

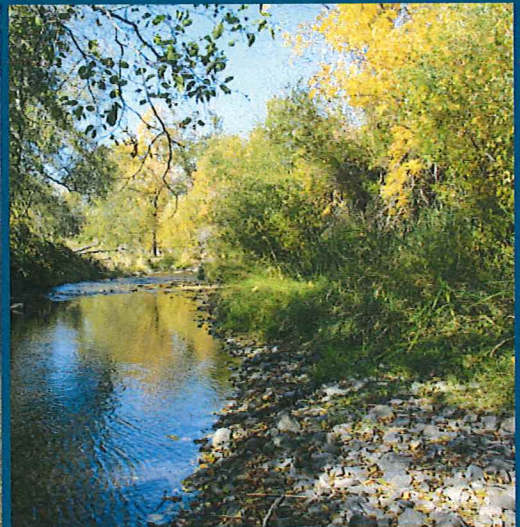
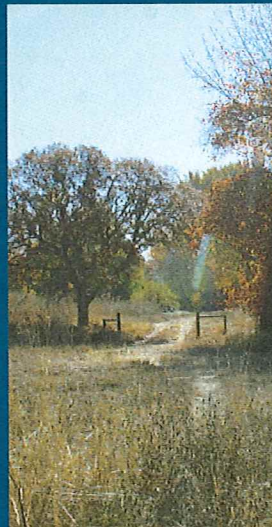


# BEAR CREEK GREENWAY

## Extension Feasibility Study

Prepared by Alta Planning + Design  
For the City of Ashland, Oregon

September 2018



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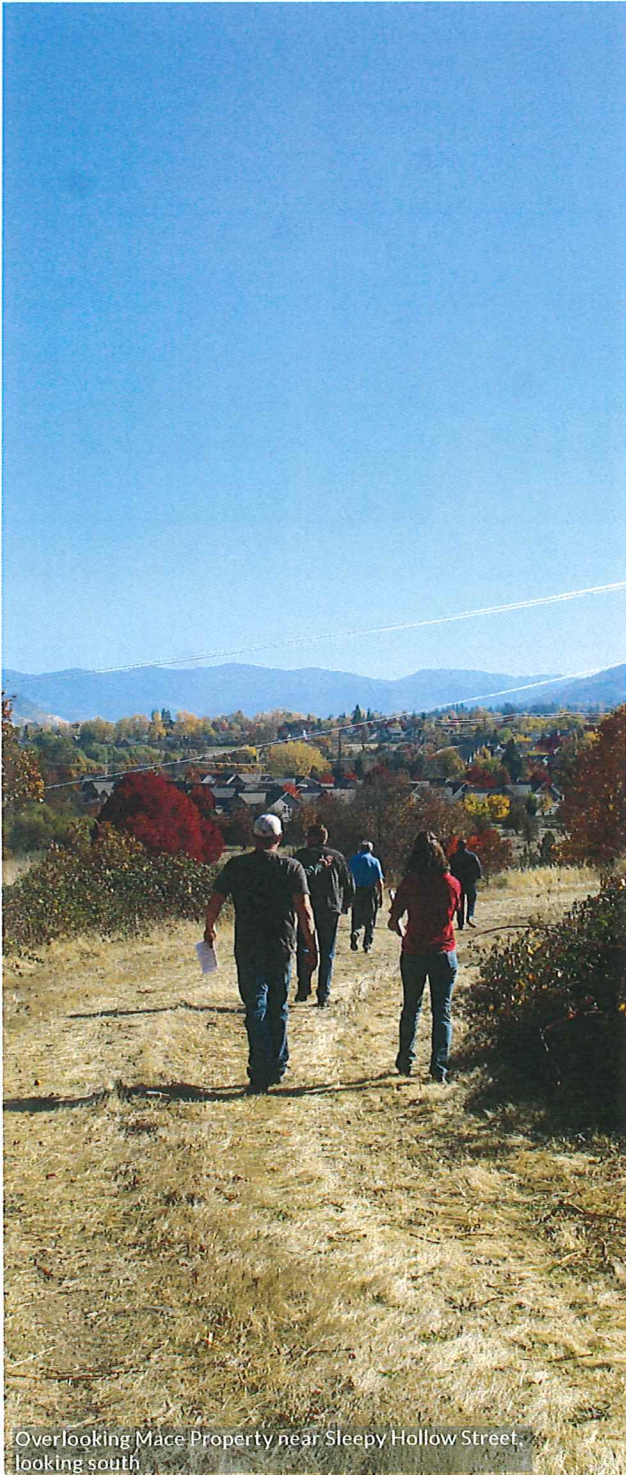
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## ACKNOWLEDGMENTS

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Over looking Mace Property near Sleepy Hollow Street, looking south

Many thanks to all who took part in this trail planning effort, including:

- Ashland Residents and Stakeholders
- Bear Creek Greenway Foundation
- Ashland Woodlands and Trails Association
- Jackson County
- Oregon Department of Transportation
- Ashland Public Works Department
- Ashland Parks and Recreation Department

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## EXECUTIVE SUMMARY

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## EXECUTIVE SUMMARY

### Project Introduction

The Bear Creek Greenway Extension Feasibility Study consists of a trail alignment analysis and recommendations for an extension of the Bear Creek Greenway between the Ashland Dog Park and North Mountain Park in Ashland, Oregon. This report includes a summary of the opportunities and constraints associated with the project area, the alignment alternatives evaluation, a preferred alignment recommendation, and planning-level design guidance.

The proposed extension of the Bear Creek Greenway will extend the existing path from its current terminus at the Ashland Dog Park into the City of Ashland with the potential to connect to existing parks, trails, residential neighborhoods, and commercial centers. Future plans call for an extension of the Greenway through Ashland all the way to Emigrant Lake, approximately five miles southeast of North Mountain Park.

### Regional Context

The Bear Creek Greenway is located within Jackson County, in the Rogue Valley of southwestern Oregon. The Greenway follows Bear Creek and Interstate 5 for approximately 20 miles and links several major communities along its riparian corridor, the most populated area in the Rogue Valley. The Greenway is typically a paved, 10-foot wide, separated mixed-use path that begins at the Dean Creek Road just north of Central Point and runs through the cities and towns of Central Point, Medford, Phoenix, and Talent before reaching its current terminus near the northwest corner of Ashland.

This project builds on a rich body of trail planning, design and implementation work over several decades that has provided Rogue Valley residents with the current Bear Creek Greenway and a connecting trail network that links valley communities with one another and provides access to the abundance of outdoor recreation and scenic resources that distinguish the region. The Bear Creek Greenway is the multi-use trail that serves as the backbone for this growing network.

### Project Goals

#### The Bear Creek Greenway Extension should:

- Provide a simple, direct connection between Ashland Dog Park and North Mountain Park
- Celebrate experiences of nature while protecting and enhancing riparian corridors, native vegetation and habitat
- Minimize risk and conflicts between pedestrians, bicycle traffic, and automobile traffic
- Support a safe and a secure environment for all users
- Provide an attractive route of travel for people walking and biking along Bear Creek
- Link the Greenway to existing and planned active transportation facilities and parks
- Maximize use of public property and existing rights-of-way

\*Project Goals were developed based on input from City of Ashland Parks and Recreation Staff and the Bear Creek Greenway Foundation

### Opportunities & Constraints

Based on an analysis of the study area (Map 1), the project team mapped several potential alignment corridors and identified associated opportunities and constraints.

Opportunities include close proximity to Bear Creek and Ashland Creek, connectivity from residential areas and existing bicycle and trail facilities to the trail corridor, high quality views, and recent land acquisitions that support implementation of the Bear Creek Greenway extension.

The most immediate constraints to trail feasibility relate to environmental factors and private property impacts. The floodways, riparian protection zones and wetlands are a major consideration for the trail alignment. The project team avoided these areas as much as possible when delineating the potential routes. Where there are potential impacts, it is generally because of adjacent private property constraints.

Other constraints include major road crossings, required stream crossings, landslide deposit areas, and the on-street segments associated with some of the alignments (due to the absence of feasible off-street options).

### Key Planning Considerations

Key considerations for planning the specific trail alignment included:

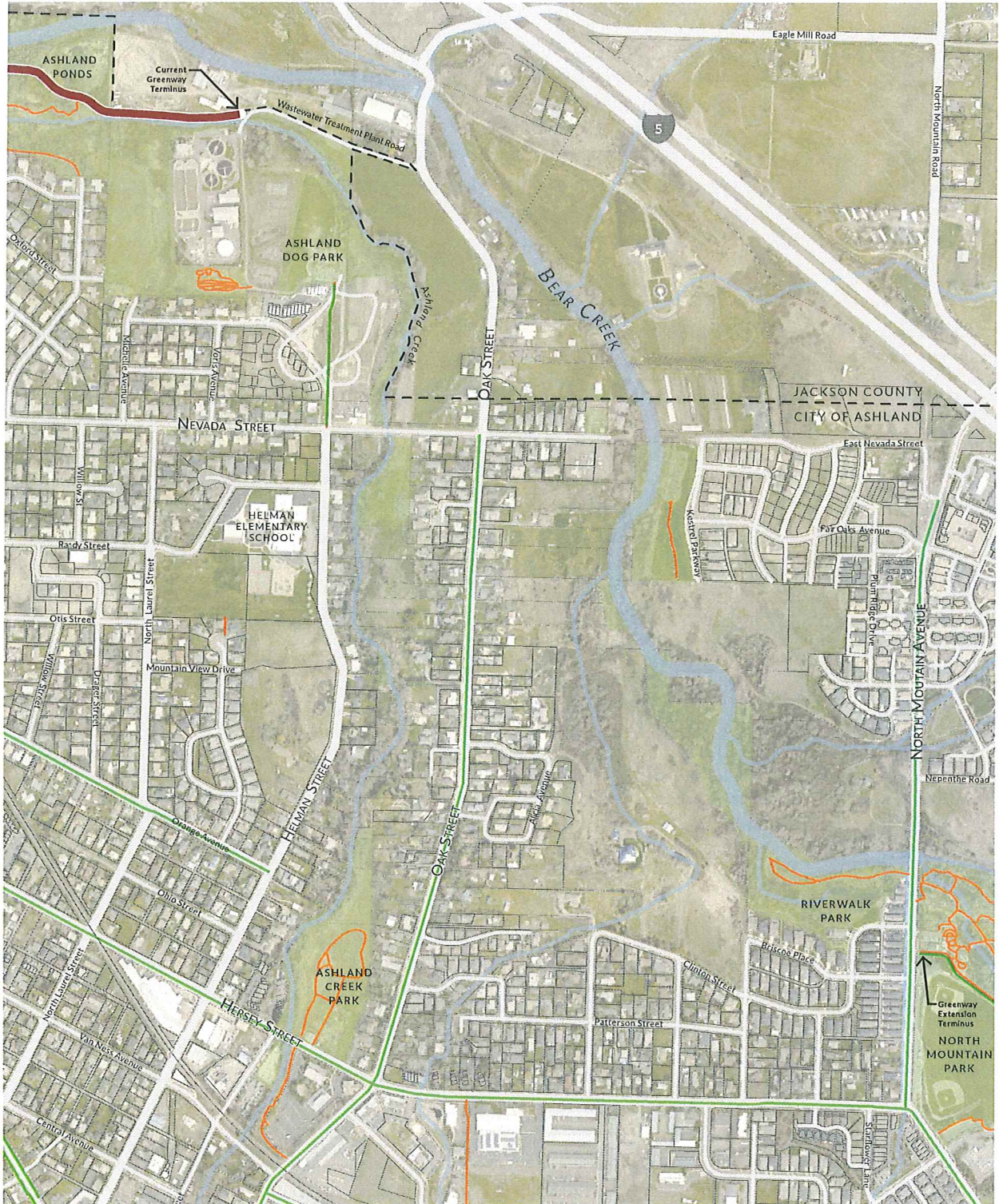
- Minimizing private property impacts while establishing the most direct route
- Minimizing environmental impacts while still creating a scenic experience in close proximity to Bear Creek for trail users
- Minimizing high costs associated with elements such as bridges and stream crossings
- Taking advantage of existing on-street facilities while providing an enjoyable experience for trail users that feels connected to the creek.



Kestrel Property Conservation Area, looking south



# EXECUTIVE SUMMARY

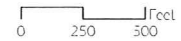


## BEAR CREEK GREENWAY EXTENSION

Map 1. Study Area

### LEGEND

- Existing Bear Creek Greenway
- Existing Bike Route
- Existing Trail
- City Boundary
- Tax Lots
- Parks
- Streams



This project is a City of Ashland 2017 project prepared by Park Planning + Design, 2018



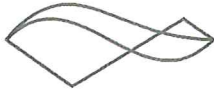
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## EXECUTIVE SUMMARY

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### Evaluation

The project team completed a series of analytical steps to determine a recommended trail alignment for the Bear Creek Greenway between Ashland Dog Park and North Mountain Park. These included site analysis, delineation of multiple alignment alternatives, and the evaluation of those alternatives based on the evaluation criteria.



#### Delineation of Alignment Alternatives

The project team delineated three alignment alternatives for the evaluation. Project goals developed in coordination with City staff and project stakeholders guided the delineation. These goals included:

##### HIGHEST PRIORITY

- Foster connectivity; create a high quality user experience; avoid Bear Creek floodway; maximize user safety and security; minimize conflicts with automobiles

##### MEDIUM PRIORITY

- Minimize property acquisition; minimize impacts within stream and wetland protection zones

##### LOW PRIORITY

- Avoid floodplain

#### Alignment Segments

To support the evaluation of alignment alternatives, the project team divided alignments into segments based on major differences in surrounding conditions, path junctions, and potential cross over points between alignment alternatives. This allowed final recommended alignments to potentially include a combination of segments from different alignment alternatives (Map 2).

#### Secondary Routes

In addition to the core alignment alternatives, the project team identified one or more secondary routes for each alignment alternative, and considered these routes for inclusion in the alignment recommendations.



#### Evaluation Criteria

The project team and City of Ashland Parks and Recreation Staff developed the following evaluation criteria, applied with the same ranked priorities used to delineate the alignment alternatives:

##### OVERALL QUALITY

- Creates Greenway Experience: a family-friendly separated path experience with a strong connection to natural vegetation, waterways, and nature experiences
- Connects Trails and Parks, such as existing bicycle facilities, hard and soft trails, public parks, and civic plazas
- Directness of Route, which is a comparison between the alignment alternatives

##### SAFETY

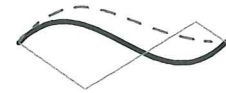
- Minimizes Crime Risk, based on Crime Prevention Through Environmental Design (CPTED) principles such as avoiding isolating path users, maximizing "eyes on the trail", and maintaining clear lines of sight
- Minimizes Vehicle Conflict Risk by ensuring that roadway crossings, side-paths, and on-street facility segments can be designed to the highest safety standards

##### ENVIRONMENTAL

- Avoids Floodway
- Avoids Stream & Wetland Protection Zones
- Avoids 100-year floodplain, as defined by the Federal Emergency Management Agency

##### HIGH-COST ITEMS

- Avoids Private Property Impacts and the need for land and easement acquisition
- Avoids High Cost Elements such as bridges, major intersection improvements at trail crossings, major environmental permitting and mitigation costs, and existing bridge retrofits



#### Alignment Recommendations

Recommendations fall into one of several categories including a recommended interim, short-term, and permanent alignment. Some alignment alternatives may be recommended for a potential future path.

##### INTERIM ALIGNMENT

An interim alignment takes advantage of existing conditions and creates a path for users as soon as possible. This alignment does not necessarily meet project aims, but fosters short-lived access and use.

##### SHORT-TERM ALIGNMENT

If funding or other factors delay implementation of the permanent alignment, a short-term alignment will generally be less expensive and easier to implement, even if it lacks the overall quality expected for the permanent alignment.

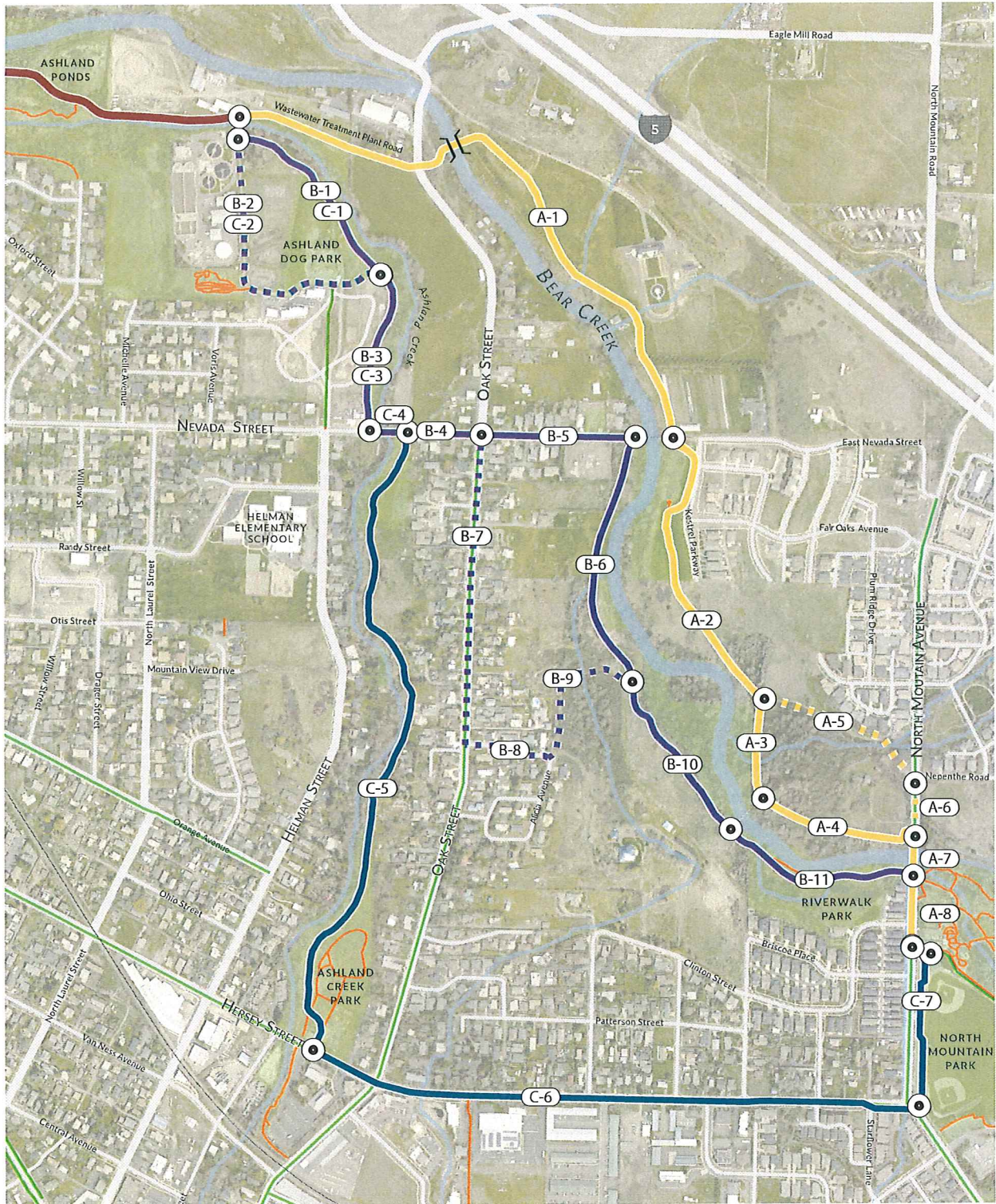
##### PERMANENT ALIGNMENT

This alignment best meets the project's goals and values and is the recommended long-term, permanent alignment for the Bear Creek Greenway.

##### POTENTIAL FUTURE PATH (NOT MAPPED)

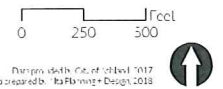
If an alignment alternative was not recommended for the permanent or interim alignments, it may nevertheless be worthy of future consideration or fall within the scope of a separate trail planning effort. When an alignment is recommended as an optional future path, this implies that no fatal flaws were identified during the alternatives evaluation.

# EXECUTIVE SUMMARY



**BEAR CREEK GREENWAY EXTENSION**  
 Map 2. Draft Alignment Alternatives

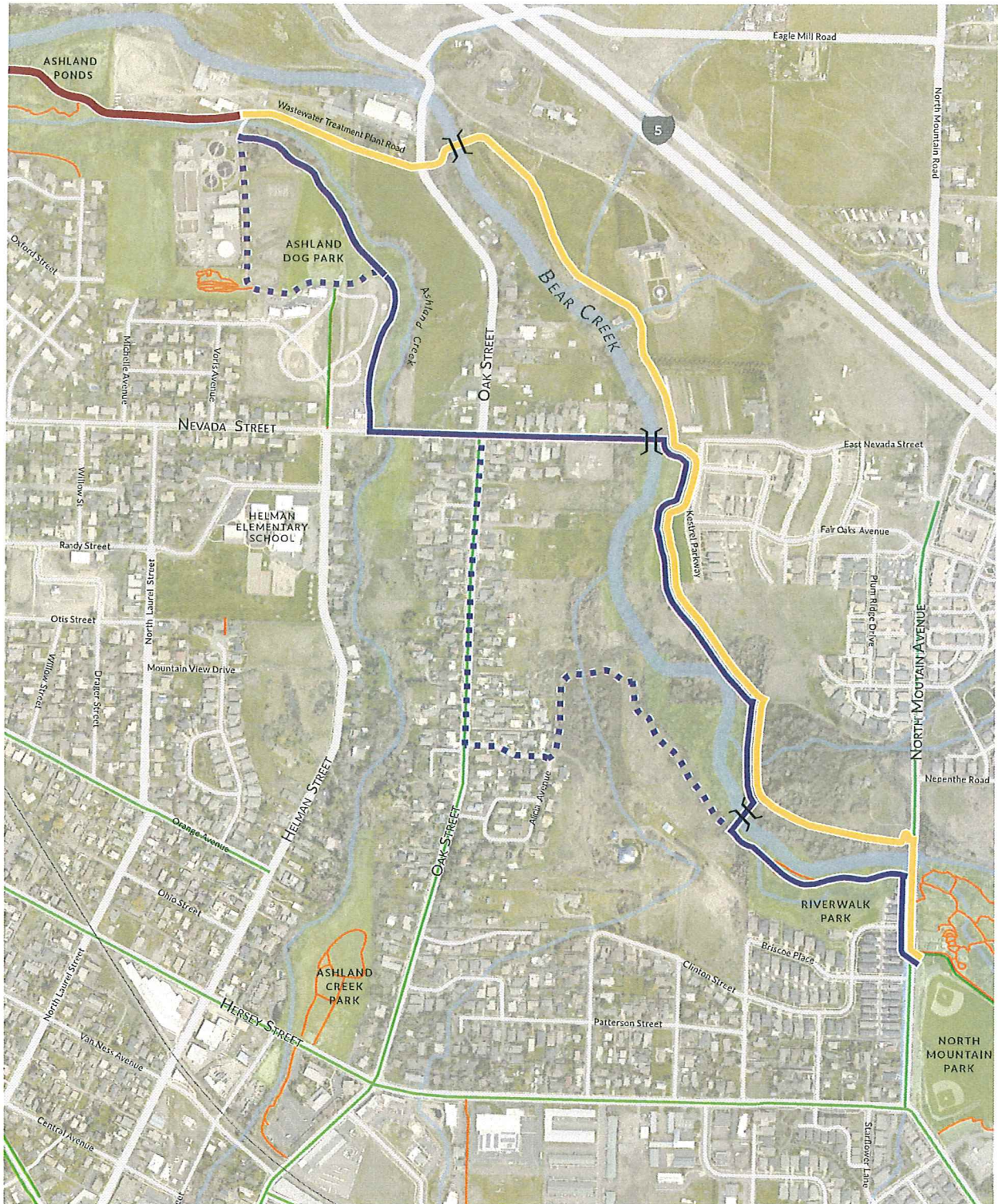
- LEGEND**
- Alignment A
  - - - Secondary Route
  - Alignment B
  - - - Secondary Route
  - Alignment C
  - - - Secondary Route
  - A-1 Segment
  - Segment Endpoint



Planimetric City of Ashland 2017  
 Prepared by: RaPlanning + Design 2018



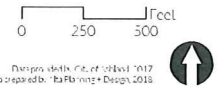
# EXECUTIVE SUMMARY



**BEAR CREEK GREENWAY EXTENSION**  
 Map 3. Draft Recommended Alignment

**LEGEND**

- Interim Alignment
- Short-term Alignment
- Permanent Alignment
- Pedestrian/Bicycle Bridge
- Existing Bear Creek Greenway
- Existing Bike Route
- Existing Trail
- Parks
- Streams



Map prepared by: RaPa Inc. • Design, 2018

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## INTRODUCTION

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## INTRODUCTION

### Project Introduction

The Bear Creek Greenway Extension Feasibility Study consists of a trail alignment analysis and recommendations for an extension of the Bear Creek Greenway between the Ashland Dog Park and North Mountain Park in Ashland, Oregon. This report includes a summary of the opportunities and constraints associated with the project area, the alignment alternatives evaluation, a preferred alignment recommendation, and planning-level design guidance.

This project builds on a rich body of trail planning, design and implementation work over several decades that has provided Rogue Valley residents with the current Bear Creek Greenway and a connecting trail network that links valley communities with one another and provides access to the abundance of outdoor recreation and scenic resources that distinguish the region. Bear Creek Greenway is the multi-use trail that serves as the backbone for this growing network.

The proposed extension of the Bear Creek Greenway will extend the existing path from its current terminus at the Ashland Dog Park into the City of Ashland with the potential to connect to existing parks, trails, residential neighborhoods, and commercial centers. Ashland is a well-known destination, home to the Oregon Shakespeare Festival, Southern Oregon University (SOU), an attractive downtown, and Lithia Park along Ashland Creek. Future plans call for an extension of the Greenway through Ashland to Emigrant Lake, approximately five miles southeast of North Mountain Park.

### Regional Context

The Bear Creek Greenway is located within Jackson County, in the Rogue Valley of

southwestern Oregon. The Greenway follows Bear Creek and Interstate 5 for approximately 20 miles and links several major communities along its riparian corridor (Map 4). The Greenway is typically a paved, 10-foot wide, separated mixed-use path that begins at the Dean Creek Road just north of Central Point and runs through the cities and towns of Central Point, Medford, Phoenix, and Talent before reaching its current terminus near the northwest corner of Ashland. The Greenway includes a direct connection to Bear Creek, the Rogue Valley International-Medford Airport, the Rogue Valley Mall, and eight public parks along its path. The Greenway sets the stage for a future link to the Rogue River (located two miles north of the Greenway's Dean Creek trailhead access point) and the Rogue River Greenway, currently in the planning phases.

### Historical Summary

The Bear Creek Greenway Foundation was created in 1985 to help acquire land for the Bear Creek Greenway. Steady progress has been made through vision and planning, land acquisition, engineering, and construction. Nearly 20 miles of trail are now enjoyed by bicyclists, walkers, runners, school groups, families and children.

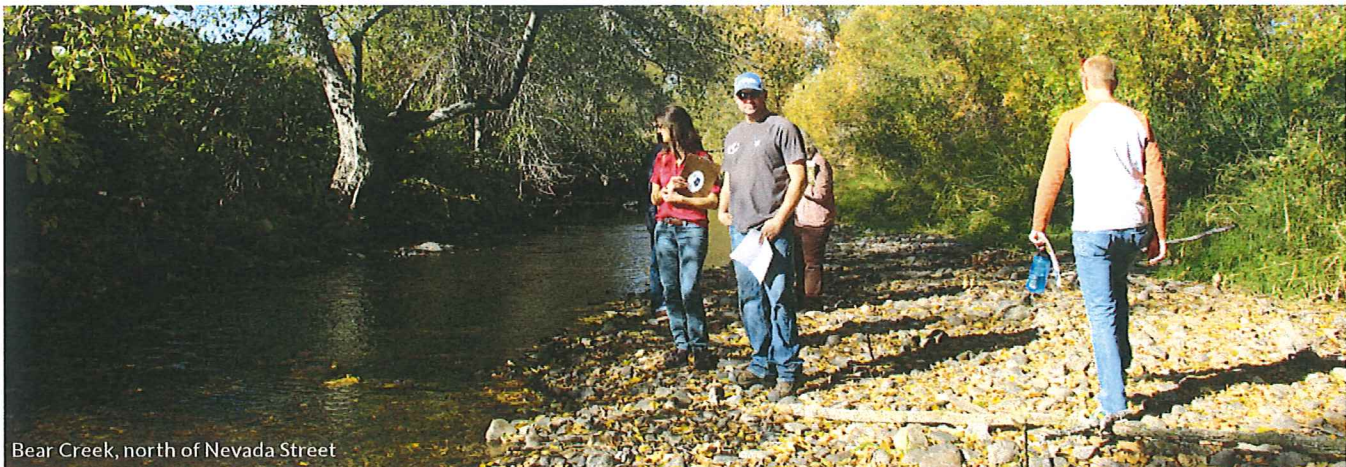
According to historical accounts written by the Foundation, regional planners have envisioned "an emerald necklace" of park land stretching from Emigrant Lake near Ashland to the Rogue River dating back to the 1960s. In 1973, a state bill established the Bear Creek Greenway which enabled Jackson County to proceed with planning and land acquisition for a nearly 30-mile long trail from the creek's source at Emigrant Creek to a point near Eagle Point where Bear Creek flows into the Rogue River. That same year, the Oregon Department of Transportation (ODOT) built the first 3.4 miles of trail through Medford.

### Project Goals

The Bear Creek Greenway Extension should:

- Provide a simple, direct connection between Ashland Dog Park and North Mountain Park
- Celebrate experiences of nature while protecting and enhancing riparian corridors, native vegetation and habitat
- Minimize risk and conflicts between pedestrians, bicycle traffic, and automobile traffic
- Support a safe and a secure environment for all users
- Provide an attractive route of travel for people walking and biking along Bear Creek
- Link the Greenway to existing and planned active transportation facilities and parks
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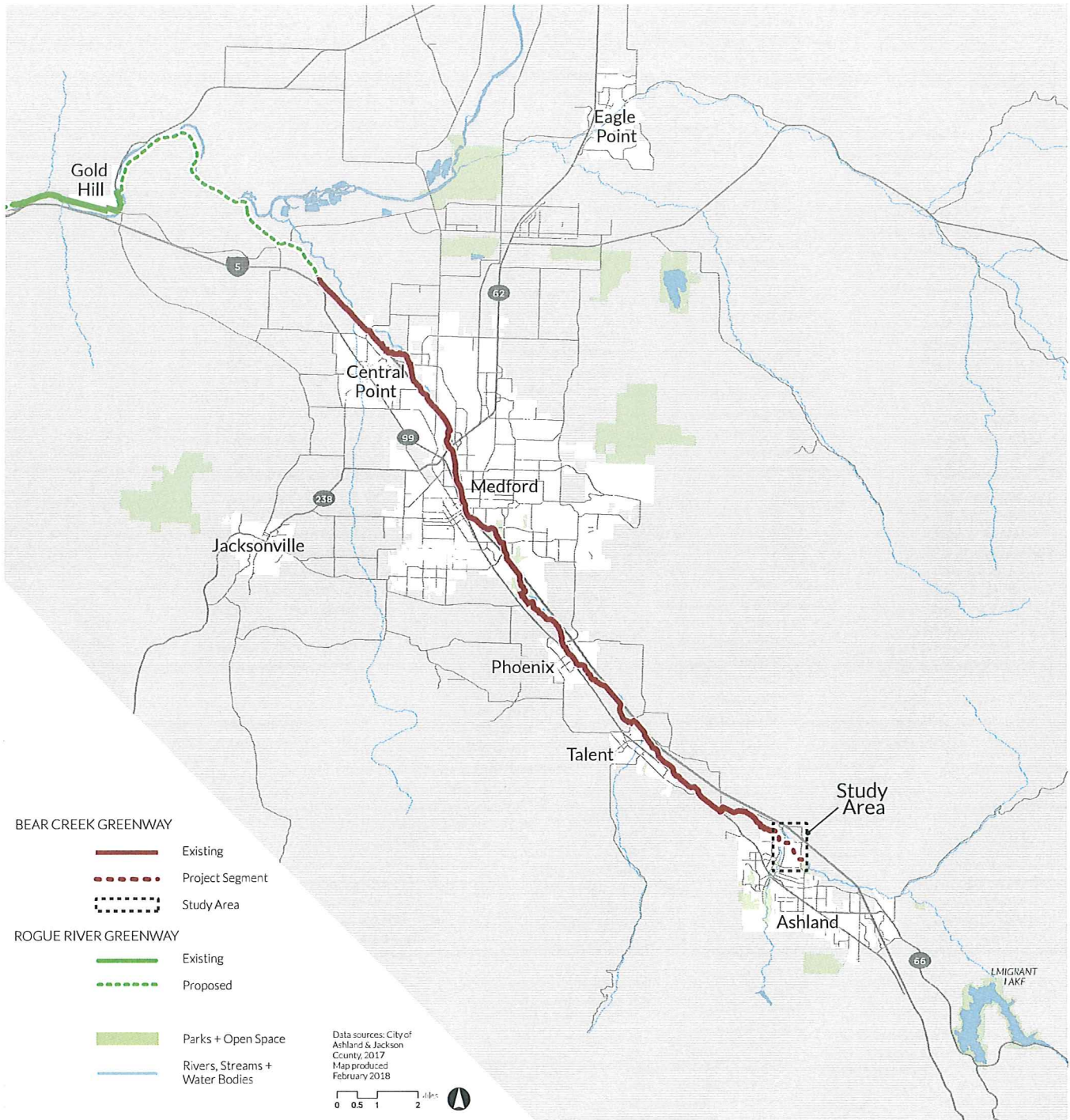
\*Project Goals were developed based on input from City of Ashland Parks and Recreation Staff and the Bear Creek Greenway Foundation



Bear Creek, north of Nevada Street



# INTRODUCTION



Map 4. Bear Creek Greenway Regional Map

# INTRODUCTION

## Existing Plans

### Ashland Trails Master Plan, July 2006

The Ashland Trails Master Plan identifies the Bear Creek Greenway as the Rogue Valley's premier trail and identifies full implementation of the trail as a major regional priority. At a local level, the Bear Creek Greenway extension will connect with several planned trails in the Ashland area including Wrights Creek Trail, Ashland Creek Trail, Roca Creek Trail, Clay and Hamilton Creek Trails, and Tolman Creek Trail. The Greenway extension will also connect with Helman and Oak Streets, which are designated bike routes. The extension will cross and connect with North Mountain Avenue, an important route to travel north from Ashland toward Grizzly Peak. The Greenway extension will also provide a trail link between Ashland Dog Park and North Mountain Park to the south.

The Ashland Trails Master Plan establishes a network to link the aforementioned trails, in which the proposed greenway extension will play a key role. The Plan also establishes basic trail design elements.

### Ashland Transportation System Plan, October 2012

The bicycle and pedestrian elements of Ashland's Transportation System Plan (TSP) identify a planned off-street bike path/greenway connecting Nevada St. and Mountain Ave along Bear Creek, which aligns with the Trails Master Plan to extend the Bear Creek Greenway in the project study area. Other TSP projects that are relevant to the study area, including bike routes and road extensions that would serve the trail, are summarized in Table 2.

### Bear Creek Greenway Management Plan, December 2006

The Bear Creek Management Plan established a collaborative effort between multiple jurisdictions and the Greenway Foundation, and identifies basic standards, responsibilities, and cost estimates for trail management, public safety, and natural resources protection.

Table 2. City of Ashland 2012 TSP Projects within Project Area

PROJECT NAME	NO.	PROJECT EXTENT	DESCRIPTION	PRIORITY
Nevada Street	B3	From Vansant Street to N Mountain Avenue	Add a bicycle lane to fill gap in existing network	Medium (5-15 years)
Helman Street	B19	From Nevada Street to N Main Street	Bicycle boulevard to fill gap in existing network	High (0-5 years)
Oak Street	B21	From Nevada Street to N Main Street	Bicycle boulevard to fill gap in existing network	Low (5-25 years)
East Nevada Street Extension	R17	From Kestrel Parkway to the stub of Nevada Street to the west	Extend Nevada Street from Bear Creek to Kestrel Parkway	Development-Driven
Kestrel Parkway Extension	R32	Kestrel Parkway to Nepenthe Road	Extend Kestrel Parkway to N Mountain Avenue at Nepenthe Road	Development-Driven

## Project Planning Process

During the course of the Bear Creek Greenway Extension Feasibility Study, the project team, comprised of representatives from the City of Ashland, the Bear Creek Greenway Foundation, and Alta Planning + Design, explored alignment options and weighed the opportunities and constraints associated with each. Planning the alignment took place through the following steps:

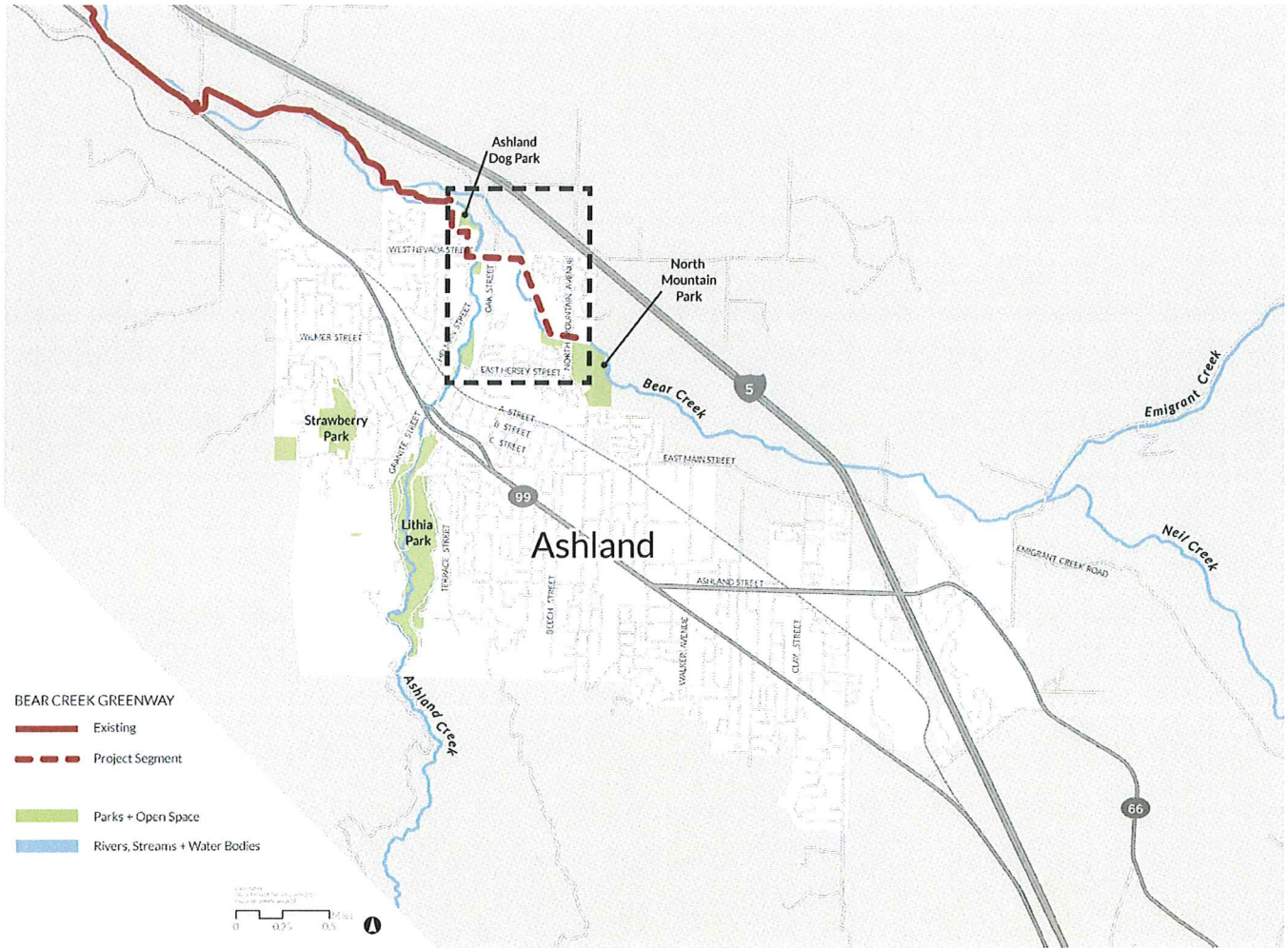
- During the fall of 2017, the project team conducted a site analysis, mapped opportunities and constraints within the corridor, and developed a range of alternative trail alignments. This analysis is presented in Chapters III and IV of this report.
- Using GIS and LiDAR elevation data, the team refined three alternative alignments for evaluation: "A" running northeast of Bear Creek, "B" running southwest of Bear Creek, and "C" running east of Ashland Creek and utilizing existing roadways.
- Evaluation of the trail alignment alternatives was primarily based on the evaluation criteria agreed upon by the project team and described in Chapter IV of this report.
- In early 2018, the project team further refined the alternatives and evaluated them against the criteria. The team presented the draft alignment to local stakeholders, and adjusted the design based on feedback.
- In spring 2018, the City of Ashland selected a preferred trail alignment based on the analysis findings and feedback from internal and external stakeholders.

## Key Agencies and Partners

The Bear Creek Greenway is managed by a collaborative effort between multiple jurisdictions (Central Point, Medford, Phoenix, Talent, and Ashland) as well as Jackson County, ODOT, and the Bear Creek Greenway Foundation. This project will directly involve the following stakeholders and partners:

- City of Ashland
- Ashland Parks & Recreation Department
- Ashland Woodlands and Trails Association
- Bear Creek Greenway Foundation
- Jackson County
- Oregon Department of Transportation

# INTRODUCTION



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EXISTING CONDITIONS

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## EXISTING CONDITIONS

### Site Setting

The following chapter discusses existing conditions within the study area. The corresponding thematic maps illustrate conditions that will impact trail feasibility and inform the alignment alternatives analysis.

### Land Use

The study area for the Bear Creek Greenway Extension Feasibility Study includes 847 acres located at the northern limits of the City of Ashland (Map 6). Of these, 644 acres (76%) are within the Ashland Urban Growth Boundary (UGB) and 203 acres (24%) are located in unincorporated Jackson County.

The study area includes residential developments, two riparian corridors (Bear Creek and Ashland Creek), and Helman Elementary School. The Ashland Wastewater Treatment Plant and the Ashland Dog Park are located at the northwest edge of the study area, where the Bear Creek Greenway trail alignment currently ends. North Mountain Park is the destination for the proposed greenway extension, approximately one mile to the southeast. Interstate 5 runs along the edge of the study area to the north. Other major roadways within the study area include East Nevada Street and West Hersey Street (running east-west), and Helman Street, Oak Street, and North Mountain Avenue (north-south).

The study area includes 4.4 miles of existing bicycle facilities which includes existing portions of the Bear Creek Greenway, multi-use paths, bicycle lanes, and bicycle boulevards. In addition, the study area

includes 2.8 miles of existing trails for hikers, bikers, or mixed use.

Privately owned land accounts for 722 acres (85%) of the study area. Many of these privately owned parcels are located in close proximity to Bear Creek, where trail alignments are most desirable (Map 7).

Areas that are subject to City of Ashland zoning are as follows: 336 acres (60%) are zoned Single Family Residential with 82 acres (15%) zoned for Employment and 59 acres (11%) zoned for the North Mountain Neighborhood development. An additional 56 acres (10%) include Suburban Residential, Multi Family Residential, and High Density Residential zoning. Only 9 acres (2%) are zoned for commercial, with 4 acres (0.75%) zoned for industrial use.

### Environmental Factors

The proposed Greenway extension is located along a riparian corridor and thus is subject to several environmental protection standards (Map 8).

The largest waterway in the study area is Bear Creek, which flows over 1.5 miles in the study area and has an elevation drop of 55 feet between the southeast and northwest corners of the study area. Ashland Creek is another important waterway that feeds into Bear Creek just beyond the northwest corner of the study area. Other named waterways include Beach Creek, Mountain Creek, Talent Canal, Kitchen Creek, Mook Creek, and Mountain Creek.

The City of Ashland has established Stream Protection Zones for streams. Fish bearing

streams with an annual average stream flow less than 1,000 cubic feet of water per second (cfs) require a 50-foot setback from top of bank. Local non-fish bearing streams require a 40-foot setback from the centerline of the stream and intermittent or ephemeral streams require a 30-foot setback from the centerline.

Bear Creek and Ashland Creek both require a 50-foot setback from top of bank, while the other named waterways within the study area require a 30-foot setback from the stream centerline.

Bear Creek is surrounded by a designated Floodway and 100-year floodplain along both sides of its bank. Furthermore, wetlands have been identified in the southwest portion of the study area, in the area where Bear Creek meets North Mountain Avenue. These wetlands, which are classified as Locally Significant by the City of Ashland, require a 50-foot development buffer.

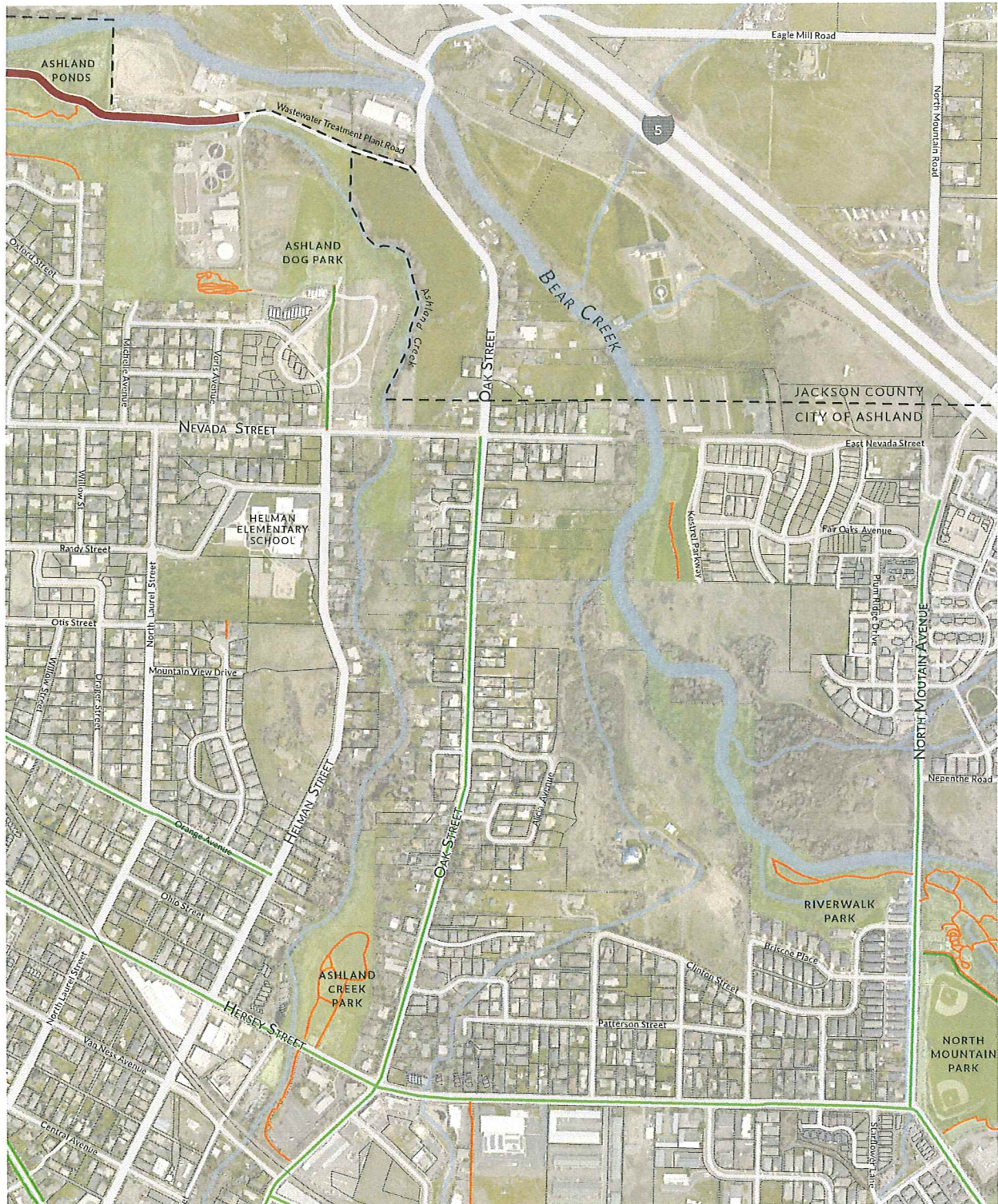
### Potential Geotechnical Concerns

The Oregon Department of Geology and Mineral Industries (DOGAMI) provides Landslide Deposit Inventory maps and data that illustrate the locations of identified scarps, landslide deposits and associated features throughout Oregon (Map 9). The presence of historic landslide deposits does not guarantee that there will be construction challenges but in many cases, trail construction that requires cut or fill into steep slopes may be more complex and expensive when work is performed within less stable landslide deposit areas. At a minimum, a qualified geotechnical investigation is warranted.



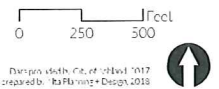
North Mountain Park, looking east

# EXISTING CONDITIONS



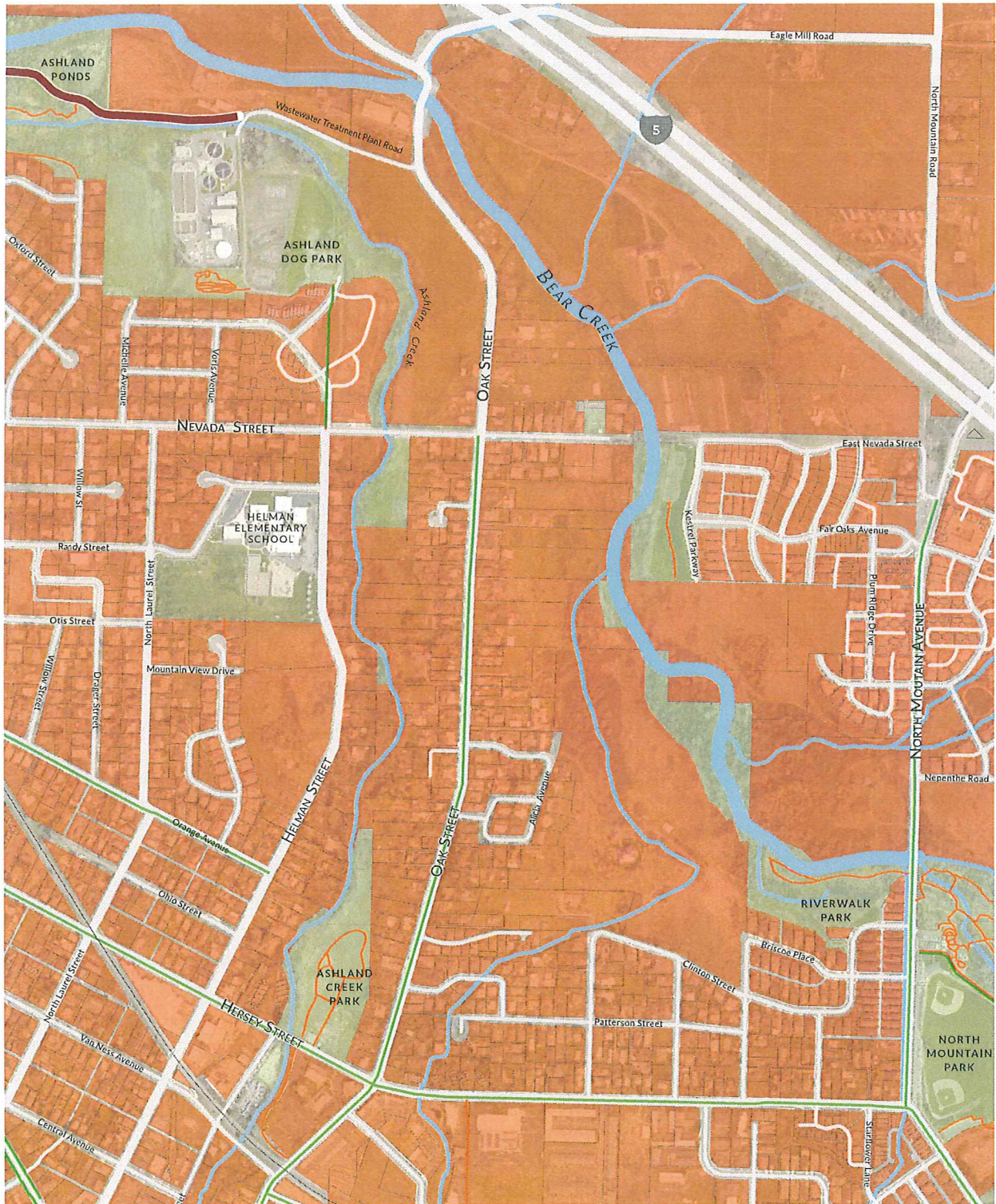
**BEAR CREEK GREENWAY EXTENSION**  
 Map 6. Study Area

- LEGEND**
- Existing Bear Creek Greenway
  - Existing Bike Route
  - Existing Trail
  - City Boundary
  - Tax Lots
  - Parks
  - Streams



Design: Utah City of 12/15/17  
 as prepared by: BSR Planning + Design, 2018

# EXISTING CONDITIONS



**BEAR CREEK GREENWAY EXTENSION**  
 Map 7. Private Property Ownership

- LEGEND**
- Privately Owned Parcels
  - Existing Bear Creek Greenway
  - Existing Bike Route
  - Existing Trail
  - Tax Lots
  - Parks
  - Streams

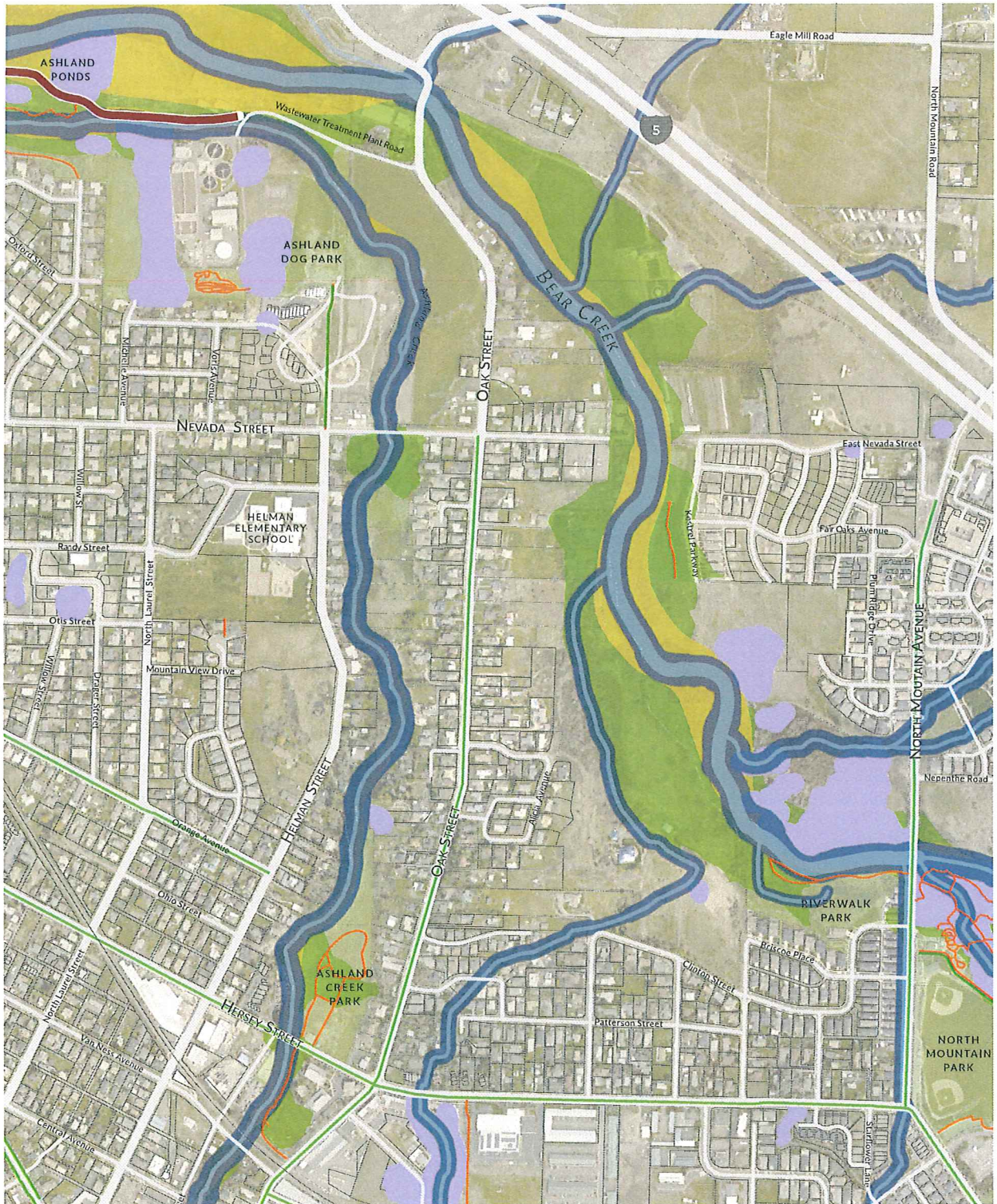


Design: Urban, Co., et al. 10/16/17  
 Map prepared by: The Planning & Design, 2018





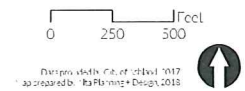
# EXISTING CONDITIONS



**BEAR CREEK GREENWAY EXTENSION**  
 Map 8. Environmental Factors

**LEGEND**

- Existing Bear Creek Greenway
- Existing Bike Route
- Existing Trail
- Wetlands
- Floodway
- Tax Lots
- Parks
- Streams
- 100-Year Floodplain
- Stream Protection Zone



Map prepared by City of Ashland 2017  
 by Planning + Design, 2018

# EXISTING CONDITIONS



**BEAR CREEK GREENWAY EXTENSION**  
 Map 9. Geotechnical Factors

- LEGEND**
- Landslide Deposits
  - Existing Bear Creek Greenway
  - Existing Bike Route
  - Existing Trail
  - Tax Lots
  - Parks
  - Streams



Design sketch, City of Ashland 2017  
 as created by: The Planning + Design, 2018



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## EXISTING CONDITIONS

### Opportunities & Constraints

Based on an analysis of the study area, the project team mapped several potential alignment corridors and identified associated opportunities and constraints.

Opportunities include close proximity to Bear Creek and Ashland Creek, connectivity from residential areas and existing bicycle and trail facilities to the trail corridor, high quality views, and recent land acquisitions that support implementation of the Bear Creek Greenway extension.

The most immediate constraints to trail

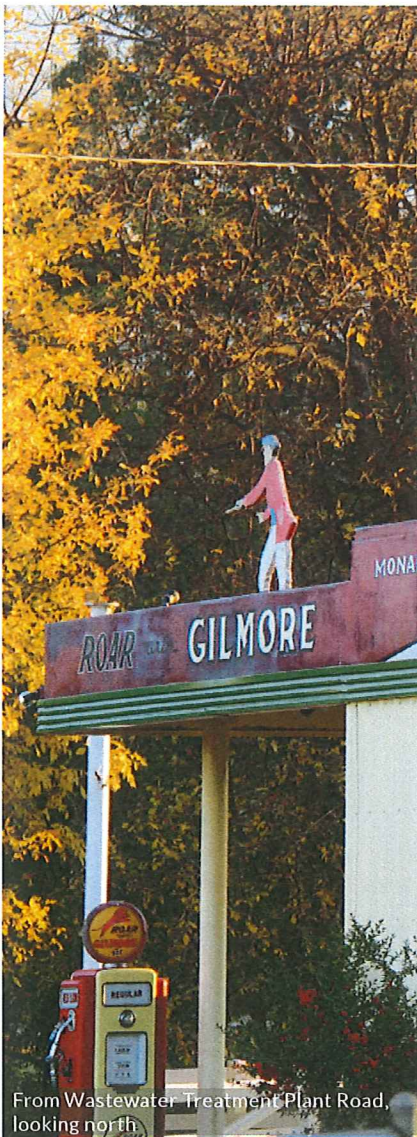
feasibility relate to environmental factors and private property impacts. The floodways, riparian protection zones and wetlands are a major consideration for the trail alignment. The project team avoided these areas as much as possible when delineating the potential routes. Where there are potential impacts, it is generally because of adjacent private property constraints.

Other constraints include major road crossings, required stream crossings, landslide deposit areas, and the on-street segments associated with some of the alignments (due to the absence of feasible off-street options).

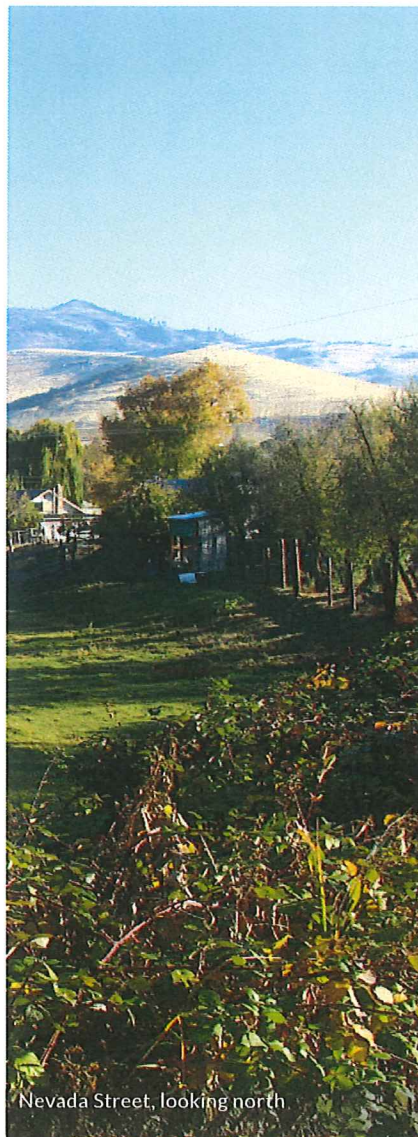
### Key Planning Considerations

Key considerations for planning the specific trail alignment included:

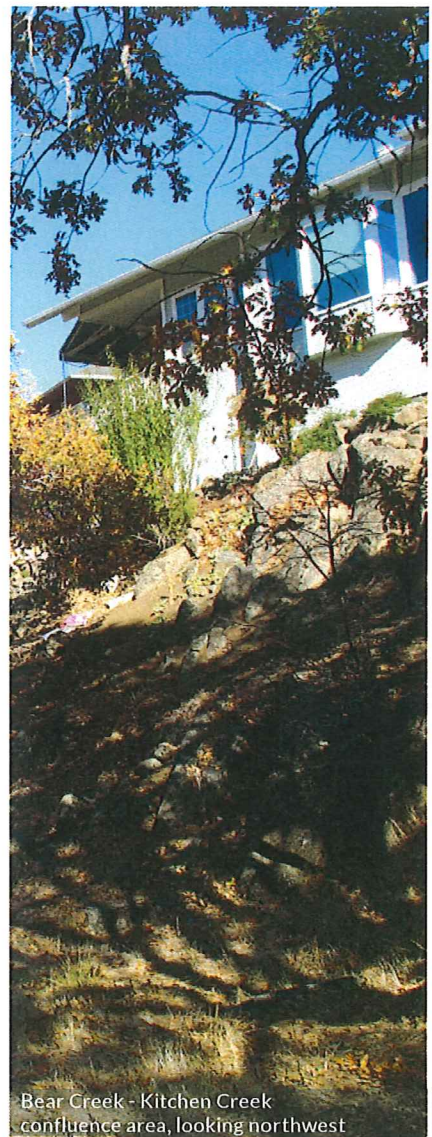
- Minimizing private property impacts while establishing the most direct route
- Minimizing environmental impacts while still creating a scenic experience in close proximity to Bear Creek for trail users
- Minimizing high costs associated with elements such as bridges and stream crossings
- Taking advantage of existing on-street facilities while providing an enjoyable experience for trail users that feels connected to the creek



From Wastewater Treatment Plant Road, looking north

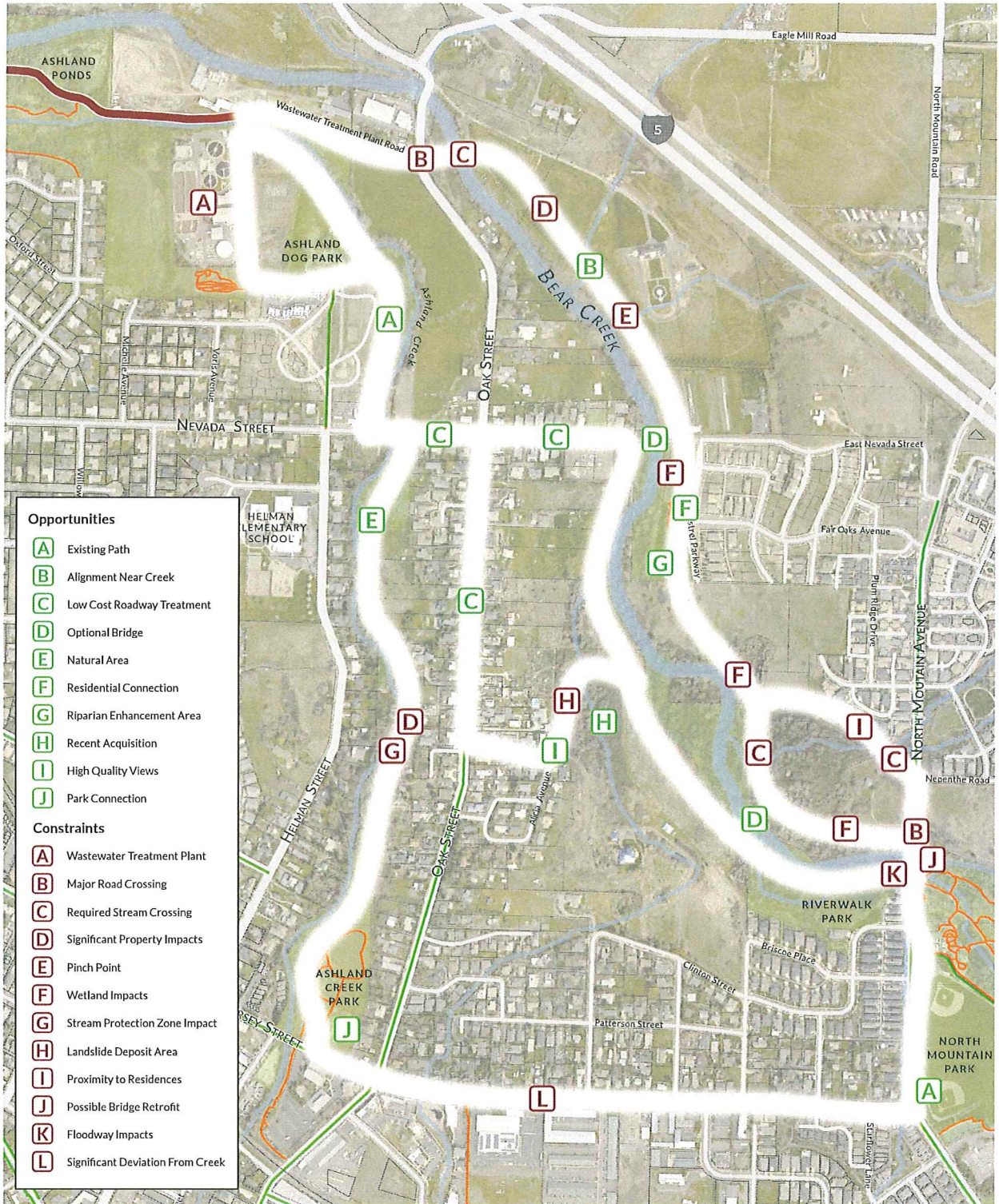


Nevada Street, looking north



Bear Creek - Kitchen Creek confluence area, looking northwest

# EXISTING CONDITIONS



- Opportunities**
- A** Existing Path
  - B** Alignment Near Creek
  - C** Low Cost Roadway Treatment
  - D** Optional Bridge
  - E** Natural Area
  - F** Residential Connection
  - G** Riparian Enhancement Area
  - H** Recent Acquisition
  - I** High Quality Views
  - J** Park Connection
- Constraints**
- A** Wastewater Treatment Plant
  - B** Major Road Crossing
  - C** Required Stream Crossing
  - D** Significant Property Impacts
  - E** Pinch Point
  - F** Wetland Impacts
  - G** Stream Protection Zone Impact
  - H** Landslide Deposit Area
  - I** Proximity to Residences
  - J** Possible Bridge Retrofit
  - K** Floodway Impacts
  - L** Significant Deviation From Creek

**BEAR CREEK GREENWAY EXTENSION**  
 Map 10. Opportunities & Constraints

**LEGEND**

Alignment Alternatives	Tax Lots
Existing Bear Creek Greenway	Parks
Existing Bike Route	Streams
Existing Trail	

0 250 500 Feet

Designed by: City of Ashland 2017  
 Map created by: The Planning + Design, 2018

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# IV.

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## ALIGNMENT ALTERNATIVES EVALUATION

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## ALIGNMENT ALTERNATIVES EVALUATION - OVERVIEW

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### Evaluation

The project team completed a series of analytical steps to determine a recommended trail alignment for the Bear Creek Greenway between Ashland Dog Park and North Mountain Park. These included site analysis, delineation of multiple alignment alternatives, and the evaluation of those alternatives based on the evaluation criteria developed in collaboration with the City of Ashland Parks and Recreation staff.



#### Delineation of Alignment Alternatives

The project team selected three alignment alternatives for evaluation. Project goals developed in coordination with City staff and project stakeholders guided the selection. These goals included:

##### HIGHEST PRIORITY

- Foster connectivity; create a high quality user experience; avoid Bear Creek floodway; maximize user safety and security; minimize conflicts with automobiles

##### MEDIUM PRIORITY

- Minimize property acquisition; minimize impacts within stream and wetland protection zones

##### LOW PRIORITY

- Avoid floodplain

#### Alignment Segments

To support the evaluation of alignment alternatives, the project team divided alignments into segments based on major differences in surrounding conditions, path junctions, and potential cross over points between alignment alternatives. This allowed final recommended alignments to potentially include a combination of segments from multiple alignment alternatives (Map 2).

#### Secondary Routes

In addition to the core alignment alternatives, the project team identified one or more secondary routes for each alignment alternative, and considered these routes for inclusion in the alignment recommendations.



#### Evaluation Criteria

The project team and City of Ashland Parks and Recreation Staff developed the following evaluation criteria, applied with the same ranked priorities used to delineate the alignment alternatives:

##### OVERALL QUALITY

- Creates Greenway Experience: a family-friendly separated path experience with a strong connection to natural vegetation, waterways, and nature experiences
- Connects Trails and Parks, such as existing bicycle facilities, hard and soft trails, public parks, and civic plazas
- Directness of Route, which is a comparison between the alignment alternatives

##### SAFETY

- Minimizes Crime Risk, based on Crime Prevention Through Environmental Design (CPTED) principles such as avoiding isolating path users, maximizing "eyes on the trail", and maintaining clear lines of sight
- Minimizes Vehicle Conflict Risk by ensuring that roadway crossings, side-paths, and on-street facility segments can be designed to the highest safety standards

##### ENVIRONMENTAL

- Avoids Floodway
- Avoids Stream & Wetland Protection Zones
- Avoids 100-year floodplain, as defined by the Federal Emergency Management Agency

##### HIGH-COST ITEMS

- Avoids Private Property Impacts and the need for land and easement acquisition
- Avoids High Cost Elements such as bridges, major intersection improvements at trail crossings, major environmental permitting and mitigation costs, and existing bridge retrofits



#### Alignment Recommendations

Recommendations fall into one of several categories including a recommended interim, short-term, and permanent alignment. Some alignment alternatives may be recommended for a potential future path.

##### INTERIM ALIGNMENT

An interim alignment takes advantage of existing conditions and creates a path for users as soon as possible. This alignment does not necessarily meet project aims, but fosters short-lived access and use.

##### SHORT-TERM ALIGNMENT

If funding or other factors delay implementation of the permanent alignment, a short-term alignment will generally be less expensive and easier to implement, even if it lacks the overall quality expected for the permanent alignment.

##### PERMANENT ALIGNMENT

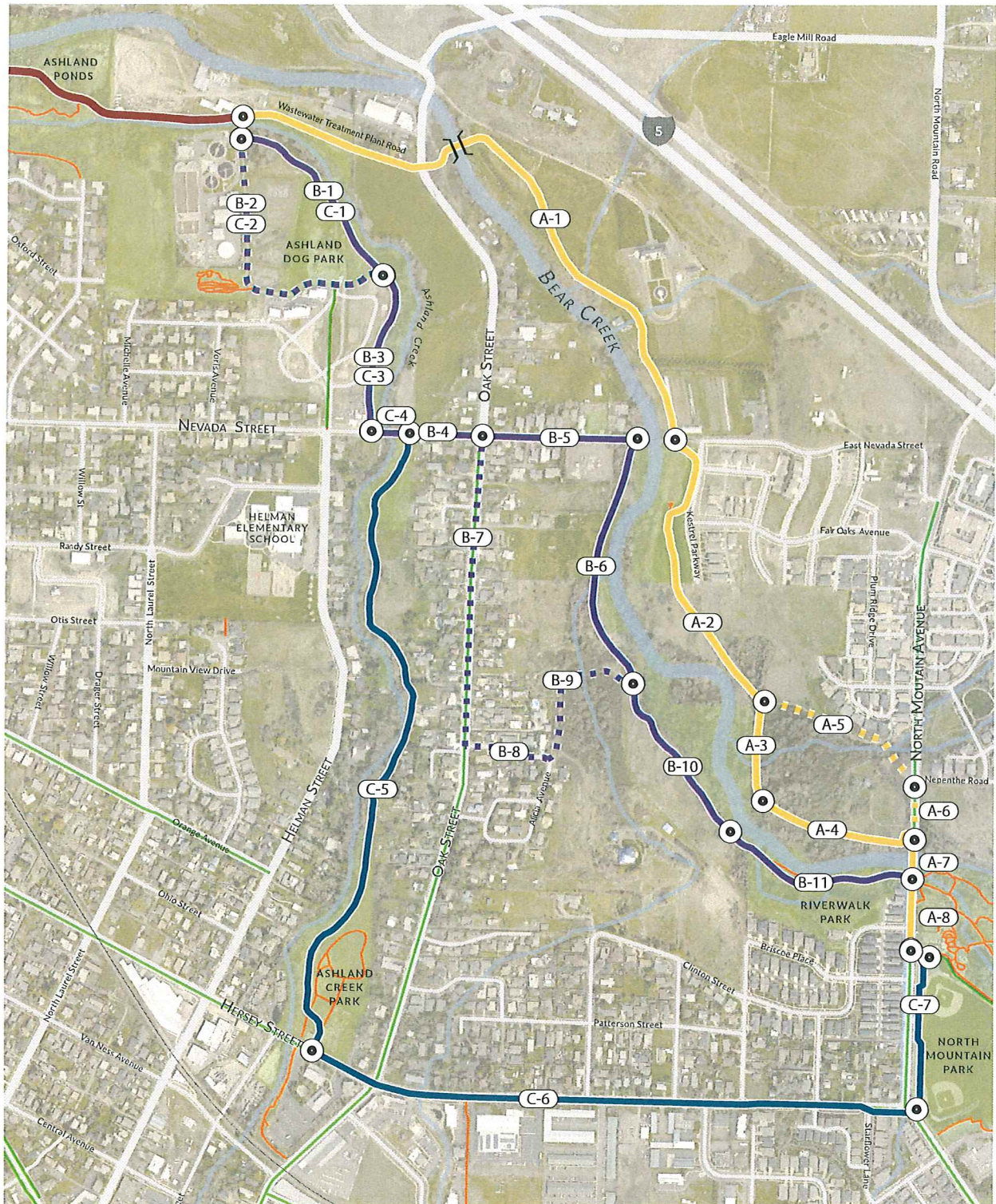
This alignment best meets the project's goals and values and is the recommended long-term, permanent alignment for the Bear Creek Greenway.

##### POTENTIAL FUTURE PATH (NOT MAPPED)

If an alignment alternative was not recommended for the permanent or interim alignments, it may nevertheless be worthy of future consideration or fall within the scope of a separate trail planning effort. When an alignment is recommended as an optional future path, this implies that no fatal flaws were identified during the alternatives evaluation.



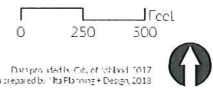
# ALIGNMENT ALTERNATIVES EVALUATION - OVERVIEW



**BEAR CREEK GREENWAY EXTENSION**  
 Map 11. Alignment Alternatives

**LEGEND**

- Alignment A
- - - Secondary Route
- Alignment B
- - - Secondary Route
- Alignment C
- - - Secondary Route
- (A-1) Segment
- ⊙ Segment Endpoint



Map created by City of Ashland 2017  
 Map created by The Planning + Design, 2018

## ALIGNMENT ALTERNATIVES EVALUATION - A

### ALIGNMENT DESCRIPTION

**Alignment A** (1.27 miles) travels east on Wastewater Treatment Plant Road, crosses Oak Street and Bear Creek before running along the bank of the creek southeast to East Nevada Street. After crossing East Nevada Street, the trail travels south adjacent to Kestrel Parkway to the Bear Creek / Kitchen Creek confluence. The trail crosses Kitchen Creek and turns east to follow Bear Creek to North Mountain Avenue. A short on-street segment connects the trail to North Mountain Park to the south (Map 12).

A secondary route travels east before reaching Kitchen Creek, to connect to North Mountain Avenue farther north and avoids the floodplain area.

### EVALUATION SUMMARY

Alignment Alternative A is the most direct alignment and has the highest potential to provide a "greenway" experience along Bear Creek. Except for required at-grade crossings at Oak Street and North Mountain Avenue, this alignment minimizes or eliminates the risk of conflict with automobiles. With the exception of a required bridge over Bear Creek east of Wastewater Treatment Plant Road, Alignment A completely avoids the Bear Creek floodway although there are some unavoidable stream and wetland protection zone impacts.

One of the most significant impacts is within segment A-1 where the path would pass through private property and encounter an existing structure. Figure 1 on page 35 demonstrates the nature of that constraint in a detailed cross section.

Table 3 summarizes the results of the evaluation of Alignment A based on the evaluation criteria.

### DESIGN ASSUMPTIONS

- Intersection safety improvements for at-grade crossings at Oak Street and Wastewater Treatment Plant Road and on North Mountain Avenue between Nepenthe Road and North Mountain Park
- New bicycle/pedestrian bridge over Bear Creek
- Stream and wetland permitting and mitigation
- Boardwalk within the Bear Creek / Kitchen Creek confluence area
- May require bridges to cross Kitchen Creek for both primary and secondary routes
- May require bridge retrofit on North Mountain Avenue
- Optional bridges at East Nevada Street and within the Bear Creek / Kitchen Creek confluence area are not considered within this evaluation

### OPPORTUNITIES

- Provides high quality greenway experience
- Most direct route between Ashland Dog Park and North Mountain Park
- Optional bridges at East Nevada Street and within the Bear Creek / Kitchen Creek confluence area would provide a high level of access to the trail from local residential neighborhoods and connect to Riverwalk Park and the recently acquired Mace Property

### CONSTRAINTS

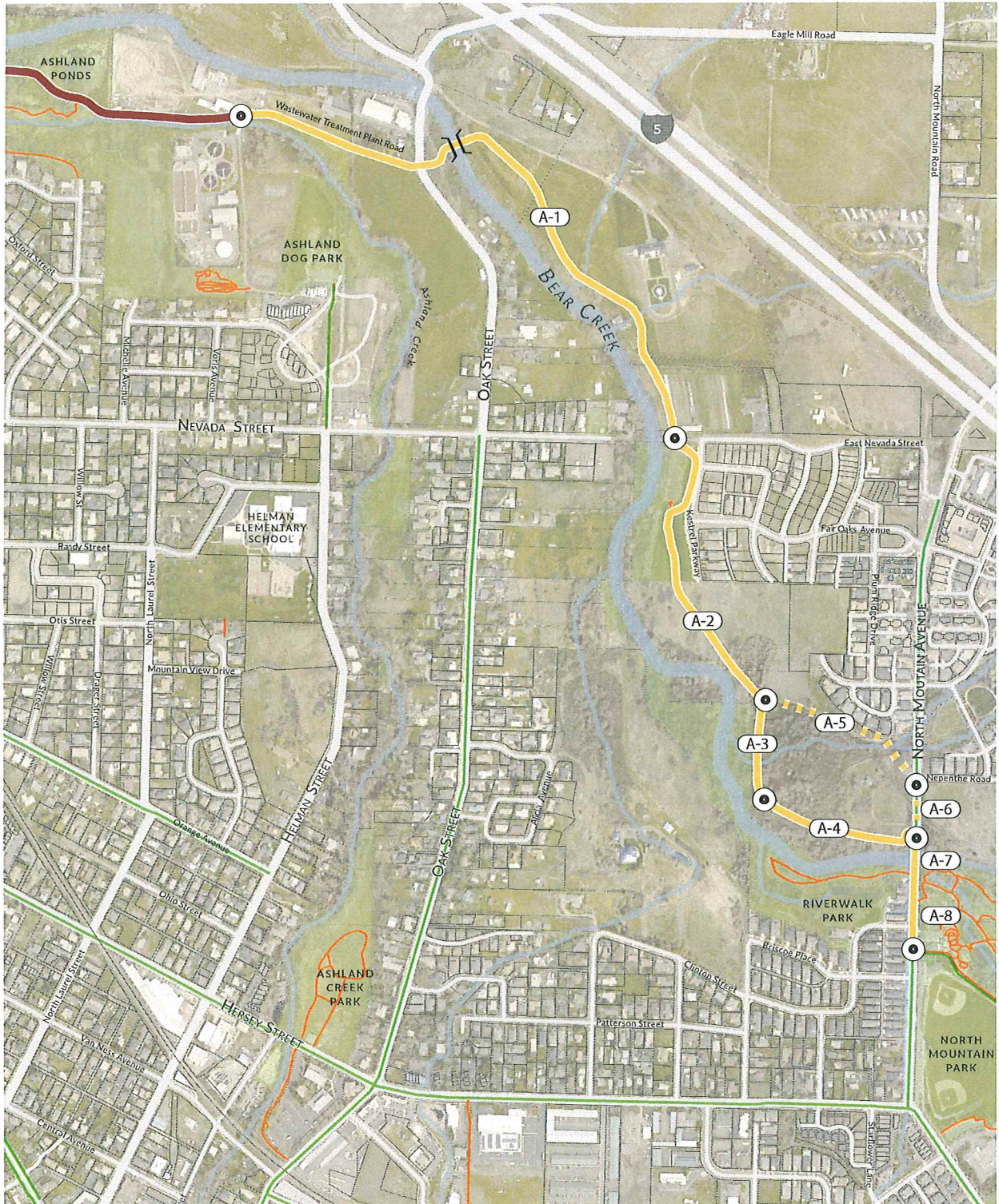
- Potentially challenging at-grade road crossing of Oak Street at Wastewater Treatment Plant Road
- Requires crossing Bear Creek twice, with a new bridge east of Wastewater Treatment Plant Road and a bridge retrofit on North Mountain Avenue
- Stream and wetland permitting and mitigation required, specially within the Bear Creek / Kitchen Creek confluence area
- Private property including an existing structure conflict with the path alignment

TABLE 3. EVALUATION CRITERIA & PRIORITY RANKING - ALIGNMENT A

ID	OVERALL QUALITY			SAFETY		ENVIRONMENTAL			HIGH COST ITEMS (PROPERTY, BRIDGES, STRUCTURES)			OVERALL EVALUATION
	GREENWAY EXPERIENCE	CONNECTS TRAILS + PARKS	DIRECTNESS OF ROUTE	CRIME RISK	VEHICLE CONFLICT RISK	AVOIDS FLOODWAY	STREAM + WETLAND PROTECTION	AVOIDS 100-YR FLOOD-PLAIN	AVOIDS PRIVATE PROPERTY	AVOIDS HIGH COST ELEMENTS		
A-1	●	●	●	●	●	●	●	●	●	●	●	●
A-2	●	●	●	●	●	●	●	●	●	●	●	●
A-3	●	●	●	●	●	●	●	●	●	●	●	●
A-4	●	●	●	●	●	●	●	●	●	●	●	●
A-5	●	●	●	●	●	●	●	●	●	●	●	●
A-6	●	●	●	●	●	●	●	●	●	●	●	●
A-7	●	●	●	●	●	●	●	●	●	●	●	●
A-8	●	●	●	●	●	●	●	●	●	●	●	●

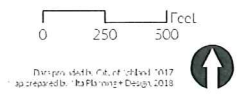
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# ALIGNMENT ALTERNATIVES EVALUATION - A



**BEAR CREEK GREENWAY EXTENSION**  
 Map 12. Alignment Alternative A

- LEGEND**
- Alignment A
  - - - Secondary Route
  - Pedestrian/Bicycle Bridge
  - Existing Bear Creek Greenway
  - Existing Bike Route
  - A-1 Segment
  - Segment Endpoint
  - Tax Lots
  - Parks
  - Streams



This project is the property of the City of Ashland, Oregon. It was prepared by the Planning & Design, 2018.

## ALIGNMENT ALTERNATIVES EVALUATION - A

### IMPORTANT CONSIDERATIONS

One of the key constraints Alignment A faces is a long stretch of private property within segment A-1 along the east side of Bear Creek. The alignment would have to pass between an existing structure and the access driveway, which would require careful coordination and support from the property owner.

Figure 1 illustrates the relationship of the existing structure to the floodway. A 50-foot buffer is proposed between the trail and the structure, placing it mid-way between the access driveway and structure.

TABLE 4. COST ESTIMATE SUMMARY - ALIGNMENT A

Segment Name	Notes	Miles	Fully Burdened Cost
<b>ALIGNMENT A</b>			
SEPARATED TRAIL	East side of Bear Creek	0.19	\$1,830,000
ON-STREET TREATMENTS	North Mountain Ave	0.58	\$358,000
BIKE-PED BRIDGE	East of Wastewater Treatment Plant Road and Oak Street	0.02	\$350,000
<b>TOTAL</b>		<b>0.78</b>	<b>\$2,538,000</b>

Note: This planning level cost estimate is intended to guide the selection of an alignment alternative. The estimate is limited to construction of the Bear Creek Greenway extension and does not include property acquisition costs, environmental mitigation costs, bridge costs, or specialized studies such as a geotechnical investigation. The cost estimate is provided in current dollars for 2018.

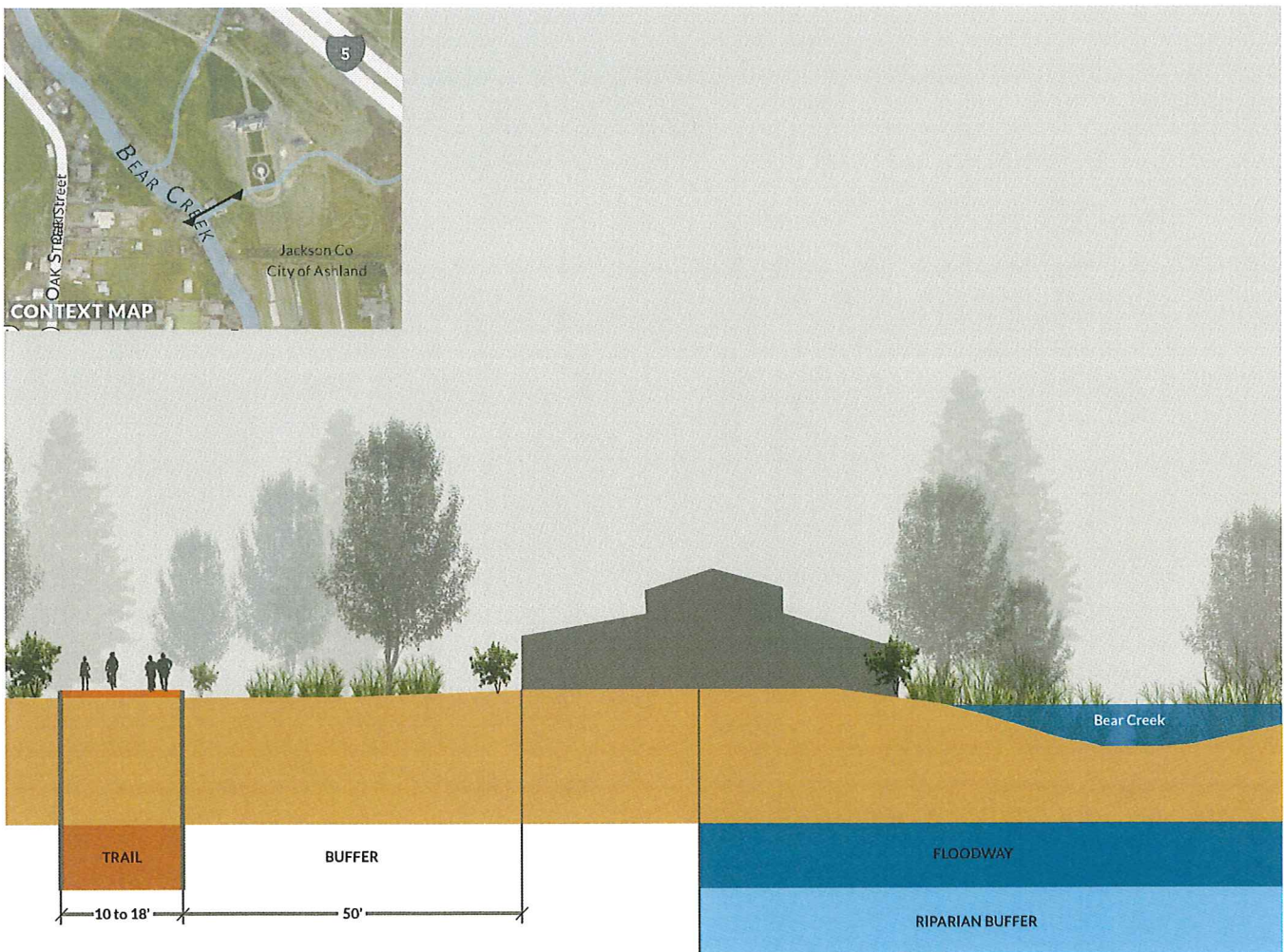


Figure 1. Trail jog required at Mazor Stanley Trustee Property, looking southeast

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ALIGNMENT ALTERNATIVES EVALUATION - A

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*Kestrel Property conservation area , looking south*



*Wastewater Treatment Plant Road, looking east*



*Bear Creek and Kitchen Creek confluence area floodplain*

## ALIGNMENT ALTERNATIVES EVALUATION - B

### ALIGNMENT DESCRIPTION

**Alignment B** (1.30 miles) begins by crossing Ashland Creek at an existing bridge at the northeast corner of the wastewater treatment plant property. The trail then follows the south bank of Ashland Creek to East Nevada Street, and runs east along East Nevada Street until the road's juncture with Bear Creek. The trail follows Bear Creek southeast along its south bank to North Mountain Avenue. A short on-street segment connects the trail to North Mountain Park to the south.

Secondary route options include 1) using an existing path corridor along the eastern edge of the wastewater treatment plant property and 2) turning south on Oak Street and using existing infrastructure on Oak Street and Sleepy Hollow Street to connect to Bear Creek farther southeast than the primary Alignment B option.

### EVALUATION SUMMARY

Alignment B best utilizes existing assets and investments to extend the Bear Creek

Greenway to North Mountain Park. This alignment is the most suitable for avoiding private property impacts, the floodway, and high cost elements. Path segments south of Nevada Street provide a rich greenway experience while minimizing crime risk associated with isolated, hidden places.

Figure 2 on (pg. 40) depicts a potential cross-section for a Nevada Street segment of the Greenway.

Table 5 summarizes the results of the evaluation of Alignment B based on the evaluation criteria.

### DESIGN ASSUMPTIONS

- Core alignment along Nevada Street requires a combination of intersection treatments, roadway signs and markings
- Requires new bicycle/pedestrian bridge over Bear Creek
- Requires floodplain and wetland impacts

- May require boardwalk within the Kitchen Creek/Bear Creek floodplain confluence area
- Alternative segment requires crossing over Kitchen Creek near North Mountain Road

### OPPORTUNITIES

- Intimate connection to Bear Creek
- Provides high quality greenway experience
- Takes advantage of recent property acquisitions

### CONSTRAINTS

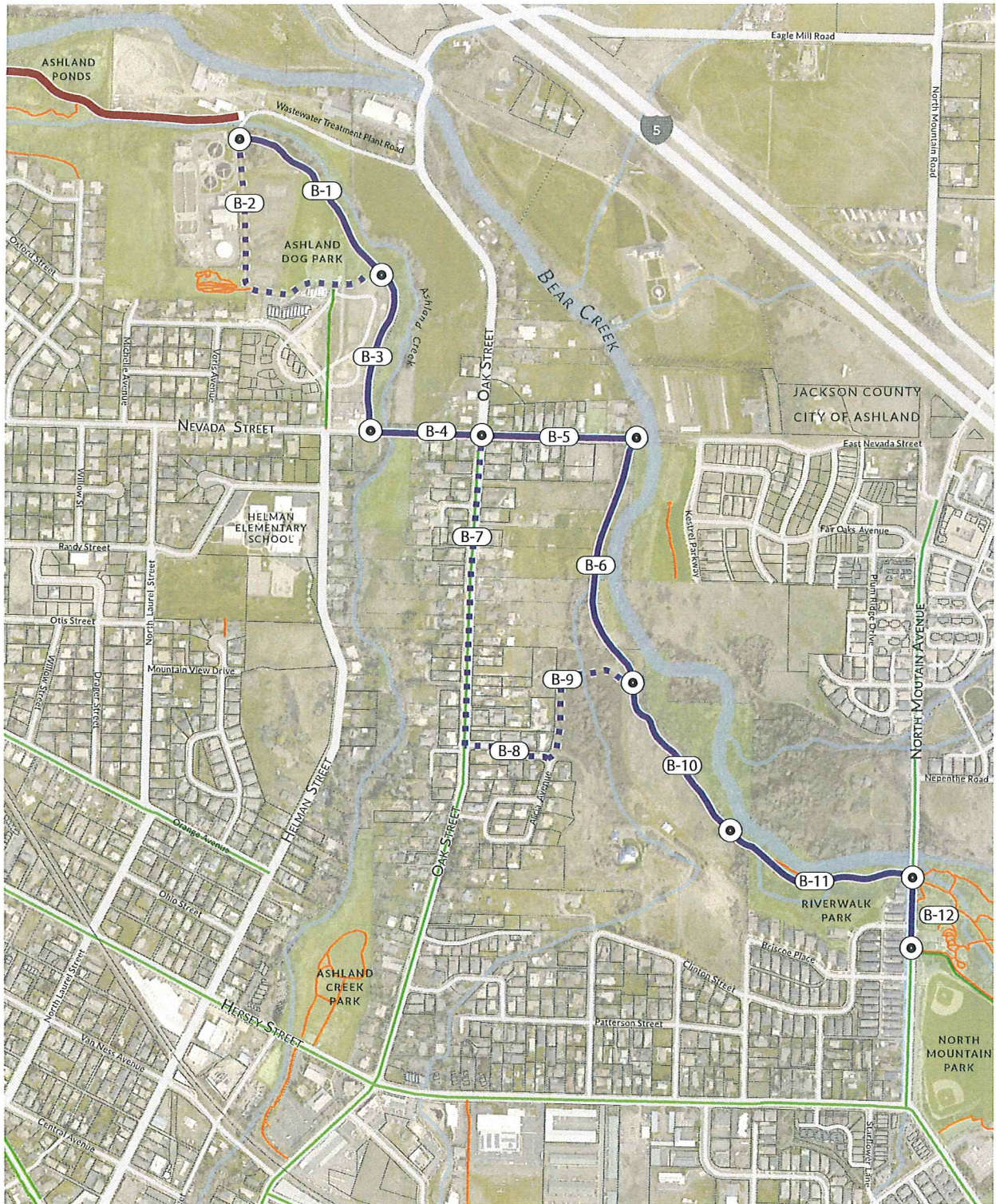
- Imposes private property impacts
- Landslide deposits complicate cut/fill between Sleepy Hollow Street and Bear Creek
- Poses most environmental crime risk when trail is not in high use

**TABLE 5. EVALUATION CRITERIA & PRIORITY RANKING - ALIGNMENT B**

ID	OVERALL QUALITY			SAFETY		ENVIRONMENTAL			HIGH COST ITEMS (PROPERTY, BRIDGES, STRUCTURES)		OVERALL EVALUATION
	GREENWAY EXPERIENCE	CONNECTS TRAILS + PARKS	DIRECTNESS OF ROUTE	CRIME RISK	VEHICLE CONFLICT RISK	AVOIDS FLOODWAY	STREAM + WETLAND PROTECTION	AVOIDS 100-YR FLOOD PLAIN	AVOIDS PRIVATE PROPERTY	AVOIDS HIGH COST ELEMENTS	
B-1	●	●	●	●	●	●	●	●	●	●	●
B-2	●	●	●	●	●	●	●	●	●	●	●
B-3	●	●	●	●	●	●	●	●	●	●	●
B-4	●	●	●	●	●	●	●	●	●	●	●
B-5	●	●	●	●	●	●	●	●	●	●	●
B-6	●	●	●	●	●	●	●	●	●	●	●
B-7	●	●	●	●	●	●	●	●	●	●	●
B-8	●	●	●	●	●	●	●	●	●	●	●
B-9	●	●	●	●	●	●	●	●	●	●	●
B-10	●	●	●	●	●	●	●	●	●	●	●
B-11	●	●	●	●	●	●	●	●	●	●	●
B-12	●	●	●	●	●	●	●	●	●	●	●

KEY: Not Optimal ← ○ — ● — ● — ● — ● — ● → Optimal

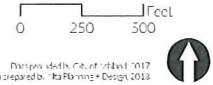
# ALIGNMENT ALTERNATIVES EVALUATION - B



**BEAR CREEK GREENWAY EXTENSION**  
 Map 13. Alignment Alternative B

**LEGEND**

- Alignment B
- - - Secondary Route
- Existing Bear Creek Greenway
- Existing Bike Route
- Existing Trail
- B-1 Segment
- Segment Endpoint
- Tax Lots
- Parks
- Streams



## ALIGNMENT ALTERNATIVES EVALUATION - B

### IMPORTANT CONSIDERATIONS

One of the most significant constraints for Alignment B is the need to use Nevada Street and potentially Oak Street for portions of the alignment. The disadvantages of this alignment segment include increased risk for conflict between pedestrians, bicyclists, and automobiles, and the fact that a path alignment along a roadway lacks the “greenway” experience that other alignments offer such as proximity to waterways and natural vegetation.

While acknowledging those constraints, there are a range of design interventions that can allow an alignment segment along Nevada Street to provide a safe and attractive option for both Bear Creek Greenway and roadway users. Figure 2 shows a potential cross-section that includes the existing sidewalk, parking on the south side of Nevada Street, bi-directional motor vehicle lanes, and a separated trail.

TABLE 6. COST ESTIMATE SUMMARY - ALIGNMENT B

Segment Name	Notes	Miles	Fully Burdened Cost
<b>ALIGNMENT B</b>			
SEPARATED TRAIL	West side of Bear Creek	0.50	\$1,338,000
SIDE PATH/WIDEN SIDEWALK	Nevada St	0.15	\$463,000
ON-STREET TREATMENTS	Oak Street	0.12	\$185,000
<b>TOTAL</b>		<b>0.77</b>	<b>\$1,986,000</b>

Note: This planning level cost estimate is intended to guide the selection of an alignment alternative. The estimate is limited to construction of the Bear Creek Greenway extension and does not include property acquisition costs, environmental mitigation costs, bridge costs, or specialized studies such as a geotechnical investigation. The cost estimate is provided in current dollars for 2018.



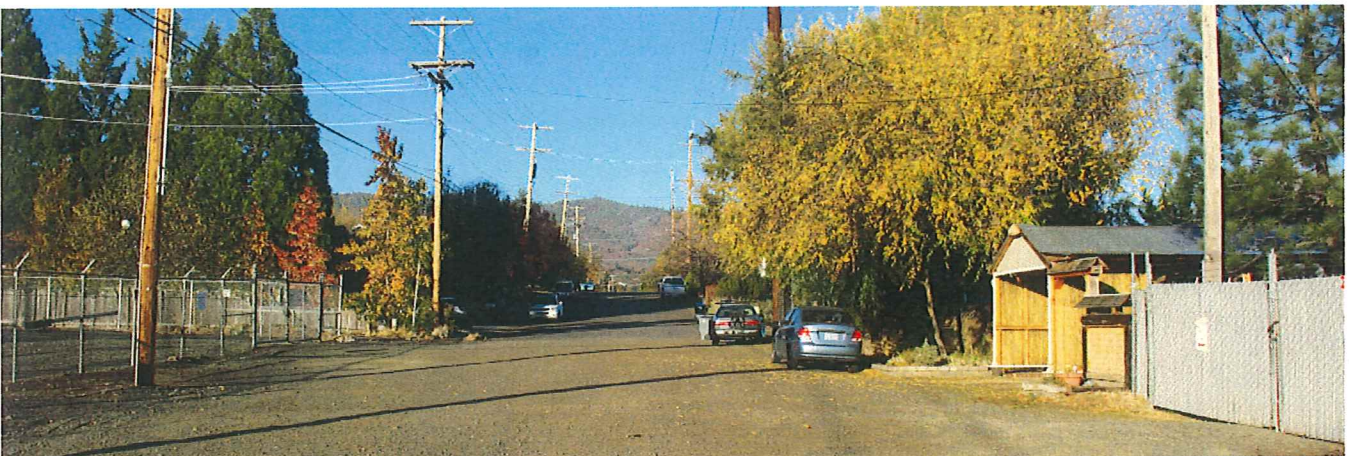
Figure 2. Proposed cross-section for West Nevada Street at Briggs Lane, looking east



ALIGNMENT ALTERNATIVES EVALUATION - B



*East Nevada Street at Ashland Creek, looking east*



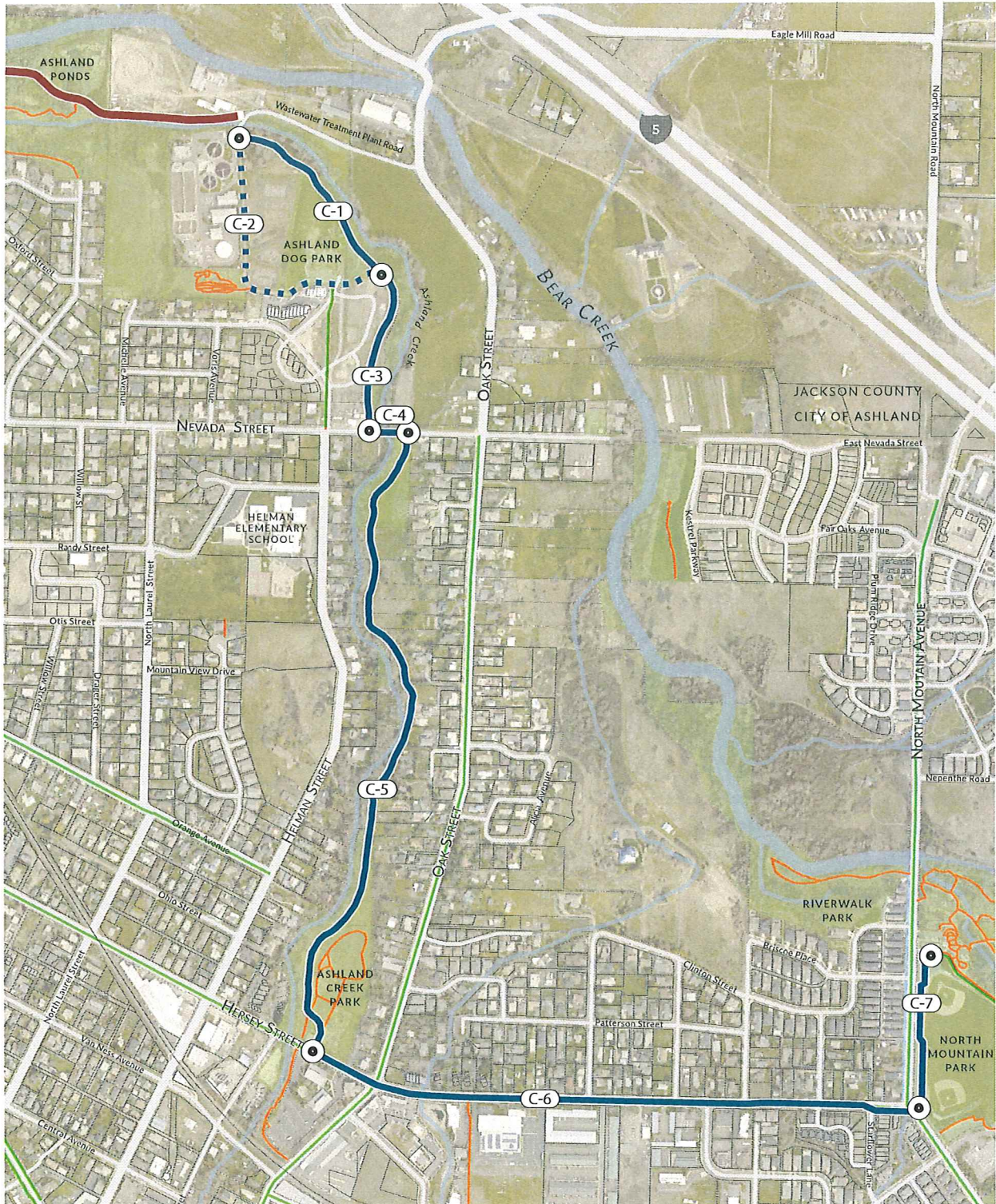
*East Nevada Street at Electric Sub Station, looking west*



*Riverwalk Park west of North Mountain Avenue, looking west*



# ALIGNMENT ALTERNATIVES EVALUATION - C



**BEAR CREEK GREENWAY EXTENSION**  
 Map 14. Alignment Alternative C

**LEGEND**

- Alignment C
- - - Secondary Route
- Existing Bear Creek Greenway
- Existing Bike Route
- Existing Trail
- C-1 Segment
- Segment Endpoint
- Tax Lots
- Parks
- Streams



Prepared by: R3 Planning + Design, 2018



## ALIGNMENT ALTERNATIVES EVALUATION - C

### IMPORTANT CONSIDERATIONS

One of the key constraints Alignment C faces is a tight riparian corridor along the east side of Ashland Creek, in which where the Bear Creek Greenway would have to fit between the floodway on the west and private residential properties to the east. A path alignment through this area would require careful coordination and support from property owners.

Figure 3 illustrates the most constrained pinch point along Ashland Creek, where the proposed path would come into close proximity to an existing residential structure. However, if stream protection zone impacts can be mitigated and property owner support can be secured, an alignment along Ashland Creek is feasible. Assuming a future trail extension south of Hersey Street, this alignment would provide an essential connection to Lithia Park and Downtown Ashland.

TABLE 8. COST ESTIMATE SUMMARY - ALIGNMENT C

Segment Name	Notes	Miles	Fully Burdened Cost
<b>ALIGNMENT C</b>			
SEPARATED TRAIL	East side of Bear Creek	0.60	\$1,393,000
SIDE PATH/WIDEN SIDEWALK	Nevada St	0.19	\$72,000
ON STREET	E Hersey Street	0.19	\$557,000
<b>TOTAL</b>		<b>0.98</b>	<b>\$2,022,000</b>

Note: This planning level cost estimate is intended to guide the selection of an alignment alternative. The estimate is limited to construction of the Bear Creek Greenway extension and does not include property acquisition costs, environmental mitigation costs, required bridges, or specialized studies such as a geotechnical investigation. The cost estimate is provided in current dollars for 2018.

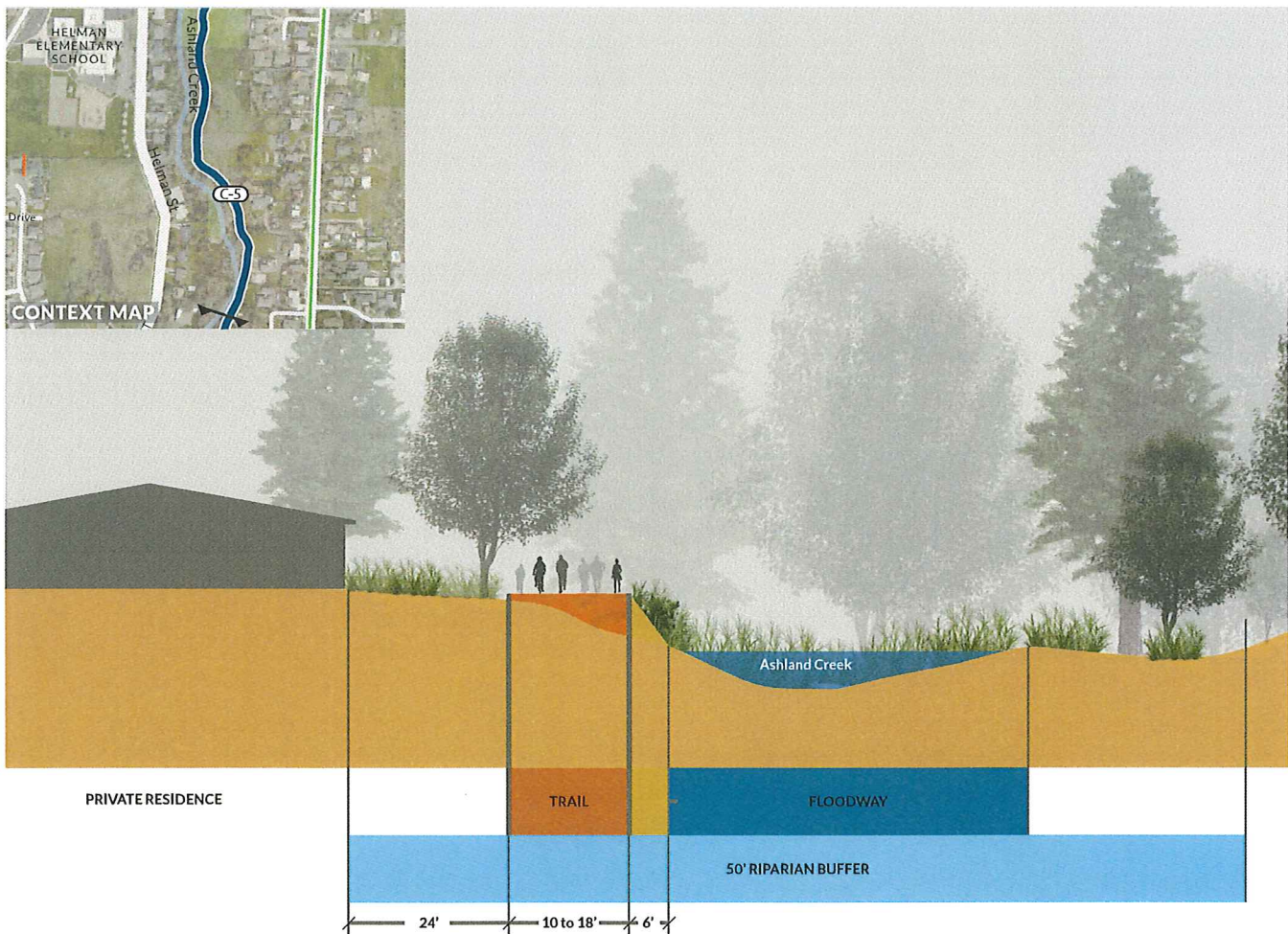


Figure 3. Ashland Creek, looking south

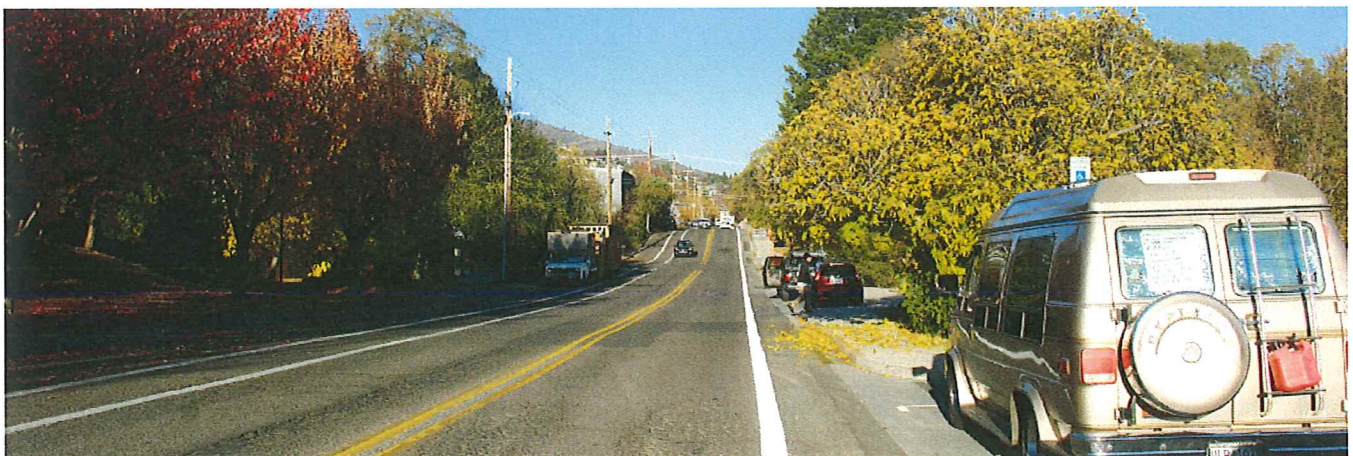
ALIGNMENT ALTERNATIVES EVALUATION - C



*East Nevada Street, looking south along the east side of the Ashland Creek corridor*



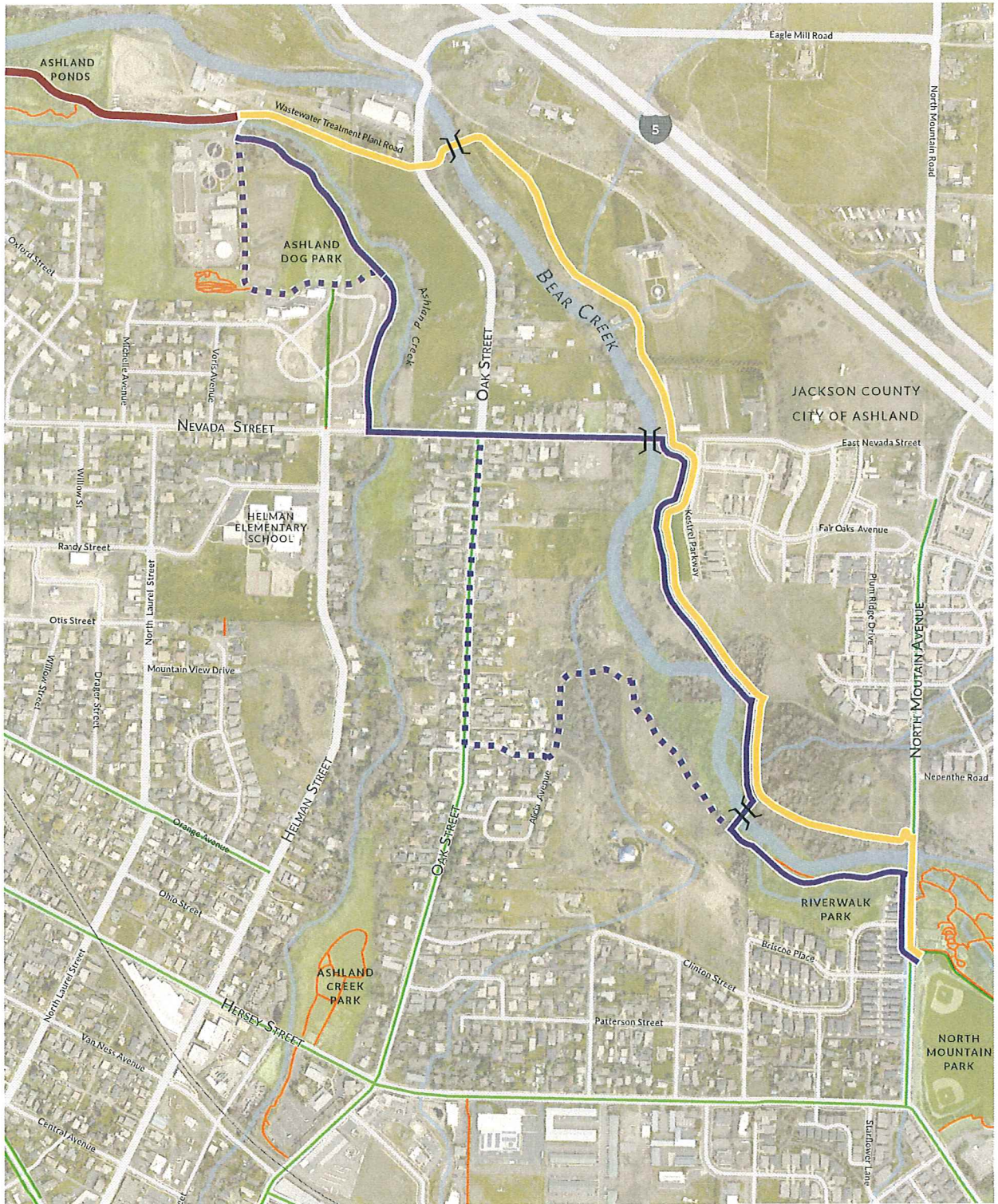
*Ashland Creek Park, looking north*



*East Hersey Street, looking east*



# ALIGNMENT RECOMMENDATION



**BEAR CREEK GREENWAY EXTENSION**  
 Map 15. Draft Recommended Alignment

**LEGEND**

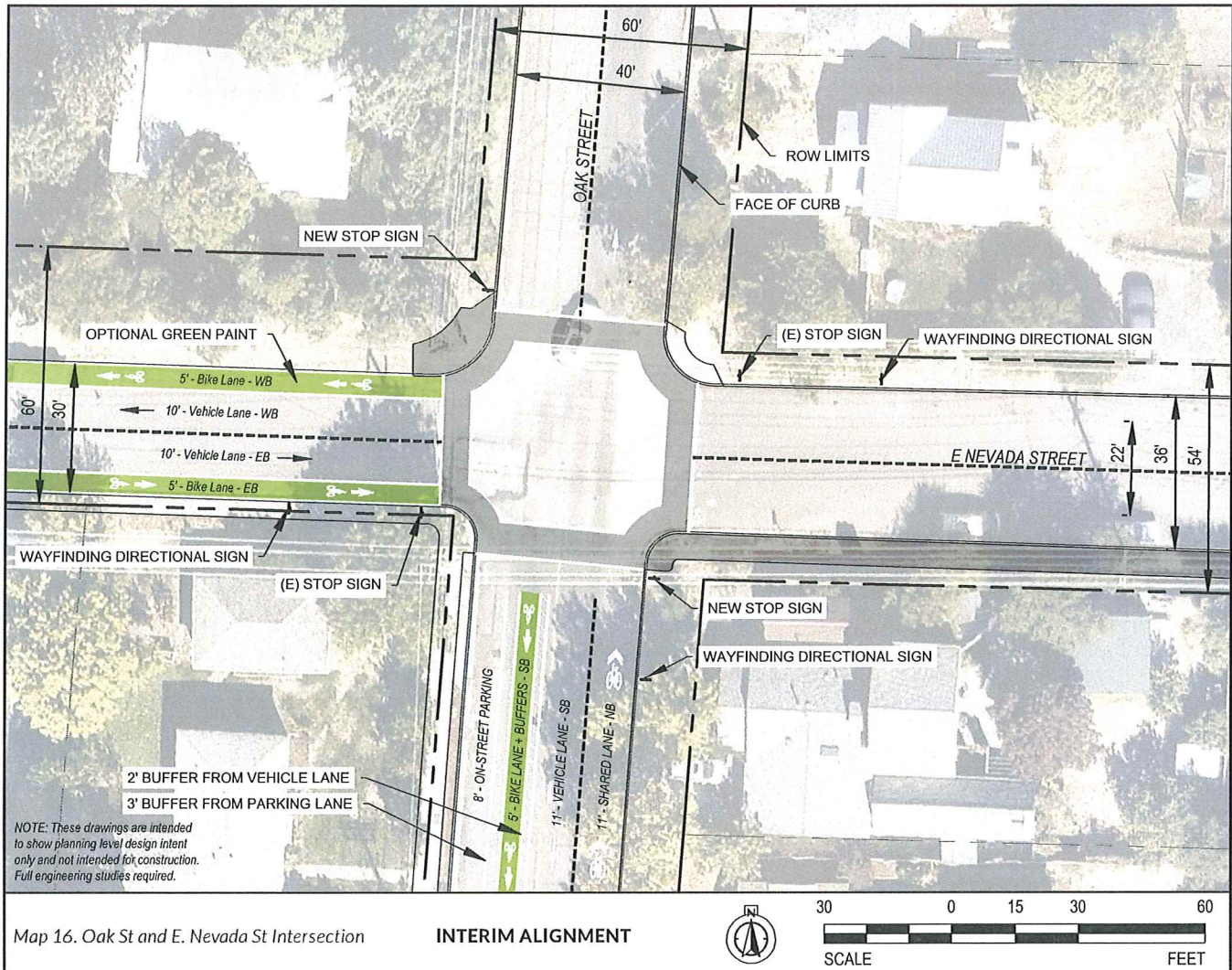
- ■ ■ Interim Alignment
- ■ ■ Short-term Alignment
- ■ ■ Permanent Alignment
- Pedestrian/Bicycle Bridge
- ■ ■ Existing Bear Creek Greenway
- ■ ■ Existing Bike Route
- ■ ■ Existing Trail
- ■ ■ Parks
- ■ ■ Streams



Photo credit: City of Ashland 2017  
 Map created by: Itta Planning + Design 2018



## TYPICAL DESIGN GUIDANCE



### Context & Summary

The interim alignment follows E Nevada St between Ashland Creek and Oak St. Path users then travel south on Oak St for about 1,500 ft until reaching Sleep Hollow St and connecting to Bear Creek.

### EXISTING CONDITIONS

- E Nevada St measures approximately 30 ft. curb to curb with a sidewalk on the south side. No bicycle facilities are present. Traffic volumes are unknown but generally higher west of Oak St.
- Oak St measures approximately 40 ft. curb to curb with sidewalks on the west side, on street parking, and shared lane markings with traffic calming features. The road slopes up in

the southbound direction, which is especially relevant for cyclists.

- The E Nevada St and Oak St intersection is currently configured as a two way stop with through traffic on Oak St.

### PRIORITIES

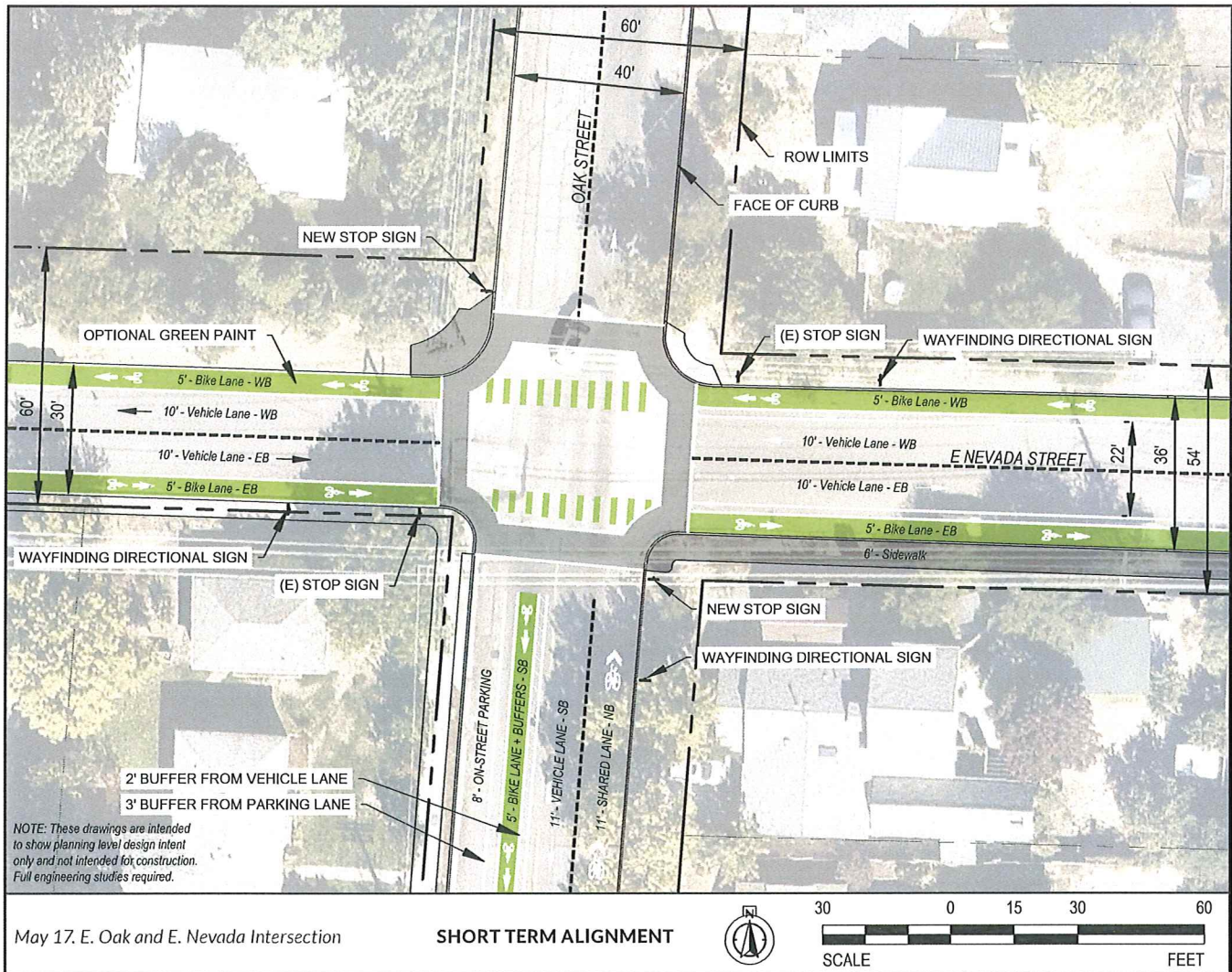
- Provide a safe and comfortable on-street connection for Bear Creek Greenway path users of all ages and abilities
- Address higher volume and higher speed automobile traffic along Oak St
- Ensure that the route alignment and turning movements are legible and clear for path users

### DESIGN PROPOSALS

- Add stop signs for Oak St traffic, changing the intersection into a full 4-way stop
- Provide wayfinding directional signs for path users in advance of turning movements
- Provide 5-ft. bike lanes on both sides of E Nevada St with 10-ft. travel lanes, retaining the existing sidewalk on the south side.
- Provide a buffered 5-ft. bike lane on Oak St for southbound path users (riding up hill) with dedicated southbound traffic lane. Also provide an 8-ft. parking lane on the west side of Oak St and an 11-ft. shared lane for both vehicles and path users traveling northbound (riding down hill).



## TYPICAL DESIGN GUIDANCE



### Context & Summary

Similar to the interim alignment, the short term alignment follows E Nevada St between Ashland Creek and Oak St but then continues east on E Nevada St until reaching Bear Creek. Improvements associated with the interim alignment would remain in place even after the short term improvements are implemented.

### EXISTING CONDITIONS

- The character of E Nevada St changes east of Oak St with a slightly wider curb to curb distance but lacking sidewalks or bike facilities.
- Approximately 400 ft east of the Oak St intersection, E Nevada becomes a gravel road that slopes down another 450 ft until reaching Bear Creek where the road dead ends.

### PRIORITIES

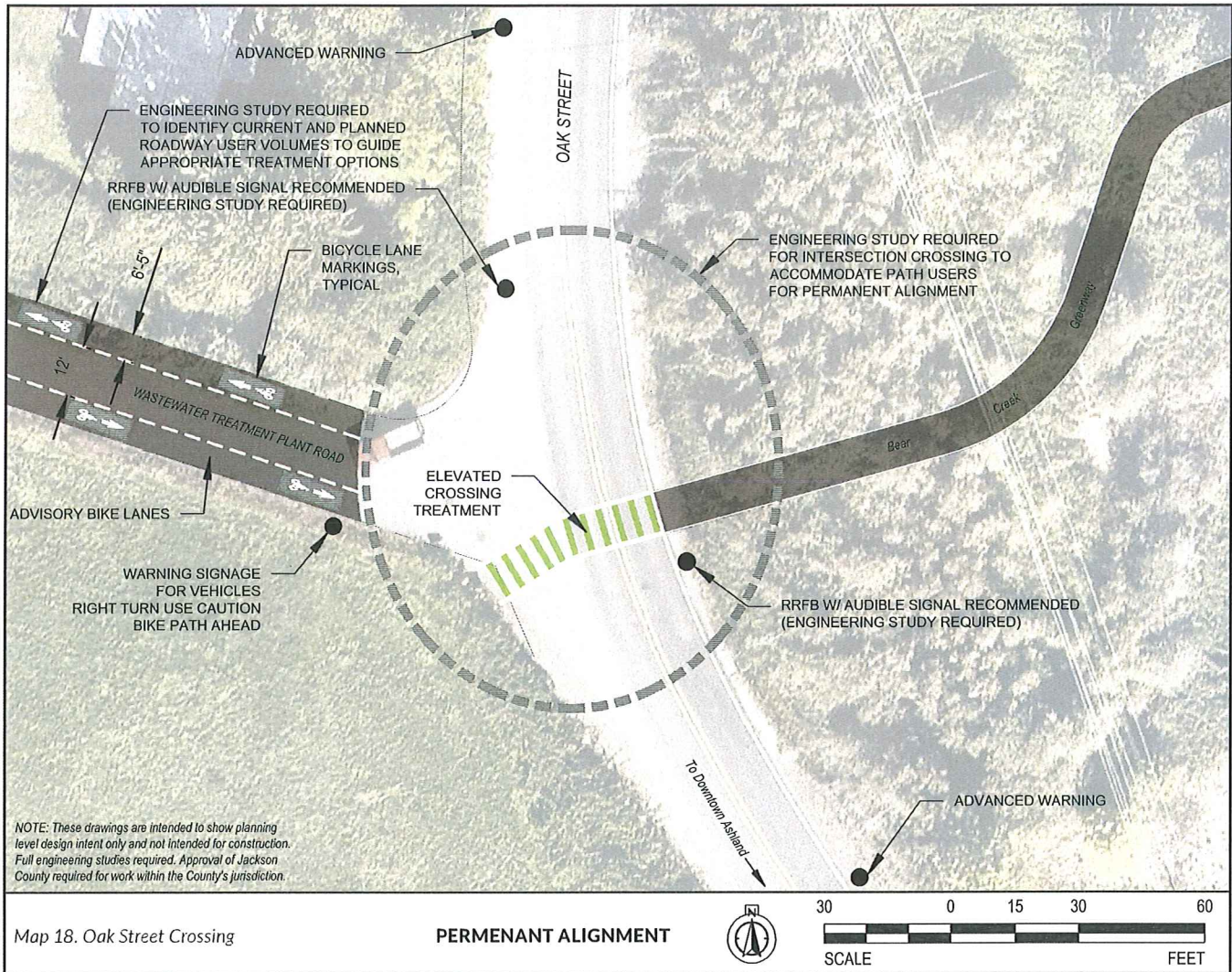
- Provide a safe and comfortable on-street connection for Bear Creek Greenway path users of all ages and abilities
- Implement necessary roadway improvements such as asphalt paving and at least one sidewalk
- Ensure that the route alignment and turning movements are legible and clear for path users

### DESIGN PROPOSALS

- Retain all interim alignment improvements
- Pave E Nevada St between Oak St and Bear Creek
- Provide a sidewalk on the south side of E Nevada St between Oak St and Bear Creek

- Provide 5-ft. bike lanes on both sides of E Nevada St with 10-ft. travel lanes
- Add pavement markings within the Oak St intersection to delineate bike route crossings
- Provide wayfinding directional signs for path users in advance of turning movements

## TYPICAL DESIGN GUIDANCE



### Context & Summary

For the permanent alignment, the Bear Creek Greenway follows Wastewater Treatment Plan Road, crosses Oak St at grade, and continues east until crossing Bear Creek using a proposed bike/ped bridge

### EXISTING CONDITIONS

- Wastewater Treatment Plant Rd has low traffic volumes for access to the Treatment Plan and a limited number of residences

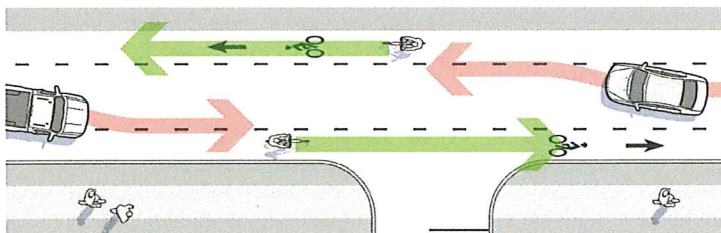
- Oak St traffic volumes are higher with relatively poor site lines here the road curves

### PRIORITIES

- Provide a safe pedestrian and bicycle crossing across Oak St for path users of all ages and abilities
- Address site visibility concerns at the bend in the road on Oak St
- Provide design elements that highlight the Oak St crossing for vehicles turning right onto Oak from Wastewater Treatment Plant Rd.

### DESIGN PROPOSALS

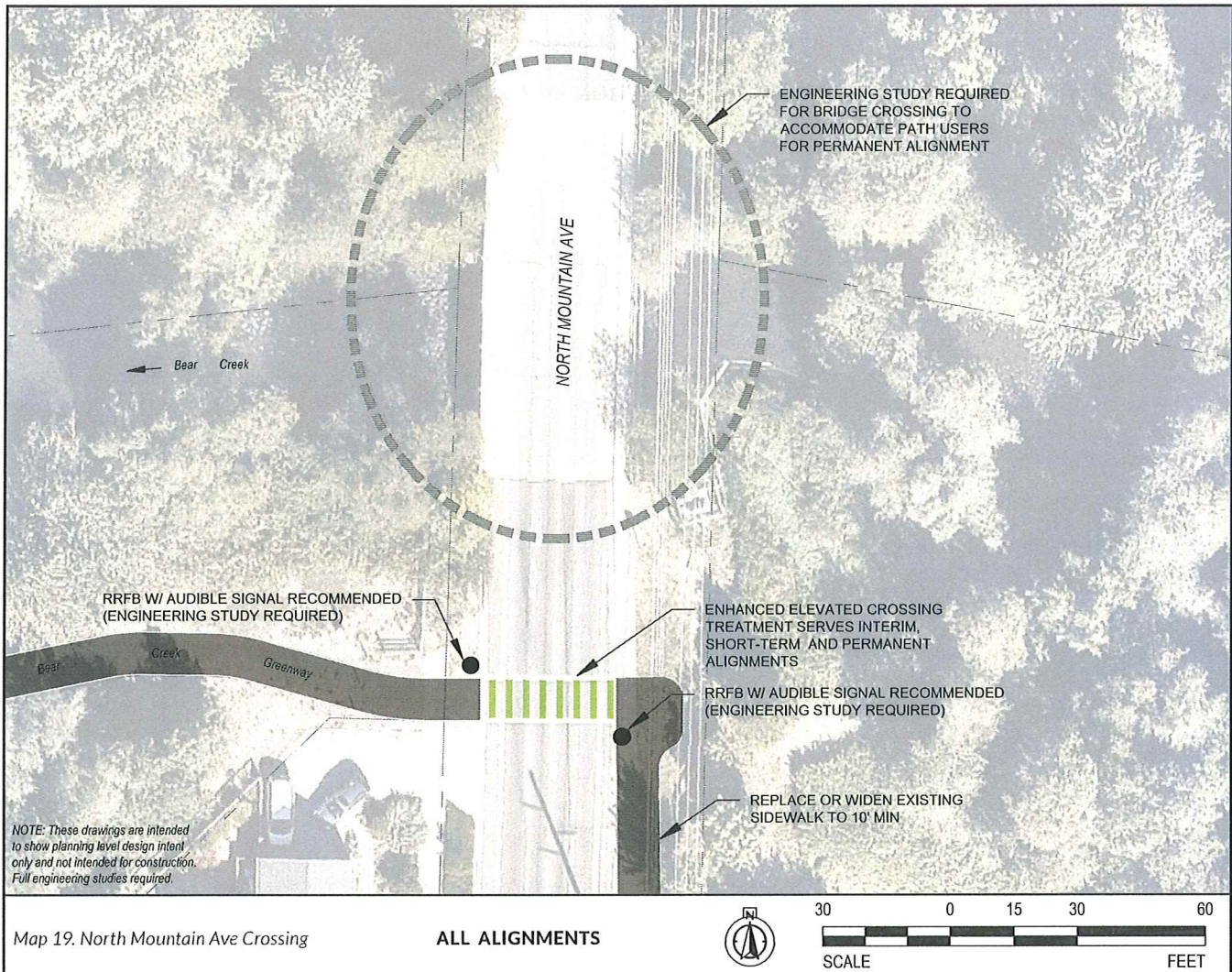
- Consider advisory bike lanes on Wastewater Treatment Plant Rd with a single 12 ft. vehicle travel lane
- Consider highly visible pavement markings for the Oak St path crossing
- Consider advanced warnings and RRFB or HAWK signals on Oak St near Wastewater Treatment Plant Rd in both northbound and southbound directions



**Figure X. Advisory Bike Lanes.**

When approaching oncoming motor vehicles, motorists must merge into the Advisory Bike Lane. If a bicyclist is present, motorists must slow and yield to bicyclist traffic prior to entering the Advisory Bike Lane (Alta Planning + Design, Advisory Bike Lanes in North America, August 2017, [https://altaplanning.com/wp-content/uploads/Advisory-Bike-Lanes-In-North-America\\_Alta-Planning-Design-White-Paper.pdf](https://altaplanning.com/wp-content/uploads/Advisory-Bike-Lanes-In-North-America_Alta-Planning-Design-White-Paper.pdf))

## TYPICAL DESIGN GUIDANCE



### Context & Summary

For the interim and short-term alignments, the Bear Creek Greenway crosses North Mountain Ave just south of Bear Creek. The permanent alignment will connect in from the north, crossing Bear Creek on North Mountain Ave, merging with the interim and short-term facilities.

### EXISTING CONDITIONS

- North Mountain Ave is a relatively busy street with good site lines in this segment.
- South of the Bear Creek bridge, North Mountain Ave includes bike lanes and sidewalks on both sides of the road.
- North of the Bear Creek bridge, bicycle lanes and the sidewalk on the west side of the road disappear for 675 where they are re-introduced. However, there is a continuous narrow sidewalk on the east side of the road throughout.

### PRIORITIES

- Provide a safe and comfortable crossing for path users across North Mountain Ave south of the Bear Creek bridge to serve both interim and short-term path alignments
- Complete a detailed study to connect the permanent alignment coming in from the north and crossing the Bear Creek bridge.

### DESIGN PROPOSALS

- Provide a high visibility crossing treatment across North Mountain Ave
- Consider RRFB or HAWK signals in both northbound and southbound directions

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V.

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APPENDIX - A - ANNOTATED EVALUATION SUMMARY

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## ANNOTATED EVALUATION SUMMARY

TABLE 10. EVALUATION CRITERIA & PRIORITY RANKING - ALIGNMENT A

ID	OVERALL QUALITY			SAFETY				ENVIRONMENTAL				HIGH COST ITEMS (PROPERTY, BRIDGES, STRUCTURES)				OVERALL EVALUATION		
	GREENWAY EXPERIENCE	CONNECTS TRAILS + PARKS	DIRECTNESS OF ROUTE	CRIME RISK	VEHICLE CONFLICT RISK	AVOIDS FLOODWAY	STREAM + WETLAND PROTECTION	AVOIDS 100-YR FLOOD PLAIN	AVOIDS PRIVATE PROPERTY	AVOIDS HIGH COST ELEMENTS								
A-1		Natural Area and Farm Land		Existing Trails		Less Frequent Eyes On Trail		Major Road Crossing Oak Street			Stream Crossings		Within Natural Area		Significant Impacts		Bridge + Intersection Improvements	
A-2		Partial On Street Alignment		Existing Path and Residential Area		Eyes On Trail		Low Volume Road			Wetland Impacts		Within Natural Area		Moderate Impacts		No High Cost Elements Identified	
A-3		Natural Area		Potential Bridge Connection		Semi-Isolated		No Vehicle Traffic			Kitchen Creek & Wetland Impacts		Within Natural Area		Moderate Impacts		No High Cost Elements Identified	
A-4		Natural Area		Potential Bridge Connection		Semi-Isolated		No Vehicle Traffic			Wetland Impacts		Within Natural Area		Moderate Impacts		No High Cost Elements Identified	
A-5		Natural Area With Pinch Point		Neighborhood Connection		Eyes On Trail		No Vehicle Traffic			Kitchen Creek Crossing		Outside Bear Creek Floodplain		Moderate Impacts		Stream Crossing	
A-6		Roadway		Bike Lanes		Major Road		Major Road			Existing Road		Existing Roadway		No Impacts		No High Cost Elements Identified	
A-7		Roadway		Bike Lanes		Major Road		Major Road			Existing Road		Existing Roadway		No Impacts		Potential Bridge Retrofit	
A-8		Roadway		Bike Lanes		Major Road		Major Road			Existing Road		Existing Roadway		No Impacts		No High Cost Elements Identified	

KEY: Not Optimal ← ○ — ● → Optimal

## ANNOTATED EVALUATION SUMMARY

**TABLE 11. EVALUATION CRITERIA & PRIORITY RANKING - ALIGNMENT B**

ID	OVERALL QUALITY			SAFETY			ENVIRONMENTAL			HIGH COST ITEMS (PROPERTY, BRIDGES, STRUCTURES)			OVERALL EVALUATION
	GREENWAY EXPERIENCE	CONNECTS TRAILS + PARKS	DIRECTNESS OF ROUTE	CRIME RISK	VEHICLE CONFLICT RISK	AVOIDS FLOODWAY	STREAM + WETLAND PROTECTION	AVOIDS 100-YR FLOOD PLAIN	AVOIDS PRIVATE PROPERTY	AVOIDS HIGH COST ELEMENTS			
B-1													
B-2													
B-3													
B-4													
B-5													
B-6													
B-7													
B-8													
B-9													
B-10													
B-11													
B-12													

KEY: Not Optimal ← ○ — ● → Optimal

**TABLE 12. EVALUATION CRITERIA & PRIORITY RANKING - ALIGNMENT C**

ID	OVERALL QUALITY			SAFETY			ENVIRONMENTAL			HIGH COST ITEMS (PROPERTY, BRIDGES, STRUCTURES)			OVERALL EVALUATION
	GREENWAY EXPERIENCE	CONNECTS TRAILS + PARKS	DIRECTNESS OF ROUTE	CRIME RISK	VEHICLE CONFLICT RISK	AVOIDS FLOODWAY	STREAM + WETLAND PROTECTION	AVOIDS 100-YR FLOOD PLAIN	AVOIDS PRIVATE PROPERTY	AVOIDS HIGH COST ELEMENTS			
C-1													
C-2													
C-3													
C-4													
C-5													
C-6													
C-7													

KEY: Not Optimal ← ○ — ● → Optimal

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# VI.

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APPENDIX - B - DETAILED COST ESTIMATES

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DETAILED COST ESTIMATES - INTERIM ALIGNMENT

TABLE 13. COST ESTIMATE DETAILS - INTERIM ALIGNMENT

10' Wide Shared Use Path (2,750 feet, 6" depth)									
Item Description	Unit	L	W	H	Qty	Unit Cost	Total	Notes	
Clearing and Grubbing	SF	2,750	20		55,003	\$0.35	\$19,251	20' width	
Excavation	CY	2,750	10	1	1,019	\$24.00	\$24,446	10' width	
Erosion Controls	LF	2,750			5,500	\$2.50	\$13,751	Assume both sides	
Sedimentation Controls	LF	2,750			2,750	\$7.15	\$19,664	Hay bales, assume one side	
Grading	SY	2,750	14		4,278	\$15.00	\$64,170	Shoulders + ac trail width	
Crusher fine shoulders	CY	2,750	4	0.33	136	\$100.00	\$13,580	2' wide, assume both sides	
Asphalt path over aggregate	SF	2,750	10		27,501	\$9.00	\$247,513	10' wide asphalt path	
Mile markers	EA				1	\$450.00	\$450		
Tree planting	EA				128	\$350.00	\$44,800	Assume 4 new trees for every 1 removed	
Tree removal	EA				32	\$350.00	\$11,200	Assume 16 per 1/4 mile	
Wayfinding Signs	EA				4	\$700.00	\$2,800	2 @ Sleepy Hollow and 2 confirmation signs	
Regulatory and Warning Signs	EA				2	\$450.00	\$900	Path closure hours, other regulations	
<b>Estimated Direct Cost</b>							<b>\$462,525</b>		
Contingency	40%						\$185,010		
Engineering / Design	15%						\$69,379		
Construction / Overhead / Mobilization	20%						\$92,505		
Project Administration	15%						\$69,379		
<b>Estimated Construction Costs (70% burden)</b>							<b>\$878,798</b>		

Nevada Street - Bike Lanes (570 feet)									
Item Description	Unit	L	W	H	Qty	Unit Price	Total	Notes	
Wayfinding Signs	EA	2			2	\$700.00	\$1,400	At Briggs Lane and W. Nevada St	
Regulatory Signs	EA	2			2	\$450.00	\$900	For vehicles from both ends of road segment	
Pavement markings	EA	6			6	\$750.00	\$4,500	Every 200' each direction, thermoplastic bike with arrow markings	
Striping removal	LF	0			0	\$1.00	\$0	No existing striping	
Restripe travel lanes	LF	2125			4250	\$3.00	\$12,750	2 bike lane lines	
Stop signs	EA	2			2	\$250.00	\$500	Convert Oak and Nevada to 4-way stop	
New speed limit signs	EA	2			2	\$250.00	\$500		
<b>Estimated Direct Cost</b>							<b>\$20,550</b>		
Contingency	40%						\$8,220		
Engineering / Design	15%						\$3,083		
Construction / Overhead / Mobilization	20%						\$4,110		
Project Administration	15%						\$3,083		
<b>Estimated Construction Costs (70% burden)</b>							<b>\$39,045</b>		

Nevada Street - Buffered Bike Lane with Shared Lane (1,555 ft)									
Item Description	Unit	L	W	H	Qty	Unit Price	Total	Notes	
Wayfinding Signs	EA	2			2	\$700.00	\$1,400	At Oak St and E Nevada St	
Regulatory Signs	EA	2			2	\$450.00	\$900	For vehicles from both ends of road segment	
Pavement markings	EA	16			16	\$750.00	\$12,000	Every 200' each direction, thermoplastic bike with arrow markings and shared lane markings	
Striping removal	LF	1555			1555	\$1.00	\$1,555		
Restripe travel lanes	LF	1555			7775	\$3.00	\$23,325	4 bike lane lines and 1 dashed centerline	
New speed limit signs	EA	2			2	\$250.00	\$500		
<b>Estimated Direct Cost</b>							<b>\$39,680</b>		
Contingency	40%						\$15,872		
Engineering / Design	15%						\$5,952		
Construction / Overhead / Mobilization	20%						\$7,936		
Project Administration	15%						\$5,952		
<b>Estimated Construction Costs (70% burden)</b>							<b>\$75,392</b>		

Note: This planning level cost estimate is intended to guide the selection of an alignment alternative. The estimate is limited to construction of the Bear Creek Greenway extension and does not include property acquisition costs, bridges, mitigation costs, or specialized studies such as a geotechnical investigation. The cost estimate is provided in current dollars for 2018.

DETAILED COST ESTIMATES - INTERIM ALIGNMENT

TABLE 14. COST ESTIMATE DETAILS- INTERIM ALIGNMENT

<b>Sleepy Hollow St - Shared Lane Markings (430 ft)</b>								
Item Description	Unit	L	W	H	Qty	Unit Price	Total	Notes
Wayfinding Signs	EA	4			4	\$700.00	\$2,800	At Oak St and Sleepy Hollow St
Pavement markings	EA	4			4	\$750.00	\$3,000	Every 200' each direction, thermoplastic bike with arrow markings
<b>Estimated Direct Cost</b>							<b>\$5,800</b>	
Contingency		40%					\$2,320	
Engineering / Design		15%					\$870	
Construction / Overhead / Mobilization		20%					\$1,160	
Project Administration		15%					\$870	
<b>Estimated Construction Costs (70% burden)</b>							<b>\$11,020</b>	
<b>Widen Sidewalk from 4' to 10', concrete (375 feet)</b>								
Item Description	Unit	L	W	H	Qty	Unit Cost	Total	Notes
Sidewalk	SF	375	4	0.5	750	\$12.00	\$9,000	6' widening of existing 4' sidewalk
Curb ramps	EA				1	\$2,500.00	\$2,500	East side of North Mountain Ave
Wayfinding Signs	EA				4	\$700.00	\$2,800	At Riverwalk Park and N. Mtn Park junctions
Warning Signs	EA				2	\$450.00	\$900	North Mountain Ave, N and S vehicle approaches
<b>Estimated Direct Cost</b>							<b>\$15,200</b>	
Contingency		40%					\$6,080	
Engineering / Design		15%					\$2,280	
Construction / Overhead / Mobilization		20%					\$3,040	
Project Administration		15%					\$2,280	
<b>Estimated Construction Costs (70% burden)</b>							<b>\$28,880</b>	

Note: This planning level cost estimate is intended to guide the selection of an alignment alternative. The estimate is limited to construction of the Bear Creek Greenway extension and does not include property acquisition costs, bridges, environmental mitigation costs, or specialized studies such as a geotechnical investigation. The cost estimate is provided in current dollars for 2018.

DETAILED COST ESTIMATES - SHORT-TERM ALIGNMENT

TABLE 15. DETAILED COST ESTIMATE - SHORT-TERM ALIGNMENT

10' Wide Shared Use Path (4,158 feet, 6" depth)									
Item Description	Unit	L	W	H	Qty	Unit Cost	Total	Notes	
Clearing and Grubbing	SF	4,158	20		83,160	\$0.35	\$29,106	20' width	
Excavation	CY	4,158	10	1	1,540	\$24.00	\$36,960	10' width	
Erosion Controls	LF	4,158			8,316	\$2.50	\$20,790	both sides, length of project	
Sedimentation Controls	LF	4,158			4,158	\$7.15	\$29,730	hay bales, assume one side	
Grading	SY	4,158	14		6,468	\$15.00	\$97,020	shoulders + ac trail width	
Crusher fine shoulders	CY	4,158	4	0.33	205	\$100.00	\$20,531	2' wide x 2	
Asphalt path over aggregate	SF	4,158	10		41,580	\$9.00	\$374,220	10' wide asphalt path	
Mile markers	EA				1	\$450.00	\$450		
Tree planting	EA				200	\$350.00	\$70,000	assume 4 new trees for every 1 removed	
Tree removal	EA				50	\$350.00	\$17,500	assume 16 per 1/4 mile	
Wayfinding Signs	EA				10	\$700.00	\$7,000		
Regulatory and Warning Signs	EA				3	\$450.00	\$1,350		
<b>Estimated Direct Cost</b>							\$704,657		
Contingency	40%						\$281,863		
Engineering / Design	15%						\$105,699		
Construction / Overhead / Mobilization	20%						\$140,931		
Project Administration	15%						\$105,699		
<b>Estimated Construction Costs (70% burden)</b>							\$1,338,848		

E Nevada St to Kestrel Pkwy - On-Street Improvements (1,085 ft)									
Item Description	Unit	L	W	H	Qty	Unit Price	Total	Notes	
Wayfinding Signs	EA	2			2	\$700.00	\$1,400	At E Nevada St and Oak St & at Kestrel Pkwy	
Regulatory Signs	EA	2			2	\$450.00	\$900	For vehicles from both ends of road segment	
Pavement markings	EA	10			10	\$750.00	\$7,500	Every 200' each direction, thermoplastic bike with arrow markings	
Restripe travel lanes	LF	1085			2170	\$3.00	\$6,510	2 bike lanes	
Stop signs	EA				0	\$250.00	\$0	Added under Interim improvements	
<b>Estimated Direct Cost</b>							\$16,310		
Contingency	40%						\$6,524		
Engineering / Design	15%						\$2,447		
Construction / Overhead / Mobilization	20%						\$3,262		
Project Administration	15%						\$2,447		
<b>Estimated Construction Costs (70% burden)</b>							\$30,989		

Note: This planning level cost estimate is intended to guide the selection of an alignment alternative. The estimate is limited to construction of the Bear Creek Greenway extension and does not include property acquisition costs, bridges, environmental mitigation costs, or specialized studies such as a geotechnical investigation. The cost estimate is provided in current dollars for 2018.

**DETAILED COST ESTIMATES - PERMANENT ALIGNMENT**

TABLE 16. DETAILED COST ESTIMATE - PERMANENT ALIGNMENT

<b>10' Wide Shared Use Path (5,200 ft)</b>									
Item Description	Unit	L	W	H	Qty	Unit Cost	Total	Notes & Assumptions	
Clearing and Grubbing	SF	5,200	20		104,000	\$0.35	\$36,400	20' width	
Excavation	CY	5,200	10	1	1,926	\$24.00	\$46,222	10' width	
Erosion Controls	LF	5,200			10,400	\$2.50	\$26,000	Both sides, length of project	
Sedimentation Controls	LF	5,200			5,200	\$7.15	\$37,180	Hay bales, assume one side	
Grading	SY	5,200	14		8,089	\$15.00	\$121,333	Shoulders + ac trail width	
Crusher fine shoulders	CY	5,200	4	0.3333	257	\$100.00	\$25,676	2' wide x 2	
Asphalt path over aggregate	SF	5,200	10		52,000	\$9.00	\$468,000	10' wide asphalt path	
Mile markers	EA				1	\$450.00	\$450		
Tree planting	EA				250	\$350.00	\$87,500	Assume 4 new trees for every 1 removed	
Tree removal	EA				65	\$350.00	\$22,750	Assume 16 per 1/4 mile	
Wayfinding Signs	EA				6	\$700.00	\$4,200	Directional or turn signs	
Regulatory and Warning Signs	EA				4	\$450.00	\$1,800	Misc. at trail entrances	
<b>Estimated Direct Cost</b>							<b>\$877,511</b>		
Contingency	40%						\$351,004		
Engineering / Design	15%						\$131,627		
Construction / Overhead / Mobilization	20%						\$175,502		
Project Administration	15%						\$131,627		
<b>Estimated Construction Costs (70% burden)</b>							<b>\$1,667,271</b>		

<b>Wastewater Treatment Plant Road - Advisory Bike Lanes (938 ft)</b>									
Item Description	Unit	L	W	H	Qty	Unit Price	Total	Notes & Assumptions	
Wayfinding Signs	EA	4			4	\$700.00	\$2,800	Both ends of segment, both directions	
Regulatory Signs	EA	2			2	\$450.00	\$900	For vehicles from both ends of road segment	
Pavement markings	EA	10			10	\$750.00	\$7,500	Every 200' each direction, thermoplastic bike with arrow markings	
Restripe travel lanes	LF	938			1876	\$3.00	\$5,628	2 dashed lane lines for advisory bike lanes	
<b>Estimated Direct Cost</b>							<b>\$16,828</b>		
Contingency	40%						\$6,731		
Engineering / Design	15%						\$2,524		
Construction / Overhead / Mobilization	20%						\$3,366		
Project Administration	15%						\$2,524		
<b>Estimated Construction Costs (70% burden)</b>							<b>\$31,973</b>		

<b>North Mountain Ave - Widen Sidewalk from 4' to 10', concrete</b>									
Item Description	Unit	L	W	H	Qty	Unit Cost	Total	Notes & Assumptions	
Concrete Sidewalk on Existing Bridge	SF	205	6	0.5	18074	\$24.00	\$433,776	6' widening, connecting to Interim improvements	
Curb ramps	EA	1			1	\$2,500.00	\$2,500	On N. Mountain Ave north of Bear Creek bridge	
Wayfinding Signs	EA	2			2	\$700.00	\$1,400	At N. Mountain Ave and path junction	
Warning Signs	EA	1			1	\$450.00	\$450	For southbound vehicles	
<b>Estimated Direct Cost</b>							<b>\$438,126</b>		
Contingency	40%						\$175,250		
Engineering / Design	15%						\$65,719		
Construction / Overhead / Mobilization	20%						\$87,625		
Project Administration	15%						\$65,719		
<b>Estimated Construction Costs (70% burden)</b>							<b>\$832,439</b>		

Note: This planning level cost estimate is intended to guide the selection of an alignment alternative. The estimate is limited to construction of the Bear Creek Greenway extension and does not include property acquisition costs, bridges, environmental mitigation costs, or specialized studies such as a geotechnical investigation. The cost estimate is provided in current dollars for 2018.