

ZOO MONTANA TO RIVERFRONT PARK TRAIL FEASIBILITY STUDY



FINAL DRAFT - NOVEMBER

2014



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ZooMontana to Riverfront Park Trail Feasibility Study

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Contents

Executive Summary.....	1
Rationale.....	1
Methods.....	1
Public Involvement	1
Landowner Impacts.....	1
Action Strategy	2
Overview	3
Introduction	3
Purpose of Study.....	4
Existing Plan Review.....	4
Existing Conditions.....	7
Physical Features.....	7
Field Visit	17
Opportunities and Constraints.....	17
Public Outreach.....	21
First Public Open House	21
Second Public Open House	22
Trail Alignment Options	23
Segment Options	23
Segment Evaluation	27
Action Strategy	33
Potential Preferred Alignments.....	40
Cost Estimate	41
Appendix A – Segment Evaluation Results	45
Appendix B- Public Outreach Plan.....	49
Appendix C- Cost Estimates by Segment.....	50

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Executive Summary

Rationale

The Billings area has experienced rapid growth in its trail system over the past decade. The concept of a continuous trail corridor generally following the Yellowstone River has been a vision for at least 20 years. In 2011, the Yellowstone Riverfront Trail Feasibility Study explored the feasibility of a trail connecting Mystic and Riverfront Parks and was funded by the Billings Chamber of Commerce. In 2014 the Billings MPO commissioned this document to study a similar connection between ZooMontana and Riverfront Park. Substantial new and imminent development is occurring within the study area. With this development comes opportunity to explore trail connections that may not otherwise be possible

Methods

The Billings MPO hired a planning team led by Alta Planning + Design and Peaks to Plains Design P.C. to conduct the study. A Project Oversight Committee was formed with representation from various key stakeholders including multiple City and County departments, MDT, BikeNet, the Yellowstone River Parks Association (YRPA), ZooMontana, and the Chamber of Commerce. The POC convened four times during the course of the study to review key deliverables and provide direction to the project team.

Public Involvement

Two public open houses were held in June and September of 2014 to gain public input. Landowners within the study area were individually invited via mail to attend the meetings. The Draft ZooMontana to Riverfront Feasibility Study was available for comment for approximately one month through the MPO's website. Finally, the Planning Board, PCC, City Council and County Commission were apprised of the project's progress via their regularly scheduled meetings.

Landowner Impacts

Multiple landowners were engaged throughout the planning process and this feedback directly contributed to potential alignments that stayed closer to Canyon Creek and the Yellowstone River to score lower than those more centrally located within the study area. Other landowners either were selling or buying large areas of land for the purposes of development. Several were engaged and were generally supportive of integrating a trail within their developments. The process was designed to be transparent and little negative sentiment was observed. As per official Yellowstone County policy, no land will ever be taken for the purposes of trail development.

Action Strategy

Existing public rights-of-way and large parcels that are or will be in the process of development provide for a multitude of potential trail alignments. Due to the uncertainty of final development plans it would not be prudent to forward a single preferred alternative. Rather, a list of actions for each area of the study area was developed for the MPO to keep progress moving forward and to secure opportunities as they arise. Preferred trail routing along some of the existing roads may depend on how the trail will traverse future residential and industrial subdivisions. As previously stated, this approach offers significant opportunity to provide a higher quality experience than utilizing solely existing public rights-of-way. If the MPO chooses, a continuous trail could be implemented at present time entirely within existing public rights-of-way, however the overall user experience may not be as high quality.

Three potential preferred alternatives were explored and all had similar non-developer funding requirements for construction of approximately \$2.15 million. This feasibility study provides the strategy and actions to eventually achieve the vision of the corridor.

Overview

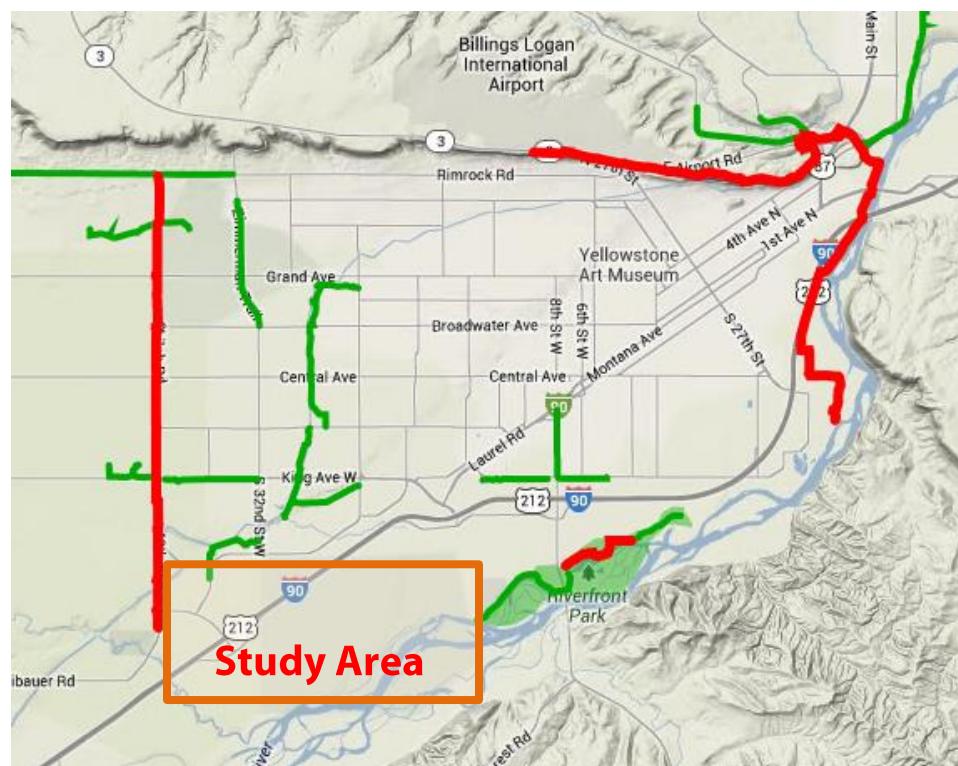
Introduction

Riverfront Park is one of the recreational jewels of the Billings area. The 600 acre park (Billings' largest) has an extensive trail network, fishing access, developed lawn areas with facilities for picnicking and group events. Riverfront Park stands isolated from the rest of the area's trails and parks and is accessed primarily by cars. The vision of connecting the City of Billings to and along the Yellowstone River Corridor through a riverside trail has been a community vision for at least the past 20 years. This concept of a trail is proposed in the 2011 Billings Area Bikeway and Trail Master Plan and had previously also been recommended in the 2007 Riverfront Park Master Plan Update, the 2004 Billings Heritage Trail Plan, the 1994 BikeNET Plan and the 1994 Yellowstone River Master Plan.

In 2011, a similar trail feasibility study was commissioned through the Billings Chamber of Commerce to study connecting Riverfront Park to Mystic Park to the east. This new feasibility study looks west from Riverfront Park to create a connection to ZooMontana where the Shiloh Road Trail begins heading north. If the vision of this trail connection can be realized the City will be one step closer to having a continuous 26 mile 'marathon loop' trail that, along with other spur trails, will connect a large portion of residents to the trail and park system in the Billings area.

Exhibit 1

Project context map of major City of Billings trail segments and the project study area.
(Red denotes marathon trail segments)



Purpose of Study

This study is intended to determine the feasibility of building an approximately 4 mile greenway trail connecting existing trail segments that terminate at ZooMontana and Riverfront Park. This study describes various potential alignment alternatives with a recommended implementation approach. This study also makes recommendations for the trail and related improvements such as trailheads and interpretive sites. For this study, a greenway is defined as “a corridor of land that connects people and nature together” and a trail is defined as “a linear facility for non-motorized transportation and recreation.” The trail is intended to serve primarily as a shared-use path for pedestrians and bicyclists separated from motorized traffic, however many alignment alternatives will parallel existing roadways with varying levels of vehicle traffic.

The proposed trail offers options to the community for pedestrian and bicycle travel, improved mobility for residents living south of I-90, a safe route to Elysian Elementary School, close-to-home outdoor activities, potential economic development, and health benefits of regular exercise. These opportunities can help residents be more active and healthy, combat obesity in children and adults, and encourage environmental stewardship in trail users of all ages.

Existing Plan Review

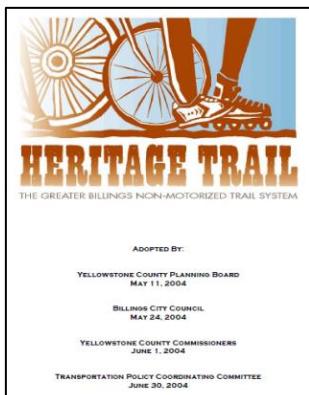
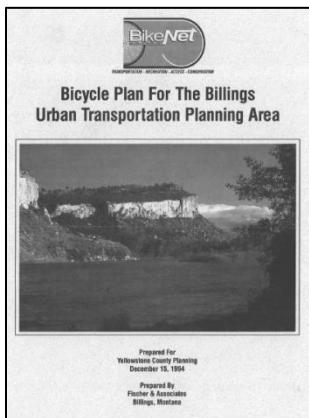
Relevant planning documents are summarized here to illustrate how this project fits into previous planning efforts and the overall vision of non-motorized transportation and recreation

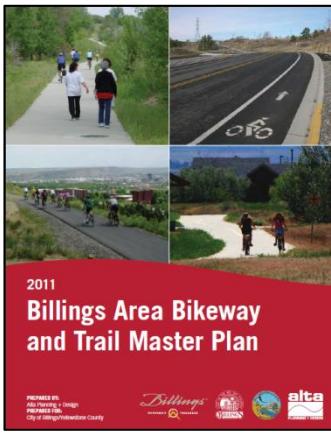
BikeNet Plan (1994)

In 1994, the first community-wide non-motorized plan, The BikeNet Plan, was adopted. In the ten years following adoption many advances were made for non-motorized travel including the hiring and subsequent contracting of an Alternate Modes Coordinator, implementation of 10 miles of paved trail, and new roadways being striped with bicycle lanes. This plan laid the foundation for the expansion of non-motorized transportation within the Billings area. The BikeNet Plan depicts a ‘bike path’ generally following the Yellowstone River from Riverfront Park to Canyon Creek, which it follows to the ZooMontana site.

Heritage Trail Plan (2004)

In 2004, an update to the BikeNet plan, the Heritage Trail Plan, was adopted. This plan gave updated guidance on where to expand a system of on and off road facilities and gave emphasis on the role of trails not only as functional and recreational systems, but also as an opportunity for interpretive sites to bind historical places and events. The Heritage Trail Plan became a powerful roadmap for off-street trail development. The Heritage Trail Plan depicts an ‘undefined’ trail corridor westward from Riverfront Park, and another undefined trail corridor crossing I-90 at Canyon Creek. No trail alignments were depicted in the Heritage Trail Plan that crossed private property, only general needs.





Billings Area Bikeway and Trail Master Plan (2011)

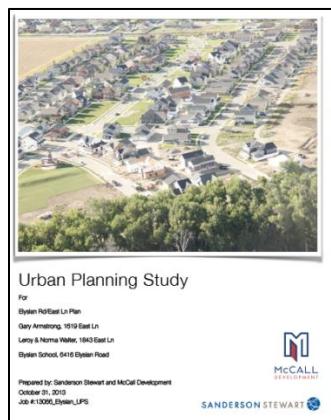
In 2011, an update to the Heritage Trail Plan, now dubbed the Billings Area Bikeway and Trail Master Plan was adopted. Between 2004 and 2010, an additional 25 miles of paved trail were constructed, a Bicycle and Pedestrian Advisory Committee was formed, and Billings was declared a Bronze level Bicycle Friendly Community from the League of American Bicyclists. This update placed equal emphasis on on-street bike facilities as it did on trails and provided greater detail on both. Similar to the Heritage Trail Plan, trail proposals through private land were not depicted beyond arrows pointing in the general direction. The Billings Area Bikeway and Trail Master Plan continued the recommendation of the previous two plans for a trail with an undefined alignment to connect ZooMontana to Riverfront Park via Canyon Creek.



Riverfront Park Master Plan (2008)

The Riverfront Park Master Plan was adopted by the City of Billings in 2008 provides guidance on the preferred activities surrounding the 600-plus acre regional park. A statistically valid community-wide survey indicated that some form of pathway use (trail hiking, nature walks, bicycling and paved trails) were in the top five (of 18) activity preferences affiliated with the park.

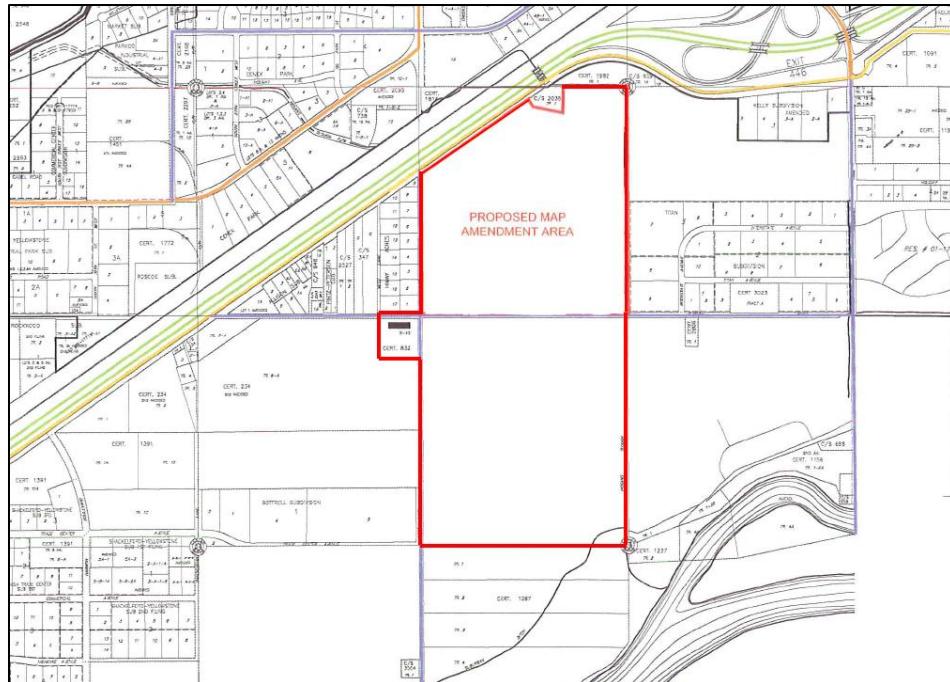
The adopted concept plan graphic reflects a contiguous multi-use path that generally parallels the Yellowstone River from the park's east to the west boundary. Several secondary trails are identified within the park, with varying levels of development. A trailhead is identified at the west end of Riverfront Park, in the vicinity of Songbird Lane and South 12th Street West. Suggested elements for the trailhead include a picnic shelter and tables, rest rooms and a parking area.



Elysian – East Lane Urban Planning Study (2013)

This urban planning study analyzes the benefits and impacts developing a 163 acre tract of land south of Elysian Road and east of East Lane. The study envisions a master planned community with parks and will incorporate greenway trail recommendations found within the Yellowstone Greenway Master plan and the Billings Area Bikeway and Trail Master Plan. No proposed plat has been developed for the study area, so it could be well suited to a variety of potential trail alignments through it.

Exhibit 1
Elysian – East Lane
Urban Planning Study
Area



West Billings Groundwater Recharge Study (2010)

The study area for this project exists upstream on Canyon Creek from the study area being considered in this trail feasibility study; however it examines greenway trails under a variety of scenarios as flood reduction measures for areas of west and northwest Billings. Ultimately the study concluded that greenway trail enhancements were not by themselves the preferred way to manage flooding within the study area. The study did note however, that greenway trails could be a separate component along the study area drainages for their recreational value and that 50 feet should be the maximum greenway right-of-way provided. Such greenway trails could connect with the Shiloh and ZooMontana to Riverfront Park trail segments at some point in the future. This study also performs cursory analysis of a trail along Canyon Creek.

POTENTIAL ALTERNATIVES FEASIBILITY STUDY
WEST BILLINGS FLOOD MITIGATION AND
GROUNDWATER RECHARGE STUDY

Yellowstone County, Montana

Prepared for:

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Project No. 100013850

Existing Conditions

This section of the study outlines the inventory of physical characteristics of the corridor between ZooMontana and Riverfront Park in Billings. The inventory includes the features that were studied in order to develop a comprehensive recommendation for a preferred alignment for the proposed greenway trail. These features include elements that were gathered from GIS information provided by The City of Billings and Yellowstone County, and on-the-ground fieldwork, which was performed by the Project Oversight Committee and the Alta project team. Maps 1-3 Summarize the existing conditions and the land uses in the study area.

Physical Features

Length, Dimensions, Boundaries and Topography

The approximate length of the existing gap in trails between the Shiloh path termination near Zoo Montana and Riverfront Parks is approximately 4 miles. The study area for this feasibility study stretches from Shiloh Road on the west to King Avenue on the north and the north bank of Yellowstone River on the south.

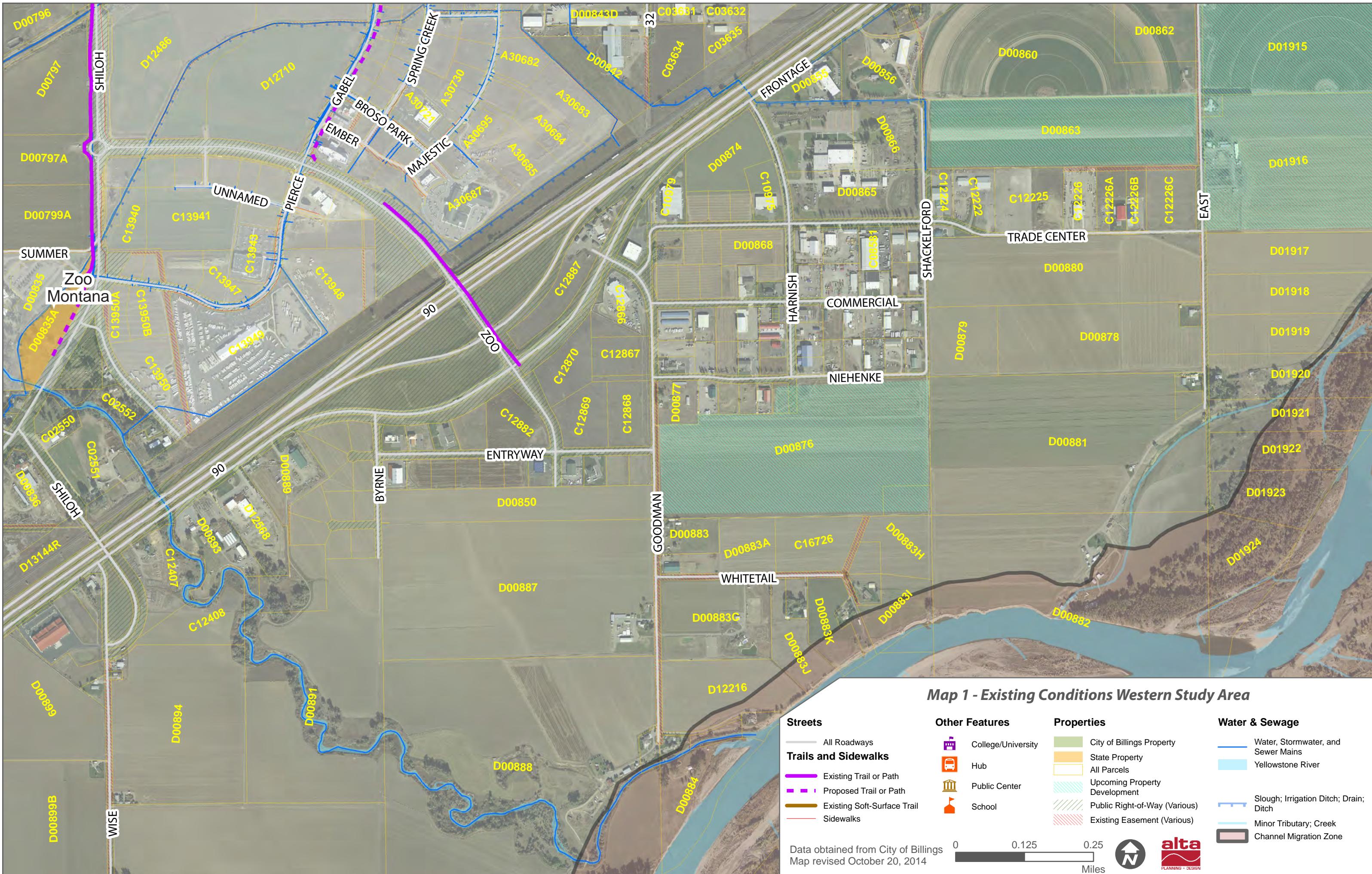
Any trail that will ultimately connect ZooMontana to Riverfront Park will have to cross a significant barrier of about 400 feet in width consisting of two railroad tracks, Interstate 90 and the Frontage Road.

The corridor proves the possibility of developing a greenway trail generally following the northern riverbank though it would be less direct and circuitous. This strategy would also be complicated by the challenges of negotiating easements with a large number of private landowners. A general trail corridor traveling more directly eastward is possible through the use of existing public rights-of-way and utility easements is possible and also allows for opportunistic partnerships with future development to achieve a higher quality trail corridor. A combination of the above is also possible. There are no significant slopes within the study area.

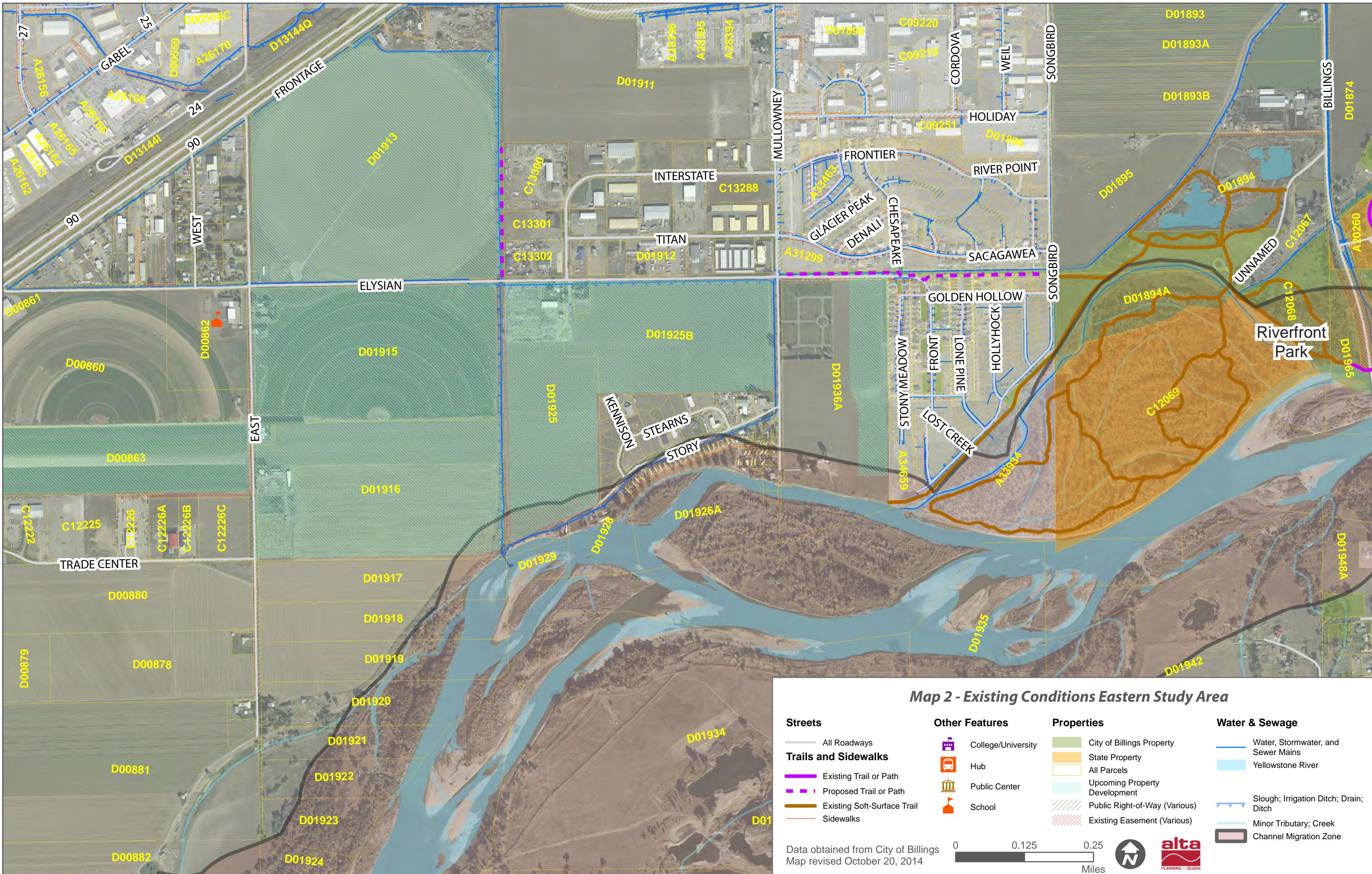
Surrounding Land Uses

The study area hosts a wide variety of existing and future land uses. A substantial portion of the study area is currently located in Yellowstone County, however most of the new development is being annexed into the city as improvements are being made. Undeveloped land, Agricultural land, Commercial and Industrial uses dominate the central and western portions of the study area with some smaller areas of residential rural. The eastern portion of the study area has seen recent residential development including the Josephine Crossing subdivision. Additional land is expected to develop as residential in the future.

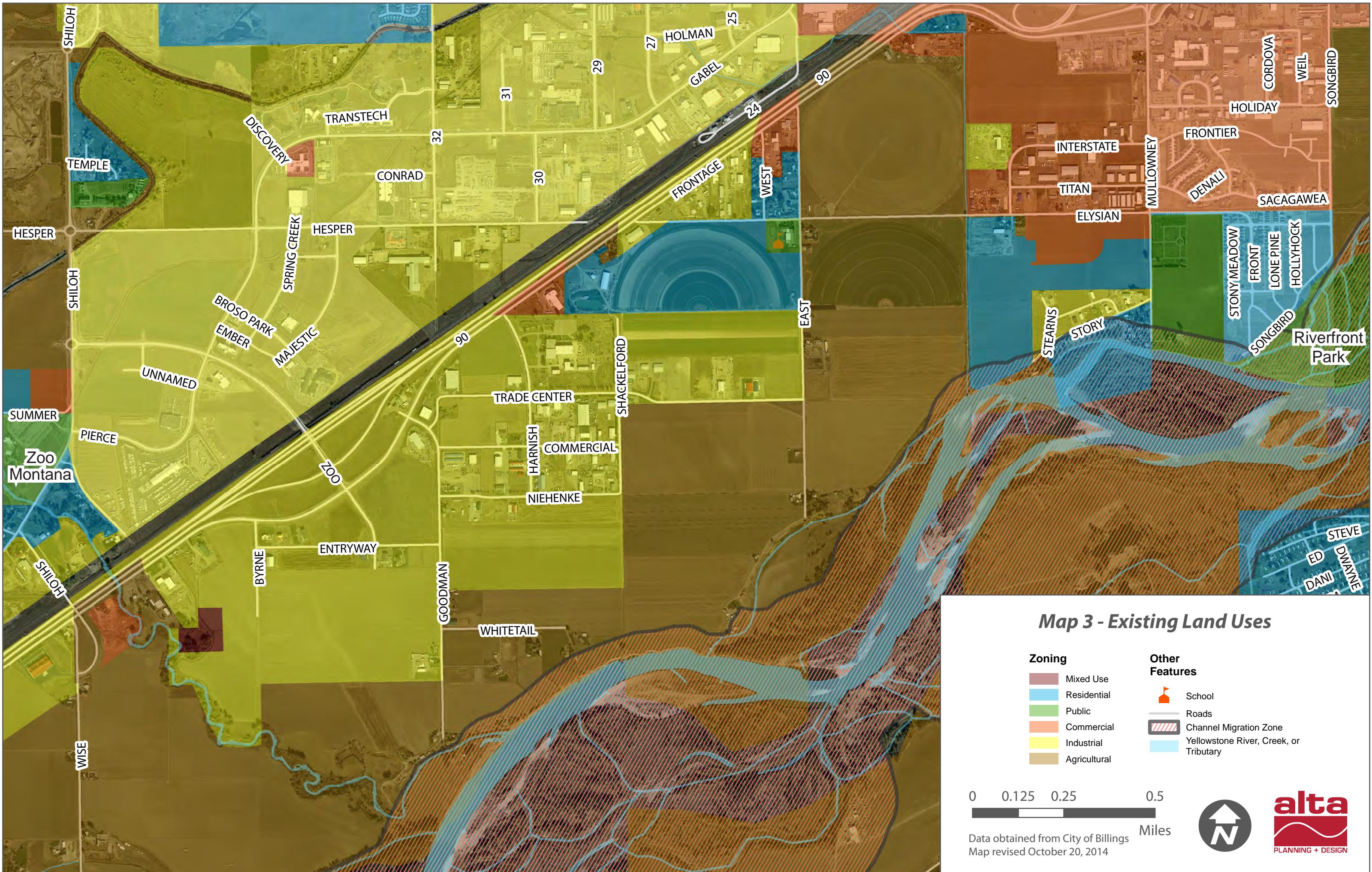
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Traffic

Traffic data in the form of Average Daily Traffic (ADT) volumes is available for some of the roads within the study area for the period of 2010-2013. Counts area available on Zoo Drive, the Frontage Road just west of Mullowney Lane and on Mullowney Lane south of the Frontage Road. No traffic counts appear to be available on Elysian Road.

Table 1
Traffic Volumes on
Study Area Roadways

Location	2010	2013
Zoo Drive just north of I-90	9000	9000
South Frontage Road at Mullowney Lane	4480	5000
Mullowney Lane just south of the Frontage Road	4150	5490

Traffic volumes are just one component of compatibility for bicycling and trail user comfort. Prevailing traffic speeds are a second key component. No speed studies are available within the study, however posted speed limits are typically representative of the 85th percentile speed at which only 15 percent of vehicles exceed this speed. The Frontage Road is posted at 55mph in most places reducing to 45mph approaching I-90 interchanges. Elysian Road is posted at 45mph, with a 35mph and 15 mph school speed zone in front of Elysian School. Mullowney Lane is not posted. Zoo Drive is posted at 45mph. Generally, bicyclists and pedestrians lose comfort when speeds exceed 35mph and require greater trail separation from passing vehicular traffic to regain comfort.

Flooding and the Yellowstone River

The Yellowstone River is ever changing. Portions of the north bank are at risk of flooding and ultimately of being incorporated into the channel as it migrates over time. Aerial photographs are available beginning in 1940 to the present day that illustrate how dramatic the changes are along the banks of the Yellowstone River. One of the biggest floods occurred in 1997, which nearly inundated many of the river islands and low lying bank areas. During peak flows in 2011 and 2014 existing natural surface trails on Norm's Island and Riverfront Park were washed away.

From field analysis and analysis of the Yellowstone River Channel Migration Zone, it is likely not advisable to pursue trail alignment alternatives that utilize existing islands within the current channel. Any trail alignment utilizing these islands would necessitate long bridge structures and would continually be at risk for being washed away during periods of high spring runoff. Whether or not an island is owned by the State or a private individual depends on how the island was formed. For example, if an island is formed by the river bed, the State owns it. But if the river cuts a new channel and the island land is cut off from the main land, then the property owner still owns it. Several of the islands just to the west of Riverfront Park are owned privately.

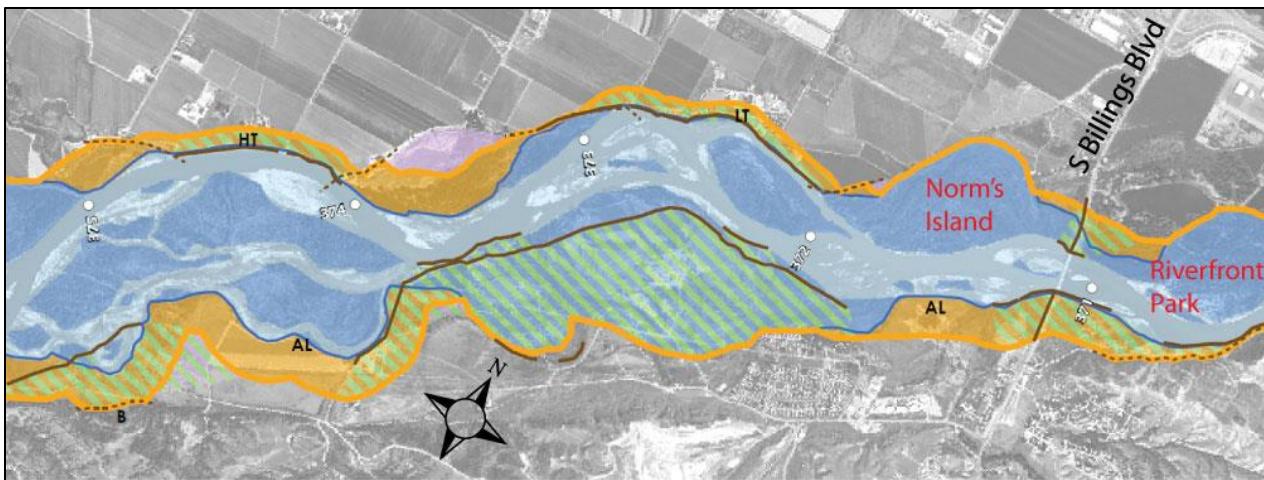


Exhibit 2
 100-year migration corridor of the Yellowstone River shows the volatility of the riverbank

(Source: Yellowstone River Conservation District Council)

- 2001 Channel
- Historic Migration Zone (1950-2001)
- Avulsion Potential Zone *area with relic channel remnants prone to reactivation*
- Restricted Migration Area *area of CMZ or avulsion zones isolated by bank and floodplain protection features*
- Composite CMZ *area encompassing 1950-2001 channel, and erosion buffer*
- Bank Protection, Dikes and Transportation Encroachments

Links/Connections

The study area has seen increasing development pressure in recent years. A trail connecting ZooMontana to Riverfront Park would have substantial local value to residents and employment centers throughout the study area. Linkages to the Shiloh Road Trail and other connections provide additional benefits and trip generation. Elysian School also is a key focal point within the corridor. If the school were connected by trail to nearby subdivisions and residences, students would have the option of walking and bicycling to school where it is currently unsafe to do so. Students living in the Josephine Crossing and Riverfront Point subdivisions are currently bussed to Elysian School despite the distance being just over one mile. Hotels located off of Zoo Drive would also gain an important amenity for guests through nearby access to the trail.

Impacts and Benefits to Adjacent Land Uses

The trail's impacts and benefits to adjacent land uses will vary depending on the preferred alignments. Impacts may include, but are not limited to trail easements, trail segments paralleling existing roadways combined with intersection improvements, voluntary purchase of private property for the trail or other parkland dedication. The trail could even be incorporated into future residential

development as an integral amenity that would make purchasing lots by the public more attractive. Proximity to trails has shown a positive correlation with property value in communities across the United States.

Environmental and Social Benefits

The development of a trail connecting ZooMontana to Riverfront Park will bring significant environmental and social benefits to the community, including:

- Giving the community direct access to nature and vistas along the Yellowstone River
- Increasing multi-modal transportation options
- Providing opportunities for outdoor active recreation (such as walking and biking), leading to increased public health
- The potential for providing safe routes to Elysian School
- The potential for improving riparian habitat when completing any needed restoration work adjacent to the trail

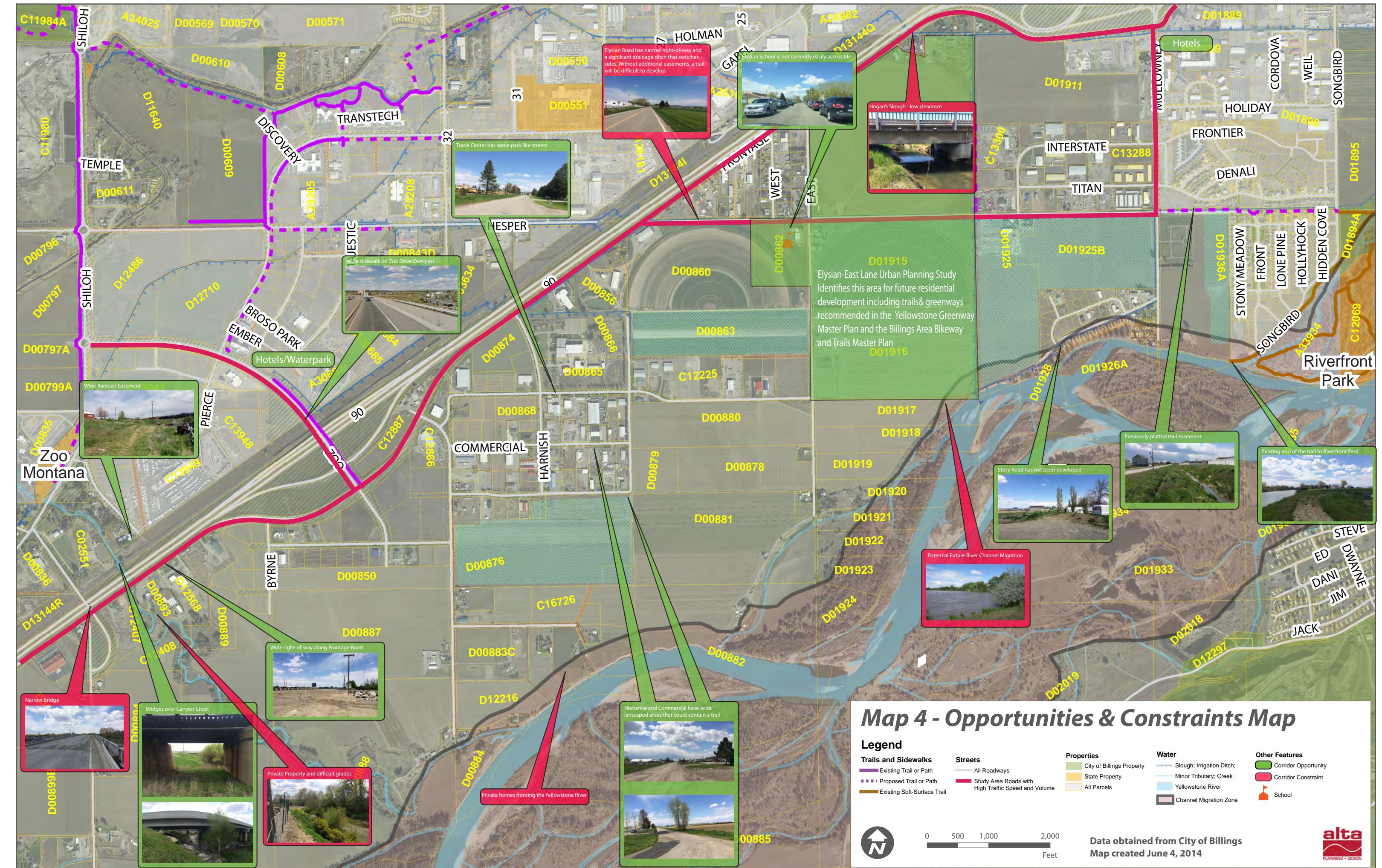
Field Visit

On May 13, 2014 the Project Oversight Committee met to kick-off the initiation of major work with the trail feasibility study by verifying base maps and discussing features of the corridor. Following the meeting, the project team performed a field visit within the study area to confirm project opportunities and constraints.

Opportunities and Constraints

Map 4 illustrates opportunities and constraints associated with the development of a continuous greenway trail between ZooMontana and Riverfront Park in Billings.

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Public Outreach

Chapter 2 noted that there are potential trail alignments within existing public rights-of-way and also substantial opportunities to improve the trail experience by gaining access to existing private property. This could range from acquiring a narrow easement along a property edge, to a trail being fully integrated into a future development project over existing vacant land. This chapter details how the public and private property owners were involved in the ZooMontana to Riverfront Park Trail Feasibility Study by the Project team and the City of Billings/Yellowstone County to achieve transparency in the planning process. The Public Outreach Plan approved by the Project Oversight Committee can be found in Appendix A.

First Public Open House

A public meeting was held on June 18, 2014 at the Audubon Center at 7026 South Billings Boulevard from 4 to 7pm. Approximately 15 members of the public attended with various other attendees representing the City/County and members of the POC. Representatives from four major landowners attended and the project team was able to discuss the potential for trail alignments through the study area. Two residential landowners expressed that a trail alignment through their property along the riverfront would not be supported. One landowner expressed doubt that the northern riverbank would remain stable enough to support a trail for too much longer. Attendees participated in a mapping exercise to explore trail alignments along the corridor. All of the meeting attendees were supportive of development of a trail between ZooMontana and Riverfront Park.

Exhibit 3

Attendees offering ideas for trail alignment alternatives in June 2014



Second Public Open House

A second public open house was held September 24th, 2014 from 4:30 to 6:30 pm at the Elysian School Gym. The purpose of the meeting was to showcase the draft trail alignment alternatives and the ranking process used to evaluate them. This meeting was well attended with more than 60 members of the public in attendance including multiple landowners within the study area. The Public Draft ZooMontana to Riverfront Trail Feasibility Study was available on the Billings MPO's website for download and review and comments were accepted on the draft document until October 1st, 2014.

Attendees were invited to submit comments on cards and verbally to the project team during the open house. Several landowners who own homes and active farmland adjacent or near to the Yellowstone River provided comments that they were not in support of a trail along or through their property. These sentiments were valuable and several of these segments were ultimately reduced in scoring due to landowner sentiment being known with regard to the available right-of-way criterion in the segment evaluation process. There were many positive comments about the project and the Canyon Creek potential alignments.

Exhibit 4

Public Open House
attendees in September
2014



Trail Alignment Options

This section describes the ZooMontana to Riverfront Park trail segment options and the evaluation framework used to determine feasibility.

Segment Options

The Project Team developed four potential trail “segment reaches” based on field visits, background documents and data research, property ownership research, stakeholder outreach, comments received at the first public meeting, and input from the POC. These segments are designated reaches “A” through “D” and incorporate a variety of routing options for linking ZooMontana to Riverfront Park. Map 5 depicts the segment options for the trail. Some of the segments depicted in this analysis are contingent on obtaining landowner consent to develop a trail, as such, alignment options over private property are not depicted unless landowner consent was obtained during the outreach process. It should be noted that segments are terminated whenever they meet another segment. This supports the segment evaluation framework and allows comparisons between multiple trail routing portions that are interdependent, thus enabling a broader, holistic comparison of segment options against one another.

Reach A

This trail reach is defined by the study area’s western extent and considers trail alignment alternatives stemming from the existing trail along Shiloh Road or from the trail’s termination at ZooMontana. This trail reach only covers alignment options to get from the origin point across Interstate 90 and the Railroad.

Reach B

This trail reach begins on the south side of I-90 and traverses along two general corridors including the South Frontage Road and Canyon Creek. This is a transitional reach that connects the trail to the industrial zone of Reach C.

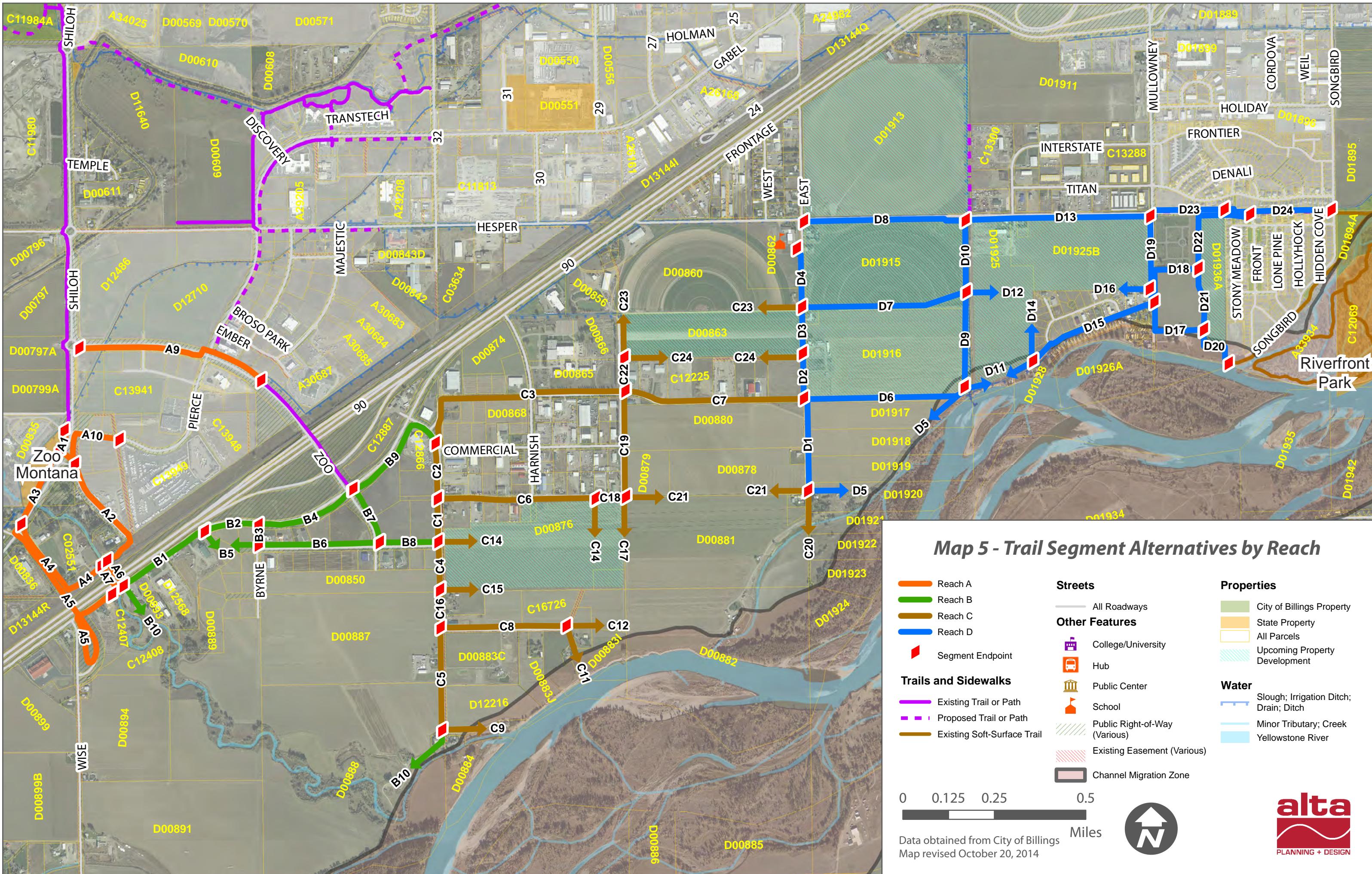
Reach C

Segments within Reach C are defined between Goodman Road and East Lane. Within this area the land use is predominantly industrial subdivisions with at least two undeveloped parcels that will likely develop in the same manner. On the south there are residential rural land uses near the Yellowstone River.

Reach D

Segments within Reach D fall between East Lane and Riverfront Park. Several of the larger vacant parcels are in various stages of planning for development. Development in this area is a mix of residential and commercial/industrial and this trend will likely continue with the majority of the parcels being residential. There are significant opportunities within this reach due to the timeliness of concurrent land development planning.

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Segment Evaluation

The segments presented in Maps 1 and 2 provide an overview of various alignment options for routing a continuous greenway trail, or trail and on-road connection between ZooMontana and Riverfront Park. Based on an understanding of the study area constraints and existing conditions and the values of the Project Oversight Committee, scoring criteria were developed to evaluate these segments. The following evaluation criteria and scoring descriptions were developed:

- **Opinion of User Comfort**
Evaluate segments based on the user experience. A trail installed immediately adjacent or connected to a high-speed roadway will not be as comfortable or well used as a more scenic separated trail away from traffic.
- **Access to and Appreciation for Nature**
Evaluate segment's abilities to provide a positive user experience, including riparian and riverfront trail experiences that reflects the need for access to the trail as a destination.
- **Major Structures**
A segment that requires expensive construction or reconstruction of existing infrastructure may be more difficult to implement than alternatives that do not.
- **Economic Development**
Includes a segment's proximity to tourist facilities such as hotels, restaurants, attractions, etc.
- **Right-of-way availability**
Alignment segments where existing public right of way, existing land use, easements or other provisions can be made will result in a more feasible option. Other scenarios include a segment that crosses parcels slated for near term development or on parcels with property owner support. Finally areas with landowner opposition to a trail must be factored into the scoring.
- **Trail Isolation**
Maintain a balance where the trail is scenic and comfortable must be weighed against one that is isolated and lacks visibility to adjacent landowners and passersby.
- **Land Use**
Evaluates the type of land use that the trail will be passing through. Industrial uses are less pleasant than agricultural, residential and park/open space settings.
- **Environmental Compatibility**
General feasibility with regard to a segment's ability to pass NEPA, and overcome potential erosion issues such as segments within stream channels or along the Yellowstone River.

The POC participated in an exercise to weight three of the criteria higher than the others to reflect the priorities of the group. User comfort was weighted the highest at a factor of 3, with Economics and Right-of-Way also receiving weights of 2. The weighting and scoring framework is presented below in Table 2.

Table 2 Trail Segment Scoring Framework

Criterion	Weight	Points	Description
Opinion of User Comfort Along Facility	3	3 2 1	Trail segment offers completely separated experience Trail segment offers separated facility along a minor or low traffic street, or has significant separation along a major street or highway Trail segment offers separated facility along a major street or highway
Access to and Appreciation for Nature	1	3 2 1 0	Trail segment provides fullest user experience Trail segment provides some views, scenic quality or wildlife viewing Trail segment provides limited views, scenic quality or wildlife viewing Trail segment provides no natural experience
Major Structures (Bridges, Underpasses, etc.)	1	3 2 1	Trail segment does not require any significant new structures Trail requires moderate new structures Trail segment may require major modification to or new structures.
Economic Development	2	3 2 1	Trail segment facilitates direct connection to an economic generator (hotel, restaurant, etc.) Trail segment has peripheral connection to an economic generator Trail segment has minimal connective value to an economic generator
Right-of-Way Availability	2	3 2 1 0	Trail segment is within Publicly controlled right-of-way Trail passes through property slated for near term development or property owner had expressed verbal or written support for trail Trail segment would pass through private property, owners have not been active in this planning process Trail segment is in an area that one or more property owners have opposed the idea during this planning process
Trail Isolation	1	3 2 1	Trail segment will be visible to area residents, passing vehicles and others Trail segment will have limited visibility to adjacent land uses and residents Trail segment is in remote area with little observation beyond other trail users
Land Use	1	3 2 1 0	Trail segment is in within or adjacent to parkland or open space Trail segment is within or adjacent a residential area Trail segment is within or adjacent to agricultural operations Trail segment is within or adjacent to industrial uses
Environmental Compatibility	1	3 2 1 0	Trail segment has minimal environmental issues Trail segment may have localized environmental issues Tail segment is susceptible to flooding/inundation and other maintenance concerns Trail segment is proposed in an area that has experienced flooding or other environmental issues.

Following the establishment of the scoring framework, the project team evaluated each trail alignment alternative. Trail segments adjacent to or overlapping land that is expected to be developed was rated with the future land-use in mind. If a trail segment is between two land uses or is otherwise similarly divided between two point totals, half a point was awarded. The results are depicted in Appendix A. A colorized representation of the total score was created using the following framework:

Green = 76percent of total points and above

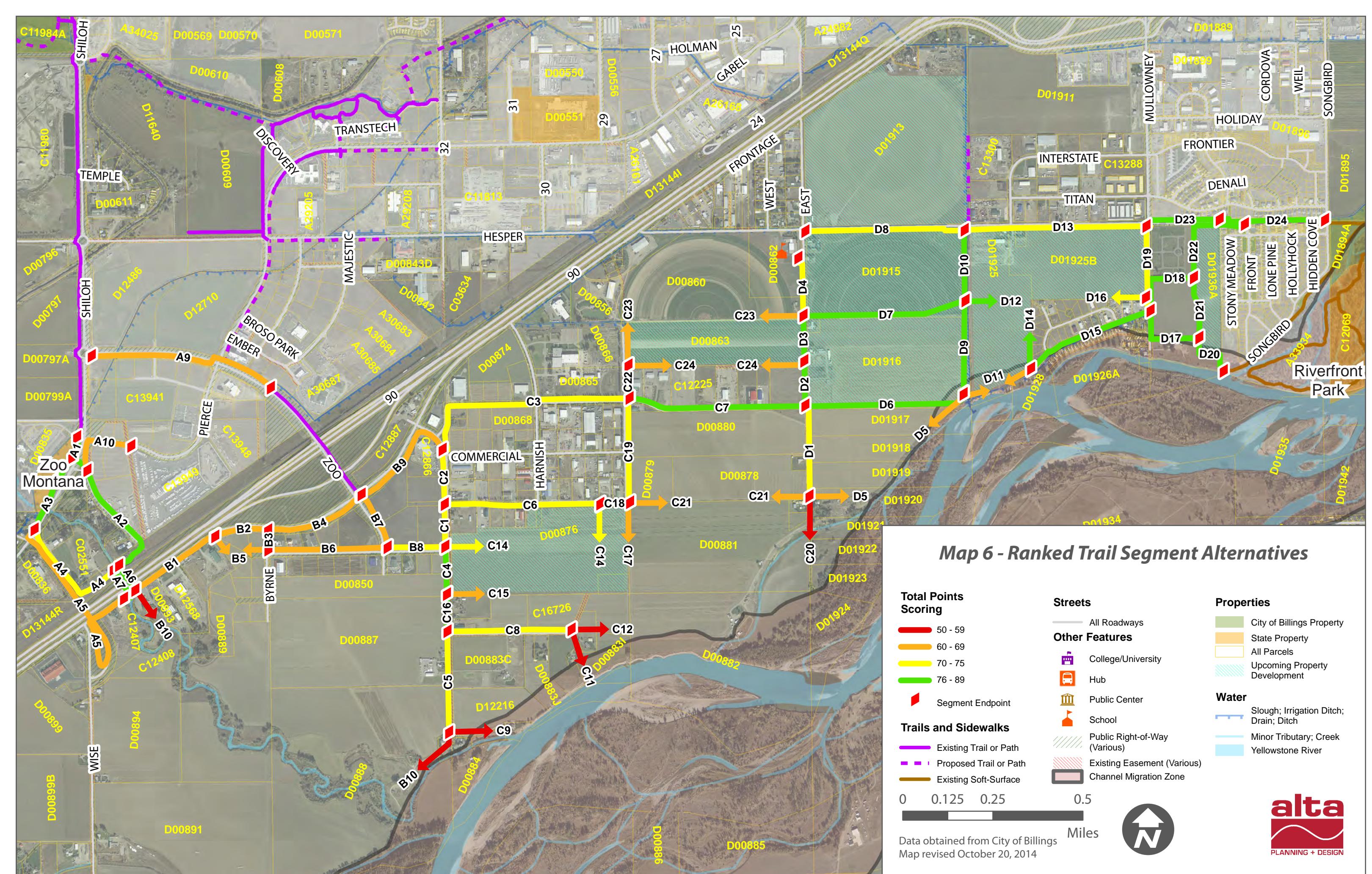
Yellow = 71-75 percent

Orange = 60-70 percent

Red = below 60 percent

Map 6 visually depicts the results of the segment evaluation, and Appendix A depicts the scoring assigned to each individual trail segment according to the framework listed in Table 2.

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Action Strategy

This section provides the City/County with a recommended strategy for applying the results of the evaluation framework and evaluation results. This trail feasibility study is occurring at a time just prior to a significant amount of future land development. As such, the number of potential segment alternatives, and ultimately the number of ways to piece together a successful trail is numerous. As such, there is no single preferred trail alignment. The City/County will need to stay involved in development applications as they arise and piece together the best possible alignment according to the feasibility ranking provided in the previous section. The following strategies provide direction to developing the trail and should be utilized by the City/County over time to create a continuous trail connection between ZooMontana and Riverfront Park.

Reach A

From the analysis, the preferred alternative is to utilize the Canyon Creek alignment (segment A6 specifically), however to maximize overall connectivity and create economic links to the hotels and waterpark additional trail should be created along Zoo Drive to connect to the existing wide sidewalk. At this time the Old Shiloh Bridge should be considered the least favorable alternative.

Actions:

- Open negotiations with Montana Rail Link (MRL)/Burlington Northern Santa Fe (BNSF) to acquire access to wide right-of-way along northern side of railroad tracks to access Canyon Creek from Southeast Shiloh Road. If negotiations are unsuccessful, seek trail easement from owners of parcel C02553A along south property line. This alternative will result in the trail passing beneath two elevated ExxonMobil pipelines rather than crossing over them in a buried state. Trail fencing will likely be required to keep trail users away from the railroad tracks and other utilities that share the right-of-way.
- Study engineering feasibility of a trail underpass beneath Shiloh Road just south of Pierce Parkway, as an alternative, study feasibility of installing either a full traffic signal or roundabout at Pierce Parkway and Shiloh Road to facilitate an at-grade trail crossing.
- Open discussions with MDT about constructing a retaining wall and trail structure beneath the I-90 and Frontage Road bridges (see Exhibits 5 and 6) and a ramp system to regain grade to the south side of the Frontage Road.
- The City owned parkland to the southeast of the ZooMontana parking lot could be developed as a trailhead parking area and provide overflow parking for Zoo events if necessary.

Exhibit 5

Conceptual cross-section of I-90 bridge with future trail

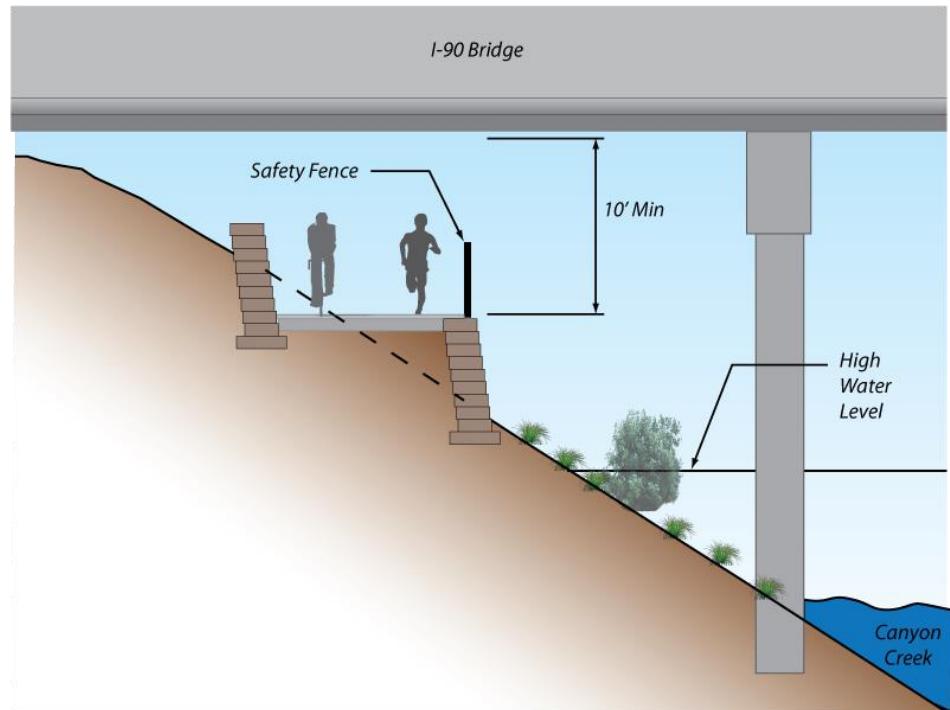


Exhibit 6

Conceptual rendering of I-90 bridge with future trail

Reach B

Reach B is characterized by essentially two choices. Approach the Yellowstone River roughly paralleling Canyon Creek, or utilize the South Frontage Road right-of-way to reach the industrial subdivisions off of Entryway Drive. Due to the multiple property owners (including the largest one who expressed opposition to a trail along this alignment) it is not recommended that a trail be developed along the Canyon Creek alignment at this time.

Actions:

- Work with MDT to identify a conceptual trail alignment within the I-90 South Frontage Road corridor. The right-of-way available on the southern side of the Frontage Road is substantial, ranging from approximately 20 to 60 feet. The number of existing driveways are minimal. It should be possible to achieve a high degree of separation to mitigate the high speed and noise generated on the Frontage Road itself. Utility location including buried utilities should be researched. It may be undesirable to cover certain types of utilities that may need to be accessed or repaired over time. See Exhibits 7 and 8 for a conceptual cross-sections.
- As industrial lots develop along Entryway Drive the plan review process should ensure that landscaping and other obstructions to a possible trail along Entryway Drive do not interfere with a future trail. The street right-of-way is approximately 80 feet wide and there is approximately 22 feet of public space on each side of the street. Any future trail should maximize separation from the roadway, also maximizing the landscaped buffer space. As development applications are reviewed, access management techniques are encouraged to reduce the number of driveways the trail will ultimately cross.
- Much of the ultimate alignment for Reach B will depend on the best feasible alternatives of Reach C. The City/County should only implement this reach either concurrently with Reach C, or after an alignment for Reach C is finalized.

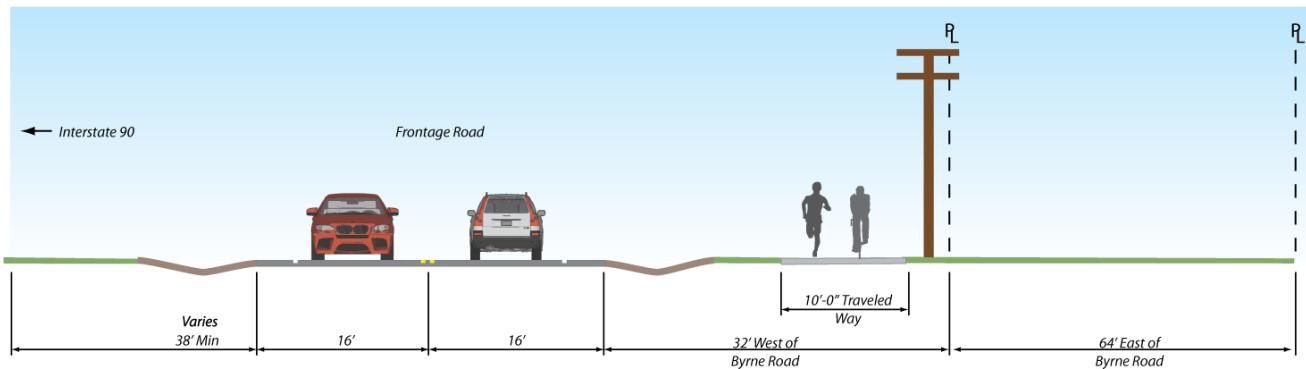


Exhibit 7

Conceptual cross-section of trail adjacent to Frontage Road



Exhibit 8

Conceptual rendering of trail adjacent to Frontage Road

Reach C

Industrial subdivisions comprise nearly all of Reach C. The southern alignments near the Yellowstone River frontage are not recommended for development at this time due to landowner opposition in several parcels as well as likely alignments being within the Yellowstone River channel migration zone. This section of the river has the north bank as the outside edge of a bend which has resulted in observed bank erosion and an uncertain future. Landowners that the project team spoke with told of the recent changes to the riverbank.

Actions:

- Work with upcoming development to integrate trail alignments away from roadways if possible. Within the industrial subdivisions, parcel D00876 has submitted a preliminary plat for additional lots and roads, parcel D00863 has also undergone planning for development. D00876 presents an opportunity to provide a higher quality connection from Entryway Drive to Shackleford Lane. Segments C6, C18, C14, C15 and C17 all have potential for improved experiences if the trail can be better integrated into the subdivision layout.
- There are multiple potential east-west alignments within Reach C. Neihenke Road and Trade Center Avenues are favored among the existing public rights-of-way. Trade Center Avenue may present the most direct connection to Reach D.

- Reach D will inform which alignments are the most ideal for both Reach B and C.
- Elysian School could serve as a trailhead. A joint-use agreement could be created between the School District and the County to provide this facility outside of school hours.

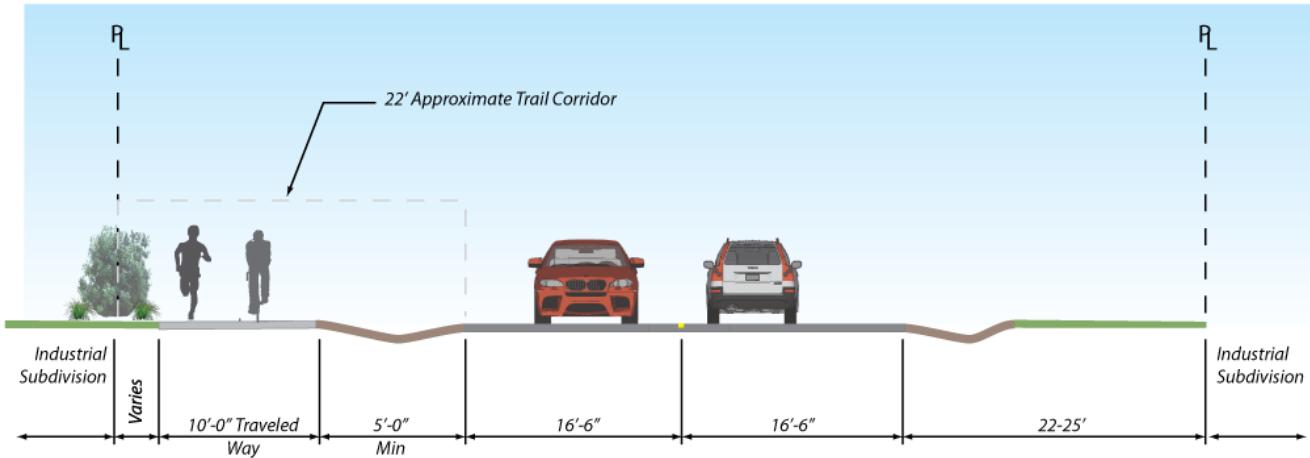


Exhibit 9

Conceptual cross-section of trail adjacent to industrial subdivision streets

Reach D

Reach D is perhaps the most influential of the four reaches and could provide an excellent trail experience as well as intra and inter-residential linkages. There are two large residential and industrial subdivisions that are currently in the planning stages and may be developed in the coming years.

- The developers of Parcels D01915 and D01916 are supportive of the trail and have expressed a willingness to work one or more alignments through their property (the Elysian-East Lane Urban Planning Study reviewed previously). The City/County should partner with the developers and take a proactive stance on integrating trail alignments. Ideally all three east-west alignments would be implemented to not only provide a basis for the overall ZooMontana to Riverfront Park trail, but to strengthen community connections. If possible routing the trail alignment along parks, drainage ditches or other utility easements will create the best trail user experience. The minimum trail corridor should be 20 feet in constrained areas. Exhibit 10 depicts minimum and desirable trail corridors through new subdivisions.
- A trail linking existing and future residential to Elysian School is a key objective of this study and should be highly prioritized.
- The owner of parcels D01925 and D01925B has not been consulted (though several attempts were made) during this trail feasibility study, however, based on a preliminary plat application, all proposed alignment alternatives should be feasible with minor changes to the plat. There is a park proposed along the Yellowstone River that a trail would integrate will within. The

City/County should make every effort to engage this property owner and integrate trail easements into the future development.

- The City/County should consider abandoning the middle section of Story Road along alignment D15 and make it a trail corridor only. The trail can then occupy the southern side of the street right-of-way where it would serve vehicles. The middle section does not serve any of the existing industrial lots and is redundant to the site circulation.
- Two representatives of the Holy Cross Cemetery met with the project team during the first public workshop and indicated that they would be open to several potential trail alignments on church property if trespassing opportunities could be mitigated. The City/County should work with the Great Falls Catholic Diocese and the developers on both sides of the cemetery to arrive at a mutually agreeable alignment as the Cemetery alignment will depend heavily on connections through other private lands on both sides. Exhibit 12 depicts a conceptual trail traversing the Cemetery Property.
- The Josephine Crossing village center could serve as an informal trailhead as there is good access and it forms a natural node along the trail with the future coffee shop and nearby bed and breakfast.

Exhibit 10
Recommended trail
corridor through new
residential and industrial
subdivisions

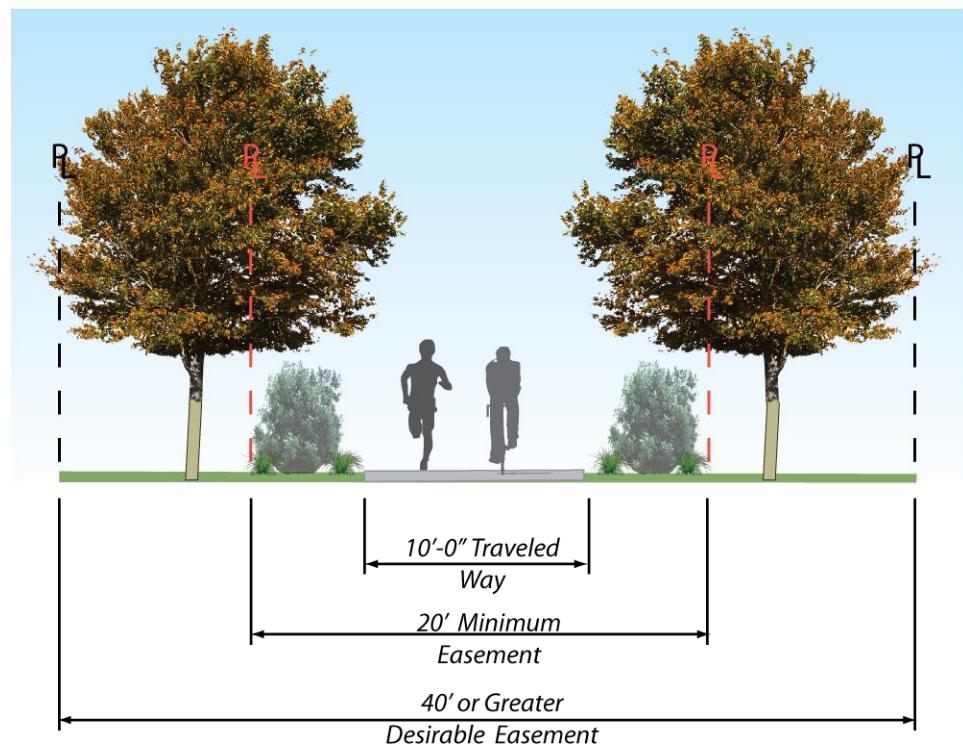


Exhibit 11

Conceptual trail along Elysian Road as part of Reach D. Five foot separation shown which is minimum per AASHTO, greater separation will increase comfort

**Exhibit 12**

Conceptual trail along Mollowney Lane and turning east towards Josephine's Crossing



Potential Preferred Alignments

As previously stated, at the time of publication of this feasibility study, it is impossible to predict the timing and scale of future development along the corridor. These future industrial and residential subdivisions contain opportunities for well planned, attractive and high quality trail connections. The exact routing of these connections cannot currently be predicted as they will need to integrate with the locations of future parcels, local roads, parks, drainage features and ditches, etc.

Regardless, it is still a useful exercise to run through three scenarios of a potential alignment from ZooMontana to Riverfront Park using the known elements and considerations from the field work and public involvement with some of the unknowns of private land development. Three preferred alignment scenarios were established by combining individual trail segment alternatives. These were classified by the following methodology:

Ideal Route

This route combines existing public right-of-way with trail segment alternatives over some private property, most of which was engaged during the planning process. It is possible a small number of the proposed segment alternatives may not ultimately be feasible, however, this route should be considered a high priority for the City/County to pursue.

Segments:

A1, A2, A6, B1, B5, B6, B8, C14, C18, C21, D1, D2, D3, D4, D5, D11, D15, D17, D20

Probable Route

This route is similar to the Ideal Route, however it involves private property only where the planning team has had positive and documented interactions with landowners and developers. This route still requires several key parcels to develop and the trail be integrated within those subdivisions and as such will still be dependent on private development to create a continuous route between ZooMontana and Riverfront Park.

Segments:

A1, A2, A6, B1, B2, B3, B6, B8, C1, C6, C7, C14, C18, C19, D2, D3, D4, D6, D11, D15, D17, D20

Doable Now Route

This route could be developed at any time and lays entirely within existing public right-of-way or Montana Rail Link/Burlington Northern & Santa Fe property. This route will result in nearly the entire trail route being implemented immediately adjacent to existing roadways. This will degrade the user experience and limit the overall potential to the corridor. It is not recommended that the City/County implement this route unless access through some or all of the private property becomes untenable.

Segments:

Cost Estimate

Right-of-Way Acquisition Costs

If land donations cannot be obtained, easements and parcels will be required to construct the ZooMontana to Riverfront Park trail must be obtained from the property owners in fee. This cost will vary widely depending upon existing land use, size, and utility of the acquired portion of a parcel, development potential of the area, and a host of other factors.

In addition to the payments to property owners, the services of a licensed surveyor will be needed during the ROW acquisition process. The survey firm will perform boundary surveys and prepare easement maps that must be recorded in the county's land records. These services typically cost \$3,000 to \$4,000 per easement. (Note: this range assumes that easement maps are prepared after survey base maps of the proposed corridor are developed.)

Finally, legal services will be needed to perform the property transactions. A relatively simple easement transaction will typically cost on the order of \$1,500 per transaction if performed by an outside counsel.

Engineering Costs

Engineering costs cover a variety of professional services, including:

- Survey (including preparation of easement maps as described above)
- Wetland Delineation
- Preliminary, Semi-Final and Final Design
- Permitting (local, state and federal as required)
- Preparation of Construction Documents
- Bid Assistance
- Construction Observation and Contract Administration

Based upon similar project experience and the proposed greenway trail features, the engineering costs for the trail are expected to range between twenty five and thirty percent of the total construction cost. However, the actual cost of these services will vary widely depending on the length of the project and project phasing. To a large extent, the costs of permitting, preparing bid documents and administering the construction for a single phase is the same as the cost for the entire project. Similarly, survey and design are more cost effective if done at one time. For this reason, significant cost savings can be realized by developing larger portions corridor as a single project.

Construction Costs

This section includes preliminary estimates of construction costs based upon the recommended greenway alignment described in this report. Important assumptions used to arrive at these estimates include:

- All costs are in 2014 dollars
- Costs do not include property acquisition
- Standard construction methods and materials are used
- A concrete trail section is assumed as most historical sources of funding for trails in Billings require paved trail surfacing. Natural surface trails are estimated to average 60% of the cost of a paved trail.

In developing these cost estimates, we have relied upon our experience with similar greenway projects to select the construction materials with the best life-cycle cost and performance characteristics. Each trail segment alternative has an estimated range with a lower and higher potential cost.

Table 3 provides a summary of estimated construction costs only for each of the recommended potential preferred alignments. Engineering, construction contingency, mobilization and right-of-way acquisition are not included in these costs. Depending on which general preferred alignment is ultimately implemented, substantial portions of the route could be constructed as part of residential and commercial subdivisions. This amount is identified for reference. A more detailed cost estimate (by segment) is provided in Appendix C. Interestingly the cost of each potential preferred alignment does not vary by a significant amount. In fact, the likely costs that would need to be covered through the City/County are nearly identical regardless of which potential preferred alignment is chosen.

Table 3
Cost estimate
summary

	Total Cost		Public Cost*	
	Low	High	Low	High
Ideal Route	\$2.53 M	\$2.91 M	\$1.87 M	\$2.14 M
Probably Route	\$2.75 M	\$3.17 M	\$1.90 M	\$2.17 M
Doable Now Route	\$2.41 M	\$2.72 M	\$1.87 M	\$2.14 M

*Trail segments that could be implemented as part of new development are omitted.

Since these preliminary estimates are based on a planning-level understanding of trail components, rather than on a detailed design, they should be considered as “Order of Magnitude”. American Society for Testing and Materials (ASTM) Standard E2620 defines Order of Magnitude as being accurate to within plus 50% or minus 30%. This broad range of potential costs is appropriate given the level of uncertainty in the design at this point in the process. Many factors can affect final construction costs, including:

- Final construction phasing
- Revisions to the design as required by local, state and federal permitting agencies
- Additional requirements imposed by property owners as a condition of granting property rights (e.g., fencing, vegetated buffers, etc.)

- Fluctuations in commodity prices during the design and permitting processes
- Selected construction materials
- Type and quantity of amenities (e.g., benches, lighting, bike racks, etc.)
- Extent of landscaping desired
- Availability of donated materials and volunteer labor

As the project progresses through preliminary, semi-final and final design phases, these uncertainties begin to diminish. With each round of refinement and range of expected construction costs will become more accurately known.

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Appendix A – Segment Evaluation Results

Segment	Opinion of User Comfort Along Facility			Economic Development			Land Use			Score Total	Total Points
	Major Structures (Bridges, underpasses etc)	Access to and Appreciation for Nature	Opinion of User Comfort Along Facility	Right-of-Way Availability	Trail Isolation	Environmental Compatibility					
Weight	3	1	1	2	2	1	1	1			
A1	2	1	3	3	3	3	3	3	31	86%	
A2	2	1	2	3	3	3	2	3	29	81%	
A3	2	1	2	3	3	3	3	2	29	81%	
A4	3	2	3	3	1	2	1	2	27	75%	
A5	2	0	1	3	3	3	0	3	25	69%	
A6	3	3	2	3	2	1	3	1	29	81%	
A7	3	3	2	3	2	1	3	1	29	81%	
A8	1	3	1	3	3	3	0	2	24	67%	
A9	1	0	3	3	3	3	0	3	24	67%	
A10	1	0	3	3	3	3	0	3	24	67%	
B1	1	0	3	3	3	3	0	3	24	67%	
B2	1	0	3	3	3	3	0	3	24	67%	
B3	2	0	3	3	3	3	0	3	27	75%	
B4	1	0	3	3	3	3	0	3	24	67%	
B5	3	0	3	3	1	2	0	3	25	69%	
B6	2	0	3	2	3	3	0	3	25	69%	
B7	1	0	3	3	3	3	0	3	24	67%	
B8	2	0	3	3	3	3	0	3	27	75%	
B9	1	0	3	3	3	3	0	3	24	67%	
B10	3	3	2	2	0	1	1	1	21	58%	
C1	2	0	3	3	3	3	0	3	27	75%	
C2	2	0	3	3	3	3	0	3	27	75%	
C3	2	0	3	3	3	3	0	3	27	75%	
C4	2	1	3	3	3	3	0	3	28	78%	
C5	2	2	3	1	3	3	1	3	26	72%	
C6	2	0	3	3	3	3	0	3	27	75%	
C7	2	1	3	3	3	3	1.5	3	29.5	82%	
C8	2	2	3	1	3	3	2	3	27	75%	
C9	3	3	2	1	1	2	1	0	21	58%	
C10	3	3	3	1	0	2	1	3	23	64%	
C11	2	2	3	1	0	2	2	3	20	56%	
C12	3	2	3	1	0	0	1	3	20	56%	

Segment	Opinion of User Comfort Along Facility	Access to and Appreciation for Nature	Major Structures (Bridges, underpasses etc)	Economic Development	Right-of-Way Availability	Trail Isolation	Land Use	Environmental Compatibility	Score Total	Total Points
Weight	3	1	1	2	2	1	1	1		
C13	3	3	3	1	0	2	1	3	23	64%
C14	2	0	3	3	3	3	0	3	27	75%
C15	3	1	3	2	1	2	1	3	25	69%
C16	2	1	3	3	3	3	0.5	3	28.5	79%
C17	3	1	1	2	1	2	1	3	23	64%
C18	2	0	3	3	3	3	0	3	27	75%
C19	2	1	3	2	3	3	1	3	27	75%
C20	3	3	2	1	0	1	1	0	18	50%
C21	3	1	3	3	0	2	1	3	25	69%
C22	2	1	3	2	3	3	1	3	27	75%
C23	2.5	1	3	2	1	2	0.5	3	23	64%
C24	2.5	0	3	2	1.5	2	0	3	22.5	63%
C25	3	3	2	1	1	2	1	0	21	58%
D1	2	1	3	2	3	2	1	3	26	72%
D2	2	0	3	3	3	3	0.5	3	27.5	76%
D3	2	0	3	3	3	3	0.5	3	27.5	76%
D4	2	0	3	3	3	2	1	3	27	75%
D5	3	3	3	2	0	1	1	1	22	61%
D6	3	2	3	2	2	3	1.5	3	29.5	82%
D7	3	0	3	3	2	3	2	3	30	83%
D8	1.5	1	3	2	2.5	3	2	3	25.5	71%
D9	3	2	3	3	2	3	2	3	32	89%
D10	3	2	3	3	2	3	2	3	32	89%
D11	2.5	3	2	2	1	3	2	1	24.5	68%
D12	3	1	2	3	1	3	2	3	28	78%
D13	2	0	2	3	2	3	1.5	3	25.5	71%
D14	3	1	3	3	1	3	1.5	3	28.5	79%
D15	2	2	3	3	3	2	1.5	3	29.5	82%
D16	3	0	3	3	1	2	1	3	26	72%
D17	2.5	2	3	3	2	2	2	3	29.5	82%
D18	2.5	2	3	3	2	2	2	3	29.5	82%
D19	2	0	3	2	3	3	1	3	26	72%
D20	3	3	3	3	2	2	2	2	31	86%

Segment	Opinion of User Comfort Along Facility	Access to and Appreciation for Nature	Major Structures (Bridges, underpasses etc)	Economic Development	Right-of-Way Availability	Trail Isolation	Land Use	Environmental Compatibility	Score Total	Total Points
Weight	3	1	1	2	2	1	1	1		
D21	3	2	3	3	2	2	2	3	31	86%
D22	2.5	1	3	3	2.5	2.5	2	3	30	83%
D23	2	1	2	3	3	3	2	3	29	81%
D24	2.5	1	3	3	3	3	2	3	31.5	88%

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Appendix B- Public Outreach Plan

This document outlines the public involvement strategy for the ZooMontana to Riverfront Park Trail Feasibility Study. Its purpose is to identify outreach methods, participants, dates, formats, and purposes for each meeting. Information contained in this appendix is based on the approved scope of work, and notes taken during Project Oversight Committee Meetings (POC). This public outreach plan meets the guidelines set forth in the Yellowstone County Board of Planning Participation Plan.

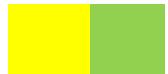
This public outreach approach was designed to accommodate multiple methods of public involvement and foster a spirit of cooperation among project stakeholders. The goal of this public involvement plan was to facilitate a shared vision of a trial corridor between ZooMontana and Riverfront Park. The project team has engaged the agencies, stakeholders, and the general public in many ways, including:

1. **Project Oversight Committee (POC) Meetings:** The project team was guided by the POC formed by City/County Staff. Key stakeholders from the City, Yellowstone County, MDT, BikeNET, YRPA and others were invited to participate. See the acknowledgements at the beginning of this document for the POC participants.
2. **First Meeting Series:** Input from the general public was gathered via a two pronged public workshop; This first part of the meeting (public workshop format) presented the project vision and the existing/conditions and opportunities/constraints along the corridor. See the main study document for a summary of this meeting. A portion of this event was also geared especially toward property owners within the corridor.
3. **Second Meeting Series:** A second public meeting (open house format) will be held near the end of the project to present the status of the project and the draft alignment opportunities.
4. **Stakeholder Publicity:** We encourage all participating stakeholders to publicize the status of the project and make the project as widely understood as possible. Alta has supplied weekly progress reports to the City/County, highlights of this information was sometimes passed along to others.
5. **Planning Board Meeting:** Alta Planning provided a project summary briefing at one Planning Board meeting at the appropriate times as determined by City/County staff.

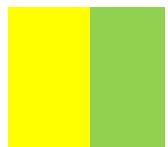
Appendix C- Cost Estimates by Segment

ID	Length	Cost (low)	Cost (high)	Ideal Route	Probable Route	Doable now
A1	307	\$ 24,600	\$ 29,200			
A2	2,113	\$ 569,100	\$ 600,800			
A3	1,198					
A4	1,786					
A5	3,749					
A6	507	\$ 88,200	\$ 95,800			
A7	708					
A8	206					
A9	2,812					
A10	1,059					
B1	1,412	\$ 113,000	\$ 134,200			
B2	796	\$ 63,700	\$ 75,700			
B3	292	\$ 23,400	\$ 27,800			
B4	1,455					
B5	854	\$ 68,400	\$ 81,200			
B6	1,721	\$ 137,700	\$ 163,500			
B7	880					
B8	847	\$ 67,800	\$ 80,500			
B9	1,750					

ID	Length	Cost (low)	Cost (high)	Ideal Route	Probable Route	Doable now
B10	7,659					
C1	619	\$ 49,600	\$ 58,900			
C2	872					
C3	3,390					
C4	671					
C5	1,469					
C6	2,291	\$ 183,300	\$ 217,700			
C7	2,604	\$ 208,400	\$ 247,400			
C8	1,818					
C9	2,300					
C10	269					
C11	696					
C12	875					
C13	621					
C14	2,795	\$ 223,600	\$ 265,600			
C15	2,611					
C16	543					
C17	1,274					
C18	422	\$ 33,800	\$ 40,100			
C19	1,520	\$ 121,600	\$ 144,400			
C20	4,476					



low to mid complexity

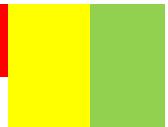


low to mid complexity

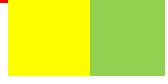
low to mid complexity



low to mid complexity



low to mid complexity



low to mid complexity

ID	Length	Cost (low)	Cost (high)	Ideal Route	Probable Route	Doable now
C21	2,626	\$ 210,100	\$ 249,500			
C22	477					
C23	3,209					
C24	2,576					
C25	668					
D1	1,304	\$ 104,400	\$ 123,900			
D2	616	\$ 49,300	\$ 58,600			
D3	696	\$ 55,700	\$ 66,200			
D4	932	\$ 74,600	\$ 88,600			
D5	2,968	\$ 237,500	\$ 282,000			
D6	2,336	\$ 186,900	\$ 222,000			
D7	2,368					
D8	2,334	\$ 186,800	\$ 221,800			
D9	1,331					
D10	1,015					
D11	1,071	\$ 160,700	\$ 176,800			
D12	949					
D13	2,729	\$ 259,300	\$ 300,200			
D14	1,019					
D15	1,978	\$ 158,300	\$ 188,000			
D16	1,696					

ID	Length	Cost (low)	Cost (high)	Ideal Route	Probable Route	Doable now
D17	1,133	\$ 90,700	\$ 107,700			
D18	1,065					
D19	1,187					
D20	794	\$ 63,600	\$ 75,500			
D21	899					
D22	1,511					
D23	1,010	\$ 96,000	\$ 111,100			
D24	1,584	\$ 126,800	\$ 150,500			

low to mid complexity may need fencing

low to mid complexity

mid to high complexity (ditch may need rerouting or to be piped in a culvert)
low to mid complexity (parking area needs to be reclaimed as trail easement - Alley is platted only)



--> Indicates segment could be developer funded