its entire range (Global or G-rank) and within Montana (State or S-rank).

MTNHP and field investigations have documented a total of 19 potential sensitive species of special concern (species of concern) in the Yellowstone County, Billings East Quadrangle area. The quarter of a quarter Latitude/Longitude (QQLL) information provided by MTNHP covers an area of over 200 square miles. This larger database was used for species that have an extensive home range. Of these 19 species, 15 are likely to occur in the study area based on MTNHP Species Occurrence Data, probable occurrence based on habitat, and/or documentation during DEA field investigations. **Table 3.24** summarizes the species, ranks, habitat requirements, and occurrence in the study area. Descriptions of Montana Species of Concern that occur in the study area are provided below.

Table 3.24 Species of Concern Documented in the Billings East Quadrangle, Yellowstone County

COMMON NAME	SCIENTIFIC NAME	GLOBAL RANK[2]	STATE RANK[2]	HABITAT REQUIREMENTS	OCCURRENCE IN STUDY AREA[1]
BIRDS					
Bald eagle	*Haliaeetus leucocephalus*	G5	S3	Rivers, lakes, riparian forest	P/D
Black-billed cuckoo	*Coccyzus erythropthalmus*	G5	S3B	Riparian forest	P
Brewer's sparrow	*Spizella breweri*	G5	S2B	Sagebrush	P/D
Grasshopper sparrow	*Ammodramus savannarum*	G5	S3B	Grasslands	NL
Great blue heron	*Ardea heodias*	G5	S3	Riparian forest	P/D
Loggerhead shrike	*Lanius ludovicianus*	G4	S3B	Sagebrush, mixed use	P
Peregrine falcon	*Falco peregrinus*	G4	S2B	Cliffs	P
Pinyon jay	*Gymnorhinus cyanocephalus*	G5	S3	Open conifer	NL

COMMON NAME	SCIENTIFIC NAME	GLOBAL RANK[2]	STATE RANK[2]	HABITAT REQUIREMENTS	OCCURRENCE IN STUDY AREA[1]
Veery	*Catharus fuscescens*	G5	S3B	Riparian forest	P
MAMMALS					
Hoary bat	*Lasiurus cinereus*	G5	S3	Riparian or forest near water sources	P
Spotted bat	*Euderma maculatum*	G4	S2	Arid land rock outcrops	P
REPTILES					
Common sagebrush lizard	*Sceloporus graciosus*	G5	S3	Sagebrush steppe with rock outcrops	P/D
Greater short-horned lizard	*Phrynosoma hernandesi*	G5	S3	Sandy/gravelly soils of sparse arid sage or grasslands	P
Milksnake	*Lampropeltis triangulum*	G5	S2	Rock outcrops, hillsides, badlands	P
Snapping turtle	*Chelydra serpentina*	G5	S3	Small reservoirs and perennial small streams	D
Spiny softshell	*Apalone spinifera*	G5	S3	Prairie rivers and larger streams	P
Western hog-nosed snake	*Heterodon nasicus*	G5	S2	Sagebrush, grasslands, arid farms or floodplains	P
FISH					
Sauger	*Sander canadensis*	G5	S2	Large prairie rivers	NL
Yellowstone cutthroat trout	*Oncorhynchus clarkii bouvieri*	G4T2	S2	Cold rivers	NL

Source: MTNHP 2011.

[1]P = Probable occurrence based on habitat. D= Documented by DEA field studies. NL=Not likely.

[2]Definitions of Ranks:

G1 / S1 At high risk because of extremely limited and/or rapidly declining numbers, range, and/or habitat, making it highly vulnerable to global extinction or extirpation in the state.

G2 / S2 At risk because of very limited and/or declining numbers, range, and/or habitat, making it vulnerable to global extinction or extirpation in the state.

G3 / S3 Potentially at risk because of limited and/or declining numbers, range, and/or habitat, even though it may be abundant in some areas.

G4 / S4 Apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining.

G5 / S5 Common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range.

B Breeding.

T Rank of a subspecies or variety. Appended to the global rank of the full species.

3.4.10.1 SPECIES DESCRIPTIONS

Summaries of the Montana Species of Concern that have been documented in Billings East Quadrangle, Yellowstone County, are referenced primarily from the MTNHP and MTFWP Montana Field Guide and the MTNHP GIS geodatabase (DEA 2011c).

3.4.10.1.1 BALD EAGLE

The bald eagle was removed from Endangered Species Act (ESA) protection in 2007. This species is still protected by the Bald and Golden Eagle Protection Act and the MBTA, and is a Montana Species of Concern. The bald eagle is a year-round resident in forested, mountainous areas of Montana and also may move to the more temperate weather of lower elevations or to other areas with higher concentrations of food (DEA 2011c).

The bald eagle occurs primarily in riparian and lacustrine habitats (forested areas along rivers and lakes), especially during the breeding season. Important year-round habitat includes wetlands, major water bodies, spring spawning streams, ungulate winter ranges, and open water areas. Wintering habitat may include upland sites. Nesting sites are generally located within larger, forested areas near large lakes and rivers, where nests are usually built in the tallest, oldest, large-diameter trees. Nesting site selection is dependent upon maximum local food availability and minimum disturbance from human activity. Bald eagles consume primarily fish, but they also take waterfowl, carrion, and small mammals in the winter. Nests are very large structures, usually reused for many years. The most common nest trees are ponderosa pine, Douglas-fir, and cottonwood. Nest building dates in Montana begin as early as December, and fledging may continue through August (DEA 2011c). In Montana, seasonal restrictions occur from approximately February 1 through August 15 (DEA 2011c).

According to the *BRR*, bald eagles have been sighted regularly in the study area as breeding birds, winter migrants, and transients (DEA 2011c). Individual bald eagles were observed along the Yellowstone River and Five Mile Creek by DEA biologists, a landowner, and according to other accounts. Bald eagle nest locations in 2012 provided by MTFWP were located about 1.5 miles downstream of the study area and about 0.6 miles upstream.

A communal roosting snag within 500 feet of the alternative alignments, near the Yellowstone River, north of the terminus of Johnson Lane, was found during field investigations. This is the only communal roosting location currently identified. Communal roosting typically occurs outside of the breeding season at opportunistic feeding locations. Individual roosting sites have been observed at various locations along the Yellowstone River and Five Mile Creek.

3.4.10.1.2 BLACK-BILLED CUCKOO

The black-billed cuckoo is a grayish-brown cuckoo with a dark mandible. Black-billed cuckoos typically arrive in Montana from early to mid-June and depart before October. It is a summer resident and a nocturnal migrant. In Montana, they are found most often in riparian areas with a shrubby understory. They also occur in foothill deciduous woodlands. Their diet consists of insects such as caterpillars, crickets, grasshoppers, and butterflies. Their diet also includes mollusks, fish, small vertebrates, and fruits. Their populations have been correlated to tent caterpillar populations.

There has been one sighting of the black-billed cuckoo in the study area on June 20, 2009. The sighting was of indirect breeding evidence west of the study area near Billings Bench gravel pit pond, east of Barnet Road, about 0.1 mile west of the Yellowstone River. The riparian habitat along the Yellowstone

River meets the habitat requirement for this species. None were documented during DEA field investigations.

3.4.10.1.3 BREWER'S SPARROW

Brewer's sparrows migrate into Montana in mid-May to late May and leave in mid-August (DEA 2011c). They generally nest in sagebrush in Montana (DEA 2011c). Brewer's sparrows eat mostly insects (grasshoppers and beetles) and a smaller percentage of grass seeds. In central Montana, most nests were found between 6 to 8 inches above the ground in big sagebrush plants.

Brewer's sparrows have been sighted in the study area during the Landbird Monitoring Program, with indirect breeding evidence. The sagebrush steppe areas in the study area are suitable habitat for Brewer's sparrow. They were documented during field investigations by DEA biologists in these areas and were likely breeding populations.

3.4.10.1.4 GRASSHOPPER SPARROW

Grasshopper sparrows occur in open prairies with intermittent brush. Their diet consists of insects and grasshoppers in the summer and grasses and seeds in the winter. This migratory sparrow occurs in Montana mid-April to mid-July. They nest and forage mostly on the ground. Grasshopper sparrows have been documented in the study area during the Landbird Monitoring Program, with indirect breeding evidence.

The study area has limited habitat for the grasshopper sparrow due to lack of native prairieland; thus, it is not likely that grasshopper sparrows occupy the study area. None were documented during DEA field investigations.

3.4.10.1.5 GREAT BLUE HERON

The great blue heron is a year-round resident throughout most of Montana. It is a fairly common permanent resident. They are found in wetlands in residential and wilderness settings. Most Montana nesting colonies are in cottonwoods along major rivers and lakes. A smaller number occur in riparian ponderosa pines and on islands in prairie wetlands. Nesting trees are the largest available. Great blue herons consume mostly fish but also amphibians, invertebrates, reptiles, mammals, and birds. Breeding season begins in March, and fledging occurs by mid-August.

Great blue herons have been regularly sighted in the study area in agricultural areas, wetlands, and along the Yellowstone River. MTFWP identified a heron rookery south of the study area and near the south crossing of the Yellowstone River. Great blue heron colonies usually exist in the same location for many years. Colonies are most vulnerable to disturbance during the nesting season from industrial development, road construction, vehicle traffic, and repeated human intrusions. However, some colonies located in proximity to existing human activities tolerate some disturbance. The MTFWP *Fish and Wildlife Recommendations for Subdivisions* (2012) recommends an 800-foot vegetated buffer.

3.4.10.1.6 LOGGERHEAD SHRIKE

Loggerhead shrikes migrate to Montana primarily in May and depart in August. This species occurs in native grassland communities with shrub components as well as fallow fields and roadsides. They eat primarily insects but also consume amphibians, small reptiles, small mammals, and birds.

A loggerhead shrike was sighted in the study area in 2002 during the Landbird Monitoring Program, with indirect breeding evidence. Although there is suitable habitat for loggerhead shrike in the study area, none were documented through field investigations (DEA 2011c).

3.4.10.1.7 PEREGRINE FALCON

Peregrine falcons are migratory birds arriving in Montana in late April to early May and departing in August to early September. Nests are typically located on ledges of vertical cliffs, ideally in undisturbed areas with a wide view, near water, and close to prey sources. They sometimes nest on human-made substitutes for cliffs such as tall buildings, bridges, rock quarries, and raised platforms. Peregrine falcons feed primarily on birds (medium-size songbirds to small waterfowl) and may hunt 4 to 5 miles from their nest site. The nesting period is estimated to be June and July. The peregrine falcon was removed from the federal endangered species list in 1999.

There is a peregrine falcon eyrie (i.e., nest) at the Sacrifice Cliff area, about 5 miles upstream from the project. The study area is within their hunting range.

3.4.10.1.8 PINYON JAY

Pinyon jays are small-medium jays and are crestless. Adult plumage is entirely dull blue. This jay is a year-round resident of southeast Montana and may be nomadic. In Montana, they occur in low-elevation ponderosa pine and limber pine-juniper woodlands. They are generally omnivorous, and pine seeds are an important component of their diet. They also consume wild fruits, agricultural grains, arthropods, lizards, snakes, and nestling birds or small mammals. These jays are rarely seen individually and often nest in colonies.

Pinyon jays have been sighted most commonly about 5 miles southwest of the study area in the Sacrifice Cliff area. Generally, there is a lack of conifers in the study area, except a location near the mouth of Five Mile Creek. No pinyon jays were documented during field investigations.

3.4.10.1.9 VEERY

This thrush is migratory and is found in Montana mid-April through mid-September. It has a strong preference for riparian habitats in the Great Plains. In Montana, veerys are often associated with willow thickets and cottonwoods along streams and lakes in valleys and lower mountain canyons. The veery is primarily a ground forager, with a diet including insects and fruit.

There is one documented sighting in 1991 at the Billings Riverfront Park, about 4 miles from the study area. However, the entire riparian habitat along the Yellowstone River meets the habitat requirement for this species. None were heard or seen during field investigations (DEA 2011c).

3.4.10.1.10 HOARY BAT

Hoary bat is the largest bat species found in Montana. It is migratory and only a summer resident in Montana, with records of occupying forested areas from early June through September. This bat appears to be solitary, roosting primarily in trees. Roosting may occur in human-made structures. Often occurring over water sources within forested terrain, both conifer and hardwood, as well as along riparian corridors, hoary bats are reported in Montana over a broad elevation range. They favor moths, beetles, other flying bugs, and much smaller bats as their diet. Hoary bats breed in autumn, possibly during migration, and give birth from the middle of May into early July.

The hoary bat was observed southwest of Huntley in 2005. The riparian habitat along the Yellowstone River and Five Mile Creek meets the habitat requirement for this species. None were heard or seen during field investigations (DEA 2011c).

3.4.10.1.11 SPOTTED BAT

Spotted bats have been documented most frequently in open, arid habitats dominated by Little Utah juniper and sagebrush, sometimes intermixed with limber pine or Douglas-fir, or in grassy meadows in ponderosa pine savannah (DEA 2011c). Cliffs, rocky outcrops, and water are other characteristics of sites where spotted bats have been documented. Spotted bats roost in caves and in cracks and crevices in cliffs and canyons. This bat is insectivorous, feeding primarily on moths (DEA 2011c).

The spotted bat was observed mostly at the Billings Riverfront Park, about 4 miles from the study area. The cliff areas along the Yellowstone River and Five Mile Creek meet the habitat requirements for this species. None were documented during biological field investigations (DEA 2011c).

3.4.10.1.12 COMMON SAGEBRUSH LIZARD

The common sagebrush lizard is a year-round resident of southeast Montana. It is small and narrow with small, spiny, keeled scales on the back and a pale dorsolateral stripe on each side. It uses rodent burrows, shrubs, logs, and rocks for cover. Although a ground dweller, this lizard will perch above ground in low shrubs and trees, and consumes mostly ants, beetles, and moths. It is diurnal and active above ground from early May through mid-September.

The sagebrush steppe areas in the study area are suitable habitat for this species. They were observed during field investigations by DEA biologists in these areas and in an irrigated cropland site (DEA 2011c).

3.4.10.1.13 GREATER SHORT-HORNED LIZARD

The greater short-horned lizard is a year-round resident of eastern Montana. It is broad and flattened, with a single row of scales fringing each side of the body and the back of the head. Coloration is cryptic. This species occurs in sparse, short grass and sagebrush in coulees and canyons with stone and sun-baked soil. It consumes mostly ants and beetles.

This species has been observed in suitable habitat within the study area. The drainage areas of the sagebrush steppe areas in the study area are suitable habitat for this species. However, they were not documented during field investigations by DEA biologists (DEA 2011c).

3.4.10.1.14 MILKSNAKE

The milksnake is a year-round resident of southeast Montana. The body of the milksnake is marked with wide whitish, black, and reddish/orange bands. Milksnakes have been reported in areas of open sagebrush-grassland habitat and most often in or near areas of rocky outcrops and hillsides or badland scarps, sometimes within city limits. Milksnakes are carnivorous, consuming mostly small vertebrates, including snakes, lizards, reptile eggs, birds, bird eggs, small mammals (especially mice), and occasionally insects and worms (DEA 2011c). Milksnakes are mostly crepuscular and nocturnal. In Montana, they are active from late May to October. Predators are largely unknown in Montana, but milksnakes exhibit predator defense behavior and rear up and strike, or vibrate the tail, when disturbed, although they are usually docile when handled.

There are few recent milksnake records for Montana. The milksnake was historically present in the southeast portion of the study area, but there has been no recent observation there. Current sightings have been about 4 miles outside of the study area near the cliffs of Alkali Creek, Rimrocks area, and the ExxonMobil refinery. There is suitable habitat in the study area for this species. However, they were not documented during field investigations (DEA 2011c).

3.4.10.1.15 SPINY SOFTSHELL

Native populations of the spiny softshell turtle occur in Montana east of the Continental Divide in the Missouri River and Yellowstone River drainages, and some principal tributaries (Maxwell et al. 2003). Spiny softshells are isolated in Montana from the remainder of the global population. They primarily occupy large rivers and their tributaries, but are also found in lakes, ponds along rivers, bayous, irrigation canals, oxbows, and pools along intermittent streams. They are considered to be generalist carnivores and usually feed on the bottom. Major foods include crayfish, aquatic insects, and fish. Eggs are laid primarily in the second half of May through June.

The spiny softshell has been observed in Billings Riverfront Park and the Yellowstone River. There is suitable habitat along the Yellowstone River for this species. However, they were not documented during field investigations by DEA biologists (DEA 2011c).

3.4.10.1.16 SNAPPING TURTLE

Snapping turtle habitat studies are lacking, and there is little quantitative information available. They have been captured or observed in backwaters along major rivers, at smaller reservoirs, and in smaller streams and creeks with permanent flowing water and sandy or muddy bottoms. Snapping turtle diets have not been studied in Montana, but they are known to eat about anything that can be captured (fish, amphibians, reptiles, aquatic birds, small mammals, invertebrates, and carrion). They are mostly nocturnal and hibernate from October until April.

A single snapping turtle was observed by a landowner a few years ago at his gravel pit pond near Mary Street. There is suitable habitat in the study area for this species. However, they were not documented during field investigations by DEA biologists (DEA 2011c).

3.4.10.1.17 WESTERN HOG-NOSED SNAKE

The western hog-nosed snake has been found in a variety of habitats including sagebrush-grassland habitat, near pine savannah in grassland underlain by sandy soil, and in arid areas, farmlands, and floodplains, particularly those with gravelly or sandy soils. They occupy burrows or dig into soil and, less often, are found under rocks or debris during periods of inactivity.

The western hog-nosed snake has been observed in suitable habitat near the study area. There is suitable habitat in the study area for this species. However, they were not documented during field investigations by DEA biologists (DEA 2011c).

3.4.10.1.18 SAUGER

The sauger is a highly prized sport fish native to Montana east of the Continental Divide. It is mainly a river fish, but it also inhabits turbid waters of large rivers and reservoirs. In the spring, sauger broadcast their spawn in gravelly or rocky areas over riffles in shallow water and seem to prefer turbid water. Spawning is often accompanied by migration upstream and/or into tributary streams in the spring. Long migration occurs in the Yellowstone and Missouri rivers. The Tongue and Powder rivers are vital spawning areas for the Yellowstone River population. Billings is the western extent of their range in the Yellowstone River. Their major food items are insects and small fish (DEA 2011c).

The sauger has been documented by MTFWP in the Yellowstone River. The bulk of this fishery exists downstream of Huntley, Montana. Recent information suggests that the sauger in this area are genetically unique from sauger in the Bighorn River and in the Yellowstone River below the confluence of the Bighorn River. The study area may have spawning areas within the Yellowstone River channels or Five Mile Creek.

3.4.10.1.19 YELLOWSTONE CUTTHROAT TROUT

The Yellowstone cutthroat trout has a golden coloration, two prominent red slashes on the lower jaw, and medium-large, black spots that tend to be concentrated posteriorly. They are native to the Yellowstone River drainage of southwest and south-central Montana. Yellowstone cutthroat trout are stocked in Lake Elmo, which is located about 0.5 mile west of the Mary Street and US 87 interchange outside of the study area, and in parts of the Yellowstone River. Yellowstone cutthroat trout would be rare in the study area and unlikely to occur. Historically, Yellowstone cutthroat trout likely spawned in the Yellowstone River, but well upstream of Billings. Currently they are relegated to headwater areas, which are not present in the study area (DEA 2011c).

3.4.11 THREATENED AND ENDANGERED SPECIES

In accordance with Section 7(c) of the Endangered Species Act of 1973, the Billings Bypass project was evaluated to assist FHWA in its coordination with the U.S. Fish and Wildlife Service (USFWS) in determining the potential effects on plant and animal species listed by the USFWS as threatened, endangered, candidate, or proposed. The ESA directs federal agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the existence of any threatened or endangered species, or result in the destruction or modification of their critical habitat. Section 7 of the ESA requires federal agencies to consult with the USFWS on actions that may affect listed species. MDT is responsible for Section 7 consultation for this project on behalf of the lead federal agency, the FHWA.

Species that are listed under the ESA that are evaluated for potential impacts under this project are: whooping crane (*Grus americana*), a listed Endangered species, black-footed ferret (*Mustela nigripes*), a listed Endangered species, and Sprague's pipit (*Anthus spragueii*) and greater sage-grouse (*Centrocercus urophasianus*), listed Candidate species.

3.4.11.1 WHOOPING CRANE (ENDANGERED)

The whooping crane is a large, white crane that inhabits wetlands and upland grain fields. They nest in marshes and feed on insects, minnows, crabs, clams, crayfish, frogs, rodents, small birds, and berries. The whooping crane has been listed as endangered since March 11, 1967. Critical habitat was designated in 1978; Montana is not included within the designation. Conversion of habitat to agriculture was the primary factor in the decline of the whooping crane. Collision with rural power lines is also thought to have contributed to a substantial number of whooping crane deaths. Currently, reproductive characteristics of whooping crane make recovery difficult.

This species migrates through eastern Montana. Most observations have occurred in April and October. Whooping cranes were documented in April 2010 near the Huntley Interchange, about 9 miles east of the study area. No whooping cranes were observed during field visits in the study area. Habitat that could be used during migration by whooping cranes is present in the study area. However, use of these areas would be infrequent and brief during migration.

3.4.11.2 BLACK-FOOTED FERRET (ENDANGERED)

The black-footed ferret has a similar habitat of the prairie dog, depending on them as a primary prey species and their burrows for shelter. Only large prairie dog complexes that include several thousand acres of closely spaced colonies can support and sustain a breeding population of black-footed ferrets. Black-footed ferrets have been extirpated from most of their former range mainly as a result of prairie dog and predator control programs. All current known populations are the result of the reintroduction of captive-bred individuals. The last observation near the study area was in 1949. Suitable habitat or prairie dog areas were not located in the study area during field investigations by DEA biologists (DEA 2011).

3.4.11.3 GREATER SAGE-GROUSE (CANDIDATE SPECIES)

The greater sage-grouse is the largest of Montana's grouse. They are year-round residents of Montana. Sagebrush is the preferred habitat. Greater sage-grouse have high habitat acreage requirements. They use sagebrush-covered benches in June to July with an average required acreage of 213 acres. When the forbs on the sagebrush-covered benches dry out, the greater sage-grouse move to alfalfa fields, requiring an averaging of 144 acres, or greasewood bottoms, requiring an averaging of 91 acres. The greater sage-grouse move back in late August to early September to sagebrush vegetation, requiring an average of 128 acres this time of the year (Peterson 1969).

On March 5, 2010, the USFWS determined that the greater sage-grouse warrants protection under the ESA, but is precluded due to higher listing priorities and is thus designated as a Candidate species. Evidence suggests that habitat fragmentation and destruction across much of the species' range has contributed to significant population declines over the past century. These birds cannot survive in areas where sagebrush no longer exists, and distribution has contracted due to loss of sagebrush habitat (USFWS 2011).

Individual greater sage-grouse and their leks have been documented more than 2 miles west of the study area in suitable habitat. None have been documented in the study area. It is unlikely that greater sage-grouse occur in the study area due to lack of quality, suitable habitat in sufficient acreage. Sagebrush areas in the study area are limited to isolated, small locations. The project corridors do not contain sagebrush steppe habitat suitable for greater sage-grouse and are predominantly developed or agricultural land unsuitable for the greater sage-grouse.

3.4.11.4 SPRAGUE'S PIPIT (CANDIDATE SPECIES)

The Sprague's pipit is endemic to grasslands and prefers native, medium to intermediate height prairie. The Sprague's pipit arrives in Montana in early May and breeds shortly thereafter. Sprague's pipit nests have been recorded from May through August. On September 14, 2010, the USFWS determined that the Sprague's pipit warrants protection under the ESA, but is precluded due to higher listing priorities and is thus designated as a Candidate species. Sprague's pipits avoid unsuitable landscape features in breeding territories. Threats include loss of habitat, habitat fragmentation on the breeding grounds, and inadequacy of existing regulatory mechanisms. Approximately 2% of the species' historical U.S. range remains in potentially suitable habitat for the pipit (50 CFR Part 17). Migrating populations occur in southern Montana, and breeding occurrences are generally north of the Yellowstone River through southern Canada.

There is no breeding evidence in Yellowstone County according to the MTNHP and MTFWP and as documented in the *BRR* (DEA 2011c). Sprague's pipit is unlikely to occur in the study area. There are no reported species occurrences in the study area or observations made during field investigations (DEA 2011c). Suitable habitat in the form of large tracts of native medium to intermediate height prairie is not present in the study area.

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4 ENVIRONMENTAL CONSEQUENCES

Chapter 4 discusses the environmental impacts from construction and operation of the alternatives listed in Chapter 2, Alternatives. Chapter 4 presents background; methodologies; direct, indirect, and temporary and construction impacts; cumulative impacts; and mitigation strategies associated with the alternatives under consideration for each resource.

As a result of the scoping process, it was determined with stakeholders and the lead agencies to do an environmental impact statement to analyze the significance of impacts, relative to their context and intensity. Key issues being analyzed include impacts to wetlands and waters of the U.S., floodplains, historic resources, right-of-way and relocations, and parks and recreation resources.

This resource analysis focuses on the resource issues that differentiate the alternatives being described. The Council for Environmental Quality regulations on implementing the National Environmental Policy Act (NEPA) provides direction to focus the assessment criteria for the impact discussions. It is the policy of NEPA (40 CFR 1500.2(b)) "…to emphasize real environmental issues and alternatives." This alternatives analysis provides an appropriate level of detail, commensurate with the early stages of design, to compare the build alternatives and relative project impacts using consistent assumptions. This level of detail is sufficient to show relative comparison of impacts among alternatives. During final design, additional site-specific details may be developed in order to further avoid, minimize, and mitigate impacts to resources whenever possible.

Direct impacts are defined as impacts that are:

- Caused by the action.
- Occur at the same time and same place.

Indirect impacts are defined as impacts that:

- Are caused by the action.
- Are later in time or farther removed in distance.
- Are reasonably foreseeable.

Federal Regulations in 40 CFR 1508.7 define cumulative impacts as those that:

- Result from the incremental impact of the action when added to the past, present, and reasonably foreseeable future actions.
- Can result regardless of what agency (federal or non-federal) or person undertakes such other actions.
- Can result from individually minor but collectively significant actions taking place over period of time.

PHASE 1 AND FULL BUILDOUT ROAD CONSTRUCTION: APPROACH AND ANALYSIS

As described in Section 2.6 "Phased Project Implementation," the potential impacts associated with the Full Buildout of each of the build alternatives (four-lane road and associated improvements) were disclosed in the DEIS. However, due to funding constraints, an initial two-lane road would be constructed in advance of the Full Buildout. The two-lane road is considered "Phase 1" in this document. This FEIS presents additional analysis describing the potential impacts associated with building an initial two-lane road (Phase 1) before the construction of a final four-lane road (Full Buildout).

In general, Phase 1 would not have substantially different effects than the Full Buildout. Although the footprint of Phase 1 would be narrower than the footprint of the Full Buildout, the right-of-way needed for the Full Buildout would be purchased (to the extent possible) during development of Phase 1, and Phase 1 would be built along the same alignment with generally the same access control and pedestrian and bicycle facilities as with the final four-lane road. The bridge across the Yellowstone River would initially be constructed as a two-lane bridge with sufficient right-of-way acquired on the bridge approaches to accommodate the later construction of a second, adjacent two-lane bridge. The other bridges and the culverts that would be required for the project would be built wide enough to allow for the eventual expansion to a four-lane road, and thus the impacts associated with those improvements would be similar when comparing Phase 1 to the Full Buildout.

Thus, for most of the resources considered, the impacts from Phase 1 would be similar to or fewer than impacts from the Full Buildout. Thus, the impacts associated with the Full Buildout should be considered the "worst-case scenario" for Phase 1. For the following resources, differences between the footprint, construction, and operation of Phase 1 and the Full Buildout warrant additional analysis regarding the impacts associated with Phase 1:

- Transportation
- Water Resources
- Water Body Modifications
- Floodplains
- Wildlife and Aquatic Species
- Wetlands

For the other resource topics, differences in the impacts associated with Phase 1 and the Full Buildout are minor and are not analyzed further.

4.1 CUMULATIVE RESOURCES ANALYZED

The Montana Department of Transportation (MDT) examines cumulative impacts to determine whether any of the resources are reaching a level where there may be a fundamental change in the health of the resource. This analysis examines direct and indirect actions that may occur as a result of the proposed actions and how they may affect resources of concern. When the lead agencies examined the resources in 2011 during the project scoping, which is part of the process when critical issues are identified, a primary concern was the potential for the build alternatives to increase the potential for development and to increase population. In turn, this development has the potential to have an "additive" impact on community values and sensitive natural resources. With respect to this primary concern, all of the resources studied in the EIS were analyzed related to the potential for cumulative effects. Not all of the resources have the potential to be affected. The resources of concern for the cumulative effects analysis analyzed in Chapter 4 are:

- Transportation (with the exception of pedestrian and bicycle facilities)
- Land Use and Local Plans
- Socioeconomic Resources
- Cultural Resources

- Farmlands
- Water Resources
- Water Body Modifications
- Wetlands
- Wildlife

4.1.1 CUMULATIVE STUDY AREA

The geographic resource boundary used for the cumulative impacts analysis is based on other resources of concern and the potential impacts to these resources under a build alternative.

For most resources, this boundary consists of the regional study area for the Billings Bypass. This regional study area consists of an area between Old Hwy 312 and the I-90/I-94 interstate corridors. The geographic resource boundary used for the cumulative impacts analysis is based on the resources of concern and the potential impacts to these resources under a build alternative.

The only exception to the use of that boundary was the resource analysis conducted for Land Use and Local Plans. This cumulative study area considered the effects to land use west of the general study area, where much of the growth is expected to occur. The north, east, and west boundaries of this cumulative study area roughly followed the Urban Planning Boundary southwest from the general study area to 40th Street on the western edge of the city of Billings. The southern boundary of the cumulative study area is the Montana Rail Link railroad. **Figure 4.1** depicts the cumulative and general study areas.

4.1.2 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

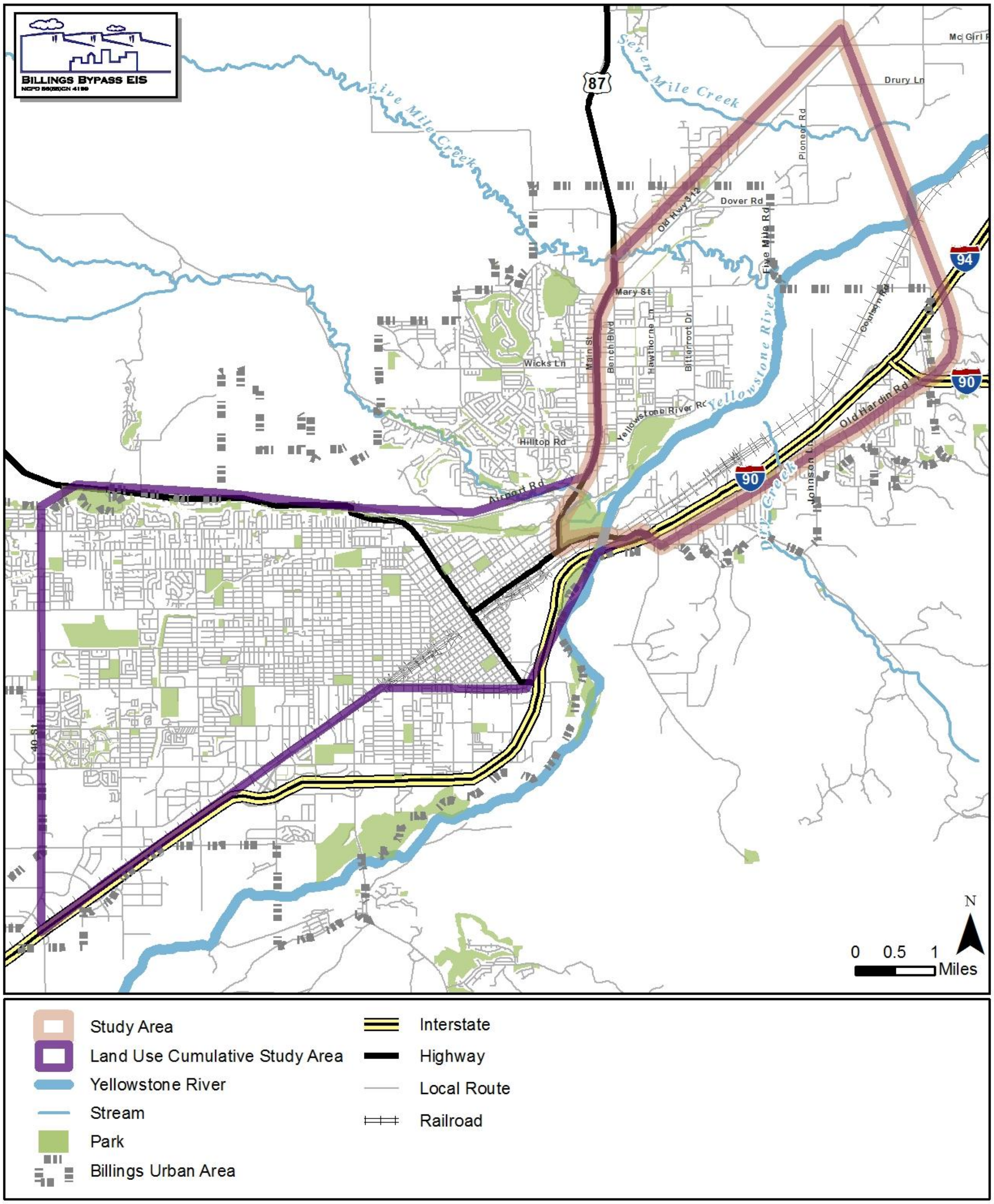
The time frame considered for the cumulative impacts analysis begins with the development of Billings in the late 1800s and extends to 2035. Past actions considered include agricultural operations, transportation improvements, and residential and commercial development. MDT assessed past actions in relation to their effects on key resources of concern including wetlands and waters of the U.S., historic resources, land use, wildlife, socioeconomic resources, and transportation.

4.1.2.1 PAST ACTIONS

Billings was established in 1882 in the Montana Territory near the already existing town of Coulson. The city of Billings was a rail hub founded by the Northern Pacific Railroad on a site originally known as Clark's Fork Bottom. The Montana & Minnesota Land Company oversaw the development of potential railroad land and platted the new town of Billings. The new town developed along the two sets of rail tracks and drew residents from all over (Jiusto 1998).

The topography within the study area influenced the founding of Billings and subsequent development of transportation routes in the area. Development of irrigation also stimulated local settlement and economic development. A 1941 aerial photograph shows cultivated and irrigated fields, with only a few farmsteads, north of Five Mile Creek in the vicinity of the study area. By this time, agriculture on the irrigated lands of the Billings Bench was well diversified. Truck farming, a type of farming that originally depended on local or regional markets, was also popular, because Billings provided a good local market (Oravetz 1943).

Figure 4.1 Cumulative and General Study Areas



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 12/15/2013

The proposed project corridor would cross lands irrigated by the Coulson Ditch, which is located south of the Yellowstone River and irrigates nearly 700 acres, with an additional 800 acres possible. These irrigated fields, all of which were originally natural prairie, had to be rigorously prepared into irrigated farmland. Many of the irrigated fields within and adjacent to the study area did not drain properly, particularly on the Billings Bench. This was especially true along the proposed project corridor between Mary Street and Old Hwy 312. Two drains were constructed in the 1930s, both of which cross the project corridor along Five Mile Road (G. Ostermiller, pers. comm., 2011).

4.1.2.1.1 PAST TRANSPORTATION ACTIONS

The Northern Pacific Railway was a railway that operated across the northern tier of the western United States. The hub was located in Billings and served a large area, and its presence led Billings to become one of the largest trade areas in the United States (Big Sky Economic Development 2012). Billings is the trade and distribution center for most of Montana, northern Wyoming, and western portions of North Dakota and South Dakota.

The Billings and Central Montana Railroad (BCM), a 12.8-mile rail line that provided passenger and freight service from Billings to the newly created town of Shepherd, was constructed in 1913 near the center of the Billings Bench Boulevard reconstruction project from Hilltop Road to US Hwy 87. The BCM railroad bed, abandoned in 1972, is still visible and crosses the project corridor in the vicinity of Mary Street (DeVries et al. 1976; Dove 1935).

Dover Road served as the primary travel route between Billings and Huntley, and became part of the Montana primary road system by 1914. The Yellowstone Trail, a road network developed in the 1910s, followed Dover Road. In 1926 the Yellowstone Trail was designated US Highway 10 (now Old Hwy 312 along the north edge of the study area and I-90 along the south edge), which served as the major east-west route across the southern part of Montana from Idaho to North Dakota until the development of the Interstate Highway System (Wyes 1992).

US Highway 10 was the main roadway in 1941. In 1945, the Montana Department of Highways completed plans for a roadway to replace US Highway 10. The portion of the highway south of the Yellowstone River became I-90 and currently serves as the major transportation route through the Yellowstone Valley. New residential developments were created along the highway corridor on either side. Completion of this highway started the transformation of the area near Five Mile Creek from agricultural to suburban. Landowners began to subdivide their property along the highway within the study area, and several small subdivisions were platted in the 1950s. The Borgen Subdivision was developed in the 1950s between Coulson Road and I-90. During the 1960s and 1970s, many of the houses along the south side of Mary Street between Bench Boulevard and Bitterroot Drive were constructed. Since 1972, subdivisions in this area have experienced extensive growth as the population of Billings moves eastward towards Huntley (Meshnick et al. 1972).

As a result of these past actions, the majority of the study area is developed and no longer retains its original setting. The study area between I-90 and Old Hardin Road has become highly developed with commercial enterprises, including gas stations, banks, and car washes. Most of Mary Street between Bench Boulevard and Five Mile Road has become urbanized and is within the Billings city limits. Five Mile Road north to Old Hwy 312 is mostly agricultural and unincorporated, and two large and active gravel pits flank the road, with several smaller abandoned gravel pits located nearby. Several commercial developments exist at the junction of the project corridor and Old Hwy 312. In the Lockwood area, Johnson Lane between the Yellowstone River and Coulson Road is mostly rural, and includes one large, active gravel pit and the ExxonMobil Wildlife Refuge.

4.1.2.2 PRESENT ACTIONS

The *Billings Area I-90 Corridor Planning Study* published in March 2012 recommends near- and long-term improvements to the I-90 corridor from the Laurel Interchange (southwest of Billings) to the Pinehills Interchange (where I-90 and I-94 connect). Recommended improvement options that could be undertaken presently or in the reasonably foreseeable future (see below), depending on funding availability, include (MDT n.d.):

- Interstate widening and interchange reconstruction to address capacity needs and traffic operations within the 2035 planning horizon.
- Bridge reconstruction.
- Safety improvements to reduce conflicts at interchange ramps.
- Geometric improvements to bring the interstate into compliance with current MDT design standards.

Bench Boulevard is currently under reconstruction from Lake Elmo Drive to Hilltop Road as a part of Phase I of the Bench Boulevard Reconstruction project. The road will be widened to two driving lanes and a two-way left-turn lane, with parking available along most of the alignment. Construction is scheduled for completion in 2013 (MDT n.d.). Phase II of the project will include reconstruction of the northern section of Bench Boulevard, including the Bench Boulevard/US 87/Old Hwy 312 intersection. Phase II is currently scheduled for 2016.

MDT has identified safety improvements for intersections along Old Hwy 312, including the intersection of Pioneer Road and Drury Lane in the northeast section of the study area. The remaining intersections are farther northeast along Old Hwy 312, outside of the study area. The purpose of the improvements is to reduce the number and severity of crashes on Old Hwy 312. Design is nearly complete, and MDT is in the process of obtaining environmental permits (MDT n.d.).

Big Sky Economic Development Authority, a public agency evolved from the Montana TradePort Authority, is preparing a master plan to develop the Gateway Expansion area, adjacent to the southwest corner of the study area, for hospitality and entertainment uses. The area has been identified as providing a major opportunity for full-scale redevelopment. The plan is expected to address recommendations for easing traffic congestion at 6th Avenue and Main Streets, and may include a grade-separated overpass to ease traffic congestion (City of Billings 2009; Billings Gazette 2012). The plan will include the transportation corridor from the I-90 Lockwood Interchange to the Airport Road/Main Street intersection and the land along its corridor (City of Billings 2011a).

Most of Mary Street between Bench Boulevard and Five Mile Road is now urbanized and within the Billings city limits. Five Mile Road north to Old Hwy 312 is mostly agricultural and unincorporated, and two large and active gravel pits flank the road, with several smaller abandoned gravel pits located nearby. Several commercial developments exist at the junction of the proposed project corridor and Old Hwy 312. In the Lockwood area, Johnson Lane between the Yellowstone River and Coulson Road is mostly rural, and includes one large, active gravel pit and the ExxonMobil Wildlife Refuge.

The Borgen Subdivision was developed in the 1950s between Coulson Road and I-90. The study area between I-90 and Old Hardin Road is highly developed with commercial enterprises, including gas stations, banks, and car washes. In general, most of the study area is now becoming part of the urban extension of Billings and Lockwood.

The population of Billings constitutes 70% of the total county population; this percentage has fluctuated from 62% to 75% from 1980 to 2010 (Cambridge Systematics, Inc. 2010). Yellowstone County has experienced steady growth for the past several decades (City of Billings 2008). Growth in Billings has been more gradual but steady since the 1980s, with growth rates ranging from 11% to 21% each decade. The Billings growth rate declined to 8% between 1970 and 1980, reflecting changes in the oil and gas industries and the agricultural industry. Because of the historic reliance on extractive resources, Billings and Yellowstone County have experienced repeated boom and bust economic cycles. Land development has generally followed these boom and bust cycles.

The majority of the study area is developed and no longer retains its original setting. Only one small parcel of natural prairie exists along the project corridor, located in the vicinity of Five Mile Creek and the Yellowstone River. The project corridor would cross several cultivated or irrigated fields, which have been modified by earth moving activities to remove the contours, leaving a flat landscape more suitable for irrigation. Pasture lands that have been developed from cultivated fields and reclaimed gravel pits are common, and several are irrigated. Urban developments dominate the landscape and include residential, commercial/residential, and commercial/industrial developments, as well as reclaimed/abandoned/active gravel pits (Meshnick et al. 1972). By 1978, Billings Heights (immediately northeast of Billings) became the most densely populated suburb in Montana. The city of Billings annexed portions of Billings Heights in 1984 (Stevens and Redman 2000). From 2000 to 2010, Lockwood, a southeastern suburb of the city, saw growth of 57.8%—the largest growth rate of any community in Montana (U.S. Census 2010).

4.1.2.3 REASONABLY FORESEEABLE FUTURE ACTIONS

The following list of transportation, land development, and parks and recreation projects are expected to occur in the future within or proximate to the study area:

- Bench Boulevard from Lincoln Lane to Hilltop Road – widen to two driving lanes and a two-way left-turn lane, with parking available along most of the alignment.
- 6th Avenue to Bench Boulevard – extend Bench Boulevard south to intersect with Main Street at 4th and 6th avenues (Phase 1).
- Old Hardin Road from Lockwood Interchange to Johnson Lane – widen to three lanes as a “super collector” facility.
- Old Hardin Road from Johnson Lane to Becraft Lane – new connection south of existing to eliminate “double intersection.”
- Lake Elmo Drive from Hansen Lane to Wicks Lane – intersection improvements and multi-use facilities.
- Inner Belt Loop – construct new roadway from near the terminus of Wicks Lane to the intersection of Zimmerman Trail and MT 3. The facility will be constructed as a two-lane rural roadway with ditches and a multi-use path along one side. The length of the project is approximately 6 miles. New intersections will be constructed at Wicks Lane and Alkali Creek, including reconstruction of the intersection of Zimmerman Trail and MT 3.
- Main Street/Hilltop Road – intersection capacity improvements.
- Old Hwy 312/Dover to Bitterroot Drive – reconstruction and signs/markings.

- Lockwood North/South Connector – provide additional connection between the areas of Lockwood north and south of I-90 near Piccolo Lane to provide traffic congestion relief at the Lockwood and Johnson interchanges; requires some reconstruction of I-90 (Marvin & Associates 2008).

Public and private development projects include planned residential and commercial developments. Known subdivision and other projects in the Billings area (city limits or within the urban area) as follows:

- Johnson Lane Materials Subdivision – 5 lots/20 acres north of the railroad tracks, near Johnson Lane.
- Bitterroot Heights Subdivision – north of Mary Street alignments (both options), between Hawthorne Lane and Bitterroot Drive.
- Doss Estates – between Five Mile Road and Pioneer Road, north of planned Dover Memorial Park.
- Clear Creek Subdivision – planned commercial development opposite the junction of Mary Street with US 87 and Old Hwy 312,
- Viewcrest Subdivision – along Old Hwy 312, between Five Mile Road and Mary Street alignments.
- Pioneer Subdivision – northeast of connection between Five Mile Road alignment and Old Hwy 312.
- Cherry Creek Estates Subdivision – planned manufactured home park north of Yellowstone River near Bitterroot Drive.

Future developments outside of the general project area but within the Billings Urban Area include:

- Skyview Ridge Subdivision – western edge of Billings, bordering Alkali Creek.
- Unknown Planned Development (formerly Nothing Concrete) – northwest of connection between Five Mile Road alignment and Old Hwy 312.
- High Sierra Subdivision - northwestern edge of Billings.

These projects will be developed as demanded by the market, and most likely in phases.

Planned parks and trails in the study area are:

- Dover Memorial Park – Master planned park adjacent to the Yellowstone River and bisected by all build alternative alignments. Lands are currently in private ownership.
- Kiwanis Trail –Extension of multi-use trail from north terminus extending past Five Mile Creek to Bitterroot Drive (Kiwanis Extension).

4.2 TRANSPORTATION CONDITIONS

This section analyzes future year transportation conditions under the No Build Alternative and each of the build alternatives. Traffic projections for the future year, 2035, were based on MDT approved methodology that included:

- Land use projections from the *Billings Urban Area Long-Range Transportation Plan* (2009 Update) were utilized to project changes and redistribution of traffic volumes.
- Traffic volumes to/from areas external to the Billings urban area were increased to the projected increase of traffic within the city.
- Traffic projections for the build alternatives were determined by redistributing traffic based on the shortest travel time route for existing and future year (2035). Origin-destination data collected in 2000 as part of the *North Bypass Feasibility Study* was also examined to determine the degree of traffic utilizing the build alternatives.

Further details regarding the traffic projection methodology can be found in the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013).

4.2.1 TRAFFIC OPERATIONS

4.2.1.1 METHODOLOGY

Changes in future year (2035) traffic volumes and patterns were assessed for transportation facilities impacted by each build alternative, including the Phase 1 two-lane and Full Buildout four-lane road configurations. An analysis of PM peak hour travel times (generally between 4:30 PM and 5:30 PM) and delays was performed along critical roadway corridors and at key intersections within the study area. As with existing conditions, future year performance of urban arterial roadways is primarily controlled by the performance of key intersections that are reported through level of service (LOS). For roadway corridors, the measure of vehicle miles traveled (VMT) was used as the primary performance indicator. Level of service was also calculated for segments of I-90 and I-94 related to interchange options.

4.2.1.2 RESULTS

Changes in year 2035 traffic volumes on certain study area roads are a direct indicator of the effectiveness of an alternative. Anticipated traffic operations impacts (direct and indirect) under the No Build Alternative and the three build alternatives, including the Phase 1 two-lane and Full Buildout four-lane road configurations, are summarized in **Table 4.1**. The table uses the following four measures to determine overall performance of each build alternative:

Vehicle Miles Traveled (VMT) – The number of vehicle miles traveled (VMT) is an indicator of the travel levels on the roadway system by motor vehicles. VMT is estimated for the given time period. This estimate is based upon traffic volume counts and roadway length. As the amount of vehicular travel increases, the energy used by the vehicles and the total costs of auto travel increase accordingly.

Vehicle Hours Traveled (VHT) – Vehicles Hours Traveled is an indicator of travel levels on the proposed roadway system. VHT is estimated for a given time. As the amount of travel time increases, congestion increases and energy consumption and costs continue to escalate.

Average Daily Traffic Accommodated by the Proposed Bypass – Average Daily Traffic (ADT) is the average 24-hour traffic volume at a given location along a roadway facility. It is used to determine facility performance and can act as an indicator of where additional traffic capacity is needed. ADT can be used to compare and contrast the effectiveness of new improved roadways to supply additional roadway capacity and to alleviate congestion on alternate roadways.

Intersection Performance Under Each of the Proposed Alignments as Indicated by Level of Service (LOS) – LOS is a qualitative measure of capacity and operating conditions. LOS is given a letter designation from A to F, with LOS A representing very short delays and LOS F representing very long delays. LOS C or better is the desirable condition.

Table 4.1 Impacts Summary – Year 2035 Traffic Operations

OPERATIONAL MEASURE	NO BUILD	MARY STREET OPTION 1		MARY STREET OPTION 2		FIVE MILE ROAD	
		PHASE 1	FULL BUILDOUT	PHASE 1	FULL BUILDOUT	PHASE 1	FULL BUILDOUT
DAILY VEHICLE MILES TRAVELED (VMT)							
Total Daily VMT[1]	666,800	670,280	670,400	670,160	670,280	674,110	674,250
Change in Daily VMT from No Build[1]	NA	+3,480	+3,600	+3,360	+3,480	+7,310	+7,450
DAILY VEHICLE HOURS TRAVELED (VHT)							
Change in Daily VHT from No Build[2]	NA	-1,295	- 1,315	-1,270	- 1,300	-1,065	- 1,080
AVERAGE DAILY TRAFFIC (ADT)							
ADT along Billings Bypass at proposed Yellowstone River crossing	NA	15,550	15,900	15,250	15,600	12,800	13,000
INTERSECTION PERFORMANCE							
Intersections with one or more approaches at LOS E or F	11	4	4	4	4	5	5
Intersections with one or more approaches at LOS D	1	1	1	1	1	0	0
Intersections with all approaches at LOS C or better	5	15	15	15	15	15	15

Source: *Billings Bypass Combined Traffic Reports*, August 2013.
[1] Daily VMT estimates are for select highways and roadway corridors within or crossing the study area boundaries.
[2] Daily VHT estimates are based on the number of vehicles projected to use the bypass at the Yellowstone River crossing.

As **Table 4.1** shows, VMT in 2035 is anticipated to increase, for Phase 1 or the Full Buildout, under all three build alternatives compared to the No Build Alternative, with the greatest increase occurring under Full Buildout of the Five Mile Road Alternative. Despite the increase in VMT, vehicle hours traveled (VHT) in 2035 is expected to decrease for Phase 1 and the Full Buildout under all three build alternatives compared to the No Build Alternative. Average travel time savings for vehicles using any of the three proposed bypass alignments range from 4 to 6 minutes as vehicles circumvent congestion and avoid longer travel times. Additionally, the shift in vehicles from existing roadways to the bypass would alleviate congestion and decrease travel times along existing corridors.

Existing roadways that are directly impacted by the build alternatives would be partially or fully reconstructed as a part of the proposed improvements. This includes Five Mile Road, Mary Street, and Johnson Lane. The greatest impact to VMT along area roadways as a result of the build alternatives would occur to these three roadways. **Table 4.2** shows the change in VMT along these roadways under the build alternatives compared to the No Build Alternative. For each alternative, the Phase 1 and Full Buildout changes are similar, with the Full Buildout changes to VMT generally slightly greater than

Phase 1 changes to VMT. The greatest impact to each directly impacted roadway in 2035 and the corresponding percentage change in VMT compared to the No Build Alternative are:

- Five Mile Road (Mary Street to Dover Lane): 1660% from Full Buildout of the Five Mile Road Alternative
- Mary Street (Bench Boulevard to Five Mile Road): 285% from Phase 1 and Full Buildout of the Five Mile Road Alternative
- Johnson Lane (Old Hardin Road to Coulson Road): 121% from Full Buildout of the Mary Street Option 1 Alternative

Table 4.2 Change in 2035 VMT on Directly Impacted Existing/Planned Roadway Network

CORRIDOR	NO BUILD	MARY STREET OPTION 1		MARY STREET OPTION 2		FIVE MILE ROAD	
		PHASE 1	FULL BUILDOUT	PHASE 1	FULL BUILDOUT	PHASE 1	FULL BUILDOUT
Five Mile Rd (Mary St to Dover Ln)	325	849%	870%	909%	930%	1639%	1660%
Mary St (Bench Blvd to Five Mile Rd)	5,150	**-17%**	**-17%**	**-17%**	**-17%**	285%	285%
Johnson Ln (Old Hardin Rd to Coulson Rd)	3,805	118%	121%	116%	119%	98%	99%

Source: *Billings Bypass Combined Traffic Reports*, August 2013.
Note: Percentages in bold indicate decreases in VMT associated with the build alternative compared to the No Build Alternative.

Table 4.3 shows the change in VMT in 2035 for each build alternative compared to the No Build Alternative along the principal roadway corridors within the study area, excluding the directly impacted roadways discussed above. Only changes to VMT under Full Buildout of the build alternatives are shown in the table. Changes to VMT under Phase 1 vary by no more than +/-2% from Full Buildout. For all three build alternatives, Phase 1 and Full Buildout road configurations would provide a decrease in VMT of 10% or greater to the following corridors:

- Old Hwy 312 west of Five Mile Road
- Main Street (1st Avenue to US 87/Old Hwy 312)
- Bench Boulevard (Main Street/6th Avenue to Mary Street)
- US 87(1st Avenue to Lockwood Interchange)
- I-94 (Pinehills Interchange to Huntley Interchange)

Additionally, both the Mary Street Option 1 Alternative and Mary Street Option 2 Alternative would provide a 17% reduction in VMT for Mary Street from Bench Boulevard to Five Mile Road, as shown in **Table 4.3**.

Table 4.3 Change in 2035 VMT on Indirectly Impacted Existing/Planned Roadway Network

CORRIDOR	NO BUILD	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD
		FULL BUILDOUT	FULL BUILDOUT	FULL BUILDOUT
Old Hwy 312 (US 87 to Five Mile Rd)	39,258	**-13%**	**-15%**	**-14%**
Old Hwy 312 (Five Mile Rd to S-522 Huntley)	56,056	15%	19%	19%
Main St (1st Ave to US 87/Old Hwy 312)	162,124	**-17%**	**-16%**	**-13%**
Bench Blvd (Main St/6th Ave to Mary St)	33,836	**-15%**	**-16%**	**-15%**
US 87 (Old Hwy 312 to Independence Ln)	12,480	0%	0%	0%
US 87 (1st Ave to Lockwood Interchange)	52,500	**-30%**	**-29%**	**-23%**
Bitterroot Dr (Dover Rd to Wicks Ln)	5,600	21%	19%	19%
Dover Rd (Old Hwy 312 to Five Mile Rd)	2,704	**-3%**	**-3%**	**-3%**
Wicks Ln (Lake Elmo Rd to Bitterroot Dr)	16,480	**-2%**	**-2%**	**-2%**
Hilltop Rd (Lake Elmo Rd to Bench Blvd)	4,224	0%	0%	0%
I-90 (S. 27th St Interchange to Pinehills Interchange)	196,693	**-8%**	**-8%**	**-8%**
I-94 (Pinehills Interchange to Huntley Interchange)	65,826	**-13%**	**-16%**	**-16%**

Source: *Billings Bypass Combined Traffic Reports*, August 2013.

Notes: 1. Percentages in bold indicate VMT decreases associated with the build alternative compared to the No Build Alternative.
2. Only changes to VMT under Full Buildout of the build alternatives are shown in the table because changes to VMT under Phase 1 vary by no more than +/-2% from Full Buildout.

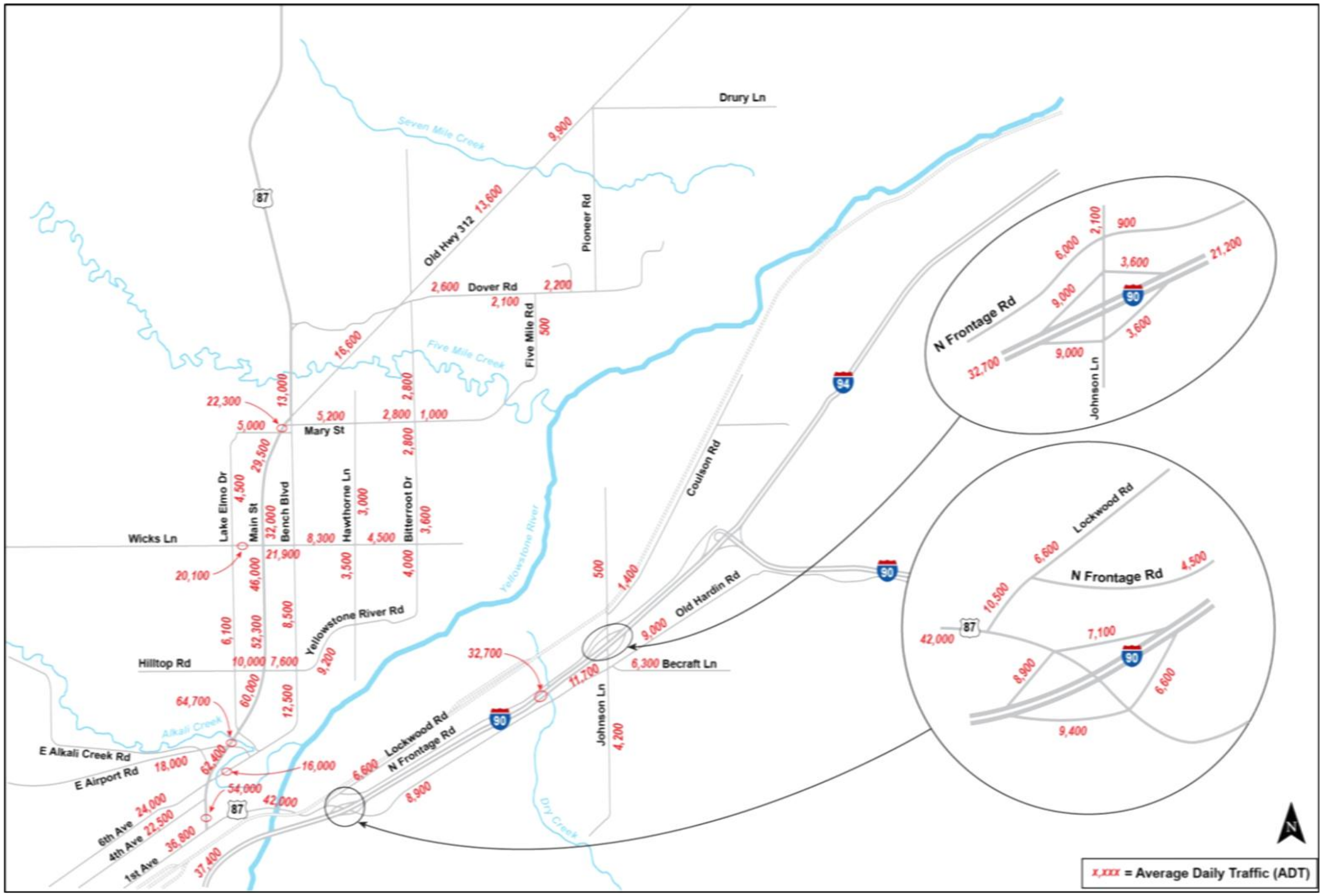
The result of this reduction in VMT under the build alternatives is a decrease in traffic congestion. As is shown in **Table 4.1**, intersection performance would also benefit from Phase 1 and Full Buildout of each of the three build alternatives. Intersection performance is essentially the same under the Phase 1 and Full Buildout road configurations for each build alternative.

Under the No Build Alternative, 11 intersections within the study area would have one or more approaches perform at LOS E or F, resulting in increased delays and travel times through these intersections. Phase 1 and Full Buildout of both Mary Street alternatives would have only four intersections that operate with at least one approach performing at LOS E or F in 2035, while Phase 1 and Full Buildout of the Five Mile Road Alternative would have five intersections with at least one approach performing LOS E or F in 2035.

4.2.1.2.1 NO BUILD ALTERNATIVE

As described in Chapter 2, Alternatives, under the No Build Alternative the proposed Billings Bypass would not be constructed. This alternative would include the routine maintenance and improvements of the existing roads. However, for the purpose of modeling traffic in the study area, the currently programmed, committed, and funded roadway projects were included. While the No Build Alternative does not meet the project purpose and need, it provides a baseline condition against which to compare and measure the effects of the build alternatives. The future year 2035 daily traffic volumes under the No Build Alternative are illustrated in **Figure 4.2**.

Figure 4.2 2035 No Build Alternative Traffic Volumes



Source: *Billings Bypass Combined Traffic Reports*, August 2013.

Under the No Build Alternative, traffic congestion would increase along critical roadway corridors. **Table 4.4** shows the 2010 and 2035 No Build Alternative VMT statistics for potentially impacted roadway corridors within the study area. Growth in VMT along all of the select roadway corridors, except for Hilltop Road, is expected to exceed 40%. Traffic volumes along five of the corridors are expected to more than double by 2035.

Table 4.4 Growth in VMT from 2010 to 2035 No Build

CORRIDOR	2010 VMT	2035 NO BUILD VMT	% GROWTH IN VMT
Old Hwy 312 (US 87 to Five Mile Rd)	27,177	39,258	44%
Old Hwy 312 (Five Mile Rd to S-522 Huntley)	40,040	56,056	40%
Main St (1st Ave to US 87/Old Hwy 312)	113,494	162,124	43%
Bench Blvd (Hilltop Rd to Mary St)	7,330	14,456	97%
US 87 (Old Hwy 312 to Independence Ln)	5,664	12,480	120%
US 87 (1st Ave to Lockwood Interchange)	35,000	52,500	50%
Five Mile Rd (Mary St to Dover Ln)	65	325	400%
Bitterroot Dr (Dover Rd to Wicks Ln)	2,664	5,600	110%
Mary St (Bench Blvd to Five Mile Rd)	2,025	5,150	154%
Dover Rd (Old Hwy 312 to Five Mile Rd)	1,128	2,704	140%
Wicks Ln (Lake Elmo Rd to Bitterroot Dr)	11,492	16,480	43%
Hilltop Rd (Lake Elmo Rd to Bench Blvd)	3,672	4,224	15%
Johnson Ln (Old Hardin Rd to Coulson Rd)	2,531	3,805	50%
I-90 (S. 27th St Interchange to Pinehills Interchange)	130,955	196,693	50%
I-94 (Pinehills Interchange to Huntley Interchange)	44,091	65,826	49%

Source: *Billings Bypass Combined Traffic Reports*, August 2013.

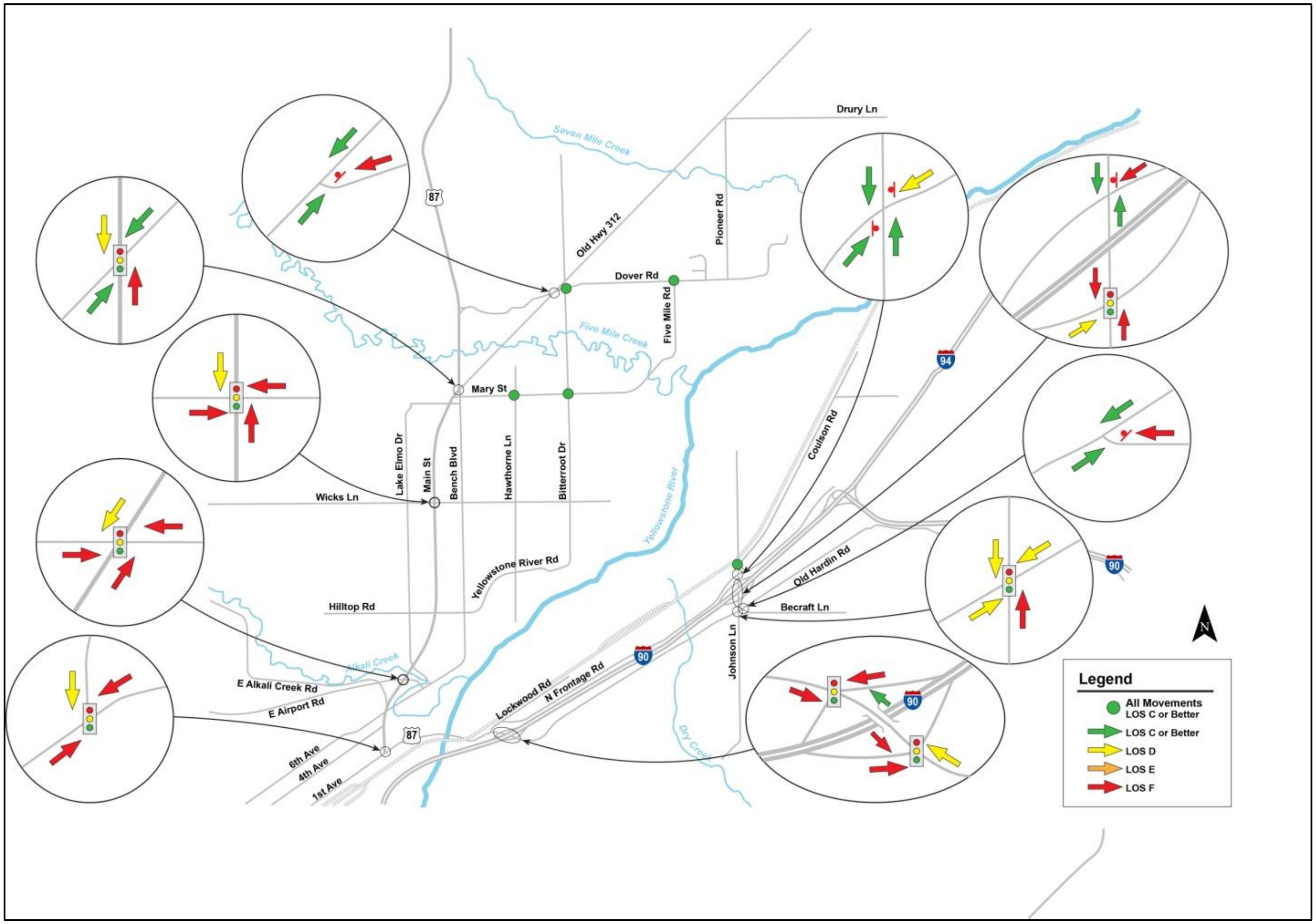
Under the No Build Alternative, traffic congestion would increase along critical roadway corridors and operational performance would decrease at key intersections within the study area. **Figure 4.3** illustrates the performance at key intersections within the study area in 2035 for the No Build Alternative.

Of the 17 key intersections identified as potentially affected (see the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013) for a description of these intersections) under the No Build Alternative:

- Five intersections would operate with all approaches performing at LOS C or better.
- One intersection would operate with one approach at LOS D and all other approaches at LOS C or better.
- Eleven intersections would operate with at least one approach at LOS F.

Figure 4.3 identifies intersections with at least one approach at LOS F during PM peak period. The PM peak period occurs from 4:30 PM to 5:30 PM. The Johnson Lane/North Frontage Road intersection would perform with one approach at LOS D and with all other approaches at LOS C or better.

Figure 4.3 2035 No Build Alternative Intersection Performance



Source: *Billings Bypass Combined Traffic Reports*, August 2013.

Direct Impacts – Traffic Operations: No Build Alternative

Direct impacts as a result of the No Build Alternative would include continued congestion along the primary roadway corridors through Billings and Billings Heights, including along Main Street, Bench Boulevard, and US 87 from 1st Avenue to the I-90 Lockwood Interchange. Operational conditions at intersections along these roadway corridors would continue to degrade over time. VHT would also increase, with related increased energy consumption and cost. Emergency services response time would also be impacted by the increasing congestion on the existing roadway network.

Indirect Impacts – Traffic Operations: No Build Alternative

Based on projected growth in the region, traffic is expected to increase, leading to greater congestion and degraded traffic operations. Within the larger Billings area, this increase in traffic congestion and the degraded traffic operations that would occur as a result of the No Build Alternative may indirectly impact travelers along alternative travel routes in and around the community.

Temporary Construction Impacts – Traffic Operations: No Build Alternative

No construction impacts are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – Traffic Operations: No Build Alternative

The No Build Alternative would result in cumulative effects to the transportation network that serves Billings and Billings Heights.

Based on projected growth in the region, including the development projects in the study area, traffic is expected to increase, leading to greater congestion and degraded traffic operations. These conditions would combine with the congestion and degraded operational conditions expected under the No Build Alternative, as described above. The transportation plans that are presently being implemented and planned for the future would help address these conditions. However, the resulting cumulative impact would be a moderate degradation of traffic operations.

Mitigation – Traffic Operations: No Build Alternative

No mitigation would be necessary under the No Build Alternative.

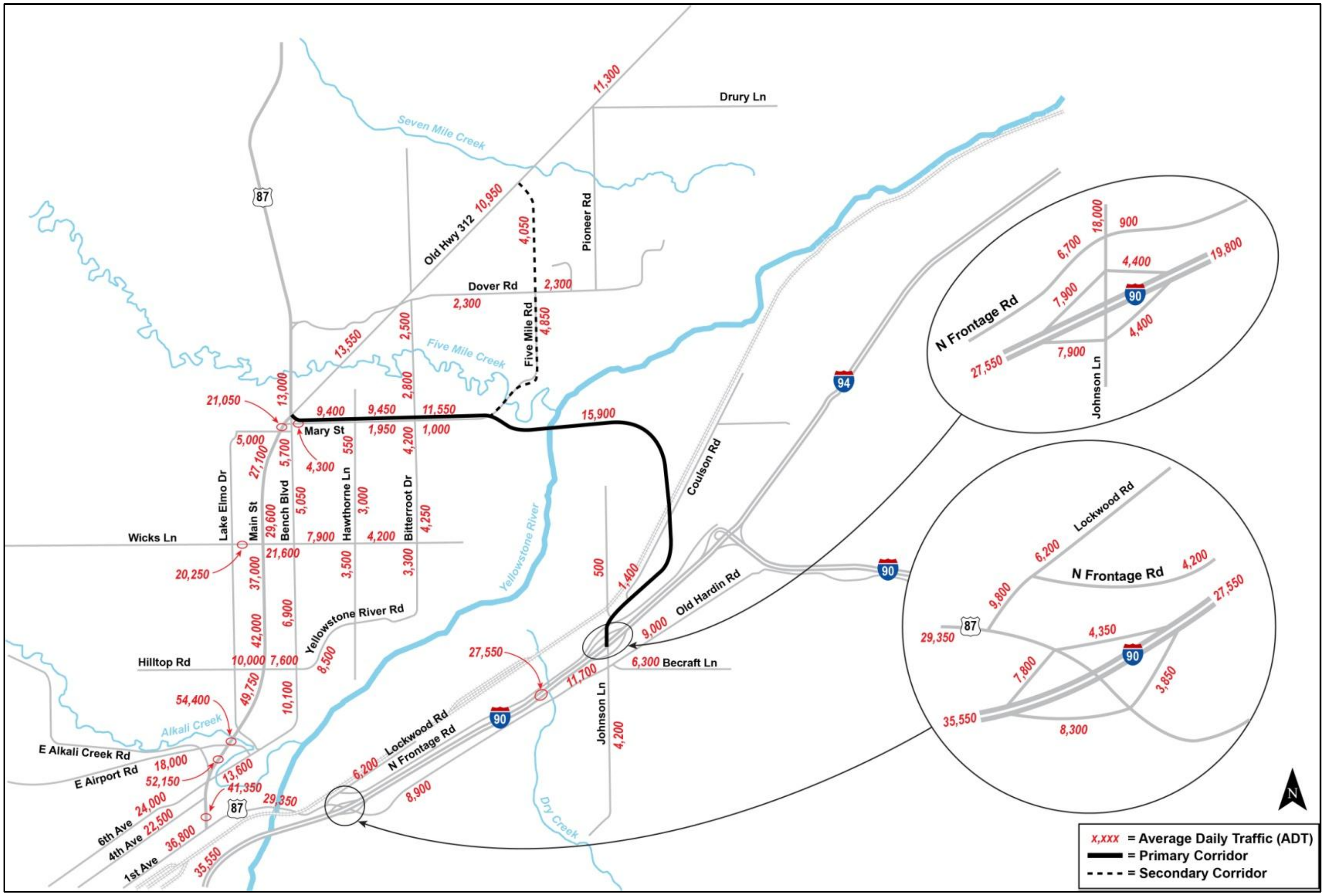
4.2.1.2.2 MARY STREET OPTION 1 ALTERNATIVE

As described in Chapter 2, Alternatives, the Mary Street Option 1 Alternative would provide a 4. 9-mile-long connection across the Yellowstone River between I-90 and Old Hwy 312. The roadway would connect to I-90 at Johnson Lane, and extend north, crossing the Montana Rail Link (MRL) railroad before turning west. The alignment would then cross the Yellowstone River and parallel Mary Street on the north until connecting with Old Hwy 312 just northeast of the US 87/Main Street/Old Hwy 312 intersection. Secondary improvements would include the reconstruction of Five Mile Road from Mary Street to Dover Road and a new collector road from Dover Road to Old Hwy 312.

Phase 1 of the Mary Street Option 1 Alternative assumes a two-lane Billings Bypass, while Full Buildout assumes a four-lane road configuration. Separate intersection design concepts were developed for the two-lane and four-lane configurations.

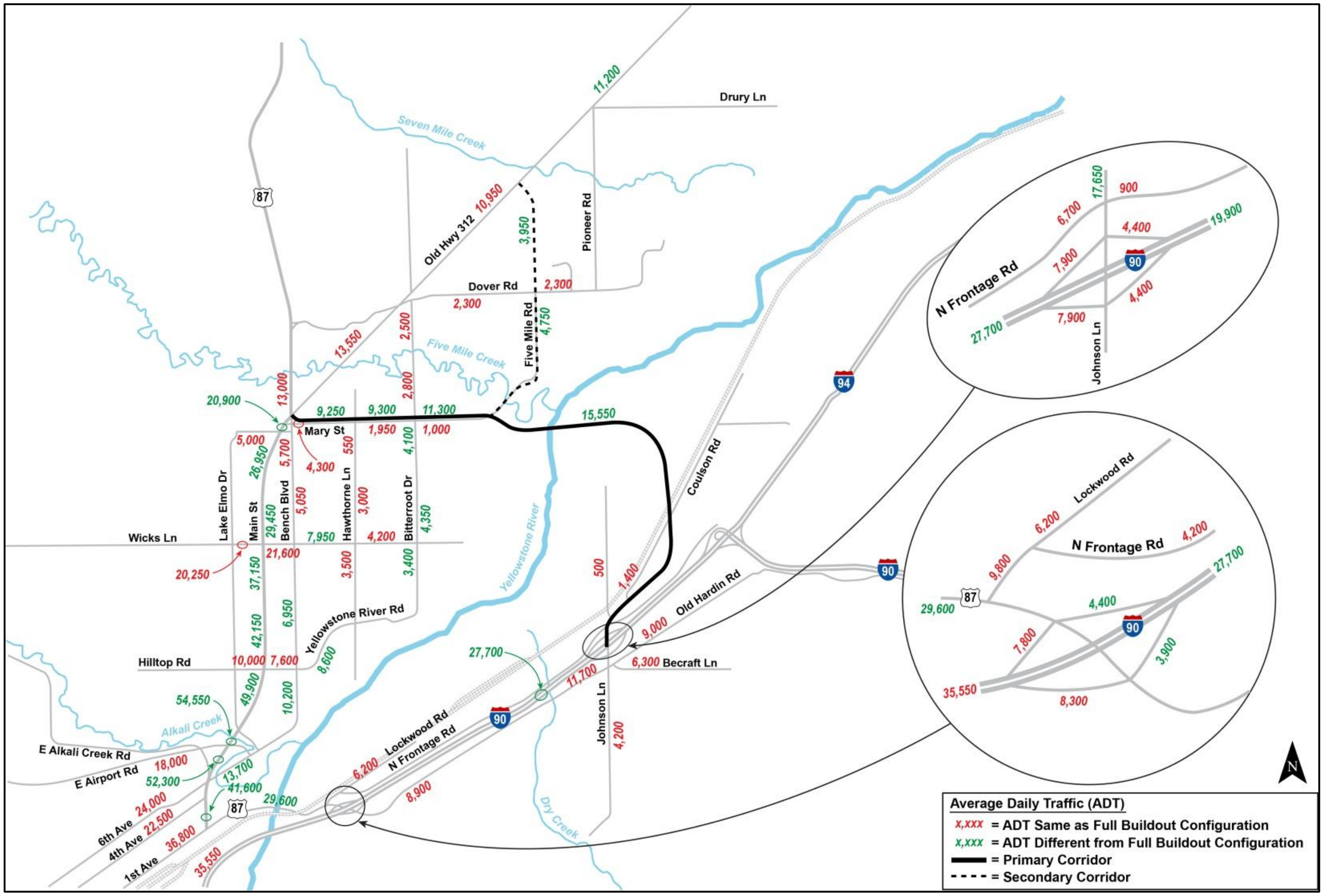
The future year 2035 daily traffic volumes under Full Buildout of the Mary Street Option 1 Alternative are illustrated in **Figure 4.4**. Phase 1 volumes and locations where Phase 1 volumes differ from Full Buildout are illustrated in **Figure 4.5**.

Figure 4.4 2035 Mary Street Option 1 Alternative – Full Buildout Traffic Volumes



Source: *Billings Bypass Combined Traffic Reports*, August 2013.

Figure 4.5 2035 Mary Street Option 1 Alternative – Phase 1 Traffic Volumes



Source: *Billings Bypass Combined Traffic Reports*, August 2013.

Direct Impacts – Traffic Operations: Mary Street Option 1 Alternative

Full Buildout

Average annual daily traffic volumes were forecast for 2035 for Full Buildout of the Mary Street Option 1 Alternative. An ADT of 15,900 vehicles is projected for Full Buildout of this alternative at the location of the Billings Bypass at the Yellowstone River and at the MRL railroad crossing.

Full Buildout of the Mary Street Option 1 Alternative would directly impact traffic operations along Five Mile Road and Johnson Lane. As summarized in **Table 4.2**, increases in traffic volumes along these two roadways would result in the following increases in VMT in 2035 compared to the No Action Alternative:

- Five Mile Road from Mary Street to Dover Road – 870% increase in VMT, from 325 miles traveled to 3,155.
- Johnson Lane from Old Hardin Road to Coulson Road – 121% increase in VMT, from 3,805 miles traveled to 8,415.

Full Buildout of the Mary Street Option 1 Alternative impacts intersections along its proposed alignment. **Figure 4.6** illustrates intersection performance under Full Buildout of the Mary Street Option 1 Alternative. This alternative would directly impact ten existing intersections and add three intersections along its alignment, resulting in a total of thirteen intersections in 2035. Final design of the existing and new intersections would ensure that all perform at LOS B or better in 2035. These intersections are shown on **Figure 4.6** and described in detail in the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013).

Phase 1

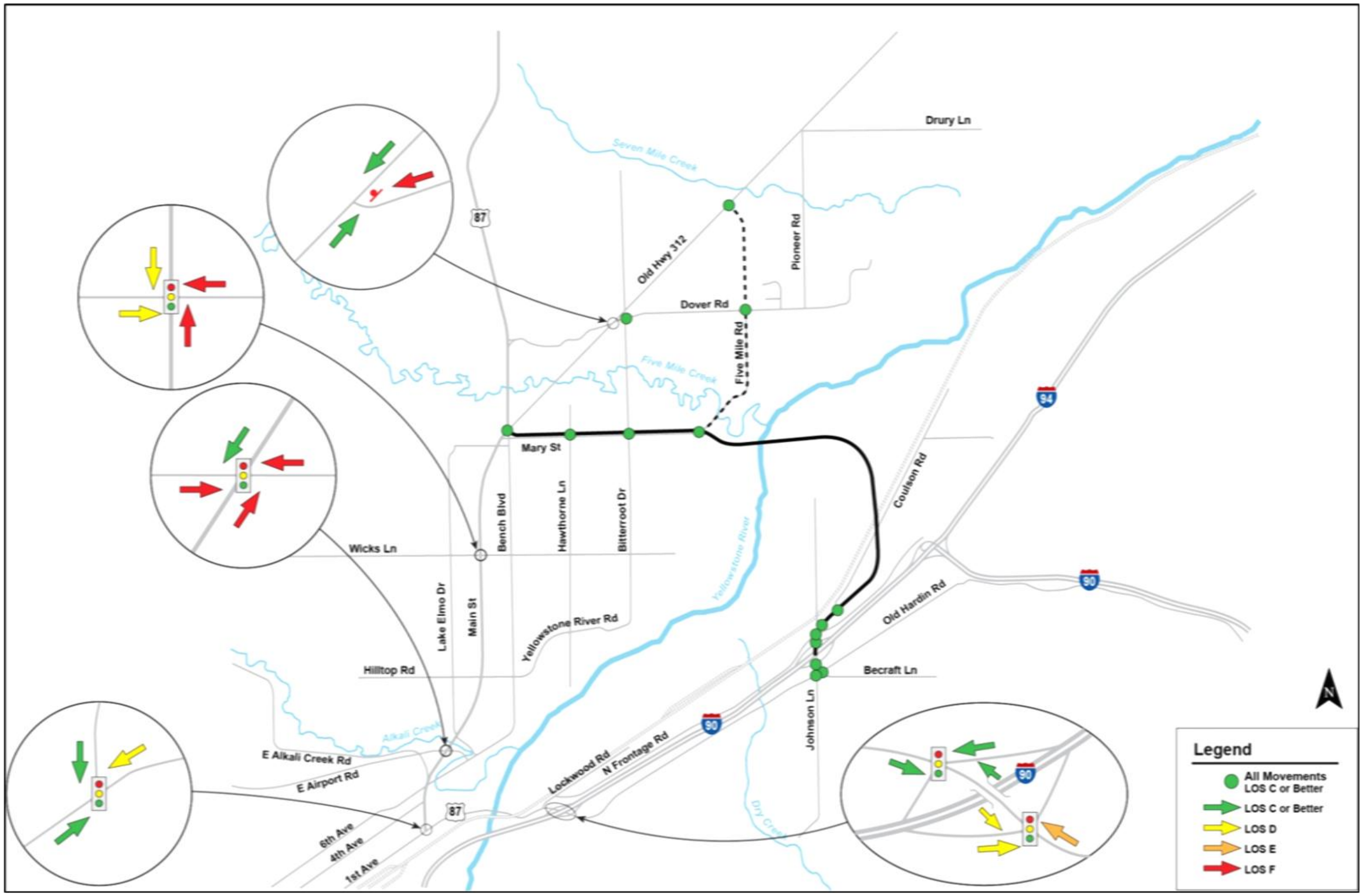
Direct impacts to traffic operations from Phase 1 of the Mary Street Option 1 Alternative are very similar to direct impacts associated with Full Buildout. As shown in **Figure 4.6**, an ADT of 15,550 vehicles is projected in 2035 at the Billings Bypass crossing of the Yellowstone River and MRL railroad under Phase 1. This is 350 daily vehicles less than the projected ADT under Full Buildout.

As with Full Buildout, Phase 1 would directly impact traffic operations along Five Mile Road and Johnson Lane. Increases in traffic volumes along these two roadways would result in the following increases in VMT in 2035 compared to the No Action Alternative:

- Five Mile Road from Mary Street to Dover Road – 849% increase in VMT, from 325 miles traveled to 3,085.
- Johnson Lane from Old Hardin Road to Coulson Road – 118% increase in VMT, from 3,805 miles traveled to 8,310.

Direct impacts to intersections under Phase 1 are similar to impacts under Full Buildout. Phase 1, like Full Buildout, would directly impact thirteen intersections in 2035—three new and ten existing intersections. Phase 1 final design would ensure that all intersections perform at LOS C or better in 2035, compared to the Full Buildout final design, which would result in all intersections performing at LOS B or better. Level of Service C is still considered acceptable by MDT standards. The 13 intersections are shown on **Figure 4.6** and are described in detail in the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013).

Figure 4.6 2035 Mary Street Option 1 Alternative Intersection Performance – Phase 1 and Full Buildout



Source: *Billings Bypass Combined Traffic Reports*, August 2013.

Indirect Impacts – Traffic Operations: Mary Street Option 1 Alternative

Full Buildout

Under Full Buildout of the Mary Street Option 1 Alternative, overall VMT (**Table 4.1**) would increase in the Billings urban area as vehicles would engage in longer trips in order to utilize the new Billings Bypass. This alternative would increase VMT by an estimated 3,600 miles in 2035, compared to the No Build Alternative, to a total of 670,400 VMT on select roadway corridors within the study area. Though more miles would be traveled, travel times would decrease as drivers avoid congested areas of Billings and Billings Heights. Daily VHT in 2035 would decrease an estimated 1,315 hours under this alternative compared to the No Build Alternative. Additionally, the shift in vehicles from existing roadways to the bypass would alleviate congestion and decrease travel times along existing corridors.

Full Buildout of the Mary Street Option 1 Alternative would indirectly impact traffic operations along roadway corridors throughout the study area. As summarized in **Table 4.3**, VMT in 2035 is expected to increase by 10% or more along the following roadways compared to the No Build Alternative:

- Old Hwy 312 from Five Mile Road to S-522 Huntley.
- Bitterroot Drive from Wicks Lane to Dover Road.

As is shown in **Table 4.1** and **Table 4.3**, VMT in 2035 would decrease along most principal roadway corridors within the study area compared to the No Build Alternative, resulting in decreased congestion and improved roadway and intersection performance. Full Buildout of the Mary Street Option 1 Alternative would result in a VMT decrease of 10% or more along the following six roadway corridors:

- Old Hwy 312 (US 87/Main Street to Five Mile Road).
- Mary Street (Bench Boulevard to Five Mile Road).
- Main Street (1st Avenue to US 87/Old Hwy 312).
- Bench Boulevard (Main Street/6th Avenue to Mary Street).
- US 87 (1st Avenue to Lockwood Interchange).
- I-94 (Pinehills Interchange to Huntley Interchange).

Figure 4.6 illustrates the indirect impacts to operational performance at intersections bordering or near the study area. Of these intersections, only the Old Hwy 312/Dover Road intersection would not show an improvement to intersection approach LOS compared to the No Build Alternative. The other intersections all show improvement to at least one intersection approach. Two of the intersections, Main Street/1st Avenue/US 87 and the westbound I-90 ramps/US 87 show the most improvement, with all approaches operating at acceptable conditions of LOS D or better.

Phase 1

Overall VMT and VHT projections within the study area for Phase 1 of the Mary Street Option 1 Alternative are very similar to the projections for Full Buildout. Phase 1 would result in 670,280 VMT daily on select roadway corridors within the study area, 120 vehicle miles less than the Full Buildout VMT, as shown in **Table 4.1**. Under Phase 1, daily VHT in 2035 would be approximately 20 hours more than Full Buildout VHT.

Phase 1 ADT volumes would vary from the ADT volumes for Full Buildout by no more than 350 vehicles on any of the principal roadway corridors within the study area. This equates to a difference in ADT volumes of no more than +/-3%. As described in the *Billings Bypass Combined Traffic Reports*, this variation in volumes is statistically insignificant (Marvin & Associates 2013)

Temporary Construction Impacts – Traffic Operations: Mary Street Option 1 Alternative

Full Buildout

Construction of Full Buildout of the Mary Street Option 1 Alternative would create temporary construction impacts to traffic operations in addition and subsequent to the impacts from the Phase 1 two-lane roadway construction. Construction would begin after construction for Phase 1 is completed. Traffic operations would be impacted by construction at intersecting roadways and along the bypass that is related to widening the two-lane roadway to four lanes. This additional impact would primarily be due to a reduced speed limit and longer travel times along the bypass during construction of the four-lane widening.

Phase 1

Construction of Phase 1 of the Mary Street Option 1 Alternative would create short-term construction impacts throughout the construction period, which could begin as soon as 5 but up to 20 years after the ROD is signed. Construction detours and delays can create short-term impacts on local traffic circulation and congestion for residents and commuters. These impacts may include delays or the need for alternative travel routes to reach residences and community facilities. Traffic diversions and construction equipment and activities would also affect speeds and traffic operations on existing adjacent roadways and intersections. However, these temporary impacts should be limited, because much of the new bypass roadway construction is on a new alignment.

Disruptions to access and parking for businesses and residences located within the construction zone would occur and could create increased traffic on other streets in and outside of the study area. Emergency service response may be negatively impacted as a result of construction, as well. Delays to the traveling public and inconvenience to residents in the corridor would occur. MDT would try to minimize the inconvenience to the public through construction traffic planning during final design, and by monitoring and adjusting these plans throughout the construction phase. The *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013) includes detailed information on roadway locations that are most likely to incur the greatest impacts as a result of construction.

Cumulative Impacts – Traffic Operations: Mary Street Option 1 Alternative

The cumulative impacts of Mary Street Option 1 Alternative for Phase 1 and Full Buildout to traffic operations would be essentially the same. The alternative would result in improved operational performance at 11 intersections within the study area and improved performance along various corridors within Billings and Billings Heights, including the primary north-south corridor of Main Street. Congestion and travel times along these corridors would decrease with implementation of this alternative. Most of the area south of Mary Street has been developed and is adjacent to residential areas. The improved mobility provided by this alternative and the other planned transportation improvements in the study area would likely expedite already planned growth, including subdivisions and retail. This would likely not induce growth beyond what has been identified in local plans. Property values could increase for nearby properties, which have limited access to activity centers, but which would have easier access to these places under the Mary Street Option 1 Alternative. Because the City of Billings has an Urban Planning Area and outlined growth policies, it is not anticipated that these impacts would result in significant effects to the Billings community.

Mitigation – Traffic Operations: Mary Street Option 1 Alternative

The following steps would be taken to minimize impacts to traffic operations during construction of either Phase 1 or Full Buildout of the Mary Street Option 1 Alternative:

- Develop traffic management plans during final design in accordance with the Manual on Uniform Traffic Control Devices.

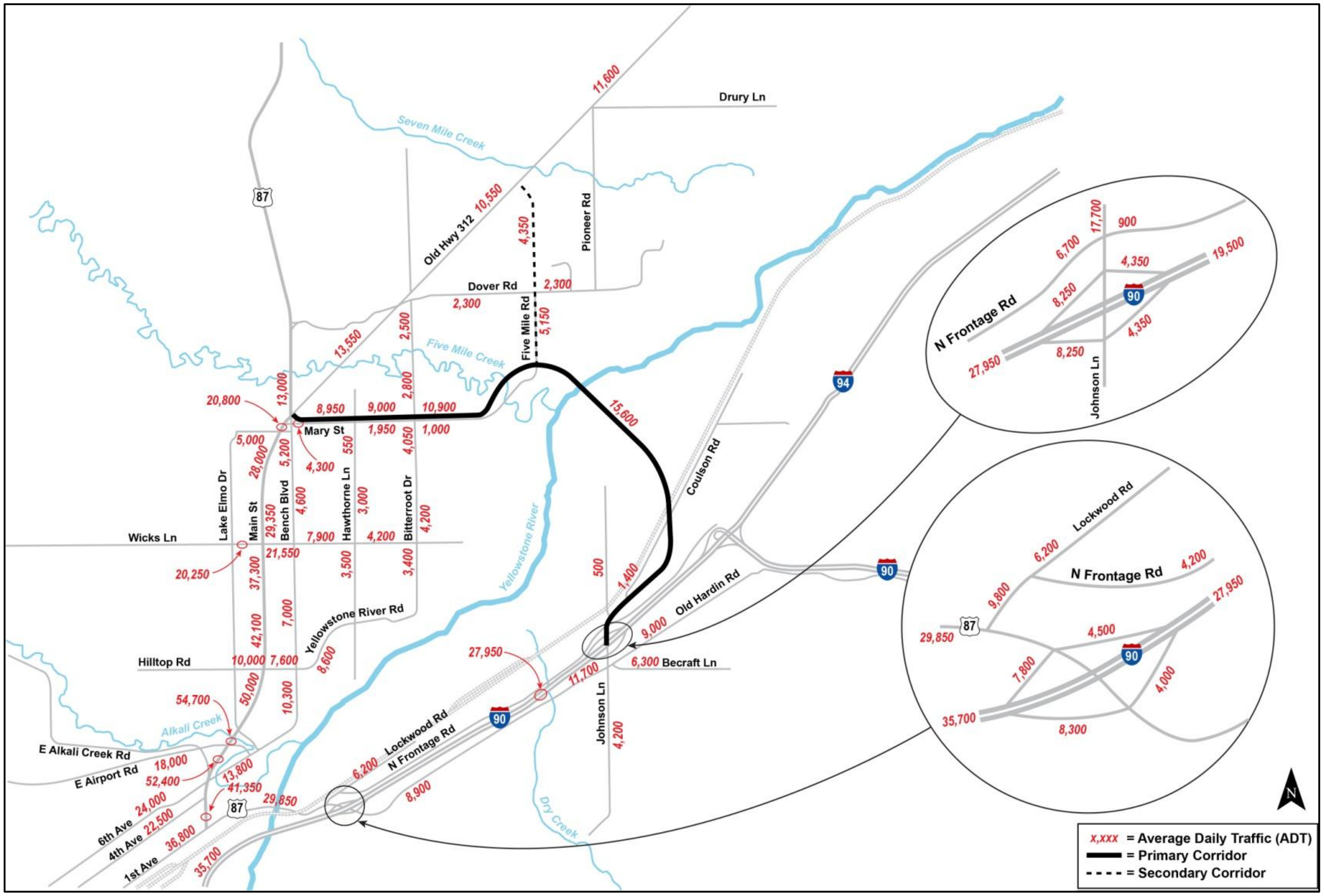
4.2.1.2.3 MARY STREET OPTION 2 ALTERNATIVE

As described in Chapter 2, Alternatives, the Mary Street Option 2 Alternative would provide a 5.1-mile-long connection across the Yellowstone River between I-90 and Old Hwy 312. Similar to the Mary Street Option 1 Alternative alignment, the roadway would connect to I-90 at Johnson Lane and extend north crossing the MRL railroad and Yellowstone River. The bypass would intersect with Five Mile Road to the north of Five Mile Creek before turning southwest toward the Mary Street corridor. The roadway would turn west and parallel Mary Street on the north until connecting with Old Hwy 312 just northeast of the US 87/Main Street/Old Hwy 312 intersection. Secondary improvements would include the reconstruction of Five Mile Road from the new bypass to Dover Road. A new collector road would be constructed from Dover Road to Old Hwy 312.

Phase 1 of the Mary Street Option 2 Alternative assumes a two-lane Billings Bypass, while the Full Buildout assumes a four-lane road configuration. Separate intersection design concepts were developed for the two-lane and four-lane configurations.

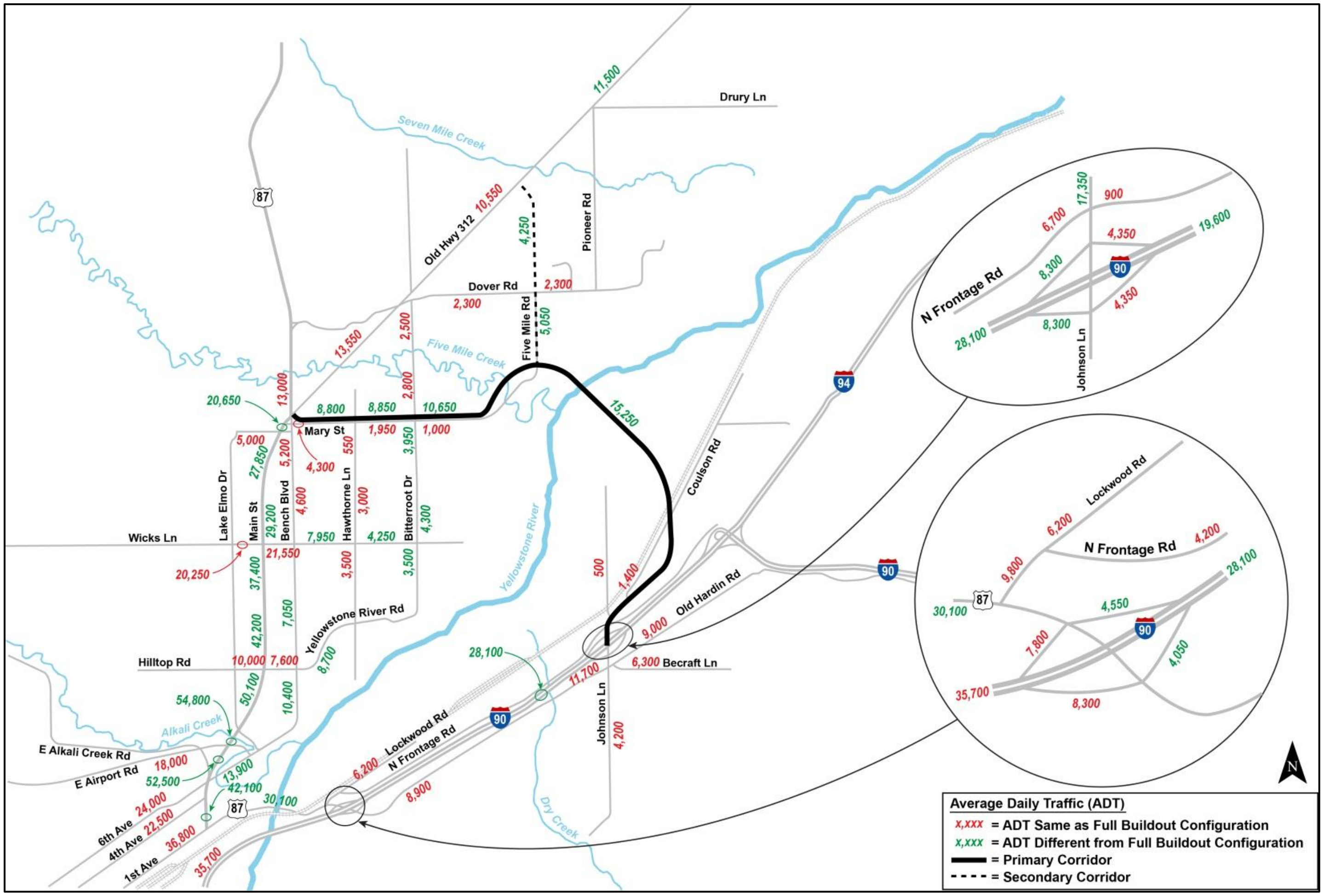
The future year 2035 daily traffic volumes under Full Buildout of the Mary Street Option 2 Alternative are illustrated in **Figure 4.7**. Traffic volumes and locations where volumes differ from Full Buildout for Phase I of the Mary Street Option 2 Alternative are illustrated in **Figure 4.8**.

Figure 4.7 2035 Mary Street Option 2 Alternative – Full Buildout Traffic Volumes



Source: *Billings Bypass Combined Traffic Reports*, August 2013.

Figure 4.8 2035 Mary Street Option 2 Alternative – Phase 1 Traffic Volumes



Source: *Billings Bypass Combined Traffic Reports*, August 2013.

Direct Impacts – Traffic Operations: Mary Street Option 2 Alternative

Full Buildout

Average annual daily traffic volumes were forecast for 2035 for Full Buildout of the Mary Street Option 2 Alternative. An ADT of 15,600 vehicles is projected for Full Buildout of this alternative at the location of the Billings Bypass at the Yellowstone River and at the MRL railroad crossing.

Full Buildout of the Mary Street Option 2 Alternative would directly impact traffic operations along Five Mile Road and Johnson Lane. As summarized in **Table 4.2**, increases in traffic volumes along these two roadways would result in the following increases in VMT in 2035 compared to the No Build Alternative:

- Five Mile Road from Mary Street to Old Hwy 312 – 930% increase in VMT, from 325 miles traveled to 3,350.
- Johnson Lane from Old Hardin Road to Coulson Road – 119% increase in VMT, from 3,805 miles traveled to 8,330.

Full Buildout of the Mary Street Option 2 Alternative impacts intersections along its proposed alignment. **Figure 4.9** illustrates intersection performance under Full Buildout of the Mary Street Option 2 Alternative. This alternative would directly impact ten existing intersections and add three intersections along its alignment, resulting in a total of thirteen intersections in 2035. Final design of the existing and new intersections would ensure that all perform at LOS B or better in 2035. These intersections are shown in **Figure 4.9** and described in detail in the *Billings Bypass Combined Traffic* Reports (Marvin & Associates 2013).

Phase 1

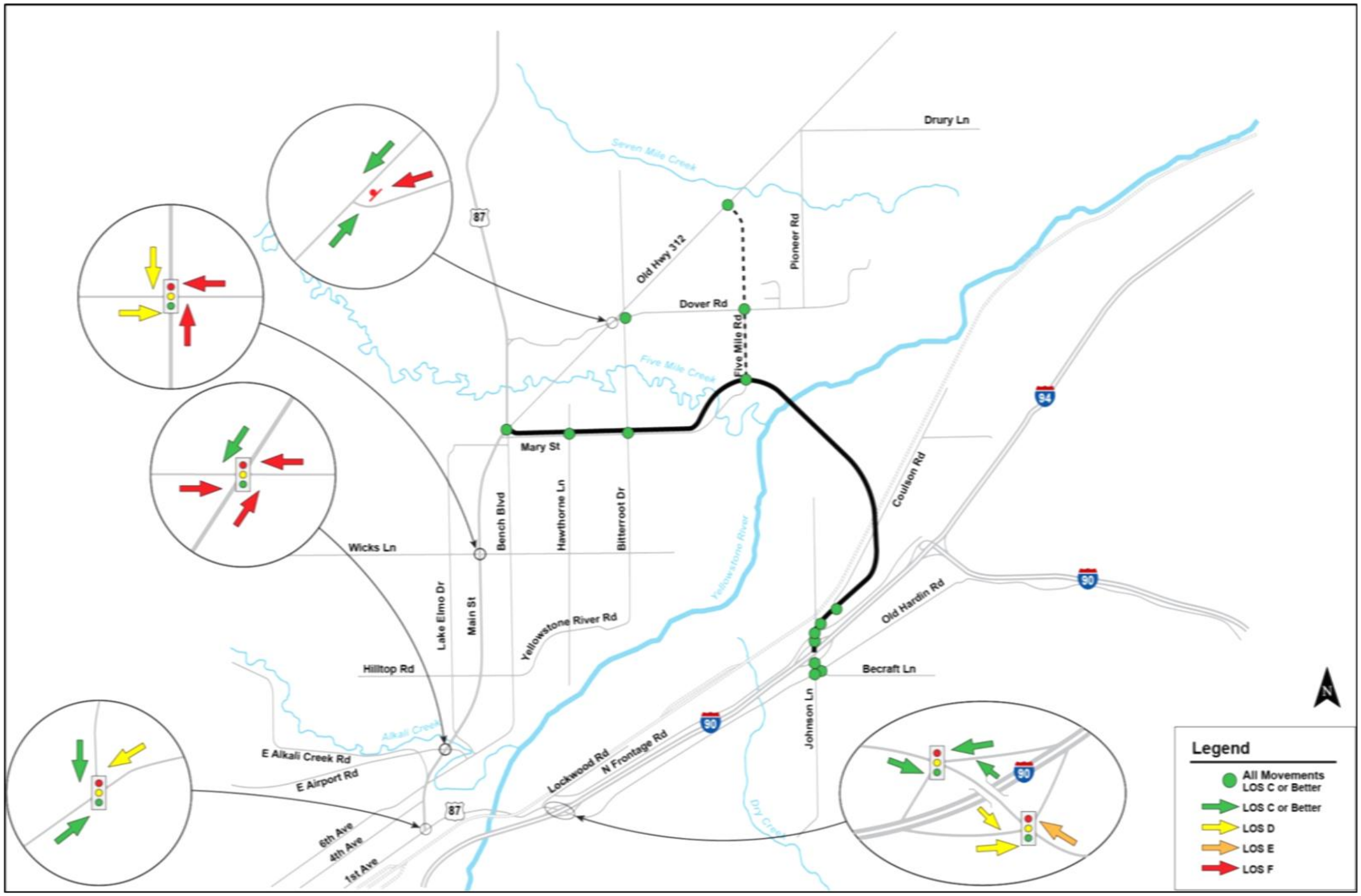
Direct impacts to traffic operations from Phase 1 of the Mary Street Option 2 Alternative are very similar to direct impacts associated with Full Buildout. As shown in **Figure 4.6**, an ADT of 15,250 vehicles is projected in 2035 at the Billings Bypass crossing of the Yellowstone River and MRL railroad under Phase 1. This is 250 daily vehicles less than the projected ADT under Full Buildout.

As with Full Buildout, Phase 1 would directly impact traffic operations along Five Mile Road and Johnson Lane. Increases in traffic volumes along these two roadways would result in the following increases in VMT in 2035 compared to the No Build Alternative:

- Five Mile Road from Mary Street to Old Hwy 312 – 909% increase in VMT, from 325 miles traveled to 3,280.
- Johnson Lane from Old Hardin Road to Coulson Road – 116% increase in VMT, from 3,805 miles traveled to 8,225.

Direct impacts to intersections under Phase 1 are similar to those impacts under Full Buildout. Phase 1, like Full Buildout, would directly impact 13 intersections in 2035—three new and ten existing intersections. Phase 1 final design would ensure that all intersections perform at LOS C or better in 2035, compared to the Full Buildout final design, which would result in all intersections performing at LOS B or better. Level of Service C is still considered acceptable by MDT standards. The 13 intersections are shown on **Figure 4.9** and are described in detail in the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013).

Figure 4.9 2035 Mary Street Option 2 Alternative Intersection Performance – Phase 1 and Full Buildout



Source: *Billings Bypass Combined Traffic Reports*, August 2013.

Indirect Impacts – Traffic Operations: Mary Street Option 2 Alternative

Full Buildout

Under Full Buildout of the Mary Street Option 2 Alternative, overall VMT (**Table 4.1**) would increase in the Billings urban area as vehicles would engage in longer trips in order to utilize the new Billings Bypass. This alternative would increase VMT by an estimated 3,480 miles in 2035 compared to the No Build Alternative, to a total of 670,280 VMT on select roadway corridors within the study area. Though more miles would be traveled, travel times would decrease as drivers avoid congested areas of Billings and Billings Heights. Daily VHT in 2035 would decrease by an estimated 1,300 hours under this alternative compared to the No Build Alternative. Additionally, the shift in vehicles from existing roadways to the bypass would alleviate congestion and decrease travel times along existing corridors.

Full Buildout of the Mary Street Option 2 Alternative would indirectly impact traffic operations along roadway corridors throughout the study area. As summarized in **Table 4.3**, VMT in 2035 is expected to increase by 10% or more along the following roadways compared to the No Build Alternative:

- Old Hwy 312 from Five Mile Road to S-522 Huntley.
- Bitterroot Drive from Wicks Lane to Dover Road.

As shown in **Table 4.1** and **Table 4.3**, VMT in 2035 would decrease along most principal roadway corridors within the study area compared to the No Build Alternative, resulting in decreased congestion and improved roadway and intersection performance. Similar to Full Buildout of the Mary Street Option 1 Alternative, Full Buildout of the Mary Street Option 2 Alternative would result in a VMT decrease of 10% or more along the following six roadway corridors:

- Old Hwy 312 (US 87/Main Street to Five Mile Road).
- Mary Street (Bench Boulevard to Five Mile Road).
- Main Street (1st Avenue to US 87/Old Hwy 312).
- Bench Boulevard (Main Street/6th Avenue to Mary Street).
- US 87 (1st Avenue to Lockwood Interchange).
- I-94 (Pinehills Interchange to Huntley Interchange).

Indirect impacts to operational performance at intersections bordering or near the study area are illustrated in **Figure 4.9**. The impacts are the same as those resulting from the Full Buildout of the Mary Street Option 1 Alternative.

Phase 1

Overall VMT and VHT projections within the study area for Phase 1 of the Mary Street Option 2 Alternative are very similar to the projections for Full Buildout. Phase 1 would result in 670,160 VMT daily on select roadway corridors within the study area, which is 120 vehicle miles less than the Full Buildout VMT, as shown in **Table 4.1**. Under Phase 1, daily VHT in 2035 would be approximately 30 hours more than the Full Buildout VHT.

As with the Mary Street Option 1 Alternative, Phase 1 of the Mary Street Option 2 Alternative would have 2035 ADT volumes that vary from the 2035 ADT volumes of Full Buildout by no more than 350 vehicles on any of the principal roadway corridors within the study area. This equates to a difference in ADT volumes of no more than +/-3%. As described in the *Billings Bypass Combined Traffic Reports*, this variation in volumes is statistically insignificant (Marvin & Associates 2013).

Temporary Construction Impacts – Traffic Operations: Mary Street Option 2 Alternative

Full Buildout

Construction of Full Buildout of the Mary Street Option 2 Alternative would create temporary construction impacts to traffic operations in addition and subsequent to the impacts from the Phase 1 two-lane roadway construction. Construction would begin after construction for Phase 1 is completed. Traffic operations would be impacted by construction at intersecting roadways and along the bypass that is related to widening the two-lane roadway to four lanes. This additional impact would primarily be due to a reduced speed limit and longer travel times along the bypass during construction of the four-lane widening.

Phase 1

Construction of Phase 1 of the Mary Street Option 2 Alternative would create short-term construction impacts throughout the construction period, which could begin as soon as 5 but up to 20 years after the ROD is signed. Construction detours and delays can create short-term impacts on local traffic circulation and congestion for residents and commuters. These impacts may include delays or the need for alternative travel routes to reach residences and community facilities. Traffic diversions and construction equipment and activities would also affect speeds and traffic operations on existing adjacent roadways and intersections. However, these temporary impacts should be limited, because much of the new bypass roadway construction is on a new alignment.

Disruptions to access and parking for businesses and residences located within the construction zone would occur and could create increased traffic on other streets in and outside of the study area. Emergency service response may be negatively impacted as a result of construction as well. Delays to the traveling public and inconvenience to residents of the corridor would occur. MDT would try to minimize inconvenience to the public through construction traffic planning during final design, and by monitoring and adjusting these plans throughout the construction phase. The *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013) includes detailed information on roadway locations that are most likely to incur the greatest impacts as a result of construction.

Temporary construction impacts under the Mary Street Option 2 Alternative would be slightly less than the temporary construction impacts under the Mary Street Option 1 Alternative, because the length of reconstruction of Five Mile Road would be shorter.

Cumulative Impacts – Traffic Operations: Mary Street Option 2 Alternative

Cumulative impacts under Phase 1 and Full Buildout of this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Traffic Operations: Mary Street Option 2 Alternative

Mitigation under Phase 1 and Full Buildout of this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

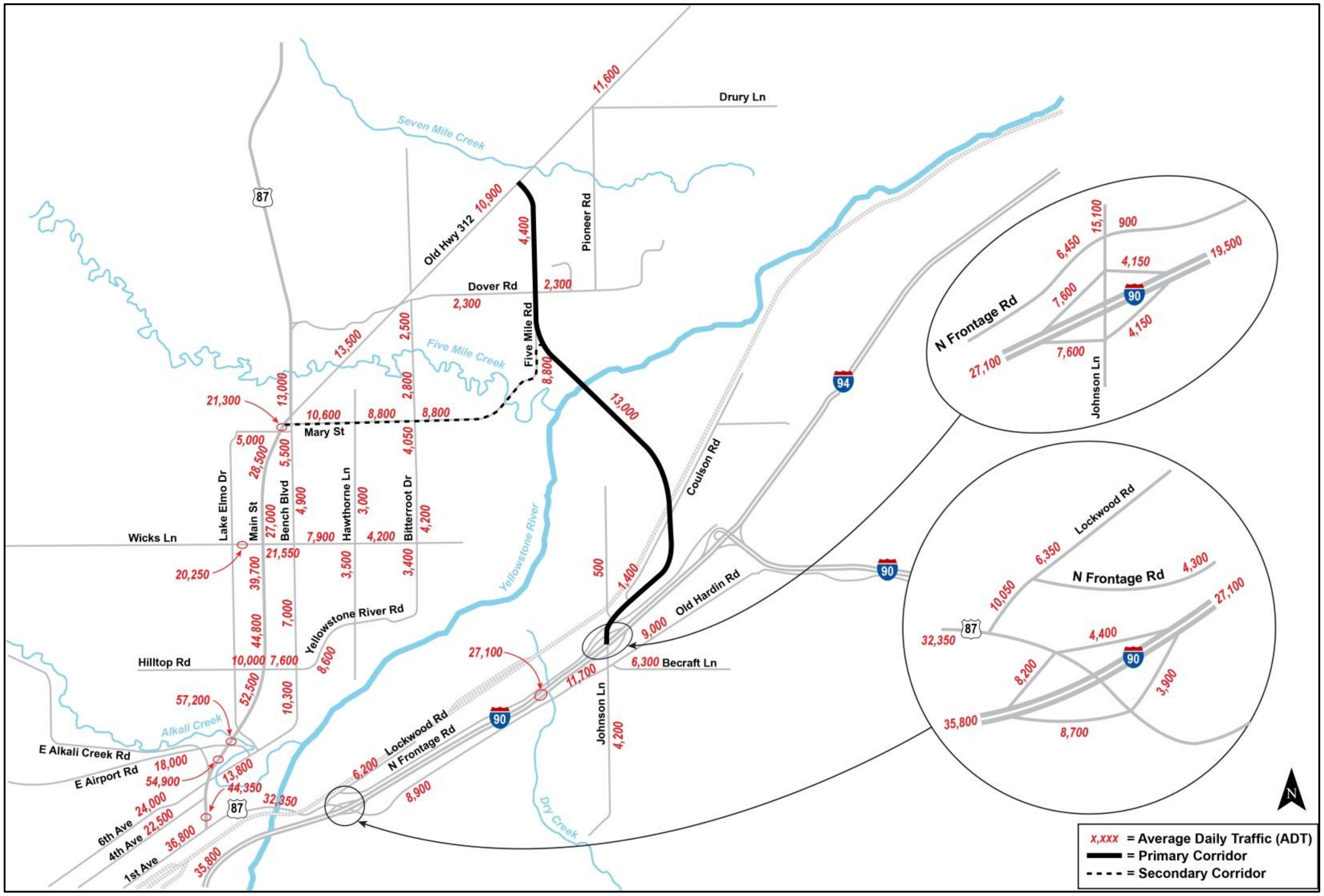
4.2.1.2.4 Five Mile Road Alternative

As described in Chapter 2, Alternatives, the Five Mile Road Alternative would provide a 4.4- to 4.5-mile-long connection across the Yellowstone River between I-90 and Old Hwy 312. The roadway would connect to I-90 at Johnson Lane and then extend north, crossing the MRL railroad, and then northwest, crossing the Yellowstone River. The bypass would follow the existing Five Mile Road alignment north to Dover Road and then continue north to connect with Old Hwy 312. Secondary improvements would include the reconstruction of Mary Street from Five Mile Road to Dover Road and intersections along its alignment.

Phase 1 of the Five Mile Road Alternative assumes a two-lane Billings Bypass, while Full Buildout assumes a four-lane road configuration. Separate intersection design concepts were developed for the two-lane and four-lane configurations.

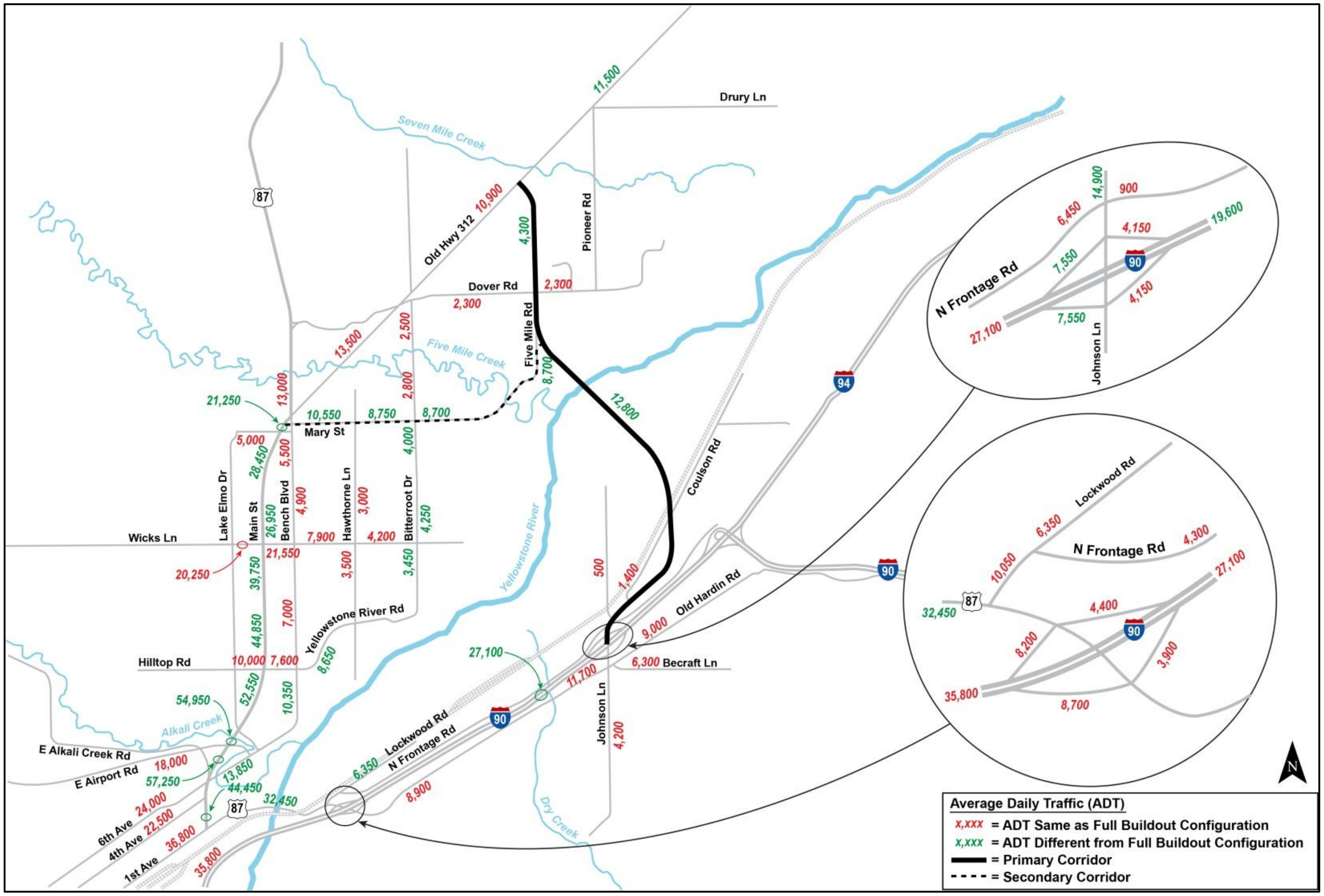
The future year 2035 daily traffic volumes under Full Buildout of the Five Mile Road Alternative are illustrated in **Figure 4.10**. Traffic volumes for Phase 1 and locations where volumes differ from Full Buildout are illustrated in **Figure 4.11**.

Figure 4.10 2035 Five Mile Road Alternative – Full Buildout Traffic Volumes



Source: *Billings Bypass Combined Traffic Reports*, August 2013.

Figure 4.11 2035 Five Mile Road Alternative – Phase 1 Traffic Volumes



Source: *Billings Bypass Combined Traffic Reports*, August 2013.

Direct Impacts – Traffic Operations: Five Mile Road Alternative

Full Buildout

Average annual daily traffic volumes were forecast for 2035 for Full Buildout of the Five Mile Road Alternative. An ADT of 13,000 vehicles is projected for Full Buildout of this alternative at the location of the Billings Bypass at the Yellowstone River and MRL railroad crossing.

Full Buildout of the Five Mile Road Alternative would directly impact traffic operations along Five Mile Road, Johnson Lane, and Mary Street. As summarized in **Table 4.2**, increases in traffic volumes along these roadways would result in the following increases in VMT in 2035 compared to the No Build Alternative:

- Five Mile Road from Mary Street to Old Hwy 312 – 1660% increase in VMT, from 325 miles traveled to 5,720.
- Johnson Lane from Old Hardin Road to Coulson Road – 99% increase in VMT, from 3,805 miles traveled to 7,575.
- Mary Street from Five Mile Road to Bench Boulevard – 285% increase in VMT, from 5,150 miles traveled to 19,820.

Full Buildout of the Five Mile Road Alternative impacts intersections along its proposed alignment. **Figure 4.12** illustrates intersection performance under Full Buildout of the Five Mile Road Alternative. This alternative would directly impact ten existing intersections and add three intersections along its alignment, resulting in a total of thirteen intersections in 2035. Final design would ensure that all of these intersections perform at LOS B or better in 2035. These intersections are shown on **Figure 4.12** and described in detail in the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013).

Phase 1

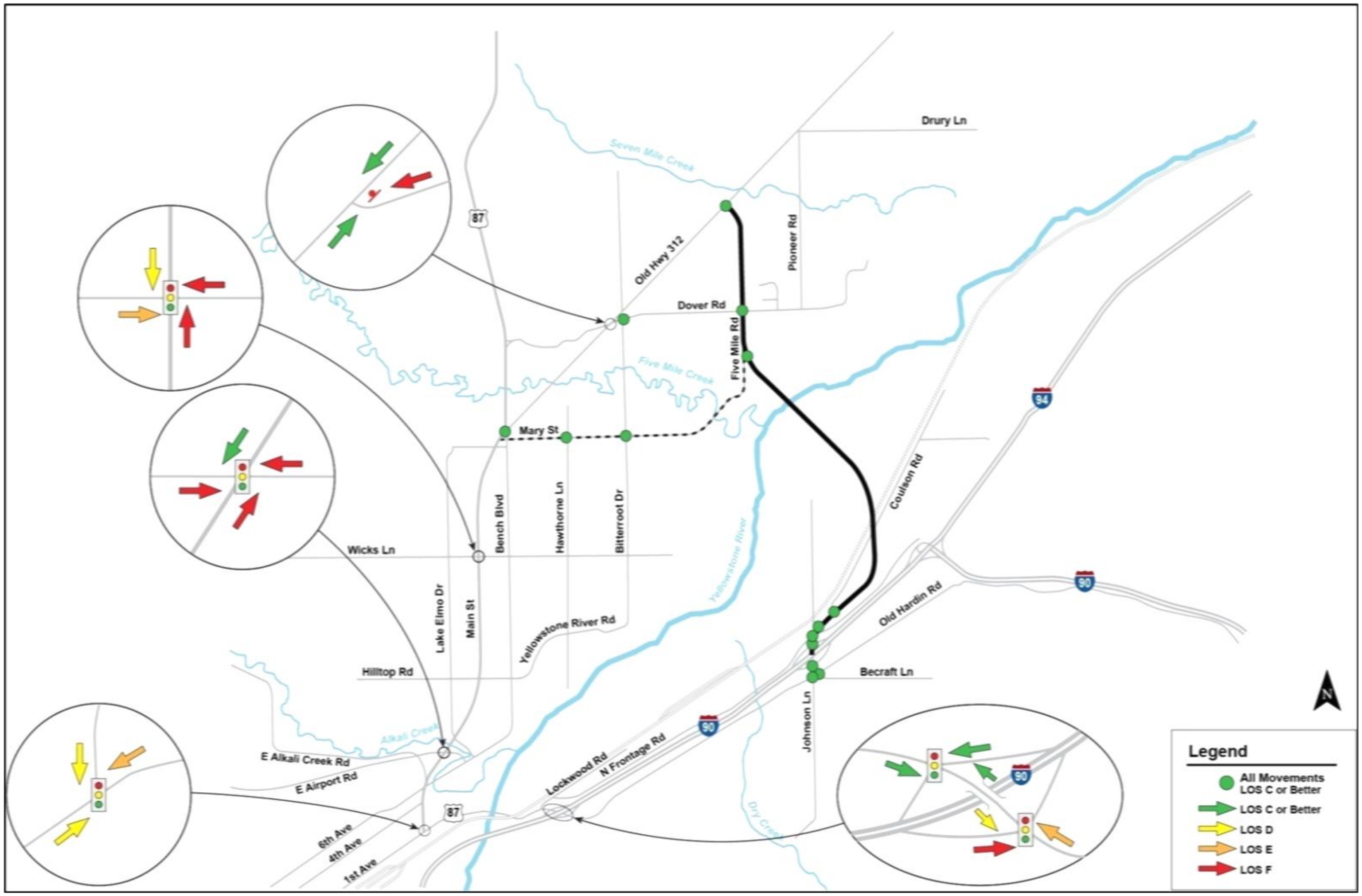
Direct impacts to traffic operations from Phase 1 of the Five Mile Road Alternative are very similar to direct impacts associated with Full Buildout. As shown in **Figure 4.11**, an ADT of 12,800 vehicles is projected in 2035 at the Billings Bypass crossing of the Yellowstone River and MRL railroad under Phase 1. This is 200 daily vehicles less than the projected ADT under Full Buildout.

As with Full Buildout, Phase 1 would directly impact traffic operations along Five Mile Road, Johnson Lane, and Mary Street. Increases in traffic volumes along these three roadways would result in the following increases in VMT in 2035 compared to the No Build Alternative:

- Five Mile Road from Mary Street to Old Hwy 312 – 1638% increase in VMT, from 325 miles traveled to 5,650.
- Johnson Lane from Old Hardin Road to Coulson Road – 98% increase in VMT, from 3,805 miles traveled to 7,515.
- Mary Street from Five Mile Road to Bench Boulevard – 285% increase in VMT, from 5,150 miles traveled to 19,820.

Direct impacts to intersections under Phase 1 are similar to those impacts under Full Buildout. Phase 1, like Full Buildout, would directly impact 13 intersections in 2035—three new and ten existing intersections. Phase 1 final design would ensure that all intersections perform at LOS C or better in 2035, compared to the Full Buildout final design, which would result in all intersections performing at LOS B or better. Level of Service C is still considered acceptable by MDT standards. The 13 intersections are shown on **Figure 4.12** and are described in detail in the *Billings Bypass Combined Traffic Reports* (2013).

Figure 4.12 2035 Five Mile Road Alternative Intersection Performance – Phase 1 and Full Buildout



Source: *Billings Bypass Combined Traffic Reports*, August 2013.

Indirect Impacts – Traffic Operations: Five Mile Road Alternative

Full Buildout

Under Full Buildout of the Five Mile Road Alternative, overall VMT (**Table 4.1**) would increase in the Billings urban area as vehicles would engage in longer trips in order to utilize the new Billings Bypass. This alternative would increase VMT by an estimated 7,450 miles in 2035 compared to the No Build Alternative, to a total of 674,250 VMT on select roadway corridors within the study area. Though more miles would be traveled, travel times would decrease as drivers avoid congested areas of Billings and Billings Heights. Daily VHT in 2035 would decrease by an estimated 1,080 hours under this alternative compared to the No Build Alternative. Additionally, the shift in vehicles from existing roadways to the bypass would alleviate congestion and decrease travel times along existing corridors.

Full Buildout of the Five Mile Road Alternative would indirectly impact traffic operations along roadway corridors throughout the study area. As summarized in **Table 4.3**, VMT in 2035 is expected to increase by 10% or more along the following roadways compared to the No Build Alternative:

- Old Hwy 312 from Five Mile Road to S-522 Huntley.
- Bitterroot Drive from Wicks Lane to Dover Road.

As shown in **Table 4.1** and **Table 4.3**, VMT in 2035 would decrease along most principal roadway corridors within the project study area compared to the No Build Alternative, resulting in decreased congestion and improved roadway and intersection performance. Full Buildout of the Five Mile Road Alternative would result in a VMT decrease of 10% or more along the following five roadway corridors:

- Old Hwy 312 (US 87/Main Street to Five Mile Road).
- Main Street (1st Avenue to US 87/Old Hwy 312).
- Bench Boulevard (Main Street/6th Avenue to Mary Street).
- US 87 (1st Avenue to Lockwood Interchange).
- I-94 (Pinehills Interchange to Huntley Interchange).

Figure 4.12 illustrates the indirect impacts to operational performance at intersections bordering or near the study area. Of these intersections, only the Old Hwy 312/Dover Road intersection would not show an improvement to intersection approach LOS under Full Buildout of the Five Mile Road Alternative compared to the No Build Alternative. The other intersections all show improvement to at least one intersection approach. The westbound I- 90 ramps/US 87 intersection shows the most improvement, with all approaches operating at acceptable conditions of LOS D or better.

Phase 1

Overall VMT and VHT projections within the study area for Phase 1 of the Five Mile Road Alternative are very similar to the projections for Full Buildout. Phase 1 would result in 674,110 VMT daily on select roadway corridors within the study area, which is 140 vehicle miles less than the Full Buildout VMT, as shown in **Table 4.1**. Under Phase 1, daily VHT in 2035 would be approximately 15 hours more than Full Buildout VHT.

Phase 1 ADT volumes would vary from the ADT volumes of Full Buildout by no more than 200 vehicles on any of the principal roadway corridors within the study area. This equates to a difference in ADT volumes of less than +/-2%. As described in the *Billings Bypass Combined Traffic Reports*, this variation in volumes is statistically insignificant (Marvin & Associates 2013).

Temporary Construction Impacts – Traffic Operations: Five Mile Road Alternative

Full Buildout

Construction of Full Buildout of the Five Mile Road Alternative would create temporary construction impacts to traffic operations in addition and subsequent to the impacts from the Phase 1 two-lane roadway construction. Construction would begin after construction for Phase 1 is completed. Traffic operations would be impacted by construction at intersecting roadways and along the bypass that is related to widening the two-lane roadway to four lanes. This additional impact would primarily be due to a reduced speed limit and longer travel times along the bypass during construction of the four-lane widening.

Phase 1

Construction of Phase 1 of the Five Mile Road Alternative would create short-term construction impacts throughout the construction period, which could begin as soon as 5 but up to 20 years after the ROD is signed. Construction detours and delays can create short-term impacts on local traffic circulation and congestion for residents and commuters. These impacts may include delays or the need for alternative travel routes to reach residences and community facilities. Traffic diversions and construction equipment and activities would also affect speeds and traffic operations on existing adjacent roadways and intersections. However, these temporary impacts should be limited, because much of the new bypass roadway construction is on a new alignment.

Disruptions to access and parking for businesses and residences located within the construction zone would occur and could create increased traffic on other streets in and outside of the study area. Emergency service response may be negatively impacted as a result of construction as well. Delays to the traveling public and inconvenience to residents of the corridor would occur. MDT would try to minimize inconvenience to the public through construction traffic planning during final design, and by monitoring and adjusting these plans throughout the construction phase. The *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013) includes detailed information on roadway locations that are most likely to incur the greatest impacts as a result of construction.

Cumulative Impacts – Traffic Operations: Five Mile Road Alternative

The cumulative impacts to traffic operations for Phase 1 and Full Buildout of the Five Mile Road Alternative would be similar, but lesser than, the impacts identified for Phase 1 and Full Buildout of the Mary Street alternatives. Although there is more undeveloped land along Five Mile Road, the planned roadway would have limited access between Dover Road and Old Hwy 312. In addition, the northernmost portion of the study area along Five Mile Road is outside of the Urban Planning Area, and is proposed to remain rural in nature.

Mitigation – Traffic Operations: Five Mile Road Alternative

Mitigation under Phase 1 and Full Buildout of this alternative would be the same as that indicated for the Mary Street alternatives.

4.2.2 ACCESSIBILITY

4.2.2.1 METHODOLOGY

The alternatives were evaluated to identify impacts to accessibility for properties along the project corridors. Overlays of the build alternatives were combined with design information and traffic and parcel data to determine where changes in existing accessibility would occur. Locations where access would be removed, added, relocated, or reconfigured are identified.

4.2.2.2 RESULTS

Anticipated accessibility impacts (direct and indirect) are summarized in **Table 4.5**. The impacts for the three build alternatives are for Phase 1 and Full Buildout.

Table 4.5 Direct and Indirect Impacts Summary - Accessibility

ALTERNATIVES	DIRECT IMPACTS	INDIRECT IMPACTS
NO BUILD ALTERNATIVE		
	• Minor direct impacts could occur to accessibility as a result of the No Build Alternative.	• Increased congestion/diminished accessibility along primary corridors within Billings and Billings Heights. • Degraded operational performance at intersections along primary roadway corridors within Billings/Billings Heights.
ALL THREE BUILD ALTERNATIVES (PHASE 1 AND FULL BUILDOUT)		
	• Enhanced accessibility for vehicles travelling between Lockwood area and Billings/Billings Heights area. • Temporary construction impacts at the I-90/Coulson Interchange, along Coulson Road, Five Mile Road, Mary Street, and at the US 87/Old Hwy 312/Main Street intersection.	• Accessibility improvements as congestion decreases along primary corridors within Billings and Billings Heights. • Improved operational performance at intersections along primary roadway corridors within Billings/Billings Heights. • Shorter travel times/improved accessibility between Lockwood and Billings Heights/Billings and the surrounding areas.
MARY STREET OPTION 1 ALTERNATIVE (PHASE 1 AND FULL BUILDOUT)		
	• Provides the most amount of direct access between Lockwood and areas along Mary Street and north along US 87.	• Existing Mary Street would provide supplemental local access, while the bypass alignment would be a limited access facility.
MARY STREET OPTION 2 ALTERNATIVE (PHASE 1 AND FULL BUILDOUT)		
	• Improvement to general accessibility between Lockwood and areas adjacent to Mary Street and north along US 87. • Greater accessibility to areas north along Old Hwy 312 than under Mary Street Option 1.	• Existing Mary Street would provide supplemental local access, while the bypass alignment would be a limited access facility.
FIVE MILE ROAD ALTERNATIVE (PHASE 1 AND FULL BUILDOUT)		
	• Provides the least direct accessibility of the three build alternatives between Lockwood and areas along Mary Street and north along US 87. • Greatest accessibility to areas north along Old Hwy 312 of the three build alternatives.	• Limited direct accessibility along Five Mile Road would require other supplemental roadways to be constructed for land access if adjacent lands were to be developed.

Note: Impacts for the three build alternatives are for both Phase 1 and Full Buildout.

Accessibility impacts associated with Phase 1 of each of the build alternatives would be very similar to the Full Buildout of the build alternatives. The direct impacts from Phase 1 and Full Buildout of the build alternatives are expected to be the same, except that slightly fewer vehicles are expected to utilize the new bypass under Phase 1 of all three build alternatives.

Temporary construction impacts from Phase 1 and Full Buildout of the build alternatives are expected to be the same, except that Full Buildout impacts would include the Phase 1 impacts from construction of the two-lane bypass and the subsequent impacts from widening to the four-lane bypass.

Indirect and cumulative impacts of each build alternative are also expected to be the same under either Phase 1 or Full Buildout.

4.2.2.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Accessibility: No Build Alternative

There would be no change in accessibility to the roadway network.

Indirect Impacts – Accessibility: No Build Alternative

Indirect impacts to access as a result of the No Build Alternative would include continued difficulties with access between the Lockwood area and Billings/Billings Heights. Increased congestion along the existing connections between these areas would result in decreasing accessibility over time. Additionally, accessibility along Main Street, Bench Boulevard, and US 87 between 1st Avenue and the I-90 Lockwood Interchange would grow increasingly difficult as congestion continues to increase. Operational performance at intersections and driveway accesses along these corridors would continue to degrade over time.

Temporary Construction Impacts – Accessibility: No Build Alternative

Minor temporary construction impacts are likely to occur associated with planned City of Billings projects. Generally, these impacts could include impeded accessibility to residential and business areas adjacent to these projects for the duration of construction.

Cumulative Impacts – Accessibility: No Build Alternative

As noted under indirect impacts, congestion would continue to increase along existing connections between Lockwood and Billings, resulting in more accessibility issues. Operational performance at intersection and driveway accesses along existing corridors within Billings and the Billings Heights neighborhood would degrade over time. This degraded operational performance could hamper projected growth and changes in planned land use that may occur as a result of the improvements. Operational performance at intersection and driveway accesses along existing corridors within Billings and the Billings Heights neighborhood would degrade over time. Under the No Build Alternative, development and growth in Billings would continue along current trends. No land would be acquired, developed, or directly affected as a result of this alternative, and land use patterns would change according to adopted local land use plans where applicable. Higher-density development would continue to occur. Cumulative effects of the No Build Alternative would be negligible.

Mitigation – Accessibility: No Build Alternative

No mitigation is expected within or adjacent to the study area for the No Build Alternative.

4.2.2.2.2 MARY STREET OPTION 1 ALTERNATIVE

Direct Impacts – Accessibility: Mary Street Option 1 Alternative

The direct impacts to accessibility from Phase 1 and Full Buildout of the Mary Street Option 1 Alternative would be essentially the same. The new bypass roadway would provide enhanced accessibility for vehicles traveling between Billings Heights and Lockwood and the surrounding areas. Shorter travel times and a direct travel route would benefit vehicles traveling through the area from the east along I-90 to and from the north along US 87. Additionally, the secondary improvements along Five Mile Road would enhance accessibility for vehicles traveling to and from areas along Old Hwy 312 to the northeast, as well as to properties located on either side of the alignment.

Access to Coulson Road from Johnson Lane would be eliminated, because approximately 1,000 feet of Coulson Road would be removed. Access to Coulson Road would be provided by a new stop-controlled intersection along the new bypass roadway.

Under Phase 1 of the Mary Street Option 1 Alternative, the benefits to accessibility due to the new bypass roadway would be experienced by 350 fewer vehicles daily in 2035 than under Full Buildout.

Indirect Impacts – Accessibility: Mary Street Option 1 Alternative

The indirect impacts to accessibility from Phase 1 and Full Buildout of the Mary Street Option 1 Alternative would be essentially the same. Mary Street would be retained for local access adjacent to the new bypass roadway. Access points along Mary Street would include intersections at Bench Boulevard, Hawthorne Lane, Bitterroot Drive, and Five Mile Road.

Under the Mary Street Option 1 Alternative, traffic shifting to the new bypass roadway would ease congestion along existing roadway corridors. Accessibility to and from Billings and Billings Heights would improve as traffic volumes decrease along Main Street, Bench Boulevard, and US 87 west of the Lockwood Interchange. Additionally, traffic diverted to the new bypass would result in decreased congestion along Billings and Billings Heights roadway corridors and enhanced accessibility to the downtown Billings area.

Under Phase 1 of the Mary Street Option 1 Alternative, 350 fewer vehicles would be rerouted to the new bypass roadway in 2035 compared to Full Buildout. This small difference in vehicles shifting to the bypass would result in indirect impacts to accessibility that are indistinguishable from impacts of the Full Buildout.

Temporary Construction Impacts – Accessibility: Mary Street Option 1 Alternative

Full Buildout

Construction of Full Buildout of the Mary Street Option 1 Alternative would create temporary construction impacts to accessibility in addition and subsequent to the impacts from the Phase 1 two-lane roadway construction. Accessibility would be impacted by construction at intersecting roadways and along the bypass that is related to widening the two-lane roadway to four lanes. This additional impact would primarily be due to a reduced speed limit and longer travel times along the bypass during construction of the four-lane widening.

Phase 1

Construction of the Mary Street Option 1 Alternative would create short-term construction impacts to accessibility throughout the construction period. Temporary detours may be required during construction, resulting in short-term impacts on local traffic circulation and accessibility. Accessibility may be restricted during construction along existing roadways in the vicinity of Johnson Lane, the I-90 Interchange, Coulson Road, Mary Street, and Five Mile Road, and the US 87/Old Hwy 312/Main Street intersection.

Cumulative Impacts – Accessibility: Mary Street Option 1 Alternative

The cumulative impacts to accessibility for Phase 1 and Full Buildout of the Mary Street Option 1 Alternative would be essentially the same. This alternative would improve accessibility between the communities surrounding Billings by providing an additional route to cross the Yellowstone River and the MRL railroad. Provision of the additional route may allow for greater development pressure and may expedite development in the areas already targeted for future commercial and residential use along Mary Street. The extension of Five Mile Road as a secondary corridor would result in a new connection to Old Hwy 312, and would pave and improve the existing gravel portion of Five Mile Road south of Dover Road. Since Five Mile Road would become an improved county road, new development could occur. However, much of this area is outside city limits and the Urban Planning Area, and does not currently receive city services such as water and sewer. Future land use in this area is slated to remain residential. The *Yellowstone County and City of Billings 2008 Growth Policy Update* (City of Billings 2008) shows that most of the growth over the next 10 to 20 years will happen west of the study area. There could be a cumulative effect of increased accessibility, resulting in expedited growth, but this would not be considered significant.

Mitigation – Accessibility: Mary Street Option 1 Alternative

No mitigation is required for direct impacts associated with accessibility. The following steps would be taken to minimize impacts to accessibility during construction of either Phase 1 or Full Buildout of the Mary Street Option 1 Alternative:

- Develop traffic management plans during final design in accordance with the Manual on Uniform Traffic Control Devices.
- The traffic management plan would ensure maintenance of access to local businesses/residences.

4.2.2.2.3 MARY STREET OPTION 2 ALTERNATIVE

Direct Impacts – Accessibility: Mary Street Option 2 Alternative

Direct impacts under this alternative, for both Phase 1 and Full Buildout, would be the same as those indicated for the Mary Street Option 1 Alternative. The new bypass roadway would provide enhanced accessibility for vehicles traveling between Billings Heights and Lockwood and the surrounding areas. Shorter travel times and a direct travel route would benefit vehicles traveling through the area from east along I-90 to and from north along US 87. Additionally, the secondary improvements along Five Mile Road would enhance accessibility for vehicles traveling to and from areas along Old Hwy 312 to the northeast as well as to properties located on either side of the alignment.

Access to Coulson Road from Johnson Lane would be eliminated, because approximately 1,000 feet of Coulson Road would be removed. Access to Coulson Road would be provided by a new stop-controlled intersection along the new bypass roadway.

Under Phase 1 of the Mary Street Option 2 Alternative, the benefits to accessibility due to the new bypass roadway would be experienced by 350 fewer vehicles daily in 2035 than under Full Buildout.

Indirect Impacts – Accessibility: Mary Street Option 2 Alternative

Direct impacts under the Mary Street Option 2 Alternative, for both Phase 1 and Full Buildout, would be the same as those indicated for the Mary Street Option 1 Alternative. Mary Street would be retained as local access to the new bypass roadway. Access points along Mary Street would include intersections at Bench Boulevard, Hawthorne Lane, Bitterroot Drive, and Five Mile Road.

Under the Mary Street Option 2 Alternative, traffic shifting to the new bypass roadway would ease congestion along existing roadway corridors. Accessibility to and from Billings and Billings Heights would improve as traffic volumes decrease along Main Street, Bench Boulevard, and US 87 west of the Lockwood Interchange. Additionally, traffic diverted to the new bypass would result in decreased congestion along Billings and Billings Heights roadway corridors and enhanced accessibility to the downtown Billings area.

Under Phase 1 of the Mary Street Option 2 Alternative, 350 fewer vehicles would be rerouted to the new bypass roadway in 2035 than under Full Buildout. This small difference in vehicles shifting to the bypass would result in indirect impacts to accessibility that are indistinguishable from impacts of the Full Buildout.

Temporary Construction Impacts – Accessibility: Mary Street Option 2 Alternative

Temporary construction impacts to accessibility due to Phase 1 and Full Buildout of the Mary Street Option 2 Alternative would be essentially the same as the temporary construction impacts associated with Phase 1 and Full Buildout of the Mary Street Option 1 Alternative.

Full Buildout

Construction of Full Buildout of the Mary Street Option 2 Alternative would create temporary construction impacts to accessibility in addition and subsequent to the impacts from the Phase 1 two-lane roadway construction. Accessibility would be impacted by construction at intersecting roadways and along the bypass that is related to widening the two-lane roadway to four lanes. This additional impact would primarily be due to a reduced speed limit and longer travel times along the bypass during construction of the four-lane widening.

Phase 1

Construction of the Mary Street Option 2 Alternative would create short-term construction impacts to accessibility throughout the construction period. Temporary detours may be required during construction, resulting in short-term impacts on local traffic circulation and access. Access may be restricted during construction along existing roadways in the vicinity of Johnson Lane, the I-90 Interchange, Coulson Road, Mary Street, and Five Mile Road, and at the US 87/Old Hwy 312/Main Street intersection.

Cumulative Impacts – Accessibility: Mary Street Option 2 Alternative

Cumulative impacts from Phase 1 and Full Buildout of this alternative would be the same as those indicated for Phase 1 and Full Buildout of the Mary Street Option 1 Alternative.

Mitigation – Accessibility: Mary Street Option 2 Alternative

No mitigation is required for direct impacts associated with accessibility. The following steps would be taken to minimize impacts to access during construction of either Phase 1 or Full Buildout of the Mary Street Option 2 Alternative:

- Develop traffic management plans during final design in accordance with the Manual on Uniform Traffic Control Devices.
- The traffic management plan would ensure maintenance of access to local businesses/residences.

4.2.2.2.4 FIVE MILE ROAD ALTERNATIVE

Direct Impacts – Accessibility: Five Mile Road Alternative

Direct impacts under the Five Mile Alternative, for both Phase 1 and Full Buildout, would be similar to those under both of the Mary Street alternatives. The new bypass roadway would provide enhanced accessibility for vehicles traveling between Lockwood and Billing Heights and the surrounding areas. In particular, vehicles traveling to and from areas along Old Hwy 312 would benefit from shorter travel times and a direct travel route to the Lockwood area from the Five Mile Road Alternative alignment. Additionally, secondary improvements along Mary Street would enhance accessibility for vehicles traveling to and from Billings Heights.

The Five Mile Road extension north of Dover Road would be an uninterrupted facility, with no access points between the Dover Road and Old Hwy 312 intersections.

Access to Coulson Road from Johnson Lane would be eliminated, because approximately 1,000 feet of Coulson Road would be removed. Access to Coulson Road would be provided by a new stop-controlled intersection along the new bypass roadway.

Under Phase 1 of the Five Mile Road Alternative, the benefits to accessibility due to the new bypass roadway would be experienced by 200 fewer vehicles daily in 2035 than under Full Buildout.

Indirect Impacts – Accessibility: Five Mile Road Alternative

Because Five Mile Road would be constructed as a limited access facility, adjacent properties would be accessed from other roadways.

Under the Five Mile Alternative, traffic shifting to the new bypass roadway would ease congestion along existing roadway corridors. Accessibility to and from Billings and Billings Heights would improve as traffic volumes decrease along Main Street, Bench Boulevard, and US 87 west of the Lockwood Interchange.

Under Phase 1 of the Five Mile Road Alternative, 200 fewer vehicles would be rerouted to the new bypass roadway in 2035 compared to Full Buildout. This small difference in vehicles shifting to the bypass would result in indirect impacts to accessibility that are indistinguishable from impacts of the Full Buildout.

Temporary Construction Impacts – Accessibility: Five Mile Road Alternative

Temporary construction impacts to accessibility due to Phase 1 and Full Buildout of the Five Mile Road Alternative would be essentially the same as the temporary construction impacts associated with Phase 1 and Full Buildout of either of the Mary Street alternatives.

Full Buildout

Construction of Full Buildout of the Five Mile Road Option 1 Alternative would create temporary construction impacts to accessibility in addition and subsequent to the impacts from the Phase 1 two-lane roadway construction. Accessibility would be impacted by construction at intersecting roadways and along the bypass that is related to widening the two-lane roadway to four lanes. This additional impact would primarily be due to a reduced speed limit and longer travel times along the bypass during construction of the four-lane widening.

Phase 1

Construction of the Five Mile Road Alternative would create short-term construction impacts to accessibility throughout the construction period. Temporary detours may be required during construction, resulting in short-term impacts on local traffic circulation and accessibility. Accessibility may be restricted during construction along existing roadways in the vicinity of Johnson Lane, the I-90 Interchange, Coulson Road, Mary Street, and Five Mile Road, and at the US 87/Old Hwy 312/Main Street intersection.

Cumulative Impacts – Accessibility: Five Mile Road Alternative

The cumulative impacts to accessibility from Phase 1 and Full Buildout of the Five Mile Road Alternative would be essentially the same. The Five Mile Road Alternative would improve accessibility between the communities surrounding Billings by providing an additional route to cross the Yellowstone River and the MRL railroad. However, access along Five Mile Road would be limited, and growth in areas slated for additional residential development may not occur. The cumulative effects to surrounding communities as a result of improved accessibility would be negligible.

Mitigation – Accessibility: Five Mile Road Alternative

No mitigation is required for direct impacts associated with accessibility. The following steps would be taken to minimize impacts to accessibility during construction of either Phase 1 or Full Buildout of the Five Mile Road Alternative:

- Develop traffic management plans during final design in accordance with the Manual on Uniform Traffic Control Devices.
- The traffic management plan would ensure maintenance of access to local businesses/residences.

4.2.3 SAFETY

4.2.3.1 METHODOLOGY

The *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013) applied existing crash rates to future year traffic volumes to estimate future year crash totals along study area roadways under the No Build Alternative and the three build alternatives. Using the same methodology, the *Billings Bypass Combined Traffic Study Reports* (2013) projected future year crash totals for Phase 1 of the three build alternatives. For the new Billings Bypass roadway alignments, historical crash rates along similar roadways constructed under current design standards were used to estimate future crash totals.

4.2.3.2 RESULTS

Year 2035 crash projections for roadways and proposed project alternatives within the study area are shown in **Table 4.6**.

Table 4.6 Year 2035 Crash Projections

ROADWAYS	NO BUILD	MARY STREET OPTION 1		MARY STREET OPTION 2		FIVE MILE ROAD	
		PHASE 1	FULL BUILDOUT	PHASE 1	FULL BUILDOUT	PHASE 1	FULL BUILDOUT
Billings Bypass Corridor	NA	27	19	26	18	18	12
Existing Study Area Roadways	551	488	484	488	484	500	500
Total	551	515	503	514	502	518	512

Source: *Billings Bypass Combined Traffic Reports*, August 2013.

The build alternatives are predicted to experience between 5% and 10% fewer crashes along the select study area roadways than the No Build Alternative in 2035, even though there would be between 4.5 and 5.1 miles of new roadway. Research indicates that two-lane roadways similar to the proposed Phase 1 bypass roadways generally have higher crash rates than four-lane roadways (Marvin & Associates 2013). It is estimated that six to twelve more crashes would occur annually under Phase 1 of the build alternatives than under Full Buildout.

The build alternatives are also predicted to experience between 5% and 10% fewer injury crashes than the No Build Alternative. The number of fatalities under the No Build Alternative is projected to be less than two in 2035. The number of fatalities under Phase 1 and Full Buildout of each build alternative is also projected to be less than two.

Under the build alternatives, the shift of traffic from generally urban roadway facilities to a more rural roadway alignment may result in an increased potential for wildlife-related accidents. However, all of the build alternatives would have safety benefits over the No Build Alternative by reducing exposure (traffic) on the existing streets and diverting traffic to newer, safer facilities.

Anticipated safety impacts and benefits in the study area are summarized in **Table 4.7**.

Table 4.7 Direct and Indirect Impacts Summary – Safety

ALTERNATIVES	DIRECT IMPACTS		INDIRECT IMPACTS	
	PHASE 1	FULL BUILDOUT	PHASE 1	FULL BUILDOUT
NO BUILD ALTERNATIVE				
	• None.		• Increased number of crashes and increased emergency response times as congestion along existing corridors increases. 551 projected crashes in 2035.	

ALTERNATIVES	DIRECT IMPACTS		INDIRECT IMPACTS	
	PHASE 1	FULL BUILDOUT	PHASE 1	FULL BUILDOUT
MARY STREET OPTION 1 ALTERNATIVE				
	• 27 projected crashes along the bypass alignment (including animal-related crashes) in 2035.	• 19 projected crashes along the bypass alignment (including animal-related crashes) in 2035.	• Decrease of 63 crashes along existing roadways to 488 in 2035.* • Improved emergency response times.	• Decrease of 67 crashes along existing roadways to 484 in 2035.* • Improved emergency response times.
MARY STREET OPTION 2 ALTERNATIVE				
	• 26 projected crashes along the bypass alignment (including animal-related crashes) in 2035.	• 18 projected crashes along the bypass alignment (including animal-related crashes) in 2035.	• Decrease of 63 crashes along existing roadways to 488 in 2035.* • Improved emergency response times.	• Decrease of 67 crashes along existing roadways to 484 in 2035.* • Improved emergency response times.
FIVE MILE ROAD ALTERNATIVE				
	• 18 projected crashes along the bypass alignment (including animal-related crashes) in 2035.	• 12 projected crashes along the bypass alignment (including animal-related crashes) in 2035.	• Decrease of 51 crashes along existing roadways to 500 in 2035.* • Improved emergency response times.	• Decrease of 51 crashes along existing roadways to 500 in 2035.* • Improved emergency response times.

Source: *Billings Bypass Combined Traffic Reports*, August 2013.
* Change compared to No Build Alternative.

4.2.3.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Safety: No Build Alternative

No direct impacts to safety are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Safety: No Build Alternative

Under the No Build Alternative, the lack of connectivity and mobility, along with increased traffic congestion, would contribute to increasingly unsafe roadway conditions along existing roadways. Crashes would increase as congestion and vehicle conflicts increase over time. **Table 4.7** above shows the total projected crashes along the primary roadway corridors within the study area in 2035.

In addition to an increase in crashes, the increased congestion experienced under the No Build Alternative would result in further limitations to mobility in downtown Billings and Billings Heights, negatively impacting emergency response times. Main Street, the primary emergency route between Billings and

Billings Heights, would experience increased congestion that would increasingly impede emergency response.

Temporary Construction Impacts – Safety: No Build Alternative

No temporary construction impacts to safety are expected with or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – Safety: No Build Alternative

No cumulative impacts to safety are expected with or adjacent to the study area from the No Build Alternative.

Mitigation – Safety: No Build Alternative

No mitigation to safety is expected with or adjacent to the study area from the No Build Alternative.

4.2.3.2.2 MARY STREET OPTION 1 ALTERNATIVE

Direct Impacts – Safety: Mary Street Option 1 Alternative

Full Buildout

According to the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013), the new Billings Bypass alignment under Full Buildout of the Mary Street Option 1 Alternative is projected to experience 19 crashes in 2035, as shown in **Table 4.6**.

The Mary Street Option 1 Alternative would likely lower crash rates along Johnson Lane between the I-90 Interchange and Coulson Road. This segment of roadway has the third highest crash rate within the study area due to high traffic volumes, high truck traffic volumes, and restrictive geometry. Improvements to the geometry should result in a decreased crash rate.

Phase 1

According to the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013), the new Billings Bypass alignment under Phase 1 of the Mary Street Option 1 Alternative would experience 27 crashes in 2035, eight more than under the Full Buildout. This increase is based on historical crash data indicating that two-lane roadway facilities of this type typically experience higher crash rates than four-lane roadways.

Indirect Impacts – Safety: Mary Street Option 1 Alternative

Full Buildout

Under Full Buildout of the Mary Street Option 1 Alternative, the enhanced connectivity and mobility provided by the Billings Bypass would result in decreased traffic congestion through Billings and Billings Heights. This decrease in traffic along existing roadway corridors is expected to result in decreased crashes and vehicle conflicts. As shown in **Table 4.6**, the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013) estimates that under Full Buildout of the Mary Street Option 1 Alternative, the existing roadway corridors within the study area will experience 484 crashes in 2035. This is a decrease of 67 crashes compared to the No Build Alternative. The number of injuries and injury crashes are projected to decrease proportionally to the reduced number of overall predicted crashes.

In addition to a decrease in crashes, the decreased congestion experienced under the Mary Street Option 1 Alternative would result in enhanced mobility in downtown Billings and Billings Heights. Main Street, the primary emergency route between Billings and Billings Heights, would experience decreased congestion and travel times, improving emergency response times.

The Mary Street Option 1 Alternative would likely lower crash totals along existing roadway corridors as congestion is alleviated. This would include the roadway with the highest crash rate in the area, Bench Boulevard from Main Street to Wicks Lane, including the US 87/Old Hwy 312/Main Street intersection.

Phase 1

Under Phase 1 of the Mary Street Option 1 Alternative, indirect impacts to safety would be nearly the same as indirect impacts from the Full Buildout. According to the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013), the bypass would result in an estimated four more crashes along existing roadway corridors within the study area than under the Full Buildout in 2035.

Temporary Construction Impacts – Safety: Mary Street Option 1 Alternative

Full Buildout

Construction of Full Buildout of the Mary Street Option 1 Alternative would create short-term impacts similar to and subsequent to those that would occur under Phase 1, as described below.

Phase 1

Temporary construction impacts to safety conditions would result from Phase 1 of the Mary Street Option 1 Alternative. Construction along existing roadways and intersections would impede traffic flow and may result in increased vehicle conflicts and conflicts between vehicles and construction personnel and/or equipment. Crash rates may increase during construction, though lower speeds in construction areas may result in lower crash severity rates.

Cumulative Impacts – Safety: Mary Street Option 1 Alternative

The Phase 1 and Full Buildout Mary Street Option 1 Alternative cumulative impacts to safety would be essentially the same. With the provision of the new bypass, new access would be provided to vacant land. Portions of this land area are designated for future residential and/or commercial development. The secondary corridor improvements to Five Mile Road could expedite planned development in the northern portion of the study area. The increased density in land use, along with other planned roadway improvements could draw more traffic into the study area, thereby increasing the overall volume of traffic and VMT. There is a potential for more crashes as a result of the increase in VMT throughout the study area. However, improvements to geometry associated with the new roadway would lower crash rates in the southern part of the study area. The net impact to safety associated with the new roadway coupled with the planned development would be cumulatively insignificant.

Mitigation – Safety: Mary Street Option 1 Alternative

No mitigation for safety impacts is required. However, the following measures would be followed for the project during final design and construction.

Phase 1 and Full Buildout of the Mary Street Option 1 Alternative, including the Billings Bypass, secondary improvements, and intersection improvements, would be designed in accordance with MDT and FHWA design standards. Additionally, during construction, the project would follow the MDT and FHWA safety standards as outlined in *MDT Work Zone Safety and Mobility Guidelines (2009)*. These guidelines were designed to provide "an opportunity to increase safety for MDT employees, construction workers and the public while improving the mobility of the traveling public and our goods and services."

At this time, no specific locations have been identified as potential or likely wildlife crossings. However, as the design process evolves, MDT would continue to evaluate the appropriateness and necessity of wildlife-crossing mitigation measures such as signage and wildlife-friendly fencing in order to mitigate for a potential increase in wildlife-related crashes near the Yellowstone River, Five Mile Creek, or other locations.

4.2.3.2.3 MARY STREET OPTION 2 ALTERNATIVE

Direct Impacts – Safety: Mary Street Option 2 Alternative

Full Buildout

Direct impacts to safety under the Full Buildout of the Mary Street Option 2 Alternative would be very similar to those indicated for the Mary Street Option 1 Alternative. According to the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013), Full Buildout of this alternative is projected to experience 18 crashes in 2035, as shown above in **Table 4.6**.

As with the Full Buildout of the Mary Street Option 1 Alternative, Full Buildout of the Mary Street Option 2 Alternative would likely lower accident rates along Johnson Lane between the I-90 Interchange and Coulson Road.

Phase 1

According to the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013), the new Billings Bypass alignment under Phase 1 of the Mary Street Option 2 Alternative would experience 26 crashes in 2035, eight more than under the Full Buildout. This increase is based on historical crash data indicating that two-lane roadways of this type typically experience higher crash rates than four-lane roadways.

Indirect Impacts – Safety: Mary Street Option 2 Alternative

Full Buildout

Indirect impacts to safety under the Full Buildout of the Mary Street Option 2 Alternative would be very similar to those indicated for the Mary Street Option 1 Alternative. Under Full Buildout of the Mary Street Option 2 Alternative, 484 crashes are projected along existing roadways in 2035, as shown in **Table 4.6**. This is a decrease of 67 crashes compared to the No Build Alternative. The number of injuries and injury crashes are projected to decrease proportionally to the reduced number of predicted crashes.

As with the Full Buildout of Mary Street Option 1, the Full Buildout of Mary Street Option 2 would result in enhanced mobility in downtown Billings and Billings Heights. Main Street, the primary emergency route between Billings and Billings Heights, would experience decreased congestion and travel times, improving emergency response times.

The Full Buildout of the Mary Street Option 2 Alternative would likely lower crash totals along existing roadway corridors as congestion is alleviated. This would include the roadway with the highest crash rate in the area, Bench Boulevard from Main Street to Wicks Lane, including the US 87/Old Hwy 312/Main Street intersection.

Phase 1
Under Phase 1 of the Mary Street Option 2 Alternative, indirect impacts to safety would be nearly the same as indirect impacts from the Full Buildout. According to the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013), the bypass would result in an estimated four more crashes along existing roadway corridors within the study area than under the Full Buildout in 2035.

Temporary Construction Impacts – Safety: Mary Street Option 2 Alternative

Temporary construction impacts to safety under Phase 1 and Full Buildout of this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Cumulative Impacts – Safety: Mary Street Option 2 Alternative

Cumulative impacts to safety under Phase 1 and Full Buildout of this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Safety: Mary Street Option 2 Alternative

Mitigation under Phase 1 and Full Buildout of this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

4.2.3.2.4 FIVE MILE ROAD ALTERNATIVE

Direct Impacts – Safety: Five Mile Road Alternative

Full Buildout
The new Billings Bypass alignment under Full Buildout of the Five Mile Road Alternative is projected to experience 12 crashes in 2035, as shown above in **Table 4.6**.

As with the Full Buildout of the Mary Street Option 1 and Mary Street Option 2 alternatives, Full Buildout of the Five Mile Road Alternative would likely lower crash rates along Johnson Lane between the I-90 Interchange and Coulson Road. This segment of roadway has the third highest crash rate within the study area due to high traffic volumes, high truck traffic volumes, and restrictive geometry. Improvements to the geometry should result in a decreased crash rate.

Phase 1
According to the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013), the new Billings Bypass alignment under Phase 1 of the Five Mile Road Alternative would experience 18 crashes in 2035, six more than under the Full Buildout. This increase is based on historical crash data indicating that two-lane roadway facilities of this type typically experience a higher crash rates than four-lane roadways.

Indirect Impacts – Safety: Five Mile Road Alternative

Full Buildout
Under Full Buildout of the Five Mile Road Alternative, the enhanced connectivity and mobility provided by the proposed bypass would result in decreased traffic congestion through Billings and Billings Heights. This decrease in traffic along existing roadway corridors is expected to result in decreased crashes and vehicle conflicts. As shown above in **Table 4.6**, 500 crashes are projected along existing roadways under the Five Mile Road Alternative in 2035. This is a decrease of 51 crashes compared to the

No Build Alternative. The number of injuries and injury crashes are projected to decrease proportionally to the reduced number of overall predicted crashes.

The decrease to congestion experienced under the Five Mile Road Alternative would result in enhanced mobility in downtown Billings and Billings Heights. Main Street, the primary emergency route between Billings and Billings Heights, would experience decreased congestion and travel times, improving emergency response times.

The Five Mile Road Alternative would likely lower crash totals along existing roadway corridors as congestion is alleviated. This would include the roadway with the highest crash rate in the area, Bench Boulevard from Main Street to Wicks Lane, including the US 87/Old Hwy 312/Main Street intersection.

Phase 1

Under Phase 1 of the Five Mile Alternative, indirect impacts to safety would be very similar to indirect impacts from the Full Buildout. According to the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013), the bypass would result in an estimated 51 fewer crashes along existing roadway corridors compared to the No Build Alternative in 2035. This is the same decrease in crashes as is projected under the Full Buildout.

Temporary Construction Impacts – Safety: Five Mile Road Alternative

Temporary construction impacts to safety under Phase 1 and Full Buildout of this alternative would be the same as those indicated for the Mary Street alternatives.

Cumulative Impacts – Safety: Five Mile Road Alternative

With the provision of the new bypass under Phase 1 and Full Buildout, new access would be provided to vacant land. Portions of this land area are designated for future residential and/or commercial development. Improvements to Five Mile Road could expedite planned development in the northern portion of the study area. Secondary corridor improvements along Mary Street could also expedite planned development along that roadway. The increased density in land use and planned roadway improvements could draw more traffic into the study area, thereby increasing the overall volume of traffic and VMT. There is a potential for more crashes as a result of the increase in VMT throughout the study area. However, improvements to geometry associated with the new roadway would lower crash rates in the southern part of the study area. The net impact to safety associated with the new roadway coupled with the planned development would be cumulatively insignificant.

Mitigation – Safety: Five Mile Road Alternative

Mitigation under Phase 1 and Full Buildout of this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

4.2.4 PEDESTRIAN AND BICYCLE FACILITIES

4.2.4.1 METHODOLOGY

Impacts to pedestrians and bicyclists are assessed by studying impacts to pedestrian and bicycle facilities. Pedestrian and bicycle facilities within the study area were mapped and the Full Buildout of the three proposed build alternatives were overlaid to calculate direct impacts. Additionally, the design of the Full Buildout of the build alternatives was analyzed to determine the nature and extent of bicycle and pedestrian facilities that would be included as part of the proposed alternatives. Indirect impacts were analyzed by looking at the proximity of the proposed roadways to existing and proposed facilities.

Direct impacts of Phase 1 of the build alternatives are assumed to be generally the same as the Full Buildout impacts, except for the lesser distance and time required for pedestrians and bicyclists to cross the two-lane bypass compared to the four-lane bypass. Indirect impacts of Phase 1 of the build alternatives would be the same as Full Buildout. Full Buildout would result in additional temporary impacts, because the two-lane road shoulders would be reconstructed for the four-lane widening.

4.2.4.2 RESULTS

Overall, roadways within the study area would be improved over the No Build Alternative with implementation of Phase 1 and Full Buildout of any of the build alternatives, which include provisions for bicycle travel on 8-foot-wide shoulders and a designated bike lane (Mary Street secondary corridor). Pedestrian travel is improved with any of the build alternatives, with designated crosswalks at signalized intersections and a separated sidewalk (Mary Street secondary corridor).

Table 4.8 shows the direct and indirect impacts on pedestrian and bicycle facilities of the No Build Alternative and Phase 1 and Full Buildout of the three build alternatives. Impacts from the build alternatives are assumed to be generally the same, except for the distance and time required for pedestrians and bicyclists to cross the bypass. Phase 1 would result in shorter roadway crossings and less time within the vehicular conflict zone for pedestrians and bicyclists along the bypass. The Phase 1 two-lane options of the build alternatives may therefore be slightly safer for pedestrians and bicyclists at intersections and designated crossings.

Table 4.8 Direct and Indirect Impacts Summary – Pedestrian and Bicycle Facilities

ALTERNATIVES	DIRECT IMPACTS	INDIRECT IMPACTS
NO BUILD ALTERNATIVE		
	• None.	• None.
MARY STREET OPTION 1 ALTERNATIVE (PHASE 1 AND FULL BUILDOUT)		
	• Provides 8-ft shoulder along new alignment to accommodate bike travel. • Existing Mary St retained, providing for bike travel. • Provides 8-ft shoulder on Johnson Ln and bridge structure to connect with Mary St. • Provides 8-ft shoulder on connection between Mary St and Five Mile Rd and extension of Five Mile Rd. • Maintains connection to secondary bike routes. • Maintains connection to Kiwanis Trail via an at-grade or grade separated crossing. • Maintains Five Mile Rd as a primary bike route and provides connection to primary bike routes along Mary St and Dover Rd.	• No separate sidewalks or bike lanes along roadways. • Temporary detours related to road construction for bicycle travel and access to Kiwanis Trail. • Expedites completion of comprehensive bicycle network.

ALTERNATIVES	DIRECT IMPACTS	INDIRECT IMPACTS
MARY STREET OPTION 2 ALTERNATIVE (PHASE 1 AND FULL BUILDOUT)		
	• Provides 8-ft shoulder along new alignment to accommodate bikes. • Existing Mary St retained, providing for bike travel. • Provides 8-ft shoulder on Johnson Ln and bridge structure to connect with Mary St. • Provides 8-ft shoulder on connection between Mary St and Five Mile Rd and extension of Five Mile Rd. • Maintains connection to secondary bike routes. • Maintains connection to Kiwanis Trail via an at-grade or grade-separated crossing. • Stop-controlled intersections further safe bicycle and pedestrian travel. • Maintains Five Mile Rd as a primary bike route and provides connection to primary bike routes along Mary St and Dover Rd.	• No separate bike lanes or sidewalks along roadways. • Temporary detours related to road construction for bicycle travel and access to Kiwanis Trail. • Expedites completion of comprehensive bicycle network.
FIVE MILE ROAD ALTERNATIVE (PHASE 1 AND FULL BUILDOUT)		
	• Provides 5-ft separated sidewalk and 4-ft bike lane along Mary St to accommodate bicycle and pedestrian travel. • Mary St/Main St connection improved to connect with arterial bike route. • Provides 8-ft shoulder on Johnson Ln and bridge structure to connect with Five Mile Rd. • Provides 8-ft shoulder along Five Mile Rd – could facilitate bicycle travel. • Maintains connection to secondary bike routes. • Maintains connection to Kiwanis Trail via an at-grade or grade-separated crossing. • Reduces through traffic and travel speeds on Mary St, which increases bicycle and pedestrian safety. • Maintains Five Mile Rd as a primary bike route and provides connection to primary bike routes along Mary St and Dover Rd.	• Increased motorist travel (VMT) along Mary St, which could cause conflicts with alternative travel modes. • No separate bike lanes or sidewalk along Five Mile Rd. • Temporary detours related to road construction for bicycle travel and access to Kiwanis Trail. • Expedites completion of comprehensive bicycle network. • Limited access on Five Mile Rd may deter pedestrian and bicycle usage.

Note: Impacts for the three build alternatives are for Phase 1 and Full Buildout. The distance and time required for pedestrians and bicyclists to cross the Phase 1 two-lane bypass would be less than that required for crossing the Full Buildout four-lane bypass.

4.2.4.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Pedestrian and Bicycle Facilities: No Build Alternative

The existing sidewalk and crosswalk conditions would not be improved. Accommodations for bicyclists would remain as existing and would prevent implementation of bicycle improvements recommended in *2011 Billings Area Bikeway and Trail Master Plan*.

Indirect Impacts – Pedestrian and Bicycle Facilities: No Build Alternative

Indirect impacts as a result of the No Build Alternative would include out-of-direction alternative mode travel and a lack of connections to existing bicycle and pedestrian paths through Billings and Billings Heights and the Lockwood neighborhood, including the I-90 Lockwood Interchange area.

Temporary Construction Impacts – Pedestrian and Bicycle Facilities: No Build Alternative

No temporary construction impacts to pedestrian and bicycle facilities are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Pedestrian and Bicycle Facilities: No Build Alternative

No mitigation to pedestrian and bicycle facilities is expected within or adjacent to the study area from the No Build Alternative.

4.2.4.2.2 MARY STREET OPTION 1 ALTERNATIVE

Direct Impacts – Pedestrian and Bicycle Facilities: Mary Street Option 1 Alternative

Full Buildout

The Full Buildout of the Mary Street Option 1 Alternative would provide 8-foot shoulders on Mary Street and Five Mile Road. The area outside the rumble strips that is usable for bicyclists would be 6.5 feet, which is more than the minimum 4-foot area recommended by the AASHTO *Guide for the Development of Bicycle Facilities* (1999) for bicycle use. This alternative would maintain a pedestrian/bicycle path between Mary Street and the Kiwanis Trail, and maintain the existing Mary Street, which could act as an alternative bicycle and pedestrian travel route. The roadway improvements would create the opportunity to provide an improved crossing of the planned extension of Kiwanis Trail north, and provide access to the Kiwanis Trail. The new roadway would need to be designed to accommodate the planned extension of the Kiwanis Trail, and not preclude its future extension. This alternative may impact the Two Moon Park to Five Mile Creek trail extension if that trail is constructed before roadway improvements/bridge. A crossing for the trail and roadway would need to be designed subject to the timing of improvements. The alignment would cross the southern portion of planned John H. Dover Memorial Park, with an opportunity to provide direct access to the park area. This alternative would also maintain and improve connections to bicycle routes on Dover Road, Old Hardin Road, Hawthorne Lane, and Bitterroot Drive via existing Mary Street, and the new Mary Street corridor with signalized intersection crossings (*Billings Heritage Trail Map*, updated 2010) (City of Billings and Yellowstone County 2010). Signage and other intersection treatments would increase awareness of bicyclists and pedestrian crossings for motorists traveling on Five Mile Road. In addition, this alternative would eliminate 1,000 feet of an existing secondary bike route on Coulson Road, which would force nonmotorized travelers to exit Coulson Road and take another, indirect travel route.

Phase 1

Direct impacts of Phase 1 of the Mary Street Option 1 Alternative are assumed to be generally the same as the Full Buildout impacts except for the distance and time required for pedestrians and bicyclists to cross the two-lane bypass compared to the four-lane bypass. Phase 1 would have shorter crossings for pedestrians and bicyclists and therefore less time within the conflict zone with vehicles traveling along the bypass. Phase 1 of the Mary Street Option 1 Alternative may therefore be slightly safer for pedestrians and bicyclists at intersections and designated crossings than Full Buildout.

Indirect Impacts – Pedestrian and Bicycle Facilities: Mary Street Option 1 Alternative

Indirect impacts to pedestrian and bicycle facilities of Phase 1 and Full Buildout of the Mary Street Option 1 Alternative would be the same. This alternative would expedite completion of a comprehensive bicycle network within the study area, and provide improved bicycle and pedestrian travel options within Billings and Billings Heights. Expedited residential growth may occur along Mary Street as a result of the improved roadway, generating additional pedestrians and bicyclists in the vicinity of the project. The new alignment would be an arterial with shoulders but with limited access. The existing Mary Street corridor would be retained as a local access road, and Five Mile Road would be improved with a shoulder, improving conditions for bicyclists. Neither facility would include sidewalks, but the existing Mary Street corridor would be more conducive to pedestrian use. The project would have an overall positive impact on bicycle and pedestrian circulation.

The Mary Street Option 1 Alternative would result in a negative indirect impact to bicycle and pedestrian travel along roadway corridors throughout the study area due to an increase in VMT, including Old Hwy 312 from Five Mile Road to S-522 Huntley, and Bitterroot Drive from Wicks Lane to Dover Road. Alternatively, the Mary Street Option 1 Alternative would result in a positive indirect impact to bicycle and pedestrian travel along the following roadway corridors due to a decrease in VMT, which could encourage more bicycle and pedestrian travel:

- Old Hwy 312 (US 87/Main Street to Five Mile Road).
- Mary Street (Bench Boulevard to Five Mile Road).
- Main Street (1st Avenue to US 87/Old Hwy 312).
- Bench Boulevard (Main Street/6th Avenue to Mary Street).
- US 87 (1st Avenue to Lockwood Interchange).

Temporary Construction Impacts – Pedestrian and Bicycle Facilities: Mary Street Option 1 Alternative

Full Buildout

Construction of Full Buildout of the Mary Street Option 1 Alternative would create short-term impacts similar to those that would occur under Phase 1, as described below. The temporary construction impacts to pedestrian and bicycle facilities of the Full Buildout would result from shoulder reconstruction for the four-lane widening along with the impacts noted below for the Phase 1 two-lane roadway construction.

Phase 1

Construction of Phase 1 of the Mary Street Option 1 Alternative would create short-term construction impacts throughout the construction period. Bicycle and pedestrian travel times might increase during construction, and temporary detours could be required. Construction detours might create short-term impacts on directional travel. Vehicular traffic detours might cause increased vehicular and bicycle/pedestrian conflicts.

Road construction impacts could temporarily restrict bicycle travel and access to Kiwanis Trail. Temporary construction at intersections would impede connections to primary bike routes (Dover Road and Old Hardin Road), secondary bike routes (Hawthorne Lane, Frontage Road, and Coulson Road), and arterial bike routes (Main Street, Old Hwy 312, Bitterroot Drive, and Johnson Lane).

Mitigation – Pedestrian and Bicycle Facilities: Mary Street Option 1 Alternative

Mitigation of impacts to pedestrian and bicycle facilities due to Phase 1 and Full Buildout of the Mary Street Option 1 Alternative would be the same. Bicycle and pedestrian accommodations would be taken into consideration during final design of the alternative. The following steps would be taken to minimize impacts to bicycle and pedestrian travel during construction:

- Develop traffic management plans during final design in accordance with the Manual on Uniform Traffic Control Devices. The traffic management plan would minimize access restrictions to existing bike routes and trails and provide safe and travel-efficient detours with appropriate signage to the extent practicable.

4.2.4.2.3 MARY STREET OPTION 2 ALTERNATIVE

Direct Impacts – Pedestrian and Bicycle Facilities: Mary Street Option 2 Alternative

Direct impacts to pedestrian and bicycle facilities under Phase 1 and Full Buildout of this alternative would be the same as those indicated for the Mary Street Option 1 Alternative with the following exceptions:

- The alignment crosses a planned trail along Five Mile Creek.
- This alternative would not impact the Two Moon Park to Five Mile Creek trail extension.

Indirect Impacts – Pedestrian and Bicycle Facilities: Mary Street Option 2 Alternative

Indirect impacts to pedestrian and bicycle facilities under Phase 1 and Full Buildout of this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Pedestrian and Bicycle Facilities: Mary Street Option 2 Alternative

Temporary construction impacts to pedestrian and bicycle facilities under Phase 1 and Full Buildout of this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Pedestrian and Bicycle Facilities: Mary Street Option 2 Alternative

Mitigation under Phase 1 and Full Buildout of this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

4.2.4.2.4 FIVE MILE ROAD ALTERNATIVE

Direct Impacts – Pedestrian and Bicycle Facilities: Five Mile Road Alternative

Phase 1 and Full Buildout of this alternative would provide additional pedestrian and bicycle facilities along the improved Five Mile Road and the Mary Street secondary corridor compared to the No Build Alternative.

Full Buildout

The Full Buildout of the Five Mile Road Alternative would provide 8-foot-wide shoulders on Five Mile Road. This alternative would maintain Five Mile Road as a primary bike route, and provide an improved pedestrian and bicycle connection to primary bike routes along Mary Street and Dover Road, based on the *Billings Heritage Trail Map* (updated 2010) (City of Billings and Yellowstone County 2010). The alignment would cross the southern portion of the planned John H. Dover Memorial Park, with an opportunity to provide direct access to the park area. The roadway improvements would create the opportunity to provide an improved crossing of the planned extension of Kiwanis Trail north, and provide access to the Kiwanis Trail. The new roadway would need to be designed to accommodate the planned extension of the Kiwanis Trail, and not preclude its future extension. The alignment crosses a planned trail along Five Mile Creek, with an opportunity to provide access to the trail. Signage and other intersection treatments would increase awareness of bicyclists and pedestrian crossings for motorists traveling on Five Mile Road. This alternative would create additional lanes of traffic for pedestrians crossing the bypass at the Johnson Lane, Coulson Road, and Five Mile Road/Mary Street intersections. Pedestrian improvements at these intersections would help in identifying the pedestrian crossing location, and signage and other intersection treatments would increase awareness of the crossing for motorists traveling on the bypass.

Phase 1

As with the Mary Street alternatives, the direct impacts to pedestrian and bicycle facilities of Phase 1 of the Five Mile Road Alternative are assumed to be generally the same as the Full Buildout impacts, except for the distance and time required for pedestrians and bicyclists to cross the two-lane bypass compared to the four-lane bypass. Phase 1 would have shorter crossings for pedestrians and bicyclists and therefore less time within the conflict zone with vehicles traveling along the bypass. Phase 1 of the Five Mile Road Alternative may therefore be slightly safer for pedestrians and bicyclists at intersections and designated crossings than Full Buildout.

Indirect Impacts – Pedestrian and Bicycle Facilities: Five Mile Road Alternative

Indirect impacts to pedestrian and bicycle facilities of Phase 1 and Full Buildout of the Five Mile Road Alternative would be the same. This alternative would be a limited access facility, with only three intersection connections. While the newly paved road would have shoulders that could be used by bicyclists, projected traffic volumes, lack of sidewalks, and lack of connectivity to the bicycle network would not make it an attractive route for recreationists. The existing Mary Street corridor would be improved, with added shoulders and improved intersections, making it safer for recreationalists.

Temporary Construction Impacts – Pedestrian and Bicycle Facilities: Five Mile Road Alternative

Temporary construction impacts to pedestrian and bicycle facilities under Phase 1 and Full Buildout of this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Pedestrian and Bicycle Facilities: Five Mile Road Alternative

Mitigation under Phase 1 and Full Buildout of this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

4.3 SOCIAL AND ECONOMIC CONDITIONS

4.3.1 LAND USE AND LOCAL PLANS

4.3.1.1 METHODOLOGY

Current land use was identified using parcel level land use information from the Montana Computer Assisted Mass Appraisal data for Yellowstone County. This data was supplemented with available information from maps, aerial images, and local planning documents. Future land use was identified through review of local plans and coordination with the city/county planning department regarding major planned developments. Changes in land use as a direct effect of the proposed project were identified based on the anticipated right-of-way acquisitions. The potential for future changes in land use and population patterns that could be indirectly related to the project were also identified. Impacts to land use were assessed qualitatively based on the compatibility of these changes with adopted land use and transportation plans for local jurisdictions.

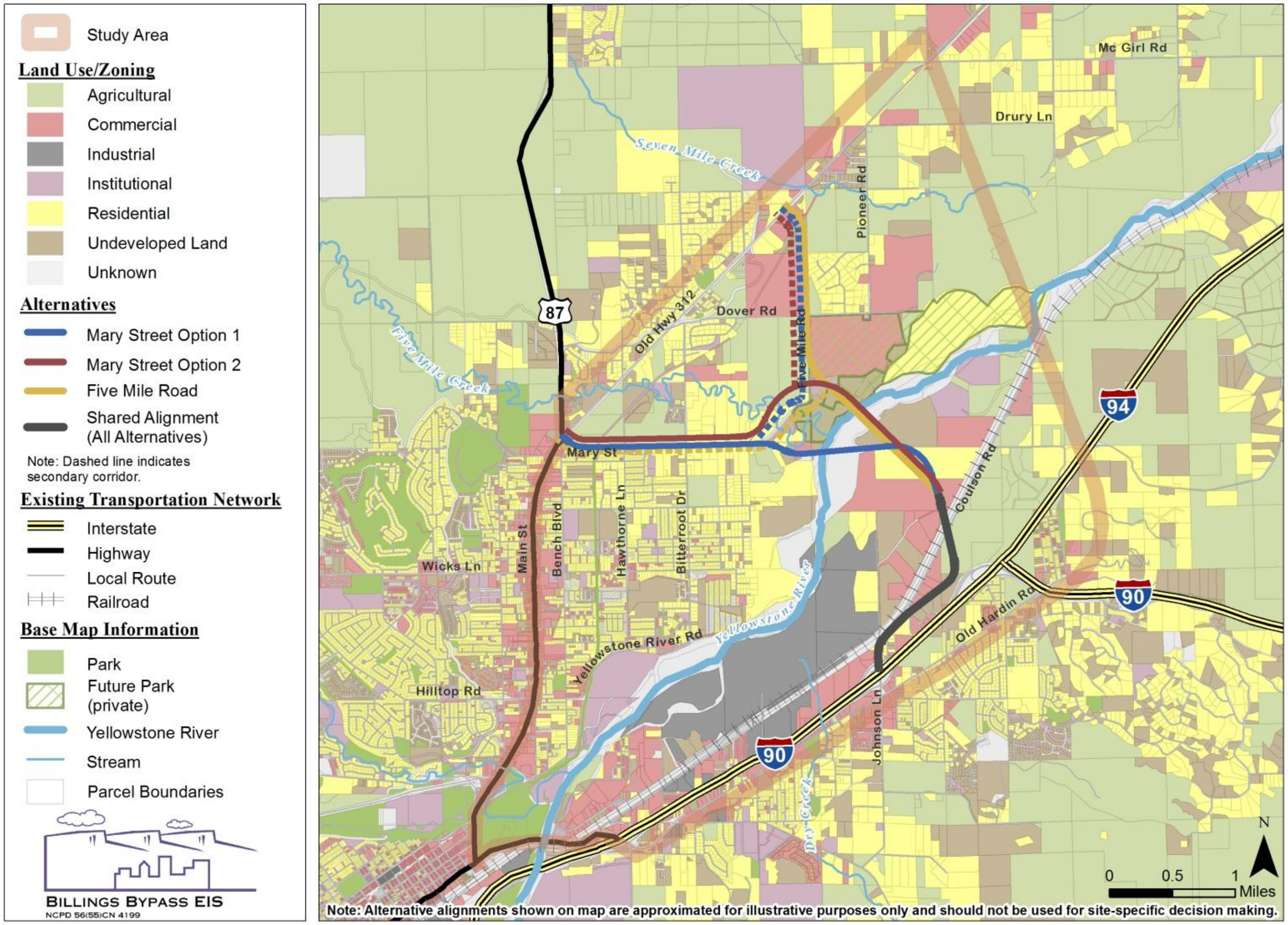
4.3.1.2 RESULTS

Assessment of land use impacts is a qualitative analysis of the impacts to existing and proposed land uses within the study area and of the indirect impacts to future land use and population patterns. The city and county have jointly developed several planning documents that provide guidance on land use and zoning within the study area. The *Yellowstone County and City of Billings 2008 Growth Policy Update* (City of Billings 2008) addresses land uses north and south of the Yellowstone River, and anticipates a mix of residential and highway commercial/controlled industrial uses in the study area. The *Billings Heights Neighborhood Plan* (City of Billings 2006) addresses a portion of the study area north of the Yellowstone River, and identifies both low and medium residential uses, light retail and mixed uses along Old Hwy 312, and light retail at the northeast corner of Dover Road and Bitterroot Drive. The *Lockwood Community Plan* (Yellowstone County 2006) addresses land uses in the study area south of Yellowstone River. Alternatives are evaluated for consistency with these three documents. **Table 4.9** presents the direct and indirect impacts to land use by alternative. **Figure 4.13** depicts the existing land uses in the study area and the build alternatives.

Table 4.9 Full Buildout Direct and Indirect Impacts – Land Use

ALTERNATIVES	DIRECT IMPACTS	INDIRECT IMPACTS
NO BUILD ALTERNATIVE		
	• None.	• None.
MARY STREET OPTION 1 ALTERNATIVE		
	• Alignment is inside Urban Planning Area (UPA). • Provides improved access to future residential development along Mary St. • Compatible with planned land uses south of the Yellowstone River.	• Capacity improvements to Mary St, and Five Mile Rd could expedite planned residential development. • Planned commercial development around existing and new interchanges may be expedited.
MARY STREET OPTION 2 ALTERNATIVE		
	• Same as Mary Street Option 1.	• Same as Mary Street Option 1.
FIVE MILE ROAD ALTERNATIVE		
	• Compatible with existing local plans, future land use, and zoning. • Alignment is inside UPA. • Provides accessibility and helps sustain planned future land uses.	• Limited access along Five Mile Rd may deter residential growth. • Planned commercial development around existing and new interchanges may be expedited.

Figure 4.13 Existing Land Use Zoning in the Study Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/21/2013

4.3.1.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Land Use and Local Plans: No Build Alternative

No direct impacts to land use and local plans are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Land Use and Local Plans: No Build Alternative

No indirect impacts to land use and local plans are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Land Use and Local Plans: No Build Alternative

No temporary construction impacts to land use and local plans are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – Land Use and Local Plans: No Build Alternative

No cumulative impacts to land use and local plans are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Land Use and Local Plans: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.3.1.2.2 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Land Use and Local Plans: Mary Street Option 1 Alternative

This alternative is compatible with existing local plans, future land use, and zoning. The primary corridor alignment would fall inside of the UPA, consistent with city plans to constrain growth within the UPA boundary.

South of the Yellowstone River along the primary corridor, existing agricultural, industrial, and commercial uses would remain the primary land uses along the new roadway alignment. The new roadway alignment between the Yellowstone River and the existing alignment of Johnson Lane would require the acquisition of approximately 51 acres of agricultural and residential land, but the remaining land in the parcels would retain existing land uses.

North of the Yellowstone River along the primary corridor, existing residential use would remain the primary land use along the south side of Mary Street, and the new roadway would provide improved access to anticipated residential development along the north side of Mary Street.

This alternative is compatible with existing local plans, and future land use and zoning. The primary corridor alignment would fall inside of the UPA. North of Mary Street, the area would remain primarily low-density residential, with a zoned retail designation. The *Yellowstone County and City of Billings 2008 Growth Policy Update* (City of Billings 2008) describes the land surrounding Old Hwy 312 as planned for highway-related, community, commercial, and controlled industrial land uses in the future. The secondary corridor would provide new and improved access to future land uses.

Indirect Impacts – Land Use and Local Plans: Mary Street Option 1 Alternative

The improved mobility throughout the study area may also improve the attractiveness of rural areas for residential development, encouraging conversion of agricultural land to residential uses. Vacant and undeveloped land along both Mary Street and Five Mile Road has been designated for future residential development; improved access and mobility may expedite this development. Secondary corridor improvements to Five Mile Road would create additional access to the adjacent area and promote development. The Mary Street Option 1 alignment is more constrained by existing development than the Five Mile Road secondary corridor. Both the primary and secondary corridors would contain a number of new and improved intersections. Commercial uses tend to cluster immediately adjacent to controlled access points such as interchanges. At these locations, commercial developments can take advantage of the visibility afforded by the transportation corridor. The new connection at Old Hwy 312 has been designated for future commercial use and would likely be attractive to businesses. These proposed improvements should not develop land or population beyond what is already projected for the City of Billings.

Temporary Construction Impacts – Land Use and Local Plans: Mary Street Option 1 Alternative

Temporary impacts during the construction phase of the project would include increased congestion, out-of-direction travel for residents, dust generated by construction activities, degraded air quality, increased noise, and visual degradation due to construction materials storage and activities. Because these impacts would be temporary, there would be no impact to current or future land use or current or future zoning.

Cumulative Impacts – Land Use and Local Plans: Mary Street Option 1 Alternative

This alternative, in conjunction with current and planned land use plans and projects, would result in improved regional travel options and improved mobility for motorists. These improvements have been known to redirect growth as residents and business owners seek to live and work in locations with reliable and efficient transportation systems. Construction of the Mary Street Option 1 Alternative would improve access along the existing Mary Street corridor as well as Five Mile Road; this could expedite planned development, resulting in land use changes. Foreseeable improvements to other roadways in the study area may also expedite planned development. However, the City of Billings has an established Urban Planning Area, or UPA, to direct and contain future development, so undesirable growth and land use changes would not occur as a result of this project. Induced growth related to sprawl would be negligible. Because of the UPA, this alternative, combined with the other planned improvements, would not result in a significant cumulative effect on land use. Cumulative impacts would be negligible.

Mitigation – Land Use and Local Plans: Mary Street Option 1 Alternative

No mitigation is expected within or adjacent to the study area from the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 1 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.1.2.3 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Land Use and Local Plans: Mary Street Option 2 Alternative
Direct impacts to land use and local plans under the Mary Street Option 2 Alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Indirect Impacts – Land Use and Local Plans: Mary Street Option 2 Alternative
Indirect impacts to land use and local plans under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction – Land Use and Local Plans: Mary Street Option 2 Alternative
Temporary construction impacts to land use and local plans under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Cumulative Impacts – Land Use and Local Plans: Mary Street Option 2 Alternative
Cumulative impacts to land use and local plans under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Land Use and Local Plans: Mary Street Option 2 Alternative
No mitigation is expected within or adjacent to the study area from the Mary Street Option 2 Alternative.

Phase 1

Phase 1 impacts and mitigation under the Mary Street Option 2 Alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

4.3.1.2.4 FIVE MILE ROAD ALTERNATIVE

Full Buildout

Direct Impacts – Land Use and Local Plans: Five Mile Road Alternative
This alternative is compatible with existing local plans, future land use, and zoning. The primary corridor alignment would fall inside of the UPA. North of Mary Street, the area would remain primarily low-density residential, zoned with a retail designation. The *Yellowstone County and City of Billings 2008 Growth Policy Update* (City of Billings 2008) describes the land surrounding Old Hwy 312 as having highway-related, community, commercial, and controlled industrial land uses in the future.

Along Mary Street, the roadway would be reconstructed to a two-lane road and include a two-way left-turn lane, bicycle lanes, curb and gutter, and sidewalks. These improvements would help support planned new residential development and mixed use and light retail uses in the area near Bench Boulevard and Main Street, and along Old Hwy 312.

Indirect Impacts – Land Use and Local Plans: Five Mile Road Alternative
Indirect impacts to land use and local plans under the Five Mile Road Alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction – Land Use and Local Plans: Five Mile Road Alternative
Temporary construction impacts to land use and local plans under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Cumulative Impacts – Land Use and Local Plans: Five Mile Road Alternative
Cumulative impacts to land use and local plans under this alternative would be similar to those indicated for the Mary Street Option 1 Alternative. According to the *Yellowstone County and City of Billings 2008 Growth Policy Update* (City of Billings 2008) most of the growth in the next 10 to 20 years would be to the west of the study area. Limited access along Five Mile Road may limit growth in areas slated for higher density residential, and development may not occur. The population of Billings is projected to continue to grow, and many areas in the study area will be developed in accordance with local plans. The limited access along Five Mile Road would not have an overall significant cumulative effect to land use.

Mitigation – Land Use and Local Plans: Five Mile Road Alternative
No mitigation is expected within or adjacent to the study area from the Five Mile Road Alternative.

Phase 1
Phase 1 impacts and mitigation under the Five Mile Road Alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

4.3.2 PARKS AND RECREATION

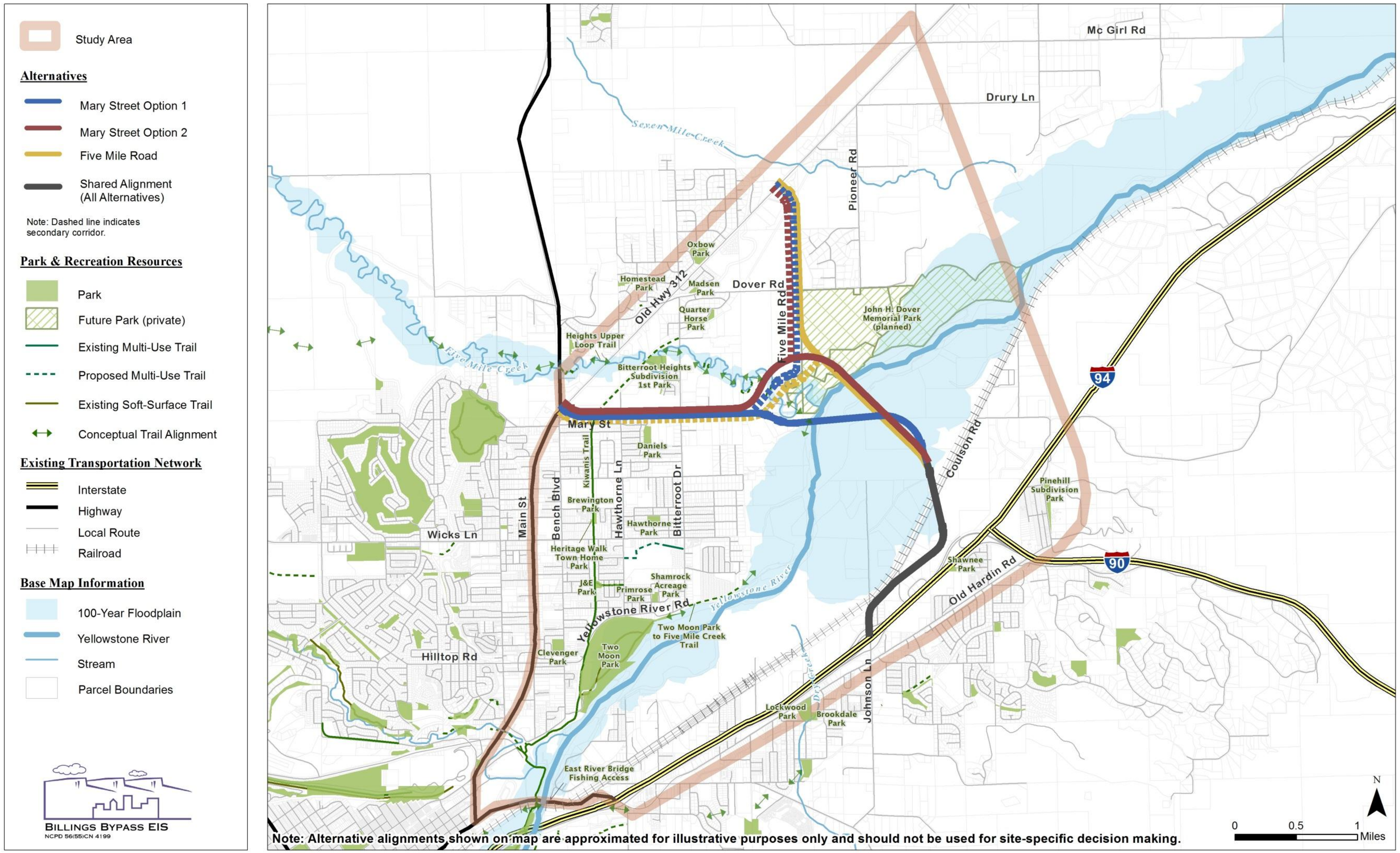
4.3.2.1 METHODOLOGY
Impacts to parks and recreational facilities were assessed by studying impacts to existing and planned park facilities and areas. Existing and planned public and private parks and recreational facilities within the study area were inventoried, and the design of the three build alternatives was analyzed to determine direct impacts incurred as part of the proposed alternatives. Indirect effects were analyzed by looking at the proximity of the proposed roadways to existing and proposed parks and recreational facilities.

4.3.2.2 RESULTS
Overall, parks and recreational facilities within the study area would be impacted marginally with implementation of any of the build alternatives. Impacts to park facilities include alignment crossings within the planned John H. Dover Memorial Park. Impacts to recreational facilities include crossing considerations to the planned extension of the Kiwanis Trail, the planned trail along Five Mile Creek, and the planned trail connection from Five Mile Creek to the Two Moon Park trail extension. **Figure 4.14** depicts the parks and recreational facilities within the study area. **Table 4.10** presents the direct and indirect impacts to parks and recreational facilities within the study area. Because the Phase 1 and Full Buildout impacts do not differ substantially, only the Full Buildout impacts are presented in **Table 4.10.**

Table 4.10 Direct and Indirect Impacts Summary – Parks and Recreational Facilities

ALTERNATIVES	DIRECT IMPACTS	INDIRECT IMPACTS
NO BUILD ALTERNATIVE		
	• None.	• None.
MARY STREET OPTION 1 ALTERNATIVE		
	• Alignment crosses planned extension of Kiwanis Trail (primary corridor). • Maintains connections to existing arterial bike routes (primary corridor). • Does not affect existing Kiwanis Trail. • Impacts Two Moon Park to Five Mile Creek trail extension if trail is constructed before roadway improvements/bridge (primary corridor). • Alignment crosses southern portion of planned John H. Dover Memorial Park (secondary corridor).	• Expedited completion of planned bicycle network. • Visual and noise impacts to park users from roadway crossing through John H. Dover Memorial Park may occur. • Access and movement within John H. Dover Memorial Park interrupted by roadway construction (secondary corridor) if park is developed. • Enhanced access to study area parks.
MARY STREET OPTION 2 ALTERNATIVE		
	• Maintains connections to existing arterial bike routes (primary corridor). • Does not affect existing Kiwanis Trail. • Alignment crosses planned extension of Kiwanis Trail (primary corridor). • Alignment crosses planned trail along Five Mile Creek (primary corridor). • Alignment crosses southern portion of planned John H. Dover Memorial Park.	• Expedited completion of planned bicycle network. • Visual and noise impacts to park users from roadway crossing through John H. Dover Memorial Park may occur. • Access and movement within John H. Dover Memorial Park interrupted by roadway construction if park is developed. • Enhanced access to study area parks.
FIVE MILE ROAD ALTERNATIVE		
	• Maintains connection to existing Kiwanis Trail and arterial bike routes (secondary corridor). • Alignment crosses planned extension of Kiwanis Trail (secondary corridor). • Alignment crosses planned trail along Five Mile Creek (secondary corridor). • Alignment crosses southern portion of planned John H. Dover Memorial Park.	• Expedited completion of planned bicycle network. • Visual and noise impacts to park users from roadway crossing through John H. Dover Memorial Park may occur. • Access and movement within John H. Dover Memorial Park interrupted by roadway construction (primary and secondary corridor) if park is developed. • Enhanced access to study area parks.

Figure 4.14 Parks and Recreational Facilities



Sources: DOWL HKM August 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/22/2013

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4.3.2.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Parks and Recreation: No Build Alternative

No direct impacts to parks and recreation are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Parks and Recreation: No Build Alternative

No indirect impacts to parks and recreation are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Parks and Recreation: No Build Alternative

No temporary construction impacts to parks and recreation are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Parks and Recreation: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.3.2.2.2 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Parks and Recreation: Mary Street Option 1 Alternative

Primary Corridor

This alternative would maintain existing Mary Street, which could act as an alternative bicycle and pedestrian travel route (see Section 4.2.4, "Pedestrian and Bicycle Facilities"). This alternative would not include any improvements to Mary Street in the vicinity of the existing Kiwanis Trail, and would thus not affect the existing connection to the Kiwanis Trail from Mary Street. The roadway improvements would create the opportunity to provide an improved crossing of the planned extension of Kiwanis Trail north and provide access to that trail. The new roadway would need to be designed to accommodate the planned extension of the Kiwanis Trail and not preclude its future extension.

Although the Two Moon Park to Five Mile Creek trail extension is still conceptual and the needed right-of-way remains in private ownership, this alternative may impact it if the proposed trail is constructed before the roadway improvements and bridge. A crossing for the trail and roadway may need to be designed subject to the timing of improvements.

Secondary Corridor

This alternative would provide 8-foot-wide shoulders on Five Mile Road, and would maintain Five Mile Road as a primary bike route (see Section 4.2.4, "Pedestrian and Bicycle Facilities"). The alignment would cross the southern portion of the planned John H. Dover Memorial Park, with an opportunity to provide direct access to the park area.

Indirect Impacts – Parks and Recreation: Mary Street Option 1 Alternative

The Mary Street Option 1 Alternative would expedite the completion of a comprehensive bicycle network within the study area, and enhance access to parks throughout the study area. The new alignment may expedite planned growth, but would not induce unanticipated growth in population in the study area. No additional demand on parks and recreational resources would occur as a result of the project. The new road could result in visual intrusion from a larger or new facility (see Section 4.3.7, “Visual Resources”). Noise impacts to park users could result from a new roadway crossing through the planned John H. Dover Memorial Park (see Section 4.3.8, “Noise”). Improvements would ease congestion and enhance access to these amenities.

Temporary Construction Impacts – Parks and Recreation: Mary Street Option 1 Alternative

Temporary impacts to parks and recreational facility users could occur during the construction of the project, including increased congestion, out-of-direction travel for residents, dust generated by construction activities, degraded air quality, increased noise, and visual degradation due to construction materials storage and activities. During construction, possible trail closures, detours, or protection structures could cause inconvenience to trail users on the Kiwanis Trail and planned trail extensions and connections. Construction detours may create short-term impacts to directional travel within these facilities.

Road construction impacts could limit use and access to primary bike routes (see Section 4.2.4, “Pedestrian and Bicycle Facilities”), as well as limit access and movement within the planned John H. Dover Memorial Park.

Mitigation – Parks and Recreation: Mary Street Option 1 Alternative

Bicycle and pedestrian accommodations would be taken into consideration during final design of this alternative as noted in Section 4.2.4 above. The following steps would be taken to minimize impacts to parks and recreational facilities during construction:

- Coordinate with the City of Billings to include appropriate signage and/or public notifications regarding temporary trail closures.
- Coordinate with the City of Billings throughout final design to ensure that the final project provides for safe and effective pedestrian and bicycle movement across the project corridor at the Kiwanis Trail crossing.
- Bridge design over Five Mile Creek would consider accommodating the potential trail crossing under the bridge.
- Coordinate with park planners regarding impacts to John H. Dover Memorial Park during final design.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to parks and recreation as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 1 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.2.2.3 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Parks and Recreation: Mary Street Option 2 Alternative

Direct impacts to parks and recreation under the Mary Street Option 2 Alternative would be the same as those indicated for the Mary Street Option 1 Alternative, with the following exceptions:

- The alignment crosses a planned trail along Five Mile Creek.
- This alternative would not impact the Two Moon Park to Five Mile Creek trail extension.

Indirect Impacts – Parks and Recreation: Mary Street Option 2 Alternative

Indirect impacts to parks and recreation under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction – Parks and Recreation: Mary Street Option 2 Alternative

Temporary construction impacts to parks and recreation under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Parks and Recreation: Mary Street Option 2 Alternative

Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to parks and recreation as well as mitigation for Phase 1 of the Mary Street Option 2 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 2 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.2.2.4 FIVE MILE ROAD ALTERNATIVE

Full Buildout

Direct Impacts – Parks and Recreation: Five Mile Road Alternative

Primary Corridor

This alternative would provide additional recreational (pedestrian and bicycle) facilities along the improved Five Mile Road compared to the No Build Alternative. Specifically, this alternative would provide 8-foot-wide shoulders on Five Mile Road and would maintain Five Mile Road as a primary bike route (see Section 4.2.4, “Pedestrian and Bicycle Facilities”). The alignment would cross the southern portion of the planned John H. Dover Memorial Park, with an opportunity to provide direct access to the park area.

Secondary Corridor

This alternative would provide a designated pedestrian/bicycle route along Mary Street (see Section 4.2.4, "Bicycle and Pedestrian Facilities") and would maintain the connection to the existing Kiwanis Trail. The roadway improvements would create the opportunity to provide an improved crossing of the planned extension of the Kiwanis Trail north and provide access to that trail. The new roadway would need to be designed to accommodate the planned extension of the Kiwanis Trail and not preclude its future extension. The alignment crosses a planned trail along Five Mile Creek, with an opportunity to provide access to that trail. The alignment crosses the southern portion of the planned John H. Dover Memorial Park.

Indirect Impacts – Parks and Recreation: Five Mile Road Alternative

Indirect impacts to parks and recreation under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction – Parks and Recreation: Five Mile Road Alternative

Temporary construction impacts to parks and recreation under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Parks and Recreation: Five Mile Road Alternative

In addition to the mitigation proposed for the Mary Street Option 1 Alternative, mitigation for the Five Mile Road Alternative would include accommodation of a new pedestrian crossing at the intersection of the existing Kiwanis Trail with Mary Street.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to parks and recreation as well as mitigation for Phase 1 of the Five Mile Road Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.2.3 SECTION 4(f) IMPACTS: PARK AND RECREATIONAL RESOURCES

Congress amended Section 4(f) in 2005 when it enacted the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (Public Law 109-59, enacted August 10, 2005) (SAFETEA-LU). Section 6009 of SAFETEA-LU added a new subsection to Section 4(f), which authorizes U.S. Department of Transportation (USDOT) agencies to approve a project that results in a *de minimis* impact (see definition of *de minimis* later in this section) to a Section 4(f) resource without the evaluation of avoidance measures typically required in a Section 4(f) evaluation.

On April 11, 2008, the USDOT put in effect a final rule that clarifies factors to consider both in determining if avoidance alternatives are feasible and prudent, and when all alternatives use Section 4(f) property. In addition, the final rule establishes procedures for determining when use has a *de minimis* impact, updates the regulations to recognize exceptions for use and applying a programmatic evaluation, and moves the regulation to 23 CFR 774. FHWA regulations (23 CFR 774.3) state:

> The Administration may not approve the use, as defined in Sec. 774.17, of a Section 4(f) property unless a determination is made under paragraph (a) or (b) of this section.
>
> (a) The Administration determines that:
>
> There is no feasible and prudent avoidance alternative, as defined in Sec. 774.17, to the use of land from the property; and
>
> The action includes all possible planning, as defined in Sec. 774.17, to minimize harm to the property resulting from such use; or
>
> (b) The Administration determines that the use of the property, including any measure(s) to minimize harm (such as avoidance, minimization, mitigation, or enhancement measures) committed to by applicant, will have a *de minimis* impact, as defined in 36 Sec. 774.17, on the property.

According to the Section 4(f) Final Rule (23 CFR 774.17) a feasible and prudent avoidance alternative is defined as:

> "(1) A feasible and prudent avoidance alternative avoids using Section 4(f) property and does not cause other severe problems of a magnitude that substantially outweighs the importance of protecting the Section 4(f) property. In assessing the importance of protecting the Section 4(f) property, it is appropriate to consider the relative value of the resource to the preservation purpose of the statute.
>
> (2) An alternative is not feasible if it cannot be built as a matter of sound engineering judgment.
>
> (3) An alternative is not prudent if:
>
> > (i) It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need;
> >
> > (ii) It results in unacceptable safety or operational problems;
> >
> > (iii) After reasonable mitigation, it still causes:
> >
> > > (a) Severe social, economic, or environmental impacts;
> > >
> > > (b) Severe disruption to established communities;
> > >
> > > (c) Severe disproportionate impacts to minority or low income populations; or
> > >
> > > (d) Severe impacts to environmental resources protected under other Federal statutes;
> >
> > (iv) It results in additional construction, maintenance, or operational costs of an extraordinary magnitude;
> >
> > (v) It causes other unique problems or unusual factors; or

> (vi) It involves multiple factors in paragraphs (3)(i) through (3)(v) of this definition, that while individually minor, cumulatively cause unique problems or impacts of an extraordinary magnitude."

4.3.2.3.1 SECTION 4(f) "USE"

As defined in 23 CFR 774.17 and 774.15, where applicable and not excepted, the "use" of a protected Section 4(f) resource can be classified as a direct use, a temporary use, a constructive use, or *de minimis* use. These are defined in the following sections. A use of Section 4(f) property is defined in 23 CFR 774.17. A use occurs when:

- Land is permanently incorporated into a transportation facility;
- There is a temporary occupancy of land that is adverse in terms of the Section 4(f) statute's preservationist purposes; or
- There is a constructive use of a Section 4(f) property.

Permanent, or direct uses and temporary uses can be determined to be *de minimis* (see below).

Constructive use occurs when the transportation project does not incorporate land from a Section 4(f) resource, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the resource are substantially diminished. This determination is made through:

- Identification of the current activities, features, or attributes of the resource that may be sensitive to proximity impacts;
- Analysis of the proximity impacts on the resource;
- Consultation with the appropriate officials having jurisdiction over the resource.

De Minimis Use

The SAFETEA-LU amendment to the Section 4(f) requirements allows the USDOT to determine that certain uses of Section 4(f) land would have no adverse effect on the protected resource. When this is the case, the use is considered *de minimis*, and compliance with Section 4(f) is simplified. The *de minimis* subsection authorizes the FHWA to approve a project that results in a *de minimis* impact to a Section 4(f) resource without the evaluation of avoidance alternatives typically required in a Section 4(f) evaluation.

Section 6009 of SAFETEA-LU amended 23 USC 138 which now states:

> [T]he Secretary shall not approve any program or project (other than any project for a park road or parkway under Section 204 of this title) which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from an historic site of national, State, or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use.

A finding of *de minimis* use may be made for historic sites when no historic property is affected by the project or when the project would have "no adverse effect" on the historic property in question. For parks, recreation areas, and wildlife and waterfowl refuges, a finding of *de minimis* use may be made when impacts would not adversely affect the activities, features, and attributes that qualify the resource for protection under Section 4(f).

4.3.2.4 PROJECT PROCESS AND IDENTIFICATION OF SECTION 4(f) RESOURCES

An assessment of the Section 4(f) resources in the study area searched for publicly owned parks and recreation areas including existing and planned parks, recreation trails, wildlife and waterfowl refuges, and significant historic sites. Parks and recreation areas, recreation trails, and historic sites were identified within the regional study area. No wildlife or waterfowl refuges are present in the study area. The recreational uses of the public parks and recreation areas were then evaluated to determine whether they are considered to be properties protected under Section 4(f). Planned parks are protected by Section 4(f) only if they are publicly owned, and if the public agency that owns the property has formally designated and determined it to be significant for park, recreation area, or wildlife and waterfowl refuge purposes.

Data on parks and recreation sites was gathered from the City of Billings by requesting data on properties, including parks and recreation areas, open space and trails, and wildlife and waterfowl refuges. A Geographic Information Systems (GIS) database was created using this information and verified with the use of relevant comprehensive plans, parks and recreation master plans, and open space management plans.

Table 4.11 shows the current and planned public parks and recreation areas within the study area. Although there are multiple Section 4(f) resources identified in the table below, based on anticipated project impacts and the location of those 4(f) resources, no constructive use impacts are anticipated. For purposes of this Section 4(f) evaluation, only Section 4(f) resources having a Section 4(f) use by any of the build alternatives are discussed in detail.

Table 4.11 Park and Recreational Resources: Section 4(f) Applicability

PROPERTY	PUBLICLY OWNED	PUBLICLY ACCESSED	SECTION 4(f)	WITHIN PROJECT FOOTPRINT?
EXISTING PARKS AND TRAILS				
Bitterroot Heights Subdivision 1st Park	Yes	Yes	Yes	No
Brewington Park	Yes	Yes	Yes	No
Clevenger Park	Yes	Yes	Yes	No
Daniels Park	Yes	Yes	Yes	No
East River Bridge Fishing Access	Yes	Yes	Yes	No
Hawthorne Park	Yes	Yes	Yes	No
Heights East Trails	Yes	Yes	Yes	No
Heritage Walk Town Home Park	Yes	Yes	Yes	No
Homestead Park	Yes	Yes	Yes	No
J&E Park	Yes	Yes	Yes	No

PROPERTY	PUBLICLY OWNED	PUBLICLY ACCESSED	SECTION 4(f)	WITHIN PROJECT FOOTPRINT?
Kiwanis Trail	**Yes**	**Yes**	**Yes**	**Yes**
Lockwood Park	Yes	Yes	Yes	No
Madsen Park	Yes	Yes	Yes	No
Oxbow Park	Yes	Yes	Yes	No
Pine Hill Subdivision Park	Yes	Yes	Yes	No
Primrose Park	Yes	Yes	Yes	No
Quarter Horse Park	Yes	Yes	Yes	No
Shamrock Acreage Tracts Subdivision Park	Yes	Yes	Yes	No
Shawnee Park	Yes	Yes	Yes	No
Two Moon Park	Yes	Yes	Yes	No
PLANNED PARKS AND TRAILS				
John H. Dover Park	No	No	No	Yes
Heights Upper Loop Trail[1]	No (but portions with easements)	No	Yes (partial)	No[1]
Heights East Trail Extension	Portions	Partial	Yes (partial)	No
Kiwanis Trail Extension	**Yes**	**Yes**	**Yes**	**Yes**
Two Moon Park to Five Mile Trail	No (but portions with easements)	No	No	Yes

[1] The Heights Upper Loop trail is largely conceptual. However, the city has obtained easements in limited sections of property along Five Mile Creek. These sections with easements do not coincide with any of the planned improvements for the Billings Bypass, under any of the build alternatives. See **Figure 4.16** for a detailed image of the easements obtained by the city in relation to the build alternatives.

Resources shown **in bold** are described in more detail in and **Figure 4.15**, which provide more information on the Kiwanis Trail and the (planned) Kiwanis Trail Extension, two resources that would be affected by any of the build alternatives.

Source: City of Billings, Parks and Recreation, December 2011.

Table 4.12 and **Figure 4.15** provide more information on the Kiwanis Trail and the (planned) Kiwanis Trail Extension, two resources that would be affected by any of the build alternatives. **Figure 4.16** shows a detailed view of an additional resource: the Heights Upper Loop Trail. As noted in the table above, the Heights Upper Loop Trail is largely conceptual. However, the city has obtained easements in limited sections of property along Five Mile Creek. These sections with easements do not coincide with any of the planned improvements for the Billings Bypass, under any of the build alternatives, as shown in **Figure 4.16**.

Table 4.12 Section 4(f) Resources – Public Parks and Recreation Areas

RESOURCE	LOCATION	SIZE (ACRES)	AMENITIES	OFFICIAL WITH JURISDICTION	TYPE OF RESOURCE
Kiwanis Trail	Runs south from Mary St between Bench Blvd and Hawthorne Ln	21.3	Existing trail; paved bike and pedestrian facility	City of Billings	Recreational trail
Kiwanis Trail Extension (planned)	Runs northeast from Mary St between Bench Blvd and Hawthorne Ln	10.5	Planned trail	City of Billings	Recreational trail

4.3.2.4.1 USE OF SECTION 4(f) RESOURCES

As noted above, based on anticipated project impacts and the location of 4(f) resources in the project area, no constructive use impacts are anticipated.

Of the identified Section 4(f) resources, one existing trail and one planned trail could be affected by the build alternatives. The existing trail would not be affected with the Mary Street Option 1 or Mary Street Option 2 alternatives and would be maintained with the Five Mile Road Alternative, and the impacts to the planned trail have been determined to be a *de minimis* use. The impact to the planned trail would be the permanent incorporation of right-of-way to the roadway project. Additionally, temporary impacts would occur during construction, with potential detours of the existing trail.

These impacts are anticipated to be *de minimis* uses of the recreational resources. *De minimis* impacts on publicly owned parks, recreation areas, and wildlife and waterfowl refuges are defined as those that do not “adversely affect the activities, features and attributes” of the Section 4(f) resource. A full description of these impacts can be found in Section 4.3.2, “Parks and Recreation.”

Figure 4.15 Kiwanis Trail (Existing and Planned) Detailed View

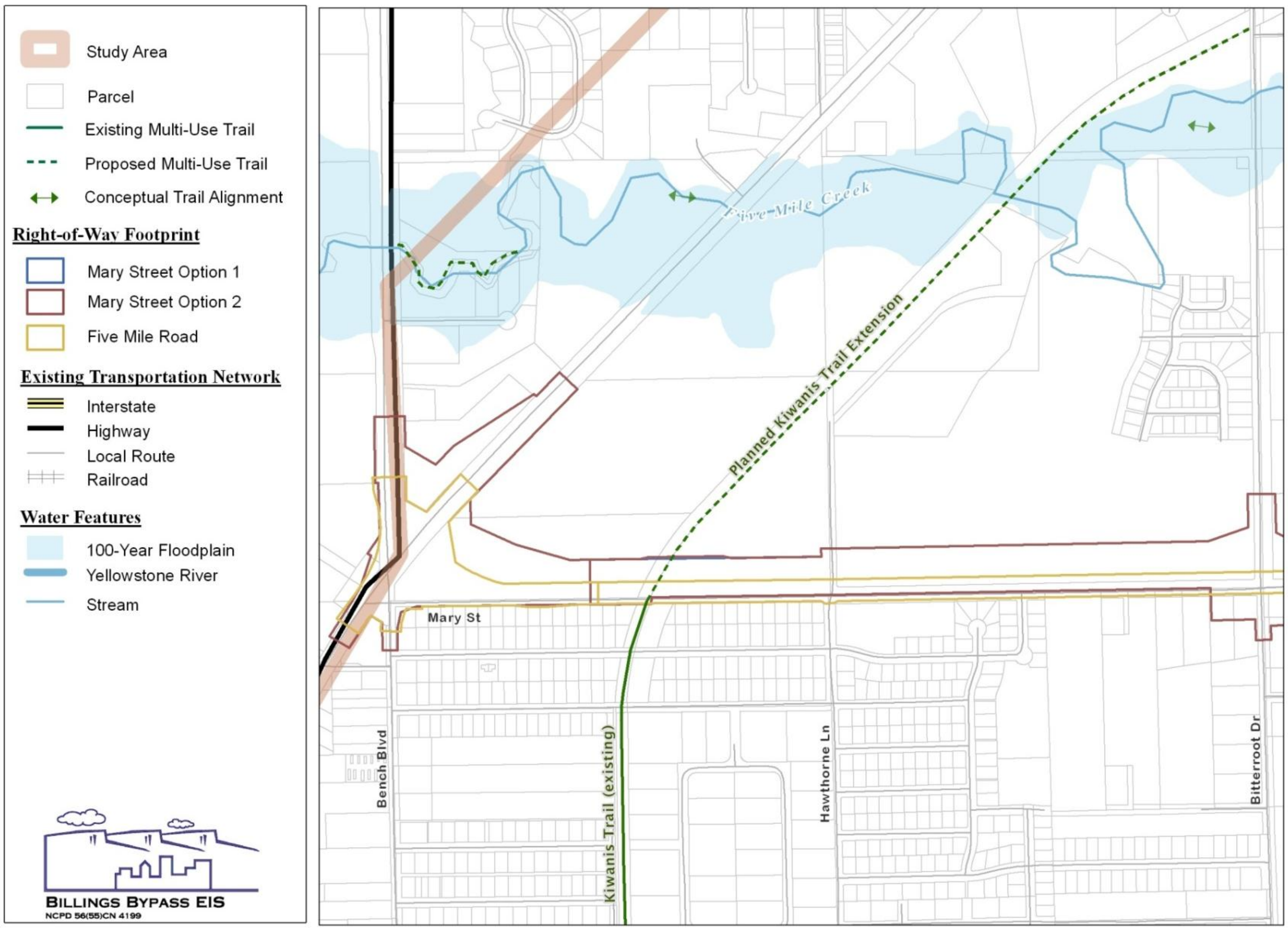
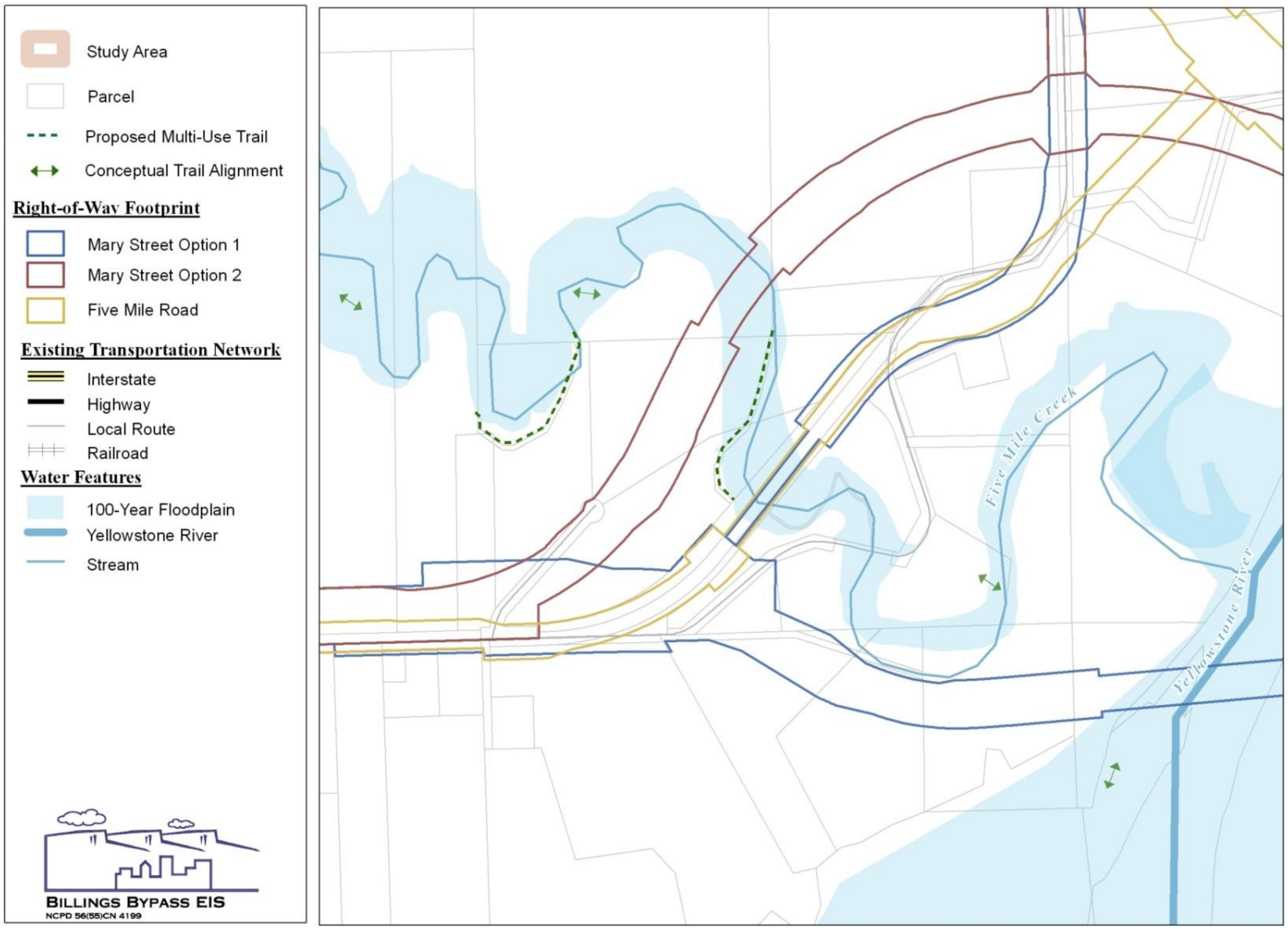


Figure 4.16 Conceptual Trail Alignment and City Easements: Heights Upper Loop Trail



4.3.2.4.2 COORDINATION WITH JURISDICTIONS

Consultation and coordination has occurred with jurisdictions in which public parks, recreation areas, and the wildlife and waterfowl refuge are considered significant resources by Section 4(f) criteria. The City of Billings has jurisdiction for the park and recreational resources in the study area.

MDT and FHWA have coordinated with the City of Billings Parks and Recreation Department throughout the development of the DEIS and FEIS. The potential *de minimis* findings, possible measures to minimize harm, and general mitigation strategies were discussed with the city before and after selection of the preferred alternative. On February 3, 2014, the City of Billings concurred with the *de minimis* findings presented in this FEIS. The letter indicating the concurrence of the City of Billings is included in Appendix B.

4.3.2.4.3 *DE MINIMIS* IMPACTS

De minimis impacts on publicly owned parks, recreation areas, and wildlife and waterfowl refuges are defined as those that do not "adversely affect the activities, features and attributes" of the Section 4(f) resource. There is one planned recreational resource and one existing recreational resource that could be minimally impacted by the build alternatives. **Table 4.13** summarizes those impacts and **Figure 4.17** shows the project footprints in relation to the existing and planned Kiwanis Trail. The Kiwanis Trail and the planned Kiwanis Trail Extension could be minimally impacted by the build alternatives. These are recreational resources protected under Section 4(f). In both cases, the impacts of the project to the facility would be minimal, and the recreational use of the facility would be maintained without negatively impacting activities, features, and attributes of the facility. Thus, FHWA finds that the build alternatives result in a *de minimis* impact to the Kiwanis Trail and the planned Kiwanis Trail Extension.

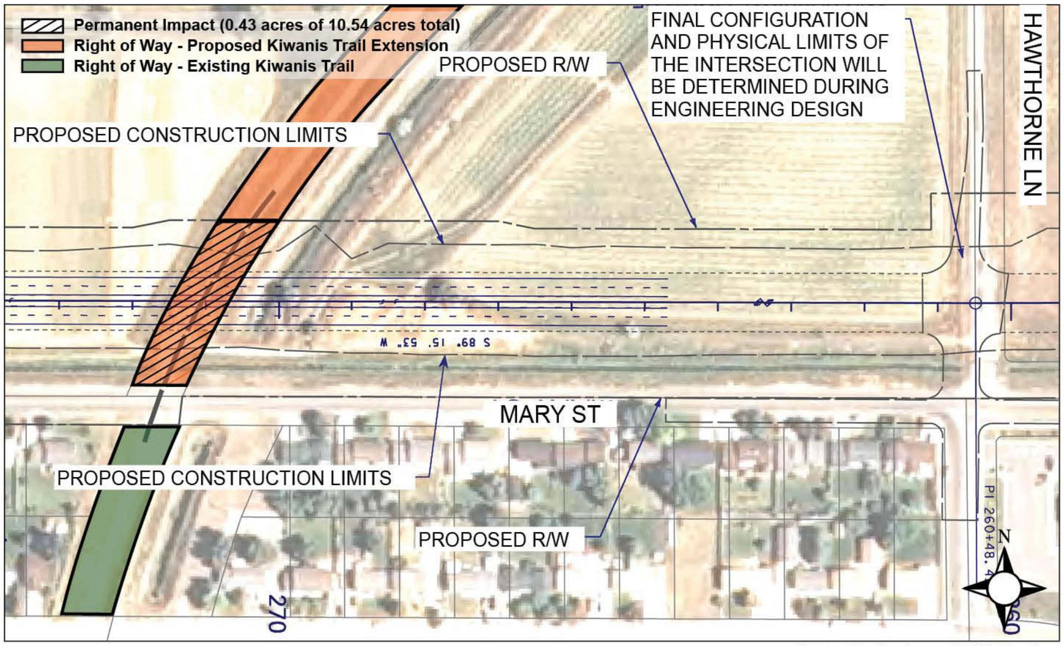
For a *de minimis* finding, the officials with jurisdiction over a park, recreation area, or wildlife or waterfowl refuge must also provide written concurrence that the project would not adversely affect the activities, features, and attributes that qualify the property for protection under Section 4(f). This written concurrence is attached in Appendix B.

Table 4.13 Section 4(f) Resources – Public Parks and Recreation Areas: Anticipated Use

RESOURCE	DESCRIPTION	ALTERNATIVE IMPACTING RESOURCE	SIZE (ACRES)	SIZE OF IMPACT (ACRES)	USE
Kiwanis Trail	Existing trail; paved bike and pedestrian facility on abandoned railroad grade.	All build alternatives	21.3	Mary 1: 0.0 Mary 2: 0.0 Five Mile: 0.0	Temporary impacts during construction (detour, possible closure).
Kiwanis Trail Extension (planned)	Planned paved multi-use trail on existing abandoned railroad grade.	All build alternatives	10.5	Mary 1: 0.43 Mary 2: 0.43 Five Mile: 0.16	Permanent impacts to right-of-way. Would not preclude trail development.

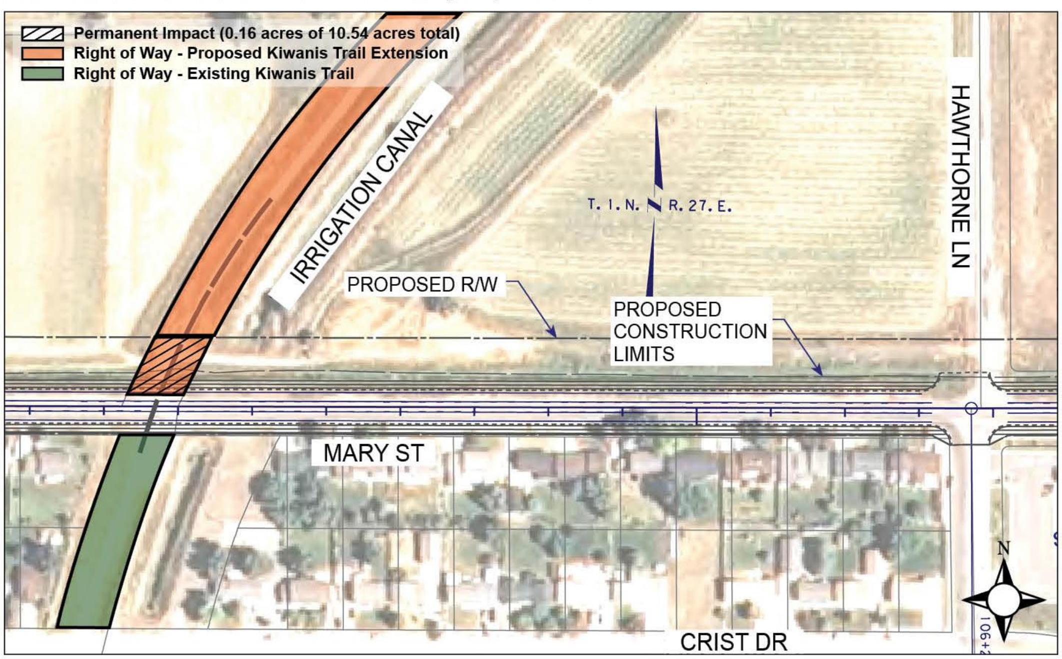
Figure 4.17 Project Footprints and the Existing and Planned Kiwanis Trails

Mary Street Option 1 and Option 2 Alternatives – Primary Improvements



Note: Preliminary 30% Design

Five Mile Road Alternative – Secondary Improvements



Note: Preliminary 30% Design

4.3.2.5 *DE MINIMIS* DETERMINATION – KIWANIS TRAIL

4.3.2.5.1 PROPERTY DESCRIPTION

The Kiwanis Trail is a 10-foot-wide concrete trail, approximately 1.95 miles in length (Alta 2011). The trail, built in 1996, extends from Yellowstone River Road near Two Moon Park to Bitterroot Drive, connecting to the Metra, Coulson, and Mystic trails to serve as the longest segment of trail in Billings (collectively these trails are referred to as the Jim Dutcher Trail, extending 6.5 miles). The Kiwanis Trail is a Section 4(f) resource, connects multiple city parks, and serves regional recreational needs.

4.3.2.5.2 SECTION 4(f) USE

Neither the Mary Street Option 1 or Mary Street Option 2 alternative would include any improvements to Mary Street in the vicinity of the existing Kiwanis Trail. Under both of these alternatives, the proposed corridor would parallel Mary Street to the north. The existing Mary Street corridor would remain a local access road for residents and would not be altered in the vicinity of the existing Kiwanis Trail. None of the existing Kiwanis Trail right-of-way would be converted to a transportation use, and the recreational use of the facility would be maintained as it currently exists without negatively impacting the activities, features, or attributes that make it eligible for protection under Section 4(f).

The Five Mile Road Alternative would reconstruct Mary Street to City standards for an urban arterial roadway. Mary Street would be designed to accommodate the planned extension of the Kiwanis Trail and would include a new pedestrian crossing where the existing Kiwanis Trail, the planned Kiwanis Trail, and Mary Street intersect. **Figure 4.17** shows the project footprints in relation to the existing and planned Kiwanis Trail.

Additionally, construction activities may require partial closure of the existing trail for pedestrian safety, resulting in minor, temporary impacts to the recreational use of the trail. In the short term, there would be temporary detours related to road construction for bicycle travel and access to Kiwanis Trail.

The anticipated impacts would not compromise the activities, features, or attributes of the trail. MDT would continue to coordinate with the City of Billings during further project design to ensure impacts are minimal.

4.3.2.5.3 MITIGATION AND ENHANCEMENTS

The following steps would be taken to minimize impacts to users of the Kiwanis Trail.

- MDT would coordinate with the City of Billings to include appropriate signage and/or public notifications regarding temporary trail closures.
- If the Five Mile Creek Alternative is constructed, mitigation would include accommodation of a new pedestrian crossing at the intersection of the existing Kiwanis Trail with Mary Street.

4.3.2.5.4 *DE MINIMIS* IMPACT TO KIWANIS TRAIL

The primary recreational use of this facility is a recreational multi-use trail that currently terminates at Mary Street. Because the impacts of the project to the existing trail would be minimal and the recreational use of the facility would be maintained without negatively impacting its activities, features, and attributes, the minor modification to the northern boundary of the existing facility would result in a *de minimis* impact.

4.3.2.6 *DE MINIMIS* DETERMINATION – PROPOSED KIWANIS TRAIL EXTENSION

4.3.2.6.1 PROPERTY DESCRIPTION

The proposed Kiwanis Trail Extension follows the railroad alignment from the northern terminus of the existing Kiwanis Trail at Mary Street. The extension would bring the trail north and east, past Five Mile Creek to Bitterroot Drive (Kiwanis Extension).

4.3.2.6.2 SECTION 4(f) USE

The Mary Street Option 1 and Mary Street Option 2 alternatives would temporarily use approximately 0.43 acre along the southern boundary of the 10.5-acre resource for expansion of the roadway. The Five Mile Road Alternative would use approximately 0.16 acre along the southern boundary of the 10.5-acre open space for expansion of the roadway.

The new roadway would need to be designed to accommodate the planned extension of the Kiwanis Trail, and not preclude its future extension. The Mary Street Option 1 and Mary Street Option 2 alternatives would maintain the existing Mary Street, which could act as an alternative bicycle and pedestrian travel route. The Five Mile Road Alternative would include bicycle lanes along a widened Mary Street, with a new pedestrian crossing at the intersection of the existing Kiwanis Trail with Mary Street.

These impacts would be permanent, but would not preclude the trail from being developed, nor would the impacts compromise the activities, features, or attributes of the planned trail. MDT would continue to coordinate with the City of Billings during further project design to ensure impacts are minimal.

4.3.2.6.3 MITIGATION AND ENHANCEMENTS

The following avoidance, minimization, and mitigation measures are proposed to minimize project effects:

- MDT would coordinate with the City of Billings throughout final design to ensure that the final project provides for safe and effective pedestrian and bicycle movement across the project corridor at the Kiwanis Trail crossing.
- MDT would coordinate with the City of Billings to include appropriate signage and/or public notifications regarding temporary trail closures.

4.3.2.6.4 *DE MINIMIS* IMPACT TO KIWANIS TRAIL EXTENSION

The primary recreational use of this facility will be a recreational multi-use trail. The trail has not been developed for public use, but is planned as an extension of the existing Kiwanis Trail that currently terminates at Mary Street. The project would not preclude future development of the facility, and the impacts of the project to the existing trail would be minimal, because the recreational use of the facility would be maintained without negatively impacting its planned activities, features, and attributes. Thus, the proposed project would result in a *de minimis* impact.

4.3.2.7 CONCLUSION

The Kiwanis Trail and the planned Kiwanis Trail Extension could be minimally impacted by the build alternatives. These are recreational resources protected under Section 4(f). In both cases, the impacts of the project to the facility would be minimal, and the recreational use of the facility would be maintained without negatively impacting activities, features, and attributes of the facility. Thus, FHWA finds that the build alternatives would result in a *de minimis* impact to the Kiwanis Trail and the planned Kiwanis Trail Extension. On February 3, 2014, the City of Billings concurred with the *de minimis* findings presented in this FEIS. The letter indicating the concurrence of the City of Billings is included in Appendix B.

4.3.3 SOCIOECONOMIC CONDITIONS

4.3.3.1 METHODOLOGY

Social conditions describe the social settings and characteristics of the study area relating to housing, community demographics, and commuting. MDT evaluates these characteristics to determine the effects of a transportation action on a community and its quality of life. The analysis of impacts to the communities in the study area assists in the decision making process for transportation projects. Often, these impacts, both positive and negative, occur to the communities and neighborhoods adjacent to the proposed alignment. Impacts to social conditions were analyzed within 1,000 feet on each side of the proposed alignment. The impact analysis evaluates social impacts using the following criteria:

- Impeded access to adjacent neighborhoods and/or communities.
- Impacts to community cohesion resulting from physical or perceptual isolation or separation, walls, or barriers.
- Changes in neighborhood travel patterns.
- Potential population changes as a result of the alternatives, including an evaluation of direct impacts caused by property acquisitions and indirect effects such as potential growth related to land use planning.

The social impacts of the alternatives were estimated by reviewing preliminary ROW plans developed for each road design alternative.

The impact analysis was based on information provided by Yellowstone County planning staff, review of the *Yellowstone County and City of Billings 2008 Growth Policy Update* (City of Billings 2008), and site visits to the study area (DOWL/HKM 2010).

4.3.3.2 RESULTS

Neighborhoods within 1,000 feet of the proposed alignments may be impacted as a result of new access to and from the roadways. Residents could be temporarily impacted by construction, dust, and noise associated with construction; increased congestion; and lost time due to out-of-direction travel. **Table 4.14** summarizes direct and indirect impacts to community resources.

Table 4.14 Direct and Indirect Impacts Summary – Community Resources

ALTERNATIVES	DIRECT IMPACTS	INDIRECT IMPACTS
NO BUILD ALTERNATIVE		
	• None.	• None.
MARY STREET OPTION 1 ALTERNATIVE		
	• Would maintain character of the Billings Heights neighborhood. • No change in existing access to neighborhoods. • Adjacent communities would benefit from proximity to an improved travel way and maintenance of existing access. • Wider shoulders and an improved clear zone would improve operations, safety, and response time for police, fire protection, and emergency ambulance services.	• Enhanced mobility and access in the study area may expedite growth and convert vacant or agricultural lands to higher density land uses. • Potential for higher property taxes associated with growth. • Improved access to community centers, and employment centers and improvements to emergency response times.
MARY STREET OPTION 2 ALTERNATIVE		
	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
FIVE MILE ROAD ALTERNATIVE		
	• Would maintain character of the Billings Heights neighborhood. • Community facilities benefit from proximity to an improved travel way and maintenance of existing access. • Addition of designated bike lanes and sidewalks would improve access for alternative modes. • Wider shoulders and an improved clear zone would improve operations, safety, and response time for police, fire protection, and emergency ambulance services.	• Similar to Mary Street options. • Planned growth adjacent to Five Mile Road may be deterred due to limited access.

Note: Clear zone is the unobstructed, relatively flat area provided beyond the edge of the travel lane for the recovery of errant vehicles.

4.3.3.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Socioeconomic Conditions: No Build Alternative

No direct impacts to socioeconomic conditions are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Socioeconomic Conditions: No Build Alternative

No indirect impacts to socioeconomic conditions are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Socioeconomic Conditions: No Build Alternative

No temporary construction impacts to socioeconomic conditions are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – Socioeconomic Conditions: No Build Alternative

No cumulative impacts to socioeconomic conditions are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Socioeconomic Conditions: No Build Alternative

No mitigation to socioeconomic conditions is expected within or adjacent to the study area from the No Build Alternative.

4.3.3.2.2 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Socioeconomic Conditions: Mary Street Option 1 Alternative

The Billings Heights neighborhood would maintain its character of development, with greater opportunities to grow, according to the *Billings Heights Neighborhood Plan* (City of Billings 2006). The primary corridor alignment would not change existing access to neighborhoods. The Lockwood neighborhood has developed in proximity to the Yellowstone River, the MRL railroad line, and the I-90 corridor. The proposed bridge allows access to areas east and west of the neighborhood. As a result, this alternative does not create fragmentation of the Lockwood neighborhood.

The Mary Street Option 1 Alternative would have positive impacts on community cohesion through improved connections between communities. Several design features of the alternative, such as improved intersection/interchange access and pedestrian/bicycle crossings, would promote a more cohesive sense of community along Mary Street. Traffic safety and operations improvements would strengthen cohesion between neighborhood areas. The bypass would support the daily movement of study area residents to shop, commute to jobs, and access community destinations more easily.

This alternative would provide direct accessibility benefits by improving vehicular access to businesses located along Main Street, thereby helping to meet the project purpose of improving access and connectivity between I-90 and Old Hwy 312.

This alternative would provide direct accessibility benefits for pedestrians and bicyclists in the study area by strengthening connections between neighborhoods. An 8-foot-wide shoulder on each side of the roadway would provide a travel way for bicyclists. The existing Mary Street would be retained as a parallel facility for bicycle travel. Pedestrian improvements at intersections would increase awareness of pedestrians and bicyclists for motorists traveling on Mary Street. These improvements could serve to strengthen the connection between neighborhoods on the north and south sides of Mary Street.

There would be no impact on schools or churches. Recreational users would have easier access to trail facilities. Wider shoulders and an improved clear zone would improve operations, safety, and response time for police, fire protection, and emergency ambulance services.

The secondary corridor alignment would not change existing access to the low-density residential and agricultural land uses within this area. There would be no impact on the recreation areas, rest areas, churches, or school districts, including Pioneer Elementary School. These uses would benefit from their proximity to an improved travel way and would maintain existing access.

Indirect Impacts – Socioeconomic Conditions: Mary Street Option 1 Alternative

Enhanced mobility and access in the study area may expedite growth and convert vacant or agricultural lands to higher density land uses. The areas adjacent to the proposed roadway are designated areas for higher density residential, retail, and commercial use. Area travelers would have eased access to community facilities and employment centers, making the study area an attractive place to live and/or develop. This could lead to higher property values, which could afflict existing residents through increased property taxes and decreased affordability of living in the area, but it could also have a beneficial impact to others; for example, it could increase school revenues. The Mary Street Option 1 Alternative is anticipated to improve access to hospitals and emergency service response time. The alternative would have an overall positive effect on the economy and would not alter the population growth or economic growth projected to occur in Billings. Safer connections and routes may be provided for those using alternative modes, which may allow for more people to access employment centers and area destinations.

Temporary Construction Impacts – Socioeconomic Conditions: Mary Street Option 1 Alternative

Temporary impacts during the construction phase of the Mary Street Option 1 Alternative could include increased congestion, out-of-direction travel for residents, dust generated by construction activities, degraded air quality, increased noise, and visual degradation due to construction materials storage and activities. Construction would primarily impact residents immediately adjacent to the proposed corridor, and such impacts would be temporary. Emergency service and school bus routes could be impacted by lane closures and traffic congestion during construction. Students attending Pioneer Elementary School and their families could be temporarily affected by detours during construction along Five Mile Road.

Cumulative Impacts – Socioeconomic Conditions: Mary Street Option 1 Alternative

The construction of the Mary Street Option 1 Alternative would not add to the population growth projected in the region, but it could provide more opportunities to construct a variety of housing options, with the potential to shift higher densities to locations near the corridor. This alternative would encourage development and redevelopment opportunities along Mary Street and Johnson Lane (extended), and increase access to land along the existing Five Mile Road, which could spur land use changes to higher intensity uses. The area along Five Mile Road is planned for residential uses. Expediting planned growth and enhancing access to developable land may provide a positive economic impact to the study area. This alternative would also provide enhanced access to existing employment centers. Enhanced access to community facilities throughout the study area would occur, including enhanced access to parks and recreational resources. In combination with other planned transportation improvement projects, the Mary Street Option 1 Alternative may promote more concentrated development near the roadways, reducing the need for extensive infrastructure systems and reducing less efficient development patterns—a beneficial effect. Cumulative effects to the overall population and economy would be beneficial and are anticipated to be minor.

Mitigation – Socioeconomic Conditions: Mary Street Option 1 Alternative

The analysis considered opportunities to avoid and minimize anticipated impacts to neighborhoods and community facilities throughout the development of the alternatives. The alternatives were largely designed to use existing roadway alignments and vacant lands, therefore minimizing the amount of property required for acquisition. In addition, the following mitigation would be implemented.

- Use existing roadway alignments and vacant lands to minimize the amount of property required for acquisition.
- Design proposed intersection improvements in coordination with the City of Billings.
- To mitigate construction impacts before and during construction, coordinate with emergency services and school districts to minimize disruption to services.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to socioeconomic conditions, as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 1 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.3.2.3 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Socioeconomic Conditions: Mary Street Option 2 Alternative

Direct impacts on communities under the Mary Street Option 2 Alternative would be the same as those indicated for the Mary Street Option 1 Alternative. This alternative would provide direct accessibility benefits by improving vehicular access from the south and east portions of the Billings urban area to businesses located along Main Street, thereby helping to meet the project purpose of improving access and connectivity between I-90 and Old Hwy 312.

This alternative would provide direct accessibility benefits for pedestrians and bicyclists in the study area by strengthening connections between neighborhoods. An 8-foot-wide shoulder on each side of the roadway would provide an unmarked travel way for bicyclists. The existing Mary Street would provide a parallel facility for bicycle travel. Pedestrian improvements at intersections would increase awareness of pedestrians at crossings for motorists traveling on Mary Street. These improvements could serve to strengthen the connection between neighborhoods on the north and south sides of Mary Street. Wider shoulders and an improved clear zone would improve operations, safety, and response time for police, fire protection, and emergency ambulance services.

Indirect Impacts – Socioeconomic Conditions: Mary Street Option 2 Alternative

Indirect impacts to communities under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Socioeconomic Conditions: Mary Street Option 2 Alternative

Temporary construction impacts to communities under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Cumulative Impacts – Socioeconomic Conditions: Mary Street Option 2 Alternative

Cumulative impacts to socioeconomic conditions under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Socioeconomic Conditions: Mary Street Option 2 Alternative

Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to socioeconomic conditions as well as mitigation for Phase 1 of the Mary Street Option 2 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 2 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.3.2.4 Five Mile Road Alternative

Full Buildout

Direct Impacts – Socioeconomic Conditions: Five Mile Road Alternative

The primary corridor alignment of the Five Mile Road Alternative would not change existing access to the low-density residential and agricultural land uses within this neighborhood. There would be no direct impacts on the recreation areas, rest areas, churches, or school districts, including Pioneer Elementary School. Adjacent communities would benefit from their proximity to an improved travel way and maintenance of existing access.

This alternative would provide direct accessibility benefits for pedestrians and bicyclists in the study area. An 8-foot-wide shoulder on each side of the roadway would provide an unmarked travel way for bicyclists. Pedestrian improvements at intersections would increase awareness of pedestrians at the crossing for motorists traveling Five Mile Road.

Access to community facilities would be enhanced as a result of the proximity to an improved travel way and maintenance of existing access. The area north of Five Mile Creek would benefit from improved response times for emergency services through an improved roadway.

The secondary corridor alignment would not change existing access to neighborhoods. The Lockwood neighborhood is bounded by the Yellowstone River, the BNSF Railway rail line, and the I-90 corridor. The bridge would allow access to areas east and west of the neighborhood. As a result, the Five Mile Road Alternative does not create fragmentation of the Lockwood neighborhood.

This alternative would have positive impacts on community cohesion through improved connections between communities and would provide direct accessibility benefits, as described in the Mary Street Option 1 Alternative. This alternative would provide direct accessibility benefits for pedestrians and bicyclists in the study area by strengthening connections between neighborhoods and providing linkages to the existing bicycle network. Designated bicycle lanes and separated sidewalks along Mary Street would provide a designated travel way for bicyclists and pedestrians. The bicycle lanes and sidewalks would provide a direct connection to the Kiwanis Trail. The existing Mary Street would provide a parallel facility for bicycle travel. Pedestrian improvements at intersections would increase awareness of the crossing for motorists traveling on Mary Street. These improvements could serve to strengthen the connection between neighborhoods on the north and south sides of Mary Street.

Indirect Impacts – Socioeconomic Conditions: Five Mile Road Alternative

Indirect impacts to socioeconomic conditions under this alternative would be similar to those described under the Mary Street Option 1 Alternative. Access along Five Mile Road would be limited, and growth in areas slated for additional residential development may not occur or could be slow to occur, but it is not anticipated that this would influence socioeconomic factors. The City of Billings is projected to have continued population and economic growth.

Temporary Construction Impacts – Socioeconomic Conditions: Five Mile Road Alternative

Temporary construction impacts on socioeconomic conditions under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Cumulative Impacts – Socioeconomic Conditions: Five Mile Road Alternative

The Five Mile Road Alternative would increase access to land along Five Mile Road; however, Five Mile Road would be a limited access facility, with connections limited to Old Hwy 312, Dover Road, and Mary Street. Secondary corridor improvements to Mary Street may expedite residential growth in the western portion of the study area. This alternative would enhance access to community facilities throughout the study area, including parks and recreational resources. The City of Billings has a strong economy, and economic growth is expected, regardless of planned transportation projects. The alignment would have an overall positive effect on the economy, because residents would have improved access to retail and commercial areas, and the Five Mile Road Alternative would not alter the projected population growth. Cumulative effects to the overall population and economy would be beneficial and are anticipated to be minor.

Mitigation – Socioeconomic Conditions: Five Mile Road Alternative

Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to socioeconomic conditions as well as mitigation for Phase 1 of the Five Mile Road Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.4 ENVIRONMENTAL JUSTICE

4.3.4.1 METHODOLOGY

The environmental justice (EJ) methodology consisted of two integrated parts: (1) identification of minority and low-income populations, and (2) determination of whether disproportionately high and adverse impacts fall on the minority or low-income segments of the population. Minority and low-income populations are any readily identifiable group of minority or low-income persons who live in geographic proximity, or geographically dispersed persons who would be similarly affected by the proposed project.

To determine whether the alternatives would have a "disproportionately high and adverse impact" on minority or low-income populations, a number of factors were considered. These factors include the potential for temporary (construction) and permanent (operational) impacts, mitigation measures that would be incorporated into the project, and offsetting benefits. A disproportionately high and adverse impact is defined as either of the following:

- An impact that is predominantly borne by minority or low-income households.
- An impact that would be experienced by these populations in a way that is appreciably more severe or greater in magnitude than the adverse effect that would be experienced by non-minority or non-low-income populations.

Three factors were considered in identifying whether a low-income or minority community is bearing a disproportionate share of the impacts:

- Whether there would be an environmental impact that would significantly and adversely affect the minority or low-income populations.
- Whether the effects would exceed, or are likely to exceed, those on the general population.
- Whether the effects occur, or would occur, in minority or low-income populations affected by cumulative or multiple exposures to environmental hazards.

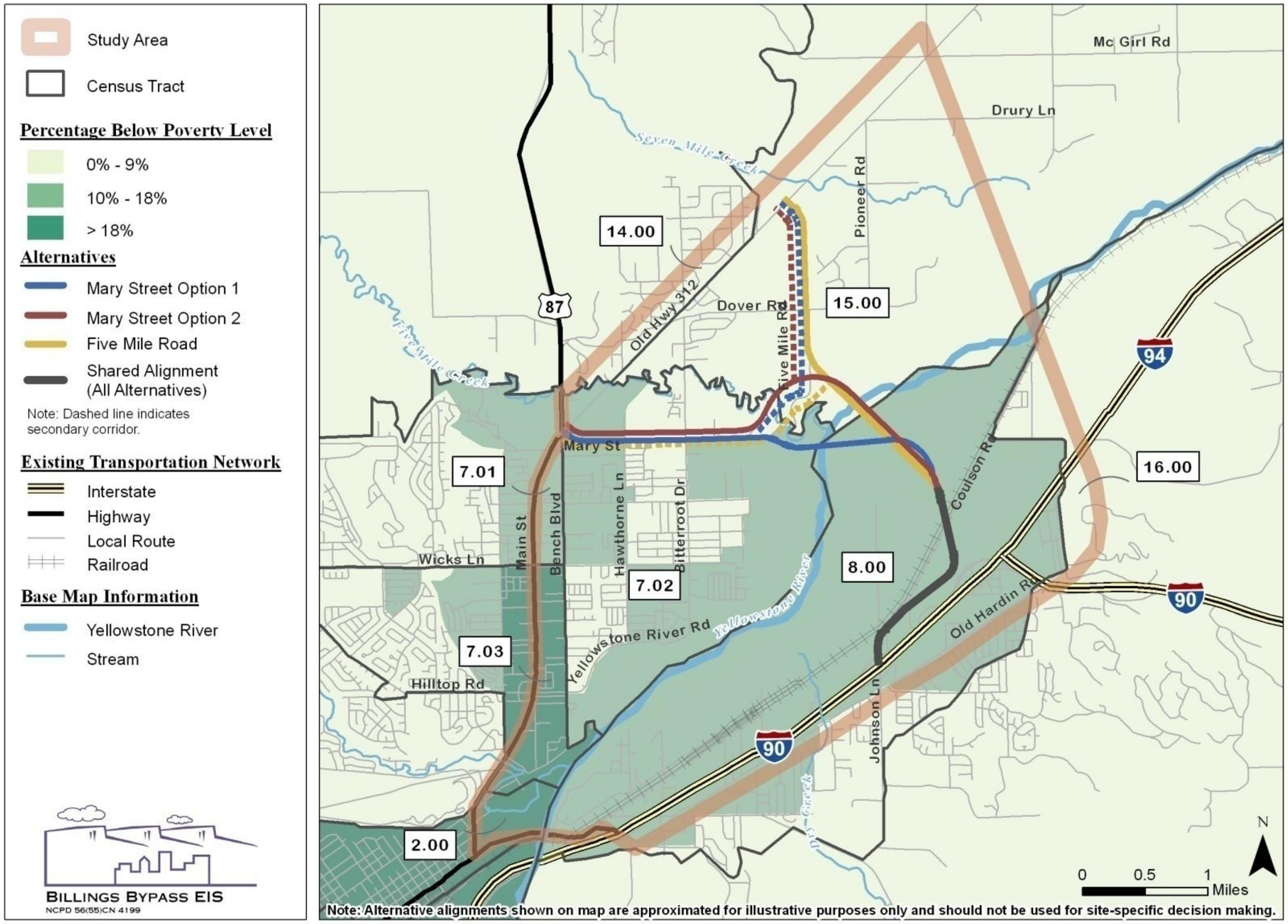
4.3.4.2 RESULTS

The analysis of existing EJ populations in Section 3.3.4 concluded that there are minority populations of Hispanic and Native American persons within the study area. Section 3.3.4 also concluded that there is a readily identifiable low-income population within the study area. A summary of direct and indirect impacts of each alternative to EJ populations is shown in the table below. Low-income and minority populations in proximity to the alternatives are depicted in **Figure 4.18** and **Figure 4.19** , respectively.

Table 4.15 Direct and Indirect Impacts Summary – Environmental Justice

ALTERNATIVES	DIRECT IMPACTS	INDIRECT IMPACTS
NO BUILD ALTERNATIVE		
	• None.	• None.
MARY STREET OPTION 1 ALTERNATIVE		
	• One residence and one garage would be displaced in block group 7.02-3; four residences would be displaced in block group 8-3. • Beneficial impacts would occur from enhanced safety and mobility. • Adverse visual and noise impacts would occur.	• Safety and mobility for motorists and pedestrians would improve. • Increased noise and visual impacts may occur in identified block groups.
MARY STREET OPTION 2 ALTERNATIVE		
	• Four residences would be displaced in block group 8-3. • Similar beneficial and adverse impacts as those for the Mary Street Option 1 Alternative would occur.	• Same as Mary Street Option 1.
FIVE MILE ROAD ALTERNATIVE		
	• Same as Mary Street Option 2.	• Same as Mary Street Option 1.

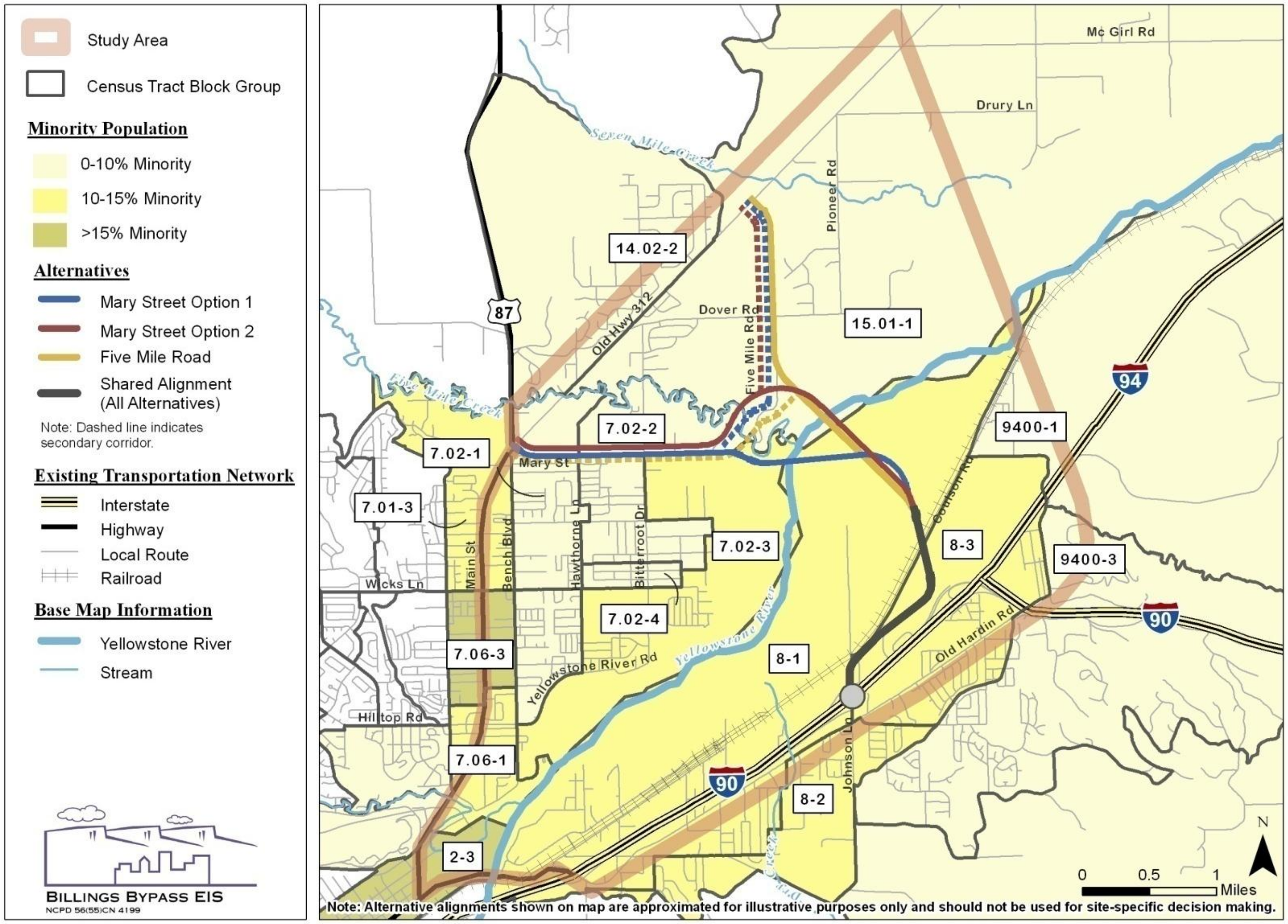
Figure 4.18 Low-income Populations



Sources: DOWL HKM August 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), Census 2000 Data, Census 2010 Data - Montana: 2010 Redistricting Data SF, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 6/15/2012

Figure 4.19 Minority Populations



Sources: DOWL HKM August 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), Census 2000 Data, Census 2010 Data - Montana: 2010 Redistricting Data SF, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 6/15/2012

4.3.4.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Environmental Justice: No Build Alternative

No direct impacts to EJ populations are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Environmental Justice: No Build Alternative

No indirect impacts to EJ populations are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Environmental Justice: No Build Alternative

No temporary construction impacts to EJ populations are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Environmental Justice: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

Preliminary Environmental Justice Finding

No disproportionately high and adverse impacts to EJ populations are anticipated from the No Build Alternative.

4.3.4.2.2 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Environmental Justice: Mary Street Option 1 Alternative

One residence and one garage would be displaced in block group 7.02-3, and four residences would be displaced in block group 8-3 under the Mary Street Option 1 Alternative. However, 14 displacements would potentially occur overall from this alternative, with mitigation provided, as described below. Therefore, impacts would not be high and adverse or disproportionately borne by EJ populations.

Both the Exxon-Mobil Fire Brigade and the Lockwood Fire Department are within areas of moderate minority populations (10% to 15%) and poverty levels (10% to 18%), and there are churches located in EJ census tracts and block groups. However, the Mary Street Option 1 Alternative would not directly impact any community facilities.

Indirect Impacts – Environmental Justice: Mary Street Option 1 Alternative

Under the Mary Street Option 1 Alternative, vehicle and pedestrian mobility would improve through the north end of block group 7.02-3, benefiting the EJ population through enhanced safety and mobility. However, new and adverse visual and noise impacts would also be expected, particularly west of Bitterroot Drive and south of Mary Street. These impacts would also be experienced by all adjacent residents, not just EJ populations, particularly west of Bitterroot Drive south of Mary Street. Therefore, the impacts would not be experienced to a greater degree by EJ populations.

Population increases and new development (both residential and transportation-related) has likely had, and would continue to have, both adverse and beneficial impacts on low-income and/or minority populations. Increased growth provides more jobs; residential development provides more housing options; and new transportation routes improve mobility to community facilities and employment centers—all of which result in beneficial effects. However, if the planned development occurs within Billings, low-income areas both inside and adjacent to the study area may also be redeveloped as higher-income communities, which can displace EJ populations or increase property taxes in these areas. New transportation routes can also bisect and fragment EJ communities, as well as increase noise and visual impacts. However, no fragmentation of existing communities would occur as a result of the Mary Street Option 1 Alternative. The roadway improvements that are planned would add capacity to existing facilities; therefore, communities would not be fragmented and would have improved access to area activity centers. The impacts borne as a result of these projects are similar to those experienced by the general population, and would result in minor indirect effects (both beneficial and adverse) to low-income and minority populations.

Temporary Construction Impacts – Environmental Justice: Mary Street Option 1 Alternative

Temporary impacts during the construction phase of the project would include increased congestion, out-of-direction travel for residents, dust generated by construction activities, degraded air quality, increased noise, and visual degradation due to construction materials storage and activities. Temporary easements would be required for construction under the Mary Street Option 1 Alternative. The need for temporary easements would be greatest along Johnson Lane near the North Frontage Road and near Old Hardin Road, which could affect minority populations in block group 8-2.

Construction of the Mary Street Option 1 Alternative may result in disruption and/or spread of existing hazardous materials, particularly in the area north of Coulson Road (east of the river), between Coulson Road and I-90, and just south of I-90. North of Coulson Road, this alternative would traverse gravel pit 4, where soil and groundwater contamination has been reported, and may also affect gravel pits 11, 12, and 14 (see Section 3.4.2, "Hazardous Materials"). Diesel and/or asphalt may be stored at gravel pits, and equipment operation can result in contaminant releases. Impacts may particularly affect block group 7.02-3. A moderate percentage of minorities (10% to 15%) and people living below the poverty line (10% to 18%) live in these areas and could be affected if construction activities disrupt or spread hazardous materials. However, contamination that would otherwise remain in place and potentially migrate would be mitigated under this alternative. In addition, contamination may be prevented by removing potential existing sources, such as underground storage tanks, before they release contaminants. Therefore, beneficial impacts to EJ populations may also result from this alternative.

Construction activities could also impact pipelines 5 and 6, which run north-south on Bitterroot Drive, and east-west along Mary Street, respectively (see Section 3.4.2, "Hazardous Materials"). Because avoidance and standard procedures would be implemented during construction near fuel pipelines to prevent accidental disruption, no high and adverse environmental impacts are expected to affect EJ populations in the area.

Mitigation – Environmental Justice: Mary Street Option 1 Alternative

There would be no disproportional impacts to Environmental Justice populations and thus no mitigation is required. Mitigation for impacts described above are listed in the respective sections of this FEIS.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to EJ populations as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 1 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

Preliminary Environmental Justice Finding

No disproportionately high and adverse impacts to EJ populations are anticipated from the Mary Street Option 1 Alternative.

4.3.4.2.3 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Environmental Justice: Mary Street Option 2 Alternative

The same four residences as with the Mary Street Option 1 Alternative would be displaced in block group 8-3 at the Johnson Lane Interchange. This alternative is in the vicinity of the same community facilities described for the Mary Street Option 1 Alternative, and also would not directly affect them.

For the Mary Street Option 2 Alternative, beneficial impacts from increased mobility, as well as adverse visual and noise impacts, would be similar to those described for the Mary Street Option 1 Alternative, although adverse impacts would be concentrated between the new bridge and Bitterroot Drive. These impacts would also be experienced by all adjacent populations, particularly west of Bitterroot Drive south of Mary Street. Therefore, there would be no disproportionate impacts to EJ populations.

Indirect Impacts – Environmental Justice: Mary Street Option 2 Alternative

Indirect impacts to EJ populations under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Environmental Justice: Mary Street Option 2 Alternative

Temporary construction impacts to EJ populations under this alternative would be similar to those indicated for the Mary Street Option 1 Alternative.

Construction-related disturbance to hazardous materials could occur, and particularly could affect block group 7.02-3. The related impacts would be similar to those of the Mary Street Option 1 Alternative; however, no impacts from gravel pit 11 are expected. The Mary Street Option 2 Alternative would also impact gravel pits 3, 9, 10, 12, and 14. Adverse and beneficial impacts would result as described for the Mary Street Option 1 Alternative during construction.

Mitigation – Environmental Justice: Mary Street Option 2 Alternative

There would be no disproportional impacts to Environmental Justice populations and thus no mitigation is required. Mitigation for impacts described above are listed in the respective sections of this FEIS.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to EJ populations as well as mitigation for Phase 1 of the Mary Street Option 2 Alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 2 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

Preliminary Environmental Justice Finding

No disproportionately high and adverse impacts to EJ populations are anticipated from the Mary Street Option 2 Alternative.

4.3.4.2.4 FIVE MILE ROAD ALTERNATIVE

Full Buildout

Direct Impacts – Environmental Justice: Five Mile Road Alternative

The same four residences as with the Mary Street Option 1 Alternative would be displaced in block group 8-3 at the Johnson Lane Interchange. This alternative is in the vicinity of the same community facilities described for the Mary Street Option 1 Alternative, and also would not directly affect them.

For the Five Mile Road Alternative, beneficial impacts from increased mobility, as well as adverse visual and noise impacts, would be similar to those described for the Mary Street Option 1 Alternative, although adverse impacts would be concentrated between the connection of Five Mile Road and Bitterroot Drive.

Indirect Impacts – Environmental Justice: Five Mile Road Alternative

Indirect impacts to EJ populations under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Environmental Justice: Five Mile Road Alternative

Temporary construction impacts to EJ populations under this alternative would be similar to those indicated for the Mary Street Option 1 Alternative. In addition, the Five Mile Road Alternative would traverse gravel pit 3 and soils potentially contaminated with diesel spills that occurred at Five Mile Road and Old Hwy 312. Construction activities could have both adverse and beneficial impacts to EJ populations related to these sites.

Mitigation – Environmental Justice: Five Mile Road Alternative

There would be no disproportional impacts to Environmental Justice populations and thus no mitigation is required. Mitigation for impacts described above are listed in the respective sections of this FEIS.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to EJ populations as well as mitigation for Phase 1 of the Five Mile Road Alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

Preliminary Environmental Justice Finding

No disproportionately high and adverse impacts to EJ populations are anticipated from the Five Mile Road Alternative.

4.3.5 RIGHT-OF-WAY AND UTILITIES

4.3.5.1 METHODOLOGY

Under each of the build alternatives, additional right-of-way (ROW) would need to be acquired by MDT to accommodate the new alignment and/or road widening. In some cases, ROW acquisitions may require relocating homes, businesses, outbuildings (such as garages or other storage structures), and/or utility structures. ROW requirements that have been identified at this time are preliminary and are based on conceptual design. Actual ROW impacts may be reduced depending on refinements during final design.

For the purposes of the NEPA evaluation, a conservative estimate of the ROW needs is established for clearance in the environmental document. The estimated ROW for the proposed project was established approximately 10 feet from the proposed construction limit or by the MDT standard ROW section, whichever was greater. For segments including sidewalks, the estimated ROW was established approximately 3 feet beyond the back of the sidewalk. These ROW limits were overlaid with parcel data from the Montana Cadastral Database to identify impacted parcels and estimate the area of the parcels that would be impacted permanently or temporarily. The analysis also identified physical impacts to residences, businesses, or accessory structures, such as garages or other storage structures, to discern where there would be full acquisitions of a property. A full parcel acquisition is identified when 20% or greater of the property is impacted.

Locations of transmission lines, substations, high-pressure gas lines, water lines, sanitary sewers, storm sewers, pump stations, fiber optic and telephone lines, communication towers, petroleum lines, and oil and gas wells were identified by contacting utility providers to obtain information on service line and facility locations in the project corridors. Potential utility conflicts were identified by comparing the footprint of the proposed project with the locations of major utilities. The likelihood of a conflict was evaluated by assessing the profile of the proposed improvements, estimated depth/elevation of the utility, its type of protection, and potential for the presence of manholes and valves in relation to the proposed improvements in that location. The evaluation determined the need for relocation or adjustment of existing utilities in the project corridors.

4.3.5.2 RESULTS

All of the build alternatives would require the acquisition of public and private property along the primary and secondary corridors for conversion into roadway ROW. The ROW requirements that have been identified at this time are preliminary due to the conceptual level of design. The approximate amount of ROW acquisition by land ownership type is presented in **Table 4.16**.

Table 4.16 Total Right-of-Way Conversion into Roadway Impacts by Land Ownership

LAND OWNERSHIP	NO BUILD ALTERNATIVE	MARY STREET OPTION 1 ALTERNATIVE (INCLUDING SECONDARY CORRIDOR)	MARY STREET OPTION 2 ALTERNATIVE (INCLUDING SECONDARY CORRIDOR)	FIVE MILE ROAD ALTERNATIVE (INCLUDING SECONDARY CORRIDOR)
County Land	None	2.2 acres	0 acres	0 .74 acres
City Land	None	0.42 acres	0.44 acres	0.17 acres
Private Land	None	170.6 acres	173.5 acres	138.7 acres
Additional acreage required from parcels with unknown property owners	None	87.9 acres	80.4 acres	81.7 acres
TOTAL	**None**	**261.1 acres**	**254.4 acres**	**221 acres**

Note: Totals may not equal exact sum of subtotals due to rounding.

Under each of the build alternatives, ROW requirements may result in relocation or acquisition of homes, businesses, outbuildings, or utility structures. Three types of ROW impacts are identified, as follows:

- **Full Impact –** Structure falls within ROW limits and would be physically impacted by the alignment, requiring relocation or acquisition.
- **Potential Impact –** Structure falls outside of ROW limits; close proximity of ROW or construction limits could render the structures unusable. Close proximity is defined as within 50 feet of the ROW limits, and was identified through a visual survey of aerial photography with an overlay of the ROW footprint for each alternative.
- **Access Impact –** Parcel access would have to be greatly reconfigured or moved because it is in close proximity to ROW limits. Full and potential impacts are identified.

Table 4.17 summarizes the ROW impacts to structures and access for each alternative. **Table 4.18** identifies indirect impacts associated with each alternative. The locations of impacted structures are depicted in **Figure 4.20** through **Figure 4.23**. Individual impacts by alternative are depicted in the respective alternative discussions below.

Table 4.17 Impacted Structures by Alternative

TYPE OF IMPACT	NO BUILD ALTERNATIVE	MARY STREET OPTION 1 ALTERNATIVE	MARY STREET OPTION 2 ALTERNATIVE	FIVE MILE ROAD ALTERNATIVE
FULL IMPACT (INSIDE ROW)				
Commercial Structure	None	0	0	0

TYPE OF IMPACT	NO BUILD ALTERNATIVE	MARY STREET OPTION 1 ALTERNATIVE	MARY STREET OPTION 2 ALTERNATIVE	FIVE MILE ROAD ALTERNATIVE
Residential Structure	None	9	8	7
Accessory Structure	None	7	6	4
POTENTIAL IMPACT (OUTSIDE ROW)				
Commercial Structure	None	3	3	3
Residential Structure	None	5	5	4
Accessory Structure	None	2	1	3
ACCESS IMPACT				
Full Access Issues	None	3	3	3
Potential Access Issues	None	7	5	5
TOTAL STRUCTURES IMPACTED (FULL AND POTENTIAL)	**None**	**27**	**23**	**21**
TOTAL ACCESS ISSUES (FULL AND POTENTIAL)	**None**	**10**	**8**	**8**

Table 4.18 Indirect Impacts by Alternative

NO BUILD ALTERNATIVE	MARY STREET OPTION 1 ALTERNATIVE (INCLUDING SECONDARY CORRIDOR)	MARY STREET OPTION 2 ALTERNATIVE (INCLUDING SECONDARY CORRIDOR)	FIVE MILE ROAD ALTERNATIVE (INCLUDING SECONDARY CORRIDOR)
INDIRECT IMPACTS ASSOCIATED WITH ROW ACQUISITION			
• None.	• ROW acquisition could occur as a result of new development associated with improved access.	• See Mary Street Option 1 Alternative.	• See Mary Street Option 1 Alternative.

4.3.5.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Right-of-Way and Utilities: No Build Alternative

No direct impacts to right-of-way and utilities are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Right-of-Way and Utilities: No Build Alternative

No indirect impacts to right-of-way and utilities are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Right-of-Way and Utilities: No Build Alternative

No temporary construction impacts to right-of-way and utilities are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Right-of-Way and Utilities: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.3.5.2.2 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Right-of-Way and Utilities: Mary Street Option 1 Alternative

Right-of-Way – Primary Corridor

The Mary Street Option 1 Alternative would require the greatest amount of ROW acquisition, with a total of approximately 261 acres. The majority of ROW required by this alternative would be agricultural property and is in private ownership. ROW acquisition would also be required along cross-streets along the existing alignments of Johnson Lane, Mary Street, and Five Mile Road for intersection improvements. Mary Street Option 1 impacts are depicted in **Figure 4.20** and **Figure 4.21**

South of the Yellowstone River

Near the intersection of Johnson Lane:

- Full impacts to four residential structures and one accessory structure.
- Potential impacts to three residential structures, two commercial structures, and one accessory structure.
- Full access impacts to two parcels.
- Potential access impacts to two parcels.

Directly northwest of the BNSF railroad crossing:

- Full access impacts to two businesses and one residential structure, all of which share the same access.

North of the Yellowstone River

Between the Yellowstone River and Old Hwy 312, impacts would include:

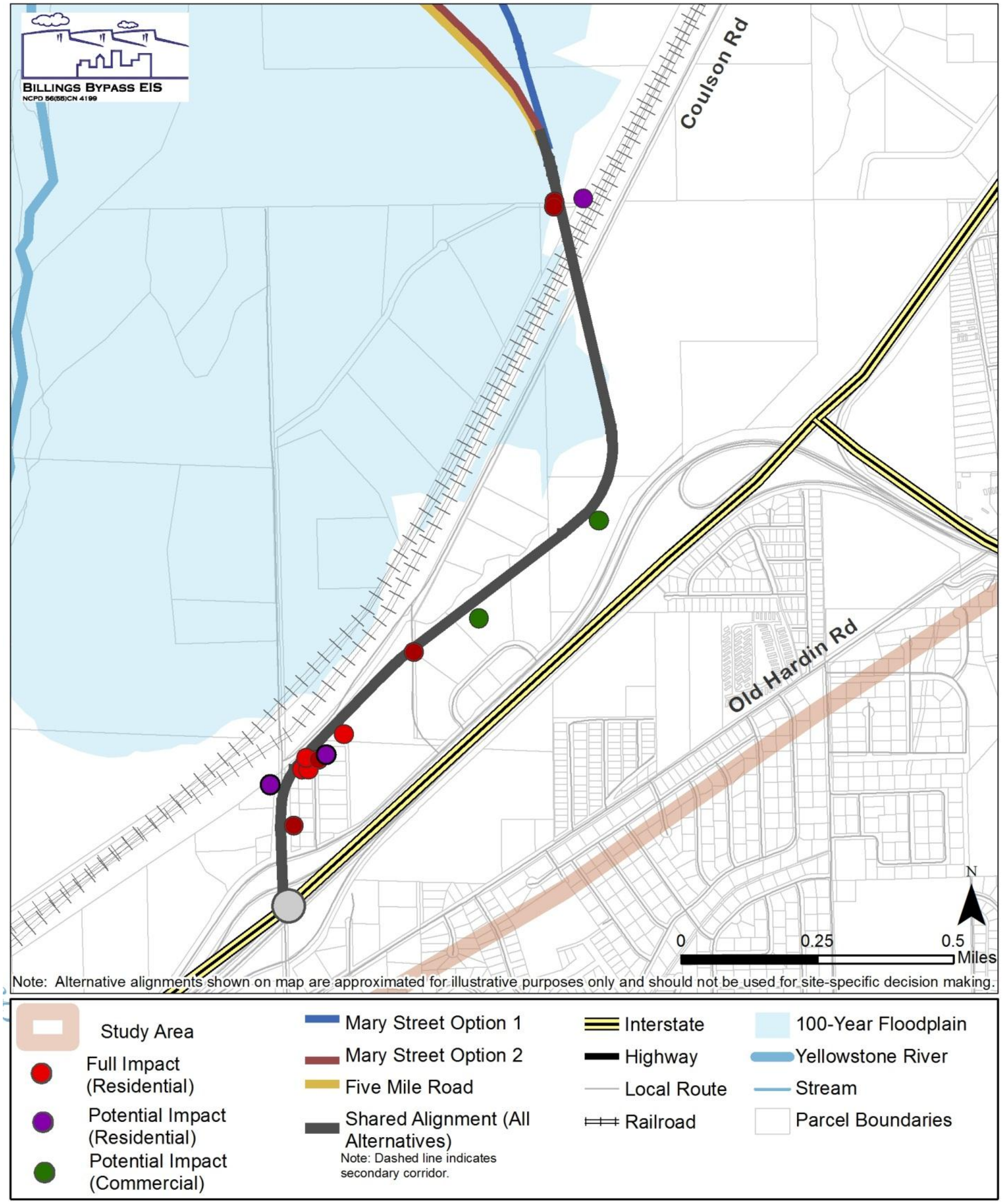
- Full impacts to three residential structures and five accessory structures.
- Potential impacts to two residential structures, one commercial structure, and one accessory structure

Right-of-Way – Secondary Corridor

Along the secondary corridor, impacts would include:

- Full impacts to two residential structures and two accessory structures.
- Potential impacts to one residential structure.

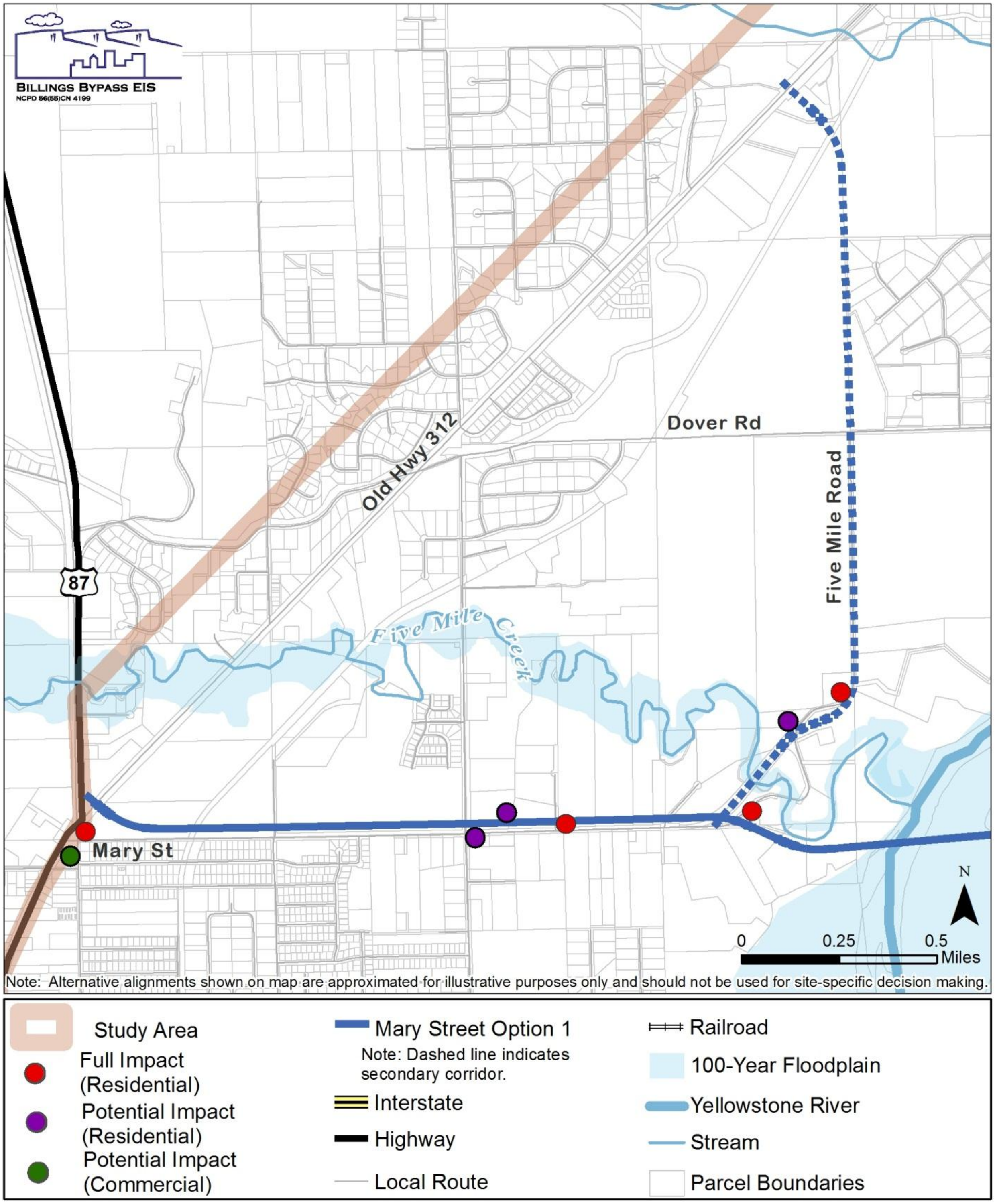
Figure 4.20 All Alternatives – ROW Impacts South of the Yellowstone River



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/21/2013

Figure 4.21 Mary Street Option 1 Alternative: ROW Impacts North of Yellowstone River



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/23/2013

Utilities

The Mary Street Option 1 Alternative would have the following impacts to the following utilities that may require relocation:

Existing

- Substation located at the intersection of Johnson Lane and Old Hardin Road.
- Overhead power line along Old Hardin Road, Johnson Lane underneath I-90, and North Frontage Road.
- Power and service lines along Firth Street, Sannon Boulevard, and Coulson Road.
- Overhead power lines and service lines extending from Main Street to Bitterroot Drive.
- Overhead power lines crossing Mary Street at Bench Boulevard and extending north along US 87.
- Overhead power line adjacent to Mary Street from Hawthorne Street to Bitterroot Drive and continuing east.
- Distribution cables along Johnson Lane, Coulson Road, and Firth Street.
- Fiber optic cable along Johnson Lane from North Frontage Road to Old Hardin Road.
- Distribution cables along Mary Street.
- Water distribution facilities along Mary Street from Old Hwy 312 to Columbine Drive.
- Service line extending parallel along Dover Road.

Planned

- Lift station near Johnson Lane and Coulson Road intersection.
- Eight-inch sewer main along Johnson Lane between the lift station and North Frontage Road.
- Six-inch main along Johnson Lane between the lift station and Old Hardin Road.
- Water mains planned along Five Mile Road.
- Overhead power lines crossing Five Mile Road at the intersection of Five Mile Road and Dover Road.

Railroads

The Mary Street Option 1 Alternative would cross over the Montana Rail Link (MRL) railroad, and would require coordination with the railroad to approve the bridge design, obtain an easement across the railroad right-of-way, and address construction and maintenance requirements.

Indirect Impacts – Right-of-Way and Utilities: Mary Street Option 1 Alternative

Planned transportation improvements that would require additional ROW include new and upgraded traffic signals, wider turn lanes, and Americans with Disabilities Act sidewalk improvements; bridge design with safer approaches on the rural roadway system; and a wider and safer intersection at the intersection of Mary Street and Five Mile Road. ROW acquisition could occur as a result of new development indirectly associated with the improved access in the study area associated with the new alignment. This would change land use in the study area and region.

Temporary Construction Impacts – Right-of-Way and Utilities: Mary Street Option 1 Alternative

Property would be needed for temporary easements during the construction of this alternative, for the purposes of grading, irrigation relocations, fencing relocations, temporary access, or temporary construction staging. The need for temporary easements would be greatest along Johnson Lane near the North Frontage Road and near Old Hardin Road, and along Mary Street east from Old Hwy 312 to Hawthorne Lane. Easements would only be needed for construction and would not require the permanent acquisition of property. Upon completion of construction activities, property owners would have unrestricted use of these areas again. Impacts to utilities would be short-term and addressed prior to or during construction through relocation or adjustment.

Mitigation – Right-of-Way and Utilities: Mary Street Option 1 Alternative

In some specific locations, ROW acquisition may be reduced to the extent practicable to minimize the amount of land needed. Design variances from roadway standards may allow for a reduction in ROW acquisition if safety is not compromised. In particular, ROW minimization would be considered under each alternative at those primary and secondary structures outside of the construction limits but within the ROW. Even if ROW is minimized to avoid impacting structures, physical impacts to the property, such as changes to accesses or circulation within the property, could still result. During ROW negotiations, a select number of private-access driveway connections to the project corridor may be deemed necessary to serve land-locked parcels. Mitigation would include the reconfiguration of access points, steepening of side slopes adjacent to the roadway, construction of retaining walls, and/or shifts in the alignment to avoid or minimize impacts to structures to the extent practicable.

Final design should evaluate the practicability and benefits of such measures, while weighing risk, safety, and the ability of a residence or other use to function with either direct or indirect (e.g., loss of parking or limited access) impacts.

The acquisition of land or improvements for highway construction is governed by state and federal laws and regulations designed to protect both the landowners and taxpaying public. Affected landowners are entitled to receive fair market value for any land or buildings acquired and any damages as defined by current regulations. The acquisition of property would comply fully with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (the “Uniform Act”), 42 USC 4601 et. seq., 49 CFR Part 24, and the Fifth Amendment of the United States Constitution. The Uniform Act applies to all acquisitions of real property or displacements of people resulting from federal or federally assisted programs or projects.

Impacted fences, including livestock pens, would be relocated to the extent practicable in consultation with the property owner. Property owners with impacted stock passes would be consulted during final design in order to continue to accommodate this use as needed. Impacted utilities, including electric substations, overhead telephone and power lines, and local utilities would be relocated as needed in consultation with utility providers.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to right-of-way and utilities as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 1 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.5.2.3 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Right-of-Way and Utilities: Mary Street Option 2 Alternative

Right-of-Way

The ROW required for the Mary Street Option 2 Alternative would be a total of approximately 254 acres. The majority of additional ROW required by this alternative would be agricultural property and is in private ownership. ROW acquisition would also be required along cross-streets along the existing alignments of Johnson Lane, Mary Street, and Five Mile Road for intersection improvements.

South of the Yellowstone River

South of the Yellowstone River, direct impacts to right-of-way under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

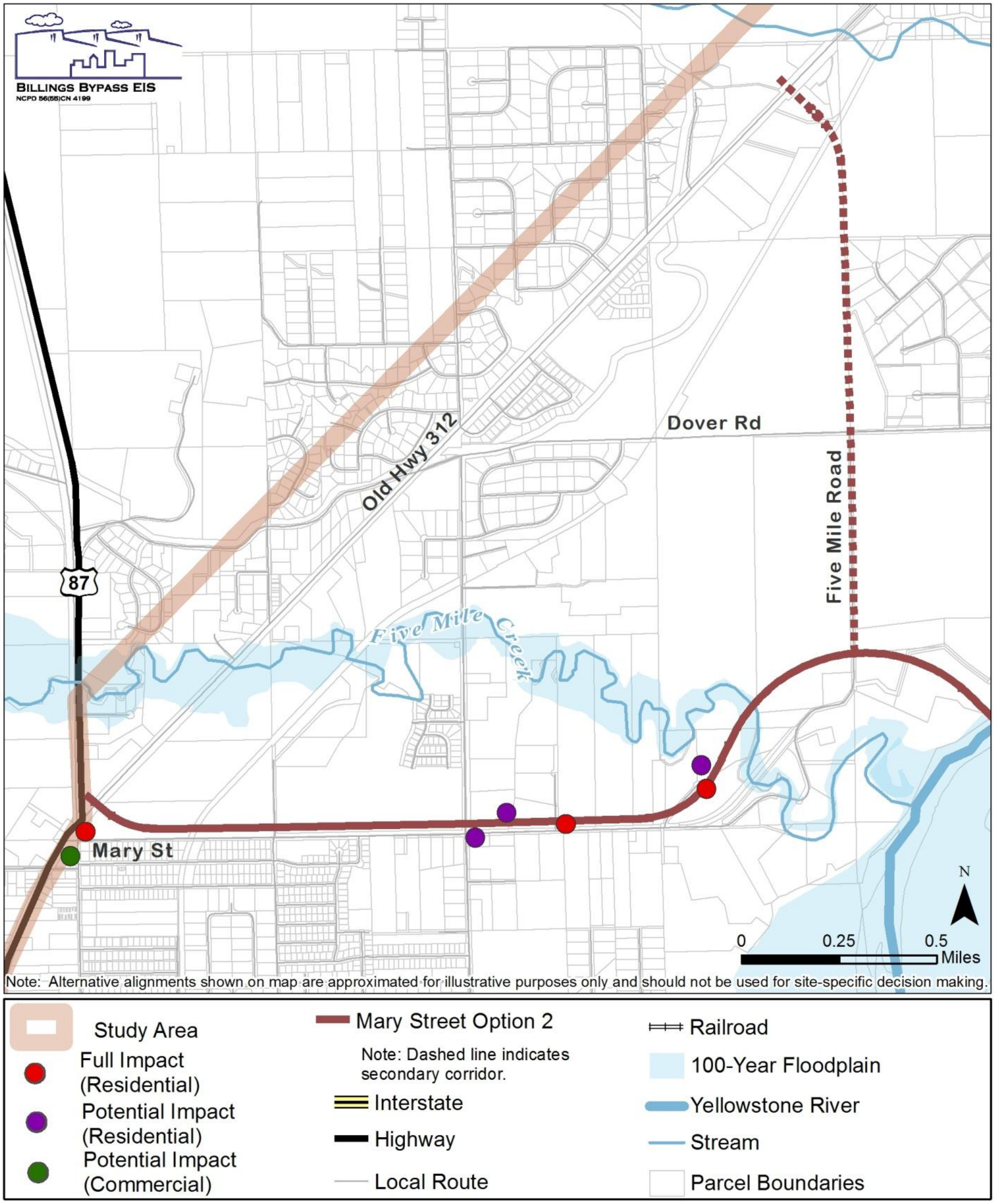
North of the Yellowstone River

Between the Yellowstone River and Old Hwy 312, impacts would include:

- Full impacts to three residential structures and five accessory structures.
- Potential impacts to three residential structures, one commercial structure, and one accessory structure.

There would be no impacts associated with the secondary corridor.

Figure 4.22 Mary Street Option 2 Alternative: ROW Impacts North of Yellowstone River



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/24/2013

Utilities
Direct impacts to utilities under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Railroads
Direct impacts to railroads under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Indirect Impacts – Right-of-Way and Utilities: Mary Street Option 2 Alternative
Indirect impacts to utilities under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Right-of-Way and Utilities: Mary Street Option 2 Alternative
Temporary construction impacts to ROW and utilities under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Right-of-Way and Utilities: Mary Street Option 2 Alternative
Mitigation for this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1
Direct, indirect, temporary construction, and cumulative impacts to ROW and utilities as well as mitigation for Phase 1 of the Mary Street Option 2 Alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 2 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.5.2.4 FIVE MILE ROAD ALTERNATIVE

Full Buildout

Direct Impacts – Right-of-Way and Utilities: Five Mile Road Alternative

Right-of-Way – Primary Corridor
The Five Mile Road Alternative would require the least amount of ROW acquisition, with a total of approximately 221 acres. The majority of additional ROW required by this alternative would be agricultural property and is in private ownership. ROW acquisition would also be required along cross-streets along the existing alignments of Johnson Lane, Mary Street, and Five Mile Road for intersection improvements.

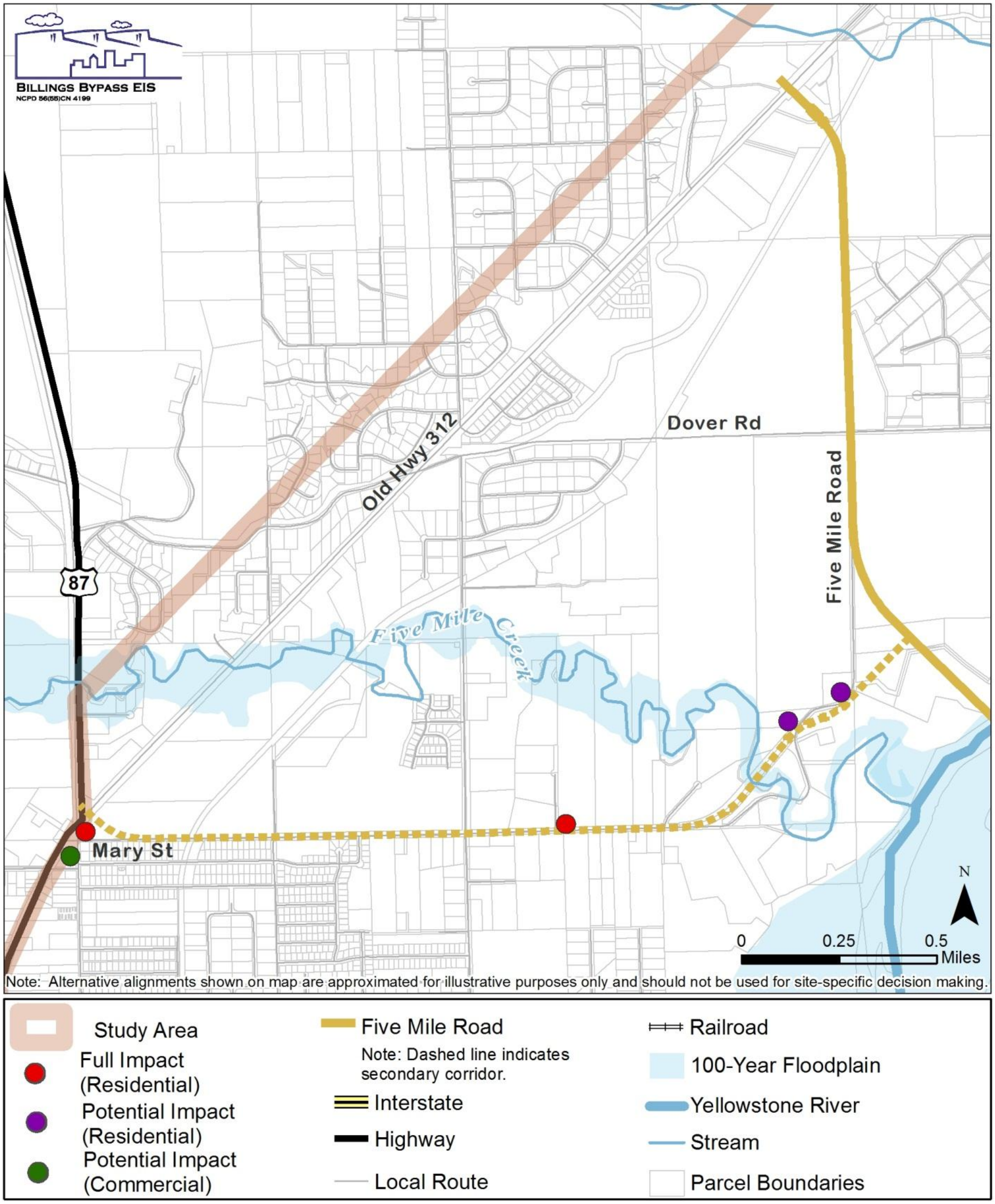
South of the Yellowstone River

South of the Yellowstone River, direct impacts to ROW under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

North of the Yellowstone River

Between the Yellowstone River and Old Hwy 312, there would be no direct impacts along the primary corridor.

Figure 4.23 Five Mile Road Alternative: ROW Impacts North of Yellowstone River



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/24/2013

Right-of-Way – Secondary Corridor

Along the secondary corridor, impacts would include:

- Full impacts to two residential structures and two accessory structures.
- Potential impacts to two residential structures and one commercial structure.

Utilities

Direct impacts to utilities under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Railroads

Direct impacts to railroads under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Indirect Impacts – Right-of-Way and Utilities: Five Mile Road Alternative

Indirect impacts to right-of-way and utilities under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Right-of-Way and Utilities: Five Mile Road Alternative

Temporary construction impacts to right-of-way and utilities under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Right-of-Way and Utilities: Five Mile Road Alternative

Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to right-of-way and utilities as well as mitigation for Phase 1 of the Five Mile Road Alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.6 CULTURAL RESOURCES

4.3.6.1 METHODOLOGY

Within the area of potential effect (APE), prehistoric or historic districts, sites, buildings, structures, or objects included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) were identified during field inventories in 2010. The sites identified were all historic. No prehistoric or historic districts, archeological resources, or tribal cultural properties were identified. The current condition, location, and setting of identified resources were documented, as well as the nature of planned project activities within the APE. The State Historic Preservation Officer (SHPO) was consulted regarding the eligibility of the identified resources (see letter dated December 15, 2011, in Appendix D). For resources that were determined to be listed or eligible for listing on the NRHP, the likely impact of project activities and actions on the qualities that qualify the resources for listing on the NRHP was assessed in accordance with Section 106 of the National Historic Preservation Act. This was done by applying the "Criteria of Adverse Effect" as defined under Section 106. The SHPO was consulted to determine whether the impacts constitute an Adverse Effect, No Adverse Effect, or No Historic Properties Affected. SHPO concurrence was required for the eligibility and finding of effects (see letter dated December 15, 2011, in Appendix D).

Since the DEIS, additional survey was completed in December 2012 for ten properties where access had previously been denied. None of these properties were found to be eligible for listing on the NRHP (see letter dated September 16, 2013 in Appendix D). Supplemental analyses of Coulson Ditch and the Five Mile Creek bridge were completed in 2013, and SHPO concurred that neither resource is eligible for listing on the NRHP (see letters dated September 12, 2013 and December 3, 2013 in Appendix D). Finally, documentation on the nine properties outside the APE but within the study area, as identified in Sections 3.3.6.4, was submitted to SHPO and they were determined to be not eligible for listing on the NRHP (see letter dated December 18, 2013 in Appendix D).

4.3.6.2 RESULTS

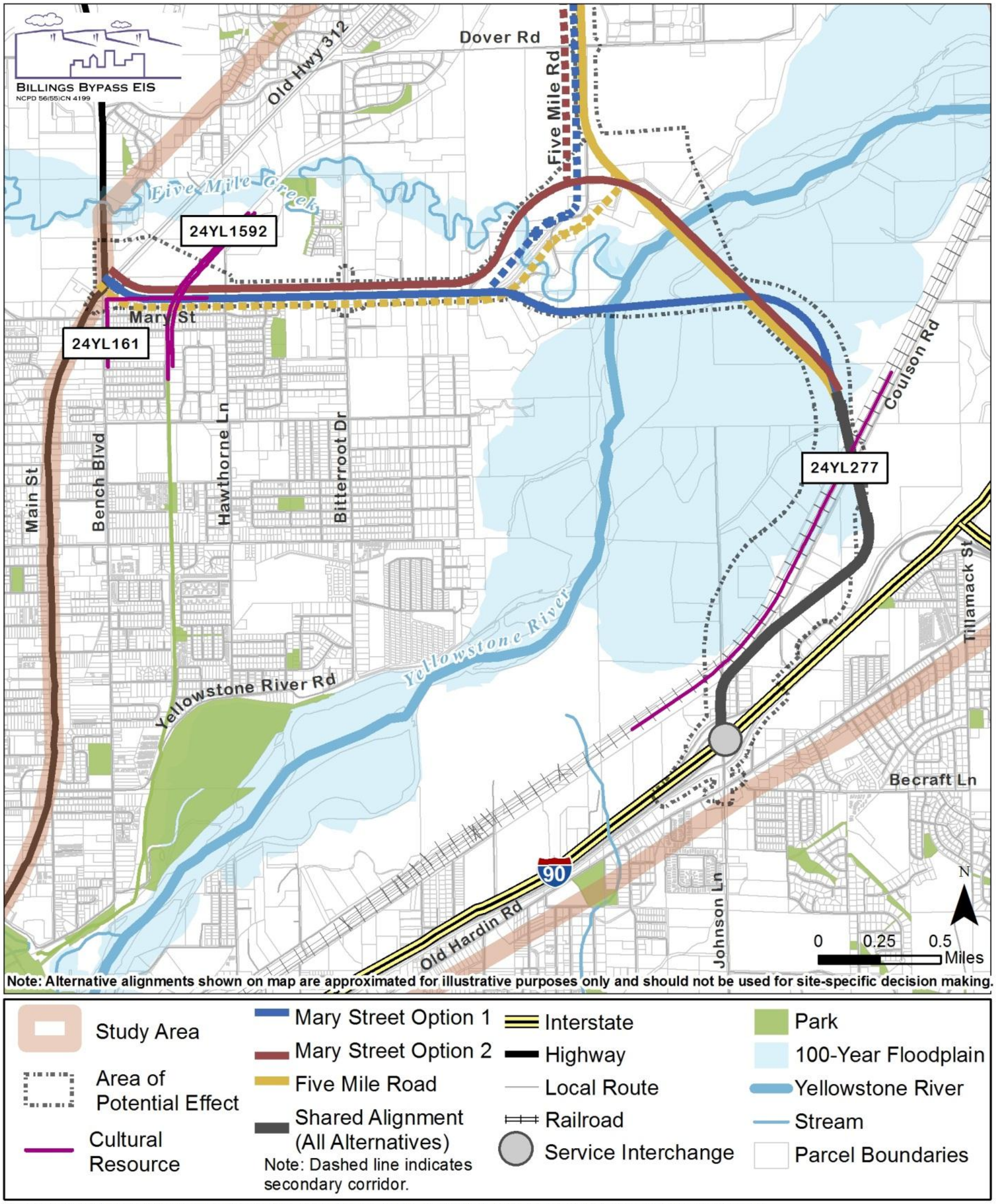
Cultural resources impacts of the No Build Alternative and the build alternatives are summarized in the table below. All of the build alternatives would result in No Adverse Effect to the following properties: Northern Pacific Railway Mainline (Site 24YL277), and Billings Bench Water Association Canal (Site 24YL0161).

The abandoned Billings and Central Montana Railroad (Site 24YL1592) would be impacted for approximately 2,000 feet. It is covered under the terms of MDT's *Programmatic Agreement [PA] Among the Federal Highway Administration, the Montana Department of Transportation, the Advisory Council on Historic Preservation, and the Montana Historic Preservation Office Regarding Abandoned Historic Railroad Grades Affected by Montana Department of Transportation Undertakings in Montana* of 2011. A depiction of cultural resources in the APE can be found in **Figure 4.24**.

Table 4.19 Direct and Indirect Impacts Summary – Cultural Resources

ALTERNATIVES	DIRECT IMPACTS	INDIRECT IMPACTS
NO BUILD ALTERNATIVE		
	• None.	• None.
MARY STREET OPTION 1 ALTERNATIVE		
	• No Adverse Effect to Northern Pacific Railway Mainline (Site 24YL277), and Billings Bench Water Association Canal (Site 24YL0161). • Billings and Central Montana Railroad (Site 24YL1592) is covered under terms of MDT's Abandoned Historic Railroad Grade Programmatic Agreement.	• Impacts from continued urbanization of the study area resulting from project implementation.
MARY STREET OPTION 2 ALTERNATIVE		
	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
FIVE MILE ROAD ALTERNATIVE		
	• Same as Mary Street Option 1 Alternative. • An additional section of the Billings Bench Water Association Canal would be impacted through realignment, but No Adverse Effect is expected.	• Same as Mary Street Option 1 Alternative.

Figure 4.24 Area of Potential Effect and Sites Eligible for NRHP Listing



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 10/14/2013

4.3.6.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Cultural Resources: No Build Alternative

No direct impacts are expected within the area of potential effect from the No Build Alternative.

Indirect Impacts – Cultural Resources: No Build Alternative

No indirect impacts are expected within the area of potential effect from the No Build Alternative.

Temporary Construction Impacts – Cultural Resources: No Build Alternative

No temporary construction impacts are expected within the area of potential effect from the No Build Alternative.

Cumulative Impacts – Cultural Resources: No Build Alternative

No cumulative impacts are expected within the area of potential effect from the No Build Alternative.

Mitigation – Cultural Resources: No Build Alternative

No mitigation is expected within the area of potential effect from the No Build Alternative.

4.3.6.2.2 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Cultural Resources: Mary Street Option 1 Alternative

Northern Pacific Railway (NP) Mainline (Site 24YL277)

Under the Mary Street Option 1 Alternative, a grade-separated structure is proposed to carry the roadway over the railroad tracks. Two of the structure's bents, or piers, would be located within the existing railroad ROW, but would not encroach on the existing railroad grade. The bents would not impact the function or historic significance of the railroad to Yellowstone County and Montana. The impact would be visual and localized to the setting. However, the setting has already been compromised by adjacent industrial, commercial, and residential development. The proposed grade separation would not detract enough to render the Northern Pacific Railway Mainline ineligible for the NRHP. There would be No Adverse Effect to the Northern Pacific Railway Mainline. SHPO concurred with this determination on December 15, 2011.

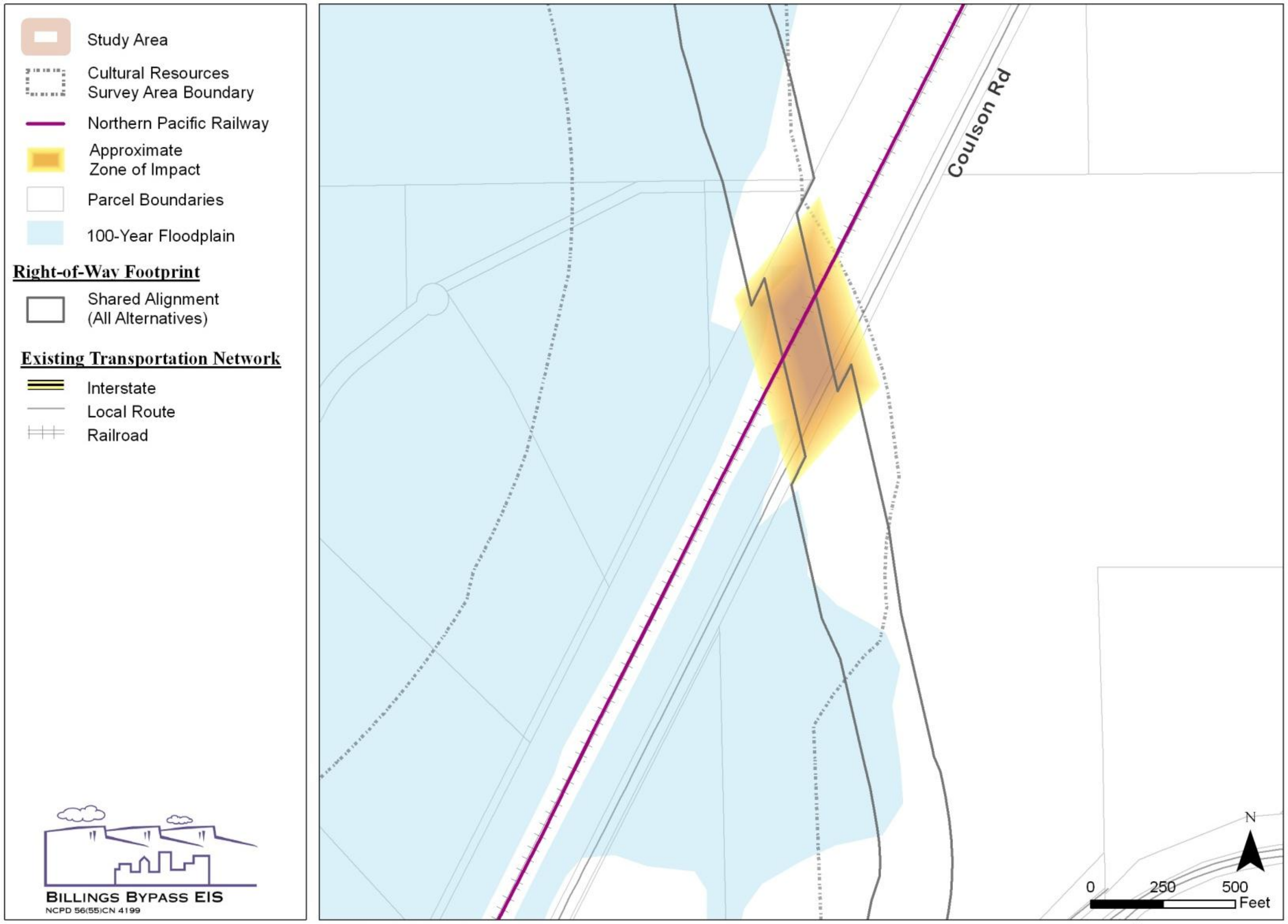
Billings and Central Montana Railroad (Site 24YL1592)

Less than 2,000 feet of the Billings and Central Montana Railroad would be impacted under the Mary Street Option 1 Alternative primary corridor. A crossing of the abandoned railroad grade would be required for the proposed route. Because less than 2,000 feet of the abandoned railroad grade would be impacted by the proposed project, it falls under the terms of the MDT's *Abandoned Historic Railroad Grades Programmatic Agreement*. The Programmatic Agreement includes provisions for the evaluation of abandoned railroad grades in consultation with the SHPO. Therefore, mitigation for this resource would be addressed under the Programmatic Agreement.

Billings Bench Water Association Canal (Site 24YL0161)

The Mary Street Option 1 Alternative primary corridor would include a crossing of the Billings Bench Water Association Canal. There would be no change in the alignment of the ditch or diminution of its function; it would carry the same water capacity as it does now. Impacts would result from construction

Figure 4.25 Northern Pacific Railway Mainline – All Build Alternatives



Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

Date Plotted: 6/22/2012

Figure 4.26 Billings and Central Montana Railroad – Mary Street Option 1 and Mary Street Option 2 Alternatives

Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

Date Plotted: 6/21/2012

Figure 4.27 Billings Bench Water Association Canal – Mary Street Option 1 and Mary Street Option 2 Alternatives

Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

Date Plotted: 6/22/2012

of a new crossing of the ditch and placement of the ditch in a 6-foot-diameter round pipe or a box culvert. The existing ditch alignment would be perpetuated, as would its existing carrying capacity and function. There has been considerable residential development in proximity to the ditch that has already impacted the setting in the vicinity of the proposed crossing. There would be No Adverse Effect to the Billings Bench Water Association Canal. SHPO concurred with this determination on December 15, 2011.

Indirect Impacts – Cultural Resources: Mary Street Option 1 Alternative

Minor indirect impacts of the Mary Street Option 1 Alternative to cultural resources would occur to the extent that the alternative would contribute to continued urbanization of the study area. Increased urbanization and development could result in impacts to cultural resources from site disturbance, destruction, or other similar actions.

Temporary Construction Impacts – Cultural Resources: Mary Street Option 1 Alternative

Impacts of this alternative to cultural resources during construction would likely include impacts from the temporary presence of construction equipment, noise, and dust. Access to cultural resource properties might be affected from lane closures or detours. Temporary construction staging areas and construction limits may extend beyond the vicinity of the ROW in order to accommodate needed materials and equipment. During construction, there could be unanticipated discoveries of archeological resources. Mitigation measures would be incorporated to reduce the possibility of construction-related impacts, as described below.

Cumulative Impacts – Cultural Resources: Mary Street Option 1 Alternative

Past, present, and possible future growth trends have affected, and would continue to affect, development in the study area. The new roadway and other planned roadway improvements may also influence traffic patterns, which could affect future roadway expansion or development, changing land use. Changes to land use and redevelopment often are associated with cultural resource impacts. The proposed subdivisions in the study area could directly affect cultural resources through ground disturbance, and would indirectly result in more people using local roadways, potentially increasing the need for more transportation facilities. These impacts would be combined with the effects to resources (ditches and railways) expected under the Mary Street Option 1 Alternative. As land becomes more valuable for development, farmers are increasingly pressured to sell their land. The improvements to Five Mile Road as a secondary corridor would expedite planned development in the northern portion of the study area, which is primarily agricultural. The increased density in land use could convert the remaining farmsteads into urban and subdivision development, which would continue in accordance with local development plans and be contained in the UPA. Many ditches and farms may be considered eligible for the NRHP, and effects to them may change the overall historic context of the region. Billings and Yellowstone County have policies in place to direct growth and contain it within the UPA, in order to retain the rural nature of the community; therefore, cumulative effects to cultural resources would not be significant.

Mitigation – Cultural Resources: Mary Street Option 1 Alternative

Although no adverse impacts to cultural or historic resources are anticipated with the Mary Street Option 1 Alternative, the following mitigation measures would be implemented during construction under the Mary Street Option 1 Alternative should evidence of historic or pre-historic sites be discovered during construction. In accordance with MDT Standard Specifications 107, the contractor would be required to immediately stop work in the area until the significance of the site is determined and appropriate measures implemented.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to cultural resources as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 1 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.6.2.3 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Cultural Resources: Mary Street Option 2 Alternative

Direct impacts to cultural resources under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Indirect Impacts – Cultural Resources: Mary Street Option 2 Alternative

Indirect impacts to cultural resources under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Cultural Resources: Mary Street Option 2 Alternative

Temporary construction impacts to cultural resources under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Cumulative Impacts – Cultural Resources: Mary Street Option 2 Alternative

Cumulative impacts to cultural resources under this alternative would be the same as those indicated for Mary Street Option 1.

Mitigation – Cultural Resources: Mary Street Option 2 Alternative

Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to cultural resources as well as mitigation for Phase 1 of the Mary Street Option 2 Alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 2 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.6.2.4 FIVE MILE ROAD ALTERNATIVE

Full Buildout

Direct Impacts – Cultural Resources: Five Mile Road Alternative
Direct impacts to cultural resources under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative, with the following exceptions:

Billings Bench Water Association Canal (Site 24YL0161)
The proposed Five Mile Road Alternative would include a crossing of the Billings Bench Water Association Canal near Mary Street. The crossing would consist of a 6-foot-diameter pipe or box culvert. There would be no change in the alignment of the ditch or diminution of its existing function. In addition, approximately 1,650 feet of the Billings Bench Water Association Canal would be realigned to accommodate a proposed new roadway. Although the ditch would be realigned, it would still function as an irrigation facility, and there would be no change in its function or carrying capacity. The realignment would involve the construction of a ditch similar in appearance to what would be destroyed. The proposed realignment would be on the same general tangent as the existing ditch. There would be No Adverse Effect to the Billings Bench Water Association Canal. SHPO concurred with this determination on December 15, 2011.

Indirect Impacts – Cultural Resources: Five Mile Road Alternative
Indirect impacts to cultural resources under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Cultural Resources: Five Mile Road Alternative
Temporary construction impacts to cultural resources under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Cumulative Impacts – Cultural Resources: Five Mile Road Alternative
Cumulative impacts to cultural resources under this alternative would be would be similar to those indicated for the Mary Street Option 1 Alternative. The Five Mile Road Alternative would be a limited access facility, with connections to the existing roadway network limited to Old Hwy 312, Dover Road, and Mary Street. Therefore, this alternative would likely slow the conversion of farmsteads to higher density uses and minimize impacts to historic resources that may be associated with the farms or agricultural use. Billings and Yellowstone County have policies in place to direct growth and contain it within the UPA, in order to retain the rural nature of the community; therefore, cumulative effects to cultural resources would not be significant.

Mitigation – Cultural Resources: Five Mile Road Alternative
Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to cultural resources as well as mitigation for Phase 1 of the Five Mile Road alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

Figure 4.28 Billings and Central Montana Railroad – Five Mile Road Alternative

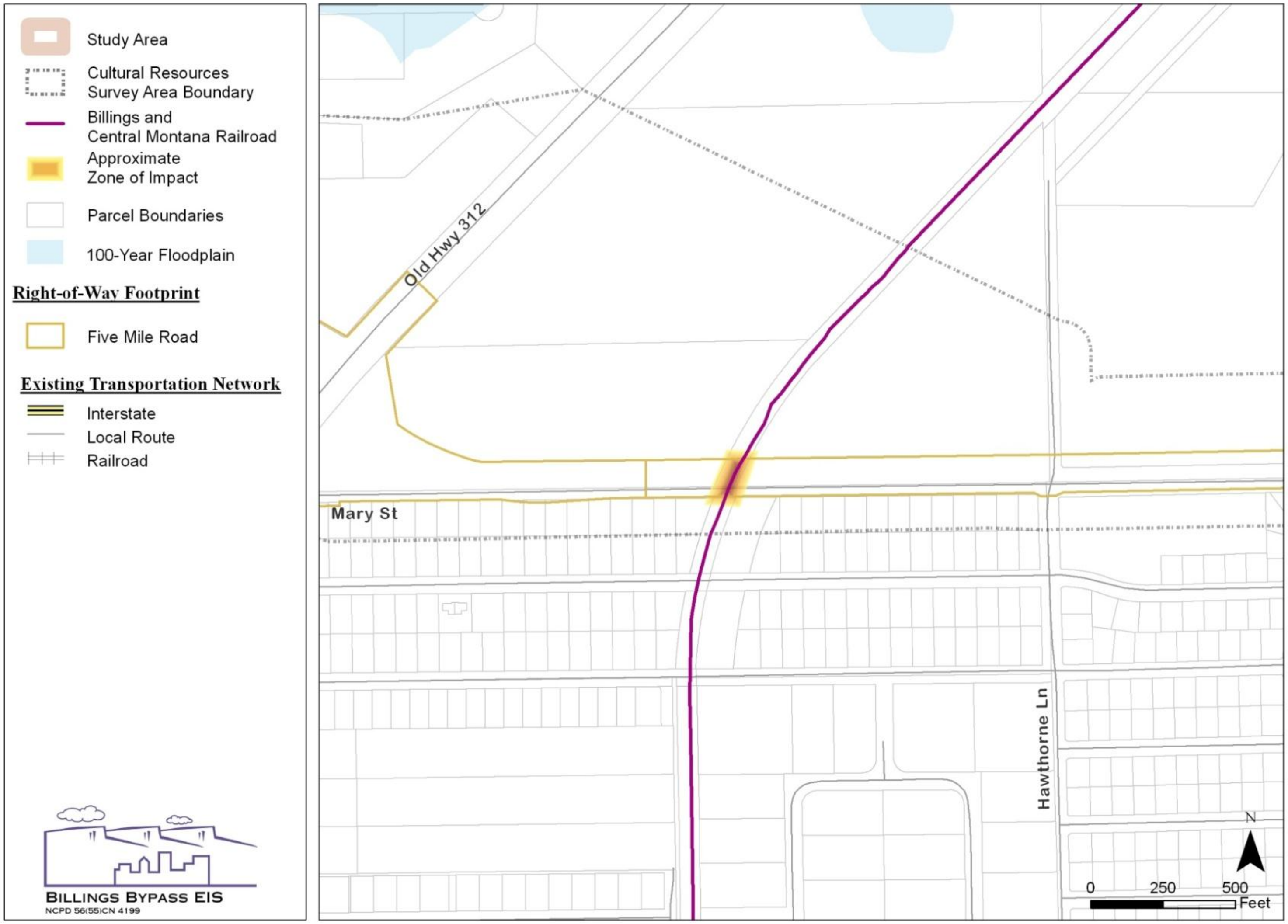
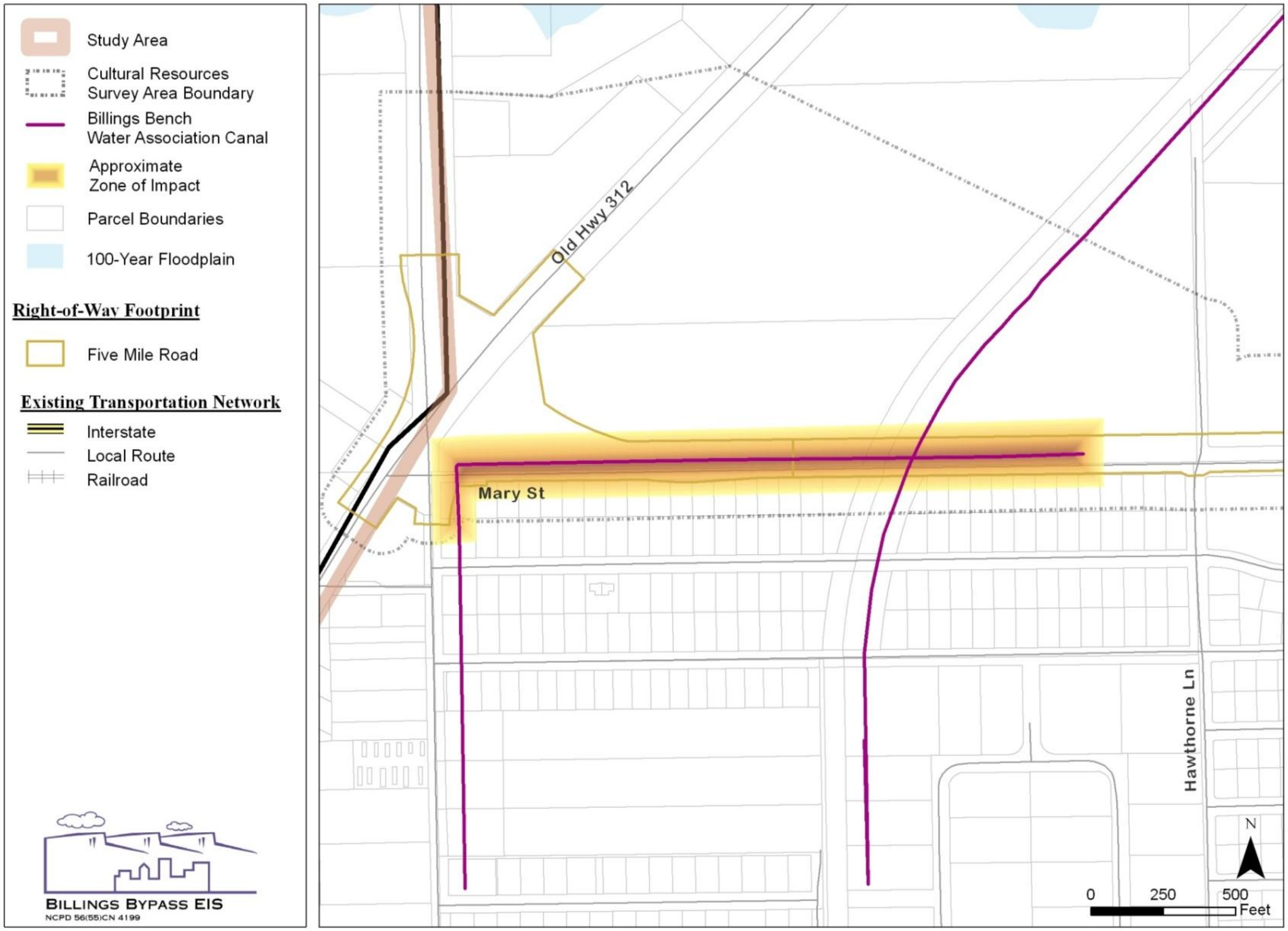


Figure 4.29 Billings Bench Water Association Canal – Five Mile Road Alternative



4.3.6.3 SECTION 4(f): CULTURAL RESOURCES

Section 4(f) refers to the original section within the U.S. Department of Transportation Act of 1966, which requires consideration of certain categories of properties when developing transportation projects. Section 4(f) properties include publicly owned public parks, recreation areas, and wildlife or waterfowl refuges, or any publicly or privately owned historic site listed or eligible for listing on the NRHP. Please refer to Section 4.3.2.3, "Section 4(f) Use," for additional information on Section 4(f) regulations and background.

In August 2005, Section 6009 (a) of the Safe, Accountable, Flexible, Efficient, Transportation Act (SAFETEA-LU) amended existing Section 4(f) legislation to simplify the process and approval of projects that have only "*de minimis*" impacts on lands impacted by Section 4(f). This revision provides that once the USDOT determines that a transportation use of Section 4(f) property, after consideration of any impact avoidance, minimization, and mitigation or enhancement measures, results in a *de minimis* impact on that property, an analysis of avoidance alternatives is not required, and the Section 4(f) evaluation process is complete. *De minimis* impacts on historic resources are defined as those that do not "adversely affect the activities, features and attributes" of the Section 4(f) resource.

4.3.6.3.1 *DE MINIMIS* FOR HISTORIC RESOURCES

Historic sites qualifying for Section 4(f) protection must be officially listed on or eligible for inclusion in the NRHP. The NRHP eligibility is established through the Section 106 process. Section 6009 of SAFETEA-LU amended Title 23 USC Section 138(b)(2), which now states:

> With respect to historic sites, the Secretary may make a finding of *de minimis* impact only if—
>
> (A) the Secretary has determined, in accordance with the consultation process required under Section 106 of the National Historic Preservation Act (16 USC 470f), that—
>
> > (i) the transportation program or project will have no adverse effect on the historic site; or
> >
> > (ii) there would be no historic properties affected by the transportation program or project;
>
> (B) the finding of the Secretary has received written concurrence from the applicable State historic preservation officer or tribal historic preservation officer (and from the Advisory Council on Historic Preservation if the Council is participating in the consultation process); and
>
> (C) the finding of the Secretary has been developed in consultation with the parties consulting as part of the process referred to in subparagraph (A).

Thus, the SAFETEA-LU amendment to the Section 4(f) requirements allows the USDOT to determine that certain uses of Section 4(f) land would have no adverse effect on the protected resource. When this is the case, the use is considered *de minimis*, and compliance with Section 4(f) is simplified. The FHWA may approve a project that results in a *de minimis* impact to a Section 4(f) resource without the evaluation of avoidance alternatives typically required in a Section 4(f) evaluation. A finding of *de minimis* use may be made for historic sites when no historic property is affected by the project or the project would have "no adverse effect" on the historic property in question.

Only historic properties listed in or eligible for listing in the NRHP qualify for protection under Section 4(f). The Section 4(f) properties shown below have been evaluated for *de minimis* determination with respect to the proposed project, and no adverse effect is expected from implementation of the proposed build alternatives. Use of the properties has been evaluated based on current engineering design.

Table 4.20 *De Minimis* Uses of Section 4(f) Historic Resources

ID NO.	RESOURCE	SECTION 4(f) USE		
		ALTERNATIVE		
		MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD
24YL277	Northern Pacific Railway Mainline	• Railroad tracks crossed by grade separation structure. • Two piers located within existing railroad ROW.	Same as Mary Street Option 1 Alternative.	Same as Mary Street Option 1 Alternative.
24YL1592	Billings and Central Montana Railroad	Abandoned railroad grade crossed by proposed route; less than 2,000 feet affected.	Same as Mary Street Option 1 Alternative.	Same as Mary Street Option 1 Alternative.
24YL0161	Billings Bench Water Association Canal	Canal crossed by proposed route with 6-foot-diameter pipes or box culverts.	Same as Mary Street Option 1 Alternative.	Approximately 1,650 feet of canal realigned. Similar canal constructed on same tangent as existing canal.

Source: Ethnoscience 2011.

A preliminary finding of *de minimis* use was made in the DEIS for the Northern Pacific Railway Mainline, Billings and Central Montana Railroad, and Billings Bench Water Association Canal. SHPO concurred on December 15, 2011, that there would be No Adverse Effect to any of the NRHP-eligible properties listed above in **Table 4.20**. FHWA notified SHPO in December 2013 that they intended to classify the use of the properties as *de minimis.*

The *de minimis* impact finding is based on the degree or level of use, including any avoidance, minimization and mitigation, or enhancement measures that are included in the project to address the Section 4(f) use. *De minimis* impact findings must be expressly conditioned upon the implementation of any measures that were relied upon to reduce the use to a *de minimis* level. "*De Minimis* Uses of Section 4(f) Historic Resources," summarizes the effects on the individual historic resources. Additionally, the table lists the type of Section 4(f) use of each resource.

4.3.6.3.2 SECTION 4(f) USE – NORTHERN PACIFIC RAILWAY (NP) MAINLINE

Mary Street Option 1 Alternative

Under the Mary Street Option 1 Alternative, a grade-separated structure is proposed to carry the roadway over the railroad tracks. Two of the structure's bents, or piers, would be located within the existing railroad ROW, but would not encroach on the existing railroad grade. The bents would not impact the function or historic significance of the railroad to Yellowstone County and Montana. The impact would be visual and localized to the setting. However, the setting has already been compromised by adjacent industrial, commercial, and residential development. The proposed grade separation would not detract enough to render the Northern Pacific Railway Mainline ineligible for the NRHP. There would be No Adverse Effect to the Northern Pacific Railway Mainline (Ethnoscience 2011). SHPO concurred with this determination on December 15, 2011.

Mary Street Option 2 Alternative

The Section 4(f) use of Northern Pacific Railway Mainline for the Mary Street Option 2 Alternative would be the same as that for the Mary Street Option 1 Alternative.

Five Mile Road Alternative

The Section 4(f) use of Northern Pacific Railway Mainline for the Five Mile Road Alternative would be the same as that for the Mary Street Option 1 Alternative.

Planning and Measures to Minimize Harm

Mary Street Option 1 Alternative

In its design, the roadway was shifted to locate it outside the railroad ROW. The section of Coulson Road that currently is within the railroad ROW would be removed and reseeded with native vegetation. No change is planned where Johnson Lane crosses the ROW. The overpass that is planned to cross the ROW was designed to cross as perpendicularly as possible, minimizing the area of impact to the railroad ROW, as well as the Yellowstone River floodplain. The overpass was also designed to maintain train clearance requirements and to allow for access and maintenance. The project would encroach only on the north side of the railroad ROW through placement of fill slopes and piers for the side-by-side overpass bridges. The railroad itself would not be realigned or regraded.

Mary Street Option 2 Alternative

The planning and measures to mitigate harm for the Mary Street Option 2 Alternative would be the same as those for the Mary Street Option 1 Alternative.

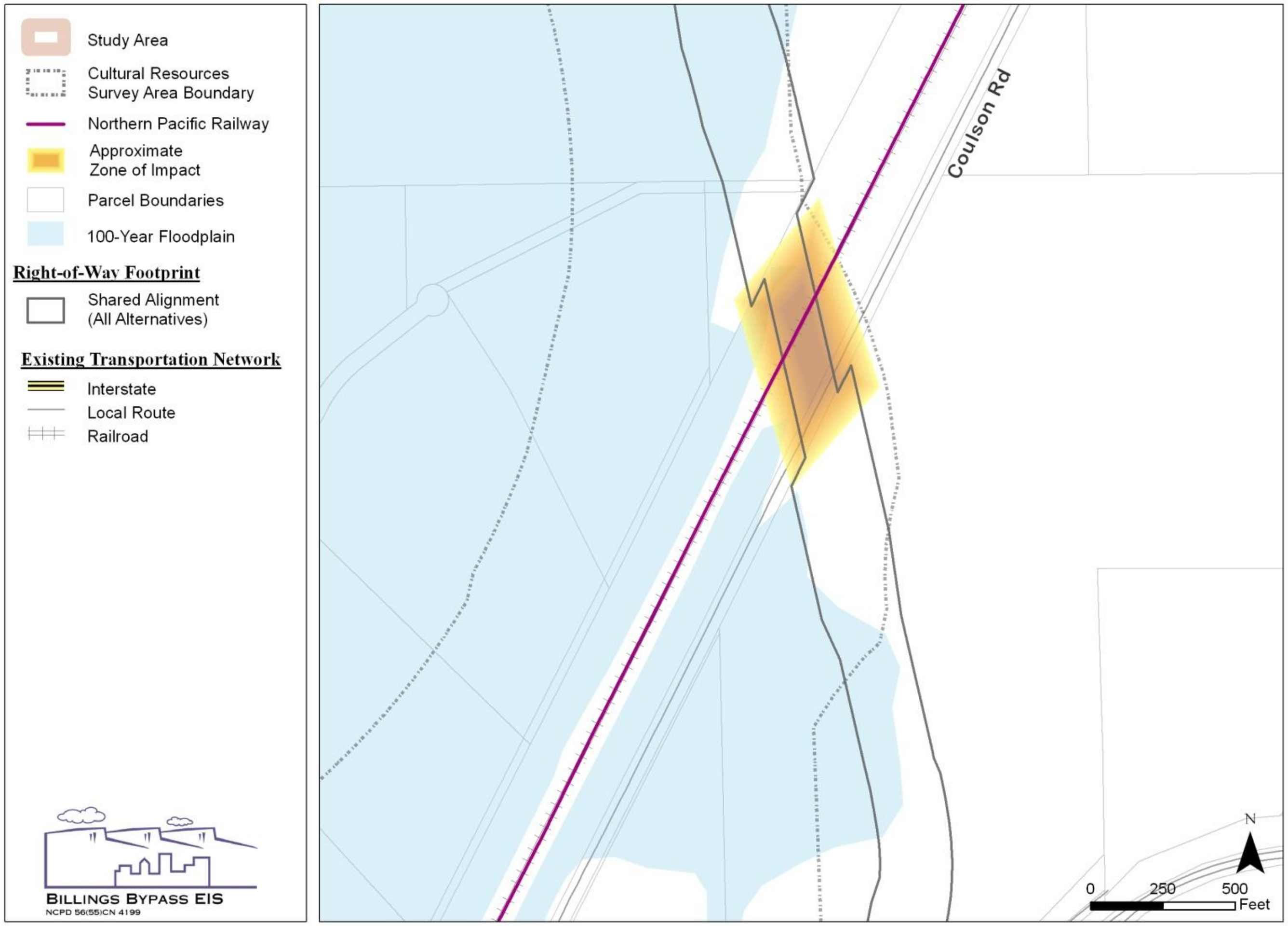
Five Mile Road Alternative

The planning and measures to mitigate harm for the Five Mile Road Alternative would be the same as those for the Mary Street Option 1 Alternative.

Mitigation Measures

No mitigation would be required for any of the build alternatives.

Figure 4.30 Northern Pacific Railway Mainline – All Build Alternatives



Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

Date Plotted: 6/22/2012

4.3.6.3.3 SECTION 4(f) USE – BILLINGS AND CENTRAL MONTANA RAILROAD

Mary Street Option 1 Alternative

Less than 2,000 feet of the Billings and Central Montana Railroad abandoned grade would be impacted under the Mary Street Option 1 Alternative. A crossing of the abandoned railroad grade would be required for the proposed route. Because less than 2,000 feet of the abandoned railroad grade would be impacted by the proposed project, it falls under the terms of the MDT's abandoned historic railroad grades Programmatic Agreement. The Programmatic Agreement includes provisions for the evaluation of abandoned railroad grades in consultation with the SHPO. Therefore, impacts to this resource would be addressed under the Programmatic Agreement (Ethnoscience 2011).

Mary Street Option 2 Alternative

The Section 4(f) use of Billings and Central Montana Railroad for the Mary Street Option 2 Alternative would be the same as that for the Mary Street Option 1 Alternative.

Five Mile Road Alternative

The Section 4(f) use of Billings and Central Montana Railroad for the Five Mile Road Alternative would be the same as that for the Mary Street Option 1 Alternative.

Planning and Measures to Minimize Harm

Mary Street Option 1 Alternative

The proposed roadway would cross the railroad grade, which is now a bike path and walkway, in two locations at the west end of Mary Street. Design options that have been identified to reduce impacts to the railroad grade include raising or lowering the roadway or the trail, or both.

Mary Street Option 2 Alternative

The planning and measures to mitigate harm for the Mary Street Option 2 Alternative would be the same as those for the Mary Street Option 1 Alternative.

Five Mile Road Alternative

The planning and measures to mitigate harm for the Five Mile Road Alternative would be the same as those for the Mary Street Option 1 Alternative.

Mitigation Measures

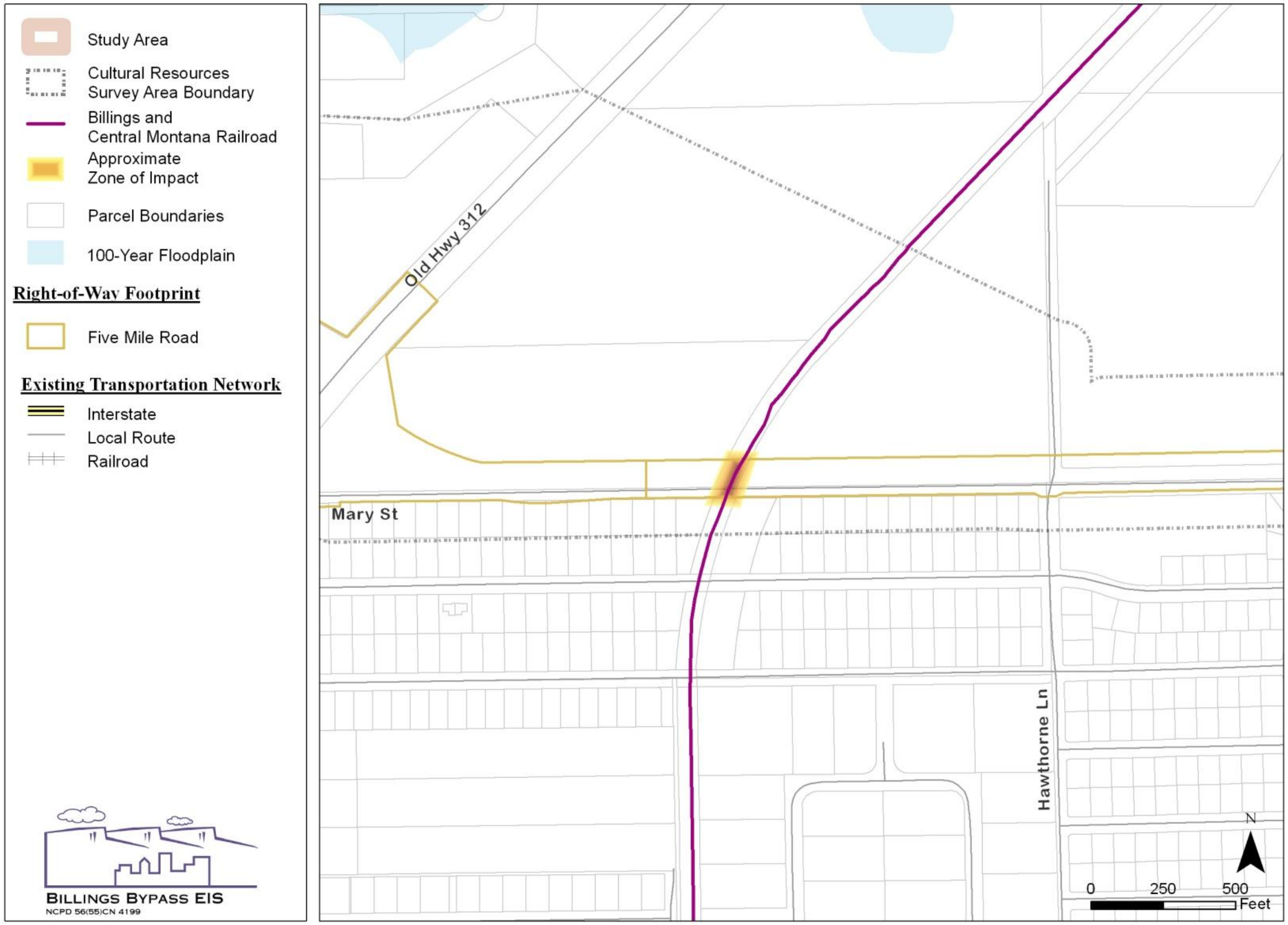
No mitigation would be required for any of the build alternatives.

Figure 4.31 Billings and Central Montana Railroad – Mary Street Option 1 and Mary Street Option 2 Alternatives

Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

Date Plotted: 6/21/2012

Figure 4.32 Billings and Central Montana Railroad – Five Mile Road Alternative



Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

Date Plotted: 6/21/2012

4.3.6.3.4 SECTION 4(f) USE – BILLINGS BENCH WATER ASSOCIATION CANAL

Mary Street Option 1 Alternative

The Mary Street Option 1 Alternative primary corridor would include crossings of the Billings Bench Water Association Canal. The crossings would consist of either 6-foot-diameter pipes or box culverts. There would be no change in the alignment of the ditch or diminution of its function; it would carry the same water capacity as it does now.

Impacts would consist of the construction of a new crossing of the ditch and placement of the ditch in a 6-foot-diameter round pipe or a box culvert. The existing ditch alignment would be perpetuated, as would its existing carrying capacity and function. There has been considerable residential development in proximity to the ditch that has already impacted the setting in the vicinity of the proposed crossing. There would be No Adverse Effect to the Billings Bench Water Association Canal. SHPO concurred with this determination on December 15, 2011.

Mary Street Option 2 Alternative

The Section 4(f) use of Billings Bench Water Association Canal for the Mary Street Option 2 Alternative would be the same as that for the Mary Street Option 1 Alternative.

Five Mile Road Alternative

The Five Mile Road Alternative secondary corridor would include a crossing of the Billings Bench Water Association Canal near Mary Street. The crossing would consist of a 6-foot-diameter pipe or box culvert. There would be no change in the alignment of the ditch or diminution of its existing function.

For the Five Mile Road Alternative, approximately 1,650 feet of the Billings Bench Water Association Canal would be realigned to accommodate a proposed new roadway. Although the ditch would be realigned, it would still function as an irrigation facility, and there would be no change in its function or carrying capacity. The realignment would involve the construction of a ditch similar in appearance to what would be destroyed. The proposed realignment would be on the same general tangent as the existing ditch. None of the NRHP Criteria of Adverse Effect would apply.

Planning and Measures to Minimize Harm

Mary Street Option 1 Alternative

The canal is currently crossed by Mary Street near its intersection with Old Hwy 312 and Main Street. The proposed roadway design for the primary corridor crosses the canal at the same location, but as perpendicularly as possible to minimize the area of impact. The design avoids the ditch as much as possible in order to maintain its integrity.

Mary Street Option 2 Alternative

The planning and measures to mitigate harm for the Mary Street Option 2 Alternative would be the same as those for the Mary Street Option 1 Alternative.

Five Mile Road Alternative

Mary Street currently crosses the canal near its intersection with Old Hwy 312 and Main Street. The proposed Five Mile Road Alternative secondary corridor crosses the canal at the same location, but as perpendicularly as possible to minimize the area of impact. In addition, the canal would be relocated and shifted to the north and would parallel Mary Street. The relocated ditch would maintain the integrity of the original as much as possible.

Mitigation Measures

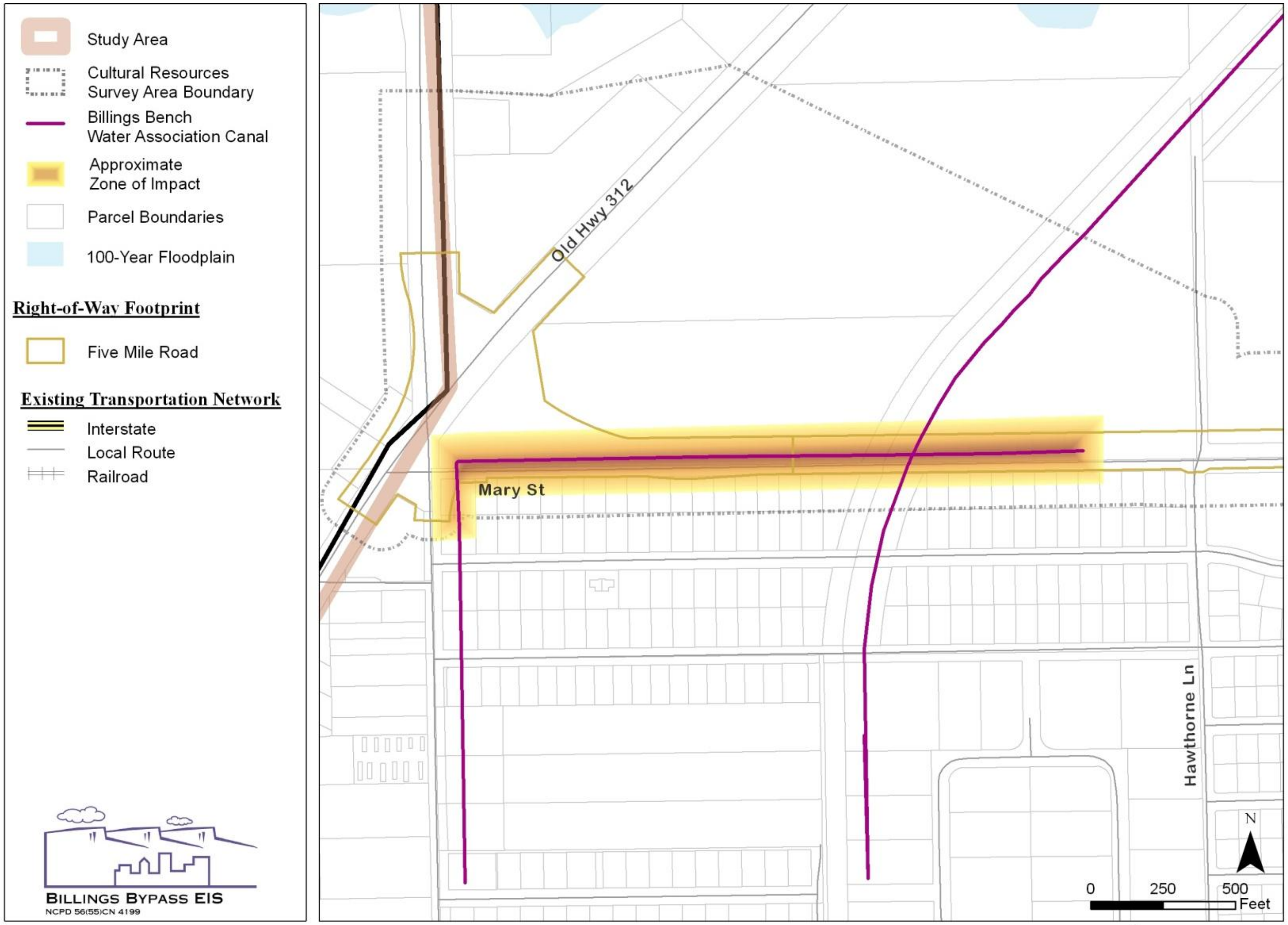
- No mitigation would be required for any of the build alternatives.

Figure 4.33 Billings Bench Water Association Canal – Mary Street Option 1 and Mary Street Option 2 Alternatives

Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

Date Plotted: 6/22/2012

Figure 4.34 Billings Bench Water Association Canal – Five Mile Road Alternative



Sources: DOWL/HKM December 2011, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Ethnoscience, November 2011

Date Plotted: 6/22/2012

4.3.7 VISUAL RESOURCES

4.3.7.1 REGULATORY CONTEXT

FHWA mandates evaluations of visual effects through the National Environmental Policy Act (NEPA) process during project development. Requirements for visual quality protection in association with roadway systems and other transportation facilities are also contained in specific federal programs:

- Transportation Equity Act for the 21st Century (1998).
- Safe, Accountable, Flexible and Efficient Transportation Equity Act of 2003.
- Highway Beautification Act of 1965.
- Historic Preservation Act of 1966.
- U.S. Department of Transportation Act, Section 4(f) (1966).

4.3.7.2 METHODOLOGY

Visual quality analyses were conducted in accordance with the U.S. Department of Transportation, *FHWA Visual Impact Assessment for Highway Projects* (FHWA 1988). The FHWA methodology uses a qualitative and quantitative approach to analyze existing and post-construction views of the project area. Key Observation Points (KOPs) were selected to represent views *from* the project area and *toward* the project area, as described in Section 3.3.7. The KOPs correspond to landscape units (LUs), which are "outdoor rooms" that are delineated by geographic location and distinct landscape character (FHWA 1998a) (see Section 3.3.7).

Figure 4.35, below, is a line-of-sight topographic map that was used to help select KOPs. The figure depicts the number of KOPs that could be viewed from locations within the study area, not accounting for vegetation or distance. This helps assess the extent of the overall changes throughout the study area to which viewers may be exposed. The figure indicates that more KOPs would be seen by viewers on higher topography, such as along I-94 north of its intersection with I-90, and along Old Hwy 312 north of Five Mile Creek. Residents along Mary Street and Five Mile Road, where the topography is more flat, would be exposed to fewer KOPs.

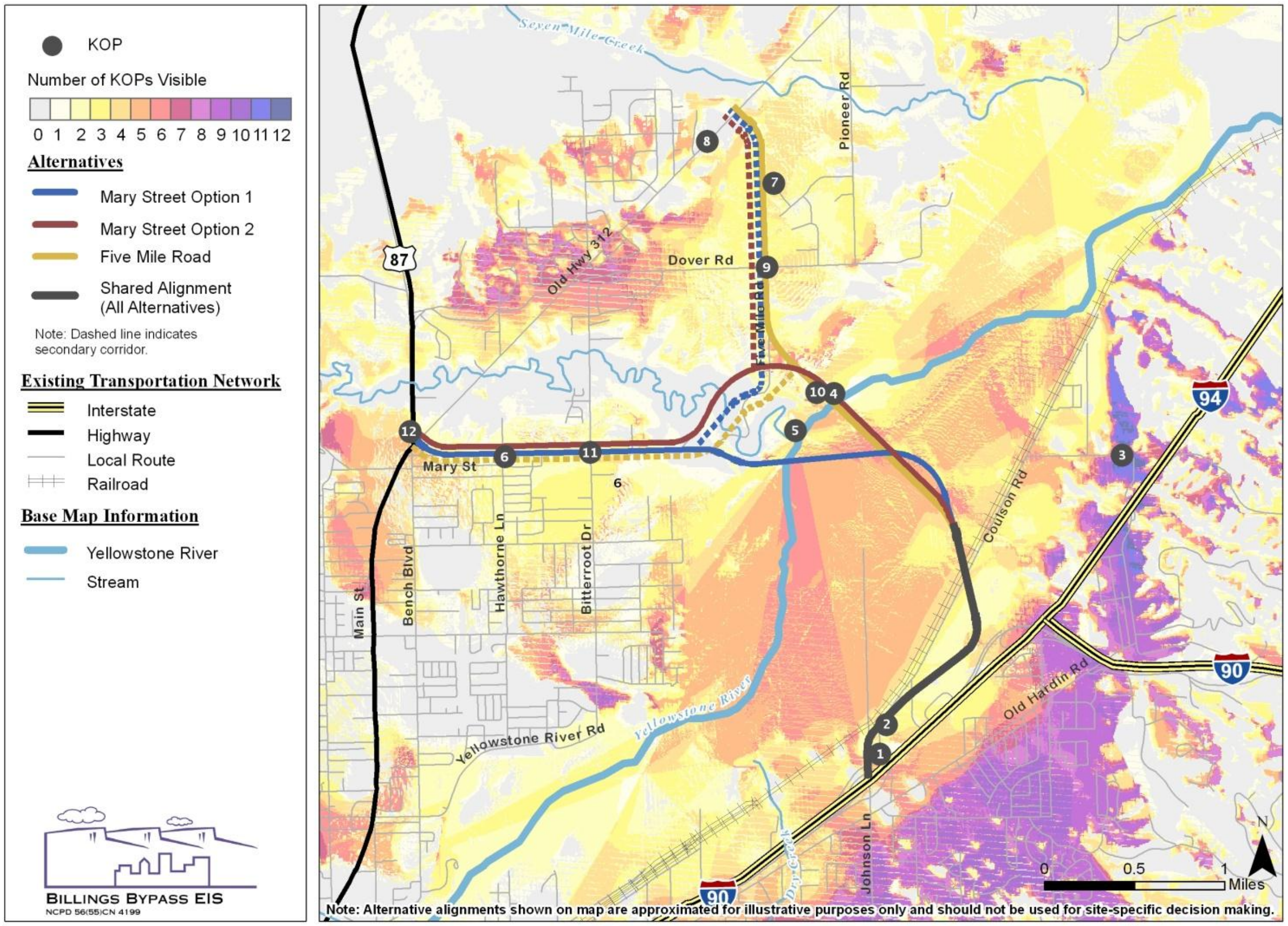
Visual quality is assessed by three components, as discussed in **Table 4.21** Visual Quality Rating Scale: vividness, intactness, and unity, none of which alone is equivalent to total visual quality. All three must be high to indicate high visual quality.

- Vividness: Vividness is the memorability of the visual impression received from the contrasting landscape elements as they combine to form a striking and distinctive visual pattern.

- Intactness: Intactness is the integrity of visual order in the natural and built landscape, and the extent to which the landscape is free from visual encroachment.

- Unity: Unity is the degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony or the inter-compatibility between landscape elements.

Figure 4.35 Number of Key Observation Points Visible in Study Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 6/18/2012

The existing conditions and the post-construction conditions for each KOP were described and evaluated based on the anticipated changes in vividness, intactness, and unity. If necessary, a visual simulation of the post-construction condition was created to demonstrate the anticipated changes for a KOP; not all KOPs were simulated. Evaluations based on the three components have proven to be good predictors of the visual quality using the following equation (FHWA 1998a):

$$\text{Visual Quality} = \frac{\text{Vividness} + \text{Intactness} + \text{Unity}}{3}$$

Table 4.21 Visual Quality Rating Scale

COMPONENT	VERY HIGH	AVERAGE	VERY LOW
Vividness	• Highly memorable; contrasting landscape elements combine to form distinctive visual patterns. • Strongly defined landscape or landforms, i.e., mountains, large bodies of water. • Distinctive patterns, colors, and textures of vegetation or memorable built structures.	• Moderately memorable, some distinctive patterns. • Moderately defined landscape or landforms, i.e., low rolling hills and smaller water bodies. • Vegetation patterns, colors, and textures are less visible. Some memorable built structures.	• Low memorability. Little visual pattern; landscape elements do not form striking and distinctive pattern. • Homogeneous landforms or landscapes and small bodies of water. • Unnoticeable vegetation patterns, colors, textures; built structures are not memorable.
Intactness	• High visual integrity between natural and built landscape, free from visual encroachment. • Natural areas and built landscapes blend into surrounding character and create no visual discontinuity. • Natural and built patterns are not disturbed and maintain visual order.	• Average visual integrity between natural and built landscape. • Some visual encroachment present and lacks visual order. • Some disruption of natural and built patterns.	• Low visual integrity between natural and built landscape. • Visual encroachment very apparent. • Disrupted patterns; integrity of natural visual order is lost.
Unity	• Landscape elements join to form highly coherent, harmonious visual pattern. • Built and natural elements blend together.	• Landscape elements join to form a moderately coherent, harmonious visual pattern. • Built elements blend with natural elements, but visual order is disrupted.	• Landscape elements do not join to form a coherent, harmonious visual pattern. • Built elements have no visual relationship to natural landforms or patterns; no visual order.

Source: FHWA 1998a.

The table below provides the ranges for total visual quality ratings based on FHWA guidance (FHWA 1988).

Table 4.22 Guidance for Rating Visual Quality Criteria

VIVIDNESS, UNITY, INTACTNESS	DEVELOPED LAND USES	ENCROACHMENTS, UNDESIRABLE ELEMENTS
Very High: 5.7-7	None	None
High: 4.7-5.6	Little	Few
Moderately High: 3.7-4.6	Some	Some
Average: 2.7-3.6	Average	Average
Moderately Low: 1.9-2.6	Moderately High	Several
Low: 1.0-1.8	High	Many
Very Low: 0.0-0.9	Very High	Very Many

4.3.7.3 RESULTS

No impacts to visual resources are expected within or adjacent to the study area from the No Build Alternative. An increase in visual quality is expected under all build alternatives at KOP 2 near Firth Street and Johnson Lane. Elsewhere, visual quality would decrease under the build alternatives, in many cases only slightly. In general, the negative visual quality effects expected under the build alternatives would not be a substantial change from existing conditions. The highest degree of visual quality decrease is expected as follows:

- Under the Mary Street Option 2 and Five Mile Road alternatives at KOPs 4 and 5, where the proposed side-by-side bridges would cross the Yellowstone River due to introduction of a new element.
- Under the Mary Street Option 1 and Five Mile Road alternatives at KOP 7, where the proposed actions would introduce a new roadway facility in view of a subdivision and businesses.
- Under all build alternatives at KOP 8, at the proposed intersection with Old Hwy 312, because the alternatives introduce a new element.

Views toward the road from residences or businesses that now overlook rolling agricultural fields would include the new roadway (e.g., KOP 7), and views by visitors of the Yellowstone River Parks Association (YRPA) proposed John H. Dover Memorial Park would include new side-by-side bridges where none previously existed (KOPs 4 and 5). For these viewers, the project could have some unavoidable negative impacts to visual quality. However, the park has not been developed, so primary viewers do not yet exist. If the bridge(s) were built before the park, then their presence in the view would represent baseline conditions. In that case, there would be no visual change from existing conditions for primary viewers, resulting in minimal impacts.

The following table provides a summary of visual quality impacts.

Table 4.23 Direct and Indirect Impacts Summary – Visual Resources

ALTERNATIVE	DIRECT IMPACTS	INDIRECT IMPACTS
NO BUILD ALTERNATIVE		
	• None.	• None.
MARY STREET OPTION 1 ALTERNATIVE		
	• Increase in visual quality toward the road at the north end of Firth St near Johnson Ln. • Primarily slight decreases in visual quality overall. • Larger decrease in visual quality for viewers toward the road at residential subdivision north of Dover Rd and east of Pioneer Rd. • Larger decrease in visual quality for viewers toward the road at intersection of Five Mile Rd extension with Old Hwy 312.	• Traffic increase on some connecting nearby transportation facilities, with potential effects to views toward these routes. • Commercial/industrial uses may locate along or in vicinity of new roadways, with impacts to visual quality.
MARY STREET OPTION 2 ALTERNATIVE		
	Same as Mary Street Option 1 Alternative, except: • Substantial decrease in visual quality for viewers toward the road of the Yellowstone River bridge crossing, although views would remain moderately high. Viewers would be recreationists at the proposed park. • If the bridges were built before the park, there would be no visual change from existing conditions.	• Same as Mary Street Option 1 Alternative.
FIVE MILE ROAD ALTERNATIVE		
	Same as Mary Street Option 2 Alternative, except: • Slightly more decrease in visual quality toward the road at residential subdivision north of Dover Rd and east of Pioneer Rd.	• Projected growth may be slower, resulting in fewer visual impacts associated with conversion of land use.

4.3.7.3.1 NO BUILD ALTERNATIVE

Direct Impacts – Visual Resources: No Build Alternative

No direct impacts to visual resources are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Visual Resources: No Build Alternative

No indirect impacts to visual resources are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Visual Resources: No Build Alternative

No temporary construction impacts to visual resources are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Visual Resources: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.3.7.3.2 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Visual Resources: Mary Street Option 1 Alternative

Views Toward the Road

This section describes each KOP for viewers *toward* the road that could be affected by the Mary Street Option 1 Alternative. These KOPs were used to identify viewsheds that the proposed project could affect viewers when looking toward the road. The KOPs shown below represent a snapshot in time at one specific location. The visual quality of these KOPs was quantified based on FHWA's three visual quality component criteria — vividness, intactness, and unity.

KOP 1: North of Intersection of Johnson Lane and I-90/94 Corridor (LU1)

Figure 4.36 KOP 1 – Existing

This KOP was selected based on changes to the proposed Johnson Lane Interchange. Changes at the interchange have the potential to substantially alter the viewshed, and the various options for the interchange and their effects are discussed below. KOP 1 is located at the approximate south end of Firth Street looking southwest. Firth Street is in the foreground and to the left; it connects to the North Frontage Road, which parallels the highway. Local traffic would use these roads. I-90 comprises the horizon line; a few trees extend above it in the distance. The existing I-90 overpass over Johnson Lane is in the approximate center of the photograph. Viewers *toward* the road would be primarily residents of and near the Firth Street subdivision.

The current view includes telephone poles and lines, roads, and the interstate on the horizon line. Few trees exist. Vividness is low because the memorability of the visual impression is low due to an absence of contrasting landscape elements. Intactness is average, because the view includes several utility poles that encroach upon the view. Unity is moderately low, because the landscape elements demonstrate a low degree of visual harmony. The existing visual quality is rated as 2.1, moderately low.

Johnson Lane Option 1: Roundabouts

Under the Johnson Lane Option 1: Roundabouts, both roundabouts, north of the interstate, would be visible to the right of the photo. The northernmost roundabout would exist where the foreground trees are shown to the right of the photo, and these trees would likely be removed. The southernmost roundabout would be visible near the existing overpass. New interchange structures would replace the overpass, which would be shifted farther to the left in the photo above. On-/off-ramps would connect to the southernmost roundabout from the highway, which would be visible between the frontage road and the highway.

The change at this location would not be very great compared to existing conditions. Because Firth Street slopes downward away from the interstate, the angle of view in KOP 1 is slightly upward. Therefore, the new roundabouts would be on the same plane as the frontage road, which is only slightly visible, into which Firth Street connects. Realigning Johnson Lane below the overpass would result in a slightly noticeable change. The new on-/off-ramps would parallel the existing horizontal roadways (I-90 and North Frontage Road), minimizing disruptions to intactness and unity. Vividness is already low at this location and would remain so. Intactness would decrease to moderately low from the encroachment of the roundabouts. Unity would remain moderately low. Visual quality under Johnson Lane Option 1: Roundabouts is rated at 1.8, low.

Residents would be the primary viewers at this location. Residents would experience a slight impact due to the decrease in overall visual quality.

Johnson Lane Option 2: Single-Point Urban Interchange

Under the Johnson Lane Option 2: Single-Point Urban Interchange, Johnson Lane and the North Frontage Road would connect at a signalized intersection. New interchange structures would replace the existing interstate overpass, and Johnson Lane would be widened and slightly realigned at the overpass into a curve. On-/off-ramps from the interstate would connect to the traffic signal below the interstate structures. The ramps would be visible, but the signal may be obscured by the structures.

Few of these changes would be visible from KOP 1. Because the highway would be shifted to the south, it would be more distant at this KOP, reducing its scale and presence in the view. The signalized intersection at the North Frontage Road would be located beyond the trees in the right of the photo, and these trees would likely remain in place. If the trees were removed, the signalized intersection would be only minimally visible from this KOP. Widening and realigning Johnson Lane below the overpass would result in a slightly noticeable change. The new on-/off-ramps would parallel the existing horizontal roadways (I-90 and North Frontage Road), minimizing disruptions to intactness and unity. Changes to vividness, intactness, and unity would be similar to Johnson Lane Option 1. Visual quality under Option 2 is rated at 1.8, low.

The primary viewer groups would be the same as for Johnson Lane Option 1, with similar impacts.

Johnson Lane Option 3: Urban Interchange with Roundabouts

Under the Johnson Lane Option 3: Urban Interchange with Roundabouts, one roundabout would be visible where Johnson Lane and North Frontage Road connect. As with Option 1, the trees to the right of the photo would likely be removed. Substantial changes to the I-90 overpass would occur at this location, because an additional large roundabout would be constructed below the interstate. On-/off-ramps would connect to the central roundabout from the interstate, which would be visible between the North Frontage Road and the interstate.

The result would be a wider opening under the interstate, which would be more visible to the left of the photo. The new on-/off-ramps would parallel the existing horizontal roadways (I-90 and North Frontage Road), minimizing disruptions to intactness and unity. Changes to vividness, intactness, and unity would be similar to Johnson Lane Option 1. Visual quality under Johnson Lane Option 3 is rated at 1.8, low.

The primary viewer groups would be the same as for Johnson Lane Option 1, with similar impacts.

Johnson Lane Option 4: Diverging Diamond

Under the Johnson Lane Option 4: Diverging Diamond, I-90 would be shifted to the south. Johnson Lane would not be realigned under the highway, but it would be widened. A traffic signal would be constructed at the intersection of Johnson Lane and North Frontage Road. On-/off-ramps from the interstate would connect to a signalized intersection at Johnson Lane. New overpass structures would be built to replace the existing overpass structures.

Because the highway would be shifted to the south, it would be more distant, reducing its scale and presence in the view. Widening Johnson Lane would have minimal, if any, effect at this location, because it currently is not visible in the photo. The signalized intersection at the North Frontage Road would be located beyond the trees in the right of the photo, and these trees would likely remain in place. If the trees were removed, the signalized intersection would be only minimally visible from this KOP. The new on-/off-ramps would parallel the existing horizontal roadways (I-90 and North Frontage Road), minimizing disruptions to intactness and unity. Changes to vividness, intactness, and unity would be similar to Johnson Lane Option 1. Visual quality under Option 4 is rated at 1.8, low.

The primary viewer groups would be the same as for Johnson Lane Option 1, with similar impacts.

Johnson Lane Option 5: Diverging Diamond with Roundabouts

As for Johnson Lane Options 1 and 4, under Johnson Lane Option 5, I-90 would be shifted to the south. Option 5 would be very similar to Option 4, with the exception of the signalized intersection at the North Frontage Road being replaced by a roundabout, similar to Options 1 and 3 (for purposes of analyzing this KOP).

The change from this location would not be substantially different from existing conditions. Because the highway would be shifted to the south, it would be more distant at this KOP, reducing its scale and presence in the view. Widening Johnson Lane would have minimal, if any, effect at this specific location, because it currently is not visible in the photo. The new roundabout would be on the same plane as North Frontage Road, which is only slightly visible, into which Firth Street connects. The new on-/off-ramps would parallel the existing horizontal roadways (I-90 and North Frontage Road), minimizing disruptions to intactness and unity. Changes to vividness, intactness, and unity would be similar to Johnson Lane Option 1. Visual quality under Johnson Lane Option 5 is rated at 1.8, low.

The primary viewer groups would be the same as for Johnson Lane Option 1, with similar impacts.

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KOP 2: Firth Street South of Coulson Road (LU1)

Figure 4.37 KOP 2 – Existing

KOP 2 was selected based on changes at the north end of this small residential subdivision on Firth Street. KOP 2 is located near the east edge of Firth Street, where Johnson Lane would curve northeast along Coulson Road through residential parcels. The view is looking north/northwest. Viewers *toward* the road would be primarily residents of and near the Firth Street subdivision.

The current view includes telephone poles and lines, a road and driveway, a small residence, and several motor vehicles. Some large trees exist. Vividness is low, because the landscape elements do not combine to form a striking pattern. Intactness is low, because the view includes several built elements that visually dominate the view. Although natural elements are included (the mature trees), unity is low because there is no harmony between the built and natural elements, and no coherent visual pattern. The existing visual quality is 1.8, low.

Figure 4.38 KOP 2 – Proposed

The residence and vegetation at the KOP 2 site shown in **Figure 4.37** would be removed. Vividness would remain low due to an absence of contrasting landscape elements, particularly the mature trees that would be removed; the view is not considered "memorable." Removal of the structures and vehicles would improve intactness, because the landscape would have fewer visually encroaching features. Although the alignment represents a built structure, it would parallel the horizon line, railroad, and horizontal row of trees and structures that comprise the horizon line. The result would be a more coherent, harmonious visual pattern. Unity between the human-made and natural pattern elements would improve, because these patterns reinforce each other. Visual quality for the Mary Street Option 1 Alternative for KOP 2 would increase to 3.0, average.

Residents would be the primary viewers at this location and would experience a slight benefit due to the increase in overall visual quality.

KOP 3: Coulson Road West of Intersection with Dickie Road (LU1)

Figure 4.39 KOP 3 – Existing

KOP 3 was selected based on where Johnson Lane would be raised over the railroad track. The photo is taken looking primarily west from a residential driveway at the east end of Coulson Road (3925 Coulson Road) where it meets Dickie Road. (Coulson Road travels northeast from Johnson Lane, paralleling the railroad approximately 2.5 miles to the road's termination. However, at approximately mile 2.0, this road is intersected by another road also named Coulson Road, which travels directly east to Dickie Road. To differentiate between the two, the former is referred to here as the north/south Coulson Road, and the latter as the east/west Coulson Road.) Viewers *toward* the road would be primarily residents in this area and local traffic on Coulson Road. The east/west Coulson Road is the dominant feature in this view, and provides a line for the eye to follow toward the horizon. A few residences exist to the right in the middle ground, but the rest of the view is composed primarily of cropland to the south (left) and a horizontal row of trees in the center. The view is moderately intact due to few visual encroachments. Unity is moderately high because the visual resources form a fairly coherent, harmonious visual pattern between the built and natural elements. The existing visual quality is 3.7, moderately high.

With the project (the proposed conditions), Johnson Lane would be raised over the railroad tracks that roughly parallel the north/south Coulson Road. Neither the railroad nor the north/south Coulson Road would be visible behind the vegetation. As shown in the "Existing" photo, neither the railroad nor the north/south Coulson Road are currently visible behind the vegetation (they are just beyond Coulson Road as shown in the photo). The raised structure may be visible above the horizontal row of trees in the center and the houses to the right. Vividness would not likely change, because the change in form and line would not make the view more memorable or striking. Intactness would be slightly reduced due to the addition of another structure, particularly one that would rise above and encroach upon the other landscape elements. Unity would also be slightly reduced, because the new structure would detract from the existing unity formed by the horizontal lines of the built and natural patterns. Visual quality would decrease to 3.3, average.

Residents and local traffic would be the primary viewers *toward* the road and would be most affected as they approach the overpass along east/west Coulson Road to their homes.

KOP 4: Proposed South Bridge Crossing of the Yellowstone River on the Western River Bank (LU2)

Figure 4.40 KOP 4 – Existing

KOP 4 was selected based on the proposed new south side-by-side bridge structures crossing the Yellowstone River. The view is looking south from the river's west bank. Viewers *toward* the road would be primarily park visitors who may use the river and the proposed park at this location.

This view is composed of water, various types of vegetation, and sandstone cliffs. The river is a vivid landscape component because of the edge created by the shoreline, as well as the color and reflectivity of the water. The vegetation provides pattern elements of texture and color, which would change seasonally. Few structures are visible. The fence in the foreground conforms with the line formed by the shoreline. Vividness is therefore moderately high, because the landscape components combine in striking, distinctive, and memorable visual patterns. Intactness is very high, because few elements visually encroach into the view. The visual resources join together to form a coherent, harmonious visual pattern, resulting in a high level of unity. The existing visual quality is 5.4, high.

Figure 4.41 KOP 4 – Proposed

The proposed south bridge crossing the Yellowstone River would add a contrasting landscape component that would increase the distinctiveness of the view, making it more memorable. Vividness would be very high. Although the side-by-side bridges represent both an encroachment and increased development, the addition of the structure is not overwhelming given its distance and profile—it does not visually dominate the view. The horizontal line created by the structure parallels the natural horizon line, and the vertical supports are compatible in scale and direction with the trees that flank the shoreline, integrating the view's visual patterns and order. Therefore, visual intactness would be reduced to moderately high. Unity is moderately high for similar reasons. The lines and forms in the structure visually relate to those of the natural elements. The human-made and natural patterns reinforce each other from this view. Visual quality would be reduced to 4.8, but would remain high.

Primary viewers would be recreationists in the proposed park, who may interpret the change as positive or negative, depending on their personal perspectives about structures in general. Some may view the bridge as an aesthetically pleasing addition to the landscape; some may see it as an encroachment. However, the park has not been developed, so primary viewers do not yet exist. If the bridge were built before the park, then the presence of the bridge in the view would represent baseline conditions. In that case, there would be no visual change from existing conditions for primary viewers.

KOP 6: Intersection of Mary Street and Hawthorne Lane (LU3)

Figure 4.42 KOP 6 – Existing

KOP 6, located in the parking lot of the Heights Family Worship Center, was specifically selected to capture the proposed changes at this intersection. The view is looking northwest. Viewers *toward* the road would be primarily residents, church visitors, and motorists along Mary Street.

This view is composed of built elements, most noticeably Mary Street and Hawthorne Lane, and telephone poles. Vegetation in the form of cropland or vacant land appears in the middle ground, with a row of tall, deciduous trees creating an undulating but predominantly level horizon line. Although these elements provide contrast, the scale and visual patterns of form and line are not striking or distinctive. The view rates low in memorability. Therefore, vividness is moderately low. The general horizontal lines created by Mary Street, the sidewalk, and the row of trees in the background are disrupted by the vertical encroachments of the telephone poles and stop/street sign, which decrease intactness. Existing visual quality is 3.1, average.

Figure 4.43 KOP 6 – Proposed, Mary Street Option 1 Alternative – Primary Corridor Improvements

Mary Street would not change; it would remain as a local access road for residents. A new principal arterial would be constructed to the north, paralleling Mary Street, including two 12-foot-wide travel lanes, paved shoulders, and drainage channels and small side slopes on the north side of Mary Street. Vividness would not change. Intactness would decrease due to the visual encroachment of a new facility into the cropland. Unity would decrease slightly. However, the new roadway would be similar in form and line to the existing road (Mary Street). Visual quality would slightly decrease to 2.8, but would remain average.

KOP 7: Subdivision North of Dover Road, East of Pioneer Road (LU3)

Figure 4.44 KOP 7 – Existing

KOP 7 was selected to demonstrate the difference between the primary corridor improvements proposed under the Five Mile Road Alternative and the secondary corridor improvements proposed under the Mary Street Options 1 and 2 alternatives. All three would include a new roadway along the western boundary of this subdivision located north of Dover Road, east of Pioneer Road. This KOP is located at the Atkins property, 3576 Summerfield, looking west. Viewers *toward* the road would be residents who live in this subdivision.

Grass in the foreground comprises the majority of this view. Large, deciduous trees to the left indicate the presence of an irrigation canal. The colors and texture of the vegetation provide slight contrasting pattern elements against the sky; however, vividness is low. Intactness is moderately high, with the only intrusion being the chain link fence. Unity is average. The existing visual quality is 3.8, moderately high.

Figure 4.45 KOP 7 – Proposed, Mary Street Option 1 Alternative – Secondary Corridor Improvements

The secondary corridor improvements associated with the Mary Street Option 1 Alternative would have two travel lanes and paved shoulders with drainage and side slopes. These improvements would introduce a new horizontal element that parallels the existing horizon line and property lines. Vividness would be reduced due to removal of mature trees. Intactness would decrease due to the encroachment of a new human-made facility into the view of the cropland. Residential viewers would be primarily affected, particularly those whose property is directly adjacent to the roadway. These residents would have continuous views toward the road from their houses. For many of the residents, some of the roadway features would not be visible. Overall visual quality would decrease to 3.0, average.

Views from the Road

This section describes each KOP identified in the LUs described above for viewers *from* the road. These KOPs were used to identify specific views that may be affected by the proposed project for the motorist. The KOPs shown below represent a snapshot in time at one specific location.

KOP 8: Intersection of Five Mile Road Extension with Old Hwy 312 (LU3)

Figure 4.46 KOP 8 – Existing

The image is taken from approximately 3953 Old Hwy 312 looking east and slightly south, near the Westate Machinery Company. The view is primarily agricultural, with human-made structures of the machinery company to the right (south) of the image. Mesas are visible in the distance that do not disrupt the primarily straight horizon line but provide moderately defined landforms. Vegetation is sparse. A few trees are evident in the middle ground, providing minimal visual interest. No waterbodies are evident. Vividness is average. The structures to the right are the primary encroachment onto an otherwise mostly intact view. Therefore, intactness is moderately high. The green of the fields and small middle ground trees contribute to unity, which is moderately high. The existing visual quality is 3.6, average.

With the Mary Street Option 1 Alternative, the proposed roadway would replace the majority of the green agricultural field in the foreground view. Primarily viewers from the road would be affected. Vividness would decrease somewhat. Intactness and unity would be reduced due to encroachment of a new human-made facility. Visual quality would be reduced to 1.9, moderately low.

KOP 9: Intersection of Five Mile Road and Dover Road (LU3)

Figure 4.47 KOP 9 – Existing

KOP 9 was selected based on changes at Five Mile Road where it currently terminates at Dover Road. The view is of Five Mile Road looking south from Dover Road. Primary viewer groups would be local residents and motorists. Agricultural fields flank both sides of the roadway. A few structures, trees, and foothills are visible only in the distance and are barely discernible, so vividness is low. The most obvious sign of human presence is the agricultural fields, but no encroachments other than the road exist. Intactness is therefore moderately high. There is some visual harmony between the human-made and natural elements in this view. Therefore unity is average. The existing visual quality for viewers from the road is 4.1, moderately high.

Proposed Mary Street Option 1 Alternative - Secondary Corridor Improvements

Under the Mary Street Option 1 Alternative, Five Mile Road would remain a two-lane rural local road, to meet MDT standards. Motorists traveling south on Five Mile Road would see two travel lanes, as well as shoulder and drainage improvements. Vividness and unity would not substantially change, although the road would be paved and wider, representing more encroachment and a minor decrease in intactness. There would be no change to unity. Overall visual quality would be reduced to 3.9, moderately high.

KOP 11: Intersection of Mary Street and Bitterroot Drive (LU3)

Figure 4.48 KOP 11 – Existing

This view is looking west on Mary Street from its intersection with Bitterroot Drive. Primary viewer groups would be local residents and motorists. Trees of differing types and ages on the left side of the road provide some level of visual contrast. Vividness is average. Human presence is evident from the road itself and some residences (partially screened by vegetation). The utility poles paralleling the road on both sides encroach upon the view. Intactness is therefore average. The varying heights of the telephone poles and trees paralleling the road disrupt unity somewhat. Overall visual quality is 3.0, average.

Proposed Mary Street Option 1 Alternative - Primary Corridor Improvements

Mary Street would not change; it would remain as an unimproved rural local road. A new urban principal arterial would be constructed to the north, paralleling Mary Street. Drivers traveling west on Mary Street would see two travel lanes, a continuous two-way left-turn lane in the center of the road, paved shoulders, and drainage channels and side slopes on the north side of Mary Street (the right side of the photo). Vividness would decrease but remain moderately high. Intactness would decrease due to encroachment of a new facility. Unity would decrease slightly. Visual quality would slightly decrease to 2.8, but would remain average.

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KOP 12: Intersection of Mary Street and Old Highway 312 (LU3)

Figure 4.49 KOP 12 – Existing

KOP 12 was selected based on proposed changes at the western terminus of Mary Street at its intersection with Old Hwy 312 and US 87. This KOP is located on US 87 looking toward the existing signalized intersection with Old Hwy 312, shown to the right. US 87 is in the foreground, and Old Hwy 312 creates a horizontal line in the middle ground. The view is looking southeast. Primary viewer groups would be local residents and motorists.

Human-made elements are visible, including the roadway, streetlights, and some structures. The red barn and mature trees visible on the horizon along Mary Street are moderately memorable; however, vividness is moderately low. Intactness is moderately low due to encroachment from the roadway, streetlights, and signage. The visual elements do not create an overall harmonious view due to the varying heights of the lines, such as the streetlights, which disrupt continuity. Unity is moderately low. Visual quality is 2.9, average.

Figure 4.50 KOP 12 – Proposed, Intersection Improvements for Mary Street Option 1 and Option 2 Alternatives – Primary Corridor Improvements

The intersection improvements for the Mary Street Option 1 Alternative would eliminate the existing signalized intersection at this location. Two roundabouts may be implemented at this location: one to connect Main Street, US 87, Old Hwy 312, and the proposed arterial, and the second to connect Mary Street and Bench Boulevard. Although the type of intersection would not be determined until final design, the roundabouts were simulated in the photo to depict the worst-case scenario. The second roundabout would not be visible from this view. The vegetation in the foreground on the left side of the simulation would be removed under the Mary Street Option 1 and Mary Street Option 2 alternatives (the same simulation used for this KOP was also used for the Mary Street Option 2 Alternative, which is why the vegetation was not removed). Vividness would be slightly reduced from the removal of the red barn, but the reduction in visual encroachments from the signalized intersection and billboard in the middle ground would slightly improve intactness. Overall visual quality would remain 2.7, average.

Indirect Impacts

Population trends have affected the study area landscape as land has been developed to accommodate new residential and commercial/industrial areas over the years. Subdivisions planned for the area reflect a current growth trend, introducing new impacts to motorists (viewers looking at the newly developed land) and a new source of viewers *of* the road (new subdivision residents). Changes in traffic patterns (e.g., congestion) associated with population growth and decline have also affected visual quality in the past and would continue to do so. Transportation improvement projects planned for the area, such as the proposed road widening projects, would result in both adverse and beneficial impacts, depending on the type of improvement. For example, improvements to widen or develop a new road would result in visual intrusion from a larger or new facility, but may also reduce the amount of congestion in the view. Parks planned for the area would result in beneficial impacts by protecting land from development and incorporating a natural element into the built environment. Overall, the result of these past, present, and reasonably foreseeable future actions is expected to impact the visual integrity of the area, primarily due to land development. The Mary Street Option 1 Alternative would result primarily in reductions in visual quality for the majority of the KOPs evaluated for this alternative. In some cases, the change is expected to be slight or it would affect few viewers of the road, or both. In other cases, the change would affect residents with a direct view of the new facility. Billings and Yellowstone County have policies in place to direct growth and contain it within the UPA in order to retain the rural nature of the community.

Temporary Construction Impacts – Visual Resources: Mary Street Option 1 Alternative

Short-term impacts would occur to the visual environment during construction. The most noticeable temporary construction-related impacts to visual quality throughout the study area would result from:

- Stockpiling materials and establishing staging areas for equipment and other materials.
- Operating construction equipment of various sizes, including hauling trucks, earth-working heavy equipment, and cranes.
- Placing temporary erosion and sediment control measures at construction sites, such as plastic sheeting, sandbags, and straw.
- Exposing soils and dust associated with earth movement activities.
- Removing vegetation.

Medium- and heavy-duty construction equipment would affect visual quality in the short term because it would disrupt views. Construction lights, if used, would increase light and glare if work is performed at night. Residential viewers with the highest sensitivity to changes in visual quality would be those most affected by construction activities.

Mitigation – Visual Resources: Mary Street Option 1 Alternative

The MDT National Highway System (NHS) Rural Principal Arterial – Flat Terrain design criteria were used to identify ways to minimize project impacts. Each build alternative alignment was segmented based on factors such as the surrounding land use and zoning, whether it fell within or outside of the Metropolitan Planning Organization (MPO) or UPA boundaries, and the speed and functional classification of connecting roads. The segments were then evaluated individually to determine whether the NHS Rural Principal Arterial design criteria for flat terrain could be accommodated, and whether they was appropriate given the context of the surrounding area. Alternate standards were recommended for segments that could not accommodate the NHS Rural Principal Arterial design criteria without substantial impacts. Therefore, alignments requiring extensive earthwork, ROW acquisition, elevated structures, and large retaining walls were avoided, which minimized visual impacts from the build alternatives.

Context Sensitive Solutions (CSS) would be applied to help preserve scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility. CSS is a collaborative, interdisciplinary approach that involves all stakeholders in providing a transportation facility that fits its setting.

The following core principles of CSS would be applied to decision-making where applicable (FHWA 2009):

1. Strive towards a shared stakeholder vision to provide a basis for decisions.
2. Demonstrate a comprehensive understanding of contexts.
3. Foster continuing communication and collaboration to achieve consensus.
4. Exercise flexibility and creativity to shape effective transportation solutions, while preserving and enhancing community and natural environments.

Mitigation for Unavoidable Adverse Visual Effects

Consistent with the CSS approach, MDT would follow the guidelines below in attempts to mitigate any unavoidable visual impacts resulting from this project to the extent practical.

Vegetation

The use of vegetation can visually unify the corridor, as follows:

- In accordance with Standard Specification 201, clearing and grubbing activities would occur only within staked construction limits in order to minimize disturbances to native plant communities and specimen trees
- Maintain as many trees as possible by allowing minimal fill around the base of trees. During final design retaining walls, "do not disturb areas" would be incorporated into the plans as needed.
- Select seed mixtures that include native grasses and forbs to blend cut and fill slopes and other construction-related disturbances with adjacent land uses.
- Maintain as many trees as possible, set clearing and grading limits, and plant trees at key locations.

Road Features

The following measures can minimize visual impacts from the road:

- Bridges: Select bridge type that is low and horizontal, with low-contrast materials.

During final design, the following elements may be included:

- Retaining walls: Use wall treatments that blend with the colors and textures of surrounding landscapes to the extent practicable.
- Guardrails: Use low-profile guardrails with a weathering finish to blend into the setting.
- Lighting: If used, blend luminaires with natural colors; shield fixtures to minimize glare and spillover to the extent practicable.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to visual resources as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 1 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.7.3.3 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Visual Resources: Mary Street Option 2 Alternative

Views Toward the Road
Direct impacts to visual resources under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative for those viewing the road, with the following exceptions:

- KOP 4 would be replaced with KOP 5, described below, because the side-by-side bridges crossing the Yellowstone River would be located farther north.

KOP 5: Proposed Center Bridge Crossing of the Yellowstone River on the Western River Bank (LU2)

Figure 4.51 KOP 5 – Existing

KOP 5 was selected based on the proposed new side-by-side bridge structures crossing the Yellowstone River. Viewers *toward* the road would be primarily recreationists (e.g., hikers, boaters, and anglers) who may use the river and the proposed park at this location. The view is from the confluence of Five Mile Creek, looking north/northeast.

This view is composed mostly of water. Tall, deciduous trees and sandstone cliffs flank the river, creating a near mirror image on either side of the water as they slope downward toward the river. The trees and cliffs provide texture and color that contrast with each other. As mentioned above, the river is a vivid landscape component because of the edge created by the shoreline, as well as the color and reflectivity of the water. No built structures are visible. As with KOP 4, the view is memorable. Vividness is therefore average. Intactness is moderately high, because no elements visually encroach onto the view and none have been obviously subtracted. The visual resources join together to form a coherent, harmonious visual pattern, resulting in a high level of unity. The existing visual quality is 5.5, high.

Figure 4.52 KOP 5 – Proposed

The bridge in this view is an encroachment onto the landscape. The contrasting elements it introduces would increase the vividness of the view and make it more memorable. Intactness would decrease due to the addition of the structure, which is large and conspicuous from this perspective, therefore dominating and encroaching onto the view. The horizontal line created by the bridge creates a new horizon line, where the original horizon line reflected the contours of the floodplain landscape. The vertical posts echo the vertical lines in the cliffs and trees, but the posts are larger and more prominent. Therefore, there is some unity between the natural and built elements, but the structure's line and form are predominant. Visual quality is rated 4.2, moderately high.

Primary viewers would be recreationists, particularly boaters who may use the nonmotorized boat and rescue boat river access ramp proposed by YRPA in this general location after the planned park is established. Park users from this viewpoint would likely see the bridge(s) as an encroachment given its proximity and the overall decrease in visual quality expected here. However, the park has not been developed, so primary viewers do not yet exist. If the bridge(s) were built before the park, then their presence in the view would represent baseline conditions. In that case, there would be no visual change from existing conditions for primary viewers.

Views from the Road

The same impacts described for the Mary Street Option 1 Alternative for views *from* the road would apply to the Mary Street Option 2 Alternative, with the following exceptions.

KOP 10: Center Bridge (LU2)

Figure 4.53 KOP 10 – Existing

As from KOP 4, the view from KOP 10 is composed of water, various types of vegetation, and sandstone cliffs. The river is a vivid landscape component because of the edge created by the shoreline, as well as the color and reflectivity of the water. The vegetation provides pattern elements of texture and color, which would change seasonally. Vividness is high, because the landscape components combine in striking and distinctive visual patterns. Intactness is very high, because few elements visually encroach into the view. The visual resources join together to form a coherent, harmonious visual pattern, resulting in high unity. The existing visual quality is 5.6, high.

No roadway currently exists at this location. Under the Mary Street Option 2 Alternative, the alignment would cross the Yellowstone River at this location. Viewers traveling south on the proposed road would experience this view, which is currently unavailable to the general public (but would be available to park visitors once the proposed park is completed). Primary viewer groups would be local residents and motorists. Vividness would remain high. Drivers would see the southbound lanes and bridge barrier in the foreground, and this encroachment would cause a minor decrease in intactness and unity. Existing quality would decrease to 5.2 but would remain high.

Indirect Impacts – Visual Resources: Mary Street Option 2 Alternative

Similar impacts to visual resources as described under the Mary Street Option 1 Alternative would apply to the Mary Street Option 2 Alternative. As with the Mary Street Option 1 Alternative, the Mary Street Option 2 Alternative would result primarily in reductions in visual quality for the majority of the KOPs evaluated for this alternative, particularly KOP 5 (views of the proposed bridge crossing the Yellowstone River). Billings and Yellowstone County have policies in place to direct growth and contain it within the UPA, in order to retain the rural nature of the community; therefore, the cumulative effects to visual resources would be moderated and would not result in adverse impacts to these resources.

Temporary Construction Impacts – Visual Resources: Mary Street Option 2 Alternative

Temporary construction impacts to visual resources under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Visual Resources: Mary Street Option 2 Alternative

Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to visual resources as well as mitigation for Phase 1 of the Mary Street Option 2 Alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 2 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.7.3.4 FIVE MILE ROAD ALTERNATIVE

Full Buildout

Direct Impacts – Visual Resources: Five Mile Road Alternative

Views Toward the Road

The same direct impacts to KOPs 1 through 3 for viewers toward the road would apply to the Five Mile Road Alternative as described for the Mary Street Option 1 Alternative. Impacts to KOP 5 and KOP 10 as described for the Mary Street Option 2 Alternative would also apply to the Five Mile Road Alternative. In addition, the following impacts would apply.

KOP 6: Intersection of Mary Street and Hawthorne Lane (LU3)

Figure 4.54 KOP 6 – Existing

The existing conditions for KOP 6 would be the same as those described for the Mary Street Option 1 Alternative. Existing visual quality is 3.1, average.

Figure 4.55 KOP 6 – Proposed, Five Mile Road Alternative – Secondary Corridor Improvements

As part of secondary improvements under the Five Mile Road Alternative, Mary Street would be reconstructed to City of Billings standards for an urban arterial roadway, including two travel lanes plus a continuous two-way left-turn lane in the center of the road, sidewalks on both sides of the road, and bike lanes. As shown in the simulation above, viewers would see a wider street. Widening of Mary Street would introduce minor visual change from this view. There would be no change to vividness or unity. Intactness would not be reduced, because the roadway that would be widened already exists. All of the existing natural elements would remain. Visual quality would slightly decrease to 2.9, but would remain average.

KOP 7: Subdivision North of Dover Road, East of Pioneer Road (LU3)

Figure 4.56 KOP 7 – Existing

The existing conditions for KOP 7 would be the same as those described for the Mary Street Option 1 Alternative. The existing visual quality is 3.8, moderately high.

Figure 4.57 KOP 7 – Proposed, Five Mile Road Alternative – Primary Corridor Improvements

A rural principal arterial would be implemented for the Five Mile Road Alternative primary corridor improvements. The road would include four travel lanes, paved shoulders, and a 50-foot depressed median. These improvements would introduce a new horizontal element that parallels the existing horizon line and property lines. Vividness would be reduced due to the removal of mature trees. Intactness would decrease due to the encroachment of a new human-made facility into the view of the cropland. Residential viewers would be primarily affected, particularly those whose property is directly adjacent to the roadway. These residents would have continuous views toward the road from their houses. From this view, some of the roadway features would not be visible. Visual quality would decrease to 2.9, average.

Views from the Road

This section describes each KOP identified in the LUs described above for viewers *from* the road. These KOPs were used to identify specific views that may be affected by the proposed project for the motorist. The KOPs shown below represent a snapshot in time at one specific location. For the Five Mile Road Alternative, impacts to KOP 8 would be the same as described for the Mary Street Option 1 Alternative. The following additional impacts would apply.

KOP 9: Intersection of Five Mile Road and Dover Road (LU3)

Figure 4.58 KOP 9 – Existing

The existing conditions for KOP 9 would be the same as those described for the Mary Street Option 1 Alternative. The existing visual quality is 4.1, moderately high.

Proposed Five Mile Road Alternative - Primary Corridor Improvements

Five Mile Road would be improved from a rural local road to a rural principal arterial. Drivers traveling south on Five Mile Road would see four travel lanes, a 50-foot-wide depressed median, paved shoulders adjacent to both the median and outside lanes, and drainage channels and side slopes on both sides of the road. Although changes to the roadway itself would be noticeably different from existing conditions, views from the road would remain the same. Vividness and unity would not substantially change, although the road would be paved and wider, representing more encroachment and a minor decrease in intactness. There would be no change to unity. Visual quality would decrease slightly to 3.9, moderately high.

KOP 11: Intersection of Mary Street and Bitterroot Drive (LU3)

Figure 4.59 KOP 11 – Existing

The existing conditions for KOP 11 would be the same as those described for the Mary Street Option 1 Alternative. The existing visual quality is 3.0, average.

Proposed Five Mile Road Alternative - Secondary Corridor Improvements

As part of secondary corridor improvements proposed under the Five Mile Road Alternative, Mary Street would be reconstructed to City of Billings standards for an urban arterial roadway. Drivers traveling west on Mary Street would see two travel lanes, a continuous two-way left-turn lane in the center of the road, sidewalks on both sides of the road, and bike lanes. The overall effect would be a wider facility that would introduce more development. Vividness would decrease slightly due to a reduction in vegetation flanking the roadway and the widening of the roadway. Additional encroachment would reduce intactness. Visual quality would be reduced slightly to 2.7, but would remain average.

KOP 12: Intersection of Mary Street and Old Highway 312 (LU3)

Figure 4.60 KOP 12 – Existing

The existing conditions for KOP 12 would be the same as those described for the Mary Street Option 1 Alternative. The existing visual quality is 2.9, average.

Figure 4.61 KOP 12 – Proposed, Intersection Improvements for Five Mile Road Alternative – Secondary Corridor Improvements

The intersection improvements for the Five Mile Road Alternative secondary corridor would eliminate the existing signalized intersection. A roundabout may be implemented to connect Main Street, US 87, Old Hwy 312, and the proposed arterial. Although the type of intersection would not be determined until final design, the roundabout was simulated to depict the worst-case scenario. Drivers would see the roundabout medians in the foreground and island in the middle ground instead of the signalized intersection that currently exists, as shown above. Vegetation to the left of the photo would remain. Vividness would decrease under this alternative due to removal of the red barn. Overall visual quality would be slightly reduced to 2.8, average.

Indirect Impacts – Visual Resources: Five Mile Road Alternative

The same past, present, and reasonably foreseeable future actions described under the Mary Street Option 1 Alternative would apply to the Five Mile Road Alternative. As with the Mary Street Option 1 Alternative, the Five Mile Road Alternative would result primarily in reductions in visual quality for the majority of the KOPs evaluated for this alternative. Although some of the reductions are expected to be slight, impacts at KOP 5 and KOP 7 would be more substantial. However, this alternative would limit access to land along Five Mile Road that is slated for higher density residential development and is currently primarily agricultural. The Five Mile Road Alternative would be a limited access facility, limited to Old Hwy 312, Dover Road, and Mary Street. Therefore, this alternative would likely slow the conversion of rural land to higher density uses and minimize impacts to the visual landscape. Billings and Yellowstone County have policies in place to direct growth and contain it within the UPA, in order to retain the rural nature of the community.

Temporary Construction Impacts – Visual Resources: Five Mile Road Alternative

The temporary construction impacts to visual resources under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Visual Resources: Five Mile Road Alternative

The mitigation measures under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to visual resources as well as mitigation for Phase 1 of the Five Mile Road Alternative would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.8 NOISE

4.3.8.1 METHODOLOGY

As noted in Chapter 3, a traffic noise analysis for new highway construction projects in Montana consists of the following steps. The first two steps are addressed in Chapter 3; the remaining steps are addressed in this chapter (MDT 2011):

1. Identify study area and noise-sensitive receptors by land use Activity Category and distance to the edge of the closest travel lane of the proposed project.
2. Determine existing noise levels at a representative subset of receptors.
3. Predict future “build” noise levels at a larger representative subset of receptors.
4. Determine traffic noise impacts.
5. Evaluate abatement feasibility and reasonableness if there are traffic noise impacts.
6. Address coordination with local officials, including simple modeling of distance-based future “build” noise levels out to 60 dBA and 64 dBA for undeveloped Activity Category G lands.
7. Address construction noise.

The *Billings Bypass NCPD 56(55), CN 4199 Traffic Noise Impact Assessment* (Big Sky Acoustics, 2012) identifies traffic noise impacts that would occur under the proposed alternatives (see Appendix E). The impact analyses used the FHWA’s Traffic Noise Model (TNM) Version 2.5 to predict traffic noise levels for the No Build Alternative and the build alternatives based on traffic volume projections and the proposed design of the project alternatives. Noise Abatement Criteria (NAC), as defined by FHWA, consider noise-sensitive receptors such as residences, parks or schools impacted if noise levels approach or exceed NAC in a project's design year. MDT defines "approach" as 1 A-weighted decibel (dBA) below the NAC, and defines "substantially exceeds" as 13 dBA over existing noise levels.

For the purposes of determining and abating traffic noise impacts, 23 CFR 772, Section 772.11–Noise Abatement, gives primary consideration to receptor locations that represent exterior areas (e.g., Categories B and C – see the Chapter 3 "Noise" section for a description of the categories), where frequent human use occurs and a lowered noise level would be of benefit.

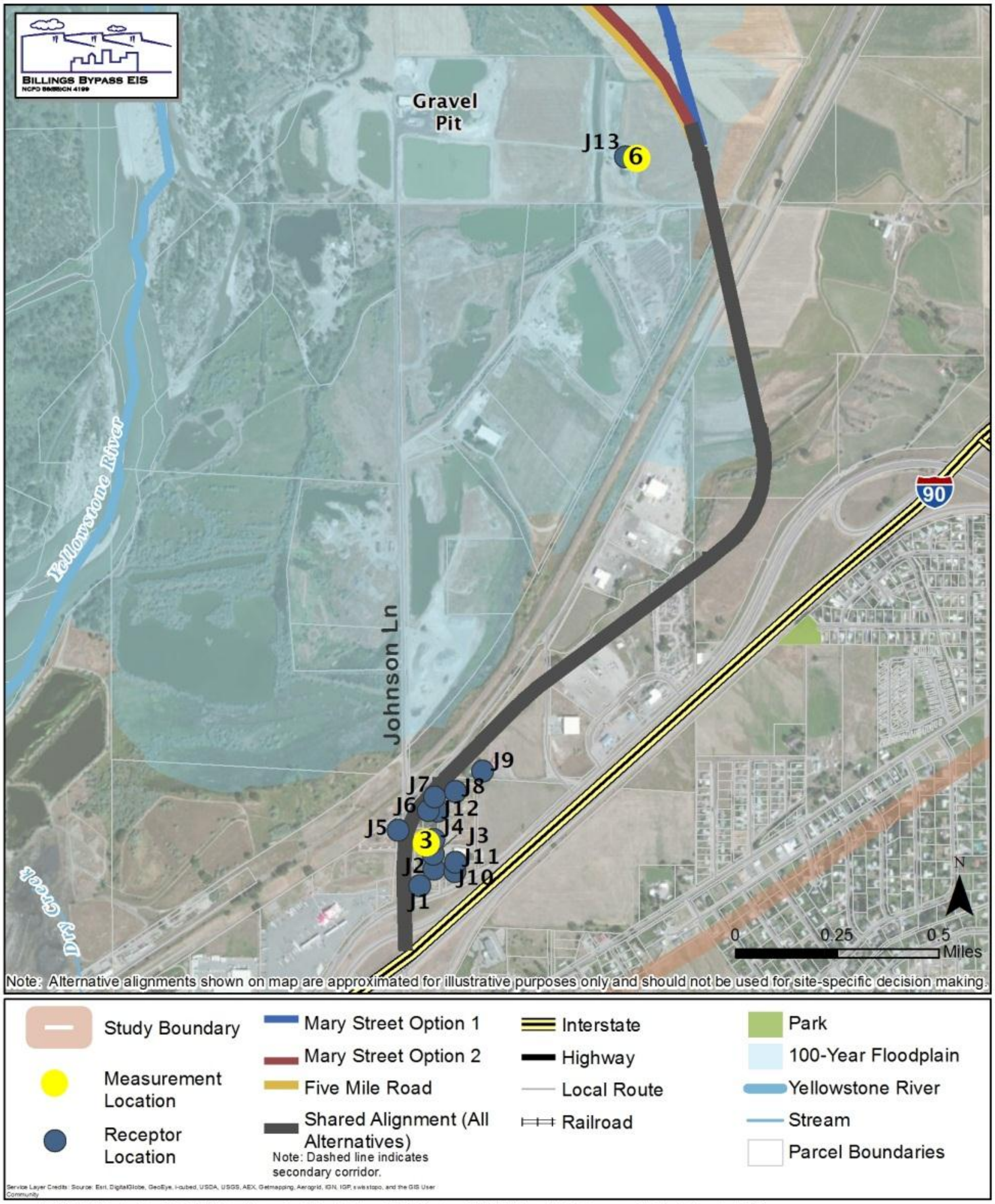
4.3.8.2 RESULTS

A summary of the direct and indirect noise impacts is shown in the table below. No impacts are expected from the No Build Alternative. Eight to ten residences would be impacted according to noise impact criteria under the build alternatives; the number of affected residences varies by alternative. No mitigation measures were identified that meet MDT's criteria for feasibility and reasonableness under any build alternative. Although earthen berms, which can be used for traffic noise mitigation, would not be high enough given limited space or low elevations, they may be used as a visual buffer and could possibly provide traffic noise mitigation for affected residents along Five Mile Road. As required by MDT guidance, Category G lands (undeveloped lands permitted for future development) in the study area were identified. The planned Bitterroot Heights subdivision, located north of Mary Street between Bitterroot Drive and Hawthorne Lane, meets this definition. To help local officials evaluate future development for noise-compatible use at the planned Bitterroot Heights subdivision, local developers are encouraged to incorporate noise-compatible development on these planned properties, as described in more detail below. **Figure 4.62, Figure 4.63,** and **Figure 4.64** depict the impacted noise receptors in the study area in relation to the alternatives.

Table 4.24 Direct and Indirect Impacts Summary – Noise

ALTERNATIVE	DIRECT IMPACTS	INDIRECT IMPACTS
NO BUILD ALTERNATIVE		
	• None.	• None.
MARY STREET OPTION 1 ALTERNATIVE		
	• Impacts to four residences would equal or exceed the "approach" impact criterion. • Impacts to three residences would "substantially exceed" the existing ambient noise level.	• Indirect impacts include increased traffic on roadways providing access to the bypass. This could occur at Old Hwy 312 and the western intersection with Mary Street as travelers approach the proposed alignments.
MARY STREET OPTION 2 ALTERNATIVE		
	• Impacts to four residences would equal or exceed the "approach" impact criterion. • Impacts to four residences would "substantially exceed" the existing ambient noise level.	• Same as Mary Street Option 1 Alternative.
FIVE MILE ROAD ALTERNATIVE		
	• Impacts to three residences would equal or exceed the "approach" impact criterion. • Impacts to three residences would "substantially exceed" the existing ambient noise level.	• Same as Mary Street Option 1 Alternative at Old Hwy 312 and the western intersection with Mary Street as travelers approach the proposed alignments, with slight differences based on location of primary and secondary corridors.

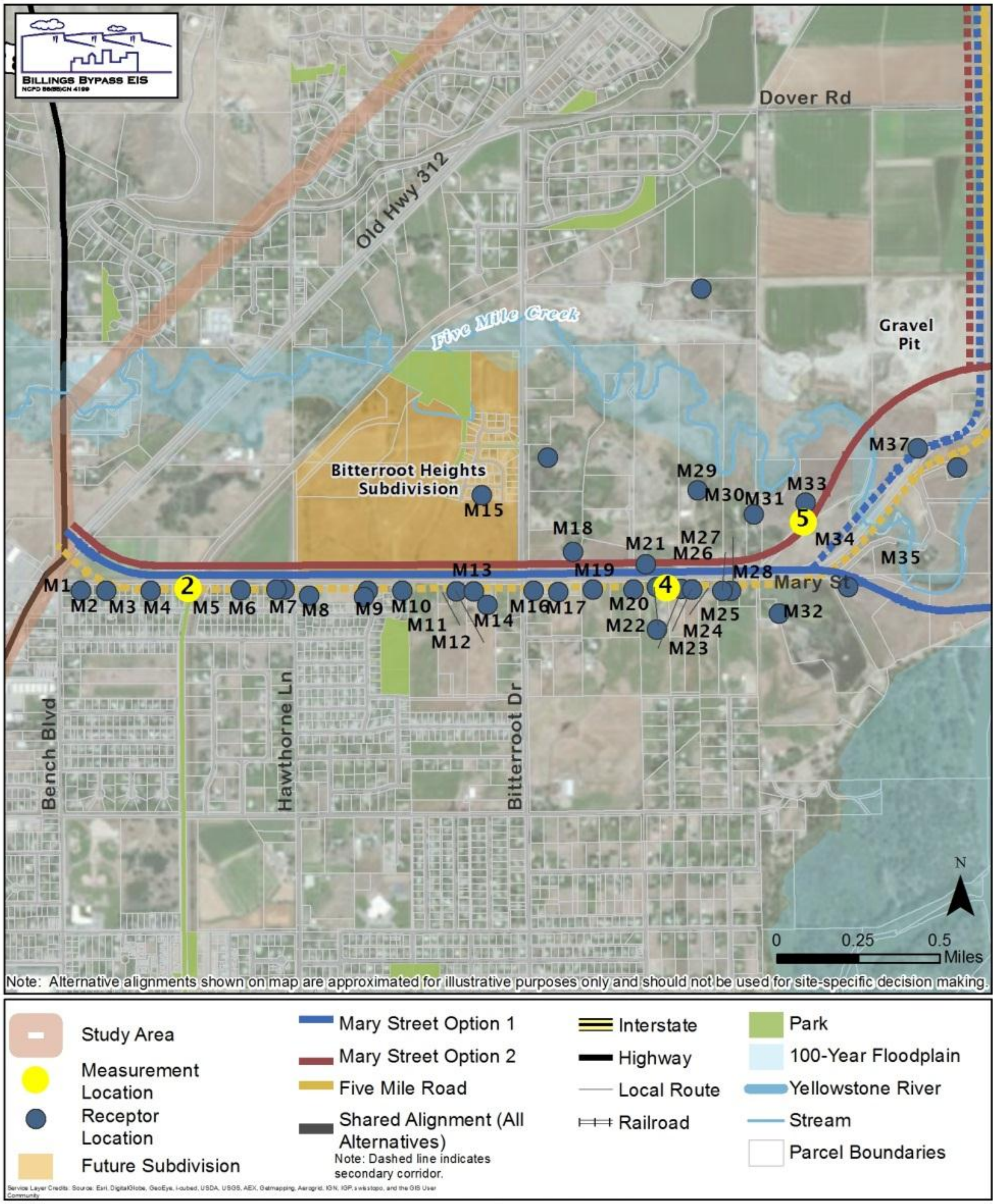
Figure 4.62 Noise Receptors South of Yellowstone River



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/11/2013

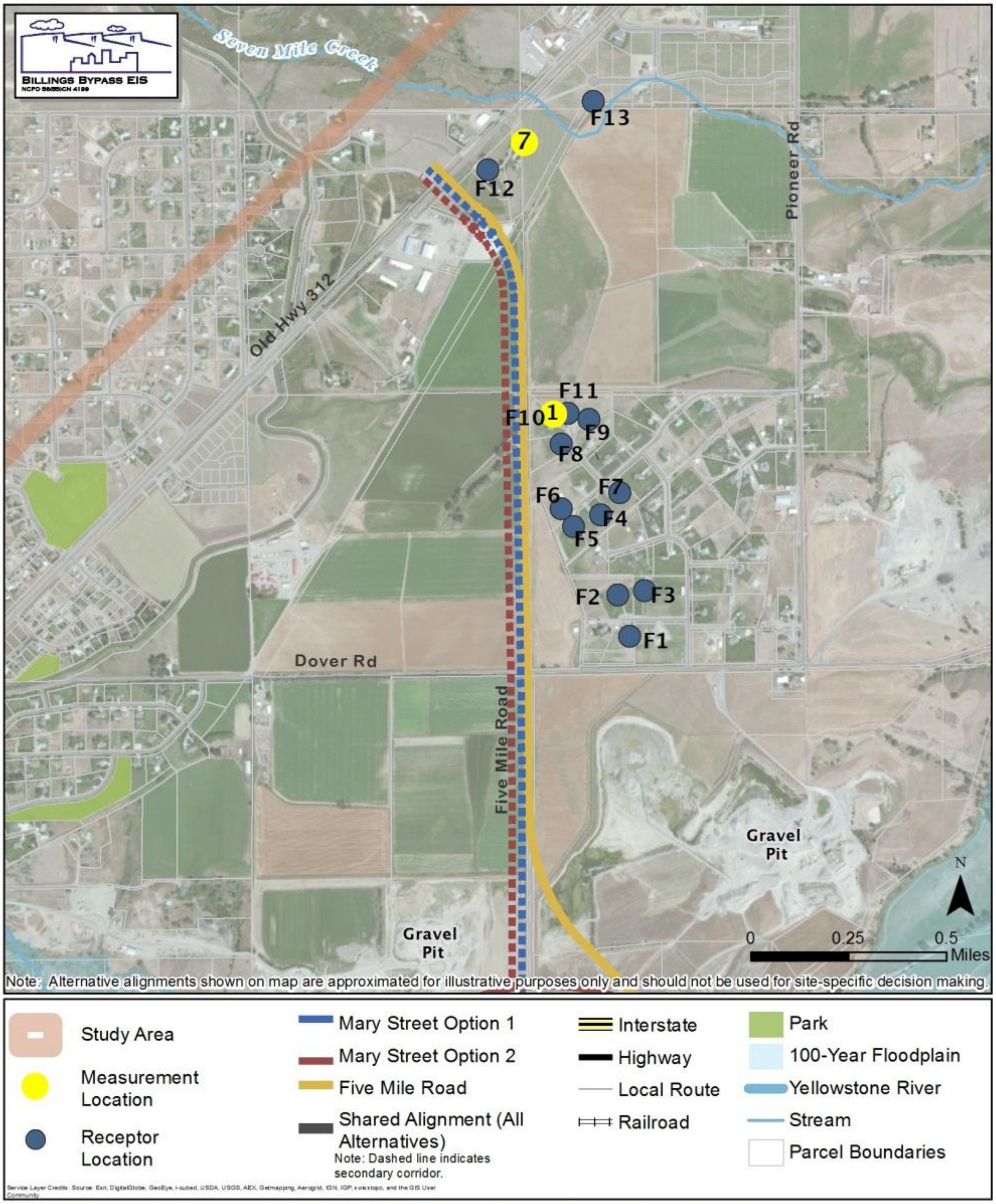
Figure 4.63 Noise Receptors Along Mary Street



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/11/2013

Figure 4.64 Noise Receptors Along Five Mile Road



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/11/2013

4.3.8.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Noise: No Build Alternative

No direct impacts related to noise are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Noise: No Build Alternative

No indirect impacts related to noise are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Noise: No Build Alternative

No temporary construction impacts related to noise are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Noise: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.3.8.2.2 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Noise: Mary Street Option 1 Alternative

For the Mary Street Option 1 Alternative, traffic noise impacts are expected at nine single-family residences, as follows. The Mary Street Option 1 Alternative noise impacts summary table (see **Table 4.25** below) does not include the receptors that might be relocated due to ROW impacts (as discussed under Section 4.3.5, "Right-of-Way and Utilities."

- Two residents (J6 and J7) might be relocated due to ROW impacts (as discussed under Section 4.3.5**,** "Right-of-Way and Utilities"). These residences are located north of I-90 near the intersection of Johnson Lane and Coulson Road.

- Four Category B receptors (J1, J8, J9, and J12) are located north of I-90 adjacent to Johnson Lane. J1 is located at the southern end of Johnson Lane, and J8, J9, and J12 are located along Coulson Road near its intersection with Johnson Lane:
  - Design year (2035) noise levels (66 to 69 dBA) would be equal to or greater than the 66 dBA "approach" impact criterion for Category B receptors (residents).

- Three Category B receptors (M18, M21, and M35) are located adjacent to Mary Street. M18 and M21 are located north of Mary Street and east of Bitterroot Drive. M35 is located east of the intersection of Mary Street and Five Mile Road:
  - Predicted noise levels (61 to 69 dBA) exceed the present year (2010) noise levels of 42 dBA, 45 dBA, and 52 dBA, for M18, M21, and M35, respectively, by more than 13 dBA for Category B receptors (residents).
  - Predicted noise levels for receptors M18, M21, and M35 would therefore "substantially exceed" the existing ambient noise level.

Table 4.25 Direct Noise Impacts, Mary Street Option 1 Alternative

RECEPTOR	NAC dBA	EXISTING dBA	PREDICTED dBA
J1	66 dBA	60 dBA	66 dBA
J8	66 dBA	55 dBA	69 dBA
J9	66 dBA	55 dBA	68 dBA
J12	66 dBA	55 dBA	68 dBA
M18	66 dBA	42 dBA	62 dBA
M21	66 dBA	52 dBA	68 dBA
M35	66 dBA	45 dBA	61 dBA

Indirect Impacts – Noise: Mary Street Option 1 Alternative
The new alignment could expedite planned development in undeveloped areas, including residential, commercial, and industrial uses. New subdivisions planned in the study area would result in more localized traffic and noise, as well as the introduction of new noise receptors.

Temporary Construction Impacts – Noise: Mary Street Option 1 Alternative
Road construction may cause localized, short-duration noise impacts, which may cause annoyance to people living in the area. Noise impacts from construction activities would vary based on the construction phase being implemented and the type of equipment used (see Section 3.3.8 in Chapter 3). Most residents in proximity to the alignment would experience noise from mobilization, clearing and grubbing, earthwork, foundations, base preparation, paving, and cleanup activities. Noise impacts from bridge construction would occur where the roadway would be elevated over Coulson Road and the railroad tracks, and across the Yellowstone River. Aerial photographs show few residences in the Coulson Road location; some industrial uses occur amid primarily agricultural areas. No residences exist on the east side of the Yellowstone River at the proposed bridge location, although some residences exist on the west side, near Five Mile Creek. Therefore, most residents would not be exposed to noise impacts from bridge construction activities, which would require large equipment such as cranes, although they would experience noise from equipment and materials traveling to and from the bridge construction site. Measures to offset temporary construction impacts are described below.

During project construction, the contractor would comply with all applicable regulations governing equipment noise levels and the City of Billings Noise Ordinance (Yellowstone County does not have specific noise regulations). The Billings Municipal Code limits noise in residential districts to 55 dBA (8 AM to 8 PM) and 50 dBA (8 PM to 8 AM), and noise in industrial districts to 80 dBA (8 AM to 8 PM) and 75 dBA (8 PM to 8 AM). Construction noise is limited to the maximum permissible noise levels specified for industrial districts (City of Billings n.d.). In addition, contractors may use the following techniques to reduce construction noise impacts at the identified receptors:

1. Place stationary noise sources away from receptors.
2. Use portable noise barriers or natural terrain to provide shielding.
3. Turn off idling equipment.
4. Drive equipment forward instead of backward; lift instead of drag materials; and avoid scraping or banging activities.
5. Avoid operating equipment in such a manner that may annoy, disturb, and endanger the comfort, repose, health, peace, or safety of any reasonable person of normal sensitivity.

6. Use quieter equipment with properly sized and maintained mufflers, engine intake silencers, less obtrusive backup alarms, engine enclosures, noise blankets, or rubber linings.
7. Confine work that does not have to be done at night to daylight hours. When work must be done at night, complete the noisiest work as early as possible and provide hotel vouchers.

Mitigation – Noise: Mary Street Option 1 Alternative

When traffic noise impacts are predicted, possible abatement measures for the mitigation of street traffic noise need to be considered, and the measures are assessed to determine whether they are feasible and reasonable (MDT 2011). Possible abatement measures include construction of noise barriers, modification of the proposed build alternatives, acquisition of real property, traffic management measures, or building modifications for Activity Category D public use or institutional structures. Barriers typically provide the highest level of noise reduction of these mitigation measures.

As described below, no feasible or reasonable mitigation measures were found for the impacts associated with the project. Coordination between local officials and developers is suggested to require setbacks for future developments, or development of noise-compatible uses near the roadway.

Design Modifications

Shifting the alignment near the I-90/Johnson Lane Interchange to eliminate anticipated traffic noise impacts at receptors J8, J9, and J12 and at receptors J6 and J7, which would be relocated, would be feasible if the alignment was moved to the north side of the railroad tracks at Johnson Lane. A similar alignment was evaluated in 2011 but was determined to be unreasonable and was therefore eliminated from further consideration. Shifting the alignment to avoid impacted receptors M18, M33, M34, and M35 along Mary Street would move the roadway closer to other receptors, which may create new impacts, require the acquisition of additional ROW, or relocate additional receptors. Therefore, shifting the alignment is not feasible or reasonable.

Traffic Management

Traffic management measures include traffic control devices, signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive lane designations (MDT 2011).

Traffic control devices, including stop-controlled, signalized, and roundabout intersections, are being considered for this alternative. Traffic control devices and their locations would be refined during final design, and traffic noise predictions would be recalculated at that time.

Restricting certain vehicle types, such as heavy trucks, or limiting the time of day that certain vehicles may use the alignment are not reasonable mitigation measures. Doing so would contradict the project's purpose, which is to improve truck/commercial vehicle access and mobility in the eastern area of Billings, and to improve connectivity between I-90 and Old Hwy 312.

Modifying speed limits is a viable potential noise mitigation measure if modifying speed limits does not hinder the function of the roadway (although speed limits are generally set by the Transportation Commission and are usually reduced for safety concerns rather than noise impacts) (MDT 2011). Traffic noise levels are reduced by approximately 1 dBA for every 5 miles per hour (mph) reduction in speed. The proposed speed limits for the Mary Street Option 1 Alternative range from 45 to 50 mph. As a secondary corridor, Five Mile Road is proposed to be designated at 45 mph. Reducing the speed limits by 5 to 10 mph would reduce the predicted noise levels by 1 to 2 dBA, eliminating expected impacts to one receptor (J1) of the nine that would be affected by the Mary Street Option 1 Alternative. However, a

10 mph reduction in speed may hinder the functionality of the roadways and would be extremely difficult to enforce. Therefore, modifying speed limits is not feasible, because it would limit the utility of the roadway.

Designating exclusive traffic lanes is a potential noise mitigation measure, but it is not reasonable for this project. Receptors are located on both sides of the proposed primary corridor roadway alignments. Therefore, designating a truck lane in each direction, for example, would not change the predicted noise levels at the affected receptors.

Barriers

According to MDT policy, noise barriers and berms may be used to reduce the traffic noise at a receptor if they are considered feasible and reasonable. MDT first considers design modifications or traffic management measures to reduce or eliminate impacts. Then MDT considers noise barriers or berms, applying the following criteria.

To determine whether such a mitigation measure is *feasible*, it must:

- Provide a minimum 5-dBA reduction in noise levels for 75% of the impacted “front row” receptors and
- Not cause safety hazards or maintenance, utility, or access limitations.

To determine whether a mitigation measure is *reasonable,* it must examine:

- The cost of abatement,
- Public support, and
- Whether a noise reduction design goal of 7 dBA can be achieved for 60% of the impacted “front row” receptors.

A noise barrier is most effective when it is continuous and solid, and blocks the direct line of sight between the roadway and a receptor. Barriers can be constructed using built-up dirt to create a berm; using masonry materials (such as concrete or concrete block), metal panels, or thick wood to create a wall; or using a combination of berm and wall. To be effective, a barrier must be continuous and solid with no gaps, holes, or openings, including between the bottom edge of the barrier and the ground surface. An earthen berm typically requires a very large base for support and may also require additional ROW to accommodate construction. Although it may be used for visual screening, vegetation is not an effective barrier material since sound readily passes through it. In addition, stands of nondeciduous vegetation must be 200 feet deep to achieve a 4 to 5 dBA noise reduction (MDT 2011).

MDT uses a Cost-Effectiveness Index (CEI), which considers the noise reduction the barrier would provide and the number of benefited receptors, to determine whether a barrier is reasonable. MDT currently uses a planning cost of $35/square foot for noise barriers, which includes wall and foundation construction. A CEI that exceeds $4,900 is not considered reasonable (MDT 2011).

Since barriers are not cost-effective for isolated, individual receptors, such as Mary Street receptors M18, M21, M33, M34, and M35, traffic noise barriers were considered as mitigation measures only for groups of receptors for which impacts are expected. The CEI for receptors J1 to J12 was calculated for the Mary Street Option 1 Alternative to determine whether barriers would be reasonable, assuming that they would be located on the ROW line near the receptors. The CEI values for this alternative were well above MDT’s $4,900 reasonableness criterion due to the small number of benefited receptors. In some cases, earthen berms may be constructed to provide visual buffers, and such earthen berms would also reduce traffic noise. However, the impacted receptors at Johnson Lane and Mary Street are located very close to the proposed roadways or at elevations above the proposed alignments due to the existing terrain. Therefore, sufficiently high berms could not be constructed due to limited space or lower elevation in these areas, and would therefore be ineffective. See Appendix E for detailed information.

Coordination with Local Officials

Traffic noise can substantially affect the value and usefulness of property near roadways. Traffic noise at future areas of frequent residential outdoor use can be annoying and distracting, and hinder communication. In March 2008, MDT published *Growing Neighborhoods in Growing Corridors: Land Use Planning for Traffic Noise* to provide guidance for avoiding traffic noise issues in the future. For example, if 60 dBA can be met at a building exterior by appropriately planning a site, then the need for traffic noise control measures, such as barrier walls, earthen berms, and building material modifications, for example, can be avoided in the future. Sixty dBA represents the typical exterior background noise level of a large urban area and the background noise levels inside large, busy offices.

MDT traffic noise guidance requires that design year noise levels be predicted for NAC Category G lands (undeveloped lands that have not been permitted for development) and included in environmental documentation. These noise levels are provided to local public agencies to assist them in planning in order to prevent traffic noise impacts at future developments along state roadways (MDT 2011).

The Bitterroot Heights subdivision is located north of Mary Street and between Bitterroot Drive and Hawthorne Lane. The *Bitterroot Heights Subdivision Master Plan* was submitted to the City of Billings in 2004, and the First Filing residential section (Receptor M15) has been built in the northeastern section of the property. Three of eight future filings are located adjacent to Mary Street. The Future Filing sections of the Bitterroot Heights subdivision are an area of potential development and are currently categorized as an Activity Category G receptor.

Minimum setback distances for each segment of the alternative were derived to help local officials evaluate future development for noise-compatible use, as described in the technical report developed for this project (Big Sky Acoustics 2012). To avoid future traffic noise impacts for the planned Bitterroot Heights subdivision, local officials should strongly encourage developers to incorporate noise-compatible development on their planned or proposed properties.

Phase 1

Direct, indirect, temporary construction, and cumulative noise impacts as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative, for both the primary and secondary corridors. However, the Phase 1 footprint would be narrower than the Full Buildout footprint and would carry slightly lower volumes of traffic. However, as noted in Section 4.2.1, Phase 1 ADT volumes would vary from the ADT volumes for Full Buildout by no more than 350 vehicles on any of the principal roadway corridors within the study area. This equates to a difference in ADT volumes of no more than +/-3%. As described in the *Billings Bypass Combined Traffic Reports*, this variation in volumes is statistically insignificant (Marvin & Associates 2013). Thus, the differences in noise are not anticipated to be substantially different than under the Full Buildout.

4.3.8.2.3 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Noise: Mary Street Option 2 Alternative

For the Mary Street Option 2 Alternative, traffic noise impacts are expected at 10 single-family residences, as follows. The summary table does not include the relocated receptors.

- Two residents (J6 and J7) might be relocated due to ROW impacts (as discussed under Section 4.3.5, "Right-of-Way and Utilities," as under the Mary Street Option 1 Alternative. As described for the Mary Street Option 1 Alternative, these residences are located north of I-90 near the intersection of Johnson Lane and Coulson Road.
- Four Category B receptors (J1, J8, J9, and J12) would be affected by the Mary Street Option 2 Alternative as described for Mary Street Option 1, with design year noise levels equal to or greater than the 66 dBA "approach" impact criterion. J1 is located at the southern end of Johnson Lane and J8, J9, and J12 are located along Coulson Road near its intersection with Johnson Lane.
- Two Category B receptors (M18 and M21) would be affected by the Mary Street Option 2 Alternative as described for Mary Street Option 1, with predicted noise levels that would "substantially exceed" the existing ambient noise level. M18 and M21 are located north of Mary Street and east of Bitterroot Drive.
- Two additional Category B receptors (M33 and M34) are located north of the proposed alignment on the eastern end of Mary Street. These residences are located just northeast of the intersection of Five Mile Road and Mary Street:
  - Predicted design year noise levels of 61 dBA and 68 dBA for M33 and M34, respectively, exceed the present year (2010) noise level of 45 dBA by more than 13 dBA for these Category B receptors (residents).
  - Predicted noise levels for receptors M33 and M34 would therefore "substantially exceed" the existing ambient noise level.

Table 4.26 Noise Impacts, Mary Street Option 2 Alternative

RECEPTOR	NAC dBA	EXISTING dBA	PREDICTED dBA
J1	66 dBA	60 dBA	66 dBA
J8	66 dBA	55 dBA	69 dBA
J9	66 dBA	55 dBA	68 dBA
J12	66 dBA	55 dBA	68 dBA
M18	66 dBA	42 dBA	62 dBA
M21	66 dBA	52 dBA	68 dBA
M33	66 dBA	45 dBA	61 dBA
M34	66 dBA	45 dBA	69 dBA

Indirect Impacts – Noise: Mary Street Option 2 Alternative

Indirect impacts under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Noise: Mary Street Option 2 Alternative

Temporary construction impacts under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Noise: Mary Street Option 2 Alternative

Mitigation measures under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Coordination with Local Officials

Coordination with local officials under this alternative would be the same as that described for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative noise impacts as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative, for both the primary and secondary corridors. However, the Phase 1 footprint would be narrower than the Full Buildout footprint and would carry slightly lower volumes of traffic. However, as noted in Section 4.2.1, Phase 1 ADT volumes would vary from the ADT volumes for Full Buildout by no more than 350 vehicles on any of the principal roadway corridors within the study area. This equates to a difference in ADT volumes of no more than +/-3%. As described in the *Billings Bypass Combined Traffic Reports*, this variation in volumes is statistically insignificant (Marvin & Associates 2013). Thus, the differences in noise are not anticipated to be substantially different than under the Full Buildout.

4.3.8.2.4 FIVE MILE ROAD ALTERNATIVE

Full Buildout

Direct Impacts – Noise: Five Mile Road Alternative

For the Five Mile Road Alternative, traffic noise impacts are expected at eight single-family residences, as follows. The summary table does not include the relocated receptors.

- Two residences (J6 and J7) may be relocated due to ROW impacts (as discussed under Section 4.3.5, "Right-of-Way and Utilities," the same as the Mary Street Option 1 Alternative. These residences are located north of I-90 near the intersection of Johnson Lane and Coulson Road.
- Three Category B receptors (J8, J9, and J12) located along Johnson Lane would be impacted, as described for the Mary Street Option 1 Alternative. Receptors J8, J9, and J12 are located along Coulson Road near its intersection with Johnson Lane.
- Three Category B receptors (F6, F9, and F10) are located east of the proposed Five Mile Road Alternative. These residences are located north of Dover Road and east of the proposed Five Mile Road extension:
  - Predicted design year noise levels (51 to 54 dBA) would exceed the present year (2010) noise levels of 37 and 38 dBA by more than 13 dBA for Category B receptors (residents).
  - Predicted noise levels for receptors F6, F9, and F10 would therefore "substantially exceed" the existing ambient noise level.

Table 4.27 Noise Impacts, Five Mile Road Alternative

RECEPTOR	NAC dBA	EXISTING dBA	PREDICTED dBA
J8	66 dBA	55 dBA	69 dBA
J9	66 dBA	55 dBA	68 dBA
J12	66 dBA	55 dBA	67 dBA
F6	66 dBA	37 dBA	52 dBA
F9	66 dBA	38 dBA	51 dBA
F10	66 dBA	38 dBA	54 dBA

Indirect Impacts – Noise: Five Mile Road Alternative
As under the Mary Street Option 1 and 2 alternatives, indirect impacts related to noise under this alternative include increased traffic on roadways providing access to the bypass. Traffic would increase on roads that approach the western intersection with Mary Street as travelers use it to access the secondary corridor, and as travelers approach the access to the primary corridor at Old Hwy 312. Receptors adjacent to these approach roads may also experience increased noise.

Temporary Construction Impacts – Noise: Five Mile Road Alternative
Temporary construction impacts related to noise under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Noise: Five Mile Road Alternative
Mitigation measures under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative. Additional options were explored, as described below.

Traffic Management
Mary Street is proposed as a 35 mph three-lane configuration for the Five Mile Road Alternative. Reducing the speed limit by 10 mph, which equates to a 2 dBA reduction, would eliminate expected impacts to two of the receptors that would be affected by this alternative (J12 and F9). However, a 10 mph reduction in speed may hinder the functionality of the roadway and would be extremely difficult to enforce. Therefore, modifying speed limits is not feasible, because it would limit the utility of the roadway.

Barriers
As described for the Mary Street Option 1 Alternative, noise barriers were considered as mitigation measures only for *groups* of receptors, not individual receptors, that would be affected by noise impacts. Barriers would not be reasonable for receptors J1 to J12, as described for the Mary Street Option 1 Alternative. The CEI for receptors F1 to F11 was calculated for the Five Mile Road Alternative to determine whether barriers would be reasonable at those locations. The CEI values for receptors F1 to F11 were well above MDT's $4,900 reasonableness criterion due to the small number of benefited receptors. Therefore, barriers would not be reasonable for traffic noise mitigation for this alternative. However, earthen berms may be constructed to provide visual buffers under this alternative, and such berms would also reduce traffic noise. If sufficient height can be achieved, berms could be used as a visual buffer and possibly as a traffic noise mitigation measure for receptors along the Five Mile Road alignment, because the terrain is relatively flat.

Coordination with Local Officials

Coordination with local officials under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative noise impacts as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative, for both the primary and secondary corridors. However, the Phase 1 footprint would be narrower than the Full Buildout footprint and would carry slightly lower volumes of traffic. However, as noted in Section 4.2.1, Phase 1 ADT volumes would vary from the ADT volumes for Full Buildout by no more than 350 vehicles on any of the principal roadway corridors within the study area. This equates to a difference in ADT volumes of no more than +/-3%. As described in the *Billings Bypass Combined Traffic Reports*, this variation in volumes is statistically insignificant (Marvin & Associates 2013). Thus, the differences in noise are not anticipated to be substantially different than under the Full Buildout.

4.3.9 FARMLANDS

4.3.9.1 METHODOLOGY

Prime and important farmland in the study area was inventoried using National Resource Conservation Service (NRCS) Yellowstone County Soil Survey data, aerial photography, and site visits (see Chapter 3).

Because the proposed project would convert farmlands (of prime or unique farmland, or farmland of statewide or local importance) to a non-agricultural land use, as defined in the Farmland Protection Policy Act (FPPA), coordination with the NRCS is required. Form NRCS-CPA-106 was submitted to NRCS.

Form NRCS-CPA-106 requires assignment of points based on alternative site characteristics. For example, if the percentage of a site being farmed within the study area is greater than 90%, 20 points are assigned. The purpose of the form is to rate and rank sites for agricultural importance and determine which alternative sites should receive the highest level of protection from conversion to nonagricultural uses. The score can then be used as an indicator of how the alternatives would impact agricultural land. If the total score for each alternative is less than 160, no further consideration for protection is required under FPPA and no additional sites need to be evaluated. If the total score for each alternative is 160 or greater, additional alternatives should be evaluated and sites with higher values should be given greater consideration for protection. If MDT's preferred alternative has a total score of 160 or greater, MDT would coordinate with the NRCS to determine appropriate avoidance and minimization measures for farmland impacts that can be incorporated into project design (MDT 2010), for example, considering the use of land that is not farmland or identifying alternative site locations and designs that would convert fewer acres of farmland or convert farmland with a relative lower value.

4.3.9.2 RESULTS

In accordance with the FPPA (7 USC 4201 et. seq.), a Farmland Conversion Impact Rating form (NRCS-CPA-106) was submitted to the NRCS Billings Field Office on August 14, 2012 (see Appendix C). The completed form was returned by NRCS on August 6, 2013. Each of the build alternatives received a total score of less than 160 points. Therefore, no further consideration for protection of farmland is required for any of the build alternatives in compliance with the FPPA. Under the provisions of 7 CFR 658.4(c)(2), no additional mitigation would be necessary.

As discussed in Section 4.3.5, "Right-of-Way and Utilities," agricultural land would comprise the majority of private land converted to ROW use by each of the build alternatives. The ROW footprint for each alternative ranges between 0.011% and 0.013% of the total area of important farmland in Yellowstone County. The potential direct impacts of each alternative to farmland due to ROW acquisition are summarized in **Table 4.28**. Potential indirect impacts are summarized in **Table 4.29**. Prime farmland if irrigated and farmland of statewide importance are depicted in **Figure 4.65**.

Table 4.28 Direct Impacts Summary – Farmlands

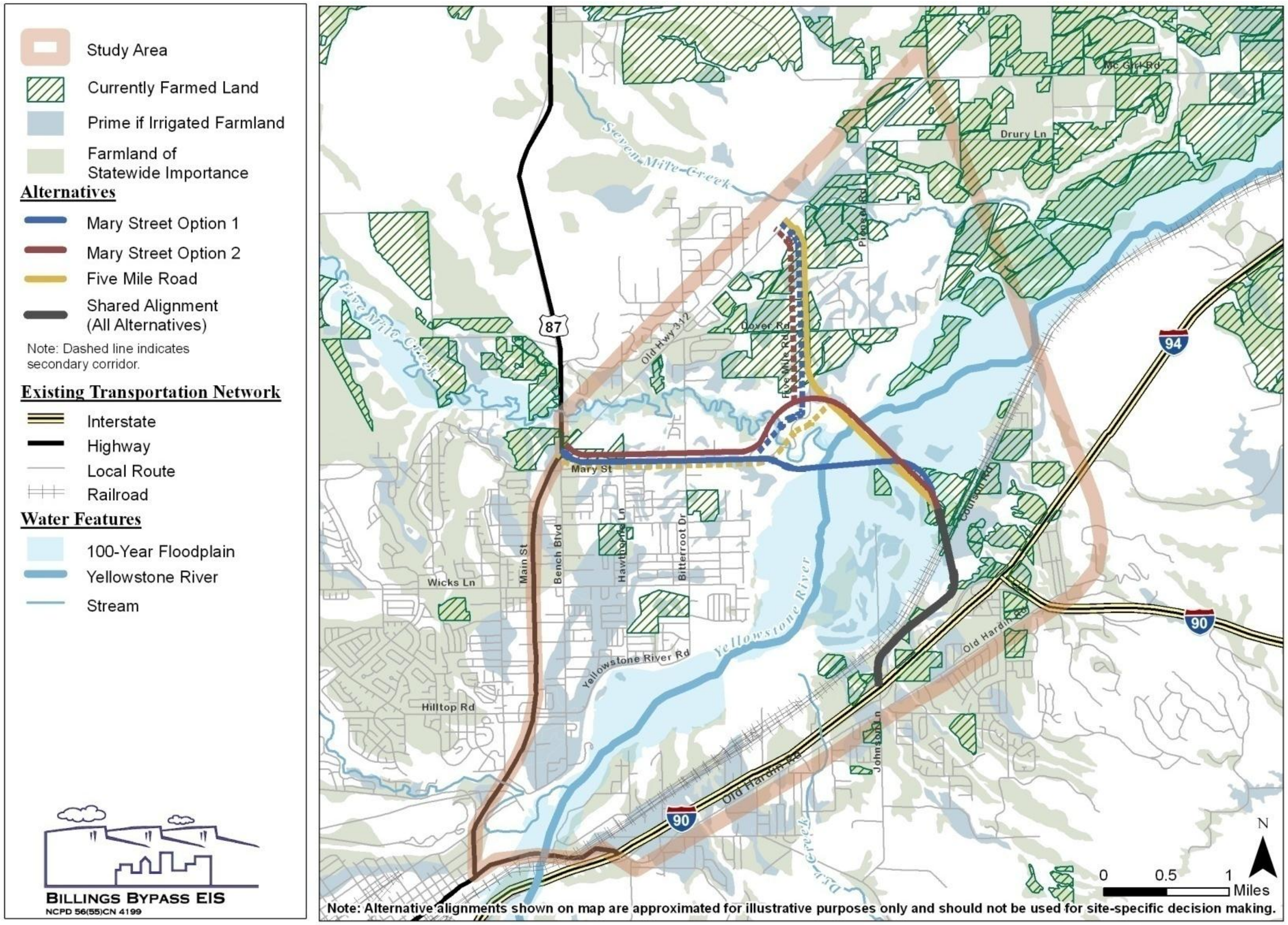
IMPORTANT FARMLAND CATEGORY	NO BUILD	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD
Statewide Importance	None.	14 acres	21 acres	20 acres
Prime and Unique	None.	24 acres	22 acres	24 acres
Total	None.	38 acres	43 acres	44 acres
Points Scored (if above 160, additional evaluation required)	N/A	110	125	123

Source: Completed form NRCS-CPA-106 (Appendix C).

Table 4.29 Indirect Impacts Summary – Farmlands

NO BUILD	MARY STREET OPTION 1	MARY STREET OPTION 2	FIVE MILE ROAD
Indirect Impacts			
None.	• Construction of a roadway through parcels used for farming could indirectly affect the viability of some parcels for agricultural use. • Equipment access and size of the leftover parcels may make farming on one or both of the remaining sections of the bisected parcels impractical or uneconomical. • Loss of prime farmland to other uses would put pressure on marginal lands, which generally are more erodible, drought-prone, and less productive and cannot be easily cultivated.	• See Mary Street Option 1 Alternative.	• See Mary Street Option 1 Alternative.

Figure 4.65 Prime and Important Farmlands in the Study Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 6/15/2012

4.3.9.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Farmlands: No Build Alternative

No direct impacts to farmlands are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Farmlands: No Build Alternative

No indirect impacts to farmlands are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Farmlands: No Build Alternative

No temporary construction impacts to farmlands are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – Farmlands: No Build Alternative

No cumulative impacts to farmlands are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Farmlands: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.3.9.2.2 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Farmlands: Mary Street Option 1 Alternative

As summarized in **Table 4.28**, ROW requirements for this alternative would impact 38 acres of important farmland. South of the Yellowstone River, impacts to important farmland would primarily occur directly northwest of Coulson Road. Two parcels partially consisting of important farmland would be bisected by the alternative alignment, and approximately 18 of this farm's total 94 acres would be required for ROW acquisition. If these parcels are leased and farmed by one farmer, bisecting the farm would make it more difficult to farm, because it would cause a physical separation that could lead to difficulties in transporting equipment between parcels.

The new roadway alignment under the Mary Street Option 1 Alternative would also bisect another 5.4-acre farm consisting of important farmland located near the Johnson Lane Interchange. Approximately half of the farm would be acquired for ROW. The remaining farmland would be fragmented and most likely no longer be farmable due to the ROW acquisition.

North of the Yellowstone River along the primary corridor, minor ROW impacts to important farmland would occur to one farm located near the intersection of Old Hwy 312 and Mary Street. Along the secondary corridor, impacts to important farmland would occur to four farms located near the intersection of Five Mile Road and Dover Road. The small amount of farmland taken for ROW acquisition in this area would amount to linear parcels along the edge of the farm and would not impact overall farming operations.

Indirect Impacts – Farmlands: Mary Street Option 1 Alternative

In addition to the direct loss of farmland through ROW acquisition, construction of a roadway through parcels used for farming could indirectly affect the viability of some parcels for agricultural use. Problems associated with equipment access and size of the leftover parcels may make farming on one or both of the remaining sections of any bisected parcels impractical or uneconomical. Farmers may decide to convert land to other uses or sell it for development. The loss of prime farmland to other uses would put pressure on marginal lands, which generally are more erodible, drought-prone, and less productive and cannot be easily cultivated.

Temporary Construction Impacts – Farmlands: Mary Street Option 1 Alternative

Farmers access their farms and move farm equipment to and from their sites by way of local roadways. Impacts resulting from construction could include disruption of access to parcels being farmed and traffic delays, thereby affecting farming activities that utilize local roadways. Construction permits would be required to access private land used for agriculture and could disrupt farming activities. These permits would be temporary and therefore would not permanently convert farmland to other uses. Construction in the immediate vicinity of farmlands would produce increased noise, dust, and air pollution in the short term, but is anticipated to have a negligible effect on agricultural activities.

Cumulative Impacts – Farmlands: Mary Street Option 1 Alternative

Despite experiencing repeated economic boom and bust economic cycles, Billings has grown at a steady rate for the past several decades. This growth has included development of residential, commercial, and industrial areas, which likely replaced several acres of farmland, including lands identified as important under NRCS guidelines. The majority of the residential and commercial developments planned within the study area, described in Section 4.3.1, "Land Use and Local Plans," would also affect farmlands identified as prime or of statewide importance, resulting in varying degrees of acquisition based on the level of development. Other future developments outside the study area but within the Billings urban area would contribute to the loss of farmlands within Billings. Similarly, planned transportation projects both within and outside of the study area would involve some degree of farmland acquisition, particularly those that involve roadway widening. The improvements to Five Mile Road as a secondary corridor could expedite planned development in the northern portion of the study area, which is primarily agricultural. The increased density in land use could convert the remaining farmsteads into urban and subdivision development, which would continue in accordance with local development plans and be contained in the UPA. Billings and Yellowstone County have policies in place to direct growth and contain it within the UPA, in order to retain the rural nature of the community; therefore, cumulative effects to farmlands would be moderate but not significant.

Mitigation – Farmlands: Mary Street Option 1 Alternative

Because all of the build alternatives received total point values of less than 160 points on the CPA-106 form, no mitigation to important farmlands is required under this alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to farmlands as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.9.2.3 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Farmlands: Mary Street Option 2 Alternative

As summarized in **Table 4.28**, ROW requirements for this alternative would impact 43 acres of important farmland. South of the Yellowstone River, impacts to important farmland would be similar to those discussed under the Mary Street Option 1 Alternative, with the exception of a farm located directly northwest of Coulson Road. Two parcels partially consisting of important farmland would be crossed by the alternative alignment, and approximately 22 of the total 94 acres would be required for ROW acquisition. Although the Mary Street Option 2 Alternative would require approximately 4 more acres for ROW acquisition, this acquisition would be located along the western edge of the farmland and would not have a substantial impact on farming operations.

North of the Yellowstone River, direct impacts to important farmland under this alternative would be the same as those discussed for the Mary Street Option 1 Alternative.

Indirect Impacts – Farmlands: Mary Street Option 2 Alternative

Indirect impacts to farmlands under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Farmlands: Mary Street Option 2 Alternative

Temporary construction impacts to farmlands under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Cumulative Impacts – Farmlands: Mary Street Option 2 Alternative

Cumulative impacts to farmlands under this alternative would be similar to those indicated for the Mary Street Option 1 Alternative, with no measurable differences.

Mitigation – Farmlands: Mary Street Option 2 Alternative

Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to farmlands as well as mitigation for Phase 1 of the Mary Street Option 2 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.9.2.4 FIVE MILE ROAD ALTERNATIVE

Full Buildout

Direct Impacts – Farmlands: Five Mile Road Alternative
As summarized in **Table 4.28,** ROW requirements for this alternative would impact 44 acres of important farmland. South of the Yellowstone River, impacts to important farmland under the Five Mile Road Alternative would be the same as those discussed under the Mary Street Option 2 Alternative.

North of the Yellowstone River along the primary corridor, ROW impacts to important farmland would occur to four farms located near the intersection of Five Mile Road and Dover Road. The small amount of farmland taken for ROW acquisition in this area would amount to linear parcels along the edge of the four farms and would not measurably impact overall farming operations.

At the Old Hwy 312 and Five Mile Road intersection, similar impacts would occur as those discussed under the Mary Street Option 1 Alternative. The Five Mile Road Alternative would require slightly more ROW acquisition at this intersection and would therefore impact a slightly greater amount of farmland.

Along the secondary corridor, this alternative would require a minor acquisition of important farmland on a farm located near the intersection of Mary Street and Old Hwy 312. The acquisition would not measurably impact overall farming operations.

Indirect Impacts – Farmlands: Five Mile Road Alternative
Indirect impacts to farmlands under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Farmlands: Five Mile Road Alternative
Temporary construction impacts to farmlands under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Cumulative Impacts – Farmlands: Five Mile Road Alternative
Cumulative impacts to farmlands under this alternative would be similar to those indicated for the Mary Street Option 1 Alternative. The Five Mile Road Alternative would be a limited access facility, with connections to the local roadway network limited to Old Hwy 312, Dover Road, and Mary Street. Therefore, this alternative would likely slow the conversion of rural land to higher density uses. Billings and Yellowstone County have policies in place to direct growth and contain it within the UPA, in order to retain the rural nature of the community; therefore, cumulative effects to farmlands would not be significant.

Mitigation – Farmlands: Five Mile Road Alternative
Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1
Direct, indirect, temporary construction, and cumulative impacts to farmlands as well as mitigation for Phase 1 of the Five Mile Road Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of

the Five Mile Road Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.10 IRRIGATION

4.3.10.1 METHODOLOGY

Irrigated land and irrigation facilities were identified using land use data, aerial photography, and coordination with local irrigation districts. Direct impacts assessed include ROW acquisition for irrigated parcels and impacts to irrigation ditches and other facilities. Longitudinal impacts and lateral impacts were identified. However, relocations or modifications to irrigation systems would be evaluated in more detail during final design.

4.3.10.2 RESULTS

All three build alternatives would impact irrigation systems, including ditch relocation or realignment, replacement, or installation of culverts, or replacement of irrigation structures. Impacted irrigation ditches would be relocated outside of ROW limits. The ownership and acreage of irrigated land would be affected only in those areas where lands are acquired for the proposed roadway alignment and associated embankments. The impact on irrigated land not taken as ROW would be negligible, because the impacted irrigation facilities would be replaced. **Figure 4.66** depicts irrigation systems impacted by the build alternatives.

4.3.10.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Irrigation: No Build Alternative

No direct impacts to irrigation are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Irrigation: No Build Alternative

No indirect impacts to irrigation are expected within or adjacent to the study area from the No Build Alternative.

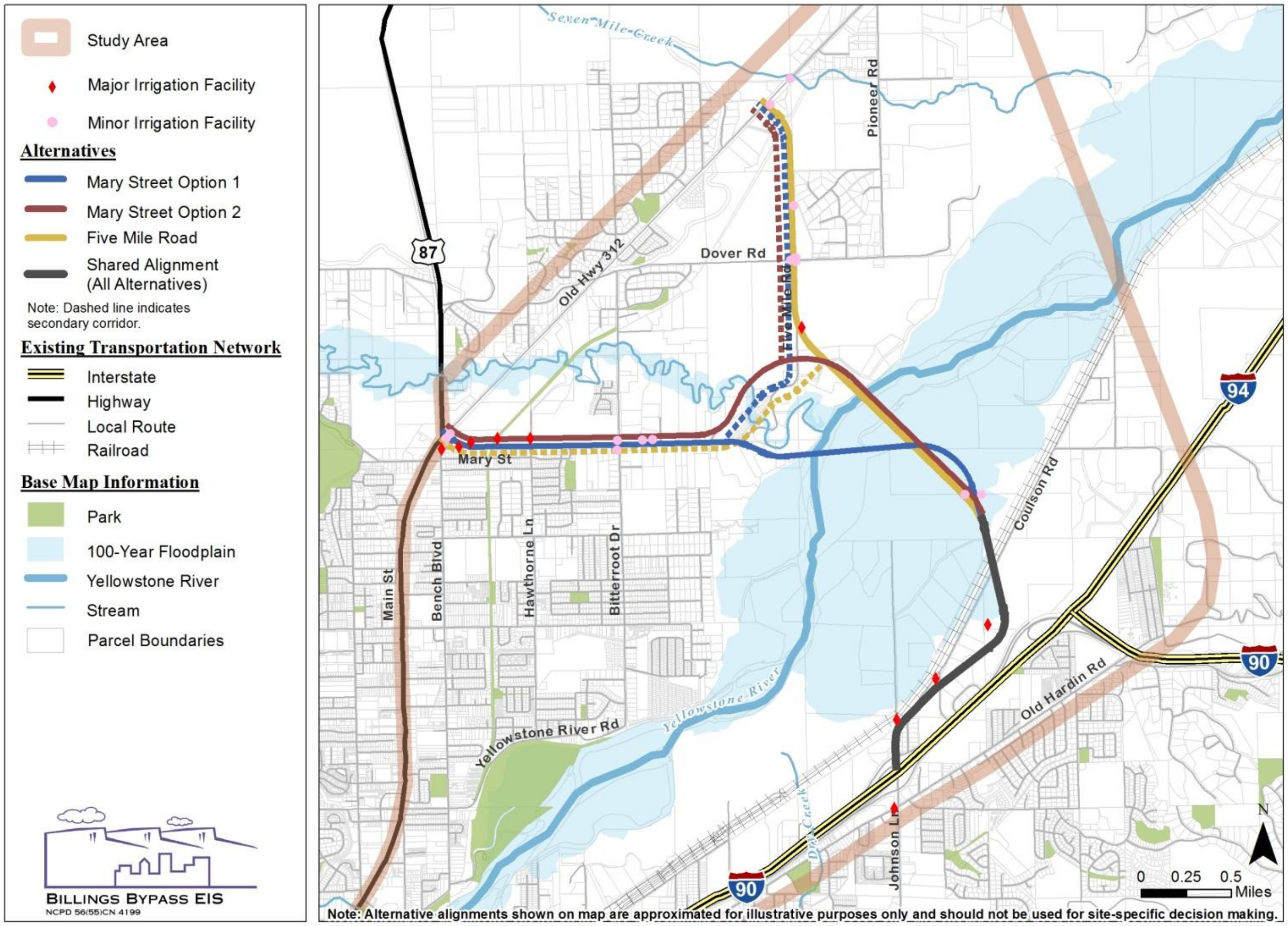
Temporary Construction Impacts – Irrigation: No Build Alternative

No temporary construction impacts to irrigation are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Irrigation: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

Figure 4.66 Irrigation Facilities



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/10/2013

4.3.10.2.2 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

The ownership and acreage of irrigated land would be affected only in those areas where lands are acquired for the proposed new roadway alignment and associated embankments. For the Mary Street Option 1 Alternative, the total area of land impacted by the ROW equals approximately 261 acres. Irrigated land taken as ROW under this alternative amounts to linear parcels of land adjacent to the roadway. Conservatively estimating that the entire ROW requirement consists of irrigated farmland, the impacted area would represent only 0.004% of the irrigated land in Yellowstone County. This alignment would longitudinally impact two major irrigation ditches, several minor irrigation ditches, one center-pivot sprinkler system, and one drainage ditch throughout the project limits. The following impacts, as summarized in **Table 4.30**, would occur to these irrigation facilities along the primary and secondary corridors.

Table 4.30 Mary Street Option 1 Alternative Irrigation Impacts

IRRIGATION FEATURE	DIRECT IMPACTS	INDIRECT IMPACTS
Coulson Ditch	• Relocation of two channels to the north; 650 feet and 1,400 feet. • New channel crossing. • New approach culvert. • Potential for conflict with utilities at one channel change. • Potential for construction impacts to ditch when construction occurs outside of ROW. • Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	• None.
24 Acre Center Pivot	• Roadway would impact approximately 12 acres, resulting in a loss of irrigated land.	• None.
Minor Irrigation Features	• Impacts to several minor, privately owned irrigation ditches used for crop irrigation. • Installation of new approach and crossing culverts. • Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation. • Possible minor channel changes. • Loss of land due to relocation of minor ditches outside of ROW. • Replacement of irrigation structures, such as culverts, check structures, and headgates, to MDT standards. • Potential for construction impacts to ditches when construction occurs outside of ROW.	• None.

IRRIGATION FEATURE	DIRECT IMPACTS	INDIRECT IMPACTS
Billings Bench Water Association (BBWA) Lateral	• Replacement of one substandard corrugated metal pipe crossing culvert to MDT standard reinforced concrete pipe. • Potential for construction impacts to ditch when construction occurs outside of ROW. • Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	• None.
Drainage Ditch near Five Mile Road	• Relocation outside of the clear zone of the roadway; ditch would be partially in the ROW. • Loss of irrigated or privately owned land. • Ditch section may be reduced in size. • Potential for construction impacts to ditch when construction occurs outside of ROW.	• None.

Direct Impacts – Irrigation: Mary Street Option 1 Alternative

As described in **Table 4.30**, direct impacts resulting from the construction of this alternative would primarily include relocation of irrigation facilities, irrigation ditch channel changes, replacement of irrigation structures, and the loss of irrigated land due to ditch relocation. A number of culverts would be required to accommodate drainage and irrigation features along the proposed roadway, interchange, and intersections. Existing culverts, which are assumed to be substandard corrugated metal pipe, would be replaced with MDT-standard reinforced concrete pipe (RCP). It is assumed that existing irrigation structures would be replaced with standard RCP during each project; overall, this would be a beneficial impact. New culverts would be required in areas where there is no existing roadway alignment.

South of the Yellowstone River, the alternative would impact approximately half of the acres irrigated by a center-pivot sprinkler system. The center of the pivot system would need to be relocated in order to maximize the amount of land it irrigates. A safety feature may need to be added to the system to prevent the watering mechanisms associated with the pivot from crossing the alternative alignment.

Secondary corridor improvements would impact a deeply incised drainage ditch located along the proposed extension of Five Mile Road. This privately owned drainage ditch drains runoff and irrigation waste waters to the Miller and McGirl Ditch. The drainage ditch would be relocated outside of the clear zone of the roadway, although it would remain partially inside of the ROW. Relocation would result in the loss of irrigated lands and private property.

Indirect Impacts – Irrigation: Mary Street Option 1 Alternative

No indirect impacts to irrigation under the Mary Street Option 1 are anticipated.

Temporary Construction Impacts – Irrigation: Mary Street Option 1 Alternative

Construction activities could temporarily disrupt irrigation flow as channels are relocated or reconstructed. Erosion from construction could cause increased sedimentation, affecting the quality of irrigation waters.

Mitigation – Irrigation: Mary Street Option 1 Alternative

Modifications to irrigation facilities would be designed and constructed in coordination with the ditch owners/operators.

Mitigation of lateral impacts to irrigation facilities in each district would consist of reconstruction by MDT of the existing culverts to maintain existing size and flow requirements. It is anticipated that the existing irrigation water flow would be maintained during construction, and that construction of irrigation facilities would occur outside of the irrigation season (April 15–October 15). Irrigation facilities would be relocated outside of the proposed project ROW. Landowners would be compensated for loss of irrigated land. Coordination with the landowner of the center-pivot sprinkler system would be required to identify the necessary modifications to this sprinkler system. The drainage ditch located along the proposed extension of Five Mile Road would be sized to handle storm flows during final design.

Mitigation related to land acquisition is described in Section 4.3.5, Right-of-Way and Utilities.

Contractors would be required to adhere to all applicable water quality laws and regulations in accordance with MDT standard specifications.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to irrigation as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 1 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.10.2.3 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

The ownership and acreage of irrigated land would be affected only in those areas where lands are acquired for the proposed new roadway alignment and associated embankments. For the Mary Street Option 2 Alternative, the total area of land impacted by the ROW equals approximately 254 acres. Irrigated land taken as ROW under this alternative amounts to linear parcels of land adjacent to the roadway. Conservatively estimating that the entire ROW requirement consists of irrigated farmland, the impacted area would represent only 0.004% of the irrigated land in Yellowstone County. This alignment would longitudinally impact two major irrigation ditches, several minor irrigation ditches, one center-pivot sprinkler system, and one drainage ditch within the study area. The following impacts, as summarized in **Table 4.31**, would occur to these irrigation facilities along the primary and secondary corridors.

Table 4.31 Mary Street Option 2 Alternative Irrigation Impacts

IRRIGATION FEATURE	DIRECT IMPACTS	INDIRECT IMPACTS
Coulson Ditch	• Relocation of two channels to the north; 650 feet and 1,400 feet. • New channel crossing. • New approach culvert. • Potential for conflict with utilities at one channel change. • Potential for construction impacts to ditch when construction occurs outside of ROW. • Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	• None.
24 Acre Center Pivot	• Roadway would impact approximately 12 acres of the 24 irrigated acres, resulting in a loss of irrigated land.	• None.
Minor Irrigation Features	• Impacts to several minor privately owned irrigation ditches used for crop irrigation. • Installation of new approach and crossing culverts. • Possible minor channel changes. • Loss of land due to relocation of minor ditches outside of ROW. • Replacement of irrigation structures, such as culverts, check structures, and headgates to MDT standards. • Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	• None.
Billings Bench Water Association (BBWA) Lateral	• Replacement of one substandard corrugated metal pipe crossing culvert to MDT-standard RCP. • Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	• None.
Drainage Ditch near Five Mile Road	• Relocation outside of the clear zone of the roadway; ditch would be partially in the ROW. • Loss of irrigated or privately owned land. • Ditch section may be reduced in size. • Potential for construction impacts to ditch when construction occurs outside of ROW.	• None.

Direct Impacts – Irrigation: Mary Street Option 2 Alternative

Direct impacts to irrigation under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Indirect Impacts – Irrigation: Mary Street Option 2 Alternative

No indirect impacts to irrigation are anticipated under this alternative.

Temporary Construction Impacts – Irrigation: Mary Street Option 2 Alternative

Temporary construction impacts to irrigation under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Irrigation: Mary Street Option 2 Alternative

Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to irrigation as well as mitigation for Phase 1 of the Mary Street Option 2 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 2 Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.10.2.4 FIVE MILE ROAD ALTERNATIVE

Full Buildout

The ownership and acreage of irrigated land would be affected only in those areas where lands are acquired for the proposed new roadway alignment and associated embankments. For the Five Mile Road Alternative, the total area of land impacted by the ROW equals approximately 221 acres. Irrigated land taken as ROW under this alternative amounts to linear parcels of land adjacent to the roadway. Conservatively estimating that the entire ROW requirement consists of irrigated farmland, the impacted area would represent only 0.004% of the irrigated land in Yellowstone County. This alignment would longitudinally impact three major irrigation ditches, several minor irrigation ditches, one center-pivot sprinkler system, and one drainage ditch throughout the project limits. The following impacts, as summarized in **Table 4.32**, would occur to these irrigation facilities along the primary and secondary corridors.

Table 4.32 Five Mile Road Alternative Irrigation Impacts

IRRIGATION FEATURE	DIRECT IMPACTS	INDIRECT IMPACTS
Coulson Ditch	• Relocation of two channels to the north; 650 feet and 1,400 feet. • New channel crossing. • New approach culvert. • Potential for conflict with utilities at one channel change. • Potential for construction impacts to ditch when construction occurs outside of ROW. • Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	• None.
24 Acre Center Pivot	• Roadway would impact approximately 12 acres of 24 total, resulting in a loss of irrigated land.	• None.
Billings Bench Water Association (BBWA) Lateral	• Channel change of approximately 100 feet. • New culvert crossing over road prism. • Loss of land due to channel change. • Potential for construction impacts to ditch when construction occurs outside of ROW. • Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	• None.
Drainage Ditch near Five Mile Road	• Relocation outside of the clear zone of the roadway; ditch would be partially in the ROW. • Loss of irrigated or privately owned land. • Ditch section may be reduced in size. • Potential for construction impacts to ditch when construction occurs outside of ROW.	• None.
Minor Irrigation Features	• Impacts to several minor privately owned irrigation ditches used for crop irrigation. • Installation of new approach and crossing culverts. • Possible minor channel changes. • Loss of land due to relocation of minor ditches outside of ROW. • Replacement of irrigation structures, such as culverts, check structures, and headgates, to MDT standards. • Potential for construction impacts to ditches when construction occurs outside of ROW. • Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	• None.

IRRIGATION FEATURE	DIRECT IMPACTS	INDIRECT IMPACTS
Unnamed Ditch	• Approximate 4,500 feet channel change to shift ditch outside of ROW. • Replacement of one crossing culvert, one approach culvert, and two irrigation check structures. • Loss of land due to channel change. • Potential for construction impacts to ditches when construction occurs outside of ROW. • Construction activities could temporarily disrupt irrigation flow and/or increase sedimentation.	• None.

Direct Impacts – Irrigation: Five Mile Road Alternative

As described in **Table 4.32**, direct impacts to irrigation resulting from the construction of this alternative would primarily include relocation of irrigation facilities, irrigation ditch channel changes, replacement of irrigation structures, and loss of irrigated land due to ditch relocation. A number of culverts would be required to accommodate drainage and irrigation features along the proposed roadway, interchange, and intersections. Existing culverts, which are assumed to be substandard corrugated metal pipe, would be replaced with MDT standard RCP. New culverts would be required in areas where there is no existing roadway alignment.

South of the Yellowstone River, the alternative would impact approximately half of the acres irrigated by a center-pivot sprinkler system. The center of the pivot system would need to be relocated in order to maximize the amount of land it irrigates. A safety feature may need to be added to the system to prevent the watering mechanisms associated with the pivot from crossing the alternative alignment. Coordination with the landowner would be required to identify the necessary modifications to this sprinkler system.

North of the Yellowstone River, a deeply incised drainage ditch located along the proposed extension of Five Mile Road would be impacted. This privately owned drainage ditch drains runoff and irrigation waste waters to the Miller and McGirl Ditch. The drainage ditch would be relocated outside of the clear zone of the roadway, although it would remain partially inside of the ROW. Relocation would result in the loss of irrigated lands and private property.

Improvements associated with the secondary corridor would impact an unnamed irrigation ditch originating from Lake Elmo. A channel change of approximately 4,500 feet would be required to shift the ditch outside of proposed project ROW. New crossing and approach culverts would be required, and two irrigation check structures would need replacement.

Indirect Impacts – Irrigation: Five Mile Road Alternative

No indirect impacts to irrigation are anticipated under this alternative.

Temporary Construction Impacts – Irrigation: Five Mile Road Alternative

Temporary construction impacts to irrigation under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Irrigation: Five Mile Road Alternative

Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to irrigation as well as mitigation for Phase 1 of the Five Mile Road Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.3.11 ENERGY

Energy use associated with the project includes vehicle fuel consumption in the transportation study area, electrical power required for operation of signalized intersections and street/intersection lighting operations in the study area, and the energy required for construction of the project.

4.3.11.1 METHODOLOGY

Energy use is estimated for two types of activities: construction and operations. Construction energy is that used in the construction of the alternatives, including planned mitigation. Operational energy includes that used for operating vehicles and for signals, lighting, etc. Vehicular energy use is estimated for the No Build Alternative and the build alternatives using outputs from the traffic analysis, combined with estimates of the distance vehicles travel on specific roadway segments.

Energy consumption during construction is addressed qualitatively. Differences among the build alternatives in the energy required to construct the project are estimated to be minor. Similarly, energy use related to the operation of signals and lighting is addressed qualitatively, because those outputs are also estimated to be similar among build alternatives. Energy use related to vehicle operations is assessed quantitatively, as defined below.

The energy calculations are used to compare overall energy impacts among alternatives, but, because variables such as average fuel efficiency are used, the results are not precise enough to be considered definitive. Energy use is calculated using the number of average daily vehicles, the average distance those vehicles travel, and an estimated fleet fuel consumption rate.

The formula for the calculation of vehicular operational energy use is:

$$E = V \times L \times FCR \times CF$$

Where E = energy in BTUs

V = number of vehicles (ADT)

L = length of roadway segment (in miles)

FCR = fuel consumption ratio (gallon/mile), fleet average

CF = BTU/gallon conversion factor

4.3.11.2 RESULTS

4.3.11.2.1 DIRECT IMPACTS – ENERGY

The project would result in direct impacts due to fuel consumption by drivers and energy use for operation of new signals and lighting associated with the build alternatives.

The No Build and build alternatives would have varying fuel consumption demand for the operation of vehicles within the study area. Since each of the build alternatives includes secondary improvements that encompass all of the same roadway segments, the total distance of roadways analyzed for the build alternatives is the same (not true for the No Build Alternative). However, the number of vehicles on each roadway segment varies by alternative.

In 2010, average daily VMT was 434,000 miles within the study area, which includes US 87 on the west, Old Hwy 312 on the north, the area east of Pioneer Road including part of I-94 on the east, and I-90 on the south. By 2035, VMT is expected to increase by 54% within the same area if the proposed project is not built, and by 55% under each of the build alternatives.

The build alternatives would increase VMT by 0.5% to 1.1% over the No Build Alternative. In the corridor, the build alternatives would result in between 12,993,000 and 13,070,000 gallons of fuel consumed annually. The Five Mile Road Alternative would result in the highest fuel consumption. **Table 4.33** shows the results of the operations energy analysis.

Table 4.33 Energy Use for Operations by Alternative

ALTERNATIVES	THOUSAND GALLONS/YEAR[1]	TRILLION BTU/YEAR[2]	DIFFERENCE TO NO BUILD	DIFFERENCE TO EXISTING[3]
NO BUILD ALTERNATIVE				
	12,925	1,616	N/A	+ 51.0%
MARY STREET OPTION 1 ALTERNATIVE				
	12,995	1,624	+ 0.5%	+ 51.8%
MARY STREET OPTION 2 ALTERNATIVE				
	12,993	1,624	+ 0.5%	+ 51.8%
FIVE MILE ROAD ALTERNATIVE				
	13,070	1,634	+ 1.1%	+ 52.7%

[1] Fuel used on study area roadways, based on traffic modeling presented in Section 4.2.1. Fleet average of 18.83 miles per gallon estimated using Caltrans estimate from the "2007 California Motor Vehicle Stock, Travel and Fuel Forecast." California Department of Transportation, Division of Transportation System Information, May 2008.

[2] Conversion factor of 125,000 BTU/gallon used for analysis.

[3] The existing energy use for the traffic study area is estimated at 8,559 thousand gallons per year (2010).

Differences among the build alternatives in the energy required to operate signalized intersections and street/intersection lighting are estimated to be minor, because the number of signals and lights in operation would likely be similar, if not the same, for each of them. The No Build Alternative would have nominally lower energy use for signals and illumination, because the new roadways associated with the build alternatives would not be constructed.

4.3.11.2.2 INDIRECT IMPACTS – ENERGY: CONSTRUCTION

The project would result in indirect impacts from using energy to construct the project.

The differences in construction energy used among the build alternatives are not expected to be great, because all of the build alternatives include both primary and secondary corridors, and cover approximately the same distance and widths of roads. Construction of any of the build alternatives would require energy for the generation and transport of construction materials (e.g., aggregate base, retaining walls, bridges), and from the operation of construction equipment. Because the three build alternatives all have similar attributes in terms of roadway length, bridges, and additional features (bike lanes, sidewalks) and because all of the build alternatives are expected to require approximately the same amount of time for construction, similar amounts of energy would likely be expended to construct each alternative.

4.3.11.2.3 CUMULATIVE EFFECTS

No cumulative impacts related to energy are expected as a result of any of the Build Alternatives.

4.3.11.2.4 MITIGATION MEASURES - ENERGY

No energy mitigation measures are required or proposed for this project.

4.3.11.2.5 PHASE 1 RESULTS

Direct, indirect, and cumulative impacts related to energy as would not be substantially different than the Full Buildout impacts. As noted in Section 4.2.1, Phase 1 ADT volumes would vary from the ADT volumes for Full Buildout by no more than 350 vehicles on any of the principal roadway corridors within the study area. This equates to a difference in ADT volumes of no more than +/-3%. As described in the *Billings Bypass Combined Traffic Reports*, this variation in volumes is statistically insignificant (Marvin & Associates 2013). Thus, the differences in energy consumption are not anticipated to be significant.

Construction impacts would, however, be higher if the project has phased implementation rather than being built in one phase, due to construction management efficiencies that could be realized if the project was built all at once.

4.4 ENVIRONMENTAL

4.4.1 AIR QUALITY

4.4.1.1 METHODOLOGY

The following analysis presents the assessment of carbon monoxide (CO), particulate matter (PM), and Mobile Source Air Toxics (MSATs) project-related impacts. The CAL3QHC computer dispersion model was used to predict the 1-hour CO concentrations at the receptor locations shown in **Figure 4.67** for Existing (2010), Design Year No Build (2035), and Design Year Build (2035) conditions. MOBILE6.2 was used to model mobile source emissions. All traffic input was derived from the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013). Worst-case traffic operations and atmospheric conditions were incorporated to predict existing, worst-case CO concentrations. Particulate matter, MSATs, and greenhouse gas emissions are addressed qualitatively.

4.4.1.2 RESULTS

Table 4.34 summarizes the results of the air quality modeling and qualitative analysis and identifies direct and indirect impacts. The existing (2010) conditions are presented for comparison. Projected air quality impacts do not vary substantially among the build alternatives; thus, they are discussed as a whole below.

Table 4.34 Direct and Indirect Impacts Summary – Air Quality

CO MAXIMUM – 1 HR STANDARD = 35 PPM	CO MAXIMUM – 8 HR STANDARD = 9 PPM	PM IMPACTS	MSATs IMPACTS	INDIRECT IMPACTS
EXISTING CONDITIONS (2010)				
• Airport Road and Main Street – 8.3 ppm	• Airport Road and Main Street – 5.6 ppm	• Area is in attainment for PM 2.5	• Area toxics are of national concern	• None
NO BUILD ALTERNATIVE (DESIGN YEAR 2035)				
• Airport Road and Main Street – 7.6 parts per million (ppm).	• Airport Road and Main Street – 5.1 ppm.	• No hot-spot analysis required; project is not a project of concern due to area attainment status.	• Project has “low potential” MSATs effects.	• None.
MARY STREET OPTION 1 ALTERNATIVE (DESIGN YEAR 2035)				
• Airport Road and Main Street – 7.1 ppm.	• Airport Road and Main Street – 4.8 ppm.	• Same as No Build Alternative.	• Same as No Build Alternative.	• Increased commercial and high density residential development in the study area could result in increased vehicle miles traveled and the potential for more mobile source pollution.
MARY STREET OPTION 2 ALTERNATIVE (DESIGN YEAR 2035)				
• Airport Road and Main Street – 7.1 ppm.	• Airport Road and Main Street – 4.8 ppm.	• Same as No Build Alternative.	• Same as No Build Alternative.	• Same as Mary Street Option 1 Alternative.
FIVE MILE ROAD ALTERNATIVE (DESIGN YEAR 2035)				
• Airport Road and Main Street – 7.2 ppm.	• Airport Road and Main Street – 4.8 ppm.	• Same as No Build Alternative.	• Same as No Build Alternative.	• Same as Mary Street Option 1 Alternative.

4.4.1.2.1 NO BUILD ALTERNATIVE

The No Build Alternative would result in small improvements in 1-hour CO concentrations at the worst-performing intersections. Generally, the improvements in vehicle technology, fuel types, and the effect of planned projects on traffic flow would result in fewer localized air quality problems than are present today. For a discussion of PM and MSAT emissions, refer to Section 4.4.1.2.2, "Build Alternatives" below.

4.4.1.2.2 BUILD ALTERNATIVES

Full Buildout

Generally direct impacts related to air quality would be similar among the build alternatives because the length of the alternatives and the types of terrain and land uses that the alternatives cross are similar. The direct, indirect, temporary construction, and cumulative impacts and proposed mitigation measures are presented together, for all build alternatives, below.

Direct Impacts – Air Quality: All Build Alternatives

Carbon Monoxide Analysis

CO is a stable gas that disperses in predictable ways in the atmosphere. Therefore, computer modeling was used to assess both existing and expected future atmospheric concentrations of CO at selected receptor sites. The air quality models were designed to replicate traffic operations associated with the existing and future conditions. All intersection areas were modeled under existing and future traffic conditions, as well as select portions along the proposed project alternatives. The greatest concentrations of CO tend to occur in the winter months, when automobiles experience incomplete combustion of fuel due to low temperatures. For this reason, all modeling was performed to represent wintertime (January) conditions.

Typical areas selected for the analysis include residential yards and open areas along the project corridor as well as signalized intersections. Coordination was conducted with members of the project team in order to identify the worst-case locations to be included in the analysis. Several factors were taken into account to identify potential CO receptors, including land use type, human activity levels, location of geometric improvements, and projected traffic volumes. As discussed in the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013), the two signalized intersections with highest projected ADT under Design Year No Build conditions were at Airport Road and Main Street as well as at Wicks Lane and Main Street. The ADT projected at each signalized intersection is 73,500 and 60,000, respectively, for PM peak conditions. In addition, the intersections are projected to operate at LOS F (highly congested) under Design Year No Build conditions. As such, since these areas experience the highest traffic volumes in the corridor, the intersections are considered worst-case. Sensitive receptors adjacent to each intersection were selected based on EPA modeling protocols and were included in the air quality assessment.

If the worst-case areas selected in the analysis are below the National Ambient Air Quality Standards (NAAQS) and Montana Ambient Air Quality Standards (MAAQS) under Design Year Build conditions, it is assumed that all other sections of the corridor would also remain below the thresholds. **Figure 4.67** shows the sensitive receptor locations selected for the analysis along select portions of each build alternative, as well as the two signalized intersections that were included in the hot-spot analysis.

Based on review of the supplied traffic data, the CO modeling analysis for the project corridor focused on the PM peak conditions, as presented in the *Billings Bypass Combined Traffic Reports* (Marvin & Associates 2013). Maximum CO concentrations, calculated by adding the background concentration to the CO concentration projected for all years considered in the analysis area, are shown in **Table 4.35** for the selected study area intersections, and in **Table 4.36** for selected receptors along the proposed alignments. Under all scenarios for each proposed alternative and selected signalized intersections, the highest 1-hour and 8-hour CO concentrations are projected to be below the national standards of 35 ppm and 9 ppm, respectively. In addition, the projected CO concentrations are well below the MAAQS of 23 ppm and 9 ppm, respectively. Furthermore, in all cases, the 1-hour CO projections are below the 8-hour standard. Therefore, since the projected 1-hour and 8-hour CO concentrations do not exceed the NAAQS or the MAAQS as a result of the proposed improvements, no mitigation measures are required.

Table 4.35 Modeled CO Concentrations at Worst-Performing Study Area Intersections

		EXISTING (2010)		DESIGN YEAR NO BUILD (2035)		MARY STREET OPTION 1 (2035)		MARY STREET OPTION 2 (2035)		FIVE MILE ROAD (2035)	
Location	**Receptor ID**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**
Airport Road and Main Street	A10	8.0	5.4	7.6	5.1	7.1	4.8	7.1	4.8	7.2	4.8
	A18	8.3	5.6	7.2	4.8	6.7	4.5	6.7	4.5	6.8	4.6
Wicks Lane and Main Street	W8	6.6	4.4	7.4	5.0	6.6	4.4	6.4	4.3	5.7	3.8
	W9	7.5	5.0	6.5	4.4	6.1	4.1	6.1	4.1	6.4	4.3

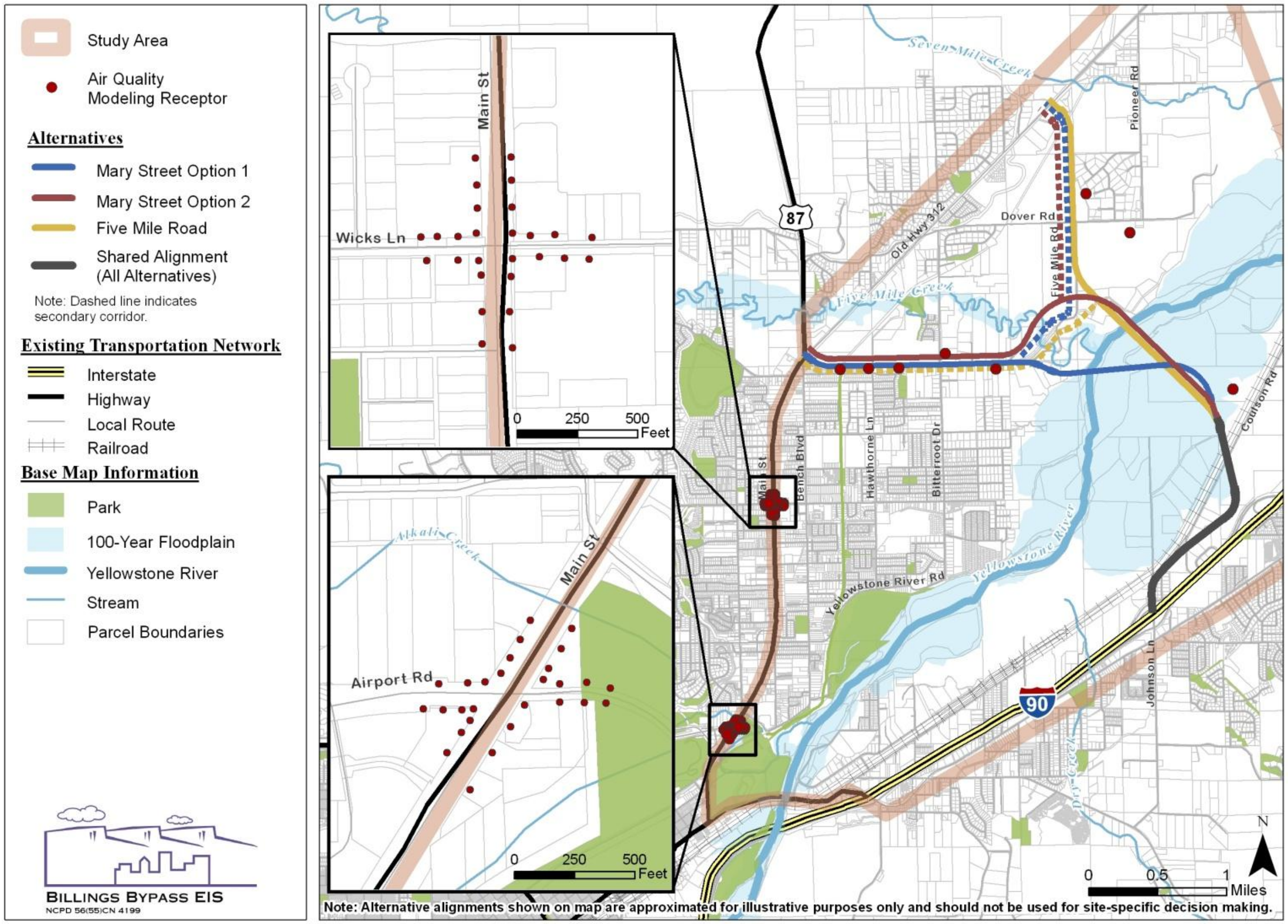
Notes: Highlighted cells represent the highest CO concentrations per analysis year for the given location. 28 receptors near Airport Road and Main Street were modeled, and 27 receptors near Wicks Lane and Main Street were modeled. Numbers above reflect the worst-performing sites in the vicinity of those two intersections.

1. 1-hour and 8-hour CO concentrations shown above are in parts per million (ppm). The NAAQS for CO are 35 ppm and 9 ppm for the highest 1-hour and 8-hour concentrations, respectively. The MAAQS are 23 ppm and 9 ppm for the highest 1-hour and 8-hour CO concentrations, respectively.

2. 1-hour CO concentrations are predicted using CAL3QHC computer dispersion model and assuming a background concentration of 2.5 ppm, as supplied by MDEQ.

3. 8-hour CO concentrations were calculated by applying a persistence factor of 0.67 to the 1-hour concentration. The persistence factor of 0.67 is based on 2008-2010 December/January data at monitor number 30-111-0085, as supplied by MDEQ.

Figure 4.67 Air Quality Receptor Locations



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010, Big Sky Acoustics (noise receptor and measurement information) 2011, McCormick Taylor, 2012

Date Plotted: 6/20/2012

Table 4.36 Modeled CO Concentrations at Selected Sensitive Receptors (1-Hour and 8-Hour CO Level Summary (ppm))

	EXISTING (2010)		DESIGN YEAR NO BUILD (2035)		MARY STREET OPTION 1 (2035)		MARY STREET OPTION 2 (2035)		FIVE MILE ROAD (2035)	
Receptor ID	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**
M1	2.6	1.7	2.7	1.8	2.9	1.9	2.9	1.9	2.9	1.9
M2	2.6	1.7	2.7	1.8	2.8	1.9	2.8	1.9	2.8	1.9
M3	2.5	1.7	2.6	1.7	2.98	1.9	2.8	1.9	2.8	1.9
M4	2.5	1.7	2.5	1.7	2.8	1.9	2.7	1.8	2.7	1.8
M5	2.5	1.7	2.5	1.7	2.8	1.9	2.7	1.8	2.7	1.8
M6	2.5	1.7	2.5	1.7	2.6	1.7	2.6	1.7	2.6	1.7
M7	2.5	1.7	2.5	1.7	2.5	1.7	2.6	1.7	2.6	1.7
M8	2.5	1.7	2.5	1.7	2.7	1.8	2.6	1.7	2.6	1.7

Notes:

1. 1-hour and 8-hour CO concentrations shown above are in parts per million (ppm). The NAAQS for CO are 35 ppm and 9 ppm for the highest 1-hour and 8-hour concentrations, respectively. The MAAQS are 23 ppm and 9 ppm for the highest 1-hour and 8-hour CO concentrations, respectively.

2. 1-hour CO concentrations are predicted using CAL3QHC computer dispersion model and assuming a background concentration of 2.5 ppm, as supplied by MDEQ.

3. 8-hour CO concentrations were calculated by applying a persistence factor of 0.67 to the 1-hour concentration. The persistence factor of 0.67 is based on 2008-2010 December/January data at monitor number 30-111-0085, as supplied by MDEQ.

Fine Particulate Matter Analysis

Particle pollution is composed of a mixture of solid particles and liquid droplets found in the atmosphere. The particles are a combination of several items including dust, dirt, soot, and smoke, and they can vary in size. Particulate matter (PM) created by human activity includes, but is not limited to, the following sources: wood stoves, industry and power plants, and emissions from motor vehicles. It can also be formed in the atmosphere from gases, including sulfur dioxide, nitrogen dioxide, and volatile organic compounds (VOCs).

Particle pollution includes "inhalable coarse particles" with diameters larger than 2.5 micrometers and smaller than 10 micrometers and "fine particles" with diameters 2.5 micrometers and smaller. The average human hair is about 70 micrometers in diameter—making it 30 times larger than the largest fine particle.

The project is located in Billings, Montana, in an area designated as attainment for $PM_{2.5}$ (particles with diameter 2.5 micrometers and smaller). Therefore, based on the attainment designation for $PM_{2.5}$, no hot-spot analysis is necessary, since the area has not been identified as nonattainment or maintenance and is in compliance with the NAAQS and the MAAQS. Furthermore, the project is not considered to be a project of air quality concern. The March 2006 final rule provides examples of projects that would not be covered by 40 CFR 93.123(b)(1) and would not require a $PM_{2.5}$ hot-spot analysis (71 FR 12491).

Based on the above information, it can be determined that the project is not considered a project of "air quality concern" with respect to particulate matter, is located in a geographic area that is in attainment for $PM_{2.5}$, and has met all of the state and federal requirements.

Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources, and stationary sources (e.g., factories or refineries). MSATs are a subset of the 188 air toxics defined by the Clean Air Act. EPA has assessed this expansive list in its latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified seven compounds of particular concern: acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. These are compounds that EPA's 1999 National-Scale Air Toxics Assessment identified as the most significant contributors to cancer and non-cancer health risk from breathing outdoor air toxics, and that have a significant contribution from mobile sources.

The 2007 EPA rule mentioned above requires controls that would dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (i.e., vehicle miles traveled, or VMT) increases by 145%, as assumed, a combined reduction of 72% in the total annual emission rates for the priority MSATs is projected from 1999 to 2050, as shown in **Figure 4.68**.

On September 30, 2009, FHWA issued *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents* (FHWA 2009). This interim guidance update reflects recent regulatory changes, addresses stakeholder requests to broaden the horizon years of emission trends performed with MOBILE6.2, and updates stakeholders on the status of scientific research on air toxics.

Based on the nature of the improvements, the project is best characterized as "low potential MSAT effects" and is discussed qualitatively below.

Qualitative Analysis

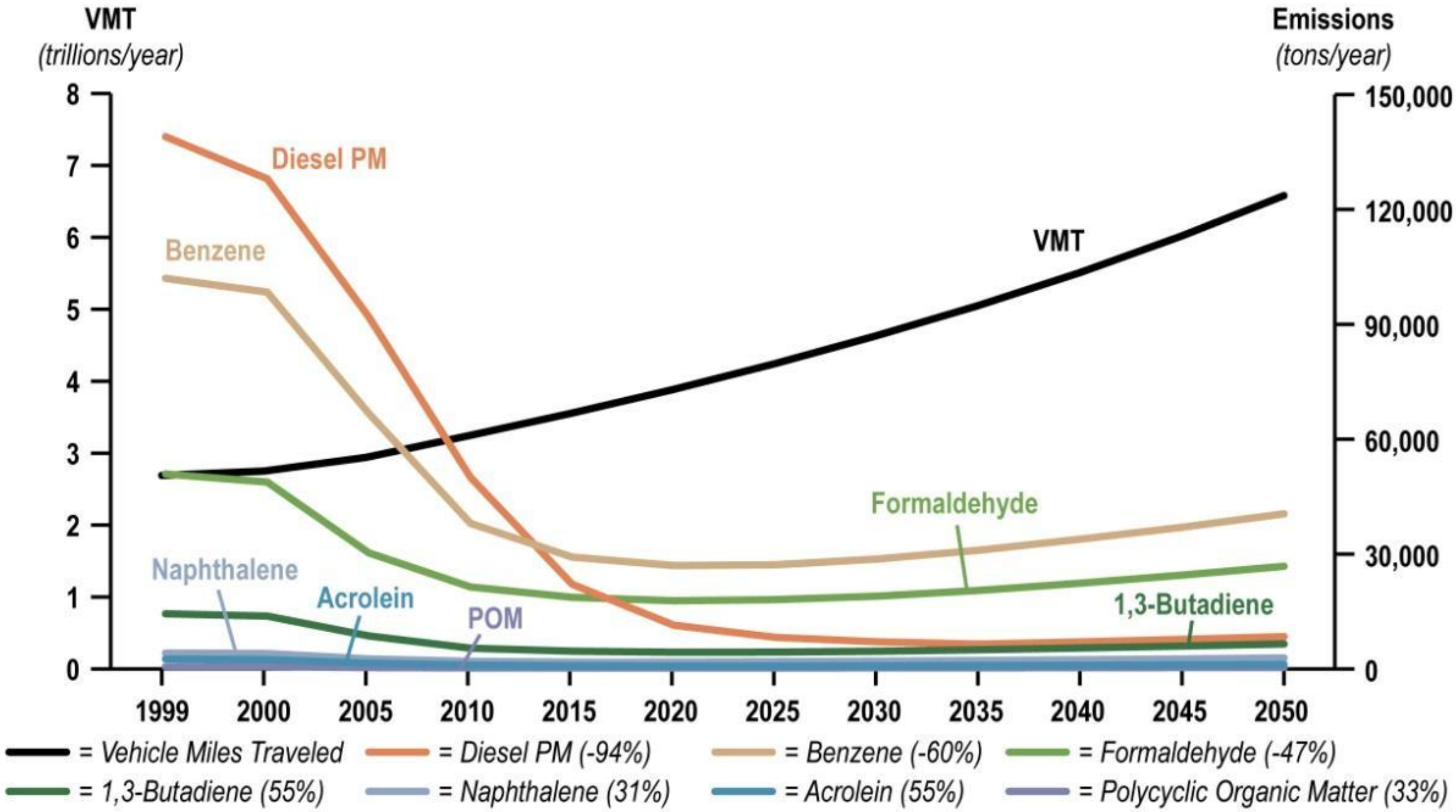
In accordance with the updated guidance, the project area is best characterized as a project with "low potential MSAT effects" since Design Year traffic is projected to be less than 140,000 to 150,000 annual average daily traffic (AADT). As a result, a qualitative assessment of emissions projections was prepared in accordance with Appendix B of the guidance. Project-specific elements, including increased travel speeds and improvements to level of service (LOS) and the overall effects on MSAT emissions, are discussed below. As stipulated in the guidance, additional discussion is required, including information that is incomplete or unavailable for a project-specific assessment of MSAT impacts. Additionally, air toxics is an emerging field, and current scientific techniques, tools, and data are not sufficient to accurately estimate human health impacts that would result from the transportation project. Appendix C from the FHWA guidance is also discussed below to satisfy this portion of the requirements.

For each of the build alternatives, the amount of MSATs emitted is generally proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix and diesel vehicle percentages remain constant for each alternative. The VMT estimated for each of the build alternatives are generally projected to be only slightly higher when compared to the No Build Alternative in each analysis year. As such, significantly higher levels of MSAT emissions are not expected as a result of this project. Also, regardless of the alternative chosen, MSAT emissions would likely be significantly lower than present levels in the Design Year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72% from 1999 to 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be substantially lower in the future in virtually all locations in the project corridor, regardless of which alternative is selected.

Under each build alternative, there may be localized areas where VMT could increase and other areas where VMT could decrease. Therefore, it is possible that localized increases in MSAT emissions may occur in some locations. The localized increases in MSAT emissions could be most pronounced along each of the alternatives. However, even if localized increases do occur in some areas, total MSAT emissions would be substantially lower in future years due to fleet turnover and the implementation of EPA's vehicle and fuel regulations.

In summary, for each of the build alternatives in the Design Year, the total MSAT emissions in the project corridor are expected to be significantly lower than those emitted today, even when taking into account the small projected increase in VMT in some project locations.

Figure 4.68 National MSAT Emission Trends 1999-2050 for Vehicles Operating on Roadways, Using EPA's MOBILE6.2 Model



Note:
(1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.
(2) Trends for specific locations may be different, depending on locally derived information representing vehicle miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is currently incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation than by any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. EPA is the lead authority for administering the Clean Air Act and its amendments and has specific statutory obligations with respect to hazardous air pollutants and MSATs. EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. The agency maintains the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects," and is accessible here: http://www.epa.gov/ncea/iris/ index.html. Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSATs, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents*. 7Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious are the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling, dispersion modeling, and exposure modeling, and then final determination of health impacts. Each step in the process builds on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70-year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in a National Cooperative Highway Research Program (NCHRP) study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country—three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with NAAQS for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways and to determine the portion of time that people are actually exposed at a specific location. There are considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than those that are safe or acceptable.

Conclusion Regarding MSAT Emissions

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities, and improving access for emergency response, that are better suited for quantitative analysis.

Moreover, EPA regulations for vehicle engines and fuels would cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOBILE6.2 model forecasts a combined reduction of 72% in the total annual emission rate for the priority MSATs from 1999 to 2050, while VMT is projected to increase by 145%. This trend would reduce both the background level of MSATs and the possibility of even minor MSAT emissions from this project.

Transportation Conformity

The Billings Bypass EIS project was included in the *Billings Urban Area Long-Range Transportation Plan* (2009) and the Fiscal Year 2010-2014 Transportation Improvement Program (TIP), which has been found to conform to the NAAQS for CO. Based on the results of the "hot-spot" air quality analysis presented above, CO concentrations associated with the build alternatives are predicted to be well below the NAAQS and the MAAQS under Design Year Build (2035) conditions. Since projected CO levels are below the NAAQS and the MAAQS under Design Year Build conditions, no exceedences are anticipated as a result of the proposed project and no mitigation measures are required. Because the project is in a conforming TIP and based on the results of the hot-spot analysis, the project has met all conformity requirements as outlined by the CAA of 1990 and the Carbon Monoxide State Implementation Plan for the State of Montana.

Greenhouse Gases

An individual project does not generate enough greenhouse gas emissions to significantly influence global climate change. A project's effects on global climate change are a cumulative impact. A new roadway is assessed by its potential impact through its incremental contribution combined with the cumulative increase of all other sources of greenhouse gases in the world. Impacts to greenhouse gases would occur if the project contributed a cumulatively considerable net increase of greenhouse gas emissions. The significance threshold associated with greenhouse gas emissions is very high, since global climate change is a worldwide phenomenon, and this roadway project would not contribute to greenhouse gas emission at a cumulatively considerable level.

Indirect Impacts – Air Quality: All Build Alternatives

An indirect effect of the new roadway could be increased commercial and high density residential development in the study area. As a result there would be an increase in vehicle miles traveled in the study area and the potential for more mobile source pollution. Transportation projects that might exacerbate air quality problems must meet certain requirements before they can proceed. Particularly, a regional air quality conformity analysis is needed to show that projects are compatible with the State Implementation Plan (SIP). While the number of pollution sources is expected to grow, pollution emissions are not expected to increase proportionately because of the implementation of stricter regulatory controls.

Any incremental emissions impacts to air quality from the build alternatives would be small compared to current pollutant emissions levels.

Temporary Construction Impacts – Air Quality: All Build Alternatives

The temporary air quality impacts from construction are not expected to be significant, regardless of the alternative selected. Emissions would be produced during the construction of this project by heavy equipment and vehicle travel to and from the site. Earthmoving and ground-disturbing operations would generate airborne dust. Construction emissions are short term or temporary in nature.

Mitigation – Air Quality: All Build Alternatives

In accordance with MDT Standard Specification 107, the contractor would be required to adhere to applicable air quality rules and regulations, which may require the use of dust suppression and emission control measures to minimize short-term construction-related impacts.

Operation of all equipment including, but not limited to, hot-mix paving plants and aggregate crushers must meet the minimum air quality standards established by federal, state, and local agencies in accordance with MDT Standard specification 107.11.3.

Phase 1

Direct, indirect, and cumulative impacts to air quality as would not be substantially different than the Full Buildout impacts with mitigation. As noted in Section 4.2.1, Phase 1 ADT volumes would vary from the

ADT volumes for Full Buildout by no more than 350 vehicles on any of the principal roadway corridors within the study area. This equates to a difference in ADT volumes of no more than +/-3%. As described in the *Billings Bypass Combined Traffic Reports*, this variation in volumes is statistically insignificant (Marvin & Associates 2013). The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout. Thus, the differences in air quality impacts are not anticipated to be significant.

Construction impacts would, however, be higher if the project has phased implementation rather than being built in one phase, due to construction management efficiencies that could be realized if the project was built all at once.

4.4.2 HAZARDOUS MATERIALS

4.4.2.1 METHODOLOGY

An Initial Site Assessment (ISA) was performed to identify hazardous materials/substances in the study area that could be affected by ground disturbance associated with each proposed build alternative or pose long-term cleanup/control requirements. The investigation included review of aerial photographs, available mapping, an environmental database search, and a site visit. If significant issues are identified in the ISA, a Preliminary Site Investigation is performed.

4.4.2.2 RESULTS

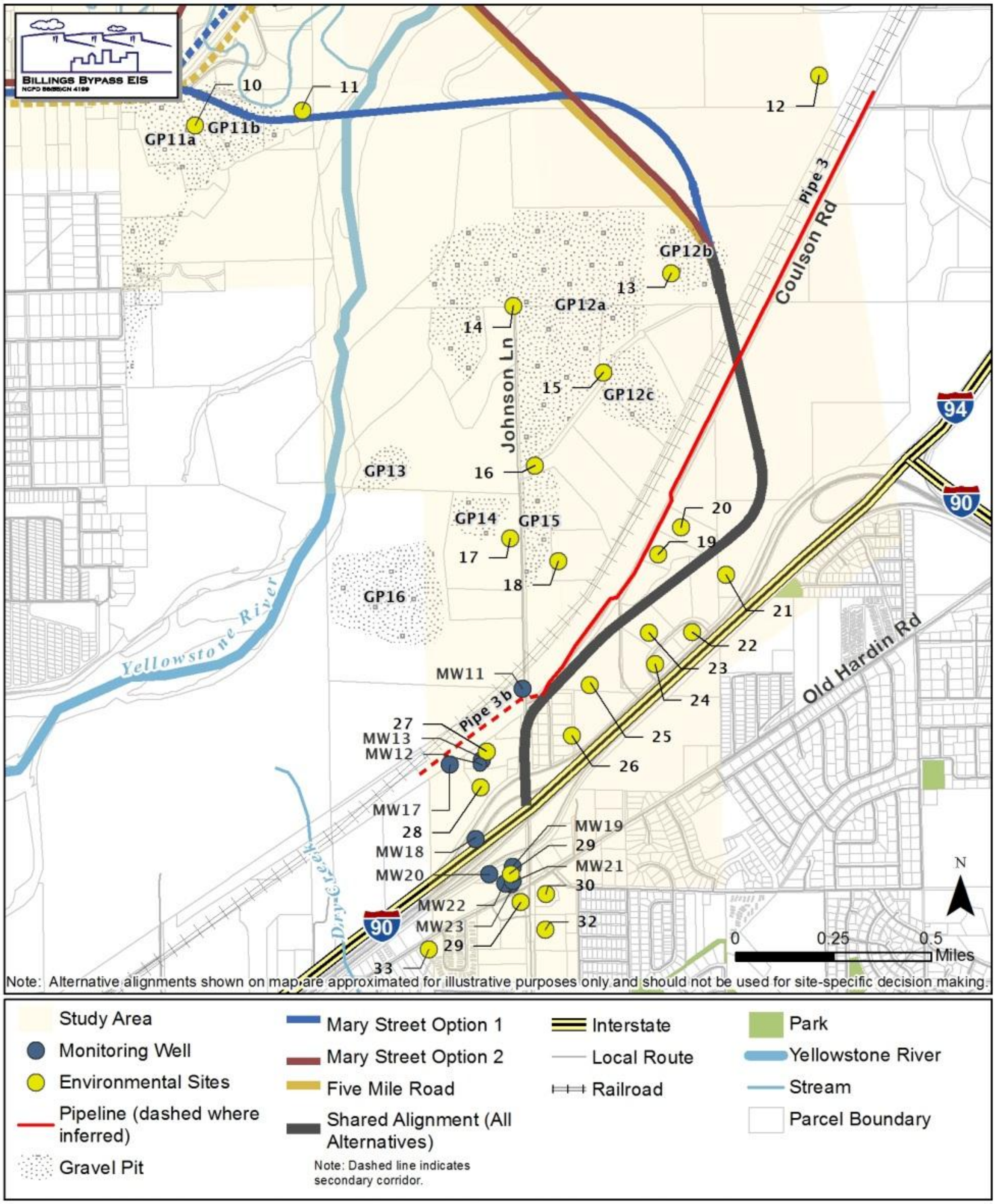
Figure 4.69 and **Figure 4.70** illustrate the location of hazardous material sites relative to the proposed alternative alignments. The potential for impact from existing contaminated sites depends upon the extent and character of contamination encountered as well as the activity proposed on the site. A variety of impacts, beneficial or adverse, could result from encounters with existing hazardous materials sites, including:

- Contamination that otherwise would remain in place and potentially migrate may be discovered and addressed by the proposed project.
- Contamination may be cleaned up faster as a result of the project.
- Contamination may be prevented by removing potential existing sources, such as USTs, before they release contaminants.
- Contaminated materials may be uncovered or disrupted, allowing more direct exposure to the public than would occur without the proposed project.
- Contamination may be spread as a result of construction.

The likelihood of impacts would be minimized by identifying the sites and potential sites before construction and employing appropriate control, cleanup, and disposal measures. Many sites identified in environmental databases are inactive or have been closed following contamination removal. If excavation were required near a known hazardous materials site, additional soil testing would be required to identify the extent of potential contamination.

Table 4.37 summarizes the known hazardous material sites within the study area that could be affected by construction activities and/or ROW acquisition for the No Build Alternative and each build alternative.

Figure 4.69 Hazardous Materials South of Yellowstone River



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/13/2013

Figure 4.70 Hazardous Materials North of Yellowstone River

Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/13/2013

Table 4.37 Direct and Indirect Impacts Summary – Hazardous Materials

ALTERNATIVE	DIRECT IMPACTS	INDIRECT IMPACTS
NO BUILD ALTERNATIVE		
	• None.	• None.
ALL BUILD ALTERNATIVES		
	• Potential impacts associated with construction activities and/or ROW acquisition at four UST/LUST sites (Site Nos. 6, 13, 29, and 30), three AST sites (Site Nos. 21, 23, and 25), one automotive site (Site No. 3), one “Other” site (Site No. 5), one spill site (Site No. 14), and one substation (Site No. 31). • Relocation or protection in place of one groundwater monitoring well (Site No. MW 18). Potential to encounter soil and/or groundwater contamination during construction. • Relocation or protection in place of all pipelines (Site Nos. Pipe 1-3/3b). Potential to encounter petroleum hydrocarbons during construction. • Potential to encounter diesel, asphalt, USTs, ASTs, or contaminated fill during construction at four gravel pits (Site Nos. GP 2c [Site 7], GP 4a, GP 10 [Site 4], and GP 12b).	• Increased mobility associated with the proposed action may increase truck traffic carrying freight. Increased truck traffic may be associated with a higher incidence of spills and crashes. • New alignments may expedite growth of planned residential and commercial development, which may increase potential to encounter hazardous materials during construction.
MARY STREET OPTION 1 ALTERNATIVE		
	• Potential impacts associated with construction activities and/or ROW acquisition at two “Uncategorized” sites (Site Nos. 8 and 11) and one UST (Site No. 9). • Potential to encounter diesel, asphalt, USTs, ASTs, or contaminated fill during construction at three gravel pits (Site Nos. GP 1, GP 7, and GP 11a/b).	• Same as “All Build Alternatives.”

ALTERNATIVE	DIRECT IMPACTS	INDIRECT IMPACTS
MARY STREET OPTION 2 ALTERNATIVE		
	• Potential impacts associated with construction activities and/or ROW acquisition at one "Other" site (Site No. 8). • Relocation or protection in place of two groundwater monitoring wells (Site Nos. MW 5 and MW 6). Potential to encounter soil and/or groundwater contamination during construction. • Potential to encounter diesel, asphalt, USTs, ASTs, or contaminated fill during construction at four gravel pits (Site Nos. GP 1, GP 4b, GP 5, and GP 6).	• Same as "All Build Alternatives."
FIVE MILE ROAD ALTERNATIVE		
	• Potential impacts associated with construction activities and/or ROW acquisition at one UST (Site No. 9). • Potential to encounter diesel, asphalt, USTs, ASTs, or contaminated fill during construction at four gravel pits (Site Nos. GP 4b, GP 5, GP 7, and GP 11a).	• Same as "All Build Alternatives."

4.4.2.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Hazardous Materials: No Build Alternative

No direct impacts related to hazardous materials are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Hazardous Materials: No Build Alternative

No indirect impacts related to hazardous materials are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Hazardous Materials: No Build Alternative

No construction impacts related to hazardous materials are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – Hazardous Materials: No Build Alternative

No cumulative impacts related to hazardous materials are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Hazardous Materials: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.4.2.2.2 ALL BUILD ALTERNATIVES

Full Buildout

Direct Impacts – Hazardous Materials: All Build Alternatives

Project impacts on the environment at each site identified in **Table 4.37** cannot be assessed without detailed evaluations of site-specific conditions that determine the nature and extent of contamination. Impacts may include exposure of construction workers and the public to contaminated media, introduction of hazardous materials to the environment from construction equipment, and potential release of hazardous materials that are currently contained (e.g., materials containing asbestos during construction, etc.). Typically, contaminated soil can be removed and disposed of or treated at locations designed for hazardous materials management. Contaminated groundwater can be treated onsite or at a licensed offsite facility. Onsite treatment of groundwater would employ techniques engineered for the specific contaminants encountered. By using licensed carriers and vehicles equipped for this task, limited risk of public exposure would occur during removal and transport offsite.

Construction activities would require displacement of existing structures on properties along each proposed alternative alignment, and existing structures could contain hazardous building materials (e.g., asbestos, lead-based paint). Properties also have the potential to contain unreported USTs. Each of the build alternatives has the potential to encounter hazardous building materials and/or USTs during the displacement of existing structures.

Hazardous materials sites that would be impacted by construction activities include former spill sites (Site No. 14), and sites identified as having USTs/LUSTs (Site Nos. 6, 13, 29, and 30) and/or ASTs (Site Nos. 21, 23, and 25). All build alternatives would require acquisition of portions of the property that contains Groundwater Monitoring Well 18 (associated with the Flying J Travel Plaza). The connection between Five Mile Road and Old Hwy 312 for all build alternatives would require partial acquisition of the parcel containing one automotive site (Site No. 3) along Old Hwy 312 and one “uncategorized” site (Site No. 5), assumed to be the former location of a Kmart store.

North of Coulson Road, the build alternatives would traverse two active gravel pits (Site Nos. GP 4a and GP 12b) and two inactive gravel pits (Site Nos. GP 2c and GP 10). The Reinhold Kembel/Billings MPC Facility (Site No. 13), located within Gravel Pit 12, is listed as a UST and spill site with reported groundwater contamination and soil contamination that was subsequently removed. Some reclamation has occurred at Gravel Pit 4, and several ASTs were observed on the site in 2007. There is potential to encounter diesel, asphalt, USTs, ASTs, or contaminated fill during construction at each site.

All build alternatives traverse Pipelines 1, 2, and 3/3b. Pipelines 1 and 2 run north-south on Bitterroot Drive and east-west along Mary Street, respectively, and Pipeline 3/3b runs parallel with Coulson Road. All pipelines would be avoided to the greatest extent possible. If protection in place is not feasible, these facilities would be included in final design plans and relocated as part of the project. However, avoidance and standard procedures implemented during construction near fuel pipelines are expected to prevent accidental disruption and unnecessary relocation of these facilities.

The electrical substation located south of Old Hardin Road (Site No. 31) may include oil-filled equipment and PCBs, but it would be avoided or protected in place by the proposed project. However, contaminated soil may still be encountered during construction. Transmission lines present in the project vicinity, crossing I-90 just northeast of the Johnson Lane Interchange, would also be avoided to the greatest extent possible. If relocation is necessary as a result of the proposed bypass or if construction occurs within proximity of transmission lines, Occupational Safety and Health Administration (OSHA) standard procedures would be followed to avoid significant impacts to these facilities.

Indirect Impacts – Hazardous Materials: All Build Alternatives

Development resulting from new roadways can expedite growth that would bring more regulated materials, including fertilizer and petroleum products, into the study area as demand for these products increase. Additionally, there is a potential to encounter hazardous materials associated with construction and maintenance of future residential and commercial development that is planned for the study area in the future. Increased mobility associated with the proposed action may increase freight-carrying truck traffic. Increased truck traffic may be associated with a higher incidence of spills and crashes.

Temporary Construction Impacts – Hazardous Materials: All Build Alternatives

The project corridor is a previously disturbed area, and there is possibility for encountering contaminated materials or soils during construction. Construction detours could temporarily reroute traffic, thereby exposing new areas to increased truck traffic, which may result in a higher incidence of spills.

In addition to potential releases from sites along or adjacent to the alternative alignment during construction discussed in the direct impacts section above, vehicles and equipment used to construct all build alternatives have the potential to release hazardous materials, mainly petroleum products. Appropriate safety measures would be used to minimize release.

Mitigation – Hazardous Materials: All Build Alternatives

Avoidance and Protection in Place

Existing facilities within proximity of project corridors, including but not limited to substations, transmission lines, fuel pipelines, groundwater monitoring wells, and active USTs/ASTs, would be included in final design plans and avoided to the greatest possible extent through design considerations and protection-in-place methods during construction. If avoidance is not possible and relocation is required to accommodate the project, coordination with facility owners would be necessary during final design to relocate the facilities. Any construction in proximity to existing utilities, if necessary, would be performed in accordance with state regulations. Active USTs or ASTs impacted by the Preferred Alternative would be relocated to outside the proposed ROW, if necessary. Inactive USTs or LUSTs would be closed according to applicable regulations.

Hazardous Materials Associated with Acquired Structures

Before construction, all buildings that have been or would be acquired for the project and proposed for demolition would be surveyed by a state-licensed inspector for asbestos and other sources of contamination.

A National Emissions Standards for Hazardous Air Pollutants Demolition/Renovation Notification form would be filed with MDEQ for all relocated or demolished structures.

Asbestos removal would be performed in accordance with the OSHA requirements, Montana Department of Labor and Industry occupational safety and health requirements, and MDEQ rules and permit requirements for demolitions/renovations.

Additional Investigation

Sites in the immediate proximity of the alignment would be further investigated under a Phase II assessment before property acquisition to determine the magnitude and extent of contamination, if any. This would include a site visit, review of agency documents, and interviews with agency personnel. Where appropriate, surface soil, subsurface soil, and/or groundwater samples would be collected and analyzed for probable contaminants of concern.

Previously Undiscovered Hazardous Materials or Substances Discovered During Construction

Contaminated soils, groundwater, hazardous substances, and USTs encountered during construction would be handled by Sections 107.23 and 107.24 of MDT Standard Specifications for Road and Bridge Construction. Phase 1

Direct, indirect, temporary construction, and cumulative impacts related to hazardous materials as well as mitigation for Phase 1 of the build alternatives would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of all build alternatives. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.4.2.2.3 MARY STREET OPTION 1 ALTERNATIVE

Direct Impacts – Hazardous Materials: Mary Street Option 1 Alternative

The Mary Street Option 1 Alternative would result in the same impacts related to hazardous materials as those indicated for all build alternatives, as described above. In addition, the Mary Street Option 1 Alternative would traverse three gravel pits (Site Nos. GP 1, GP 7, and GP 11a/b). While all the pits appear to be inactive and partially reclaimed, there is a limited potential to encounter diesel, asphalt, USTs, ASTs, or contaminated fill during construction. Gravel Pit 11 is associated with the Lohof Gravel Pit (Site No. 10), a delisted Superfund site where remediation has been completed. As shown in **Table 4.37**, construction activities and ROW acquisition associated with Mary Street Option 1 could impact Site Nos. 8 and 9, which may be in proximity or at the same location. Site No. 8 is assumed to be the location of an air or water quality monitoring station, while Site No. 9 is listed as a UST. The Mary Street Option 1 Alternative would acquire portions of the Billings Rendering Plant property (Site No. 11) at the east end of Mary Street. The plant was closed in 2000, and all buildings have been removed.

Indirect Impacts – Hazardous Materials: Mary Street Option 1 Alternative

Indirect impacts related to hazardous materials under this alternative would be the same as those indicated for all build alternatives, as described above.

Temporary Construction Impacts – Hazardous Materials: Mary Street Option 1 Alternative

Temporary construction impacts related to hazardous materials under this alternative would be the same as those indicated for all build alternatives, as described above.

Mitigation – Hazardous Materials: Mary Street Option 1 Alternative

Mitigation for the Mary Street Option 1 Alternative would be the same as that indicated for all build alternatives, as discussed above.

4.4.2.2.4 MARY STREET OPTION 2 ALTERNATIVE

Direct Impacts – Hazardous Materials: Mary Street Option 2 Alternative

The Mary Street Option 2 Alternative would result in the same impacts related to hazardous materials as those indicated for all build alternatives, as described above. In addition, the Mary Street Option 2 Alternative would traverse two active gravel pits (Site Nos. GP 4b and GP 5) and two inactive gravel pits (Site Nos. 1 and 6). Gravel pits can store diesel and/or asphalt in ASTs and/or USTs and operate equipment that can result in contaminant releases. Contaminated fill might also have been used in the reclamation process and could be encountered by construction onsite.

As shown in **Table 4.17,** ROW acquisition associated with the Mary Street Option 2 Alternative could impact the greatest number of environmental sites among the build alternatives. Acquisitions associated with the Mary Street Option 2 Alternative also include portions of the properties that contain two groundwater monitoring wells (Site Nos. MW 5 and MW 6) and Site No. 8, assumed to be the location of an air or water quality monitoring station.

Indirect Impacts – Hazardous Materials: Mary Street Option 2 Alternative

Indirect impacts related to hazardous materials under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Hazardous Materials: Mary Street Option 2 Alternative

Temporary construction impacts related to hazardous materials under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Hazardous Materials: Mary Street Option 2 Alternative

Mitigation for the Mary Street Option 2 Alternative would be the same as that indicated for all build alternatives, as discussed above.

4.4.2.2.5 FIVE MILE ROAD ALTERNATIVE

Direct Impacts – Hazardous Materials: Five Mile Road Alternative

The Five Mile Road Alternative would result in the same impacts related to hazardous materials as those indicated for all build alternatives, as described above. In addition, this alternative would traverse two active gravel pits (Site Nos. GP 4b and GP 5) and two inactive gravel pits (Site Nos. GP 7 and GP 11a). Gravel Pit 11 is associated with the Lohof Gravel Pit (Site No. 10), a delisted Superfund site where remediation has been completed. Acquisitions associated with the Five Mile Road Alternative include portions of the property that contains one UST (Site No. 9).

Indirect Impacts – Hazardous Materials: Five Mile Road Alternative

Indirect impacts related to hazardous materials under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Hazardous Materials: Five Mile Road Alternative

Temporary construction impacts related to hazardous materials under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Hazardous Materials: Five Mile Road Alternative

Mitigation for the Five Mile Road Alternative would be the same that indicated for all build alternatives, as discussed above.

4.4.3 WATER RESOURCES AND WATER QUALITY

4.4.3.1 METHODOLOGY

Surface water, groundwater, and public water supply resources in the study area were identified through literature review and review of available GIS data. This inventory was evaluated against the proposed project alternatives to identify potential impacts to these resources. Potential impacts to surface waters were assessed qualitatively and included evaluation of impaired or threatened waters included on the 303(d) list to determine whether the alternative could exacerbate existing conditions for these impaired water bodies. Potential impacts to wells, wellhead protection areas, and public water supplies were evaluated based on their locations relative to the construction limits of the proposed alternative alignments.

4.4.3.2 RESULTS

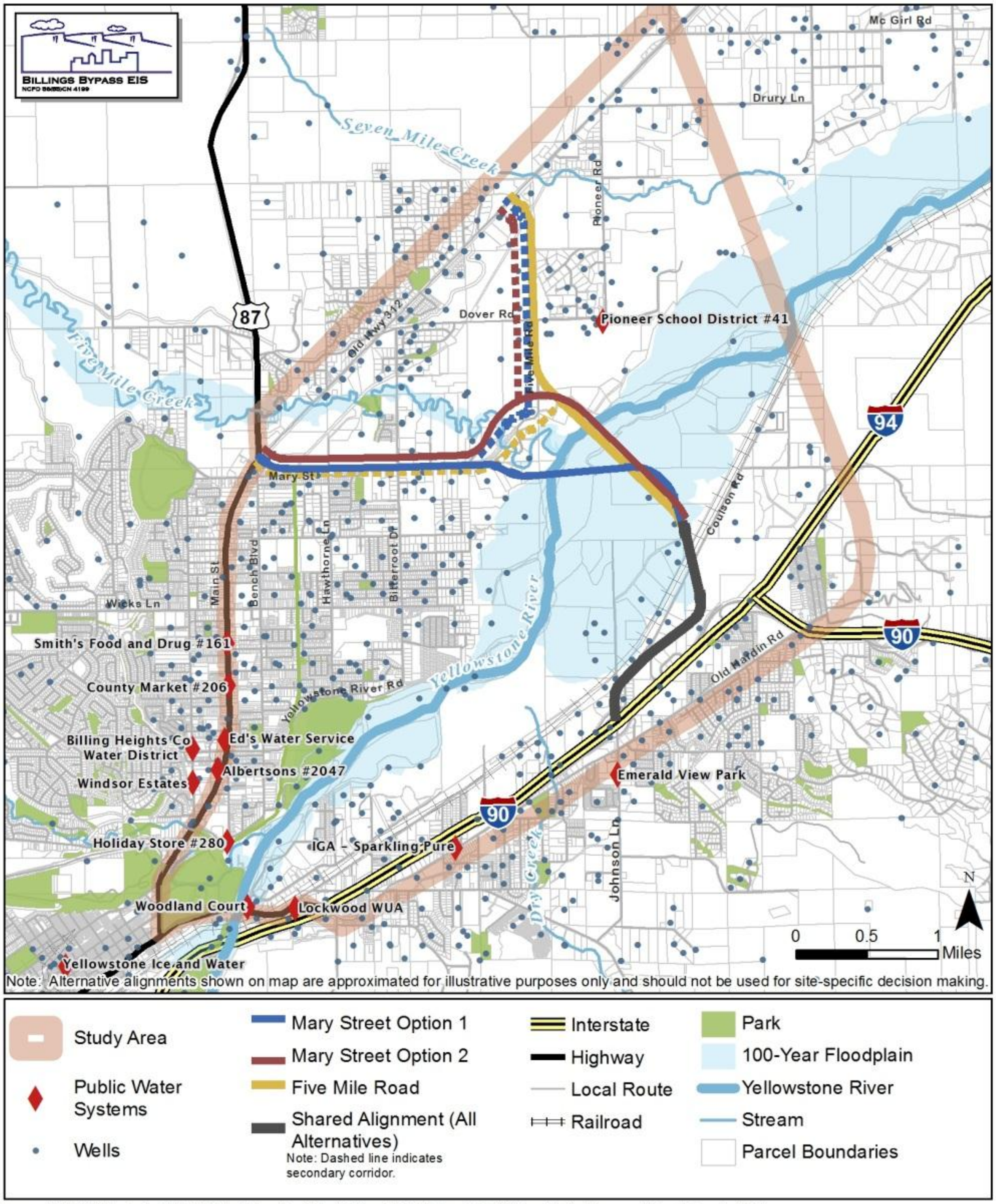
Impacts to surface water, groundwater, and public water supply resources in the study area are summarized below in **Table 4.38**. Generally, the impacts of all the build alternatives would be similar. The remainder of this section provides additional detail regarding anticipated impacts to water quality, groundwater, and public water supplies. **Figure 4.71** depicts the locations of surface water, groundwater, and public water supply resources in and near the study area.

Table 4.38 Direct and Indirect Impacts Summary – Water Resources and Water Quality

ALTERNATIVE	DIRECT IMPACTS	INDIRECT IMPACTS	CONSTRUCTION IMPACTS
NO BUILD ALTERNATIVE			
	• None.	• None.	• None.
ALL BUILD ALTERNATIVES			
	• Longitudinal impact to irrigation canal following Mary Street. • No anticipated impacts on groundwater or public water supplies. • Additional impervious surface and traffic lead to water quality degradation; minimization and mitigation measures improve outcomes.	• Impacts to watershed hydrology due to roadway influence.	• Erosion and disturbance leading to decreased water quality, increased sedimentation, and increased water temperatures.

ALTERNATIVE	DIRECT IMPACTS	INDIRECT IMPACTS	CONSTRUCTION IMPACTS
MARY STREET OPTION 1 ALTERNATIVE			
	• New side-by-side bridges crossing Yellowstone River and Yellowstone River side channel. • Replace existing bridge; widen roadway across Five Mile Creek. • 56.0 acres additional impervious surface.	• Impacts to watershed hydrology due to roadway influence.	• Erosion and disturbance leading to decreased water quality, increased sedimentation, and increased water temperatures.
MARY STREET OPTION 2 ALTERNATIVE			
	• New side-by-side bridges crossing Yellowstone River. • New bridge crossing of Five Mile Creek. • 55.6 acres additional impervious surface. • Potentially more water quality impacts than Mary Street Option 1 due to additional water crossing at Five Mile Creek.	• Impacts to watershed hydrology due to roadway influence.	• Erosion and disturbance leading to decreased water quality, increased sedimentation, and increased water temperatures.
FIVE MILE ROAD ALTERNATIVE			
	• New side-by-side bridges crossing Yellowstone River (same crossing as in Mary Street Option 2). • Replace existing bridge and widen roadway across Five Mile Creek; 46.8 acres additional impervious surface. • No anticipated impacts to groundwater or public water supplies.	• Impacts to watershed hydrology due to roadway influence.	• Erosion and disturbance leading to decreased water quality, increased sedimentation, and increased water temperatures.

Figure 4.71 Surface Water and Groundwater Within and Near the Study Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/11/2013

4.4.3.2.1 WATER QUALITY

Water quality impacts are related to the introduction of new bridges in the study area, creation of new impervious surface, and construction. The design features and their associated effects for the build alternatives are summarized in **Table 4.39**. The No Build Alternative does not include new bridges.

Table 4.39 Features Related to Water Quality

ALTERNATIVES AND WATERWAY CROSSINGS	BRIDGE FEATURES AND OTHER CHARACTERISTICS	
MARY STREET OPTION 1 ALTERNATIVE		
Yellowstone River	• Approximately 2,010 feet long. • Approximately 85 feet wide. • Up to nine piers in water (preliminary design).	• Spans the floodway and the side channels located just outside of the floodway. • Stormwater carried off bridge for treatment to the maximum extent practicable.
Yellowstone River Channel	• Approximately 185 feet long. • Approximately 85 feet wide.	• Clear span of channel. • Stormwater carried off bridge for treatment to the maximum extent practicable.
Five Mile Creek	• Approximately 180 feet long. • Approximately 85 feet wide.	• Bridge can be designed to span the floodway. Up to one pier would encroach in floodplain. • Secondary improvements; replacement and widening of existing bridge to maintain typical section associated with secondary improvements.
Culverts	• Install drainage and irrigation culverts in order to perpetuate existing drainage patterns and existing irrigation facilities along Five Mile Road, Mary Street, and between the Johnson Lane Interchange and Yellowstone River Bridge.	
New Impervious Surface	• Adds 56.0 acres of impervious surface.	
MARY STREET OPTION 2 ALTERNATIVE		
Yellowstone River	• Approximately 1,890 feet long. • Approximately 85 feet wide. • Up to eight piers in water (preliminary design).	• Bridge spans the floodway and the effective flow limits. • Stormwater carried off bridge for treatment to the maximum extent practicable.
Five Mile Creek	• Approximately 215 feet long. • Approximately 85 feet wide.	• New bridge upstream of existing bridge. • Bridge can be designed to span the floodway. Up to two piers would encroach in floodplain (preliminary design). • Stormwater carried off bridge for treatment to the maximum extent practicable.

ALTERNATIVES AND WATERWAY CROSSINGS	BRIDGE FEATURES AND OTHER CHARACTERISTICS
Culverts	• Install drainage and irrigation culverts in order to perpetuate existing drainage patterns and existing irrigation facilities along Five Mile Road, Mary Street, and between the Johnson Lane Interchange and Yellowstone River Bridge.
New Impervious Surface	• Adds 55.6 acres of impervious surface.
FIVE MILE ROAD ALTERNATIVE	
Yellowstone River	• Same as Mary Street Option 2 Alternative bridges.
Five Mile Creek	• Same as Mary Street Option 1 Alternative bridge (replace and widen existing to maintain existing typical section).
Culverts	• Install drainage and irrigation culverts in order to perpetuate existing drainage patterns and existing irrigation facilities along Five Mile Road, Mary Street, and between the Johnson Lane Interchange and Yellowstone River Bridge.
New Impervious Surface	• Adds 46.8 acres of impervious surface.

Sources: DOWL HKM 2011a and GIS analysis, January 2012. The existing edge of pavement was compiled from City of Billings edge of roadway data and by tracing aerial imagery.

No Build Alternative

Direct Impacts – Water Resources and Water Quality: No Build Alternative
No direct impacts to water resources and water quality are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Water Resources and Water Quality: No Build Alternative
No indirect impacts to water resources and water quality are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Water Resources and Water Quality: No Build Alternative
No construction impacts to water resources and water quality are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – Water Resources and Water Quality: No Build Alternative
No cumulative impacts to water resources and water quality are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Water Resources and Water Quality: No Build Alternative
No mitigation is expected within or adjacent to the study area from the No Build Alternative.

Mary Street Option 1 Alternative

Full Buildout

Direct Impacts – Water Resources and Water Quality: Mary Street Option 1 Alternative
Direct impacts to the water quality of the Yellowstone River, Five Mile Creek, and Seven Mile Creek would occur at bridge crossing locations and through other drainage (stormwater systems and drainage culverts) as a result of increased runoff from the new impervious surface created throughout the study

area. Information about the proposed bridge crossings is presented above in **Table 4.39**. For the Mary Street Option 1 Alternative, construction would occur on three bridges over waterways: new 2,010-foot side-by-side bridges across the Yellowstone River, new 185-foot side-by-side bridges over a side channel of the Yellowstone River, and the existing bridge over Five Mile Creek, which would be replaced and widened to 85 feet (bridge lengths are approximate).

Fill placement at stream crossings may introduce some fine materials to the surface waters, which would cause temporary increases in the level of suspended particulates during construction. The placement of fill may also cause unnatural turbulence, which could suspend bottom sediments. This may result in temporary increases of turbidity levels near water or wetland encroachments. Stormwater runoff from recently graded areas near waters and wetlands can also transport sediments to the waters. This would result in an increase in suspended particulates and turbidity levels. However, a Stormwater Pollution Prevention Plan (SWPPP) would be implemented to minimize particulate and turbidity levels.

Because the proposed project would increase impervious surface through construction of new roads and widening of existing roads, stormwater runoff is likely to increase. The primary source of contaminants from transportation systems is runoff from impervious surfaces. Rainfall and snowmelt can carry sediments, animal and agricultural wastes, pesticides, fertilizers, heavy metals, hydrocarbons, road salts, and debris into creeks, wetlands, and waterways. Stormwater runoff can also result in water temperature increases in receiving waters. As shown in **Table 4.39**, the Mary Street Option 1 Alternative would result in an additional 56.0 acres of impervious surface to the study area.

Indirect Impacts – Water Resources and Water Quality: Mary Street Option 1 Alternative

Indirect impacts to water quality are typically associated with clearing of vegetation and increased impervious surface. When areas adjacent to aquatic resources are left exposed as a result of cuts and fills, sedimentation can occur.

Additionally, hydrology may be changed with impervious surfaces preventing rainfall from percolating into the soil. Roads commonly affect how water and its various loads move through watersheds. Roads can disrupt natural flows of surface water and groundwater or create new routes for the flow of water. Fill can increase onsite and offsite flooding. The presence of roads bisecting wetlands can disrupt water circulation patterns (Forman et al. 2003).

Temporary Construction Impacts – Water Resources and Water Quality: Mary Street Option 1 Alternative

Direct water quality impacts would be primarily related to construction. Construction actions could exacerbate the impaired condition of the Yellowstone River, destabilize the banks, or cause erosion, contributing to decreased water quality, increased sedimentation, and increased water temperatures. Storm water runoff presents the potential for violations of water quality standards within the study area. In-stream work, which would be required for bridge and culvert replacements, can contribute to sedimentation and introduction of pollutants. These impacts would occur with varying intensity and duration during the phases of construction. There would be no major differences in construction impacts among the three build alternatives.

Cumulative Impacts – Water Resources and Water Quality: Mary Street Option 1 Alternative

The project would occur in an area that is relatively undeveloped, but one with multiple waterways, irrigation ditches, and existing culverts for movement of irrigation waters or drainage. The projects discussed in the cumulative effects section (Section 4.1) would have additional impacts on water resources and water quality due to the addition of impervious surface and development of urban uses, and from increased human influence on the land. However, much of the land that would be converted from other uses for the proposed other projects is farmland, which can produce other negative environmental impacts, for example from the use of fertilizers and pesticides. These projects would be expected to avoid impacts to sensitive water quality features whenever practicable; potential impacts of these cumulative projects would therefore be limited. Measures would be implemented to avoid and/or minimize impacts to water resources during construction of these proposed projects. Additional protection to water resources would be achieved through an SWPPP and a Spill Prevention, Control, and Countermeasure (SPCC) Plan, reducing impacts to water resources. The other planned and reasonably foreseeable projects that involve construction also would implement BMPs to avoid impacts to water bodies, no impacts to water resources are expected after their construction. Given that the other planned transportation and development projects described in Section 4.1 would be designed to avoid and minimize negative impacts, as would the Mary Street Option Alternative, these projects would contribute incrementally, but mostly temporarily, to overall impacts to water quality. As a result, cumulative effects to water resources and quality for the Mary Street Option 1 Alternative are expected to be minor.

Mitigation – Water Resources and Water Quality: Mary Street Option 1 Alternative

The project team considered water resources and water quality in the development of the conceptual design and routing of alternatives. Alternatives avoided water resources where practicable. Where impacts to the resources are unavoidable, impacts would be minimized through bridge and culvert design analysis and final design of the selected alignment. The final design would include water quality conservation measures. The proposed bridge designs would avoid and minimize impacts to the rivers, floodplain, hydraulics, river riffle/pool complexes, and channel migration zone, as practicable.

The potential and magnitude for the impacts to occur would be minimized with implementation of standard BMPs. Stormwater runoff filtration would be determined in future design, and BMPs for stormwater management would be encouraged. Standard specifications and stream protection plans would be used during and after construction to reduce or eliminate water quality impacts. MDT has procedures in place throughout the design process that ensure coordination with MDEQ regarding water quality and applicable total maximum daily loads (TMDLs). With the conservation measures described below, the Mary Street Option 1 Alternative is unlikely to significantly alter the water resources and water quality. These conservation measures are:

- To the maximum extent practicable, a stormwater collection system would be included on the Yellowstone River Bridge. The likelihood of such a system being included is high, because stormwater control is a priority among permitting agencies. The bridges would be designed to comply with Section 404 of the Clean Water Act.
- In-water work for bridge construction should be scheduled during low water levels to minimize impacts to river characteristics.
- The existing and proposed conveyances and anticipated in-stream work would be evaluated quantitatively to identify impacts within the bed and banks of the water bodies.
- A temporary erosion control plan would include provisions for post-construction revegetation of the disturbed road corridor with a seed mix of desirable species to minimize erosion.
- Consistent with the terms of MDT's MS4 permit, MDT has a stormwater management program (SWMP) that includes management practices, control techniques, systems, designs, good standard engineering practices, and other provisions necessary for the control of pollutants. The SWMP also includes measurable goals for construction site stormwater runoff control and post-construction stormwater management.

- A SWPPP would be implemented to minimize particulate and turbidity levels. The plan would be incorporated as part of the final design and would be used to acquire a Montana Pollutant Discharge Elimination System (MPDES) permit.
- The SWPPP would be designed to prevent or reduce erosion and release of sediment from construction areas. Temporary, site-specific erosion control structures or practices would be selected based on BMPs for highway construction projects. BMPs may include slope roughening, temporary seeding, mulching, erosion control blankets, straw bales, gravel filter berms, ditches, silt fences, and settling basins. Goals of the SWPPP include the following:
  - Avoid or minimize the extent of exposed soils,
  - Stabilize and protect disturbed areas as soon as possible in order to keep runoff velocities low,
  - Prevent surface water runoff from reaching disturbed areas,
  - Retain sediment within the corridor, and
  - Implement a thorough maintenance and follow-up program.

The following would be implemented as mitigation for permanent impacts:

- Bridges and culverts would be designed to minimize impacts to rivers, floodplain, hydraulics, river riffle/pool complexes, and channel migration zone, as practical.
- If practicable, direct drainage of bridge deck runoff would be eliminated.
- In accordance with MDT Standard Specifications 107 and 208, the contractor would be required to adhere to applicable water quality rules, regulations, and permit conditions.

The following would be implemented as mitigation for temporary (construction-related) impacts:

- In accordance with MDT Standard Specifications 107 and 208, the contractor would be required to adhere to applicable water quality rules, regulations, and permit conditions.
- The design would be prepared in accordance with the existing municipal storm sewer system (MS4) permit requirements including inclusion of low impact development practices as practicable.
- Erosion and sediment control(s) would be required as necessary to minimize damage to the highway and adjacent properties and abate pollution of surface and ground water resources. Routine site monitoring would be conducted as necessary to ensure all pollution control measures are installed, maintained, and functioning correctly.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to water resources as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would be less but not substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 1 Alternative. Additionally, the same mitigation measures that would apply to the Full Buildout would be used for the Phase 1 construction, thus minimizing overall impacts. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout. Construction impacts would occur during both the construction of the Phase 1 improvements and again during construction of the Full Buildout, but these impacts are not expected to be significant.

Mary Street Option 2 Alternative

Full Buildout

Direct Impacts – Water Resources and Water Quality: Mary Street Option 2 Alternative

For the Mary Street Option 2 Alternative, new 1,890-foot-long side-by-side bridges would be constructed across the Yellowstone River, and a new 215-foot-long bridge over Five Mile Creek would be constructed to the northwest of the existing bridge (bridge lengths are approximate). As shown in **Table 4.39**, the Mary Street Option 2 Alternative would result in an additional 55.6 acres of impervious surface in the study area.

Indirect Impacts – Water Resources and Water Quality: Mary Street Option 2 Alternative

Indirect impacts to water resources and water quality under the Mary Street Option 2 Alternative would be similar to those indicated for Mary Street Option 1 Alternative.

Temporary Construction Impacts – Water Resources and Water Quality: Mary Street Option 2 Alternative

Temporary construction impacts to water resources and water quality for the Mary Street Option 2 Alternative would be similar to those for Mary Street Option 1 Alternative, though the Mary Street Option 2 Alternative would require a new bridge over Five Mile Creek.

Cumulative Impacts – Water Resources and Water Quality: Mary Street Option 2 Alternative

For the reasons described for the Mary Street Option 1 Alternative, the cumulative impacts for water quality associated with the Mary Street Option 2 Alternative are similar to those identified under the Mary Street Option 1 Alternative. These impacts are anticipated to be minor.

Mitigation – Water Resources and Water Quality: Mary Street Option 2 Alternative

Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative. Mitigation measures would be refined in future design.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to water resources as well as mitigation for Phase 1 of the Mary Street Option 2 Alternative would be less but not substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 2 Alternative. Additionally, the same mitigation measures that would apply to the Full Buildout would be used for the Phase 1 construction, thus minimizing overall impacts. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout. Construction impacts would occur during both the construction of the Phase 1 improvements and again during construction of the Full Buildout, but these impacts are not expected to be significant.

Five Mile Road Alternative

Full Buildout

Direct Impacts – Water Resources and Water Quality: Five Mile Road Alternative

For the Five Mile Road Alternative, new 1,880-foot-long side-by-side bridges across the Yellowstone River would be constructed (same as Mary Street Option 2 Alternative), and the existing bridge over Five

Mile Creek would be replaced and the roadway would be widened to 85 feet (same as Mary Street Option 1 Alternative). (Please note that bridge lengths are approximate) As shown in **Table 4.39**, the Five Mile Road Alternative would result in an additional 46.8 acres of impervious surface in the study area.

Indirect Impacts – Water Resources and Water Quality: Five Mile Road Alternative
Indirect impacts to water resources and water quality under this alternative would be similar to those indicated for Mary Street Option 1 Alternative.

Temporary Construction Impacts – Water Resources and Water Quality: Five Mile Road Alternative
Temporary construction impacts to water resources and water quality for the Five Mile Road Alternative would be similar to those indicated for the Mary Street Option 1 Alternative. The potential for erosion and stormwater runoff might be lower, because the construction footprint is smaller than that of the Mary Street Option 1 Alternative and there would be no new bridge over Five Mile Creek (as opposed to the Mary Street Option 2 Alternative).

Cumulative Impacts – Water Resources and Water Quality: Five Mile Road Alternative
For the reasons described for the Mary Street Option 1 Alternative, the cumulative impacts for water quality associated with the Five Mile Road Alternative are anticipated to be minor.

Mitigation – Water Resources and Water Quality: Five Mile Road Alternative
Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative. Mitigation measures would be refined in future design.

Phase 1
Direct, indirect, temporary construction, and cumulative impacts to water resources as well as mitigation for Phase 1 of the Five Mile Road Alternative would be less but not substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative. Additionally, the same mitigation measures that would apply to the Full Buildout would be used for the Phase 1 construction, thus minimizing overall impacts. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout. Construction impacts would occur during both the construction of the Phase 1 improvements and again during construction of the Full Buildout, but these impacts are not expected to be significant.

4.4.3.2.2 GROUNDWATER

Groundwater resources considered in this section include groundwater supply and access to groundwater via public and private wells.

Effects on groundwater supply would be negligible because: (1) excavation and disturbance would not directly affect groundwater, and (2) no significant water use would be required that may affect groundwater levels.

There are no public wells that appear to be in conflict with any of the proposed project corridors. Between 12 and 15 private wells could be directly affected by the build alternatives. These wells include groundwater monitoring or testing wells, as described in Chapter 3. **Table 4.40** shows the number of private wells that could be affected by the No Build Alternative and the different build alternatives. Due to the conceptual level of design, these conclusions would be reevaluated during final design.

Table 4.40 Groundwater Testing or Monitoring Wells Potentially Affected

ALTERNATIVE	PRIMARY CORRIDOR	SECONDARY CORRIDOR	TOTAL FOR ALTERNATIVE
No Build	0	0	0
Mary Street Option 1	12	2	14
Mary Street Option 2	13	2	15
Five Mile Road	11	1	12

Based on the fairly minor cuts and fills proposed for the project and the soil lithology consisting of terrace gravels overlying bedrock, groundwater effects due to fill surcharge are expected to be relatively minor. Prior to final design, a geotechnical investigation would be performed along the proposed alignment. As part of the investigation, soil borings would be drilled to obtain soil and groundwater characteristics. Groundwater monitor wells may also be monitored to periodically check groundwater fluctuation near residential areas both before and after construction. The geotechnical and groundwater data would be used to supplement a stormwater runoff design to help limit groundwater effects near existing residences.

No indirect, temporary construction, or cumulative impacts to groundwater are anticipated from any of the alternatives. If private wells within the acquired right-of-way are affected by the project, they would be relocated or protected in place.

4.4.3.2.3 PUBLIC WATER SUPPLIES

The Yellowstone River is the source of public water in the study area. The intake is upstream of the study area and would not be affected by the project. The project would not have an impact on the quantity or quality of water available for the city's public water supplies, or other public water supplies. No wells used for public or private water supplies appear likely to be affected by any of the build alternatives.

No direct, indirect, temporary construction, or cumulative impacts are anticipated for public water supplies from any of the alternatives.

4.4.4 WILD AND SCENIC RIVERS

4.4.4.1 METHODOLOGY

As discussed in Chapter 3, the Yellowstone River and its tributaries are not designated as National Wild and Scenic Rivers. Therefore, no assessment of impacts for this topic area is required.

4.4.5 WATER BODY MODIFICATIONS

4.4.5.1 METHODOLOGY

Water crossings for each build alternative were identified. The existing and proposed conveyances and anticipated in-stream work were evaluated to identify potential impacts within the bed and banks of water bodies. At this point in the project, designs of culverts and bridges are conceptual in nature, and the associated water body modifications would be evaluated in more detail during final design.

4.4.5.2 RESULTS

As noted in Chapter 3, the three surface water bodies in the study area are the Yellowstone River, Five Mile Creek, and Seven Mile Creek. Other surface water bodies include smaller unnamed tributaries, ponds in wetlands, and gravel pit ponds. The project corridors also include irrigation ditches, including Coulson Ditch and numerous smaller side ditches. The hydrology of the area, including the irrigation systems and gravel pit ponds, is detailed in the *Preliminary Location Hydraulic Study Report* (DOWL HKM 2011a).

The various alignments would longitudinally impact certain irrigation and drainage ditches throughout the project corridors. Impacted irrigation ditches would be relocated outside of the ROW limits, and impacted drainage ditches are assumed to be located within the right-of-way, to the extent that the ditch geometry does not infringe into the clear zone (DOWL HKM 2011a, p. 5-1).

Potential water body modifications resulting from proposed improvements are typically determined according to the proposed bridge designs for each build alternative. Because of the current conceptual level of design of the build alternatives, bridge replacements have not been designed. Bridge engineering, revegetation of stream banks, and analysis of resulting water body modifications would be conducted during final design. **Table 4.41** summarizes the direct and indirect impacts to water body modifications from all the alternatives.

Table 4.41 Direct and Indirect Impacts Summary – Water Body Modifications

ALTERNATIVE	IMPACTS
No Build	• None.
Mary Street Option 1	• New crossing of Yellowstone River and replacement bridge over Five Mile Creek. • Replacement, relocation, or construction of irrigation and drainage ditches throughout the project corridors. • Indirect impacts could occur if the project structures, or erosion from the project, would later result in changes to stream hydrology or bank and channel reshaping. • Indirect impacts could affect water bodies if development occurs along the new corridor, resulting in increased impervious surface and increased stormwater runoff.
Mary Street Option 2	• New crossings of Yellowstone River and Five Mile Creek. • Replacement, relocation, or construction of irrigation and drainage ditches throughout the project corridors. • Indirect impacts similar to Mary Street Option 1 Alternative.
Five Mile Road	• New crossing of Yellowstone River and replacement bridge over Five Mile Creek. Replacement, relocation, or construction of irrigation and drainage ditches throughout the project corridors. • Indirect impacts similar to Mary Street Option 1 Alternative.

4.4.5.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Water Body Modifications: No Build Alternative

No direct impacts to water body modifications are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts Water Body Modifications: No Build Alternative

No indirect impacts to water body modifications are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts Water Body Modifications: No Build Alternative

No construction impacts to water body modifications are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts Water Body Modifications: No Build Alternative

No cumulative impacts to water body modifications are expected within or adjacent to the study area from the No Build Alternative.

Mitigation Water Body Modifications: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.4.5.2.2 ALL BUILD ALTERNATIVES

Types of water body modifications that may occur as a result of bridge replacements include impoundment and channel alterations from realignment, deepening or erosion. Although final design for water crossings has not been determined, new structures would be designed to minimize disturbance to stream hydrology, banks, and channels. Known information about the proposed water crossings is listed by alternative below. Additional detail can be found in the in the *Preliminary Location Hydraulic Study Report* (DOWL HKM 2011a).

A channel migration study documented in the *Preliminary Location Hydraulic Study Report* prepared for the project identified trends in lateral movement of the Yellowstone River near the proposed bridge options (DOWL HKM 2011a). A comprehensive analysis of the hydrologic and hydraulic characteristics of a final alignment would be conducted during final design.

The following elements would result in impacts to water body modifications within the study area:

- **Yellowstone River Bridge Construction**: Bridge construction requires that banks be excavated to construct footings, piers, and embankments for the structure. This includes work within the ordinary high water mark. The bridge designs have not been finalized. The hydraulics of these bridge crossings are governed primarily by the number of piers that need to be located within the active channel. The hydraulic analysis assumed two drilled shaft piers for 85-foot-wide side-by-side bridges across the Yellowstone River. The side-by-side bridges over the Yellowstone River would likely have a maximum of nine piers in the water. Temporary cofferdams and work platforms would be constructed for bridge piers or abutments. Where feasible, bridges would be built such that footings and abutments are outside of the active channels and floodway, effectively spanning the water body and wetlands.

- **Roadway Construction/Widening**: When widening the highway, construction methods would be similar to those used for new roadway construction, except that widening would include placing fill material in waters or wetlands located along existing roadways.
- **Culvert Construction and Replacement**: Methods of construction, replacement, and removal would be determined by the contractor. Culvert construction would require excavation of waters or wetlands to lay the pipe or box culvert. However, for culvert replacement, the new culvert would be placed so the existing concrete culvert would continue to contain flow during construction, thereby isolating the construction activities from the stream channel.
- **Irrigation Canals and Lateral Ditches**: Major irrigation canals and lateral ditches would be relocated, thus modifying longitudinal impacts. Methods of construction would be similar to culvert construction, and removal would occur when needed to maintain irrigation flow.

4.4.5.2.3 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Water Body Modifications: Mary Street Option 1 Alternative

The Mary Street Option 1 Alternative would require side-by-side bridges in two locations to span the Yellowstone River and its side channel. These bridges would be designed to avoid and minimize disturbance to the river.

Detailed evaluations of potential bridge scour have not been completed for this planning-level analysis. Scour at the proposed crossing is not expected to be a major issue. A detailed scour evaluation would be required during final design.

The existing crossing of Five Mile Creek would be replaced and the roadway would be widened as part of the secondary corridor improvements for the Mary Street Option 1 Alternative. The construction would be designed to avoid and minimize disturbance to Five Mile Creek.

Drainage culverts required for the proposed project were classified into two categories: (1) major drainage culverts and (2) minor drainage culverts. The major drainage culverts include approach and crossing culverts that drain areas larger than 0.05 square mile (32 acres). These culverts are hydraulically sized using an analysis program. The minor drainage culverts are culverts that drain areas smaller than 0.05 square mile and are sized using engineering judgment or the MDT minimum crossing culvert size of 24 inches. Culverts would be designed to accomplish no roadway overtopping for the 50-year design flood and no backwater damage to adjacent property.

The water body modification impacts related to culverts would not vary significantly among the build alternatives.

Indirect Impacts – Water Body Modifications: Mary Street Option 1 Alternative

Indirect impacts to water body modifications under the Mary Street Option 1 Alternative could occur if the alternative's structures, or erosion from the alternative, would later result in changes to stream hydrology or bank and channel reshaping. These impacts would occur as a result of the alternative but could be located away from the bridge site, or could occur later in time.

Temporary Construction Impacts – Water Body Modifications: Mary Street Option 1 Alternative

Short-term impacts related to water body modifications associated with construction include in-water work, which can affect hydrology, flooding potential, erosion, sedimentation, and aquatic habitats. Any of the build alternatives would be designed to minimize these effects. The Mary Street Option 1 Alternative and Five Mile Road Alternative are similar in that they would construct new crossings of the Yellowstone River, but unlike the Mary Street Option 2 Alternative, they would use an existing crossing of Five Mile Creek.

Cumulative Impacts – Water Body Modifications: Mary Street Option 1 Alternative

The Yellowstone River has a dynamic stream channel and has been shifting due to natural processes. None of the other proposed area transportation projects, as listed in Section 3.2, "Transportation Conditions," have new crossings of the Yellowstone River, Five Mile Creek, or Seven Mile Creek, so impacts to those water bodies from other past, present, or reasonably foreseeable future projects are not anticipated. Minor indirect impacts are possible from planned transportation and land development projects, if those projects result in sufficient erosion and sedimentation to have an influence on river and stream dynamics. This project and the other planned and reasonably foreseeable projects that involve construction also would implement BMPs to minimize erosion and sedimentation impacts. So, the potential for indirect impacts from the other planned and reasonably foreseeable projects is relatively small; therefore, the cumulative impacts resulting from the alternative, in combination with other projects, is anticipated to be minor.

Mitigation – Water Body Modifications: Mary Street Option 1 Alternative

New structures would be designed to minimize disturbance to stream hydrology and banks and to minimize channel alterations.

All stream crossings would be designed in accordance with 23 CFR 650 Subpart A and in coordination with the appropriate regulatory agencies

All construction work would be performed in accordance with state and federal guidelines regarding water quality and permit conditions. These include the applicable regulations under the Federal Clean Water Act of 1972, as amended (i.e., Section 404 Permit), and specific permit requirements from the Montana Stream Protection Act (SPA) 124 authorization; Montana Floodplain and Floodway Management Act, Section 402/MPDES permit; MS4 permit, and utilization of the current BMPs.

To re-establish permanent vegetation and to reduce the spread and establishment of noxious weeds, disturbed areas within MDT right-of-way and easements would be seeded with desirable plant species, as soon as practicable, as recommended and determined feasible by the MDT Botanist.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to water body modifications as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would be similar to the Full Buildout impacts, with the exception of the Yellowstone River Crossing, where there would be additional short-term impacts related to construction for phased implementation. For the Yellowstone River crossing, construction impacts would occur during both the construction of the Phase 1 improvements and again during construction of the Full Buildout because Phase 1 would involve the construction of one bridge to carry two lanes of traffic, and the Full Buildout would require the construction of a second, stand-alone bridge across the Yellowstone River, at which point each of the stand-alone bridges would carry one-way traffic. For all of the other water crossings (culverts, Five Mile Creek, irrigation systems), the water body crossing would be constructed wide enough to accommodate the eventual Full Buildout and thus there would not be additional impacts after the completion of Phase 1 construction.

4.4.5.2.4 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Water Body Modifications: Mary Street Option 2 Alternative

The general direct impacts to water body modifications outlined for the Mary Street Option 1 Alternative would also apply to the Mary Street Option 2 Alternative. The Mary Street Option 2 Alternative would require side-by-side bridges to span the Yellowstone River and a second bridge across Five Mile Creek. The Yellowstone River bridges would have a maximum of eight piers in the water and would span the entire floodway and effective flow limits of the Yellowstone River.

Detailed evaluations of potential bridge scour have not been completed for this planning-level analysis. Scour at the proposed crossings is not expected to be a major issue. A detailed scour evaluation would be required during final design.

Indirect Impacts – Water Body Modifications: Mary Street Option 2 Alternative

Indirect impacts to water body modifications under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Water Body Modifications: Mary Street Option 2 Alternative

Short-term impacts associated with construction would be similar to those described for the Mary Street Option 1 Alternative. However, since the Mary Street Option 2 Alternative would not require the removal of the existing bridge for Mary Street traffic across Five Mile Creek compared to the other two build alternatives, it could result in fewer construction impacts to Five Mile Creek.

Cumulative Impacts – Water Body Modifications: Mary Street Option 2 Alternative

Cumulative impacts to water body modifications under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Water Body Modifications: Mary Street Option 2 Alternative

Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to water body modifications as well as mitigation for Phase 1 of the Mary Street Option 2 Alternative would be similar to the Full Buildout impacts, with the exception of the Yellowstone River Crossing, where there would be additional short-term impacts related to construction for phased implementation. For the Yellowstone River crossing, construction impacts would occur during both the construction of the Phase 1 improvements and again during construction of the Full Buildout. For all of the other water crossings (culverts, Five Mile Creek, irrigation systems), the water body crossing would be constructed wide enough to accommodate the eventual Full Buildout and thus there would not be additional impacts after the completion of Phase 1 construction.

4.4.5.2.5 FIVE MILE ROAD ALTERNATIVE

Full Buildout

Direct Impacts – Water Body Modifications: Five Mile Road Alternative
The Five Mile Road Alternative would require the same side-by-side bridges across the Yellowstone River as the Mary Street Option 2 Alternative alignment. These bridges would be shorter than those planned for Mary Street Option 1. It would span the entire floodway and the effective flow limits. The existing crossing of Five Mile Creek would be replaced, and the roadway would be widened as part of the secondary corridor improvements for the Five Mile Road Alternative.

Indirect Impacts – Water Body Modifications: Five Mile Road Alternative
Indirect impacts to water body modifications under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Water Body Modifications: Five Mile Road Alternative
Short-term impacts associated with construction would be similar to those described for the Mary Street Option 1 Alternative. The Mary Street Option 1 Alternative and Five Mile Road Alternative are similar in that they would construct new crossings of the Yellowstone River and they would replace the existing crossing of Five Mile Creek with a wider bridge.

Cumulative Impacts – Water Body Modifications: Five Mile Road Alternative
Cumulative impacts to water body modifications under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Water Body Modifications: Five Mile Road Alternative
Mitigation for under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to water body modifications as well as mitigation for Phase 1 of the Five Mile Road Alternative would be similar to the Full Buildout impacts, with the exception of the Yellowstone River Crossing, where there would be additional short-term impacts related to construction for phased implementation. For the Yellowstone River crossing, construction impacts would occur during both the construction of the Phase 1 improvements and again during construction of the Full Buildout. For all of the other water crossings (culverts, Five Mile Creek, irrigation systems), the water body crossing would be constructed wide enough to accommodate the eventual Full Buildout and thus there would not be additional impacts after the completion of Phase 1 construction.

4.4.6 FLOODPLAINS

4.4.6.1 METHODOLOGY

The base flood (100-year flood) of the Yellowstone River was evaluated using a delineation based on a study of the Yellowstone River Floodplain initiated by the Federal Emergency Management Agency (FEMA). This study has been completed, but has not yet been adopted. The current regulatory floodplain was developed in 1981 and published with revisions in March 2000. This floodplain is being modified based on guidance from the regulatory agencies. The newest data is being used in this analysis. For Five

Mile Creek, preliminary floodplain maps were used, because there are not yet Flood Insurance Rate Maps for that waterway. Each build alternative was evaluated to determine the extent of encroachment into the base floodplain.

The following minimum hydraulic opening criteria were used to design the proposed bridges:

- Hydraulics of alternative bridges were evaluated using the HEC-RAS program, a computer program that models the hydraulics of water flow through natural rivers and other channels.
- The maximum allowable increase in base flood elevation is 0.5 feet for sites covered by the National Flood Insurance Program.
- The waterway opening should satisfy the site constraints and accommodate the trial design flood, while satisfying the following criteria:
  - No roadway overtopping.
  - No significant backwater damage to adjacent property.
  - A minimum clearance of 1 foot should be provided between the base flood water surface elevation and the low chord of the bridge for passage of ice and debris, or 1-foot minimum clearance between roadway overtopping and the low chord.

In addition to these guidelines and criteria, the bridge crossings were designed with sensitivity to the environmental functions of the river and surrounding area.

4.4.6.2 RESULTS

Table 4.42 summarizes the floodplain analysis completed for the EIS. Because the bridges are sized to minimize impacts to the floodplain, the design would not exceed the 0.5-foot rise criteria, and buried box culverts are planned to maintain ecological and bed load transport in the floodplain, none of the build alternatives would likely result in a significant encroachment, as defined in 23 CFR 6503105(q):

Significant encroachment shall mean a highway encroachment and any direct support of likely base flood-plain development that would involve one or more of the following construction-or flood-related impacts:

> (1) A significant potential for interruption or termination of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route.
>
> (2) A significant risk, or
>
> (3) A significant adverse impact on natural and beneficial flood-plain values.

The alternatives are discussed in more detail below.

Table 4.42 Impacts Summary – Floodplains

ALTERNATIVE	IMPACTS
No Build	• None.
Mary Street Option 1	• New side-by-side bridges over Yellowstone River would span the floodway, effective flow limits, and side channels outside floodway: no floodway infringement. These bridges could have up to eight 10-foot piers aligned with the flow direction infringing into the floodway and floodplain, and would result in less than a 0.5-foot rise of the base flood elevation. • New side-by-side bridges over Yellowstone River side channel would infringe into floodplain but would result in less than a 0.5-foot rise of the base flood elevation. • Existing bridge over Five Mile Creek would be replaced with a wider bridge.
Mary Street Option 2	• New side-by-side bridges over Yellowstone River would span the floodway and effective flow limits: no floodway infringement. These bridges could have up to nine piers in the water. • New bridge over Five Mile Creek would infringe into floodplain if a concrete bridge with piers in the floodplain is used, but would result in less than a 0.5-foot rise of the base flood elevation.
Five Mile Road	• New side-by-side bridges over Yellowstone River would span the floodway and effective flow limits: no floodway infringement. These bridges could have up to nine piers in the water. (Same bridges over the Yellowstone River as for Mary Street Option 2 Alternative.) • Existing bridge over Five Mile Creek would be replaced with a wider bridge.

Source: DOWL HKM 2011a.

4.4.6.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Floodplains: No Build Alternative

No direct impacts to floodplains are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Floodplains: No Build Alternative

No indirect impacts to floodplains are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Floodplains: No Build Alternative

No construction impacts to floodplains are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – Floodplains: No Build Alternative

No cumulative impacts to floodplains are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Floodplains: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.4.6.2.2 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Floodplains: Mary Street Option 1 Alternative

The Mary Street Option 1 Alternative crosses the Yellowstone River and Five Mile Creek. Crossing the Yellowstone River would require new side-by-side bridges in two locations: 2,010-foot-long bridges over the main channel of the Yellowstone River, and 185-foot-long bridges over a side channel to the east (please note that bridge lengths are approximate).

Each bridge over the Yellowstone River would have two lanes of traffic and left and right shoulders. Two 10-foot-diameter drilled shafts were assumed for the hydraulic analysis. These piers should be aligned with the flow of the Yellowstone River to minimize flow obstruction and to maximize the width between piers for the passage of debris and ice flows. The proposed side-by-side bridges would fully span the floodway, resulting in a long, multiple-span bridge. The south abutment would have fill in the floodplain, but would not infringe into the floodway. The side channel bridge is sized to provide an opening that does not infringe into the active channel.

The Yellowstone River crossing would infringe on the floodplain due to the large volume of fill to keep the roadway above flood elevations on the south side of the river. On the southeastern side of the Yellowstone River, there would be large removal requirements because the project would require a large embankment to raise the profile of the road over the railroad tracks and to keep the road above the updated FEMA 100-year flood elevations between the tracks and the river. The removal and fill requirements are more balanced north of the river, because the topography is generally level. A planning-level hydraulic analysis showed that the bridge could be designed to meet the criteria of less than a 0.5-foot rise in the base flood elevation.

The existing bridge over Five Mile Creek would be replaced and widened to accommodate the 85-foot roadway width. Floodplain impacts are not anticipated for the replacement of this existing crossing. It was assumed at this location that the bridge structure would clear span the entire floodplain. (See the Mary Street Option 2 Alternative discussion, below, for the results of the analysis of a replacement bridge upstream of the existing bridge.)

Culverts would be designed to accomplish no roadway overtopping for the 50-year design flood and no backwater damage to adjacent property.

Scour

Detailed evaluations of potential bridge scour have not been completed for this planning-level analysis. The I-90 bridge located upstream of the study area spans the Yellowstone River with a bridge much shorter than the proposed project crossing. Scour at the proposed crossing is not expected to be a significant issue for design. A detailed scour evaluation would be required during final design.

Indirect Impacts – Floodplains: Mary Street Option 1 Alternative

It is reasonable to expect that increased development would, over time, place additional stressors on environmentally sensitive areas and could encroach into the 100-year floodplain. Although the land use conversions are projected to occur under local comprehensive plans with or without the project, any inducement or acceleration of land conversions within floodplains could influence the character of the river. With the mitigation measures associated with floodplain permitting for the project, indirect impacts associated with the project are expected to be negligible.

Temporary Construction Impacts – Floodplains: Mary Street Option 1 Alternative
Potential temporary decreases in floodplain storage could occur during construction, due to work within the floodplain.

Mitigation – Floodplains: Mary Street Option 1 Alternative
The crossing of the Yellowstone River would require a substantial amount of fill and some removal of fill from within the floodplain to achieve the backwater requirements of no rise above 0.5 feet in base flood elevation.

The proposed project would be designed in compliance with Executive Order (E.O.) 11988, Floodplain Management. State of Montana drainage design standards would be applied to achieve results that would not increase or significantly change the flood elevations and/or limits.

Mitigation would be in accordance with permitting requirements of Yellowstone County.

Phase 1
Impacts to floodplains for Phase 1 of the Mary Street Option 1 Alternative would be reduced under Phase 1 compared to the Full Buildout. In Phase 1, one two-lane bridge across the Yellowstone River would be constructed, with the second two-lane bridge deferred until construction of the Full Buildout. Thus, the removal and fill impacts associated with construction would occur once during Phase 1 and again for the Full Buildout. The configuration of the bridges have not yet been determined, but both the Phase 1 and Full Buildout bridge or bridges could be designed to meet the criteria of less than a 0.5-foot rise in the base flood elevation.

There would be no difference in the floodplain impacts or mitigation related to the Five Mile Creek bridge, because the bridge over Five Mile Creek would be constructed to accommodate the Full Buildout. Thus, the floodplain impact described above for the Full Buildout would occur in Phase 1.

4.4.6.2.3 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Floodplains: Mary Street Option 2 Alternative
The Mary Street Option 2 Alternative would require new crossings of both the Yellowstone River and Five Mile Creek. The Yellowstone River crossing would be approximately 1,890 feet long over the active channel and a side channel and would cross the Yellowstone River essentially perpendicular to the flow. The left bridge abutment (looking downstream) would be located on a bluff approximately 75 feet above the Yellowstone River. The right abutment would be located to span the floodway, effective flow limits, and the side channels. The roadway fill south of the Yellowstone River bridge would not impact the hydraulics of the river, because the fill would be located outside of the effective flow limits. The required length of the proposed bridge has been established to span the entire floodway and the effective flow limits.

The bridge would infringe on the floodplain due to the large volume of fill needed to raise the roadway profile above flood elevations on the south side of the river. A planning-level hydraulic analysis showed that the bridge could be designed to meet the criteria of less than a 0.5-foot rise in the base flood elevation.

The Five Mile Creek bridge would be approximately 214 feet long and 85 feet wide, which accounts for two lanes of traffic and left and right shoulders for both directions, similar to the Yellowstone River Bridge crossings. The bridge would be located northwest, or upstream, of the existing Mary Street Five Mile Road Bridge. An 85-foot-wide bridge would typically require two drilled shaft piers or a pier wall. Two 6-foot-diameter drilled shafts were assumed for the purpose of this analysis. These piers should be aligned with the flow of Five Mile Creek to reduce flow obstruction. The proposed bridge crosses Five Mile Creek at a 28-degree skew, and the bridge length would be greater than the effective waterway opening. The left bridge abutment (looking downstream) is located on a bluff approximately 40 feet above Five Mile Creek.

The planned bridge across Five Mile Creek is sized to span the floodway. The right abutment would be located outside of the floodplain, but the 2:1 spill-through abutment would infringe into the floodplain. The bridge design could meet the standard of less than a 0.5-foot of base flood elevation rise.

Culverts would be designed to accomplish no roadway overtopping for the 50-year design flood and no backwater damage to adjacent property.

Scour

Detailed evaluations of potential bridge scour have not been completed for this planning-level analysis. The existing bridge located upstream along Old Hwy 312 spans Five Mile Creek with a bridge shorter than the planned Five Mile Creek bridge. Scour at the proposed crossing locations is not expected to be a significant issue for design. A detailed scour evaluation would be required in the future during final design.

Indirect Impacts – Floodplains: Mary Street Option 2 Alternative

Indirect impacts to floodplains under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Floodplains: Mary Street Option 2 Alternative

Temporary construction impacts to floodplains under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Floodplains: Mary Street Option 2 Alternative

The removal and fill requirements for the Yellowstone River crossing would be similar to those described for the Mary Street Option 1 Alternative. Preliminary hydraulic analysis suggests that the new crossing over Five Mile Creek would increase the base flood elevation, but by less than the 0.5-foot standard.

Phase 1

The floodplain impacts associated with Phase 1 for the Mary Street Option 2 Alternative would be similar to those described for the Mary Street Option 1 Alternative. The floodplain impact related to Five Mile Creek would be fully incurred during Phase 1.

4.4.6.2.4 FIVE MILE ROAD ALTERNATIVE

Full Buildout

The Five Mile Road Alternative would require a crossing of the Yellowstone River and a crossing of Five Mile Creek. The Yellowstone River crossing would be same as that described above under the Mary

Street Option 2 Alternative. The crossing of Five Mile Creek would be along the existing bridge, which would be replaced and widened to accommodate an 85-foot-wide roadway.

Direct Impacts – Floodplains: Five Mile Road Alternative

The direct impacts associated with the Yellowstone River crossing for the Five Mile Road Alternative would be the same as those described for the Mary Street Option 2 Alternative.

As described under the Mary Street Option 1 Alternative, the existing bridge over Five Mile Creek would be replaced and the roadway would be widened to accommodate the 85-foot roadway width. Floodplain impacts are not anticipated for the replacement of this existing crossing. It was assumed at this location that the bridge structure would clear span the entire floodplain.

Culverts would be designed to accomplish no roadway overtopping for the 50-year design flood and no backwater damage to adjacent property.

Scour

Detailed evaluations of potential bridge scour have not been completed for this planning-level analysis. The existing bridge located upstream of Old Hwy 312 spans Five Mile Creek with a bridge shorter than the planned Five Mile Creek Bridge. Scour at the proposed crossing locations is not expected to be a significant issue for design. A detailed scour evaluation would be required in the future during final design.

Indirect Impacts – Floodplains: Five Mile Road Alternative

Indirect impacts to floodplains under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Temporary Construction Impacts – Floodplains: Five Mile Road Alternative

Temporary construction impacts to floodplains under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Floodplains: Five Mile Road Alternative

The removal and fill requirements for the Yellowstone River crossing would be similar to those described for the Mary Street Option 1 Alternative.

Phase 1

The floodplain impacts associated with Phase 1 for the Five Mile Creek Alternative would be similar to those described for the Mary Street Option 1 Alternative.

4.4.6.3 ONLY PRACTICABLE ALTERNATIVE FINDING, FLOODPLAINS

If a project would cause more than a 1-foot net rise in the base flood elevation, Subpart A of 23 CFR 650 requires a finding that the selected alternative is the only practicable alternative. Because none of the build alternatives, including the Preferred Alternative, and including Phase 1 of any of the alternatives, would cause a significant net rise of the floodplains at the Yellowstone River or Five Mile Creek crossings, no “Only Practicable Alternative Finding” is required or provided. This analysis meets the requirements of Executive Order 11988, Protection of Floodplains.

4.4.7 WETLANDS

4.4.7.1 METHODOLOGY

A Biological Resources Report (BRR) was prepared for this EIS (DEA 2011c). The BRR documented biological and aquatic resources in the study area. It included the methodology used in delineating wetlands and documented the location, size, and type of waters and wetlands identified within the study area. The impacts to the aquatic resources in this evaluation were updated from the BRR and were derived from the preliminary alternative design provided in January 2012 by DOWL HKM. Final alignment designs are anticipated to reduce aquatic impacts through avoidance and minimization measures implemented on the basis of policies, procedures, and regulations.

Wetland boundaries were documented by using the U.S. Army Corps of Engineers (COE) *Wetland Delineation Manual* (Environmental Laboratory 1987) and *Regional Supplement Great Plains Region, Version 2.0* (COE 2010). Wetland boundaries within the study area were documented using Global Positioning System (GPS) information. **Table 4.43** shows the delineated acreage of each wetland in the study area and the direct impacts associated with the three build alternatives. The wetland impacts were analyzed assuming maximum impacts, i.e., using all Johnson Lane intersection configurations. Jurisdictional wetlands are those regulated by the COE as waters of the United States. The project team made preliminary classifications of jurisdiction or non-jurisdictional wetlands. The COE would make the final determination on the jurisdiction of the project's waters and wetlands.

4.4.7.2 RESULTS

4.4.7.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Wetlands: No Build Alternative

No direct impacts to wetlands are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Wetlands: No Build Alternative

No indirect impacts to wetlands are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Wetlands: No Build Alternative

No temporary construction impacts to wetlands are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – Wetlands: No Build Alternative

No cumulative impacts to wetlands are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Wetlands: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.4.7.2.2 BUILD ALTERNATIVES

Full Buildout

More than 50 wetlands were identified in the study area. **Table 4.43** provides a summary of direct wetland impacts. **Table 4.44** provides a summary of indirect wetland impacts. Only those wetlands that would be affected by one or more of the build alternatives are listed in the tables. **Figure 4.72** depicts wetlands within the study area. Implementing any of the build alternatives would result in permanent loss of existing wetlands. Wetland area would be lost to the construction of the roadway, bridges, culverts, and landscaping due to the placement of fill in the form of soil, riprap, concrete, various sizes of rock, and other construction materials. The area of loss was minimized to the extent practicable during preliminary design.

The impact calculations presented below were determined on the basis of conceptual design and are therefore preliminary estimates. Most of the effects under any of the build alternatives are associated with the primary corridors. Final impacts and further avoidance, minimization, and mitigation would be determined during final design.

Based on the analysis completed for this FEIS, the Mary Street Option 2 and the Five Mile Road Alternatives were recognized as the two least environmentally damaging practicable alternatives as a result of this evaluation. For more information, see Appendix F, the Clean Water Act Section 404(b)(1) Evaluation.

Table 4.43 Jurisdictional and Non-jurisdictional Wetland Impacts

WETLAND ID	WETLAND CLASS[1]	MDT RATING[2]	PRELIMINARY JURISDICTIONAL DETERMINATION	JUSTIFICATION FOR DETERMINATION	DELINEATED ACRES	MARY STREET OPTION 1 IMPACTED ACRES	MARY STREET OPTION 2 IMPACTED ACRES	FIVE MILE ROAD IMPACTED ACRES
A	PEM	III	Yes	Unnamed drainage and irrigation waste ditch; flows northeast to Five Mile Creek.	1.00	tr[3]	tr	–
AA	PEM	IV	Yes	Supply/waste ditch for agricultural use, outlet to Five Mile Creek.	0.08	0.04	0.04	–
AC	R2EM	III	Yes	Wetland associated with irrigation canal that discharges to natural drainage to Yellowstone River.	0.94	–	–	0.20
AD	PEM	IV	Yes	Wetland associated with two canals that join and flow east for agricultural end use and/or to Seven Mile Creek or the Miller McGirl Ditch.	1.15	1.06	1.06	1.08
AF	PFO	II	Yes	Wetland has a natural drainage to the Yellowstone River.	1.82	0.50	0.21	0.21

WETLAND ID	WETLAND CLASS[1]	MDT RATING[2]	PRELIMINARY JURISDICTIONAL DETERMINATION	JUSTIFICATION FOR DETERMINATION	DELINEATED ACRES	MARY STREET OPTION 1 IMPACTED ACRES	MARY STREET OPTION 2 IMPACTED ACRES	FIVE MILE ROAD IMPACTED ACRES
AG	R2UB	II	Yes	Wetland located within the Yellowstone River channel.	10.32	1.24	0.68	0.68
AH	PSS	IV	Yes	Wetland has seasonal flow east to larger wetland that flows to the Yellowstone River and/or gravel pit ponds adjacent to the wetlands that discharge to the Yellowstone River.	0.20	0.03	–	–
C	R2SBHx	IV	Yes	Wetland abuts the canal that flows north to Five Mile Creek.	0.18	0.02	0.03	–
D	PEM	IV	No	Wetland abuts lateral supply ditch; agriculture end use.	0.09	0.03	0.03	–
D9	PEM	IV	No	Wetland abuts lateral supply ditch; agriculture end use.	0.83	0.15	0.21	0.26
E	PEM	III	Yes	Wetland source water is a pipe from Lake Elmo; the wetland pond discharges into the Yellowstone River.	0.89	0.18	–	0.11
F	PEM	III	Yes	Wetland along Five Mile Creek.	1.11	tr	0.10	0.01
I	PSS	IV	Yes	Wetland along irrigation ditch that discharges into natural drainages to Five Mile Creek.	0.39	0.10	0.10	–
J	PSS	IV	Yes	Wetland along irrigation ditch that discharges into natural drainages to Five Mile Creek.	0.19	0.12	0.13	–
K	PFO	III	No	Subsurface flow from gravel pit ponds from SE of Mary Street; end use is cistern/domestic landscape irrigation; potential intermittent flow to Five Mile Creek without surface connectivity.	0.29	0.29	0.06	–

WETLAND ID	WETLAND CLASS[1]	MDT RATING[2]	PRELIMINARY JURISDICTIONAL DETERMINATION	JUSTIFICATION FOR DETERMINATION	DELINEATED ACRES	MARY STREET OPTION 1 IMPACTED ACRES	MARY STREET OPTION 2 IMPACTED ACRES	FIVE MILE ROAD IMPACTED ACRES
L2	PEM	IV	Yes	Wetland connects to larger canal wetland to the south (Wetland AD), which potentially drains to Seven Mile Creek or the Miller McGirl Ditch.	0.30	tr	tr	tr
L4	PEM	III	Yes	Wetland connects to Wetland AD, which potentially drains to Seven Mile Creek or the Miller McGirl Ditch.	1.31	0.23	0.23	0.24
M	PEM	IV	No	Wetland abuts supply ditch; agriculture end use.	0.68	0.42	0.44	0.68
O	R2UB	IV	Yes	Wetland located within the Yellowstone River channel.	1.79	–	0.23	0.27
P	PEM	III	Yes	Wetland abuts supply/water ditch that potentially flows to the Yellowstone River.	0.94	0.09	0.09	0.09
R	PEM	IV	Yes	Wetland abuts irrigation lateral supply/waste ditch that potentially flows into the Yellowstone River.	0.02	0.02	0.02	0.02
S	PEM	IV	Yes	Wetland associated with Coulson Ditch, which potentially discharges into the Yellowstone River.	1.12	0.67	0.67	0.67
T	PEM	IV	No	Roadside ditch wetlands with fully infiltrated flow.	0.37	0.37	0.37	0.37
W	PEM	III	Yes	Wetland discharges into an unnamed drainage to Yellowstone River.	12.2	0.08	0.08	0.08
Y	PEM	IV	No	Wetland abuts lateral supply ditch; agriculture end use.	0.04	0.04	0.04	0.04

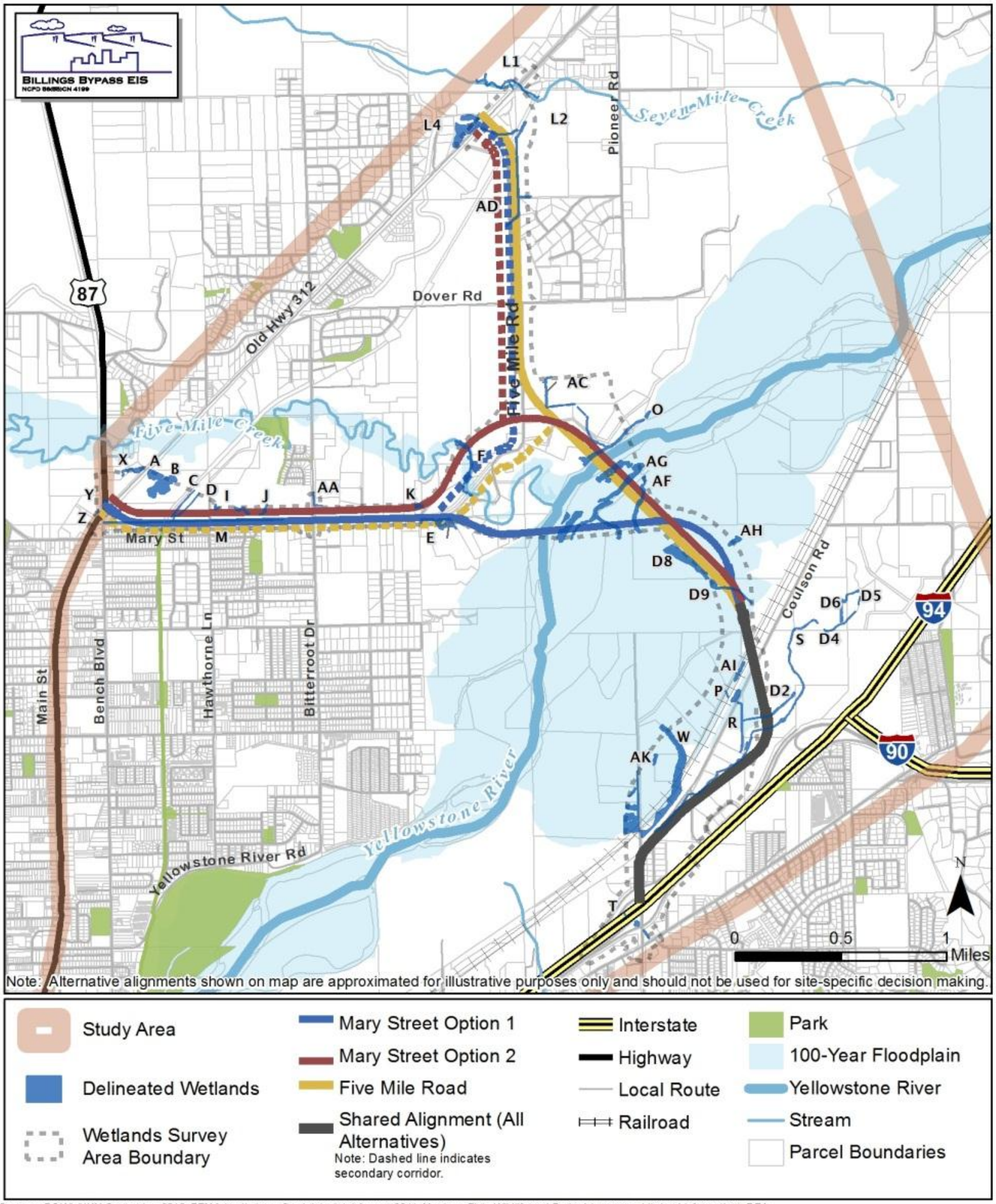
WETLAND ID	WETLAND CLASS[1]	MDT RATING[2]	PRELIMINARY JURISDICTIONAL DETERMINATION	JUSTIFICATION FOR DETERMINATION	DELINEATED ACRES	MARY STREET OPTION 1 IMPACTED ACRES	MARY STREET OPTION 2 IMPACTED ACRES	FIVE MILE ROAD IMPACTED ACRES
Z	PEM	IV	No	Ditch at intersection, intermittent flow, and small pond. Flow north from culvert to culvert; ends in agricultural land roadside ditch.	0.04	0.01	0.01	–
Total[4]						5.71	4.84	5.02
Total – estimated jurisdictional[4]						4.40	3.68	3.67

[1] Wetland Classes: PEM - palustrine emergent; PFO - palustrine forested; PSS - palustrine scrub-shrub; R2UB – riverine unconsolidated bottom; R2EM – riverine emergent vegetation; R2SBHx – riverine streambed, permanently flooded, excavated.
[2] MDT Ratings: I-IV scale, with I being of highest quality.
[3] tr = < 0.001 acres, included in totals.
[4] Totals presented are based on the GPS delineation data collected with six decimal places and may not match data presented in this table due to rounding.

Table 4.44 Indirect Wetland Impacts

ALTERNATIVE	INDIRECT IMPACTS
No Build	• None.
Mary Street Option 1	• Additional loss of wetlands or waters of the U.S. may occur, due to planned development as a result of expedited growth from increased access to the study area. • Potential loss of inherent wetland functions and values. • Potential for impacts to wetlands under bridges due to obstruction of sunlight and precipitation from structures.
Mary Street Option 2	• See Mary Street Option 1 Alternative.
Five Mile Road	• See Mary Street Option 1 Alternative.

Figure 4.72 Wetlands in Study Area



Sources: DOWL/HKM September 2010, FEMA (preliminary floodplain data) August 2011, Montana Fish, Wildlife and Parks (streams, public land information), DEA Field Investigations, USDA National Agricultural Imagery Program (July 2009 aerial photography), Yellowstone County (schools, public water supply, parks) 2010

Date Plotted: 9/11/2013

4.4.7.2.3 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Wetlands: Mary Street Option 1 Alternative

The Mary Street Option 1 Alternative would have an impact on 5.71 acres of wetlands, 4.40 acres of which are likely to be determined to be jurisdictional. The Mary Street Option 1 Alternative has the longer bridge crossing of the Yellowstone River and has the highest wetland impact to Yellowstone River wetlands rated as MDT Category II. Category II wetlands have high wetland functions and values. It also impacts the most riparian habitat.

Indirect Impacts – Wetlands: Mary Street Option 1 Alternative

The Mary Street Option 1 Alternative may lead to increased development in the study area (including along Five Mile Road), and there could be development pressure to expedite planned growth. This could cause additional impacts on wetlands and waters of the U.S. due to encroachment and/or loss and construction impacts (erosion/sedimentation) on remaining wetlands. These impacts are not certain, and could be avoided through planning; they are not quantified in this document.

Indirect impacts to wetlands would include potential loss of their inherent functions and values including:

- Fish and wildlife habitat: Bank and shoreline stabilization.
- Flood attenuation: Groundwater discharge and recharge.
- Surface water storage: Sediment, nutrient, and toxicant removal.
- Uniqueness, and recreational and educational opportunities.

Depending on the height of bridge structures, wetlands under bridges may be impacted due to obstruction of sunlight and precipitation from the structures.

Temporary Construction Impacts – Wetlands: Mary Street Option 1 Alternative

There would be temporary impacts to waters of the U.S. during construction. The distinction between direct and temporary impacts would be determined in final design and permitting. Depending on the type of construction method used, they could range from temporary work bridges to temporary fills in wetlands to accommodate necessary construction activities. Locating borrow or material sources, staging areas, and fill or waste disposal areas is the responsibility of the contractor. Those activities would be permitted as appropriate. Construction staging activities would make every attempt avoid the use of wetlands. Impacts associated with construction disturbance are considered temporary, because the area could later be reclaimed where practicable. Reclaiming affected wetlands after construction may be required based on conditions associated with wetland permits.

Cumulative Impacts – Wetlands: Mary Street Option 1 Alternative

Past projects have developed the area from natural habitats to its current condition. Past activities have resulted in losses of wetland to agricultural uses and residential/commercial development. Highway improvement projects have also contributed to a lesser extent to these losses up to the time that regulations protecting wetlands were adopted and became law.

Although the study area is not subject to a high degree of development pressure, any future private development in the study area is anticipated to result in impacts to the aquatic system, including wetlands. Most of the existing wetlands in the study area are associated with irrigation ditches. High quality wetlands are located near riparian areas, especially along the Yellowstone River. The study area is relatively undeveloped but has potential to urbanize, especially along Mary Street. The improvements to Five Mile Road as a secondary corridor would expedite planned development in the northern portion of the study area, which is primarily agricultural and likely contains irrigation ditches associated with wetlands. Development would continue in accordance with local development plans and be contained in the Urban Planning Area. Additionally, the extension of Five Mile Road would likely not lead to development of the northernmost portion of the study area, because the City of Billings and Yellowstone County have indicated they would not provide services in that portion. Regulations protecting wetlands would not allow for significant effects to the ecosystem, so the project would not substantially add to cumulative impacts to wetlands in the area. Cumulative impacts would therefore be negligible.

Several land development projects are planned in the study area. These include residential and commercial developments. These projects would be developed incrementally as determined by the market. However, those future actions that are subject to wetland regulations would likely include measures to avoid, minimize, or mitigate impacts. Therefore, cumulative effects from development would not likely result in significant alteration to the aquatic ecosystem. Likewise, the project would not substantially add to cumulative impacts to wetlands in the area.

Avoidance, Minimization, and Mitigation – Wetlands: Mary Street Option 1 Alternative

Avoidance and Minimization

The following avoidance and minimization measures were incorporated in the preliminary design of the proposed build alternatives, and would be incorporated into the alternative that is ultimately selected:

- Alignment design incorporated a combination of existing roadway corridors, new roadway corridors, and existing and new interchange configurations that were advanced to evaluation in the DEIS and FEIS.
- Alignment was shifted away from waters and wetland areas to avoid or minimize impacts where practicable.
- Bridge structures were located at a narrow crossing point nearly perpendicular to the Yellowstone River and Five Mile Creek.
- Bridge span lengths would be optimized during final design.
- Channel characteristics would be preserved or designed to match appropriate natural or preconstruction conditions.
- Detailed scour evaluation would be required during final design.
- Fill areas and amounts would be minimized.
- Fill materials would be very similar to those at the discharge site.
- Clearing of vegetation would be minimized.
- The timing and duration of the construction activities would be scheduled to coincide with the lowest flows possible and so that they do not coincide with spawning runs of fish when migration movements could be disrupted or blocked.
- An SWPPP and BMPs would be incorporated into construction to avoid and minimize impacts. The contractor would be required to follow the SWPPP and recommended BMPs. The selection of the BMPs would be done during the final design activities and at the discretion of the highway designer.
- Stormwater facilities would be incorporated for runoff from the bridge deck to the maximum extent practicable.
- Areas temporarily impacted from construction would be restored.

Mitigation

As described above, impacts to wetlands would be avoided and minimized to the maximum extent practicable.

For unavoidable wetland impacts, mitigation would be provided in accordance with Executive Order #11990 and the U.S. Army Corps of Engineers Clean Water Act permit requirements. Appropriate monitoring would be conducted to ensure that any wetland mitigation site functions as intended. Mitigation for the impacts to jurisdictional wetlands may occur in the form of using credits from one of MDT's wetland mitigation reserves, purchasing credits from a wetland mitigation bank, or developing on-site wetland restoration, enhancement, or creation.

Phase 1

Phase 1 impacts of the Mary Street Option 1 Alternative would be lower than those associated with the Full Buildout, approximately 4.87 acres in total, with 3.65 of those acres likely to be jurisdictional. Approximately 80 percent of wetland impacts associated with the Full Buildout would occur during Phase 1, with the remainder occurring during the Full Buildout. Construction impacts would occur twice, during Phase 1 and in the Full Buildout though the impacts of the two construction periods would be similar to one construction period. Construction impacts would be avoided and minimized to the extent practicable for all phases of project implementation.

MDT would mitigate for impacts in Phase 1 during construction of Phase 1. More information can be found in Appendix F, the Clean Water Act Section 404(b)(1) Evaluation.

4.4.7.2.4 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Wetlands: Mary Street Option 2 Alternative

The Mary Street Option 2 Alternative would have an impact on 4.84 acres of wetlands, 3.68 acres of which are likely to be determined to be jurisdictional. The Mary Street Option 2 Alternative has a shorter crossing of the Yellowstone River than the Mary Street Option 1 crossing, but has additional impacts to wetlands and waters of the U.S. by the new bridge crossing of Five Mile Creek (Mary Street Option 1 would rebuild the existing bridge in place). The Mary Street Option 1 and Mary Street Option 2 alternatives have similar amounts of new impervious surfaces.

Indirect Impacts – Wetlands: Mary Street Option 2 Alternative

Indirect impacts to wetlands for this alternative would be the same as for the Mary Street Option 1 Alternative; they would be minor and based on planned development that may be expedited by the project.

Temporary Construction Impacts – Wetlands: Mary Street Option 2 Alternative

No additional temporary construction impacts to wetlands under this alternative are anticipated beyond those disclosed in the direct impacts section.

Construction staging activities would make every attempt avoid the use of wetlands. Impacts associated with construction disturbance are considered temporary because the area could later be reclaimed.

Cumulative Impacts – Wetlands: Mary Street Option 2 Alternative

Cumulative impacts to wetlands under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Avoidance, Minimization, and Mitigation – Wetlands: Mary Street Option 2 Alternative

Avoidance, minimization, and mitigation measures under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Phase 1

Phase 1 impacts of the Mary Street Option 2 Alternative would be lower than those associated with the Full Buildout, approximately 4.36 acres in total, with 3.36 of those acres likely to be jurisdictional. Approximately 80 percent of wetland impacts associated with the Full Buildout would occur during Phase 1, with the remainder occurring during the Full Buildout. Construction impacts would occur twice, during Phase 1 and in the Full Buildout, though the impacts of the two construction periods would be similar to one construction period. Construction impacts would be avoided and minimized to the extent practicable for all phases of project implementation.

MDT would mitigate for impacts in Phase 1 during construction of Phase 1. More information can be found in Appendix F, the Clean Water Act Section 404(b)(1) Evaluation.

4.4.7.2.5 FIVE MILE ROAD ALTERNATIVE

Full Buildout

Direct Impacts – Wetlands: Five Mile Road Alternative

The Five Mile Road Alternative has the lowest wetland impacts and the same crossing of the Yellowstone River as the Mary Street Option 2 Alternative. The Five Mile Road Alternative would have an impact on 5.02 acres of wetlands, 3.67 acres of which are likely to be determined to be jurisdictional. The Five Mile Road Alternative has the least amount of new impervious surfaces.

Indirect Impacts – Wetlands: Five Mile Road Alternative

Indirect impacts to wetlands under this alternative would be the same as for the Mary Street Option 1 Alternative; they would be minor and based on planned development that may be expedited by the project.

Temporary Construction Impacts – Wetlands: Five Mile Road Alternative

No additional temporary construction impacts to wetlands under this alternative are anticipated beyond those disclosed in the direct impacts section.

Construction staging activities would make every attempt avoid the use of wetlands. Impacts associated with construction disturbance are considered temporary because the area could later be reclaimed.

Cumulative Impacts – Wetlands: Five Mile Road Alternative

Cumulative impacts to wetlands under this alternative would be similar to those described for the Mary Street Option 1 Alternative. The limited access associated with the new alignment may deter or slow new growth in the area adjacent to Five Mile Road; however, continued growth is projected for the Billings regional area. These incremental developments result in impacts to the aquatic system, including wetlands. Most of the existing wetlands in the study area are associated with irrigation ditches. Regulations protecting wetlands would not allow for significant effects to the ecosystem, so the project would not substantially add to cumulative impacts to wetlands in the area. Therefore, cumulative impacts would be negligible.

Avoidance, Minimization, and Mitigation – Wetlands: Five Mile Road Alternative

Avoidance, minimization, and mitigation measures under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Phase 1

Phase 1 impacts of the Five Mile Road Alternative would be lower than those associated with the Full Buildout, approximately 4.58 acres in total, with 3.34 of those acres likely to be jurisdictional. Approximately 80 percent of wetland impacts associated with the Full Buildout would occur during Phase 1, with the remainder occurring during the Full Buildout. Construction impacts would occur twice, during Phase 1 and in the Full Buildout, though the impacts of the two construction periods would be similar to one construction period. Construction impacts would be avoided and minimized to the extent practicable for all phases of project implementation.

MDT would mitigate for impacts in Phase 1 during construction of Phase 1. More information can be found in Appendix F, the Clean Water Act Section 404(b)(1) Evaluation.

4.4.8 VEGETATION

4.4.8.1 METHODOLOGY

An inventory of vegetation along the project corridors was prepared using aerial photography and site visits, and plant species present in the project corridors were identified. Direct impacts are assessed based on the permanent and temporary impacts that would be caused by construction of the proposed build alternatives. This analysis includes the maximum amount of habitat impacted under each build alternative. Indirect impacts evaluated include degradation of riparian habitat and the potential spread of noxious weeds.

4.4.8.2 RESULTS

4.4.8.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Vegetation: No Build Alternative

No direct impacts to vegetation are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Vegetation: No Build Alternative

No indirect impacts to vegetation are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Vegetation: No Build Alternative

No temporary construction impacts to vegetation are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – Vegetation: No Build Alternative

No cumulative impacts to vegetation are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Vegetation: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.4.8.2.2 BUILD ALTERNATIVES

Generally, direct vegetation impacts would be similar among the build alternatives, because the length of the alternatives and the types of habitat that the alternatives cross are similar. Most of the land that would be converted to a transportation use is currently in agricultural use, in irrigated hay fields, cropland, or non-irrigated rangeland. All of the build alternatives would pass through at least three areas with noxious weeds (north of the Johnson Lane Interchange, southeast of either Yellowstone River crossing, and near Five Mile Creek). Construction disturbance is correlated with increased risk that the weeds would spread.

Table 4.45 shows direct and indirect impacts to vegetative habitat types for each build alternative. Impacts to vegetation that are determined to provide habitat value for wildlife and aquatic species relates to impacts to wildlife and aquatic species. Most of the impacts are associated with the primary corridors for all build alternatives. The total ROW required for the project ranges from 170 acres for the Five Mile Road Alternative to 210 acres for the Mary Street Option 1 Alternative. (See Section 4.3.5, “Right-of-Way and Utilities,” for more detail.)

Table 4.45 Direct and Indirect Impacts to Vegetative Habitat (acres)

IMPACTS	MARY STREET OPTION 1 ALTERNATIVE (PRIMARY CORRIDOR / SECONDARY CORRIDOR)	MARY STREET OPTION 2 ALTERNATIVE (PRIMARY CORRIDOR / SECONDARY CORRIDOR)	FIVE MILE ROAD ALTERNATIVE (PRIMARY CORRIDOR / SECONDARY CORRIDOR)
DIRECT IMPACTS TO VEGETATIVE HABITAT (ACRES)			
Cliffs	0.1 / 0.0	0.1 / 0.0	0.03 / 0.0
Pond	0.1 / 0.0	0.0 / 0.0	1.9 / 0.3
Riparian	11.2 / 0.7	5.5 / 0.5	5.3 / 0.5
Sage Steppe	0.1 / 0.0	0.0 / 0.0	0.01 / 0.0
Total	11.5 / 0.7	5.6 / 0.5	7.3 / 0.9
INDIRECT IMPACTS			
	• Possibility of increased degradation of riparian, sagebrush steppe, and cliff areas through fragmentation or spread of noxious weeds.	• See Mary Street Option 1 Alternative.	• See Mary Street Option 1 Alternative.

Source: GIS analysis based on data in the *Biology Resource Report*, DEA, 2011. Numbers may not sum due to rounding.

4.4.8.2.3 MARY STREET OPTION 1 ALTERNATIVE

Full Buildout

Direct Impacts – Vegetation: Mary Street Option 1 Alternative

The Mary Street Option 1 Alternative would have the highest direct impacts on riparian habitat and the highest total impact on vegetative habitat. These impacts are generally associated with the primary corridor.

Indirect Impacts – Vegetation: Mary Street Option 1 Alternative

The Mary Street Option 1 Alternative may increase the degradation of the riparian, sagebrush steppe, and cliff areas through fragmentation or spread of noxious weeds, particularly along the riparian areas on the southeast side of the Yellowstone River, where noxious weed populations have been documented.

In addition to the three areas of noxious weeds disturbed by all of the build alternatives, the Mary Street Option 1 Alternative would pass through an additional fourth area infested with noxious weeds, in the area connecting the Yellowstone River Bridge with the existing Mary Street corridor.

Temporary Construction Impacts – Vegetation: Mary Street Option 1 Alternative

Ground-disturbing construction activities could facilitate the spread of noxious weeds by opening up new areas for invasion and promoting new weed growth by transporting weeds to new areas by equipment.

Mitigation – Vegetation: Mary Street Option 1 Alternative

To re-establish permanent vegetation and to reduce the spread and establishment of noxious weeds, disturbed areas within MDT right-of-way and easements would be seeded with desirable plant species, as soon as practicable, as recommended and determined feasible by the MDT Botanist.

Post-construction, the site would be monitored until final stabilization is met.

In accordance with Standard Specification 201, clearing and grubbing activities would occur only within staked construction limits. To control the spread of noxious weeds, the contractor would be required to wash all equipment prior to transport into the project area as specified in the Supplemental Specifications. Additional mitigation measures for vegetation or noxious weeds are not anticipated.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to vegetation as well as mitigation for Phase 1 of the Mary Street Option 1 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 1 Alternative. Approximately 75 percent of vegetation impacts would occur during Phase 1, with the remainder following during Full Buildout. Construction impacts would occur twice, so some of the revegetation planted after the construction of Phase 1 may need to be repeated or restored after the construction of the Full Buildout. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.4.8.2.4 MARY STREET OPTION 2 ALTERNATIVE

Full Buildout

Direct Impacts – Vegetation: Mary Street Option 2 Alternative
The Mary Street Option 2 Alternative would have impacts to approximately 6 acres of vegetation classified as habitat, the lowest amount of impacts among the build alternatives. The majority of the affected vegetation is classified as riparian habitat, mostly associated with the Yellowstone River.

Indirect Impacts – Vegetation: Mary Street Option 2 Alternative
The Mary Street Option 2 Alternative would have the same indirect impacts to vegetation as the Mary Street Option 1 Alternative, except it would not traverse the fourth area of noxious weeds north of the Yellowstone River.

Temporary Construction Impacts – Vegetation: Mary Street Option 2 Alternative
Temporary construction impacts to vegetation under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Vegetation: Mary Street Option 2 Alternative
Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to vegetation as well as mitigation for Phase 1 of the Mary Street Option 2 Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Mary Street Option 2 Alternative. Approximately 75 percent of vegetation impacts would occur during Phase 1, with the remainder following during Full Buildout. Construction impacts would occur twice, so some revegetation planted after the construction of Phase 1 may need to be repeated or restored after the construction of the Full Buildout. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.4.8.2.5 FIVE MILE ROAD ALTERNATIVE

Full Buildout

Direct Impacts – Vegetation: Five Mile Road Alternative
The Five Mile Road Alternative would affect approximately 8 acres of vegetation classified as habitat, including 5.9 acres of riparian habitat and over 2 acres of pond habitat. The ponds are located in recently excavated gravel pits and do not have high habitat value.

Indirect Impacts – Vegetation: Five Mile Road Alternative
Indirect impacts to vegetation under this alternative would be the same those indicated for the Mary Street Option 2 Alternative.

Temporary Construction Impacts – Vegetation: Five Mile Road Alternative
Temporary construction impacts to vegetation under this alternative would be the same as those indicated for the Mary Street Option 1 Alternative.

Mitigation – Vegetation: Five Mile Road Alternative
Mitigation under this alternative would be the same as that indicated for the Mary Street Option 1 Alternative.

Phase 1
Direct, indirect, temporary construction, and cumulative impacts to vegetation as well as mitigation for Phase 1 of the Five Mile Road Alternative would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the Five Mile Road Alternative. Approximately 75 percent of vegetation impacts would occur during Phase 1, with the remainder following during Full Buildout. Construction impacts would occur twice, so some revegetation planted after the construction of Phase 1 may need to be repeated or restored after the construction of the Full Buildout. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.4.9 WILDLIFE AND AQUATIC SPECIES

4.4.9.1 METHODOLOGY
General wildlife, migratory birds, aquatic species, and critical habitat were identified through literature review and field reconnaissance. Impacts are assessed based on the potential for direct mortality; loss, fragmentation, or alteration of habitat; and water quality degradation.

4.4.9.2 RESULTS

4.4.9.2.1 NO BUILD ALTERNATIVE

Direct Impacts – Wildlife and Aquatic Species: No Build Alternative
No direct impacts to wildlife and aquatic species are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Wildlife and Aquatic Species: No Build Alternative
No indirect impacts to wildlife and aquatic species are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Wildlife and Aquatic Species: No Build Alternative
No temporary construction impacts to wildlife and aquatic species are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – Wildlife and Aquatic Species: No Build Alternative

No cumulative impacts to wildlife and aquatic species are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Wildlife and Aquatic Species: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.4.9.2.2 BUILD ALTERNATIVES

Full Buildout

Generally, direct impacts to wildlife and aquatic species would be similar among the build alternatives, because the length of the alternatives and the types of habitat that the alternatives cross are similar. Direct and indirect impacts to wildlife and aquatic species are summarized in **Table 4.46**. The direct, indirect, temporary construction, and cumulative impacts and proposed mitigation measures are presented together for all build alternatives below.

Table 4.46 Direct and Indirect Impacts to Wildlife and Aquatic Species

	NO BUILD ALTERNATIVE	MARY STREET OPTION 1 ALTERNATIVE	MARY STREET OPTION 2 ALTERNATIVE	FIVE MILE ROAD ALTERNATIVE
DIRECT IMPACTS				
Wildlife Species	• None.	• Loss of habitat due to construction and increased habitat fragmentation (barrier effect).	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
Aquatic Species	• None.	• Direct mortality and loss of habitat at ground-disturbed or pier locations. • Minor impact to aquatic habitat associated with canals and ditches.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
INDIRECT IMPACTS				
Wildlife Species	• None.	• Impacts from roadway noise associated with presence of a new roadway. • Reduced quality of wildlife habitat. • Inhibited wildlife movement.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.

	NO BUILD ALTERNATIVE	MARY STREET OPTION 1 ALTERNATIVE	MARY STREET OPTION 2 ALTERNATIVE	FIVE MILE ROAD ALTERNATIVE
Aquatic Species	• None	• Temporary disturbances related to construction, including erosion, sedimentation, and runoff, and spilled fuels that could potentially reduce water quality. • Degraded water quality from increased water temperature or pollutants. • Increased salinity, turbidity, and toxicity could affect aquatic life and reduce food availability for fish species.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.

Direct Impacts – Wildlife and Aquatic Species: Build Alternatives

Wildlife

Direct impacts on wildlife include loss of habitat due to construction and increased habitat fragmentation (or barrier effect). These impacts primarily occur in the higher quality habitat areas such as along the Yellowstone River and its tributaries. The undeveloped areas associated with irrigated hayfields in the southern portion of the study area, north of Mary Street and along both sides of the Five Mile Road alignment, also provide general wildlife habitat. With adherence to conservation measures and the Migratory Bird Treaty Act (MBTA), no direct impacts to migratory birds should occur. It is anticipated that direct impacts to wildlife would be similar among alternatives, because the length of the alignments relative to areas of habitat are similar.

Aquatic Species

The existing condition of the aquatic habitat has been degraded due to water quality concerns related to the Yellowstone River, as well as the proximity of agriculture, commercial, and residential disturbance. Aquatic invertebrates and smaller, less mobile organisms may be directly impacted (mortality, loss of habitat) at ground-disturbed or pier locations. Aquatic habitat associated with the canals and ditches is limited; therefore, only minor impact to these areas is anticipated.

The location of piers could impact Yellowstone River channel sites that currently provide habitat for fish, amphibians, and reptiles.

Indirect Impacts – Wildlife and Aquatic Species: Build Alternatives

Wildlife

Wildlife may be impacted indirectly by roadway noise associated with the presence of a new roadway, which could reduce the quality of wildlife habitat in the study area. Wildlife movement could be inhibited by the roadway, particularly if fencing or barrier walls are used.

Aquatic Species

Indirect impacts to aquatic species could result from the temporary disturbance related to construction. These impacts include increased erosion, sedimentation, and runoff, and spilled fuels that could potentially reduce water quality. Water quality degradation can occur from increased water temperature and/or pollutants. More specifically, as runoff moves over warmed impervious surfaces, the temperature of the water rises and dissolved oxygen content decreases. When introduced into aquatic habitats, this causes stress or mortality in aquatic organisms. Increased salinity, turbidity, and toxicity affect aquatic life and reduce food availability for fish species.

Temporary Construction Impacts – Wildlife and Aquatic Species: Build Alternatives

Wildlife

During construction, small mammals, reptiles, amphibians, and invertebrates, especially those that burrow, could experience direct mortality due to earth-moving activities. Birds and larger species of mammals currently inhabiting one of the project corridors and adjacent areas may be displaced into surrounding lands during construction because of construction noise and other disturbances. In particular, the cavity nesting or burrowing mammals that utilize the mature, large-diameter trees along the Yellowstone River may experience direct mortality during the winter and spring breeding months if tree removal occurs during these months.

Aquatic Species

Construction activity occurring within water bodies may result in direct mortality and temporary disturbance and/or displacement of individual fish, aquatic amphibians and reptiles, aquatic invertebrates, and other organisms. Microinvertebrates and smaller, less mobile organisms may be directly impacted at ground-disturbed or pier locations. During construction of the bridges and culvert placement, fish and other aquatic organisms may be temporarily disturbed and/or displaced. This disturbance would be due to noise and possible sedimentation generated during construction. Pile driving produces extremely high sound levels and acoustic pressures that research has shown to produce negative effects to fish. The canals and ditches have limited potential impacts due to limited aquatic habitat.

Cumulative Impacts – Wildlife and Aquatic Species: Build Alternatives

Past projects have developed the area from natural habitats to its current condition, which is generally developed into urban or agricultural use, with the exception of riparian and wetland areas associated with the Yellowstone River and other water resources. The study area is largely undeveloped, but it is adjacent to higher density developed areas of Billings to the west. Planned commercial and residential growth in the study area could increase loss of habitat for both wildlife and aquatic species.

Construction of a new road through agricultural lands would result in wildlife collisions at rates similar to those of nearby highways. Any increase of carrion from potential increases in vehicle/wildlife collisions could attract scavenging wildlife and may cause injury or mortalities of these species. The bridges over the main drainages of the Yellowstone River and Five Mile Creek and the large culverts planned for ecological and floodplain connectivity are anticipated to accommodate movements of certain wildlife and aquatic species. Additional conservation measures would be evaluated during detailed design. Cumulative impacts would be minor.

The Yellowstone River is a key component of ecosystem function for wildlife and aquatic species in the area. Past activities such as roadway construction, agriculture, and development have led to impaired water quality, which has resulted in impacts to habitat. Use of planned mitigation and implementation of BMPs would protect the river from further degradation and help to avoid adverse effects to wildlife or aquatic species. Thus, when combined with past, present, and reasonably foreseeable impacts, the cumulative effect to wildlife and aquatic species from the build alternatives is anticipated to be minimal.

Mitigation – Wildlife and Aquatic Species: Build Alternatives

Mitigation for wildlife would include:

- Compliance with Section 208 of MDT's Standard Specifications, Water Pollution Control and Stream Preservation (MDT 2006), and adherence to resource agency conditions.
- MDT would continue to evaluate the appropriateness and necessity of additional wildlife crossings measures near the Yellowstone River, Five Mile Creek, or other locations. Recommended conservation measures are listed below.
- In accordance with the Migratory Bird Treaty Act (MBTA) of 1918 and the Bald and Golden Eagle Protection Act of 1940, impact to known breeding locations such as avian nests or burrows would be avoided or minimized as required. In conformance to the MBTA, seasonal restrictions or deterrent methods are used to ensure that active nests are not harmed during the breeding season. Recommended conservation measures are listed below.

Mitigation for substantive negative impacts to aquatic species is anticipated during final design of the bridge crossing and culverts for this project and the implementation of standard specifications and BMPs. Bridge crossings are planned for the fish-bearing streams.

Avoidance and minimization of impacts to aquatic species is anticipated through measures including the following:

- Design bridges to optimize the shape, size, number, and placement of pier locations in a manner that would maintain uninterrupted fish passage.
- Schedule in-water work for bridge construction during low water levels to minimize construction during spawning periods.
- Adhere to Section 208 of MDT's Standard Specifications for Road and Bridge Construction (2006).
- Adhere to special conditions set forth by the resource agencies.

Recommended Conservation Measures: Wildlife

At this time, no specific locations have been identified as potential or likely wildlife crossings. However, as noted above, as the design process evolves, MDT would continue to evaluate the appropriateness and necessity of additional wildlife crossings near the Yellowstone River, Five Mile Creek, or other locations. Wildlife-crossing mitigation measures such as signage and the installation of wildlife-friendly fencing would be evaluated to reduce potential barriers to wildlife movement. MDT's timely and routine carcass removal would minimize the potential of injury or mortalities to scavenging wildlife.

The Migratory Bird Treaty Act of 1918 prohibits the destruction or damage of active or occupied nests and eggs of migratory birds. Native species that do not migrate are included under the protected list of the MBTA (USFWS n.d.) and the Bald and Golden Eagle Protection Act. Impact to known breeding locations such as avian nests or burrows would be avoided or minimized as required. In conformance to the MBTA, seasonal restrictions or deterrent methods are used to ensure that active nests are not harmed during the breeding season.

Recommended conservation measures include, but are not limited to:

- Removal of structures outside of the nesting season and when the nests are not occupied, typically between the dates of August 16 and April 30.
- Installation of nesting deterrents that do not harm active nests, including:
  - Cover or enclosure of potential nesting surfaces with mesh netting, chicken wire fencing, or other suitable material to prevent birds from establishing new nests.
  - Application of a nontoxic, nonlethal, bird repellent gel or liquid on all potential nesting surfaces on the structure to prevent new nests from being established.
- Removal of existing and new nests from the structure as they are built (this work is performed outside of the nesting season and when the nests are not occupied, typically between the dates of August 16 and April 30).
- Use of wildlife-friendly fencing to minimize barriers to movement.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to wildlife and aquatic species as well as mitigation for Phase 1 of build alternatives would not be substantially different than the Full Buildout impacts and mitigation. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the build alternatives. The majority of anticipated wildlife habitat impacts would occur during Phase 1, therefore most of the wildlife would be displaced and dispersed from the project area. Full Buildout would have minor impacts. The Construction impacts would occur twice, though the impacts of the two construction periods would be similar to one construction period. The second construction period would similarly result in impacts to aquatic species but the impacts are not anticipated to be substantially greater than those originally anticipated for one construction period. With avoidance and minimization measures, construction scheduling, and BMPs, construction impacts to aquatic species during Phase 1 would be physically and biologically contained as practicable.

The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.4.10 STATE SPECIES OF CONCERN

4.4.10.1 METHODOLOGY

State species of concern and critical habitat were identified through agency consultation, literature review, and field reconnaissance. Species status and distribution, life history and habitat requirements, reasons for decline, and occurrence in the project corridors were documented (see Section 3.4.10, “State Species of Concern”). Impacts are assessed based on the potential for direct mortality, or loss, fragmentation, or alteration of habitat. Based on the anticipated impacts of the build alternatives, a determination of effect is documented, including the likelihood that the project would contribute to a trend toward federal listing or loss of viability of the species.

4.4.10.2 RESULTS

Table 4.47 summarizes direct and indirect impacts to state species of concern.

Table 4.47 Direct and Indirect Impacts to State Species of Concern

SPECIES	NO BUILD ALTERNATIVE	MARY STREET OPTION 1 ALTERNATIVE	MARY STREET OPTION 2 ALTERNATIVE	FIVE MILE ROAD ALTERNATIVE
DIRECT IMPACTS				
Grasshopper Sparrow	• None.	• None.	• None	• None
Pinyon Jay	• None.	• None.	• None	• None
Brewer's Sparrow	• None.	• None.	• None	• None
Greater Short Horned Lizard	• None.	• None.	• None	• None
Loggerhead Shrike	• None.	• Direct mortality may occur due to inability to disperse during construction.	• Same as Mary Street Option 1 Alternative	Same as Mary Street Option 1 Alternative
Common Sagebrush Lizard	• None.	• Direct mortality may occur due to inability to disperse during construction.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
Milksnake	• None.	• Direct mortality may occur due to inability to disperse during construction.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
Western Hog-nosed Snake	• None.	• Direct mortality may occur due to inability to disperse during construction.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
Spiny Softshell	• None.	• Negligible direct impacts.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
Snapping Turtle	• None.	• Negligible direct impacts.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
Sauger	• None.	• Potential for disruption of spawning locations.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
Yellowstone Cutthroat Trout	• None.	• Negligible direct impacts.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.

SPECIES	NO BUILD ALTERNATIVE	MARY STREET OPTION 1 ALTERNATIVE	MARY STREET OPTION 2 ALTERNATIVE	FIVE MILE ROAD ALTERNATIVE
Black-billed Cuckoo	• None.	• May experience direct mortality in the riparian areas, wetlands, or ditches that are affected by construction activities.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
Great Blue Heron	• None.	• May experience direct mortality in the riparian areas, wetlands, or ditches that are affected by construction activities.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
Veery	• None.	• May experience direct mortality in the riparian areas, wetlands, or ditches that are affected by construction activities.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
Hoary Bat	• None.	• May experience direct mortality in the riparian areas, wetlands, or ditches that are affected by construction activities.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
Eagle	• None.	• May experience temporary disturbance during construction if roosting area is found within 0.5 mile of project limits.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
Heron Rookery	• None.	• Construction noise and vegetation removal may affect heron rookery.	• No anticipated impacts.	• No anticipated impacts.
Small burrowing animals, hibernating reptiles, and amphibians	• None.	• May experience direct mortality in the riparian areas, wetlands, or ditches that are affected by construction activities.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.
INDIRECT IMPACTS				
All State Species of Concern	• None.	• Loss and degradation of habitat and habitat fragmentation.	• Same as Mary Street Option 1 Alternative.	• Same as Mary Street Option 1 Alternative.

4.4.10.2.1 NO BUILD ALTERNATIVE

Direct Impacts – State Species of Concern: No Build Alternative

No direct impacts to state species of concern are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – State Species of Concern: No Build Alternative

No indirect impacts to state species of concern are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – State Species of Concern: No Build Alternative

No temporary construction impacts to state species of concern are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – State Species of Concern: No Build Alternative

No cumulative impacts to state species of concern are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – State Species of Concern: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.4.10.2.2 BUILD ALTERNATIVES

Full Buildout

The following impacts to state species of concern would be similar among all build alternatives. There are no distinguishing characteristics regarding how the different build alternatives may affect the state species of concern, except with respect to the heron rookery location, as described in the discussion of temporary construction impacts below.

Direct Impacts – State Species of Concern: Build Alternatives

Generally, for the state species of concern that may occur in the study area, the types of direct impacts would be similar to those described for general wildlife and aquatic species in Section 4.4.9, "Wildlife and Aquatic Species."

Because the grasshopper sparrow and pinyon jay are highly unlikely to occur in the study area, no impacts to these species are anticipated. The Brewer's sparrow and greater short-horned lizard have specific habitat requirements that are present in the study area, but have been avoided with the design of the proposed build alternative alignments. Therefore, no impacts to these species are anticipated.

Species that inhabit primarily developed or agricultural areas (loggerhead shrike, common sagebrush lizard, milksnake, and western hog-nosed snake) and that are adapted to human use when nesting or denning would have suitable habitat available outside of the study area. However, direct mortality may occur to individuals of those species unable to disperse during construction, such as reptiles that burrow. However the potential effect to the overall population of these species is considered negligible.

The species that utilize the Yellowstone River corridor, such as the spiny softshell, snapping turtle, and sauger, would incur negligible direct impacts from the bridge crossings. The locations of sauger spawning areas in the study area have not been identified; therefore, there is potential for disruption of spawning locations. Construction timing to avoid spawning activity would be important for the sauger, which is a spring spawner. Overall, the build alternatives are not anticipated to negatively affect sauger (Ruggles 2011). The Yellowstone cutthroat trout spawning areas are in the Yellowstone River headwaters, outside of the study area, and negative impacts are not anticipated.

Where riparian areas, wetlands, or ditches are impacted by the project, direct mortality may affect tree nesting or breeding species such as the black-billed cuckoo, great blue heron, veery, and hoary bat and other small and less mobile species that would not be able to disperse out of the construction zone (small burrowing animals, hibernating reptiles, and amphibians).

The closest eagle nest is 0.61 miles from the project construction limits. No impacts to eagle nests are anticipated.

The heron rookery is located about 550 feet south of the Mary Street 1 Alternative, south of the Yellowstone River and more than 1,300 feet west of the other alternatives.

Indirect Impacts – State Species of Concern: Build Alternatives

Indirect impacts would include loss and degradation of habitat and habitat fragmentation. These impacts would be similar among all build alternatives. There are no distinguishing characteristics regarding how the different alternatives would indirectly impact the state species of concern.

Temporary Construction Impacts – State Species of Concern: Build Alternatives

Construction activity occurring within water bodies may result in direct mortality and temporary disturbance and/or displacement of the spiny softshell, snapping turtle, Yellowstone cutthroat trout, and sauger. This disturbance would be due to noise and possible sedimentation generated during construction. Pile driving produces extremely high sound levels and acoustic pressures that research has shown produce negative effects to fish.

The peregrine falcon and the bald eagle, whose nesting areas are located away from the project corridors, could potentially experience temporary disruption in foraging and roosting locations during construction from noise and vegetation removal. The project would not affect the peregrine eyrie, which is over 5 miles away.

The closest bald eagle nest is located 0.6 mile upstream. Bald eagles typically concentrate their activities near their nest territories. Construction of the project is not anticipated to impact nesting activities from this distance. If communal roosting areas are located with 0.5 mile of project limits prior to construction, coordination with the USFWS and MTFWP would be required.

The nearby heron rookery would be avoided during construction. However, construction noise and vegetation removal for the Mary Street 1 Alternative would likely affect the colony. Coordination with the USFWS and MTFWP would be required if this alternative is selected. By utilizing construction scheduling and buffers, as addressed in the following conservation measures, construction impacts to the heron rookery would be minimized.

Cumulative Impacts – State Species of Concern: Build Alternatives

The cumulative impacts to state species of concern are similar to those outlined for wildlife and aquatic species, above. The potential increase of carrion from increases in vehicle/wildlife collisions could attract scavenging eagles and may cause injury or mortalities. By implementing conservation measures such as construction scheduling, buffers, and other MTFWP recommendations, potential long-term impacts would be avoided or minimized.

Mitigation – State Species of Concern: Build Alternatives

Efforts to avoid and minimize impacts to state species of concern are anticipated to be achieved through compliance with Section 208 of MDT's Standard Specifications and adherence to resource agency conditions. Complying with the conditions of the resource agencies would avoid or minimize impacts to species of concern. The *Fish and Wildlife Recommendations for Subdivisions* address state species of concern.

Implementation of the "Recommended Conservation Measures" for general wildlife species, particularly in regard to the MBTA and the Bald and Golden Eagle Protection Act, would avoid the majority of breeding schedules, if necessary. Complying with the conditions of the resource agencies would avoid or minimize impacts to species of concern. Specific to bald eagles:

- *The Montana Bald Eagle Guidelines Addendum, 2010* addresses the bald eagle buffers, seasonal construction restrictions, and habitat conservation.
- MDT would continue to evaluate the appropriateness and necessity of wildlife crossings locations and other measures to minimize the potential increase of available carrion for bald eagles.
- The location of the eagle nests and communal roosting sites would be verified by a preconstruction survey or through coordination with resource agencies or organizations.
- Coordination with the USFWS and MTFWP is required if blasting is to occur within ½ mile of bald eagle nests or roosts.

Recommended Conservation Measures: Species of Concern

The location of the eagle nests and communal roosting sites needs to be verified by a preconstruction survey or through coordination with resource agencies or organizations. Blasting within 0.5 mile of active nests should be avoided during nesting season. The recommended seasonal construction restrictions for occupied bald eagle nests within the buffer area are from February 1 through August 15 (MTFWP 1994, 2010; USFWS 2007). The current nest locations are outside of this buffer area and the road construction buffer limits (i.e., the nests are more than 660 feet from project clearing, external construction, and landscaping activity limits). However, if a new bald eagle nest were to be located within 0.5 mile of the project, informal consultation with the USFWS and MTFWP would be initiated.

Blasting within 0.5 mile of communal roosting sites may not be conducted without prior coordination with the USFWS and MTFWP. Communal roosting typically occurs outside of the breeding season at opportunistic feeding locations. At least one communal roosting site is within 0.5 mile of the project corridor. Several bald eagles were observed during the August 2011 field investigation at a communal roosting snag tree south of the Yellowstone River near the crossing location. Coordination with the USFWS and MTFWP is required if blasting is to occur near roosts. This coordination is recommended to occur during final design.

MDT would continue to evaluate the appropriateness and necessity of wildlife crossings locations and other measures to minimize the potential increase of available carrion for bald eagles. Injuries or mortalities would be minimized through MDT's routine roadway maintenance activities, which include timely removal of dead animals along the roadway.

For the Mary Street Option 1 Alternative, the boundary of the heron rookery needs to be verified by a preconstruction survey or coordination with resource agencies or organizations. If the selected alternative is located within the 900-foot recommended buffer area, coordination with MTFWP would be initiated during final design. Planting screening vegetation between the road and the rookery would reduce visual, and potentially noise, impacts. A construction schedule restriction could be implemented within an 900-foot buffer of the heron rookery from March 1 through mid-August to avoid the nesting season.

Phase 1

Direct, indirect, temporary construction, and cumulative impacts to state species of concern as well as mitigation for Phase 1 of the build alternatives would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the build alternatives. The majority of anticipated habitat impacts would occur during Phase 1, therefore most of the wildlife will be displaced and dispersed from the project area. Full Buildout would have minor impacts. A BRR re-evaluation would be conducted prior to Full Buildout for species of concern. Construction impacts would occur twice, though the impacts of the two construction periods would be similar to one construction period. The second construction period would similarly result in impacts to aquatic species but the impacts are not anticipated to be substantially greater than those originally anticipated for one construction period. With avoidance and minimization measures, construction scheduling, and BMPs, construction impacts to aquatic species during Phase 1 would be physically and biologically contained as practicable. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1, so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.4.11 THREATENED AND ENDANGERED SPECIES

4.4.11.1 METHODOLOGY

Threatened and endangered species and critical habitat were identified through agency consultation, literature review, and field reconnaissance. Species status and distribution, life history and habitat requirements, reasons for decline, and occurrence in the project corridors were documented (see the "Threatened and Endangered Species" section of Chapter 3). Impacts are assessed based on the potential for direct mortality, or loss, fragmentation, or alteration of critical habitat. Based on the anticipated impacts of the build alternatives, a determination of effect is documented and submitted for USFWS review and concurrence. Concurrence for the determination of effect from the USFWS was received July 26, 2012, and is included in Appendix B of this FEIS.

4.4.11.2 RESULTS

4.4.11.2.1 No Build Alternative

Direct Impacts – Threatened and Endangered Species: No Build Alternative

No direct impacts to threatened and endangered species are expected within or adjacent to the study area from the No Build Alternative.

Indirect Impacts – Threatened and Endangered Species: No Build Alternative

No indirect impacts to threatened and endangered species are expected within or adjacent to the study area from the No Build Alternative.

Temporary Construction Impacts – Threatened and Endangered Species: No Build Alternative

No temporary construction impacts to threatened and endangered species are expected within or adjacent to the study area from the No Build Alternative.

Cumulative Impacts – Threatened and Endangered Species: No Build Alternative

No cumulative impacts to threatened and endangered species are expected within or adjacent to the study area from the No Build Alternative.

Mitigation – Threatened and Endangered Species: No Build Alternative

No mitigation is expected within or adjacent to the study area from the No Build Alternative.

4.4.11.2.2 BUILD ALTERNATIVES

Full Buildout

Summaries of the 2012 and 2011 federally listed species in Yellowstone County are provided in **Table 4.48** and further described below. The impacts to these species would be similar among all build alternatives. There are no distinguishing characteristics regarding how the different alternatives may affect the federally listed species.

Table 4.48 Federally Listed Species in Yellowstone County – Direct and Indirect Impacts (All Build Alternatives)

COMMON NAME	SCIENTIFIC NAME	USFWS STATUS	OCCURRENCE IN STUDY AREA	PROJECT EFFECT DETERMINATION	INDIRECT IMPACTS
Whooping crane	*Grus americana*	Listed Endangered	Potentially during migration	Not likely to adversely affect	Loss and degradation of habitat and habitat fragmentation
Black-footed ferret	*Mustela nigripes*	Listed Endangered	Highly unlikely	No Effect	Loss and degradation of habitat and habitat fragmentation
Greater sage-grouse	*Centrocercus urophasianus*	Candidate	Unlikely	Not likely to jeopardize continued existence	Loss and degradation of habitat and habitat fragmentation
Sprague's pipit	*Anthus spragueii*	Candidate	Unlikely	Not likely to jeopardize continued existence	Loss and degradation of habitat and habitat fragmentation

Due to the absence of known individuals or populations and also the lack of suitable habitat in the study area for the greater sage-grouse and Sprague's pipit, the proposed project is not likely to significantly impact populations, individuals, or suitable habitat of these candidate species and therefore is not likely to jeopardize their continued existence. The black-footed ferret was addressed in the Biological Assessment

Addendum prepared in June 2012. The project would have no effect to the ferret because the last observation near the study area was in 1949 (MTNHP 2011b) and suitable habitat and prey (prairie dogs) are not located in the study area (DEA 2011c, DEA 2013).

The proposed project could have negligible effects on whooping crane. Only brief, rare use of the study area is likely during migration. There would be a slight decrease in potential habitat for migrating cranes due to construction of the roadway and a slight increase in potential disturbance or avoidance from construction. Because the potential for cranes to use the study area is very slight, the effects on the species from the project are negligible during construction and operation. Because the crane has some limited potential to briefly occur in the study area, the proposed project may affect, but is not likely to adversely affect, whooping crane.

In a letter dated July 26, 2012, the USFWS concurred with MDT's determination that the project is not likely to adversely affect the whooping crane and acknowledged MDT's no effect determination for the black-footed ferret. USFWS also acknowledged MDT's determination that the proposed action is not likely to jeopardize the existence of greater sage-grouse and Sprague's pipit (both candidate species). USFWS also noted that the letter indicated conclusion of informal consultation pursuant to regulations (50 CFR 402.13).

4.4.11.2.3 MITIGATION

No conservation measures are likely to be necessary with respect to threatened and endangered species. However, if any whooping cranes are observed in or adjacent to the study area during construction, work would be halted and MDT would contact the USFWS. Migration peaks for whooping crane are in April and October.

Phase 1

Impacts to threatened and endangered species as well as mitigation for Phase 1 of the build alternatives would not be substantially different than the Full Buildout impacts. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase 1 would still purchase the ROW for the final four-lane footprint of the Full Buildout, and it would be built along the same alignment with the same access control included in the Full Buildout of the build alternatives. The majority of anticipated habitat impacts would occur during Phase 1, therefore most of the wildlife would be displaced and dispersed from the project area. Full Buildout would have minor impacts. A BRR re-evaluation would be conducted prior to Full Buildout for threatened and endangered species. Construction impacts would occur twice, though the impacts of the two construction periods would be similar to one construction period.

The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1 so there would not be different impacts associated with the secondary corridor improvements under Phase 1 or the Full Buildout.

4.5 RELATIONSHIP BETWEEN SHORT-TERM ENVIRONMENTAL IMPACTS AND LONG-TERM PRODUCTIVITY

Short-term impacts are anticipated during the construction of the proposed improvements. Short-term impacts associated with construction of the proposed project include potential for increased travel delays during construction; traffic congestion; temporary restricted access to residences and businesses; and environmental impacts such as increased fugitive dust emissions; disruption of vegetation, water resources, and wildlife areas; increased noise; and visual intrusions to motorists and residents. Mitigation measures would be employed to minimize short-term environmental impacts. These impacts and potential mitigation measures are described for each topic presented in Chapter 4.

Long-term productivity improvements are expected as a result of the proposed project. The maintenance and enhancement of long-term productivity of the environmental resources of an area are based on a number of different factors, including transportation systems. The need for transportation improvements is considered and analyzed as part of the compilation of the Montana Statewide Transportation Improvement Program and the Billings Area Transportation Improvement Program. These plans take into account the requirements for long-term productivity of the transportation system and include the Billings Bypass Project. Thus, the proposed project is consistent with local and regional planning in the area. The contribution to the maintenance and enhancement of long-term productivity of the uses within the area is expected to outweigh the short-term impacts.

4.6 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible commitments are those that cannot be reversed (i.e., the resource is permanently lost or consumed). Resources that would be irreversibly committed if a build alternative is selected include: natural resources (e.g., land converted for roadway use, filling of wetlands); physical resources (use of construction materials); human resources (provision of labor in design, management, and construction); and fiscal resources (public funding for design and construction of the project).

Some of these resources consumed are not in short supply and, therefore, their use would not have an adverse effect upon continued availability of these resources. These include labor resources and construction materials such as cement, aggregate, and bituminous materials. The commitment of fossil fuels for the construction of the project would not affect the local availability of fossil fuels for other purposes. For any of these resources, the demands of the project can be accommodated by the available supply.

Resources that would be irreversibly used by the project that are irretrievable are cultural resources and the expenditure of state and federal funds. The cost of the build alternatives ranges from $111 million to $122 million.

Irreversible commitments can also be those that are only lost for a period of time but are unlikely to revert to their former use. For example, if the Billings Bypass facility is no longer needed in the future, the land could be converted to another use, including its original use. However, it is unlikely that this would occur. Therefore, the resource commitments of habitat, wetlands, farmlands, and land use would likely also be irreversible, since they would not be expected ever to revert to former uses.

The irreversible and irretrievable commitment of these resources is offset by the benefits associated with the proposed transportation improvements. These benefits include improved safety, reduced roadway deficiencies, improved traffic operations, and improved access to existing and planned development. These benefits are anticipated to outweigh the irreversible commitment of natural, physical, human, and fiscal resources.

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5 PERMITS AND AUTHORIZATIONS

The permits listed below may be required for the Build Alternatives:

- Clean Water Act (CWA) Section 402/Montana Pollutant Discharge Elimination System (MPDES) authorization from MDEQ Permitting and Compliance Division. The MPDES permit requires a storm water pollution prevention plan (SWPPP) that includes a temporary erosion and sediment control plan. The erosion and sediment control plan identifies BMPs, as well as site-specific measures to minimize erosion and prevent eroded sediment from leaving the work zone. The construction contractor will be contractually obligated to prepare and comply with the SWPPP.

- Compliance with the existing municipal storm sewer system (MS4) permit. The design will be prepared in accordance with the permit requirements including inclusion of low impact development practices as practicable.

- CWA Section 404 permit from the U.S. Army Corps of Engineers (COE) for any activities that may result in the discharge or placement of dredged or fill materials in waters of the U.S., including wetlands. Permits for permanent facilities will be obtained during final design. The construction contractor will be contractually obligated to obtain permits for temporary facilities and construction practices.

- Federal Rivers and Harbors Act (Section 10 Permit) from the U.S. Army Corps of Engineers (COE) for any construction of any structure in or over any federally listed navigable waters of the U.S.

- A Montana Department of Natural Resources and Conservation (MDNRC) land use license or easement application and the Application for Licensing Structures & Improvements on Navigable Water Bodies (Form DS 432) for the construction, placement, or modification of a structure or improvements in, over, below, or above a navigable stream.

- Montana Stream Protection Act (SPA 124) from the MFWP-Fisheries Division. The Montana SPA 124 is required for projects that may affect the bed or banks of any stream in Montana. SPA 124 authorization for permanent facilities will be obtained during final design. The construction contractor will be contractually obligated to obtain additional SPA 124 authorizations for temporary facilities and construction practices.

- Short-Term Water Quality Standard for Turbidity related to construction activity (318 Authorization) from the MDEQ-Water Quality Bureau for any activities that may cause unavoidable violations of state surface water quality standards for turbidity, total dissolved solids, or temperature. The construction contractor will be contractually obligated to obtain this authorization.

- Floodplain Development Permit from the Yellowstone County Floodplain Administrator.

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6 COMMENTS AND COORDINATION

This chapter summarizes the public and agency information and involvement for the Billings Bypass EIS process. It describes how MDT and FHWA informed members of the public, agencies, and stakeholders and engaged them in the process. Public and agency input, including comments received on the EIS, was solicited throughout the process and helped decision makers identify alternatives that have the best opportunity to meet the project's purpose and need while also minimizing impacts. The identification, consideration, and analysis of alternatives are vital components of the NEPA process and the goal of objective decision making. In order to meet the requirements of Section 6002 of the Safe, Accountable, Flexible & Efficient Transportation Equity Act - A Legacy for Users (SAFETEA-LU) and Moving Ahead for Progress in the 21st Century (MAP-21), the Montana Department of Transportation (MDT) gathered input from agencies and the public to assist in the development of alternatives. This scoping process also guided the establishment of criteria to be used for screening of the alternatives.

6.1 AGENCY CONSULTATION AND COORDINATION

6.1.1 LEAD, COOPERATING, AND PARTICIPATING AGENCIES

The lead agency/cooperating agency concept was introduced by the Council on Environmental Quality (CEQ) to aid in early coordination and expedite processing of NEPA documents. A lead agency is responsible for supervising the preparation of the environmental documentation. Cooperating agencies are those agencies specifically requested by the lead agency to assist during the environmental process. CEQ's regulations require that those federal agencies with jurisdiction by law be requested to be cooperating agencies for environmental assessments (EAs) and EISs. In addition to lead and cooperating agencies, SAFETEA-LU (Section 6002) created a new category of agencies called participating agencies to aid in the environmental review process for EISs. These are federal, state, tribal, regional, and local government agencies that have an interest in the project. These participating agencies are formally invited to participate in the environmental review of the project. Non-governmental organizations and private entities cannot serve as participating agencies.

The project team, including the lead agencies, met with the cooperating and participating agencies on April 1, 2011, to receive input on the purpose and need, range of alternatives, and impact assessment methodologies.

6.1.1.1 LEAD AGENCIES

FHWA serves as the federal lead agency for the project. MDT, as the direct recipient of federal funds and administrator of state and local funds for the project, is the state lead agency. The responsibilities of these lead agencies are to manage the SAFETEA-LU Section 6002 process, prepare the EIS, and provide opportunities for public involvement and consideration of participating/cooperating agency involvement.

6.1.1.2 COOPERATING AGENCIES

Cooperating agencies are those governmental agencies that the federal lead agency specifically invites to participate during the project environmental evaluation and review process. FHWA's NEPA regulations (23 CFR 771.111(d)) require that those federal agencies with jurisdiction by law (with permitting or land transfer authority) or special expertise with respect to any environmental impact involved in a proposed project or project alternative be invited to be cooperating agencies for an EIS. If a state agency, local agency, or Tribe has similar qualifications, they may also become a cooperating agency.

The U.S. Army Corps of Engineers (COE) is the only cooperating agency for this project. The COE is a cooperating agency because of the need for a Section 404 permit for any dredge/fill operation in waters of the United States including jurisdictional wetlands (see Chapter 5 for permitting information and Appendix F for the Clean Water Act Section 404b(1) Evaluation).

6.1.1.3 PARTICIPATING AGENCIES

Table 6.1 shows the cooperating and participating agencies invited to participate in the project. Multiple federal and state agencies have interest in the project and are involved as participating agencies. The concept of participating agencies was established to encourage governmental agencies at any level with an interest in the proposed project to be active participants in the NEPA evaluation. Designation as a participating agency does not indicate project support nor does it provide an agency with increased oversight or approval authority beyond its statutory limits, but it does give invited agencies new opportunities to provide input at key decision points in the process.

Table 6.1 Cooperating and Participating Agencies

AGENCY	INVITED TO BE COOPERATING OR PARTICIPATING?	RESULT
U.S. Army Corps of Engineers	Cooperating	Accepted
U.S. Environmental Protection Agency	Participating	Accepted
U.S. Department of Agriculture – Natural Resources Conservation Service	Participating	Accepted
U.S. Department of the Interior – Fish & Wildlife Service	Participating	Accepted
U.S. Department of the Interior – Bureau of Land Management	Participating	Declined
Montana Department of Fish, Wildlife & Parks	Participating	Accepted
Montana Department of Environmental Quality	Participating	Accepted
Montana State Historic Preservation Office	Participating	Accepted
Montana Department of Natural Resources & Conservation	Participating	Accepted
Montana Natural Heritage Program	Participating	Declined
City of Billings	Participating	Accepted
Yellowstone County	Participating	Accepted
Yellowstone County Planning Board	Participating	Accepted

In May 2006, MDT sent scoping letters to local, state, and federal agencies. These letters were either cooperating agency requests or information requests in order to solicit agency input on key project objectives. In September 2010, MDT sent new letters notifying agencies that the project had been re-scoped and the Notice of Intent (NOI) was being reissued. The letters also notified agencies that FHWA and MDT would proceed with the project in accordance with the Section 6002 process. As such, the letters served as an invitation to be cooperating or participating agencies.

The U.S. Bureau of Land Management (BLM) declined because it does not intend to submit comments on the project, and the Montana Natural Heritage Program declined because it has no jurisdiction or authority with respect to the project.

6.1.2 OTHER AGENCIES AND GROUPS

The following Tribe and organizations were sent letters informing them about the project and soliciting input on behalf of the project:

- Jeremy Not Afraid, District Conservationist – Crow Nation
- Dr. R. Keith Beeman, Superintendent – Billings K-12 Schools, District 2
- Duane Winslow, Director – Yellowstone County Disaster and Emergency Services

In a letter dated January 31, 2011, the Lockwood Rural Fire District stated its support for the concept of rebuilding the Johnson Lane Interchange as soon as possible in lieu of building a second interchange farther to the east. The letter can be found in Appendix B, Agency Coordination.

See Section 6.2.3, "Stakeholder Interviews and Group Meetings" for detailed information on stakeholder coordination.

6.1.3 AGENCY MEETINGS AND INPUT

Coordinating and participating agencies met with FHWA and MDT in April 2011 to review the coordination plan, discuss the purpose and need, discuss the range of alternatives, and allow for collaboration on the impact assessment methodologies to be used for the EIS.

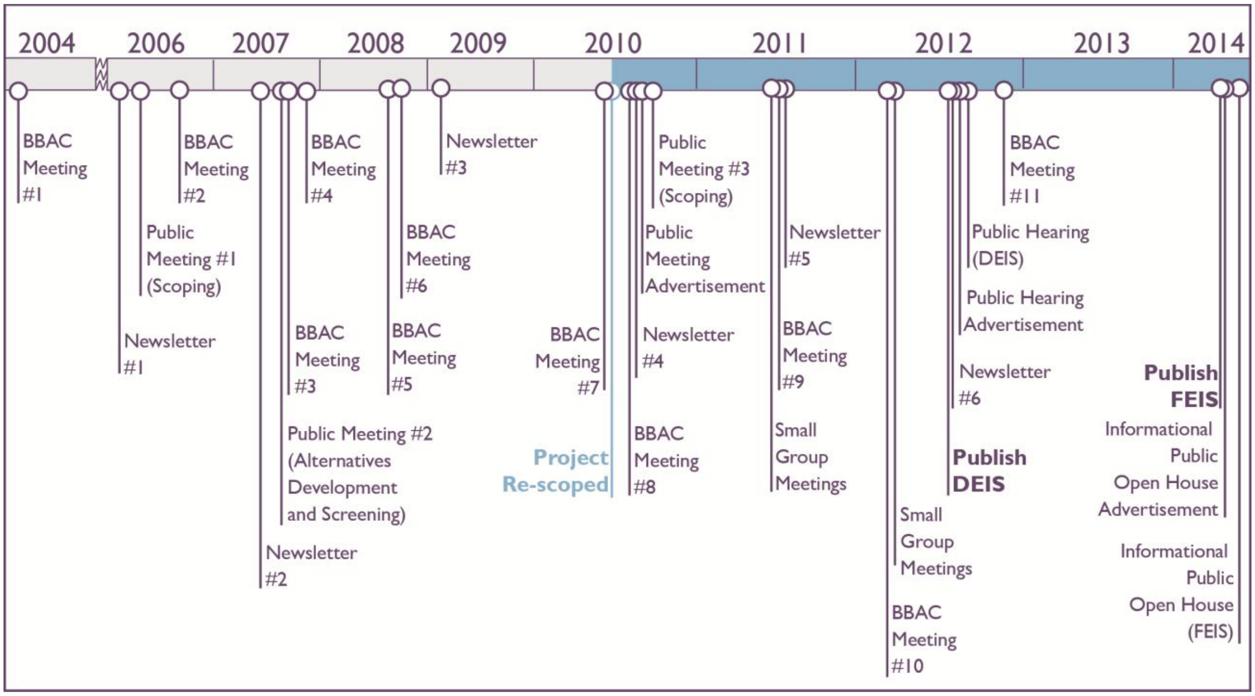
The COE and the Environmental Protection Agency (EPA) were the only agencies to submit comments on the purpose and need. The COE commented that for permit reviews, practicable alternatives should include alternatives that do not involve a discharge of dredged or fill material into waters of the United States or structures over the Yellowstone River. The EPA commented that the purpose and need should focus on the need for improved connectivity between I-90 and Old Hwy 312 and should not preclude options that do not include a crossing of the Yellowstone River. The purpose and need in Chapter 1 states the need for connection and access between I-90 and Old Hwy 312 to provide mobility within eastern Billings. The EPA commented that alternatives that avoid impacts to aquatic resources, such as alternatives involving improvements to existing roads and bridges, should be evaluated adequately enough to dismiss them. Alternatives with no bridge crossing of the Yellowstone River were considered and are discussed in Chapter 2. Additionally, the project team prepared a memorandum summarizing the analysis and screening process performed on three "no-bridge" alternatives. This memorandum was transmitted to the COE, and the COE subsequently met with the project team to discuss the selection of the Yellowstone River bridge crossing locations. The COE concurred with the identified river crossing locations and indicated they had no additional comments on the "no-bridge" alternative screening memorandum.

A public hearing was held after the release of the DEIS for cooperating and participating agencies and the public to review preliminary recommendations on September 12, 2012. More information on the public hearing is presented in Section 6.2.2.3, "Public Hearing."

6.2 PUBLIC INVOLVEMENT

This section describes the public involvement activities for the project, from the formal Billings Bypass Advisory Committee to public meetings, one-on-one stakeholder meetings, and other public information efforts, such as mailings and the project website. Since the project inception in 2003, MDT has made a concerted effort to be as inclusive as possible in identifying and engaging affected stakeholders in the project process. A timeline of the public involvement process is depicted in **Figure 6.1**.

Figure 6.1 Public Involvement Process Timeline



6.2.1 BILLINGS BYPASS ADVISORY COMMITTEE

A Billings Bypass Advisory Committee (BBAC) was established to provide advice to the project team and to facilitate involvement of a wide range of community interests in the study area. The BBAC is composed of approximately 25 individuals representing a broad spectrum of stakeholders and includes elected local officials, staff from city and county departments, and representatives of local and regional organizations.

The BBAC fulfills two primary roles: (1) members provide advice and make recommendations to MDT and FHWA on transportation improvements and priorities; and (2) members serve as a liaison between the project team and the community. Members play a vital role in helping to identify key community issues and helping to engage the public and stakeholders in the planning process. BBAC members have committed to actively participate in meetings through the sharing of opinions and information. Project materials are distributed to committee members at meetings and are occasionally distributed to members before meetings. In addition to the BBAC meetings, members are expected to attend public meetings and workshops conducted in their respective interest areas.

Eleven BBAC meetings have been held throughout the duration of the project. These meetings correlated to decision points in the EIS process, including before and after the project was re-scoped in 2010. MDT and FHWA team members attended these meetings as active participants. The dates, times, and locations of these meetings are listed in **Table 6.2**.

Table 6.2 BBAC Meetings

MEETING	DATE	TIME	LOCATION
1	February 5, 2004	8:30 AM – 10:30 AM	Homestead Quality Inn Conference Room 2036 Overland Avenue, Billings
2	October 26, 2006	2:00 PM – 5:00 PM	Sky Top Conference Room, Crown Plaza Hotel 27 North 27th Street, Billings
3	October 3, 2007	1:00 PM – 2:00 PM	MDT Billings District Office 424 Morey Street, Billings
4	November 29, 2007	3:30 PM – 5:00 PM	MDT Billings District Office 424 Morey Street, Billings
5	October 8, 2008	8:00 AM – 10:00 AM	Holiday Inn – Bighorn Room 5500 Midland Road, Billings
6	November 14, 2008	10:00 AM – 11:00 AM	Homestead Quality Inn 2036 Overland Avenue, Billings
7	July 28, 2010	6:00 PM – 8:00 PM	Billings Hotel and Convention Center - Parlor 110 1123 Mullowney Street, Billings
8	September 28, 2010	3:00 PM – 5:00 PM	Billings Hotel and Convention Center - Parlor 110 1123 Mullowney Street, Billings
9	June 23, 2011	3:30 PM – 5:30 PM	Billings Hotel and Convention Center - Parlor 110 1123 Mullowney Street, Billings
10	February 28, 2012	1:30 PM – 3:30 PM	Hilton Garden Inn 2465 Grant Road, Billings
11	December 11, 2012	2:30 PM – 4:30 PM	Billings Hotel and Convention Center 1123 Mullowney Street, Billings

During the eleven meetings held by the BBAC over the course of the project, the BBAC accomplished the following primary activities with the project team:

1. Provided input to the purpose and need for the project.
2. Provided input to the study area validation.
3. Affirmed transportation goals for the corridor identified in the Billings North Bypass Feasibility Study.
4. Helped to identify the range of alignment alternatives to be studied.
5. Assisted in the development, evaluation, and refinement of alternatives.
6. Consulted with and represented the interests of the communities along the corridor.
7. Provided input to the public involvement program.
8. Provided input to the revised purpose and need for the re-scoped project.

9. Reviewed the results of the alternatives screening process and provided input on refinement of alternatives to be carried forward to evaluation in the DEIS.
10. Reviewed the evaluation process and impacts and provided input on the DEIS alternatives.
11. Reviewed frequently asked questions and comments received from agencies and the public after release of the DEIS and the public hearing.

The eleventh meeting concluded the BBAC's responsibilities for the EIS process.

6.2.2 PUBLIC MEETINGS AND PUBLIC HEARING

Three public meetings and one public hearing have been conducted, and one additional informational public open house will be conducted for the project after publication of this FEIS. The purpose of the public meetings was to provide information to the general public and to obtain their input during project development. The purpose of the public hearing was to share the results of the environmental analysis as documented in the DEIS.

6.2.2.1 NOTIFICATION PROCESS

Since the project inception in 2003, MDT has made a concerted effort to be as inclusive as possible in identifying and including affected stakeholders in the project process. There have been three public meetings, one public hearing, an active website, and six newsletters sent to study area residents.

In April 2006, a newsletter (Newsletter #1) was distributed to approximately 1,300 landowners in the study area as well as representatives of community groups and elected and agency officials. A postcard was included with the newsletter, and it requested that landowners desiring to be on the project mailing list return the postcard with their contact information. This resulted in a mailing list of approximately 600 landowners. In 2007, Newsletter #2 was distributed and included additional parcels identified using parcel data for Yellowstone County. This information was supplemented with information from 34 right-of-entry letters, and website and email requests. Newsletter #3 was issued on January 3, 2009.

Up to this point in the process, all of the proposed alternatives extended from I-90 to MT 3 and were located farther north. Mary Street was located outside of the study area, and therefore landowners along Mary Street were not automatically included in the mailing list for the first three newsletters.

In 2008, FHWA issued guidance that projects must have dedicated funding in order to obtain a Record of Decision (ROD) and proceed with construction. As proposed, the Billings Bypass project did not have sufficient funding to comply with the outlined requirements. MDT coordinated with the local Policy Coordinating Committee (PCC) of the Billings urban area on potential approaches to proceed with the project. In November 2009, the PCC voted to re-scope this project to focus only on the eastern segment between I-90 and Old Hwy 312.

In September 2010, FHWA reissued the Notice of Intent (NOI) for the re-scoped project in the Federal Register. Re-scoping reduced the project study area to that shown in the FEIS (see **Figures 1.1 and 1.2**), and also made it necessary to re-analyze and define the needs within that study area. The mailing list was updated to include those parcels that would now lie within the potential area of effect for the revised study area, and to remove listings for parcels no longer within the study area (unless those recipients expressed interest in remaining on the mailing list).

In October 2010, Newsletter #4 was sent out to the revised mailing list; it described changes to the project and advertised a public meeting to be held on October 13, 2010. The public meeting was also advertised in the *Billings Gazette* on October 3, 2010 and October 10, 2010. Right-of-entry letters for additional field work were sent to 117 landowners in May and June of 2011. Newsletter #5, which included project updates, was mailed out in August 2011, and Newsletter #6 was mailed out in August 2012 and invited residents to the public hearing held on September 12, 2012. Newsletters #4, #5, and #6 were distributed to more than 1,300 stakeholders. All six newsletters are available for viewing on the Billings Bypass website at: http://www.billingsbypass.com/news.htm.

MDT placed three paid advertisements in the *Billings Gazette* on August 17, 2012; August 26, 2012; and September 9, 2012 announcing both the availability of the DEIS for public comment and the date and time of the public hearing. Newsletter #6 announced the meeting and hearing, and was sent to the project mailing list, which includes local businesses, local agencies and governments, landowners in the project area, and residents expressing interest in the proposed project. Local print and other public media covered the meeting and hearing.

6.2.2.2 PUBLIC MEETINGS

Three public meetings were held at the following points in the project: (1) during the scoping process for the project area, (2) during development and screening of the alternatives, and (3) during a second scoping phase for the re-scoped project. A public hearing was held after the publication of the DEIS, as described in Section 6.2.2.3, and another public meeting will be held after publication of this FEIS, as described in Section 6.4.3.

- At the first public meeting, held in April 2006, the project team introduced the community to the project and provided them with the opportunity to voice concerns and ask questions. The project team solicited input on the project development and affirmation of the project purpose and need as well as project goals. Approximately 180 members of the public were in attendance.
- At the second public meeting, held in October 2007, the project team presented the range of bypass alternatives that were suggested up to that date. The community provided comments on these alternatives and input on the screening criteria for the preliminary evaluation of alternatives. Approximately 102 members of the public were in attendance.
- At the third meeting, held in October 2010, the project team introduced the re-scoped project and presented the revised purpose and need statement and conceptual alternatives based on the revised purpose and need. The project team solicited comments and input on these modified project elements. Approximately 71 members of the public were in attendance.

6.2.2.3 PUBLIC HEARING

The public hearing was held on September 12, 2012, at Lockwood Middle School after the August 2012 publication and release of the DEIS. Speakers included Paul Grant, MDT Public Involvement Coordinator; Stefan Streeter, MDT Billings District Administrator; and Wendy Wallach, David Evans and Associates, Inc. Project Manager. The public hearing included a presentation of the findings made in the DEIS, followed by a question-and-answer session for attendees to ask questions and a formal hearing for attendees to provide their formal public comments about the DEIS. The formal comments on the alternatives evaluated and the analysis in the DEIS were considered in the preparation of this FEIS. Appendix J contains transcripts of comments received by individuals at the public hearing. Approximately 135 members of the public were in attendance.

The public hearing allowed several formats and opportunities for public comment, which included the following:

- Attendees were encouraged to sign in at the public hearing registration table. The registrants' names were added to the master mailing list, if they had not previously been included, so they would be able to receive future meeting notices and newsletters.
- Posters of the project purpose and need, alternatives, and graphic representations of the alternatives were posted around the room.
- Members of the design team and MDT staffed the project displays that were dispersed throughout the front of the auditorium. Attendees were encouraged to voice or write formal comments that were later incorporated into the comment record.
- A DEIS comment form was provided for submittal at the meeting or for mailing after the meeting.
- A court recorder prepared a transcript of the meeting. Recorded comments were incorporated into the comment record and are included in Appendix J.

6.2.3 STAKEHOLDER INTERVIEWS AND GROUP MEETINGS

The project team has conducted small group or "one-on-one" meetings with individual property owners, tenants, neighborhood associations, and businesses to discuss specific project issues in an effort to gain insight into concerns in the study area. At the second public meeting held in October 2007, the project team provided a sign-up sheet for individuals or groups that wanted to meet with project team representatives. In November of 2007, the project team conducted meetings with seven different stakeholder groups, by request, as identified below. Specific concerns raised by the groups are listed.

- Pine Hill Subdivision Residents – concern about project effects on neighborhood: noise and eminent domain.
- Lockwood Residents – questions about urban renewal district, economic and social impact assessments, funding issues, and alternatives.
- Hidden Lake Subdivision Residents – concern about proximity of the northern preliminary alignment to their subdivision.
- Lone Eagle Subdivision Residents – concern about project effects on their neighborhood.
- Hiaring Subdivision Landowners – concern about proximity of southern corridor to property along Alkali Road.
- Ranchers and Landowners in the Western Segment of the Study Area – concern about their ranches.
- Yellowstone River Parks Association – concern about Five Mile Creek and major regional park.

As a result of the meeting with ranchers and landowners in the western segment of the old study area, the project team updated the Study Area Validation Technical Memorandum to determine whether updated construction costs and an adjusted design year for the project would result in a change in the boundaries within which a bypass route was feasible. Based on the updated analysis, the northern study area boundary was moved north to include the Shepherd-Acton Road corridor. Upon the request of the BBAC, the project team conducted a stakeholder meeting with landowners and residents along Shepherd-Acton Road in November 2008 to inform them of the project and the alternatives under consideration.

After the project was re-scoped in 2009 and the study area boundary was modified, additional small group and "one-on-one" meetings were conducted with seven different stakeholder groups, by request, as identified below. Specific concerns raised by the groups are listed.

- Yellowstone River Parks Association – concern about how to plan with the uncertainty of the project and concern about road cuts and visual impacts.

- Lockwood Water & Sewer – concern about potential for the Johnson Lane Interchange to impact new lift station.
- Mary Street Landowners – concern about impacts and questions about alternatives development process.
- JDW Industrial Park 2 LLC – questions and concerns about field surveys.
- Heights Community Development Task Force – questions about traffic operations and the future extension west to MT 3, and concerns about residential and park impacts.
- Lockwood Burger King – concerns about construction occurring too soon and septic field on lot.
- Lockwood Urban Transportation District (two meetings) – questions about the interchange location decision, concerns about project-generated traffic, interchange capacity, roadway maintenance, and project timeline.

6.2.4 OTHER PUBLIC INVOLVEMENT: INFORMATION SHARING

Other means of public involvement and information sharing for the project are newsletters, news releases, and the project website. These are described below.

6.2.4.1 NEWSLETTERS

MDT publishes and distributes project newsletters throughout the course of the project to keep the public informed of current activities. Six newsletters have been distributed to date:

- Newsletter #1: Announcement of project, project contacts, and first public meeting (April 2006).
- Newsletter #2: Announcement of second public meeting, provided information on alternatives (June 2007).
- Newsletter #3: Summary of issues from second public meeting and update on alternatives development (January 2009).
- Newsletter #4: Information about the new purpose and need and the new study area after the project was re-scoped (October 2010).
- Newsletter #5: Summary of input from the 2010 scoping open house, information about the alternatives screening and development process, and overview of alternatives to be evaluated in the DEIS (August 2011).
- Newsletter #6: Presentation of final alternatives evaluated in DEIS and announcement of the publication of the DEIS, providing dates for the public hearing and presenting final alternatives and evaluation (September 2012).

6.2.4.2 PRESS RELEASES

Press releases have been and will be issued at key points during the project to announce public meetings, workshops, and public hearing and to summarize results of these meetings. Press releases were issued in April 2006, September 2007, and October 2010 to announce each of the three public meetings, and in September 2012 to announce the public hearing. In addition, MDT placed three paid advertisements in the *Billings Gazette* on August 17, 2012; August 26, 2012; and September 9, 2012 announcing both the availability of the DEIS for public comment and the date and time of the public hearing. MDT uses paid print advertisements in newspapers to ensure that notices are published on specific days as needed. MDT distributes press releases to newspapers and TV and radio stations.

6.2.4.3 PROJECT WEBSITE

The project team has maintained a project website at **www.billingsbypass.com** throughout the project. A link is provided from the MDT website to the project website. Comments and queries received from the website are tracked in the issues and comments tracking database.

After publication of the DEIS, a link from the project website led readers to the MDT website, where they could download the document in its entirety and also submit comments electronically. During the formal public comment period for the DEIS (August 17, 2012 to October 1, 2012), the project team tracked comments for responses in the FEIS. These comments and responses are included in Appendix J.

The DEIS document and this FEIS document may also be viewed on the MDT website at: http://www.mdt.gov/pubinvolve/eis_ea.shtml.

6.3 COMMENTS AND KEY ISSUES RAISED BY THE PUBLIC

Throughout project development, the public has been invited to participate in the process, primarily by providing comments. This section describes the process used to solicit comments before and after the publication of the DEIS, provides details on the publication of the DEIS, and highlights key issues raised through those comments.

6.3.1 COMMENTS RECEIVED BEFORE PUBLICATION OF THE DEIS

Comments made by the public during public meetings or via phone, email, letter, or the website have been recorded in a database built for the project. The comments are organized into the following categories:

- Alternatives
- Economic Impacts
- Funding
- Noise/Air Quality
- Project Schedule/Administration
- Property Impacts
- Public Outreach
- Safety
- Traffic
- Other

Most of the comments received before the publication of the DEIS relate to alternatives, traffic, or public outreach. Individuals offered ideas about different alternatives, highlighted concerns with the alternatives presented to date, asked for more (or more frequent) information about the project, and expressed opinions about the project. Key issues raised to date include concerns about increased traffic through Billings Heights and near the Pioneer School, and support for improving the safety of the intersection of Old Hwy 312, Mary Street, and US 87. Traffic concerns focused on truck traffic and general increases in traffic, particularly along Mary Street and onto Old Hwy 312 and US 87 and were raised as issues by multiple members of the public. Several property owners used the request for access to their property as an opportunity to express concerns or support for the project.

6.3.2 PUBLICATION OF THE DEIS

FHWA released the DEIS on August 17, 2012, concurrent with the publication of the notice of availability in the Federal Register. The public and agency comment periods began the same day and ended on October 1, 2012. The close of the comment period was stated at the bottom of the signature page and allowed for the required comment period of 45 days as specified in the Council on Environmental Quality (CEQ), *Regulations for Implementing NEPA, Section 1506.10, Timing of Agency Action*.

MDT distributed the DEIS to several public agencies (federal, state, county, and city), organizations, and other interested parties (see Chapter 9 for the distribution list) and to individuals upon request. MDT notified the public of the availability of the DEIS through the project newsletter, website, and media releases. In addition, MDT made copies available for review at several public locations including the Billings City Hall, Yellowstone County offices, the Lockwood Water and Sewer District, MDT offices in Billings and Helena, the Montana State University-Billings Library, and the Billings Public Library.

USDOT policy guidance on implementing limited English proficiency requirements suggests the written translation of documents for eligible language groups that constitute either 1,000 persons or 5% of the population to be affected by the project. According to the analysis presented in Chapter 3 (Section 3.3.3.1), 785 persons or 1% of the study area speaks English less than very well. Therefore, the translation of vital documents was not completed for the proposed project.

6.3.3 COMMENTS RECEIVED AFTER PUBLICATION OF THE DEIS

The DEIS stated how and where to deliver written comments and the deadline for submitting formal comments. The DEIS also included the date, time, and location of the public hearing, at which written and oral comments could be received. MDT advertised the public hearing through media releases, a project newsletter, and the project website.

On September 12, 2012, MDT held a public hearing to receive formal public input on the DEIS, as discussed in Section 6.2.2.3, which disclosed the environmental effects of the proposed project. At the public hearing, the public could provide comments on the DEIS either in writing or during a formal oral comment period that was recorded and transcribed. A total of 134 people attended the public hearing.

MDT received 124 separate written communications in the form of letters, email, and project comment forms, and 16 people provided oral testimony at the public hearing. One of the letters submitted was a petition signed by 370 people stating opposition to the build alternatives. Each comment was numbered, recorded, and distributed among the project team. Comments were considered individually and collectively.

To create responses to each comment, the recorded testimony and comment letters were organized in groups by agency, organization, and individual and then coded for responses. Each comment was entered into a matrix and coded by category and content, and assigned to appropriate team members for responses. Project staff reviewed, analyzed, evaluated, and responded to each written communication and oral testimony received. In many cases one letter, email, comment sheet, or oral testimony included several different comments. Copies of the written communications and transcripts of the oral testimony are included in Appendix J.

Many of the written and oral comments fell into the following general categories:

- Preferences and supporting reasoning for or against a specific alternative.
- Requests for new alternatives to be studied, or for modification of an alternative from the DEIS.

Of the comments received from agencies and the public in opposition to or with concerns about one or more of the build alternatives, four primary issues were apparent: (1) expansion or creation of roadway near residences; (2) adequacy of the public involvement process; (3) questions about the alternatives themselves, including how access to housing would be preserved; and (4) general objections to impacts associated with the project (e.g., traffic, development, and change in the rural character of the Billings Heights area). The majority of comments with concerns about the project focused on the area north of the proposed Yellowstone River crossing. The petition from the "United Citizens of Mary Street and 5-Mile Road Neighborhood" stated opposition to all of the build alternatives presented in the DEIS. The petition is included in Appendix J as comment "IND-26."

The comments are summarized above and included in their entirety, with responses, in Appendix J, "Agency and Public Comments and Responses."

6.4 FUTURE PUBLIC INVOLVEMENT AND INFORMATION ACTIVITIES

This section provides information about:

- Notice of Availability of the FEIS
- FEIS Availability
- Informational Public Meeting

6.4.1 NOTICE OF AVAILABILITY OF FINAL ENVIRONMENTAL IMPACT STATEMENT

The notice announcing the availability of the FEIS will indicate the date, place, and time of a public meeting and where to forward comments and questions regarding the proposed project.

6.4.2 FEIS AVAILABILITY

Public availability notices will be sent to those on the mailing list. Copies of the FEIS will be available at the following locations for public review for at least 30 days. Comments on the FEIS will be accepted for 30 days after publication of the notice of availability of the FEIS.

AVAILABILITY OF FEIS REVIEW COPIES	
Montana Department of Transportation Billings District Office 424 Morey Street Billings, MT 59101	**Montana State University Billings Library** 1500 University Drive Billings, MT 59101
City-County Planning Department 4th Floor Parmly Billings Library 510 North Broadway Billings, MT 59101	**Yellowstone County Commissioners Office** (County Courthouse) 217 North 27th Street, Room 403 Billings, MT 59101

AVAILABILITY OF FEIS REVIEW COPIES	
Montana Department of Transportation Environmental Services Bureau 2960 Prospect Avenue Helena, MT 59601	**Lockwood Water & Sewer District** 1644 Old Hardin Road Lockwood, MT 59101

In addition, a copy of the FEIS will be available on the MDT website at: http://www.mdt.mt.gov/pubinvolve/eis-ea.shtml.

6.4.3 INFORMAL OPEN HOUSE

An informal open house will be held after the publication of this FEIS. That meeting will be held on April 9, 2014, at the Bitterroot Elementary School in Billings. See the project website at www.billingsbypass.com for more information.

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7 LIST OF PREPARERS

The table below lists the responsibilities of those who prepared and reviewed this environmental impact statement (EIS). David Evans and Associates, Inc. is the primary consultant responsible for the preliminary roadway design, environmental studies, and EIS preparation, with assistance of subconsultants: Big Sky Acoustics, LLC, Ethnoscience, Inc., DOWL-HKM, Inc., and Marvin & Associates, Inc.

The table below also lists the Federal Highway Administration (FHWA) and Montana Department of Transportation (MDT) personnel who are responsible for project oversight and review.

NAME AND TITLE	EIS RESPONSIBILITY
FEDERAL HIGHWAY ADMINISTRATION	
Alan Woodmansey, PE *Operations Engineer*	Lead Agency
Lloyd Rue *Project Development Engineer*	EIS Reviewer
Marcee Allen *Safety/Traffic/Design Engineer*	EIS Reviewer
Brian Hasselbach *ROW & Environmental Specialist*	EIS Reviewer
MONTANA DEPARTMENT OF TRANSPORTATION	
Tom Martin, PE *Environmental Services Bureau Chief*	EIS Reviewer
Tim Conway, PE *Consultant Design Bureau Chief*	EIS Reviewer
Tom Gocksch, PE *Billings District Project Development Engineer* *Environmental Services Bureau*	EIS Reviewer
Stefan Streeter, PE *District Administrator*	Project Management
Fred Bente *Consultant Design*	Project Management
DAVID EVANS AND ASSOCIATES, INC.	
Laura Meyer, AICP *Project Manager*	EIS Project Management, Public Involvement, Alternatives Development and Evaluation, Project Documentation
Wendy Wallach *Project Manager*	EIS Project Management, Public Involvement, Alternatives Development and Evaluation, Project Documentation
Ron Bockelman *Project Manager*	EIS Project Management, Public Involvement, Alternatives Development and Evaluation, Project Documentation
Mara Krinke *Sr. Planner*	Air Quality, Water Resources and Water Quality, Water Body Modifications, Floodplains, Energy Consumption, Wetlands, Vegetation, Wildlife and Aquatic Species, State Species of Concern, Threatened and Endangered Species

NAME AND TITLE	EIS RESPONSIBILITY
Michael D'Alessandro *Project Planner*	Wetlands, Vegetation, Wildlife and Aquatic Species, State Species of Concern, Threatened and Endangered Species
Maggie Buckley *Environmental Planner*	Community Resources, Economic Conditions, Section 4(f), Section 6(f), Hazardous Materials, Environmental Justice
Kacey Meis *Planner, GIS Analyst*	EIS Deputy Project Management, Land Use and Local Plans, ROW/Utilities, Farmlands, Irrigation, GIS
Jon Gage *Sr. Landscape Architect*	Visual Resources Lead/QC Visual Resources Technical Report
Patricia Steinholtz *NEPA Planner*	Visual Resources, Noise, Cultural Resources
Ian Chase *Transportation Planner*	Traffic Operations, Access, Safety
Scott Weeks *Sr. Transportation Planner*	Pedestrian and Bicycles, Land Use and Local Plans, Community Resources, Economic Conditions, Right-of-Way and Relocation of Utilities
Gigi Cooper *Planner*	Environmental Justice
Geneva Hooten *Planner*	Document assistance, QC
Licia (Lee) Stragis *Wildlife Biologist*	Biological Resources
Kayla Kruse *GIS Analyst*	Impact Analysis, QC
Mike Cassell *Sr. Graphic Specialist*	Graphics
Becky Lucas *Sr. Graphic Designer*	Graphics
Christine Immroth *Technical Editor*	Technical Editing
BIG SKY ACOUSTICS, LLC	
Sean Connolly *President*	Noise Analysis
ETHNOSCIENCE, INC.	
Lynelle Peterson *Senior Archaeologist*	Cultural Resource Investigation and Documentation
Scott Wagers *Staff Archaeologist*	Cultural Resource Investigation and Documentation
Jennifer Thomas *Staff Archaeologist*	Cultural Resource Investigation and Documentation
DOWL-HKM, INC.	
John A. Shoff, PE, PTOE *Western States Division Manager*	Engineering

NAME AND TITLE	EIS RESPONSIBILITY
Todd G. Cormier, PE, PTOE, AVS *Manager, Transportation/Traffic Engineering*	Engineering
Doug Enderson, PE, PTOE *Transportation Engineer*	Engineering
Greg Gabel, PE *Water Resources Engineer*	Engineering
MARVIN & ASSOCIATES, INC.	
Bob Marvin *President*	Traffic

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8 DISTRIBUTION LIST

8.1 FEDERAL AGENCIES

FEDERAL	
FEDERAL AGENCIES	
U.S. Department of Agriculture **Natural Resources Conservation Service** 1629 Avenue D, Building A, STE 4 Billings, MT 59102 Philip Sandoval, District Conservationist, Billings Field Office	**U.S. Department of the Army, Corps of Engineers, Omaha District, Billings Regulatory Office** 2602 First Avenue North STE 309 Billings, MT 59101 Shannon Johnson, Regulatory Project Manager
U.S. Environmental Protection Agency 10 West 15th Street STE 3200 Helena, MT 59626 Stephen Potts, NEPA/EIS Review	**U.S. Fish and Wildlife Service** **Montana Field Office** 585 Shepard Way Helena, MT 59601 Mike McGrath, Fish and Wildlife Biologist, Transportation

8.2 STATE AGENCIES

STATE	
STATE AGENCIES	
Montana Department of Environmental Quality 1520 East Sixth Avenue Helena, MT 59601 Jeff Ryan, Permitting and Greg Hallsten, EIS Coordinator	**Montana Department of Fish, Wildlife & Parks** 1420 East Sixth Avenue Helena, MT 59601 Gary Hammond, Regional Supervisor
Montana Natural Heritage Program 1515 East Sixth Avenue Helena, MT 59601 Neil Snow, Director	**Montana Department of Natural Resources & Conservation, Southern Land Office** 1371 Rimtop Drive Billings, MT 59105 Jeff Bollman, Area Planner
Montana State Historic Preservation Office 225 North Roberts Street Helena, MT 59601 Mark Baumler, PhD, Director	

8.3 LOCAL AGENCIES

LOCAL	
YELLOWSTONE COUNTY	
Yellowstone County Commissioners PO Box 35000 Billings, MT 59107 Jim Reno, Chairman	**Yellowstone County Planning Board** 7256 Hwy 3 Billings, MT 59106 Paul Gatzemeier, President

LOCAL	
CITY OF BILLINGS	
City of Billings PO Box 1178 Billings, MT 59103 Christina Volek, City Administrator	

8.4 PUBLIC COPIES

PUBLIC	
Montana Department of Transportation Billings District Office 424 Morey Street Billings, MT 59101	**Montana State University Billings Library** 1500 University Drive Billings, MT 59101
City-County Planning Department 4th Floor Parmly Billings Library 510 North Broadway Billings, MT 59101	**Yellowstone County Commissioners Office** (County Courthouse) 217 North 27th Street, Room 403 Billings, MT 59101
Montana Department of Transportation Environmental Services Bureau 2960 Prospect Avenue Helena, MT 59601	**Lockwood Water & Sewer District** 1644 Old Hardin Road Lockwood, MT 59101

9 LIST OF SOURCES/DOCUMENTS

Advisory Council on Historic Preservation (ACHP). 2002. Section 106 Regulations Summary. http://www.achp.gov/106summary.html.

Alta Planning + Design (Alta). 2011. *Billings Area Bikeway and Trail Master Plan*. Prepared for the City of Billings/Yellowstone County.

American Association of State Highway and Transportation Officials (AASHTO). 1999. *Guide for the Development of Bicycle Facilities (1999).*

Berglund, J. and R. McEldowney. 2008. *MDT Montana Wetland Assessment Method*. Prepared for Montana Department of Transportation. Post, Buckley, Schuh & Jernigan. Helena, MT. 42 pp.

Big Sky Acoustics. 2011. *Billings Bypass EIS Final Preliminary Traffic Noise Assessment of Existing Conditions*. Helena, Montana. October 18, 2011.

———. 2012. *NCPD 56(55), CN 4199 Traffic Noise Impact Assessment*.

Big Sky Business Journal. 2011. 2011 Montana Small Business Community – Billings. http://www.bigskybusiness.com/index.php?option=com_content&view=article&id=2012:2011-montana-small-business-community-billings&catid=19:montanagovernment&Itemid=119. Posted June 8, 2011. Accessed on September 20, 2011.

Big Sky Economic Development. 2012. http://bigskyeda-edc.org/.

Billings Chamber of Commerce Convention and Visitors Bureau. 2008. Billings Topography/Geography. http://www.billingschamber.com/site/billings-geography/. Accessed on August 9, 2011.

Billings Gazette. 2012. City won't seek transportation grant, looks to future. Ed Kemmick. http://billingsgazette.com/news/article_7e3aad57-e2f1-5d9f-bbe6-ca6f364b4419.html#ixzz1ySKOXGZF. February 7, 2012.

Billings Public Schools. 2011. District Profile/System Summary 2010-11 and School Report Cards. Accessed via the Billings Public Schools website on August 18-19, 2011. http://www.billingsschools.org/site/Default.aspx?PageID=63.

Bloomberg Businessweek. 2011. America's Best Affordable Places 2011. http://images.businessweek.com/slideshows/20110525/america-s-best-affordable-places-2011/slides/27. Accessed on September 21, 2011.

Bureau of Economic Analysis (BEA). 2011. CA30 Regional Economic Profiles. http://www.bea.gov/regional/. Accessed on September 14, 2011.

California Public Utilities Commission (CPUC). 2009. "Transmission Line Noise Fact Sheet: Common Sounds and Their Associated Noise Levels." http://docs.cpuc.ca.gov/environ/tehachapi_renewables/FS7.pdf. March 13, 2009.

Cambridge Systematics, Inc. 2010. *Billings Urban Area Long-Range Transportation Plan, 2009 Update*. Prepared for City/County Planning Department. March 2010.

City of Billings. n.d. Billings, Montana Code of Ordinances, Chapter 17 – Noise. http://library.municode.com/index.aspx?clientID=10441&stateID=26&statename=Montana&CustomBanner=10441.jpg&ImageClass=L&cl=10441.

———. 2006. *The Billings Heights Neighborhood Plan*. Prepared by Billings Planning and Community Services Department. Adopted by the Billings City Council on January 23 and the Yellowstone Board of County Commissioners on February 7.

———. 2008. *Yellowstone County and City of Billings 2008 Growth Policy Update.* Prepared by Billings Planning and Community Services Department. http://www.ci.billings.mt.us/DocumentCenter/Home/View/4281.

———. 2009. *East Billings Urban Renewal District Master Plan*. http://ci.billings.mt.us/DocumentCenter/Home/View/4825.

———. 2011a. Planning and Community Services Department 2011 Annual Report. http://www.ci.billings.mt.us/DocumentCenter/Home/View/4132.

———. 2011b. Parks, Recreation, & Public Lands Department website. http://www.prpl.info/recreation/index.html. Accessed on August 19, 2011.

———. 2011c. MET Transit website. Bus Routes & Schedules. http://mt-billings.civicplus.com/index.aspx?NID=284. Accessed on September 13, 2011.

———. 2011d. Billings Heights Task Force website. http://ci.billings.mt.us/index.aspx?nid=679. Accessed on August 17, 2011.

City of Billings and Yellowstone County. 2005. Unified Zoning Regulations. City of Billings and Yellowstone County Jurisdictional Area. Adopting Ordinance #97-5048. Approved March 23, 2005.

City of Billings and Yellowstone County. 2010. *Billings Heritage Trail Map*. (2010 updated.) Prepared by Billings Planning and Community Services Department.

CNN. 2009. *CNN Money*. Best Places to Launch. http://money.cnn.com/smallbusiness/best_places_launch/2009/snapshot/34.html. Accessed on September 20, 2011.

Corps of Engineers (COE). 2010. U.S. Army Corps of Engineers. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0). Army Research and Development Center. ERDC/EL TR-10-1. Vicksburg, MS.

David Evans and Associates, Inc. (DEA). 2011a. *Billings Bypass Draft Preliminary Alternatives Report*. Prepared for Montana Department of Transportation.

———. 2011b. *Billings Bypass Alternatives Report*. Prepared for Montana Department of Transportation.

———. 2011c. *Biological Resources Report for Billings Bypass*. Prepared for Montana Department of Transportation. November 2011.

———. 2013a. Addendum to Biological Resources Report, from L. Stragis, Senior Biologist, DEA. Memorandum. August 28.

———. 2013b. *Billings Bypass Final Alternatives Report*. Prepared for Montana Department of Transportation.

Devries, L., S. Wolske, N. Kinghorn, and M. Gerringa. 1976. *Lest We Forget: Shepherd, Montana*. Frontier Press, Inc., Billings, MT.

Dove, Samuel E. 1935. *A History of the Billings Bench Water Association and Its Predecessors 1903-1935.* Bound manuscript, Billings Bench Water Association, Billings, MT.

DOWL HKM. 2001. *Billings North Bypass Feasibility Study*. Prepared for Montana Department of Transportation.

———. 2011a. *Billings Bypass Hydraulics Report*. Prepared for Montana Department of Transportation and David Evans and Associates, Inc.

———. 2011b. *Hazardous Materials/Substances Initial Site Assessment*. Prepared for Montana Department of Transportation and David Evans and Associates, Inc.

———. 2013. Billings Bypass EIS Comments, from S. Weisenberger, PE, Geotechnical Engineer, DOWL HKM. Memorandum. August 23.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Ethnoscience, Inc. (Ethnoscience). 2011. *Billings Bypass: A Cultural Resource Inventory in Yellowstone, Montana.* Prepared for David Evans and Associates, Inc. September 21.

———. 2012. *Addendum to Billings Bypass: A Cultural Resource Inventory in Yellowstone, Montana.* Prepared for David Evans and Associates, Inc. December 17.

ExxonMobil. 2011. *We are ExxonMobil Billings Refinery* (brochure). Downloaded from http://www.exxonmobil.com on August 18, 2011.

Federal Emergency Management Agency (FEMA). 2011. Definitions. http://www.fema.gov/business/nfip/19def2.shtm. Accessed December 2011.

Federal Highway Administration (FHWA). 1998a. Visual Impact Assessment for Highway Projects. Office of Environmental Policy. Publication No. FHWA-HI-88-054.

———.1998b. Order 6640.23, FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. December 2.

———. 2008. *Transportation Planning Requirements and Their Relationship to NEPA Process Completion*, January 28.

———. 2009. *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents.* http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/aqintguidmem.cfm.

———. 2011a. *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* http://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf.

———. 2011b. *Special Report - Measurement, Prediction, and Mitigation*, Chapter 2 Noise Measurements 2.0 Background. http://www.fhwa.dot.gov/environment/noise/construction.

———. 2011c. *Supplement to January 28, 2008 "Transportation Planning Requirements and Their Relationship to NEPA Process Completion,"* February 9.

———. 2012. *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA.* http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/aqintguidmem.cfm

Forman, R. and D. Sperling, eds. 2003. *Road Ecology, Science and Solutions*. Island Press, Washington, DC.

Health Effects Institute (HEI). 2007. *Mobile-Source Air Toxics: A Critical Review of the Literature on Exposure and Health Effects*, Special Report 16. http://pubs.healtheffects.org/view.php?id=282 . January 2007.

———. 2009. *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects*. http://pubs.healtheffects.org/getfile.php?u=453. May 2009.

Jiusto, C. 1998. *Tales Spun Along the Tracks: A History of Downtown Billings.* Downtown Billings Study Team, Downtown Billings Historic and Architectural Survey.

Lockwood Fire. 2011. Lockwood Fire District website. http://lockwoodfire.com/about/about.htm. Accessed on August 18, 2011.

Marvin & Associates. 2008. *Lockwood Transportation Study*. Available online at: http://mt-billings.civicplus.com/DocumentCenter/Home/View/2002.

———. 2013. *Billings Bypass Combined Traffic Reports.* Prepared for Montana Department of Transportation and David Evans and Associates, Inc. August.

Maxwell, Bryce A., J. Kirwin Werner, P. Hendricks, and D. L. Flath. 2003. Herpetology in Montana. Northwest Fauna, Number 5, Society for Northwestern Vertebrate Biology. Seattle, WA.

MetraPark. 2011. MetraPark website. http://www.metrapark.com/. Accessed on August 18, 2011.

Michael Minor and Associates. 2001. Traffic Noise Background Information. http://www.drnoise.com/PDF_files/Traffic%20Noise%20Primer.pdf.

Montana Department of Commerce, Census and Information Center (CEIC). 2011. http://ceic.mt.gov.

Montana Department of Environmental Quality (MDEQ). 2010. Watershed Information. Natural Resource Information Service (NRIS). Montana 303(d) Listings. http://nris.state.mt.us. Accessed June 2011.

Montana Department of Labor and Industry (MDLI). 2010a. *Demographic & Economic Information for Yellowstone County*. September.

———. 2010b. Research & Analysis Bureau. Unemployment Rates and Labor Force Statistics. Available online at: http://www.ourfactsyourfuture.org/cgi/dataanalysis/AreaSelection.asp?tableName=Labforce. Accessed on September 14, 2011.

———. 2011. Research & Analysis Bureau. Workforce Informer, Labor Market Info: Yellowstone County Profile. http://www.ourfactsyourfuture.org/?PAGEID=4&SUBID=150. Accessed on September 14, 2011.

Montana Department of Transportation (MDT). n.d. Public Involvement, active plans. Available online at: http://www.mdt.mt.gov/pubinvolve/active_projects.shtml.

———. 2006. *Standard Specifications for Road and Bridge Construction*. 2006 Edition. Section 208, Water Pollution Control and Stream Preservation.

———. 2008. *Growing Neighborhoods in Growing Corridors: Land Use Planning for Highway Noise*. http://www.mdt.mt.gov/other/research/external/docs/research_proj/noise_plan/final_report.pdf. March.

———. 2009. *Work Zone Safety and Mobility*.

———. 2010. *MDT Environmental Manual*, Chapter 33 Farmland Impacts. http://www.mdt.mt.gov/publications/docs/manuals/env/Chapter%2033%20FARMLAND%20IMPACTS.pdf. October 10.

———. 2011. *Traffic Noise Analysis and Abatement Policy*. http://www.mdt.mt.gov/business/contracting/docs/npolicy-2011.pdf. April 27.

Montana Natural Heritage Program (MTNHP). 2011. *Montana Natural Heritage Tracker*. Regarding SOC and T&E species observations. http://mtnhp.org/Tracker/NHTMap.aspx. Retrieved July 2011.

Meshnick, J.C., F.T. Miller, J.H. Smith, and W.C. Bourne. 1972. *Soil Survey of Yellowstone County, Montana*. United States Department of Agriculture, Soil Conservation Service and the United States Department of the Interior, Bureau of Indian Affairs, in cooperation with the Montana Agricultural Experiment Station. U.S. Government Printing Office, Washington, D.C.

National Park Service (NPS). 1997. *How to Apply the National Register Criteria for Evaluation.* National Register Bulletin. U.S. Department of the Interior, National Park Service, Cultural Resources, Washington D.C. http://www.nps.gov/history/nr/publications/bulletins/nrb15/.

Natural Resources Conservation Service (NRCS). 2011a. Farmland Protection Policy Act. http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/alphabetical/fppa.

———. 2011b. Soil Survey Geographic (SSURGO) Database for Survey Area. United States Department of Agriculture. http://soildatamart.nrcs.usda.gov. Accessed in July 2011.

———. 2011c. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/. Accessed on October 17, 2011.

Oravetz, G. J. 1943. *Irrigation Districts Yellowstone County, Montana: History, Equipment, Acreage Irrigated and Potential Irrigable Acreage for each Project in the County*. Billings Commercial Club, Billings. Prepared by the State Engineer's Office.

Peterson, J. G. 1969. The food habits and summer distribution of juvenile sage-grouse in central Montana. M.S. thesis. Montana State University, Bozeman. 39 pp.

Pioneer School. 2011. School website: http://www.pioneerschool.us/home/home.htm. Accessed on August 19, 2011.

Shepherd Volunteer Fire Department (VFD). 2011. Department website: http://www.shepherdfire.org/. Accessed on August 19, 2011.

Stagliano, D. M. 2005. *Aquatic Community Classification and Ecosystem Diversity in Montana's Missouri River Watershed*. Report to Bureau of Land Management. Montana Natural Heritage Program, Helena, MT. 65 pp. plus appendices.

Stevens, K. and D. Redman. 2000. *Billings A to Z.* Frenkse Companies, Billings, MT.

U.S. Census Bureau. 2010. Legacy American FactFinder. Data from the American Community Survey, Economic Census, and Population Estimates. http://factfinder.census.gov/home/saff/main.html?_lang=en.

———. 2011. New American FactFinder. Data from Census 2010 and Census 2000. http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml. Accessed June through September 2011.

U.S. Department of Housing and Urban Development (HUD). Affordable Housing. http://www.hud.gov/offices/cpd/affordablehousing/. Accessed on September 27, 2011.

U.S. Environmental Protection Agency (EPA). 1971. *Noise From Construction Equipment and Operations, Building Equipment, and Home Appliances*. NTID 300.1.

U.S. Fish and Wildlife Service (USFWS). Not dated. Birds Protected by the Migratory Bird Treaty Act, List of Migratory Birds. http://www.fws.gov/migratorybirds/intrnltr/mbta/mbtandx.html. Accessed in November 2007.

———. 2007. *National Bald Eagle Management Guidelines*. http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BaldEagle/NationalBaldEagleManagementGuidelines.pdf. Accessed on September 13, 2011.

———. 2011. Endangered Species: Mountain–prairie region. Species account: Greater sage-grouse. http://www.fws.gov/mountainprairie/species. Accessed July 2011.

United States Geological Survey (USGS). 2011. Topographic Map data map server. http://isse.cr.usgs.gov/ArcGIS/rest/services/DRG/TNM_Digital_Raster_Graphics/MapServer. Accessed in September 2011.

Wyes, M. 1992. *Roads to Romance: The Origins and Development of the Road and Trail System In Montana*. Montana Department of Transportation, Helena.

Yellowstone County. 2006. *The Lockwood Community Plan*. Coordinated by the Lockwood Steering Committee and Planning and Community Services Department. Adopted August 15, 2006.

———. 2011. Natural Resource Information System Geographic Information Systems (GIS) parcel assessor data. http://www.co.yellowstone.mt.gov/mapping/.

Yellowstone River Parks Association (YRPA). 2010. John H. Dover Memorial Park. http://www.yrpa.org/park07.html. Accessed on November 7, 2011.

———. 2011. YRPA website: http://www.yrpa.org/home.html. Accessed August 19, 2011.

Yellowstone Valley Electric Cooperative, Inc. 2011. *YVEC Facilities within Bypass Route.*

Personal Communications

Axline, J. Personal communication. December 13, 2011.

Friday, W. Personal communication. September 30, 2011.

Inabnit, M. Personal communication. June 14, 2011.

Manchester, L. Personal communication. June 2, 2011.

Neiskens. Personal communication. June 6, 2011.

Neiskens. Personal communication. November 30, 2011.

Ostermiller, G. Personal communication. 2011.

Ruggles, M. Personal communication. October 31, 2011.

Swenson, D. Personal communication. October 28, 2011.

Swenson, D. Personal communication. November 30, 2011.

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10 GLOSSARY

Abutment: An abutment is the part of a bridge at the ends of a bridge that supports the superstructure, contains the earth in the approach fills, and directly receives the impact loads produced by traffic passing from the roadway onto the bridge. An abutment is a wall supporting the end of a bridge or span and sustaining the pressure of the abutting earth.

Acceleration lane: Acceleration lane is a speed-change lane, including tapered areas, for the purpose of enabling a vehicle entering a roadway to increase its speed to a rate at which it can more safely merge with through traffic.

Access connection: Access connection is a facility for entry and/or exit such as a driveway, street, road, or highway that connects to the highways under the jurisdiction of the department or municipality.

Access control: Access control is the enforcement of specified authorization rules based on positive identification of user and the systems or data they are permitted to access.

Access roadway: An access roadway is a connection to a highway or freeway.

Acquisition: Acquisition is the process of obtaining right-of-way by negotiation and/or eminent domain proceedings. Negotiation would involve getting the owner to convey, dedicate, or possibly option the property to the public agency. Just compensation must be paid in all acquisitions or takings.

Alignments: Alignments refer to the geometric design elements that define the horizontal and vertical configuration of the roadways.

Annual average daily traffic (AADT): 1. The annual average daily traffic is 24-hour axle counts for a segment of roadway to which seasonal factors and axle correction factors are applied to develop the AADT. AADT may be further defined as: (a) Historic AADT - A record of AADT for previous years, used to develop growth factors for estimating current and/or future AADT. (b) Current AADT - The most recent AADT estimate for a roadway segment. (c) Forecasted AADT - A 20-year projection of AADT developed using linear regression and 10 years of historic AADT. (d) Modeled AADT - The AADT produced by the travel demand models. Modeled AADT may be for the base year or for a forecast year. 2. The annual average daily traffic is the total traffic for a year divided by 365. Usually, AADT is adjusted for day of the week, seasonal variations, and/or vehicle classification.

Arterial highway: An arterial highway is a general term denoting a highway primarily for through traffic, usually on a continuous route.

At-grade: At-grade means a combination of horizontal alignments and vertical grade lines which intersect.

Auxiliary lane: Auxiliary lane is a lane striped for use as an acceleration lane, or deceleration lane, right-turn lane, or left-turn lane, but not for through traffic use.

Berm: A berm is a mound of earth, generally of triangular (or trapezoidal) cross section, that parallels a roadway and serves as a noise barrier.

Best management practices (BMPs): Best management practices are schedules of activities, practices, and procedures to prevent or reduce pollution of waters of the United States. Such practices include planning strategies, operating procedures, and physical practices to control site runoff.

Bicycle lane: A bicycle lane is a portion of a roadway that has been designated by striping, signing, or pavement markings for the preferential or exclusive use of bicyclists.

Bicycle path: A bicycle path is a bikeway separated from motorized vehicular traffic by an open space or barrier, either within the highway right-of-way or within an independent right-of-way that may also be used by pedestrians, skaters, joggers, wheelchairs, and other non-motorized users.

Bicycle route: A bicycle route is a continuous pathway, usually on a city street, designated for bicycles.

Buffer zone: 1. A buffer zone is undeveloped, open spaces which border a highway. 2. A buffer zone is an area which provides a degree of insulation from effects.

Capacity: Capacity is the number of vehicles that can traverse a point or section of a lane or roadway during a set time period under prevailing roadway, traffic, and control conditions.

Centerline: The centerline is a line dividing the roadway from opposite moving traffic. It is a survey line with continuous stationing for the length of the project. Construction plans and right-of-way maps refer to this line. Horizontal alignment is the center of the roadbed.

Channel: A channel is the bed where a stream of water runs.

Channel stabilization: Channel stabilization refers to erosion prevention and stabilization of velocity distribution in a channel using nonstructural and structural measures.

Clear zone: The clear zone is the unobstructed, relatively flat area provided beyond the edge of the travel lane for the recovery of errant vehicles.

Clearing or grubbing: Clearing or grubbing refers to the removal of vegetation, structures, or other objects as an item of highway or transportation facility construction.

Controlled access highway: A controlled access highway, in accordance with applicable state law, is a state highway on which owners or occupants of abutting lands and other persons are denied access to or from the highway except at such points and only in such manner as may be determined by the department.

Corridor: A corridor is a broad geographical band with no predefined size or scale that follows a general directional flow connecting major sources of trips. It involves a nominally linear transportation service area that may contain a number of streets, highways, and transit route alignments.

Corridor study: In planning, the study of a corridor, which is a broad geographical band that follows a general directional flow or connects major sources of trips. It may contain a number of streets, highways, and transit lines and routes.

Cross section: A cross section is the view of the vertical plane cutting through the roadway, laterally perpendicular to the centerline, showing the relationship of the various components of the roadway.

Cross slope: A cross slope is a slope from centerline to crown line.

Crossover: Crossover is an at-grade connection between opposing lanes of traffic.

Crown: The crown is the edge of roadway.

Cul-de-sac street: A cul-de-sac street is a local street only open at one end and with a special provision for turning around. A dead-end street with a turn-around.

Culvert: A culvert is a structure under a roadway, usually for drainage. It is a bridge-class culvert if it has a clear opening of 20 feet or more measured along the centerline of the roadway between extreme ends of the openings for multiple boxes or multiple pipes that are 60 inches or more in diameter.

Curb: A curb is a vertical or sloping member along the edge of a pavement or shoulder forming part of a gutter, strengthening or protecting the edge and clearly defining the edge to vehicle drivers. The surface of the curb facing the general direction of the pavement is called the "face."

Cuts: Cuts are sections of highway constructed below ground elevation requiring excavation during construction. Earth that is removed below the natural ground line.

Deceleration lane: Deceleration lane is a speed-change lane, including tapered areas, for the purpose of enabling a vehicle that is exiting a roadway to leave the travel lanes and slow to a safe exit.

Decibel: A decibel is a basic unit of sound pressure level. Decibels are logarithmic expressions of sound pressure levels.

Design capacity: Design capacity refers to an estimated capacity, usually based on vehicles per day or design hourly volume, that is used to determine the design of a highway, i.e., the number of lanes and other considerations.

Design speed: Design speed is a selected speed used to determine the various design features of a roadway.

Design standard: Design standard is the policies, guidelines, and criteria which guide and/or control detailed design for normal conditions.

Design year: Projects are planned and designed to meet the future, anticipated needs and characteristics of a certain year. This is referred to as the design year. Typically, the design year for roadways is 20 years after the construction year. For bridges, the design year is typically greater.

Detailed design: Detailed design is a stage in the computer system design, specification, and development process. In this context, this term refers to the development stage during which the actual implementation design (the how to do what) is determined and documented. The end result of this activity is known as the architecturally based "detailed design."

Directional interchange: The directional interchange is an interchange, generally having more than one highway grade separation, with direct connections for the major turning movements.

Divided highway: A divided highway is a highway with a median designed to separate traffic moving in opposite directions.

Drainage: Drainage is the removal of water from the highway right-of-way area by use of culverts, ditches, outfall channels, and other drainage structures.

Drainage channels and side slopes: Side slopes provide a transition from the roadway shoulder to the original ground surface and transmit runoff from the road to a drainage channel.

Easement: Easement refers to the right to use or control an area of the property of another for designated purposes.

Egress: Egress is the right to go out or a place for going out, such as an exit. The right to leave a tract of land. Often used interchangeably with access.

Embankment: An embankment is a raised structure of soil, soil aggregate, rock, or combination of the three. Materials used for fill section.

Endangered species: An endangered species is any species that is in danger of extinction throughout all or a significant portion of its range.

Erosion control: Erosion control includes protection of soil from dislocation by water, wind, or other agents.

Farm operation: Farm operation means any activity conducted solely or primarily for the production of one or more agricultural products or commodities including timber, for sale or home use, and customarily producing such products or commodities in sufficient quantities to be capable of contributing materially to the operator's support.

Feasibility study: A study about a project's feasibility which is summarized in a document. The study addresses issues including the project's benefits, costs, effectiveness, alternatives considered, analysis of alternative selection, environmental effects, public opinions, and other factors.

Fill: Fill is the embankment material placed above natural ground line.

Flood fringe: The area between the floodway and the floodplain.

Floodplain: A floodplain is the lowland and relatively flat areas adjoining inland and coastal water including flood prone areas of offshore islands, including at a minimum, the area subject to a 1% or greater chance of flooding in any given year.

Floodway: The channel of a stream and the adjacent overbank areas that must be reserved in order to discharge a base flood without cumulatively increasing the water surface elevation more than a designated amount.

Full Buildout: The Full Buildout is the complete four-lane road of the Preferred Alternative alignment. The Full Buildout meets the project's purpose and need and is recommended as a long-term solution for the project corridor as the City of Billings continues to grow. This long-term solution would meet the traffic needs beyond the 20-year planning horizon.

Functional class: Functional class is a description of a highway segment's design purpose (interstate, freeway, expressway, arterial, collector, or local) and location (urban or rural). Among other things, functional class defines a highway segment's eligibility for federal funding.

Frontage road: A frontage road is a roadway that could parallel the bypass in some areas for the purpose of safely and efficiently collecting and distributing traffic between the higher speed regional bypass and the lower speed local street system.

Geometric design: A geometric design refers to the dimensions and elements of a highway or road.

Grade: A grade is the slope of a roadway, channel, or natural ground.

Grade separation: A grade separation is the crossing of two highways or a highway and a railroad at different levels.

Highway structure: Highway structure is a general term to refer to various highway design features which are of particular concern to utility installations, i.e., bridges.

Historic properties: Buildings, structures, objects, sites, or districts with historical or archeological significance that are listed in, or eligible for listing in, the National Register of Historic Places.

Impermeability: Impermeability refers to the resistance an asphalt pavement has to the passage of air and water into or through the pavement.

Ingress: Ingress is the right to enter a highway facility at given points.

Interchange: Interchange is a system of interconnecting roadways in conjunction with one or more grade separations that provides for the movement of traffic between two or more roadways or highways on different levels. A proposed interchange will be designated as an interchange when the construction contract has been awarded, regardless of whether it is open to the public.

Intermodal: Intermodal means between or including more than one means or mode of transportation.

Intersection: An intersection is any at-grade connection with a roadway, including two roads or a driveway and a road.

Leq: Leq is the energy-averaged sound pressure level in decibels. Leq is usually reported on an hourly basis and written as Leq(h).

Level of service: Level of service is a measure of traffic flow and congestion. As defined in the Highway Capacity Manual: A qualitative measure describing operational conditions within a traffic stream; generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

Local access road: A local access road is a local public street or road that is generally parallel to a highway. Access for businesses or properties located between the highway and the local access road is provided to the local access road rather than the highway.

Local road: A local road is a road that primarily provides access to adjacent land and provides service to motorists over relatively short distances.

Luminaire: A luminaire is a device that directs, controls, and modifies the light produced by a light source. A luminaire consists of a light source, reflector, refractor, housing, and such support as may be integral with the housing.

Median: The median is the physical separation provided between opposing lanes of traffic.

Mitigation: Mitigation is a technique or means of reducing impacts to resources or to the natural environment. Mitigation includes avoiding the impact altogether by not taking a certain action or parts of an action; minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

Noise abatement criteria (NAC): Noise abatement criteria are absolute sound levels, provided by FHWA, used to determine when a noise impact occurs.

Noise barrier: A noise barrier is a solid wall or earth berm located between the roadway and the receiver location, which breaks the line-of-sight between the receiver and the roadway noise sources.

Peak hour traffic (PHT): Peak hour traffic (PHT) is the percentage of Average Daily Traffic (ADT) that occurs during the hour with the highest traffic volume.

Phase 1: Phase 1 refers to the construction of the first two lanes of the Preferred Alternative alignment. This two-lane principal arterial represents a smaller impact area within the same right-of-way as the full, four-lane footprint of the Full Buildout. Phase 1 is intended as an interim solution and therefore does not meet the purpose and need for the project, though it does meet the traffic needs for the 20-year planning horizon identified in the EIS.

Programmatic agreement: Programmatic agreement is an agreement that governs how certain activities will occur, usually on a specific environmental issue.

Public involvement: Public involvement is an ongoing phase of the project planning process that encourages and solicits public input and provides the public the opportunity to become fully informed regarding project development.

Retaining walls: Retaining walls are vertical walls used to retain earth. A wall for sustaining the pressure of earth or filling deposited behind it.

Right-of-Way (ROW): Right-of-way is a general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to transportation purposes. Right-of-way is the entire width of land between the public boundaries or property lines of a highway. This may include purchase for drainage.

Rural road: A rural road is a road, street, way, highway, thoroughfare, or bridge that is located in an unincorporated area and that is not privately owned or controlled, any part of which is open to the public for vehicular traffic, and over which the state or any of its political subdivisions have jurisdiction.

Scoping: Scoping is the process that occurs prior to the preparation of an EIS. Scoping may include a meeting or series of meetings, an environmental analysis, and interagency coordination. Any information that is gathered will be used and provides the basis for the preparation of the EIS.

Section 4(f) property: A significant publicly owned park, recreation area, wildlife and waterfowl refuge, or historic property (including archeological sites) protected by Section 4(f) of the U.S. Department of Transportation Act of 1966 (49 USC 303).

Shoulder: The shoulder is the paved portion of the roadway outside of the travel lane.

Sight distance: Sight distance is the distance visible to the driver of a passenger vehicle measured along the normal travel path of a roadway from a designated location and to a specified height above the roadway when the view is unobstructed by traffic.

Span: A span is the horizontal distance between supports, or maximum inside distance between the sidewalls of culverts.

Stopping sight distance: Stopping sight distance is the distance required by a driver of a vehicle, traveling at a given speed, to bring the vehicle to a stop after an object on the roadway becomes visible. It includes the distance traveled during driver perception-reaction time and the vehicle braking distance.

Storage lane length: Storage lane length is the portion of an auxiliary lane required to store the number of vehicles expected to accumulate in the lane during an average peak period.

Taking: Taking is the process of obtaining right-of-way by negotiation or eminent domain proceedings. Also that portion of real property taken for transportation purposes.

Traffic control device: A traffic control device is any sign, signal, marking, or installation placed or erected under public authority, for the purpose of regulating, warning, or guiding traffic.

Travel lane: The travel lanes are the portion of the roadway provided for the through movement of vehicles.

Trip generation: Trip generation is the procedure by which estimates of the number of trips produced and attracted by the zone within an urban area are developed.

Turning movement: Turning movement is the traffic making a designated turn at an intersection.

Typical section(s): Typical section(s) show usual roadway (or bridge) cross sectional features including lane and shoulder widths; limits of surfacing; pavement structure data including subgrade treatment type and depth, base course(s) thickness(es), and type of surfacing material; travel lane and shoulder cross slopes; side slope rates for cut and fill sections; ditch or storm sewer location and depth; typical right-of-way limits; profile grade line location; typical traffic barrier location median width and slopes; and curb location and geometry.

Vehicle mile of travel or vehicle miles traveled (VMT): Vehicle mile of travel is a unit to measure vehicle travel made by a private vehicle, such as an automobile, van, pickup truck, or motorcycle. Each mile traveled is counted as one vehicle mile regardless of the number of persons in the vehicle.

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INDEX

A

B

C

D

E

F

G

T

U

V

W

Y

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