

Environmental Assessment and Nationwide Section 4(f) Evaluation



Montana Department of Transportation



Arthur Avenue

CM 7-2(36)94 CN 4611

Missoula, Montana

February 2006

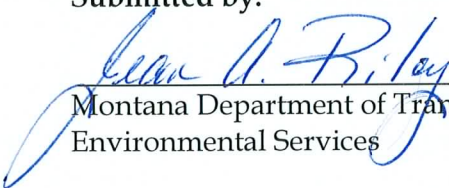
Prepared for: Montana Department of Transportation

Environmental Assessment
For
Arthur Avenue
CM 7-2(36)94
Control No. 4611

This document is prepared in conformance with the Montana Environmental Policy Act (MEPA) requirements and contains the information required for an Environmental Assessment under the provisions of ARM 18.2.237(2) and 18.2.239. It is also prepared in conformance with the National Environmental Policy Act (NEPA) requirements for an Environmental Assessment under 23 CFR 771.119.

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By the
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and the
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Submitted by:


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Glossary of Terms

24-Hour 10 Microns (PM₁₀) Standard - National Ambient Air Quality Standards for respirable particulate matter of 10 microns or less (PM₁₀). Under NAASQ Standards, particulate matter of 10 microns or less shall not exceed 150 µg/m³ on more than three days over three years with daily sampling.

8-Hour Average CO - NAAQS standard for Carbon monoxide. Carbon monoxide shall not to be at or above 9 ppm more than once per calendar year.

BLM Special Status Species - The status of species on Bureau of Lands Management Land is defined by BLM 6840 manual and designated by the Montana State Office of the BLM in 1996. Sensitive species are proven to be imperiled in at least part of its range and documented to occur on BLM lands. Watch species either known to be imperiled and suspected to occur on BLM lands suspected to be imperiled and documented on BLM lands, or needing further study for other reasons.

CAA - The original Clean Air Act was passed in 1963, but our national air pollution control program is actually based on the 1970 version of the law. The 1990 Clean Air Act Amendments are the most far-reaching revisions of the 1970 law. In this summary, we refer to the 1990 amendments as the 1990 Clean Air Act.

CAAAAs - In 1997 the EPA reviewed the air quality standards for ground-level ozone (commonly know as smog) and particulate matter (or PM). Revisions were made to both standards based on scientific evidence. At the same time, EPA developed a new program to control regional haze, which is largely caused by particulate matter. These revisions were included in the Clean Air Act Amendments.

Circulating Flow - The vehicle flow rate in all lanes of the roundabout in front of a roundabout entry lane.

Couplet - A section of roadway where two opposing one-way roadways converge into a two way section of roadway.

Deficiencies - In relation to traffic control devices, deficiencies are associated with the lack of appropriate control and/or insufficiencies that may affect the roadway's ability to move traffic in an adequate manner.

Fault - A fracture in the bedrock along which there has been movement of the sides relative to one another.

Flyover - An overpass structure where one, or multiple lanes, cross over top of intersections, lanes or other features. Flyovers are usually above ground structures that bridge across objects.

Gaining River – A river that receives or “gains” water from the saturated zone.

Gateway Affect – As part of the design, the University would like to make the entrance into the campus more inviting and accentuate the entrance.

Geometric – The special characteristics of a facility, including approach grade, the number and width of lanes, lane use, and parking lanes.

Level of Service – A quantitative measure describing operational conditions within a traffic stream, based on service measures such as speed, and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience.

Losing River – A river that loses water to the saturated zone.

Moiese Gravelly Loam – A soil unit named after Moiese, Montana consisting of a mixture of gravel and sand, silt, and clay in approximately equal proportions.

Multimodal – Refers to the use of more than one mode of transportation. Modes of transportation may include but are not limited to cars, bikes, pedestrians, buses, and trucks. Multimodal traffic is a composition of the different modes of transportation. However, for this document, multimodal does not include rail and transit systems.

No Added Capacity – CDM, with MDT’s approval, has defined “no added capacity” for this project to mean that the design will look at current capacity and levels of service during standard operation and compare it to adjacent intersections to determine if there are significant impacts or stress added to the existing transportation system.

Platoon – A group of vehicles or pedestrians traveling together, either voluntarily or involuntarily, because of signal control, geometrics, or other features.

Pleistocene – An epoch or subcategory of the quaternary time period representing 10,000 to 1.8 million years ago.

PM₁₀ NAAQS – PM₁₀ is one of the seven air pollutants the Environmental Protection Agency (EPA) regulates under the National Ambient Air Quality Standards (NAAQS). PM₁₀ is defined as particulate matter (PM) with a mass median aerodynamic diameter less than 10 micrometers (um) - PM₁₀. In other words, these are the (smaller) particles that make it through some type of pre-separator (removes large particles) and are collected on a sampling medium (filter).

Precambrian – A geologic eon representing the time period greater than 4.5 billion years ago.

Quaternary Age – A geologic time period representing the period from 1.8 million years ago to the present.

Roundabout – A circular intersection with yield control of all entering traffic, channelized approaches, counter-clockwise circulation, and approach geometric curvature to ensure that travel speeds on the circulatory roadway are typically less than 50 kph (30 mph).

Rotaries – Rotaries are sometimes referred to as traffic circles. These intersection treatments are similar to roundabouts except for the access into a rotary is regulated by a signal or a stop sign, as compared to a roundabout, which is yield controlled. With rotaries, the right-of-way is to the vehicles entering the system while roundabouts are for the vehicle within the system. Often rotaries have large center islands and straight approach, similar to spokes in a bicycle wheel where several streets approach from different directions.

Slip Lane – A lane that is used to bypass an intersection. This is often seen as a right turn lane that is allowed to enter an intersecting roadway down stream of the intersection under yield control.

Thrust Fault – A fault in which the hanging wall has been pushed or thrust on top of the footwall. The dip, or angle between the fault and the horizontal is less than 45 degrees.

Traffic Queue – A line of vehicles, bicycles, or persons waiting to be served by the system in which the flow rate from the front of the queue determines the average speed within the queue. Slowly moving vehicles or people joining the rear of the queue are usually considered part of the queue. The internal queue dynamics can involve starts and stops. A faster-moving line of vehicles is often referred to as a moving queue or a platoon.

Traffic Responsive Signals – Traffic signals that are able to interact with fluctuations in traffic volumes. Traffic responsive signals often work as a network of signals to allow for smoother traffic flow through a designated corridor.

Transmissive – A geologic unit capable of transmitting water.

Transverse Fault – A fault that trends at an angle to the structural trend of the region.

Unconfined Alluvial Aquifer – A body of sediment that is sufficiently permeable to yield economically significant quantities of water that is not confined under pressure beneath relatively impermeable rocks or soils.

USFS Sensitive Species – The status of species on Forest Service lands as defined by the U.S. Forest Service manual (2670.22). These species are listed as such by the

Regional Forester (Northern Region) on National Forests in Montana. Species are listed as sensitive species, subspecies or variety for which the Regional Forester has determined there is a concern for population viability range wide or in the region.

USFWS Threatened and Endangered Species – The status of species on Forest Service lands as defined by the U.S. Forest Service manual (2670.22). These taxa are listed as such by the Regional Forester (Northern Region) on National Forests in Montana. Species are listed as threatened and endangered under the endangered species act or proposed for listing, and known or suspected to occur on national forests.

Vehicle Accident Rate – a ratio of the number of accidents per million vehicle miles traveled.

Vehicle Severity Index – percentage of accidents associated with bodily injury.

Vehicle Severity Rate – a ratio of accident severity weighted crashes per million miles traveled.

Volume to Capacity (v/c) Ratio – The ratio of volume to capacity is an approximate indicator of the overall sufficiency of intersections geometrics. A v/c ratio of 1.0 shows an intersection is over capacity.

WB-50 – AASHTO Classification for a truck with a 50 foot wheel base. This is a truck trailer combination that is also referred to as a WB-15.

WB-67 – AASHTO Classification for a truck with a 67 foot wheel base. This is a truck trailer combination that is also referred to as a WB-20.

List of Acronyms

AAQS	Ambient Air Quality Standards
ADA	Americans with Disabilities Act
ASTs	above-ground storage tanks
BLM	Bureau of Land Management
BRR	Biological Resources Report
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CDM	Camp Dresser & McKee Inc.
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
CMAQ	Congestion Mitigation & Air Quality Improvement Program
CO	carbon monoxide
dBA	decibels A-weight
DEQ	Department of Environmental Quality
DOT	U.S. Department of Transportation
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
ha	hectares
HABS	Historic American Building Survey
HCM	Highway Capacity Manual
Leq	Equivalent noise level
LOS	Level of Service
LUST	leaking underground storage tanks
MAAQS	Montana Ambient Air Quality Standards
MCCHD	Missoula City/County Health Department
MDFWP	Montana Department of Fish Wildlife and Parks
MDT	Montana Department of Transportation
MNHP	Montana Natural Heritage Program
MOU	Memorandum of Understanding
MPDES	Montana Pollutant Discharge Elimination System
MPO	Metropolitan Planning Organization
MUTCD	Manual on Uniform Traffic Control Devices
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NPL	National Priority List
NO _x	nitrogen oxides
NRHP	National Register of Historic Places
O ₃	ozone
PM ₁₀	particulate matter less than 10 microns
RCRA	Resource Conservation and Recovery Act

SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO ₂	sulfur dioxide
TIP	transportation improvement program
UHPIP	Urban Highway Pilot Improvement Program
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USTs	underground storage tanks
v/c	volume to capacity
veh/h	vehicle per hour
VOCs	volatile organic compounds

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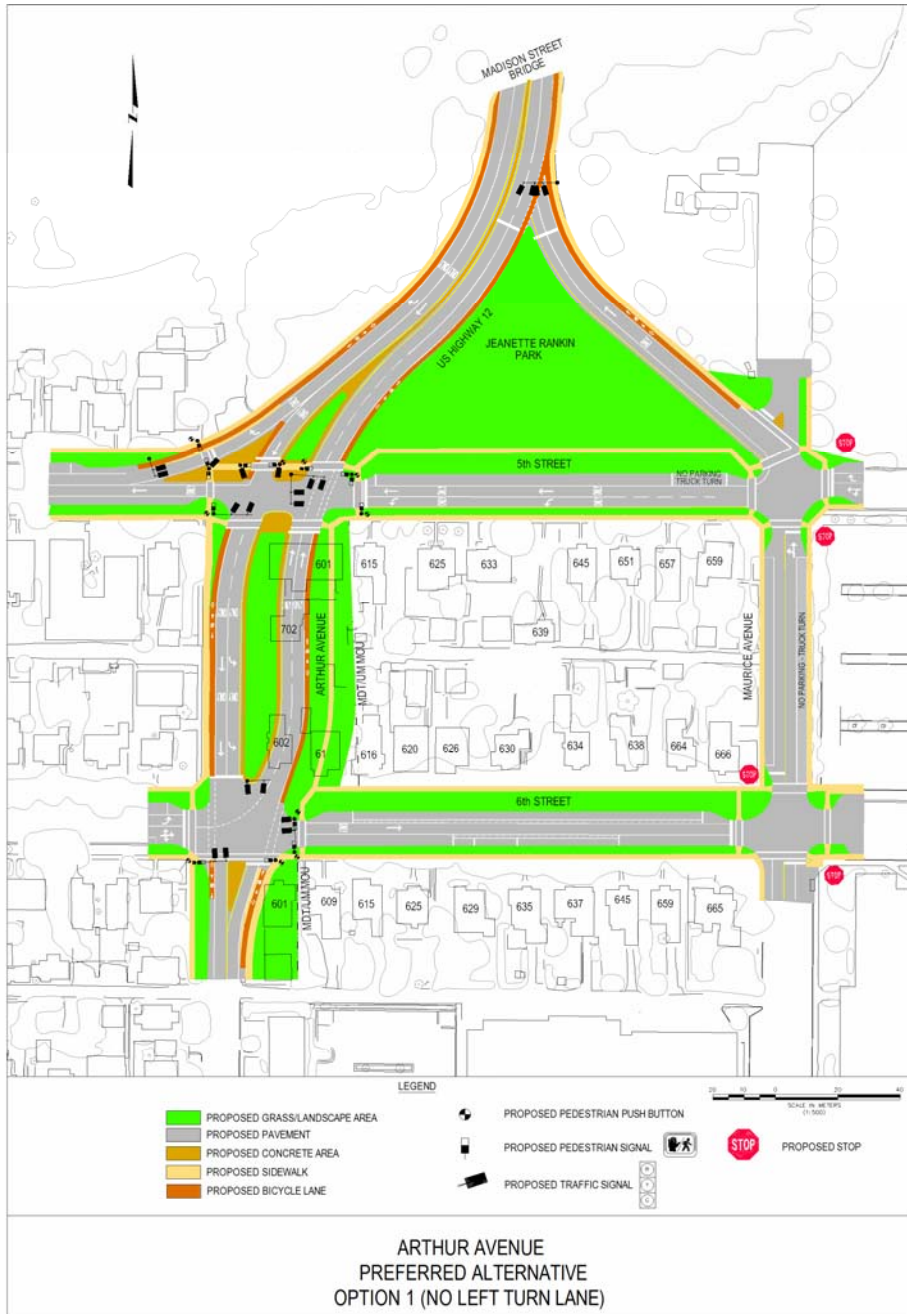
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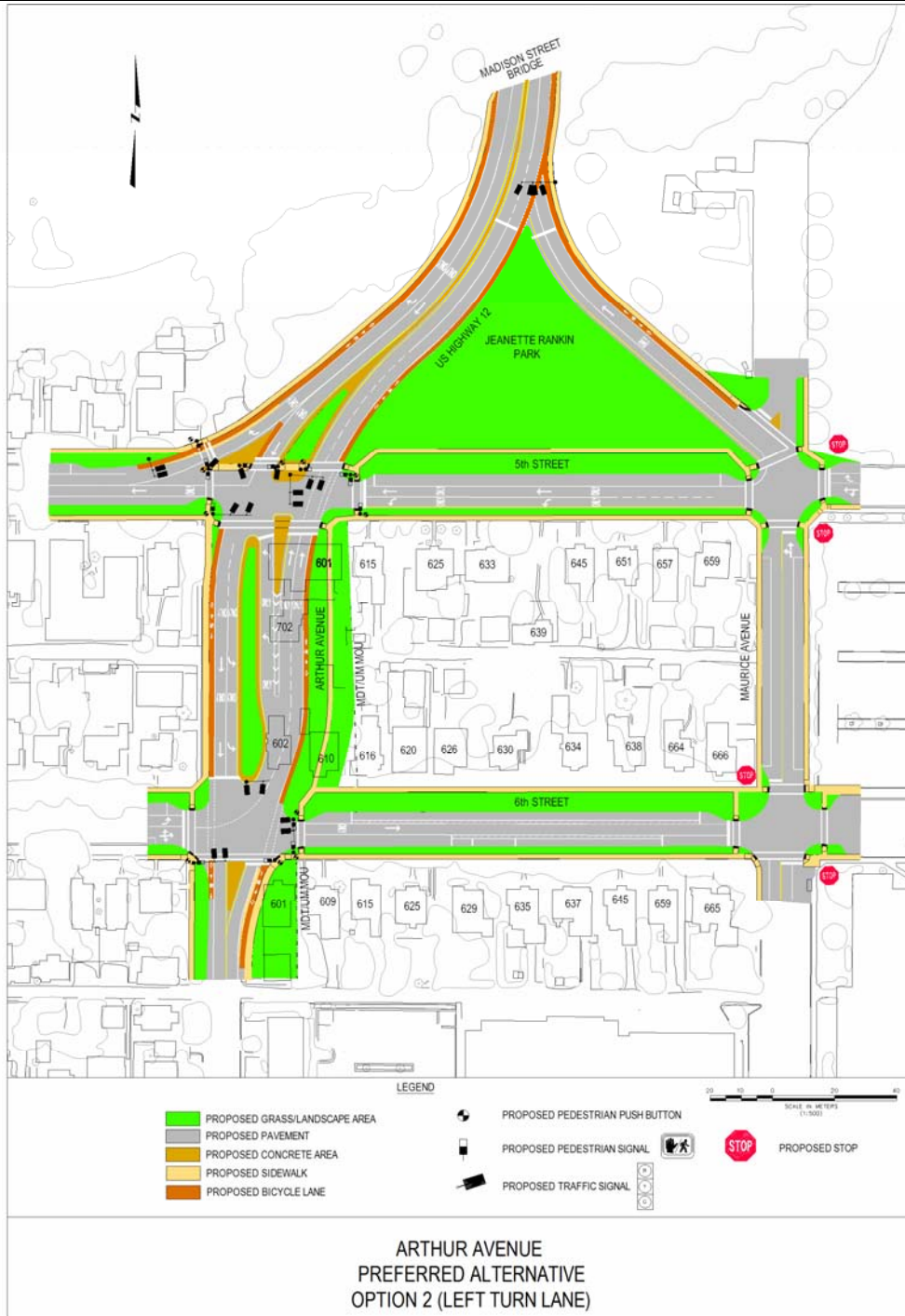
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Summary

Introduction

The purpose of the Arthur Avenue project is to improve automobile, bicycle, and pedestrian flow on U.S. Highway 12 near the University of Montana - Missoula Campus (University) allowing the safe and efficient movement of traffic. The proposed improvements would accomplish this by installing pedestrian and bicycle facilities, traffic actuated signals, and realignment of the existing roadways to establish a more direct route for U.S. Highway 12. This would reduce the traffic on 6th Street and Maurice Avenue, increasing the safety around the University.





The project is located adjacent to the University and the Clark Fork River at the southern end of the Madison Street Bridge in the City of Missoula (the City). The bridge is not included in the project; however, design consideration would be given to the bridge access and egress (couplets) on the south side of the river. The study area begins south of the Madison Bridge and includes the intersections of Arthur Avenue at 6th Street, 6th Street at Maurice Avenue, Maurice Avenue at 5th Street, and Arthur Avenue at 5th Street.

Goals of the project include the following:

- To maintain a uniform volume capacity across the project that will be consistent with the surrounding U.S. Highway 12 roadways.
- To incorporate physical changes to the roadway and its adjoining environment to increase the safety, comfort, and convenience of the traveling public.
- To provide a more direct route for U.S. Highway 12 traffic without impacting the capacity of adjacent or connecting roadways.
- To provide a more efficient and user-friendly entrance to the University.
- To accommodate the multimodal travel of trucks, cars, bicycles, and pedestrians.
- To decrease the impacts of University special events on U.S. Highway 12 traffic and increase the efficiency and safety for the public traveling to and from the special events.
- To have a positive effect on air quality.
- To update existing roadway facilities.
- To recognize, evaluate, and comply with, if feasible, the requirements of the Memorandum of Understanding (MOU) between the City, the Montana Department of Transportation (MDT), and the University regarding property available for the project and other issues.

The project was nominated to reconstruct Arthur Avenue from 6th Street to 5th Street, including the intersections. The proposed work would also include realignment of the U.S. Highway 12 eastbound couplet between the Madison Street Bridge and the 6th Street/Maurice Avenue intersection; and realignment of the U.S. Highway 12 westbound couplet between the bridge and the Arthur Avenue/5th Street intersection. The proposed work would include: alignment modification, intersection improvements, grading, installing gravel, storm drains, curbs and gutters, and surfacing, signing, striping, lighting, landscaping, signals, and other miscellaneous items. Some right-of-way acquisition and utility relocation would be required; however the University plans to donate right-of-way to the project based upon a MOU signed May 22, 2001. In addition to the MOU right-of-way, a small (± 5 m²) of private right-of-way may be required for sidewalk placement.

The MDT signed a MOU with the City and the University. As described in the MOU, the project consists of “. . . realigning the eastbound leg of U.S. Highway 12 from 6th Street along Arthur Avenue to more directly connect to the Madison Street Bridge. Through traffic will no longer be required to loop along 5th Street and Maurice Avenue by the Adams Center.” The MOU prescribes that MDT is responsible for all normal project activities, up to and including contract letting and construction. The City and University will actively participate in the project development process. The University will provide (subject to Board of Regents approval) necessary right-of-way and clear the ground needed for the project, in accordance with the MOU. Additional

right-of-way from adjacent private land owners may be needed. A copy of the MOU can be found in Appendix A of this document.

The project is being funded jointly among MDT, the City, and the University. Project funding from the University is based upon the donation of right-of-way in the project area. Most of the funding for this project is Federal funding (with State matching funding) from MDT's Montana Air and Congestion Initiative (MACI) and the Urban Highway Pilot Improvement Program (UHPIP).

The project is context sensitive and would greatly enhance the aging infrastructure while incorporating important safety features into a multi modal environment. Context Sensitive Solutions, or CSS, as defined by the Federal Highway Administration (FHWA), "is a collaborative, interdisciplinary approach to involve all stakeholders in the development of a transportation project. This involvement ensures that the project fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility." The development of this project has been the collaborative effort of the stakeholders, as evidenced by the extensive public involvement and careful attention paid to stakeholder interests. As a result, the project has addressed critical issues such as pedestrian and bicycle safety, air quality, and the aesthetic value of the University gateway. Obvious concerns about this project include the impacts to the historic district and Jeanette Rankin Park, and through the evaluation of numerous alternatives, proposed impacts have been kept to a minimum.

Without implementation of the project, the 1957 roadway layout, outdated non-compliant safety measures, increased traffic in Missoula, and the University will increasingly negatively impact the neighborhoods and the efficiency of traffic flow on U.S. Highway 12. The effects are already being seen by the long delays at each intersection and other difficulties for all modes of traffic including bikes and pedestrians.

Through state and community meetings, public hearings, and neighborhood workshops, it is clear that the project is needed and is overwhelmingly supported by MDT, the City, the University, local residents, and interests groups. A majority see the positive benefits of this project by: removing U.S. Highway 12 traffic from the local streets and to the University; improving traffic flow including traffic from special events at the University; and accommodating pedestrians and bicyclists with new facilities while increasing safety.

Several alternatives were considered for implementation of this project, including the No Action alternative. Multiple criteria are used to select the Preferred Alternative from the initial list of potential alternatives. Candidates for the Preferred Alternative are limited to those that meet project objectives. The Preferred Alternative is the alternative that best meets all project objectives. Potential impacts that may result from implementation of the Preferred Alternative are summarized on the following pages. Also included in this discussion are the potential cumulative impacts that may result from implementation of this and other related projects, impacts of not

implementing this project (the No Action alternative), and mitigation measures associated with the potential impacts.

Summary of Resources and Impacts

As part of this project, an evaluation of potential impacts (both direct and indirect) on the affected environment is required. Important resource categories or components of the potentially affected environment requiring evaluations of impacts include the following:

- Land Forms, Geology, and Soils
- Important Farmland
- Water Resources and Quality
- Floodplains
- Air Quality
- Vegetation
- Wetlands
- Threatened and Endangered Wildlife
- Other Wildlife Resources and Fisheries
- Land Ownership, Right-of-Way, and Use
- Social/Environmental Justice
- Economic
- Noise
- Hazardous Material/Substances
- Archeological and Historical
- Parkland
- Section 6(f) Lands
- Pedestrian and Bicycle Facilities
- Visual Resources

The following are evaluated for each of the resource categories identified:

- Impacts of the Preferred Alternative
- Cumulative Impacts
- Impacts of the No Action Alternative

Potential impacts to the resource categories are summarized in the table below.

Resource Category	Potential Impacts of Preferred Alternative	Potential Cumulative Impacts	Potential Impacts of No Action
Land Forms, Geology, and Soils	Small cut and fills	None	None
Important Farmland	Resource not present within or adjacent to project area		
Water Resources and Quality	Limited to hazardous materials spills	None	Minimal from maintenance and transport
Floodplains	None	None	None
Air Quality	Temporary dust, long-term positive	None	Continued degradation due to poor traffic flow
Vegetation	Loss of few individual trees and some grass	None	None
Wetlands	None	None	None
Threatened and Endangered Wildlife	Sediment transport to Clark Fork River can impact bull trout	None	None
Other Wildlife Resources and Fisheries	Not measurable	None	None
Land Ownership, Right-of-Way, and Use	In addition to MOU, $\pm 5 \text{ m}^2$ ($\pm 54 \text{ ft}^2$) of right of way required sidewalk connections	None	None
Social/Environmental Justice	None	None	None
Economic	Positive, due to increased safety, short-term job increase. Negligible loss of tax revenue from right-of-way acquisition	Minor positive, due to potential increased demand for local goods	None
Noise	Short term construction noise	None	Continued increase
Hazardous Material/Substances	Limited to construction-related activities	Negligible	None
Archeological and Historical	2 historic properties would be impacted (610 S. 6 th St. E.)	None	No impact on historic properties
Parkland	Loss of 0.25 ac of Jeanette Rankin Park (grass and possibly some mature trees)	None	Park use is currently limited due in part to access; however, there would be no loss of park property
Section 6(f) Lands	Resource not present within or adjacent to project area		
Pedestrian and Bicycle Facilities	Positive, due to improved safety and flow of pedestrians and bicycles	None	Continued poor conditions for pedestrians and bicycles
Visual Resources	Positive due to additional green space and landscaping	None	None

In summary, no significant adverse impacts from the preferred alternative or due to cumulative impacts including those associated with this project are identified for the potentially affected environment. The preferred alternative is expected to have

measurable positive impacts on certain resource categories and neither positive nor negative impacts on other categories.

Summary of Mitigation Measures

Mitigation measures are incorporated into the proposed project to eliminate or minimize any potential impacts identified. These mitigation measures are summarized below for those resource categories for which potential impacts have been identified.

Resource Category	Potential Impacts of Preferred Alternative	Potential Cumulative Impacts	Potential Impacts of No Action	Mitigation Measures
Land Forms, Geology, and Soils	Minimal	None	None	Erosion control and slope stabilization
Water Resources and Quality	Limited to hazardous materials spills	None	Small probability from maintenance and transport	Control spills, refueling, and containment
Air Quality	Temporary dust, long-term positive	None	Continued degradation due to poor traffic flow	Dust control as needed
Wetlands	Not measurable	None	None	None
Other Wildlife Resources and Fisheries	Not measurable	None	None	Erosion control and re-vegetation
Noise	Short term construction equipment noise	None	Continued increase	Construction related noise and operation hours will maintain compliance with the Missoula City Noise Ordinance (MMC 9.30. MP)
Hazardous Material/Substances	Limited to construction-related activities	Negligible	None	Control spills, refueling, and containment
Archeological and Historical	2 historic properties would be impacted (610 S. 6 th Street E.)	None	No impact on historic properties	Historic American Buildings Survey (HABS) of the home, new owners and home relocation
Parkland	Loss of 0.25 ac of Jeanette Rankin Park (grass and possibly some mature trees)	None	Minimal due to limited use of park; however, there would be no loss of park property	Improve park access, landscaping, weed control, add green space in other areas
Pedestrian and Bicycle Facilities	Positive, due to improved safety and flow of pedestrians and bicycles	None	Continued poor conditions for pedestrians and bicycles	Bicycle lane and pedestrian facilities are incorporated into project
Visual Resources	Positive due to additional green space and landscaping	None	None	Additional green space and landscaping incorporated into project

Overall Conclusions on Need

This project is context sensitive and would enhance the aging infrastructure while incorporating important safety features into a multimodal environment. Without this project, increasing impacts to the neighborhoods and the use of U.S. Highway 12 would continue due to the 1957 roadway layout, outdated non-compliant safety measures, and increased traffic in Missoula and the University. The effects of increased traffic are already being seen by the long delays at each intersection and safety concerns as described in the section above.

Through state and community meetings, public hearings, and “neighborhood” workshops, it is clear that this project is needed and overwhelmingly supported by the MDT, the City, the University, local residents, and interests groups. The majority sees the positive benefits of this project by: removing U.S. Highway 12 traffic from the local streets and the University; improving traffic flow including traffic from special events at the University; and accommodating pedestrians and bicyclists with new facilities while increasing their safety.

Section 1

Introduction

1.1 Project Location, Length, and Termini

The Arthur Avenue project includes roadways between the Madison Street Bridge and 6th Street, and Arthur Avenue and Maurice Avenue. The project was developed by MDT in association with the Federal Highway Administration (FHWA), University, and the City to evaluate and resolve traffic and safety issues in the project area. Figure 1-1 depicts the existing roadway configurations.

1.2 Purpose and Need

The project was nominated to reconstruct Arthur Avenue from 6th Street to 5th Street, including the intersections. The work would also include realignment of the U.S. Highway 12 eastbound couplet between the Madison Street Bridge and the 6th Street/Maurice Avenue intersection; and realignment of the U.S. Highway 12 westbound couplet between the bridge and the Arthur Avenue/5th Street intersection. The purpose of the project is to improve traffic flow, reduce out-of-direction travel, and to improve safety. The project is needed to meet demands of a mixed variety of motor vehicles, bicycles, and pedestrians and provide an aesthetic and efficient entrance into the University, while maintaining adequate capacity for highway traffic.

The work may include realignment, intersection improvements, grading, installing gravel, storm drains, curbs and gutters, and surfacing, signing, striping, lighting, landscaping, signals, and other miscellaneous items. Some right-of-way acquisition and utility relocation would be required; however, most of the right-of-way acquisition that would be needed was included in a Memorandum of Understanding (MOU) described below. An additional $\pm 5 \text{ m}^2$ ($\pm 54 \text{ ft}^2$) of private right-of-way may be required for sidewalk placement. Both State and Federal funds will be required for this project.

The MDT signed a MOU on May 22, 2001 with the City and the University. As described in the MOU the project consists of “. . . realigning the eastbound leg of U.S. Highway 12 from 6th Street along Arthur Avenue to more directly connect to the Madison Street Bridge. Through traffic would no longer be required to loop along 5th Street and Maurice Avenue by the Adams Center.”

Briefly, the MOU prescribes that MDT is responsible for all normal project activities, up to and including contract letting and construction. The City and University will actively participate in the project development process. The University would provide (subject to Board of Regents approval) necessary right-of-way, as bare ground free of structures, anticipated to be needed for the project in accordance with the MOU. The MOU is included in Appendix A. A small amount of additional right-of-way from adjacent private land owners may be needed.



The purpose of the project is to improve automobile, bicycle, and pedestrian flow on U.S. Highway 12 near the University allowing the safe and efficient movement of traffic. Roadways included in the project are Arthur Avenue, 5th Street, 6th Street, Maurice Avenue and the southern approach, and departure legs from the Madison Street Bridge. The goals of the proposed action should be:

- To maintain a uniform volume capacity across the project that will be consistent with the surrounding U.S. Highway 12 roadways.
- To incorporate physical changes to the roadway and its adjoining environment to increase the safety, comfort, and convenience of the traveling public.
- To provide a more direct route for U.S. Highway 12 traffic without impacting the capacity of adjacent or connecting roadways.
- To provide a more efficient and user-friendly entrance to the University.
- To accommodate the multimodal travel of trucks, cars, bicycles, and pedestrians.
- To decrease the impacts of University special events on U.S. Highway 12 traffic and increase the efficiency and safety for the public traveling to and from the special events.
- To have a positive effect on air quality.
- To update existing roadway facilities.
- To recognize, evaluate, and comply, if feasible, with the requirements of the MOU between the City, MDT, and the University regarding property available for the project and other issues.

1.3 Project Funding

The project is being funded by the City of Missoula, the State of Montana, the University, and federal funding sources. Project funding from the University is based upon the donation of right-of-way in the project area. Most of the funding for this project is Federal funding (with State matching funding) from MDT's Montana Air and Congestion Initiative (MACI) and the Urban Highway Pilot Improvement Program (UHPIP).

Camp Dresser & McKee Inc. (CDM) was tasked to define "no added capacity" for the Arthur Avenue Reconstruction project. CDM, with MDT's approval, has defined "no added capacity" for this project to mean that the design will look at current capacity and levels of service during standard operation and compare it to adjacent intersections to determine if there are significant impacts or stress added to the existing transportation system. MDT determined that it did not want to create more traffic in a residential area and therefore, did not add capacity to the existing system. It is understood by both CDM and MDT that this definition does not include special

events from the University. Designing for special events is not feasible. Instead, CDM will analyze the special events and make reasonable recommendations to mitigate these impacts within the project area. In addition, MDT has stated that the “no added capacity” definition is for the current year, and does not need to meet future conditions; however, CDM shall take growth projections into account for the preferred alternative and analyze the future at 10-years and 20-years out. Current year denotes the year when the project began data collection and the design process. For this project the current year is considered to be 2002.

1.4 Jurisdiction

U.S. Highway 12, on the Primary Highway System, is functionally classified as a principal arterial. Arthur Avenue, at its intersection with Sixth Street is a minor arterial on the Urban Highway System. The local and through traffic on these roadways are heavily mingled with often conflicting results. The network accommodates not only “normal” traffic but also traffic from special events (such as football games, basketball games, and concerts) that occur nearly every week at the University. Street maintenance and snow removal is performed by the City. The area is police patrolled by the Montana Highway Patrol, the County Sheriff, and the City police. Streets east of Maurice Avenue are the jurisdiction of the University police.

1.5 Current and Projected Road Use

1.5.1 Current Road Use

The current roadway use within the project area is multifaceted. There is a mix of commuters, commercial trucks, and University traffic traveling on Arthur Avenue, Maurice Avenue, 5th Street, and 6th Street. In addition, there is also pedestrian and bicycle traffic.

In general, referring to Figure 1-1, the U.S. Highway 12 eastbound traffic (traffic flowing north from Madison Street Bridge) follows 6th Street to Maurice Avenue to the Madison Street Bridge. U.S. Highway 12 westbound traffic (traffic flowing south from Madison Street Bridge) goes down 5th Street. Any vehicle accessing the University must continue southbound and turn east onto 6th Street. Within the project area, Arthur Avenue is one-way southbound, Maurice Avenue is one-way northbound, 5th Street is one-way westbound and 6th Street is one-way eastbound.



Arthur Avenue South of 6th Street (North)

1.5.2 Projected Road Use

The purpose of the Arthur Avenue project is to improve vehicle, bicycle, and pedestrian flow on U.S. Highway 12 near the University of Montana - Missoula Campus (University) allowing the safe and efficient movement of traffic. The proposed improvements would accomplish this by installing pedestrian and bicycle

facilities, traffic actuated signals, and realignment of the existing roadways to establish a more direct route for U.S. Highway 12. This would reduce the traffic on 6th Street and Maurice Avenue, increasing the safety around the University.

The improvements would not alter or hinder the existing road use, as the current circulation patterns within the project area would be maintained except Arthur Avenue. This would ensure the same access to buildings and locations as the existing road use while improving flow and safety.

1.6 Accidents

The MDT performed an accident analysis and engineering study evaluation for the Arthur Avenue Project (CN 4611) in October of 2002. Refer to “Accident Studies and Dominant Trends – Act.122 (406)” in Appendix D in the Revised Preliminary Traffic Report. The accident data were collected for a three-year period between July 1, 1999 and June 30, 2002 and compared to other Urban Principal Arterials.

In summary, the analysis identified 75-recorded accidents. During the study period, there were no fatalities due to vehicular incidents; however, on December 13, 2002, a pedestrian was struck and killed at 6th Street and Maurice Avenue.

Within the study area and time period analyzed, the Vehicle Accident Rate is 8.62, the Vehicle Severity Index is 1.48, and the Vehicle Severity Rate is 12.76. The Vehicle Accident Rate is 40 percent higher in the project area than the statewide average; the Vehicle Severity Index is 18 percent higher than the statewide average.

Existing pedestrian facilities are cumbersome and do not allow easy access to many areas of the project. Current conditions do not provide a marked access to the northwest corner of the Arthur Avenue and 5th Street intersection. Similarly the northwest side of the intersection at Maurice Avenue and 6th Street does not have marked access. At the intersection of Maurice Avenue and 5th Street there is no marked access to either the northwest or southwest side of the intersection. Although unmarked crossings are common in Missoula, these access restrictions are required for the existing alignment as un-signalized intersections and the volume of traffic generated by U.S. Highway 12 and the University do not allow for protected pedestrian crossings at these locations.

The existing bicycle facilities necessitate the intermixing of bicycles and vehicles for most of the project. The main safety concern involving bicycles occurs from the Madison Street Bridge to the intersection of Arthur Avenue and 5th Street. At this location the bicycle lane crosses two travel lanes where motorists are negotiating both a horizontal and vertical curve. If the bicycle chooses to follow the sidewalk located on the northwest side of the couplet, they are unable to cross at the intersection of 5th Street and Arthur Avenue because of the lack of cross walks. Due to the existing lane configurations at the intersection of Arthur Avenue and 5th Street, it is often difficult for bicycles and pedestrians to determine a motorist’s path entering and exiting the intersection.

Section 2

Alternatives for the Arthur Avenue Project

2.1 Preferred Alternative Selection Process

This section describes the alternatives considered to address the transportation needs, safety improvements, and traffic control/geometric deficiencies identified in the “Preliminary Field Review Report” dated September 12, 2001 provided by MDT. The process of selecting the preferred alternative is identified and includes several conceptual alternatives that were rejected for various reasons. It also includes conceptual alternatives that were refined a number of times until a preliminary plan was developed for presentation at a Public Meeting. A preferred alternative was developed based on the University, City, and community’s support and comments.

The preferred alternative is the improvement that MDT, the City, and the University believe would best meet the reasons for undertaking the project, giving consideration to economic, environmental, technical, public opinion, “no added capacity,” the MOU and other factors. The preferred alternative is detailed in Section 2.5.

2.2 Methodology

A process of developing conceptual alternatives was conducted in collaboration with the stakeholders, community, and general public. The alternative development process included the following:

- Identify the purpose and need.
- Evaluate issues in the MOU.
- Brainstorm and conceptualize ideas to address the project needs.
- Refine ideas into alternatives by levels of impact.
- Evaluate and compare alternatives.
- Eliminate alternatives from further consideration based on the evaluation.
- Forward Preferred Alternative to the Environmental Assessment document.

2.2.1 Preliminary Alternative Development

The objective of the preliminary alternative development session was to develop alternatives that would optimize the area with regard to the Purpose and Need. Around 25 ideas for improvements were developed and separated into the following groups of alternatives.

2.2.1.1 No-Build Alternative

The No-Build Alternative was evaluated as a baseline for design comparison and a viable option.

2.2.1.2 Minimal Improvements

Minimal impacts such as traffic signal improvements, new pavement markings, and advanced University signing (trailblazing) were evaluated because of their low overall cost and minimal impact to the project. These improvements were removed from consideration because implementation would not improve operation and safety at these intersections. Therefore, this group of improvements was not advanced through the preferred alternative selection process.

2.2.1.3 Moderate Improvements

Moderate impacts such as roadway realignments and “non-standard” improvements such as roundabouts appeared to be a cost effective and viable option to address traffic conditions. As a basis, the roadway realignment and roundabout alternatives were carried forward to the next step of the alternative selection process.

2.2.1.4 Extensive Improvements

Overpass structures and interchanges were evaluated in an effort to streamline access to the U.S. Highway 12 and the University. These alternatives were not considered further due to costs well beyond the budget, safety issues and improvements that may be required outside of the project area.

2.3 Alternatives Considered but Rejected

The following are alternatives considered but rejected for the reasons described below in each of the figures. Some of the reasons for rejection include: 1) cost, 2) the alternative is not safe or does not effectively allow traffic movement, or 3) the alternative is not safe or does not provide adequate facilities for other modes of traffic such as bikes and pedestrians. More detailed discussions of the alternative evaluation process are described in Appendix B – Conceptual Alternatives.

2.4 Roundabout Alternatives (more alternatives considered but rejected)

The roundabout alternative has been considered in great length for this project. Capacity and impacts to the historic district have resulted in the rejection of roundabouts as a feasible alternative. It is the opinion of CDM that modern roundabouts can be an effective intersection improvement alternative where properly designed and warranted. Ongoing research in the United States and Europe is indicative of an alleviation of certain types of collisions, as well as an overall improvement to traffic flow under the “slow and go” versus “stop and go” scenarios.

However, roundabouts are not a panacea for all roadway intersection problems. Similar to traffic signals, roundabouts are used to provide improved traffic control at an intersection. Yet, roundabouts have certain geometric design criteria, static capacity and pedestrian and bicycle accommodation limitations that must be accounted for when selecting an intersection improvement alternative.

Section 2.4.1 through 2.4.8 present a detailed evaluation of roundabout versus traffic signal control at the study area intersections.

Alternatives Considered but Rejected

Roundabout South of Madison Street Bridge



- Park would be removed.
- Wetlands impact ±1 acre.
- Alternative does not adequately handle traffic flow.
- Pedestrian and bike use problems.
- Right-of-way acquisition required.

Intersection South of Madison Street Bridge



- Turning movements would slow traffic and cause congestion.
- Park would be removed.
- Traffic flow is not smooth.
- Wetlands impact ±1 acre.
- Right-of-way acquisition required.

U.S. Highway 12 Shift to Arthur



- Horizontal and vertical curves causes impact to sight distance.
- Traffic merging sight problem.
- Right-of-way acquisition required.
- Wetlands impacts over 1 acre.

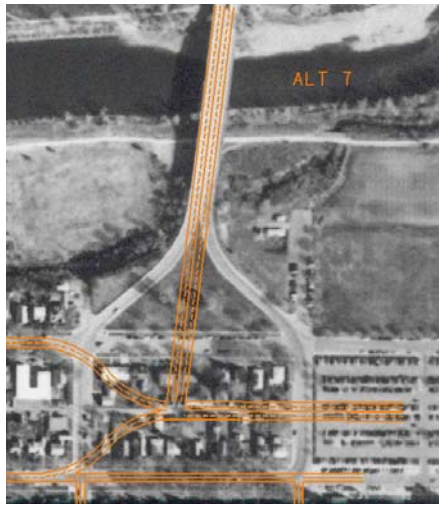
New Intersection at 5th and 6th



- Right-of-way acquisition required.
- One-way to two-way street connection issues causing difficult traffic patterns.
- Park would be removed.
- Does not meet University land use plan.

Alternatives Considered but Rejected Continued...

New Roadway Between 5th and 6th



- Does not meet University land use plans.
- Right-of-way acquisition required.
- Difficult pedestrian and bike access.
- Residential access issues.

Flyovers Separating University and U.S. Highway 12



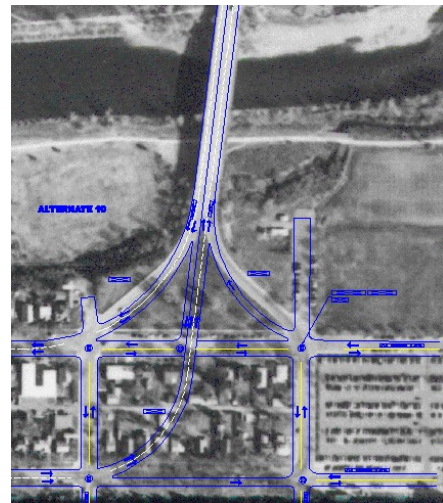
- Alignment would require steep slopes.
- Sight distance problematic.
- Flyovers are more costly than other alternatives that accomplish the same objectives.
- Right-of-way acquisition required.
- Park would be removed.

Split Bridge 2-Lane 2-Way Flyovers



- Motorist confusion problems.
- Poor alignment with existing bridge.
- Reduces park size significantly.
- Flyovers are very costly and objectives can be achieved with less cost.

Flyover from the Madison Street Bridge



- Bicycle and pedestrian access limited.
- Traffic congestion at University.
- Costly overpass and objectives can be achieved with less cost.
- Does not meet University land use plans.
- Park would be removed.
- Right-of-way acquisition required.

2.4.1 Site Specific Roundabout History

WGM Group prepared the “Madison/ Arthur Roundabout Feasibility Analysis” dated 1999 for the University of Montana Facilities Services, Missoula, Montana. This document provided a “general review of the feasibility of locating modern roundabouts at the intersection of Madison Street and Arthur Avenue with 5th Street and 6th Street.”¹

Eight years ago, WGM Group had the engineering insight to recommend that a single lane roundabout may not have sufficient capacity for future traffic volumes in the area. Their recommendation included “a roundabout with a minimum 140 foot inscribed diameter with lane designations as a single lane roundabout. This diameter is large enough to be converted to a two lane roundabout if future traffic volumes warrant additional lanes.”

The document was prepared as a broad evaluation of roundabouts and did offer two conceptual plans illustrating potential roundabout installations at the intersections of Madison Street and Arthur Avenue with 5th Street and 6th Street. However, the document was prepared prior to “Roundabouts: An Informational Guide (RIG)” FHWA-RD-00-67, a Federal Highway Administration publication released in June 2000², which provides specific details regarding roundabout capacity and geometric design.

CDM prepared Activity 112 Revised Preliminary Traffic, a comprehensive traffic study for the Arthur Avenue Reconstruction Project in Missoula (CN 4611) dated January 30, 2004³. This document included a Preferred Alternative Selection Process, which incorporated an overview of roundabout alternatives at the study locations. Based on capacity analysis and right-of-way constraints, roundabouts were not selected as the preferred alternative for the intersections of Arthur Avenue at 6th Street and Arthur Avenue at 5th Street. Instead, a state-of-the-art coordinated and closed-loop traffic signal system was proposed for the two intersections. This traffic signal system would include adjustable phasing and timing to accommodate large fluctuations in traffic during special events at the University.

In 2005, the Missoula Institute for Sustainable Transportation (MIST) developed a “Citizen Plan for Arthur/5th/6th” that called for a single-lane roundabout at both intersections of Madison Street and Arthur Avenue at 5th Street and 6th Street. The Citizen Plan calls for single lane roundabouts at each intersection with an inscribed diameter of 98 feet.

The following documentation illustrates in detail, the general characteristics associated with roundabouts per the RIG (capacity, geometry, non-motorized users), the expected impacts associated with a roundabout (both single lane and double lane)

¹ WGM Group, March 8, 1999. Madison/Arthur Roundabout Feasibility Analysis. University of Montana Facilities Services Missoula, Montana.

² Roundabouts: An Informational Guide, FHWA-RD-00-67, Washington D.C., June 2000

³ Activity 112 Revised Preliminary Traffic, CDM, Helena, MT, January 2004.

at these two intersections designed per the RIG, as well as a comparison between the roundabout alternatives and the preferred alternative selected in the Activity 112 Revised Traffic Study.

2.4.2 Roundabout Evaluation Methodology

2.4.2.1 Geometric Guidelines

2.4.2.1.1 Inscribed Diameter

According to the RIG, the inscribed diameter is the “basic parameter used to define the size of a roundabout. It is measured between the outer edges of the circulatory roadway.” While there are six categories of roundabouts, there are three categories of interest for the Arthur Avenue Reconstruction Project with corresponding inscribed diameters as follows:

- Urban Compact 80-100ft (98-foot inscribed diameter illustrated by MIST).
- Urban Single Lane 100-130ft (somewhat consistent with WGM Group recommendation of 140 foot inscribed diameter).
- Urban Double Lane 150-180ft (somewhat consistent with WGM Group recommendation of 140 foot inscribed diameter).

In addition to inscribed diameter dimensions, a roundabout’s circular path should be designed to accommodate the classification of traffic that will be using the roundabout. In other words, the roundabout’s geometry should be based on an appropriate design vehicle. While compact roundabouts may be designed to accommodate passenger cars, buses and emergency vehicles in a local neighborhood, a roundabout designed for a major route must be able to accommodate larger vehicles, such as tractor-trailers.

2.4.2.1.2 Truck Accommodation

Highway 12 is a state numbered route and one of the major truck routes through Missoula. Therefore, any improvements provided along Highway 12 must accommodate WB-20m (WB-67) in accordance with MDOT standards.

According to RIG (page 146) Exhibit 6-19, an urban single lane WB-50 design vehicle warrants a 100-130 foot inscribed circle with typical entry widths of 14 to 16 feet. In order to accommodate a WB-67, the inscribed circle would have to be even larger. Furthermore, while a truck apron can be provided to help accommodate larger vehicles, a completely mountable center island is not recommended. This would defeat the purpose of the circulating roadway and is not applicable for a state numbered route with high volume.

2.4.2.2 Capacity Analysis

Capacity analysis at a roundabout is typically evaluated as the volume to capacity ratio. This is an indication of how many vehicles a roundabout can process, given the geometry (single lane or double lane). In general, according to RIG, an urban compact

roundabout can process 15,000 vehicles per day (vpd), while a single lane roundabout can process 20,000 vpd.

Translated to hourly volumes, based on Exhibit 4-6 in RIG, a single lane roundabout can accommodate approximately 1,200 vehicles per hour (veh/h) entering and a circulating flow of 1,800 veh/h. Circulating flow is the vehicle flow rate in all lanes of the roundabout in front of a roundabout entry lane. [“Exiting vehicles exceeding 1,200 veh/h may indicate a need for a double lane roundabout.”] A double lane roundabout can accommodate slightly less than 2,500 veh/h entering flow and 3,000 veh/h circulating flow.

Capacity analysis is typically performed on roundabouts using a nationally accepted software package. A software package recognized by RIG as an appropriate methodology – aaSidra – has been used to analyze roundabout capacity for this project. The Site Specific evaluation below illustrates the results of the capacity analysis performed on the proposed roundabout alternatives.

2.4.2.3 Non-motorized Users

In addition to vehicular accommodation, intersection improvements must accommodate non-motorized modes of transportation. Given the close proximity of the intersections to the University, accommodation of bicyclists and pedestrians is paramount.

2.4.2.3.1 Pedestrians

Pedestrian accommodation at a single lane roundabout is typically provided along each leg of the roundabout. If splitter islands are provided, a pedestrian refuge area should be a minimum width of 6 feet to accommodate persons pushing a stroller or walking a bicycle. However, increasing the width of the splitter islands generally requires increasing the inscribed circle diameter.

According to RIG, the risk of being involved in a severe collision is lower at [single lane] roundabouts than other forms of intersections, due to the slower vehicle speeds. Likewise, the number of conflict points for pedestrians is lower at roundabouts than at other intersections, which can lower the frequency of collisions. These facts are dependent on the location of the pedestrian crossing, which is critical. The RIG recommends that crosswalks be located approximately one car length away from the circulating roadway to avoid vehicles queued across the crosswalk. However, for a double lane roundabout, “the pedestrian crossing should be located one, two or three car lengths away from the yield line.”

At double lane roundabouts, pedestrians face the dilemma of attempting to cross two approach lanes (or two exit lanes) at the same time without pedestrian refuge between each lane. Pedestrians end up trapped in a double-hazard zone, whereby a vehicle in the first lane may yield to a pedestrian, but the vehicle in the second lane may not, leading to a potentially severe collision. Unlike a signalized intersection, where the vehicles are controlled by traffic signal indications such that a pedestrian may cross an entire street, a double lane roundabout does not provide a “pedestrian walk time.”

2.4.2.3.2 *Bicyclists*

In Missoula, bicycle accommodation through intersections is vital.

Bicycle accommodation at a single lane roundabout typically takes three forms. First, the bicyclist acts as a motor vehicle and joins the traffic stream. Second, the bicyclist can dismount the bicycle and act as a pedestrian, crossing the crosswalks. And third, if provided, the bicyclist could join a shared path to traverse the roundabout and then return to a dedicated bicycle lane. While these options function well at a single lane roundabout, a double lane roundabout presents the same hazards to bicyclists as they do to pedestrians.

According to RIG, at double lane roundabouts, bicyclists are less visible and therefore more vulnerable to the merging and exiting conflicts that happen at double lane roundabouts (page 110). Per a British study quoted in RIG (Exhibit 5-17) bicyclists "... fare worse in terms of crashes at roundabouts than at signalized intersections."

A signalized intersection, with today's technology, can not only include a dedicated bicycle lane along the roadway, but can also include bicycle sensitive loop detectors, to activate the traffic signal for the bicyclist.

Pedestrians, bicyclists, and motor vehicles use the intersections on a daily basis. However, during special events at the University, the number of vehicles and pedestrians increases exponentially. Therefore, it is critical that the intersection improvement alternatives be capable of accommodating the influx of traffic during special events.

2.4.2.4 **Special Events**

WGM Group prepared a "Special Events Transportation Study" dated March 5, 1998 for the University of Montana Facilities Services Missoula, Montana⁴. This document identified that the University of Montana is:

"a major center for entertainment and cultural events in Western Montana. Events are held each week of the school year, including athletic contests, concerts, theater productions, and lecture series. University events bring thousands of visitors to Missoula each year. Missoula derives a great deal of economic benefit from the events. Parking and transportation to and from events are critical issues in serving as an excellent host to visitors."

The roadways and intersections providing access to the University for these Special Events must be capable of handling the tremendous influx of motor vehicles and pedestrians that occur prior to the event as well as the mass exodus at the completion of the event. According to the WGM study, "easy and convenient access to events affects attendance. In addition, patrons that arrive early can generate increased revenue from concessions and souvenirs."

⁴ Special Events Transportation Study, WGM Group, Missoula, MT March 5, 1998.

Events at the University range from weekend football games to outdoor concerts, Field House events (basketball games) and even the Home and Garden Show. While many of these events occur at different times of the year, there are still some events that overlap. Therefore, the overall intersection operation should be flexible, such that an infiltration of traffic on one approach can be accommodated at certain times throughout the year. Roundabouts pose a potential “grid-lock” during special events when U.S. Highway 12 traffic is introduced from the south or west sides. This grid-lock condition may occur because roundabouts provide equal vehicular right-of-way under any condition for all approaches. Traffic signals can be controlled to limit one or more movements when an approach reaches capacity or grid-lock. This is an advantage of conventional signals over roundabouts when it comes to controlling special events such as University football games.

According to the WGM study:

“special traffic handling procedures are used after football games and near capacity basketball games to facilitate the movement of traffic. These operations have been tested and refined over many years and appear to move traffic very efficiently. The phasing of the traffic signals in the University area based on typical daily traffic operations that are directly opposite of special event traffic characteristics.”

The City of Missoula has upgraded the traffic signals surrounding the University to provide closed-loop or centralized communications and programming capabilities to accommodate these special traffic handling procedures. Therefore, traffic signal phasing and timing for a special event can be programmed into the main controller with specific dates and times. Providing this type of equipment at the intersections of Arthur Avenue at 5th Street and 6th Street would integrate these intersections into the City’s system and allow for specific timing and phasing handling an influx of traffic to the University as well as an exodus of traffic leaving the University once the event is completed.

While one may consider providing traffic signals at a roundabout as a hybrid solution the RIG states “roundabouts should never be planned for metering or signalization.” Installing traffic signals at a roundabout defeats the purpose of installing a roundabout.

2.4.3 A Comparison Between Traffic Signals and Roundabouts

2.4.3.1 Capacity

Traffic signals offer the distinct advantage of providing increased capacity for a particular approach based on demand. This is especially critical during special events at the University, as a traffic signal can increase capacity (to a certain extent) using its own traffic demand logic and/or via pre-programmed phasing/timing plans established for event days.

In fact, the WGM study prepared in 1999 indicated that “Inappropriate Sites” for Roundabouts include:

- Where a satisfactory geometric design cannot be provided.
- Where a signal interconnect system would provide a better level of service.
- Where it is desirable to be able to modify traffic via signal timings.
- Where peak period reversible lanes may be employed.
- Where the roundabout is close to existing signals and queuing from the signal could be a problem.”

The locations along Arthur Avenue under consideration for a proposed roundabout meet the first three criteria listed above as being inappropriate sites for a roundabout. As illustrated in the following figures (Fig. 2-1 and Fig. 2-2) the geometric configuration of the skewed approach from the Madison Street Bridge does not lend itself to the efficient operation of a roundabout. Furthermore, the level of service of a roundabout, compared to that of a signal interconnects system, provides a less efficient operating intersection from a level of service standpoint. And as previously mentioned, modifications to traffic signal timing will be critical to handling of traffic during special events.

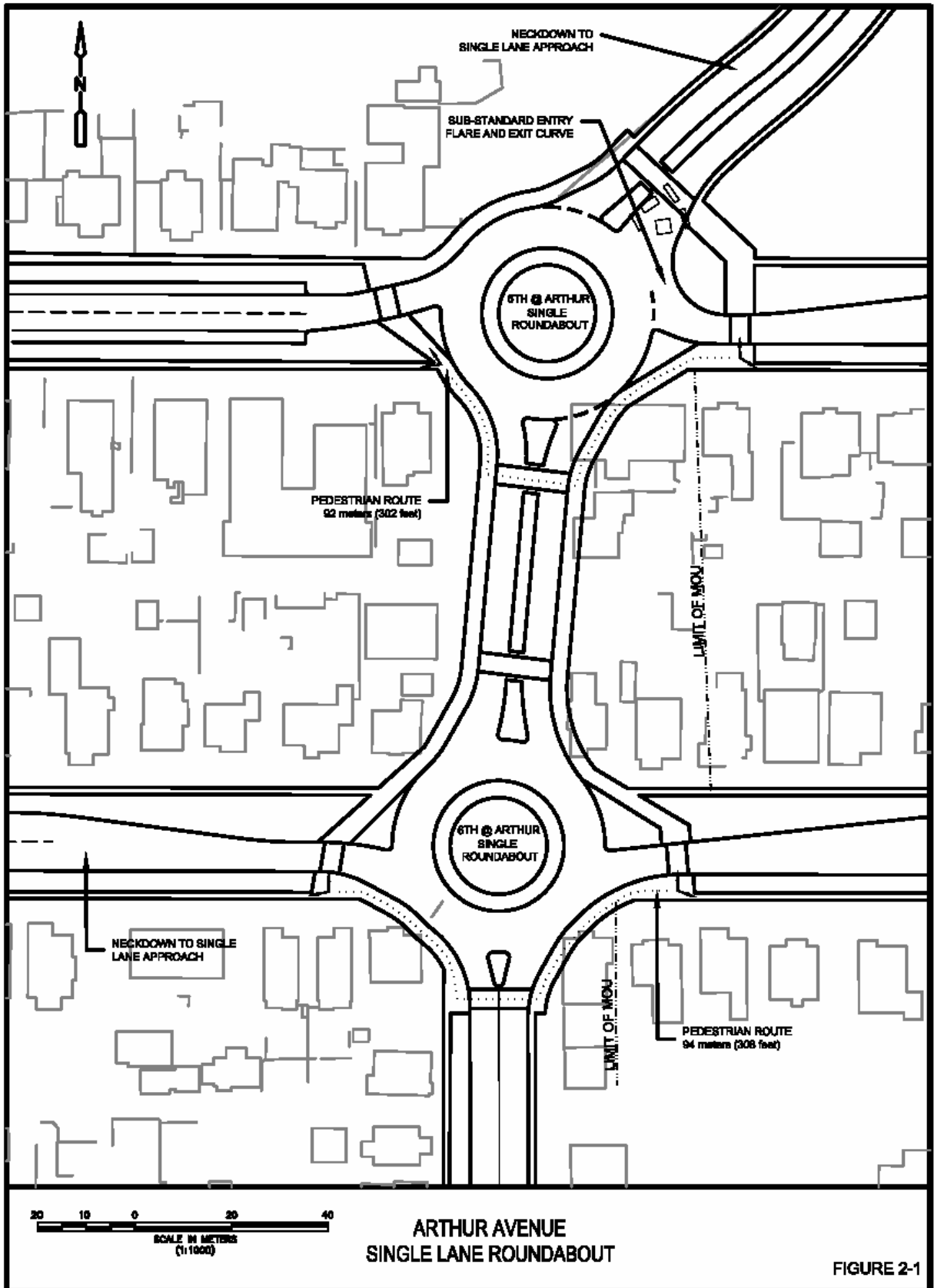
For a site specific evaluation of the locations considered for roundabouts please refer to Section 2.4.4 of this document.

2.4.3.2 Power and Maintenance

All traffic signal installations require power and maintenance. New technologies, including the use of Light Emitting Diodes (LED) have reduced the costs of operating traffic signals significantly. According to the RIG, “for general purposes, an annual cost of \$3,000 for providing power to a signalized intersection is a reasonable approximation.”

A roundabout, whether single lane or double lane, requires power and maintenance as well. According to RIG:

Roundabouts typically have a slightly higher illumination power and maintenance costs compared to signalized or sign-controlled intersections due to a larger number of illumination poles. Roundabouts have slightly higher signing and pavement marking maintenance costs due to a higher number of signs and pavement markings.



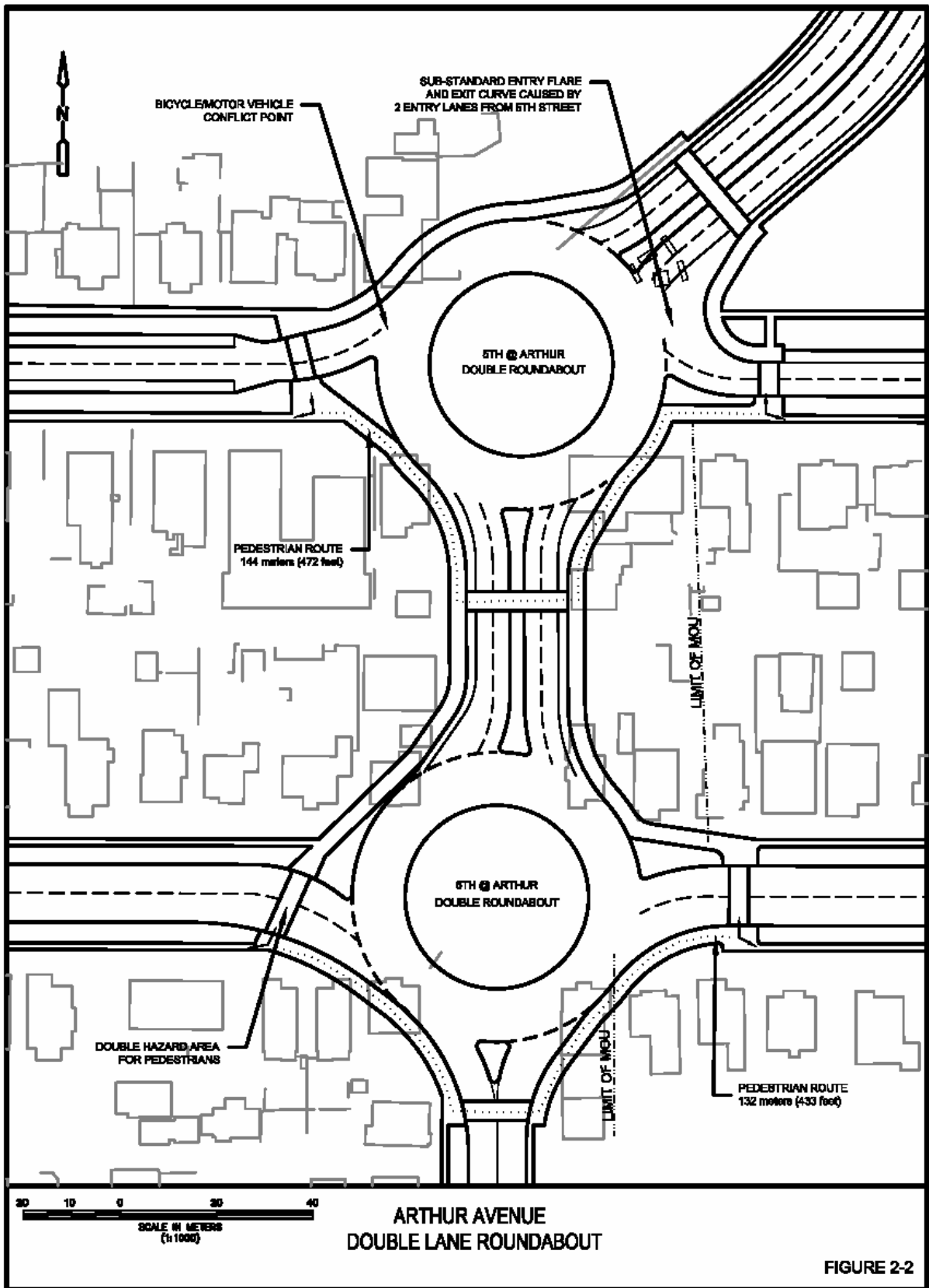


FIGURE 2-2

A recent article in the ISMA Journal⁵ indicates that “Lighting should be provided for all roundabouts. The geometry of a roundabout makes headlamps ineffective in the detection of people or objects in the vehicle’s path.” The committee that authored the article is considering a recommendation that “a roundabout may have continuous lighting on the approach roads. This lighting will help a driver adapt to the roundabout lighting. Where there is no lighting on the approach roads lighting should be added on the approach roads for a distance of approximately 80m from the start of the roundabout.” The RIG recommends that all roundabouts be illuminated. The existing lighting structures surrounding the intersections along Arthur Avenue are insufficient for a roundabout installation and would require additional poles.

Roadway maintenance presents a unique challenge at a roundabout, especially a single lane roundabout. The circulatory flow of a roundabout can be seriously hindered by roadway maintenance, especially if one segment of the entire circulating area must be closed for roadway maintenance. Yet the paved area of a standard signalized intersection can usually accommodate traffic flow even with one lane closed to traffic.

Special procedures are also required to accommodate snow removal in a roundabout.

2.4.3.3 Collisions

Numerous studies have shown that single lane roundabouts can help alleviate the occurrence of cross-movement or angle collisions at an intersection. Properly timed traffic signals, with protected turn phases, can also help alleviate the occurrence of cross-movement or angle collisions at an intersection.

However, according to RIG, “due to the presence of additional entry lanes and the accompanying need to provide wider circulatory and exit roadways, double lane roundabouts introduce additional conflicts not present in single lane roundabouts.”

In addition, “the proportion of single-vehicle crashes at roundabouts is high compared to other intersection types because of an increased amount of side friction – because of the relatively high number of out-of-control vehicles, it is desirable to have adequate amounts of clear zone where there are no roadside hazards on each side of the roadway. “

2.4.3.4 Traffic Management During Construction

According to RIG “It is highly desirable to detour traffic for construction of a roundabout” because an unfinished layout means traffic priority may not be obvious. On the contrary, existing traffic signal controls can be maintained or temporary traffic signal controls installed while the permanent installation is being constructed with less disruption to traffic.

⁵ IMSA Journal, “Roundabout Lighting” Ananthanarayanan and Lutkevich, September 2005.

2.4.4 Site Specific Evaluation

2.4.4.1 Arthur Avenue at 6th Street

2.4.4.1.1 Capacity Analysis results

2.4.4.1.1.1 Single Lane Analysis

Based on 2002 traffic data, at the intersection of Arthur Avenue at 6th Street, the volume of traffic that would hypothetically enter the roundabout are approximately 1,354 veh/h and 1,804 veh/h during the morning and evening peak hours, respectively. This exceeds the recommendations of RIG, which mention that a single lane roundabout can typically process 1,200veh/h.

A roundabout is considered an “equal opportunity” intersection improvement, which does not allow priority to be given to any one approach. Thus roundabouts tend to work well at intersections where the approach volumes are balanced. However, at the intersection of Arthur Avenue at 6th Street, the volume of traffic approaching the intersection along 6th Street eastbound and Arthur Avenue southbound is close to 60 percent higher than the approaching volume along Arthur Avenue northbound during the evening peak hour. During the morning peak hour, the Arthur Avenue southbound approach is three times higher than the volume along the Arthur Avenue northbound approach.

Therefore, based on traffic volumes alone, a single lane roundabout is not an appropriate intersection improvement alternative at the intersection of Arthur Avenue at 6th Street. While a double lane roundabout would be able to provide the required capacity, a double lane roundabout has impacts associated with right-of-way and non-motorized users as illustrated below.

2.4.4.1.1.2 Double Lane Analysis

According to RIG the volume of traffic that can typically be handled by a double lane roundabout is 2500 veh/h. According to this data, a double-lane roundabout would be capable of handling the expected traffic volumes at the intersection of Arthur Avenue at 6th Street. The intersection was evaluated using aaSIDRA and the results of the analysis suggest that a double lane roundabout has adequate capacity to handle 2002 peak morning (1471 veh/h) and evening (1961 veh/h) traffic. The results of the model using 2012 estimated traffic volumes were an undesirable level of service (D) at the evening (2174 veh/h) peak hour.

2.4.4.1.2 Geometric Impacts

2.4.4.1.2.1 Single Lane Roundabout

While it is known that a single lane roundabout will not be able to process the traffic volumes at the intersection of Arthur Avenue at 6th Street, a single lane roundabout has been designed to illustrate the expected impacts. As illustrated in Figure 2-1, the roundabout has an inscribed diameter of 44 meters (144 feet). While this is slightly higher than the typical inscribed diameter for a single lane roundabout as illustrated in the RIG, this diameter is required to accommodate WB-67 vehicles with a truck apron along the center island.

This roundabout design will result in additional right-of-way requirements on the west side of Arthur Avenue, including the demolition of one home on the west side of Arthur Avenue that is not included in the MOU, and three homes on the east side of Arthur Avenue

2.4.4.1.2.2 Double Lane Roundabout

Since a single lane roundabout cannot process the traffic volumes at the intersection of Arthur Avenue at 6th Street, a double lane roundabout has been designed for the intersection and is illustrated in Figure 2-2. The double lane roundabout has an inscribed diameter of 60 meters (197 feet) and the inner circle diameter is 36 meters (118 feet). While this is slightly larger than that typically implemented for double lane roundabouts per the RIG, this roundabout design can accommodate WB-67 vehicles circulating next to a passenger vehicle.

This roundabout design will result in additional right-of-way requirements on the west side of Arthur Avenue, including the demolition of at least four homes that are not part of the MOU. Right-of-way requirements on east side of Arthur Avenue would also include the demolition of at least four homes.

2.4.4.1.2.3 Non-Motorized Users

The pedestrian crossings for the single lane roundabout have been located approximately one vehicle length back from the roundabout yield line (entry point) as recommended by the RIG. As illustrated in Figure 2.1, the pedestrian crossing distance for pedestrians traveling along the south side of 6th Street is measured at 94 meters (308 feet). This is almost three times longer than the pedestrian walking distance for the preferred alternative. Given the location of the crosswalk along Arthur Avenue, it is likely that pedestrians may risk entering the roundabout area at an unmarked location to shorten their walking distance, a scenario that could lead to a potentially severe collision.

Pedestrian crossings for the double lane roundabout have been located two vehicle lengths back from the roundabout entry lane in accordance with the recommendations of RIG. As illustrated in Figure 2.2, the pedestrian crossing distance for pedestrians traveling along the south side of 6th Street is measured at 132 meters (433 feet). Given the location of the crosswalk along Arthur Avenue, it is highly likely that pedestrians will risk entering the roundabout area at an unmarked location to shorten their walking distance, a scenario that could lead to a potentially severe collision.

2.4.5 Site Specific Evaluation

2.4.5.1 Arthur Avenue at 5th Street

2.4.5.1.1 Capacity Analysis results

2.4.5.1.1.1 Single Lane Analysis

At the intersection of Arthur Avenue at 5th Street, based on 2002 traffic figures the volume of traffic that would hypothetically enter the roundabout would be 1,033 vehicles entering per hour (veh/h) and 1,899 veh/h during the morning and evening

peak hours, respectively. This exceeds the recommendations of RIG during the evening peak hour, which mentions that a single lane roundabout typically processes 1,200 veh/h. Furthermore, the volumes illustrated above do not include the Madison Street southbound right-turns. Including these volumes in the proposed roundabout would result in 1,494 veh/h and 2,360 veh/h entering the roundabout during the morning and evening peak hours, respectively.

Again, roundabouts tend to work well at intersections where the approach volumes are balanced. However, at the intersection of Arthur Avenue at 5th Street, the volume of traffic approaching the intersection along Madison Street southbound is almost twice as high as the volume approaching along Arthur Avenue northbound and 13 times higher than the volume approaching along 5th Street during the morning peak hour. During the evening peak hour, the volume of traffic approaching along Arthur Avenue northbound is 60 percent higher than the volume approaching along Madison Street southbound and 200 percent times higher than the volume approaching on 5th Street west. These calculations do not include the Madison Street southbound right-turns.

Therefore, based on traffic volumes alone, a single lane roundabout is not an appropriate intersection improvement alternative at the intersection of Arthur Avenue at 5th Street. While a double lane roundabout would be able to provide the required capacity, a double lane roundabout has impacts associated with right-of-way and non-motorized users as illustrated in the next section.

2.4.5.1.1.2 Double Lane Analysis

According to the data illustrated in RIG, a double lane roundabout would be capable of handling the expected traffic volumes at the intersection of Arthur Avenue at 5th Street. The intersection was evaluated using aaSIDRA and the results of the analysis suggest that a double lane roundabout has adequate capacity to handle 2002 peak morning and evening traffic. The results of the model using 2012 estimated traffic volumes were an unacceptable level of service (E) at the evening peak hour.

2.4.5.1.2 Geometric Impacts

While it is known that a single lane roundabout will not be able to process the traffic volumes at the intersection of Arthur Avenue at 5th Street, a single lane roundabout has been designed to illustrate the expected impacts. As illustrated in Figure 2-1, the roundabout has an inscribed diameter of 44 meters (144 feet). While this is slightly higher than the typical inscribed diameter for a single lane roundabout as illustrated in the RIG, this diameter is required to accommodate WB-67 vehicles with a truck apron along the center island.

The approach lanes for the single lane roundabout, specifically the Madison Street bridge southbound approach and the Arthur Avenue northbound approach, will need to be reduced to a single lane to enter the roundabout in order to achieve the proper deflection angles. The neck down to a single lane may have a “bottleneck” effect and cause back-ups to the upstream intersections. The geometric constraints of

the bridge make the 5th Street westbound approach practically a free-flowing movement.

As outlined earlier in this section, the right-of-way requirements for a single lane roundabout design will require additional take on the west side of Arthur Avenue as well as the anticipated right-of-way requirements on the east side of Arthur Avenue

2.4.5.1.2.1 Double Lane Roundabout

Since a single lane roundabout cannot process the traffic volumes at the intersection of Arthur Avenue at 5th Street, a double lane roundabout has been designed for the intersection and is illustrated in Figure 2-2. The double lane roundabout has an inscribed diameter of 60 meters (197 feet) and the inner circle diameter is 36 meters (118 feet). While this is slightly larger than that typically implemented for double lane roundabouts per the RIG, this roundabout design can accommodate circulating WB-67 vehicles next to a passenger vehicle.

As outlined earlier in the section, the right-of-way requirements for a double lane roundabout result in significantly more acquisition than was anticipated for this project and additional impacts to the historic district including demolition of at least four homes on the west side of Arthur Avenue

2.4.5.1.2.2 Non-Motorized Users

The pedestrian crossings for the single lane roundabout have been located approximately one vehicle length back from the roundabout yield line (entry point) as recommended by the RIG. As illustrated in Figure 2-1, the pedestrian crossing distance for pedestrians traveling along the south side of 5th Street is measured at 92 meters (302 feet). This is almost twice as long as the pedestrian walking distance for the preferred alternative. Given the location of the crosswalk along Arthur Avenue, it is likely that pedestrians may risk entering the roundabout area at an unmarked location to shorten their walking distance, a scenario that could lead to a potentially severe collision.

As illustrated in Figure 2-2, pedestrian crossing areas have been located two vehicle lengths back from the double lane roundabout entry lane in accordance with the recommendations of RIG. The pedestrian crossing distance for pedestrians traveling along the south side of 5th Street is measured at 144 meters (472 feet). This is almost 3 times longer than the pedestrian walking distance for the preferred alternative. Given the location of the crosswalk along Arthur Avenue, it is highly likely that pedestrians will risk entering the roundabout area at an unmarked location to shorten their walking distance, a scenario that could lead to a potentially severe collision.

2.4.6 Maurice Avenue at 6th Street

Maurice Avenue at 6th Street, at the University access, provides an ideal location for a roundabout for a “gateway” entrance. However, there is simply not enough right-of-way to provide a single or double lane roundabout at this location.

2.4.7 Maurice Avenue at 5th Street

Maurice Avenue at 5th Street is another possible “gateway” location for the University. While the morning and evening peak hour entering flows are under the threshold for a single lane roundabout, the approach volumes are heavily unbalanced, with almost 10 times as many vehicles approaching the intersection from 5th Street westbound as entering from Maurice Avenue northbound. As with the other locations, the right of way is insufficient for a single or double roundabout.

2.4.8 Refined Conceptual Alternative

Roundabouts have proven to not be a feasible alternative for the Arthur Avenue project and are thus not included in analysis of the preferred alternative. The alternative developed during the conceptual phase of this project includes reconstruction from Arthur Avenue from 6th to 5th Street, reconstruction of the intersections, and realignment of U.S. Highway 12. This was discussed by MDT in association with the City and the University as the refined conceptual alternative for presentation to the public at a community open house and public meeting. Community comment was taken and incorporated into the production of the Preferred Alternative. Section 2.5 through 2.11 describes the preferred alternative.

2.5 Preferred Alternative

The preferred alternative for the Arthur Avenue Reconstruction Project is presented with two possible options in Figures 2-3 and 2-4. The preferred alternative is recommended for advancement into the design and construction process. The methodologies for selecting this design are discussed below. More information on the Preferred Alternative can be found in the revised preliminary traffic report for the Arthur Avenue Project, entitled “Activity 112 – Revised Preliminary Traffic Report.”

2.6 Operational Goals - Preferred Alternative

MDT has established a certain operational goal for the project, which is to reconstruct Arthur Avenue, Maurice Avenue, 5th Street, and 6th Street without added capacity. The following are additional operation goals of the project:

- Reconstruction without added capacity – Design would look at current capacity and LOS during standard operation and compare it to adjacent intersections to determine if there are significant impacts or stress added to the existing transportation system as a result of the proposed project.
- The system would function under Special Events flows but design would not be based on Special Event capacity and LOS.
- The system should function with safe access for pedestrians and bikes.
- Special Events conditions would be closely coordinated with the University.

- Current (2002) conditions would be used as design characteristics, i.e. capacity and LOS.
- 10-year and 20-year growth would be evaluated for project functionality.
- Other goals listed in Section 1.2.

2.7 Proposed Improvements - Preferred Alternative

The proposed alternative for design has been discussed with MDT, the City, and University and was accepted as the preferred alternative because it best meets all of the needs for the project.

2.7.1 Elements of the Preferred Alternative

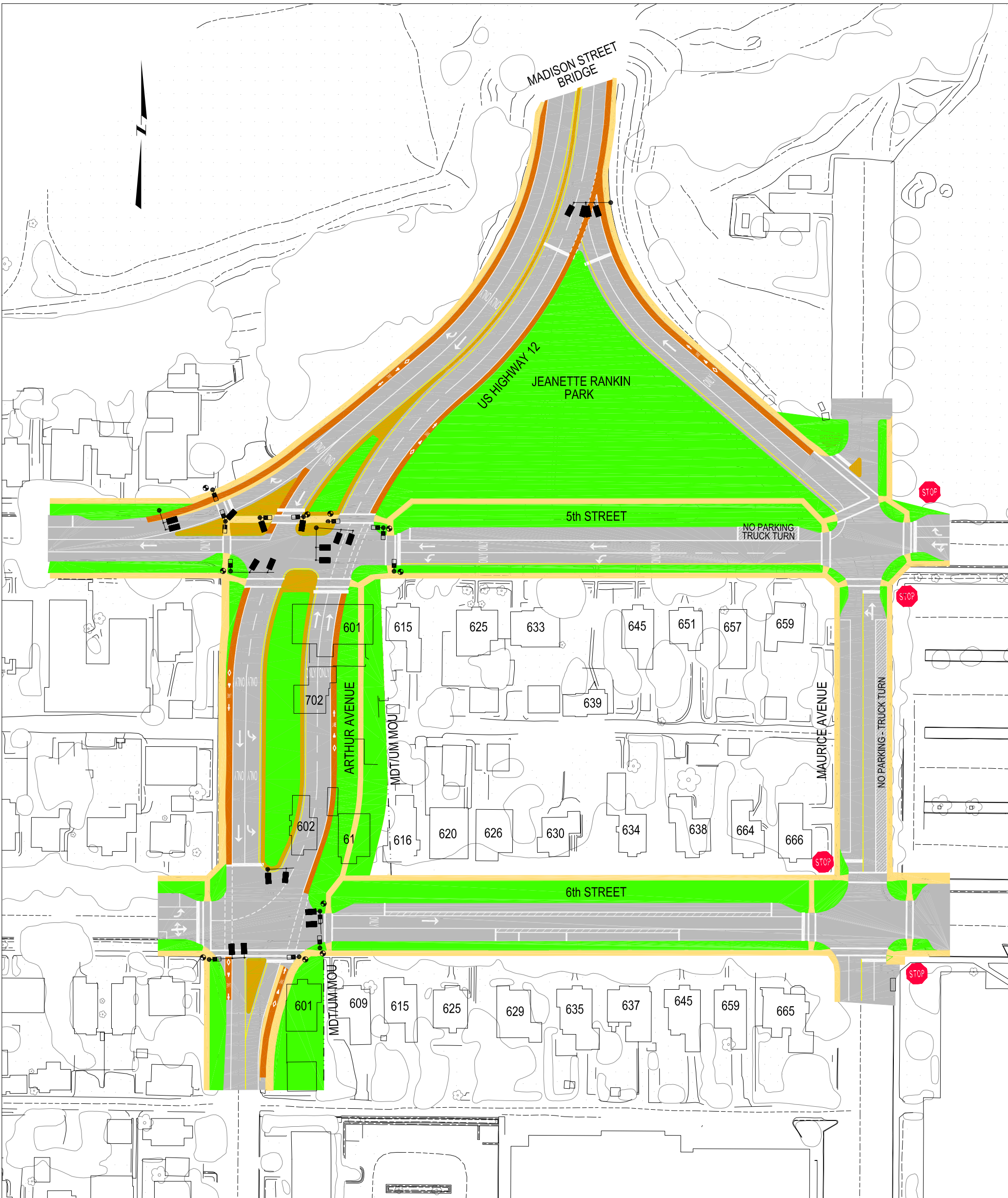
Elements of the preferred alternative are as follows:

- Cross-sectional elements of the Preferred Alternative include, but are not limited to, traffic lanes, parking lanes, bike lanes, shoulders, medians, sidewalks, and vegetated boulevards.
- Intersection treatments including traffic control signals for vehicles, bicycles, and pedestrians.
- Safety and operational improvements including revised geometric conditions, intersection configurations, and multimodal (vehicles, bicycles, and pedestrian) considerations to address concerns with the existing conditions.
- Improved advanced signing for U.S. Highway 12 and the University to reduce driver confusion upon entering the area.
- Non-motorized facilities including pedestrian sidewalks built in conformance to current Americans with Disabilities Act (ADA) accessibility standards and bike lanes to accommodate the large number of non-motorized commuters.
- Additional infrastructure elements such as guardrails, curbs and gutters, and improved storm drainage system and streetscape lighting walls would also be added where necessary to improve safety.

Elements of the Preferred Alternative are shown in Figures 2-3 and 2-4.





2.7.2 Roadway, Sidewalk, and Bicycle Improvements - Preferred Alternative

All of the roadway and sidewalk improvements would meet the requirements of MDT's 2000 Road Design Manual and the ADA accessibility guidelines. Sections 2.7.2.1 through 2.7.3.5 show the approximate preliminary dimensions and configurations of the preferred alternative.



LEGEND

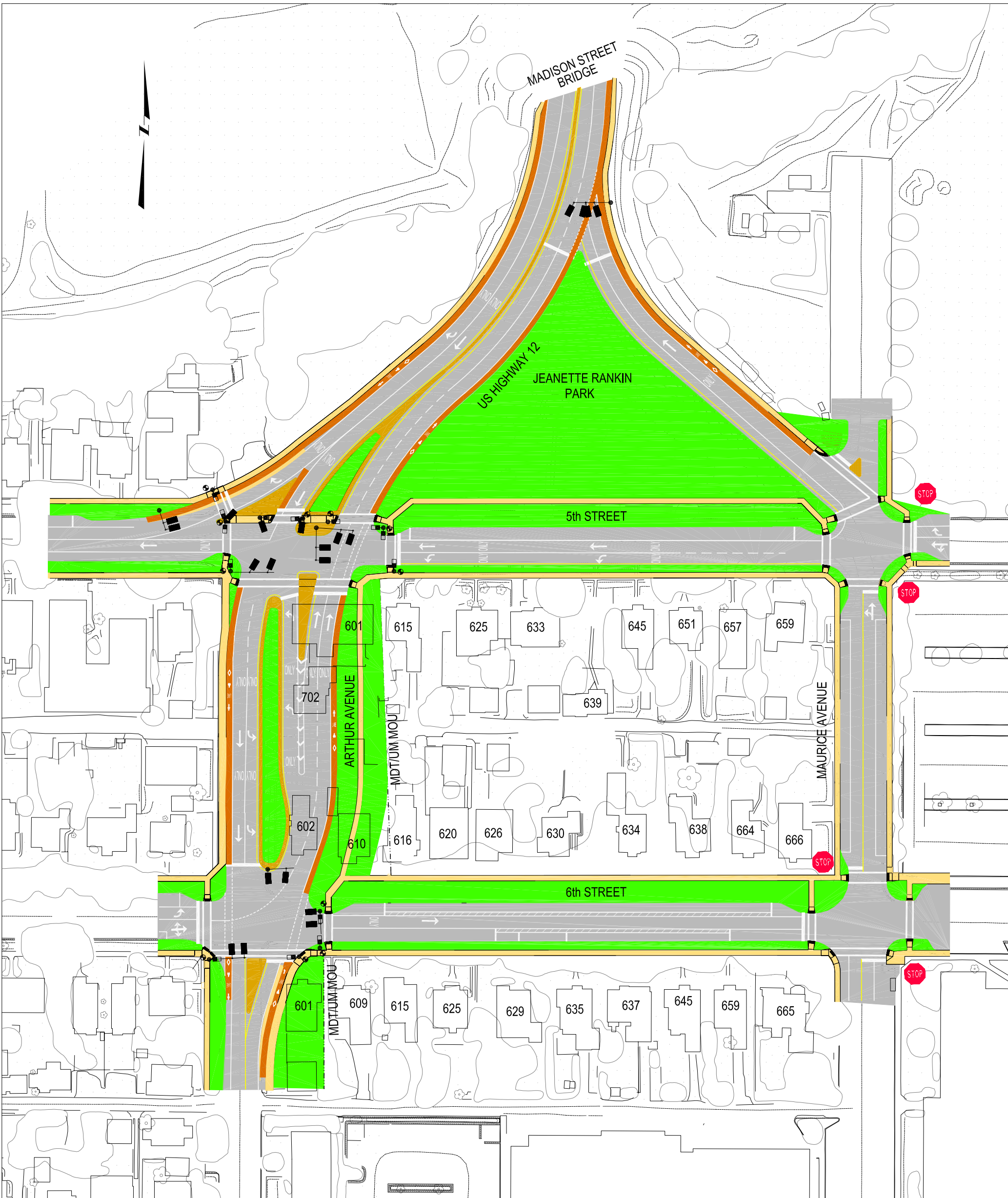
-  PROPOSED GRASS/LANDSCAPE AREA
-  PROPOSED PAVEMENT
-  PROPOSED CONCRETE AREA
-  PROPOSED SIDEWALK
-  PROPOSED BICYCLE LANE

-  PROPOSED PEDESTRIAN PUSH BUTTON
-  PROPOSED PEDESTRIAN SIGNAL
-  PROPOSED TRAFFIC SIGNAL
-  PROPOSED STOP

20 10 0 20 40
SCALE IN METERS
(1:500)

ARTHUR AVENUE
PREFERRED ALTERNATIVE
OPTION 1 (NO LEFT TURN LANE)

FIGURE 2-3



LEGEND

- PROPOSED GRASS/LANDSCAPE AREA
- PROPOSED PAVEMENT
- PROPOSED CONCRETE AREA
- PROPOSED SIDEWALK
- PROPOSED BICYCLE LANE

- PROPOSED PEDESTRIAN PUSH BUTTON
- PROPOSED PEDESTRIAN SIGNAL
- PROPOSED TRAFFIC SIGNAL

20 10 0 20 40
SCALE IN METERS
(1:500)

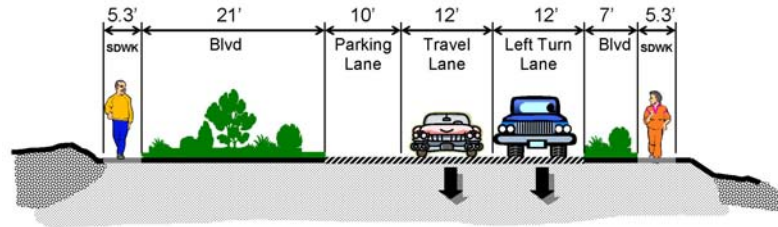
PROPOSED STOP

ARTHUR AVENUE
PREFERRED ALTERNATIVE
OPTION 2 (LEFT TURN LANE)

FIGURE 2-4

2.7.2.1 5th Street

5th Street east of Maurice Avenue would continue to serve two-lane westbound traffic with a lane reconfiguration to one left /through lane and one right turn only lane.



5th Street between Arthur Avenue & Maurice Avenue

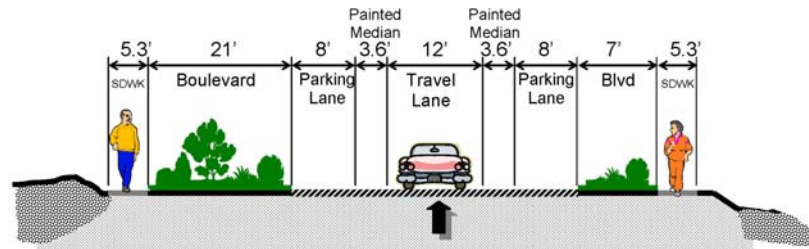
Between Arthur Avenue and Maurice Avenue, 5th Street would have two lanes, one exclusive through lane, and one left turn only lane. A parking lane on the north side of the travel lane and a sidewalk on either side would be separated by a boulevard.

On the west side of Arthur Avenue, 5th Street would have two travel lanes (westbound) with a parking lane on both sides and sidewalks separated by a boulevard. The combination of the two lanes would occur because of the one through lane of 5th Street westbound and the one lane entering from the Madison Street Bridge.

2.7.2.2 6th Street

Sixth Street west of Arthur Avenue would retain its two-travel lane and two parking lane configuration. The lane markings would be modified such that the northern lane is a left turn only lane and the southern lane would be a left, straight, right turn lane. Boulevards and sidewalks would be carried through to the intersection on the southern side of 6th Street.

Between Arthur Avenue and Maurice Avenue, 6th Street would consist of one travel lane eastbound with parking lanes on the north and south side. A



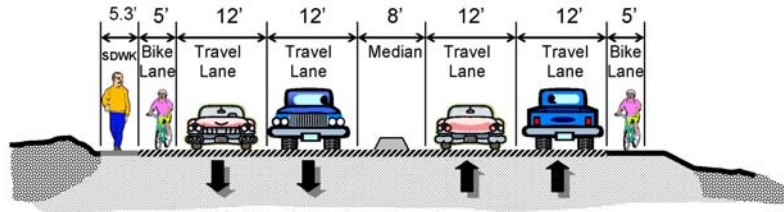
6th Street between Arthur Avenue & Maurice Avenue

printed median would separate the parking lanes from the travel lane. This median would allow for emergency access. Sidewalks would be set back from the curb by the existing boulevards. On the north side of this section of roadway the boulevard would be widened because of the removal of the second lane of traffic.

East of Maurice Avenue, 6th Street would enter the University as it currently does with two travel lanes angled parking on either side. Sidewalks would sit adjacent to the curb on both sides of the roadway.

2.7.2.3 Arthur Avenue

Arthur Avenue southbound would exit the Madison Street Bridge using the existing lane configuration of two travel lanes, a bike lane, and one sidewalk. The new configuration would retain the travel lanes and the bike path on the west side. A

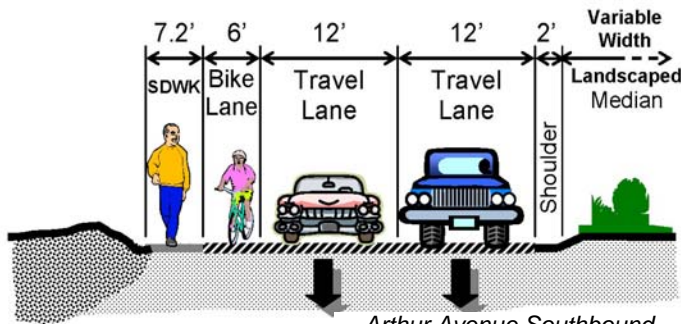


sidewalk would lie west of the bike path. A raised median would separate north and southbound traffic.

Arthur Avenue South of Madison Street Bridge

As Arthur Avenue southbound approaches the 5th Street intersection, the western lane, bicycle lane, and sidewalk peel off and connect tangentially with 5th Street. Between 5th Street and 6th Street, Arthur Avenue consists of two southbound travel lanes, one southbound bike lane on the west side, a shoulder on the east side between the turn lane and landscaped median, and a sidewalk on the west side. The travel lanes in this section are configured with the west lane for through traffic and the east lane as a left turn only.

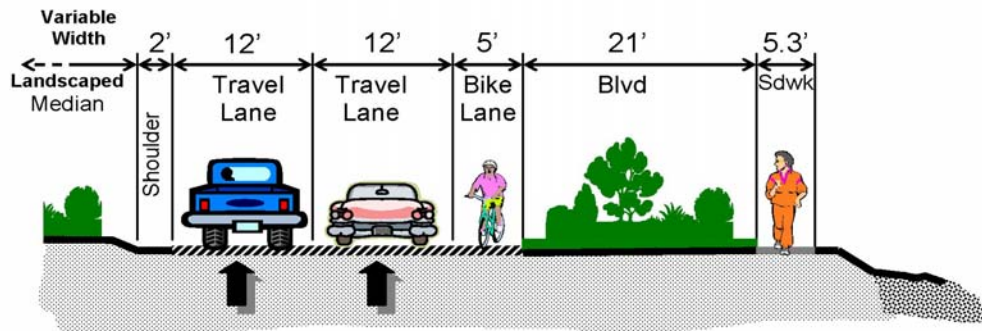
As Arthur Avenue southbound approaches the 5th Street intersection, the western lane, bicycle lane, and sidewalk peel off and connect tangentially with 5th Street.



South of 6th Street, Arthur Avenue northbound and southbound recombine into a two lane, two way roadway with a bicycle lane on the outside of the travel lanes and sidewalks on either side.

Arthur Avenue northbound (Option 1), illustrated in

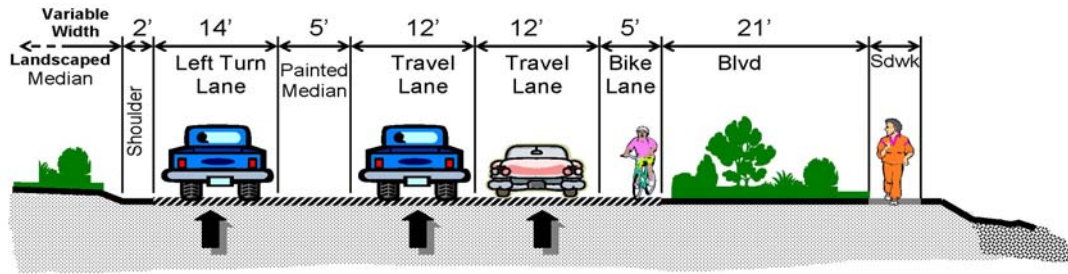
Figure 2-3, between 5th Street and 6th Street has two travel lanes for thru traffic northbound. This alternative (no left turn) would not allow access to 5th Street from Arthur Avenue. Rather, 5th Street westbound traffic would be diverted around the block. On the west side, a shoulder would separate the travel lane from a landscaped median. On the right side of the travel lane would be a bike lane and next to the bike lane would be a boulevard and a sidewalk. This option provides a pedestrian



Arthur Avenue Northbound (Option 1)

crossing distance of around 90 feet on the south side of 5th Street at Arthur Avenue.

Arthur Avenue northbound (Option 2), illustrated in Figure 2-4, between 5th Street and 6th Street has two travel lanes for thru traffic northbound and a left turn lane for 5th Street westbound traffic. This option also has a bike lane on the east side and a boulevard separating the street and sidewalk. A landscaped median lies on the east side of the street, separated from the travel lane by a shoulder. This option results in a pedestrian crossing distance of around 100 feet.

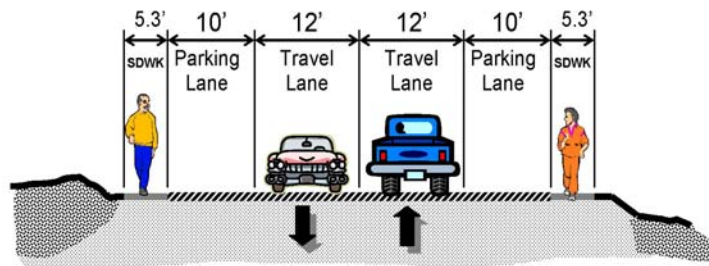


Arthur Avenue Northbound (Option 2)

For each option, between 5th Street and the Madison Street Bridge, Arthur Avenue would have two northbound travel lanes with a shoulder on the west side of the travel lanes, a bicycle lane on the east side of the travel lanes, and a sidewalk adjacent to the bicycle lane. This section would connect with the Arthur Avenue Southbound section and create the section shown previously for Arthur Avenue south of Madison Street Bridge.

2.7.2.4 Maurice Avenue

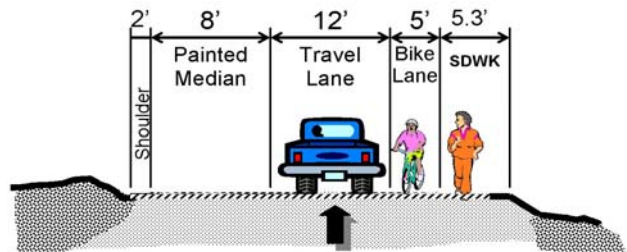
Maurice Avenue, south of 6th Street would consist of a two way, two lane roadway with travel lanes, parking lanes on either side of the travel lanes, and sidewalks adjacent to the parking lanes.



Maurice Ave. between 5th Street & 6th Street

Between 5th Street and 6th Street, Maurice Ave would consist of a two way, two lane roadway, parking lanes on either side of the travel lanes, and sidewalks adjacent to the parking lanes.

Between 5th Street and the Madison Street Bridge connection, Maurice Avenue would have two lanes for northbound traffic. Only the eastern lane would be marked. On the outside of the western lane would be a shoulder and the eastern lane



Maurice Avenue between 5th Street & Madison Street Bridge

would about a bicycle lane. A sidewalk would be placed behind the bicycle lane. This section would connect into the existing Madison Street Bridge configuration.

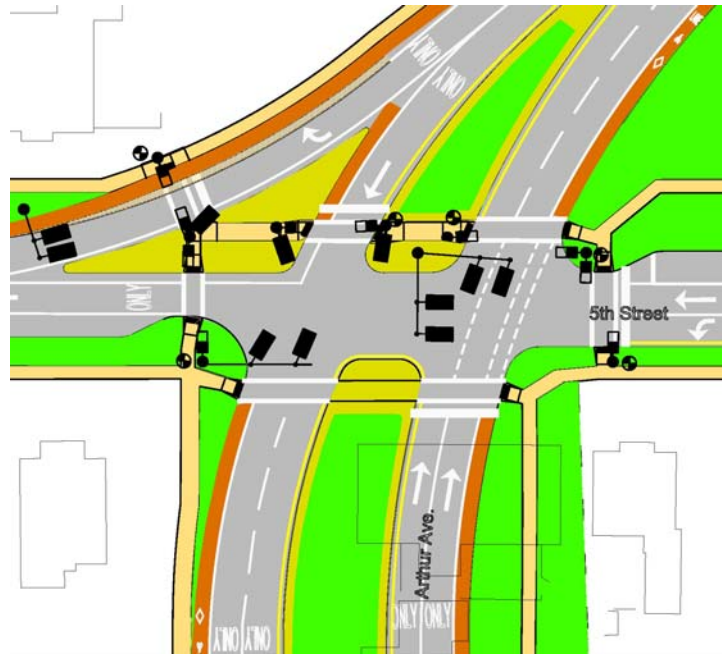
2.7.3 Intersection Improvements - Preferred Alternative

Under the proposed build conditions for Option 1, there would be three new traffic signal controlled intersections and two stop sign controlled intersections. All U.S. Highway 12 turning movements would be designed for a 67 foot (20.42 meter) wheel base tractor-trailer (WB-67). Additionally, under Option 1, turning movements for traffic wishing to head westbound on 5th and that is diverted around the block will also be designed for WB-67 tractor-trailer. This will have impacts on street parking illustrated in Figure 2-3.

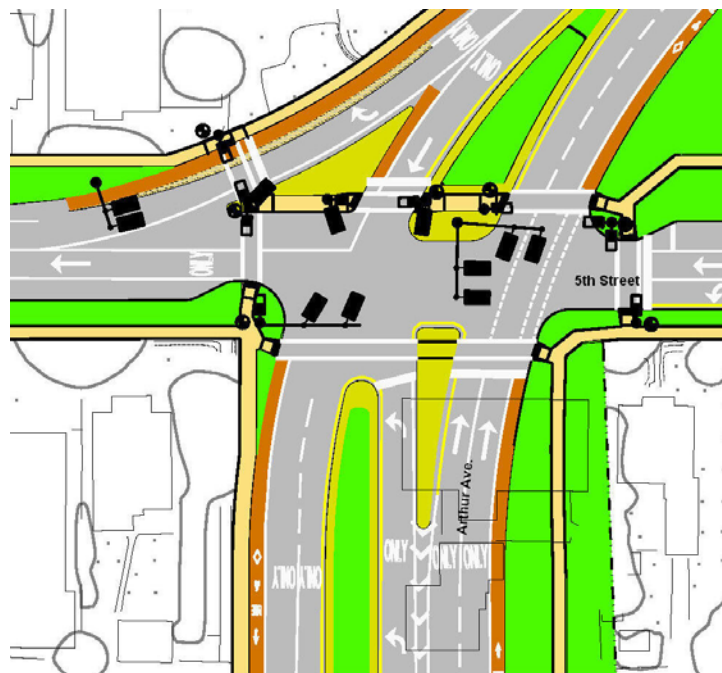
Under the proposed build condition for Option 2, there would also be three new traffic signal controlled intersections and two stop controlled intersections. All U.S. Highway 12 traffic turning movements would be designed for WB-67 tractor-trailer traffic. All non-US Highway 12 turning movements would be designed for 50-foot wheel base tractor-trailer (WB-50). Bump-outs would be incorporated into the intersection to aid in pedestrian crossings. The bump-out narrows the roadway width in the intersections by placing raised islands that protrude out into the intersections. These bump-outs allow for shorter crossing distances for pedestrians and increase visibility of both pedestrians and vehicles.

2.7.3.1 5th Street at Arthur Avenue

The intersection at 5th Street and Arthur Avenue would be a new signalized location. Southbound Arthur Avenue traffic would be controlled by the traffic signal and would have the ability to pass through the intersection and continue south on Arthur Avenue. This approach can also avoid the traffic light by taking a free right turn and continue west on 5th Street. Arthur Avenue northbound would have two lanes for thru traffic to access the Madison Street Bridge and a left turn bay to access 5th Street westbound. Fifth Street would have two lanes entering the intersection from the east. One lane would be a through lane to access 5th Street westbound and one would be a left turn lane to access Arthur Avenue southbound. Crosswalks would be incorporated along all four sides of the intersection.



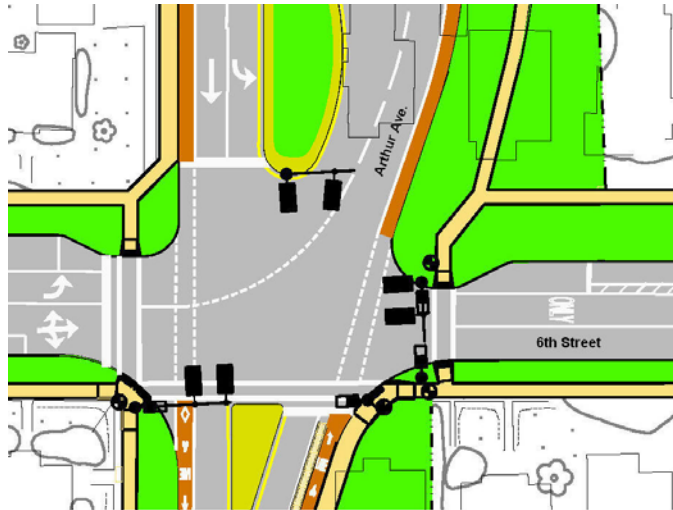
Option 1 – No Turn Lane



Option 2 – Turn Lane

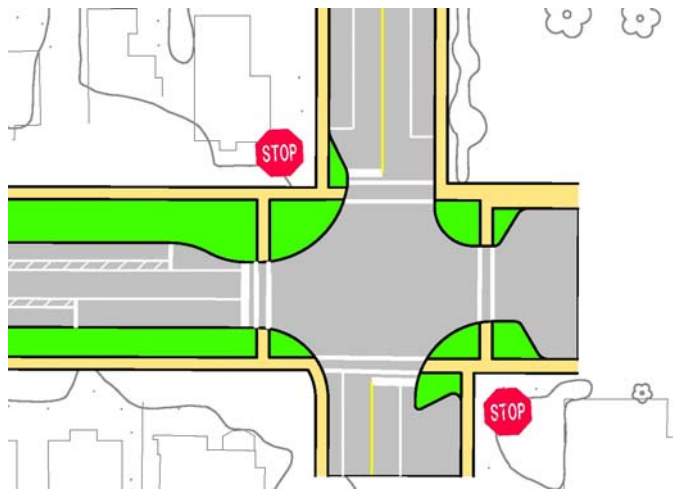
2.7.3.2 6th Street at Arthur Avenue

The 6th Street and Arthur Avenue intersection would also be a signalized intersection. The layout of the intersection and lane configuration would be as depicted in the accompanying figure. There would be crosswalks on the east, west, and south sides of the 6th Street/Arthur Avenue intersection.



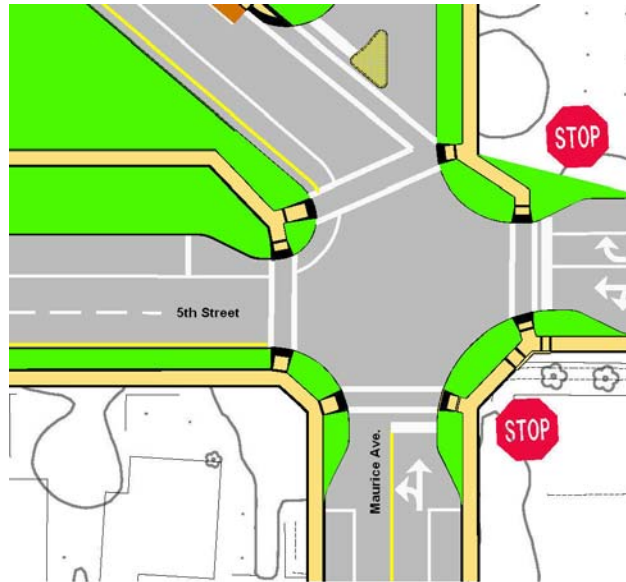
2.7.3.3 6th Street at Maurice Avenue

The intersection of 6th Street and Maurice Avenue would be a stop-controlled intersection. The 6th Street movement would be free and the Maurice Avenue movements would be under stop sign control. This intersection would have crosswalks on all four sides that include pedestrian bump-outs to shorten crossing distances.



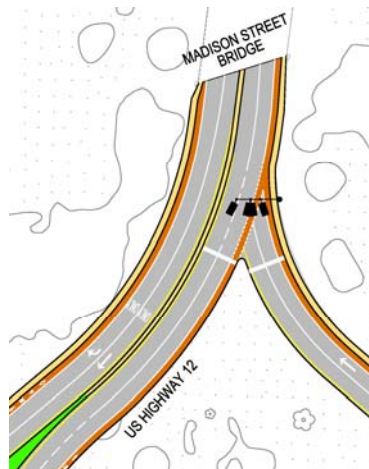
2.7.3.4 5th Street at Maurice Avenue

The 5th Street and Maurice Avenue intersection would also be a stop sign controlled intersection. This intersection would have cross walks on all four sides of the intersection and include pedestrian bump-outs to shorten crossing distances. A bump-out simply extends the sidewalk into the street, making the crossing distance shorter.



2.7.3.5 Arthur Avenue near the Madison Street Bridge

The intersection to the south of the Madison Street Bridge would be a new signaled intersection to accommodate the new U.S. Highway 12 traffic east bound on Arthur Avenue and the north bound traffic on Maurice Avenue. The layout of the intersection and land configuration would be as described in the accompanying figure.



2.8 Assessment of Preferred Alternative Analysis

All of the above intersections meet the “no added capacity” definition and show desirable overall LOS for both AM and PM operations. This analysis can be found in the Revised Preliminary Traffic Report and is available from MDT at the request of any interested party. The following is a summary of some of the issues described in the Preliminary Traffic Report. The LOS essentially describes how efficiently traffic flows at each intersection. If traffic flows more efficiently than before the project was instituted, there would be an improvement in air quality for the area, given the same volume of traffic. The volume to capacity (v/c) ratio on all approaches is less than 1.00, indicating all movements are operating under capacity. When compared to the No-Build results, the proposed project shows significant operational improvements with decreases in delay and better LOS for all of the intersections within the project area. The proposed project layout also provides for safer bicycle and pedestrian access through the system, particularly near the University. This is a direct result of the preferred alternative that re-aligns U.S. Highway 12 to Arthur Avenue and removes a significant amount of volume from Maurice Avenue.

2.9 Special Events and University Access/Egress

Special Events and the University Access/Egress issues have been analyzed under both existing and proposed conditions. A summary of results can be found in the Revised Preliminary Traffic Report which is available to the public from MDT. Below is a brief synopsis of the information provided in the Revised Preliminary Traffic Report.

2.9.1 Special Events

Special events traffic data (turning movement counts) were collected on Saturday, September 14, 2002, after a University football game at all four existing intersection locations. Under existing conditions, special events traffic conflicts with U.S. Highway 12 traffic causing long delays and over capacity conditions at all of the unsignalized intersection locations. The preferred alternative, build condition analysis shows significant operational improvements at 5th Street/ Arthur Avenue, 5th Street/Maurice Avenue, and 6th Street/Maurice Avenue. All of the approaches have a v/c less than 1.0 and the LOS is improved from the No-Build Alternative.

2.9.2 University Access and Egress on 5th Street and 6th Street - Preferred Alternative

Under existing conditions, 5th Street and 6th Street between Arthur Avenue and Maurice Avenue consist of one-way, two-lane traffic. Traffic flows west bound on 5th Street and east bound on 6th Street. The single lane entrance to the University is located at the intersection of 6th Street and Maurice Avenue. Traffic exits the University by a two-lane roadway at the intersection of 5th Street and Maurice Avenue.

The proposed project analyzed one-lane and two-lane configurations on 5th Street and 6th Street for the AM and PM peak hours. The results showed that there would be no

significant difference in operations between the two options; all intersections have acceptable LOS and minimal delays.

The preferred alternative should consist of the two-lane configuration on 5th Street with the southern lane designated left turn only. Sixth Street should be modified from a two-lane east bound traffic pattern to one-lane traffic eastbound, and 6th Street should also include an oversize bicycle lane. The bike lane is oversized to accommodate emergency vehicles. The revised configuration on 6th Street would align with the existing one-lane access to the University.

2.10 Assessment of Traffic Conditions Outside of Project Limits - Preferred Alternative

As part of the operation goals described in Section 2.6 above, three signalized intersections outside of the project area were analyzed to confirm that the proposed Arthur Avenue project improvements do not cause impacts to the adjacent intersections and that there is “no added capacity.” The intersections include Madison Street at Broadway, 5th Street at Higgins Avenue, and 6th Street at Higgins Avenue.

A complete operational analysis and assessment of these intersections compared to the Project locations is included in the Revised Preliminary Traffic Report. In general, the 5th Street at Arthur and 6th Street at Arthur intersections operate at similar LOS to those at 5th Street/Higgins Avenue and 6th Street/Higgins Avenue. The Arthur Avenue intersections show better operation than the intersection of Madison/Broadway. The analysis shows that the Arthur Avenue project would improve existing functional levels at the intersections within the project area and preserve the functionality of U.S. Highway 12 without causing any reduction in the level of service at adjacent intersections.

2.11 Advantages and Disadvantages of Option 1 and Option 2 in the Preferred Alternative

Section 2.5 through 2.11 describe the preferred alternative for the Arthur Avenue project. The preferred alternative has two sub-options with the advantages and disadvantages described below:

Advantages of Preferred Alternative Option 1 (no turn lane)

- Not including a turn lane will reduce the crossing length by approximately 3 meters (10 feet) and reduce pedestrian crossing times.
- The reduction in overall width of Arthur Avenue may fit better with the character of the streets in the existing neighborhoods.

Disadvantages of Preferred Alternative Option 1 (no turn lane)

- Traffic approaching 5th Street from the south would have to turn right on 6th, left on Maurice, and left on 5th to travel west on 5th Street. More traffic would travel on the proposed University interior streets (Maurice).
- Turning movements required to go from Arthur northbound to 5th Street westbound have less visibility compared to a single permissive left turn at Arthur and 5th. Total travel time is increased for this movement which will have a negative impact on air quality.
- A necessary reduction in street parking along 6th, Maurice, and 5th due to the added width necessary for WB-67 truck traffic.

Section 3

Affected Environment, Impacts, and Mitigation Measures

3.1 Introduction

This section describes the environment that may be affected by the proposed reconstruction of U.S. Highway 12 at Arthur Avenue and 5th and 6th Streets in Missoula. Descriptions of potentially affected environment were obtained through site visits and field surveys/research, contacts with governmental agencies, literature reviews, and numerous public involvement activities.

This section discusses the potential environmental impacts of the Preferred Alternative and those associated with the No Action alternative. If an action has a potential impact, either alone or cumulative with other projects, appropriate measures to mitigate the impacts are discussed. If the Preferred Alternative is advanced, MDT will implement the mitigation measures identified.

3.2 Landforms, Geology, and Soils

3.2.1 Affected Environment

The project area is located in the Missoula Valley adjacent to the University, and directly south of the Clark Fork River. The project area is generally flat with a gentle slope from the south to the north toward the Clark Fork River, which is located outside of the project area. Foothills surrounding the Missoula Valley rise from the valley floor beginning approximately one-half mile (0.8 km) to the east. No designated wetlands, floodplains, or other surface water bodies are present in the project area. One irrigation ditch bisects the northern boundary of the project area. Storm drains have been identified in the project area and runoff from the project area is likely to flow to these storm drains. Storm water from the east side of the project drains into the irrigation ditch to the north of the project via the underground storm drain lines. Storm water from the west side of the project enters the storm drain system along Arthur Avenue. Once the water enters the storm drain system on the west side of the project area, it is conveyed west in the City's storm drain system.

The Missoula Valley is bordered by the Clark Fork Fault to the northeast, the Ninemile Fault and the Albert Creek Thrust to the southwest, and a transverse fault to the east (McMurtrey, et al. 1965). The geology of the Missoula Valley is identified in the "Sole Source Aquifer Petition for the Missoula Valley Aquifer" as follows:

"The Missoula Valley is covered by alluvial and lacustrine sediments of Quaternary age, 1.6 million years ago to the present. The low rolling foothills surrounding the valley floor are principally composed of fine-grained sediments internally drained during the Tertiary period, 43 to 53 million years ago. The prominent Mount Jumbo and Mount Sentinel to the east and the mountain ranges surrounding the valley are composed of Precambrian metasediments of the Belt Supergroup, 0.8 to 1.6 billion years in age (Missoula City/County Health Department (MCCHD) no date)."

Pleistocene (11,000 to 1.8 million years ago) glacial activity in the Missoula Valley resulted in blockage of the mouth of the Missoula Valley on the northwest, backing up the drainages, and forming glacial Lake Missoula. The dam was breached and reformed multiple times. Sediment deposition resulting from this intermittent lake consists of thin layers of fine-grained silts and sands interbedded with coarse-grained stream deposits (Envirocon 1998a).

Soil in the project area consists of the Moiese gravelly loam that is a deep, excessively-drained soil formed in alluvium on alluvial fans and streams terraces. The permeability is moderate, approximately 0.6 to 2.0-inches (1.52 to 5 cm) per hour (Soil Conservation Service, no date). Observations of other locations in Missoula indicated that the area is underlain primarily by non-cohesive, coarse-grained sands and gravels with some silts and cobbles to a depth of approximately 150-feet (45.72 m) (Envirocon 1998a).

The Missoula Aquifer as found throughout the Missoula Valley is an unconfined alluvial aquifer composed predominantly of Quaternary-age (1.8 million years ago to the present) coarse-grained sand and gravel. The majority of the recharge to the Missoula Aquifer is from infiltration from the Clark Fork River. Additional recharge is derived from infiltration of small streams and irrigation ditches and from precipitation. The Clark Fork River, located approximately 328 feet (100 meters) north of the site, is a losing river where it enters the Missoula Valley but becomes a gaining river as it flows through the valley. Regional groundwater flow direction in the Missoula Aquifer generally follows the Clark Fork River; however, local flow direction varies with the orientation of the fine-grained layers within the aquifer material (Envirocon 1998a).

3.2.2 Impacts of the Preferred Alternative

The proposed reconstruction of Arthur Avenue would have little or no impact to land forms, geology or soils. It is anticipated that some limited cut and/or fill would be necessary to create a smooth transition from the bridge down to 5th Street. However, because the project must connect to existing bridges and streets, earth work must tie into the existing structures.

3.2.3 Mitigation Measures

Because there are no impacts to landforms and geologic conditions, no mitigation efforts are necessary. The final roadway and project area would be very similar to what is currently present and it would be replanted with stable sod, bushes, trees and other vegetation.

3.3 Important Farmland

The project is located entirely in an urban residential setting. No farmland is present at or adjacent to the site.

3.4 Water Resources and Quality

3.4.1 Affected Environment

The project is located adjacent to the Clark Fork River. In addition, a Mountain Water Company public water supply well is present on the east side of the Madison Street Bridge couplet. Storm water from the site discharges to the Clark Fork River.

3.4.2 Impacts of the Preferred Alternative

The Missoula aquifer is a highly transmissive gravel aquifer and is designated by the EPA as a Sole Source Aquifer, and is afforded special consideration. Given the proximity of the River and water supply well to the project, any fuel spills, solvent spills, or other hazardous material accidents could have an impact on water quality.

3.4.3 Mitigation Measures

The following mitigation measures would be exercised in the special provisions for the preferred alternative contract.

- Disallow any storage containers [greater than 25 gallons (95 liters)] of fuel, solvents, or other hazardous materials at the project site, specifically in the recharge area of the public water supply well.
- Allow refueling only in a designated containment area.
- Require provisions for immediate spill containment.

3.5 Floodplains

3.5.1 Affected Environment

Executive Order 11988 and FHWA floodplain regulations (23 CFR 650, Subpart A) require an evaluation of the Arthur Avenue project to determine if any of its alternatives encroach on the “base” floodplain. The “base” floodplain is defined as the area covered during water encroachment due to the “100-year” flood. The “100-year” flood represents an event, which has approximately a one percent chance of occurrence in every year.

The Federal Emergency Management Agency (FEMA) has delineated approximate 100-year floodplain boundaries for the following waterways near the project:

- Clark Fork River
- Rattlesnake Creek

Figure 3-1 is FEMA Map Number 30063C1480 D, which has an effective date of August 16, 1988. This map shows floodplain information in relation to the Arthur Avenue project.

The existing alignment crosses the Clark Fork River down stream of the introduction of Rattlesnake Creek via the Madison Street Bridge. The proposed build alternative

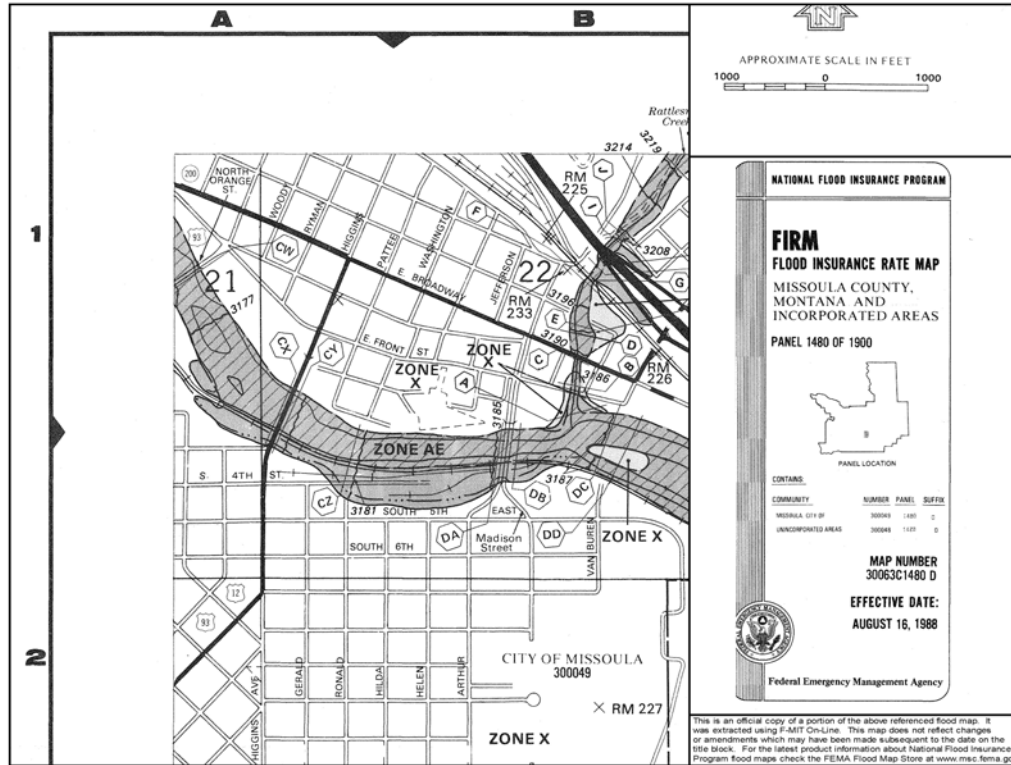


Figure 3-1
FEMA Map Number 30063C1480D

would not affect the Madison Street Bridge, and only minor modifications would be performed on the southern approach. As such, the project would have no impact on the floodplain.

3.6 Air Quality

3.6.1 Affected Environment

The Missoula air quality region is in attainment of the National Ambient Air Quality Standards (NAAQS)/Montana Ambient Air Quality Standards (MAAQS) for nitrogen oxides (NO_x), sulfur dioxide (SO₂) and ozone (O₃), but is nonattainment for carbon monoxide (CO) and particulate matter less than 10-microns (PM₁₀). The Missoula area has a history of exceeding the 24-hour average and annual average PM₁₀ NAAQS and the eight-hour average CO NAAQS. Missoula was designated nonattainment for CO in 1979. The 1990 Clean Air Act Amendment (CAAA) designated CO nonattainment areas as either moderate or serious. Based on monitoring from 1986 through 1988, Missoula was classified as a moderate nonattainment area for CO. However, Missoula has not violated the eight-hour average CO NAAQS since the implementation of the oxygenated fuels program, which began on November 1, 1992. Since Missoula has had more than three years of monitoring with no exceedances of the NAAQS, Missoula is eligible for applying for redesignation as an attainment area for CO. A maintenance plan showing that Missoula would not violate the standards must be developed by the MCCHD.

Missoula exceeded the annual average PM₁₀ standard in 1986 and exceeded the 24-hour PM₁₀ standard several times between 1987 and 1989. Because of these exceedances, Missoula was designated a non-attainment area for PM₁₀. To reduce PM₁₀ emissions, the Missoula City/County Air Pollution Control Board adopted regulations on local sources of PM₁₀, such as residential wood stoves, outdoor burning, industry, fugitive emissions, street sanding, and street maintenance to reduce PM₁₀ emissions. As a result of these regulations, Missoula has not violated either the 24-hour average or annual average PM₁₀ NAAQS since 1989. Missoula is currently a maintenance area for PM₁₀.

3.6.2 National Ambient Air Quality Standards

One of the primary purposes of the Clean Air Act (CAA) is to protect and enhance the quality of our nation's air resources. To accomplish this goal, the CAA requires the U.S. Environmental Protection Agency (EPA) to promulgate primary and secondary NAAQS. Primary NAAQS are those that allow for an adequate margin of safety to protect the public health. Secondary NAAQS are those required to protect the public welfare.

The CAA delegates to state environmental agencies, such as the Department of Environmental Quality (DEQ), the responsibility for attaining and maintaining these NAAQS by requiring that they adopt a plan that provides for the implementation, maintenance, and enforcement of the NAAQS. Within Missoula County, the Missoula City-County Health Department is responsible for attaining and maintaining NAAQS. The EPA must review and approve each State Implementation Plan (SIP) consistent with the requirements of the CAA. States may also establish their own Ambient Air Quality Standards (AAQS). DEQ has adopted AAQS for several criteria air pollutants.

Criteria pollutants are those for which NAAQS have been established. The "criteria" air pollutants CO, particulate matter with an aerodynamic diameter of 10 microns or less, volatile organic compounds (VOCs), and NO_x are contained in motor vehicle exhaust. VOCs and NO_x are known precursors to ozone (smog) formation. Table 3-1 lists the NAAQS for NO_x, CO, O₃, and PM₁₀.

3.6.3 EPA/DOT Conformity Requirements

EPA's final conformity regulations provide the criteria and procedures required by the CAA. The regulations appear in two forms: 1) under 40 CFR 51 - State Implementation Planning, and 2) 40 CFR 93 - Determining Conformity of Federal Alternatives to state or Federal Implementation Plans. The transportation conformity regulations were effective November 24, 1993 and apply to EPA-designated air quality nonattainment and maintenance areas. The regulations also apply to all "regionally significant" highway and transit projects, not just those that trigger a federal action, or receive federal funds.

**Table 3-1
Ambient Air Quality Standards (ppm)**

Pollutant	Averaging Time	NAAQS ¹	MAAQS ²	Primary/Secondary ³
Nitrogen oxides (NO _x)	1-hour	--	0.30	--
	Annual	0.053	0.053	Primary and Secondary
Carbon Monoxide (CO)	1-hour	35	23	Primary
	8-hour	9	9	Primary
Ozone (O ₃)	1-hour	0.12	0.10	Primary and Secondary
	8-hour	0.08	--	Primary and Secondary
PM ₁₀	24-hour	150 ug/m ³	150 ug/m ³	Primary and Secondary
	Annual	50 ug/m ³	50 ug/m ³	Primary and Secondary

¹ National Ambient Air Quality Standards

² Montana Ambient Air Quality Standards

³ Primary standards are not to be exceeded more than once per year.

A "regionally significant" transportation project is a principal arterial or higher functional classification, plus any other facility that serves regional transportation needs, and would normally be included in the SIP emissions modeling for the transportation network. The Metropolitan Planning Organization (MPO) or U.S. Department of Transportation (DOT) responsible for the approval or support of the affected transportation-related plans, programs, or projects must conduct a conformity analysis. The regulations also require a regional emissions modeling analysis of transportation-related plans and programs, and transportation projects. In addition, the conformity regulations under 40 CFR 93.116, requires local CO and PM₁₀ "hot spot" analyses be required for some projects in nonattainment areas.

The Arthur Avenue Reconstruction Project is located in CO and PM₁₀ nonattainment areas (See Section 3.6). The local MPO, in consultation with MDT, DEQ, the Missoula City-County Health Department, and EPA, is responsible for air quality conformity for the Missoula urban area. Missoula's conformity determination for the Missoula 2004 Transportation Plan Update was effective June 7, 2004. The MPO has determined that the plan meets the conformity requirements. Therefore, a project-related conformity analysis, which includes a regional emissions and CO/PM₁₀ hot spot analyses, is not required for this Environmental Assessment.

A general and less technical discussion of the potential air quality impacts of the project is presented below in Section 3.7.

3.7 Existing Traffic Conditions

The intersections were analyzed using the methodology of the Highway Capacity Manual (HCM) and its standard LOS rating system. The LOS is defined as a

qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A LOS definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. It can also be indirectly used, on a broad basis, to get an understanding of air quality because long queues or delays and more traffic equate to higher emissions than no delays, short queues, and less traffic.

During AM peak traffic volumes, the four intersections within the project limits operate at acceptable Levels of Service that equate to good traffic capacity, and minor delay. The PM peak traffic volumes vary at each intersection and range from an “F” for one or more approaches at Arthur Avenue at 5th Street, Maurice Avenue at 6th Street and Maurice Avenue at 5th Street. The “F” rating is the worst rating based on the Highway Capacity Manual and indicates poor capacity, long delays, and queuing. Only 6th Street at Arthur Avenue had an acceptable LOS for all approaches. During non-peak hour operations, all intersections can be described as good.

3.7.1 Impacts of the Preferred Alternative

As stated in Section 2 of this document, the Arthur Avenue Reconstruction Project’s primary objective is to improve traffic, bicycle, and pedestrian flow on U.S. Highway 12 near the University allowing the safe and efficient movement of traffic. For this reason, the preferred alternative would not be expected to result in adverse air quality impacts. With the proposed removal of U.S. Highway 12 traffic from 6th Street and Maurice Avenue, the traffic volume decreases approximately 75 percent on 6th Street and 95 percent on Maurice Avenue (over an entire day based upon traffic count data). In addition, the proposed U.S. Highway 12 intersection improvements to Arthur Avenue at 5th Street and Arthur Avenue at 6th Street are equal to or better than the existing condition’s AM/PM peak hour LOS. Because there is a more efficient flow of traffic with less waiting at intersections and a shorter, more direct, route for traffic, air quality would be improved.

Short-term air quality impacts would be anticipated during construction of the proposed project due to disturbance of approximately two to three city blocks and operation of heavy equipment in work zones. These impacts would be minor and limited to the construction period. Dust control would be implemented, on an “as-needed” basis within the project area.

3.7.2 Mitigation Measures

MDT would incorporate dust control into the contract documents to minimize any air quality impacts associated with the construction of the Arthur Avenue Project.

3.8 Vegetation

3.8.1 Affected Environment

Observations regarding vegetation and habitats associated with the project area were made during a site visit conducted on July 22, 2002. The results of the site visit indicate little if any natural habitat remains within the project area. Onsite vegetation

is dominated almost entirely by grass and planted trees and shrubs. The majority of the project area consists of residential housing (with lawns and ornamental plants) and the Jeanette Rankin Park at the northern portion of the project area. Immediately adjacent to the roads forming the eastern and western boundaries of the park are vegetated road shoulders dominated by plant species indicative of disturbed areas such as spotted knapweed (*Centaurea biebersteinii*). Just beyond the project boundaries to the north and south of the Clark Fork River are densely vegetated areas dominated by several species of shrubs and trees. Within the current boundaries of the Jeanette Rankin Park and adjacent residential areas are open (mowed) grass areas with planted shrubs (e.g., roses and other ornamentals) and shade trees such as American elm and maple.

3.8.2 Impacts of the Preferred Alternative

The proposed reconstruction of Arthur Avenue would have minimal impact on vegetation within project boundaries. These impacts would be limited to 1) loss of a very small number of mature deciduous trees that currently exist in Jeanette Rankin Park, and 2) loss of some area within the park currently vegetated with grass, and 3) a loss of some of the mature trees on the South side of 5th Street and on the south side of 6th Street. These losses are not expected to be ecologically significant because the non-paved portions of the project area would continue to be characterized by mowed grass (both in the park and private residential areas) and a large number of mature deciduous trees within and adjacent to the park.

3.8.3 Mitigation Measures

No mitigation measures are proposed for the loss of grass in the park. However, efforts are proposed to help support the addition of green space in other project areas. MDT will be responsible for sod, seed and irrigation for areas disturbed during construction. In addition, once the final design is completed, a new agreement would be set up between MDT and the City of Missoula for landscaping and maintenance within the impacted area. In this agreement, MDT may provide funding to the City for final landscaping design and tree and shrub replacement. The Missoula Urban Forester suggests that a large number of trees in the area are already well past their normal maturity and likely will begin to die in the next 20 years. This replacement of trees with a limited remaining life span would be a benefit from the project.

3.9 Wetlands

3.9.1 Affected Environment

A site visit conducted on July 22, 2002 revealed no wetlands within the project boundaries.

3.9.2 Impacts of the Preferred Alternative

The proposed reconstruction of Arthur Avenue would have no impact on wetlands.

3.9.3 Mitigation Measures

Mitigation measures are not necessary because the proposed reconstruction of Arthur Avenue would have no impact on wetlands.

3.10 Threatened and Endangered Wildlife

3.10.1 Affected Environment

The Montana Natural Heritage Program (MNHP) maintains an extensive database on plant and animal species of concern to multiple state and federal agencies. Included in this database are Montana State Species of Special Concern, USFWS Threatened and Endangered Species, U.S. Forest Service (USFS) Sensitive Species, and Bureau of Land Management (BLM) Special Status Species. MNHP was contacted to obtain information on the potential for plant and animal species of special concern to occur within the project area. The search area is defined as a point location within the project area and a one-mile radius surrounding this point location. The project area and the selected point location are in Section 22, Township 13N, and Range 19W.

The result of this search indicates that seven species of concern have been reported within the search area (eight total records), and these are presented below. These records are general and not based on project site occurrence, as indicated in a more detailed discussion provided in the Arthur Avenue Biological Resources Report (BRR). In several cases, the records are historic, and as such do not necessarily indicate that the species currently occurs or has potential to occur within the project area given the current habitat limitations. The potential for the species identified to occur within the project is discussed below. The definitions of the status or rank given by various state and federal agencies are included in the BRR.

Westslope cutthroat trout (*Oncorhynchus clarki lewisi*).

This species has no potential to occur within the project area because the project area does not provide suitable habitat (coldwater stream). This species could, however, occur near the site in the Clark Fork River.

Bull trout (Columbia River) (*Salvelinus confluentus pop 2*).

This species has no potential to occur within the project area because the project area does not provide suitable habitat (coldwater stream). However, Montana Department of Fish Wildlife and Parks (MDFWP) has recommended a 100-foot buffer on all streams and lakes/reservoirs that (a) have bull trout present and/or (b) are important for migration or over-wintering, or (c) link occupied stream reaches to major rivers. This species could, therefore, temporarily or intermittently occur near the project area in the Clark Fork River.

Fringed myotis (*Myotis thysanodes*).

This bat species is reported to have been collected in Missoula in 1964. The location of the collection is within Section 28, to the southwest of the project area. Although this species has potential to occur within the project area, the lack of (1) recent records of occurrence within the county, and (2) occurrence records for Section 22 suggest that the potential is low.

Lynx (*Felis lynx*).

This species has almost no potential to occur within the project area because the project area does not provide suitable habitat (spruce-fir forests above 3500 feet). The sensitivity of this species to human presence further indicates very little potential for this species to occur within the project area.

Spotted slug (*Magnipelta mycophaga*).

This species has little potential to occur within the project area because the project area does not provide significant amounts of natural habitat. This species was last collected in 1957 at 4150 feet elevation, between Deer Creek and a parallel small gravel road near the creek in Section 32. The collection site is on the east side of Mount Sentinel in the Sapphire Mountains. Section 32 is located southwest of Section 22 (project area).

Missoula mountainsnail (*Oreohelix sp 10*).

This species has little potential to occur within the project area because the project area does not provide significant amounts of natural habitat. This species was collected at Mount Sentinel, 4900 feet elevation, about one mile southeast of the University. The collection site is in Section 26, southeast of Section 22 (project area).

Missoula mountainsnail (*Oreohelix sp 10*).

This observation record is for the same species listed for the previous observation. Based on this specific record, the species was collected at Mount Jumbo, 4600 feet elevation, about one mile northwest of the University. The collection site is in Section 14, northeast of Section 22 (project area).

Obscure evening-primrose (*Camissonia andina*).

This species has little potential to occur within the project area because the project area does not provide significant amounts of natural habitat. This species was collected at Mount Sentinel, 3320 feet elevation, on the west side of the mountain. The collection site is in Section 27, immediately south of the project area.

In addition to the aforementioned species identified by the MNHP search, the bald eagle (*Haliaeetus leucocephalus*), currently proposed for delisting from endangered to threatened, has potential to occur onsite or near the site. Potential impacts to this and the other seven species of concern identified by the MNHP are discussed below.

3.10.2 Impacts of the Preferred Alternative

Westslope Cutthroat Trout and Bull Trout - Project-related impacts on these fish species are unexpected but possible considering the 100-foot buffer zone recommendation for Bull Trout and potential impacts that could result from project actions. Such potential impacts can include the input of sediments to the Clark Fork River from project-related activities within the northern portion of the project area.

Other Threatened and Endangered Species - The proposed reconstruction of Arthur Avenue would have no measurable impact on the remaining threatened or endangered species because 1) no threatened or endangered species are known to exist within project boundaries, 2) the site provides no suitable habitat for most of the threatened and endangered species identified by the MNHP for the project area, and 3) the use of onsite or near site habitats by threatened and endangered species (e.g., bald eagles roosting in trees) is unlikely or rare at most, given the habitat preferences of the species of concern and types of habitat available onsite or near the site. Much more suitable habitat for bald eagles (mature trees overlooking the river) exists beyond the project boundaries within the riparian corridor of the Clark Fork River.

3.10.3 Mitigation Measures

The minimal reduction in the number of mature deciduous trees and loss of a small amount of grassy areas from the park would be the only habitat-related impacts of project actions. These impacts would not affect threatened and endangered species; therefore, no specific mitigation measures are necessary to protect such species.

3.11 Other Wildlife Resources and Fisheries

3.11.1 Affected Environment

Observations regarding habitats and species associated with the project area were made during a site visit conducted on July 22, 2002. The results of the site visit indicate little natural habitat remains within the project area. The majority of the project area consists of residential housing and the Jeanette Rankin Park, while immediately adjacent to the roads forming the eastern and western boundaries of the park are vegetated road shoulders dominated by weedy or exotic plants such as spotted knapweed. Just beyond the project boundaries and south of the Clark Fork River are densely vegetated areas dominated by several species of shrubs and trees, and these areas provide suitable habitat for a variety of native plant and animal species. Commonly observed native species known or likely to occur within this well-vegetated area include cottonwood (*Populus sp.*), willow (*Salix sp.*), Douglas fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), red squirrel (*Tamiasciurus hudsonicus*), striped skunk (*Mephitis mephitis*), and a wide variety of birds including pine siskin (*Carduelis pinus*), dark-eyed junco (*Junco hyemalis*), several finch species (*Carpodacus sp.*), American robin (*Turdus migratorius*), common or northern flicker (*Colaptes auratus*), red-breasted nuthatch (*Sitta canadensis*), and black-capped chickadee (*Parus atricapallis*), among many others.

The most common forms of other wildlife routinely using the habitats within the project boundaries are those adapted to urban areas. These include the introduced eastern fox squirrel (*Sciurus niger*), which thrives in the University area, especially in association with planted deciduous trees, and both mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*). Also commonly observed in this urban environment are common passerine birds such as American robin and chipping sparrow (*Spizella passerina*), which appear to prefer the short grass habitat of mowed lawns. The project area currently supports a low diversity of native plant and animal species due to the limited amount of cover and foraging areas provided by natural habitat.

3.11.2 Impacts of the Preferred Alternative

The proposed reconstruction of Arthur Avenue would have minimal impact on other wildlife resources and no measurable impact on fisheries. The minimal impacts identified for other wildlife are due to loss of small amounts of vegetation within project boundaries that currently provide some degree of cover and potential foraging areas for invertebrates, birds, and small mammals. No fishes, amphibians, or reptiles are believed to currently use these areas. Decreased amounts of vegetated areas would be limited to 1) a slight reduction in the number of mature trees that currently

exist in Jeanette Rankin Park, and 2) a reduction in grassy areas within the park. These reductions in vegetated habitat are not expected to be ecologically significant because the project area would continue to be characterized by extensive areas vegetated by grass (both park and private residential) and a large number of mature deciduous trees within and adjacent to the park.

3.11.3 Mitigation Measures

No mitigation measures would be required for the proposed reconstruction of Arthur Avenue.

3.12 Land Ownership, Right-of-Way, and Use

The preferred alternative would use MDT and the University property as additional right-of-way. This property use is consistent with the University Master Plan for future land use and MOU. A small amount of additional right-of-way from adjacent private land owners may be required (less than a few hundred square feet). There is no significant difference of land ownership between the No Action Alternative and the Preferred Alternative, except the donation of University property for project right-of-way. No residents will be moved with exception of temporary tenants that currently reside in University owned property. Five homes are proposed to be removed in the Preferred Alternative. Each is part of the University MOU and owned by the University.

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 law, to remaining land due to the effects of highway construction. This action would be in accordance with the Uniform Relocation Assistance and Real Property acquisition Policies Act of 1970 (P.L. 91-646 as amended), (42 U.S.C. § 4651 and 4652, et. seq.) and the Uniform Relocations Act Amendments of 1987 (P.L. 100-17). No property owners are expected to be relocated except University rental tenants. The University of Montana is responsible by MOU to coordinate any rental relocations issues.

3.13 Social/Environmental Justice

3.13.1 Affected Environment

The Arthur Avenue project proposed and no action alternative are located in a University neighborhood, south of the Clark Fork River and directly adjacent to the northwest corner of University of Montana campus. The homes and residents can generally be characterized as private residential and rental properties for the University of Montana.

3.13.2 Impacts of the Preferred and No Action Alternatives

No impacts have been identified for travel and access. The preferred alternative would allow adequate existing services for fire protection, police protection, and ambulance service. Bus stops and services may be slightly modified due to the new traffic patterns, but they will remain functional without impacts. One-way roads

would be sized to allow emergency vehicle passage around backed-up traffic on 5th and 6th Streets.

Title VI of the U.S. Civil Rights Act, and Executive Order 12898, issued in February 1994, require that no minority or, by extension, low-income persons shall be disproportionately impacted by any project receiving Federal funds. For transportation projects, this means no particular minority may be disproportionately isolated, displaced, or otherwise subjected to adverse effects.

The proposed improvements to Arthur Avenue would not cause any displacement, and would not have any substantive impact on the location, distribution, density, or growth rate of the area's population. This is an urban corridor and the Build Alternative(s) would not affect the cohesion of any communities or divide any neighborhoods. Therefore, this preferred alternative would not adversely impact any ethnic, low income, or other minority groups. Both the No-Build and the proposed Build Alternative(s) are in accordance with E.O. 12898 and would not create disproportionately high and/or adverse impacts on the health or environment of minority and/or low income populations. The alternative(s) also comply with the provisions of Title VI of the Civil Rights Act of 1964 (42 D.S.C. 2000(d), as amended) under FHWA's regulations (23 CFR 200).

3.14 Economic

3.14.1 Affected Environment

Missoula is one of 56 counties in Montana. In 2000, Missoula County had a population of 96,760, which was the second highest population of any county in the state. Based on 1990-2000 data provided by the United States Conference of Mayors, Missoula had a 6.7 percent average annual increase in gross metropolitan product. Missoula County anticipates an average population increase of 1,341 people per year.

Today, forest products and service industries remain two mainstays in western Montana's economy. Education, health, and social services make up about 24 percent of the employment while retail trade makes up about 15 percent within Missoula County. The tourist industry also plays an important role in the regional economy.

3.14.2 Impacts of the Preferred Alternative

The proposed project would improve the quality of travel on an important Highway and travel corridor. Improved safety for all highway users would decrease the potential for serious motor vehicle accidents. The economic costs associated with treating victims of fatal and injury accidents would be decreased accordingly.

Temporary jobs would be created during the construction of the project. Also, the demand for local goods and services (food, lodging, recreation, etc.) would be temporarily increased in Missoula due to the presence of workers temporarily living in the area during the construction of the project. These beneficial economic impacts would be sustained over the time period when the highway project is being constructed. Local spending by workers during road construction activities may

cause a slight increase in the local tax revenues. This impact would likely be small and short-term.

The proposed reconstruction of Arthur Avenue would require new right-of-way that is being provided by the University. Right-of-way acquisition would permanently remove this amount of property from the tax rolls and taxes paid on the land would be lost to Missoula. This loss in property tax revenue would have a negligible effect on revenues for Missoula. Two lots (less than 1 acre) between 5th Street and 6th Street are being provided by the University of Montana for the right-of-way exchange.

The proposed reconstruction project would not adversely affect or cause notable long-term changes to the economy of Missoula. There would be no commercial relocations or land acquisitions that would affect the viability of agricultural operations or commercial businesses within the corridor.

3.15 Noise

3.15.1 Affected Environment

The preferred alternative involves reconstruction of the roadways with lane reconfigurations and the addition of two lanes on Arthur Avenue between 5th Street and 6th Street. Due to the realignment of U.S. Highway 12, significant traffic volumes would be removed from Maurice Avenue and 5th/6th Street, east of Arthur Avenue. These roadways would be reduced to one-lane roadways, which would increase the green space between the roadways and residents along the project. An additional 2 lanes would be added to Arthur Avenue to accommodate U.S. Highway 12 northbound traffic. This would increase the traffic flow through the area, and the offset from the edge of the travel lane to the adjacent remaining residence would be increased. The impacts of the additional lane would be realized on Arthur Avenue between 5th and 6th Street because much less traffic would travel 6th Street and Maurice Avenue with the proposed lane configuration.

3.15.2 Impacts of the Preferred Alternative

Projected peak hour noise levels in 2022 are expected to decrease along Maurice Avenue and 5th/6th Street east of Arthur Avenue and slightly increase along Arthur Avenue based on projected background growth in traffic volume of one percent per year over the 20 year period. The project is not expected to generate any additional traffic (i.e., additional roadway capacity). Peak hour noise levels are expected to decrease up to 7 decibels A-weight (dBA) over existing conditions along Maurice Avenue and 6th Street because of the significant reduction in traffic volumes on both roadways. Traffic volumes are expected to remain unchanged on 5th Street; therefore, peak hour noise levels are not expected to increase at this location. Peak hour noise levels along Arthur Avenue are expected to increase by approximately 7dBA due to the increase of traffic volumes, but because the offset from the edge of the travel lane to the adjacent residence would be increased by approximately 90 feet (27.43 m), the noise levels at the nearest receptor to Arthur Avenue would be limited to a noise increase to approximately 2 dBA. This noise level increase is considered barely perceptible based on FHWA criteria. In addition, projected peak hour noise levels would not approach or exceed the FHWA Activity Category B Noise Abatement

Criteria (NAC) defined as 66 dBA at any residential areas. Overall the project would generate a noise benefit for residents within the study area because of the improved traffic flow and the reduced hours of peak traffic conditions. Table 3-2 presents estimated peak hour noise levels for the Preferred Alternative.

3.15.3 Mitigation Measures

The Preferred Alternative would generate a slight noise level increase at some locations (less than 3 dBA) or decrease noise levels at other locations in 2022, and projected peak hour noise levels would not approach or exceed the FHWA Activity Category B NAC; therefore, no noise mitigation measures are required.

Table 3-2
Estimated Peak Hour L_{eq} Noise Levels (dBA)

Monitoring Locations	Description	Estimated Peak Hour L _{eq} Noise Levels (dBA)		
		2002 Existing	2022 No Action Alternative	2022 Preferred Alternative
1	Jeanette Rankin Park	62	63	64
2	5th Street	61	62	61
3	Arthur Avenue	60	61	62
4	6th Street	66	67	59
5	Maurice Avenue	61	62	53

L_{eq} - Equivalent Noise Level

3.15.4 Construction Noise Impacts and Mitigation Measures

Highway construction is completed in several different phases. These phases are:

- Mobilization - Contractor moves equipment to the project.
- Clearing and grubbing - Contractor removes trees, rocks, obstacles.
- Earthwork - Contractor cuts or fills dirt into area to reach desired grade.
- Foundations - Structural base preparation.
- Base Preparation - Gravel or other material added to road to make a stable base.
- Paving and Cleanup - Final paving and site work such as trees, shrubs, irrigation.

The project area is located in a residential urban area; therefore, the Contractor would be required to implement appropriate construction noise mitigation measures. These measures shall include:

- Implement a Community Relations Program to inform the public of any potential noise impact and any measures that would be employed to reduce these impacts.
- Coordinate early with the MDT construction Project Manager to reduce construction noise levels by sequencing construction activities appropriately.
- Ensure that all construction equipment would be equipped with exhaust mufflers, and would be maintained to minimize engine noise.

- Limit construction activities to maintain compliance with the Missoula City Noise Ordinance (MMC 9.30. MP).

3.16 Hazardous Material/Substances

3.16.1 Affected Environment

Hazardous materials are products or wastes regulated by the EPA or the Montana DEQ. These include substances regulated under the Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA or Superfund), the Resource Conservation and Recovery Act (RCRA), and regulations for solid waste management, above-ground storage tanks (ASTs), and underground storage tanks (USTs).

No National Priority List (NPL) or Superfund sites identified by the EPA are located in or near the Arthur Avenue area. The EPA's current list of the RCRA regulated treatment, storage, and disposal facilities and hazardous waste generators was reviewed to determine if any such facilities exist in the project area.

The proposed project area was reviewed for potential sources of hazardous waste and records of known hazardous waste sites and hazardous waste generators in the Arthur Avenue area. DEQ's current list of UST and leaking underground storage tanks (LUST) facilities was reviewed as part of this evaluation. The project area had no LUST or UST sites south of the Madison Street Bridge within the project area.

The only other known potential sources of hazardous wastes for the proposed project would be associated with the equipment used for construction of the new roadway and its related features. These are the fuels, lubricants, hydraulic fluids, and related items needed for construction vehicles and equipment. A slight risk of the release of these hazardous fluids exists since vehicles and heavy equipment would be operating within the project area throughout the construction period.

3.16.2 Mitigation Measures

The contractor will be required to follow all MDT standard specifications in order to minimize hazardous waste impacts of the proposed project.

3.17 Archaeological and Historical Resources

3.17.1 Significant Cultural Resources

Cultural resources are protected by the National Historic Preservation Act of 1966, as amended. This legislation requires the identification and evaluation of cultural resources that a project may impact. It further requires that resources identified be avoided, if possible, or when avoidance is not possible, that any adverse effects of the project on the resource be mitigated. Coordination is required with the Montana State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation if there is an adverse effect on historic properties.

The University Area Historic District (24MO827) (Figure 3-2) was listed on the National Register of Historic Places (NRHP) in 2000 and is located adjacent to the

project area. It should be noted that the *eligible* historic district encompasses the entire *listed* historic district (24MO827) as well as the outlying properties that are believed to contribute to the overall character of the historic district. The district is bounded on the north by the Jeanette Rankin Peace Park (24MO893), on the east by Maurice Avenue, the south by Eddy Avenue, and the west by Helen Avenue.

A cultural resource survey of the project area was conducted in 2002 (see Table 3-3). Thirty new properties were recorded and evaluated as to their contribution or non-contribution to the listed University Area Historic District. Of those, 12 contributing properties are located within the Area of Potential Effect on Arthur Avenue, South 5th Street East, and South 6th Street East. On South 5th Street East, the contributing property is 659. On South 6th Street East they are: the Headley Place (610 South 6th Street East) as well as 609, 615, 620, 625, 629, 634, 664, 645, 659 and 666. None of these properties are located within the listed University Area Historic District boundaries. Although not located within the listed historic district, because of their proximity, the properties lie within the eligible historic district.

The Headley Place is a single-story Craftsman-style residence that was constructed about 1929. It, too, retains a high degree of architectural integrity and contributes to the historic district.

The remaining eleven contributing properties were constructed between 1933 and 1938 and display a wide array of different architectural styles, including Craftsman, Tudor, and Minimalist Tradition. All 11 properties exhibit a high degree of architectural integrity and association with the initial development of this neighborhood adjacent to the University of Montana Campus.

3.17.2 Project Impact

A preliminary design of the Arthur Avenue – Missoula project has been completed and a copy of the preliminary plans in the vicinity of the historic sites is attached (Figure 3-2).

It is the intent of the project to widen Arthur Avenue 36 feet from the existing 44 feet to approximately 80 feet in the vicinity of the historic properties between South 5th Street East and South 6th Street East. Widening would necessitate the removal of one historic property (610 South 6th Street East, The Headley Place) at the intersection of Arthur Avenue and South 6th Street East. This property was evaluated to contribute to the University Area Historic District.

On South 5th Street East the existing 41-foot roadway would be narrowed on the north side approximately six feet to accommodate the new 33-foot roadway. This results in a wider boulevard between the street and sidewalk. For alignment purposes, the roadway would be shifted approximately two feet to the south on the south side of 5th Street. This would necessitate the removal of trees on the boulevard on the south side of the street adjacent to a contributing historic property (659 South 5th Street East). There would not be, however, encroachment on the property boundaries.

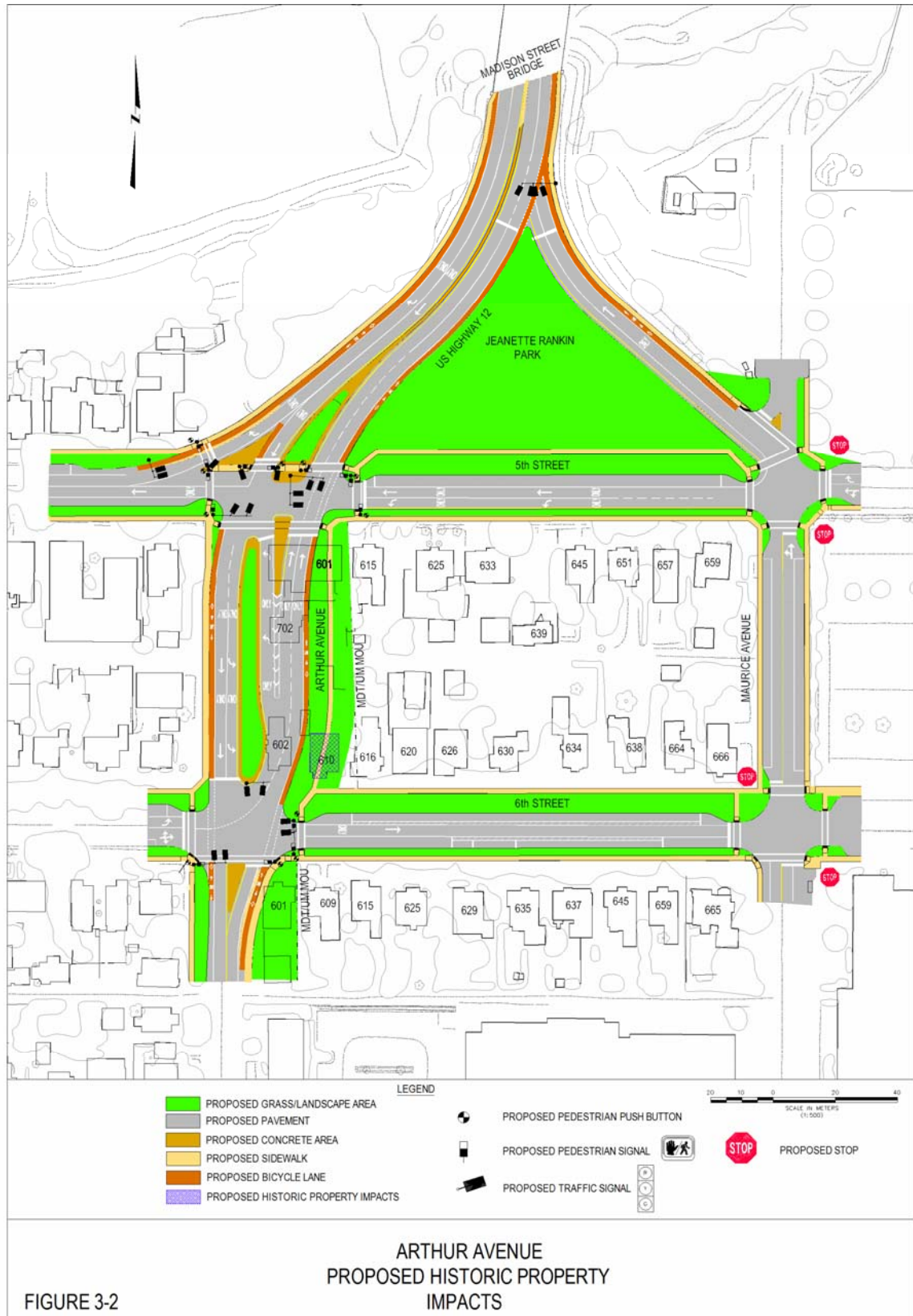


Table 3-3
Arthur Avenue Project, Resources Inventoried
(The 12 contributing properties within the area of potential effect are highlighted)

Street Address	Previously recorded for the historic district (Y/N)	NRHP eligibility	Comments
600 Eddy	No	Non-contributing element	Recent construction
500 Eddy	Yes	Contributing element	Revised site form
504 Eddy	Yes	Contributing element	Revised site form
506 Eddy	Yes	Contributing element	
526 Eddy	Yes	Contributing element	
534 Eddy	Yes	Contributing element	
538 Eddy	Yes	Contributing element	
542 Eddy	Yes	Contributing element	
502 S. 6th E.	Yes	Contributing element	Revised site form
503 S. 6th E.	Yes	Contributing element	Revised site form
505 S. 6th E.	Yes	Contributing element	
510 S. 6th E.	Yes	Contributing element	Revised site form
517 S. 6th E.	Yes	Non-contributing element	
517 ½ S. 6th E.	Yes	Non-contributing element	
518 S. 6th E.	Yes	Contributing element	Revised site form
524 S. 6th E.	Yes	Contributing element	
525 S. 6th E.	Yes	Contributing element	
529 S. 6th E.	Yes	Contributing element	Revised site form
532 S. 6th E.	Yes	Contributing element	Revised site form
533 S. 6th E.	Yes	Contributing element	Revised site form
543 S. 6th E.	Yes	Contributing element	
601 S. 6th E.	No	Non-contributing element	Loss of integrity
602 S. 6th E.	No	Non-contributing element	Heavily Remodeled Craftsman Style
609 S. 6th E.	No	Contributing element	Tudor Style
610 S. 6th E. – The Headley Place	No	Contributing element	Craftsman Style
615 S. 6th E.	No	Contributing element	Craftsman Style
616 S. 6th E.	No	Non-contributing element	Minimal Tradition Style
620 S. 6th E.	No	Contributing element	Prairie Style
625 S. 6th E.	No	Contributing element	Minimal Tradition Style
626 S. 6th E.	No	Non-contributing element	Loss of integrity
629 S. 6th E.	No	Contributing element	Minimal Tradition Style
630 S. 6th E.	No	Non-contributing element	Loss of integrity
634/636/636 ½ S. 6th E.	No	Contributing element	Minimal Tradition Style

Table 3-3 (continued)
Arthur Avenue Project, Resources Inventoried
(The 12 contributing properties within the area of potential effect are highlighted)

635 S. 6th E.	No	Non-contributing element	Loss of integrity
637 S. 6th E.	No	Non-contributing element	Loss of integrity
638 – 642 – 644 S. 6th E.	No	Non-contributing element	Loss of integrity
645 S. 6th E.	No	Contributing element	Recent construction
659 S. 6th E.	No	Contributing element	Recent construction
664 S. 6th E.	No	Contributing element	Colonial Revival Style
665 S. 6th E.	No	Non-contributing element	Loss of integrity
666 S. 6th E.	No	Contributing element	Greek Classical Revival Style
659 S. 5th E.	No	Contributing element	Arte Moderne
657 S. 5th E.	No	Non-contributing element	Recent construction
651 S. 5th E.	No	Non-contributing element	Recent construction
645 S. 5th E.	No	Non-contributing element	Recent construction
639 S. 5th E.	No	Non-contributing element	Recent construction
633 S. 5th E.	No	Non-contributing element	Recent construction
625 S. 5th E.	No	Non-contributing element	Recent construction
615 S. 5th E.	No	Non-contributing element	Recent construction
601 S. 5th E.	No	Non-contributing element	Recent construction
530 S. 5th E.	Yes	Contributing element	
529 S. 5th E.	Yes	Contributing element	
525 S. 5th E.	Yes	Non-contributing element	Recent apartments
524 S. 5th E.	Yes	Contributing element	
520 S. 5th E.	Yes	Contributing element	
516 S. 5th E.	Yes	Contributing element	Revised site form
510 S. 5th E.	Yes	Contributing element	
509 S. 5th E.	Yes	Contributing element	
505 S. 5th E.	Yes	Contributing element	
503 S. 5th E.	Yes	Contributing element	
500 S. 5th E.	Yes	Contributing element	
702 Arthur Ave	No	Non-contributing element	Craftsman
815 Arthur Ave	Yes	Contributing element	Revised site form
821 Arthur Ave.	Yes	Contributing element	Revised site form
Jeanette Rankin Park	No	Not eligible	

There would be an impact to the existing boulevard between the street and the historic property that would result in the removal of a tree.

On South 6th Street East, the existing 41-foot roadway would be narrowed to 33 feet, moving the northside of the roadway approximately eight feet to the south, away from the four historic properties (620, 634, 664, and 666 South 6th Street East) on the north side of the street between Arthur Avenue and Maurice Avenue. The four properties were evaluated to contribute to the University Area Historic District. There would, however, be no encroachment on the property boundaries. There would be an impact to the existing boulevard between the street and historic properties. The existing curb line on the south side of the street would be perpetuated and no construction activities would be completed adjacent to 609, 615, 625, 629, 645, and 659 South 6th Street East.

3.17.3 Project Effect

There would be an Adverse Effect to the Headley Place (610 S. 6th Street East/24MO946) as a result of the project. The property is individually eligible for the NHRP and, although it is located outside of the Historic District it would contribute to the University Area Historic District (24MO827) if included within its boundaries. Widening of Arthur Avenue and the installation of bike lanes, sidewalks, new curb and gutter, and shoulders would result in the removal of the property, which is currently owned by the University of Montana. The property is not in the Historic District, but if the district is expanded in the future, the property would be a contributing element.

There would be No Adverse Effect to 659 South 5th Street East as a result of the proposed project. Although the roadway would be widened in the direction of the residence, the widening would impact the existing boulevard and a tree currently standing there. There would be no encroachment on the site boundary and no physical impacts to the residence itself. There would, however, be an impact to the setting of the site because of the wider roadway and the loss of the tree. The MDT proposes to mitigate the effect by planting new semi-mature trees on the reconstructed boulevard in the approximate location of the older trees.

There would be No Effect to the six historic properties (609, 615, 625, 629, 645, and 659) located on the south side of South 6th Street East between Arthur and Maurice avenues. The existing curb line would be perpetuated. There would be no change in the existing boulevard and the existing trees would remain intact. Construction activities would not encroach on any of the six properties and the setting would remain intact. The qualities that would make the properties contributors to the historic district would remain intact.

The proposed project would have No Effect to the University Area Historic District (24MO827). The block bounded by Arthur and Maurice avenues is not currently included in the historic district. There would be no alteration of or change in the setting of the existing historic district as a result of the project. It would retain the characteristics that made it eligible for listing on the National Register of Historic Places.

3.17.4 Alternatives

Because of the increasing traffic demands placed on Arthur Avenue in the vicinity of the University of Montana campus, only the two options of the preferred alternative (other than the No-Build) were considered for this proposed project.

3.17.5 Mitigation

To mitigate the loss of the Headley Place (610 South 6th Street East/24MO946), MDT proposes to document the home to Historic American Building Survey (HABS) standards before it is demolished or relocated. The documentation would include an extensive site history, large-format photographs, and drawings of the property. The information would be provided to the Missoula Historic Preservation Commission, the Montana SHPO, and the National Park Service. The NPS has accepted the site for HABS recordation. The HABS recordation would also include streetscape photographs of Arthur Avenue between South 5th Street East and South 6th Street East prior to the initiation of construction activities.

In addition to recordation and in consultation with the Missoula Historic Preservation Commission and the Montana SHPO, the University of Montana will make the house available to be moved intact to another location.

3.18 Jeanette Rankin Park

3.18.1 Affected Environment

Jeanette Rankin Park (Site 24MO893) is located to the south of the Madison Street Bridge, which carries U.S. Highway 12 and crosses the Clark Fork River in Missoula, Montana. From the bridge the U.S. Highway 12 eastbound and westbound travel lanes diverge to form a couplet that turns U.S. Highway 12 into two separate one-way roadways. This couplet bounds the northeast and northwest sides of Jeanette Rankin Park. The south side of the park is bounded by 5th Street. The park is approximately 1.5 acres and is bowl shaped because of vertical curves for the approach and departure couplet, gaining elevation from south to north to connect to the Madison Street Bridge north of the park. The park is owned by MDT and recorded as right-of-way for U.S. Highway 12. Park maintenance is completed by the City of Missoula under a maintenance agreement with MDT.

The original park was built when the Madison Street Bridge was constructed in the mid 1950s. The park was renamed in honor of Jeanette Rankin in 1982 and is primarily a treed and grassed area with a memorial to Jeanette Rankin, which is surrounded by trees and located in the middle of the park. There is no known association with Jeanette Rankin's life that can be related to this park. The



West Corner of Jeanette Rankin Park (looking northeast)

park does not meet the standards to be placed in the National Historic Register. However, it is frequently used by the public as a place for a picnic, or by students as a spot to sit and read a book. Because the park contains the Jeanette Rankin Memorial, there are visitors who admire the memorial and the area which is landscaped and planted with flowers and shrubs. Given the size and shape of the park, and the amount of traffic that passes by the park on the east and west, the park is not often used for physical recreation such as a football game or Frisbee. Because the area is used by the public (there are benches and a memorial), and because it has 24-hour access by the public and is used as a public resource, MDT has determined that the park is a significant resource.

3.18.2 Impacts of the Preferred Alternative

If the preferred alternative is implemented, approximately 40 feet (12 meters) of the west side of the park (0.1 ha or 0.25 acres) would be required to use for roadway, curb, and gutter. This would have a minor impact on park use because the majority of the green space would remain intact and contiguous. Some sod and potentially some mature trees would be removed.

The area used would not impact the memorial of Jeanette Rankin. Use of approximately 40 feet (12 meters) of the west side of the park would remove valuable green space within a high vehicle travel area. Section 4 of this report includes the 4(f) evaluation for the park and describes in detail the impacts and mitigation efforts for the park.

3.19 Section 6(f) Lands

No National Land and Water Conservation Fund properties have been identified within the vicinity of the project. Therefore, there is no impact from the preferred alternative.

3.20 Pedestrian and Bicycle Facilities

3.20.1 Affected Environment

The project area receives high levels of pedestrian and bicycle traffic. This is due in part to the vicinity of the University. Pedestrian and bicycle facilities are currently present along streets within the Arthur Avenue project area. The existing bicycle facilities consist of bicycle lanes on both sides of the Madison Street Bridge that allow access to both Arthur Avenue and Maurice Avenue. The Maurice Avenue bike lane ends at 5th Street. The bike lane from the Madison Street Bridge to the Arthur Avenue/5th Street intersection transitions across the two southbound travel lanes to the south of the bridge, crossing from the west to the east side of the roadway along a sharp horizontal curve to the left which is impacted by a vertical crest curve. On Arthur Avenue between 5th and 6th Streets, there are bicycle lanes on both sides of the roadway that allow for the southbound movement of bicycles along the corridor. Arthur Avenue on the south side of 6th changes to two-way traffic with one bike lane for north and one bike lane for south movement.

Existing pedestrian facilities allow minimal marked crossings to the park and the

block encompassed by Arthur Avenue, Maurice Avenue, 5th Street, and 6th Street. Sidewalks do run on both sides of all of the roadways except for the couplets connecting the Madison Street Bridge to 5th Street, which only have sidewalks adjacent to the outside lane. At the intersection of Arthur Avenue and 5th Street there are marked pedestrian crossings on the south and east side of the intersection. At the intersection of Arthur Avenue and 6th Street there are designated crossings on the north, west, and south sides of the intersection. Along the east side of the intersection pedestrian crossing is prohibited and signs have been installed.

This is the only signal assisted facility currently within the project. The intersection of Maurice Avenue and 5th Street has a designated crossing on the north and east sides of the intersection. At the intersection of Maurice Avenue and 6th Street there are marked pedestrian facilities along the eastern and southern sides of the intersection.

3.20.2 Impacts of the Preferred Alternative

In addition to improving vehicular facilities, the preferred alternative would improve the safety and flow of pedestrians and bicycles through the corridor. Many of the bicycle facilities would remain in their current form with the addition of improvements to reduce possible vehicle/bicycle conflicts. The major area of current conflict occurs with southbound traffic on the south of the Madison Street Bridge where bicyclists cross the two traffic lanes. To alleviate this problem the bike lane has been extended down the northwest side of the roadway to the intersection where they can cross with a protected signal or cross to a pocket located in the new southbound Arthur Avenue configuration. A new northbound bicycle lane would be added on Arthur Avenue from 6th Street to the Madison Street Bridge to accommodate the northbound bicycle movement. Preliminary alternatives showed a bike lane on the south side of 6th street. At the request of the City and the University the bike lane was replaced with a parking lane. The City had also requested a left turn lane, from Arthur Avenue to 6th Street, for bicyclists. After careful consideration it was determined by MDT that the left turn lane was not a viable option at this location. In part, there are safety concerns associated with the potential over-run condition between a large truck and a bicycle.

Pedestrian facilities would be greatly improved with the preferred alternative with more access to the park and the block encompassed by Arthur Avenue, Maurice Avenue, 5th Street, and 6th Street. Sidewalk configurations would remain similar to existing conditions, but additional crosswalks would be added for increased functionality. The intersection of Arthur Avenue and 5th Street would become much more complex with the addition of new signals and additional lanes, and pedestrian facilities would be incorporated to assist with pedestrian mobility. This intersection would have signal assisted crossings on all four sides. The intersection at 6th Street and Arthur Avenue would have signal assisted crossings on the east, south, and west sides of the intersection. There would not be a crossing on the north side of the intersection because it would expose pedestrians to left-turning motor vehicle traffic coming from 6th and heading over the bridge two lanes abreast on a large radius. At the intersection of Maurice Avenue and 5th Street the intersection control would be a three-way stop with marked crossings on the east, south, and west sides of the

intersection. In addition, there would be a marked crossing along the parking lot along the north side of the intersection. At the intersection of Maurice Avenue and 6th Street the intersection control would be a two-way stop with marked crossings on all four sides of the intersection.

3.21 Visual Resources

No negative impacts to visual resources have been determined.

3.22 Construction Impacts

3.22.1 Affected Environment

Construction activities from the proposed project would cause temporary inconveniences to the traveling public. These would occasionally result in longer travel times, detours, temporary complete closure, and noise and dust due to the heavy equipment and machinery. These disruptions would occur intermittently for the duration of the construction period.

3.22.2 Mitigation Measures

This proposed project's contractor would be subject to all state and local laws to minimize construction noise by having mufflers on all equipment. Dust mitigation would also be required by using either water or another approved dust suppressant. All advance warning and detour signing would be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and would be used to mitigate potential traffic congestion with the use of detours and/or alternate routes. In addition, the proposed project will make efforts to complete construction during the summer months to minimize impacts to the University travel during the fall and spring semesters. The contractor would be under an incentive program to maintain the short construction timeframe and minimize impacts to the University and residences along the project. Performance specifications would be used for detour construction maintenance to maximize the efficiency of the contractor while specifying general guidelines for construction access to the residences and the University.

3.23 Permits Required

The proposed project would be in compliance with both the Water Quality provisions of 75-5-308 M.C.A. for Section 3 (a) authorizations, and Stream Protection under 87-5-501 through 509 M.C.A., inclusive. In addition, MDFWP stated that since this proposed project would not impact the banks of the Clark Fork River, or the River itself, the 124 SPA Stream Protection Permit would not be needed for this project.

However, prior to and during any relevant disturbances, the proposed project's preferred alternative would require the following under the Clean Water Act (33 U.S.C. 1251-1376, as amended):

- A Section 402/Montana Pollutant Discharge Elimination System (MPDES) authorization from the DEQ's Permitting and Compliance Division.

- Comply with the City-County Health Department for fugitive dust, paving, and the State Conformity process.

3.24 Secondary and Cumulative Impacts

MDT does not foresee any construction projects in the vicinity of the Arthur Avenue project other than an overlay of Arthur Avenue from 6th Street to South Avenue and the Van Buren Street pedestrian bridge.

The University has two potential construction projects that would be ongoing during the proposed construction of this project. The first project would be the construction of a new journalism building, which would be located to the north of Jeanette Rankin hall. This project is located approximately 0.25 miles to the southwest of the Arthur Avenue project area. The second project would be the expansion of the Pharmacy building. This project is approximately 0.5 miles to the southeast of the Arthur Avenue project. Both of these projects have estimated construction timeframes of 2005 to 2007. These projects would have minor impacts on the Arthur Avenue project. Material deliveries may add traffic impacts to the detour area. In addition, the University is planning a trail project from the near the intersection of 5th and Maurice to connect to the riverfront trail system and the new pedestrian bridge.

It is possible that as the project construction date draws closer smaller city projects may emerge near the Arthur Avenue project area.

Minor, but beneficial, economic impacts to Missoula would likely result as the Arthur Avenue project and others in Missoula are successively implemented over the next decade. The road reconstruction projects in the area may increase the demand for local goods and services (food, lodging, fuel, and recreation) in communities within the Missoula area during the construction period for each roadway project.

Because these projects would not adjoin one another in some instances, and would be implemented in different years, businesses in Missoula communities would likely be able to meet such demands for goods and services. In addition, it is anticipated that construction for the Arthur Avenue project would occur during the summer student break to help minimize the University impacts. Therefore, the cumulative economic effects of implementing the Arthur Avenue project and others known or proposed in the area would be minor.

No other secondary or cumulative impacts are anticipated that would affect stormwater runoff or increased impervious surfaces. In addition, there are no anticipated changes to vehicle, pedestrian, and bicycle routes, other than the realignment of U.S. Highway 12, that could adversely affect the Arthur Avenue project.

DRAFT SECTION 4(f) EVALUATION

Arthur Avenue – Missoula
CM 7-2(36)94: CN 4611

MISSOULA COUNTY, MONTANA

This document contains the information required for a *Section 4(f)* Evaluation as required by *Section 4(f)* of the *U.S. DEPARTMENT OF TRANSPORTATION Act* under 23 CFR 771.135.

Submitted pursuant to:

49 U.S.C. 303

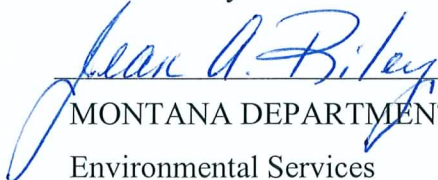
by the

U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration

and the

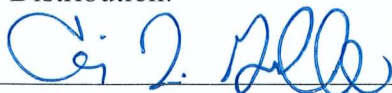
MONTANA DEPARTMENT OF TRANSPORTATION

Submitted by:


MONTANA DEPARTMENT OF TRANSPORTATION
Environmental Services

Date: 3/27/2006

Reviewed & Approved for
Distribution:



Date: 3/29/2006

FEDERAL HIGHWAY ADMINISTRATION

Section 4

Section 4(f) Evaluation

Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. 303 Section 4(f)) declared that “it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.” Section 4(f) properties are publicly owned parks, recreation areas, or wildlife and waterfowl refuges of national, state, or local significance, and historic resources eligible for listing on the National Register of Historic Places or are locally significant. Section 4(f) specifies that:

“the Secretary [of Transportation] may approve a transportation program or project requiring the use of a public park, recreation area, or wildlife and waterfowl refuge or 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) only if there is no prudent and feasible alternative to using that land; and the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.”

In general, a Section 4(f) “use” occurs when:

- Section 4(f) land is permanently acquired for a transportation facility;
- There is a temporary occupancy of Section 4(f) land that is adverse in terms of the Section 4(f) preservationist purposes; or,
- Section 4(f) land is not incorporated into the transportation project, but the project’s proximity impacts are so severe that the purposes for which the Section 4(f) site exists are substantially impaired. (This use is also known as “constructive use.”)

This Section 4(f) evaluation has been prepared pursuant to the finding that the preferred alternative of Arthur Avenue from 6th Street to 5th Street, including the intersections, would affect or “use” publicly owned land of a public park (0.25 acres of Jeanette Rankin Park). In addition, the preferred alternative would have adverse effects on one historic property, removing the entire property. While this property is not located within the boundaries of the **University Area Historic District (24MO827)** (see Figure 4-3), it does lie within the eligible historic district, and it was determined to be a property that is individually eligible for NHRP and would contribute to the listed historic district. The evaluation describes the proposed action and how it might affect the Section 4(f) properties, discusses alternatives that would avoid the use of the Section 4(f) properties, and describes measures undertaken to minimize harm to the properties where avoidance is not feasible or is not prudent.

4.1 Description of Proposed Action

The MDT, in cooperation with the University of Montana (University) and the City of Missoula, proposes to reconstruct Arthur Avenue from 6th Street to 5th Street, including the intersections. The work would also include realignment of the U.S. Highway 12 eastbound couplet (traffic flowing north from Madison Street Bridge) between the Madison Street Bridge and the 6th Street/Maurice Avenue intersection; and realignment of the U.S. Highway 12 westbound couplet (traffic flowing south from Madison Street Bridge) between the bridge and the Arthur Avenue/5th Street intersection. Figure 4-1 shows the existing alignment and 4(f) resources, and Figure 4-2 shows the preferred alternative and proposed 4(f) impacts.

4.1.1 Purpose and Need

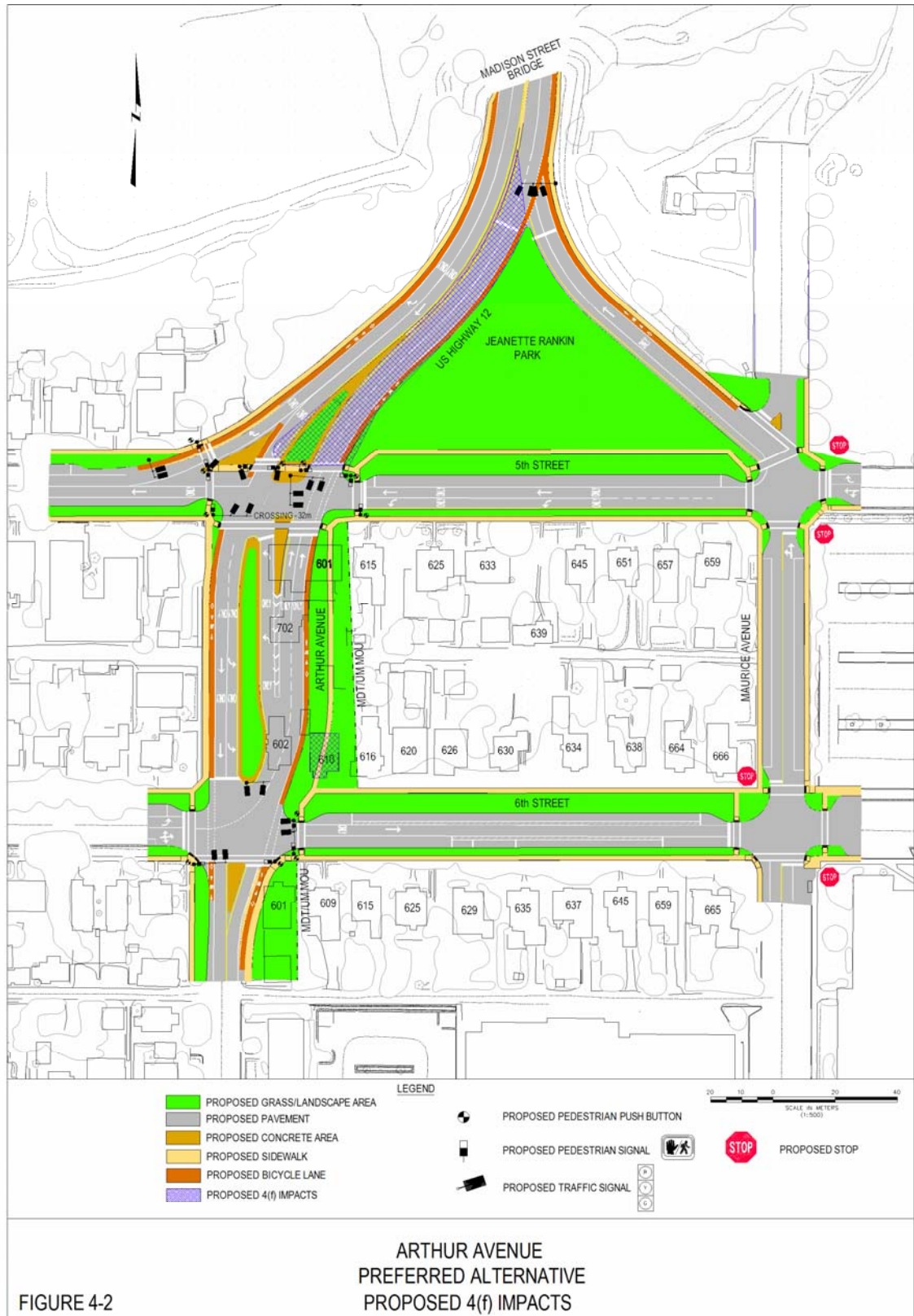
The purpose of the Arthur Avenue project is to improve vehicle, bicycle, and pedestrian flow on U.S. Highway 12 near the University of Montana - Missoula Campus (University) allowing the safe and efficient movement of traffic. The proposed improvements would accomplish this by installing pedestrian and bicycle facilities, traffic actuated signals, and realignment of the existing roadways to establish a more direct route for U.S. Highway 12. This would reduce the traffic on 6th Street and Maurice Avenue, increasing the safety around the University.

The Purpose and Need segment of Section 1 in the Environmental Assessment (EA) identified nine needs that would be addressed by the Arthur Avenue reconstruction:

- To maintain a uniform volume capacity across the project that will be consistent with the surrounding U.S. Highway 12 roadways.
- To incorporate physical changes to the roadway and its adjoining environment to increase the safety, comfort, and convenience of the traveling public.
- To provide a more direct route for U.S. Highway 12 traffic without impacting the capacity of adjacent or connecting roadways.
- To provide a more efficient and user-friendly entrance to the University.
- To accommodate the multimodal travel of trucks, cars, bicycles, and pedestrians.
- To decrease the impacts of University special events on U.S. Highway 12 traffic and increase the efficiency and safety for the public traveling to and from the special events.
- To have a positive effect on air quality.
- To update existing roadway facilities.
- To recognize, evaluate, and comply, if feasible, with the requirements of the MOU between the City of Missoula, MDT, and the University regarding property available for the project and other issues.



FIGURE 4-1



4.1.2 Alternatives Analyzed in the Environmental Assessment

MDT and the FHWA considered many alternatives to address the transportation needs, safety improvements, and traffic control/geometric deficiencies identified for the Arthur Avenue project. The process of selecting the preferred alternative is identified in Section 2 of the EA and includes several conceptual alternatives that were rejected for various reasons. These conceptual alternatives can be categorized and placed into the following four groups:

- Alternative Group 1 – No-Build (no road reconstruction).
- Alternative Group 2 – Minimal Improvements (traffic signal improvements, new pavement markings, and advanced University signing).
- Alternative Group 3 – Moderate Improvements (roadway realignments and roundabouts).
- Alternative Group 4 – Extensive Improvements (overpass structures and interchanges).

From the refinement of these conceptual alternatives, a preferred alternative (chosen from Group 3) was developed based on the University, City, and community's support and comments. The MDT, the City of Missoula, and the University support the preferred alternative because the improvements best meet the needs of the project, giving consideration to economic and environmental effects, technical aspects, public opinion, "no added capacity" objective, and the MOU. The preferred alternative is detailed further in Section 2.8 of the EA and shown at the end of Table 4-2.

4.2 Description of Section 4(f) Resources

4.2.1 Recreation Areas

Jeanette Rankin Park (Site 24MO893) is located to the south of the Madison Street Bridge, which carries U.S. Highway 12 and crosses the Clark Fork River in Missoula, Montana. From the bridge the U.S. Highway 12 eastbound and westbound travel lanes diverge to form a couplet that turns U.S. Highway 12 into two separate one-way roadways. This couplet bounds the northeast and northwest sides of Jeanette Rankin Park. The south side of the park is bounded by 5th Street. The park is approximately 1.5 acres and is bowl shaped because of vertical curves for the approach and departure couplet, gaining elevation from south to north to connect to the Madison Street Bridge north of the park. The



West Corner of Jeanette Rankin Park (looking northeast)

park is owned by MDT and recorded as right-of-way for U.S. Highway 12. Park maintenance is completed by the City of Missoula under a maintenance agreement with MDT.

The original park was built when the Madison Street Bridge was constructed in the mid 1950s. The park was renamed in honor of Jeanette Rankin in 1982 and is primarily a treed and grassed area with a memorial to Jeanette Rankin, which is surrounded by trees and located in the middle of the park. There is no known association with Jeanette Rankin's life that can be related to this park. The park does not meet the standards to be placed in the National Historic Register. However, it is frequently used by the public as a place for a picnic, or by students as a spot to sit and read a book. Because the park contains the Jeanette Rankin Memorial, there are visitors who admire the memorial and the area which is landscaped and planted with flowers and shrubs. Given the size and shape of the park, and the amount of traffic that passes by the park on the east and west, the park is not often used for physical recreation such as a football game or Frisbee. Because the area is used by the public (there are benches and a memorial), and because it has 24-hour access by the public and is used as a public resource, MDT has determined that the park is a significant resource. The focus of this 4(f) is to evaluate alternatives that allow the park to be used as it is now – an area to relax, picnic, read a book, visit the memorial, etc.

4.2.2 Significant Historic Properties

Cultural resources and historic properties are protected by the National Historic Preservation Act of 1966, as amended. This legislation requires the identification and evaluation of all cultural and historic resources that a project may impact. It further requires that resources identified be considered for avoidance if possible or, when avoidance is not possible, that any adverse effects of the project on the resource be mitigated. Coordination is required with the Montana SHPO and the Advisory Council on Historic Preservation if there is an adverse effect on historic properties. For the purpose of the Arthur Avenue Project, no cultural resources were identified. Therefore, an evaluation was completed only for impacts to historic properties.

The **University Area Historic District (24MO827)** was listed on the NRHP in 2000. The district includes 33 contributing and two non-contributing historic properties within its boundaries. The district is bounded by South 4th Street East on the north, by Higgins Avenue on the west, by Arthur Avenue on the east, and by Beckwith Avenue on the south. It should be noted that the *eligible* historic district encompasses the entire *listed* historic district (24MO827) as well as the outlying properties that are believed to contribute to the overall character of the historic district. The historic district, both listed and eligible, is within the Area of Potential Effect by the project. However, after analysis, MDT and SHPO agreed that the project would have no effect on the listed district. However, one home in the eligible historic district and deemed to contribute to the listed historic district would be impacted by the project (610 South 6th Street East). Figure 4-3 shows the existing University Historic District boundary in relation to the potential 4(f) impacts of the proposed Arthur Avenue project.

The historic nature of the area properties was determined by a cultural resource survey of the project area, which was conducted in 2002 (See Table 4-1 below). Thirty

historic properties were recorded and evaluated as to their contribution or non-contribution to the University Area Historic District. In total, the eligible historic district includes 63 contributing properties, and 12 of these contributing properties are located outside of the listed historic district boundary and within the Area of Potential Effect on Arthur Avenue, South 5th Street East, and South 6th Street East (See Figure 4-3). On South 5th Street East, the contributing property is 659. On South 6th Street East the properties are the Headley Place (610 South 6th Street East) as well as 609, 615, 620, 625, 629, 634, 645, 659, 664, and 666 South 6th Street East.



**Table 4-1
Arthur Avenue Project Resources Inventoried**

Street Address	Previously recorded for the historic district (Y/N)	NRHP eligibility	Comments
600 Eddy	No	Non-contributing element	Recent construction
500 Eddy	Yes	Contributing element	Revised site form
504 Eddy	Yes	Contributing element	Revised site form
506 Eddy	Yes	Contributing element	
526 Eddy	Yes	Contributing element	
534 Eddy	Yes	Contributing element	
538 Eddy	Yes	Contributing element	
542 Eddy	Yes	Contributing element	
502 S. 6th E.	Yes	Contributing element	Revised site form
503 S. 6th E.	Yes	Contributing element	Revised site form
505 S. 6th E.	Yes	Contributing element	
510 S. 6th E.	Yes	Contributing element	Revised site form
517 S. 6th E.	Yes	Non-contributing element	
517 ½ S. 6th E.	Yes	Non-contributing element	
518 S. 6th E.	Yes	Contributing element	Revised site form
524 S. 6th E.	Yes	Contributing element	
525 S. 6th E.	Yes	Contributing element	
529 S. 6th E.	Yes	Contributing element	Revised site form
532 S. 6th E.	Yes	Contributing element	Revised site form
533 S. 6th E.	Yes	Contributing element	Revised site form
543 S. 6th E.	Yes	Contributing element	
601 S. 6th E.	No	Non-contributing element	Loss of integrity
602 S. 6th E.	No	Non-contributing element	Heavily remodeled Craftsman Style
609 S. 6th E.	No	Contributing element	Tudor Style
610 S. 6th E. The Headley Place	No	Contributing element	Craftsman Style
615 S. 6th E.	No	Contributing element	Craftsman Style
616 S. 6th E.	No	Non-contributing element	Minimal Tradition Style
620 S. 6th E.	No	Contributing element	Prairie Style
625 S. 6th E.	No	Contributing element	Minimal Tradition Style
626 S. 6th E.	No	Non-contributing element	Loss of integrity
629 S. 6th E.	No	Contributing element	Minimal Tradition Style
630 S. 6th E.	No	Non-contributing element	Loss of integrity
634/636/636 ½ S. 6th E.	No	Contributing element	Minimal Tradition Style
635 S. 6th E.	No	Non-contributing element	Loss of integrity
637 S. 6th E.	No	Non-contributing element	Loss of integrity
638, 642, 644 S. 6th E.	No	Non-contributing element	Loss of integrity
645 S. 6th E.	No	Contributing element	Recent construction
659 S. 6th E.	No	Contributing element	Recent construction
664 S. 6th E.	No	Contributing element	Colonial Revival Style
665 S. 6th E.	No	Non-contributing element	Loss of integrity
666 S. 6th E.	No	Contributing element	Greek Classical Revival Style
659 S. 5th E.	No	Contributing element	Arte Moderne
657 S. 5th E.	No	Non-contributing element	Recent construction
651 S. 5th E.	No	Non-contributing element	Recent construction
645 S. 5th E.	No	Non-contributing element	Recent construction
639 S. 5th E.	No	Non-contributing element	Recent construction
633 S. 5th E.	No	Non-contributing element	Recent construction
625 S. 5th E.	No	Non-contributing element	Recent construction
615 S. 5th E.	No	Non-contributing element	Recent construction
601 S. 5th E.	No	Non-contributing element	Recent construction
530 S. 5th E.	Yes	Contributing element	
529 S. 5th E.	Yes	Contributing element	
525 S. 5th E.	Yes	Non-contributing element	Recent apartments

Table 4-1 (continued)
Arthur Avenue Project Resources Inventoried

524 S. 5th E.	Yes	Contributing element	
520 S. 5th E.	Yes	Contributing element	
516 S. 5th E.	Yes	Contributing element	Revised site form
510 S. 5th E.	Yes	Contributing element	
509 S. 5th E.	Yes	Contributing element	
505 S. 5th E.	Yes	Contributing element	
503 S. 5th E.	Yes	Contributing element	
500 S. 5th E.	Yes	Contributing element	
702 Arthur Ave.	No	Non-contributing element	Craftsman Style
815 Arthur Ave	Yes	Contributing element	Revised site form
821 Arthur Ave.	Yes	Contributing element	Revised site form
Jeanette Rankin Park	No	Not eligible	

- Part of Inventory but not adjacent to any proposed construction
- Part of Inventory, Adjacent to proposed construction
- Part of Inventory, Adjacent to proposed construction, Contributing to District
- Part of Inventory, Contributing to District, Adversely Impacted by Proposed Alternative



Headley Place (Right) at 610 South 6th Street East.

The Headley Place (610 South 6th Street East), a single-story Craftsman-style residence that was constructed in 1929, retains a high degree of architectural integrity. The Headley Place is not in the Historic District, but is individually eligible for NHRP. If the Historic District is expanded, the Headley Place would be a contributing element.

The remaining 11 of the 12 properties located within the Project Area of Potential Effect were constructed between 1933 and 1938 and display a wide array of different architectural styles, including Craftsman, Tudor, and Minimalist Tradition. All 12 properties exhibit a high degree of architectural integrity and association with the initial development of this neighborhood adjacent to the University of Montana campus.

All of the Project 4(f) Resources in the Arthur Avenue – Missoula project area are shown in Figure 4-1.

4.3 Description of 4(f) Uses

4.3.1 4(f) Uses of the Preferred Alternative

The preferred alternative for the Arthur Avenue project and the Proposed 4(f) uses resulting from this alternative are presented in Figure 4-2 and discussed in the following sections. The preferred alternative includes two options, one without a left turn lane and one with a turn lane.

4.3.1.1 Preferred Alternative Uses of Recreation Areas

Jeanette Rankin Park is a publicly owned park which contains a statue and memorial of Jeanette Rankin. The park has been observed to be a picnic area, a study area, and a resting area for students. The park has limited value for sporting activities due to the small size and its triangular shape. The Jeanette Rankin Memorial offers visitors and students a visually appealing landmark. The preferred alternative will require acquisition of approximately 40 feet (12.2 meters) of the west side of the park and would remove approximately 0.25 acres of green space (area of visually appealing vegetation) within a high vehicle travel area for permanent use as a transportation facility. While some sod and potentially some mature trees would be removed, the area used would not impact the Jeanette Rankin Memorial or adversely affect the existing intent of the park as a “green space” with visual appeal.

4.3.1.2 Preferred Alternative Uses of Historic Properties

The preferred alternative proposes to widen Arthur Avenue from the existing 44 feet to approximately 80 feet in the vicinity of the historic properties between South 5th Street East and South 6th Street East. Widening would require removing one historic property (610 South 6th Street East -The Headley Place) at the intersection of Arthur Avenue and South 6th Street East. This property is outside of the listed historic district boundary but was determined to contribute to the University Area Historic District.

On South 5th Street East, the roadway would be shifted to the south to accommodate an approximate 41-foot roadway. This would require removing trees on the boulevard on the south side of the street adjacent to a contributing historic property (659 South 5th Street East). There would be no encroachment on the property boundaries. The necessary roadway width required for the preferred alternative would come from the existing boulevard between the street and the historic property, and would require the removal of one tree.

On South 6th Street East, the roadway would be narrowed, moving the north side of the roadway to the south, away from the four historic properties (620, 634, 664, and 666 South 6th Street East) on the north side of the street between Arthur Avenue and Maurice Avenue. These four properties contribute to the University Area Historic District. There would be no encroachment on the property boundaries. However, there would be an impact to the historic setting of the existing boulevard between the street and historic properties due to the proximity of the roadway improvements. Although the existing curb line on the south side of the street would be shifted

approximately 2 feet to the south, the sidewalk would remain in its existing location. There would be no encroachment on the property boundaries; however, due to the proximity of the roadway improvements there would be an impact to historic setting adjacent to 609, 615, 625, 629, 645, and 659 South 6th Street East.

There would be an Adverse Effect to the Headley Place (610 South 6th Street East) as a result of the proposed project. This property lies within the eligible Historic District and was determined to contribute to the **University Area Historic District (24MO827)** if the district is expanded. Widening Arthur Avenue and installing bike lanes, sidewalks, new curb and gutter, and shoulders would result in the removal of Headley Place, which is currently owned by the University of Montana. The preferred alternative would completely use all of the property requiring the structure to be moved.

There would be No Adverse Effect to 659 South 5th Street East as a result of the proposed project. Although the roadway would be widened in the direction of the residence, the widening would only impact the existing boulevard and one tree. There would be no encroachment on the property boundary and no physical impacts to the residence itself. There would, however, be an impact to the historic setting of the site because of the wider roadway and the loss of one tree. MDT proposes to mitigate the effect by working with the City to plant new trees on the reconstructed boulevard in the approximate location of the older trees.

There would be No Adverse Effect to the four contributing historic properties (620, 634, 664, 666 South 6th Street East) on the north side of South 6th Street East between Arthur Avenue and Maurice Avenue. The roadway would be narrowed away from residences and the existing boulevard reconstructed to accommodate the new boulevard. There would be no encroachment on the historic property boundaries and the work would be confined to the existing right-of-way.

There would be No Effect to the six historic properties (609, 615, 625, 629, 645, and 659 South 6th Street East) located on the south side of South 6th Street East between Arthur Avenue and Maurice Avenue. The existing curb line would be shifted approximately 2 feet to the south and the boulevard width would be reduced to maintain the existing sidewalk location. MDT will work with the City to plant new trees in the reconstructed boulevard. Construction activities would not encroach on any of the six properties and the setting would remain intact.

The proposed project would have No Effect to the **University Area Historic District (24MO827)**. The block bounded by Arthur Avenue and Maurice Avenue is not currently included in the listed historic district. However, one property on this block, 610 South 6th Street, does lie within the eligible historic district and would be adversely impacted by the preferred alternative. There would be no alteration of or change in the setting of the existing listed historic district as a result of the project. Overall, the historic district would retain the characteristics that made it eligible for listing on the National Register of Historic Places.

4.3.2 Alternatives that Avoid all 4(f) Resources

No alternative was identified that completely avoided all of the historic properties or Jeanette Rankin Park except the no-build alternative.

4.3.3 Description of Impacts

Numerous alternatives were considered for the Arthur Avenue Project, and the figures that follow this discussion in Table 4-2 briefly describe the impacts of each of the 14 conceptual alternatives on the Project 4(f) Resources. Also, Table 4-3 provides a comparison of Section 4(f) Impacts for each alternative. Of the 14 alternatives shown in Table 4-3, only the no-build alternative would have no impacts to 4(f) properties. Each of the alternatives created impacts to the park, impacts to historic properties, or both. A more detailed description of alternatives and their impacts is provided following the tables.

Table 4-2: Alternatives Considered for the Arthur Avenue Project

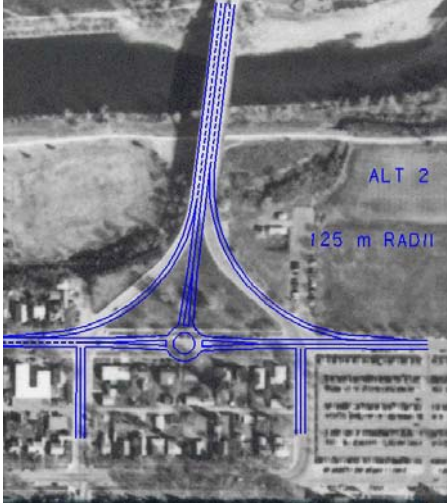
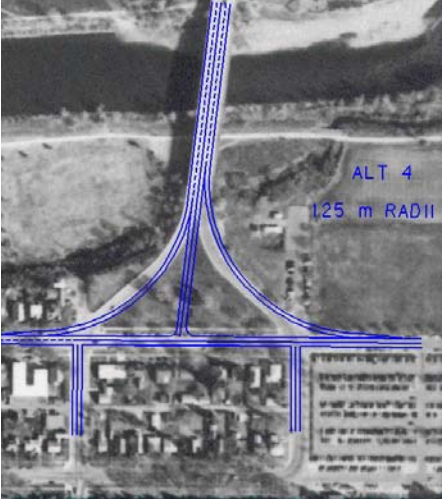
<i>Roundabout South of Madison Street Bridge</i>	<i>Intersection South of Madison Street Bridge</i>
	
<ul style="list-style-type: none"> ■ Park would be split down the middle, and approximately 50 percent of it would be removed. ■ Rankin Memorial would need to be relocated. ■ Loss of recreation, small possibility of green space remaining. ■ No impacts to historic homes. 	<ul style="list-style-type: none"> ■ Park would be split down the middle, and approximately 50 percent of it would be removed. ■ Rankin Memorial would need to be relocated. ■ Loss of recreation, small possibility of green space remaining. ■ No impacts to historic homes.

Table 4-2 continued: Alternatives Considered for the Arthur Avenue Project


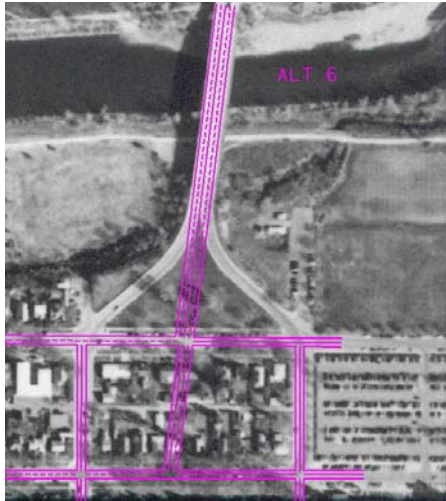
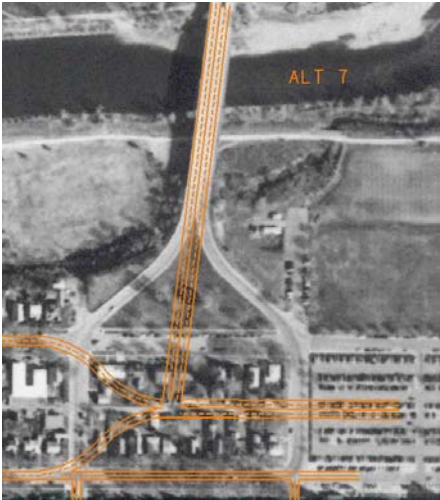

<i>U.S. Highway 12 Shift to Arthur</i>	<i>New Intersection at 5th and 6th</i>
	
<ul style="list-style-type: none"> ■ Approximately 20 percent of the park will be removed (might have possible addition on left side). ■ Rankin Memorial may be able to remain in place. ■ Impact to one historic home. 	<ul style="list-style-type: none"> ■ Park would be split down the middle, and approximately 30 percent of it would be removed. ■ Rankin Memorial would need to be relocated. ■ Loss of recreation, small possibility of green space remaining. ■ Impact to historic home at 620 6th street (will affect non-historic homes).
<i>New Roadway Between 5th and 6th</i>	<i>Flyovers Separating University and U.S. Highway 12</i>
	
<ul style="list-style-type: none"> ■ Park would be split down the middle, and approximately 30 percent of it would be removed. ■ Rankin Memorial would need to be relocated. ■ Loss of recreation, small possibility of green space remaining. ■ 2 historic homes and a total of 5 historic properties would be impacted. 	<ul style="list-style-type: none"> ■ Park would be split multiple times, and 80-100 percent of it would be removed. ■ Rankin Memorial would need to be relocated. ■ Loss of recreation, small possibility of green space remaining. ■ One historic property would be impacted.

Table 4-2 continued: Alternatives Considered for the Arthur Avenue Project

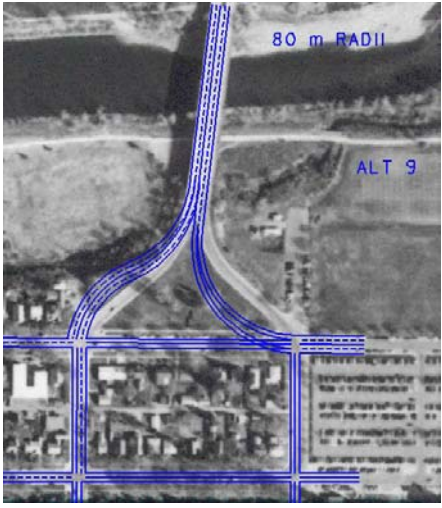
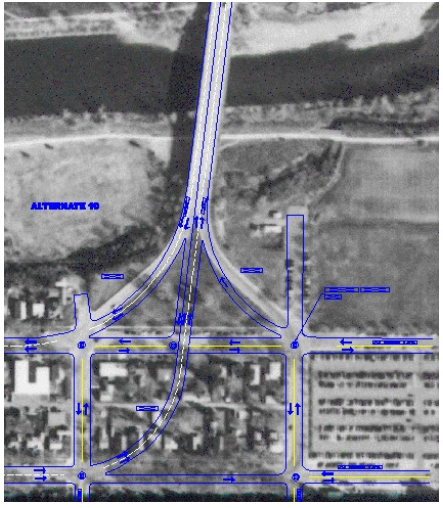
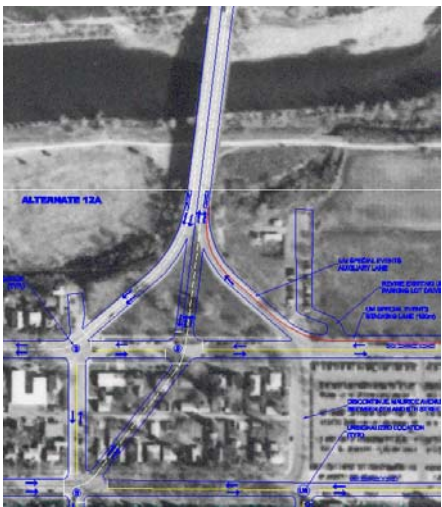



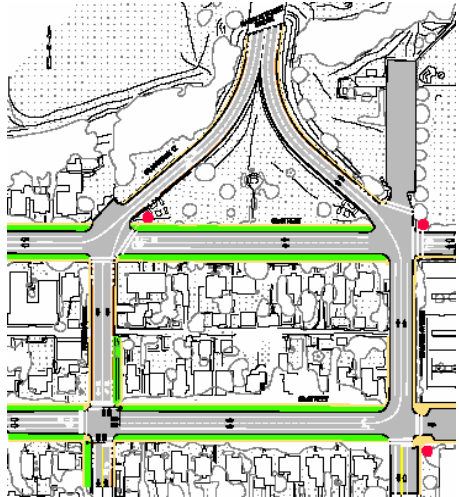
<i>Split Bridge 2-Lane 2-Way Flyovers</i>	<i>Flyover from the Madison Street Bridge</i>
	
<ul style="list-style-type: none"> ■ Approximately 20 percent of the park will be removed (might have possible addition on left side). ■ Rankin Memorial would need to be relocated. ■ One historic property would be impacted. 	<ul style="list-style-type: none"> ■ Park would be split down the middle, and approximately 50 percent of it would be removed. ■ Rankin Memorial would need to be relocated. ■ Loss of recreation, small possibility of green space remaining. ■ Two historic homes and two historic properties would be impacted.
<i>Adding a New Intersection at 5th Street</i>	<i>Realignment of 5th Street</i>
	
<ul style="list-style-type: none"> ■ Park would be split down the middle, and approximately 50 percent of it would be removed. ■ Rankin Memorial would need to be relocated. ■ Loss of recreation, but small possibility of green space remaining. ■ One historic home/property would be impacted. 	<ul style="list-style-type: none"> ■ Approximately 17 percent of the park will be removed. ■ Rankin Memorial can remain in place. ■ One historic home/property would be impacted.

Table 4-2 continued: Alternatives Considered for the Arthur Avenue Project

<i>Flyover Overpass to University</i>	<i>U.S. Highway 12 NB & SB Adjacent</i>
	
<ul style="list-style-type: none"> ■ Park would be split multiple times, and 80-100 percent of it would be removed. ■ Rankin Memorial would need to be relocated. ■ No impacts to historic homes (will affect non-historic homes). 	<ul style="list-style-type: none"> ■ Less than 20 percent of park removed. ■ Rankin Memorial remain in place. ■ No impacts to historic homes (will affect non-historic homes).
<i>No-Action Alternative</i>	
	
<ul style="list-style-type: none"> ■ None of the park will be removed. ■ Rankin Memorial can remain in place. ■ No historic homes or properties would be impacted. 	

(Note: A historic property is a property that contains a residence or structure that is considered historic.)

The following alternatives would completely eliminate park uses such as picnicking, resting in the park, using park benches, light physical recreation, visiting the memorial: A roundabout south of the Madison Street Bridge; an intersection south of

the Madison Street Bridge; a new intersection at 5th and 6th; a new roadway between 5th and 6th; a flyover separating University and U.S. Highway 12; a flyover from the Madison Street Bridge; adding a new intersection at 5th Street; a flyover pass to University.

The following alternatives would allow some continued use of the park for its current recreation activities: U.S. Highway 12 shift to Arthur; split bridge two-lane flyovers; realigning 5th Street; U.S. Highway 12 NB; SB adjacent; no-action alternatives; preferred alternative.

Summary of Alternatives Considered

The following provides a brief summary of the alternatives considered for the Arthur Avenue Project, as well as the impacts and feasible and prudent nature of each alternative.

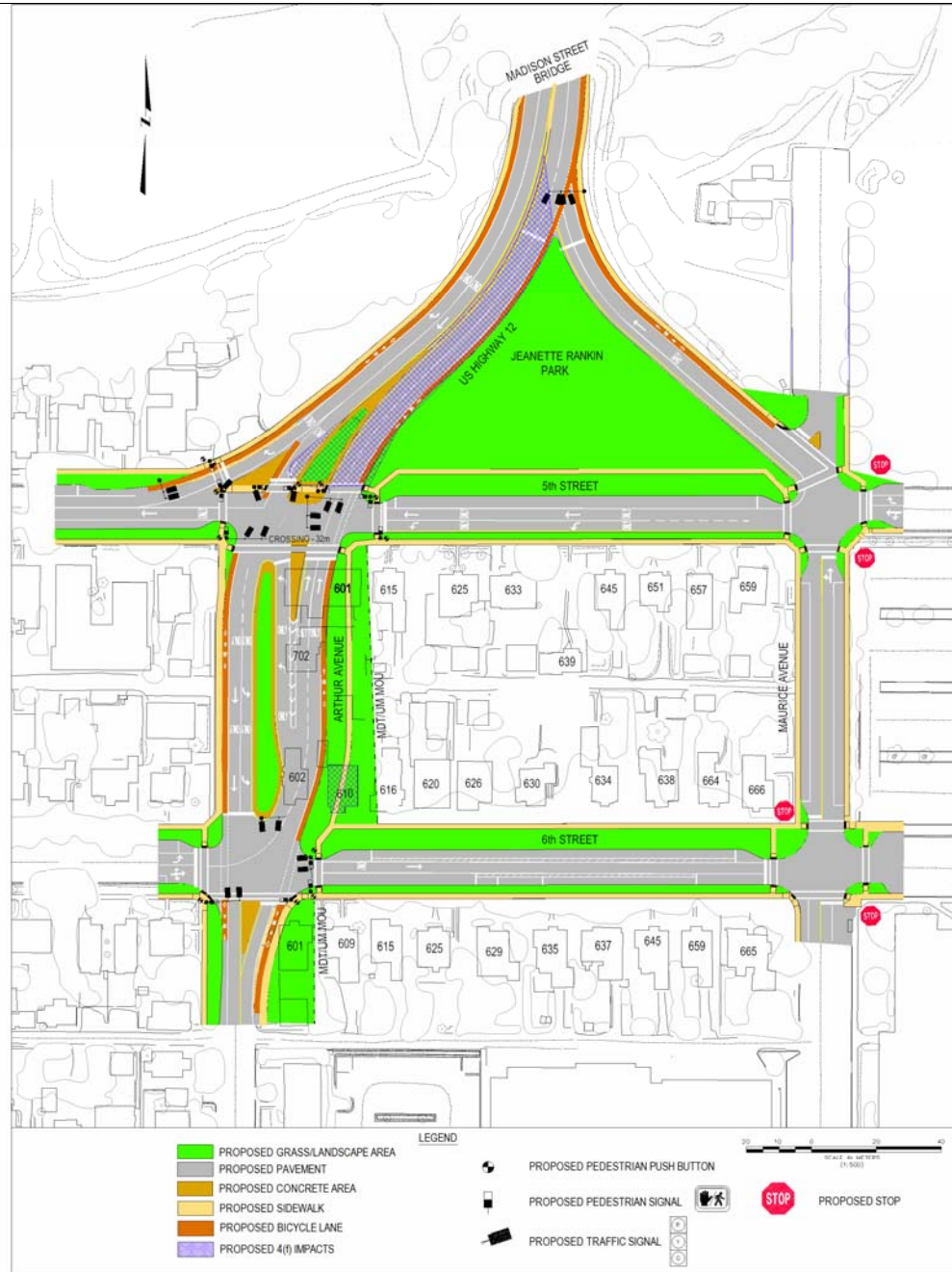
Roundabout South of Madison Street Bridge – This alternative (shown in Table 4-2) would implement a single lane roundabout on 5th Street between Arthur Avenue and Maurice Avenue.

After a thorough analysis, this option was considered inappropriate for a variety of reasons. First, a single lane roundabout cannot efficiently handle the large volumes of traffic from eastbound U.S. Highway 12 traffic, University/residential traffic from the north, and University traffic from the east. The volume of traffic that would enter the roundabout could impair its ability to cycle vehicles through in a reasonable manner. This alternative also has serious considerations regarding pedestrian and bicycle use. Since the University is directly to the east of the roundabout location, there is a large volume of bicycle and pedestrian traffic. The impact of pedestrians on a roundabout will dramatically reduce the volume of vehicles that will be able to pass through the structure, due to crossing times. Roundabouts are also difficult for pedestrians and bicyclists to negotiate and often require a signalized crossing near the roundabout. With the introduction of a signal, the platoon flow causes the roundabouts performance to suffer. Finally, while this alternative would have no impact to historic properties, it would remove at least 50 percent of Jeanette Rankin Park, impair park use, and would require relocation of the Jeanette Rankin Memorial. This alternative is feasible but not prudent because:

- Potential wetlands impacts.
- Safety issues with pedestrians and bicyclists.
- Operational concerns under existing and future traffic demands.
- Traffic will reach grid-lock from special events.
- The park would lose too much area to remain a valuable recreation space.

Table 4-2 continued: Alternatives Considered for the Arthur Avenue Project

Preferred Action Alternative – Option 2



- Approximately 17 percent of the park will be removed.
- Rankin Memorial can remain in place.
- One historic home and one historic property would be impacted.
- 4(f) Impacts are the same for Option 1 and Option 2

Intersection South of Madison Street Bridge - This alternative (shown in Table 4-2) is similar to the roundabout alternative except that the roundabout is replaced with a conventional signalized intersection. This alternative assisted in the movement of U.S. Highway 12 westbound traffic as well as traffic leaving the University.

The disadvantages of this option are similar to the Roundabout South of Madison Street Bridge. Traffic traveling on 6th Street, eastbound on U.S. Highway 12, would be required to make a left turn onto Arthur Avenue followed by a right turn onto 5th Street. Once on 5th Street, the vehicles would have to take a left at the new intersection before accessing the Madison Street Bridge. Again, this alternative would not be able to efficiently handle the traffic volume, pedestrian and bike crossings would reduce the volume of vehicles that would be able to pass through, it would remove at least 50 percent of Jeanette Rankin Park, impair park use, and require relocation of the Jeanette Rankin Memorial. This alternative is feasible but not prudent because:

- Traffic will reach grid-lock from special events.
- The park would lose too much area to remain a valuable recreation space.
- Unacceptable level of service.

U.S. Highway 12 Shift to Arthur - This alternative (shown in Table 4-2) would bring all four traffic lanes off the Madison Street Bridge and down into the intersection of Arthur Avenue and 5th Street. At the intersection, westbound U.S. Highway 12 traffic would turn onto 5th Street and proceed west. Eastbound U.S. Highway 12 traffic would come from 6th Street eastbound turning north on Arthur Avenue, which then would continue over the Madison Street Bridge. Traffic leaving the University would take the ramp to access the Madison Street Bridge. Roadways to the west of Arthur Avenue would remain one-way, but roadways east of and including Arthur Avenue would be two-way.

This alternative would remove approximately 20 percent of the park and would impact a home in the Historic District. The alternative was removed from consideration due to problems with both the horizontal and vertical curves required to access the Arthur Avenue/5th Street intersection from the north. Both of these curves have significant impacts on sight distance and by combining the two curves, the problem would be magnified. An additional concern involves the merging of traffic from the University onto U.S. Highway 12 from the ramp. Due to the angle of the merge, there would be sight and safety problems. This alternative is not feasible and not prudent because:

- Geometric design concerns (sight angles, curve combination), making it an un-safe design.
- Sight distance issues, making it an un-safe design.

New Intersection at 5th and 6th - This alternative (shown in Table 4-2) would remove the existing couplets and bring the traffic from the Madison Street Bridge south until

it intersects 5th Street. At the intersection at 5th Street, the westbound U.S. Highway 12 traffic turns west and proceeds down 5th Street. Additionally at this intersection, traffic heading south could turn and enter the University. Traffic exiting the University can either go west or north at the 5th Street intersection. The remaining southbound traffic will continue south to the intersection of 6th Street where eastbound U.S. Highway 12 traffic will be intercepted and diverted north. 5th and 6th Streets west of the intersections will be one-way. The remaining roadways will be reconfigured to two-way.

This alternative would remove approximately 30 percent of Jeanette Rankin Park and split it down the middle, the memorial would need to be relocated, there would be a complete loss of recreation, and the alternative would impact 1 historic home and 5 non-historic properties. This alternative is not reasonable and prudent because of the 4(f) impacts, additional right-of-way requirements, and congestion problems that would occur at the intersection of 5th Street and the Madison Street Bridge. This alternative is not feasible and not prudent because:

- Traffic will reach grid-lock from special events.
- Impacts to historic homes and properties (100 percent removal historic home and its property).
- Excessive right-of-way requirements.
- Unacceptable level of service.

New Roadway Between 5th and 6th - This alternative (shown in Table 4-2) is similar to the New Intersection at 5th and 6th alternative, but it would remove the 5th Street and 6th Street intersections and creates a new intersection between 5th and 6th Street. This intersection would form a couplet, similar to the Madison Street Bridge, to access 5th and 6th Streets. With this alternative all of the traffic for U.S. Highway 12, the University, and the residential community would pass through the new intersection between 5th and 6th Street. From this point, U.S. Highway 12 traffic would enter and exit to the west side of the intersection while University traffic and residential traffic would enter and exit from the east.

This alternative was rejected for multiple reasons: there would be an excessive right-of-way take required for the realignment; the couplet design and the introduction of broken back curves could cause driver confusion without proper signing; pedestrian and bicycle accessibility would be difficult in association with the couplet; there would no longer be access to residential property along Arthur Avenue and 5th Street; Jeanette Rankin Park would be split down the middle and approximately 30 percent of the park would be removed; the memorial would need to be relocated; there would be a complete loss of recreation to the park; and finally, the alternative would impact two historic homes and five historic properties. This alternative is feasible but not prudent because:

- Excessive right-of-way requirements.

- Impacts to historic homes and properties (100 percent home removal, 30 percent property removal).
- Removal of residential access.
- Pedestrian and bicycle access difficulties.

Flyovers Separating University and U.S. Highway 12 – This alternative (Shown in Table 4-2) would add overpasses to the project in an attempt to streamline traffic flow both for U.S. Highway 12 and for the University.

This alternative was removed from the viable options primarily because of cost and the feasibility of constructing the flyovers. There would need to be steep approaches to the flyovers because of the close proximity of the structures to the existing bridge. The slopes required for such an overpass would compromise stopping sight distances. In addition, the excessive slope could present serious problems during poor weather conditions. Also, this alternative would split Jeanette Rankin Park multiple times (80-100 percent removal), the memorial would need to be relocated, the park would lose all recreation, and one historic property would be impacted. This alternative is neither feasible nor prudent because:

- Traffic will reach grid-lock from special events.
- The park would lose too much area to remain a valuable recreation space.
- Geometric design concerns (steep approaches) make this alternative un-safe.
- Cost.

Split Bridge 2-Lane 2-Way Flyovers – This alternative (Shown in Table 4-2) was developed as an attempt to split the U.S. Highway 12 and residential traffic from the University traffic and thus minimize the number of flyovers required by the previous alternative.

This option was not logistically viable because of the lane configurations over the Madison Street Bridge. Extensive work, if feasible at all, would be required north of the bridge to bring the University and U.S. Highway 12 traffic into the correct lanes. In addition, the lane drop and lane addition to the U.S. Highway 12 traffic lanes, on the south side of the bridge, would be very confusing for motorists. This alternative would remove approximately 20 percent of Jeanette Rankin Park, the memorial would need to be relocated, and one historic property would be impacted. This alternative is neither feasible nor prudent because:

- Geometric design concerns (lane drop/addition).
- Cost.
- Motorist confusion (lane drop/addition).

Flyover from the Madison Street Bridge - This alternative (Shown in Table 4-2) is a variation to the New Intersection at 5th and 6th alternative. This alternative shifts the southern intersection to 6th Street and uses an overpass configuration to cross over the top of the intersection at 5th Street. This alternative has good traffic flow and the level of service at all of the intersections is above minimum designs.

This option was removed for many reasons including: the cost of an overpass structure over an intersection is very high and project funding may not allow for such costs; bicycle and pedestrian access via the overpass is very limited; merging traffic from the University would become backed up and possibly encounter gridlock in high flow conditions; there would be right-of-way issues associated with the connection between 5th and 6th Streets; Jeanette Rankin Park would be split down the middle and approximately 50 percent of the park would be removed; the memorial would need to be relocated; there would be a complete loss of recreation; and the alternative would impact two historic homes and two historic properties. This alternative is neither feasible nor prudent because:

- Traffic will reach grid-lock from special events.
- The park would lose too much area to remain a valuable recreation space.
- Cost.
- Excessive right-of-way.
- Impacts to historic homes and properties (100 percent property use, 100 percent home use).
- Bicycle and pedestrian access issues.

Adding a New Intersection at 5th Street - This alternative (Shown in Table 4-2) is identical to the Flyover from the Madison Street Bridge Alternative except that the existing couplet alignment is kept intact. This option allows for traffic to precede south on Arthur Avenue at the intersection of 5th Street and Arthur Avenue. By keeping the eastern couplet leg there is also the possibility of using the existing second lane as overflow during special events.

This alternative was removed from consideration for the same traffic reasons as the Flyover from the Madison Street Bridge. Additionally, this alternative may cause traffic conflicts at the 5th Street/ Arthur Avenue intersection. Jeanette Rankin Park would be split down the middle and approximately 50 percent of the park would be removed; the memorial would need to be relocated; there would be a complete loss of recreation; and the alternative would impact one historic home and one historic property. This alternative is neither feasible nor prudent because:

- The park would lose too much area to remain a valuable recreation space.
- Operational concerns related to signal timing and queue length.
- Excessive right-of-way requirements.

Realignment of 5th Street - This alternative (Shown in Table 4-2) maintains the existing couplets but reconfigures them in a manner such that southbound traffic can continue through to the intersection of Arthur Avenue and 5th Street.

This alternative was removed from consideration for several reasons; the first of which was traffic flow. The traffic simulation model revealed that the alignment could not handle the traffic volumes under an appropriate level of service. Second, the only way to access 5th Street from the University would be to exit via 6th Street and then merge across lanes on Arthur Avenue to access 5th Street. The merging lane would require significant signal timing issues to ensure that traffic from 6th Street westbound could access 5th Street westbound. The third reason for removal of this alternative dealt with turning radii at the new intersection within the eastern couplet. Truck traffic would have problems negotiating the turn to the north and turn to the south would require a separate left turn lane. Jeanette Rankin Park would be split down the middle and approximately 17 percent of the park would be removed and the alternative would impact one historic home and property. This alternative is feasible but not prudent because:

- Traffic will reach grid-lock from special events.
- Truck turning problems.
- Signal timing problems.
- Access problems.
- Unacceptable level of service.

Flyover Overpass to University - For this alternative (Shown in Table 4-2) the University would have ramps leading from the Madison Street Bridge to and from the campus. The southbound ramp would require an overpass structure to bring it up over the top of eastbound U.S. Highway 12. The westbound U.S. Highway 12 traffic would pass on the existing couplet alignment to 5th Street while the eastbound U.S. Highway 12 traffic would turn left on a modified Arthur Avenue alignment, which would run along the east side of the existing west couplet. The alternative removes 5th Street between Arthur and Maurice as well as Maurice between 5th and 6th Streets.

This alternative was removed from possible implementation for multiple reasons: the overpass structure would have significant construction costs and, to achieve adequate clearances, the approach slopes would have to be very steep; the realignment would introduce a complex broken back curve for the eastbound U.S. Highway 12 traffic and would require additional right-of-way acquisition to the east of Arthur Avenue; there would be no access to the block south of the park from the Madison Street Bridge; Jeanette Rankin Park would be split multiple times and approximately 80-100 percent of the park would be removed; the memorial would need to be relocated; there would be a complete loss of recreation; and while the alternative would not impact any historic properties, three non-historic properties would be affected. This alternative is neither feasible nor prudent because:

- Geometric design concerns (steep approaches, broken back curve).
- Access problems.
- The park would lose too much area to remain a valuable recreation space.
- Cost.

U.S. Highway 12 NB & SB Adjacent – This Alternative manipulates the U.S. Highway 12 northbound movement to mirror the southbound movement while minimizing impacts to the University’s property and the park. This Alternative moves U.S. Highway 12 northbound and southbound movements adjacent to each other as the transition from Arthur Avenue to the Madison Street Bridge. With this option, 5th and 6th Streets east of Arthur Avenue are switched to two way traffic and Maurice Avenue is removed. Traffic would be congested with this option and it does not offer any improvement over the no-build (see Traffic Report). This alternative is feasible but not prudent because:

- Unacceptable level of service.
- Congestion will result in safety problems.
- Congestion will reduce project funding.

No-Action Alternative – This alternative (Shown in Table 4-2) will have no impacts to the project area or 4(f) resources. It is the only avoidance alternative, and will be discussed further in Section 4.4

Preferred Action Alternative – This alternative (Shown in Table 4-2 and Figure 4-2) was found to be the most feasible, reasonable, and prudent alternative. Refer back to Section 4.1 for a description. The impacts of the preferred alternative are discussed further in the following section.

4.4 Avoidance and Minimization

Many alternatives were evaluated for the project area as shown previously in Section 4.3, as well as in Section 2, Section 3, and Appendix B of the Environmental Assessment. With the exception of the No-Build Alternative, no feasible or prudent alternatives were identified that would avoid all of the 4(f) properties. Table 4-3 shows the impacts to 4(f) resources. Of the alternatives, six had no impacts to historic homes. However, none of the six alternatives were considered feasible and prudent. In addition five of the six alternatives that had no impact to historic homes, had an impact to the park (no build alternative had no impact). Three alternatives out of the 13, (U.S. Highway 12 – Shift to Arthur, Split Bridge 2 lane 2 way Flyovers, Realignment of 5th Street) had similar impacts to 4(f) resources as the Preferred Alternative. However, none of these three alternatives were considered feasible and prudent.

- The No-Build Alternative would have no impact on 4(f) resources at this time. However, the University of Montana master plan proposes to use all of the block between 5th Street, 6th Street, Arthur Avenue, and Maurice Avenue in the future for new facilities. If the No-Build Alternative is selected, based upon University

**Table 4-3
Comparison of Section 4(f) Impacts for Each Alternative**

Name of Alternative	Approximate % Park Impacted	Impair Use of Park? (yes or no)	Proximity Impacts? ** (+/-)	Remove or Relocate Memorial? (yes or no)	# of Historic Homes Impacted	# of Historic Properties Impacted	Addresses all Purpose and Need? (yes or no)
Roundabout S. of Madison St. Bridge	50%	yes	-	yes	0	0	no
Intersection S. of Madison St. Bridge	50%	yes	-	yes	0	0	no
U.S. Highway 12 Shift to Arthur	20%	no	+	no	1	1	no
New Intersection at 5th and 6th	30%	yes	+/-	yes	1	1	no
New Roadway Between 5th and 6th	30%	yes	+/-	yes	2	5	no
Flyovers Separating U of M and Hwy12	80-100%	yes	-	yes	0	1	no
Split Bridge 2-Lane 2-Way Flyovers	20%	no	-	yes	0	1	no
Flyover from the Madison St. Bridge	50%	yes	+/-	yes	2	2	no
Adding a New Intersection at 5th Street	50%	yes	+/-	yes	1	2	no
Realignment of 5th Street	17%	no	+	no	1	1	no
Flyover Overpass to University	80-100%	yes	-	yes	0	0	no
No-Build (No Action) Alternative	0%	no	Base	no	0	0	no
Preferred Action Alternative	17%	no	+	no	1	1	yes
U.S. Highway 12 NB & SB Adjacent	20%	no	+/-	no	0	0	no

Are there any positive or negative proximity impacts which would impair the use of the 4(f) land for their intended purpose? (Based on no-build alternative as baseline). For example, a positive proximity impact could be sidewalk improvement for easier access to the park. A negative proximity impact could be decreased trees in the boulevards adjacent to the park that might decrease visual appeal when looking from the park.

planning, 602 and 610 South 6th Street East may ultimately be removed in an unrelated project.

Although the No-Build Alternative has the least impact to 4(f) resources, it also does not address the project purpose and needs objectives. Traffic safety, providing a more direct and efficient roadway, accommodation of special event traffic and air quality improvement would not be effectively resolved if the No-Build Alternative was selected.

Finally, the preferred alternative (as discussed in the previous sections) would impact 17 percent of the park, which would have the smallest impact of all of the evaluated alternatives with the exception of the no-build alternative. Also, impacts to one historic property would be necessary to carry out the preferred alternative and to fulfill all purpose and needs associated with the project in a reasonable and prudent manner. All efforts have been made to minimize impacts to 4(f) resources with this preferred alternative.

4.5 Mitigation

The following sections describe mitigation efforts proposed with the Preferred Alternative for recreation areas and historic properties.

4.5.1 Mitigation Efforts for Recreation Areas

Vegetation – MDT will be responsible for sod, seed, and irrigation for areas disturbed during construction. In addition, once the final design is completed, a new agreement would be set up between MDT and the City of Missoula for landscaping and maintenance within the impacted area. In this agreement, MDT would provide a specified monetary amount to the City for final landscaping design and tree and shrub replacement. The Urban Forester for the City of Missoula suggests that a large number of trees in the area are already well past their normal maturity and likely will begin to die in the next 20 years. The replacement of trees with a limited remaining life span would be a benefit from the project.

Noise – The Preferred Alternative would either generate a slight noise level increase (less than 3 dBA) or decrease noise levels in 2022. The projected peak hour noise levels would not approach or exceed the FHWA Activity Category B NAC; therefore, no noise mitigation measures would be required.

Facilities – The proposed project would enhance existing facilities within Jeanette Rankin Park. Improvements would be made to street lighting and sidewalks, and park access would be improved. Some special design features would minimize harm to Jeanette Rankin Park and could include improved curbs to reduce the potential for errant vehicles to enter the park. During final design, other amenities and features will be addressed for implementation and could include improvements such as additional park benches and picnic tables.

Throughout the project area, new trees will be incorporated into the boulevards according to the City of Missoula's final design, and new sod will be placed in any

disturbed areas. Landscaped medians would also be integrated into the proposed project for the incorporation of low water consumption landscaped boulevards.

In summary, the following are mitigation efforts for the 4(f) recreation areas that will be addressed for implementation during the final design:

- The contractor for the project will be required to plan for and implement containment procedures in response to any accidental spills of fuel or other hazardous materials.
- Improved park pedestrian access by providing a marked crosswalk across Arthur Avenue to the park on South 5th Street East.
- Improved pedestrian accesses from the University by providing a marked cross walk across Maurice Avenue to South 5th Street East and across South 5th Street East to the park.
- Providing a landscaped median and green space between the northbound and southbound Arthur Avenue traffic, both on the north and south side of the South 5th Street East intersection.
- Install a fence or landscaped barrier on the east side of Arthur such that park users are separated from traffic.

4.5.2 Mitigation Efforts for Historic Properties

To mitigate the loss of 610 South 6th Street East, the project will be implemented in accordance with the following:

- Conduct HABS-level documentation of the Headley Place (610 South 6th Street East/24MO946). The documentation would include extensive site histories, large-format photographs, and drawings of the properties. The information will be provided to the Missoula Historic Preservation Commission, the Montana SHPO, and the National Park Service. The HABS recordation would also include streetscape photographs of Arthur Avenue between East 5th and East 6th streets south prior to the initiation of construction activities.
- In addition to recordation and in consultation with the Missoula Historic Preservation Commission and the Montana SHPO, the University of Montana will make the house available to be moved intact to another location.

4.6 Coordination

The FHWA is taking the federal financial lead and assisting the MDT in funding this project. The FHWA has consulted with the Montana State Historic Preservation Office and the Advisory Council on Historic Preservation to coordinate efforts with MDT, the City of Missoula, the University of Montana – Missoula, and the Missoula Historic Preservation Commission for evaluating and supporting the Section 4(f) Resources involved in this project. The following documents are attached in support of these project coordination efforts:

- Memorandum of Understanding – 5th, 6th, Arthur, Madison Realignment; Montana Department of Transportation, City of Missoula, University of Montana; May 8, 2001 (See Appendix A).
- Memorandum of Agreement; STTP-CM-STPU7-2(36)94; Federal Highway Administration, Montana State Historic Preservation Office (SHPO), Montana Department of Transportation, University of Montana, and SHPO correspondence (See Appendix A).

Section 5

Agency & Public Involvement & Coordination

A public involvement process has occurred throughout all stages of the project. The public involvement coordination effort included an open house, a public meeting, and meetings with various stakeholders such as University staff and local officials. The following table summarizes the major meetings, events, and significant correspondence that have occurred since the project inception.

Date	Meeting/Event/Correspondence	Attendance
11-05-01	Preliminary Scoping Meeting	MDT, CDM, City of Missoula
12-10-01	Follow-up Scoping Meeting	MDT, City of Missoula, UM, CDM
7-22-02	Kickoff Meeting for updating all major stakeholders on the status of the project	MDT, UM, CDM, City of Missoula
2002	Special Needs Meeting	Coordinators: Visually Impaired, Handicapped, CDM
2002	Bikes and Pedestrian Interest Meeting	Public/Group Members, CDM
9-2002	Initiation of the MDT Project Website	MDT, CDM, UM, City
9-24-02	Letters were mailed to solicit requests for public involvement in the project.	City Clerk, Missoula City Fire Department, Neighborhood Liaison, City of Missoula, Missoula Parking Commission, Missoula City Council, Mayor's Office, Missoula Parks & Recreation Department, Missoula Downtown Association, Beach Transportation, Mountain Water Company, Missoula Chamber of Commerce, Mountain Line, Missoula Bicycle and Pedestrian Advisory Board, UAHA
9-30-02	Emails were sent to solicit requests for public involvement in the project.	CDM, MDT, University Administration: VP for Administration; Campus Public Safety Director, Facilities Service Director, ASUM Student Union: Vice President; Transportation Director, Faculty Senate, Staff Senate: President, Vice President, ADA Committee & DSS Department.
10-2002	Individual meetings were held with all Homeowner/Renters in the project area.	All Homeowners and Renters in area for Cultural Resources
2003	Meetings to gain local input and knowledge during the Traffic Study/Traffic Counts	Meetings with Multiple Residents
1-13-03	Meeting with UM to discuss conceptual alignment alternatives	UM, CDM

Date	Meeting/Event/Correspondence	Attendance
2-10-03	Update the core group on alignment alternatives and the status of the project	MDT, City of Missoula, UM, CDM
4-25-03	Teleconference meeting to discuss the city's bicycle and pedestrian issues prior to the public meeting.	MDT, City of Missoula, CDM
4-30-03	Public Meeting – reconstruction of the portion of Highway 12 near the University corridor through the University of Montana	MDT, City of Missoula, UM, CDM
5-01-03	Following the April public meeting, this meeting was held to present conceptual alternatives and request comments.	University Neighborhood Council, CDM
5-07-03	Attendance at the Missoula Bicycle and Pedestrian Advisory Board Meeting to present the conceptual alternative to the board and request suggestions for improvements to both bicycle and pedestrian facilities.	Missoula Bicycle and Pedestrian Advisory Board, CDM
4-06-04	Meeting for the Alignment and Grade Review	City, University, MDT, CDM, ASHMOT
5-3-04	Post Alignment and Grade Review Meeting	MDT, CDM, City, UM
8-17-04	Meeting to discuss 4(f) evaluation actions for the 2 historic homes that would be impacted on 6th Street.	MDT, UM, City of Missoula, CDM
9-7-04	Sent letter to the University of Montana requesting input on future approach needs for the University properties along the project.	UM, CDM
10-1-04	A letter was sent to the City of Missoula requesting input on the impacts to the storm drain systems within the project.	City of Missoula, CDM
12-2-04	CDM provided an email response to the Neighborhood Council with a project update.	CDM, Neighborhood Council
2-3-05	Historic Preservation Meeting	CDM, MDT, Missoula Historic Preservation District
4-4-05	Informational Public/MDT Meeting at the University Student Union Building	University, All interested Public, (Flyers Posted) - University Students, neighborhood homeowners, University and City of Missoula staff, MDT staff and consulting engineers
4-22-05	Preliminary Scoping and Discussion of EA and upcoming May 10, 2005 meeting - Polycom Helena and Missoula	MDT, City, University
5-10-05	Agency, City and University Planning Meeting at UM Facility Services	MDT, City, University
7-20-05	Agency, City and University Planning Meeting at UM Facility Services	MDT, City, University

Date	Meeting/Event/Correspondence	Attendance
10-05	Multiple EA preparation meetings	MDT, FHWA
11-05	Multiple EA preparation meetings	MDT, FHWA

In order to maintain effective communication with concerned citizens, a mailing list has been generated for people who have expressed interest in the project. Notification of availability of the EA, instructions for requesting a copy of the EA, information on how and where to comment, and public hearing information will be sent to each individual on the mailing list. In addition, Appendix D shows a detailed analysis of the unsolicited comments received by MDT via post cards.

5.1 Agency Coordination

The Arthur Avenue Project has required close coordination between the City of Missoula, University of Montana, and MDT. Dozens of meetings have occurred between these agencies via telephone, teleconference, email, and direct appearance. The following agencies have been involved with the planning of the project and have contributed input to the project development:

- Montana Department of Transportation
- Montana Department of Environmental Quality
- Montana Fish, Wildlife, & Parks
- City of Missoula
- Federal Highway Administration
- University of Montana
- State Historic Preservation Office
- U.S. Fish and Wildlife Service
- Missoula City Fire Department
- Missoula Parking Commission
- Missoula City Council
- Missoula Mayor’s Office
- Missoula Parks and Recreation Department
- Missoula Chamber of Commerce
- Missoula Bicycle and Pedestrian Advisory Board
- Associated Students of the University of Montana
- Missoula Irrigation District

5.2 Public Involvement

Public involvement has been ongoing since inception of the Arthur Avenue Project. A public meeting and open house was conducted for the project in April of 2003 after unsolicited comments were received. The open house included booths where members of the public could ask questions and make comments in a private setting. The public meeting allowed individuals to make comments on the record in a public setting. Numerous other meetings have also occurred throughout the length of the project as shown previously in the table. In April of 2005, an informational public meeting was held at the University of Montana Student Union Building. Comments and other proposed alternatives were then provided to MDT. The alternatives and comments were reviewed, analyzed, and included in this EA.

5.3 Document Availability

A Notice of Availability (NOA) of the EA and the planned date for the public hearing will be announced in the local newspaper at least fifteen days in advance of the hearing. The EA will be made available for public viewing at several locations in the project area, which are in the NOA.

At the public hearing, the general public will be given the opportunity to provide comment on the project. There will be a 45 comment period on the EA.

Appendix A
Memorandum of Understanding
Memorandum of Agreement

COPY

**MEMORANDUM OF UNDERSTANDING
5TH, 6TH, ARTHUR, MADISON REALIGNMENT**

by

**Montana Department of Transportation
City of Missoula
University of Montana**

In recognition of the need to improve traffic, bicycle and pedestrian flow on U.S. Highway 12 near the entrance to the University of Montana, the undersigned parties, the City of Missoula (City), Montana Department of Transportation (MDT), and the University of Montana (UM) agree that:

1. This Memorandum of Understanding (MOU) establishes the various funding, design, construction, and maintenance responsibilities necessary to advance the project through construction.
2. The Project consists of realigning the eastbound leg of U.S. Highway 12 from 6th Street along Arthur Avenue to more directly connect to the Madison Street Bridge. Through traffic will no longer be required to loop along 5th Street and Maurice Avenue by the Adams Center.

General Considerations

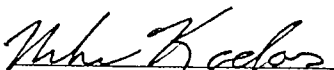
The undersigned parties agree that:

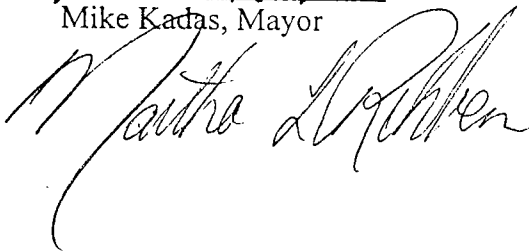
- A. MDT is responsible for:
 1. National Environmental Policy Act (NEPA) and Montana Environmental Protection Act (MEPA) compliance.
 2. Project Design, development and Public involvement.
 3. Right-of-way plan development and acquisitions.
 4. Relocating all conflicting utilities.
 5. Contract letting and award.
 6. Construction Contract administration.
- B. UM and the City will participate in the project development and NEPA/MEPA process. UM agrees that the proposed traffic realignment is beneficial to the City and UM's long-range traffic flow and operation plan and will provide, as contribution to the project and subject to Board of Regents' approval, all necessary right-of-way to implement the project. Subject to Montana Board of Regents approval, this right-of-way will be provided as bare ground clear of all improvements. It is anticipated that this right-of-way will consist of the properties currently occupied by 601 S. 6th East, 610 S. 6th East, 601 S. 5th East, 602 S. 6th East and 702 Arthur. The right-of-way provided by UM shall be appraised for value. MDT and UM may exchange property to satisfy right-of-way needs for this project subject to compliance with all state law and regulations of each agency. If

- the parties determine that an exchange of property is appropriate, a separate agreement setting forth the terms of the exchange will be executed and attached to this memorandum and incorporated as part of this agreement following approval by the parties (to be marked as Exhibit A).
- C. As part of the NEPA/MEPA process, all reasonable alternatives must be considered, including one with "roundabouts" for the 5th and 6th Street intersections with Arthur Avenue.
 - D. All activities related to the Project will comply with American with Disabilities Act (ADA), Title VI and VII of the Civil Rights Act, and Title 49 MCA.
 - E. The parties involved in the MOU may enter into separate agreements during the development of the Project. These agreements will not supersede this MOU.
 - F. All project development costs, including preliminary engineering, utility relocation, construction, and construction engineering shall be shared between Urban Pilot Improvement Program funds up to a maximum of \$600,000 for construction and construction engineering, and MDT's Discretionary Air Quality program (PE, I/C, CN, CE). MDT will provide all matching funds required of these federal funds. The estimated project development costs are \$1,386,000 not including additional right-of-way. If total costs exceed this amount the project shall be put on hold until additional project funding is secured.
 - G. MDT will provide the City and UM with periodic status reports during the development of the project.
 - H. Upon completion of the project, MDT will be responsible for maintaining the roadways and through lanes designed at U. S. Highway 12 with the following conditions:
 - MDT may contract with the City for maintenance.
 - The City will maintain or cause to maintain sidewalks and separate bicycle/pedestrian facilities.
 - The U of M will maintain all landscaping installed as part of the project.
 - I. Those street portions of S. 6th East and Maurice Avenue no longer used for through traffic and U. S. Highway 12 will remain in public ownership and will be maintained by the City.
 - J. After the project has been completed the routes involved will be re-evaluated for possible system and functional classification revisions.

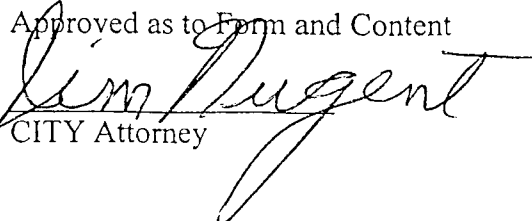
Dated this 8 day of May, 2001.

City of Missoula


Mike Kadas, Mayor



Approved as to Form and Content


CITY Attorney

I, Martha L. Fisher, Clerk of the CITY of MISSOULA, do hereby certify that the above mentioned agreement was regularly adopted the CITY COUNCIL at a meeting thereof held on the 7 day of May, 2001, and the COUNCIL authorized the MAYOR to sign this agreement on behalf of said COUNCIL.

[Official seal]

Martha L. Fisher
CITY Clerk

University of Montana
George M. Dennison
George M. Dennison, President

Approved for Legal Content
[Signature]
Attorney

Montana Department of Transportation
Dave Galt
Dave Galt, Director

Approved for Legal Content
Tim Reardon
Tim Reardon, Chief Attorney

Approved for Civil Rights Content
[Signature]
MDT Civil Rights Bureau

AGREEMENT TO EXCHANGE REAL ESTATE

BETWEEN

MONTANA DEPARTMENT OF TRANSPORTATION

AND

THE UNIVERSITY OF MONTANA

THIS AGREEMENT is entered into this 22 day of May, 2000, between the Montana Department of Transportation, hereinafter referred to MDT, and The University of Montana, hereinafter referred to UM.

It is the purpose and intent of this Agreement to define the steps and obligations of both parties in the exchange of the following described properties.

PARCEL 1, MDT PROPERTY:

A portion of Government Lot 6, Section 33, Township 25 North, Range 19 West, P.M.M., Lake County, Montana. AKA Tracts 4 & 5 of COS H-592.

PARCEL 2, UM PROPERTY

Lots 1 thru 3, Block 25, of Montana Addition to the City of Missoula, Missoula County, Mt., a.k.a. 601 South 5th Avenue East & 702 Authur Avenue, Missoula, Mt.

Lot 34 and the West 8 feet of Lot 33, in Block 25, supplementary plat of a portion of said Montana Addition, Now on file and of record in the office of the Clerk & Recorder of Missoula County, Mt., a.k.a. 602 South 6th Street, Missoula, Mt.

Lot 1 and the West 8 feet of Lot 2, Block 36, Montana Addition to the County of Missoula, Missoula County, Mt., a.k.a. 601 South 6th Street East, Missoula, Mt.

Lot 32 and the East 22 feet of Lot 33, Block 25 of Supplementary Plat of a portion of Montana Addition, City of Missoula, Missoula County, Mt., a.k.a. 610 South 6th East, Missoula, Mt.

The parties recognize and agree that state law allows MDT to exchange property for highway purposes. MDT desires to acquire right-of-way for reconstruction of a project in City of Missoula to benefit MDT, the City of Missoula and the University of Montana, therefore, the parties agree as follow:

1. MDT hereby agrees to transfer and convey Parcel 1 to UM in consideration of and in exchange for UM transferring and conveying of Parcel 2 to MDT, all in accordance with the terms of this Agreement.

2. MDT will appraise both parcels for fair market value. Said appraisals will be sent to UM for review and acceptance. If UM does not accept the appraisals, UM can obtain a second appraisal and submit it to MDT for review and acceptance. Both parties must agree upon the appraised values before an exchange can be consummated.
3. After MDT transfers title to Parcel #1 to UM, UM will provide, as contribution, all remaining necessary right-of-way to implement the project that consists of realigning the eastbound leg of U.S. Highway 12 from 6th Street along Arthur Avenue in Missoula, Mt.
4. Each party shall furnish a title commitment for an ALTA Owner's Policy of Title Insurance insuring title to the relevant property subject only to those encumbrances acceptable to the other party. Each party shall have 20 days after receipt of a title insurance commitment to object, in writing, to any exceptions described therein. If no objection is made within the time allowed, each party shall be deemed to have accepted the title commitment. If either party objects to any exception, the other party shall have 60 days to remove the exception. If they are unable to remove the exception or make it otherwise acceptable, either party may withdraw from this Agreement, in which case it shall be of no further force and effect. Title Commitments and/or Title Insurance may be waived upon mutual agreement.
5. If required by the County for recording, each party, at their own expense, will provide a survey, for their respective parcel, prepared by a registered land surveyor licensed to practice in the State of Montana. MDT must review all surveys before recording.
6. The parties agree that it is expressly intended and agreed that all existing easements, burdens, and restrictive covenants shall run with the land and shall forever bind the Grantees', their successors, and assigns.
7. To the best knowledge of both parties, there are no toxic or hazardous substances, wastes, pollutants or contaminants on the parcels involved in this land exchange. Further, there are no substances or conditions that may support a claim or cause of action under RCRA, CERCLA or any other federal, state or local environmental statutes, regulations, ordinances or other environmental regulatory requirements.
8. MDT will prepare and record the deeds and relative documents and pay for all recording costs.
9. The parties understand, that this agreement is in conjunction with a Memorandum of Understanding by MDT, UM and the City of Missoula. Said MOU establishes the various funding, design, construction, and maintenance responsibilities necessary to advance a project through construction. The project consists of realigning the eastbound leg of U.S. Highway 12 from 6th Street along Arthur Avenue. The terms and conditions of this agreement may not be changed, altered, waived or modified in any way except as may mutually be agreed in writing.
10. This agreement is to be interpreted and construed according to the laws of the State of Montana. In the event of disagreement over any of the terms contained herein which results in litigation, the parties agree that venue shall be in the First Judicial District, Lewis

and Clark County, Montana. The parties further agree that in the event of litigation, each party shall bear its own costs and attorney fees.

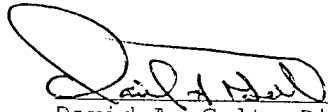
11. The parties recognize, agree and intend that this agreement shall be binding on MU and MDT and the respective successors in office for the life of this agreement and to that end each party hereto agree that the persons executing this agreement are fully and completely empowered to bind the State, MDT and UM. Any notices, requests, inquiries, demands or other communication or information required, permitted or essential to this agreement shall be in writing by certified mail to the respective parties.

13. The closing of this exchange shall occur no later than December 31, 2001 unless extended as mutually agreed upon by both parties.

14. If the project subject to the MOU referred to herein does not proceed and become finalized, UM and MDT have no obligation to proceed with the exchange subject to this Agreement.

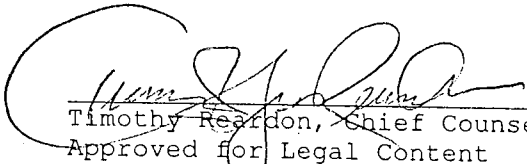
Subject to the above conditions, MDT and UM agree to proceed with the exchange of the above mentioned parcels.

MONTANA DEPARTMENT OF TRANSPORTATION



David A. Galt, Director

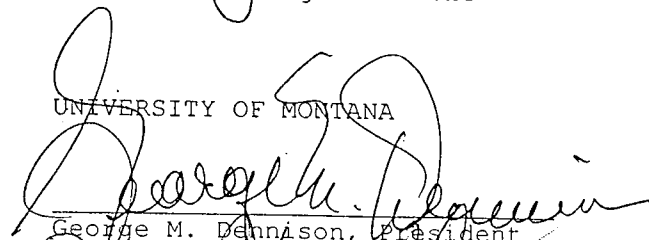
May 22, 2001
Date



Timothy Reardon, Chief Counsel
Approved for Legal Content

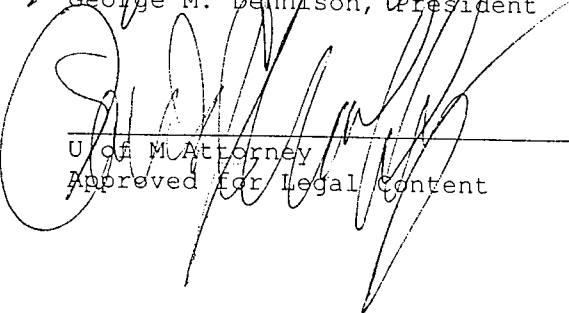
May 21, 2001
Date

UNIVERSITY OF MONTANA



George M. Dennison, President

4-28-01
Date



U of M Attorney
Approved for Legal Content

4-26-01
Date

RECEIVED

MAY 25 2005

ENVIRONMENTAL

**MEMORANDUM OF AGREEMENT
STPP-CM-STPU 7-2(36)94
ARTHUR AVENUE - MISSOULA
MISSOULA COUNTY, MONTANA
Control No. 4611**

WHEREAS the Federal Highway Administration (FHWA) proposes to assist the Montana Department of Transportation (MDT) in funding the Arthur Avenue - Missoula highway reconstruction project.

WHEREAS FHWA has determined that the undertaking will have an effect on two historic properties that would contribute to the University Area Historic District (24MO827): Strawn Place (602 South 6th Street East) and the Headley Place (610 S. 6th Street East). The FHWA has consulted with the Montana State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (Council) pursuant to Section 106 of the National Historic Preservation Act (16 USC 470) and its implementing regulations, "Protection of Historic Properties" (36 CFR 800);

WHEREAS MDT, the University of Montana – Missoula (UM), and Missoula Historic Preservation Commission participated in the consultation and have been invited to concur in this Memorandum of Agreement;

NOW, THEREFORE; FHWA and the Montana SHPO agree that the undertaking will be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

Stipulations

MDT will ensure that the following stipulations are carried out:

- 1) Conduct Historic American Building Survey (HABS)-level documentation of the Strawn Place (602 South 6th Street East) and the Headley Place (610 S. 6th Street East). The documentation would include extensive site histories, large-format photographs, and drawings of the properties. The information will be provided to the Missoula Historic Preservation Commission, the Montana SHPO, and the National Park Service if deemed appropriate. The HABS recordation would also include streetscape photographs of Arthur Avenue between East 5th and East 6th streets south prior to the initiation of construction activities.
- 2) The University of Montana will attempt to find new owners for the Strawn Place and the Headley Place. The UM will advertise in local newspapers that the historic properties are available for relocation. The UM will offer the properties free of charge to anyone willing to bear the cost of relocation. The new owners will have to relocate the buildings off-site.

- 3) If a dispute arises regarding the implementation of Agreement, FHWA shall consult with the objecting party to resolve the dispute. If any consulting party determines that the dispute cannot be resolved, FHWA shall request the further comments of the Advisory Council on Historic Preservation pursuant to the Council's regulations.

EXECUTION OF THIS MEMORANDUM OF AGREEMENT and implementation of its terms evidences that FHWA has afforded the Council an opportunity to comment on the Arthur Street – Missoula highway reconstruction project and its affects on historic properties, and that FHWA has taken into account the effect of the Undertaking on historic properties.

Theodore H Burch
Federal Highway Administration

05/23/05
Date

Mark F. Faumber
Montana State Historic Preservation Office

5/9/2005
Date

Concurring Parties:

[Signature]
[Signature]
Montana Department of Transportation

4/15/05
Date

Shert A. Sumner
The University of Montana – Missoula

3 MAY 05
Date

Missoula Historic Preservation Commission

Date

Appendix B

Conceptual Alternatives

Appendix B

Conceptual Alternatives

The two groups of alternatives identified for advancement in the brainstorming session, Moderate and Extensive Improvements, were developed into conceptual alternatives to determine if they meet the purpose and need of this project. The conceptual alternative development process was a collaborative effort between MDT, the City, the University, and CDM. The alternatives discussed below were a result of this effort.

Originally nine alternatives were discussed in a meeting with MDT to determine each alternative's viability. From this meeting most of the alternatives were dismissed due to capacity, safety, or cost factors. Two additional alternatives were created as a result of the comments generated during this meeting. A third additional alternative was created in an attempt to minimize impacts to adjacent landowners.

A second meeting between MDT and CDM was held to discuss the alternatives developed during the earlier meeting. During the second meeting an additional alternative was discussed. The new alternative was broken into four separate options in an attempt to determine which alignment would work best for the existing traffic conditions.

The four different options for the new alternative were taken to the University for review and comment. During this meeting, the University expressed right-of-way concerns and the possibility of a gateway effect. CDM then generated three additional alternatives to address the University's input and concerns.

Following the meeting with the University and the creation of the three additional alternatives, CDM met with MDT to discuss the University's desires. From this meeting another alternative was generated in an attempt to address alignment and right-of-way concerns. The final conceptual alternative was refined and presented at a Public Meeting on April 30, 2003. Following the public meeting, both the City and the University had additional comments. The comments have been discussed at numerous meetings and via email, and have been carefully considered for the development of the preferred alternative provided in this report.

Roundabout Alternatives

In addition to the numerous conceptual alternatives developed on the basis of alignment reconfigurations, roundabouts were also considered at each of the four intersections within the project limits.

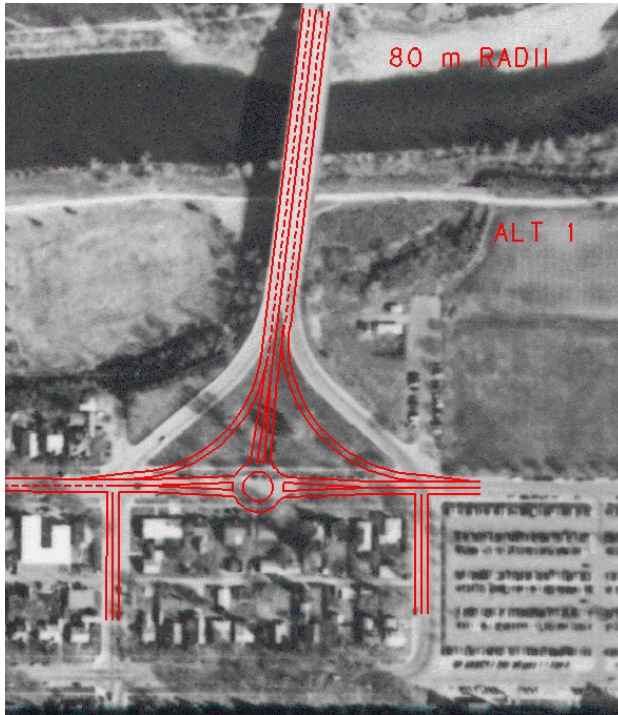
The "Madison/Arthur Roundabout Feasibility Analysis" by WGM Group dated March 8, 1999, was used as a background reference for the location of the roundabouts. That report can be found in the Revised Preliminary Traffic Report. The document looked at installing one or two-lane roundabouts at the Arthur Avenue/5th Street and Arthur Avenue/6th Street intersections.

Roundabout Methodology

For a full explanation of the roundabout methodology and a site specific analysis of each intersection please refer to Section 2.4 of this document.

Alternative 1

Alternative 1 consists of reconstruction of the northbound and southbound couplets using an 80 meter radius. This alternative also implements a single lane roundabout that is placed on 5th Street between Arthur Avenue and Maurice Avenue. The roundabout is connected to the Madison Street Bridge by extending the tangent roadway section south from the bridge. With this option, 5th and 6th Streets would



be one-way on the west side of Arthur Ave and the remaining roadways would be two-way roadways.

This option was considered inappropriate because of several reasons. The first reason for removing this alternative is that a roundabout cannot efficiently handle the large volumes of traffic from northbound U.S. Highway 12, University/residential traffic from the north, and University traffic from the east. The volume of traffic that would enter the roundabout could impair its ability to cycle vehicles through in a reasonable manner. The second reason for removing this alternative is due to

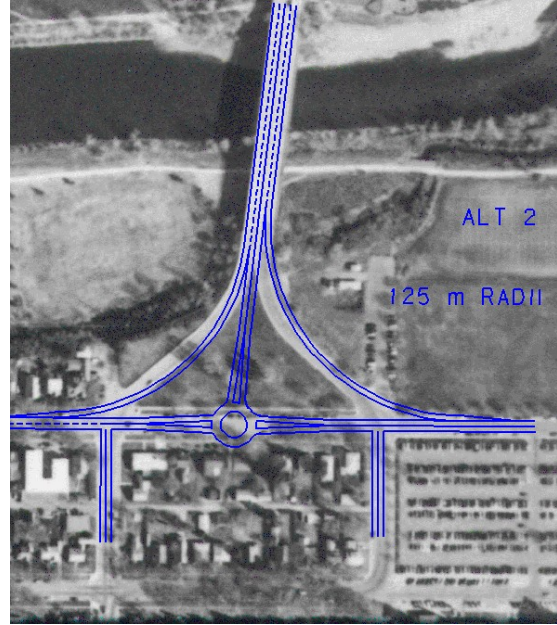
pedestrian and bicycle use. Since the University is directly to the east of the roundabout location, there is a large volume of bicycle and pedestrian traffic. The impact of pedestrians on a roundabout will dramatically reduce the volume of vehicles that will be able to pass through the structure, due to crossing times. Roundabouts are also difficult for pedestrians and bicyclist to negotiate and often require signalized crossing near the roundabout. With the introduction of a signal the platoon flow causes the roundabouts performance to suffer. This alternative would also remove a majority of the park.

Alternative 2

The second alternative uses the same configuration as alternative one except that the couplet radii are increased to 125 m. By lengthening the radii on the couplets it was possible to dedicate the couplet traffic to vehicles exiting the University and vehicles continuing from the Madison Street Bridge to 5th Street eastbound.

Similar to alternative 1, this option was removed due to the capacity of the roundabout in relation to the elevated volumes of vehicles, pedestrians, and bicycles in the area.

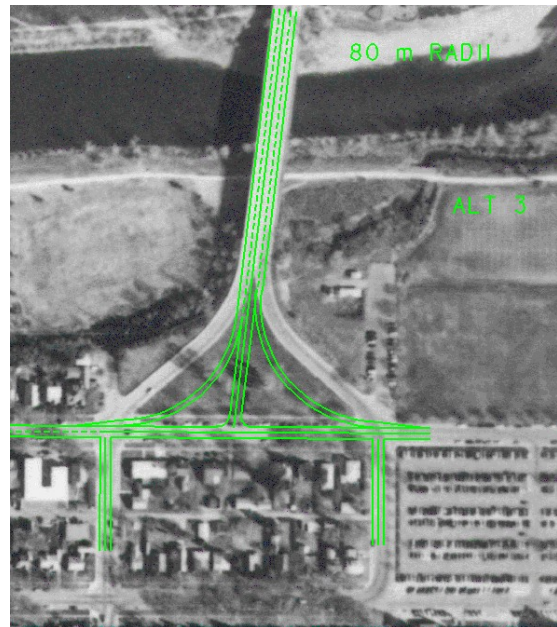
This alternative has potential wetlands impacts on the east and west sides of the existing couplet. In addition, additional right-of-way will be required and a large portion of the park will be removed.



Alternative 3

The third alternative that was reviewed was similar to alternative one except that the roundabout was removed and replaced with a conventional signal. This combination works much better with the large mixture of multimodal transportation. The signal allows for vehicles to be metered through the area in a more efficient manner while allowing pedestrians protected crossings. The conventional signaling was preferred over the roundabout by the visually impaired students and professors at the University of Montana.

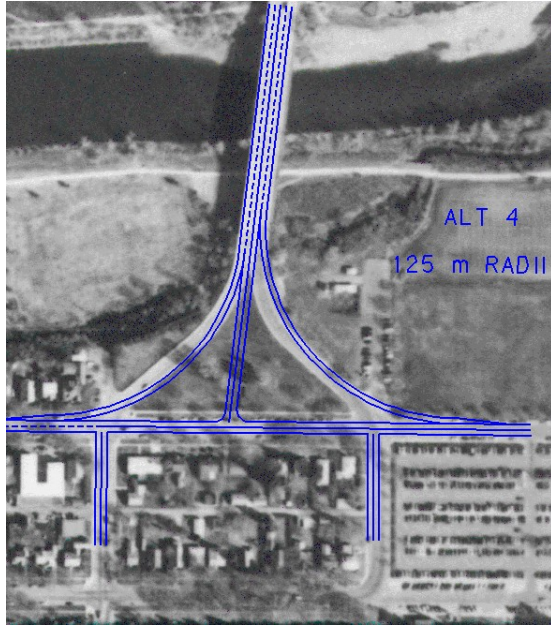
Alternative number three was removed because of the requirements for U.S. Highway 12 traffic, coming from 6th Street, to turn onto Arthur Avenue, then 5th Street and finally onto Madison Avenue. The additional turning movements would slow the traffic and cause congestion.



Alternative 4

Alternative four is a combination of alternatives two and three. This alternative uses the 125 meter radii that were used in alternative two with the conventional signalized intersection of alternative four. This alternative assisted in the movement of U.S. Highway 12 traffic south and west bound as well as traffic leaving the University

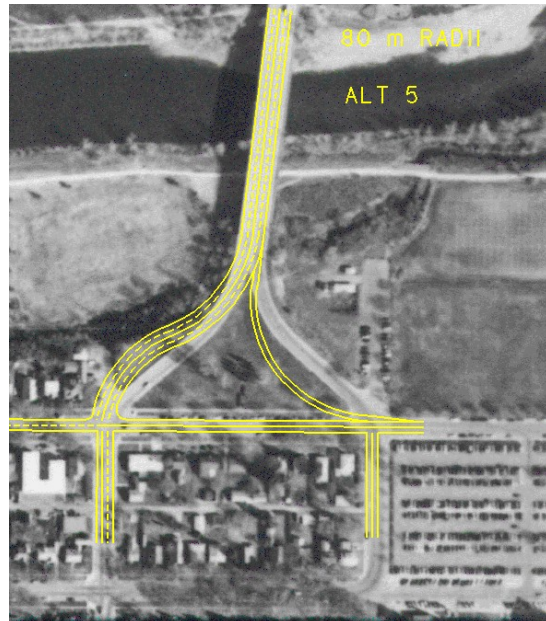
The disadvantages of this option were the same as for alternative three and two. Traffic traveling on 6th Street eastbound is required to make a left turn onto Arthur Avenue followed by a right turn onto 5th Street. Once on 5th Street, the vehicles would have to take a left at the



new intersection before accessing the Madison Street Bridge.

Alternative 5

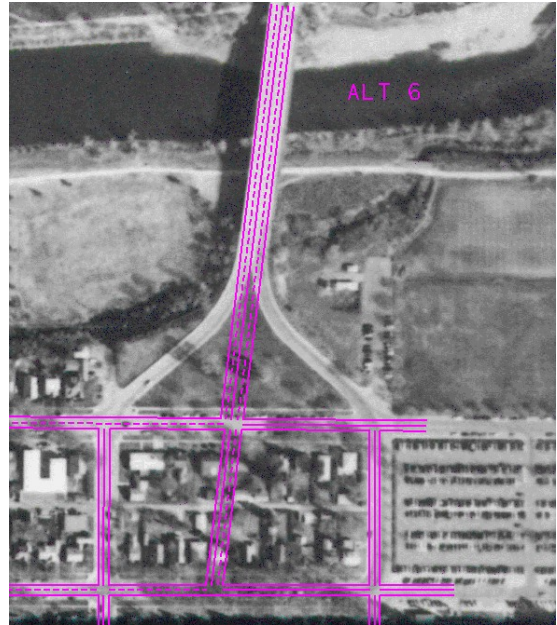
Alternative five brings all four lanes off the Madison Street Bridge and down into the intersection of Arthur Avenue and 5th Street. At the intersection, south/westbound traffic turns onto 5th Street and proceeds east. North/eastbound traffic comes from 6th Street eastbound turning north on Arthur Ave which then continues over the Madison Street Bridge. Traffic leaving the University can take the ramp to access the Madison Street Bridge. Roadways to the west of Arthur Avenue will remain one-way but roadways east of, and including, Arthur Avenue will be two-way.



Alternative 5 was removed from consideration due to problems with both the horizontal and vertical curves required to access the Arthur Avenue/ 5th Street intersection from the north. Both of these curves have significant impact on sight distance and by combining the two curves the problem is multiplied. An additional concern involves the merging of traffic from the University onto U.S. Highway 12 from the ramp. Due to the angle of the merge there would be significant sight problems.

Alternative 6

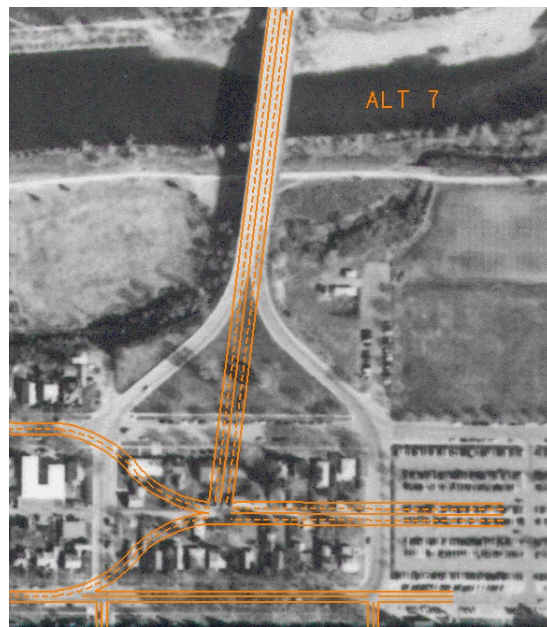
Alternative six removes the existing couplets and brings the traffic from the Madison Street Bridge south until it intersects 5th Street. At the intersection at 5th Street, the west/southbound U.S. Highway 12 traffic turns west and proceeds down 5th Street. Additionally at this intersection, traffic heading south can turn and enter the University. Traffic exiting the University can either go west or north at the 5th Street intersection. The remaining southbound traffic will continue south to the intersection of 6th Street where north/eastbound U.S. Highway 12 traffic will be intercepted and diverted north. 5th and 6th Streets west of the intersections will be one-way. The remaining roadways will be reconfigured to two-way.



This alternative was removed because of the additional right-of-way requirements as well as the congestion problems that would occur at the intersection of 5th Street and the Madison Street Bridge. If this option were implemented, special design requirements would be needed to ensure that traffic did not cross from the one-way roadway sections to the two-way roadway sections in the wrong direction.

Alternative 7

The seventh alternative uses alternative six as a base but removes the 5th Street and 6th Street intersections and creates a new intersection between 5th and 6th Street. This intersection would form a couplet, similar to the Madison Street Bridge, to access 5th and 6th Streets. By combining the two intersections from alternative 6 into one intersection there will be an increase level of service. This is due in part to minimizing the number of signalized intersections and by reducing the possibility of traffic queues backing into intersections. With this alternative all of the traffic for U.S. Highway 12, the University, and the residential community would pass through the new intersection between 5th

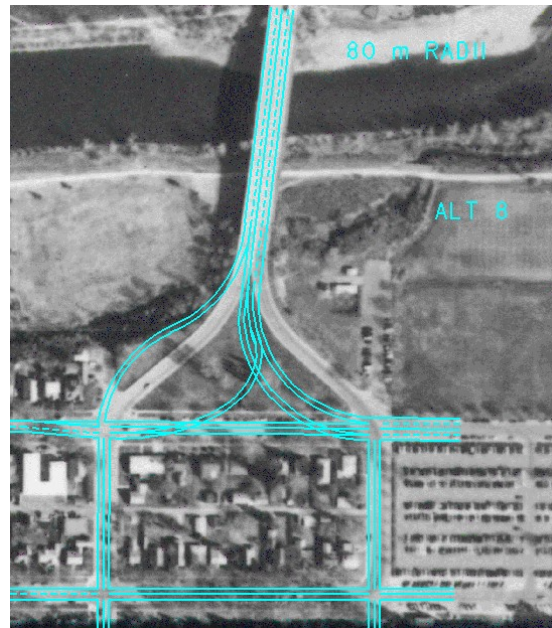


and 6th Street. From this point U.S. Highway 12 traffic would enter and exit to the west side of the intersection while University traffic and residential traffic would enter and exit from the east.

This alternative was removed from consideration because of four reasons. The first reason for removal was the excessive right-of-way take required for the realignment. The second reason revolves around the couplet design and the introduction of broken back curves entering and exiting the intersection. These curves may cause driver confusion without proper signing. The third disadvantage to this option was pedestrian and bicycle accessibility associated with the couplet. The final reason that this option was removed is because there would no longer be access to residential property along Arthur Avenue and 5th Street.

Alternative 8

Alternative eight adds overpasses to the project in an attempt to streamline traffic flow both for U.S. Highway 12 and for the University. With this option 5th and 6th Streets would be rerouted such that 5th Street would be one-way eastbound and 6th Street would be one-way westbound. Southbound U.S. Highway 12 traffic would proceed on a redesign of the west couplet through the 5th/Arthur intersection and down Arthur to 6th Street where they would head west. Southbound University traffic would traverse the northbound lane of U.S. Highway 12 and 5th Street before meeting existing grade at the 5th/Maurice intersection.

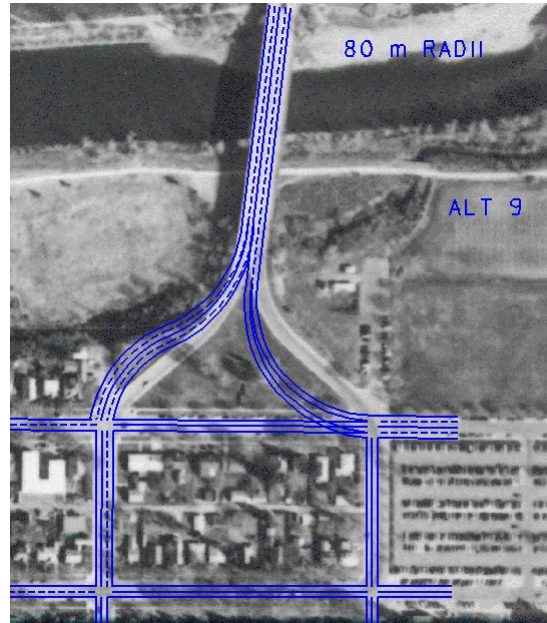


Northbound U.S. Highway 12 traffic would exit 5th Street via a flyover located on the south east corner of the 5th/Arthur intersection. From here the traffic would pass over the top of 5th Street and under the southbound University traffic before continuing north on the Madison Street Bridge. Northbound University traffic would access the modified couplet approach and be directed north on the Madison Street Bridge.

Alternative eight was removed from the viable options primarily because of cost and the feasibility of constructing the flyovers. There would need to be significantly steep approaches to the flyovers because of the close proximity of the structures to the existing bridge. The slopes required for such an overpass would compromise stopping sight distances. In addition, the excessive slope could present serious problems during poor weather conditions.

Alternative 9

Alternative nine was an attempt to split the U.S. Highway 12 and residential traffic from the University traffic and thus minimize the number of flyovers required in alternative eight. With this alternative, traffic would be split north of the Madison Street Bridge such that the east two lanes would be north/south University traffic. The two western lanes would be dedicated to the U.S. Highway 12 and residential north/south traffic. At the south end of the bridge the four lanes would be split into two lanes directed to the University and two lanes to the intersection of Arthur Avenue and 5th

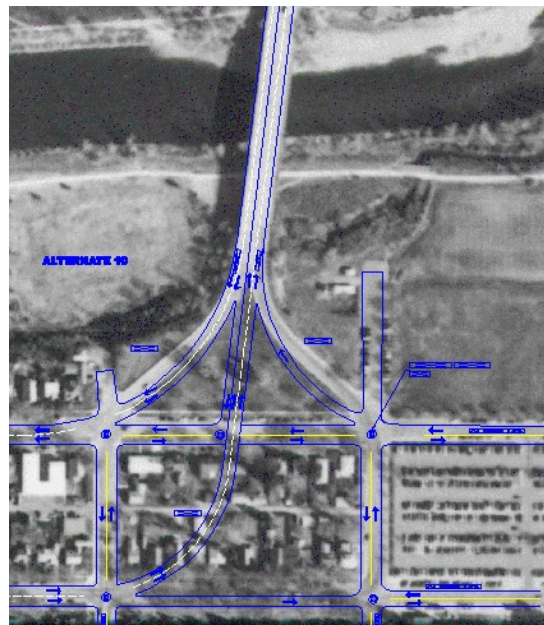


Street. The southernmost southbound University lane would go over the top of 5th Street before entering the intersection of 5th Street and Maurice Avenue at existing grade. The U.S. Highway 12 portion of this alternative will expand from two to four lanes as the alignment enters the intersection of 5th Street and Arthur Avenue.

Logistically this option is not viable because of the lane configurations over the Madison Street Bridge. Extensive work, if feasible, would be required north of the bridge to bring the University and U.S. Highway 12 traffic into the correct lanes. In addition, the lane drop and lane addition to the U.S. Highway 12 traffic lanes, on the south side of the bridge, would be very confusing for motorists.

Alternative 10

Alternative 10 is a modification of alternative six. This alternative shifts the southern intersection, shown in alternative six, to 6th Street and uses an overpass configuration to cross over the top of the intersection at 5th Street. Under this option the existing couplets will be realigned with radii to allow better traffic flow from the University and down 5th Street. With the couplet realigned, the west couplet traffic would be directed down 5th Street and would no longer be able to turn onto Arthur Avenue. Access to Arthur Avenue and the University

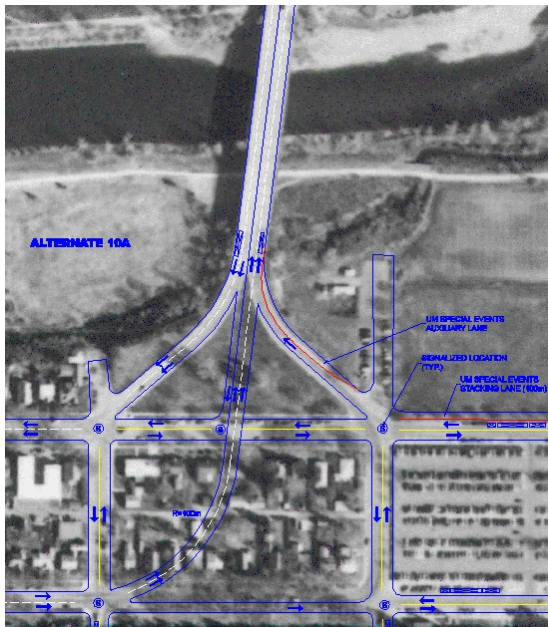


would come from the ramp that runs south from the bridge. This intersection would be at the existing grade and allow traffic to turn left or right. The intersection of 6th Street and Arthur would have an additional approach exiting to the northeast. This approach would be the continuation of U.S. Highway 12 through to the Madison Street Bridge. This alternative has very good traffic flow and the level of service at all of the intersections is above minimum designs.

This alternative was removed because of four primary reasons. The first reason was the cost of an overpass structure over an intersection is very high and project funding may not allow for such costs. The second reason for removal is bicycle and pedestrian access via the overpass is very limited. Due to the free flow nature of this option the third reason for removal involves the merging traffic from the University. This traffic would become backed up and possibly encounter gridlock in high flow conditions. The final reason for removal is due to the right-of-way issues associated with the connection between 5th and 6th Streets. The University's master plan may not allow for this alignment on their property. One other possible problem with this alternative is that 6th Street between Arthur Avenue and Maurice Avenue is one-way to the east.

Alternative 10A

Alternative 10A is identical to alternative 10 except that the existing couplet alignment is kept intact. This option allows for traffic to proceed south on Arthur Avenue at the



intersection of 5th Street and Arthur Avenue. Alternative 10 does not allow for this movement. By keeping the eastern couplet leg there is also the possibility of using the existing second lane as overflow during special events.

Alternative 10A was removed from consideration for the same reasons as alternative 10. Alternative 10A, like the existing conditions, would allow traffic from the Madison Street Bridge to pass through the intersection of 5th/ Arthur and continue south on Arthur Avenue. This configuration may cause traffic conflicts at the 5th Street/ Arthur Avenue intersection.

Alternative 11

Alternative 11 is a hybrid of alternatives five and eight. For this alternative the University would have ramps leading from the Madison Street Bridge to and from the campus. The southbound ramp would require an overpass structure to bring it up over the top of northbound U.S. Highway 12. The southbound U.S. Highway 12 traffic would pass on the existing couplet alignment to 5th Street while the northbound U.S. Highway 12 traffic would turn left on a modified Arthur Avenue

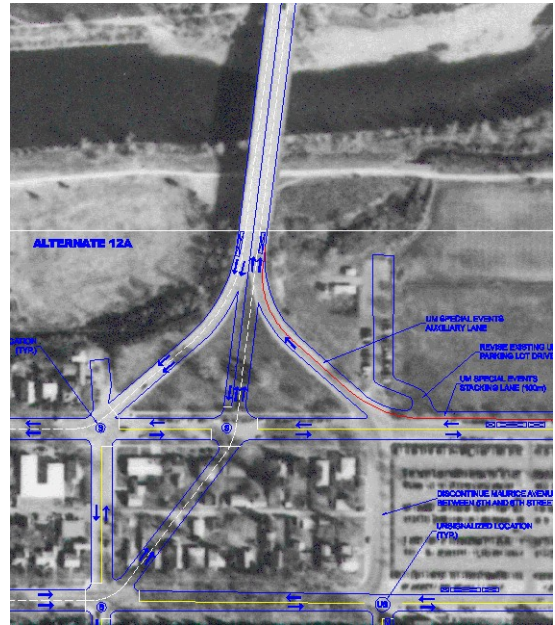
Alignment which would run along the east side of the existing west couplet. The alternative removes 5th Street between Arthur and Maurice as well as Maurice between 5th and 6th Streets.

Alternative 11 was removed from possible implementation due to several reasons. The first reason revolved around the overpass structure. Not only would this structure have a significant construction cost but, to achieve adequate clearances, the approach slopes would have to be very steep. The drawing shows the overpass near the Madison Street Bridge, but to gain adequate clearance the crossing would have to be shifted a minimum of 70 meters to the south. The realignment would introduce a complex broken back curve for the northbound U.S. Highway 12 traffic and would require additional right-of-way acquisition to the east of Arthur Avenue. This alternative provides no access to the block south of the park from the Madison Street Bridge.



Alternative 12A

Alternative 12A is a variation on alternative 10 and uses a signalized intersection between Arthur Avenue and Maurice Avenue on 5th Street. With this option southbound U.S. Highway 12 traffic over the Madison Street Bridge will take the western couplet that will allow traffic flow to continue westbound on 5th Street. U.S. Highway 12 traffic from 6th Street will leave the intersection of 6th Street and Arthur Avenue in a northeastern direction, in route to the new intersection mid-block of 6th Street between Arthur and Maurice. At this intersection U.S. Highway 12 traffic will continue north to the Madison Street Bridge. University and residential traffic would access the area by taking the roadway from the Madison Street Bridge to the intersection on 5th Street between Arthur and Maurice and then turn east to enter the University or west to enter the residential areas. Traffic exiting the University would follow an alignment similar to the existing eastern couplet. The couplet would be two lane widths across but only be



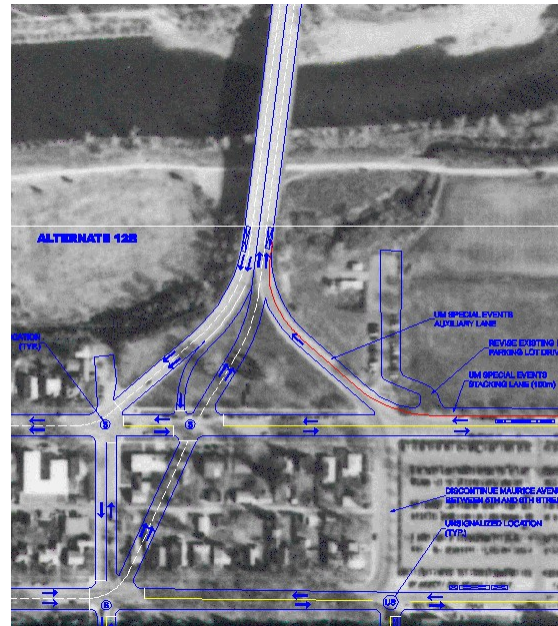
marked for a single lane. The advantages for this would be that during special events the university would be able to convert the traffic flow exiting the University into two lanes.

Alternative 12A is a very good alternative for traffic flows but significant concerns exist with the right-of-way required for the alignment. An additional concern exists with the queue length between the intersection of Arthur Avenue/5th Street and the intersection of 5th Street/Madison Street. Signals would require a signal network that would specify continuous flow from the new intersection through the 5th Street/Arthur Avenue intersection.

Alternative 12A should be further evaluated alongside other options for possible use as a final alignment.

Alternative 12B

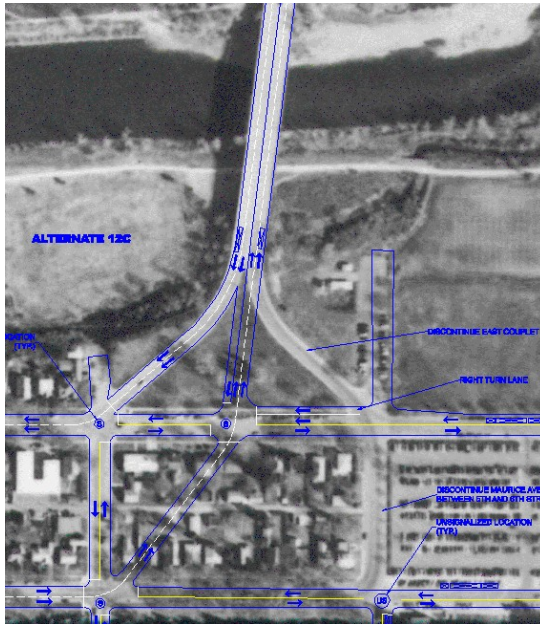
Alternative 12B uses alternative 12A as a base but moves the new intersection to the west. Similar to alternative 12A this option capitalized on the use of the couples for southbound U.S. Highway 12 traffic and traffic exiting the University. However, unlike alternative 12A, this alternative has a large boulevard section between the U.S. Highway 12 northbound and southbound lanes. The boulevard allows for the southbound University/residential lane to swing off of the couplet alignment and enter the intersection of Madison Street and 5th Street. The intersection connecting 6th Street traffic to the Madison Street Bridge has been shifted from alternative 12A and with such a shift there is a small bend in the roadway before it intersects with the Madison Street Bridge.



This option uses a minimal amount of right-of-way and has adequate traffic flows. For these reasons this alternative rates highly as a considered alternative. The drawbacks with this alternative consist of only three major concerns. The first concern is the alignment of the southbound lane from the Madison Street Bridge that enters the intersection at 5th Street and then goes to the University. The horizontal and vertical alignment of this ramp may be confusing for motorists and queues could potentially back up into a blind spot for vehicles exiting the bridge and continuing east. The second concern involves the size of the traffic queue between the new intersection and the intersection of Arthur Avenue and 5th Street. Signal coordination will be required such that there will be no vehicles within the queue during red light conditions. The final concern involves the intersection of 6th Street, Arthur Avenue

and Madison Street. The angles for this intersection would be small for traffic traveling down Arthur Avenue turning onto Madison Street. Because of the above reasons, alternative 12B should not be used unless right-of-way conditions cannot be met by other alignments. Additionally, this alignment should not be used unless special design is implemented to straighten and flatten the southbound approach into the new intersection.

Alternative 12C



Alternative 12C is based on alternative 12A but the eastern couplet is no longer used. Instead of University traffic using the existing couplet to exit to the Madison Street Bridge, this options brings them down to the new intersection on 5th Street. From this intersection the vehicles can turn to the north and access the Madison Street Bridge. By removing the eastern couplet more of the park can be reclaimed.

The drawbacks to alternative 12A also exist with this option. In addition to the 12A drawbacks, this option causes severe congestion at the new intersection located on 5th Street, between Arthur Avenue and

Maurice Avenue. With the addition of U.S. Highway 12 traffic northbound and both northbound and westbound University traffic, the overall peak hour level of service drops below acceptable levels. For these reasons alternative 12C was removed from the evaluation process.

Alternative 12D

Alternative 12D is identical to alternative 12A except that instead of a straight section of roadway between the two intersections, 6th Street/ Arthur Avenue and Madison Street/5th Street, there is a curved section. A curved section of roadway would significantly improve the traffic flow for through traffic during un-signalized movements.

This option was removed from consideration for two reasons. The main reason is the same as for alternative 12A except that even more



right-of-way will be required for this alternative. Due to the sweeping curve, the roadway between 6th Street and Madison Street will be intersected on a tangent as compared to the angled intersections of alternative 12A. The second reason that this option was removed is because there is no need for a curve, following the intersection since speeds are not excessive.

Alternative 13

Alternative 13 maintains the existing couplets but reconfigures them in a manner such that southbound traffic can continue through to the intersection of Arthur Avenue and 5th Street. In addition, one lane of southbound traffic can peel off to the east and enter the University through the eastern couplet. The eastern couplet would have an intersection where the northbound U.S. Highway 12 traffic would mix with the northbound traffic leaving the University. The U.S. Highway 12 vehicles would access the intersection via a new roadway from the 6th Street/ Arthur Avenue intersection which would head north and then turn down 5th Street to intersect with the eastern couplet.



This alternative was removed from consideration for several reasons; the first of which was traffic flow. The traffic simulation model revealed that the alignment could not handle the traffic volumes under an appropriate level of service. The second reason for removing this alternative was that the only way to access 5th Street from the University would be to exit via 6th Street and then merge across lanes on Arthur Avenue to access 5th Street. The merging lane would require significant signal timing issues to ensure that traffic from 6th Street westbound could access 5th Street westbound. The third reason for removal of this alternative dealt with turning radii at the new intersection within the eastern couplet. Truck traffic would have problems negotiating the turn to the north and the turn to the south would require a separate left turn lane.

Alternative 14A

Alternatives 14A thru 14C manipulate the U.S. Highway 12 northbound movement while minimizing impacts to the University's property and the park. Alternative 14A has the U.S. Highway 12 northbound and southbound movements adjacent to each other as the transition from Arthur Avenue to the Madison Street Bridge. With this option, 5th and 6th Streets east of Arthur Avenue are switched to two way traffic and Maurice Avenue is removed.

Alternative 14B

Alternative 14B does not have a figure but this alternative is the same as 14A, except that Maurice Avenue is reintroduced in this alternative and it is configured as a two-way roadway with one lane in either direction.

Alternative 14 C

Alternative 14C does not have a figure. This alternative varies slightly from 14A and 14B because like 14B, Maurice Avenue is reestablished but 5th and 6th Streets are one way between Arthur Avenue and Maurice Avenue.



Appendix C

Agency Correspondence



34 North Last Chance Gulch, Suite 104
Helena, Montana 59601
tel: 406 449-2121
fax: 406 449-6768

August 13, 2002

Scott Jackson
U.S. Fish and Wildlife Service
100 N. Park Ave.
Helena, MT 59601

Dear Scott:

As we discussed on the phone recently, the Montana Department of Transportation (MDT) has retained Camp Dresser & McKee (CDM) to provide engineering services for the reconstruction of Arthur Avenue near the University of Montana (U of M) in Missoula, Montana. The project will target the Arthur Avenue portion of Highway 12. Arthur and Maurice Avenues will be the eastern and western project limits. The project will be bounded by 6th Street, to the south, and the Madison Street Bridge, to the north. The entire project area is within an urban environment. The purpose of this project is to improve the traffic flow, reduce out-of-direction travel and improve safety. The project is needed to meet current and future demands of a mixture of motor vehicles, bicycles, and pedestrians. As part of this project, the use of roundabouts and/or conventional signaling in areas will be analyzed to determine overall project feasibility.

Per the requirements of the environmental assessment (EA) for this project, CDM has conducted a search to identify issues of concern to the USFWS. Specifically, CDM has searched for federal threatened and endangered species and wetlands. The results of this search indicate no wetlands within the project boundaries, and no T&E species have been identified within the project area. A summary of these results are presented following the body of this letter.

Based primarily on the information provided below as well as other site-specific information, CDM has come to the preliminary conclusion that this project has no significant potential to adversely impact federal T&E species or wetlands. CDM is seeking any additional information from USFWS that might affect this conclusion. If USFWS is in agreement with this preliminary conclusion, or if no additional information is available, please provide a letter to that effect as soon as possible.



Scott Jackson
August 13, 2002
Page 2

All correspondence can be mailed to the following:

Tony Gendusa, Ph.D.
CDM Inc.
20200 Wambli Lane
Huson, MT 59846

If you have any questions I can be reached at 406-626-4166 or gendusatc@cdm.com.

Thank you for your assistance,

Sincerely,

Tony Gendusa, Ph.D.



Scott Jackson
August 13, 2002
Page 3

Wetlands Evaluation and Coordination

A site visit conducted on July 22, 2002 revealed no wetlands within the project boundaries. The nearest potential wetlands to the project area are areas presumptively identified as riparian wetlands along the south bank of the Clark Fork River. These limited areas are presumptively identified as riparian wetlands based on hydrological characteristics and the types of plants dominating these areas. These limited riparian wetlands were not delineated or assessed with regard to function and value because they occur substantially beyond the project area. Finally, a search of the NRIS web site for wetlands within the project area confirmed that no wetlands occur within the project area.

Fish and Wildlife, Habitats, and Special Resources Assessment

Montana Natural Heritage Program Search Results

The Montana Natural Heritage Program (MNHP) was contacted to obtain information on the potential for plant and animal species of special concern to occur within the project area. The search area is defined as a point location within the project area and a one-mile radius surrounding this point location. The project area and the selected point location is in Section 22, Township 13N, Range 19W.

The results of this search (**Appendix X**) indicate that seven species of concern have been reported within the search area (eight total records). These records are general, as indicated in the survey site names provided below. In several cases, the records are historic, and as such do not necessarily indicate that the species currently occurs or has potential to occur within the project area given the current habitat limitations. The potential for these eight species to occur within the project is discussed below. The definitions of the status or rank given by various state and federal agencies are included in **Appendix X**.

1. Westslope cutthroat trout (*Oncorhynchus clarki lewisi*).

Global rank: G4T3.

State rank S2.

BLM Status: Special Status.

Survey site name: Lower Clark Fork Basin

Discussion: This species has no potential to occur within the project area because the project area does not provide suitable habitat (coldwater stream). Project-related impacts on this species are unexpected.



Scott Jackson
August 13, 2002
Page 4

2. Bull trout (Columbial River) (*Salvelinus confluentus* pop 2).

Global rank: G3TQ.

State rank S?

USFWS Endangered Species Act: LT.

Survey site name: West of the continental divide.

Discussion: This species has no potential to occur within the project area because the project area does not provide suitable habitat (coldwater stream). However, MDFWP has recommended a 100 meter buffer on all streams and lakes/reservoirs that (a) have bull trout present and/or (b) are important for migration or over-wintering, or (c) link occupied stream reaches to major rivers. Project-related impacts on this species are unexpected but possible considering the 100 meter buffer zone recommendation. Potential impacts can include the addition of sediments to the Clark Fork River from project-related activities within the northern portion of the project area.

3. Fringed myotis (*Myotis thysanodes*).

Global rank: G4G5.

State rank S3.

Survey site name: Missoula

Discussion: This species is reported to have been collected in Missoula in 1964. The location of the collection is within Section 28, to the southwest of the project area. Although this species has potential to occur within the project area, the lack of (1) recent records of occurrence within the county, and (2) occurrence records for Section 22 suggest that the potential is low.

4. Lynx (*Felis lynx*).

Global rank: G5.

State rank S3.

USFWS Endangered Species Act: (PS:LT).

Survey site name: Statewide



Scott Jackson
August 13, 2002
Page 5

Discussion: This species has almost no potential to occur within the project area because the project area does not provide suitable habitat (spruce-fir forests above 3500 feet). The sensitivity of this species to human presence further indicates very little potential for this species to occur within the project area.

5. Spotted slug (*Magnipelta mycophaga*).

Global rank: G2G3.
State rank S1S3.
Survey site name: Deer Creek

Discussion: This species has little potential to occur within the project area because the project area does not provide significant amounts of natural habitat. This species was last collected in 1957 at 4150 feet elevation, between Deer Creek and a parallel small gravel road near the creek in Section 32. The collection site is on the east side of Mount Sentinel in the Sapphire Mountains. Section 32 is located southwest of Section 22 (project area).

6. Missoula mountainsnail (*Oreohelix* sp 10).

Global rank: G1G3.
State rank S1S3.
Survey site name: Mount Sentinel

Discussion: This species has little potential to occur within the project area because the project area does not provide significant amounts of natural habitat. This species was collected at Mount Sentinel, 4900 feet elevation, about one mile southeast of the University of Montana. The collection site is in Section 26, southeast of Section 22 (project area).

7. Missoula mountainsnail (*Oreohelix* sp 10).

Global rank: G1G3.
State rank S1S3.
Survey site name: Mount Jumbo

Discussion: This observation record is for the same species listed for the previous observation (7.) Based on this specific record, the species was collected at Mount Jumbo, 4600 feet



Scott Jackson
August 13, 2002
Page 6

elevation, about one mile northwest of the University of Montana. The collection site is in Section 14, northeast of Section 22 (project area).

8. Obscure evening-primrose (*Camissonia andina*).

Global rank: G4.
State rank S2.
BLM Status: Sensitive
Survey site name: Mount Sentinel

Discussion: This species has little potential to occur within the project area because the project area does not provide significant amounts of natural habitat. This species was collected at Mount Sentinel, 3320 feet elevation, on the west side of the mountain. The collection site is in Section 27, immediately south of the project area.

Field Observations

Observations regarding habitats and species were made during a site visit conducted on July 22, 2002. The results of the site visit indicate little natural habitat remains within the project area. The majority of the project area consists of residential housing and the Jeanette Rankin Park at the northern portion of the project area. Immediately adjacent to the roads forming the eastern and western boundaries of the park are vegetated road shoulders dominated by plant species indicative of disturbed areas (e.g., spotted knapweed). Just beyond the project boundaries and south of the Clark Fork River are densely vegetated areas dominated by several species of shrubs and trees. Within the current boundaries of the Jeanette Rankin Park are open (mowed) grass areas with planted shrubs (e.g., roses) and trees (e.g., American elm, maple). No significant natural habitats occur within the project area, either within the park or the residential area. A field survey for rare and sensitive plants was therefore not performed.



United States Department of the Interior

FISH AND WILDLIFE SERVICE

MONTANA FIELD OFFICE
100 N. PARK, SUITE 320
HELENA, MONTANA 59601
PHONE (406) 449-5225, FAX (406) 449-5339

M.44 MDT (I)

August 16, 2002

Tony Gendusa
CDM Inc.
20200 Wambli Lane
Huson, Montana 59846

Dear Dr. Gendusa:

This responds to your letter dated August 13, 2002 regarding Montana Department of Transportation's proposal to reconstruct a short section of Arthur Avenue in Missoula, Montana. Your letter indicated that the proposed project would occur within an urban area and that there are no wetlands within the project boundaries. The U.S. Fish and Wildlife Service (Service) has reviewed the proposed project and determined that no federally-listed species or designated critical habitat occurs within the project area. Therefore, the Service agrees with your preliminary conclusion that this project will not affect threatened or endangered species. This concludes consultation on this project and no further review under S.7 of the Endangered Species Act is necessary.

If you have questions regarding this matter, please contact Mr. Scott Jackson, of my staff, at (406)449-5225, ext. 201.

Sincerely,

Brent Esmoil
Acting Field Supervisor



34 North Last Chance Gulch, Suite 104
Helena, Montana 59601
tel: 406 449-2121
fax: 406 449-6768

SENT

8-13-02

August 13, 2002

FILE COPY

Pat Saffel
Montana Department of Fish, Wildlife, and Parks
Regional Office
3201 Sprugin Road
Missoula, MT 59804

Dear Pat:

As we discussed on the phone recently, the Montana Department of Transportation (MDT) has retained Camp Dresser & McKee (CDM) to provide engineering services for the reconstruction of Arthur Avenue near the University of Montana (U of M) in Missoula, Montana. The project will target the Arthur Avenue portion of Highway 12. Arthur and Maurice Avenues will be the eastern and western project limits. The project will be bounded by 6th Street, to the south, and the Madison Street Bridge, to the north. The entire project area is within an urban environment. The purpose of this project is to improve the traffic flow, reduce out-of-direction travel and improve safety. The project is needed to meet current and future demands of a mixture of motor vehicles, bicycles, and pedestrians. As part of this project, the use of roundabouts and/or conventional signaling in areas will be analyzed to determine overall project feasibility.

Per the requirements of the environmental assessment (EA) for this project, CDM has conducted a search to identify issues of concern to the MDFWP. Specifically, CDM has searched for state species of special concern. The results of this search indicate no state species of special concern have been identified within the project area. A summary of these results are presented following the body of this letter.

CDM has determined that two species of concern, the bull trout and the westslope cutthroat trout, have potential to be impacted by this project under certain unlikely conditions. Although the project boundaries do not reach the Clark Fork River, the northern boundary of the project area are near the Clark Fork River, and at some point approaches the 100-meter buffer recommended for protection of bull trout. The potential impacts to salmonids in the Clark Fork River are believed limited to uncontrolled sedimentation to the river. Sediment control measures will be implemented at all applicable phases of the project, and sediment inputs to the river are not expected to occur as a result of project activities.



Pat Saffel
August 13, 2002
Page 2

Based primarily on the information provided below as well as other site-specific information, CDM has come to the preliminary conclusion that this project has no significant potential to adversely impact state species of concern or their habitats. CDM is seeking any additional information from MDFWP that might affect this conclusion. If MDFWP is in agreement with this preliminary conclusion, or if no additional information is available, please provide a letter to that effect as soon as possible.

All correspondence can be mailed to the following:

Tony Gendusa, Ph.D.
CDM Inc.
20200 Wambli Lane
Huson, MT 59846

If you have any questions I can be reached at 406-626-4166 or gendusatc@cdm.com.

Thank you for your assistance,

Sincerely,

A handwritten signature in black ink, appearing to read 'Tony Gendusa' with a stylized flourish at the end.

Tony Gendusa, Ph.D.



Pat Saffel
August 13, 2002
Page 3

Fish and Wildlife, Habitats, and Special Resources Assessment

Montana Natural Heritage Program Search Results

The Montana Natural Heritage Program (MNHP) was contacted to obtain information on the potential for plant and animal species of special concern to occur within the project area. The search area is defined as a point location within the project area and a one-mile radius surrounding this point location. The project area and the selected point location is in Section 22, Township 13N, Range 19W.

The results of this search (**Appendix X**) indicate that seven species of concern have been reported within the search area (eight total records). These records are general, as indicated in the survey site names provided below. In several cases, the records are historic, and as such do not necessarily indicate that the species currently occurs or has potential to occur within the project area given the current habitat limitations. The potential for these eight species to occur within the project is discussed below. The definitions of the status or rank given by various state and federal agencies are included in **Appendix X**.

1. Westslope cutthroat trout (*Oncorhynchus clarki lewisi*).

Global rank: G4T3.
State rank S2.
BLM Status: Special Status.
Survey site name: Lower Clark Fork Basin

Discussion: This species has no potential to occur within the project area because the project area does not provide suitable habitat (coldwater stream). Project-related impacts on this species are unexpected.

2. Bull trout (Columbial River) (*Salvelinus confluentus* pop 2).

Global rank: G3TQ.
State rank S?
USFWS Endangered Species Act: LT.
Survey site name: West of the continental divide.



Pat Saffel
August 13, 2002
Page 4

Discussion: This species has no potential to occur within the project area because the project area does not provide suitable habitat (coldwater stream). However, MDFWP has recommended a 100 meter buffer on all streams and lakes/reservoirs that (a) have bull trout present and/or (b) are important for migration or over-wintering, or (c) link occupied stream reaches to major rivers. Project-related impacts on this species are unexpected but possible considering the 100 meter buffer zone recommendation. Potential impacts can include the addition of sediments to the Clark Fork River from project-related activities within the northern portion of the project area.

3. Fringed myotis (*Myotis thysanodes*).

Global rank: G4G5.
State rank S3.
Survey site name: Missoula

Discussion: This species is reported to have been collected in Missoula in 1964. The location of the collection is within Section 28, to the southwest of the project area. Although this species has potential to occur within the project area, the lack of (1) recent records of occurrence within the county, and (2) occurrence records for Section 22 suggest that the potential is low.

4. Lynx (*Felis lynx*).

Global rank: G5.
State rank S3.
USFWS Endangered Species Act: (PS:LT).
Survey site name: Statewide

Discussion: This species has almost no potential to occur within the project area because the project area does not provide suitable habitat (spruce-fir forests above 3500 feet). The sensitivity of this species to human presence further indicates very little potential for this species to occur within the project area.



Pat Saffel
August 13, 2002
Page 5

5. Spotted slug (*Magnipelta mycophaga*).

Global rank: G2G3.
State rank S1S3.
Survey site name: Deer Creek

Discussion: This species has little potential to occur within the project area because the project area does not provide significant amounts of natural habitat. This species was last collected in 1957 at 4150 feet elevation, between Deer Creek and a parallel small gravel road near the creek in Section 32. The collection site is on the east side of Mount Sentinel in the Sapphire Mountains. Section 32 is located southwest of Section 22 (project area).

6. Missoula mountainsnail (*Oreohelix* sp 10).

Global rank: G1G3.
State rank S1S3.
Survey site name: Mount Sentinel

Discussion: This species has little potential to occur within the project area because the project area does not provide significant amounts of natural habitat. This species was collected at Mount Sentinel, 4900 feet elevation, about one mile southeast of the University of Montana. The collection site is in Section 26, southeast of Section 22 (project area).

7. Missoula mountainsnail (*Oreohelix* sp 10).

Global rank: G1G3.
State rank S1S3.
Survey site name: Mount Jumbo

Discussion: This observation record is for the same species listed for the previous observation (7.) Based on this specific record, the species was collected at Mount Jumbo, 4600 feet elevation, about one mile northwest of the University of Montana. The collection site is in Section 14, northeast of Section 22 (project area).



Pat Saffel
August 13, 2002
Page 6

8. Obscure evening-primrose (*Camissonia andina*).

Global rank: G4.
State rank S2.
BLM Status: Sensitive
Survey site name: Mount Sentinel

Discussion: This species has little potential to occur within the project area because the project area does not provide significant amounts of natural habitat. This species was collected at Mount Sentinel, 3320 feet elevation, on the west side of the mountain. The collection site is in Section 27, immediately south of the project area.

Field Observations

Observations regarding habitats and species were made during a site visit conducted on July 22, 2002. The results of the site visit indicate little natural habitat remains within the project area. The majority of the project area consists of residential housing and the Jeanette Rankin Park at the northern portion of the project area. Immediately adjacent to the roads forming the eastern and western boundaries of the park are vegetated road shoulders dominated by plant species indicative of disturbed areas (e.g., spotted knapweed). Just beyond the project boundaries and south of the Clark Fork River are densely vegetated areas dominated by several species of shrubs and trees. Within the current boundaries of the Jeanette Rankin Park are open (mowed) grass areas with planted shrubs (e.g., roses) and trees (e.g., American elm, maple). No significant natural habitats occur within the project area, either within the park or the residential area. A field survey for rare and sensitive plants was therefore not performed.

Gendusa, Tony

From: Saffel, Pat [psaffel@state.mt.us]
Sent: Monday, August 26, 2002 9:31 AM
To: Gendusa, Tony
Subject: 13 Aug letter

Your letter and our discussions suggest that the project will be approaching (implying at or near) a 100-foot distance to the Clark Fork River and, at this distance, the project lies within an urban area. You state that sediment inputs to the river are not expected to occur. Therefore, given these preliminary plans, I do not expect issues concerning bull trout or westslope cutthroat trout associated with your project.

Pat Saffel
Montana Fish, Wildlife & Parks
Fishery Manager
Missoula, Montana
406-542-5507



34 North Last Chance Gulch, Suite 104
Helena, Montana 59601
tel: 406 449-2121
fax: 406 449-6768

SENT

8-1302

August 13, 2002

Tom Ellerhoff
Montana Department of Environmental Quality
P.O. Box 200901
Helena, Montana 59620-0901

FILE COPY

Dear Tom:

As discussed with Denise Martin (DEQ) recently by phone, the Montana Department of Transportation (MDT) has retained Camp Dresser & McKee (CDM) to provide engineering services for the reconstruction of Arthur Avenue near the University of Montana (U of M) in Missoula, Montana. The project will target the Arthur Avenue portion of Highway 12. Arthur and Maurice Avenues will be the eastern and western project limits. The project will be bounded by 6th Street, to the south, and the Madison Street Bridge, to the north. The project is located within Township 13N, Range 19W, Section 22. The entire project area is within an urban environment. The purpose of this project is to improve the traffic flow, reduce out-of-direction travel and improve safety. The project is needed to meet current and future demands of a mixture of motor vehicles, bicycles, and pedestrians. As part of this project, the use of roundabouts and/or conventional signaling in areas will be analyzed to determine overall project feasibility.

Per the requirements of the environmental assessment (EA) for this project, CDM has conducted a preliminary search to identify issues of concern to the DEQ. Specifically relevant to DEQ, CDM has searched for leaking underground storage tanks, hazardous spill sites, MT CECRA sites, EPA CERLIS sites, and EPA toxic release sites.

The results of this search indicate that no hazardous spill sites, EPA toxic release sites, or EPA CERLIS sites occur within one mile of the project area. Four MT CECRA sites have been identified within the one-mile buffer zone surrounding the project area, but all are well north or west of the project boundaries. Several underground storage facilities have been identified within the one-mile buffer zone, and several of these are associated with known leaks (both active and inactive facilities). None are identified within the project boundaries.



Tom Ellerhoff
August 13, 2002
Page 2

Based primarily on the information provided below as well as other site-specific information, CDM has come to the preliminary conclusion that this project has no significant potential for association with hazardous spill or release sites, leaking USTs, or other potentially hazardous conditions. CDM is seeking any additional information from DEQ that might affect this conclusion. Alternatively, if DEQ is in agreement with this preliminary conclusion, or if no additional information is available, please provide a letter to that effect as soon as possible.

All correspondence can be mailed to the following:

Tony Gendusa, Ph.D.
CDM Inc.
20200 Wambli Lane
Huson, MT 59846

If you have any questions I can be reached at 406-626-4166 or gendusatc@cdm.com.

Thank you for your assistance,

Sincerely,

A handwritten signature in black ink, appearing to read 'Tony Gendusa'. Below the signature, the initials 'FGN' are written in a smaller, cursive hand.

Tony Gendusa, Ph.D.

Gendusa, Tony

From: Joe Oliphant [JOliphant@ci.missoula.mt.us]
Sent: Friday, August 02, 2002 10:15 AM
To: Gendusa, Tony
Cc: Steve King; Doug Harby; Bruce Bender; 'Martin, Tom'; 'duwilliams@state.mt.us'; 'frazier@state.mt.us'; 'Jameel Chaudhry (chaudhry@selway.umt.edu)'; 'POdegard@Entranco.com'; Keith Belden
Subject: Arthur Ave (CN 4611) Related Projects

Camp, Dresser, McKey;

As you requested, this email is in response to your request for information on current transportation projects near the University.

City of Missoula is managing two federal-aid transportation projects which are in proximity to 5th/6th Arthur Ave project.

Listed below is some general information about each project:

Broadway/California Ped Xing Study CM 8128 (1) CN 4499 City Project #99-070

Project limits Broadway (Mullan Road to Madison Street)

Scope

- Primary-Ped crossing near California/Broadway/Toole Intersection
- Secondary-Conversion potential for 3 lane system

MDT Consultant Design Contact-Duane Williams

Consultant Entranco

Project Manager Phil Odegard

Higgins/Hill/Beckwith CM 8117(3) CN 4498 City Project #00-038

Scope of Work

- Intersection Improvement Project
 - Signal
 - Signing/Striping
 - Roundabout

MDT Consultant Design Contact-Duane Williams

Consultant-Morrison-Maierle

Project Manager Keith Belden

Let me know if you need further information.

Have a good weekend!

Joe Oliphant

Appendix D

Comments and Responses

MEMORANDUM

TO: File – Arthur Avenue CM 7-2(36)94 CN 4611

FROM: CDM/KirK

DATE: 9-1-05

RE: Comments received on post cards sent to MDT in March 2005 and comments received at a meeting at the University of Montana on April 4, 2005.

MDT requested CDM/KirK conduct a detailed analysis of the options and ideas brought forward in post cards received by MDT in March 2005, and the comments received at a meeting at the University of Montana on April 4, 2005. This memorandum is a summary of the CDM/KirK analysis of those comments.

Analysis of the Post Cards

MDT received 127 post cards from students and Missoula residents in March 2005. The following are examples of post cards received. *“I request a public meeting on the design of the Madison/5th/6th project. The design should be one that encourages and is safe for all transportation modes. It should fit the character of the neighborhood and community. The project should be designed to reduce speeds as traffic enters the University District.”* Many of the post cards reflect the above language, and provided other detailed comments. The following table is a summary of the issues obtained from the comment section of the post cards received.

Post Card Comments Received by MDT

General Concern or Issue Presented	Number of People commenting per issue	% of Total Post Card Comments
Agree with a design that is safe for all modes of transportation, fits the character of the community, and reduces speeds into the University District. No other comments on the post cards.	54	38.0
Additional Issues Presented on Post Card		
Requested that bikes, pedestrians, or both be adequately considered in the design	30	21.1
Requested a public meeting to discuss issues	26	18.3
Thought a roundabout was a good alternative	17	12.0
Did not like any design with four or more lanes	11	7.7
Thought the project is bad	3	2.1
Concerned about the loss of houses	1	0.7
Total Post Card Commenters	142	

Post Card Comment #1: *The design should be safe for all modes of transportation, fit the character of the community, and reduce speeds into the University District.*

Response: The current Arthur Avenue, Highway 12 system requires out of direction travel, has an uncontrolled intersection at Arthur and 5th, and has limited bike and pedestrian accessibility. The proposed project will add controlled intersections with pedestrian actuated crossings, marked crossings, bike lanes, and will eliminate multiple turns in Highway 12 that reduce visibility and increase driver confusion. In addition, installation of a light controlled intersection at Arthur and 5th will cause drivers to stop for pedestrian crossing and allow pedestrians controlled access. This intersection will be preceded by signs and warning lights on or near the bridge. The installation of signs and warning lights along with the stop light should slow or stop traffic in the pedestrian conflict area. A more detailed description of pedestrian and bicycle benefits of the proposed action is described in the EA.

Post Card Comment #2: *The request that bikes, pedestrians or both are adequately considered in the design.*

Response: Bikes and pedestrians have been considered in detail during the pre-design process. Numerous enhancements have been included in the proposed alternatives as described in the EA. Some examples include addition of bike lanes on the SB portion of Arthur Ave north of 5th Street, signalized pedestrian crossings with push buttons, and ADA compliance on all crosswalks and sidewalks in the project vicinity. In addition, MDT is working in coordination with the City and University on another project; a pedestrian/bike underpass, under the Madison Street Bridge, that will provide a route for bicyclists and pedestrians directly to the University. The attached figure shows the proposed plan and MDT and the City of Missoula can be contacted regarding this project.

Post Card Comment #3: *Commenters requested a public meeting to discuss issues.*

Response: A meeting was scheduled and conducted on April 4, 2005 to specifically hear from students and other residents' issues and concerns. Prior to that, more than 3 dozen meetings have occurred with City officials, University officials, MDT, special interest groups, neighborhood residents and students. In addition, a public meeting was held at the University in 2004, and a list of prior project meetings is included in Section 5 of the EA. Also, another public meeting will be scheduled for November or December of 2005 to discuss and receive additional questions and comments on the project.

Post Card Comment #4: *Commenters feel a roundabout is a good alternative.*

Response: Please see responses to "Citizens Plan" below.

Post Card Comment #5: *Commenters do not like any plan that will include four or more driving lanes.*

Response: Currently, there are four driving lanes for Highway 12 traffic. These lanes are “split and one way” between Maurice Avenue and Arthur Avenue. The proposed plan will allow Maurice Avenue to become a City/University street, diverting the traffic to Arthur Avenue. In response to the concern presented at the April 4, 2004 meeting, and based upon the resolution presented by the students and presented at that meeting and comments from the City and University, the proposed alternative has been amended to reduce the width of Arthur Avenue by removing the turn lane at Arthur and 5th. Further information regarding this issue is provided in the EA in the description of the alternatives.

Post Card Comment #6: *Commenters think the project is bad.*

Response: The no-build alternative was considered and analyzed in the EA, and is being used as the baseline for the project.

Post Card Comment #7: *Commenters are concerned about the loss of homes in the area.*

Response: As part of the EA process, a detailed analysis was conducted to assess the impacts to properties and properties that are considered culturally or historically important. Please see Section 4 of the EA for more information. Homes that will be removed as part of this project currently belong to the University (rental properties for University students) and are part of the University and MDT MOU. This includes one historic property and four non-historic properties. For more information on the historic property please see Section 4. Mitigation measures are also listed in the EA.

Analysis of the Citizen Plan

The following is included regarding the “Citizens Plan” brought forward at the April 4, 2004 meeting and 11 comments received by MDT via post cards in March 2005.

Single Lane Roundabout

- The traffic volumes at the intersections of Arthur Avenue at 5th Street and 6th Street exceed the capacity of a single lane roundabout.
- The geometric layout of the existing streets (the skew of the Madison Street Bridge approach) does not conform to a standard roundabout; therefore, some movements would prohibit trucks (right turn from 5th to Arthur NB). Also, a single lane roundabout would require the two entry lanes on 6th Street to be reduced to one lane. This would cause severe backups through existing intersections to the west of 6th Street at Arthur Avenue. This same problem could occur for the Madison Street bridge entry lanes at 5th Street and Arthur Avenue.

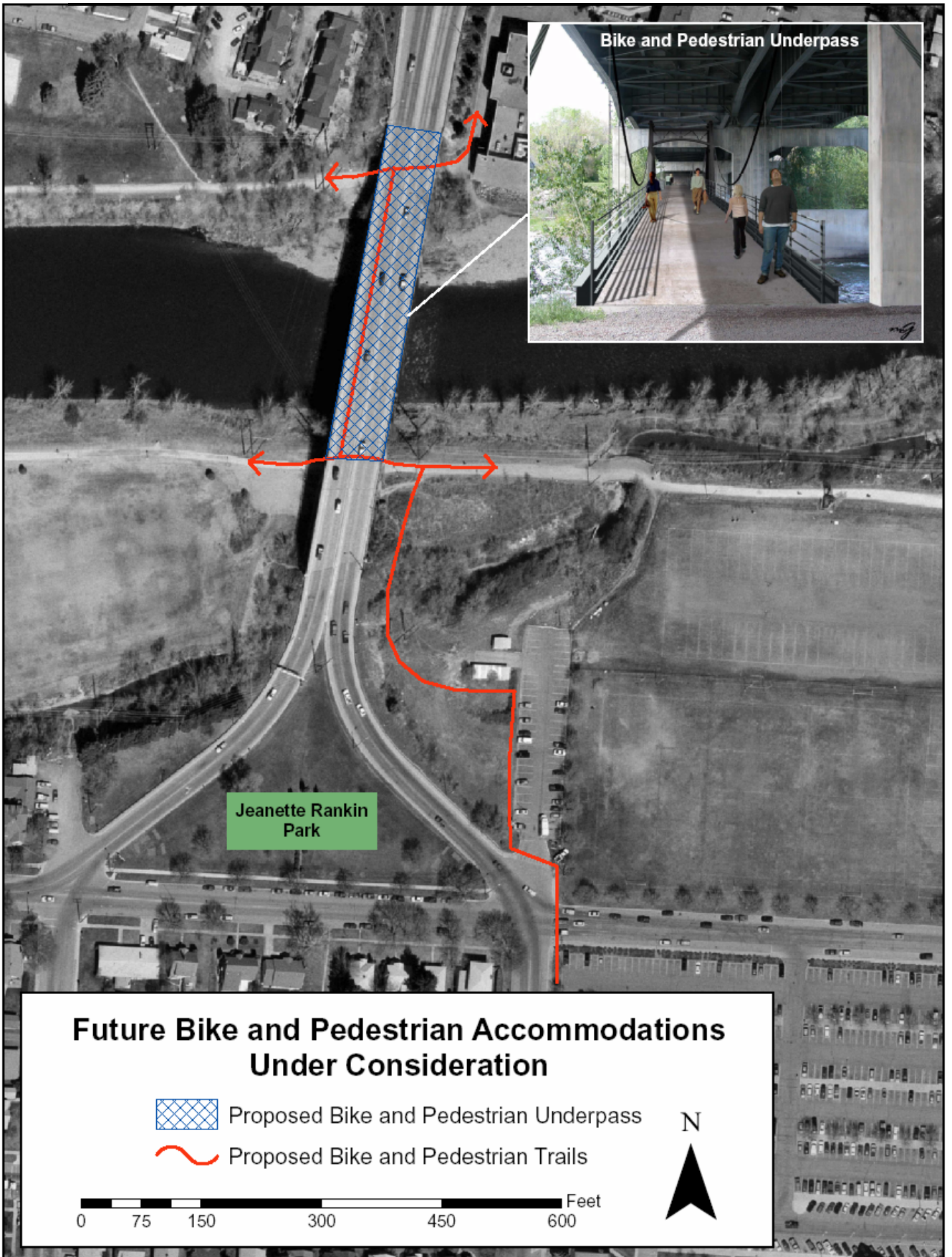
-
- A single lane roundabout at either location would have greater delays and increased emissions than the preferred alternative (new traffic signals and turning lanes).

Double Lane Roundabout

- A double lane roundabout will have more right-of-way impacts than the preferred alternative. This includes the demolition of at least 4 homes in the historic district on the west side of Arthur Avenue.
- A double lane roundabout will likely require a large retaining wall on the northwest side of Arthur Avenue at 5th Street.
- Roundabouts will exceed the limits of the Memorandum of Understanding.
- If a double lane roundabout were installed, it would result in longer crosswalks and would require pedestrians to cross two approach lanes and two exit lanes. In addition, the capacity of double lane roundabout would be reached in 7 to 10 years.
- Pedestrians in double roundabouts will face the “double hazard” of a vehicle in the first approach (or exit) lane yielding while a vehicle in the second lane fails to yield. Furthermore, vehicles approaching in the leftmost lane will not be looking towards the pedestrian crosswalk; they will be focused on traffic circling the roundabout.
- The double lane roundabout increases the pedestrian travel distance for pedestrians traveling along the southern side of 5th Street, the northern side of 6th Street, and the southern side of 6th Street.
- Bicyclists at a double lane roundabout would compete with vehicles in two approach lanes and two exit lanes.
- FHWA recommends that all roundabouts have illumination. The amount of street lighting needed will be equal to or greater than traffic signals with Light Emitting Diode (LED) signal heads. Furthermore, roundabouts will require the same roadway/pavement markings/signing maintenance as a traffic signal installation, if not more due to landscaping on the center islands.
- The Impacts to Jeanette Rankin Park would be larger with a double lane roundabout than the preferred alternative.

Roundabout Summary

Section 2.4 of the EA provides a more detailed discussion of Roundabouts and the Roundabout analysis.



Appendix E

List of Preparers

Appendix E

List of Preparers

CDM, Inc.

Darrel Stordahl
Project Manager
B.S. Mining Engineering, Montana Tech
M.S. Environmental Engineering,
Montana Tech
Reg. Professional Engineer
18 years of experience in environmental
engineering experience

Jeff Jones
Project Manager/
Project Engineer
B.S. Civil Engineering, Montana State
University
Reg. Professional Engineer
Seven years experience in transportation
and civil engineering

Wade Salyards
Project Engineer
B.S. Mining Engineering, Montana Tech
Reg. Professional Engineer
Five years experience in transportation
engineering

Kevin Johnson
Transportation Engineer
Roundabout/Capacity Analysis
B.S. Civil Engineering, Roger Williams
College
Reg. Professional Engineer
Twelve years experience in traffic
engineering

Lisa Sherman
Transportation Engineer
Roundabout/Capacity Analysis
B.S. Civil Engineering, Northeastern
University
Reg. Professional Engineer
Ten years experience traffic engineering

Amber Conboy
Transportation Engineer
Traffic Engineering
B.S. Civil Engineering, University of
Massachusetts
Engineer In Training Certificate
Five years experience transportation
engineering

Dave Kirkpatrick
EA Preparation
Technical editor/writer
B.A. Journalism, University of Montana
Seventeen years experience writing and
editing

KirK Environmental

Randy Huffsmith
EA Preparation
M.S. Engineering, University of
Wyoming
B.S. Agricultural/Civil Engineering,
University of Wyoming
Reg. Professional Engineer
Seventeen years experience
environmental consulting, EA report
preparation

Western Cultural Resources, Inc.

Dan Hall
Cultural Resources
M.A. Interdisciplinary Studies,
History/Anthropology, University of
Montana
B.A. Geology, University of Montana
Sixteen years of experience in cultural
resource services

Appendix F

Distribution List

Distribution List

FEDERAL HIGHWAY ADMINISTRATION (MONTANA DIVISION)

2880 Skyway Drive
Helena, MT 59602

CITY OF MISSOULA - DEPARTMENT OF PUBLIC WORKS

435 Ryman
Missoula, MT 59802

MISSOULA CITY-COUNTY HEALTH DEPARTMENT

301 West Alder
Missoula, MT 59802

UNIVERSITY OF MONTANA

Facilities Services
32 Campus Drive
Missoula, MT 59812

ASSOCIATED STUDENTS OF THE UNIVERSITY OF MONTANA (ASUM)

32 Campus Drive
University Center 105
Missoula, MT 59812

RESOURCE AGENCIES

EPA Montana Operations Office

Federal Building
10 West 15th Street, Suite 3200
Helena, MT 59626

DEQ Main Office

Lee Metcalf Building
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

DEQ Missoula

Air Quality Office
Missoula County Health Department
301 W. Alder
Missoula, MT 59802

US Fish & Wildlife Service

USFWS Montana Field Office
110 North Park, Suite 320
Helena, MT 59601

Montana Fish, Wildlife & Parks

1420 E 6th Ave.

PO Box 200701

Helena, MT 59620-0701

OTHER RECIPIENTS

Bob Giordano (MIST)

91 Campus Dr. #1412

Missoula, Montana 59801

VEIWING LOCATIONS

Missoula City Library

301 East Main Street

Missoula, MT 59802

ASUM Offices - Student Union Building

University Center 105

Missoula, MT 59812

Mansfield Library

University of Montana

32 Campus Drive

Missoula, MT 59812

Montana Department of Transportation District 1 Office, Missoula

2100 W. Broadway

P.O. Box 7039

Missoula, MT 59807-7039

City of Missoula, Public Works Department

City Hall, Second Floor

435 Ryman

Missoula, MT 59802