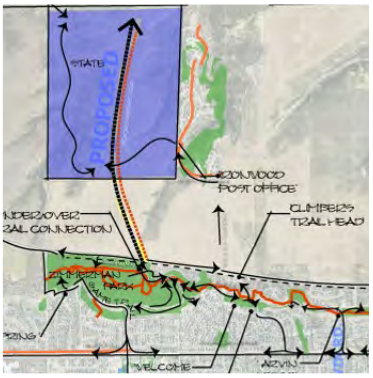
RIMROCKS TO VALLEY

BIKE|PED FEASIBILITY STUDY



BILLINGS - YELLOWSTONE COUNTY MPO METROPOLITAN PLANNING ORGANIZATION

DRAFT REPORT

APRIL 2016

SANDERSON STEWART

ACKNOWLEDGEMENTS

The Rimrocks to Valley Bike/Pedestrian Feasibility Study was conducted under the direction of the Project Oversight Committee, which included the members listed below. Along with the input of numerous community members, the guidance of the Project Oversight Committee has been essential to the success of this process and is very much appreciated.

Project Oversight Committee

Wyeth Friday, City-County Planning Division

Scott Walker, City-County Planning Division

Lora Mattox, City-County Planning Division

Jeffrey Butts, City-County Planning Division

Jared Le Fevre, Billings Chamber of Commerce

Jim Downs, Billings TrailNet

Mark Jarvis, City Parks & Recreation

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Katie Potts, MDT Planning

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INTRODUCTION

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The Billings Metropolitan Planning Organization (MPO) has identified the need to study the feasibility and to evaluate alternatives for the development of separated bicycle and pedestrian facilities from Highway 3 atop the Rimrocks to existing bicycle and pedestrian facilities below. The Rimrocks are a geological sandstone formation that form an approximately 300-foot high cliff that frames the north side of Billings, Montana. The study area for the feasibility study is bound by Highway 3 on the north, Rimrock Road on the south, Zimmerman Trail on the west and North 27th Street on the east.

The following report summarizes the planning process that evaluated these bike and pedestrian route alternatives, including identification of the potential routes, recommended design features, and the public process that was conducted to gain valuable input on each of these items.

Study Area Description

One or more bike and pedestrian connections from the Rims to the Valley would provide neighborhood connectivity and access to both transportation commuters and recreational users. In addition, the City of Billings, with support and encouragement from Billings TrailNet and the Billings Chamber of Commerce Trails Committee, has been focused on the development of the Marathon Loop Trail in recent years. When all missing links are completed, this trail will form an approximately 26-mile loop around Billings with an almost entirely off-street trail system. This feasibility study evaluates alternatives for the portion of the loop that would create a connection from the top of the Rimrocks to the bottom.

Figure 1 on the following page shows the study area for the Rimrocks to Valley Bike/Pedestrian Feasibility Study and how it relates to the proposed Marathon Loop.

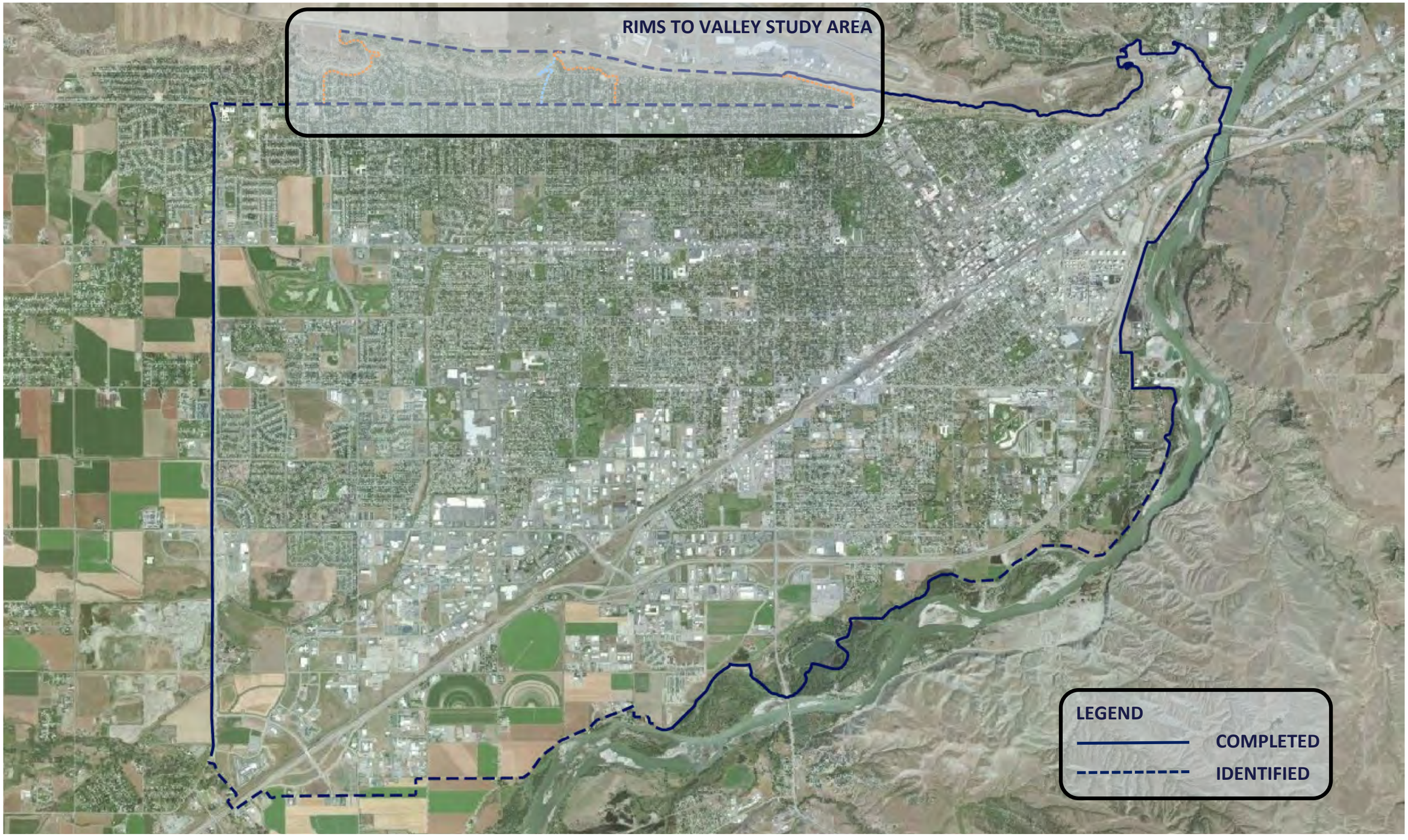

FIGURE 1 – STUDY AREA RELATIVE TO MARATHON LOOP

Goals & Objectives

The Rimrocks to Valley Bike/Pedestrian Feasibility Study provides an evaluation of bike and pedestrian route alternatives from the top to the bottom of the Rimrocks. The following objectives were outlined by the Project Oversight Committee at the onset of the study.

1. Identify routes that safely convey bicyclists and pedestrians addressing the needs of both recreational users and commuters.
2. Evaluate the feasibility of achieving ADA compliance.
3. Identify access points and place-making opportunities.
4. Consider the unique geology of the Rimrocks in the evaluation of alternatives.
5. Maintain consistency with existing community plans.
6. Identify and engage all relevant stakeholders, particularly the Rimrock neighborhoods.
7. Enhance recreational and aesthetic opportunities from atop the Rims.
8. Provide a key connection within the proposed 26-mile marathon loop trail around Billings.
9. Develop a prioritized list of short-term and long-term projects.

Public Participation Process

A thorough public participation process was conducted for the Rimrocks to Valley Bike/Pedestrian Feasibility Study in conformance with the 2009 Yellowstone County Board of Planning Participation Plan.

The following meetings were conducted as part of the plan development:

- **Project Oversight Committee Meetings** were held monthly to guide the direction of the feasibility study and a walking tour with the POC was held at the onset of the project.
- **Neighborhood Meetings** were held on October 13 and 14, 2015 adjacent to the proposed trail routes to discuss design concepts, ideas and concerns of nearby property owners.
- A **Rimrock Neighborhoods Task Force** meeting was attended on October 21, 2015 and a project overview was provided.
- **Public Meeting No. 1** was held on December 2, 2015 to introduce the feasibility study and identify issues important to stakeholders.
- **Public Meeting No. 2** was held on February 3, 2016 to present the route alternatives and request input on various access points and amenities for each route.

The following additional public meetings will be held for review and approval of the feasibility study, the dates of which are to be determined:

- **Technical Advisory Committee**
- **Yellowstone County Board of Planning (Public Hearing)**
- **Billings City Council**
- **Yellowstone County Commission**
- **Policy Coordinating Committee**

A project website was developed as a location to post draft documents for review and as a tool to request additional public input. The web address is www.sandersonstewart.com/projects/rimstovalley.

The draft and final document will also be posted on the City of Billings website at http://ci.billings.mt.us/index.aspx?NID=2336.

Related Projects

Highway 3 Corridor Study. Completed in 2015, the Highway 3 Corridor Study addresses current vehicle and non-motorized traffic circulation and access along the corridor, as well as plans for future changes to traffic patterns caused by the Inner Belt Loop connection and development activity. Recommendations consisted of several projects that relate to the Rims to Valley Feasibility Study, including a multi-use pathway that extends from North 27th Street to Apache Trail, a roundabout and grade separated crossing at the Highway 3/Zimmerman Trail intersection, and parking/trailhead facilities along Highway 3.

Zimmerman Trail. The City of Billings recently completed a rock fall mitigation project on Zimmerman Trail and they are currently designing additional improvements to the roadway and surrounding areas in coordination with the Montana Department of Transportation (MDT). Design alternatives were still being considered at the time of this study, but it is anticipated that they will generally consist of wider shoulders, stormwater improvements and slope stabilization. MDT has also recently nominated an intersection improvement project with safety funds for the installation of a roundabout at Zimmerman Trail and Highway 3.

Inner Belt Loop. The Inner Belt Loop is a proposed rural bypass roadway project that will provide a new connection between the Heights and West End regions of Billings. The south terminus of the new road has been proposed at the existing intersection of Highway 3 and Zimmerman Trail, but other options are still being considered. Alignment alternatives and intersection improvements were evaluated in the 2006 Inner Belt Loop Connection Planning Study and the 2010 Inner Belt Loop Design Traffic Report. Recommendations include a multi-use pathway along the east/south side of the roadway.

Billings Urban Area Long Range Transportation Plan. The 2014 transportation plan identifies long-range transportation projects in the area. It identifies improvements along Zimmerman Trail and the proposed Inner Belt Loop, as well as a future connection between Highway 3 and Molt Road.

Billings Area Bikeway & Trail Master Plan. This plan outlines a proposed short-range, on-street bike lane along Highway 3 east of Rod & Gun Club Road and a long-range bike lane west of this intersection. The plan also identifies proposed short-range bike lanes on North 27th Street, Airport Road and Zimmerman Trail, as well as long-range bike lanes on Rod & Gun Club Road and the Inner Belt Loop. The plan also identifies several existing primitive/unimproved trails around the Rimrocks.

ROUTE ALTERNATIVES

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The study area for this project is approximately 3 miles in length measured from east to west. Although it's fairly vast, the terrain is very steep and there are really only a very small number of locations where a route from the top to the bottom of the Rims is even possible. The project team was aware of these possible routes from past projects and our own recreational experiences in the area, but these potential routes were further explored with the Project Oversight Committee during a walking tour held early in the project process.

The following paragraphs provide a summary of the four route alternatives identified. These routes are also illustrated in Figure 2 on page 7.

Alternative 1: Stagecoach Trail

Referred to as the Stagecoach Trail, the first route alternative is adjacent to Zimmerman Trail, a two lane roadway that traverses from the bottom to the top of the Rimrocks at the western boundary of the study area. This roadway is steep and narrow and does not provide a safe on-street facility for bikes and pedestrians. The Zimmerman Trail right-of-way is owned and maintained by the City of Billings. The City of Billings and MDT have a design project currently underway for reconstruction of Zimmerman Trail and a separate project for the design of a roundabout at the intersection of Zimmerman Trail and Highway 3. The proposed trail along this route would be located along the east side of the roadway and would be placed below the grade of the road along the roadside slope.

Alternative 2: Myers Trail

The second route alternative would follow an existing natural trail known as the Myers Trail. It runs from the north end of Country Club Circle below the Rims and traverses up to the top of the Rims just east of Sky Ranch Condominiums. This trail was at one time a private driveway used to access the old Myers family home on top of

the Rims. The terminus of the Myers Trail at the top of the Rims coincides well with one of the trailheads/parking areas recommended in the Highway 3 Corridor Study.

This is an existing trail that is used often, but the current alignment crosses private property at the south end and it has some challenging sections that may be difficult for some users.

Alternative 3: Morledge Trail

The third alternative is the Morledge Trail. This route begins at the north end of 17th Street West and routes west through property owned by City of Billings Public Works. Just north of the large water tank on this property, the trail would transition onto private property owned by the Morledge family. The trail would be located toward the south side of their property and would route up and around a couple of coulees before transitioning back to public property. The trail would then need to cross a large coulee area, possibly with a boardwalk type of structure, as it ramps up toward the top of the Rims and ends in approximately the same location as the Myers Trail at the top.

The Morledge property is undeveloped and is approximately 10 acres in size. The project team has had several conversations with the Morledge family through this process and they have stated their approval of the proposed trail location and their willingness to grant a trail easement.

Alternative 4: 27th Street Trail

The final route alternative considered in this study runs along North 27th Street. It would begin near the existing trail underpass at the intersection of North 27th Street/Highway 3/Airport Road and would continue to the southeast along North 27th Street. It would be located behind the existing guard rail on the south side of the roadway. Right-of-way is limited around the ramp that curves around to Rimrock Road, so the proposed trail would instead route through public property and connect to the north end of Yucca Street.

It appears that there is existing width available on North 27th Street to consider an on-street option for bicycles as well. Both bikes and pedestrians could use the off-street multi-use trail, but bikes will likely be traveling at a fairly high speed when going downhill. In this case, a safer option may be to consider separate facilities for bikes and pedestrians. On-street bike lanes in this location would require restriping on North 27th Street and approval to do so would be needed from MDT. If possible, a 3-foot striped buffer would be ideal for this alternative in order to provide greater separation between the bike lane and the outside travel lane.

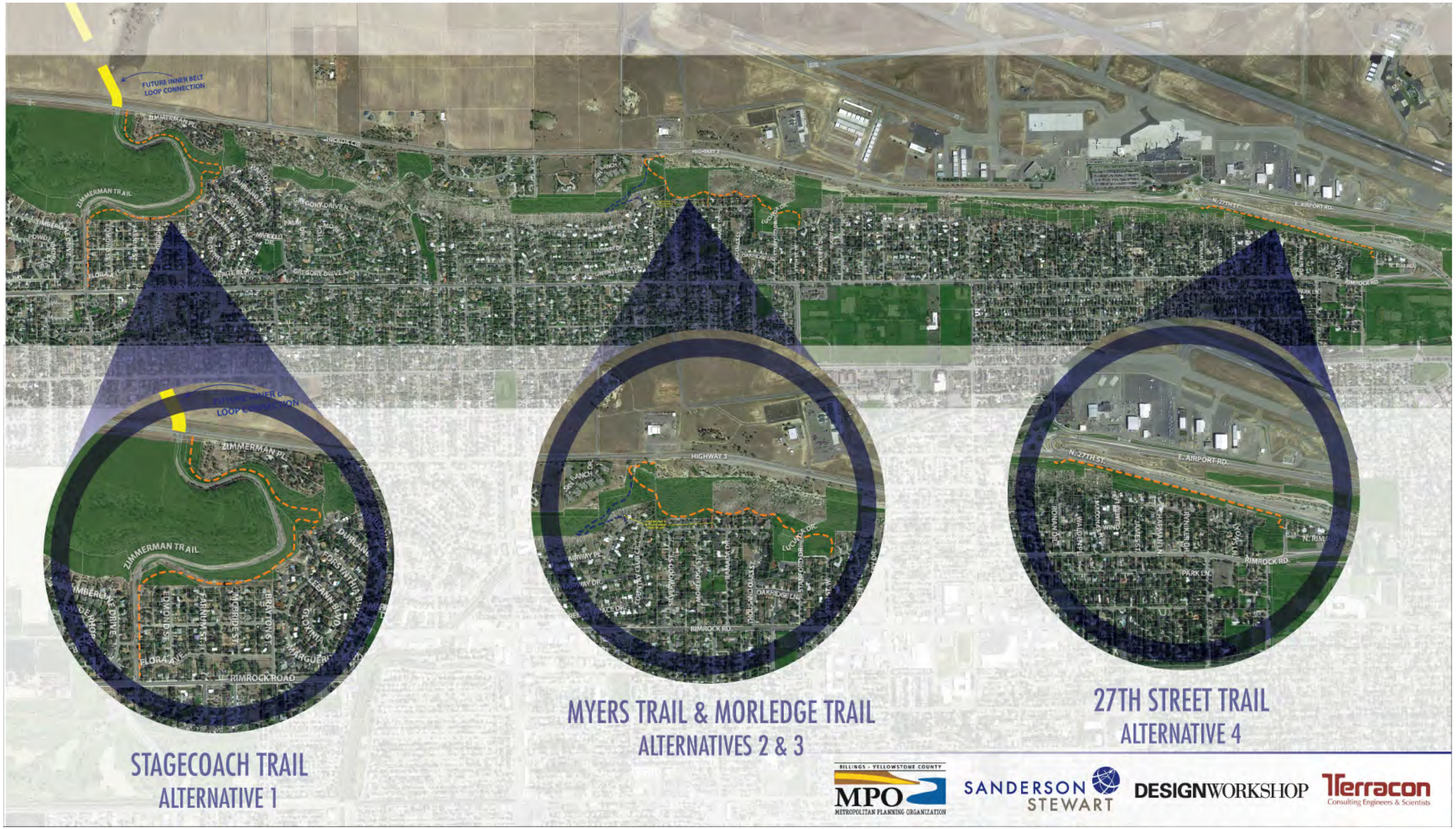


FIGURE 2 – ROUTE ALTERNATIVES

RECOMMENDED IMPROVEMENTS

3

A preliminary design of each of the four route alternatives was completed in order to evaluate slopes, consider different surfacing options, and ultimately to provide a well-vetted opinion of probable cost for each alternative. The following section provides an overview of those considerations.

Design Features

The development of this feasibility study began with 3-D laser scanning of the Rim face within the areas identified for the four potential route alternatives. The resulting scan data was then reduced into AutoCAD format for the development of base drawings for preliminary design. A trail alignment was then drafted for each of four alternatives including a preliminary design in plan and profile view in order to determine the best fit available for both horizontal and vertical alignment. The resulting plan and profile sheets are provided in Appendix A.

Longitudinal Slope

One of the primary goals of this study was to evaluate the feasibility of achieving compliance with the Americans with Disabilities Act (ADA) design standards, primarily as they relate to longitudinal slopes. The maximum longitudinal slope for ADA compliance is generally considered to be 5%. Although some guidelines allow for steeper slopes for short distances as long as level landing areas are provided in between.

Considering the challenging terrain of the Rimrocks, and as can be seen by the profiles in Appendix A, it was clear that we would not be able to meet these traditional slope standards with any of the four routes being evaluated. This is a concern because the federal funding sources often used for trail design and construction require ADA compliance. However, after further research and discussions with the Federal Highway Administration (FHWA), it is our assessment that although the routes may not be considered "ADA accessible," they could be considered "ADA compliant" to the extent practicable and could therefore still be considered eligible for federal funding. They will likely require additional documentation during design to support the exceptions to ADA standards and show that ADA compliance is not practicable due to terrain.

There are many different guidelines available and the determination of which standards to use can depend on how the routes are designated: trails, access routes, paths, etc. The guidelines that were considered most applicable to this particular situation include the following:

- US Access Board's Architectural Barriers Act (ABA) standards (Sections 1016, 1017 and 1019), which discuss outdoor recreation access routes and trails - https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards/aba-standards/chapter-10-recreation-facilities
- FHWA's Best Practices Design Guide (Chapters 14 and 15) - http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/sidewalks214.cfm
- Proposed Public Rights-of-Way Accessibility Guidelines (PROWAG) - https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/proposed-rights-of-way-guidelines

Although the Stagecoach and 27th Street alternatives may be at least partially located within highway right-of-way, the PROWAG standards do not adequately address the unique challenges associated with terrain on these routes. Therefore, it is our assessment that documentation of conditions for exceptions outlined in the other documents, namely "Compliance is not practicable due to terrain," would adequately address ADA compliance.

Surfacing

ADA compliant routes are also traditionally considered to have a paved surface, either asphalt or concrete. However, the ABA standards referenced above state that surfaces "shall be firm and stable," but are not necessarily required to be paved. If snow removal during winter months is not considered a necessity, then firm and stable surfaces do not need to be paved surfaces. Shared-use paths are generally paved with asphalt or concrete, but may also use prepared surfaces such as crushed stone or soil stabilizing agents mixed with native soils or aggregates. It's possible that an asphalt surface may not hold up very well within the direct vicinity of the Rimrocks and a natural surface would allow for more flexibility in terms of fixing problem areas (heaving and settling) that will be inherent in this terrain. The selected surface should be fitting of the landscape and easy to maintain.

There is a strong desire by the Chamber Trail Committee to eventually promote the Marathon Loop as a destination for running events that would draw athletes from throughout the Country. To that end, they are encouraging the use of asphalt or crushed rock surfaces, rather than concrete, because runners prefer the softer surfaces.

There is one location along the Morledge Trail alternative where a boardwalk may be used to "bridge" the coulee area at the west end and limit impacts to the natural drainage and terrain. This boardwalk would need to be constructed with the longitudinal slope needed to climb to the top of the Rims in this location. A variety of materials are available for construction of the boardwalk (i.e. wood, concrete, plastic, and steel). All of these materials should be considered "firm and stable" by the ABA standards noted above.

Railings

There are many locations where the terrain would also require trail construction with steep side slopes. The designs shown in Appendix A include side slopes steeper than 3:1 (vertical to horizontal) in many locations in order to avoid impacts to adjacent properties associated with long catch slopes. It has been assumed that a combination of slope stabilization (e.g. retaining walls) and railings would be required in these locations. Railings and other built

structures would be designed to utilize textures, colors, and materials that fit the surrounding context of the trail. Construction of these elements could include the use of natural materials, steel and concrete with natural color or self-weathering finishes, steel and concrete with standard finishes, or a combination thereof.

Geology of the Rimrocks

Another important design consideration in this feasibility study is the geology of the Rimrocks. There has been a history of rock fall hazards and drainage concerns that could potentially be exacerbated with new infrastructure improvement projects if not planned for accordingly. Terracon, a geotechnical engineering firm with extensive experience working in and around the Rimrocks, provided valuable input on this feasibility study. Their report is provided in Appendix B. It provides a summary of potential geologic concerns associated with each of the four route alternatives along with the potential mitigation required.

The primary concern raised by Terracon is associated with the Stagecoach Trail and the segment that follows the base of the cliff directly above Forsythia Boulevard in particular. This is a rockfall area that should either be avoided or mitigated in some way. Terracon is part of the consultant team working on the Zimmerman Trail project, including the bid alternate for the trail. This allows for good coordination between this feasibility study and the upcoming design effort.

Before and After Graphics

The following illustrations demonstrate how the possible future alignments could be woven into the existing landform of the Rimrocks. While not intended to be an exact representation of the future, they serve to help visualize some of the key aspects related to each trail alignment including how they integrate into the dramatic topography, trailhead locations, connections to other trails, and points of interest/scenic overlooks. The four views reveal the general nature of each alignment and their relationship to the Rimrocks and surrounding neighborhood context. More detailed programming and design for each of the alignments would occur in the future when funding was available for construction.

HIGHWAY 3 / ZIMMERMAN PARK TRAILHEAD

STAGECOACH TRAIL ALIGNMENT

POTENTIAL POINT OF INTEREST / TRAILHEAD LOCATION

TRAIL PARALLELS ZIMMERMAN TRAIL TO RIMROCK RD

POTENTIAL POINT OF INTEREST ALONG TRAIL

FORSYTHIA BLVD. TRAIL CONNECTION

FIGURE 3 – STAGECOACH TRAIL – BEFORE AND AFTER

FIGURE 4 - MYERS TRAIL – BEFORE AND AFTER

FIGURE 5 - MORLEDGE TRAIL – BEFORE AND AFTER

FIGURE 6 - 27TH STREET TRAIL – BEFORE AND AFTER

FIGURE 7 - 27TH STREET ON-STREET CONCEPT

Trailheads

The nature of the trailhead amenities at each potential trail access point can range in the level of improvements from very low intensity such as a simple sign/trail marker to more high intensity trailhead options with parking and other facilities. The following classifications describe potential trailhead improvements that build from low to high intensity. Different treatments and combinations of the amenities can be explored in later design phases to suit the range of needs and character of the locations along the potential alignments.

- **Low Intensity or Trail Access Point**
  - Simple trail signage/wayfinding. No formal parking or other amenities.
- **Medium Intensity or Minor Trailhead**
  - Potential amenities include parking for 3-5 cars, signage kiosk, trash receptacles, seating, bike racks, etc.
- **High Intensity or Major Trailhead**
  - Potential amenities include parking for 5-15 cars, shade structures, picnic tables, restrooms, etc.

The community engagement process revealed the stakeholders' preferences for the level of intensity desired for each distinct location. Figure 8 on the following page summarizes the polling results from the second public meeting and identifies high, medium and low intensity trailhead locations. Participants generally supported more high intensity or major trailheads along the top of the Rimrocks in conjunction with proposed trail and parking improvements along Highway 3. Lower intensity treatments were preferred for most of the other locations, especially those that were situated in residential neighborhoods. The location along the Stagecoach Trail near the southern end of Zimmerman Park received a mixed response divided between the high, medium and low options. At the moderate and high intensity trailheads, participants were most interested in including amenities such as signage and wayfinding, trash receptacles/dog waste stations, and restrooms.

Place-making Opportunities

The feasibility study identifies several opportunities for place-making and scenic viewpoints that take advantage of the Rimrocks' dramatic and unique topography. In these locations, the user experience can be enhanced by integrating standard amenities with custom elements tailored to celebrate and communicate information about the Rimrocks geology, vegetation, and cultural history. Similar to trailheads, amenities at scenic viewpoints can range from simple educational or directional signage to more elaborate overlooks or shade structures.

Stakeholder input showed a preference for lower intensity amenities such as interpretive signage at key locations along the trails or medium intensity elements including kiosks and seating opportunities. Higher intensity features such as large shade structures were not as well supported.

Two important place-making opportunities were identified in the study that could substantially enhance the overall trail experience. The first is located at the top of the Rims near where the Myers and Morledge trails intersect. This area also coincides with proposed parking and trailhead improvements identified in the Highway 3 Corridor Study completed in 2014. A relatively large flat bench in the steep topography creates an excellent zone for picnic and seating areas that would be easily accessible from the nearby parking area along Highway 3. Scenic views down the coulee and out over the city of Billings are also quite striking in this location.

Another opportunity for place-making is near the top of the 27th Street Trail alignment at the junction with the Swords Park Trail underpass. This is an important trail connection and adds to the multi-use capacity of the proposed improvements. The Swords Park Trail continues from this point east to connect with another parking and trailhead location along Airport Road. This location currently acts as an entrance into the community and a significant overlook structure would add to the distinct sense of arrival.

FIGURE 8 - COMMUNITY POLLING PREFERRED TRAILHEAD INTENSITY

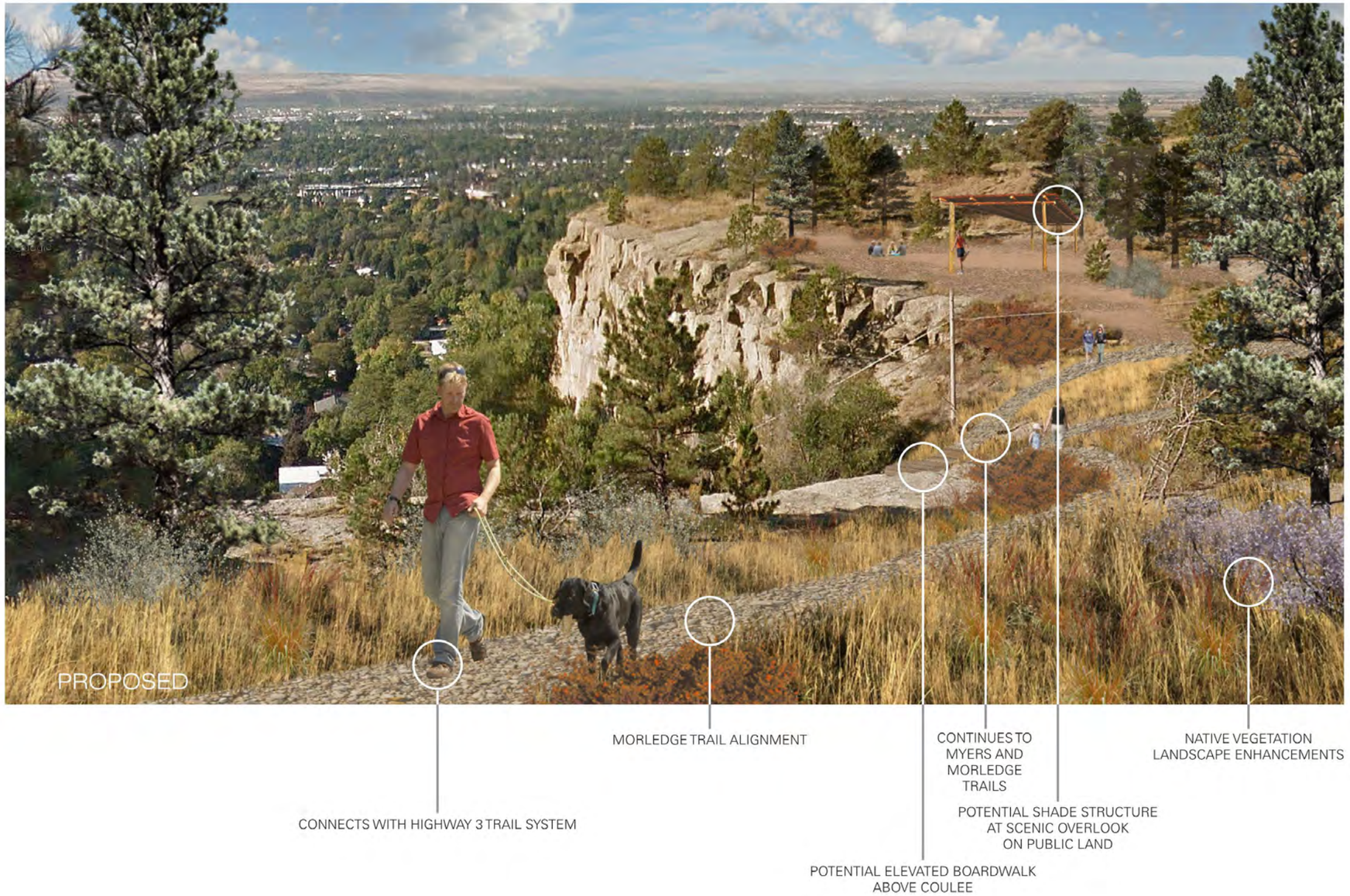


FIGURE 9 - MYERS AND MORLEDGE TRAIL – POTENTIAL POINT OF INTEREST

FIGURE 10 - 27TH STREET TRAIL – POTENTIAL POINT OF INTEREST

Public Input

Public Meeting No. 1 Comments

At the first public meeting, a questionnaire was distributed to attendees and 20 responses were received. It included questions about the potential benefits and anticipated use of these routes, as well as parking, access, safety and maintenance. A brief summary of the responses is provided in Table 1 on the following page and detailed responses are included in Appendix C.

Overall, it was clear that the majority of respondents (95%) recreate within or around the Rims and the majority (95%) are in support of a trail from the top to the bottom of the Rims. Respondents were split on whether the trail should have a paved or natural surface, but there was clear support for parking at trailheads and more clearly defined public access points.

Public Meeting No. 2 Community Polling Results

During the second public meeting, a series of questions were presented regarding the proposed design alternatives and attendees provided their answers on a response sheet. Topics included the trail surface and character for each of the alternatives, prioritization criteria, locations and amenities for trailheads, and improvements for more developed points of interest. A total of 42 people participated in the community polling, including representatives from the City, County and MDT that were in attendance at the public meeting. Table 2 on page 22 provides a summary of the top-rated response(s) for each question presented. A complete compilation of the key pad polling results is provided in Appendix D.

Several key observations were made based on the results of the polling activity. Addressing safety concerns and providing recreational value were the respondents' top two prioritization criteria whereas funding and low cost/maintenance were rated much lower as a determinant for selecting which alignments to proceed with first.

Alignment #1 – Stagecoach Trail, followed closely by Alignment #4 – 27th Street Trail, received the highest rankings for improving connectivity and safety, both in terms of impact and urgency, in traveling from the Rimrocks to the valley floor. A multi-use, dual surface pathway was the preferred trail character for the Stagecoach Trail Alignment, whereas a multi-use paved surface was preferred for the 27th Street Alignment

Generally, there was a preference for natural surface or dual surface trails for the two interior alignments (Myers and Morledge Trails) and paved options for the exterior alternatives (Stagecoach and 27th Street). Natural materials, colors, textures, and self-weathering finishes were preferred overall for the character of built structures on all four alignments. Standard finishes on steel and concrete structures were not rated highly, which speaks to the recognition by the community that the Rimrocks are a special environment and warrant more context-sensitive solutions.

The community's preferences for low, medium, and high intensity trailhead locations were also identified, as well as the most important amenities to include. Signage and wayfinding, trash receptacles and dog waste stations, and restrooms were shown to be the most desired improvements at more developed trailheads.

TABLE 1. PUBLIC MEETING NO. 1 COMMENT SUMMARY

General	
Do you think a trail would be beneficial from the top to the bottom of the Rims?	**Yes - 19 (95%)** **No - 1 (5%)**
If such a trail existed, would you use it?	**Yes - 18 (90%)** **No - 2 (10%)**
Should the trail be paved or a natural surface?	**Paved - 7 (35%)** **Natural - 3 (15%)** **Combo - 10 (50%)**
Parking & Facilities	
Should parking or other facilities be provided at the trailheads?	**Yes - 14 (70%)** **No - 4 (20%)** **Maybe - 2 (10%)**
Access	
Do you support more clearly defined public access points and routes?	**Yes - 17 (85%)** **No - 2 (10%)** **Didn't Answer - 1 (5%)**
Safety	
Would you be interested in participating in a volunteer patrol?	**Yes - 9 (45%)** **No - 6 (30%)** **Maybe - 3 (15%)** **Didn't Answer - 2 (10%)**
Maintenance	
Would you support or be willing to participate in volunteer maintenance & cleanup events?	**Yes - 16 (80%)** **No - 3 (15%)** **Maybe - 1 (5%)**
Are you concerned about proper on-going maintenance being provided on a new trail?	**Yes - 11 (55%)** **No - 6 (30%)** **Didn't Answer - 3 (15%)**
Usage	
Do you live and/or work adjacent to the Rims?	**Yes - 15 (75%)** **No - 4 (20%)** **Didn't Answer - 1 (5%)**
Do you recreate within or around the Rims?	**Yes - 19 (95%)** **No - 0 (0%)** **Didn't Answer - 1 (5%)**

TABLE 2. PUBLIC MEETING NO. 2 COMMUNITY POLLING SUMMARY

Question Summary [1]	Top Rated Response [1]	
	% of Total Votes	Description
Trail Character:		
Preferred trail type/surface for Alignment #1: Stagecoach Trail?	34%	Multi-Use (Dual Surface)
Preferred trail type/surface for Alignment #2: Myers Trail?	24%	Improved (Paved)
Preferred trail type/surface for Alignment #3: Morledge Trail?	24%	Improved (Crushed Rock)
	24%	Multi-Use (Dual Surface)
Preferred trail type/surface for Alignment #4: 27th Street Trail?	34%	Multi-use (Paved)
Character of Built Structures:		
Appropriate character for built structures for the two outer alignments near existing roadways (Stagecoach Trail and 27th Street Trail)?	49%	Any of the choices shown would be fine (Natural materials; Steel/Concrete with natural materials, weathered finish, or color; and/or Steel/concrete with galvanized or standard finish)
	37%	Steel/concrete with natural materials, weathered finish, or color
Appropriate character for built structures for the two alignments that connect through the center of the Rims (Myers Trail and Morledge Trail)?	34%	Any of the choices shown would be fine (Natural materials; Steel/Concrete with natural materials, weathered finish, or color; and/or Steel/concrete with galvanized or standard finish)
	32%	Natural materials only (boulders, wood, etc.)
Impact vs. Urgency Rankings		
Connectivity Ranking - Most Immediate Need and Greatest Impact	#1	Alignment #1 - Stagecoach Trail
	#2	Alignment #4 - 27th Street Trail
Safety Ranking - Most Immediate Need and Greatest Impact	#1	Alignment #1 - Stagecoach Trail
	#2	Alignment #4 - 27th Street Trail
Prioritization Criteria:		
Most important criteria when selecting which trail alignment(s) to implement first are?	61%	Addressing safety concerns
	61%	Providing recreational value
Trailhead Locations:		
Potential trailhead locations appropriate for LOW INTENSITY amenities? (no formal parking, trail signs only, etc.)	54%	Stagecoach Trail at Forsythia Blvd
	56%	Myers Trail at Country Club Circle
Potential trailhead locations appropriate for MEDIUM INTENSITY amenities? (minimal parking (3-5 cars), signage kiosk, trash receptacles, seating, bike rack, etc.)	34%	27th Street Trail at Yucca Street
	29%	Stagecoach Trail near southern end of Zimmerman Park
	29%	Myers/Morledge Trails at Highway 3
Potential trailhead locations appropriate for HIGH INTENSITY amenities? (parking for 5-15 cars, shade structure, picnic tables, restrooms, etc.)	66%	27th Street Trail at Highway 3
	59%	Stagecoach Trail at Highway 3
Trailhead Amenities:		
The trailhead amenities I am most interested in seeing at the moderate and high intensity trailheads include:	71%	Signage and wayfinding
	68%	Trash receptacles / dog waste stations
	41%	Restrooms
Points of Interest:		
Would you like to see points of interest at specific locations along the potential trail alignments?	41%	Yes, specific points of interest are appropriate for LOW intensity amenities.
	37%	Yes, specific points of interest are appropriate for MEDIUM intensity amenities.

[1] Complete question descriptions, lower-rated responses, and additional voting information is shown in Appendix D.

Opinion of Probable Cost

In order to plan for the future implementation of the routes proposed within this feasibility study, it is important to consider the associated construction costs of such projects. An opinion of probable cost for each route has been developed for both the crushed stone and paved surfacing alternatives. The results are summarized in Table 3 below and Appendix Eoh. These cost estimates all include unclassified excavation and imported fill as needed to achieve the design slopes, as well as surfacing materials, geotextile reinforcement, slope stabilization and walls, railing, erosion control fabric, miscellaneous signage, topsoil and seeding. The estimate for the Morledge Trail alternative includes the boardwalk structure recommended at the west end. All of the estimates also include a 20% contingency and 15% for design and construction administration services.

The Stagecoach Trail and the Morledge Trail are the two most expensive options. This is not only because they are longer routes, but also because they require much more earthwork and slope stabilization than the Myers Trail and the 27th Street Trail.

TABLE 3. OPINION OF PROBABLE COSTS

Trail Route Alternative	Opinion of Probable Cost[1]	
	Compacted Crushed Stone 8 ft wide	Paved Surface 8 ft wide
Stagecoach Trail	$912,300	$1,213,400
Myers Trail	$501,600	$632,500
Morledge Trail	$1,005,600	$1,195,300
27th Street Trail	$260,800	$437,700

[1] All cost estimates include 20% contingency and 15% for design and construction administration services.

Next Steps

It is important to note that the intent of this project was never to select one single bike/pedestrian route from the top of the Rims to the bottom. Some alignments will serve more recreational-based needs and others will provide more multi-use transportation connectivity. Overall, all four routes that have been identified are viable alternatives and should be considered with equal priority as opportunities for implementation arise.

For example, there is a possibility that the Stagecoach Trail will be designed and constructed with the City of Billings/MDT road project on Zimmerman Trail. This element of the work will be included as an alternate, so whether it is actually implemented will depend on the cost of the construction bids and if it can be incorporated into the overall project budget. However, this is a great opportunity to establish momentum and build one of these routes within the very near future. Other routes should be considered in coordination with other adjacent projects or when the opportunity arises to secure funding or to acquire right-of-way or easements where needed.

Potential funding sources available for standalone trail projects include the MDT's Transportation Alternatives Program and Montana Fish, Wildlife and Parks Recreational Trails Program. Additional information on these funding programs is available on the following websites:

- Transportation Alternatives – www.mdt.mt.gov/mdt/ta_application.shtml
- Recreational Trails – www.stateparks.mt.gov/recreation/rtpGrants.html

Both of these programs are funded through the Federal Highway Administration and both were included in the recent federal transportation bill reauthorization, so funding should be available through these programs for at least the next four to five years. All four route alternatives may not necessarily be eligible for both programs, depending on their primary use as a transportation or recreational facility, so consideration would need to be given to determine the best funding source for each individual project.

APPENDIX A: PLAN & PROFILE SHEETS

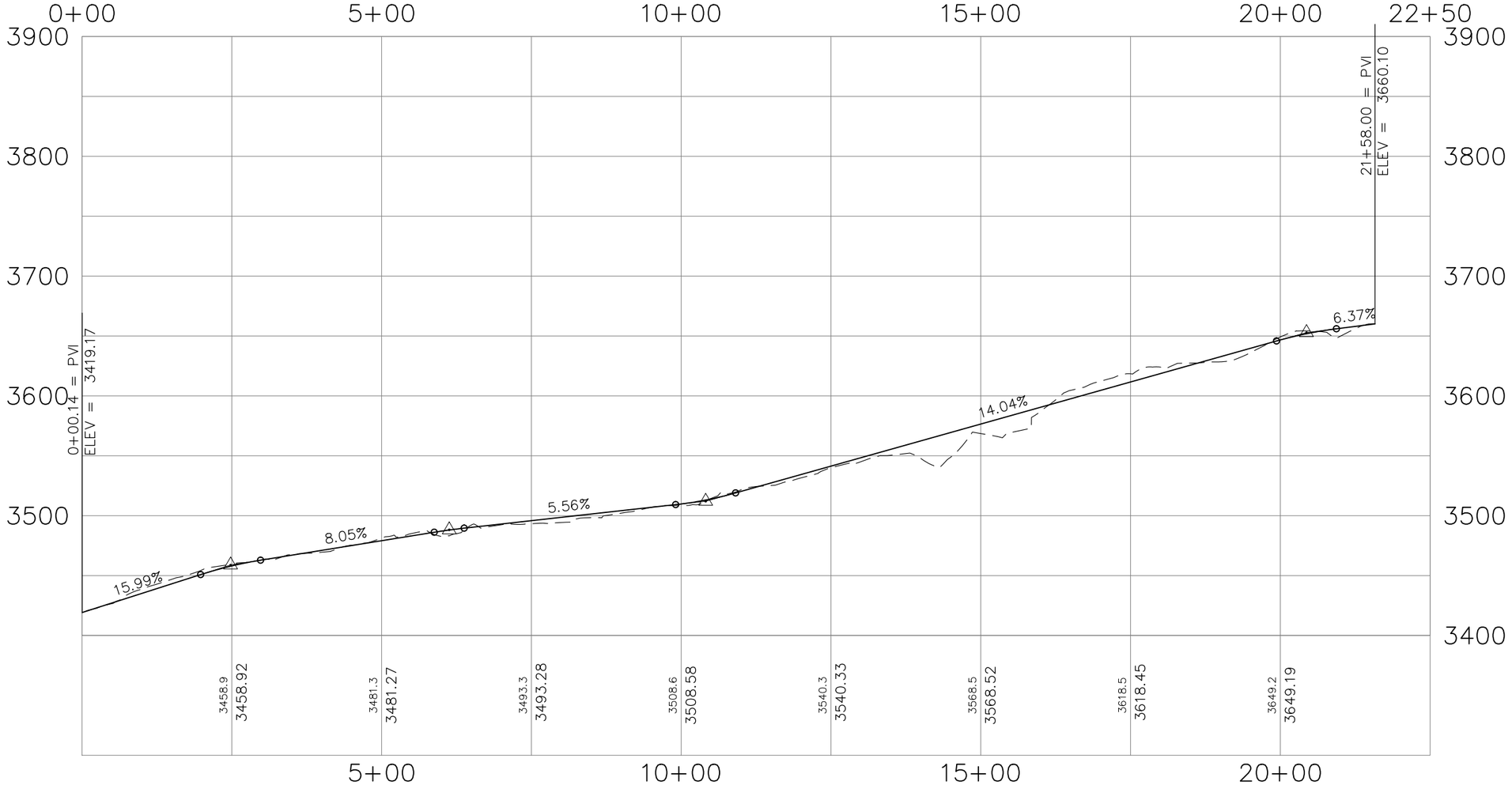
SANDERSON STEWART
WWW.SANDERSONSTEWART.COM

DATE: XX/XX/20XX
FILE: 15055_CONCEPT_BASE.DWG
PROJECT NO: XXXXX.XX
CAD: XXX
QUALITY ASSURANCE:
REVISIONS
DATE DESCRIPTION

RIMROCKS TO VALLEY
RIMROCKS TO VALLEY BIKE AND PEDESTRIAN FEASABILITY STUDY
BILLINGS, MONTANA
PLAN AND PROFILE - ZIMMERMAN TRAIL

C1.0

TO PLAN AND DESIGN ENDURING COMMUNITIES...



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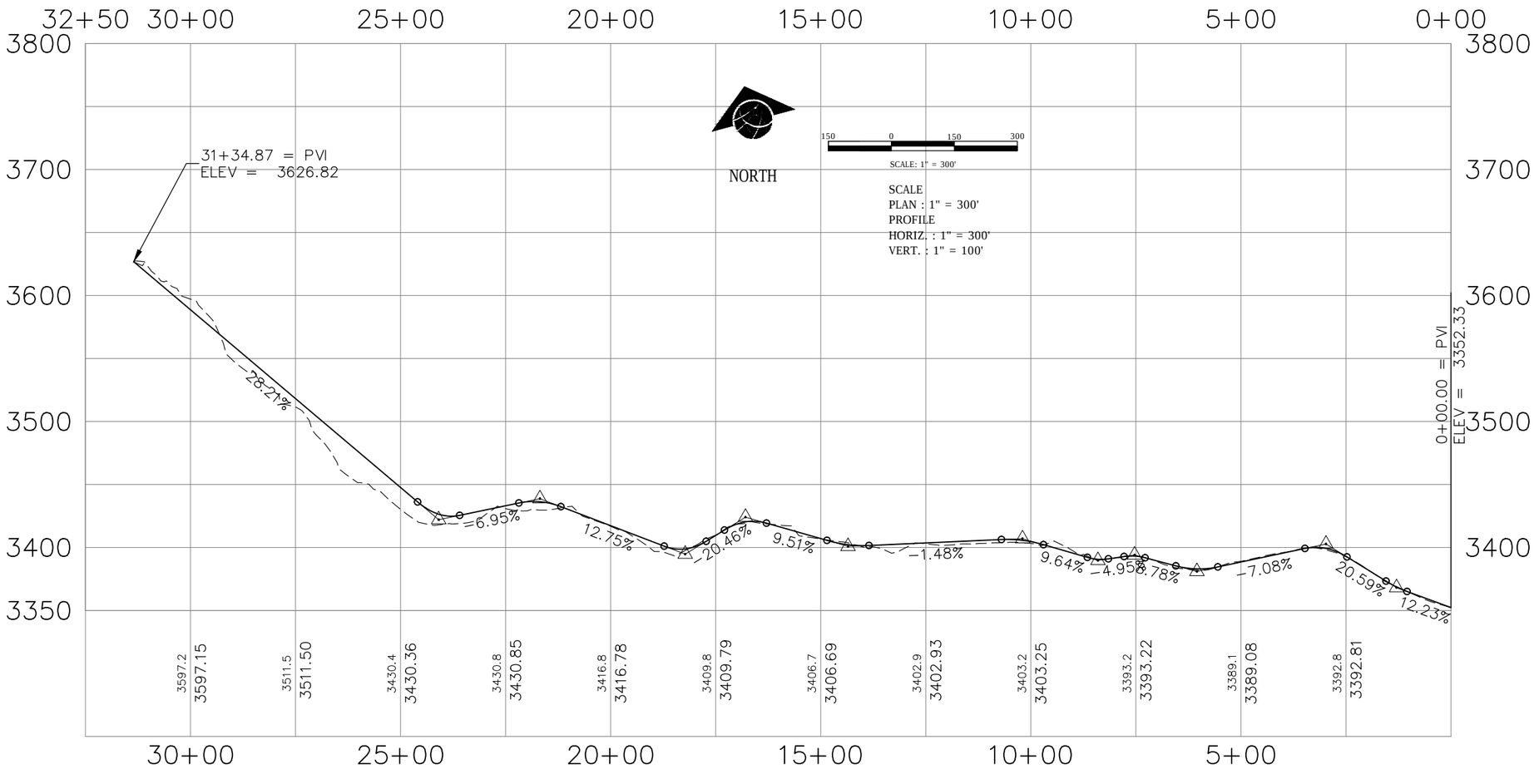
CAD: XXX
QUALITY ASSURANCE:
REVISIONS
DATE DESCRIPTION

RIMROCKS TO VALLEY
RIMROCKS TO VALLEY BIKE AND PEDESTRIAN FEASABILITY STUDY
BILLINGS, MONTANA
PLAN AND PROFILE - COUNTRY CLUB CIRCLE

C2.0

TO PLAN AND DESIGN ENDURING COMMUNITIES...



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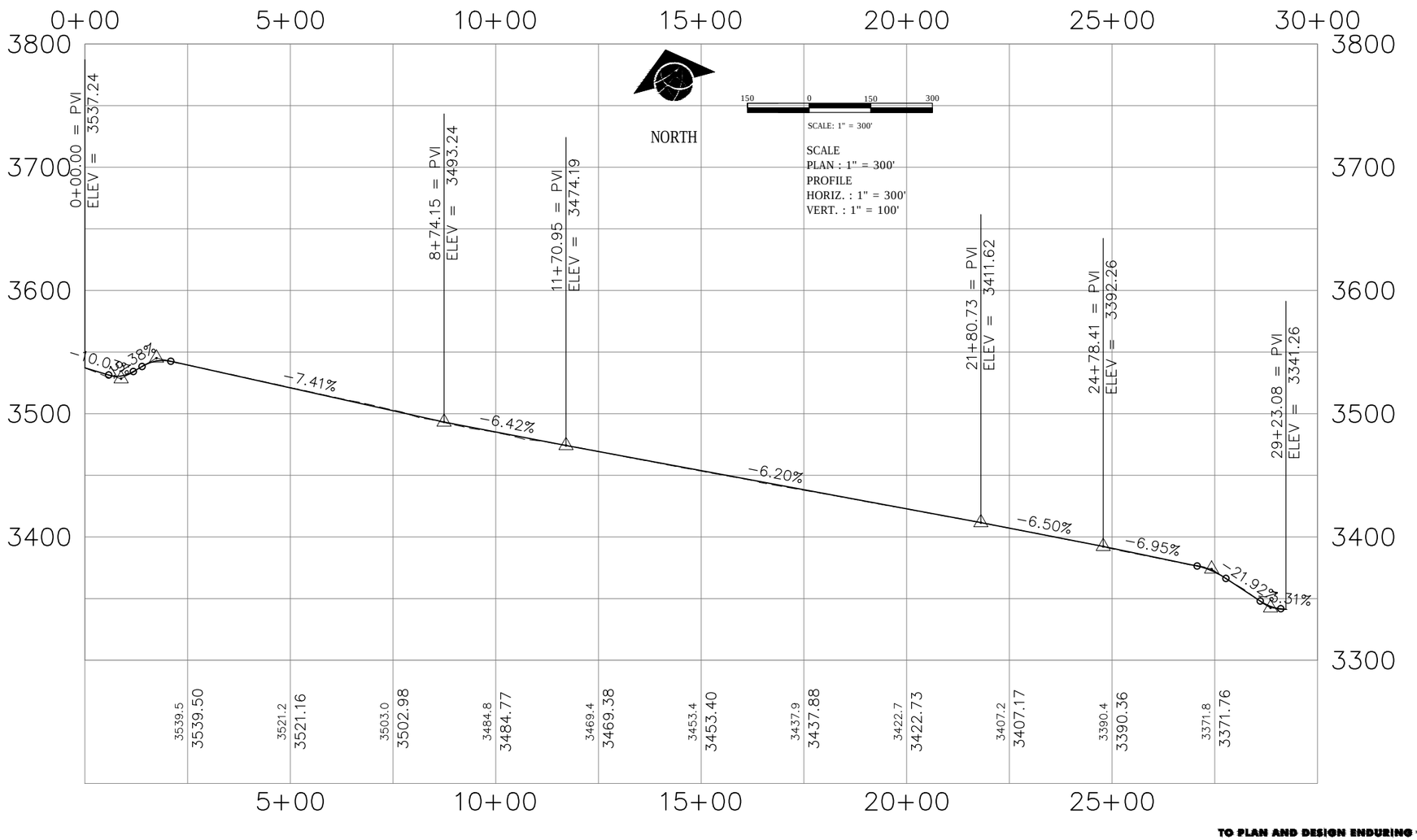
CAD: XXX
QUALITY ASSURANCE:
REVISIONS
DATE DESCRIPTION

RIMROCKS TO VALLEY
RIMROCKS TO VALLEY BIKE AND PEDESTRIAN FEASABILITY STUDY
BILLINGS, MONTANA
PLAN AND PROFILE - COUNTRY CLUB CIRCLE EAST OPTION

C3.0

TO PLAN AND DESIGN ENDURING COMMUNITIES...



SANDERSON STEWART
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DATE: XX/XX/20XX
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PROJECT NO: XXXXX.XX
CAD: XXX
QUALITY ASSURANCE:

REVISIONS

DATE	DESCRIPTION

RIMROCKS TO VALLEY
RIMROCKS TO VALLEY BIKE AND PEDESTRIAN FEASABILITY STUDY

BILLINGS, MONTANA

PLAN AND PROFILE - NORTH 27TH STREET

C4.0

TO PLAN AND DESIGN ENDURING COMMUNITIES...

APPENDIX B: GEOLOGY & ROCKFALL EVALUATION

ROCKFALL POTENTIAL EVALUATION
RIMROCKS TO VALLEY BIKE AND PEDESTRIAN FEASIBILITY STUDY
Terracon Consultants, Inc.

Terracon Consultants, Inc. (Terracon) has completed a pedestrian survey of potential rockfall that could affect the proposed trail alignments that have been developed for the Rimrocks to Valley Bike and Pedestrian Feasibility Study. A general discussion of the geology of the rims and rockfall mechanics is provided below and is followed by a brief discussion of each trail alternate.

Rims Geology and Rockfall

The rims on the north side of the Yellowstone Valley are cut into sandstone and shale of the Cretaceous Eagle Sandstone and Telegraph Creek formations. Along most of the rims between North 27th and Zimmerman Trail there are two sequences of the Eagle Sandstone which can be seen (Sequence #1 and Sequence #2). The lowest, Sequence #1, is located directly above the Telegraph Creek shale and the transition from shale into the overlaying sandstone is gradual. The change between the sandstones of Sequence #1 and Sequence #2 is more dramatic and can easily be traced. The top of Sequence #1 contains a fine-grained, well-sorted sandstone whereas Sequence #2 is a very fined-grained, siltstone (Hearn and Hansen, Reexamination of the Cretaceous (Campanian) Eagle Sandstone at Billings, Montana, Montana Geological Society: 1989 Field Conference Guidebook: Montana Centennial Edition: Geologic Resources of Montana: Vol. 1, 1989). Sequence #1 tends to break at near vertical fractures spanning the entire height of the member while Sequence #2 tends to break or splay with a more convex or concoidal fractures.

A series of near vertical joints is the main structural feature of the Eagle Sandstone. The primary joint set trends in an east to west orientation, joints are spaced approximately 10 feet apart, and except near the face of the rims, the joints are tight. The face of the rims is formed along this joint set. The joints open up near the face of the rims due to a release of tension on the face side. Freeze/thaw periods, wetting and drying periods, and erosional effects are the main causes of rockfall along the rimrocks with toppling failure mechanisms as the primary way in which the rockfalls occur. A secondary joint set trends north to south on a random spacing. The side drainages that are formed in the face of the rims are formed along the secondary north/south trending joint set.

Lopez (Lopez, D. A., 2003, Areas of Potential Rock-Fall Hazard in the Billings Area, Yellowstone County, Montana, Montana Bureau of Mines and Geology Geologic Map 61-C) reports that as the sandstone cliffs are undermined, progressive opening of the joints occurs primarily due to freeze-thaw cycles and root wedging action that force the blocks outward from the cliff face. Gravity then acts on these separated blocks causing them to fall or topple. Lopez identifies “two mechanisms occurring along the Rimrocks in the Billings area; rockfall and rock topple. A rockfall

is defined as a vertical free fall without any rotation and without any associated sliding of the underlying shale. A rock topple is defined as vertical fall with rotation away from the cliff face, so that the top of the block proceeds down slope first. The block then commonly tumbles end-over-end down the slope."

Geologic Stratigraphy at Zimmerman Trail

Based on observation of recent rockfall events at several locations along the rims, failures do not occur in a uniform manner that can be readily projected by monitoring. In some cases, an obvious gradual widening of joints that eventually leads to failure of a rock block can be observed. And, in these cases a monitoring program is extremely useful in identifying rock blocks that may be in a mode of imminent failure. However, in some cases the widening may reach an equilibrium where there is no observable movement for decades or more until the rock block suddenly fails. In still other cases, there may be no observable indication that a failure is imminent before a rock block suddenly fails. In any case, the presence of rock blocks in various stages of weathering on the slopes below the cliff faces attest to the fact that the rims are in continual state of recession away from the cliff face, much like a deck of cards, and all areas of the rims are eventually subject to rockfall.

Stagecoach Trail (Zimmerman Trail Alignment)

The Stagecoach Trail (Zimmerman Trail) alignment is generally located away from areas of active rockfall except where the alignments traverse directly below the cliff face from about Station. 20+00 to 25+00. In this area, recent rockfall is scattered across the slopes below the cliff face and there remain a number of loose rock blocks that have separated from the cliff face. Additional rockfall that could impact the trail alignments appears imminent in this area.

Rockfall Hazard: Very High

Recommendation: Avoid the area of active rockfall or institute a rockfall mitigation program that includes scaling of loose rock blocks and long-term monitoring. Note however, monitoring cannot distinguish all rock blocks that may fail.

Looking east along cliff face above Sta. 20+00 to 24+00

Looking north along cliff face above Sta. 25+00

Myers Trail Alignment

The Myers Trail alignment mostly follows an existing trail that was constructed in the early 1900's to provide access from the top of the rim's before Zimmerman Trail was developed. The trail has deteriorated considerably, but is still utilized for foot and bike access. The cliff face in this area is relatively solid with only scattered small blocks at the top of the cliff face that are slowly dislodging over time. The east facing cliff face where the trail alignment ascends to the top of the rims exhibits a lack of large loose rock blocks that span the cliff face, with a layer of smaller cubical rock blocks at the top of the cliff that are actively failing.

Sloughing of the soil slope below the cliff face would seem to be a greater concern than rockfall along this alignment.

Rockfall Hazard: Low to Moderate

Recommendation: Institute a long-term monitoring program that includes annual observation of the rock faces above the trail alignments. Note however, monitoring cannot distinguish all rock blocks that may fail.

Cliff face above Country Club Circle. Note the relatively solid nature of the cliff face.

Upper portion of the Myers Trail alignment. Note the lack of large loose rock blocks that span the cliff face and the smaller cubical rock blocks at the top of the cliff that are actively failing.

Morledge Trail Alignment

The Morledge Trail alignment will traverse along the base of the slope below the rims between 17th Street and the side drainage where both Myers Trail and Morledge Trail alignments ascend to the top of the rims. In this area, the sequence #2 cliff face above the unconformity separating sequences #1 and #2 has mostly failed, leaving a distinct ledge that serves as a catchment for rock block failures above the unconformity. Also, until the trail alignment begins to approach and climb up the side drainage, the alignment is mostly at the lower end of the boulder field and appears to be outside the run-out zone of most any modern rockfall.

As the trail alignment progresses to the west and begins to climb into the side drainage, there are several larger hanging rock blocks that appear to stable at this time, but at some time in the future will fail and may roll onto the alignment. In the side drainage, the west facing cliff face is rounded and weathered, and appears relatively stable.

Rockfall Hazard: Low to Moderate

Recommendation: Institute a long-term monitoring program that includes annual observation of the rock faces above the trail alignments. Note however, monitoring cannot distinguish all rock blocks that may fail.

Looking east toward 17th Street. Note the east half of the alignment follows along a landslide bench that appears outside of the modern run-out zone. The west half of the alignment appears at the bottom of the modern run-out zone.

Upper portion of the Morledge Trail alignment. Note the weathered and rounded nature of the west facing cliff face.

North 27th Street Alignment

The North 27th Street Trail alignment will be located on the downslope side of 27th street, opposite the cliff face. During the construction of North 27th Street, the rock face was reduced and scaled and now is very stable with only occasional small rocks separating from the rock face and rolling onto road. There is no indication that there is the potential for a large rockfall event to impact the trail alignment.

Rockfall Hazard: Very Low to Non-existent

Recommendation: Monitoring does not appear warranted.

Looking west up North 27th Street. Note, the stable nature of the rock slope. The trail alignment would be on the outside of the guard rail on the south side of the roadway.

Sincerely,

Dan C. Nebel, P.G., L.E.G.
Terracon Consultants, Inc.

APPENDIX C: PUBLIC MEETING NO.1 COMMENT SUMMARY

Rims to Valley Bike/Ped Feasibility Study
Public Meeting No. 1 Comment Summary
12/2/2015

	Response 1	Response 2	Response 3	Response 4	Response 5	Response 6	Response 7	Response 8	Response 9	Response 10	Response 11	Response 12	Response 13	Response 14	Response 15	Response 16	Response 17	Response 18	Response 19	Response 20	**Totals**
General																					
Do you think a trail would be beneficial from the top to the bottom of the Rims?	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes - 19 (95%) No - 1 (5%)**
If such a trail existed, would you use it?	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes (everyday)	Yes	Yes	Yes	Yes	No	Yes	**Yes - 18 (90%) No - 2 (10%)**
Should the trail be paved or a natural surface?	Combo	Paved	Combo	Paved	Natural	Paved	Paved	Combo	Combo	Paved	Combo	Paved	Combo	Combo	Combo	Natural	Combo	Paved	Natural	Combo	**Paved - 7 (35%) Natural - 3 (15%) Combo - 10 (50%)**
Parking & Facilities																					
Should parking or other facilities be provided at the trailheads?	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Maybe	Yes	Maybe	Yes	Yes	Yes	Yes	Yes	No	No	**Yes - 14 (70%) No - 4 (20%) Maybe - 2 (10%)**
If so, what type of facilities?	I don't think each "trailhead" needs parking. Depends on the area & availability of land. Parking along Hwy 3 is more critical.		Swords Park and Black Otter Trail parking lots are well used. Seems like a similar approach should occur all along the Marathon Loop. I would not support parking facilities in developed neighborhoods.	At least at one end.		Parking would be helpful for Alternates 1-3. Existing Rims parking may be close enough and sufficient for Alternate 4.		Parking can be provided, but it would not a priority for me. The Rims-Valley connection eliminates the need to drive up the Rims for trail along the Rims in my mind. So a low priority.			A few: after all we're talking about riding bikes - I don't see why people would drive to the trails.	Parking, bike racks.	Maybe/Maybe not depending on availability - access is most important/connecting travelers on foot/bike. Look for shared use - example - parking at MSUB to access 27th St.		Restrooms, dog pick-up bags, trash cans.		It is always nice to have parking and in some cases a toilet.		Do not add parking in residential areas.	Not at each trailhead, but spread out to allow for less project expense & quicker completion.	
Access																					
Do you support more clearly defined public access points and routes?	Yes	No	Yes	Yes	Yes	Yes		Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes - 17 (85%) No - 2 (10%) Didn't Answer - 1 (5%)**
If not, what are your concerns?							Routes need to be any place except next to current major streets like Hwy 3 & 27th & Zimmerman Trail														
Safety																					
Would you be interested in participating in a volunteer patrol?	No	No	Maybe		Yes	No	No	Maybe	Yes	Maybe	No	Yes	Yes	Yes	Yes		Yes	Yes	No	Yes	**Yes - 9 (45%) No - 6 (30%) Maybe - 3 (15%) Didn't Answer - 2 (10%)**
What safety issues do you fell will need to be considered?			Patrol person training to deal with unruly or uncooperative people on the trail.		Underpass highway and Zimmerman Trail. Stability of ground under trail.	Trash and other debris though most paths I've ridden have been well maintained and clean. Falling rock and steep edges may also be a concern but these will likely be addressed.	A presence of police - community or otherwise, lighting, means to summon help - call box?	I'm mostly interested in using my volunteer time planning for making Billings a highly desirable place to live w/ bike trails that allow access throughout town and to the Rims & river. But occaisonally being on patrol could be a good excuse to actually get out and enjoy what's been put into place.					Access to rims on 27th via roadway feels very dangerous currently (when on road).	Yes, I am a member of BP Bike Patrol				Not sure, but would support it if it means more public access.	Street traffic, maintenance (repair and cleaning), unwanted dangerous people.		
Maintenance																					
Would you support or be willing to participate in volunteer maintenance & cleanup events?	Yes	No	Maybe	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes (possibly)	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	**Yes - 16 (80%) No - 3 (15%) Maybe - 1 (5%)**
Are you concerned about proper on-going maintenance being provided on a new trail?	Yes	No	Yes	Yes	Yes	No		Yes	Yes	Yes	Yes	No			No	Yes	No	Yes	No	Yes	**Yes - 11 (55%) No - 6 (30%) Didn't Answer - 3 (15%)**
If so, what are your concerns?	Cleaning off debris/rocks/dirt and long-term viability		Having perpetual funding to maintain & repair improvements & facilities. It would be unfortunate to build a trail & then fall into disrepair.		Does the City have funds to maintain the trail?		Trash that will blow onto adjacent properties, dog poop.	Broken glass, loose gravel.	It is a long segment vulnerable to weather effects and will be labor intensive.	They need to be kept clean but hopefully users would not litter.	I'm not seeing good maintenance on existing trails, weeds encroaching on trail, goat heads, trash and broken glass in places.		Needs to include maintenance. All part of planning - new roads are more costly - development inside city with existing infrastructure makes sense.				If there is a concern, I support volunteer clean up efforts.	Wear & tear due to aging and weather damage, striping of centerlines and signage.		Graffiti	
Additional Comments																					
Please use the space to provide additional comments or concerns.	I currently run up N 27th St and the current dirt trail works. It needs help in a few spots. On 27th, I'd prefer to see bike lanes on-street & separate bikes & peds there - especially going downhill. I also ride to work up 27th & there is almost enough room for a bike lane now, it just needs to be restriped & maybe reduce lane widths.	Need to connect to some part of trail currently in existence - ie - 27th St underpass. Picnic tables, etc. could be on existing city property at bottom of trail.	I am drawn to the idea of bike ped path along Hwy 3 as an extension of the Swords Park Path. The Zimmerman Trail path seems like a natural connection. The N 27th St path already exists to a degree, whereas the Zimmerman Path does not. Developing Zimmerman creates more options vs. N 27th which just improves the existing system. I believe an off-street connection at the west end of the Hwy 3 corridor is a great asset for the community & would be highly used.	We really need to get the underpass into the Zimmerman/Hwy 3 roundabout.	What is the cost of each route? Timeline?		Who is paying & why are we putting this right next to 27th St and Hwy 3 - but who pays & how much? Connecting use of Aronson is valid and should be considered.	As a new business owner, one of the most challenging tasks I face is attracting and retaining top-notch talent in Billings. If we're going to attract the best brightest, we need a bikable, walkable community for both everyday transit and for recreation. A large body of research supports this conclusion. The Rims-to-Valley connection is one of the most critical missing pieces in creating a comprehensive multi-use trail network in Billings. Along with one of the most challenging. But if we can pull this off, we will be on our way to having a world-class recreational asset.	This is an important project that, when completed, can greatly enhance the quality of life in Billings going forward, and serve as a stimulus to recruit businesses.	The Morledge trail would be above our back yard. I am in favor of improving trails.		Let's do this thing! Keep moving our city forward. Thanks	Shouldn't the 27th St Trail have been improved already when 27th St was resurfaced? The on-street bike lane and trail off street on 27th makes great sense (should be both) - airport to downtown, next to MSUB, etc. Need a bike friendly storm drain on descent side of 27th St.	What is the plan for vehicular Zimmerman when loop connects?				Some trail plans might not include paved surfaces? How will trails incorporate the Highway 3 enhancement design? How would these designs incorporate the inner belt design? What is the timeline?			
Usage																					
Do you live and/or work adjacent to the Rims?	Yes	Yes	Yes	Yes	Yes		Yes	Sort of (S of MSUB)	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	No	Yes	Yes	**Yes - 15 (75%) No - 4 (20%) Didn't Answer - 1 (5%)**
Do you recreate within or around the Rims?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes - 19 (95%) No - 0 (0%) Didn't Answer - 1 (5%)**
If not, would you use a trail if a more established access point/alignment existed?	N/A	N/A	N/A	N/A	N/A		No	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

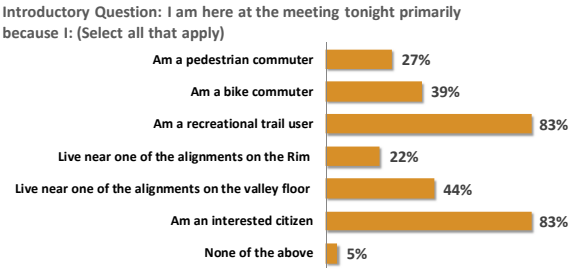
APPENDIX D: PUBLIC MEETING NO. 2 COMMUNITY POLLING RESULTS

RIMROCKS TO VALLEY
BIKE|PED FEASIBILITY STUDY

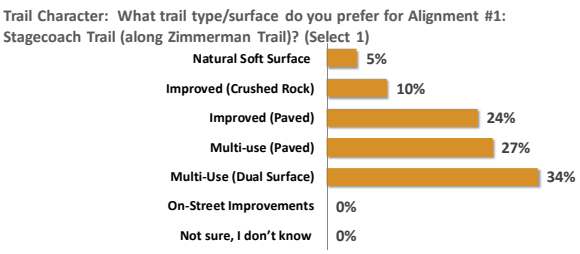
KEYPAD POLLING RESPONSES

February 3, 2015
Total Participants: 42

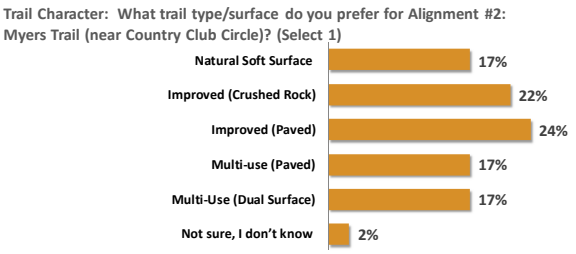
Introductory Question: I am here at the meeting tonight primarily because I: (Select all that apply)	Total Reponses	Percentage of Participants
Am a pedestrian commuter	11	27%
Am a bike commuter	16	39%
Am a recreational trail user	34	83%
Live near one of the alignments on the Rim	9	22%
Live near one of the alignments on the valley floor	18	44%
Am an interested citizen	34	83%
None of the above	2	5%



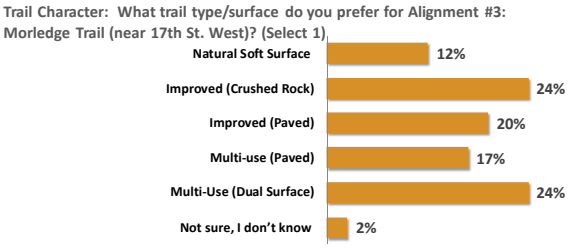
Trail Character: What trail type/surface do you prefer for Alignment #1: Stagecoach Trail (along Zimmerman Trail)? (Select 1)	Total Reponses	Percentage of Participants
Natural Soft Surface	2	5%
Improved (Crushed Rock)	4	10%
Improved (Paved)	10	24%
Multi-use (Paved)	11	27%
Multi-Use (Dual Surface)	14	34%
On-Street Improvements	0	0%
Not sure, I don't know	0	0%



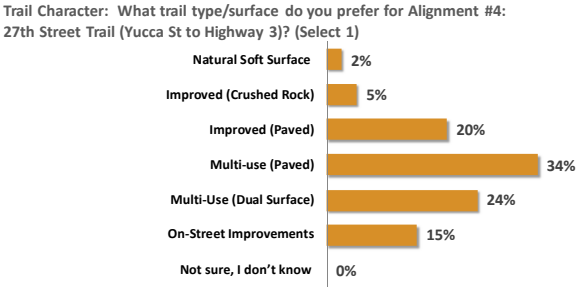
Trail Character: What trail type/surface do you prefer for Alignment #2: Myers Trail (near Country Club Circle)? (Select 1)	Total Reponses	Percentage of Participants
Natural Soft Surface	7	17%
Improved (Crushed Rock)	9	22%
Improved (Paved)	10	24%
Multi-use (Paved)	7	17%
Multi-Use (Dual Surface)	7	17%
Not sure, I don't know	1	2%



Trail Character: What trail type/surface do you prefer for Alignment #3: Morledge Trail (near 17th St. West)? (Select 1)	Total Reponses	Percentage of Participants
Natural Soft Surface	5	12%
Improved (Crushed Rock)	10	24%
Improved (Paved)	8	20%
Multi-use (Paved)	7	17%
Multi-Use (Dual Surface)	10	24%
Not sure, I don't know	1	2%

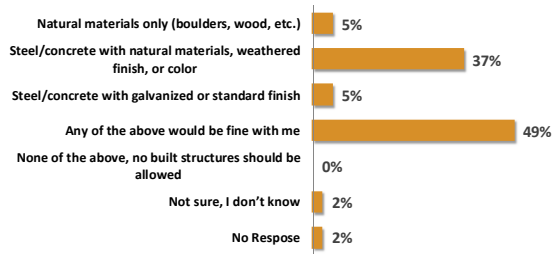


Trail Character: What trail type/surface do you prefer for Alignment #4: 27th Street Trail (Yucca St to Highway 3)? (Select 1)	Total Reponses	Percentage of Participants
Natural Soft Surface	1	2%
Improved (Crushed Rock)	2	5%
Improved (Paved)	8	20%
Multi-use (Paved)	14	34%
Multi-Use (Dual Surface)	10	24%
On-Street Improvements	6	15%
Not sure, I don't know	0	0%



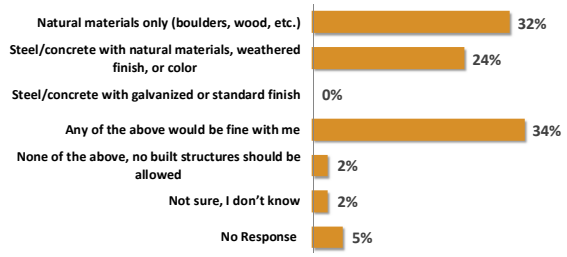
Character of Built Structures: What do you feel is the appropriate character for built structures if needed for the two outer alignments near existing roadways (Stagecoach Trail and 27th Street Trail)? (Select 1)	Total Reponses	Percentage of Participants
Natural materials only (boulders, wood, etc.)	2	5%
Steel/concrete with natural materials, weathered finish, or color	15	37%
Steel/concrete with galvanized or standard finish	2	5%
Any of the above would be fine with me	20	49%
None of the above, no built structures should be allowed	0	0%
Not sure, I don't know	1	2%
No Respose	1	2%

Character of Built Structures: What do you feel is the appropriate character for built structures if needed for the two outer alignments near existing roadways (Stagecoach Trail and 27th Street Trail)? (Select 1)

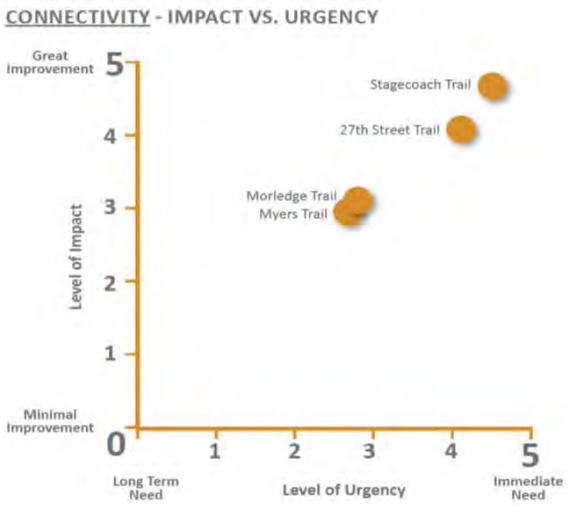


Character of Built Structures: What do you feel is the appropriate character for built structures if needed for the two alignments that connect through the center of the Rims (Myers Trail and Morledge Trail)? (Select 1)	Total Reponses	Percentage of Participants
Natural materials only (boulders, wood, etc.)	13	32%
Steel/concrete with natural materials, weathered finish, or color	10	24%
Steel/concrete with galvanized or standard finish	0	0%
Any of the above would be fine with me	14	34%
None of the above, no built structures should be allowed	1	2%
Not sure, I don't know	1	2%
No Response	2	5%

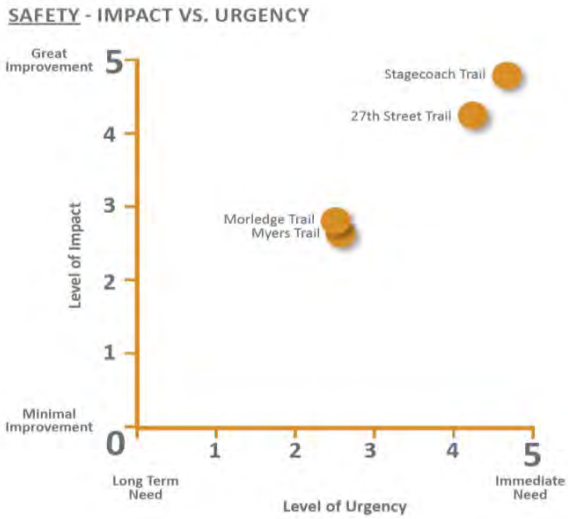
Character of Built Structures: What do you feel is the appropriate character for built structures if needed for the two alignments that connect through the center of the Rims (Myers Trail and Morledge Trail)? (Select 1)



URGENCY vs IMPACT - CONNECTIVITY	
LEVEL OF URGENCY (CONNECTIVITY)	
Stagecoach Trail (along Zimmerman Trail) - Alignment 1 Level of Urgency (CONNECTIVITY)	4.5
Myers Trail (near Country Club Circle) - Alignment 2 Level of Urgency (CONNECTIVITY)	2.7
Morledge Trail (near 17th St. West) - Alignment 3 Level of Urgency (CONNECTIVITY)	2.8
27th Street Trail (Yucca St to Highway 3) - Alignment 4 Level of Urgency (CONNECTIVITY)	4.1
LEVEL OF IMPACT (CONNECTIVITY)	
Stagecoach Trail (along Zimmerman Trail) -Alignment 1 Level of Impact (CONNECTIVITY)	4.6
Myers Trail (near Country Club Circle) - Alignment 2 Level of Impact (CONNECTIVITY)	3.0
Morledge Trail (near 17th St. West) - Alignment 3 Level of Impact (CONNECTIVITY)	3.1
27th Street Trail (Yucca St to Highway 3) - Alignment 4 Level of Impact (CONNECTIVITY)	4.1

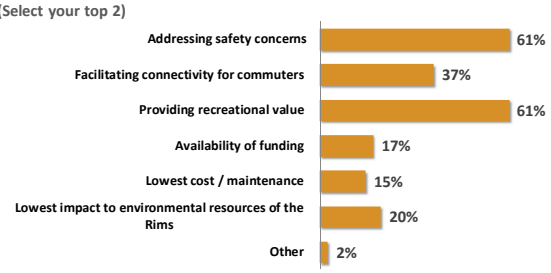


URGENCY vs IMPACT - CONNECTIVITY	
LEVEL OF URGENCY (SAFETY)	
Stagecoach Trail (along Zimmerman Trail) - Alignment 1 Level of Urgency (SAFETY)	4.60
Myers Trail (near Country Club Circle) - Alignment 2 Level of Urgency (SAFETY)	2.48
Morledge Trail (near 17th St. West) - Alignment 3 Level of Urgency (SAFETY)	2.55
27th Street Trail (Yucca St to Highway 3) - Alignment 4 Level of Urgency (SAFETY)	4.28
LEVEL OF IMPACT (SAFETY)	
Stagecoach Trail (along Zimmerman Trail) -Alignment 1 Level of Impact (SAFETY)	4.70
Myers Trail (near Country Club Circle) - Alignment 2 Level of Impact (SAFETY)	2.68
Morledge Trail (near 17th St. West) - Alignment 3 Level of Impact (SAFETY)	2.73
27th Street Trail (Yucca St to Highway 3) - Alignment 4 Level of Impact (SAFETY)	4.33



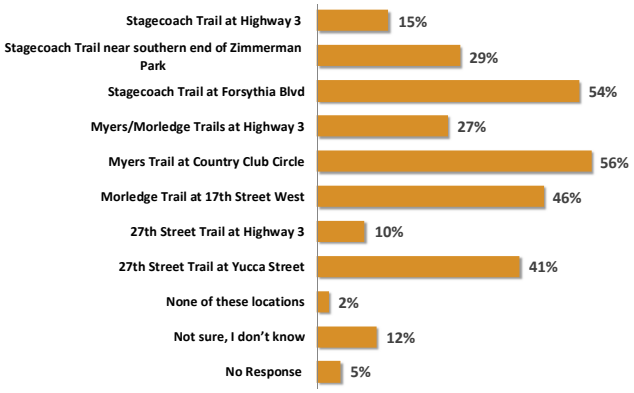
Prioritization Criteria: The criteria I feel are most important when selecting which trail alignment(s) to implement first are? (Select your top 2)	Total Reponses	Percentage of Participants
Addressing safety concerns	25	61%
Facilitating connectivity for commuters	15	37%
Providing recreational value	25	61%
Availability of funding	7	17%
Lowest cost / maintenance	6	15%
Lowest impact to environmental resources of the Rims	8	20%
Other	1	2%

Prioritization Criteria: The criteria I feel are most important when selecting which trail alignment(s) to implement first are? (Select your top 2)



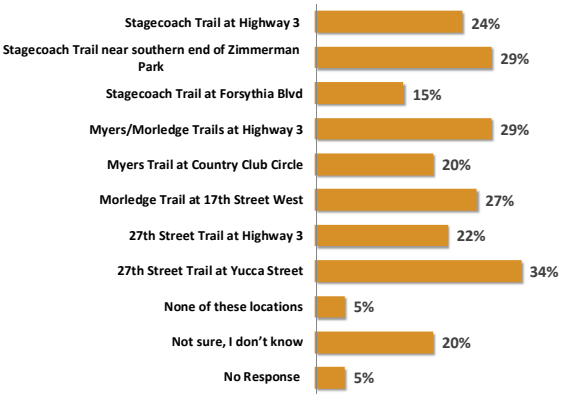
Trailhead Locations: Which of the following potential trailhead locations are appropriate for LOW INTENSITY amenities (no formal parking, trail signs only, etc.)? (Select all that apply)	Total Reponses	Percentage of Participants
Stagecoach Trail at Highway 3	6	15%
Stagecoach Trail near southern end of Zimmerman Park	12	29%
Stagecoach Trail at Forsythia Blvd	22	54%
Myers/Morledge Trails at Highway 3	11	27%
Myers Trail at Country Club Circle	23	56%
Morledge Trail at 17th Street West	19	46%
27th Street Trail at Highway 3	4	10%
27th Street Trail at Yucca Street	17	41%
None of these locations	1	2%
Not sure, I don't know	5	12%
No Response	2	5%

Trailhead Locations: Which of the following potential trailhead locations are appropriate for LOW INTENSITY amenities (no formal parking, trail signs only, etc.)? (Select all that apply)



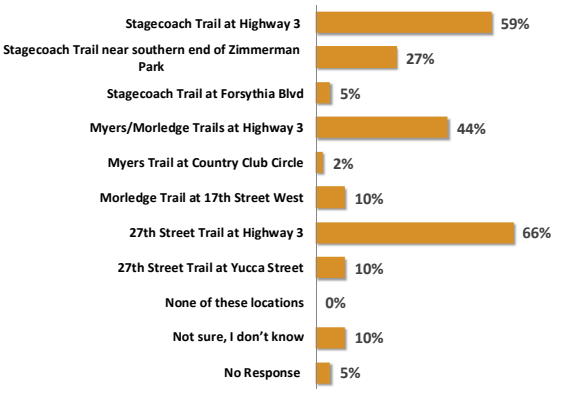
Trailhead Locations: Which of the following potential trailhead locations are appropriate for MEDIUM INTENSITY amenities (minimal parking (3-5 cars), signage kiosk, trash receptacles, seating, bike rack, etc.)? (Select all that apply)	Total Reponses	Percentage of Participants
Stagecoach Trail at Highway 3	10	24%
Stagecoach Trail near southern end of Zimmerman Park	12	29%
Stagecoach Trail at Forsythia Blvd	6	15%
Myers/Morledge Trails at Highway 3	12	29%
Myers Trail at Country Club Circle	8	20%
Morledge Trail at 17th Street West	11	27%
27th Street Trail at Highway 3	9	22%
27th Street Trail at Yucca Street	14	34%
None of these locations	2	5%
Not sure, I don't know	8	20%
No Response	2	5%

Trailhead Locations: Which of the following potential trailhead locations are appropriate for MEDIUM INTENSITY amenities (minimal parking (3-5 cars), signage kiosk, trash receptacles, seating, bike rack, etc.)? (Select all that apply)



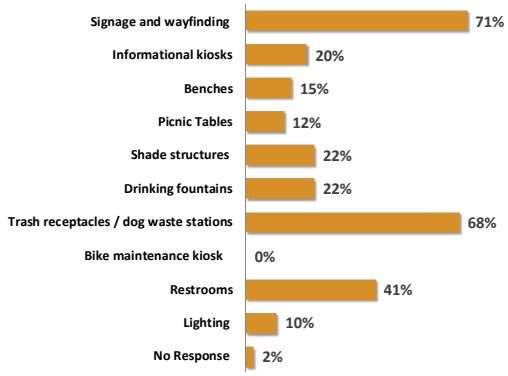
Trailhead Locations: Which of the following potential trailhead locations are appropriate for HIGH INTENSITY amenities (parking for 5-15 cars, shade structure, picnic tables, restrooms, etc.)? (Select all that apply)	Total Reponses	Percentage of Participants
Stagecoach Trail at Highway 3	24	59%
Stagecoach Trail near southern end of Zimmerman Park	11	27%
Stagecoach Trail at Forsythia Blvd	2	5%
Myers/Morledge Trails at Highway 3	18	44%
Myers Trail at Country Club Circle	1	2%
Morledge Trail at 17th Street West	4	10%
27th Street Trail at Highway 3	27	66%
27th Street Trail at Yucca Street	4	10%
None of these locations	0	0%
Not sure, I don't know	4	10%
No Response	2	5%

Trailhead Locations: Which of the following potential trailhead locations are appropriate for HIGH INTENSITY amenities (parking for 5-15 cars, shade structure, picnic tables, restrooms, etc.)? (Select all that apply)



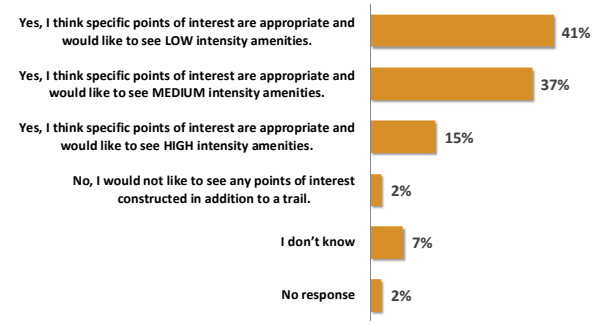
Trailhead Amenities: **The trailhead amenities I am most interested in seeing at the moderate and high intensity trailheads include: (Select your top 3)**	**Total Reponses**	**Percentage of Participants**
Signage and wayfinding	29	71%
Informational kiosks	8	20%
Benches	6	15%
Picnic Tables	5	12%
Shade structures	9	22%
Drinking fountains	9	22%
Trash receptacles / dog waste stations	28	68%
Bike maintenance kiosk	0	0%
Restrooms	17	41%
Lighting	4	10%
No Response	1	2%

Trailhead Amenities: The trailhead amenities I am most interested in seeing at the moderate and high intensity trailheads include: (Select your top 3)



Points of Interest: **Would you like to see points of interest at specific locations along the potential trail alignments? (Select 1)**	**Total Reponses**	**Percentage of Participants**
Yes, I think specific points of interest are appropriate and would like to see **LOW** intensity amenities.	17	41%
Yes, I think specific points of interest are appropriate and would like to see **MEDIUM** intensity amenities.	15	37%
Yes, I think specific points of interest are appropriate and would like to see **HIGH** intensity amenities.	6	15%
No, I would not like to see any points of interest constructed in addition to a trail.	1	2%
I don't know	3	7%
No response	1	2%

Points of Interest: Would you like to see points of interest at specific locations along the potential trail alignments? (Select 1)



APPENDIX E: OPINION OF PROBABLE COSTS

ENGINEER'S OPINION OF PROBABLE COST BASED ON CONCEPT DESIGN PLANS

RIMROCKS TO VALLEY BIKE AND PEDESTRIAN FEASIBILITY STUDY
Stagecoach Trail

ITEM NO.	EST. QTY		DESCRIPTION	UNIT PRICE		TOTAL PRICE
				$		$
100	1	LS	Mobilization/Demobilization (5%)	31,285.00 /	LS =	31,285.00
101	1	LS	Taxes, Bonds, Insurance (3%)	18,771.00 /	LS =	18,771.00
102	1	LS	Stormwater Management and Erosion Control	12,000.00 /	LS =	12,000.00
103	1	LS	Traffic Control During Construction	1,000.00 /	LS =	1,000.00
104	4	AC	Clearing and Grubbing	6,200.00 /	AC =	24,800.00
105	5,400	CY	Unclassified Excavation	20.00 /	CY =	108,000.00
106	600	CY	Imported Fill	20.00 /	CY =	12,000.00
107	1,855	CY	12-inch Thick Gravel Surface (8-foot Wide)	40.00	CY =	74,200.00
108	1	LS	Miscellaneous Signage	5,000.00 /	LS =	5,000.00
109	15,000	SY	Erosion Control Blanket	3.50 /	SY =	52,500.00
110	4	AC	Apply Topsoil and Seed Disturbed Areas	6,000.00 /	AC =	24,000.00
111	500	LF	Railing	40.00 /	LF =	20,000.00
112	1	LS	Slope Stabilization and Walls	270,000.00 /	LS =	270,000.00
113	4,440	SY	Geogrid Reinforcement	5.00 /	SY =	22,200.00

TOTAL PRICE FOR BASE BID	$ 675,756.00
TOTAL WITH 20% CONTINGENCY & 15% DESIGN/CA	$ **912,270.60**

Asphalt Surfacing Alternate

ALT1-1	4,440	SY	2 1/2-inch Thick Asphalt Surface (8-foot Wide) with 10-inch Thick Base Coarse (Includes Deduct of 2-inches of Gravel)	50.00 /	SY =	222,000.00
ALT1-2	1	LS	Miscellaneous Striping	1,000.00 /	LS =	1,000.00

TOTAL PRICE FOR ALTERNATE 1	$ 223,000.00
TOTAL PRICE WITH ALTERNATE 1	$ 898,756.00
TOTAL WITH 20% CONTINGENCY & 15% DESIGN/CA	$ **1,213,320.60**

ENGINEER'S OPINION OF PROBABLE COST BASED ON CONCEPT DESIGN PLANS

RIMROCKS TO VALLEY BIKE AND PEDESTRIAN FEASIBILITY STUDY

Myers Trail

ITEM NO.	EST. QTY		DESCRIPTION	UNIT PRICE			TOTAL PRICE
				$			$
100	1	LS	Mobilization/Demobilization (5%)	17,200.00	/ LS	=	17,200.00
101	1	LS	Taxes, Bonds, Insurance (3%)	10,320.00	/ LS	=	10,320.00
102	1	LS	Stormwater Management and Erosion Control	10,000.00	/ LS	=	10,000.00
103	1	LS	Traffic Control During Construction	1,000.00	/ LS	=	1,000.00
104	2	AC	Clearing and Grubbing	6,200.00	/ AC	=	12,400.00
105	1,890	CY	Unclassified Excavation	20.00	/ CY	=	37,800.00
106	2,200	CY	Imported Fill	20.00	/ CY	=	44,000.00
107	800	CY	12-inch Thick Gravel Surface (8-foot Wide)	40.00	CY	=	32,000.00
108	1	LS	Miscellaneous Signage	5,000.00	/ LS	=	5,000.00
109	8,000	SY	Erosion Control Blanket	3.50	/ SY	=	28,000.00
110	2	AC	Apply Topsoil and Seed Disturbed Areas	6,000.00	/ AC	=	12,000.00
111	880	LF	Railing	40.00	/ LF	=	35,200.00
112	1	LS	Slope Stabilization and Walls	117,000.00	/ LS	=	117,000.00
113	1,920	SY	Geogrid Reinforcement	5.00	/ SY	=	9,600.00

TOTAL PRICE FOR BASE BID	$ 371,520.00
TOTAL WITH 20% CONTINGENCY & 15% DESIGN/CA	$ **501,552.00**

Asphalt Surfacing Alternate

ALT1-1	1,920	SY	2 1/2-inch Thick Asphalt Surface (8-foot Wide) with 10-inch Thick Base Coarse (Includes Deduct of 2-inches of Gravel)	50.00	/ SY	=	96,000.00
ALT1-2	1	LS	Miscellaneous Striping	1,000.00	/ LS	=	1,000.00

TOTAL PRICE FOR ALTERNATE 1	$ 97,000.00
TOTAL PRICE WITH ALTERNATE 1	$ 468,520.00
TOTAL WITH 20% CONTINGENCY & 15% DESIGN/CA	$ **632,502.00**

SANDERSON STEWART

ENGINEER'S OPINION OF PROBABLE COST BASED ON CONCEPT DESIGN PLANS

RIMROCKS TO VALLEY BIKE AND PEDESTRIAN FEASIBILITY STUDY

Morledge Trail

ITEM NO.	EST. QTY		DESCRIPTION	UNIT PRICE			TOTAL PRICE
				$			$
100	1	LS	Mobilization/Demobilization (5%)	27,540.00	/ LS	=	27,540.00
101	1	LS	Taxes, Bonds, Insurance (3%)	16,524.00	/ LS	=	16,524.00
102	1	LS	Stormwater Management and Erosion Control	11,000.00	/ LS	=	11,000.00
103	1	LS	Traffic Control During Construction	1,000.00	/ LS	=	1,000.00
104	3	AC	Clearing and Grubbing	6,200.00	/ AC	=	18,600.00
105	800	CY	Unclassified Excavation	20.00	/ CY	=	16,000.00
106	9,800	CY	Imported Fill	20.00	/ CY	=	196,000.00
107	1,175	CY	12-inch Thick Gravel Surface (8-foot Wide)	40.00	CY	=	47,000.00
108	1	LS	Miscellaneous Signage	5,000.00	/ LS	=	5,000.00
109	11,500	SY	Erosion Control Blanket	3.50	/ SY	=	40,250.00
110	3	AC	Apply Topsoil and Seed Disturbed Areas	6,000.00	/ AC	=	18,000.00
111	325	LF	Railing	40.00	/ LF	=	13,000.00
112	1	LS	Slope Stabilization and Walls	171,000.00	/ LS	=	171,000.00
113	2,790	SY	Geogrid Reinforcement	5.00	/ SY	=	13,950.00
114	500	LF	Suspension Boardwalk Structure	300.00	/ LF	=	150,000.00
			TOTAL PRICE FOR BASE BID				$ 744,864.00
			TOTAL WITH 20% CONTINGENCY & 15% DESIGN/CA				$ **1,005,566.40**

Asphalt Surfacing Alternate

ALT1-1	2,790	SY	2 1/2-inch Thick Asphalt Surface (8-foot Wide) with 10-inch Thick Base Coarse (Includes Deduct of 2-inches of Gravel)	50.00	/ SY	=	139,500.00
ALT1-2	1	LS	Miscellaneous Striping	1,000.00	/ LS	=	1,000.00
			TOTAL PRICE FOR ALTERNATE 1				$ 140,500.00
			TOTAL PRICE WITH ALTERNATE 1				$ 885,364.00
			TOTAL WITH 20% CONTINGENCY & 15% DESIGN/CA				$ **1,195,241.40**

ENGINEER'S OPINION OF PROBABLE COST BASED ON CONCEPT DESIGN PLANS

RIMROCKS TO VALLEY BIKE AND PEDESTRIAN FEASIBILITY STUDY
27th Street Trail

ITEM NO.	EST. QTY		DESCRIPTION	UNIT PRICE		TOTAL PRICE
				$		$
100	1	LS	Mobilization/Demobilization (5%)	8,942.50 /	LS =	8,942.50
101	1	LS	Taxes, Bonds, Insurance (3%)	5,365.50 /	LS =	5,365.50
102	1	LS	Stormwater Management and Erosion Control	10,000.00 /	LS =	10,000.00
103	1	LS	Traffic Control During Construction	5,000.00 /	LS =	5,000.00
104	1.25	AC	Clearing and Grubbing	6,200.00 /	AC =	7,750.00
105	700	CY	Unclassified Excavation	20.00 /	CY =	14,000.00
106	50	CY	Imported Fill	20.00 /	CY =	1,000.00
107	1,100	CY	12-inch Thick Gravel Surface (8-foot Wide)	40.00	CY =	44,000.00
108	1	LS	Miscellaneous Signage	5,000.00 /	LS =	5,000.00
109	6,000	SY	Erosion Control Blanket	3.50 /	SY =	21,000.00
110	1.25	AC	Apply Topsoil and Seed Disturbed Areas	6,000.00 /	AC =	7,500.00
111	590	LF	Railing	40.00 /	LF =	23,600.00
112	1	LS	Slope Stabilization and Walls	27,000.00 /	LS =	27,000.00
113	2,600	SY	Geogrid Reinforcement	5.00 /	SY =	13,000.00

TOTAL PRICE FOR BASE BID	$ 193,158.00
TOTAL WITH 20% CONTINGENCY & 15% DESIGN/CA	$ **260,763.30**

Asphalt Surfacing Alternate

ALT1-1	2,600	SY	2 1/2-inch Thick Asphalt Surface (8-foot Wide) with 10-inch Thick Base Coarse (Includes Deduct of 2-inches of Gravel)	50.00 /	SY =	130,000.00
ALT1-2	1	LS	Miscellaneous Striping	1,000.00 /	LS =	1,000.00

TOTAL PRICE FOR ALTERNATE 1	$ 131,000.00
TOTAL PRICE WITH ALTERNATE 1	$ 324,158.00
TOTAL WITH 20% CONTINGENCY & 15% DESIGN/CA	$ **437,613.30**

SANDERSON STEWART

DESIGNWORKSHOP

Terracon
Consulting Engineers & Scientists