



1.0 PURPOSE OF AND NEED FOR PROPOSED ACTION

This chapter provides a summary description of the project area and the proposed actions by the City of Missoula, the Montana Department of Transportation, and the Federal Highway Administration. This chapter also provides a definition of the specific purpose of the proposed project and the need for the proposed improvements.

This chapter explains the purpose the proposed project is intended to serve in the community; the operational deficiencies that need to be addressed to make this facility function as intended; the additional benefits to the traveling public that could be gained from improvements in this corridor; and ends with a compilation of goals and objectives that were developed by the public and were used to develop the alternatives presented in Chapter 2 of this document.

1.1 Project Area Description

As illustrated in Figure 1-1, the proposed project is located in western Montana, in the City and County of Missoula. The proposed project lies entirely within the city limits.

The proposed project consists of approximately 1.5 miles of Russell Street from Mount Avenue on the southern end to West Broadway Street on the northern end. The existing roadway varies in width from two to four lanes including turn lanes at some intersections, and includes a two-lane bridge over the Clark Fork River.

The proposed South 3rd Street improvements extend approximately one mile from Reserve Street on the west to Russell Street on the east. The existing roadway varies in width but generally includes one travel lane in each direction and turn lanes at some intersections.

Existing Conditions of Transportation Facilities

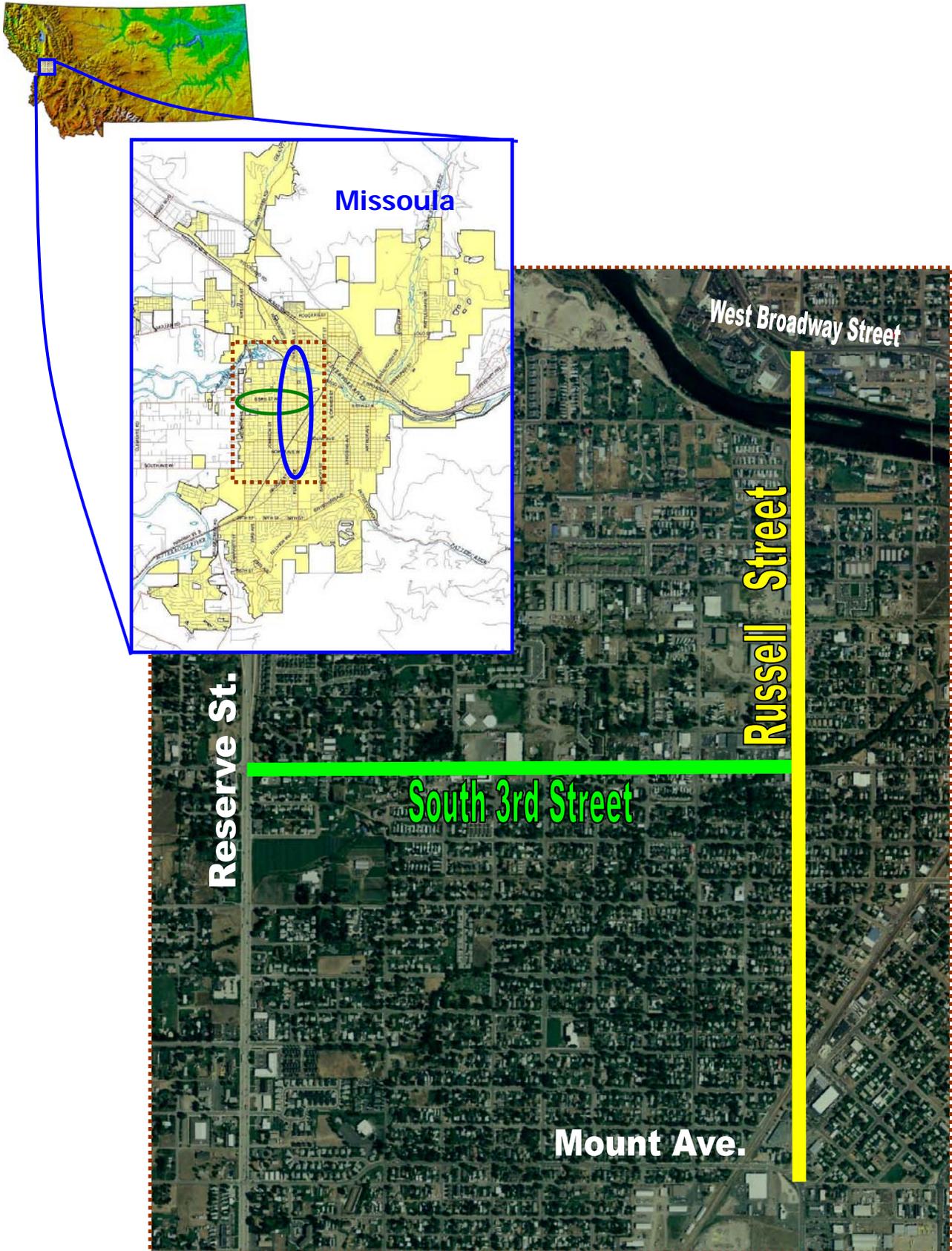
Russell Street

Russell Street is a north-south principal arterial connecting Higgins Avenue to West Broadway Street in west-central Missoula. As illustrated in Figure 1-2, the section of Russell Street under study from Mount Avenue/South 14th Street to West Broadway Street varies from two to four lanes with turn lanes. Currently, traffic signals are located on Russell Street at its intersections with Mount Avenue/South 14th Street, South 5th Street, South 3rd Street, and West Broadway Street. The signalized intersections along the corridor have pedestrian crossing facilities, including pedestrian signals, and are handicapped accessible (with curb ramps at all crossings).

There are no exclusive bike lanes and limited pedestrian facilities along Russell Street between Mount Avenue/South 14th Street and West Broadway Street. There are intermittently paved shoulders from Mount Avenue/South 14th Street to South 3rd Street, and gravel shoulders from South 3rd Street to West Broadway Street. The existing Russell Street Bridge has sidewalks on both sides.

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Figure 1-1
Project Location Map



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Figure 1-2
Existing Transportation Facility Conditions



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The existing Russell Street Bridge, formally known as the Lincoln-Russell Bridge, was built in 1957. The bridge consists of two, 12± foot lanes and two, 4.0± foot raised sidewalks adjacent to the roadway. The existing bridge is approximately 420 feet long with four 105 foot spans over the approximately 407-foot bottom width channel. The structure is supported by three in-stream piers. The existing vertical clearance between the Russell Street Bridge and the 100-year flood elevation at the south abutment is approximately 4.0 feet. Runoff from the existing Russell Street Bridge currently drains into the Clark Fork River.

The bridge footings support the interior piers and are approximately 10 feet wide by 34± feet long with a thickness of approximately 7.0 feet. Each abutment cap is supported by a wall resting on two pads that are approximately 3.0 by 14± feet wide with a thickness of approximately 4.0 feet.

South 3rd Street

South 3rd Street is an east-west minor arterial connecting Clements Road to Orange Street in the north-central Missoula. As illustrated in Figure 1-2, the section of South 3rd Street under study from Reserve Street to Russell Street is approximately one mile in length and consists of an approximately 24 foot wide, two-lane section of roadway with intermittent paved shoulders, and no bicycle or pedestrian facilities, except for crosswalks at two un-signalized intersections and at the intersections with Curtis and Catlin Streets. There are traffic signals at the intersections of South 3rd Street at Reserve Street and Russell Street.

1.2 Proposed Action

Based on priorities established through the metropolitan transportation planning process, the City of Missoula, in cooperation with the Montana Department of Transportation and the Federal Highway Administration, initiated a study to evaluate alternatives to address the current and projected safety and mobility concerns on Russell Street and South 3rd Street. The proposed project includes vehicular capacity improvements, accommodation of alternative transportation modes, transit pullouts, sidewalks, curb & gutter, boulevards, bicycle lanes, and stormwater drainage. Signalization of key intersections, as well as the potential for construction of roundabout traffic control is also under consideration with this proposed project.

1.3 Purpose of the Proposed Action

Given the physical location and functional designations of the Russell Street and South 3rd Street routes, the high traffic volumes, crash history, and multi-modal use of the corridors, **the purpose of this proposed project is to provide substantive safety and mobility improvements for all modes of travel in the Russell Street and South 3rd Street corridors.** Discussions in the following section outline the extent of the need for such improvements.

1.4 Need for the Proposed Action

The need for a transportation improvement project is generally established through an examination of characteristics such as capacity and forecast travel demand, crash history, lack of



roadway network linkages, inadequate transit accessibility or bicycle and pedestrian facilities, or outdated design features. In their Technical Advisory (6640.8A), the Federal Highway Administration outlines several different issues or problems that may be used to substantiate the need for improvements.

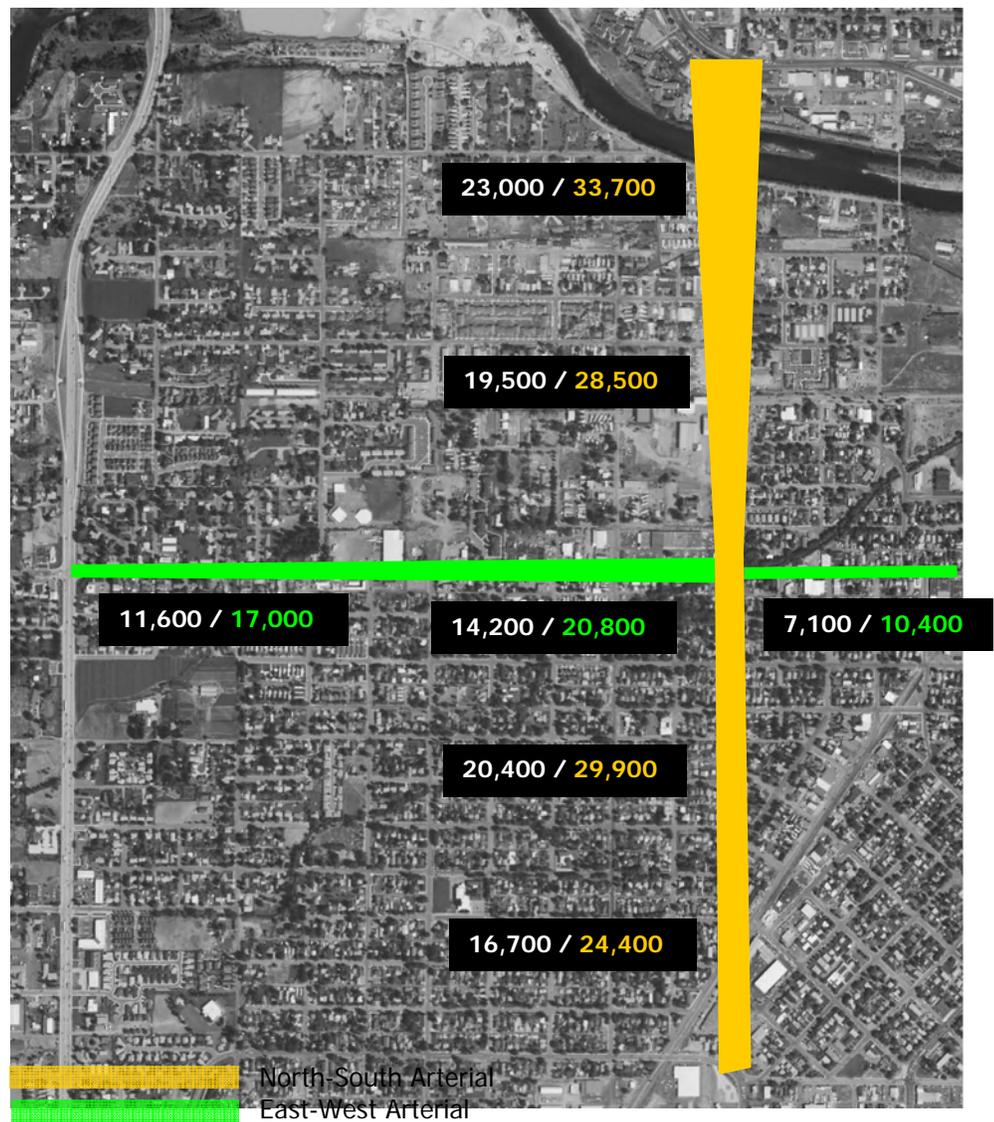
The need for improvements in these two corridors is based on a lack of future system capacity and lack of sidewalk continuity.

If these two issues can be addressed, additional benefits can also be gained in the following areas: vehicular, pedestrian, and bicycle safety; trail connectivity; improved transit service; and upgrades to an aging bridge structure. These needs and benefits are discussed below.

Vehicle Capacity and Level of Service

Figure 1-3
Existing and Projected Traffic Volumes on Russell and South 3rd

Russell Street currently experiences high levels of congestion during the morning and evening peak periods (or rush hours). As illustrated in Figure 1-3, traffic volumes counted in 2001 ranged from 16,700 average annual daily traffic south of South 3rd Street to 23,000 vehicles at the south end of the Russell Street Bridge. These traffic volumes are projected to increase to 24,400 and 33,700 vehicles respectively by the year 2025, which exceeds the traffic volumes that were projected in the 1996 Missoula Transportation Plan Update. Both the 1996 Missoula Transportation Plan Update and the 1999 Missoula Transportation Plan Update listed Russell Street as the number two priority for major improvement projects to



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remedy capacity-related problems. Russell Street continued to be listed in the 2004 Missoula Transportation Plan Update, but the Update did not prioritize projects as did previous reports.

South 3rd Street is one of several east-west arterials south of Broadway that provides important roadway links between the major north-south arterials and also serves adjacent residential and commercial areas. Traffic volumes counted on South 3rd Street in 2001 range from 7,100 vehicles just east of Russell Street to 14,200 vehicles just west of Russell Street. These traffic volumes are projected to increase to 10,400 and 20,800 vehicles respectively by the year 2025, which exceeds the traffic volumes that were projected in the 1996 Missoula Transportation Plan Update. Both the 1996 Missoula Transportation Plan Update and the 1999 Missoula Transportation Plan Update listed South 3rd Street as the number one priority for major improvement projects to remedy capacity related problems. The 2004 Missoula Plan Update did not prioritize projects, but continued to list South 3rd Street as a key project.

Maintaining adequate capacity for the multiple travel modes that use principal arterials is key to maintaining an efficiently functioning roadway system.

It should be noted that the City of Missoula is currently preparing an update to the Transportation Plan. This Plan will provide traffic projections through the year 2035. These projections will be reviewed once the plan is available. Early indication from the 2008 Envision Missoula Survey suggests that most Missoula citizens rank “Expand Roadway Capacity” as their dominant choice of transportation improvements for Missoula.

Traffic conditions on transportation facilities are commonly defined using the Level of Service concept. As shown in Figures 1-4 and 1-5, the *Highway Capacity Manual* defines Level of Service based on average travel speed, percent time delay, intersection delay, and capacity utilization to provide a qualitative assessment of the driver’s experience. Six Level of Service categories ranging from A to F are used to describe traffic operations. Level of Service A represents the best conditions and Level of Service F represents the worst. The existing facility does not provide adequate capacity to accommodate current traffic volumes during peak periods. If no improvements are made, traffic congestion in the corridor will worsen and the peak periods (or morning and evening rush hours) will extend in duration by the year 2025. In particular,

**Figure 1-4
Mainline Level of Service Definitions**

Level of Service	Flow Conditions	Technical Descriptions
A		Highest quality of service. Free traffic flow with few restrictions on maneuverability or speed. No delays
B		Stable traffic flow. Speed becoming slightly restricted. Low restriction on maneuverability. No delays
C		Stable traffic flow, but less freedom to select speed, change lanes or pass. Minimal delays
D		Traffic flow becoming unstable. Speeds subject to sudden change. Passing is difficult. Minimal delays
E		Unstable traffic flow. Speeds change quickly and maneuverability is low. Significant delays
F		Heavily congested traffic. Demand exceeds capacity and speeds vary greatly. Considerable delays

Source: 2000 HCM, Exhibit 20-2, Level of Service Criteria for Two-Lane Highways.

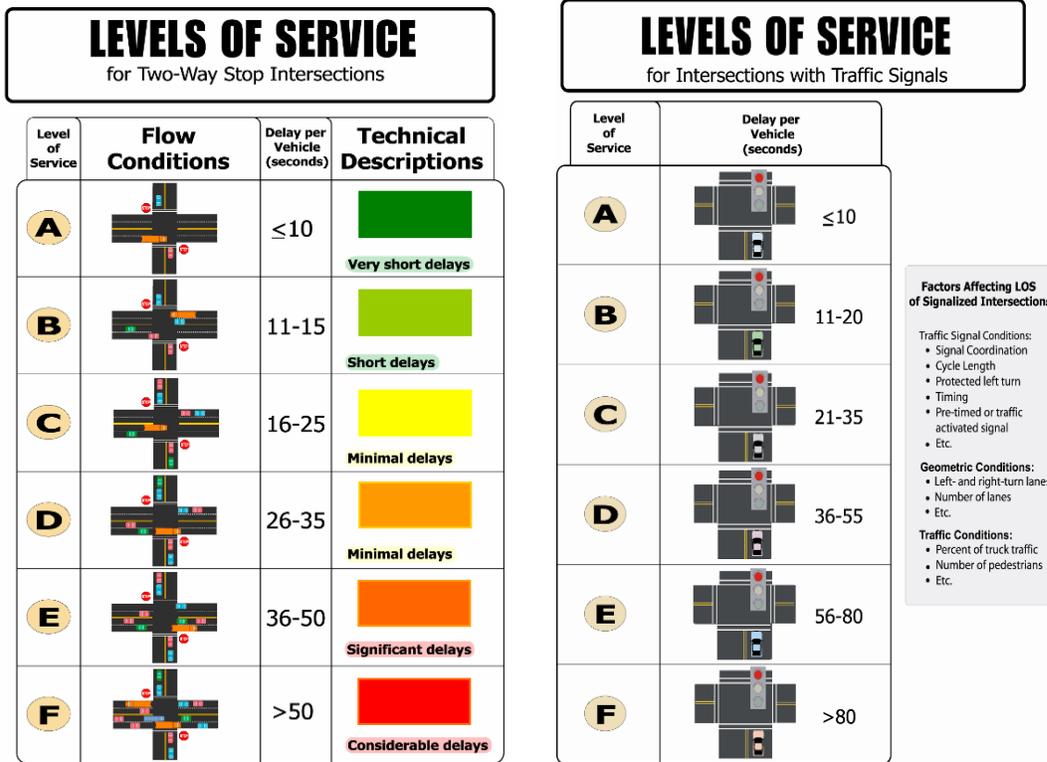


intersection operations on Russell Street are anticipated to degrade to Level of Service F at several locations, meaning drivers will experience substantial delays at these locations. Russell Street will not be capable of accommodating increased traffic volumes in the future without both mainline capacity and intersection improvements which may include signals, roundabouts, and/or turn lanes at many locations.

Recognizing that a Level of Service A is not always achievable in every corridor due to physical constraints and excessive cost, each state establishes minimum thresholds or benchmarks they strive to achieve on a given type of facility. Benchmark Level of Service values identified in the *Montana Road Design Manual* (MDT 2006) are C or better for urban principal and urban minor arterials and D or better for collectors. While not optimal, these Level of Service benchmarks offer minimal delays and are generally acceptable in light of higher costs and impacts associated with achieving a higher Level of Service.

For intersections, Level of Service is defined in terms of delay or the amount of time the average driver spends waiting at a signal or for a gap in traffic. This delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to intersection traffic control (stop signs or signals), geometrics, traffic and incidents. Levels of Service for intersections are defined to represent reasonable ranges of delay.

Figure 1-5
Intersection Level of Service Definitions



Source: 2000 HCM, Exhibit 17-2, Level of Service Criteria for TWSC Intersections

Source: 2000 HCM, Exhibit 16-2, Level of Service Criteria for Signalized Intersections

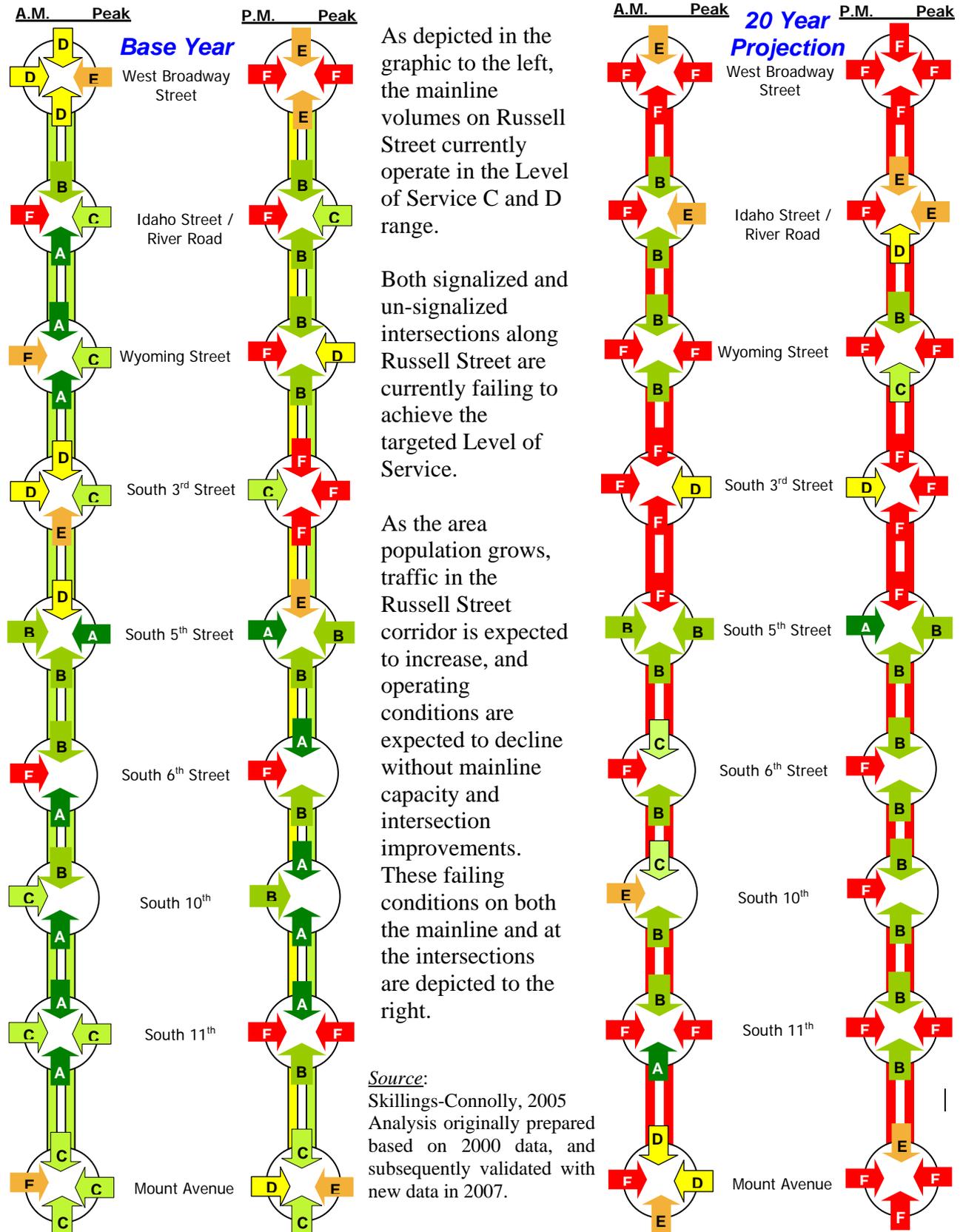
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The targeted Level of Service for intersections, according to Montana Department of Transportation, is C for urban principal (Russell Street) and minor arterials and D for collectors (South 3rd Street). In addition to these general requirements, the City of Missoula specified a minimum Level of Service of D for South 5th Street, South 6th Street, Wyoming Street, and Catlin Street. The goal for this project is to provide Level of Service C on Russell Street and South 3rd Street.

As illustrated in Figures 1-6 and 1-7, both Russell Street and South 3rd Street have intersections that currently have inadequate operating conditions. It should also be noted that these congested conditions result in more idling time, and higher levels of vehicle emissions which have substantial air quality implications. This concern is discussed further in Chapters 3 and 4 of this document.



**Figure 1-6
Russell Street Level of Service**



As depicted in the graphic to the left, the mainline volumes on Russell Street currently operate in the Level of Service C and D range.

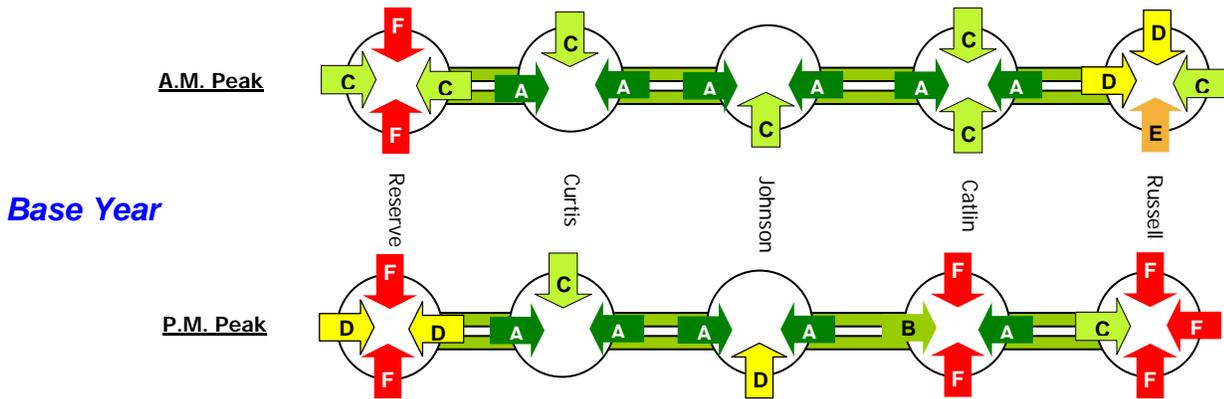
Both signalized and un-signalized intersections along Russell Street are currently failing to achieve the targeted Level of Service.

As the area population grows, traffic in the Russell Street corridor is expected to increase, and operating conditions are expected to decline without mainline capacity and intersection improvements. These failing conditions on both the mainline and at the intersections are depicted to the right.

Source:
Skillings-Connolly, 2005
Analysis originally prepared based on 2000 data, and subsequently validated with new data in 2007.

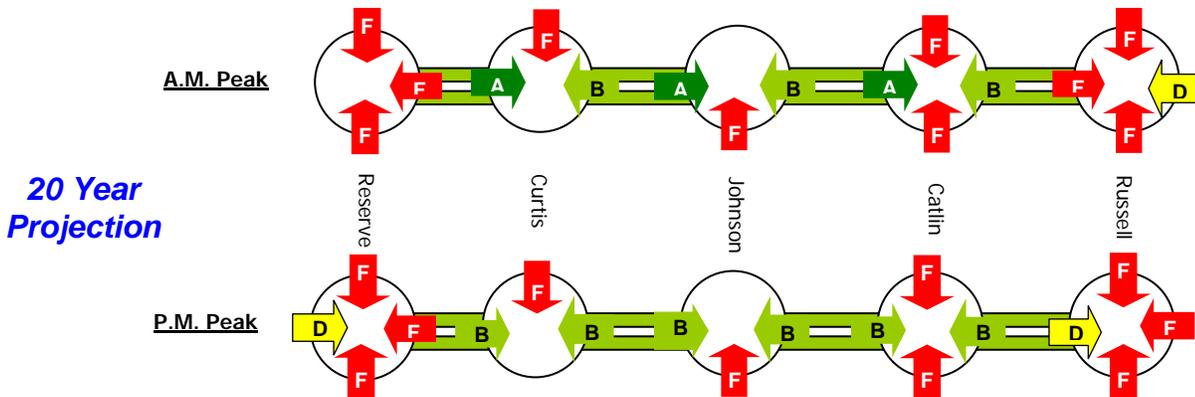
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Figure 1-7
South 3rd Street Level of Service



As indicated in the graphic above, the intersection operations on South 3rd Street at Reserve Street, Catlin Street (in the P.M. peak hour), and Russell Street currently operate at poor levels.

By the year 2025, the intersection operations are anticipated to deteriorate to failing levels throughout the South 3rd Street corridor between Reserve Street and Russell Street, if no improvements are made.



Source:
 Skillings-Connolly, 2005
 Analysis originally prepared based on 2000 data, and subsequently validated with new data in 2007.

Pedestrian and Bicycle Facilities

In addition to carrying cars and trucks, many of the city’s roadways are important corridors for non-motorized travel. A network of trails that intersect with the roadway network also serves pedestrians and bicyclists. Pedestrian/bicycle routes can be accommodated in a variety of ways, but Russell Street is particularly important in fulfilling those needs in Missoula due to its continuous north-south linkage through this portion of the community. South 3rd Street plays a similar role in an east-west fashion.



According to the *2001 Missoula Non-Motorized Transportation Plan*, the purpose of bicycle lanes is to indicate, by providing a defined space on the roadway, to both motorists and bicyclists that bicyclists belong on the road. Signed and striped bicycle lanes are the preferred bikeway design choice for principal arterials, minor arterials, and collectors with high volumes of traffic. Cyclists utilize combinations of bicycle routes to form systems for travel throughout the city; therefore, facilities should be provided to make the systems truly multi-modal. According to the American Association of State Highway and Transportation Officials', *Guide to the Development of Bicycle Facilities*, the preferred width ranges from four to five feet depending on traffic speeds and volumes, and whether on-street parking is permitted.

Bike lanes help define road space, decrease the stress level of bicyclists riding in traffic, encourage bicyclists to ride in the correct direction of travel, and signal motorists that cyclists have a right to the road. Bike lanes help to better organize the flow of traffic and reduce the chance that motorists will stray into cyclists' path of travel. In addition, several real-time studies (where cyclists of varying abilities and backgrounds ride and assess actual routes and street conditions) have found that cyclists are more comfortable and assess a street as having a better level of service for them where there are marked bike lanes present.

In summary, bike lanes do the following:

- support and encourage bicycling as a means of transportation;
- help define road space;
- promote a more orderly flow of traffic;
- encourage bicyclists to ride in the correct direction, with the flow of traffic;
- give bicyclists a clear place to be so they are not tempted to ride on the sidewalk;
- remind motorists to look for cyclists when turning;
- signal motorists that cyclists have a right to the road;
- reduce the chance that motorists will stray into cyclists' path of travel;
- make it less likely that passing motorists swerve toward opposing traffic; and/or
- decrease the stress level of bicyclists riding in traffic.

While the City has designated several arterials, including Russell Street, as a bicycle route, they do not necessarily include dedicated bicycle lanes. Well-designed facilities encourage proper behavior and decrease the likelihood of crashes. Numerous studies have shown that dedicated bicycle lanes improve safety and promote proper riding behavior.

Current bicycle and pedestrian facilities are inconsistent throughout the Russell Street and South 3rd Street corridors. Sidewalks or paved shoulders are provided in limited areas, while pedestrian routes are discontinuous or nonexistent in others. These pedestrian facilities also do not meet the current requirements of the Americans with Disabilities Act. This poor condition, inaccessibility, and inconsistency in the route discourages pedestrian travel or requires that they walk on the roadway in several portions of the corridor. There are also several areas where worn paths can be found on the roadway shoulder or lawns giving evidence of bicycle and pedestrian use even in the absence of a formal facility.

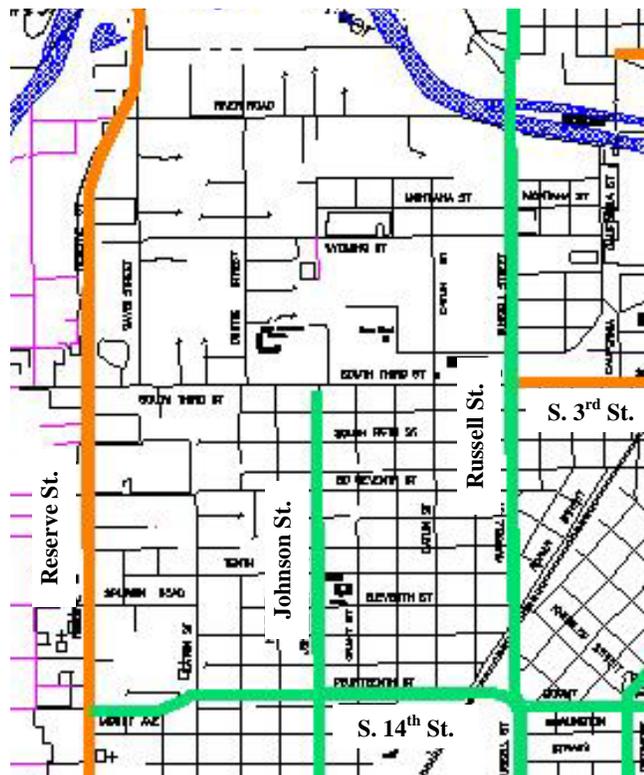
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Numerous comments were received during project scoping and public information meetings which emphasized the importance of a safe and enjoyable means for bicycle and pedestrian travel within this project corridor. The 1996 Missoula Transportation Plan Update recommends that a cohesive network of bicycle facilities be developed in the urban portions of Missoula to accommodate the safe and efficient travel of bicyclists. The Plan Update also identifies a need for improvement of sidewalks and pedestrian facilities, particularly for disabled persons and those who depend on sidewalks within Missoula. The 2004 Missoula Transportation Plan Update, although not explicit echoes these recommendations. Together, these planning efforts and the expressed opinion from public participants in this project development process, have identified the clear desire to improve bicycle and pedestrian facilities within this corridor.

According to the City of Missoula *Bike Lane / Route Map* (illustrated in Figure 1-8), the entire length of Russell Street from Mount Avenue to West Broadway Street is considered a bicycle route; however, neither Russell Street nor South 3rd Streets have bicycle lanes, and the inconsistent paved width may cause bicyclists to ride in traffic.

More explicit detail of the size and location of current facilities is discussed in Chapter 3 of this document.

Figure 1-8
City of Missoula Bike Lane / Route Map



Bike lanes shown in orange,
Bike routes shown in green.



1.5 Additional Benefits of Improvements

Intermodal Relationships

Both Russell Street and South 3rd Street are served by the Mountain Line bus system, as illustrated in Figure 1-9.

Route 2 (shown in pink) serves Russell Street from South 5th Street to West Broadway Street.

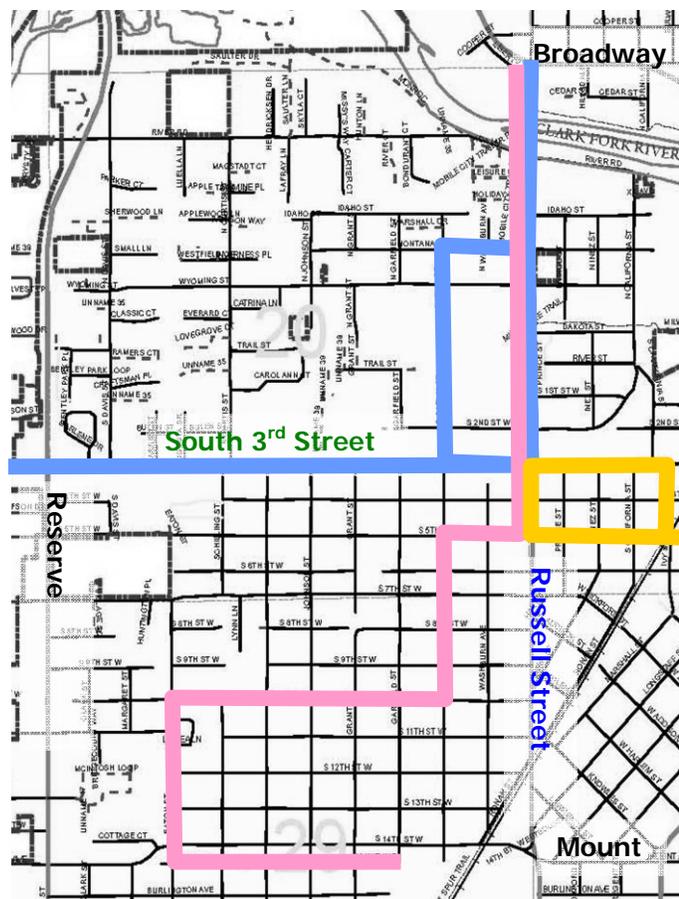
Route 9 (shown in blue) serves Russell Street from South 3rd Street to West Broadway Street, and South 3rd Street throughout the project area from Russell Street to Reserve Street.

Route 8 (shown in gold) serves Russell Street from South 5th Street to South 3rd Street.

The 1996 Missoula Transportation Plan Update identified a need for bus service throughout the Russell Street corridor.

Substantial improvements in capacity along Russell Street and South 3rd Street would improve the efficiency of transit routes utilizing these corridors, and provide a more attractive service for transit riders. And the inclusion of bicycle lanes, sidewalks, and potentially bus stop locations, would improve the overall intermodal relationships as well.

**Figure 1-9
Mountain Line Bus Routes in Project Area**



Safety Performance

During the period from July 1, 2004 through June 30, 2007, there were a total of 289 crashes on Russell Street. Crashes at intersections accounted for 219 of those, while crashes between intersections on Russell Street contributed another 70 crashes to the total. 89 crashes involved injuries, again with the majority (70) occurring at intersections, and 19 occurring between intersections. There were no fatal crashes. The percentage of in-intersection or intersection related crashes (76.5 percent) on Russell Street is significantly higher than the statewide average of 55.3 percent for the same types of crashes in a similar urban setting.

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As shown in Table 1.1 the predominant crash types on Russell Street were rear-end (61 percent), followed by right-angle (23 percent), and left turn (14 percent). The calculated crash rate for Russell Street excluding the intersection crashes is 2.15 per million vehicle miles traveled, which is lower than the national average crash rate of 6.17 crashes per million vehicle miles traveled. The statewide crash rate in Montana for urban areas with a population greater than 5,000 is 5.66 per million vehicle miles traveled. Of the 289 crashes on Russell Street, eight involved a bicycle or pedestrian which is about 2.8 percent of the crashes on Russell Street. Of all the urban crashes in the State of Montana, pedestrian/bicycle crashes account for two percent.

Table 1.1
Accident Types on Russell Street (June 30, 2004 - July 1, 2007)

Accident Type	Total Number	Percentage of Total
Rear End	176	60.9%
Right Angle	67	23.2%
Left Turn	33	11.4
Other	13	4.5%
Total	289	100%

Source: Montana Department of Transportation, 2007

During the period from July 1, 2004 through June 30, 2007, there were a total of 122 crashes within the South 3rd Street study area. Crashes at intersections accounted for 79 of those, while crashes between intersections accounted for 43. There were 41 injury crashes, with 28 occurring at intersections, and 13 between intersections. There were no fatal crashes. The percentage of in-intersection or intersection related crashes (63 percent) on 3rd Street is significantly higher than the statewide average of 55.3 percent for the same types of crashes in a similar urban setting.

As illustrated in Table 1.2 the predominant crash types on South 3rd Street were rear-end (54.9 percent), right-angle (22.1 percent), and left turn (11.5 percent). The calculated crash rate for South 3rd Street excluding the intersection crashes is 3.69 per million vehicle miles traveled. The statewide crash rate in Montana for similar urban areas is 5.66 per million vehicle miles traveled. Of the 122 crashes on South 3rd Street, eight involved a bicycle or pedestrian which is about 2.5 percent of the crashes on South 3rd Street. Of all the urban crashes in the State of Montana, pedestrian/bicycle crashes account for two percent.

Table 1.2
Accident Types on South 3rd Street (June 30, 2004 - July 1, 2007)

Accident Type	Total Number	Percentage of Total
Rear End	67	54.9%
Right Angle	27	22.1%
Left Turn	14	11.5%
Other	14	11.5%
Total	289	100%

Source: Montana Department of Transportation, 2007.



Structural Deficiencies

The Russell Street Bridge over the Clark Fork River was constructed in 1957. The structure is a two-lane steel structure that does not meet current Montana Department of Transportation design standards or seismic bridge codes. The bridge consists of a 24 foot wide travel surface with two raised, four foot sidewalks immediately adjacent to the travel lanes. The bridge is typically congested at peak hours (for a period of 2 to 3 hours) and traffic is adversely affected by the inefficiency of the intersection of West Broadway Street and Russell Streets. The *Missoula Non-Motorized Transportation Plan* identifies the bridge as needing to better accommodate bicyclists and pedestrians, and traffic projections indicate that the bridge does not provide enough carrying capacity to facilitate the traffic needs at the Russell Street and West Broadway Street intersection.

Based on a bridge inspection conducted in 2006 the existing structure has a Sufficiency Rating of 57.6 on a scale of 0 to 100, and was determined to be functionally obsolete and eligible for rehabilitation. The structure is currently programmed for re-inspection in 2008.

The sufficiency rating for a bridge structure is based on its structural adequacy and safety, necessity for public use, serviceability, and functional obsolescence. The rating is used to determine a structure's adequacy, both with regard to its load-carrying capabilities and its ability to accommodate the volume of traffic the road serves. The ratings are developed by the Federal Highway Administration and are one of the parameters used in allocating federal funding for the Highway Bridge Replacement and Rehabilitation Program. They provide a basis for establishing eligibility and priority for replacing or rehabilitating bridges. In general, the lower the rating (on a scale from 0 to 100), the higher the priority.

Photo 1-2
View of Russell Street Bridge steel structure



1.6 Goals and Objectives

During the project development process, regulatory agencies, an Advisory Committee established for this project, and the general public was asked to provide input on the proposed project. That input was used to develop a series of goals and objectives, which are outlined below. The goals (in bold text below) are broad statements of desired characteristics for corridor improvements. These goals were used to help develop the initial range of alternatives. The objectives (bulleted items below) are more detailed design concepts to be incorporated into the proposed project's final design, if feasible.

The goals and objectives developed through the process included:

Improve safety and mobility

- Provide adequate travel lanes and turn lanes to accommodate projected demand at an acceptable level of service
- Provide designated lanes/facilities for safe bicycle and pedestrian use
- Widen the bridge over the Clark Fork River to accommodate additional vehicle lanes and bicycle/pedestrian facilities
- Provide design and traffic control measures to improve safety

Improve multi-modal access and mobility

- Provide trail linkages within and across the Russell Street and South 3rd Street corridors
- Provide grade-separated bicycle and pedestrian crossings of Russell Street
- Provide facilities compliant with the Americans with Disabilities Act
- Provide adequate space for bus stops and pullouts in the corridors
- Explore the use of roundabouts to improve on the safety of turn movements and access to adjacent homes and businesses

Minimize impacts

- Reduce the adverse environmental impacts of transportation on the corridor
- Address air quality and water quality issues related to the current transportation infrastructure in the corridor
- Mitigate unavoidable impacts

Maintain Community Character

- Develop a transportation facility that maintains or enhances a sense of the residential and commercial neighborhoods within the corridor
- Provide aesthetically pleasing design elements such as landscaped boulevards

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2.0 ALTERNATIVES ANALYSIS

The following chapter documents the alternatives development and evaluation process utilized to identify the Preliminary Preferred Alternative. In an effort to identify the optimal investment in these travel corridors while recognizing the values and concerns expressed by the public, the City of Missoula, Montana Department of Transportation, and Federal Highway Administration utilized a collaborative and objective process to develop alternatives and determine the degree to which those alternatives satisfied the specific purpose and need of improving safety and mobility in the corridor. The more general goals of minimizing impacts and maintaining community character also provided guidance in the refinement of the alternatives and development of preliminary design details.

The alternatives development process was iterative and involved two major evaluation stages. The first stage involved the exploration of the No Build and several Build alternatives with varying capacity and intersection control measures on both Russell Street and South 3rd Street. A preliminary evaluation of impacts necessitated a further refinement of those alternatives that best met the safety and mobility needs. Those alternatives were refined and evaluated again for their ability to provide targeted safety and mobility improvements, to compare their preliminary impacts, and to assess their cost-effectiveness.

This chapter steps through the process in chronological order, starting with a summary of how and why the alternatives were developed, moving through description of the alternatives, discussing the alternatives evaluation process, identifying the Preliminary Preferred Alternatives, and ending with a discussion of the goals and objectives used to further refine and evaluate the alternatives.

2.1 Development of Alternatives

An Advisory Committee was formed to provide citizen input to the City of Missoula, Montana Department of Transportation, and Federal Highway Administration. A list of the members of the Advisory Committee is provided in Chapter 7 – Comments and Coordination. Advisory Committee members were charged with the responsibility of acting as a liaison between their constituents and the project team. They were also active in the outreach, preparation, and attendance of the public meetings. Advisory Committee members spent considerable time discussing critical project issues, participating in twelve meetings from late 2000 to early 2002. This committee was disbanded upon development and evaluation of alternatives.

In addition, as part of the formal National Environmental Policy Act and Montana Environmental Policy Act processes, an initial Public Scoping Meeting was held on November 16, 2000 and seven additional public meetings were held prior to the publication of this Draft Environmental Impact Statement. The seven additional public meetings included a four-day, community workshop hosted by Dan Burden of *Walkable Communities* and further meetings to discuss and refine alternatives. Public input from these meetings covered a wide range of issues that affected all travel modes and were dispersed throughout the study area and beyond.

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Stephens Avenue was reconstructed in the late 1990's, and has been referred to by the public as an example of what the community expects for a roadway reconstruction project in Missoula. The Stephens Avenue corridor includes landscaping, raised medians, left turn storage, bicycle lanes, sidewalks, boulevards, and pedestrian crossings. Initial project alternatives for Russell Street and South 3rd Street were developed based on forecast travel demand and congestion levels, bike/pedestrian corridor travel and crossing safety, issues raised in the public involvement process, and efforts to avoid known physical constraints within the corridors. Throughout the public involvement process, participants expressed a desire that improvements in the Russell Street and South 3rd Street corridors include bicycle facilities, sidewalks, bus turnouts, curbs and gutters for stormwater management, river trail system access to the roadway, illumination, landscaping, and pedestrian crossing facilities. The inclusion or exclusion of these elements will determine the width and functionality of the facilities, and define the overall feel of the corridors.

During the development and evaluation of alternatives, small modifications were made to the design concepts in an attempt to satisfy the goals and objectives outlined in Chapter 1. As outlined in the following section, the No Build and two Build alternatives on Russell Street fail to satisfy Purpose and Need. The two remaining alternatives were considered viable, but additional modifications were determined to be desirable to further minimize impacts and improve the conceptual design. Only one of these alternatives was able to minimize impacts to protected historic resources at South 5th Street and is identified as the Preliminary Preferred Alternative. Specific design elements of the Preliminary Preferred Alternatives are discussed in Section 2.5. Other options considered early in the process, but eliminated for various reasons, are discussed in Section 2.6.

Background on Consideration of Roundabouts

One of the objectives of this project as discussed in Chapter 1 – Purpose and Need, included the development of alternatives to “explore the use of roundabouts to improve on the safety of turn movements and access to adjacent homes and commercial buildings.” The roundabout concept is relatively new to Montana, but this form of intersection control is becoming more common in western states and has been used throughout the world for many years. Even with broader use across the country, there are frequent misperceptions on roundabouts. The following provides some background information on what this intersection concept entails. More can be read about roundabouts from *Roundabouts: An Informational Guide* (See List of Technical Reports in the Table of Contents of this document, and Appendix A for a summary).

Roundabouts are not the same as a “rotary” or “traffic circle”

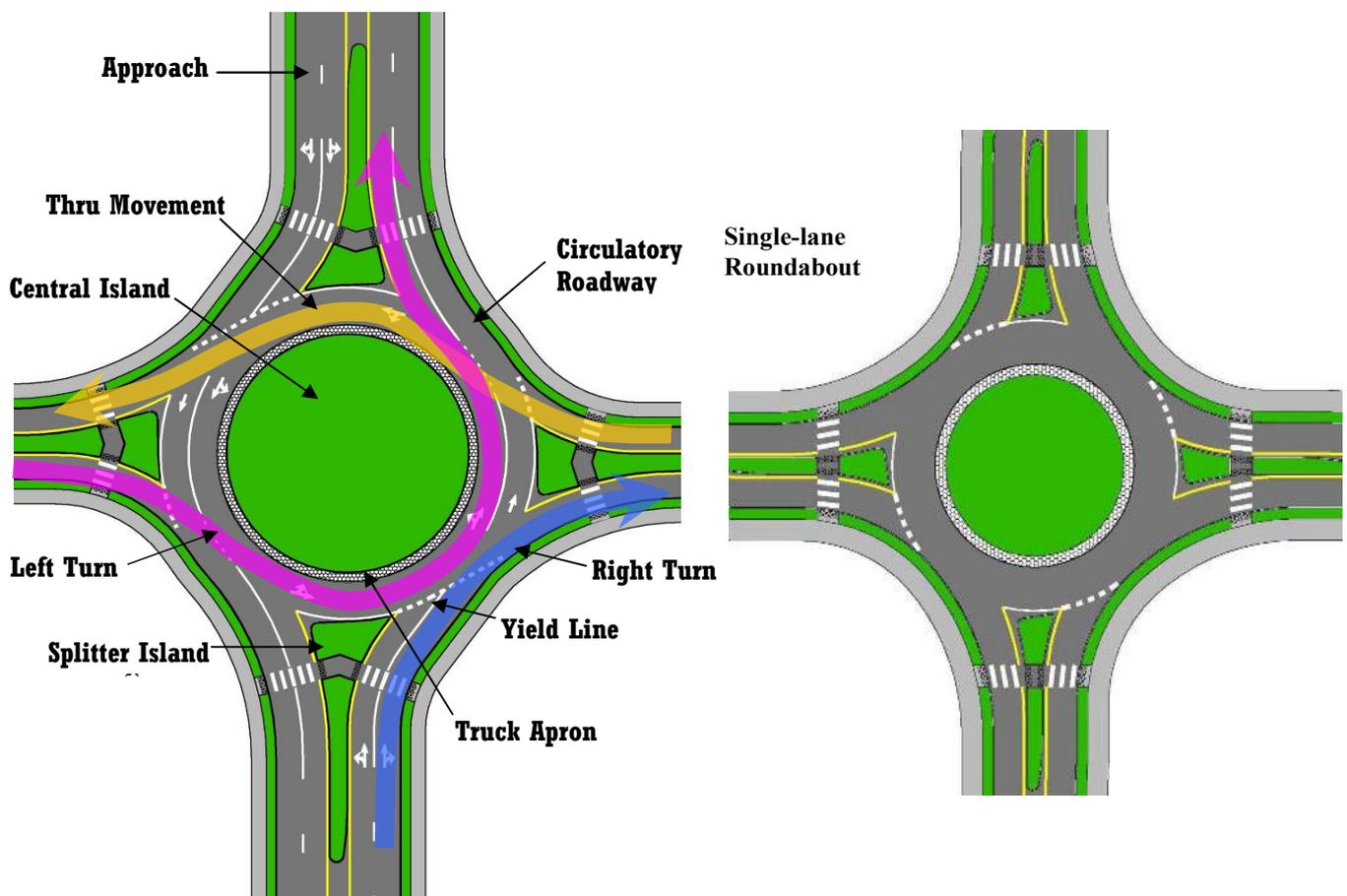
A roundabout is not the same as the older-style rotary or traffic circle like those found in some east coast and European cities. Although the United States was home to the first one-way rotary system in the world (implemented around New York City's Columbus Circle in 1904), traffic circles had fallen out of favor in this country by the 1950s. Older traffic circles, located primarily in the northeastern states, encountered serious operational and safety problems, including the tendency to lock up at higher volumes.



Based in large part on this country’s experience with the older and existing traffic circles built prior to 1990, the modern roundabout has been notably less popular in the United States than abroad. The modern roundabout has been successful in several countries in Europe and Australia, where the roundabout has changed the practice of intersection design. Just in the last decade, communities in the United States have experimented with the modern roundabout, and based on their success, there has been a growing interest in their development across the country.

The main difference between older style rotary or traffic circles and roundabouts is in how traffic enters the circle and which vehicle has the right-of-way. Figure 2-1 illustrates the typical features of a modern roundabout. With roundabouts, drivers wishing to enter must yield to vehicles already in the circle. With many of the older traffic circles, drivers inside the circle must yield to the vehicles entering the circle. Roundabouts can be designed to handle fire trucks, buses, and various sizes of emergency vehicles, as well as truck and trailer combinations. To accommodate these larger vehicles, the center island of a roundabout is often built with a gradually sloped and flat curb, called a truck apron.

Figure 2-1
Typical Roundabout Features



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Modern roundabouts range in size from mini-roundabouts (with outside diameters as small as 50 feet), to compact roundabouts (with outside diameters between 98 to 115 feet), to large, often multilane, roundabouts up to 492 feet in diameter with more than four entries, and two-bridge grade-separated roundabouts, located over or under freeways.

Roundabouts also differ from traffic calming islands often seen in neighborhoods where the intent is to slow traffic speeds in residential areas and reduce crashes.

2.2 Description of Alternatives

The following is a description of the No-Build, the five Build alternatives developed for Russell Street, and the four Build alternatives developed for South 3rd Street. Preceding the descriptions of individual alternatives are summaries of several design features, access modifications, or minor intersection realignments that would be components of any of the Build alternatives in these corridors.

Design options were also developed for the Bitterroot Branch Trail and the Milwaukee Corridor Trail crossings of Russell Street. Those options were screened, and the most preferable is presented as a component of all of the Russell Street Build alternatives.

Specific Design Elements Common to All Build Alternatives

To support the stated Purpose and Need for the proposed project, the Advisory Committee recommended nine design features that would be common to all Build alternatives. The common features are:

- The existing Russell Street Bridge would be removed and replaced with four lanes over the Clark Fork River to provide adequate capacity for projected traffic volumes. The proposed bridge concept is a 4-span, approximately 450 foot long structure. The proposed bridge supports would be in the same location longitudinally in the river as the existing piers. The new bridge profile and low chord would be higher than the existing bridge resulting in a larger hydraulic opening.
- Bicycle lanes would be included to improve multi-modal transportation in the corridors.
- Sidewalks would be constructed along both sides of each route to improve pedestrian comfort and safety.
- Grade separated pedestrian/bicycle crossings would be provided for the Milwaukee Corridor Trail and Bitterroot Branch Trail systems as they cross Russell Street.
- Curb and gutter would be included to improve stormwater management.
- Street lighting would be included to improve aesthetics and safety.
- Landscaped boulevards would be constructed on both sides of Russell Street and South 3rd Street between the curb and sidewalk to improve aesthetics.



- Bus pullouts would be incorporated into the final design along Russell Street north of South 3rd Street, and along South 3rd Street from Russell Street to Reserve Street. The transit system currently does not serve Russell Street south of South 5th Street, so no pullouts are currently planned for that portion of the corridor.
- On-street parking within the City right-of-way is currently prohibited along Russell Street and South 3rd Streets. Parking restrictions would be enforced in these areas.

Raised medians were also identified as one of the treatments to improve pedestrian crossings, reduce conflict points at driveways and minor cross streets, and provide aesthetic improvements with landscaped areas. Raised medians provide refuge in the center of the street so pedestrians can cross one direction of traffic at a time. Each alternative has different amounts of raised median, as noted in each individual description. The length of landscaped median will depend on the number of access points desired, and the length of turn movements required at those access points.

Access at driveways and cross streets affected by raised medians would be provided for by entering right-turns and exiting right-turns. Motorists desiring to turn left would be accommodated through u-turns at the open intersections, at roundabouts, or by turning in advance of the access point and routing around the block. The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Trail Connections

The Preliminary Preferred Alternative also includes four trail connections that cross the Russell Street corridor. The following trail connections would be made.

Bitterroot Branch Trail Connection

The Bitterroot Branch Trail connection is located at the intersection of the Bitterroot Branch Trail and Russell Street south of the intersection of Russell Street and South 11th Street/Knowles Street. Under the refined Preliminary Preferred Alternative, the Bitterroot Branch Trail Crossing would be constructed as a tunnel under Russell Street. The tunnel crossing would be constructed in approximately the same location as the existing trail crossing. The existing trail alignment would be modified to connect to the tunnel structure crossing.

Milwaukee Corridor Trail Connection

The Milwaukee Corridor Trail connection is located where Dakota Street intersects with Russell Street. The trail ends a short distance from the east side of Russell Street and currently trail users cross Russell Street at the Wyoming Street intersection. Under the Preliminary Preferred Alternative, the Milwaukee Corridor Trail Crossing would be constructed as a tunnel under Russell Street. The tunnel crossing would be constructed in approximately the same location as where the existing trail terminates on the east side of Russell Street. The existing trail alignment would be modified to connect to the tunnel structure crossing.

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Shady Grove (River Trail System) Trail Connection

The Shady Grove Trail connection is located parallel to the east side of Russell Street north of the bridge. The trail turns east and extends approximately one-half mile along the riverfront to Burton Street. Reconstruction of the Russell Street Bridge would include extension of the Shady Grove Trail westward under the bridge and construction of connections to the sidewalks on both sides of Russell Street.

These trail connections are depicted in Chapter 4, Section 4.5 – Pedestrian and Bicycle Impacts.

During early scoping and project development, it was determined that pedestrian/bicycle tunnels would be preferable to an overpass structure, or to an at-grade crossing. If during final design, it appears that geotechnical conditions, or underground utilities would prohibit construction of the intended under-crossings, these crossings could be redesigned as an overpass. It would not be desirable, and it is not intended that these trail crossings would be left as at-grade crossings if the corridor is reconstructed.

All Build alternatives would also include the following alignment and access improvements, as depicted in Figure 2-2:

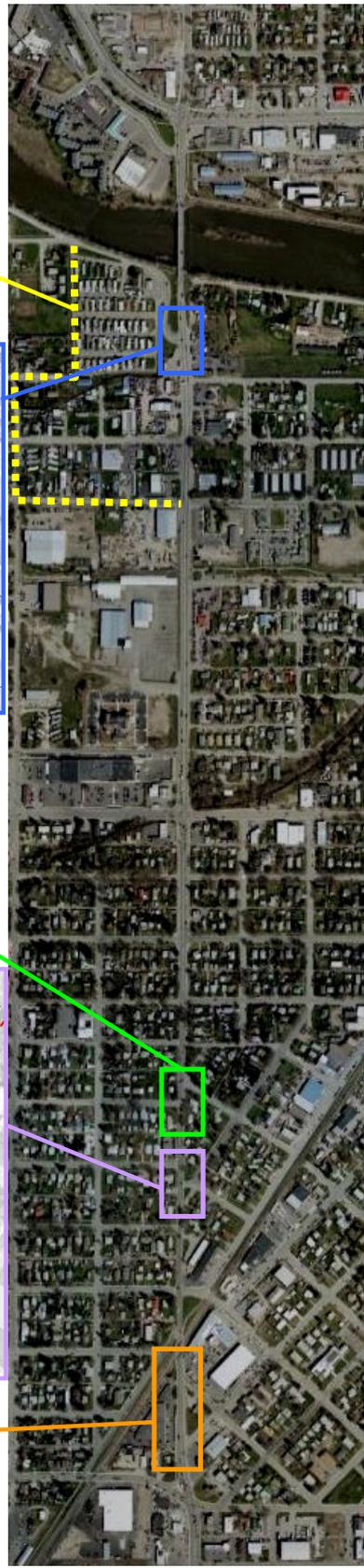
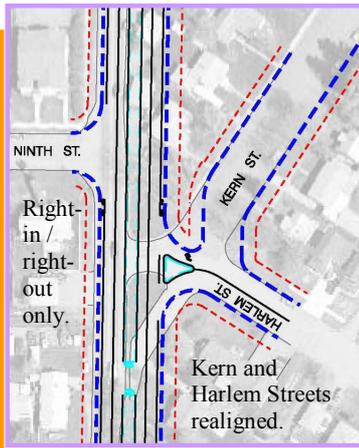
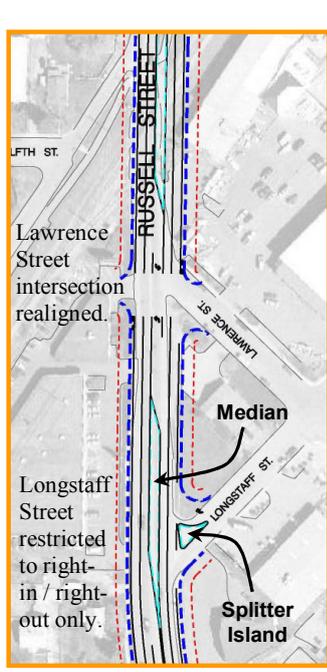
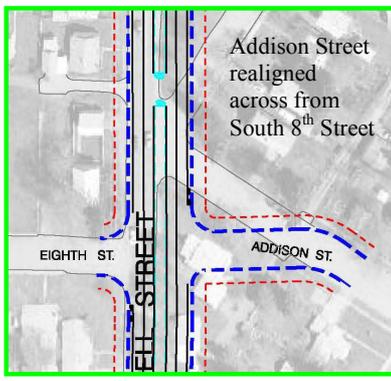
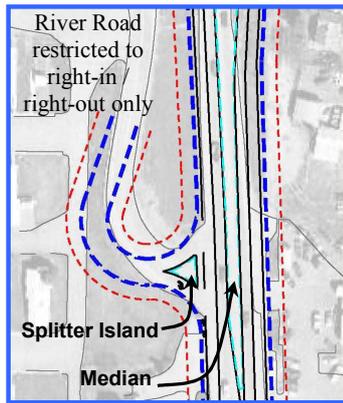
- Longstaff Street would be restricted to a right-in and right-out only connection with Russell Street.
- Lawrence Street would be realigned to a right-angle intersection with Russell Street.
- Access to Russell Street from Harlem Street and Kern Street on the east side of Russell Street would be restricted to a right-in and right-out only connection.
- Addison Street would be realigned to a right-angle intersection with Russell Street opposite from South 8th Street. Addison Street and South 8th Street would be restricted to right-in and right-out only connections with Russell Street.
- Curb and gutter sections measuring 2.0± feet wide would be constructed on both sides of Russell Street and South 3rd Street with gutters located immediately inside the curb and would provide an additional 1.5± feet of width to the bicycle lane.
- Where space is adequate along the proposed right-of-way, landscaped boulevards would be constructed on both sides of Russell Street and South 3rd Street between the curb and proposed sidewalk. Landscaping would also be included in center medians and roundabouts as appropriate.
- Knowles Street would be shifted slightly to the north to match with South 11th Street on the west.

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**Figure 2-2
Baseline Modifications to Russell Street**

New connection from River Road. New construction west of Mobile City Trailer, and improvements to existing roadways along Idaho Street, Catlin Street, and Wyoming Street.



- West Broadway Street
- Clark Fork River*
- River Road
- Idaho Street
- Montana Street
- Wyoming Street
- Dakota Street
- River Street
- South 1st Street
- South 2nd Street
- South 3rd Street
- South 4th Street
- South 5th Street
- South 6th Street
- South 7th Street
- South 8th Street
- South 9th Street
- South 10th Street
- South 11th/Knowles Street
- South 12th Street
- South 13th Street
- Mount Avenue / South 14th Street

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- River Road would remain in its current configuration and would be restricted to a right-in and right-out connection with Russell Street. In addition, right-of-way would be purchased for the construction of a new link between River Road and Idaho Street that would become part of the River Road connection to Russell Street via Wyoming Street. The connection would include a newly constructed section of road running north-south adjacent to the western boundary of Mobile City Trailer between existing River Road and Idaho Street. It would also include reconstructed sections of Idaho Street between the new River Road and Catlin Street; Catlin Street between Idaho Street and Wyoming Street; and Wyoming Street between Catlin Street and Russell Street.

Figure 2-3
Proposed River Road Connection





Russell Street Alternatives:

Originally, the No-Build (Alternative 1) and three Build alternatives were identified for Russell Street, Alternatives 2 and 3 with roundabouts, and Alternative 4 with traffic signals. During the process of analyzing the three Build alternatives, it became apparent that another alternative that has four travel lanes, a median/center turn lane, and roundabouts at the major intersections should be included as a viable alternative. There were two-lane facilities (Alternatives 2 and 3) and a four-lane facility with signals (Alternative 4) but a four-lane facility with roundabouts was lacking. This four-lane alternative was added and identified as Alternative 5. Further modifications were made to Alternative 5 during later stages of analysis and are discussed in Section 2.4.

Table 2.1 provides an overview of the Russell Street alternatives, and the sections that follow provide more detailed descriptions and graphical representations of the various alternatives.

Table 2.1
Russell Street Alternatives – Overview of Major Features

	Alt. 1 (No-Build)	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Number of Vehicular Lanes:					
Mount to South 8 th	2	2	2+	4+	4+
South 8 th to South 5 th	2	2+	2+	4+	4+
South 5 th to South 3 rd	4	2+	4	4+	4+
South 3 rd to the bridge	2+	2+	2+	4+	4+
The bridge to W. Broadway	2	4	4	4+	4+
Intersection Control:					
Signals	✓			✓	
Roundabouts		✓	✓		✓
Design Elements:					
Sidewalks		✓	✓	✓	✓
Bike lanes		✓	✓	✓	✓
Boulevards		✓	✓	✓	✓
Curb/Gutter		✓	✓	✓	✓
Lighting		✓	✓	✓	✓
Bus Pullouts		✓	✓	✓	✓

Notes: 2+ denotes a two-lane section with a center turn lane/raised median

4+ denotes a four-lane section with a center turn lane / raised median

Source: HKM Engineering., 2007

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Alternative 1 – No-Build

Alternative 1 is the No-Build Alternative and would provide no improvements to Russell Street or the existing Russell Street Bridge. Routine maintenance would continue in accordance with City, County, and state policies. Figure 2-4 illustrates the No-Build Alternative and the following provides a summary of the major features:

Lane Configuration:

- Two travel lanes from Mount Avenue/South 14th Street to South 5th Street
- Four travel lanes from South 5th Street to South 3rd Street
- Two travel lanes and a center turn lane from South 3rd Street to Russell Street Bridge
- Two travel lanes from Russell Street Bridge to West Broadway Street

Signalized Intersection Control at:

- Mount Avenue/South 14th Street
- South 5th Street
- South 3rd Street
- West Broadway Street

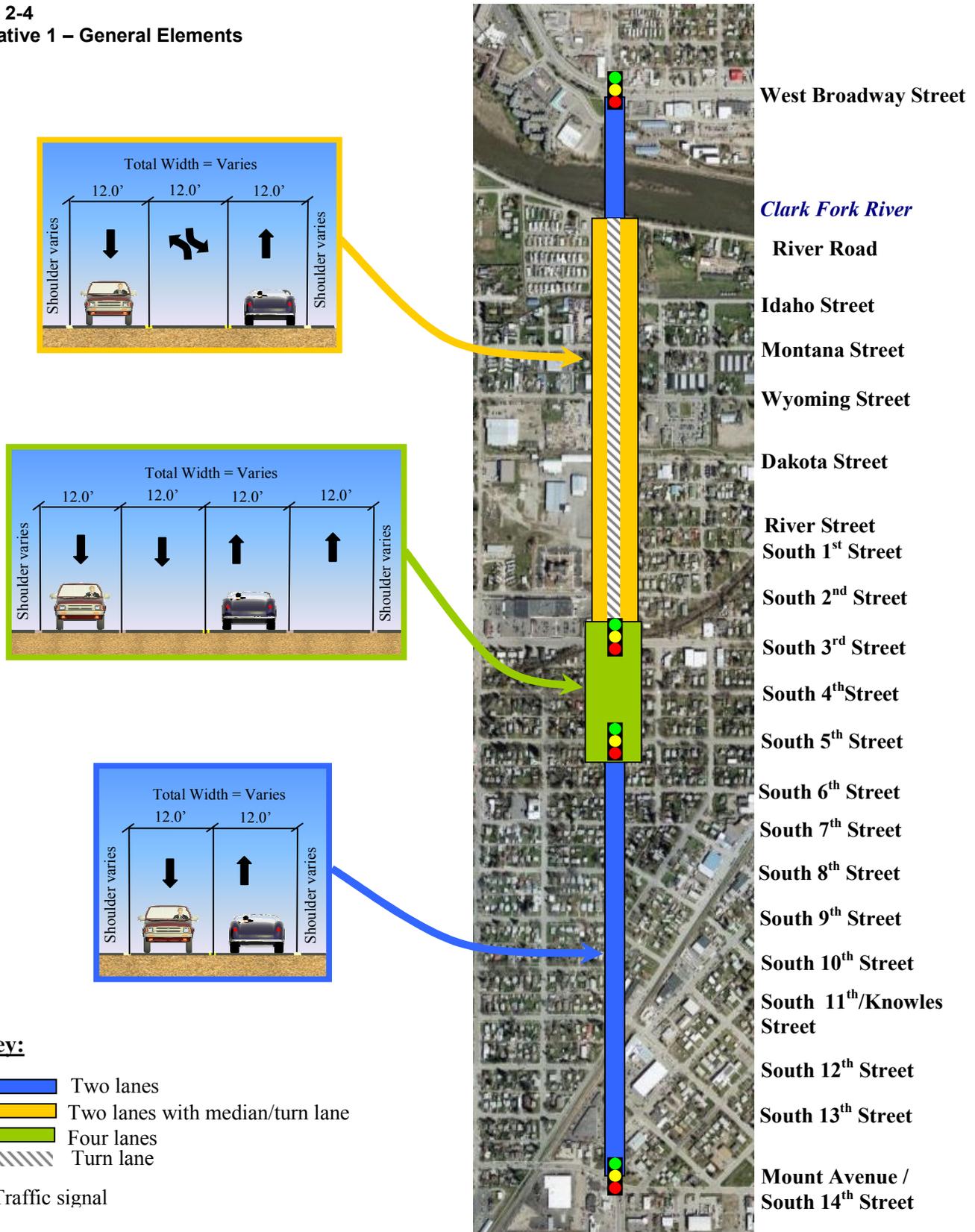
All other streets intersecting Russell Street are, and would continue to be controlled by stop signs.

Center turn lane between:

- South 3rd Street and the Russell Street Bridge



Figure 2-4
Alternative 1 – General Elements



Chapter 2.0 - Alternatives Analysis

Alternative 2

2+ Lanes with Roundabouts

Alternative 2 is very similar to the existing condition in lane configuration but includes the use of roundabouts at select intersections and limited use of raised medians to control through traffic and increase the functionality of the intersections and roundabouts.

Figure 2-5 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

- Two travel lanes from Mount Avenue/South 14th Street to South 5th Street
- Four travel lanes from South 5th Street to South 3rd Street
- Two travel lanes from South 3rd Street to Wyoming Street
- Four travel lanes from Wyoming Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

- Mount Avenue/South 14th Street
- South 5th Street
- South 3rd Street
- Wyoming Street

Single-Lane Roundabouts at:

- South 11th Street

Signal Control at:

- West Broadway Street (existing)
- All other streets intersecting Russell Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

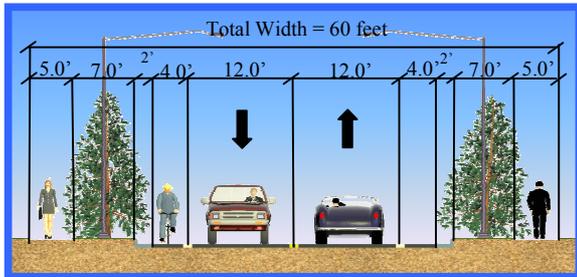
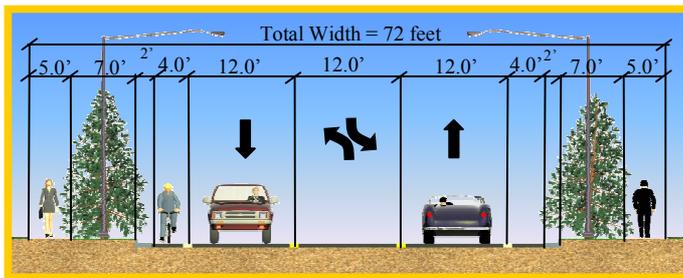
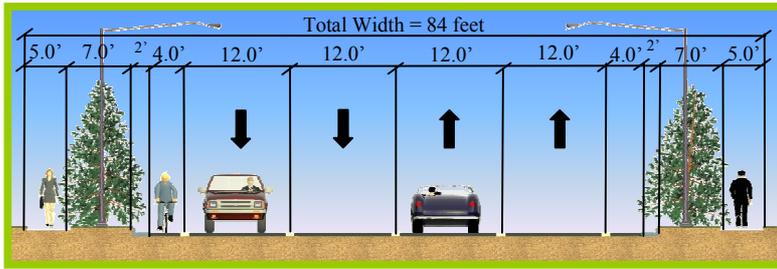
Alignment:

The alignment of Russell Street in the southern portion of the corridor would shift to the east to minimize the impact on historic and recreational properties protected under Section 4(f) of the U.S. Department of Transportation Act, as discussed later in this document.

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**Figure 2-5
Alternative 2 – General Elements**



Key:

- Two lanes
- Two lanes with median/turn lane
- Four lanes
- Raised median
- Turn lane
- Traffic signal
- Single Lane Roundabout
- Double Lane Roundabout



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Alternative 3

2+4 Lanes with Roundabouts

Alternative 3 is similar to Alternative 2 in terms of lane configuration and intersection control but includes twice the length of raised median as compared to Alternative 2, and adds a median between Mount Avenue to South 8th Street. Figure 2-6 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

- Two travel lanes from Mount Avenue/South 14th Street to South 5th Street
- Four travel lanes from South 5th Street to South 3rd Street
- Two travel lanes from South 3rd Street to Wyoming Street
- Four travel lanes from Wyoming Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

- Mount Avenue/South 14th Street
- South 5th Street
- South 3rd Street
- Wyoming Street

Single-Lane Roundabouts at:

- South 11th Street

Signal Control at:

- West Broadway Street (existing)
- All other streets intersecting Russell Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

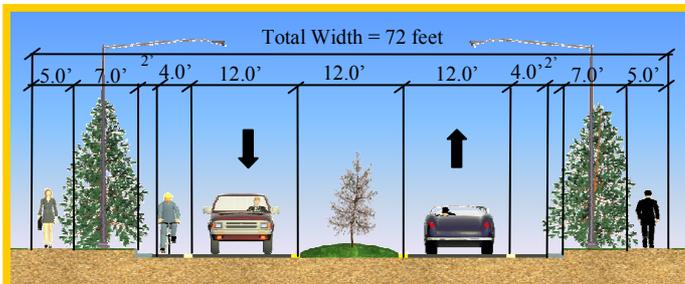
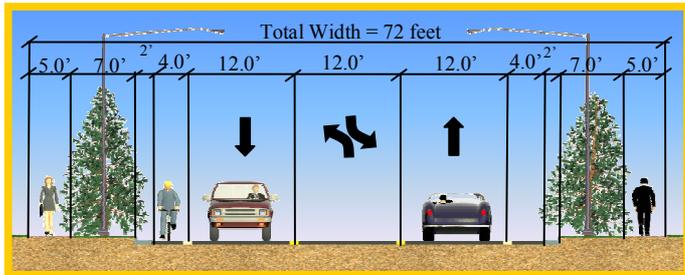
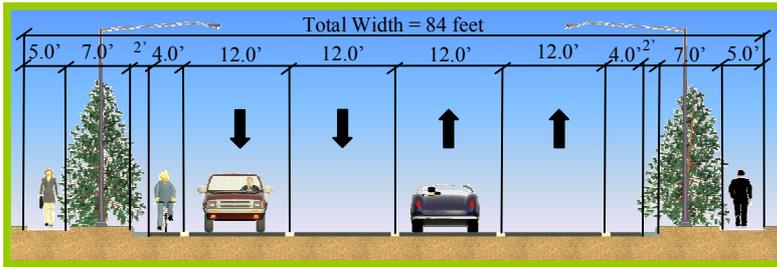
Alignment:

The alignment of Russell Street in the southern portion of the corridor would shift to the east to minimize the impact on properties protected under Section 4(f) of the U.S. Department of Transportation Act of 1966, as discussed later in this document.

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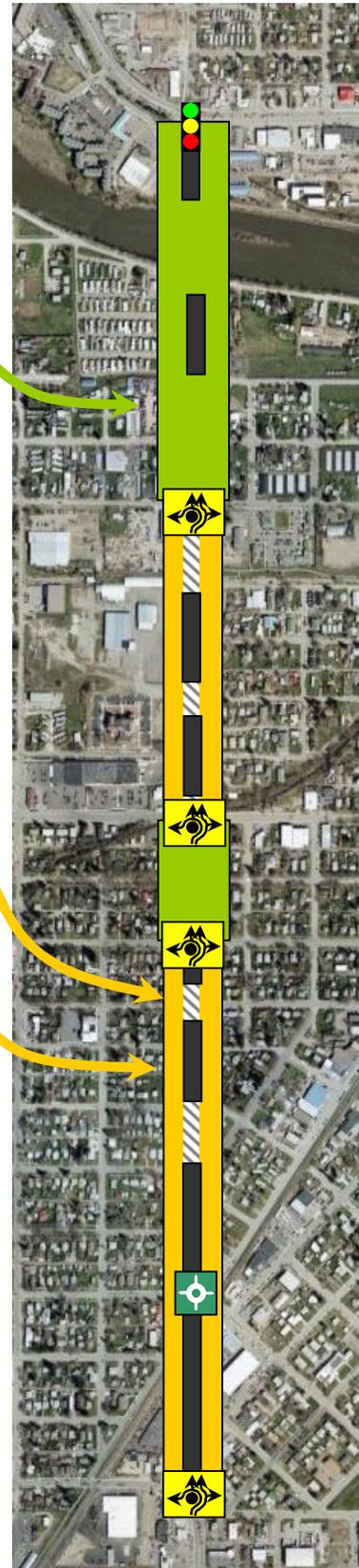


**Figure 2-6
Alternative 3 – General Elements**



Key:

- Two lanes with median/turn lane
- Four lanes
- Raised median
- Turn lane
- Traffic signal
- Single Lane Roundabout
- Double Lane Roundabout



- West Broadway Street
- Clark Fork River
- River Road
- Idaho Street
- Montana Street
- Wyoming Street
- Dakota Street
- River Street
- South 1st Street
- South 2nd Street
- South 3rd Street
- South 4th Street
- South 5th Street
- South 6th Street
- South 7th Street
- South 8th Street
- South 9th Street
- South 10th Street
- South 11th/Knowles Street
- South 12th Street
- South 13th Street
- Mount Avenue / South 14th Street

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Alternative 4

4+ Lanes with Signals

Russell Street would have four travel lanes (two southbound and two northbound) plus a center turn lane or raised median throughout the corridor. Major intersections would be controlled by signals.

Figure 2-7 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Four travel lanes from Mount Avenue/South 14th Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

none

Single-Lane Roundabouts at:

none

Signal Control at:

Mount Avenue/South 14th Street (existing)

South 5th Street (existing)

South 3rd Street (existing)

Wyoming Street

West Broadway Street (existing)

All other streets intersecting Russell Street would be controlled by stop signs

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

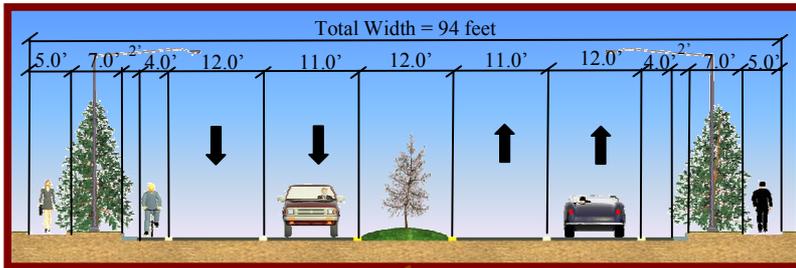
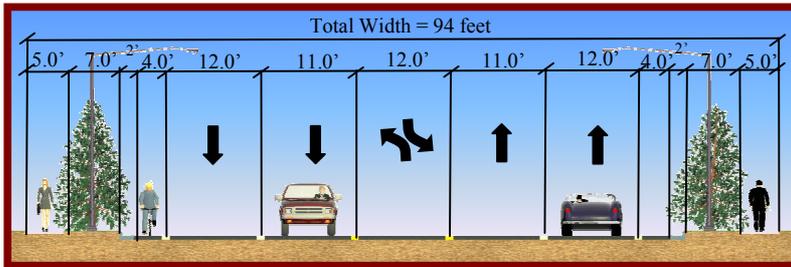
Alignment:

The alignment of Russell Street in the southern portion of the corridor would shift to the east to minimize the impact on properties protected under Section 4(f) of the U.S. Department of Transportation Act of 1966, as discussed later in this document.

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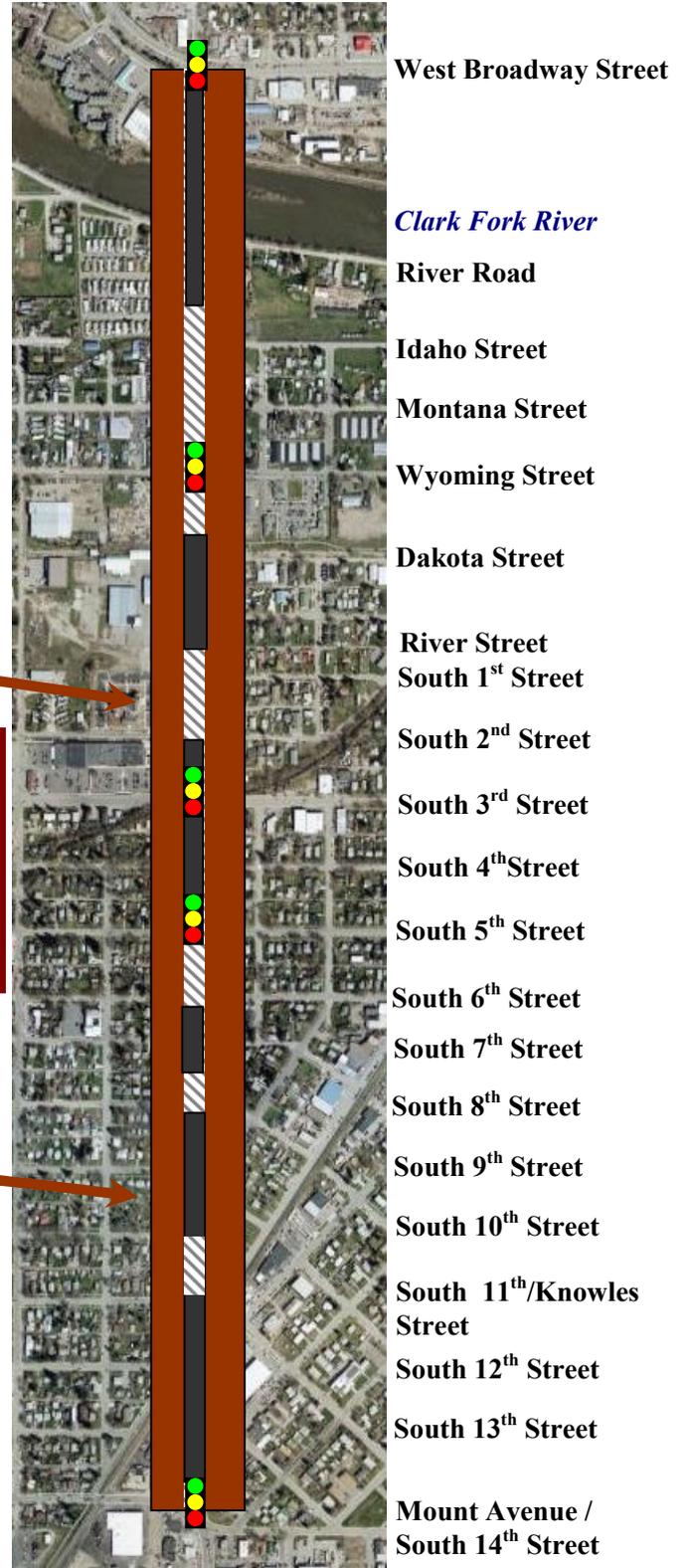


**Figure 2-7
Alternative 4 – General Elements**



Key:

- Four lanes with median/turn lane
- Raised median
- Turn lane
- Traffic signal



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Alternative 5

4+ Lanes with Roundabouts

Alternative 5 is identical to Alternative 4 in terms of lane configuration (two southbound and two northbound, with raised medians and center turn lanes) on Russell Street. However, the major intersections would be controlled by roundabouts instead of traffic signals. The West Broadway Street intersection would remain signalized. Like Alternative 4, raised medians would be used throughout the Russell Street corridor to enhance the flow of through traffic. Figure 2-8 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Four travel lanes from Mount Avenue/South 14th Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

Mount Avenue/South 14th Street
South 5th Street
South 3rd Street
Wyoming Street
South 11th Street

Single-Lane Roundabouts at:

none

Signal Control at:

West Broadway Street (existing)

All other streets intersecting Russell Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

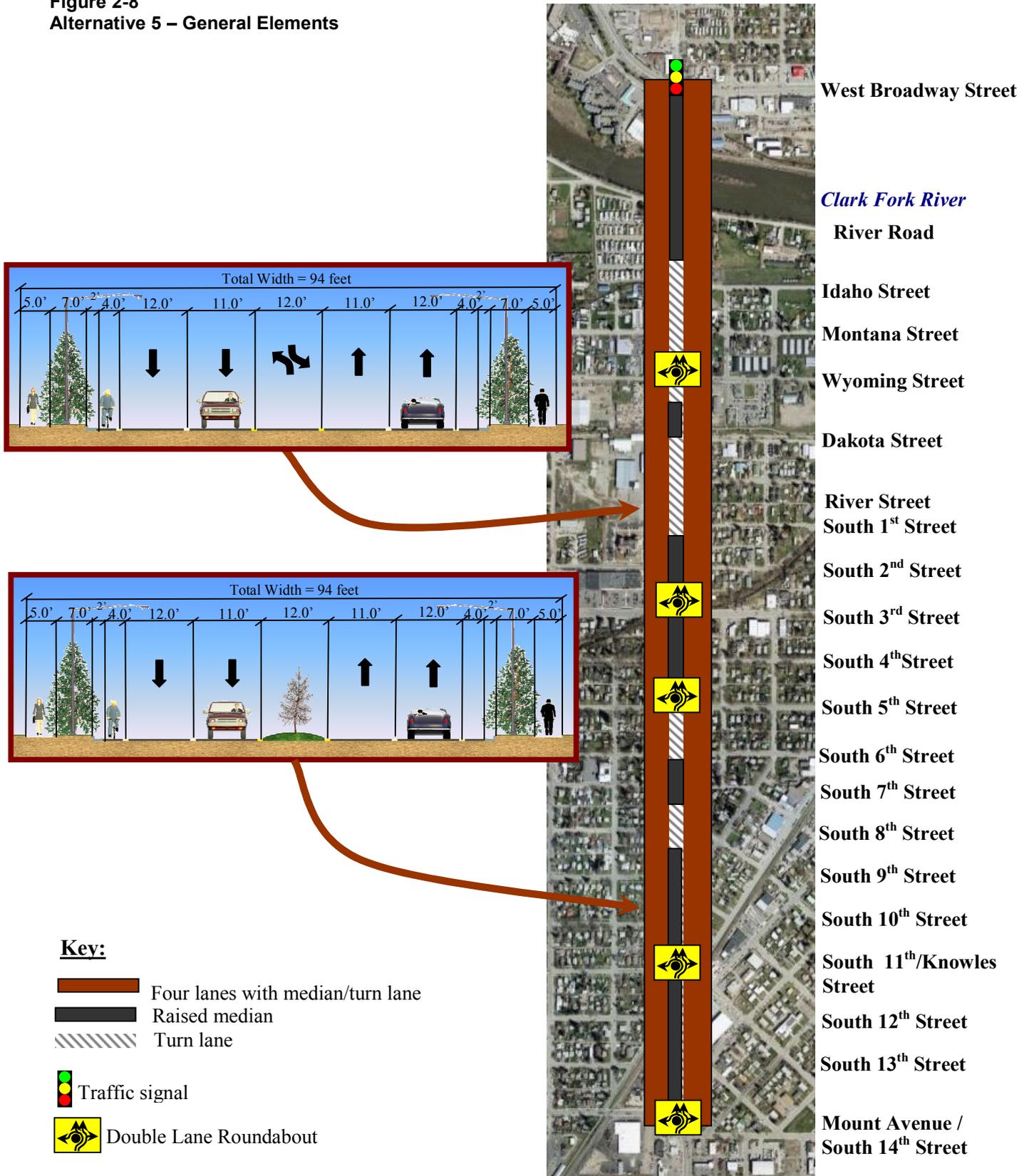
Alignment:

The alignment of Russell Street in the southern portion of the corridor would shift to the east to minimize the impact on properties protected under Section 4(f) of the U.S. Department of Transportation Act of 1966, as discussed later in this document.

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**Figure 2-8
Alternative 5 – General Elements**



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South 3rd Street Alternatives:

Table 2.2 provides an overview of the South 3rd Street alternatives, and the sections that follow provide more detailed descriptions and graphical representations of the proposed improvements.

Table 2.2
South 3rd Street Alternatives – Overview of Major Features

	Alt. A (No-Build)	Alt. B	Alt. C	Alt. D	Alt. E
Number of Vehicular Lanes:					
Reserve St. to Russell St.	2	2	2+	3+	2+
Intersection Control:					
Signals	✓			✓	✓
Roundabouts		✓	✓		
Design Elements:					
Sidewalks		✓	✓	✓	✓
Bike lanes		✓	✓	✓	✓
Boulevards		✓	✓	✓	✓
Curb/Gutter		✓	✓	✓	✓
Lighting		✓	✓	✓	✓
Bus Pullouts		✓	✓	✓	✓

Notes: 2+ denotes a two-lane facility with a center turn lane / raised median

3+ denotes a three-lane facility (2 eastbound, 1 westbound) with a center turn lane / raised median

Source: HKM Engineering Inc., 2007

For South 3rd Street Alternatives C, D, and E, raised medians would be added wherever practicable. Access at driveways and minor cross streets affected by the raised medians will be restricted to entering right-turns and exiting right-turns. Motorists desiring to turn left would be accommodated through u-turns at the open intersections, at roundabouts, or by turning in advance of the access point and routing around the block.

The intersection of Schilling Street would also be realigned directly across from Curtis Street under all South 3rd Street Build alternatives.



**Alternative A
No Build**

Alternative A is the No-Build Alternative and would provide no improvements to South 3rd Street. Routine maintenance would continue in accordance with City and State policies. The following provides a summary of the major features:

Lane Configuration:

Two travel lanes from Reserve Street to Russell Street

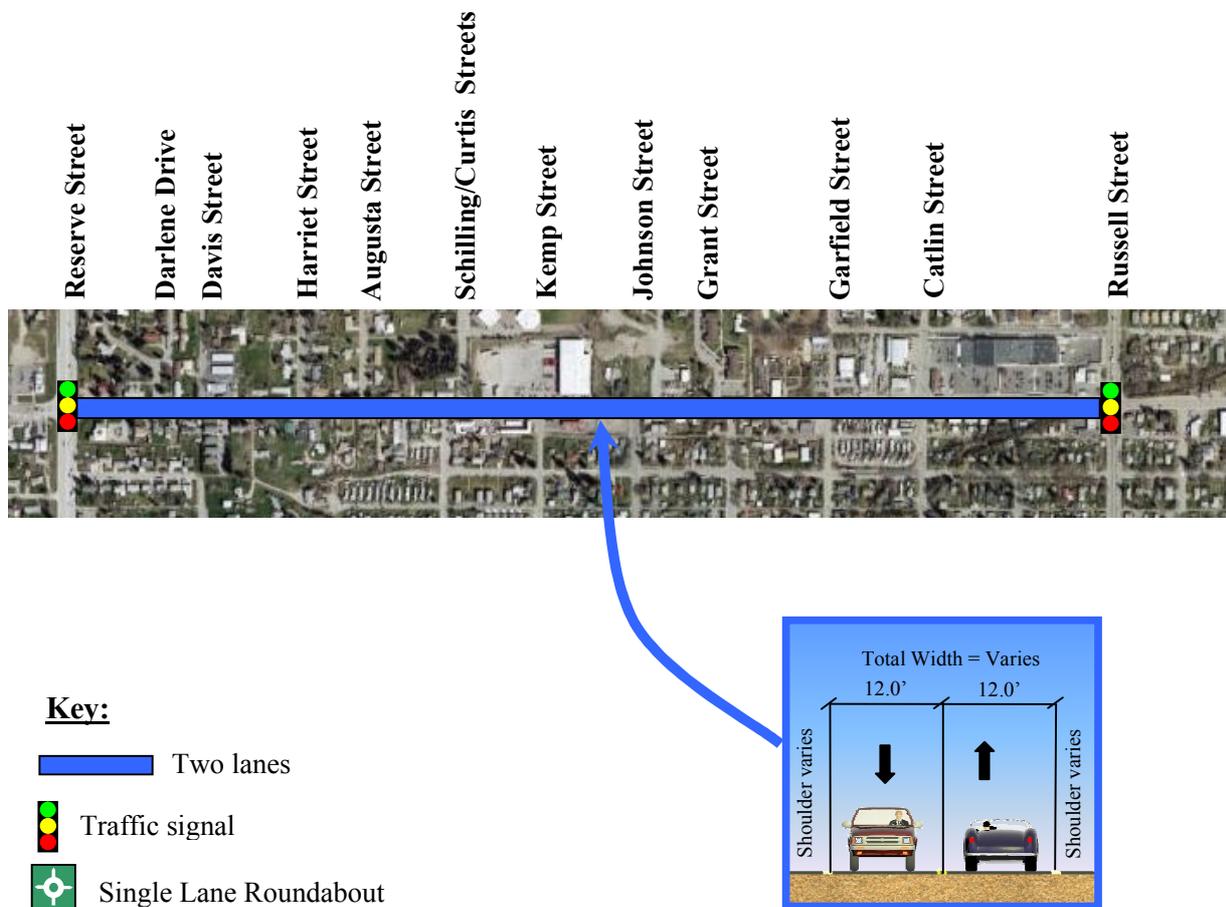
Signalized Intersection Control at:

- Reserve Street
- Russell Street

All other streets intersecting South 3rd Street are, and would be controlled by stop signs.

There are no raised medians or center turn lanes.

**Figure 2-9
Alternative A – General Elements**



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Alternative B

2 Lanes with Roundabouts

Alternative B has the same lane configuration as Alternative A (existing conditions/No Build), but includes bicycle lanes, boulevards, sidewalks, and roundabouts at select intersections.

Figure 2-10 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Two travel lanes from Reserve Street to Russell Street

Intersection Control:

The intersection control at Russell Street would be determined by the selection of one of Alternatives 1 through 5.

Two-Lane Roundabouts at:

None

Single-Lane Roundabouts at:

Schilling Street/Curtis Street

Johnson Street

Catlin Street

Signal Control at:

Reserve Street (existing)

All other streets intersecting South 3rd Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

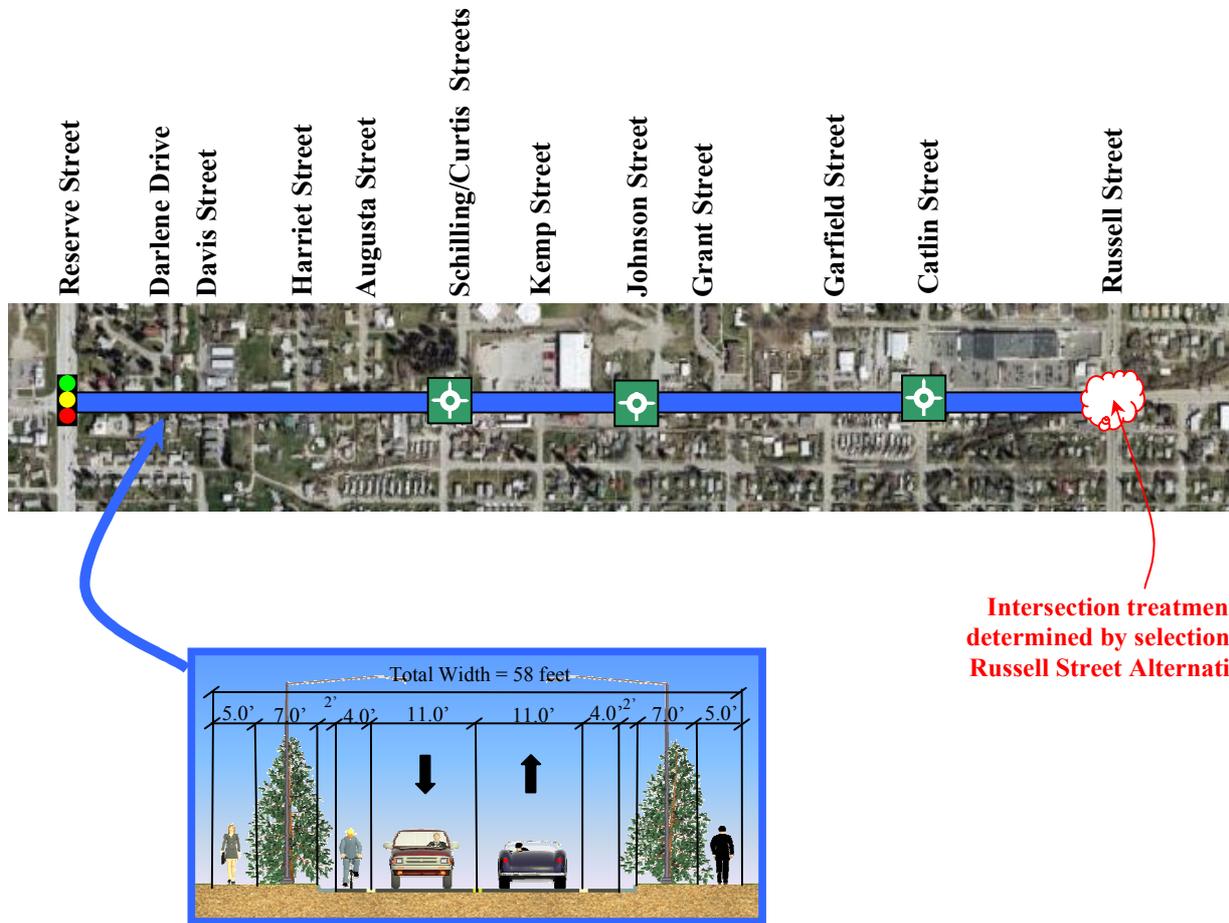
Alignment:

The existing alignment would be shifted to accommodate one-lane roundabouts at Curtis Street/Schilling Street, Johnson Street, and Catlin Street. The shift in alignment would minimize impacts on adjacent properties.

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Figure 2-10
Alternative B – General Elements



Key:

- Two lanes
- Traffic signal
- Single Lane Roundabout

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Alternative C

2+ Lanes with Roundabouts

Alternative C includes two travel lanes (one in each direction), roundabouts at select intersections, and the use of raised medians through a majority of the corridor to control through traffic and increase the functionality of the intersections and roundabouts.

Figure 2-11 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Two travel lanes from Reserve Street to Russell Street

Intersection Control:

The intersection control at Russell Street would be determined by the selection of one of Alternatives 1 through 5.

Two-Lane Roundabouts at:

None

Single-Lane Roundabouts at:

Schilling Street/Curtis Street

Johnson Street

Catlin Street

Signal Control at:

Reserve Street (existing)

All other streets intersecting South 3rd Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

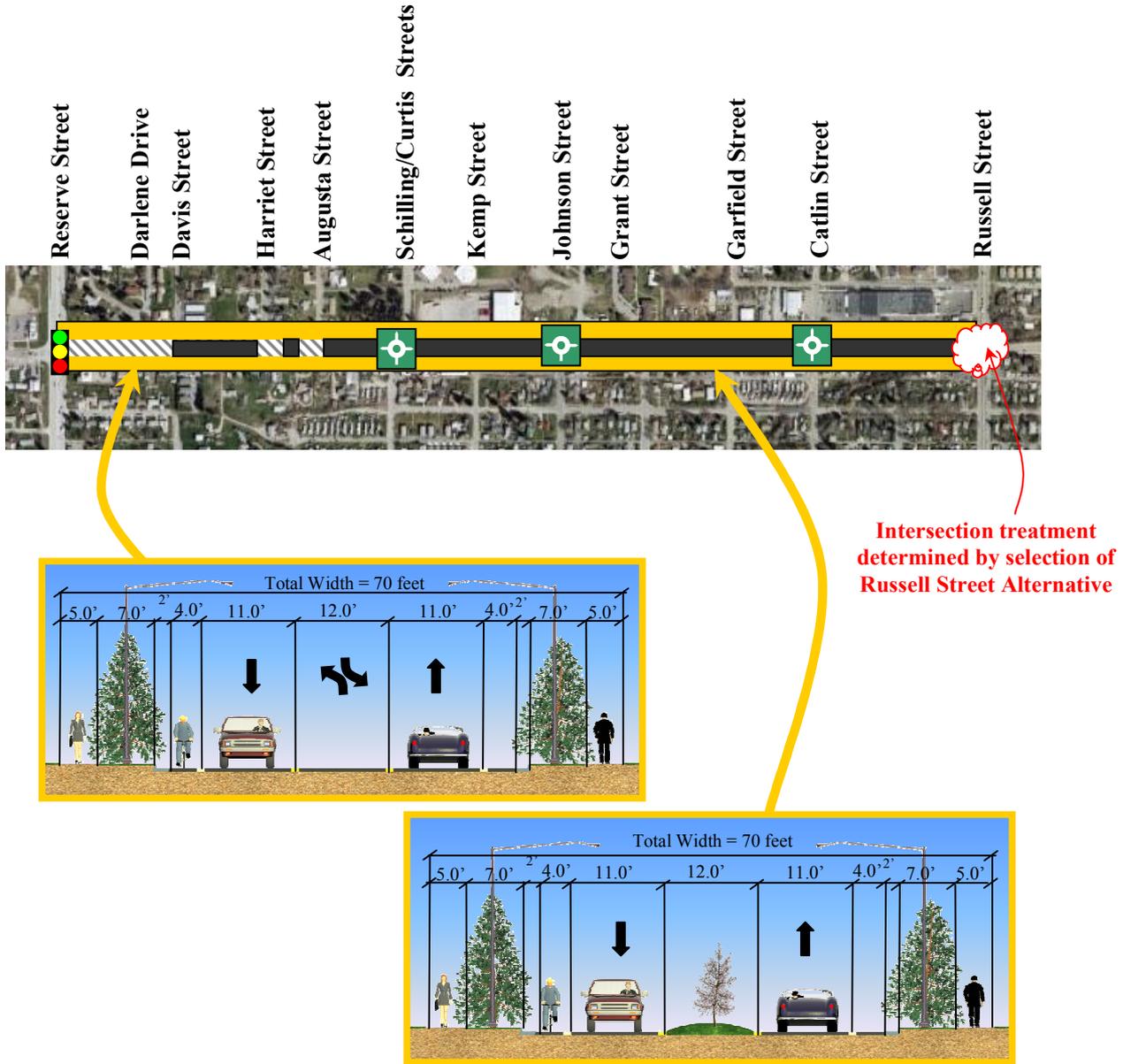
Alignment:

The existing alignment would be shifted to accommodate one-lane roundabouts at Curtis Street/Schilling Street, Johnson Street, and Catlin Street. The shift in alignment would minimize impacts on adjacent properties.

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Figure 2-11
Alternative C – General Elements



Key:

- Two lanes with median/turn lane
- Raised median
- Turn lane
- Traffic signal
- Single Lane Roundabout

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Alternative D

3+ Lanes with Signals

Alternative D would include one eastbound lane, but two westbound lanes due to the close proximity of the proposed traffic signals. The length of the additional lanes and tapers for the proposed signals at the Curtis Street/Schilling Street, Johnson Street and Catlin Street intersections on South 3rd Street overlapped, thus becoming efficient to convert the overlapping tapers into a second westbound travel lane between Reserve Street and Russell Street.

Figure 2-12 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Three travel lanes from Reserve Street to Russell Street

Intersection Control:

The intersection control at Russell Street would be determined by the selection of one of Alternatives 1 through 5.

Two-Lane Roundabouts at:

None

Single-Lane Roundabouts at:

None

Signal Control at:

Reserve Street (existing)
Schilling Street/Curtis Street
Johnson Street
Catlin Street

All other streets intersecting South 3rd Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

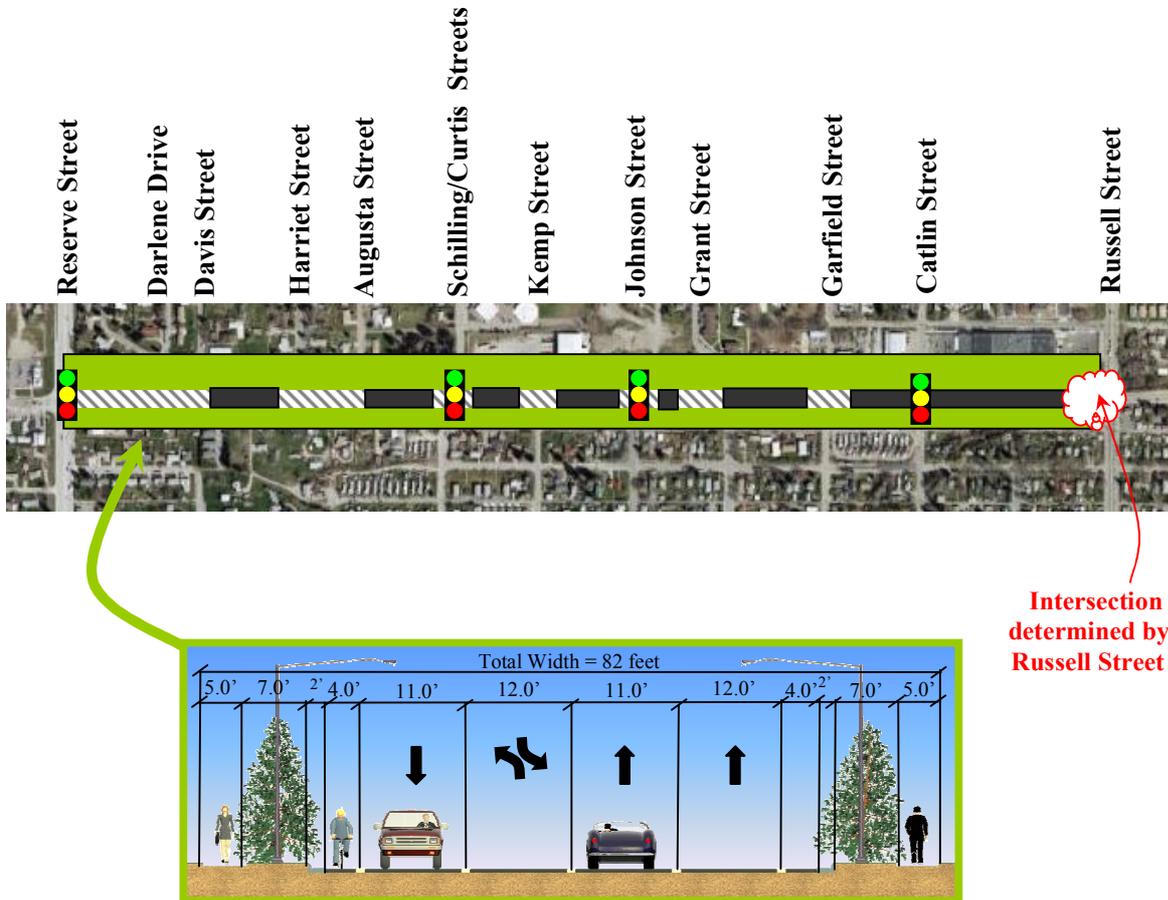
Alignment:

Schilling Street would be realigned to intersect South 3rd Street directly across from Curtis Street.

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**Figure 2-12
Alternative D – General Elements**



Key:

-  Three lanes with median/turn lane
-  Raised median
-  Turn lane
-  Traffic signal

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Alternative E

2+ Lanes with Signals

Alternative E includes two travel lanes (one in each direction), the use of raised medians and center turn lanes, and signalized intersections.

Figure 2-13 illustrates the major features of this alternative, and the following provides a summary.

Lane Configuration:

Two travel lanes from Reserve Street to Russell Street

Intersection Control:

The intersection control at Russell Street would be determined by the selection of one of Alternatives 1 through 5.

Two-Lane Roundabouts at:

None

Single-Lane Roundabouts at:

None

Signal Control at:

Reserve Street (existing)
Schilling Street/Curtis Street
Johnson Street
Catlin Street

All other streets intersecting South 3rd Street would be controlled by stop signs.

Raised median / Center turn lane:

The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

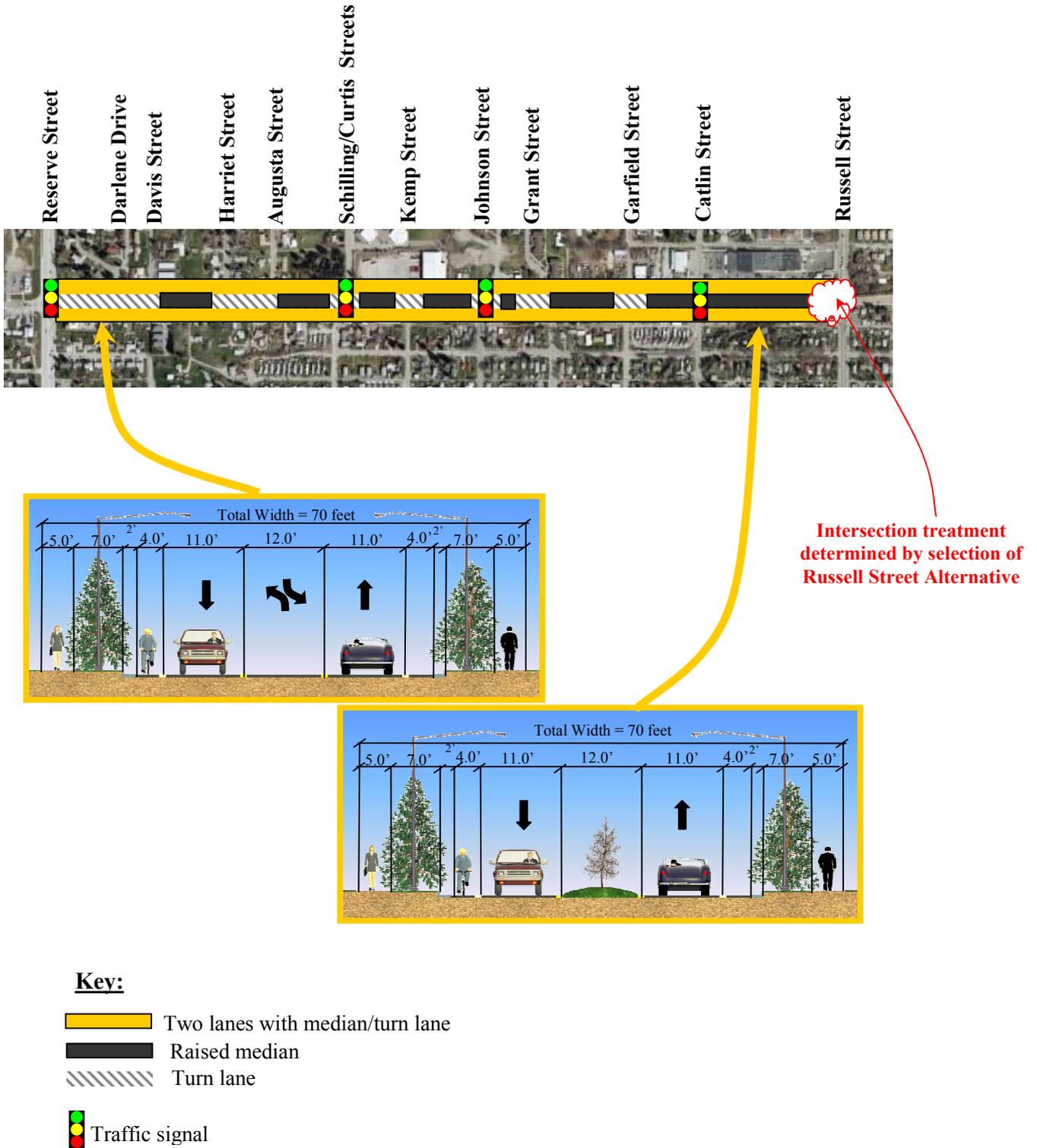
Alignment:

Schilling Street would be realigned to intersect South 3rd Street directly across from Curtis Street.

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Figure 2-13
Alternative E – General Elements



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2.3 Analysis of Alternatives

Chapter 1 of this Environmental Impact Statement outlined the overall need for improvements in the Russell Street and South 3rd Street corridors, as well as the purpose of the proposed improvements. As further articulation of the purpose and need for the proposed project, the chapter also provided a comprehensive list of goals and objectives developed through extensive coordination with the Advisory Committee and other agency and public participants over the past several years. Those goals and objectives were used to develop the alternatives presented above, and are used to evaluate the alternatives in the following section.

Based on the goals and objectives, the criteria are organized to evaluate the ability of each alternative to:

- Improve safety and capacity
- Improve multi-modal access and mobility
- Minimize impacts
- Maintain community character

The guiding principle in the development and evaluation of alternatives is to provide safety and mobility improvements first, then look for opportunities to minimize impacts and maintain community character. The following sections provide an accounting of the degree to which each alternative satisfies the broad purpose and need, and the more specific goals and objectives.

Improve Safety and Capacity

Four criteria were developed to evaluate the safety and capacity advantages of the alternatives. Table 2.3 provides a matrix of the alternatives compared to these criteria.

Table 2.3
Safety and Capacity Evaluation Matrix

Criteria	Alternatives									
	1	2	3	4	5	A	B	C	D	E
Provide adequate travel lanes and turn lanes to accommodate projected demand at the target Level of Service	O	O	O	√	√	O	√	√	√	√
Provide designated lanes/facilities for bicycle and pedestrian use	O	√	√	√	√	O	√	√	√	√
Widen the bridge over the Clark Fork River to accommodate additional travel lanes and bicycle/pedestrian facilities	O	√	√	√	√	-	-	-	-	-
Provide design and traffic control measures to improve safety	O	√	√	√	√	O	√	√	√	√

Key: √ = Satisfies the criteria O = Does not adequately satisfy the criteria



As depicted in Table 2.3, all Build alternatives provide designated bike and pedestrian facilities, widen the bridge over the Clark Fork River, and include design and traffic control measures to improve safety. The Build alternatives differ, however, in their ability to accommodate projected travel demand and improve safety.

Roadway safety is generally a function of the geometric design of the roadway, the interaction of different modes of travel, and the congestion levels a driver and/or pedestrian or bicyclist experiences. The crash history in the Russell Street and South 3rd Street corridors reveals that most vehicle crashes occur at congested intersections along these routes. All Build alternatives provide for the dedication of bicycle lanes, inclusion of sidewalks, and some type of intersection control and cross-walks at major intersections. These elements alone provide an improvement in both vehicular and pedestrian/bicyclist safety by reducing conflict between these different modes of travel. All the Build Alternatives also help lower speeds through the following design improvements:

- Narrowed travel lanes and overall cross-section*
- Street-side landscaping
- Landscaped medians
- Multiple controlled intersections with pedestrian crosswalks and refuges

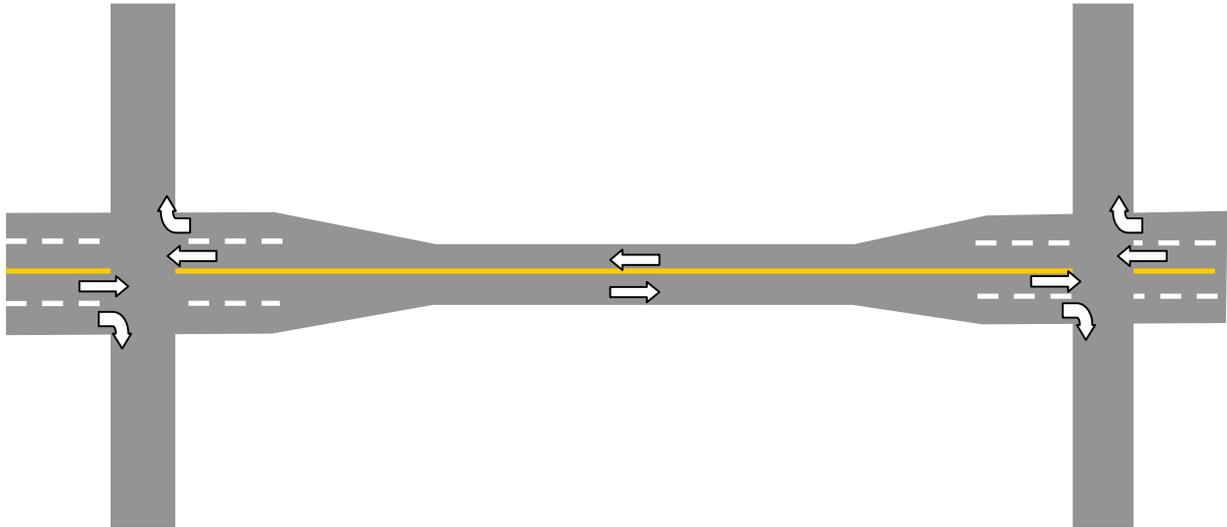
Through the inclusion of design elements to reduce conflicts and reduce speeds, all Build alternatives promote some safety benefits. Safety is also a function of congestion levels, which are improved to varying degrees by the Build alternatives.

As noted in Chapter 1 of this document, congestion is traditionally described in terms of the Level of Service experienced by the traveler. As noted in the sections above, Russell Street Alternatives 2 and 3 have one travel lane in each direction. Initial Level of Service calculations showed that several of the major intersections could not meet the targeted Level of Service C goal on Russell Street, and in fact dropped to failing levels. To improve the Level of Service, through lanes were added to increase the capacity of each approach until the overall Level of Service of the major intersections met the Level of Service C goal. This process was followed for all of the Build alternatives. The result was that several intersections required two travel lanes for the through movement. These additional through lanes, where appropriate, were then merged into one lane just downstream of the intersection. As illustrated in Figure 2-14, this creates an “hourglass effect” on the roadway where it bulges at the intersections and narrows along the mainline between.

* The proposed project includes the narrowest lanes permissible under current design standards for the interior lanes (in accordance with American Association of State Highway Transportation Officials guidance for this type of facility), but 12 foot lanes in the exterior to maintain an adequate buffer between vehicles and bicyclists.

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Figure 2-14
Hourglass Effect

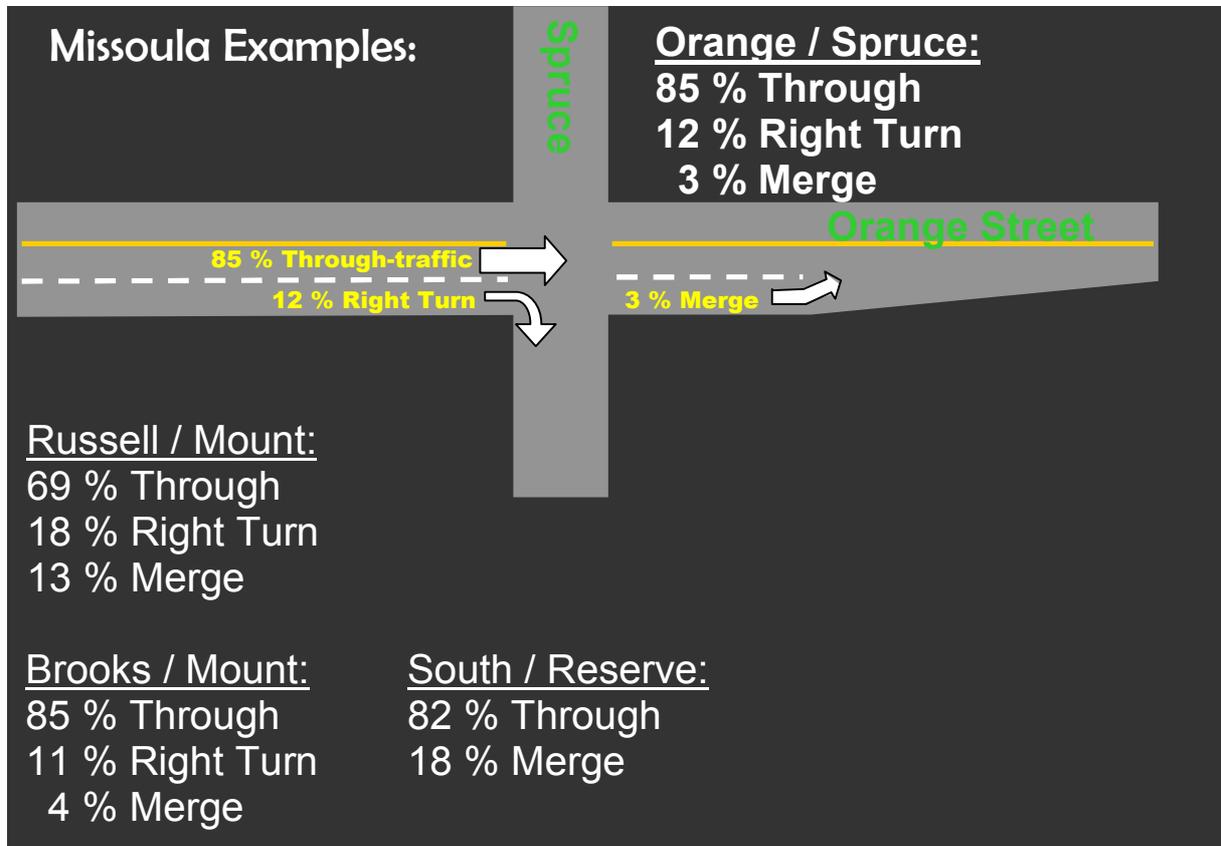


At first appearance, this configuration was projected to accommodate the future demand. However, the assumption was that the through traffic would balance out between both lanes as they moved through the intersection (e.g. 50 percent in the interior lane, and 50 percent in the exterior lane). Montana Department of Transportation staff collected field data from across the state to validate this assumption but found that most motorists will not use the exterior lane when they know it will be dropped less than 1,500 feet downstream of the intersection.

Observations by City of Missoula and Montana Department of Transportation staff in Missoula indicate that drivers do not make use of both lanes equally. A count of westbound traffic on South Avenue at Reserve Street showed that 82 percent of the through traffic remained in the inside travel lane and the remainder of traffic used the outside lane. Figure 2-15 illustrates this scenario.



**Figure 2-15
Typical Lane Utilization Imbalance**



Source: Montana Department of Transportation - Traffic and Safety Bureau. 2005

Level of Service analysis was conducted based on existing and forecast traffic volumes, as well as the “hourglass effect” noted above. Table 2.4 provides the results of the Level of Service analysis conducted for key intersections under existing and forecast conditions for the No Build and four Build alternatives on Russell Street and South 3rd Street.

As presented in the table below, the intersection Level of Service would deteriorate to Level of Service F throughout both corridors under the No Build scenario. All of the four Build alternatives in both corridors would provide improvements to varying degrees; however, Alternatives 2 and 3 fail to meet the goal of Level of Service C and drop to failing conditions at two to three intersections by the design year on Russell Street. All Build alternatives on South 3rd Street achieve the desired Level of Service with the exception of Reserve Street which fails under all scenarios. This proposed project does not include improvements on Reserve Street, and this condition would have to be addressed under a separate project.

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Table 2.4
Intersection Level of Service

Intersections	Alternatives					
	Existing	1	2	3	4	5
Russell Street at:						
Mount Avenue – South 14 th Street	D	F	F	F	C	B
South 11 th Street – Knowles Street	*F	F	A	A	B	A
South 5 th Street	D	F	D	D	B	B
South 3 rd Street	F	F	F	F	C	C
Wyoming Street	*F	F	E	E	A	A
West Broadway Street	F	F	C	C	C	C
South 3rd Street at:						
Reserve Street	F	F	F	F	F	F
Curtis –Schilling Street	*D	F	A	A	C	C
Johnson Street	*D	F	B	B	B	B
Catlin Street	*F	F	B	B	B	B

Notes: * Stop sign controlled. Indicates intersection movement under a worst-case scenario.

Level of Service is represented under existing and forecast (2025) conditions. **Bold Red** text indicates a failing to meet targeted LOS.

Source: Skillings-Connolly, 2005

Improve Multi-Modal Access and Mobility

All four Build alternatives on Russell Street and South 3rd Street satisfy the evaluation criteria for this group by providing:

- Trail linkages within and across both corridors,
- Grade-separated bike and pedestrian crossings of Russell Street,
- Facilities compliant with the Americans with Disabilities Act, and
- Adequate space for bus stops and pullouts in the corridors, where appropriate.

The Build alternatives differ in the use of roundabouts to improve on the safety of turning movements and access to adjacent homes and commercial buildings. Only Russell Street Alternatives 2, 3, and 5, and South 3rd Street Alternatives B and C explore the use of roundabouts.

Minimize Impacts

In accordance with the goals and objectives, every Build alternative on Russell Street and South 3rd Street includes:

- Reasonable flexibility in design standards by providing minimum widths as outlined in American Association of State Highway Transportation Officials guidelines,
- A design that reduces congestion and idling time to minimize vehicular impact on air quality,



- Stormwater designs to improve water quality runoff entering the Clark Fork River through the use of Best Management Practices, and
- Mitigation for unavoidable impacts (as outlined in Chapter 4).

Maintain Community Character

Throughout the public involvement process, participants have expressed a concern that Russell Street not turn into another Reserve Street. Reserve Street has four travel lanes and a center turn lane, and little landscaping. There are negative impressions of the pavement width, lack of landscaping, high speeds, and general lack of bicycle and pedestrian facilities. Because of the public input on the design aspects to be incorporated into the Russell Street Corridor, preliminary design elements are based on context sensitive solutions. Attempting to adhere to public preference and the goals and objectives identified in Chapter One, general baseline parameters had to be set for Russell and South 3rd Streets. According to *An Institute of Transportation Engineers Proposed Recommended Practice: Context Sensitive Solutions in Designing Major Urban Thoroughfares*, Russell Street and South 3rd Street can both be characterized as arterial urban thoroughfares. In Table 2.5, general parameters for urban thoroughfares are compared to the alternatives on Russell Street.

**Table 2.5
Parameters for General Urban Thoroughfares in Residential and Commercial Areas under Constrained Conditions**

Roadside	ITE Recommended	Current Conditions	Build Alternatives 2025
<i>Width</i>	16.5 feet	Varies	12 foot minimum
Traveled Way			
<i>Target Speed (mph)</i>	35	35	35
<i>Number of Through Lanes</i>	4-6	2-4	2-4
Lane Width	10-12 feet	12 feet	11-12 feet
Median Width	14-16 feet	none	12 feet
<i>Bike Lanes</i>	5-6 feet	none	5 feet
Traffic Volume (vpd)	10,000-40,000	16,000-23,000	24,000-33,700
Intersections			
<i>Roundabouts</i>	Urban single-lane roundabouts should be considered at intersections on arterial avenues with less than 20,000 entering vehicles per day.		

Source: Institute of Transportation Engineers

According to the Institute of Transportation Engineers, specific deviations from these parameters are allowed under constrained conditions. Specifically, the following variations are allowed:

- Roadside Width can be reduced to 12 feet in commercial areas and nine feet in residential areas which allows for a five foot sidewalk.
- Median Width can be reduced to a minimum of 10 feet on arterial thoroughfares.
- The Institute of Transportation Engineers also recommends no more than four through lanes in residential areas.

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Based on the above criteria and the goals outlined in the Complete Streets concept, all Build Alternatives fulfill the goal of maintaining community character through the inclusion of a balanced mix of transportation amenities. All of the Build alternatives on both Russell Street and South 3rd Street provide aesthetically pleasing design elements in the form of landscaped boulevards. All but South 3rd Street Alternative B include raised medians to allow for landscaping in the center of the roadways. Alternatives 2, 3, and 5 on Russell Street, and Alternative C on South 3rd Street include longer stretches of median for landscaping as compared to other alternatives.

With regard to a recognition of the commercial nature of the northern portion, and respect for the southern portion of the Russell Street corridor, all Build alternatives provide amenities and design elements to improve multi-modal mobility and access to homes and commercial buildings while still providing aesthetic improvements.

Summary Comparison of Impacts

To assist decision-makers and the public in understanding the environmental choices among Build alternatives, a comparison of the environmental impacts of the Build alternatives is included in Tables 2.6 and 2.7 below. Graphic illustrations of the alternatives and their impacts are also provided in Appendix B. The details of the impacts and proposed mitigation are documented in Chapter 4 of this Environmental Impact Statement.



**Table 2.6
Summary of Impacts on Russell Street**

Section	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Mount Avenue to South 11th Street	<ul style="list-style-type: none"> • 3 Commercial Buildings • 0.89 acres new right-of-way 	<ul style="list-style-type: none"> • 3 Commercial Buildings • 0.99 acres new right-of-way 	<ul style="list-style-type: none"> • 2 Commercial Buildings • 0.73 acres new right-of-way 	<ul style="list-style-type: none"> • 1 Homes • 3 Commercial Buildings • 1 4(f) Properties • 1.02 acres new right-of-way
South 11th Street to South 3rd Street	<ul style="list-style-type: none"> • 9 Homes • 4 Commercial Buildings • 4 4(f) Properties • 1.22 acres new right-of-way 	<ul style="list-style-type: none"> • 9 Homes • 4 Commercial Buildings • 4 4(f) Properties • 1.43 acres new right-of-way 	<ul style="list-style-type: none"> • 11 Homes • 5 Commercial Buildings • 3 4(f) Properties • 1.65 acres new right-of-way 	<ul style="list-style-type: none"> • 17 Homes • 5 Commercial Buildings • 5 4(f) Properties • 2.01 acres new right-of-way
South 3rd Street to Wyoming Street	<ul style="list-style-type: none"> • 3 Commercial Buildings • 0.63 acres new right-of-way 	<ul style="list-style-type: none"> • 3 Commercial Buildings • 0.67 acres new right-of-way 	<ul style="list-style-type: none"> • 0.93 acres new right-of-way 	<ul style="list-style-type: none"> • 2 Commercial Buildings • 0.84 acres new right-of-way
Wyoming Street to Russell Street Bridge	<ul style="list-style-type: none"> • 1 Commercial Building • 0.53 acres new right-of-way 	<ul style="list-style-type: none"> • 1 Commercial Building • 0.73 acres new right-of-way 	<ul style="list-style-type: none"> • 1 Commercial Building • 0.37 acres new right-of-way 	<ul style="list-style-type: none"> • 1 Commercial Building • 0.71 acres new right-of-way
Russell Street Bridge to West Broadway	<ul style="list-style-type: none"> • 2 Commercial Buildings • 0.80 acres new right-of-way 	<ul style="list-style-type: none"> • 2 Commercial Buildings • 0.78 acres new right-of-way 	<ul style="list-style-type: none"> • 2 Commercial Buildings • 0.64 acres new right-of-way 	<ul style="list-style-type: none"> • 2 Commercial Buildings • 0.79 acres new right-of-way
Totals	<ul style="list-style-type: none"> • 9 Homes • 13 Commercial Buildings • 4 4(f) Properties • 4.07 acres new right-of-way 	<ul style="list-style-type: none"> • 9 Homes • 13 Commercial Buildings • 4 4(f) Properties • 4.60 acres new right-of-way 	<ul style="list-style-type: none"> • 11 Homes • 10 Commercial Buildings • 3 4(f) Properties • 4.32 acres new right-of-way 	<ul style="list-style-type: none"> • 18 Homes • 13 Commercial Buildings • 6 4(f) Properties • 5.38 acres new right-of-way

Note: Utilities, design, and indirect costs would be additional costs not included above. Right-of-way costs are also conceptual and dependent upon final right-of-way negotiations.

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Table 2.7
Summary of Impacts on South 3rd Street

Section	Alternative B	Alternative C	Alternative D	Alternative E
Reserve Street to Russell Street	• 3 Homes	• 3 Home	• 2 Homes	• 2 Homes
	• 2 Commercial Buildings	• 2 Commercial Buildings	• 1 Commercial Building	• 1 Commercial Building
	• 2.38 acres of new right-of-way	• 2.77 acres of new right-of-way	• 3.62 acres of new right-of-way	• 2.63 acres of new right-of-way

Note: Utilities, design, and indirect costs would be additional costs not included above. Right-of-way costs are also conceptual and dependent upon final right-of-way negotiations.

Preliminary Cost Estimate

Table 2.8 compares the costs of the Build alternatives under consideration for the Russell Street and South 3rd Street projects.

Table 2.8
Preliminary Estimated Costs of the Build Alternatives

	Construction Engineering	Construction	Right-of-Way	Total Construction & Right-of-Way
Russell Street				
Alternative 2	\$4.4 million	\$29.1 million	\$7.9 million	\$41.3 million
Alternative 3	\$4.4 million	\$29.2 million	\$8.2 million	\$41.7 million
Alternative 4	\$4.3 million	\$28.5 million	\$6.8 million	\$39.6 million
Alternative 5	\$4.5 million	\$29.9 million	\$10.1 million	\$44.5 million
South 3rd Street				
Alternative B	\$1.2 million	\$8.2 million	\$3.0million	\$12.4 million
Alternative C	\$1.3 million	\$8.6 million	\$2.9 million	\$12.8 million
Alternative D	\$1.4 million	\$9.0 million	\$2.7 million	\$13.1 million
Alternative E	\$1.2 million	\$7.8 million	\$2.2 million	\$11.2 million

Note: These planning level estimates are in 2007 dollars. If the project were constructed in phases, it would be possible to construct the segment from West Broadway Street to approximately South 3rd Street at a cost of approximately \$26.5 million in the year 2012. The project proponents would continue to seek funding for subsequent phases and accumulate those funds over the next several years to ensure completion of the project by the year 2030.

Utilities, design, and indirect costs would be additional costs not included above.



2.4 Identification of the Preliminary Preferred Alternative

During early project development and through the analysis outlined in the previous section, Russell Street Alternative 5, and South 3rd Street Alternative C initially appeared to best satisfy the purpose and need, as well as the community driven goals to maintain community character through the use of roundabouts and landscaping treatments. However, the level of impacts, particularly to Section 4(f) properties, makes Alternative 5 challenging to justify given the fact that there is a less damaging alternative that provides very similar safety and operational improvements.

This section provides a summary of the alternative selection process, the attempts to refine the Build Alternatives to minimize impacts, and the ultimate decision to select Alternative 4 on Russell Street and Alternative C on South 3rd Street as the Preliminary Preferred Alternatives.

Selection Process

According to guidance provided by the Federal Highway Administration, an alternative must first meet the stated purpose and need for the proposed project to be considered “reasonable” and worthy of further evaluation. In this case, the purpose and need of the proposed project is to provide safety and mobility improvements in the Russell Street and South 3rd Street corridors.

If an alternative satisfies the purpose and need, it can be forwarded for evaluation of other factors such as cost, environmental impacts, and public support. In this case, planning level cost estimates were prepared, a planning-level design was prepared to compare impacts, and public support is gauged by the degree to which the alternatives satisfy the evaluation criteria developed through Advisory Committee and public participation. Table 2.9 provides a summary of the results of this evaluation process.

**Table 2.9
Screening Summary**

Alternative	Screen 1	Screen 2			Final Recommendation
	Meets Purpose and Need	Multimodal	Minimizes Impacts	Maintains Character	
1	No	--	--	--	<i>Must Forward</i>
2	No	--	--	--	<i>Eliminate</i>
3	No	--	--	--	<i>Eliminate</i>
4	Yes	Yes	Yes	Yes	<i>Forward</i>
5	Yes	Yes	Yes	Yes	<i>Forward</i>
A	No	--	--	--	<i>Must Forward</i>
B	Yes	Yes	Yes	Yes	<i>Forward</i>
C	Yes	Yes	Yes	Yes	<i>Forward</i>
D	Yes	Yes	Yes	Yes	<i>Forward</i>
E	Yes	Yes	Yes	Yes	<i>Forward</i>

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Based on the analysis presented earlier in this chapter, as well as input from the public, the City of Missoula, Montana Department of Transportation, and Federal Highway Administration eliminated two alternatives from further consideration on Russell Street. Alternatives 2 and 3 do not provide the necessary capacity and safety improvements to warrant the substantial investment that would be required in design, right-of-way acquisition, and construction of the two lane facilities proposed under these alternatives. Due to the high degree of interest in these alternatives from the public, they were reviewed at a preliminary level to see if they could be justified in light of a substantial savings in cost or minimization of impact to the neighboring properties. As demonstrated earlier in this chapter, their costs are not extraordinarily different than other more effective alternatives, and their impacts are similar to or greater than Alternative 4 which satisfies all other goals and objectives.

All of the South 3rd Street alternatives appear to satisfy the purpose and need for the proposed project; however, Alternatives B and C would provide a higher Level of Service for a longer period of time as compared to Alternatives D and E. The operational advantage, as well as the inclusion of roundabout intersection control in Alternatives B and C, makes these two alternatives more desirable given the level of public support for the roundabout options.

In a continuing effort to satisfy the public desire to construct major arterials in a fashion different from that of Reserve Street, and to develop a system of roundabouts in the two intersecting corridors, the City of Missoula, Montana Department of Transportation, and Federal Highway Administration refined the conceptual design of Alternative 5 to see if impacts could be further minimized and forward this alternative as the Preferred. Those efforts are outlined below.

Refinement of Alternative 5

The following modifications were made to Alternative 5 on Russell Street, as depicted in Figure 2-16.:

- To reduce the right-of-way requirements and costs associated with building a roundabout, the existing traffic signal would be left in place at Mount Avenue/South 14th Street.
- In order to minimize impacts to surrounding properties protected by Section 4(f), the proposed roundabouts at South 5th Street and South 3rd Street were reduced in size as compared to previous alternatives.
- Considerable time was spent investigating the potential of installing a roundabout at the South 11th Street/Knowles Street intersection. Due to the constraints of surrounding development, including properties protected by Section 4(f) of the Transportation Act, design modifications were necessary that hindered the ability of the roundabout intersection to provide optimal operation. Therefore, the intersection would remain a stop-controlled condition under this alternative.
- A traffic signal was selected for Wyoming Street because of the substantial right-of-way that would need to be acquired with a roundabout, and the potential operational issue of having a roundabout in close proximity to the signal at West Broadway Street.

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- Improvements to the Russell Street and West Broadway Street intersection are limited to those turning movements on West Broadway Street that are affected by the Russell Street improvements such as double left-turn lanes westbound on West Broadway Street turning south onto Russell Street and one westbound right-turn lane north onto Russell Street. Other improvements to the West Broadway Street portion of the intersection are not part of this project at this time.

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Figure 2-16
Alternative 5 - Refined

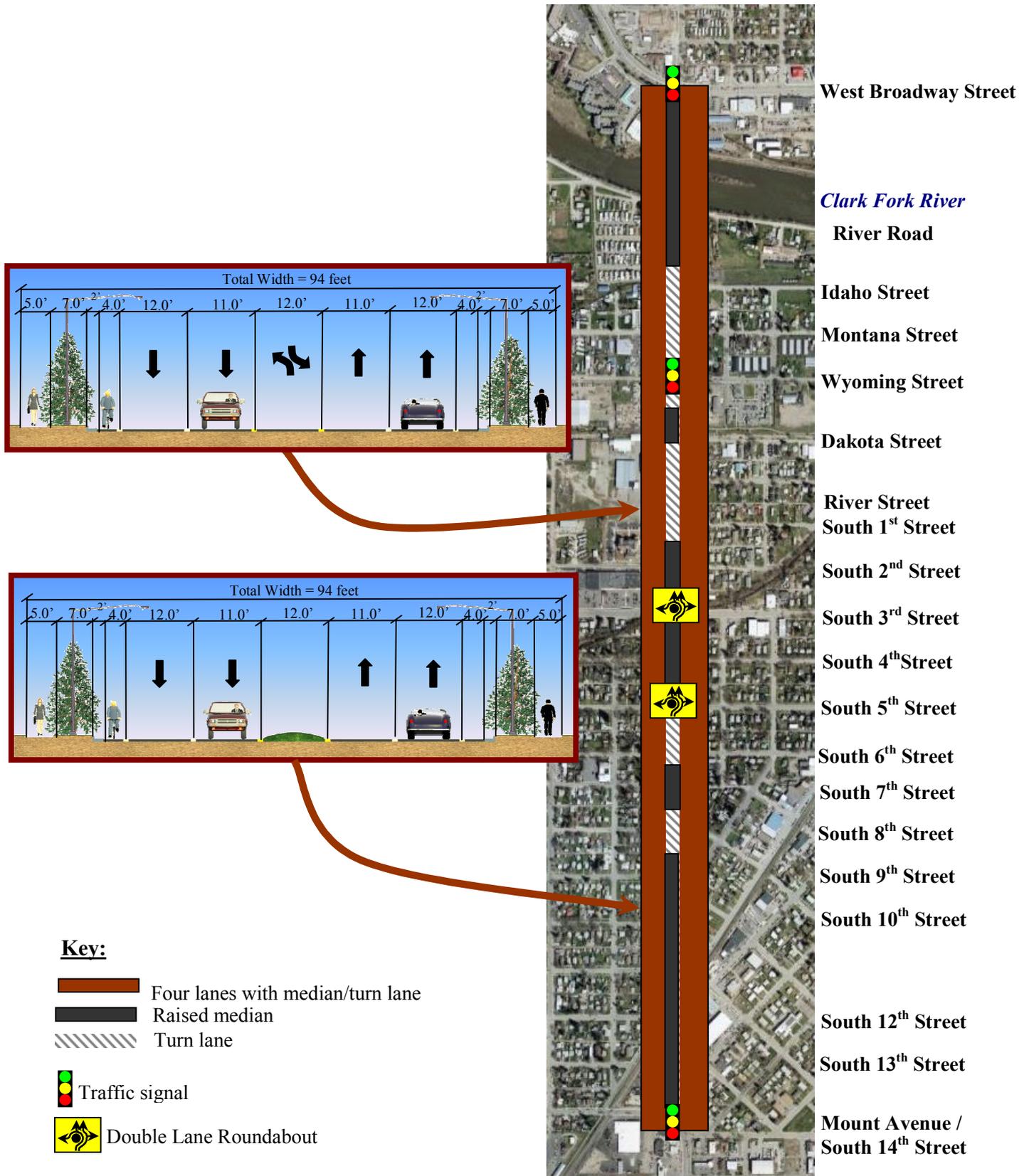




Table 2.10 provides a summary of impacts from the forwarded Build Alternatives that meet the Purpose and Need.

**Table 2.10
Impact Comparison of the Forwarded Alternatives on Russell Street**

Section	Alternative 4	Alternative 5	Alternative 5 (Refined)
Mount Avenue to South 11th Street	<ul style="list-style-type: none"> • 2 Commercial Buildings • 0.73 acres new right-of-way 	<ul style="list-style-type: none"> • 1 Homes • 3 Commercial Buildings • 1 4(f) Properties • 1.02 acres new right-of-way 	<ul style="list-style-type: none"> • 2 Commercial Building • 0.71 acres new right-of-way
South 11th Street to South 3rd Street	<ul style="list-style-type: none"> • 11 Homes • 5 Commercial Buildings • 3 4(f) Properties • 1.65 acres new right-of-way 	<ul style="list-style-type: none"> • 17 Homes • 5 Commercial Buildings • 5 4(f) Properties • 2.01 acres new right-of-way 	<ul style="list-style-type: none"> • 12 Homes • 4 Commercial Buildings • 4 4(f) Properties • 1.71 acres new right-of-way
South 3rd Street to Wyoming Street	<ul style="list-style-type: none"> • 0.93 acres new right-of-way 	<ul style="list-style-type: none"> • 2 Commercial Buildings • 0.84 acres new right-of-way 	<ul style="list-style-type: none"> • 0.63 acres new right-of-way
Wyoming Street to Russell Street Bridge	<ul style="list-style-type: none"> • 1 Commercial Building • 0.37 acres new right-of-way 	<ul style="list-style-type: none"> • 1 Commercial Building • 0.71 acres new right-of-way 	<ul style="list-style-type: none"> • 2 Commercial Buildings • 0.40 acres new right-of-way
Russell Street Bridge to West Broadway	<ul style="list-style-type: none"> • 2 Commercial Buildings • 0.64 acres new right-of-way 	<ul style="list-style-type: none"> • 2 Commercial Buildings • 0.79 acres new right-of-way 	<ul style="list-style-type: none"> • 2 Commercial Buildings • 0.66 acres new right-of-way
Totals	<ul style="list-style-type: none"> • 11 Homes • 10 Commercial Buildings • 3 4(f) Properties • 4.32 acres new right-of-way 	<ul style="list-style-type: none"> • 18 Homes • 13 Commercial Buildings • 6 4(f) Properties • 5.38 acres new right-of-way 	<ul style="list-style-type: none"> • 12 Homes • 10 Commercial Buildings • 4 4(f) Properties • 4.11 acres new right-of-way
Cost Estimate	\$39.6 million	\$44.5 million	\$39.2 million

Note: These planning level estimates are in 2007 dollars. If the project were constructed in phases, it would be possible to construct the segment from West Broadway Street to approximately South 3rd Street at a cost of approximately \$26.5 million in the year 2012. The project proponents would continue to seek funding for subsequent phases and accumulate those funds over the next several years to ensure completion of the project by the year 2030. Utilities, design, and indirect costs would be additional costs not included above. Right-of-way costs are also conceptual and dependent upon final right-of-way negotiations.

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Selection of the Preliminary Preferred Alternatives

Based on the fact that Alternative 4 satisfies the purpose and need to improve safety and mobility within the corridor, has fewer 4(f) impacts, and less overall impact as compared to Alternative 5 and the refined Alternative 5, the four-lane roadway improvement with signalized intersections proposed under Alternative 4 for Russell Street is identified as the Preliminary Preferred Alternative.

Alternative 5 (refined) was vigorously explored as the locally preferred alternative due in large part to community preference for roundabout intersection control and the expressed desire for a roadway improvement project like Stevens Avenue. During detailed analysis, it became apparent that Alternative 5 (even through refinement) would impose an impact on protected historic properties within the corridor that could be avoided with other alternatives. Due to unavoidable impacts to the historic properties at South 5th Street, Alternative 5 has been advanced for detailed consideration but ultimately not identified as the preferred alternative due to impacts to historic resources. However, the City of Missoula remains committed to providing the necessary roadway safety and capacity improvements while providing a facility that is aesthetically pleasing and enhances the existing characteristics of the surrounding area.

Alternative C on South 3rd Street satisfies the purpose and need as well as the general goals and objectives established for the project. This alternative also appears to be more responsive to neighborhood preference, provides a greater opportunity for aesthetic enhancements, and could provide some safety advantage by reducing conflict points and crash severity at intersections.

The final selection of the Preferred Alternatives will not be made until comments on this Draft Environmental Impact Statement, and comments from the Public Hearing have been fully considered. For the purposes of comparative analysis in Chapter 4 of this document, the Preliminary Preferred Alternatives consist of Alternative 4 on Russell Street and Alternative C on South 3rd Street.

2.5 Specific Design Elements of the Preliminary Preferred Alternatives

The nine design features recommended by the Advisory Committee would be fully incorporated into the Preferred Alternative. The common features are:

- The existing **Russell Street Bridge** would be removed and replaced in the same general location with four lanes over the Clark Fork River to provide adequate capacity for projected traffic volumes and necessary hydraulic capacity.
- **Bicycle lanes** would be included to improve multi-modal transportation in the corridors. Bicycle lanes measuring approximately 5.5 feet wide measured from the face of the curb would be constructed on both sides of Russell Street and South 3rd Street. The proposed bicycle lanes would be delineated from motorized



traffic by a solid white painted stripe and would be clearly marked as bicycle lanes.

- **Sidewalks** measuring approximately 5.0 feet wide would be constructed along both sides of Russell Street and South 3rd Street.
- **Grade separated pedestrian/bicycle crossings** would be provided for the Milwaukee Corridor Trail, Bitterroot Branch, Shady Grove, and River Front Trail systems as they cross Russell Street.
- **Curb and gutter** as well as drywells/sumps would be included to improve stormwater management.
- **Street lighting** would be included to improve aesthetics and safety.
- **Landscaped boulevards** would be constructed on both sides of Russell Street and South 3rd Street between the curb and sidewalk, as well as medians in both corridors and the center island of roundabouts on South 3rd Street, to improve aesthetics.
- **Bus pullouts** would be incorporated into the final design along Russell Street north of South 3rd Street, and along South 3rd Street from Russell Street to Reserve Street. The transit system currently does not serve Russell Street south of South 5th Street, so no pullouts are planned for that portion of the corridor.
- On-street parking within the City right-of-way is currently prohibited along Russell Street and South 3rd Streets. **Parking restrictions would be maintained** in these areas.

As with all other Build alternatives, the Preliminary Preferred Alternative includes the following alignment and access modifications:

- Longstaff Street would be restricted to a right-in and right-out only connection with Russell Street.
- Lawrence Street would be realigned to a right-angle intersection with Russell Street with left turn storage on Russell Street.
- Access to Russell Street from Harlem Street and Kern Street on the east side of Russell Street would be restricted to a right-in and right-out only connection.
- Addison Street would be realigned to a right-angle intersection with Russell Street opposite from South 8th Street. Addison Street and South 8th Street would be restricted to right-in and right-out only connections with Russell Street.
- Curb and gutter sections measuring 2.0± feet wide would be constructed on both sides of Russell Street and South 3rd Street with gutters located immediately inside the curb and would provide an additional 1.5± feet of width to the bicycle lane.

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- Where space is adequate along the proposed right-of-way, landscaped boulevards would be constructed on both sides of Russell Street and South 3rd Street between the curb and proposed sidewalk. Landscaping would also be included in center medians and roundabouts as appropriate.
- Knowles Street would be shifted slightly to the north to match with South 11th Street on the west.
- River Road would remain in its current configuration and would be restricted to a right-in and right-out connection with Russell Street. In addition, right-of-way would be purchased for the construction of a new link between River Road and Idaho Street that would become part of the River Road connection to Russell Street via Wyoming Street. The connection would include a newly constructed section of road running north-south adjacent to the western boundary of Mobile City Trailer between existing River Road and Idaho Street. It would also include reconstructed sections of Idaho Street between the new River Road and Catlin Street; Catlin Street between Idaho Street and Wyoming Street; and Wyoming Street between Catlin Street and Russell Street.



Russell Street – Preliminary Preferred Alternative:

Russell Street Alternative 4 is the Preliminary Preferred Alternative with two southbound and two northbound travel lanes, raised medians and center turn lanes, and the use of signal control at select intersections on Russell Street.

Figure 2-17 illustrates the major features of this alternative, and the following provides a summary. Figure 2-18 provides a more detailed illustration of the proposed improvements on Russell Street.

Lane Configuration:

Four travel lanes from Mount Avenue/ South 14th Street to West Broadway Street

Intersection Control:

Two-Lane Roundabouts at:

none

Single-Lane Roundabouts at:

none

Signal Control at:

Mount Avenue/South 14th Street (existing)

South 5th Street (existing)

South 3rd Street (existing)

Wyoming Street

West Broadway Street (existing)

All other streets intersecting Russell Street would be controlled by stop signs.

Raised median / Center turn lane:

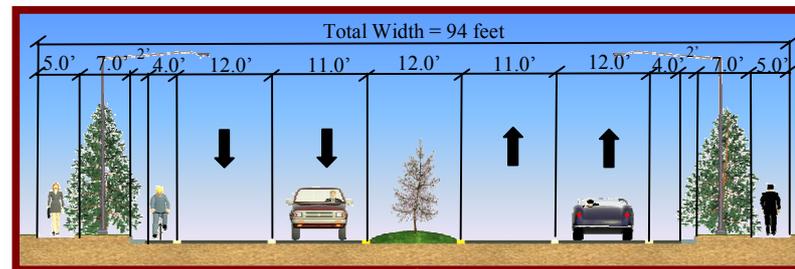
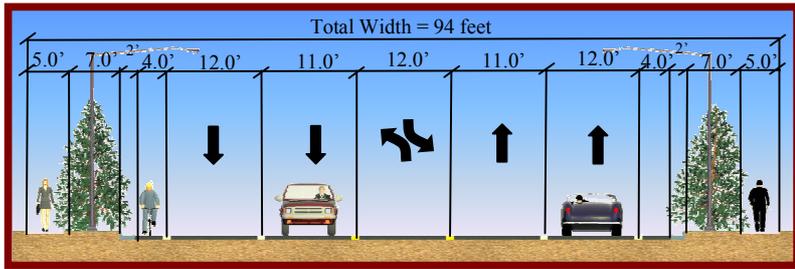
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The alignment of Russell Street in the southern segment would shift to the east to minimize the impact on properties protected under Section 4(f) of the U.S. Department of Transportation Act of 1966, as discussed later in this document.

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Figure 2-17
Preliminary Preferred Alternative –
General Elements



- Key:**
- Four lanes with median/turn lane
 - Raised median
 - Turn lane
 - Traffic signal

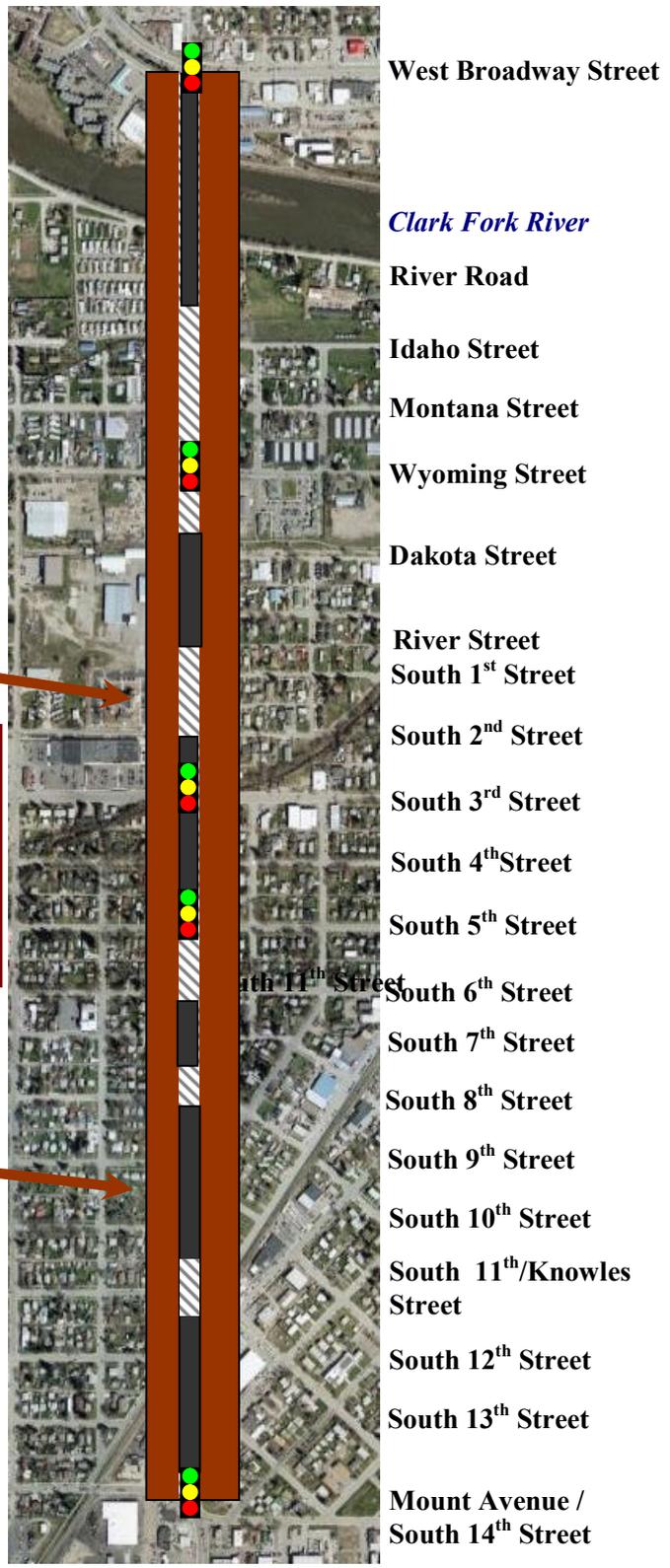




Figure 2-18
Russell Street
Preliminary Preferred Alternative
(Sheet A)

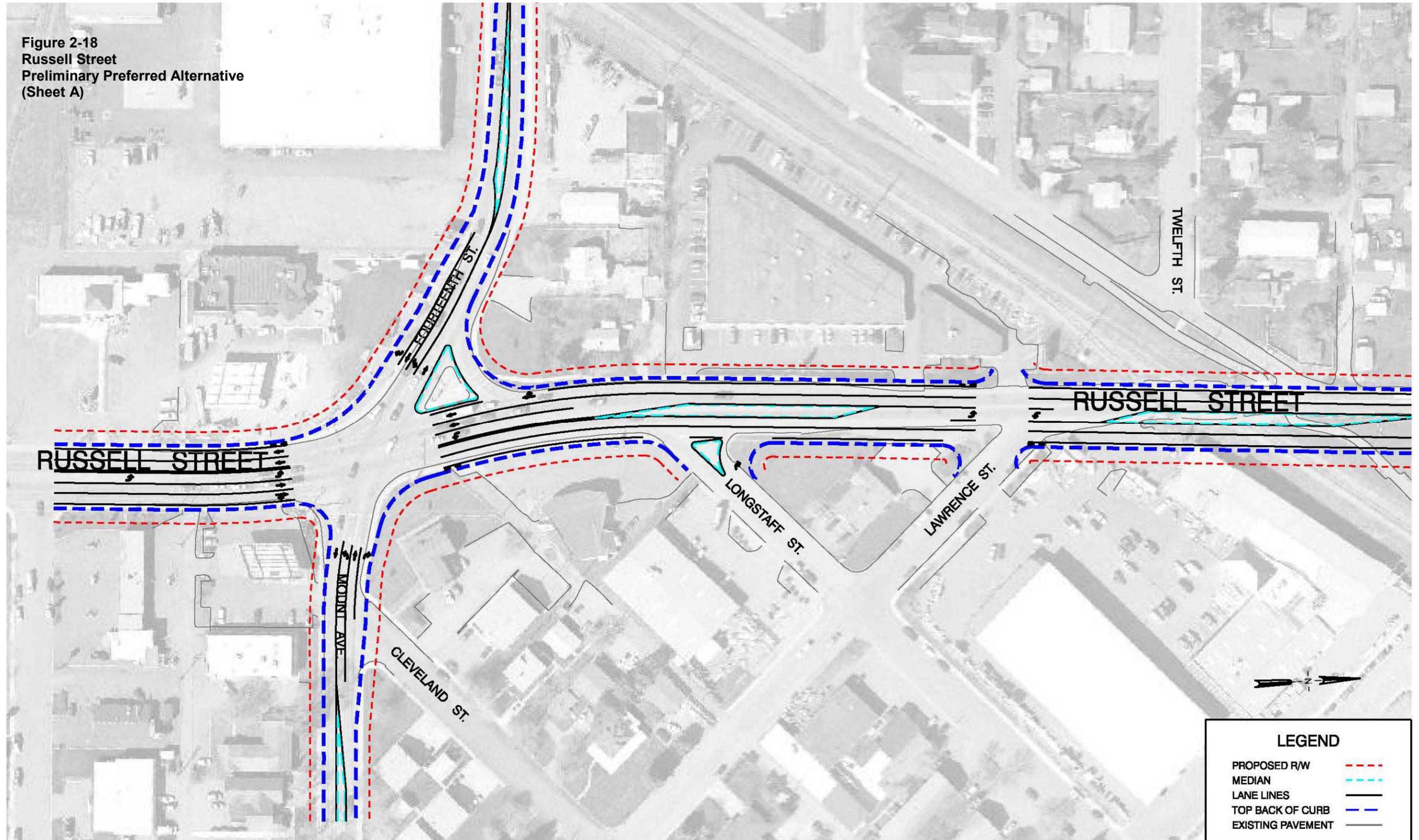


Figure 2-18
 Russell Street
 Preliminary Preferred Alternative
 (Sheet B)

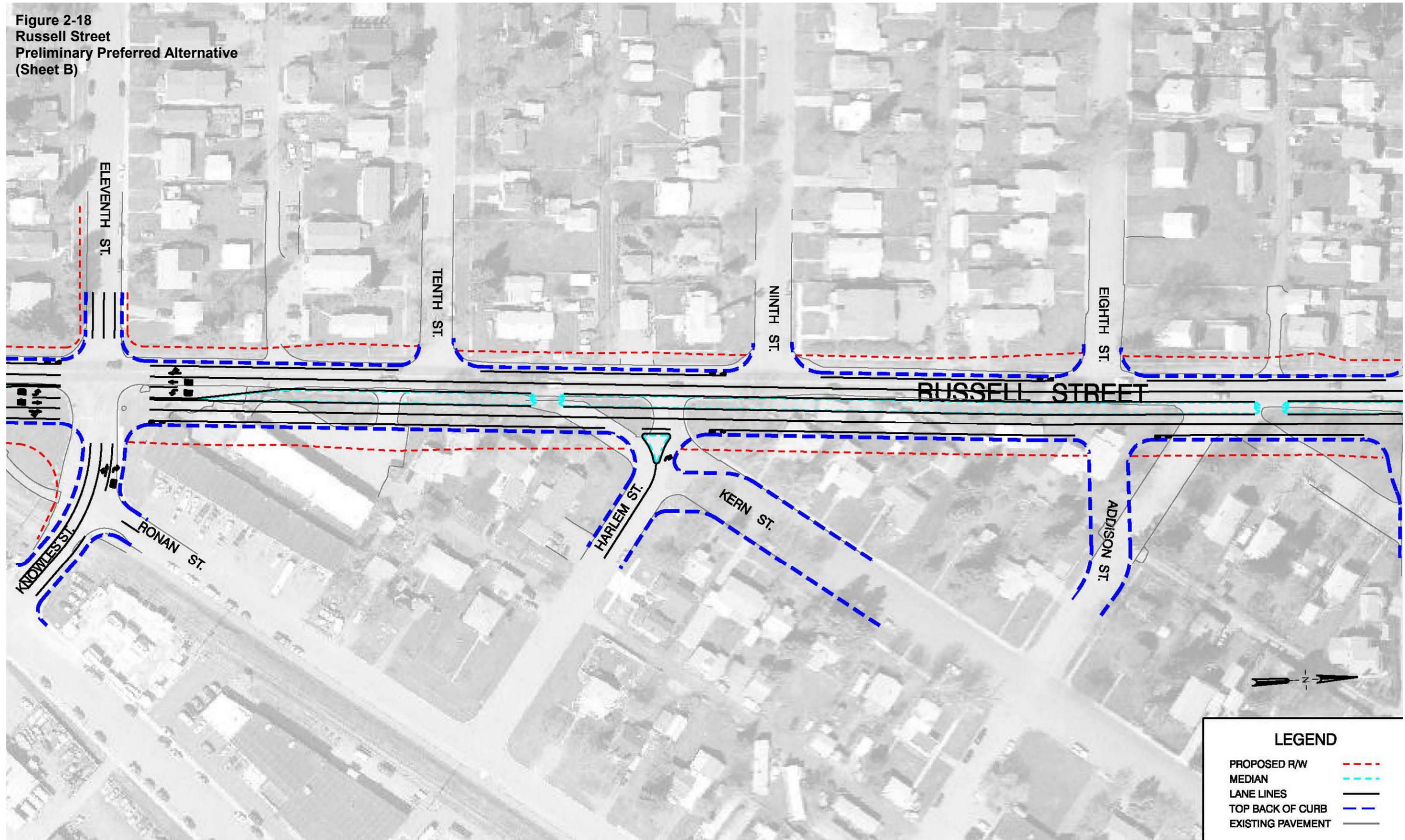




Figure 2-18
Russell Street
Preliminary Preferred Alternative
(Sheet C)

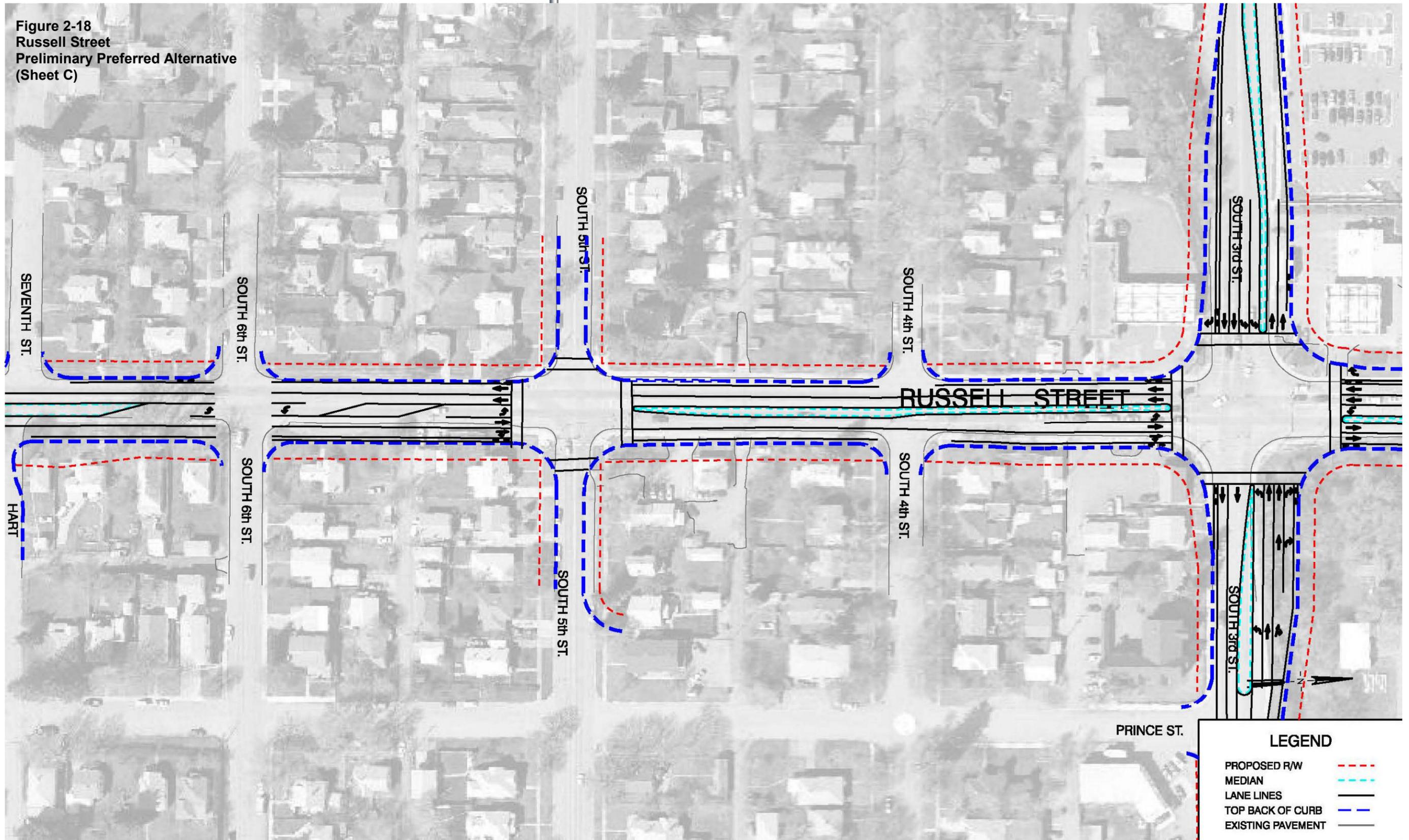


Figure 2-18
Russell Street
Preliminary Preferred Alternative
(Sheet D)



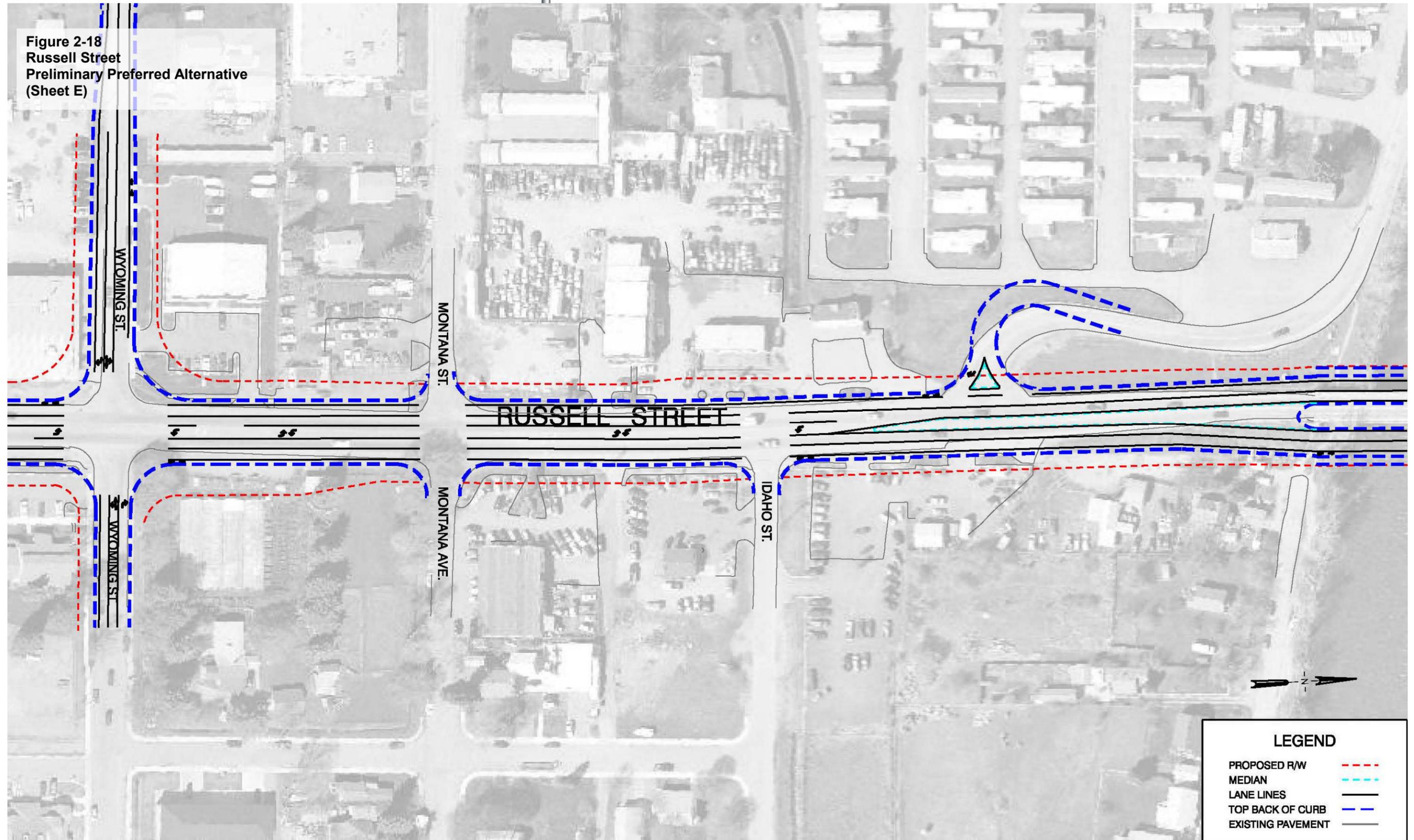
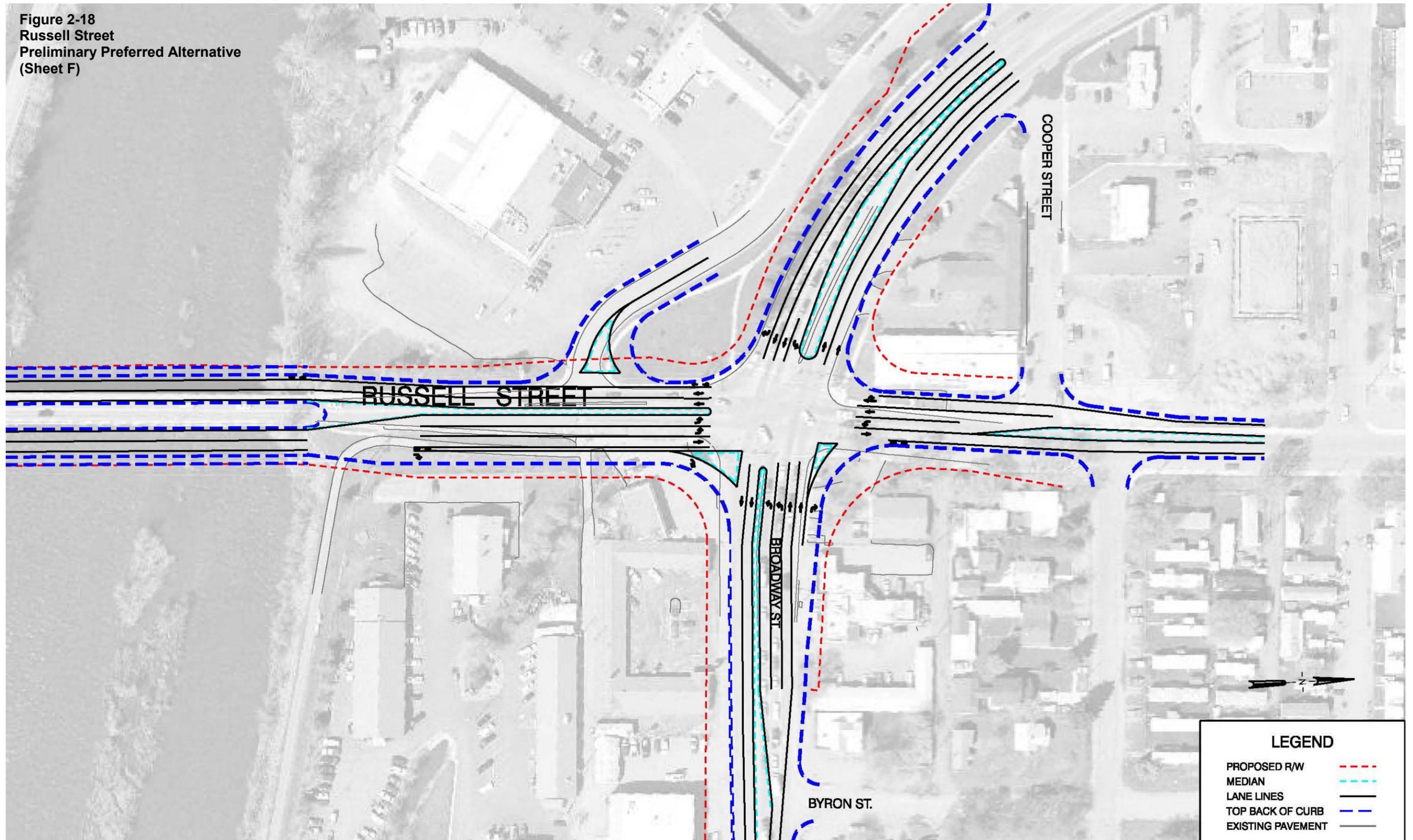


Figure 2-18
Russell Street
Preliminary Preferred Alternative
(Sheet F)





South 3rd Street – Preliminary Preferred Alternative:

Alternative C is the Preferred Alternative on South 3rd Street and includes two travel lanes (one in each direction), roundabouts at select intersections, and the use of raised landscaped medians through a majority of the corridor to control through traffic and increase the functionality of the intersections and roundabouts.

Figure 2-19 illustrates the major features of this alternative, and the following provides a summary. Figure 2-20 provides a more detailed illustration of the Preliminary Preferred Alternative on South 3rd Street.

Lane Configuration:

Two travel lanes from Reserve Street to Russell Street

Intersection Control:

Two-Lane Roundabouts at:

none

Single-Lane Roundabouts at:

Schilling Street/Curtis Street

Johnson Street

Catlin Street

Signal Control at:

Reserve Street (existing)

Russell Street (as determined by the Russell Street Preferred Alternative)

All other streets intersecting South 3rd Street would be controlled by stop signs.

Raised median / Center turn lane:

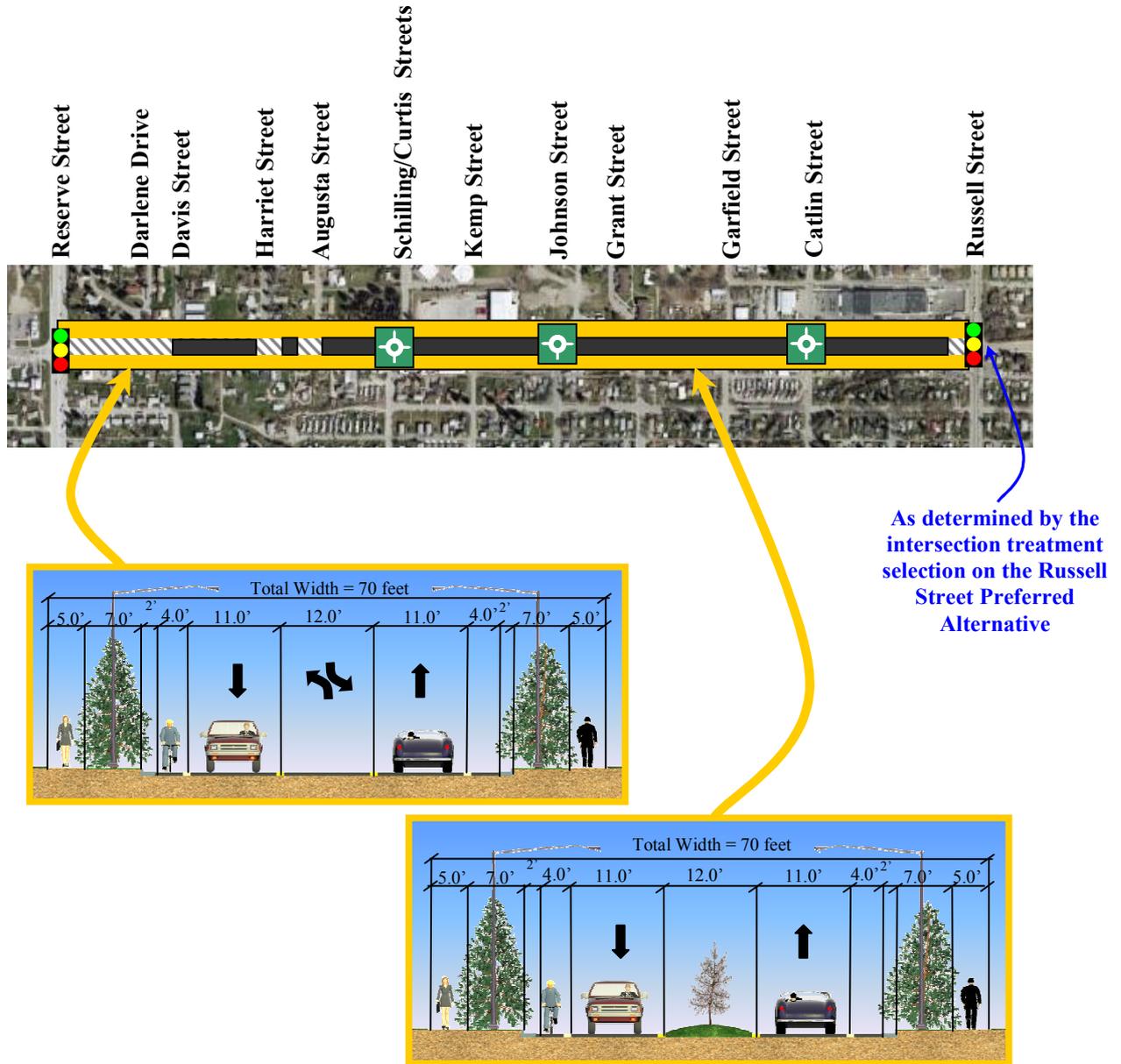
The locations of raised medians and center turn lanes are conceptual and subject to change during final design.

Alignment:

The existing alignment would be shifted to accommodate one-lane roundabouts at Curtis Street/Schilling Street, Johnson Street, and Catlin Street. The shift in alignment would minimize impacts on adjacent properties.

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Figure 2-19
Alternative C – General Elements



Key:

- Two lanes with median/turn lane
- Raised median
- Turn lane
- Traffic signal
- Single Lane Roundabout



Figure 2-20
South 3rd Street
Preliminary Preferred Alternative
(Sheet A)



Figure 2-20
South 3rd Street
Preliminary Preferred Alternative
(Sheet B)

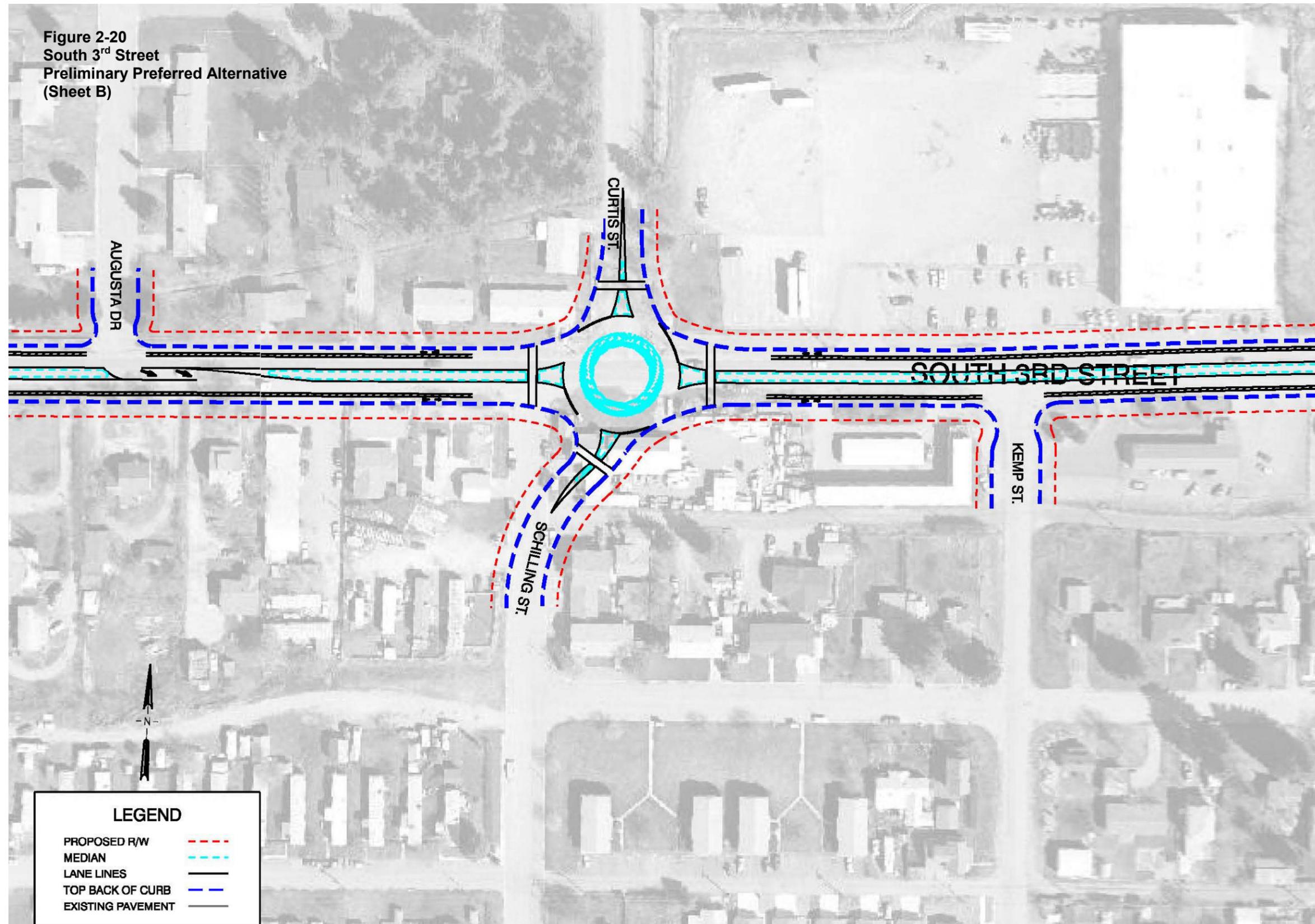




Figure 2-20
South 3rd Street
Preliminary Preferred Alternative
(Sheet C)

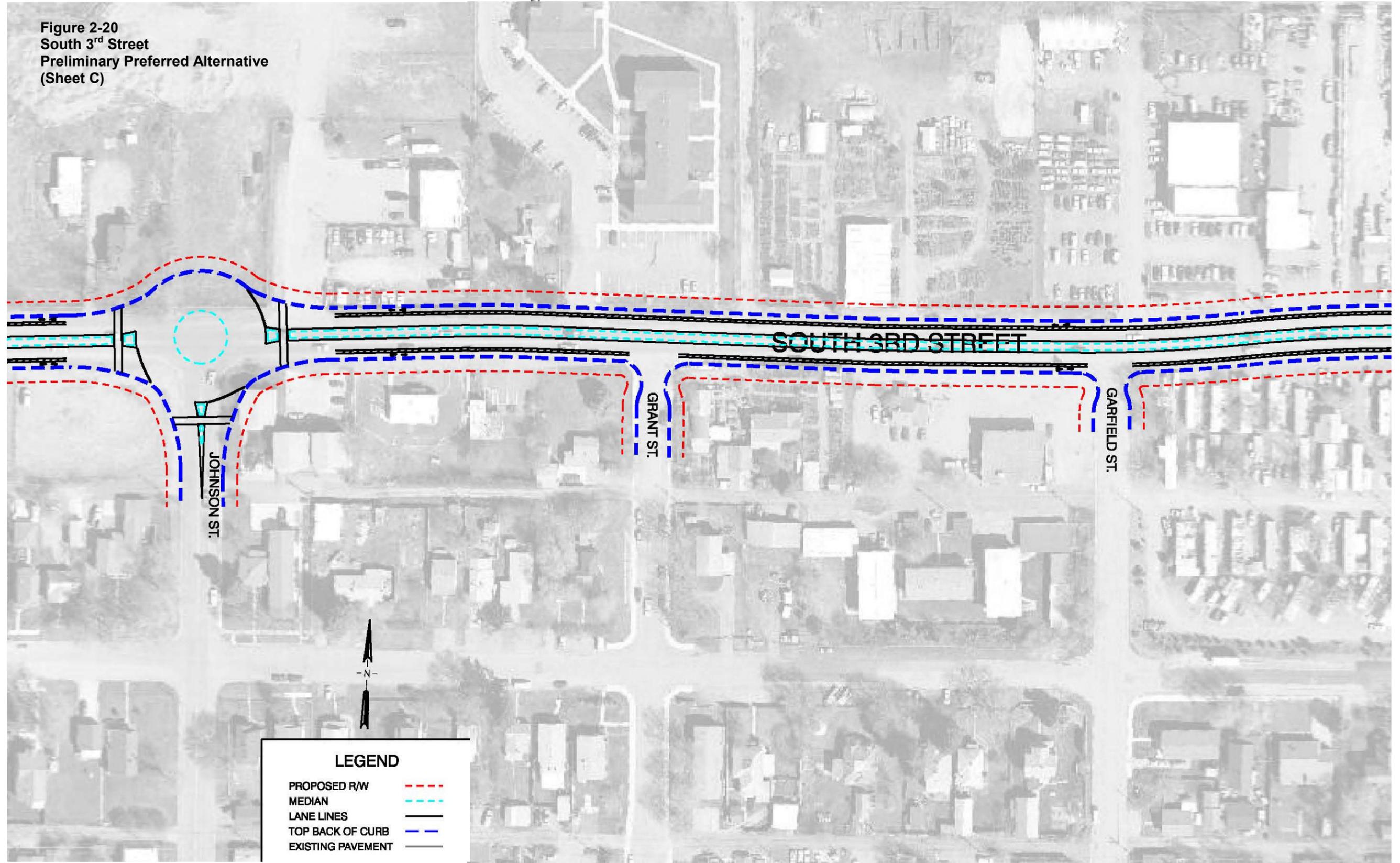
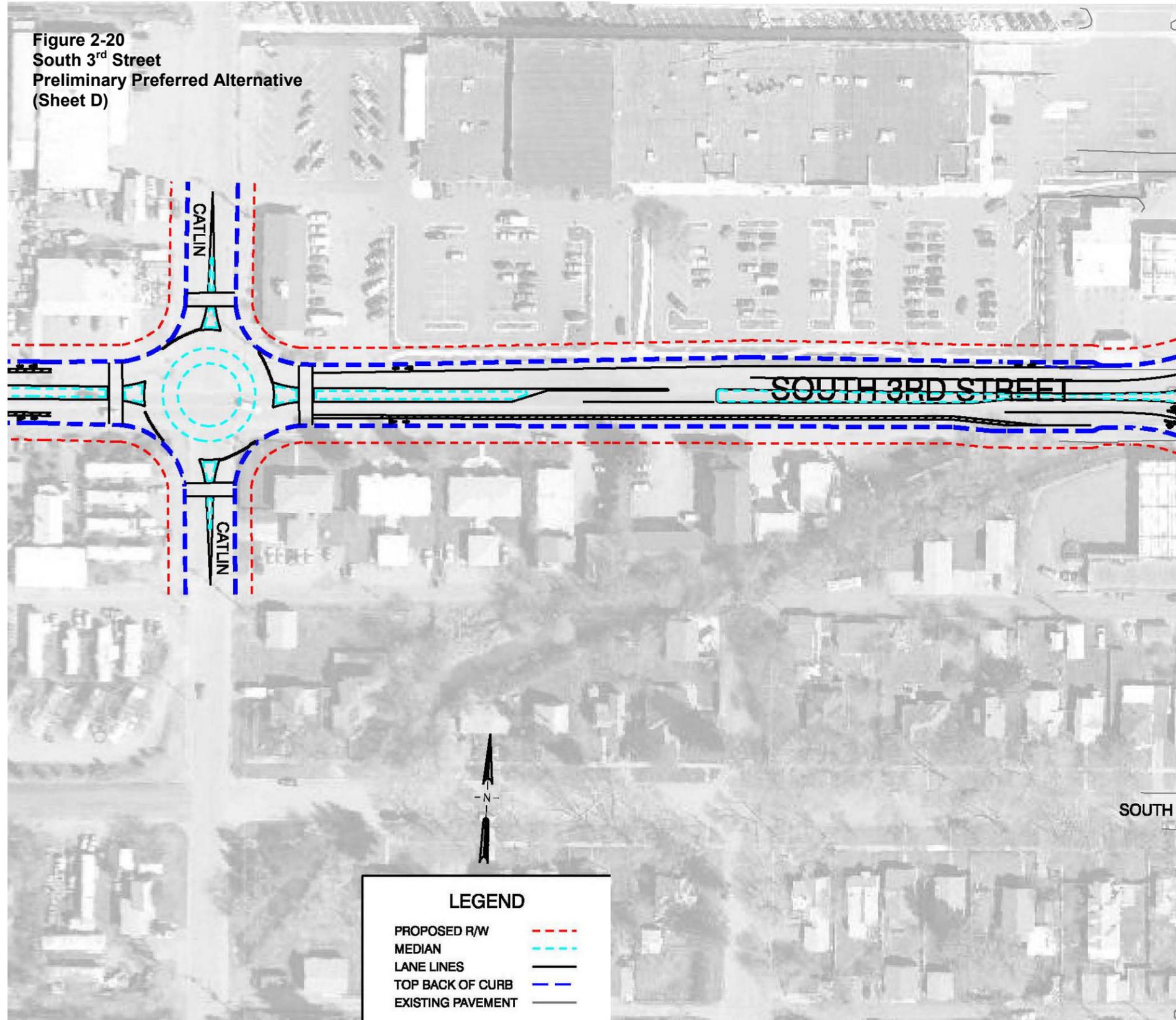


Figure 2-20
 South 3rd Street
 Preliminary Preferred Alternative
 (Sheet D)



See Figure 2-19 for details on the
 Russell Street Intersection at
 South 3rd Street



2.6 Other Alternatives Considered but Eliminated

Several alternatives were suggested through the public involvement process that were not carried forward into detailed analysis. These alternatives and the reasons for their elimination by the City of Missoula, Montana Department of Transportation, and Federal Highway Administration are discussed in this section.

Transportation System Management:

Transportation System Management strategies focus on improving roadway efficiency, and typically overlap with Intelligent Transportation System technologies. The primary purpose of Transportation System Management is to “get the most out of the existing system” through cost effective improvements such as adding auxiliary lanes in heavily congested portions of a corridor, adding turn lanes at congested intersections, or optimizing signal timing throughout a corridor. Other options might include fringe parking, ridesharing, and High Occupancy Vehicle (HOV) lanes.

The Federal Highway Administration has indicated in their Technical Advisory (TA 6640.8A) that these limited construction alternatives are “usually relevant only for major projects proposed in urbanized areas over 200,000 in population.” Due to the relatively limited population size of Missoula, the short length of the roadway improvement project, and the diversity of commuting trips in this corridor, it was determined that a Transportation System Management alternative would not provide the necessary improvements in capacity to eliminate the need for other investments in capacity expansion. It is feasible, however, that efficiencies can be gained through better signal timing or the use of roundabouts along both Russell Street and South 3rd Street, and may be explored further if improvement projects progress in these corridors.

Four-Lane Russell Street:

The Advisory Committee and general public participants involved in the scoping process considered a four-lane road with no median on Russell Street. A four-lane road with no median or center turn lane is considered less safe than most other lane configurations on this type of roadway. Motorists waiting to make left turns delay traffic. Other motorists then pull out into the outside lane to pass the vehicle waiting to turn left, which leads to an increase in the number of conflicts and traffic crashes. In addition, it is more difficult for pedestrians to cross a wide roadway without medians. The Advisory Committee concluded that this lane configuration did not meet the project purpose and need because it did not safely improve the movement of pedestrians and traffic through the project corridors, and therefore recommended to the Federal Highway Administration that it be eliminated.

Broadway Flyover:

Attendees at public scoping meetings suggested an elevated roadway (flyover) for the West Broadway Street and Russell Street intersection. The Advisory Committee considered the potential cost and environmental impacts on the Clark Fork River and the associated riparian area to be too great based on the substantial increase in the intersection footprint.

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Continuous Two-Way Left-Turn Lanes:

Attendees at public scoping meetings suggested using raised medians instead of continuous two-way left-turn center lanes. Continuous two-way left-turn center lanes throughout the corridor were not considered in further detail because the public wanted raised medians with landscaping to improve the look and feel of the corridor to meet the goals of the project. The raised medians coupled with short segments of two-way left turn lanes and left-turn storage pockets at certain locations provide nearly the same opportunities for motorists to turn left as two-way left-turn center lanes. Raised medians provided a greater margin of safety by separating the different directions of traffic when compared to the continuous two-way left-turn center lanes.

Partial Closure of Russell Street:

Attendees at public scoping meetings suggested closure of Russell Street north of the intersection of West Broadway Street and Russell Street as an option for improving traffic congestion at that intersection. If Russell Street north of the West Broadway Street intersection were closed, it would conflict with local transportation plans; therefore, this design option was not considered in detail.

I-90 / Russell Street Interchange:

Public comments on project alternatives suggested connecting Russell Street to Interstate 90. This connection was not considered in detail because it is outside the scope of the Russell Street and South 3rd Street reconstruction project. The scope of the project includes improvement of traffic congestion and conditions on Russell Street from Mount Avenue/South 14th Street to West Broadway Street. Connection of Russell Street to Interstate 90 is more appropriately considered in the metropolitan transportation planning process, which includes areas outside the Russell Street and South 3rd Street project area.

East-West Underpass Connection of River Road:

The public scoping meetings addressed the current access difficulties for residents in the River Road area. Attendees at scoping meetings proposed to connect River Road west of Russell Street to River Road east of Russell Street (underneath the Russell Street Bridge). This connection was eliminated from detailed study. The Interdisciplinary Team concluded that the costs were too high and environmental impacts on the Clark Fork River, the associated riparian area, and fisheries resources would increase if the bridge were constructed to a height that could accommodate a road crossing underneath Russell Street, and a berm were constructed adjacent to the Clark Fork River. Continually pumping water out from behind the berm and maintaining the pumping equipment would add life-long costs to the project. Lowering the elevation of River Road below the bridge to provide adequate vehicle clearance would create a safety problem if a vehicle became trapped under the bridge during a flood. Raising the elevation of the bridge in order to accommodate River Road traffic below the bridge is not feasible because bridge elevation is constrained by the existing Russell Street and West Broadway Street intersection.



2.7 Construction Phasing and Funding Strategies

Cost estimates prepared for this analysis do not include utilities, design, or indirect costs. The total costs for the proposed project will ultimately differ from the planning level estimates presented in this document.

Phasing

Based on currently available funds, reconstruction of Russell and South 3rd Streets as proposed in this Environmental Impact Statement would likely be phased. Construction projects would be programmed and completed as funds become available over the next several years.

Prior to finalizing a Record of Decision, the entire project would need to be included in the fiscally constrained portion of the conforming Long Range Transportation Plan and, in addition, at least one subsequent phase (e.g., final design, right-of-way, utility relocation or construction) included in the approved Transportation Improvement Program.

The City of Missoula receives several million dollars per year that can be accumulated under the regular program, and would have to seek additional funding to cover the remaining costs beyond regular funding sources.

It should be noted that if a substantial amount of time passes and/or ground conditions change between phases of construction, a re-evaluation of existing conditions and potential impacts may be required. Areas which could be reviewed include traffic projections contained in the Environmental Impact Statement as compared to actual counts at the time of final design for the project phase, and changes in the character of the corridor from either infill development or re-development. If no substantial changes have occurred, the project would proceed under the approved decision document. If substantial changes have occurred, and new impacts are identified, any changes in the project would likely need to be documented through a supplement to this Environmental Impact Statement.

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Funding

Through the Missoula area metropolitan transportation planning process, Russell Street has been prioritized as the number one priority for federal and state funds provided through the Surface Transportation Program-Urban funding program. Additional federal, state, and local funding prioritized through the metropolitan transportation planning process includes Congestion Mitigation and Air Quality funding, Bridge funding, Enhancement funding, and local funds. Also, a congressionally directed earmark was provided for this project through the most recent federal transportation funding bill, the Safe, Accountable, Flexible, Efficient Transportation Equity Act –A Legacy for Users. At least \$20 to 25 million is anticipated to be available from these combined funding sources.

Table 2.11
Missoula Federal Fiscal Year 2007-2011 Transportation Improvement Program

Project	Amount Reserved
South 3 rd Street (Reserve to Russell)	\$2,000,000* (Local funding)
Russell Street (Mount to Broadway)	\$12,119,800 (State Transportation Program - Urban)
Russell Street Grade Separated Crossing	\$348,500 (Congestion Mitigation Air Quality)
Milwaukee Trail West	\$388,200 (Surface Transportation Program Enhancements-City)
Russell Street	\$5,000,000 (Bridge)
Russell Street	\$4,962,000 (Earmark)

Note: * Projected amount