



# **BEND BIKEWAY PROJECT**

## ALTERNATIVES ANALYSIS REPORT

MAY 2024



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## PURPOSE

The Bend Bikeway project is a part of a two-year initiative developed by Bend City Council focused on building at least one complete North-South and one East-West Key Route. The City's community-driven Transportation System Plan (TSP) designated the term "Key Routes" to represent a network of interconnected bicycle lanes and pathways designed to provide safe and comfortable connections to schools, parks, and other destinations, as well as for cross-City travel. The routes will be designed to make it easier to ride near busy roads and encourage different ways to travel. A total of 12 Key Routes are planned in the City's TSP.

Figure 1 displays the Bend Bikeway study area comprised of the selected crosstown routes, which are comprised of pieces of various Key Routes. The approximate seven-mile east-west route spans from the planned Parkside Place affordable housing development in the east to Tree Farm Drive in the west. The approximate eight-mile north-south route spans from Pine Nursery Park in the north to Caldera High School in the south. This project also includes an approximate 0.6-mile stretch of SE 9<sup>th</sup> Street between Reed Market Road and Wilson Avenue that is intended to enhance the network of low-stress facilities and provide greater connectivity to businesses.

Project improvements are anticipated to include shared use/protected paths, neighborhood greenways, isolated accessibility enhancements (sidewalk infill, safe crossings, and curb ramps), and wayfinding.

The purpose of this alternatives analysis is to present potential alternatives and recommendations for improving these Key Routes, with the ultimate goal of arriving at a recommended alternative to advance to design and construction. Full segment alternatives are shown in Appendix A. The information provided in this report is organized into the following sections:

- **Project Goals and Evaluation Criteria Summary** – This section documents the project's overarching goals and a variety of metrics used to compare each alternative against the existing conditions as well as other alternatives.
- **Multimodal Needs and Opportunities Summary** – This section provides an overview of key findings from the analysis of current corridor conditions for both routes.
- **Shared use/Protected Path Segments Improvement Concepts** – This section describes the improvement alternatives that were considered for the portions of the Key Routes that will include shared use/protected path segments for consistency with synergy projects and/or based on the Level of Traffic Stress (LTS).
- **Intersection Crossing Enhancements** – This section documents enhancements for key crossing locations along both routes and potential locations for additional crossing enhancements.
- **Modal Filter Framework and Considerations** – This section discusses the framework for selecting ideal locations along the Key Routes for modal filter application to deprioritize motor vehicle traffic and access.
- **Summary of Recommendations and Remaining Needs** - This section provides a summary of key findings and recommendations from the analysis.

## NEARBY LANDMARKS



## PARKS



## SCHOOLS

## CROSSTOWN BIKEWAYS



NORTH-SOUTH  
KEY ROUTE

EAST-WEST  
KEY ROUTE

SE 9TH ST  
KEY ROUTE

**FIGURE 1: BEND BIKEWAY PROJECT STUDY AREA**

## PROJECT GOALS AND EVALUATION CRITERIA SUMMARY

The Bend City Council, the community driven TSP, and the voter-approved Transportation General Obligation Bond (GO Bond) have identified the need for Key Walking and Bicycling Routes that link important destinations and provide critical east-west and north-south cross-town travel for people walking and bicycling. As a result, the City Council's, the TSP's, and GO Bond's goals and needs form the basis for this project's goals. The set of project goals and evaluation criteria agreed upon by City staff and collaborators is provided in Table 1. A **goal** is an overarching principle or a broad statement of intent that informs the range of possible transportation solutions and guides decision-making. **Evaluation criteria** assess how well those goals would be met by the alternatives considered. These goals and criteria were used to help evaluate project alternatives relative to each other and in combination with community outreach, helped inform the selection of a preferred alternative.

**TABLE 1: PROJECT GOALS & EVALUATION CRITERIA**

GOAL	EVALUATION CRITERIA	MEASURE
ALIGNS WITH COMMUNITY GOALS	Enhances the quality of walking and biking facilities.	Qualitative
	Implements a planned low-stress bicycle network and connected and protected key walking and biking routes in a timely manner to align with City Council's goals.	Qualitative
	Minimizes physical footprint and impacts to natural, historic, and cultural resources.	Qualitative
MULTIMODAL SAFETY, COMFORT, AND MOBILITY	Minimizes bicycle and pedestrian LTS to align with the City of Bend's goal of LTS 2 or better.	LTS
	Aligns traffic patterns with the Transportation System Plan's road classifications and identified low-stress network.	Qualitative
	Improvements are easy to access and are intuitive for vulnerable roadway users.	Qualitative
MEET COMMUNITY NEEDS COST-EFFECTIVELY	Addresses project needs cost-effectively.	Cost (\$)
	Minimizes temporary easement or right-of-way acquisition needs and is a constructable/feasible solution.	Estimated acquisition needs (square footage)
	Minimizes the costs and challenges of ongoing maintenance requirements.	Qualitative

The project team conducted a technical evaluation of the alternatives based on the criteria outlined in Table 1 using the ratings below. The project team's recommendations have been reviewed by City staff and key collaborators to modify or confirm the recommendations. A public open house



has been held to gather community feedback to modify the alternatives and the criteria. Finally, the preferred alternatives have been presented to City Council. Refer to the Alternative Evaluation and Recommended Alternative section for results.

- Substantial alignment with the criterion
- ◐ Neutral or moderate alignment with criterion
- Minor alignment, or negative with respect to the criterion
- N/A Not applicable

## MULTIMODAL NEEDS AND OPPORTUNITIES

This section presents a brief summary of the Multimodal Needs and Opportunities Memorandum, attached as Appendix B, which discusses existing conditions along the routes and helped inform improvement concepts.

### ANTICIPATED SEGMENT TREATMENTS

Given the size of the overall study area and the varying conditions for people walking and biking throughout, the study area was further subdivided based on the types of improvements that are anticipated along the routes, in coordination with City staff:

- **Synergy Projects** – These portions of the Key Routes are anticipated to be addressed through separate planning, design, and construction projects. Therefore, the memorandum does not provide a detailed review of needs and opportunities in these segments but instead highlights which projects are anticipated to address needs for people walking and biking. These projects are summarized in the following section.
- **Shared use/Protected Paths** – These areas are assumed to require larger capital investments in shared use or protected paths to meet the intended function of a Key Route. Much of the memorandum focuses on the detailed conditions of these segments to help inform the development of improvement concepts. Alternatives for these particular segments are evaluated in this report.
- **Neighborhood Greenways** – These segments of the Key Routes are generally local streets within the existing network of neighborhood greenways in Bend. Improvements in these segments are generally focused on traffic calming measures or modal filters (diverters intended to block motor vehicles but allow people walking, biking, or rolling to continue through). Therefore, this memorandum provides a focused discussion of traffic volumes, speed, and key destinations to help inform the development of a modal filter framework and identify high-priority locations for potential modal filter or traffic calming treatments as the project progresses. The framework and considerations for modal filter treatments are described in this report.

- **Enhanced Intersections** – To reduce stress for people crossing busy roadways, intersection enhancements at several locations will be considered through this project to connect Key Route segments.
- **Other Improvement Needs** – Wayfinding improvements are anticipated throughout the study area. In addition, accessibility enhancements (such as sidewalk, safe crossings, pedestrian access ramps) are anticipated along certain segments.

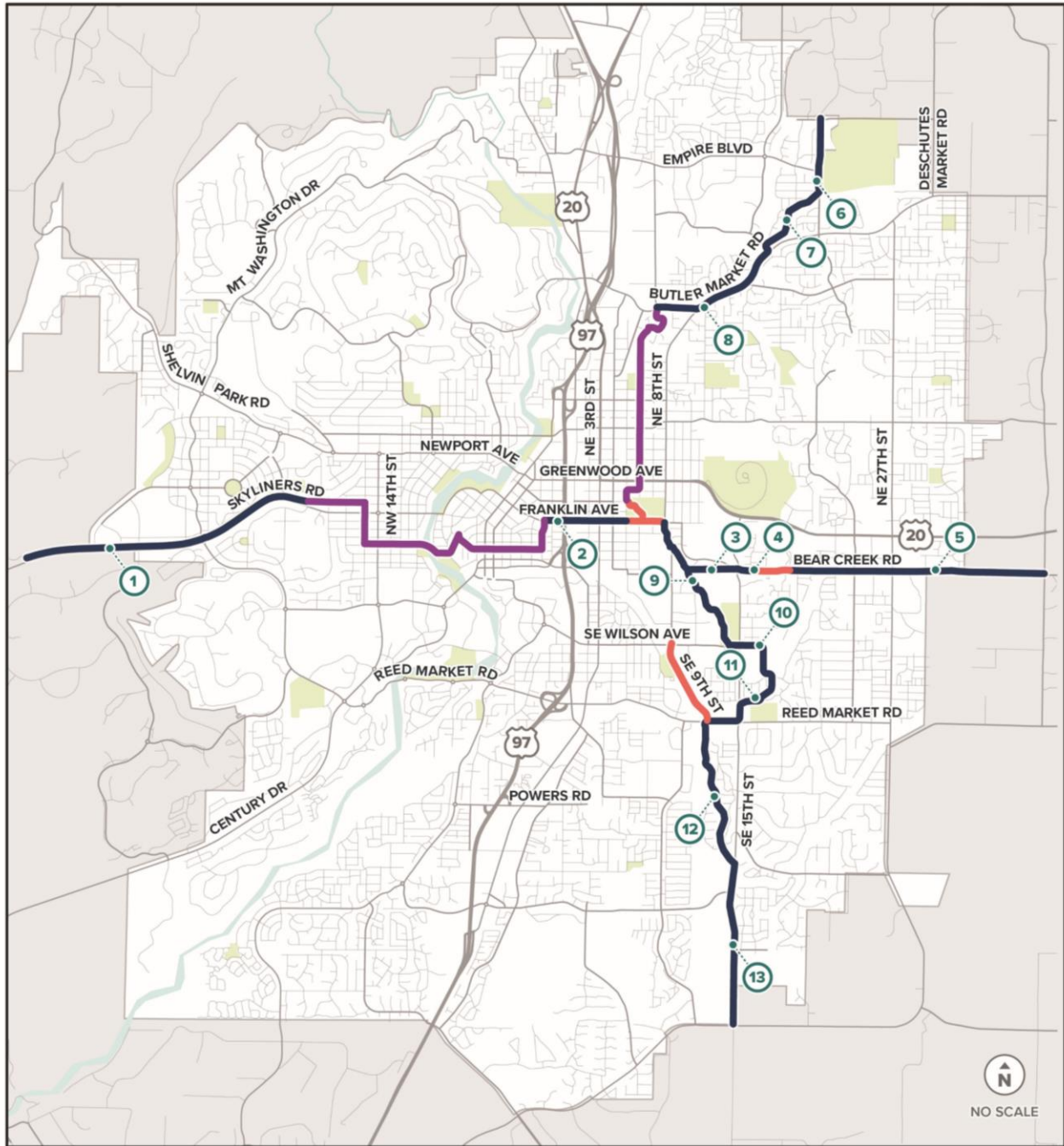
The anticipated key biking improvements are displayed in Figure 2 and summarized in the following sections. Note that wayfinding improvements are anticipated throughout the study area.

Figure 3 highlights the type of facilities present for people walking (sidewalk or shared-use path) along the Key Routes based on the existing conditions catalogued by the Pedestrian Implementation Plan (PIP).<sup>1</sup> If sidewalks are absent on either side of the road for the majority of a block, the segment was flagged as not having a facility present that is interconnected.

Approximately 25 percent of the Key Routes do not have a facility present for people walking. However, the segments along minor arterials (Franklin Avenue, Bear Creek Road, and Butler Market Road), that do not have pedestrian facilities present today are being addressed by synergy projects (discussed in more detail in the following section), which will then result in only 15 percent of the Key Routes missing facilities for people walking. Accessibility enhancements and modal filter treatments will be prioritized through these particular segments to improve the walking experience.

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<sup>1</sup> City of Bend Pedestrian Implementation Plan (June 2023) full access online:  
<https://www.bendoregon.gov/home/showpublisheddocument/57134/638333268904130000>



ANTICIPATED KEY BIKEWAY TREATMENTS\*

- SHARED-USE/  
PROTECTED PATH
- NEIGHBORHOOD  
GREENWAYS

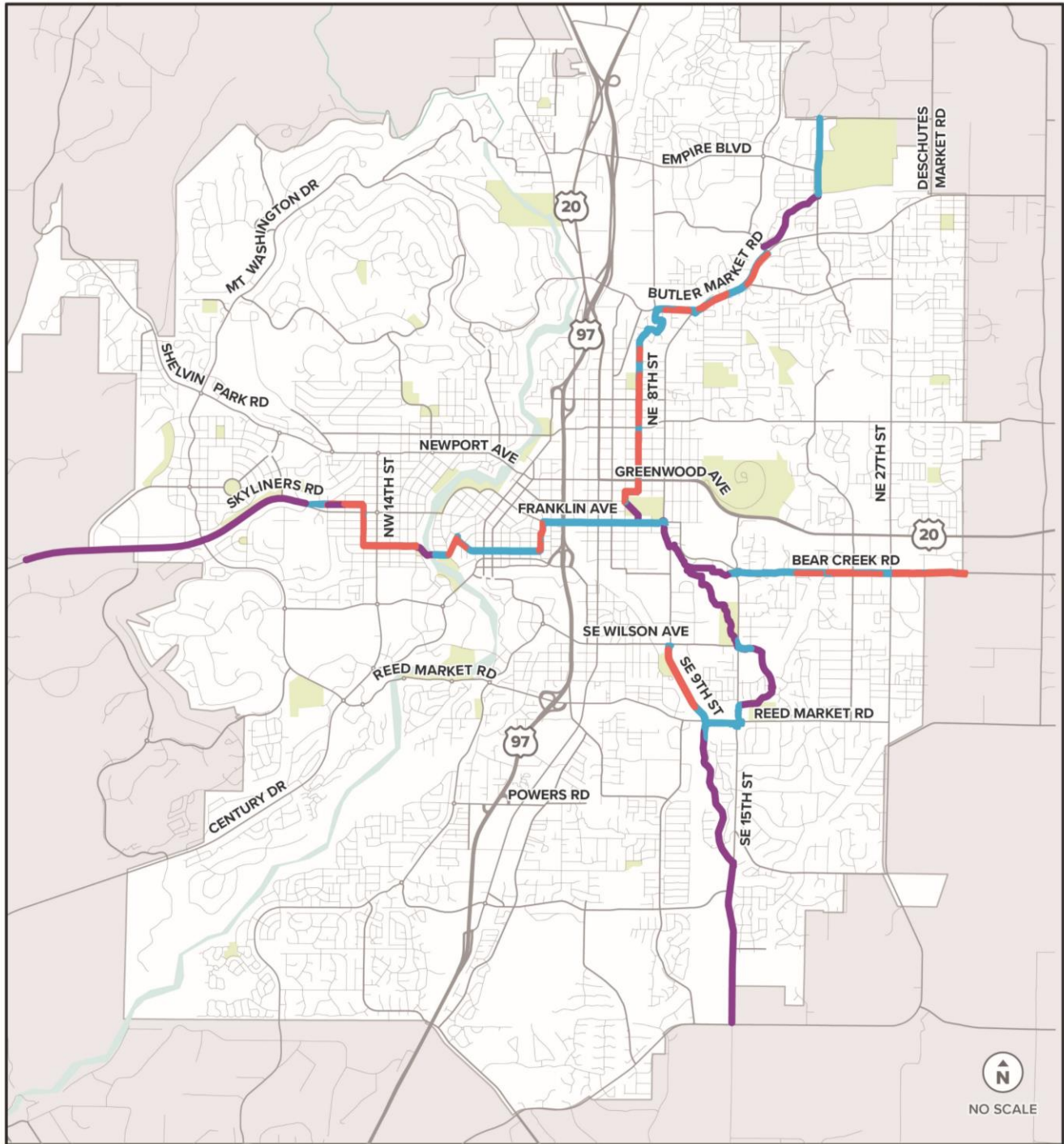
\*WAYFINDING IMPROVEMENTS WILL BE INCORPORATED THROUGHOUT THE STUDY SEGMENTS  
 \*MODAL FILTERS WILL BE CONSIDERED ALONG CERTAIN SEGMENTS

EXISTING/OTHER  
PROJECT'S IMPROVEMENTS\*

- SYNERGY PROJECT  
ROUTES
- SYNERGY PROJECT  
LOCATIONS

\*NUMBERING CORRESPONDS  
TO TABLE 2

FIGURE 2: ANTICIPATED KEY BIKEWAY TREATMENTS



EXISTING PEDESTRIAN FACILITIES

- SIDEWALKS PRESENT
- SHARED-USE PATH
- NO DEDICATED FACILITIES

**FIGURE 3: EXISTING PEDESTRIAN FACILITIES**

Source: City of Bend Pedestrian Implementation Plan



## SYNERGY PROJECTS SUMMARY

Table 2 summarizes the synergy projects that will be incorporated along both Key Routes to promote interconnected, safe, and comfortable walking and biking opportunities. The listed numbers correspond with the labels in Figure 2. These segments, owned by the City or the Bend Park and Recreation District (BPRD), will be joined together by improvements planned as part of this project. The needs for people walking and biking in these areas will be addressed through these synergy projects.

**TABLE 2: SYNERGY PROJECT ROUTES - EXISTING/OTHER PROJECT'S IMPROVEMENTS**

NO.	PROJECT NAME	EXTENTS	DETAILS	ROUTE
1	Existing – West Bend Trail	Tree Farm Drive to Hartford Avenue	This segment is from BPRD's existing trails.	East-West
2	Midtown Pedestrian and Bicycle Crossings project	Franklin Ave – NE 5 <sup>th</sup> St to Harriman St	Project will improve east-west connectivity through safer walking and biking connections in the Central Core Area of Bend.	East-West
3+5	Bear Creek and 27 <sup>th</sup> Street Improvements project	Bear Creek Rd – Cessna Ave to eastern Urban Growth Boundary (UGB) + SE 27 <sup>th</sup> St – US 20 to Reed Market Rd	Project will implement walking and biking improvements as well as connect a path from Bear Creek Elementary to the existing Coyner Trail as part of the Safe Routes to School (SRTS) program.	East-West
4	Existing – Larkspur Trail	15 <sup>th</sup> Street to Cessna Avenue	This segment is from BPRD's existing trails.	East-West
6	Existing – Pine Nursery Park Trail	Yeoman Road to North Unit Canal Trail	This segment is from BPRD's existing trails.	North-South
7	North Unit Canal Trail project	Pine Nursery Park Trail to Brinson Boulevard	Trail will be a 10-ft wide multi-use path with a primarily compacted gravel surface, plus an enhanced bicycle and pedestrian crossing will be added at Brinson Boulevard.	North-South
8	Butler Market Key Route project	Butler Market Rd – Longfellow Court to Brinson Blvd	Project will construct a shared use path adjacent to roadway and close sidewalk gaps along both sides of road.	North-South
9	Existing – Coyner Trail	Franklin Avenue to SE 15 <sup>th</sup> Street	This segment is from BPRD's existing trails. City will collaborate to enhance accessibility.	North-South
10	Coyner Trail Extension project	Larkspur Trail to SE 15 <sup>th</sup> Street	Private development will design and construct trail extension to improve	North-South

NO.	PROJECT NAME	EXTENTS	DETAILS	ROUTE
			connectivity between neighborhoods and nearby schools and parks.	
11	Larkspur Trail Improvements project	Reed Market Rd to Proposed Coyner Trail	City is collaborating with BPRD to execute minor improvements to the existing trail.	North-South
12	Central Oregon Historic Canal Trail	15 <sup>th</sup> Street Crossing to Reed Market Rd	BPRD led effort to incorporate a currently private owned trail into their Urban Trail Network.	North-South
13	Existing – 15 <sup>th</sup> Street SUP	Central Oregon Historic Canal Trail to Knott Road	Existing trail through Caldera High School and adjacent to SE 15 <sup>th</sup> Street	North-South

## SUMMARY OF KEY MULTIMODAL NEEDS AND OPPORTUNITIES

Based on the data and analysis documented in Appendix B, the following summarizes key multimodal needs and opportunities that have influenced the selection of improvements along the Key Routes:

### • Synergy Project Segments

- 13 segments along the Key Routes are anticipated to be existing/planned infrastructure from separate synergy projects.
- Specific coordination may be needed between this project and the following projects during preliminary design:
  - > Midtown Pedestrian and Bicycle Crossings project
  - > Bear Creek Road and 27th Street Improvements project
  - > Butler Market Key Route project

### • Shared use/Protected Path Segments

- Three segments have been identified for shared use/protected path treatments: 9<sup>th</sup> Street from Wilson Road to Reed Market Road, Franklin Avenue from NE 5<sup>th</sup> Street to NE 8<sup>th</sup> Street and Bear Creek Road from Alpenview Lane to Cessna Road.
- **9<sup>th</sup> Street**
  - > The Pedestrian LTS (PLTS) and Bicycle LTS (BLTS) is generally high through this segment due to the gaps in facilities for people walking and biking.
  - > There are significant utility and grade constraints on the west side of the roadway, which also parallels the railroad. A significant number of driveways conflict with any pedestrian or bicycle facility on the east side.
  - > A 5-foot-wide sidewalk with a landscaped buffer can be accommodated on the east side of the roadway to attain PLTS 2.
  - > BLTS 2 can be achieved with 7-foot-wide on-street bicycle lanes.
  - > To attain overall LTS 1, a 10-foot-wide SUP on at least one side of the roadway could be considered.



- **Franklin Avenue**

- > The existing sidewalk is narrow and high stress.
- > While the existing conditions for people biking are low-stress, they will likely not be consistent with improvements farther to the west and this is a critical segment where the two Key Routes overlap.
- > Public right-of-way (ROW) is approximately 80 feet, but the width to the back of the sidewalks is only 45 feet. There are numerous driveways, overhead utilities, and large trees at the back of walk within public ROW.
- > Either side of the roadway have potential to be utilized for PLTS and/or BLTS improvements.
- > A 10-foot-wide SUP on one side of the roadway could achieve overall LTS 1 and enhance connectivity to existing/planned infrastructure along the East-West Key Route.

- **Bear Creek Road**

- > This segment is expected to implement an improvement consistent with the on-going Bear Creek Road and 27th Street Improvements project and will therefore not be included in the Alternatives Analysis.

- **Neighborhood Greenway Segments**

- There are opportunities to incorporate pavement markings, signage, and traffic calming along some of the existing neighborhood greenway segments. Priority locations for modal filters are described in detail in the following sections.

- **Enhanced Intersection Needs**

- There are opportunities to enhance comfort and safety for people crossing along both routes. This could include urban green bicycle lanes or other treatments. Further details for critical intersections are included in the following sections.

- **Need of Facilities for People Walking**

- About a quarter of the study area does not have dedicated facilities present for people walking. Synergy projects address about ten percent of that existing need. There are opportunities to enhance accessibility for people walking through treatments such as safe crossings, pedestrian access ramps, and additional sidewalk/shared use path. Modal filter treatments also have the potential to eliminate conflicts with motor vehicle traffic.

## SHARED USE/PROTECTED PATH SEGMENTS IMPROVEMENT CONCEPTS

Alternatives were created by the project team to represent a range of potential solutions that could improve bicycle and pedestrian travel and safety along the highest volume areas of the routes. Alternatives, along with the existing street configuration, are depicted in a series of figures in Appendix A. The following sections outline what types of shared use/protected paths improvements were considered along SE 9th Street (Reed Market Road to Wilson Avenue), Franklin Avenue (5<sup>th</sup> Street to 8<sup>th</sup> Street) and Bear Creek Road (Alpenview Lane to Cessna Drive).

### FRANKLIN AVENUE (5<sup>TH</sup> STREET TO 8<sup>TH</sup> STREET)

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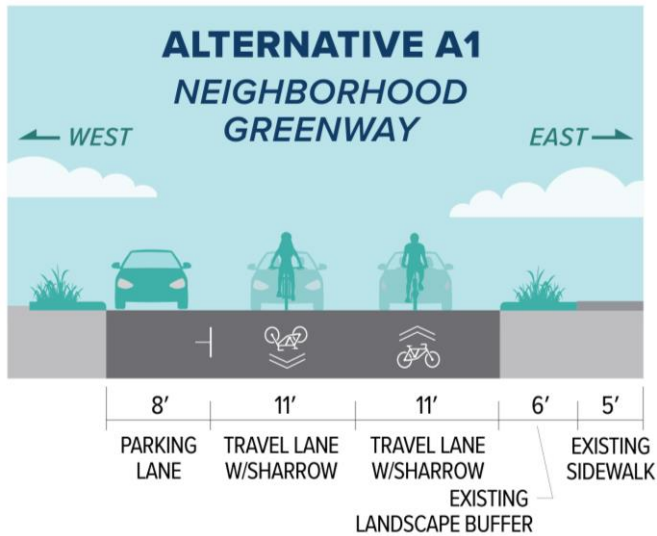
Both the North-South and East-West Key Routes intersect at this segment, providing an important connection to key destinations including Juniper Park, Bend High School sports fields, and Coyner Trail. Three alternatives are being considered, each bringing unique improvements to NE Franklin Avenue. The design will be refined to align connectivity with the outcome of the Midtown Crossings project, which is expected to end at 5<sup>th</sup> Street.

#### ALTERNATIVE A: ALTERNATE ROUTE

The first alternative (Alternative A) includes two variations (A1 and A2); both prioritize moving walking and biking routes off Franklin Avenue to lower traffic volume streets while still connecting to key destinations efficiently. These options focus on quick and cost-effective enhancements using pavement markings, signs, and crossings while maintaining the existing road size, as shown in Figure 4 and Figure 5 below. Alternative A2 would remove the existing landscape buffer to widen the existing sidewalk on the east side into a shared use path.

These alternatives would rely on a continuation of the Midtown Crossing Project's Franklin Avenue treatment from 5<sup>th</sup> Street to 6<sup>th</sup> Street which could lead to overall higher costs and longer implementation time.

## 6TH ST SOUTH OF FRANKLIN AVE



## 6TH ST SOUTH OF FRANKLIN AVE

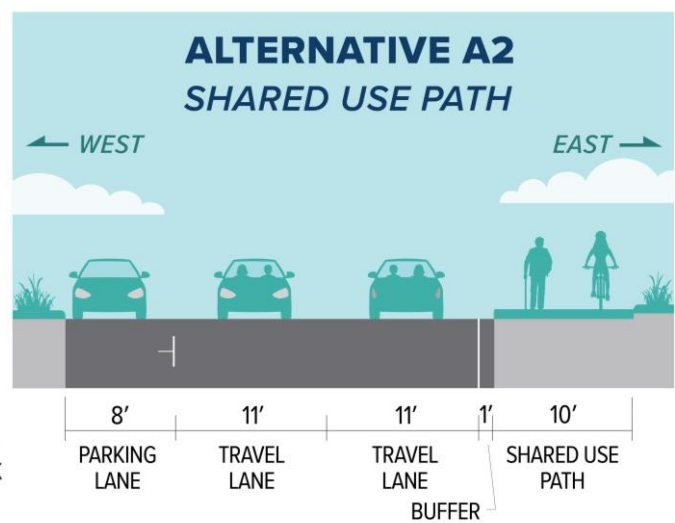


FIGURE 4: FRANKLIN AVENUE ALTERNATIVE A1 AND A2 - 6<sup>TH</sup> STREET CROSS SECTION

## EMERSON AVE EAST OF 6TH ST

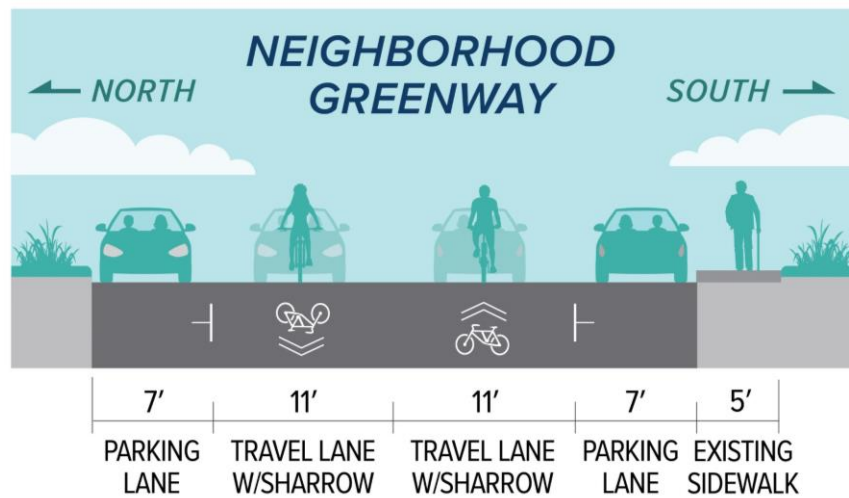


FIGURE 5: FRANKLIN AVENUE ALTERNATIVE A1/A2 – EMERSON AVENUE CROSS SECTION

## ALTERNATE B: RAISED BICYCLE LANE ON NORTH SIDE AND PROTECTED BICYCLE LANE ON SOUTH SIDE

Alternative B introduces a raised bicycle lane on the north side and a separated bicycle lane on the south side of Franklin Avenue, shown in Figure 6. Compared to the north side, the south side has more costly existing constraints, including some retaining walls. Therefore, this alternative focuses on widening to the north and reallocating the existing roadway space to avoid widening to the south. The roadway footprint would be widened five feet north behind the existing sidewalk, and the roadway centerline would be shifted two feet north to also integrate buffered bicycle lanes with delineators into the design. The 2-foot dura-curb delineator part of the north side buffer serves as added protection and provides additional opportunity to separate people on foot from people on bicycles, simplifying travel for vulnerable roadway users. The added buffer on the north side and the vertical 2-foot flexible delineator part of the south side buffer eliminate potential for people driving to encroach into the bikeway. Existing traffic patterns can be maintained, but this alternative requires more space to incorporate protected bicycle facilities on both sides. Conflict points are limited to driveways and intersections. This alternative does not preclude a future widening project to the south to widen the existing sidewalk for a shared use path.

### ALTERNATIVE B – FRANKLIN AVE CROSS SECTION

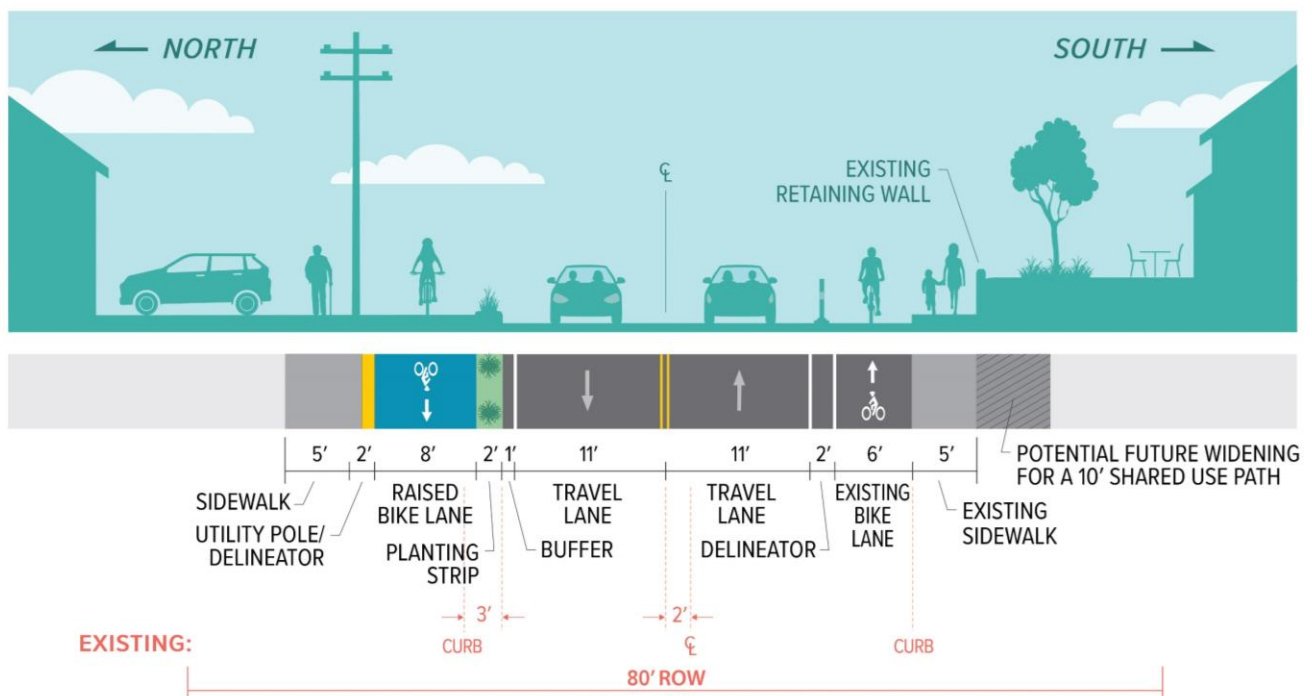


FIGURE 6: FRANKLIN AVENUE ALTERNATIVE B CROSS SECTION

### ALTERNATIVE C: RAISED BICYCLE LANES (AT SIDEWALK LEVEL) ON BOTH SIDES

Alternative C assumes an extension of the Midtown Crossing Project’s treatment, shown in Figure 7, to enhance connectivity throughout the corridor. While that project is still determining the appropriate cross section for Franklin Avenue west of 5<sup>th</sup> Street, it is likely that raised bicycle lanes at sidewalk level on both sides of the road will be an ultimate treatment. Given that, the project team evaluated a 70-foot cross section option that includes raised bicycle lanes on both sides of the roadway, which would require widening the existing 58-foot configuration but would not require additional ROW. This would have similar benefits to Alternative B, but a continuous level of protection would be maintained through the corridor. This is a significant benefit considering the proximity to parks and school sports fields. As the widest footprint option, this would be the most costly. No substantial changes to motor vehicle traffic patterns are expected.

### ALTERNATIVE C - FRANKLIN AVE CROSS SECTION

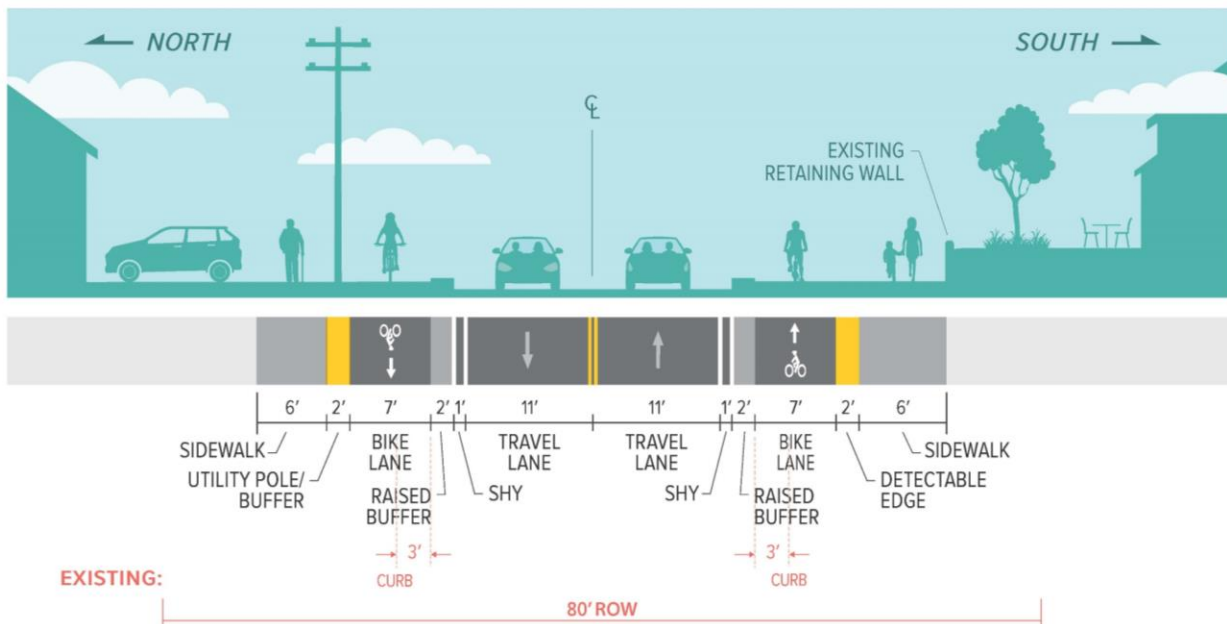


FIGURE 7: FRANKLIN AVENUE ALTERNATIVE C CROSS SECTION

## ALTERNATIVE EVALUATION AND RECOMMENDED ALTERNATIVE

Table 3 presents the evaluation results for the Franklin Avenue improvement alternatives. The alternatives perform similarly under several criteria including enhancing the quality of facilities, minimizing LTS, preserving corridor properties, and facilitating access to improvements for vulnerable roadway users.

Studied alternatives were evaluated for constraints and conflicts including impacts to existing utilities and other facilities, potential ROW needs, and impacts to existing privately owned improvements. Alternatives were developed and refined to eliminate or minimize these constraints and conflicts to the maximum extent practicable. Developed concepts also underwent a constructability review to evaluate the construction feasibility of presented alternatives.

Cost considerations included estimated material and construction costs, ROW acquisition, reconstruction costs of impacted private improvements, and City owned utility relocation work. A summary of these costs is included in Appendix C for each alternative presented in this report.

An open house was held on February 29<sup>th</sup>, 2024 to share information about the project and ensure the community's needs and priorities are being addressed. Approximately 86 people visited the in-person open house and a total of 107 participated in the online survey. When asked about their preference for transportation concepts near Franklin Avenue, approximately half of all respondents (53) favored raised and protected bicycle lanes as it provides a direct and safe option for cyclists that separates from vehicle traffic to the maximum extent possible, noting that these improvements are worth the added costs and potential impacts to adjacent property to enhance the overall biking experience. The survey along with a summary of the open house feedback are included in Appendix D.

Based on the scoring criteria established for this project and community feedback on alternatives, the following treatments are recommended:

- Alternative C cross section, which features raised cycle tracks in each direction.
- An enhanced crossing at Franklin Avenue/6th Street to improve the connection between the East-West and North-South Key Routes.

This alternative is also expected to provide the best continuity with the Midtown Crossings Project improvements to the west. If during the design phase, the additional widening and retaining walls on the south side are too costly to construct, north side improvements could be constructed first with the improvements to the south constructed as part of a different project in the future.



TABLE 3: FRANKLIN AVENUE ALTERNATIVES EVALUATION

EVALUATION CRITERION	FRANKLIN AVENUE			
	ALT A1: ALTERNATE ROUTE - NEIGHBORHOOD GREENWAY ALONG 6 <sup>TH</sup> ST AND EMERSON AVE	ALT A2: ALTERNATE ROUTE - SHARED USE PATH (SUP) ALONG ONE SIDE OF 6 <sup>TH</sup> ST AND NEIGHBORHOOD GREENWAY ALONG EMERSON AVE	ALT B: RAISED BIKE LANE NORTH SIDE AND PROTECTED BIKE LANE SOUTH SIDE WITH SIDEWALKS	ALT C: RAISED BIKE LANES AT SIDEWALK LEVEL ON BOTH SIDES
ENHANCES THE QUALITY OF WALKING AND BIKING FACILITIES.	●	●	●	●
	<ul style="list-style-type: none"><li>• Neighborhood greenway can improve connectivity to adjacent key destinations (Juniper Park, Bend HS sport fields) through a lower stress route.</li></ul>	<ul style="list-style-type: none"><li>• Neighborhood greenway can improve connectivity to adjacent key destinations (Juniper Park, Bend HS sport fields) through a lower stress route.</li><li>• SUP on 6<sup>th</sup> Street further enhances options for people walking and biking.</li></ul>	<ul style="list-style-type: none"><li>• Active transportation facilities provided on both sides of Franklin Ave (future improvements on the south side) to help improve comfort and safety.</li></ul>	<ul style="list-style-type: none"><li>• Continuous level of treatment for walk/bike facilities provided on both sides of Franklin Ave to facilitate travel and help improve comfort and safety.</li></ul>
IMPLEMENTS A PLANNED LOW-STRESS BICYCLE NETWORK AND CONNECTED AND PROTECTED KEY WALKING AND BIKING ROUTES IN A TIMELY MANNER TO ALIGN WITH CITY COUNCIL’S GOALS.	◐	●	●	●
	<ul style="list-style-type: none"><li>• Low-stress route provided via alternate route.</li><li>• Neighborhood greenway treatments (pavement markings, signs, or traffic calming) can be implemented relatively quickly but are less protected than other treatments.</li></ul>	<ul style="list-style-type: none"><li>• Low-stress route provided via alternate route.</li><li>• Physically-separated path on 6<sup>th</sup> Street eliminates potential for people driving to encroach into the walkway/bikeway. Conflict points are limited to driveways and intersections.</li></ul>	<ul style="list-style-type: none"><li>• Low-stress walk/bike facilities provided on both sides of Franklin Ave, simplifying travel for vulnerable roadway users.</li><li>• Raised cycle track and protected bike lanes provide additional opportunity to separate people on foot from people on bicycles.</li><li>• Physically-separated paths eliminate potential for people driving to encroach into the walkway/bikeway. Conflict points are limited to driveways and intersections.</li></ul>	<ul style="list-style-type: none"><li>• Simplified travel for vulnerable roadway users by providing low-stress walk/bike facilities on both sides of corridor.</li><li>• Physically-separated paths eliminate potential for people driving to encroach into the walkway/bikeway. Conflict points are limited to driveways and intersections.</li><li>• Raised cycle track provide additional opportunity to separate people on foot from people on bicycles.</li></ul>
MINIMIZES PHYSICAL FOOTPRINT AND IMPACTS TO NATURAL, HISTORIC, AND CULTURAL RESOURCES.	●	●	◐	◐
	<ul style="list-style-type: none"><li>• Does not change the existing roadway footprint.</li></ul>	<ul style="list-style-type: none"><li>• Widening is assumed to occur within the existing roadway footprint.</li></ul>	<ul style="list-style-type: none"><li>• Requires larger roadway footprint. Widens 5 feet north behind existing sidewalk to add raised bike lane with planter strip buffer.</li><li>• Requires a 2-ft shift of the existing painted centerline and lane configuration.</li></ul>	<ul style="list-style-type: none"><li>• Widens approximately 12 feet beyond existing curb to add new sidewalk and raised bike lane beside planter strip buffer.</li><li>• Widening may impact some existing mature trees within ROW as well as private properties</li></ul>
MINIMIZES BICYCLE AND PEDESTRIAN LEVEL OF TRAFFIC STRESS (LTS) TO ALIGN WITH THE CITY OF BEND’S GOAL OF LTS 2 OR BETTER. <sup>A,B</sup>	●	●	●	●
	<ul style="list-style-type: none"><li>• BLTS = 1 (key route shifted to low-speed local street)</li><li>• PLTS = 2 for existing sidewalk</li></ul>	<ul style="list-style-type: none"><li>• BLTS = 1 (key route shifted to low-speed local street and SUP on 6<sup>th</sup> Street).</li><li>• PLTS = 2 for new SUP on 6<sup>th</sup> Street</li></ul>	<ul style="list-style-type: none"><li>• BLTS = 1 (SUP or physically separated bike lanes)</li><li>• North Side PLTS = 1</li><li>• South Side PLTS = 2 (potential for future SUP improvement).</li></ul>	<ul style="list-style-type: none"><li>• BLTS = 1 (SUP or physically separated bike lanes)</li><li>• PLTS = 1 for new wider sidewalk with extended buffering width</li></ul>
ALIGNS TRAFFIC PATTERNS WITH THE TRANSPORTATION SYSTEM PLAN’S ROAD CLASSIFICATIONS AND IDENTIFIED LOW-STRESS NETWORK.	◐	◐	●	●
	<ul style="list-style-type: none"><li>• This alternate low-stress route deviates from planned Key Routes.</li><li>• No substantial changes to motor vehicle traffic patterns expected.</li></ul>	<ul style="list-style-type: none"><li>• This alternate low-stress route deviates from planned Key Routes.</li><li>• No substantial changes to motor vehicle traffic patterns expected.</li></ul>	<ul style="list-style-type: none"><li>• No substantial changes to motor vehicle traffic patterns expected.</li></ul>	<ul style="list-style-type: none"><li>• No substantial changes to motor vehicle traffic patterns expected.</li></ul>

EVALUATION CRITERION	FRANKLIN AVENUE			
	ALT A1: ALTERNATE ROUTE - NEIGHBORHOOD GREENWAY ALONG 6 <sup>TH</sup> ST AND EMERSON AVE	ALT A2: ALTERNATE ROUTE - SHARED USE PATH (SUP) ALONG ONE SIDE OF 6 <sup>TH</sup> ST AND NEIGHBORHOOD GREENWAY ALONG EMERSON AVE	ALT B: RAISED BIKE LANE NORTH SIDE AND PROTECTED BIKE LANE SOUTH SIDE WITH SIDEWALKS	ALT C: RAISED BIKE LANES AT SIDEWALK LEVEL ON BOTH SIDES
IMPROVEMENTS ARE EASY TO ACCESS AND ARE INTUITIVE FOR VULNERABLE ROADWAY USERS.	●	●	●	●
	<ul style="list-style-type: none"> <li>Greenway treatments, wayfinding and enhanced crossings will provide easy access for vulnerable road users.</li> </ul>	<ul style="list-style-type: none"> <li>Wayfinding and enhanced crossings will provide easy access for vulnerable road users.</li> <li>SUP on 6<sup>th</sup> Street allows for bidirectional multimodal travel on one side, thereby simplifying access to key destinations.</li> </ul>	<ul style="list-style-type: none"> <li>Direct route connecting to downtown and serves multiple Key Routes</li> <li>Protected and separated walk/bike facilities on both sides of the roadway simplifies connectivity and access to destinations on either side of Franklin Ave.</li> </ul>	<ul style="list-style-type: none"> <li>Direct route connecting to downtown and serves multiple Key Routes</li> <li>Protected and separated walk/bike facilities on both sides of the roadway simplifies connectivity and access to destinations on either side of Franklin Ave.</li> </ul>
ADDRESSES PROJECT NEEDS COST-EFFECTIVELY.	●	●	◐	◐
	<ul style="list-style-type: none"> <li>Lowest cost, meets or exceeds BLTS and PLTS goal.</li> <li>Note that extending Midtown Crossing project treatments between 5<sup>th</sup> and 6<sup>th</sup> will add substantial costs to this alternative.</li> </ul>	<ul style="list-style-type: none"> <li>Medium cost, meets or exceeds BLTS and PLTS goal.</li> <li>Note that extending Midtown Crossing project treatments between 5<sup>th</sup> and 6<sup>th</sup> will add substantial costs to this alternative.</li> </ul>	<ul style="list-style-type: none"> <li>High cost, meets or exceeds BLTS and PLTS goal.</li> <li>Maintains low-stress route as identified in the City’ TSP.</li> </ul>	<ul style="list-style-type: none"> <li>Highest cost, meets or exceeds BLTS and PLTS goal.</li> <li>Maintains low-stress route as identified in the City’ TSP.</li> </ul>
MINIMIZES TEMPORARY EASEMENTS, CONSTRAINTS, CONFLICTS, OR RIGHT-OF-WAY ACQUISITION NEEDS AND IS A CONSTRUCTABLE/FEASIBLE SOLUTION.	●	◐	◐	◐
	<ul style="list-style-type: none"> <li>No ROW acquisition or temporary construction easements required.</li> <li>No anticipated impacts to privately owned infrastructure.</li> <li>No anticipated utility impacts or conflicts.</li> <li>Minimal construction impacts to vehicles, bicyclists, and pedestrians.</li> </ul>	<ul style="list-style-type: none"> <li>No ROW acquisition or temporary construction easements required.</li> <li>No anticipated impacts to privately owned infrastructure (widening into existing landscape strip for shared use path on 6<sup>th</sup> Street).</li> <li>Minor utility conflicts with resulting point obstructions or potential relocations.</li> <li>Intermediate temporary construction impacts for vehicles, bicyclists, and pedestrians.</li> </ul>	<ul style="list-style-type: none"> <li>High impacts to driveways, stairs, and privately owned infrastructure within public ROW.</li> <li>Large degree of utility conflicts will require meandering, narrowing, and/or accepting interaction with slight point obstructions along bike and pedestrian routes, or relocating utility conflict points.</li> <li>High degree of temporary construction impact to vehicles, bicyclists, pedestrians, and adjacent residents.</li> </ul>	<ul style="list-style-type: none"> <li>High impacts to driveways, stairs, and privately owned infrastructure within public ROW.</li> <li>Large degree of utility conflicts with resulting point obstructions or potential relocations.</li> <li>High degree of temporary construction impact to vehicles, bicyclists, pedestrians, and adjacent residents.</li> </ul>
MINIMIZES THE COSTS AND CHALLENGES OF ONGOING MAINTENANCE REQUIREMENTS.	●	●	◐	◐
	<ul style="list-style-type: none"> <li>No significant maintenance requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Will require additional snow removal for SUP on 6<sup>th</sup> Street in winter.</li> </ul>	<ul style="list-style-type: none"> <li>Will require additional maintenance of protected bike lane and possible landscaped buffer.</li> <li>Will require additional snow removal for bike lanes in winter.</li> </ul>	<ul style="list-style-type: none"> <li>Will require additional maintenance of protected bike lane and possible landscaped buffer.</li> <li>Will require additional snow removal for bike lanes in winter.</li> </ul>

Key

Substantial alignment with criterion: ●

Neutral or moderate alignment with criterion: ◐

Minimal or no alignment with criterion: ○

Not applicable: N/A

<sup>A</sup>BLTS = Bicycle Level of Stress; Physically separated bicycle lanes (separated from motor vehicles by landscaped buffers, curbs, bollards, bioswales, on-street parking or other vertical delineators) are generally classified as BLTS 1. At 25 mph, on-street bike lanes with no separation would need to be ≥ 5.5’ to reach BLTS 1. Neighborhood greenways (local 25-mph streets with unmarked centerline) are BLTS 1.

<sup>B</sup>PLTS = Pedestrian Level of Stress; On a two-lane roadway, 10-15’ total buffering width (landscaping, shoulder/parking, and bike lane) needed to achieve PLTS 1, otherwise PLTS 2. For 25 mph roadway, landscaping needed for PLTS 1, all other buffer types result in PLTS 2.

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## SE 9<sup>TH</sup> STREET (REED MARKET ROAD TO WILSON AVENUE)

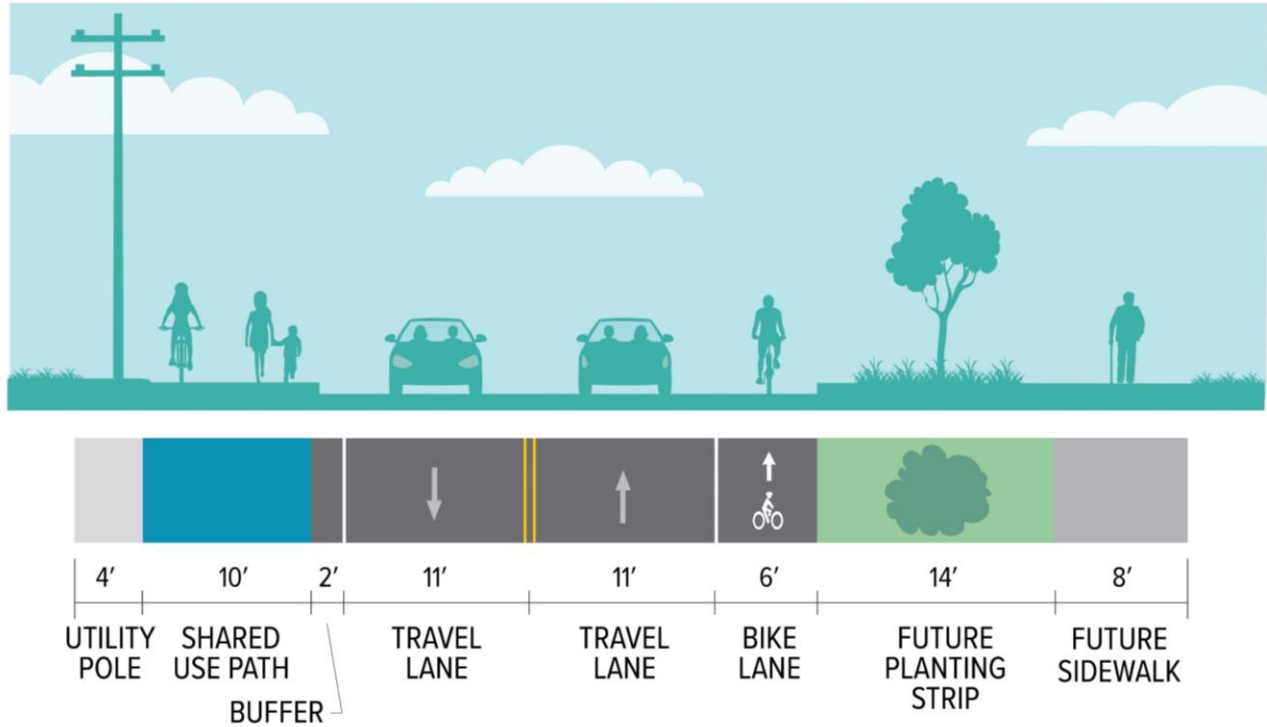
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This segment is part of a separate TSP Key Route extending from Reed Market Road to Wilson Avenue, bisecting a light industrial area, stretching approximately 0.6 miles. Widening possibilities are limited by the constraints of the railroad, existing utility poles, grade differences and driveway conflicts on the east side. The project team did an initial screening of several preliminary cross section options and selected a preferred concept to advance for further refinement during the design phase based on the following constraints and considerations:

- **Low-Stress improvements:** The project team prioritized creating a continuous, connected shared use path to create a low-stress walking and biking facility along 9<sup>th</sup> Street.
- **Existing driveway locations:** Given 9<sup>th</sup> Street runs parallel to the railroad to the west, there are very few driveway conflicts on the west side of the roadway compared to the east side. A west side shared use path option provides fewer potential conflicts between people walking, biking and driving.
- **Grade, utility and right-of-way conflicts:** Limited widening is possible to the west of the roadway, given the railroad ROW, existing overhead utility poles and grade differences.
- **Available project budget:** The City has budgeted \$1.15 million for this project, which limits the amount of roadway widening and ROW impacts that can be considered with any improvements.

The preferred alternative consists of adding a shared use/protected path on the west side of the road with potential for adding sidewalk on the east side in the future, as shown in Figure 8. A plan view concept is included in Appendix A. A shared use/protected path on the west side of the road minimizes conflicts with driveways, making it safer for pedestrians, bicyclists, and drivers alike. This choice also minimizes the physical footprint and impacts to natural resources by using a portion of the existing bicycle lane/shoulder. Overall, the preferred alternative aligns most with the available project budget of \$1.15 million when compared to the other alternative concepts that were evaluated, achieving the project goals through this segment while being mindful of financial considerations. A summary of estimated costs is included in Appendix C.

## PREFERRED ALTERNATIVE 9TH ST CROSS SECTION *(Facing North)*



**FIGURE 8: 9<sup>TH</sup> STREET PREFERRED ALTERNATIVE CROSS SECTION**

## NE BEAR CREEK ROAD (ALPENVIEW LANE TO CESSNA DRIVE)

This segment will provide an important connection along the east-west Key Route from existing to planned trails and an extension of the planned shared use path being delivered by the Bear Creek Road and 27<sup>th</sup> Street Improvements project to the existing Larkspur Trail. The north side sidewalk will be converted into a shared use path of varied widths for people walking and bicycling, while the south side remains the same with a 6-foot sidewalk and 6-foot conventional on-street bicycle lane with no buffer. Figure 9 portrays an example of the planned improvements along Bear Creek Road along a segment without existing walk/bike facilities on the south side. These improvements do not require roadway widening and will allow for a potential future full “build out” with protected walk/bike facilities on the south side.

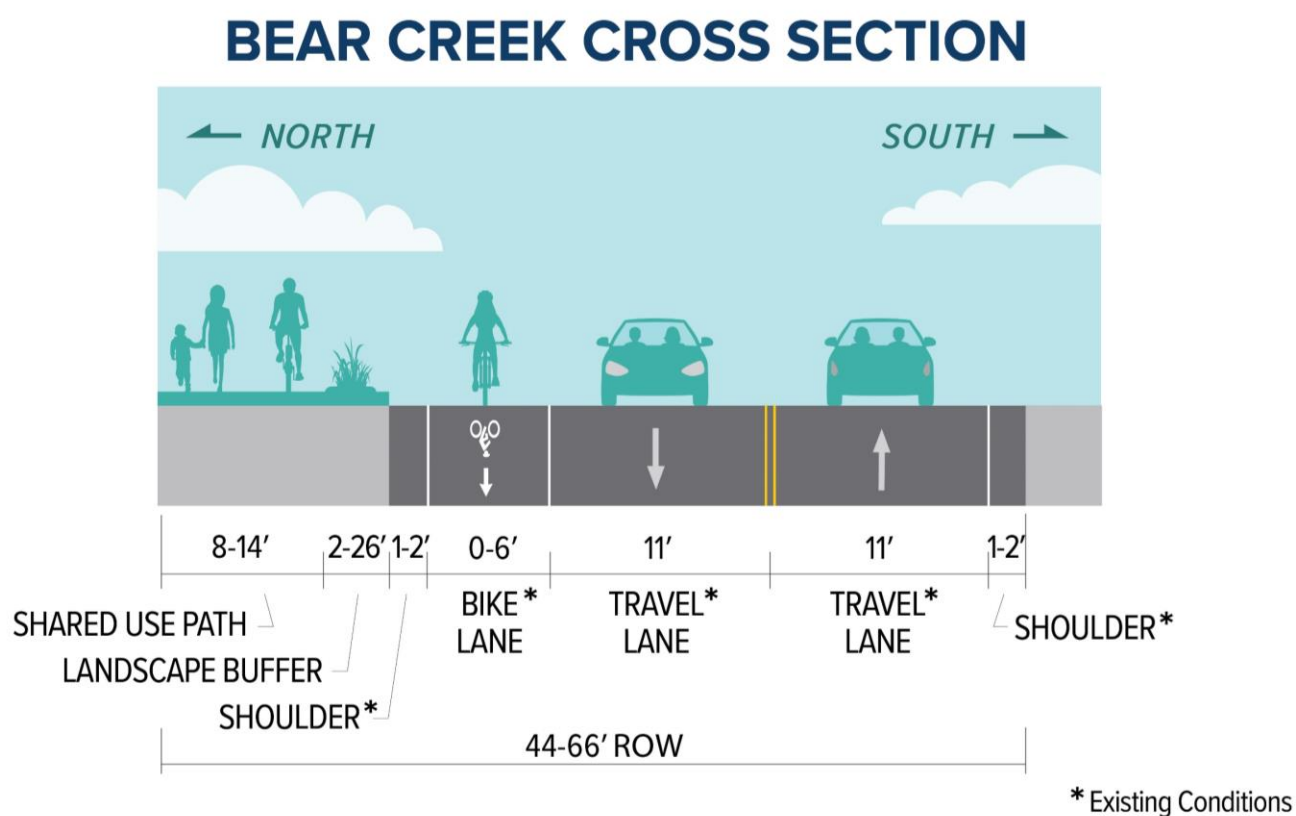


FIGURE 9: BEAR CREEK ROAD PREFERRED ALTERNATIVE CROSS SECTION

## INTERSECTION CROSSING ENHANCEMENTS

This section presents intersection crossing improvements to best support enhanced pedestrian and bicycle crossing opportunities along the Key Routes. Table 4 summarizes recommended crossing enhancements at other potential locations identified in the needs and opportunities memorandum (Appendix B). At two intersection locations, more detailed concepts were developed and are discussed below in the following sections.

**TABLE 4: RECOMMENDED INTERSECTION CROSSING ENHANCEMENTS**

INTERSECTIONS	PROPOSED IMPROVEMENTS <sup>A</sup>
<b>EAST-WEST KEY ROUTE</b>	
<b>15<sup>TH</sup> STREET &amp; GALVESTON ROAD</b>	<ul style="list-style-type: none"> <li>• Add green bicycle lane extension (crossbike) pavement markings through intersection.</li> <li>• Add pedestrian crosswalk lighting to provide enough lighting through the entire crosswalk area and avoid shadows.</li> <li>• Extend partially connected sidewalks along 15<sup>th</sup> Street for a block to enhance low-stress network (LSN).</li> <li>• Remove adjacent parking stalls to improve sight distance.</li> <li>• A partial closure on the south leg to divert southbound vehicles from the neighborhood greenway and a speed feedback sign along Galveston Road when approaching from the west. See Modal Filter Framework and Considerations section for more details.</li> <li>• Consider adding speed activated speed depression to reduce eastbound vehicle speeds.</li> </ul>
<b>CUMBERLAND AVENUE &amp; 14<sup>TH</sup> STREET/CENTURY DRIVE</b>	<ul style="list-style-type: none"> <li>• Add crossbike pavement markings through intersection.</li> <li>• Add pedestrian crosswalk lighting to enhance lighting through the entire crosswalk area and avoid shadows.</li> <li>• Extend partially connected sidewalks along a portion of the blocks on Cumberland Ave to enhance LSN.</li> </ul>
<b>DELAWARE AVENUE &amp; WALL STREET/BOND STREET</b>	<ul style="list-style-type: none"> <li>• Adjacent traffic signals at Colorado Ave help provide gaps in vehicular traffic to preserve a safe crossing environment. Reassess in the future as traffic volumes increase if a greater level of enhancement, such as a rectangular rapid flashing beacon, is needed at Wall Street/Delaware Avenue.</li> </ul>
<b>HARRIMAN STREET &amp; GEORGIA AVENUE</b>	<ul style="list-style-type: none"> <li>• See Harriman Street/Georgia Avenue discussion below for details.</li> </ul>
<b>NORTH-SOUTH KEY ROUTE</b>	
<b>BUTLER MARKET ROAD &amp; BOYD ACRES ROAD</b>	<ul style="list-style-type: none"> <li>• See Butler Market Road/Boyd Acres Road discussion for more detail.</li> </ul>



INTERSECTIONS	PROPOSED IMPROVEMENTS <sup>A</sup>
<b>6<sup>TH</sup> STREET &amp; SEWARD AVE</b>	<ul style="list-style-type: none"> <li>• Change stop sign direction or consider all-way yield and/or traffic circle.</li> </ul>
<b>6<sup>TH</sup> STREET &amp; REVERE AVE</b>	<ul style="list-style-type: none"> <li>• Add crossbike pavement markings through intersection.</li> </ul>
<b>6<sup>TH</sup> STREET &amp; OLNEY AVENUE</b>	<ul style="list-style-type: none"> <li>• Add median modal filter for a two-stage crossing across 3 lanes and reduce cut-through traffic. Refer to NE 6th Street near NE Olney Avenue section for more details.</li> </ul>
<b>6<sup>TH</sup> STREET &amp; FRANKLIN AVENUE</b>	<ul style="list-style-type: none"> <li>• Add pedestrian crosswalk lighting to enhance lighting through the entire crosswalk area and avoid shadows.</li> <li>• Add crossbike pavement markings through intersection.</li> <li>• Add bicycle and pedestrian crossing warning sign.</li> <li>• Consider minor widening to add 18" median and in-street stop crossing sign.</li> </ul>
<b>9<sup>TH</sup> STREET &amp; REED MARKET ROAD</b>	<ul style="list-style-type: none"> <li>• Add green bicycle lane extension across 9<sup>th</sup> Street leg.</li> <li>• Consider widening existing curb ramps to connect the west side shared use path to the existing crossing on the east leg.</li> <li>• Coordinate with Reed Market rail crossing implementation project to address the existing "double threat" risk of crossing two thru-lanes along Reed Market Road.</li> </ul>

<sup>A</sup> It is likely that not all proposed improvements will be funded through this current project but the City may continue to monitor if/when additional crossing enhancements are needed along the Key Routes.

## HARRIMAN STREET/GEORGIA AVENUE

As noted in the Modal Filter Framework and Considerations section of the report below, the Neighborhood Street Safety Program has identified a concept for a two-way cycle track along Harriman Street, with a conversion of traffic to one-way northbound. Based on discussions with City staff, intersection improvement concepts have been refined to a single design concept (shown in Appendix E) that will help support the implementation of the two-way cycle track, address the existing geometric issues, and help structure adjacent on-street parking without moving the existing curb lines.

## BUTLER MARKET ROAD/BOYD ACRES ROAD

The Butler Market Key Route project is currently designing a raised cycle track cross section along Butler Market Road that starts just east of the Boyd Acres Road intersection. To help fill the gap between the raised cycle track and the LSN on the south leg of the Boyd Acres Road intersection, several intersection alternatives were evaluated at Butler Market Road/Boyd Acres Road, as shown in Appendix F. The primary objective of all the alternatives was to minimally connect the northbound right turn bike movement to the raised cycle track at sidewalk grade. The other bike movements at the intersection are addressed in different ways depending on the alternatives (either with striping changes or infrastructure changes on the intersection corners). As design progresses, these concepts will be refined based on discussions with City staff and opportunities for available funding.

## MODAL FILTER FRAMEWORK AND CONSIDERATIONS

Along certain segments of the Key Routes, particularly neighborhood greenways, separation from motorized traffic is prioritized through modal filters to reduce high conflict points. This section also provides a description of the modal filter framework and identifies high-priority locations for treatments.

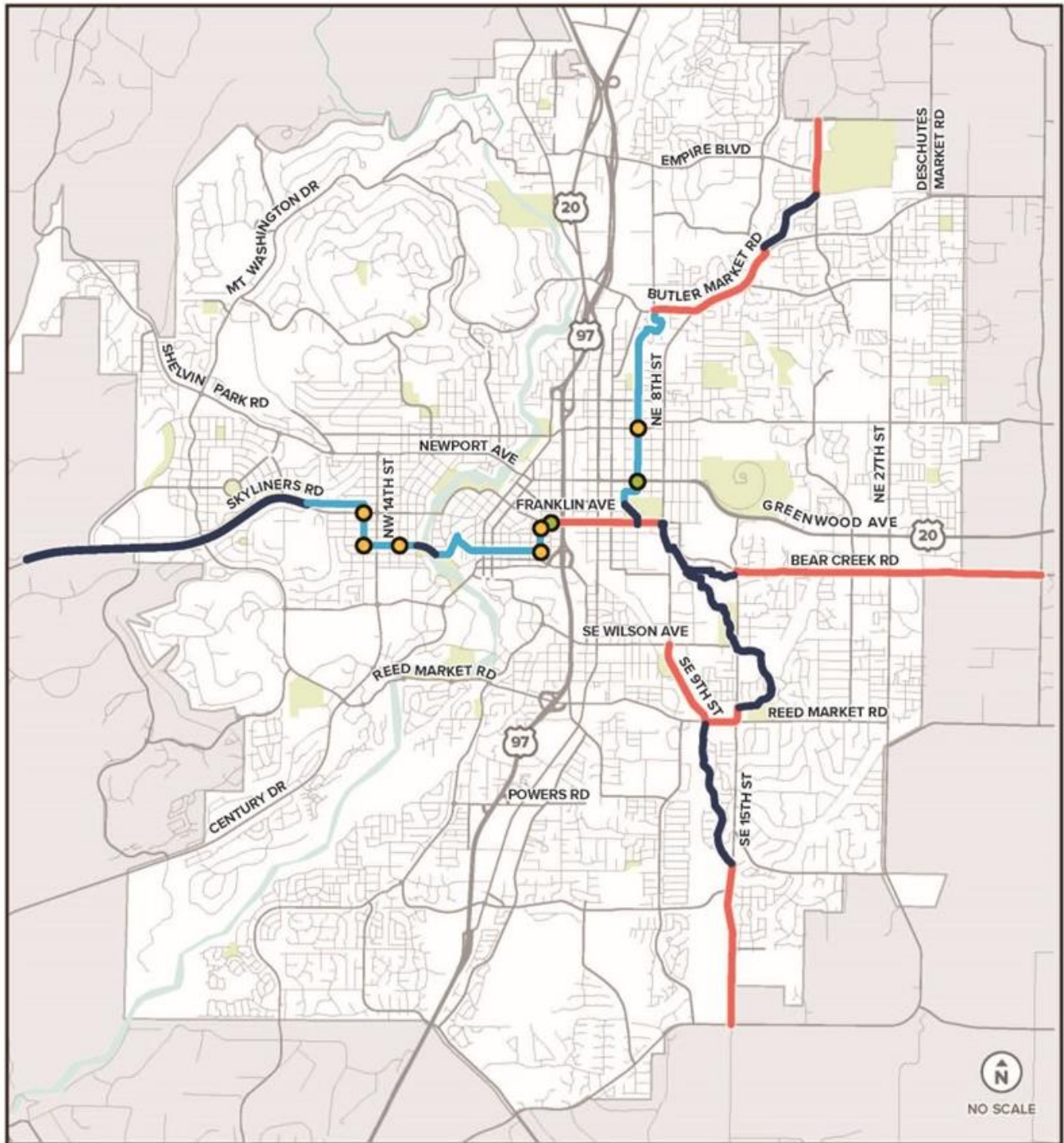
Both key routes were screened for potential modal filter applications based on the following characteristics:

- Functional classification
- Number of lanes
- Traffic volumes and speeds, including potential for existing motor vehicle diversion
- Existing modal filter locations, including median refuges and illumination presence
- Out of direction travel potential and adjacent access points
- Key destinations/origins
- Transit/freight impacts
- Community feedback

Using the framework above, the majority of the corridor does not need new modal filters due to:

- The existing route having limited potential for motor vehicle diversion (local streets likely only being used for local traffic) given adjacent street connectivity and nearby origins and destinations.
- The existing route consists of off-street trails with no motor vehicle access.
- The existing route utilizes local residential roads with traffic calming measures already in place (curb extensions, speed humps, on-street parking, etc.) that help maintain lower motor vehicle volumes and speeds.

Therefore, Figure 10 summarizes existing and proposed modal filter treatments, described in more detail in the following section.



#### MODAL FILTER TREATMENTS



**FIGURE 10: SUMMARY OF EXISTING AND PROPOSED MODAL FILTER TREATMENTS**

## RECOMMENDATIONS

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Based on the elements described in the framework above, the following sections provide context for the three neighborhoods where modal filter treatments were evaluated and describe where a new modal filter is recommended.

### ORCHARD DISTRICT NEIGHBORHOOD

Along the North-South Key Route, there are no existing modal filters along NE 6<sup>th</sup> Street from NE Greenwood Avenue to Butler Market Road (a distance of approximately one mile). Recently, this area received traffic calming treatments as part of the City's Neighborhood Greenways initiative.<sup>2</sup> Speed humps were doubled (10 now versus 5 previously) with shorter spacing between them to achieve consistent lower traffic speeds. Additional shared lane markings were installed along with two new traffic circles at Norton Avenue and Seward Avenue.

However, NE 6<sup>th</sup> Street in this area serves as a parallel local street to two more major roadways that are often congested (NE 3<sup>rd</sup> Street and NE 8<sup>th</sup> Street), indicating a higher potential for motor vehicle diversion, especially if congestion increases in the future. Therefore, two initial locations were evaluated for potential modal filters: NE 6<sup>th</sup> Street north of Revere Avenue and NE 6<sup>th</sup> Street near Olney Avenue.

#### NE 6<sup>th</sup> Street North of Revere Avenue

Based on traffic counts collected in January 2024, speeds are relatively low with less than five percent of vehicles observed traveling over 5 MPH above the posted speed limit, particularly south of Isabella Lane. Traffic counts indicated that daily traffic volumes are less than 625 vehicles per day (vpd) and remain under 50 vehicles during peak hours. This is well below national guidance for motor vehicle volumes on greenways, which should be designed for motor vehicle volumes under 1,500 vpd, with up to 3,000 vpd allowed in limited sections of a bicycle boulevard corridor.<sup>3</sup> Given this data, no modal filter is recommended along NE 6<sup>th</sup> Street north of Revere Avenue.

#### NE 6<sup>th</sup> Street near NE Olney Avenue

In this area, congestion on NE Olney Avenue and NE Revere Avenue between NE 3<sup>rd</sup> Street and NE 8<sup>th</sup> Street can encourage drivers to "stair step" and divert through this neighborhood using local streets. NE 6<sup>th</sup> Street is a particularly attractive option for diverting traffic, as the existing median at NE 5<sup>th</sup> Street/NE Olney Avenue limits local street connectivity and NE 7<sup>th</sup> Street does not connect to NE Olney Avenue (Figure 11).

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<sup>2</sup> City of Bend Neighborhood Greenways 2018-2020 Archive full access online: <https://www.bendoregon.gov/city-projects/infrastructure-projects/neighborhood-greenways>

<sup>3</sup> NACTO Urban Bikeway Design Guide – Volume Management full access online: <https://nacto.org/publication/urban-bikeway-design-guide/bicycle-boulevards/volume-management/>



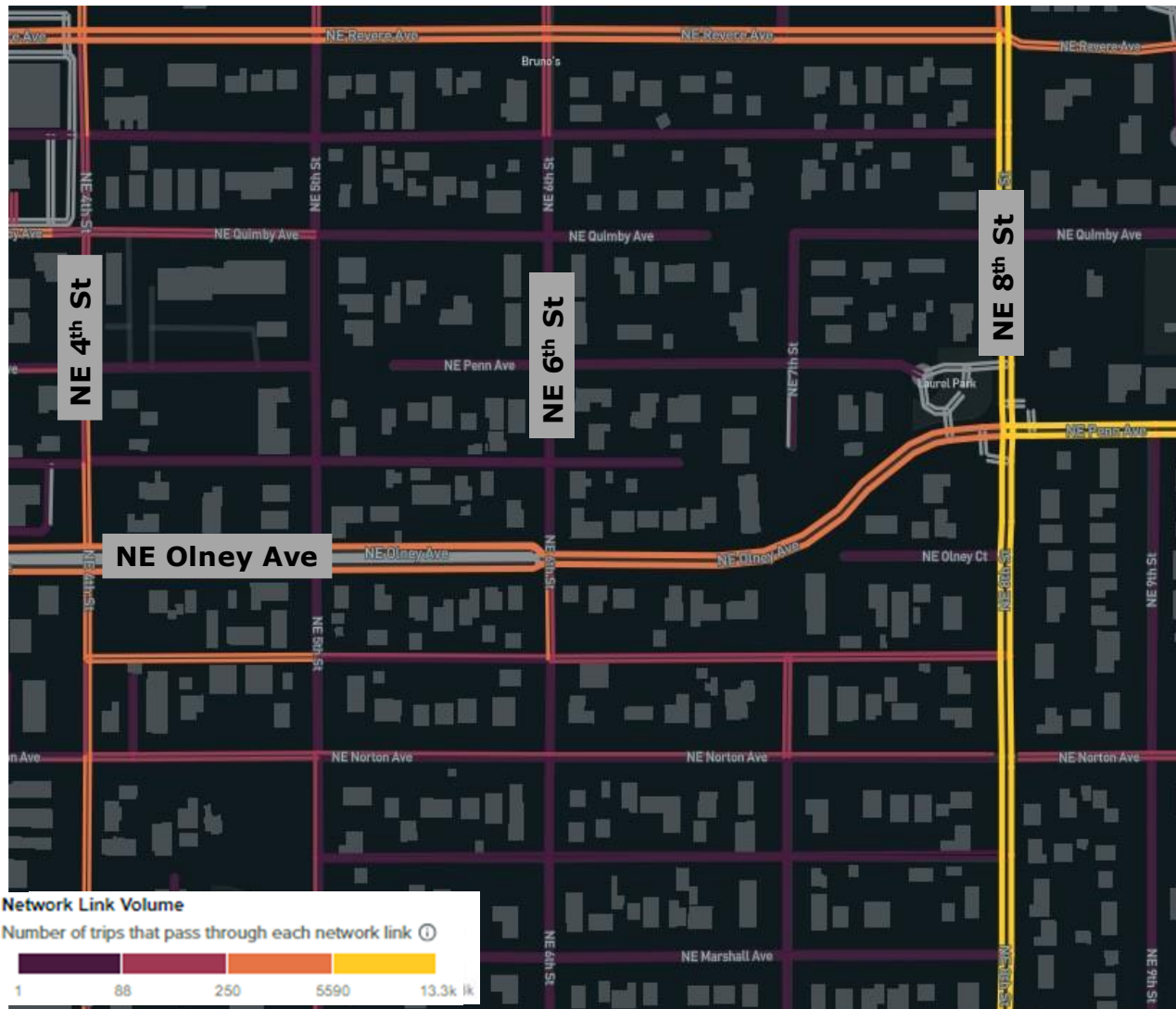


**FIGURE 11: AERIAL VIEW OF NE OLNEY AVE (NE 5TH STREET TO NE 7TH STREET)**

*Source: Google Maps Streetview*

To help limit the potential of cut-through traffic (particularly if congestion on NE Olney Avenue and NE Revere Avenue increases in the future), NE 6<sup>th</sup> Street and NE Olney Avenue was identified as a location for a modal filter. Based on the Replica Places travel model for an average weekday in Spring 2023, less than 500 vpd could be diverted from NE 6<sup>th</sup> Street to NE 4<sup>th</sup> Street (collector street) or NE 8<sup>th</sup> Street (minor arterial street) as shown in Figure 12 below. This is expected to result in limited changes to motor vehicle traffic delay by rerouting these relatively low volumes.

The added benefit of the modal filter at this location is that it provides the opportunity to enhance the crossing of Olney Avenue for people walking and biking. The intersection at NE 6<sup>th</sup> Street and NE Olney Avenue is the only intersection that requires crossing three lanes of traffic at once and does not include a median crossing. To create a safe crossing environment and ensure access to NE 6<sup>th</sup> Street is limited only to local residents, a median modal filter and crossing is recommended at the NE Olney Avenue intersection.



**FIGURE 12: NETWORK LINK VOLUMES - NE OLNEY AVE (NE 4<sup>TH</sup> STREET TO NE 9<sup>TH</sup> STREET)**

Source: Replica Places travel model

## OLD BEND NEIGHBORHOOD

The City's Neighborhood Street Safety Program (NSSP) seeks to address pedestrian and bicycle safety, safe routes to school, speeding, intersection control and crossings, and other residential street traffic safety related issues.<sup>4</sup> In the Old Bend Neighborhood, the NSSP has recommended adding a modal filter at the intersection of Colorado Avenue and Sisemore Street as well as restricting traffic on Harriman Street to strictly one-way northbound with a contra-flow bicycle lane in place of the southbound travel lane. The intent is to influence motorist choice of routes without

<sup>4</sup> City of Bend Neighborhood Street Safety Program full access online:  
<https://www.bendoregon.gov/government/departments/streets/neighborhood-street-safety-program>



limiting bicycle traffic and allow bicyclists to use safer, less trafficked streets.<sup>5</sup> The project prospectus is included in the Appendix G. This bikeway project will help implement the NSSP proposed contra-flow lane along Harriman Street. A modal filter would also be needed at the intersection of Delaware Avenue and Harriman Street to maintain the restriction on southbound traffic on the bikeway route.

Along Harriman Street, a portion of people driving through today are potentially cut-through traffic traveling between downtown Bend and the Colorado Avenue interchange/Box Factory area. Even more diverted traffic would be expected if access changes occur at US 97/Hawthorne Avenue due to the proposed Hawthorne Avenue Pedestrian and Bicyclist bridge. Restricting southbound traffic would discourage cut-through traffic. This form of modal filter is acceptable considering the southbound through traffic observed at the Georgia Avenue intersection in December 2023 was 131 vehicles during the afternoon 3-hour peak period (less than approximately 40 vehicles per hour).

## **RIVER WEST NEIGHBORHOOD**

Based on public feedback received at the first Open House for the project, modal filter treatments were also considered throughout the River West Neighborhood to reduce conflicts and cut-through traffic particularly along Neighborhood Greenways, NW 15<sup>th</sup> Street and Cumberland Avenue.

Diagonal diverters, like the one shown in Figure 13 below, are recommended at the NW 15<sup>th</sup> Street/Cumberland Avenue and NW 12<sup>th</sup> Street/Cumberland Avenue intersections. These modal filters would help limit interactions between motor vehicles and people walking/cycling along the Neighborhood Greenways or visiting the surrounding parks. The adjacent local streets provide enough connectivity for rerouted traffic to not significantly affect motor vehicle patterns.

A modal filter is also recommended at the NW 15<sup>th</sup> Street/Galveston Avenue intersection. A partial closure on the south leg restricting southbound motor vehicle access would help minimize LTS and enhance the LSN. Based on vehicle/speed data, part of Appendix C, the low number (less than 100 vpd) of rerouted vehicles are not expected to affect motor vehicle patterns. A speed feedback sign for eastbound traffic between NW 15<sup>th</sup> Street and NW 17<sup>th</sup> Street is also recommended due to the high-occurrence of speeding through this 25 MPH zone. A speed limit sign might also be beneficial for westbound traffic considering on average, westbound traffic is traveling at 27 MPH coming out from the 14<sup>th</sup> Street roundabout.

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<sup>5</sup> NACTO Urban Bikeway Design Guide – Contra-flow Bike Lanes full access online: <https://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/contr-flow-bike-lanes/>



**FIGURE 13: DIAGONAL DIVERTER EXAMPLE (SE ANKENY ST/SE 15TH AVE IN PORTLAND, OR)**

## SUMMARY OF RECOMMENDATIONS AND REMAINING NEEDS

As listed in the table, the total set of recommended improvements are anticipated to cost approximately \$9.2 million. As the project progresses, the City may seek additional funding sources and refine the project scope to better align project costs with available funding sources or to help address additional needs not met by the initial set of recommended improvements, discussed in more detail below.

Table 5 summarizes the recommended improvements along the highest LTS areas of the routes and the approximate cost estimate for the project. The segment improvements incorporate shared use/protected paths along SE 9th Street (Reed Market Road to Wilson Avenue), Franklin Avenue (5<sup>th</sup> Street to 8<sup>th</sup> Street), and Bear Creek Road (Alpenview Lane to Cessna Drive). There are also many opportunities to enhance intersections to convey giving priority to people walking/cycling. Similarly, there are segments along neighborhood greenways that can implement modal filters to reduce diverted traffic in local roadways without significantly affecting motor vehicle operations and prioritizing people walking/cycling.

As listed in the table, the total set of recommended improvements are anticipated to cost approximately \$9.2 million. As the project progresses, the City may seek additional funding sources and refine the project scope to better align project costs with available funding sources or to help address additional needs not met by the initial set of recommended improvements, discussed in more detail below.

**TABLE 5: BIKEWAY PROJECT RECOMMENDED IMPROVEMENTS**

CATEGORY	EXTENTS	RECOMMENDED IMPROVEMENTS	COST EST.
<b>SEGMENT IMPROVEMENTS</b>			
<b>SE 9<sup>TH</sup> STREET</b>	Wilson Ave to Reed Market Rd	SUP on the west side of the road with potential for adding sidewalk on the east side in the future.	\$1,825,000
<b>FRANKLIN AVENUE</b>	5 <sup>th</sup> Street to 8 <sup>th</sup> Street	Raised cycle tracks in each direction and an enhanced crossing at NE 6th Street.	\$3,200,000
<b>NE BEAR CREEK ROAD</b>	Alpenview Ln to Cessna Dr	SUP of varied widths on north side and potential future full “build out” with protected walk/bike facilities on the south side.	\$1,350,000
<b>INTERSECTIONS</b>			
<b>HARRIMAN STREET/ GEORGIA ROAD</b>	-	Conversion to one-way traffic northbound with quick-build treatments installed to reduce the crossing width.	\$80,000
<b>BUTLER MARKET ROAD/BOYD ACRES ROAD</b>	-	Intersection reconfiguration to connect the LSN to proposed raised cycle track on Butler Market Road.	\$160,000-640,000
<b>OTHER INTERSECTION RECOMMENDATIONS</b>	8 locations	See Table 4 for details.	\$440,000 <sup>a</sup>
<b>OTHER IMPROVEMENTS</b>			
<b>MODAL FILTERS</b>	6 locations	See Figure 9 for details. Includes speed activated speed depression device at 15 <sup>th</sup> Street and Galveston.	\$970,000 <sup>b</sup>
<b>NEIGHBORHOOD GREENWAY TREATMENTS</b>	Varies	Implement additional greenway striping treatments where appropriate. Include implementation of two-way cycle track between Harriman and Delaware.	\$200,000
<b>WAYFINDING TREATMENTS</b>	Varies	Implement wayfinding signing treatments where appropriate.	\$350,000
<b>TOTAL COST</b>			<b>\$9,215,000</b>

<sup>a</sup> Cost pertains to five intersections, three other locations are captured in other improvement costs.

<sup>b</sup> Cost pertains to five locations; Harriman Street/Delaware Avenue modal filter included as part of neighborhood greenway costs.

While many of the needs of the project are expected to fit within the proposed budget, there are several potential gaps that remain. As design progresses and cost estimates are refined, below lists additional opportunities to address, particularly related to sidewalk infill needs. Approximately six percent of the study area will remain without dedicated facilities for pedestrians under the current proposed project, the majority of which occurs on lower speed and lower volume local streets and could be implemented as part of the City's sidewalk infill program.

**TABLE 6: ADDITIONAL NEEDS TO BE ADDRESSED**

STREET	SEGMENT	TYPE OF FACILITY GAP	NOTES
SE 15 <sup>TH</sup> STREET	SE Reed Market Road to Canal Trail Crossing	Multimodal	If enhancing the existing canal trail from Reed Market Road to 15 <sup>th</sup> Street to meet the needs of a Key Route is not possible, additional improvements along 15 <sup>th</sup> Street may be needed to act as a parallel Key Route.
SE 27 <sup>TH</sup> STREET	at Bear Creek Road	Multimodal	This is a key intersection crossing that is planned to be addressed through the Bear Creek Road and 27 <sup>th</sup> Street Improvements project, although funding is currently constrained. This could result in a gap remaining.
BRINSON BLVD	North Unit Canal Trail to Butler Market Road	Multimodal	The Butler Market Key Route project will add crossbike pavement markings through the Brinson Blvd intersection, but additional crossing improvements at the trail or along Brinson Blvd may be needed to enhance connectivity.
NE IRVING AVE	NE 6th Street to NE 5th Street	Multimodal	Pedestrian facilities are absent on both sides of the road. Neighborhood greenway treatments planned.
NE 5TH STREET	NE Irving Ave to NE Hawthorne Ave	Multimodal	Gaps in pedestrian facilities throughout. Neighborhood greenway treatments planned.
NW HARTFORD AVE	NW Kingston Ave to NW 15th Street	Sidewalk	Pedestrian facilities are absent on both sides of the road. Neighborhood greenway treatments planned.
NW 15TH STREET	NW Hartford Ave to NW Cumberland Ave	Sidewalk	Gaps in pedestrian facilities throughout. Neighborhood greenway treatments planned.
NW CUMBERLAND AVE	NW 15th Street to NW Columbia Street	Sidewalk	Gaps in pedestrian facilities throughout. Neighborhood greenway treatments planned.
NW SHASTA PLACE	NW Riverside Blvd to NW Delaware Ave	Sidewalk	Pedestrian facilities are absent on both sides of the road. Neighborhood greenway treatments planned.
NW DELAWARE AVE	NW Shasta Place to NW Adams Place	Sidewalk	Gaps in pedestrian facilities throughout. Neighborhood greenway treatments planned.



STREET	SEGMENT	TYPE OF FACILITY GAP	NOTES
NW HARRIMAN STREET	NW Delaware Ave to NW Franklin Ave	Sidewalk	Pedestrian facilities are absent on both sides of the road. Neighborhood greenway treatments planned.
NE 6TH STREET	NE Isabella Lane to NE Irving Ave	Sidewalk	Gaps in pedestrian facilities throughout. Neighborhood greenway treatments in place.

# APPENDIX



1050 SW 6TH AVENUE, SUITE 600 • PORTLAND, OR 97204 • 503.243.3500 • [DKSASSOCIATES.COM](https://www.dksassociates.com)

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**APPENDIX F: BUTLER MARKET ROAD/BOYD ACRES ROAD**

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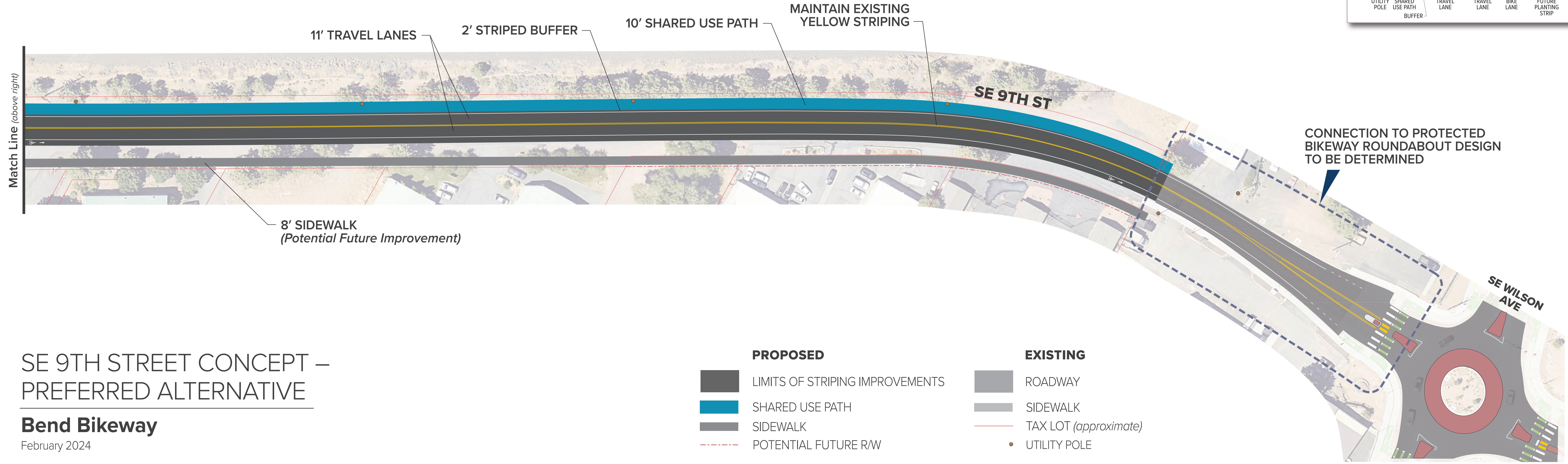
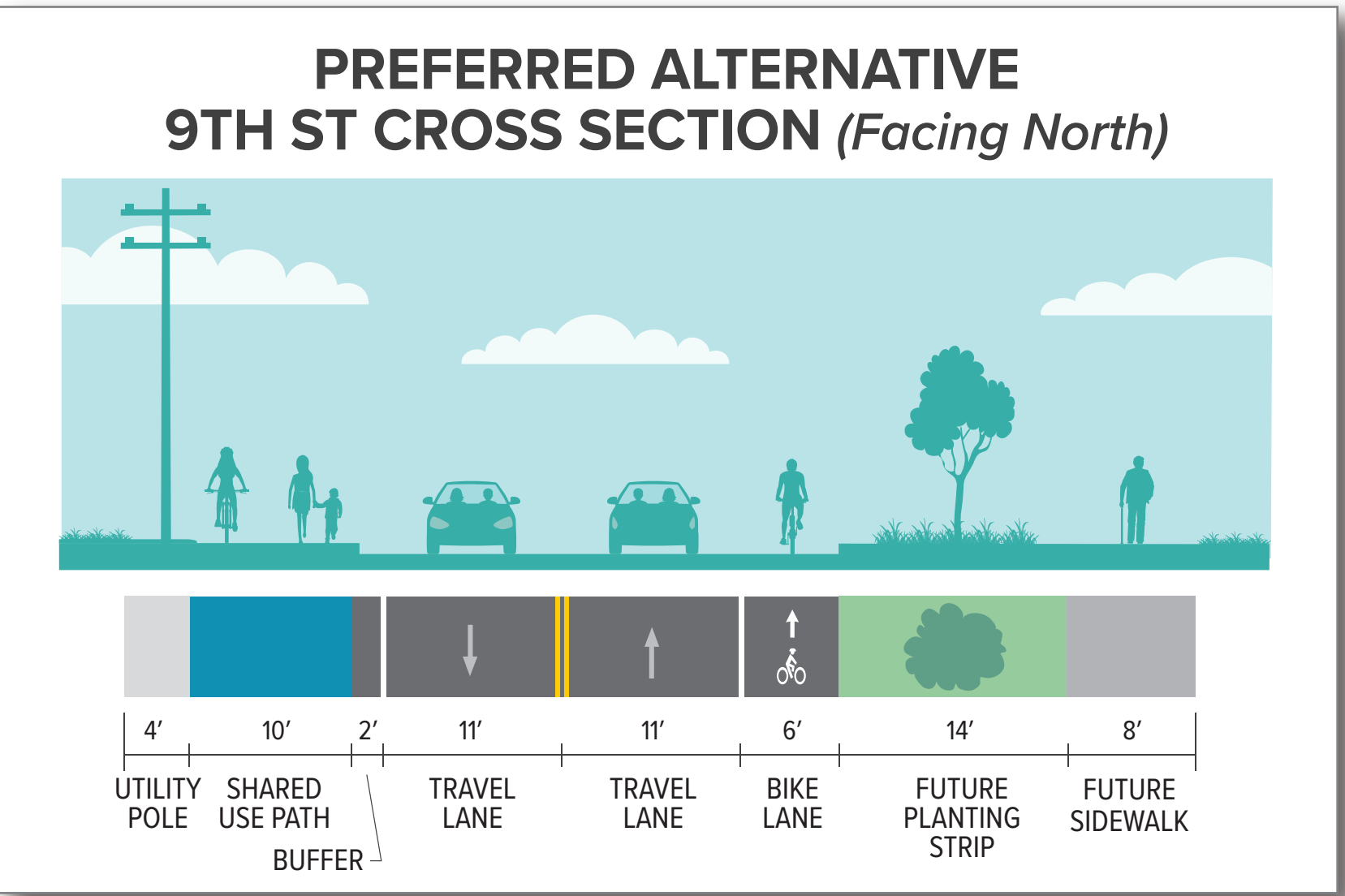
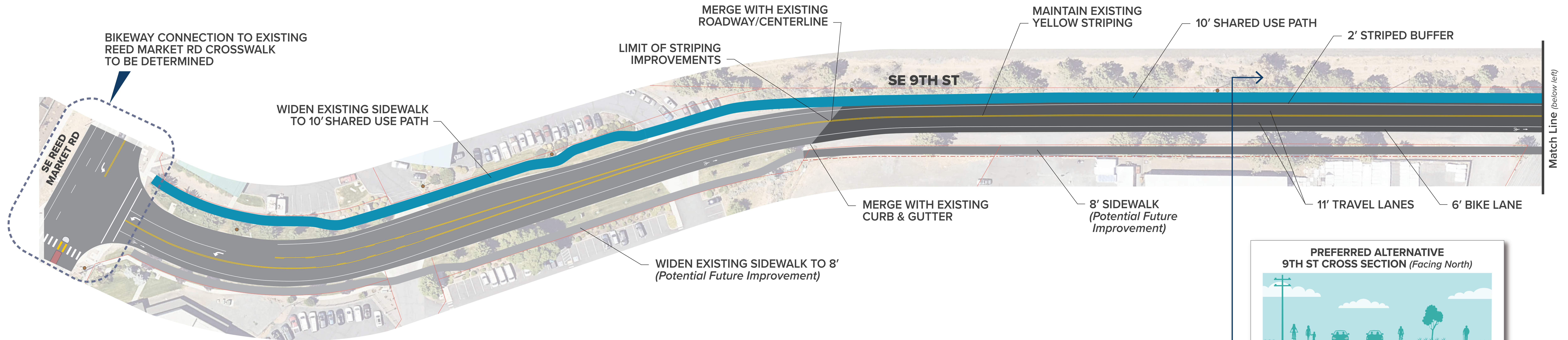
**APPENDIX H: TRAFFIC DATA**

## **APPENDIX A: ALTERNATIVE PLAN VIEW CONCEPTS**

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### **SHARED-USE/PROTECTED PATH SEGMENTS**





# SE 9TH STREET CONCEPT – PREFERRED ALTERNATIVE

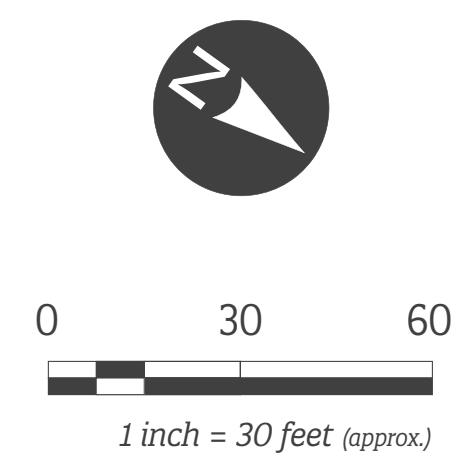
## Bend Bikeway

February 2024

- PROPOSED**

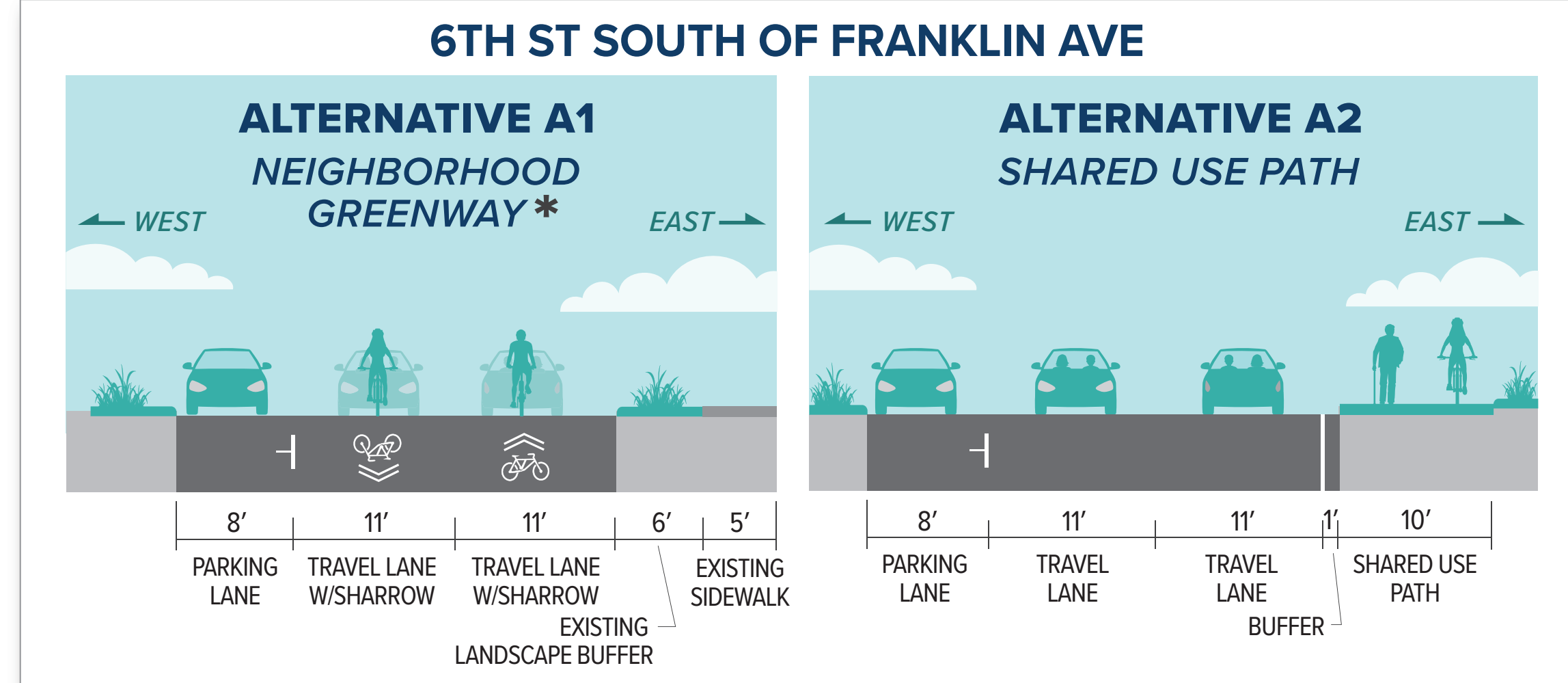
  - LIMITS OF STRIPING IMPROVEMENTS
  - SHARED USE PATH
  - SIDEWALK
  - POTENTIAL FUTURE R/W
- EXISTING**

  - ROADWAY
  - SIDEWALK
  - TAX LOT (approximate)
  - UTILITY POLE

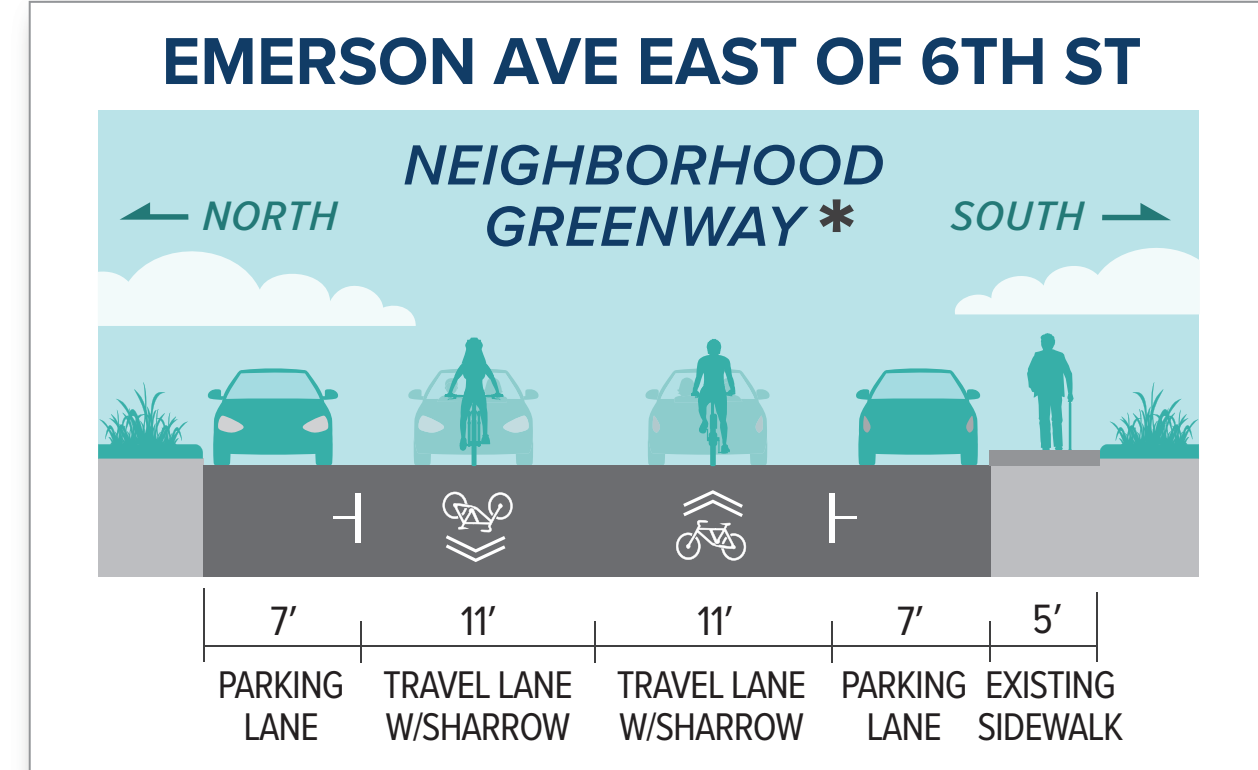




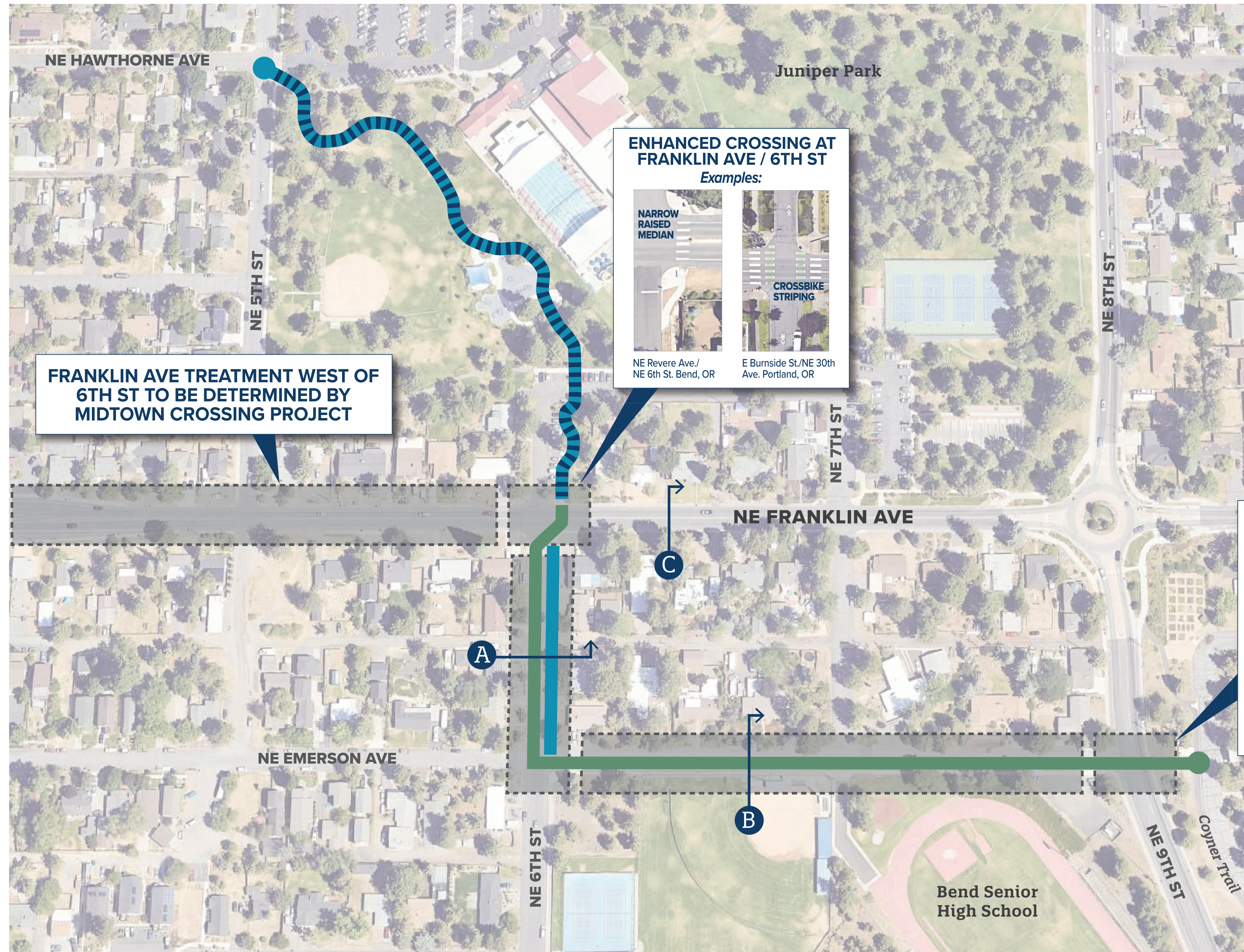
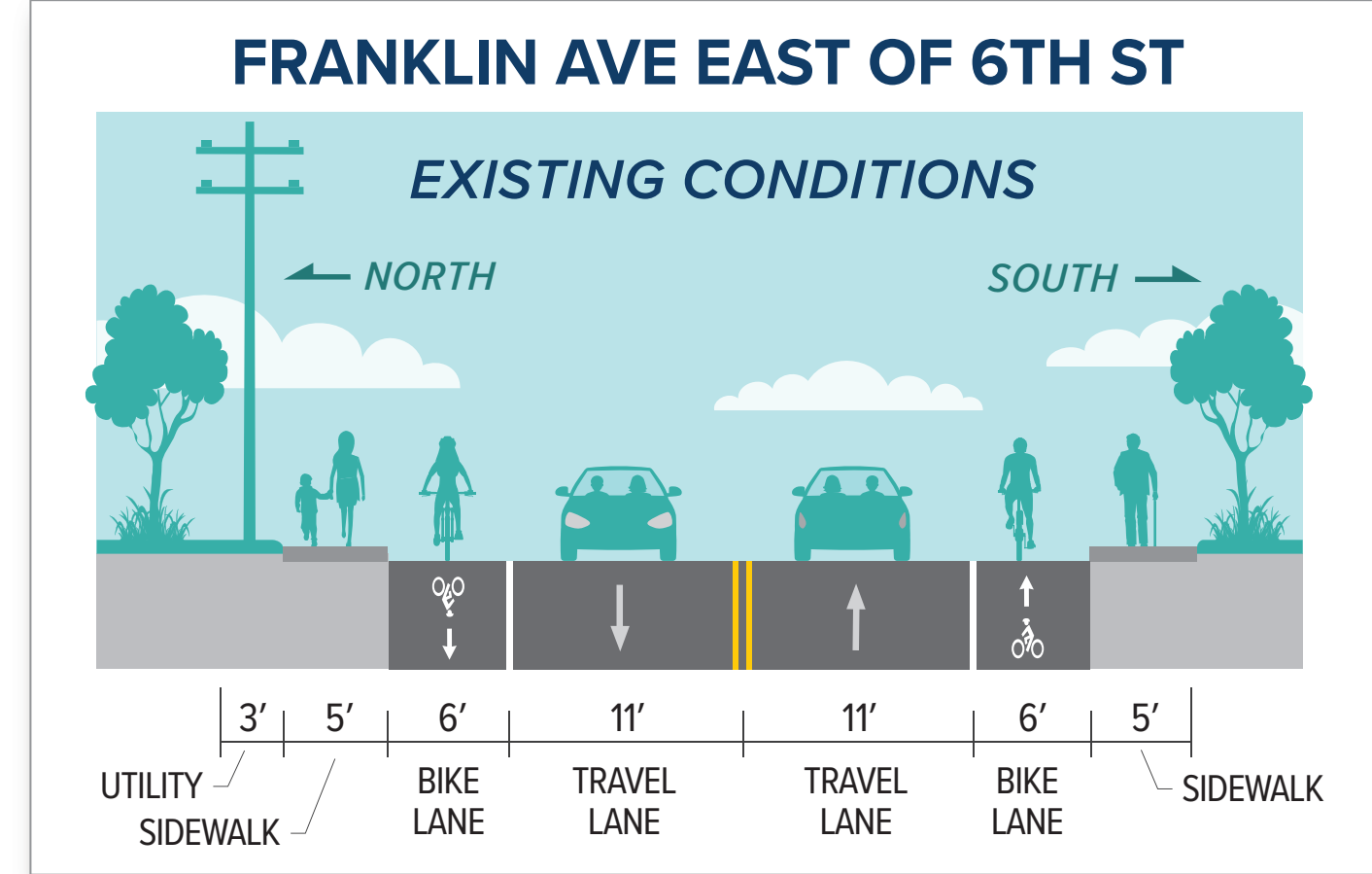
A



B



C



Not to Scale

## PROPOSED BIKEWAY ROUTE

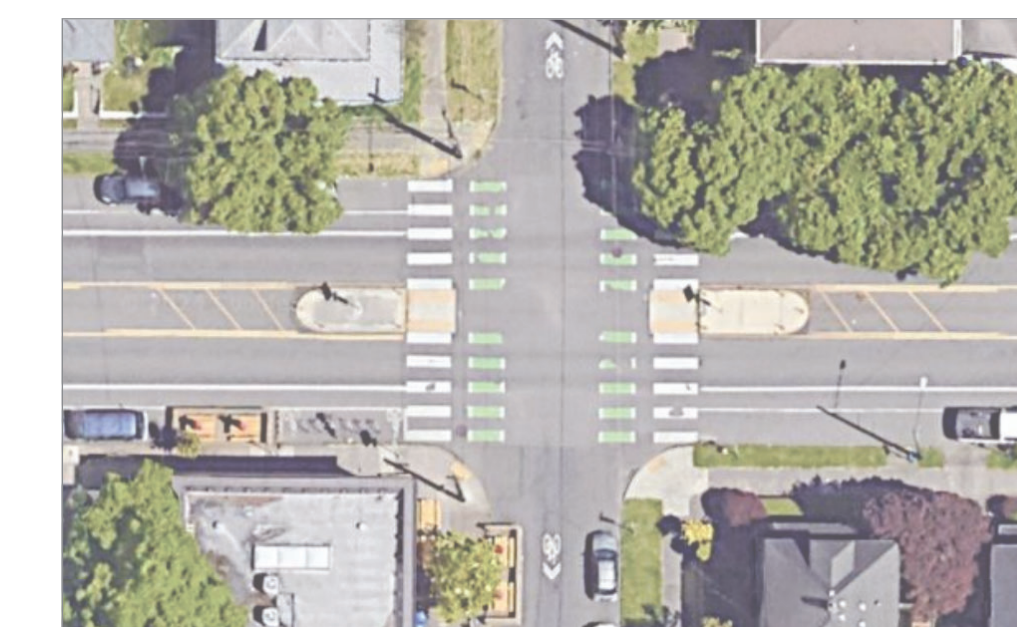
### BIKEWAY TREATMENTS

- EXISTING 10' SHARED USE PATH
- PROPOSED 10' SHARED USE PATH
- PROPOSED NEIGHBORHOOD GREENWAY\*

\* Greenway treatments typically include the use of multiple safety tools, including curb extensions, chicanes, pavement markings, speed humps, wayfinding, and/or traffic diverters to keep speeds slow and volumes low.

### ENHANCED CROSSING AT FRANKLIN AVE / 9TH ST

*Raised Median & Crossing Example:*



NE Gilsan St/NE 30th Ave.  
Portland, OR

# NE FRANKLIN AVENUE CONCEPT – ALTERNATIVES A1 & A2

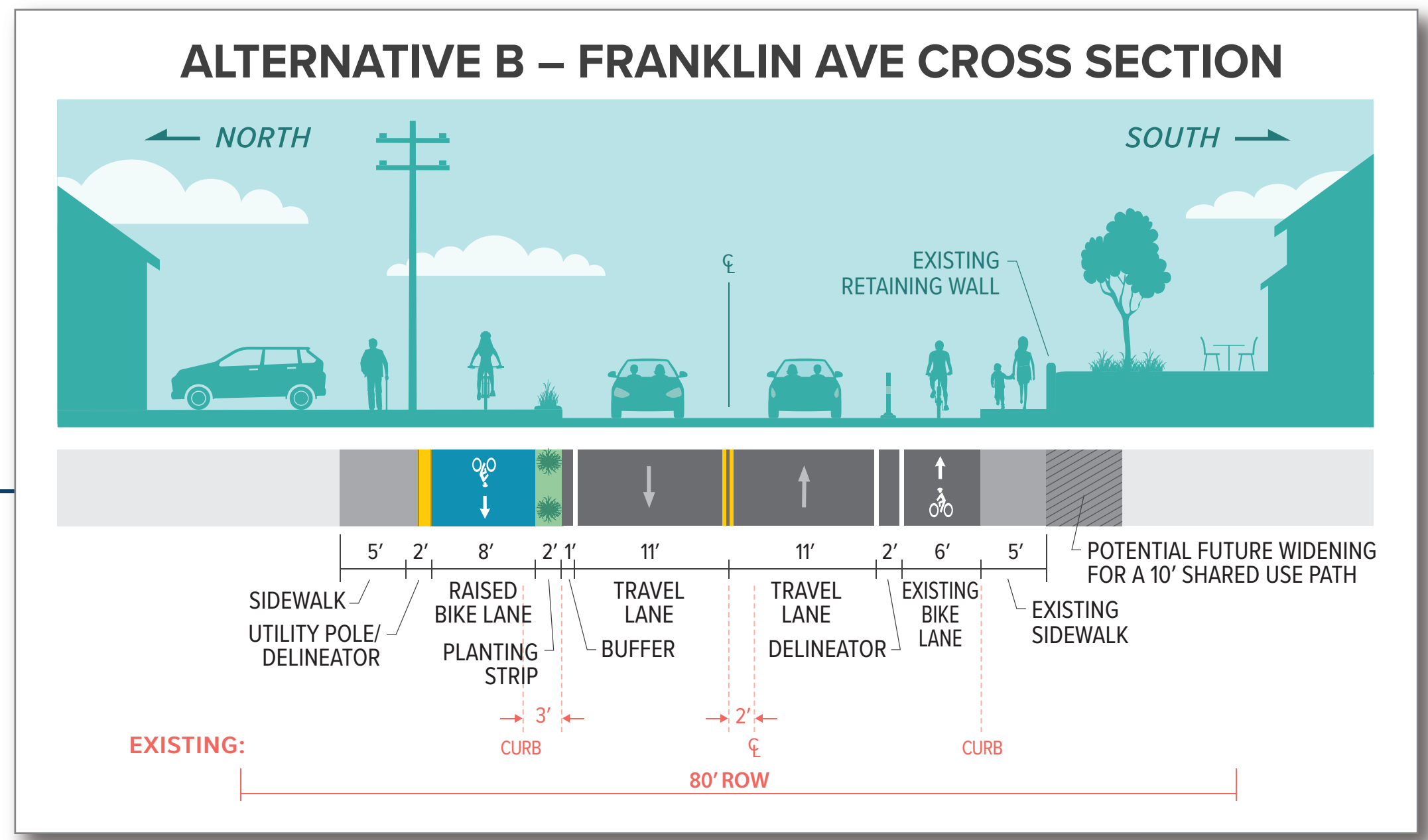
## Bend Bikeway

February 2024



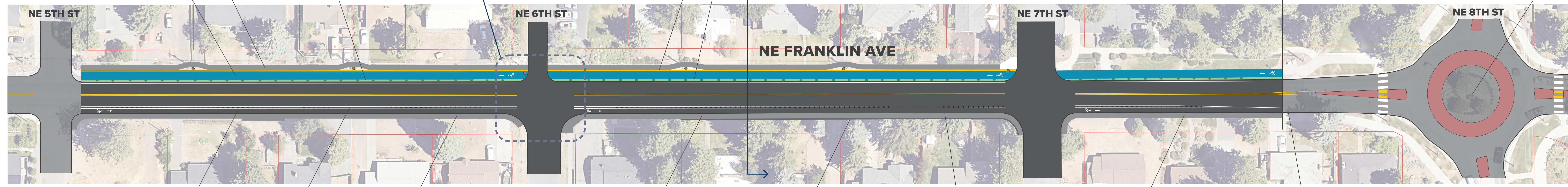
**ENHANCED CROSSING AT FRANKLIN AVE / 6TH ST**  
*Examples:*

NE Revere Ave / NE 6th St, Bend, OR      E Burnside St / NE 30th Ave, Portland, OR



ALL PROPOSED FACILITIES MERGE WITH MIDTOWN CROSSINGS PROJECT IMPROVEMENTS

ALL PROPOSED FACILITIES MERGE WITH EXISTING



5' SIDEWALK  
8' BIKE LANE  
2' PLANTING STRIP/BUFFER

CURB SHIFTED 5' SOUTH  
(See Cross Section Illustration)  
1' DETECTABLE GUIDANCE STRIP

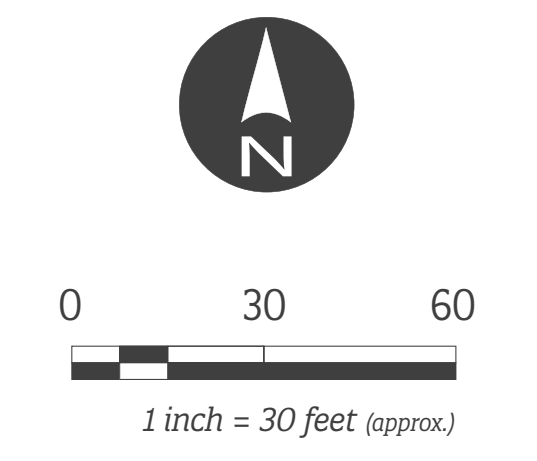
EXISTING CURB TO REMAIN IN PLACE SOUTH OF FRANKLIN AVE  
(See Cross Section Illustration)

EXISTING ROUNDABOUT

EXISTING 6' BIKE LANE  
2' BUFFER  
EXISTING 5' SIDEWALK

EXISTING 5' SIDEWALK  
EXISTING RETAINING WALL

EXISTING 5' SIDEWALK  
EXISTING BIKE RAMP



**PROPOSED**

**EXISTING**

- LIMITS OF IMPROVEMENTS
- SHARED USE PATH
- SIDEWALK *(Existing Where Noted)*
- PLANTING STRIP
- DETECTABLE GUIDANCE STRIP
- DELINEATOR POST WITH DURA-CURB

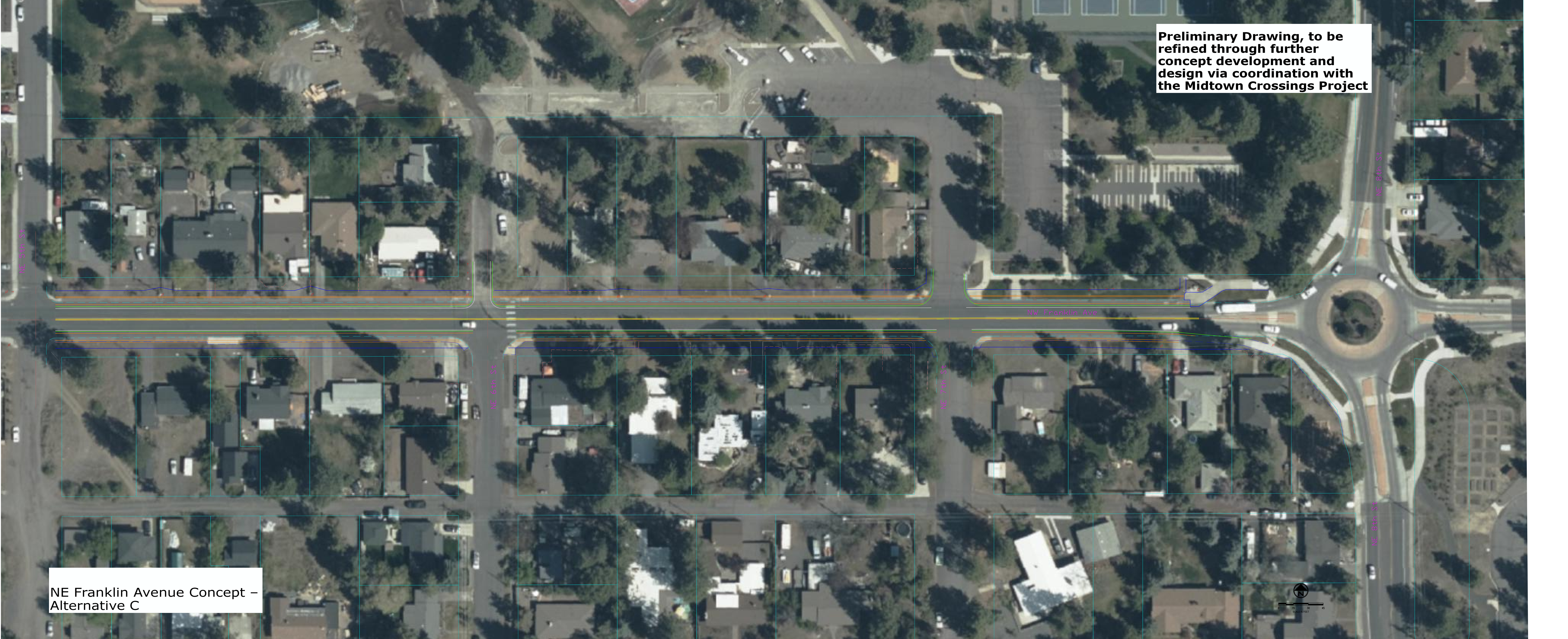
- ROADWAY
- RETAINING WALL
- TAX LOT *(approximate)*
- UTILITY POLE

# NE FRANKLIN AVENUE CONCEPT – ALTERNATIVE B

## Bend Bikeway

February 2024





**Preliminary Drawing, to be refined through further concept development and design via coordination with the Midtown Crossings Project**

**NE Franklin Avenue Concept – Alternative C**



## **APPENDIX B: NEEDS AND OPPORTUNITIES MEMORANDUM**

---

### **TASK 3.2**





## TECHNICAL MEMORANDUM 3.2

DATE: February 16, 2024

TO: Kevin Howard | City of Bend  
Gavin Powell | David Evans and Associates

FROM: Kayla Fleskes-Lane, PE; Brianna Velasquez, EI | DKS Associates

SUBJECT: Bend Bikeway Project: Multimodal Needs and Opportunities      Project # 24039-000  
Memorandum

---

### INTRODUCTION

This technical memorandum provides an overview of current corridor conditions for two proposed multimodal routes in Bend, Oregon identified as Key Walking and Bicycling Routes in the City's community-driven Transportation System Plan (TSP). The City's TSP designated the term "Key Routes" to represent a network of interconnected bicycle lanes and pathways designed to provide safe and comfortable connections to schools, parks, and other destinations, as well as for cross-City travel.

The Bend Bikeway project is a part of a two-year initiative developed by Bend City Council focused on building at least one complete North-South and one East-West Key Route. Project improvements are anticipated to include shared use/protected paths, neighborhood greenways, isolated accessibility enhancements (sidewalk infill, safe crossings, and curb ramps), and wayfinding.

This summary of existing conditions is based on field observations collected on December 21<sup>st</sup>, 2023, and analysis of data describing existing conditions for people walking and biking, and vehicle volumes/speed. The information provided in this memorandum is organized into the following sections:

- **Overall Study Area Needs** – This section documents the project study area with a focus on existing and planned land use, existing facilities for people walking and biking as well as bicycle level of traffic stress. Based on the overall needs, this section also documents anticipated segment treatments along the Key Routes, which are then used to organize the remainder of the memorandum.
- **Synergy Project Summary** – This section summarizes on-going work within the City that is expected to overlap with the Key Routes or influence the design of the Key Routes.
- **Shared use/Protected Path Segments** - This section summarizes conditions and needs for portions of the Key Routes that are anticipated to include shared use/protected path segments.

- **Neighborhood Greenway Segments** – This section documents conditions along existing or planned neighborhood greenways along the Key Routes, with a focus on traffic volumes or key origins/destinations that may influence the selection of a modal filter (diverters intended to block motor vehicles but allow people walking, biking, or rolling to continue through) framework along the Key Routes to deprioritize motor vehicle traffic and access.
- **Enhanced Intersection Needs** – This section documents key crossing locations along the Key Routes and potential locations for additional crossing enhancements.
- **Other Improvement Needs** – This section discusses wayfinding and accessibility enhancements (such as sidewalk, safe crossings, pedestrian access ramps) locations.
- **Summary of Multimodal Needs and Key Opportunities** – This section provides a summary of key findings from the analysis.

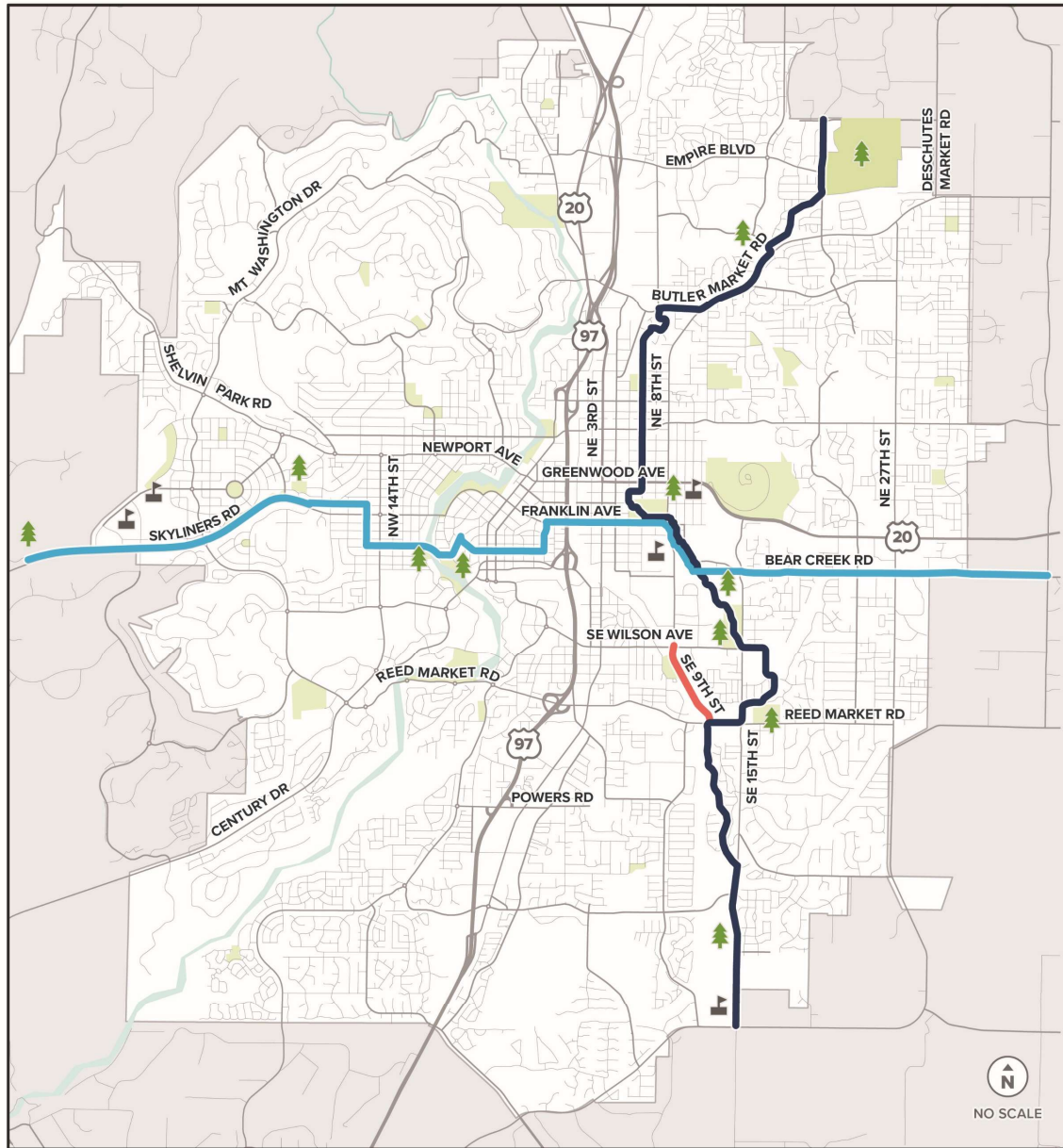
The information in this memorandum will be used to help inform improvement concepts and develop a modal filter framework as the project progresses.

## OVERALL STUDY AREA NEEDS

The following sections document the project study area and key needs and opportunities for the overall study area, focused on existing and planned land use in the area, existing facilities for people walking and existing facilities for people biking.

### STUDY AREA

The Bend Bikeway study area is comprised of a North-South and East-West Key Route, as shown in Figure 1. The approximate seven-mile East-West route spans from the planned Parkside Place affordable housing development in the east to Tree Farm Drive in the west. The approximate eight-mile North-South route spans from Pine Nursery Park in the north to Caldera High School in the south. This project also includes an approximate 0.6-mile stretch of SE 9<sup>th</sup> Street between Reed Market Road and Wilson Avenue that is intended to enhance the network of low-stress facilities and provide greater connectivity to businesses.



#### NEARBY LANDMARKS

- PARKS
- SCHOOLS

#### CROSSTOWN BIKEWAYS

- NORTH-SOUTH KEY ROUTE
- EAST-WEST KEY ROUTE
- SE 9TH ST KEY ROUTE

**FIGURE 1: BEND BIKEWAY PROJECT STUDY AREA**

## EXISTING AND PLANNED LAND USE

---

Today, the land use along the Key Routes is a mix of residential and commercial. In general, a review of the City's Zoning map and Comprehensive Plan map indicated that the future planned land use is expected to remain generally the same as existing land use, with a few exceptions discussed in detail below<sup>1</sup>.

Along the East-West Key Route the following developments are expected to affect existing land use:

- Franklin Avenue cuts through the City's Core Area in the center of Bend where urban-scale buildings are encouraged to include housing and businesses.<sup>2</sup> This area is intended to be a place where residents can live, work, and play. A significant increase in dense, mixed-use development is expected in this area in the near future.
  - As part of the Bend Central District (BCD) initiative, Franklin Avenue is also being reimaged with art and streetscape designs to create a safe, welcoming, and vibrant public space. This corridor is intended to serve as the most accessible walking and biking route connecting to East Downtown and public facilities including Juniper Park and the Bend Senior High School activity fields.
- Bear Creek Road is mostly surrounded by standard density residential, but there are also significant developments planned between Purcell Boulevard and the Eastern Urban Growth Boundary (UGB) to incorporate a variety of housing opportunities and more industrial/professional offices.<sup>3</sup>
  - The easternmost part of the route will connect to the Parkside Place housing development that will stretch 35-acres from Bear Creek Road to US 20. The development will install 346 units of housing, which includes 40% affordable units, as well as a 4-acre park and the Big Sky Park regional trail.<sup>4</sup>

Along the North-South Key Route the following developments are expected to affect existing land use:

- Industrial/professional offices will be incorporated just south of where the two Key Routes come together at Franklin Avenue, between the railroad and SE 15<sup>th</sup> Street, until the Old Farm district to establish complete neighborhoods with access to jobs, services, parks, and schools.<sup>3</sup>
- A significant increase in dense, mixed-use development is expected along the southernmost part of the route. A local commercial center is planned to fill the space between Alpenglow Park and Caldera High School. Also, a community commercial center will be incorporated near the SE 15<sup>th</sup> Street and Knott Road intersection.

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<sup>1</sup> Bend Data Viewer (2023) all-in-one searchable web map containing geographic data:  
<https://experience.arcgis.com/experience/34a4bc300bfe4f028929b2c708b8e175/>

<sup>2</sup> Core Area Investment Map (March 2023 update) full access online:  
<https://www.bendoregon.gov/home/showpublisheddocument/55601/638169739709630000>

<sup>3</sup> Bend Comprehensive Plan Chapter 11: Growth Management (2023) full access online:  
<https://bend.municipal.codes/CompPlan/11>

<sup>4</sup> Parkside Place City Workshop presentation (2023) full access online:  
[https://bend.granicus.com/MetaViewer.php?view\\_id=9&event\\_id=785&meta\\_id=64413](https://bend.granicus.com/MetaViewer.php?view_id=9&event_id=785&meta_id=64413)



## EXISTING FACILITIES FOR PEOPLE WALKING

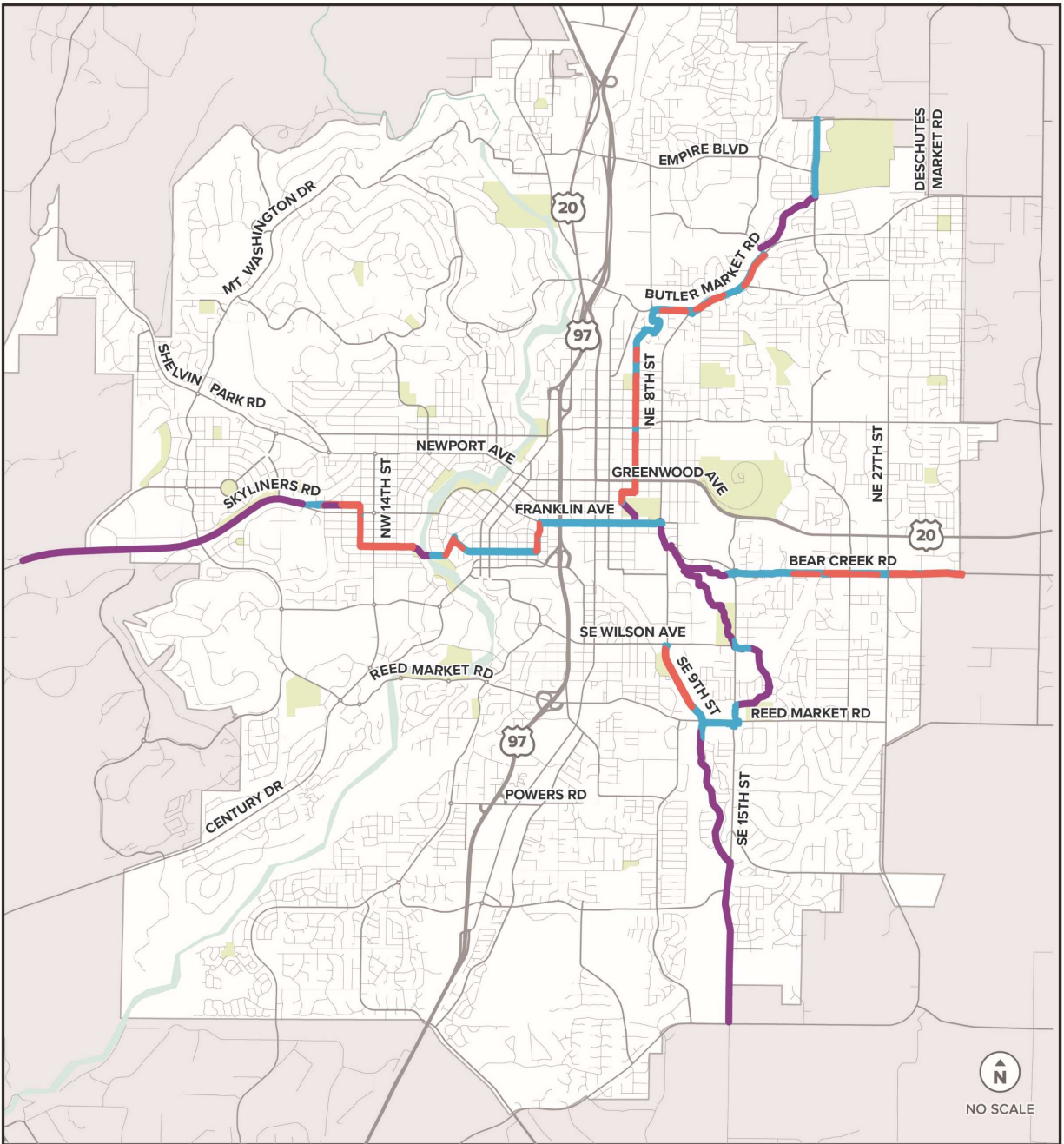
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Figure 2 highlights the type of facilities present for people walking (sidewalk or shared use path) along the Key Routes based on the existing conditions catalogued by the Pedestrian Implementation Plan (PIP).<sup>5</sup> If sidewalks are absent on either side of the road for the majority of a block, the segment was flagged as not having a facility present that is interconnected.

Approximately 25 percent of the Key Routes do not have a facility present for people walking. However, the segments along minor arterials (Franklin Avenue, Bear Creek Road, and Butler Market Road), that do not have pedestrian facilities present today are being addressed by synergy projects (discussed in more detail in following sections), which will then result in only 15 percent of the Key Routes missing facilities for people walking.

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<sup>5</sup> City of Bend Pedestrian Implementation Plan (June 2023) full access online:  
<https://www.bendoregon.gov/home/showpublisheddocument/57134/638333268904130000>



EXISTING PEDESTRIAN FACILITIES

- SIDEWALKS PRESENT
- SHARED-USE PATH
- NO DEDICATED FACILITIES

**FIGURE 2: EXISTING FACILITIES FOR PEOPLE WALKING**

Source: City of Bend Pedestrian Implementation Plan



There are a several blocks along local streets that do not have interconnected facilities for people walking within standard density residential areas. People walking are forced to share the roadway with other users including bicyclists, parked and traveling vehicles. The average right-of-way (ROW) is 60-feet, however, beyond the edge of the curb most of that space consists of mailboxes, landscaping, large trees and/or overhead utility conflicts. These conditions are present along Hartford Avenue, NW 15<sup>th</sup> Street, Cumberland Avenue, Harriman Street, and NE 6<sup>th</sup> Street. Figure 3 showcases these conditions along Cumberland Avenue.

While these local streets generally see lower traffic volumes and lower speeds, these portions of the Key Routes without interconnected pedestrian facilities are considered high-stress for people walking.



**FIGURE 3: CUMBERLAND AVENUE/NW 13TH STREET INTERSECTION (SOUTH SIDE, LOOKING WEST)**



A major portion of the existing routes are trails or shared use/protected paths (SUP) part of Bend Park and Recreation District's (BPRD) Urban Trail Network. Figure 4 displays a 10-foot SUP at the Franklin Avenue/NE 8<sup>th</sup> Street roundabout leading to Coyner Trail (shown in Figure 5) where both Key Routes connect.



**FIGURE 4: SUP AT FRANKLIN AVENUE/NE 8<sup>TH</sup> STREET ROUNDABOUT (EAST SIDE, LOOKING NORTH)**





**FIGURE 5: COYNER TRAIL NEAR FRANKLIN AVENUE/NE 8<sup>TH</sup> STREET (EAST SIDE, LOOKING SOUTH)**

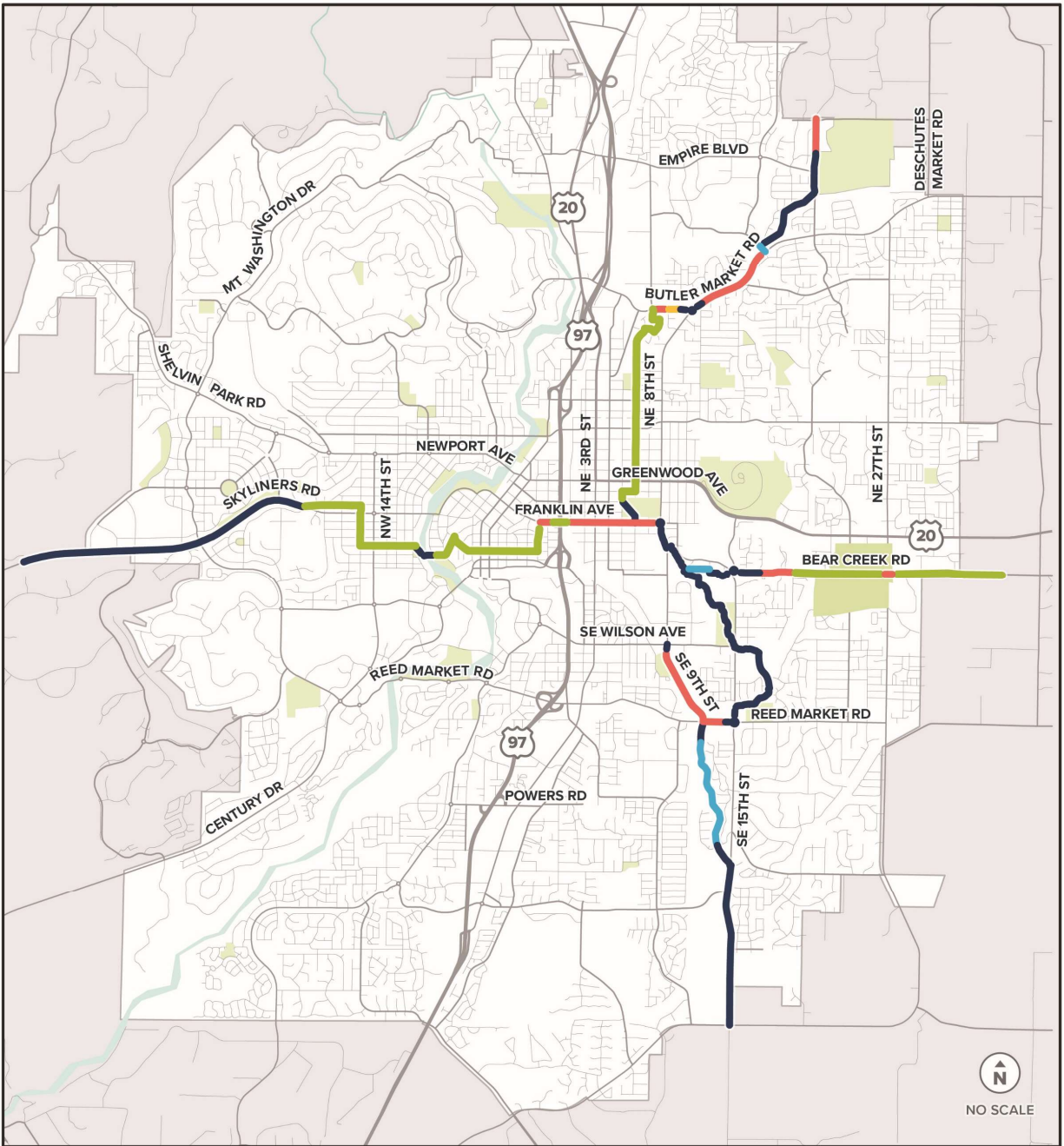
## EXISTING FACILITIES FOR PEOPLE BIKING

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Figure 6 displays the existing facilities for people biking along both Key Routes based on the latest data provided by the City. The segments without biking facilities present will be addressed by synergy projects, described in detail in the following sections.

As mentioned previously, existing trails will be fundamental components along both routes. These segments are separated from motorized traffic to encourage users of all ages and abilities to enjoy with little to no stress, particularly beside higher speed corridors (greater than 30 miles per hour (MPH)).





#### EXISTING BICYCLE FACILITIES

- SHARED ROAD
- SEPARATED OR RAISED BIKE LANE
- STRIPED BIKE LANE
- BUFFERED BIKE LANE
- NO FACILITIES PRESENT

**FIGURE 6: EXISTING FACILITIES FOR PEOPLE BIKING**

Source: City of Bend

Figure 7 summarizes the existing bicycle level of traffic stress (BLTS) results along each Key Route based on an analysis of bicycle facility data provided by the City<sup>6</sup>. Level of Traffic Stress (LTS) rates the stress of roadway segments based on characteristics such as motor vehicle traffic volumes and speeds, presence of walking and bicycling facilities, and degree of separation between motorized and nonmotorized users. The possible scores range from 1 to 4, with 1 representing the lowest stress and 4 representing the highest stress.

The majority of the routes today are BLTS 1 or 2. Table 1 summarizes the high-stress (BLTS 3 or 4) segments present, along with planned synergy projects that will reduce the BLTS. Segments without a planned synergy project will be addressed through this current project.

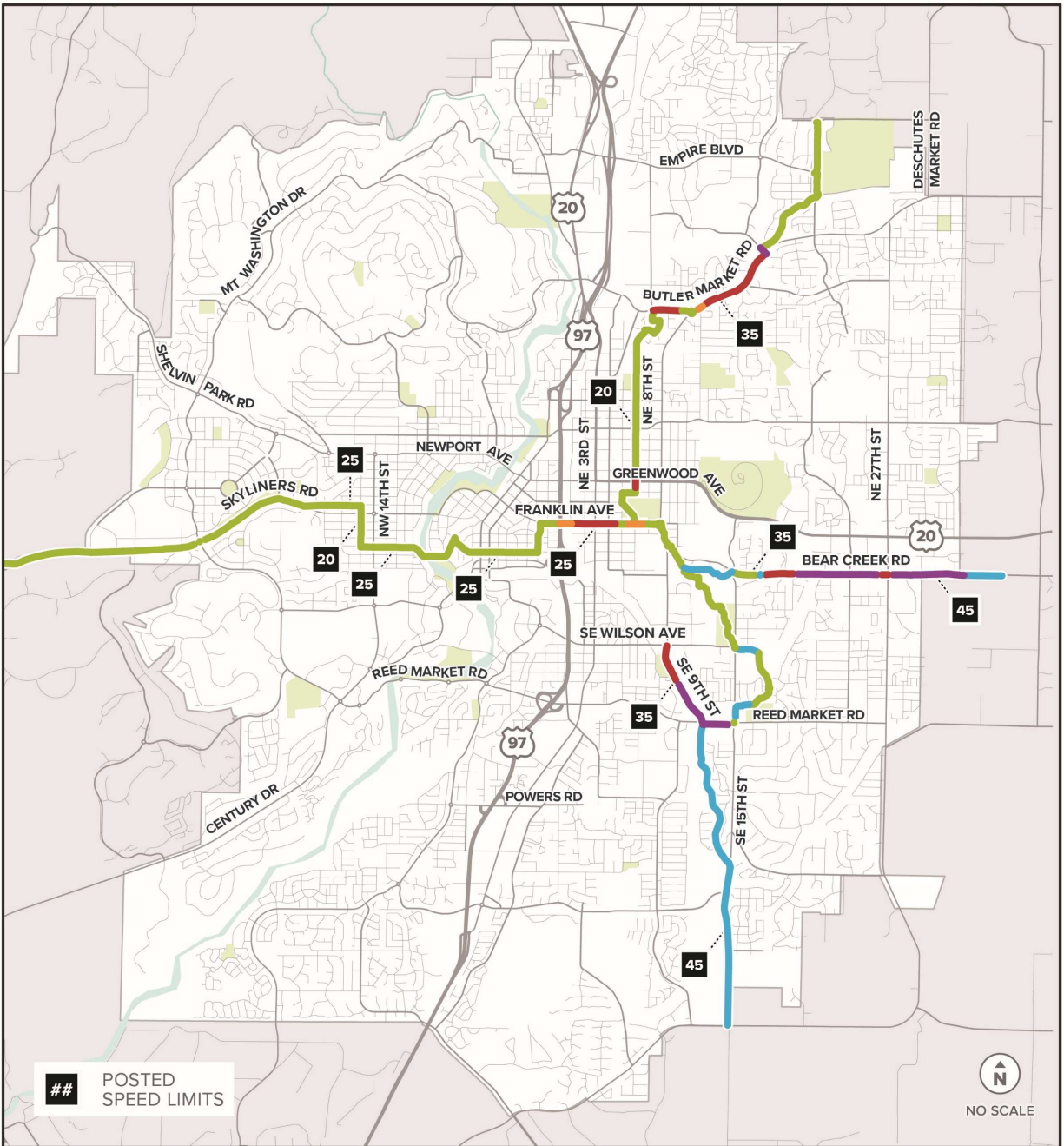
**TABLE 1: HIGH-STRESS BICYCLE FACILITIES**

SEGMENT	BLTS	EXISTING BIKE FACILITIES	SYNERGY PROJECT
<b>BRINSON BLVD – NORTH CANAL UNIT TRAIL TO BUTLER MARKET RD [35 MPH]</b>	4	None	BPRD’s North Unit Canal Trail improvement project will add an enhanced bike and pedestrian crossing at Brinson Blvd. Plus, the City’s Butler Market Key Route Project will add urban green bicycle lanes across Brinson Blvd. These crossing enhancements provide safe and comfortable transitions from the trail to the adjacent low-stress network along Butler Market Road.
<b>Butler Market Rd – Brinson Blvd To Boyd Acres Rd [35 Mph]</b>	3	4’ striped bike lane throughout, raised bike lane at NE 8 <sup>th</sup> Street roundabout	City’s Butler Market Key Route Project will add raised bike lanes and wide sidewalks.
<b>NE 6<sup>TH</sup> STREET – KEARNEY AVE TO IRVING AVE [20 MPH]</b>	3	Shared road without crossing treatments at highway	ODOT US 20: Empire to Greenwood Project Phase 1 added a 2-stage crossing with a pedestrian activated beacon. City’s Neighborhood Greenways project added pavement markings and traffic calming on 6 <sup>th</sup> Street north of Greenwood Ave.
<b>SE 9<sup>TH</sup> STREET – WILSON AVE TO REED MARKET RD [35 MPH]</b>	3/4	5’ striped bike lane. Center turn lane through south segment reduces LTS to 4.	-

<sup>6</sup> City of Bend Low-stress Network data as defined in the TSP (2022)

SEGMENT	BLTS	EXISTING BIKE FACILITIES	SYNERGY PROJECT
REED MARKET RD – SE 9 <sup>TH</sup> STREET TO SE 15 <sup>TH</sup> STREET [35 MPH]	4	6' striped bike lane	City collaborating with BPRD to add minor improvements to existing Larkspur Trail and enhance connectivity.
FRANKLIN AVE – NE 1 <sup>ST</sup> STREET TO NE 4 <sup>TH</sup> STREET [25 MPH]	3	Shared road undercrossing segment	City's Midtown Crossings Project will implement mobility, connectivity, and safety improvements through segment.
BEAR CREEK RD – ALPENVIEW LANE TO CESSNA DRIVE [35 MPH]	3	5' striped bike lane	-
BEAR CREEK RD – CESSNA DRIVE TO EASTERN UGB [45 MPH]	3/4	Mostly shared road eastbound. 6' striped bike lane on west leg of 27 <sup>th</sup> Street intersection	City's Bear Creek Road and 27 <sup>th</sup> Street Key Routes Project will add separated facility adjacent to Bear Creek Road and complete Coyner Trail connection.

The segments without available data are either outside of the City's jurisdiction or are part of the existing trail system and were not analyzed in the City's TSP. Separated trails or a Key Route through the local neighborhood are expected to operate with a BLTS of 1 or 2.



LOW STRESS NETWORK - LEVEL OF TRAFFIC STRESS

— NO DATA AVAILABLE
 — BLTS 1
 — BLTS 2
 — BLTS 3
 — BLTS 4

**FIGURE 7: EXISTING BICYCLE LTS**

Source: City of Bend

## ANTICIPATED SEGMENT TREATMENTS

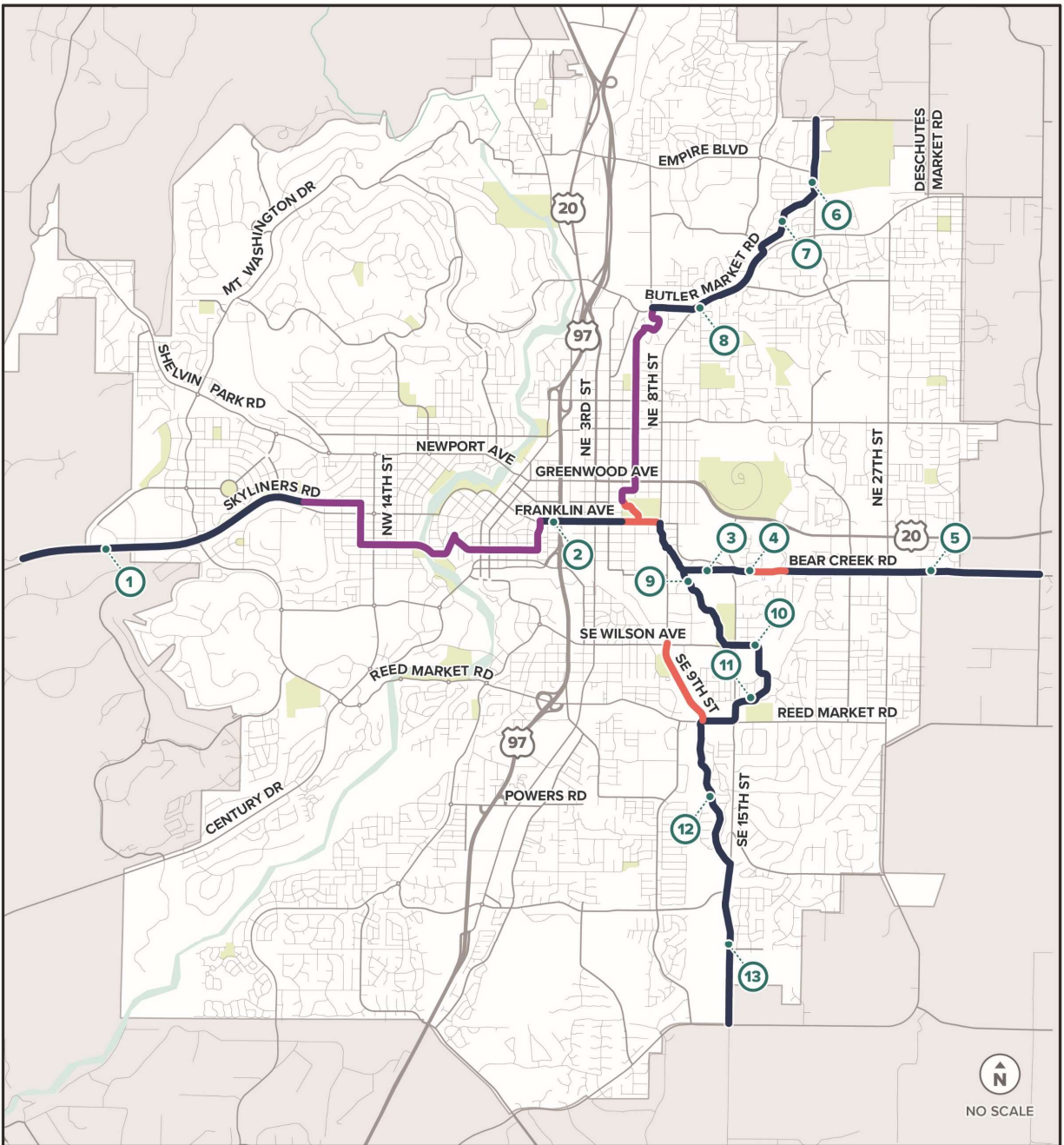
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Given the size of the overall study area and the varying conditions for people walking and biking throughout, the study area was further subdivided based on the types of improvements that are anticipated along the routes, in coordination with City staff:

- **Synergy Projects** – These portions of the Key Routes are anticipated to be addressed through separate planning, design, and construction projects. Therefore, this memorandum does not provide a detailed review of needs and opportunities in these segments but instead highlights which projects are anticipated to address needs for people walking and biking. These projects are summarized in the following section.
- **Shared use/Protected Paths** – These areas are assumed to require larger capital investments in shared use or protected paths to meet the intended function of a Key Route. Much of this memorandum focuses on the detailed conditions of these segments to help inform the development of improvements concepts and an Alternatives Analysis that will be conducted as the project progresses.
- **Neighborhood Greenways** – These segments of the Key Routes are generally local streets within the existing network of neighborhood greenways in Bend. Improvements in these segments will be generally focused on traffic calming measures or modal filters (diverters intended to block motor vehicles but allow people walking, biking, or rolling to continue through). Therefore, this memorandum provides a focused discussion of traffic volumes, speed, and key destinations to help inform the development of a modal filter framework and identify high-priority locations for potential modal filter or traffic calming treatments as the project progresses.
- **Enhanced Intersections** – To reduce stress for people crossing busy roadways, intersection enhancements at several locations will be considered through this project to connect Key Route segments.
- **Other Improvement Needs** – Wayfinding improvements are anticipated throughout the study area. In addition, accessibility enhancements (such as sidewalk, safe crossings, pedestrian access ramps) are anticipated along certain segments.

The anticipated key biking improvements are displayed in Figure 8 and summarized in the following sections. Note that wayfinding improvements are anticipated throughout the study area.





#### ANTICIPATED KEY BIKEWAY TREATMENTS\*

- SHARED-USE/  
PROTECTED PATH
- NEIGHBORHOOD  
GREENWAYS

\*WAYFINDING IMPROVEMENTS WILL BE INCORPORATED THROUGHOUT THE STUDY SEGMENTS  
\*MODAL FILTERS WILL BE CONSIDERED ALONG CERTAIN SEGMENTS

#### EXISTING/OTHER PROJECT'S IMPROVEMENTS\*

- SYNERGY PROJECT  
ROUTES
- # SYNERGY PROJECT  
LOCATIONS

\*NUMBERING CORRESPONDS  
TO TABLE 2

**FIGURE 8: ANTICIPATED KEY BIKEWAY TREATMENTS**



## SYNERGY PROJECTS SUMMARY

Table 2 summarizes the synergy projects that will be incorporated along both Key Routes to promote interconnected, safe, and comfortable walking and biking opportunities. The listed numbers correspond with the labels in Figure 8. These segments, owned by the City or BPRD, will be joined together by improvements planned as part of this project. The needs for people walking and biking in these areas will be addressed through these synergy projects; this memorandum does not provide a detailed review of the needs and opportunities along these listed segments or existing paths.

**TABLE 2: SYNERGY PROJECT ROUTES - EXISTING/OTHER PROJECT'S IMPROVEMENTS**

NO.	PROJECT NAME	EXTENTS	DETAILS	ROUTE
1	Existing – West Bend Trail	Tree Farm Avenue to Hartford Avenue	This segment is from BPRD's existing trails.	East-West
2	Midtown Pedestrian and Bicycle Crossings project	Franklin Ave – NE 5 <sup>th</sup> St to Harriman St	Project will improve east-west connectivity through safer walking and biking connections in the Central Core Area of Bend.	East-West
3+5	Bear Creek Road and 27 <sup>th</sup> Street Improvements project	Bear Creek Rd – Cessna Ave to eastern Urban Growth Boundary (UGB) + SE 27 <sup>th</sup> St – US 20 to Reed Market Rd	Project will implement walking and biking improvements as well as connect a path from Bear Creek Elementary to the existing Coyner Trail as part of the Safe Routes to School (SRTS) program.	East-West
4	Existing – Larkspur Trail	15 <sup>th</sup> Street to Cessna Avenue	This segment is from BPRD's existing trails.	East-West
6	Existing – Pine Nursery Park Trail	Yeoman Road to North Unit Canal Trail	This segment is from BPRD's existing trails.	North-South
7	North Unit Canal Trail project	Pine Nursery Park Trail to Brinson Boulevard	Trail will be a 10-ft wide multi-use path with a primarily compacted gravel surface, plus an enhanced bicycle and pedestrian crossing will be added at Brinson Boulevard.	North-South
8	Butler Market Key Route project	Butler Market Rd – Longfellow Court to Brinson Blvd	Project will construct a shared use path adjacent to roadway and close sidewalk gaps along both sides of road.	North-South
9	Existing – Coyner Trail	Franklin Avenue to SE 15 <sup>th</sup> Street	This segment is from BPRD's existing trails. City will collaborate to enhance accessibility.	North-South

NO.	PROJECT NAME	EXTENTS	DETAILS	ROUTE
10	Coyner Trail Extension project	Larkspur Trail to SE 15 <sup>th</sup> Street	Private development will design and construct trail extension to improve connectivity between neighborhoods and nearby schools and parks.	North-South
11	Larkspur Trail Improvements project	Reed Market Rd to Proposed Coyner Trail	City is collaborating with BPRD to execute minor improvements to the existing trail.	North-South
12	Central Oregon Historic Canal Trail	15 <sup>th</sup> Street Crossing to Reed Market Rd	BPRD led effort to incorporate a currently private owned trail into their Urban Trail Network.	North-South
13	Existing – 15 <sup>th</sup> Street share use/protected path	Central Oregon Historic Canal Trail to Knott Road	Existing trail through Caldera High School and adjacent to SE 15 <sup>th</sup> Street	North-South

In addition to the synergy projects listed above, the TSP includes several improvements for multi-modal travel along the Key Routes, which will be funded within the near-, mid-, or long-term planning horizon, including:

#### **Near-Term Priorities (Implementation Years 1-10)**

- The Reed Market Road and 15<sup>th</sup> Street intersection safety and capacity improvements project will expand the partial multi-lane roundabout to a full multi-lane roundabout (project ID# C-14). GO Bond funded.
- As part of the Pettigrew Road and Bear Creek Road long term safety improvements, the existing two-way stop-controlled intersection will be upgraded to a single lane roundabout (project ID# S-3). GO Bond funded.
- Pedestrian/bicycle crossing improvements are planned at the Franklin Avenue intersections with 2<sup>nd</sup> Street and 4<sup>th</sup> Street (project ID# M-5 & M-6, respectively). GO Bond funded.

#### **Mid-term Priorities (Implementation Years 11-15)**

- The Butler Market Road corridor safety and capacity improvements from US 97 to SE 27<sup>th</sup> Street will incorporate roundabouts or traffic signals at 4<sup>th</sup> Street, Brinson Boulevard, and Purcell Boulevard (project ID# C-27). GO Bond funded.
- The Ferguson Road and SE 15<sup>th</sup> Street intersection improvement project will install a roundabout to improve capacity and safety (project ID# C-34). GO Bond funded.
- Signal modifications will be implemented at the 3<sup>rd</sup> Street and Franklin Avenue intersection to improve intersection capacity and safety (project ID# C-36).
- The 15<sup>th</sup> Street corridor safety and capacity improvements from US 20 to Reed Market Road includes new sidewalks and bicycle lanes, and a roundabout at Wilson Street (project ID# C-43).
- Reed Market rail crossing implementation project to execute Reed Market at-grade rail study outcomes (project ID# C-44). This project will likely change access to Reed Market Road at 9<sup>th</sup> Street. GO Bond funded.

## Long-term Priorities (Implementation Years 16-20)

- The Knott Road rural road upgrades from 15<sup>th</sup> Street to 27<sup>th</sup> Street will construct curbs, sidewalks, and bicycle lanes along both sides of the roadway (project ID# M-25 & M-26).

## SHARED USE/PROTECTED PATH SEGMENTS CONDITIONS AND NEEDS

A SUP is a type of trail designed to be part of a transportation system, providing off-road routes for a variety of users. The primary users of shared use paths are bicyclists and pedestrians, including pedestrians using mobility devices such as manual or motorized wheelchairs.<sup>7</sup>

SUP improvements are anticipated for the following route segments based on the LTS analysis and for consistency with other synergy projects (shown in Figure 8):

- 9<sup>th</sup> Street: Reed Market Road to Wilson Avenue (approximately 3,000-ft in length).
- Franklin Avenue: NE 5<sup>th</sup> Street to NE 8<sup>th</sup> Street (approximately 1,300-ft in length).
  - Note this segment is already considered low-stress, but both Key Routes connect on this segment and improvements for people biking are planned to the west (through the Midtown Pedestrian and Bicycle Crossings project) that would make narrow, on-street bike lanes inconsistent.
- Bear Creek Road: Alpenview Lane to Cessna Drive (approximately 1,150-ft in length). Planned to address the BLTS 3 segment along this Key Route not included as part of a synergy project.
  - Note: This segment is anticipated to continue the preferred alternative improvements selected through the Bear Creek Road and SE 27<sup>th</sup> Street Improvements Project to the 15<sup>th</sup> Street intersection. Therefore, no alternatives analysis will be conducted as part of this project.

The following sections describe key geometric constraints, existing conditions for people walking and biking and includes a BLTS and Pedestrian (PLTS) analysis for each of the SUP. PLTS was analyzed for the existing pedestrian facilities along these project segments using methodology from the Oregon Department of Transportation's (ODOT) *Analysis and Procedures Manual* (APM). If any of the conditions vary along one segment, the more conservative value was used (e.g., if an 8-foot landscape buffer narrows to 4 feet within a block or two, the 4-foot measurement was used for analysis). Supporting cross section details are included in Appendix A for the LTS analysis.

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<sup>7</sup> NACTO Shared use Path Accessibility Guidelines (2011) full access online: [https://nacto.org/wp-content/uploads/2015/04/shared\\_use\\_path\\_accessibility\\_guidelines\\_federal\\_register.pdf](https://nacto.org/wp-content/uploads/2015/04/shared_use_path_accessibility_guidelines_federal_register.pdf)

## SE 9<sup>TH</sup> STREET SUP – WILSON AVENUE TO REED MARKET ROAD

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This segment runs parallel to the Burlington Northern Santa Fe (BNSF) railroad; approximately 25-feet of landscaping with trees plus utility lines separate the roadway edge and the rock alongside the railroad tracks. As shown in Figure 9, most of this segment has on-street bicycle lanes but no sidewalk, with the exception of SE 9<sup>th</sup> Street approaching Reed Market Road. From the Reed Market Road intersection, the sidewalk on the east side of the road extends about 700 feet north, while the sidewalk on the west side extends about 600 feet. In this segment, sidewalks are five feet wide with landscaped buffer ranging from five to 14 feet and conventional on-street bicycle lanes/shoulder ranging from five to seven feet with no buffer.

Beyond where the facilities for people walking and/or biking currently exist, the west side paved shoulder lane edges a fill slope, and the east side paved shoulder edges businesses. The on-street bicycle lanes do not have enough width to consider this segment as low-stress with motorized vehicles traveling at 35 MPH beside. A seven-foot conventional on-street bicycle lane could reduce BLTS to 2.

The land use designation of this area as light industry is the controlling criteria that makes this segment have a minimum PLTS of 3. Land use changes over time could encourage more pedestrian-scale developments and change the controlling criteria to be sidewalk condition. The sidewalk must be maintained in good/fair condition and be at least five feet wide with a buffer to be considered low-stress. A SUP could reduce overall LTS to 1.

A SUP on the east side would lead directly to the businesses and the midblock continental crosswalk across the three travel lanes along Reed Market Road that then leads to the Central Oregon Historic Canal Trail. However, a SUP on the east side could require significant utility coordination and relocation throughout. There are also two stormwater ponds, both near the back of the sidewalk. A SUP on the west side would require significantly less utility impact, but there is a culvert and a stormwater pond near the Reed Market Road intersection. There is also a grade difference between the sidewalk and roadway to the south near this intersection.



**FIGURE 9: SE 9<sup>TH</sup> STREET NORTH OF REED MARKET ROAD (LOOKING NORTH)**

*Source: Google Maps Streetview*



## FRANKLIN AVENUE SUP – NE 5<sup>TH</sup> STREET TO NE 8<sup>TH</sup> STREET

Both Key Routes will converge at this segment of Franklin Avenue at NE 6<sup>th</sup> Street and continue onto Coyner Trail. Figure 10 shows the existing narrow (4-5 foot) sidewalks and on-street bicycle lanes. The four-to-five-foot sidewalks are in fair condition on either side of the roadway, resulting in a PLTS of 3. A six-foot or wider sidewalk with a landscape buffer would be required to achieve PLTS 1. The bike lane is approximately five to seven feet wide, resulting in an existing BLTS of 2.

The ROW is approximately 80 feet, but the width to the back of the sidewalks is only 45 feet. As shown in the figure below, there are driveways, utilities, and large trees at the back of walk within the City ROW. The Franklin Avenue/8<sup>th</sup> Street roundabout has ten-foot SUPs, which could be extended further west through Franklin Avenue on either side to reduce overall LTS and maintain a consistent and comfortable network.



**FIGURE 10: FRANKLIN AVENUE/NE 6TH STREET INTERSECTION (NORTH SIDE, LOOKING EAST)**

## NEIGHBORHOOD GREENWAY SEGMENT CONDITIONS AND NEEDS

Neighborhood greenway is a term used to describe a route for walking and bicycling on local streets that is more comfortable than nearby busier streets. These streets remain open to motorized traffic with access to homes and businesses unaffected. The following segments fall into this category based on the bicycle facility type described in the City's TSP (shown in Figure 8):

- East-West Route
  - Hartford Avenue west of NW 15<sup>th</sup> Street
  - NW 15<sup>th</sup> Street from Hartford Avenue to Cumberland Avenue
  - Cumberland Avenue from NW 15<sup>th</sup> Street to Deschutes River Road
  - Shasta Place from Millers Landing Park to Delaware Avenue
  - Delaware Avenue from Shasta Place to Harriman Street
  - Harriman Street from Delaware Avenue to Franklin Avenue
- North-South Route
  - NE 6<sup>th</sup> Street from Butler Market Road to Juniper Park

Proposed improvements along these segments include signs, pavement markings, and limited traffic calming features such as speed humps, traffic circles, and in certain cases, modal filters.

Modal filters, or diverters, serve to block motorized vehicles, but allow people walking, biking, or rolling to continue through. Certain paths, particularly neighborhood greenways, will prioritize separation from motorized traffic through modal filters to reduce high conflict points. The type and extent of modal filters application will be assessed through the Alternatives Analysis. Due to funding constraints, treatments will likely be limited to no more than four high priority locations. The following sections describe the existing conditions and key needs for these particular segments to help prioritize improvements.

### SUMMARY OF EXISTING FACILITIES FOR PEOPLE BIKING

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From 15<sup>th</sup> Street to Harriman Street, the East-West Key Route consists of existing neighborhood greenways. They all have sharrow pavement markings and signage. Figure 11 displays the pavement markings at an intersection of two neighborhood greenways. Only NW 15<sup>th</sup> Street has speed humps.





**FIGURE 11: DELAWARE AVENUE/HARRIMAN STREET EXISTING BICYCLE FACILITIES (WEST SIDE, LOOKING WEST)**

Along the North-South route, the neighborhood greenways start from Longfellow Court and proceed through Franklin Avenue. The Butler Market intersection leading to Longfellow Court currently operates with split phasing. Sharrow pavement markings and signage are present throughout the route, but only 6<sup>th</sup> Street has speed humps. There is also traffic circles at the 6<sup>th</sup> Street intersections with Norton Avenue and Seward Avenue. The southern portion of 6<sup>th</sup> Street, leading to Juniper Park is missing pavement markings, signage, and traffic calming.

### **SUMMARY OF EXISTING TRAFFIC VOLUMES AND VEHICLE SPEEDS**

Based on a 24-hour traffic count conducted on May 23, 2023, a total of 92 pedestrians and 49 bicyclists were observed utilizing the roadway south of Greenwood Avenue along 6<sup>th</sup> Avenue. During p.m. peak hour (4:45 p.m. start), 12 pedestrians and 12 bicyclists were observed.

Traffic volumes and vehicle speed data were also collected on December 12<sup>th</sup>, 2023 along the two proposed Key Routes to determine travel trends and help inform what improvement concepts will best improve existing neighborhood greenways (Appendix B). The data collected revealed key facts of the utilization of the corridors:

- Average Daily Traffic (ADT) volumes along the Cumberland Avenue neighborhood greenway ranges from approximately 1,500 to 2,000 vehicles per day along the corridor.
  - Daily traffic volumes are slightly greater westbound (60 percent) than eastbound (40 percent). The westbound 85<sup>th</sup> percentile speed is also slightly higher at 22 MPH, versus 19 MPH eastbound, and overall, below the posted speed limit (25 MPH).
- ADT volumes along the Delaware Avenue neighborhood greenway reaches approximately 3,000 vehicles per day along the corridor.
  - Daily traffic volumes are slightly greater eastbound (62 percent) than westbound (38 percent). Motor vehicles traveled at or below the posted speed limit on average (25 MPH).
- Along the NE 6<sup>th</sup> Street neighborhood greenway, ADT volumes reach 625 vehicles per day but remains under 50 vehicles during peak hours.
  - Daily traffic volumes are similar in each direction, but vehicles south of Isabella Lane were observed traveling above the posted speed limit (20 MPH) on average.

## SUMMARY OF KEY ORIGINS AND DESTINATION NEEDS

To better understand potential locations where modal filters could be considered, a review of key origin and destinations was conducted. Private automobile trips along the key routes were analyzed using the Replica Places travel model for an average weekday in Spring 2023<sup>8</sup>. This disaggregate activity-based travel model has data outputs at the network-link level. The travel analysis considered the number of daily trips that begin, intersect, or end in Bend. The query reported the following results:

- A relatively high volume of vehicles (~2200 vehicles per day (vpd)) travel northwest on the NW Delaware Avenue segment of the East-West route from the surrounding medium-density residential area. NW Delaware Avenue serves as a main connector to the larger corridors north and south and is a designated neighborhood greenway.
- Along the Franklin Avenue segment on the proposed East-West route, approximately 1600 vehicles pass the Harriman Street intersection. The majority of these vehicles disperse to 3<sup>rd</sup> Street (~800 vpd) trying to get home (31 percent) or to work (22 percent).
- A potentially high conflict point along the North-South route is at the 15<sup>th</sup> Street and Wilson Avenue intersection. Of the 2,800 trips traveling southbound, about half turn onto Wilson Avenue to reach home (40 percent) or to shop (19 percent).

## ENHANCED INTERSECTIONS NEEDS

Along both Key Routes, crossings are minimized, but there are instances where people will have to cross busy roadways, mostly minor arterials or collectors, to remain on the routes. The PIP has already identified a few crossing locations along the routes that need enhanced crossings due to relatively high posted speed limits (greater than 30 MPH) including Butler Market Road/NE Sandy Drive and Bear Creek Road/Cessna Drive.

<sup>8</sup> Replica Places travel model – Bend Bikeway Project full access online: <https://studio.replicahq.com/places/studies/0i3b2js>

Other potential locations for enhanced intersection improvements were cited along the routes based on roadway class, either minor arterial or collector, unique geometry, and higher posted speed limits.

Along the East-West Key Route, potential locations for enhanced intersection improvements include:

- **15th Street & Galveston Road:** at this intersection of two minor arterials there are uncontrolled continental crosswalks on both sides across Galveston Road, which has one thru-lane for each direction. Overhead intersection lighting is present at the west leg crosswalk, but pedestrian level lighting could be incorporated at all crosswalks to avoid shadows and provide enough lighting through the entire crosswalk area.<sup>9</sup> There are curb extensions on every corner to shorten the crossing distances, but the northwest curb ramp does not have a north leg sidewalk for people biking or using mobility devices to access the ramp.
- **Cumberland Avenue & 14th Street/Century Drive** (similar conditions to 15<sup>th</sup> Street & Galveston Road): there are uncontrolled continental crosswalks on both sides across 14<sup>th</sup> Street and standard crosswalks across Cumberland Avenue. Both roadways have one thru-lane for each direction. Curb extensions are present on every corner.
- **Delaware Avenue & Wall Street/Bond Street:** both collectors are for one-way travel. There are uncontrolled continental crosswalks on both sides across two thru-lanes. Curb extensions along one side of the roadway shorten the crossing distances, however the two thru-lanes pose a double threat of oncoming traffic through the intersection. Figure 12 displays how people walking may become blocked from the view of other approaching motorists by a stopped vehicle. While it is illegal for a vehicle to pass a stopped vehicle at a crosswalk (ORS 811.020), people walking must stop and look to make sure all approaching vehicles have stopped before crossing the next lane.



**FIGURE 12: "DOUBLE THREAT" ON STREETS WITH TWO OR MORE THRU LANES**

*(Source: Portland Bureau of Transportation<sup>10</sup>)*

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<sup>9</sup> FHWA STEP Studio Countermeasure Selection (2023) full access online:  
[https://safety.fhwa.dot.gov/ped\\_bike/step/resources/docs/step\\_studio.pdf](https://safety.fhwa.dot.gov/ped_bike/step/resources/docs/step_studio.pdf)

<sup>10</sup> Portland Bureau of Transportation StreetSmart Safety Article – "Walk, but stay safe" full access online:  
<https://www.portlandoregon.gov/transportation/article/483014>



- **Harriman Street & Georgia Avenue:** within the neighborhood greenway, this is a particularly difficult crossing of a skewed intersection. Shown in Figure 13 below, the 5-legs extend the crossing distance traveling north to about 120-feet. Crossings are not compact enough to facilitate eye contact between people walking and drivers. The north-south legs are the only ones stop-controlled.



**FIGURE 13: HARRIMAN STREET/GEORGIA AVENUE (SOUTH SIDE, LOOKING NORTH)**

- **Harriman Street & Franklin Avenue:** this intersection is the last uncontrolled crossing through a minor arterial. There are currently no crossing treatments at this skewed intersection, but the Midtown Crossings project will address this intersection.
- **Bear Creek Road:** crossings along this road are low-stress and controlled by roundabouts or signals or will be addressed by the Bear Creek Road and 27<sup>th</sup> Street Improvements project.

Along the North-South Key Route, other potential locations for enhanced intersection improvements include:

- **Butler Market Road & Boyd Acres Road:** this intersection is currently signalized (operating with split phasing northbound/southbound) to help people cross a wide, high-speed roadway. The Butler Market Road Key Route project is currently designing raised, separated bicycle lanes



along Butler Market Road that would terminate at this intersection. Additional crossing enhancements may be needed to transition people biking safely and comfortably from the raised bicycle lanes on Butler Market Road to the neighborhood greenway on Longfellow Court.

- **6th Street & Olney Avenue:** there are uncontrolled continental crosswalks across the minor arterial, which serves as one of the primary east-west connections over the Deschutes River and across the city. The crossing distance contains one thru-lane for each direction and a center turn lane, extending about 50-feet.
- **6th Street & Franklin Avenue:** there is currently an uncontrolled continental crosswalk across the east leg of the minor arterial, shown in Figure 14. Both Key Routes will meet at this intersection. Single overhead light is provided at the west leg but may not be enough to illuminate the crosswalk.



**FIGURE 14: FRANKLIN AVENUE/6TH STREET INTERSECTION (NORTH SIDE, LOOKING WEST)**

- **9th Street & Reed Market Road:** across this major arterial, a midblock continental crosswalk on the east leg grants pedestrians and bicyclists the opportunity to cross three travel lanes in two stages (two thru-lanes eastbound, one thru-lane westbound). The crosswalk leads to the Central Oregon Historic Canal Trail. A controlled crossing (e.g., pedestrian hybrid beacon) could

minimize the “double threat” risk of crossing two thru-lanes. However, access to 9<sup>th</sup> Street might be affected by the Reed Market rail crossing implementation project.

Overall, there are many opportunities to enhance crossings for people walking and/or biking. Implementing urban green bicycle lanes through intersections along these routes could help bicyclists stay along the Key Routes, decrease conflict points, and at the same time increase visibility to prioritize people cycling/walking. Traffic calming measures, such as raised crosswalks or speed humps, delineators, or traffic circles, can maintain motor vehicle volumes and speeds low to ensure people walking and/or cycling are waiting to cross within the field of vision of people driving.

To help support the development of alternatives, traffic volumes were also collected at a handful of intersections (included in Appendix B).

## OTHER IMPROVEMENT NEEDS

Other improvements are also being considered through this project, including:

- **Accessibility Enhancements** – Several areas along the Key Routes have been identified for isolated accessibility improvements (sidewalk, safe crossings, pedestrian access ramps).
- **Wayfinding** – Wayfinding improvements will be implemented throughout the study area to identify routes to key destinations along the Key Routes.

The segments for each of these additional enhancements are discussed below. Note that details related to isolated accessibility enhancements and wayfinding will be developed separately during the design phase and, therefore, needs related to those elements are not discussed in detail in this memorandum.

## ACCESSIBILITY ENHANCEMENTS

Accessibility improvements (sidewalk, safe crossings, pedestrian access ramps) are needed to fully address the needs of the corridor. The full extent of accessibility improvements to be included along the route segments will be determined during design, although the following segments are assumed to require isolated accessibility enhancements:

- Existing Neighborhood Greenways: Harriman/Delaware to 15th/Hartford (approximately 8,600-ft in length).
- NE 5th Street, NE Irving Avenue, and NE 6th Street: Hawthorne Avenue to US 20/Greenwood Avenue (approximately 1,200-ft in length).
- NE 6th Street and Longfellow Court: US 20/Greenwood Avenue to Butler Market Road (approximately 6,800-ft in length).

## WAYFINDING

Wayfinding improvements are planned throughout the study area (approximately 10.8 miles) to help users stay on the routes and notify them of nearby destinations. Note that details related to

wayfinding improvements will be developed separately during the design phase and, therefore, wayfinding needs are not discussed in detail in this memorandum.

## SUMMARY OF MULTIMODAL NEEDS AND KEY OPPORTUNITIES

Based on the data and analysis discussed above there are several identified needs and opportunities that may influence the selection of improvements along the Key Routes. The following summarizes key multimodal needs and opportunities:

- **Synergy Project Segments**

- 13 segments along the Key Routes are anticipated to be existing/planned infrastructure from separate synergy projects.
- Specific coordination may be needed between this project and the following projects during the alternatives analysis and preliminary design:
  - > Midtown Pedestrian and Bicycle Crossings project
  - > Bear Creek Road and 27th Street Improvements project.
  - > Butler Market Key Route project

- **Shared use/Protected Path Segments**

- Three segments have been identified for shared use/protected path treatments: 9<sup>th</sup> Street from Wilson Road to Reed Market Road, Franklin Avenue from NE 5<sup>th</sup> Street to NE 8<sup>th</sup> Street and Bear Creek Road from Alpenview Lane to Cessna Road.
- **9<sup>th</sup> Street**
  - > The PLTS and BLTS is generally high through this segment due to the gaps in facilities for people walking and biking.
  - > There are significant utility and grade constraints on the west side of the roadway, which also parallels the railroad.
  - > A 5-foot-wide sidewalk with a landscaped buffer can be accommodated on the east side of the roadway to attain PLTS 2.
  - > BLTS 2 can be achieved with 7-foot-wide on-street bicycle lanes
  - > To attain overall LTS 1, a 10-foot-wide SUP on at least one side of the roadway could be considered.
- **Franklin Avenue**
  - > The existing sidewalk is narrow and high stress.
  - > While the existing conditions for people biking are low-stress, they will likely not be consistent with improvements farther to the west and this is a critical segment where the two Key Routes overlap.
  - > Public ROW is approximately 80-feet, but the width to the back of the sidewalks is only 45-feet. There are numerous driveways, overhead utilities, and large trees at the back of walk within public ROW.
  - > Either side of the roadway have potential to be utilized for PLTS and/or BLTS improvements.

- > A 10-foot-wide SUP on one side of the roadway could achieve overall LTS 1 and enhance connectivity to existing/planned infrastructure along East-West Key Route.
- **Bear Creek Road**
  - > This segment is expected to implement an improvement consistent with the on-going Bear Creek Road and 27th Street Improvements project and will therefore not be included in the Alternatives Analysis.
- **Neighborhood Greenway Segments**
  - There are opportunities to incorporate pavement markings, signage, and traffic calming along some of the existing neighborhood greenway segments. Priority locations for modal filters will be evaluated in future memorandums.
- **Enhanced Intersection Needs**
  - There are opportunities to enhance comfort and safety for people crossing along both routes. This could include urban green bicycle lanes or other treatments, which will be explored in more detail in future technical memorandums.
- **Need of Facilities for People Walking**
  - About a quarter of the study area does not have dedicated facilities present for people walking. Synergy projects address about ten percent. There are opportunities to enhance accessibility for people walking through treatments such as safe crossings, pedestrian access ramps, and additional sidewalk/shared use path. Modal filter treatments also have the potential to eliminate conflicts with motor vehicle traffic.



# APPENDIX

## CONTENTS

APPENDIX A: LEVEL OF TRAFFIC STRESS ANALYSIS

APPENDIX B: TRAFFIC COUNTS

## **APPENDIX A: LEVEL OF TRAFFIC STRESS ANALYSIS**

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SEG-EXISTING																	
ID	SEGMENT NAME															FINAL	FINAL
		Posted Speed	Thru Lanes / Direction	Total Lanes (Both Directions)	Sidewalk Condition	Effective Sidewalk Width	Buffer Type	Buffer Width	Total Ped Buffering Width	Land Use	Parking Lane Adjacent to Bike Lane	Parking Lane Width	Marked Bike Lane	Bike Lane Width	Frequent Bike Lane Blockage	SEGMENT PED LTS	SEGMENT BIKE LTS
9E	EAST: 9th St Sidewalks North of Reed Market Rd	35	1	2	Good	5 to 6	andscape w Tree	5	12	Light industry	No		Yes	7	No	3	2
9W	WEST: 9th St Sidewalks North of Reed Market Rd	35	1	2	Good	5 to 6	Landscape	5	12	Light industry	No		Yes	7	No	3	2
9E	EAST: 9th St South of Wilson Ave	35	1	2	No Sidewalk					Light industry	No		No		No	4	4
9W	WEST: 9th St South of Wilson Ave	35	1	2	No Sidewalk					Light industry	No		No		No	4	4
BC-N	NORTH: Bear Creek Rd Sidewalks Cessna Dr to 15th St	35	1	2	Good	≥6	No Buffer			Residential	No		Yes	6	No	3	3
BC-S	SOUTH: Bear Creek Rd Sidewalks Cessna Dr to 15th St	35	1	2	Good	≥6	No Buffer			Residential	No		Yes	6	No	3	3
F-N	NORTH: Franklin Ave 5th St to 8th St	≤ 25	1	2	Fair	4 to 5	No Buffer			Residential	No		Yes	5.5	No	3	2
F-S	SOUTH: Franklin Ave 5th St to 8th St	≤ 25	1	2	Good	4 to 5	No Buffer			Residential	No		Yes	5.5	No	3	2

## APPENDIX B: TRAFFIC COUNTS

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ALL TRAFFIC DATA SERVICES

(303) 216-2439

www.alltrafficdata.net

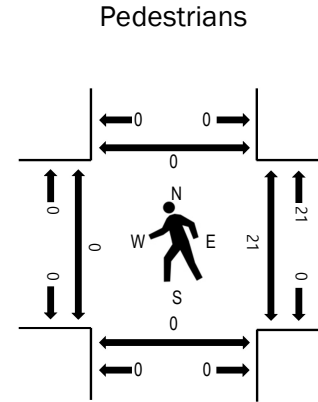
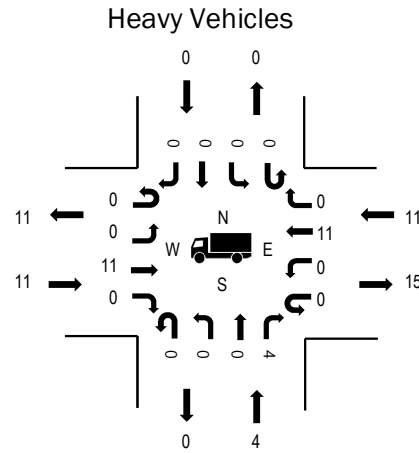
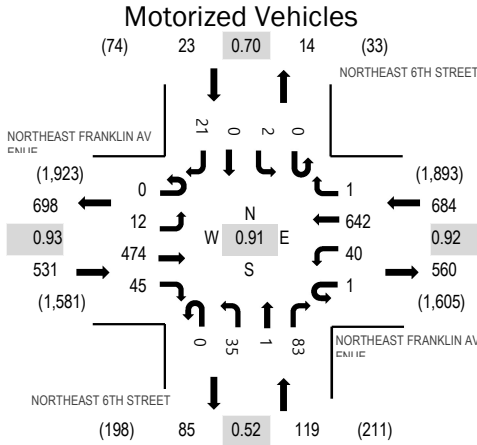
Location: 1 NORTHEAST 6TH STREET &amp; NORTHEAST FRANKLIN AVENUE PM

Date: Tuesday, December 12, 2023

Peak Hour: 03:35 PM - 04:35 PM

Peak 15-Minutes: 03:50 PM - 04:05 PM

## Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.1%	0.93
WB	1.6%	0.92
NB	3.4%	0.52
SB	0.0%	0.70
All	1.9%	0.91

## Traffic Counts - Motorized Vehicles

Interval Start Time	NORTHEAST FRANKLIN AVENUE Eastbound				NORTHEAST FRANKLIN AVENUE Westbound				NORTHEAST 6TH STREET Northbound				NORTHEAST 6TH STREET Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
3:00 PM	0	4	33	2	0	1	42	0	0	0	0	0	0	0	0	3	85	1,286
3:05 PM	0	1	39	1	0	1	51	0	0	2	0	1	0	0	0	2	98	1,325
3:10 PM	0	0	36	1	0	3	46	0	0	0	0	2	0	0	1	4	93	1,354
3:15 PM	0	0	37	2	0	2	45	0	0	0	1	5	0	0	0	0	92	1,347
3:20 PM	0	0	36	3	0	4	65	0	0	3	1	3	0	0	0	2	117	1,346
3:25 PM	0	0	49	3	0	2	49	0	0	0	0	0	0	0	0	3	106	1,336
3:30 PM	0	0	34	5	0	8	48	2	0	1	0	3	0	1	0	2	104	1,335
3:35 PM	0	0	30	9	0	6	56	0	0	1	0	5	0	1	0	3	111	1,357
3:40 PM	0	1	41	6	0	2	58	0	0	3	0	3	0	0	0	1	115	1,347
3:45 PM	0	0	36	11	0	5	50	0	0	4	0	10	0	0	0	1	117	1,343
3:50 PM	0	2	45	6	0	5	48	0	0	2	1	20	0	0	0	2	131	1,343
3:55 PM	0	1	40	1	0	5	54	0	0	6	0	8	0	0	0	2	117	1,318
4:00 PM	0	1	41	0	0	5	55	0	0	6	0	14	0	0	0	2	124	1,314
4:05 PM	0	2	42	2	0	3	65	0	0	2	0	9	0	0	0	2	127	1,293
4:10 PM	0	2	29	3	0	2	44	0	0	2	0	3	0	0	0	1	86	1,279
4:15 PM	0	2	37	3	0	1	41	0	0	1	0	4	0	0	0	2	91	1,304
4:20 PM	0	0	43	1	1	5	48	1	0	4	0	2	0	1	0	1	107	1,321
4:25 PM	0	1	42	1	0	0	59	0	0	1	0	0	0	0	0	1	105	1,317
4:30 PM	0	0	48	2	0	1	64	0	0	3	0	5	0	0	0	3	126	1,304
4:35 PM	0	1	44	1	0	0	48	0	0	1	0	2	0	0	0	4	101	1,275
4:40 PM	0	2	43	3	0	0	55	0	0	2	0	3	0	0	0	3	111	1,287
4:45 PM	0	0	33	3	0	8	66	0	0	3	0	1	0	0	0	3	117	1,252
4:50 PM	0	1	45	3	0	5	46	0	0	3	0	3	0	0	0	0	106	1,217
4:55 PM	0	0	42	5	0	4	60	0	0	0	0	1	0	1	0	0	113	1,208
5:00 PM	0	2	50	1	0	2	38	0	0	4	0	1	0	0	0	5	103	1,159
5:05 PM	0	0	51	1	0	1	54	0	0	1	0	2	0	0	0	3	113	
5:10 PM	0	1	46	0	0	3	54	0	0	1	0	6	0	0	0	0	111	
5:15 PM	0	0	52	1	0	3	44	0	0	1	0	5	0	0	0	2	108	



5:20 PM	0	1	53	2	0	3	40	0	0	2	0	1	0	0	0	1	103
5:25 PM	0	1	40	1	0	0	47	0	0	0	0	1	0	0	0	2	92
5:30 PM	0	0	43	2	0	3	40	0	0	4	0	4	0	0	0	1	97
5:35 PM	0	0	46	2	0	3	53	0	0	3	0	3	0	1	0	2	113
5:40 PM	0	0	38	0	0	1	32	0	0	1	0	3	0	0	0	1	76
5:45 PM	0	0	26	3	0	2	47	0	0	1	0	2	0	1	0	0	82
5:50 PM	0	1	44	3	0	3	43	0	0	2	0	1	0	0	0	0	97
5:55 PM	0	0	26	1	0	1	31	0	0	1	0	1	0	1	0	2	64
Count Total	0	27	1,460	94	1	103	1,786	3	0	71	3	137	0	7	1	66	3,759
Peak Hour	0	12	474	45	1	40	642	1	0	35	1	83	0	2	0	21	1,357

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
3:00 PM	2	0	2	0	4	3:00 PM	0	0	0	0	0	3:00 PM	0	0	0	0	0
3:05 PM	4	0	1	0	5	3:05 PM	0	0	0	0	0	3:05 PM	4	0	0	0	4
3:10 PM	1	0	1	0	2	3:10 PM	0	0	0	0	0	3:10 PM	0	0	0	0	0
3:15 PM	1	0	0	0	1	3:15 PM	0	0	0	0	0	3:15 PM	1	1	0	0	2
3:20 PM	3	0	1	0	4	3:20 PM	0	0	0	0	0	3:20 PM	0	0	2	0	2
3:25 PM	3	0	0	0	3	3:25 PM	0	1	0	0	1	3:25 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0	3:30 PM	1	0	0	0	1	3:30 PM	0	0	0	0	0
3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0	3:35 PM	0	0	4	0	4
3:40 PM	0	0	4	0	4	3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0
3:45 PM	2	0	0	0	2	3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0
3:50 PM	1	0	0	0	1	3:50 PM	1	0	0	0	1	3:50 PM	0	0	6	0	6
3:55 PM	2	0	1	0	3	3:55 PM	1	0	0	0	1	3:55 PM	0	0	4	0	4
4:00 PM	0	1	0	0	1	4:00 PM	0	0	0	0	0	4:00 PM	0	0	4	0	4
4:05 PM	0	2	1	0	3	4:05 PM	0	0	0	0	0	4:05 PM	0	0	1	0	1
4:10 PM	0	0	2	0	2	4:10 PM	0	0	0	0	0	4:10 PM	0	0	1	0	1
4:15 PM	1	0	1	0	2	4:15 PM	0	0	0	0	0	4:15 PM	0	0	1	0	1
4:20 PM	1	1	2	0	4	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	0	0	0	0	4:25 PM	1	0	0	0	1	4:25 PM	0	0	0	0	0
4:30 PM	4	0	0	0	4	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	0	1	0	1	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	0	1	0	1	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	0	7	0	7	4:45 PM	1	0	0	0	1	4:45 PM	0	0	0	0	0
4:50 PM	2	0	1	0	3	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	1	0	0	0	1	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	0	1	0	2	5:00 PM	0	0	0	0	0	5:00 PM	0	0	1	0	1
5:05 PM	1	0	1	0	2	5:05 PM	0	0	0	0	0	5:05 PM	0	3	0	0	3
5:10 PM	2	0	2	0	4	5:10 PM	1	0	0	0	1	5:10 PM	0	0	0	0	0
5:15 PM	1	0	0	0	1	5:15 PM	1	0	0	0	1	5:15 PM	0	0	0	0	0
5:20 PM	2	0	0	0	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	3	0	0	0	3	5:25 PM	0	1	0	0	1	5:25 PM	0	0	2	0	2
5:30 PM	0	1	0	0	1	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	1	0	1	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	3	0	0	0	3	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	1	0	0	0	1	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	1	0	0	0	1	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	1	0	0	0	1	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	44	5	31	0	80	Count Total	7	2	0	0	9	Count Total	5	4	26	0	35
Peak Hour	11	4	11	0	26	Peak Hour	3	0	0	0	3	Peak Hour	0	0	21	0	21

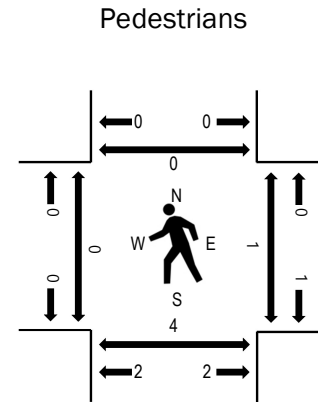
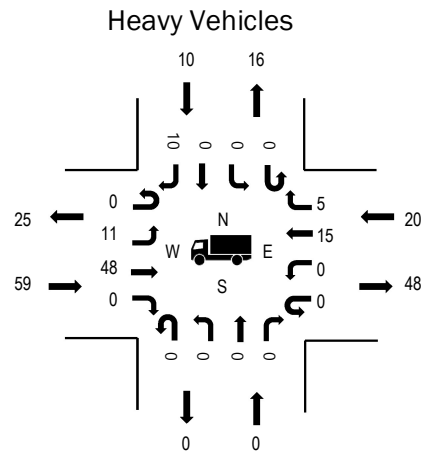
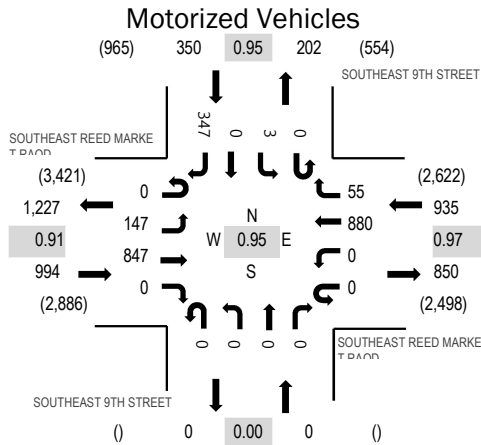
**Location:** 3 SOUTHEAST 9TH STREET & SOUTHEAST REED MARKET ROAD PM

**Date:** Tuesday, December 12, 2023

**Peak Hour:** 03:40 PM - 04:40 PM

**Peak 15-Minutes:** 03:40 PM - 03:55 PM

### Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	5.9%	0.91
WB	2.1%	0.97
NB	0.0%	0.00
SB	2.9%	0.95
All	3.9%	0.95

## Traffic Counts - Motorized Vehicles

Interval Start Time	SOUTHEAST REED MARKET				SOUTHEAST REED MARKET				SOUTHEAST 9TH STREET				SOUTHEAST 9TH STREET				Total	Rolling Hour	
	Eastbound				Westbound				Northbound				Southbound						
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			
3:00 PM	0	9	66	0	0	0	70	4	0	0	0	0	0	0	0	0	28	177	2,166
3:05 PM	0	9	71	0	0	0	70	2	0	0	0	0	0	0	0	0	22	174	2,174
3:10 PM	0	9	63	0	0	0	58	3	0	0	0	0	0	0	0	0	23	156	2,170
3:15 PM	0	12	53	0	0	0	73	5	0	0	0	0	0	0	0	0	15	158	2,190
3:20 PM	0	13	58	0	0	0	75	3	0	0	0	0	0	0	0	0	27	176	2,226
3:25 PM	0	13	69	0	0	0	53	3	0	0	0	0	0	0	0	0	30	168	2,229
3:30 PM	0	12	78	0	0	0	65	7	0	0	0	0	0	0	0	0	26	188	2,274
3:35 PM	0	15	65	0	0	0	57	5	0	0	0	0	0	0	0	0	23	165	2,266
3:40 PM	0	7	91	0	0	0	78	11	0	0	0	0	0	0	0	0	22	209	2,279
3:45 PM	0	16	60	0	0	0	76	3	0	0	0	0	0	0	0	0	29	184	2,262
3:50 PM	0	21	79	0	0	0	71	0	0	0	0	0	0	0	0	0	36	207	2,256
3:55 PM	0	11	83	0	0	0	79	3	0	0	0	0	0	0	0	0	28	204	2,223
4:00 PM	0	12	68	0	0	0	78	6	0	0	0	0	0	1	0	0	20	185	2,194
4:05 PM	0	6	54	0	0	0	72	4	0	0	0	0	0	0	0	0	34	170	2,213
4:10 PM	0	13	56	0	0	0	67	8	0	0	0	0	0	0	0	0	32	176	2,220
4:15 PM	0	12	78	0	0	0	70	5	0	0	0	0	0	0	0	0	29	194	2,238
4:20 PM	0	13	56	0	0	0	79	3	0	0	0	0	0	0	0	0	28	179	2,242
4:25 PM	0	11	96	0	0	0	67	3	0	0	0	0	0	1	0	0	35	213	2,271
4:30 PM	0	14	69	0	0	0	67	3	0	0	0	0	0	1	0	0	26	180	2,257
4:35 PM	0	11	57	0	0	0	76	6	0	0	0	0	0	0	0	0	28	178	2,236
4:40 PM	0	11	78	0	0	0	73	2	0	0	0	0	0	1	0	0	27	192	2,233
4:45 PM	0	8	70	0	0	0	61	4	0	0	0	0	0	0	0	0	35	178	2,193
4:50 PM	0	11	69	0	0	0	69	2	0	0	0	0	0	1	0	0	22	174	2,180
4:55 PM	0	12	71	0	0	0	62	1	0	0	0	0	0	2	0	0	27	175	2,164
5:00 PM	0	8	90	0	0	0	71	6	0	0	0	0	0	1	0	0	28	204	2,113
5:05 PM	0	13	64	0	0	0	70	2	0	0	0	0	0	2	0	0	26	177	
5:10 PM	0	11	87	0	0	0	66	7	0	0	0	0	0	0	0	0	23	194	
5:15 PM	0	8	82	0	0	0	79	7	0	0	0	0	0	0	0	0	22	198	



5:20 PM	0	20	79	0	0	0	70	11	0	0	0	0	0	1	0	27	208
5:25 PM	0	13	93	0	0	0	65	2	0	0	0	0	0	1	0	25	199
5:30 PM	0	7	56	0	0	0	73	2	0	0	0	0	0	2	0	19	159
5:35 PM	0	16	61	0	0	0	74	2	0	0	0	0	0	0	0	22	175
5:40 PM	0	5	39	0	0	0	73	6	0	0	0	0	0	2	0	27	152
5:45 PM	0	9	61	0	0	0	59	2	0	0	0	0	0	1	0	33	165
5:50 PM	0	6	59	0	0	0	58	5	0	0	0	0	0	0	0	30	158
5:55 PM	0	9	51	0	0	0	50	0	0	0	0	0	0	1	0	13	124
Count Total	0	406	2,480	0	0	0	2,474	148	0	0	0	0	0	18	0	947	6,473
Peak Hour	0	147	847	0	0	0	880	55	0	0	0	0	0	3	0	347	2,279

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
3:00 PM	2	0	7	1	10	3:00 PM	0	0	0	0	0	3:00 PM	0	0	0	2	2
3:05 PM	6	0	2	0	8	3:05 PM	1	0	0	0	1	3:05 PM	0	1	0	0	1
3:10 PM	7	0	3	0	10	3:10 PM	0	0	0	0	0	3:10 PM	0	1	0	0	1
3:15 PM	2	0	2	1	5	3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0
3:20 PM	5	0	5	2	12	3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0
3:25 PM	6	0	4	1	11	3:25 PM	0	0	0	0	0	3:25 PM	0	0	0	0	0
3:30 PM	3	0	2	2	7	3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0
3:35 PM	3	0	2	1	6	3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0
3:40 PM	11	0	4	0	15	3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0
3:45 PM	6	0	1	0	7	3:45 PM	0	0	0	0	0	3:45 PM	0	2	1	0	3
3:50 PM	4	0	1	1	6	3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0
3:55 PM	7	0	1	0	8	3:55 PM	0	0	0	0	0	3:55 PM	0	1	0	0	1
4:00 PM	6	0	0	0	6	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	4	0	0	1	5	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	5	0	3	4	12	4:10 PM	0	0	0	0	0	4:10 PM	0	1	0	0	1
4:15 PM	1	0	5	2	8	4:15 PM	1	0	0	0	1	4:15 PM	0	0	0	0	0
4:20 PM	3	0	2	0	5	4:20 PM	0	0	0	0	0	4:20 PM	0	1	0	0	1
4:25 PM	8	0	1	0	9	4:25 PM	0	0	0	0	0	4:25 PM	0	1	0	0	1
4:30 PM	2	0	1	1	4	4:30 PM	2	0	0	0	2	4:30 PM	0	0	0	0	0
4:35 PM	2	0	1	1	4	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	4	0	3	2	9	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	2	0	0	1	3	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	3	0	2	1	6	4:50 PM	0	0	0	0	0	4:50 PM	0	1	0	0	1
4:55 PM	3	0	1	0	4	4:55 PM	1	0	0	0	1	4:55 PM	0	0	0	0	0
5:00 PM	4	0	1	0	5	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	3	0	2	0	5	5:05 PM	1	0	0	0	1	5:05 PM	0	0	0	0	0
5:10 PM	4	0	1	0	5	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	4	0	1	0	5	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	2	0	1	0	3	5:20 PM	0	0	1	0	1	5:20 PM	0	0	0	0	0
5:25 PM	2	0	0	0	2	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	3	0	1	0	4	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	2	0	1	0	3	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	3	0	1	0	4	5:40 PM	0	0	0	1	1	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	1	0	0	0	1	5:45 PM	0	0	2	0	2
5:50 PM	2	0	0	0	2	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	1	0	0	0	1	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	135	0	62	22	219	Count Total	7	0	1	1	9	Count Total	0	9	3	2	14
Peak Hour	59	0	20	10	89	Peak Hour	3	0	0	0	3	Peak Hour	0	6	1	0	7

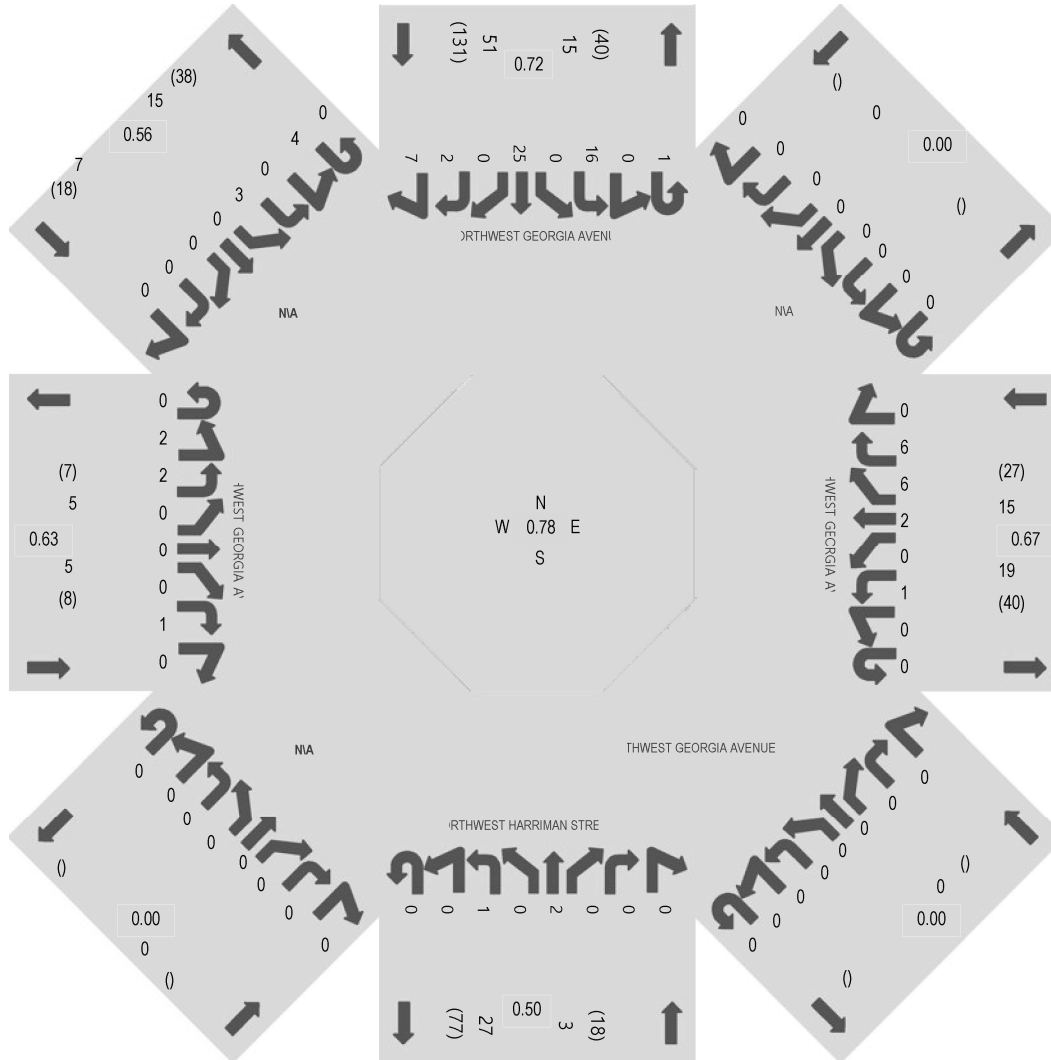
**Location:** 5 NORTHWEST HARRIMAN STREET & NORTHWEST GEORGIA AVENUE PM

**Date:** Tuesday, December 12, 2023

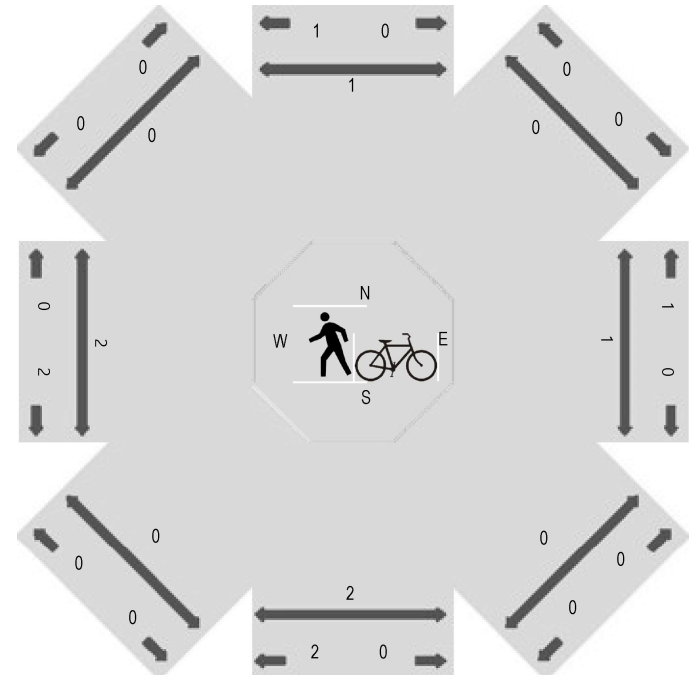
**Peak Hour:** 03:50 PM - 04:50 PM

**Peak 15-Minutes:** 04:05 PM - 04:20 PM

### Peak Hour - Motorized Vehicles



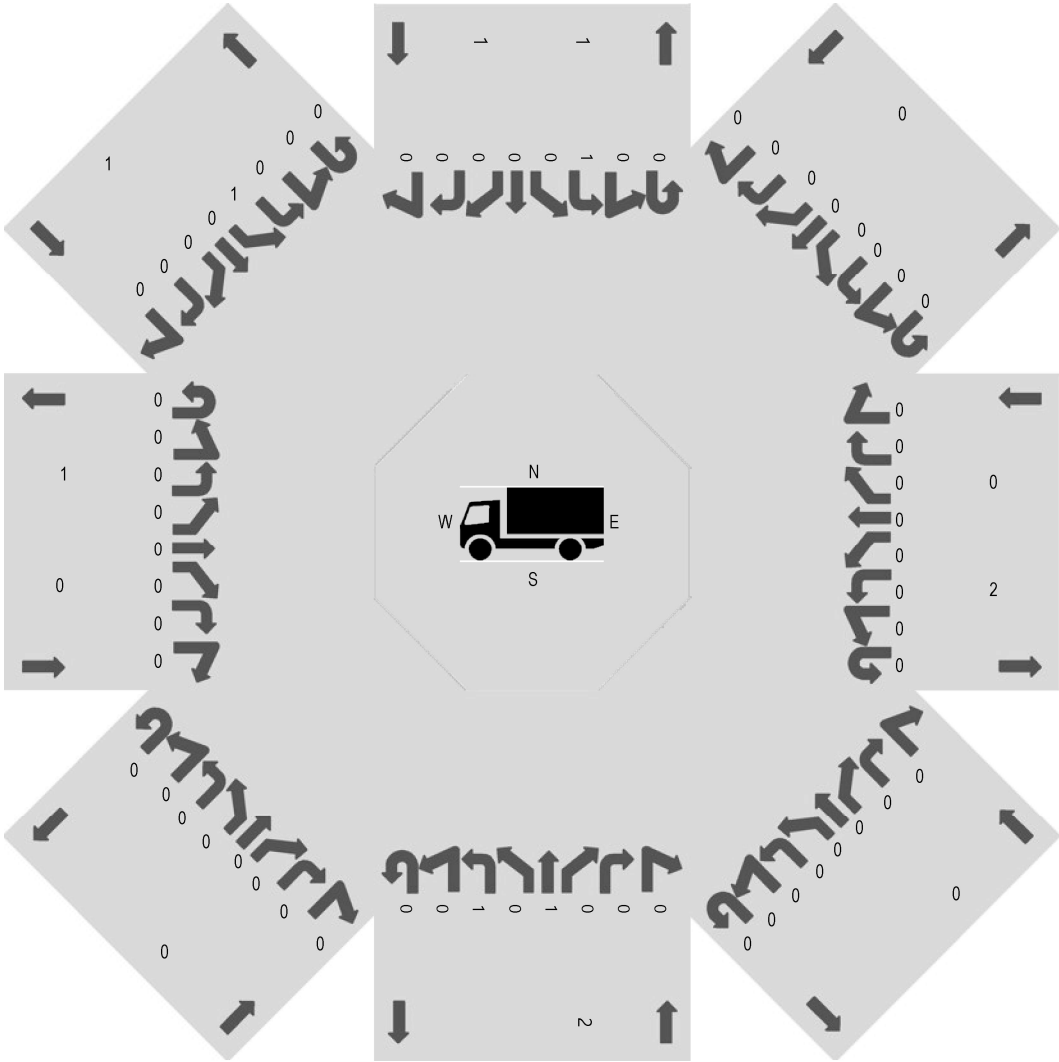
### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.



Peak Hour - Heavy Vehicles



	HV%	PHF
WB	0.0%	0.67
NWB	0.0%	0.00
NB	66.7%	0.50
NEB	0.0%	0.00
EB	0.0%	0.63
SEB	14.3%	0.56
SB	2.0%	0.72
SWB	0.0%	0.00
All	4.9%	0.78

## Traffic Counts - Motorized Vehicles

[illegible]

## Traffic Counts - Motorized Vehicles (continued)

[illegible]

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles									Interval Start Time	Bicycles on Roadway									Interval Start Time	Pedestrians/Bicycles on Crosswalk								
	WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total		WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total		WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total
3:00 PM	0	0	0	0	0	0	0	0	0	3:00 PM	0	0	0	0	0	0	0	0	0	3:00 PM	0	0	0	0	0	0	0	0	0
3:05 PM	0	0	0	0	0	0	0	0	0	3:05 PM	0	0	0	0	0	0	0	0	0	3:05 PM	0	0	0	0	0	0	0	0	0
3:10 PM	0	0	0	0	0	0	0	0	0	3:10 PM	0	0	0	0	0	0	0	0	0	3:10 PM	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	3:15 PM	0	0	0	0	0	0	0	0	0	3:15 PM	0	0	0	0	0	0	0	0	0
3:20 PM	0	0	0	0	0	0	1	0	1	3:20 PM	0	0	0	0	0	0	0	0	0	3:20 PM	0	1	0	0	0	0	0	0	1
3:25 PM	0	0	0	0	0	0	0	0	0	3:25 PM	0	0	0	0	0	0	0	0	0	3:25 PM	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	3:30 PM	0	0	0	0	0	0	0	0	0	3:30 PM	0	0	0	0	0	0	0	0	0
3:35 PM	0	0	0	0	0	0	0	0	0	3:35 PM	0	0	1	0	0	0	1	0	2	3:35 PM	1	0	0	0	0	0	0	0	1
3:40 PM	0	0	0	0	0	0	0	0	0	3:40 PM	0	0	0	0	0	0	0	0	0	3:40 PM	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	1	0	1	3:45 PM	0	0	0	0	0	0	0	0	0	3:45 PM	0	0	0	0	0	0	0	0	0
3:50 PM	0	0	0	0	0	0	0	0	0	3:50 PM	0	0	0	0	0	0	0	0	0	3:50 PM	0	0	0	0	0	0	0	0	0
3:55 PM	0	0	1	0	0	1	0	0	2	3:55 PM	0	0	0	0	0	0	0	0	0	3:55 PM	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	4:00 PM	0	0	0	0	0	0	0	0	0	4:00 PM	0	0	0	0	0	0	0	0	0
4:05 PM	0	0	0	0	0	0	0	0	0	4:05 PM	0	0	0	0	0	0	0	0	0	4:05 PM	0	0	0	0	0	0	0	0	0
4:10 PM	0	0	0	0	0	0	0	0	0	4:10 PM	0	0	0	0	0	0	0	0	0	4:10 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	4:15 PM	0	0	0	0	0	0	0	0	0	4:15 PM	0	0	0	0	0	0	0	0	0
4:20 PM	0	0	0	0	0	0	0	0	0	4:20 PM	0	0	0	0	0	0	0	0	0	4:20 PM	0	0	0	0	0	0	0	0	0
4:25 PM	0	0	0	0	0	0	0	0	0	4:25 PM	0	0	0	0	0	0	0	0	0	4:25 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	4:30 PM	0	0	0	0	0	0	0	0	0	4:30 PM	0	0	0	0	0	0	0	0	0
4:35 PM	0	0	0	0	0	0	1	0	1	4:35 PM	0	0	0	0	0	0	1	0	1	4:35 PM	0	0	0	0	0	0	0	0	0
4:40 PM	0	0	1	0	0	0	0	0	1	4:40 PM	0	0	0	0	1	0	0	0	1	4:40 PM	1	0	2	0	2	0	1	0	6
4:45 PM	0	0	0	0	0	0	0	0	0	4:45 PM	0	0	0	0	0	0	0	0	0	4:45 PM	0	0	0	0	0	0	0	0	0
4:50 PM	0	0	0	0	0	0	0	0	0	4:50 PM	0	0	0	0	0	0	0	0	0	4:50 PM	0	0	0	0	0	0	0	0	0
4:55 PM	0	0	0	0	0	0	0	0	0	4:55 PM	0	0	0	0	0	0	0	0	0	4:55 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	5:00 PM	0	0	0	0	0	0	0	0	0	5:00 PM	0	0	0	0	0	0	0	0	0
5:05 PM	0	0	0	0	0	0	0	0	0	5:05 PM	0	0	0	0	0	0	0	0	0	5:05 PM	0	0	0	0	0	0	0	0	0
5:10 PM	0	0	0	0	0	0	0	0	0	5:10 PM	0	0	0	0	0	0	0	0	0	5:10 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	5:15 PM	0	0	0	0	0	0	0	0	0	5:15 PM	0	0	0	0	0	0	0	0	0
5:20 PM	0	0	0	0	0	0	0	0	0	5:20 PM	0	0	0	0	0	0	0	0	0	5:20 PM	0	0	0	0	0	0	0	0	0
5:25 PM	0	0	0	0	0	0	0	0	0	5:25 PM	0	0	0	0	0	0	0	0	0	5:25 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	5:30 PM	0	0	0	0	0	0	0	0	0	5:30 PM	0	0	0	0	0	0	0	0	0
5:35 PM	0	0	0	0	0	0	0	0	0	5:35 PM	0	0	0	0	0	0	0	0	0	5:35 PM	0	0	0	0	0	0	0	0	0
5:40 PM	0	0	0	0	0	0	0	0	0	5:40 PM	0	0	0	0	0	0	0	0	0	5:40 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	5:45 PM	0	0	0	0	0	0	0	0	0	5:45 PM	0	0	0	0	0	0	0	0	0
5:50 PM	0	0	0	0	0	0	0	0	0	5:50 PM	0	0	0	0	0	0	0	0	0	5:50 PM	0	0	0	0	0	0	0	0	0
5:55 PM	0	0	0	0	0	0	0	0	0	5:55 PM	0	0	0	0	0	0	0	0	0	5:55 PM	0	0	0	0	0	0	0	0	0
Count Total	0	0	2	0	0	1	3	0	6	Count Total	0	0	1	0	1	0	2	0	4	Count Total	2	1	2	0	2	0	1	0	8
Peak Hour	0	0	2	0	0	1	1	0	4	Peak Hour	1	0	0	0	0	0	1	0	2	Peak Hour	1	0	2	0	2	0	1	0	6



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Site Code: 4  
DELAWARE AVE E.O LAVA RD

EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classified	Total
12/12/23	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
01:00	0	2	2	0	0	0	0	0	0	0	0	0	0	0	4
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
07:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
08:00	0	2	2	1	0	0	0	0	0	0	0	0	0	0	5
09:00	0	7	1	0	0	2	0	0	0	0	0	0	0	1	11
10:00	0	2	2	0	0	0	0	1	0	0	0	0	0	0	5
11:00	0	7	5	0	2	0	0	0	0	0	0	0	0	1	15
12 PM	0	9	2	0	1	0	0	0	0	0	0	0	0	0	12
13:00	0	14	4	0	0	0	0	1	0	0	0	0	0	1	20
14:00	0	14	3	0	2	0	0	0	0	0	0	0	0	0	19
15:00	0	13	2	0	0	0	0	0	0	0	0	0	0	1	16
16:00	0	9	5	0	1	0	0	0	0	0	0	0	0	0	15
17:00	0	12	5	0	0	0	0	0	0	0	0	0	0	0	17
18:00	0	12	2	0	1	0	0	0	0	0	0	0	0	0	15
19:00	0	6	1	0	0	0	0	0	0	0	0	0	0	0	7
20:00	0	5	2	0	0	0	0	0	0	0	0	0	0	0	7
21:00	1	6	0	0	0	0	0	0	0	0	0	0	0	0	7
22:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
23:00	0	1	2	0	0	0	0	0	0	0	0	0	0	0	3
Total	1	130	41	1	7	2	0	2	0	0	0	0	0	4	188
Percent	0.5%	69.1%	21.8%	0.5%	3.7%	1.1%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	
AM Peak		09:00	11:00	08:00	11:00	09:00		10:00						09:00	
Vol.		7	5	1	2	2		1						1	
PM Peak	21:00	13:00	16:00		14:00			13:00						13:00	
Vol.	1	14	5		2			1						1	
Grand Total	1	130	41	1	7	2	0	2	0	0	0	0	0	4	188
Percent	0.5%	69.1%	21.8%	0.5%	3.7%	1.1%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	

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DELAWARE AVE E.O LAVA RD

WB															
Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classed	Total
12/12/23	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
08:00	0	11	4	0	0	0	0	0	0	0	0	0	0	0	15
09:00	1	13	2	0	0	1	0	0	0	0	0	0	0	1	18
10:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
11:00	0	6	1	0	1	0	0	0	0	0	0	0	0	0	8
12 PM	0	3	2	0	0	0	0	0	0	0	0	0	0	1	6
13:00	0	9	1	0	0	0	0	0	0	0	0	0	0	0	10
14:00	0	4	1	0	0	0	0	0	0	0	0	0	0	1	6
15:00	1	5	1	0	1	0	0	0	0	0	0	0	0	0	8
16:00	0	4	2	0	2	0	0	0	0	0	0	0	0	2	10
17:00	0	3	3	0	1	0	0	1	0	0	0	0	0	0	8
18:00	0	9	1	0	1	0	0	0	0	0	0	0	0	0	11
19:00	0	2	0	0	0	0	0	0	0	0	0	0	0	1	3
20:00	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
21:00	0	3	0	0	0	0	0	0	0	0	0	0	0	1	4
22:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	77	21	0	6	1	0	1	0	0	0	0	0	7	115
Percent	1.7%	67.0%	18.3%	0.0%	5.2%	0.9%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	6.1%	
AM Peak	09:00	09:00	08:00		11:00	09:00								09:00	
Vol.	1	13	4		1	1								1	
PM Peak	15:00	13:00	17:00		16:00			17:00						16:00	
Vol.	1	9	3		2			1						2	
Grand Total	2	77	21	0	6	1	0	1	0	0	0	0	0	7	115
Percent	1.7%	67.0%	18.3%	0.0%	5.2%	0.9%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	6.1%	

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DELAWARE AVE E.O LAVA RD

EB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12/12/23	0	1	1	1	0	0	0	0	0	0	0	0	0	0	3	14-23	2
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	14-23	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	9-18	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
06:00	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	15-24	2
07:00	0	1	3	0	0	0	0	0	0	0	0	0	0	0	4	16-25	4
08:00	1	4	2	1	0	0	0	0	0	0	0	0	0	0	8	16-25	6
09:00	2	3	2	1	0	0	0	0	0	0	0	0	0	0	8	16-25	5
10:00	2	4	1	0	0	0	0	0	0	0	0	0	0	0	7	11-20	5
11:00	1	10	4	0	0	0	0	0	0	0	0	0	0	0	15	16-25	14
12 PM	6	7	7	0	0	0	0	0	0	0	0	0	0	0	20	16-25	14
13:00	1	4	11	0	0	0	0	0	0	0	0	0	0	0	16	16-25	15
14:00	1	7	8	2	0	0	0	0	0	0	0	0	0	0	18	16-25	15
15:00	3	5	7	1	0	0	0	0	0	0	0	0	0	0	16	16-25	12
16:00	2	7	5	0	0	0	0	0	0	0	0	0	0	0	14	16-25	12
17:00	1	13	7	0	0	0	0	0	0	0	0	0	0	0	21	16-25	20
18:00	1	3	3	1	0	0	0	0	0	0	0	0	0	0	8	16-25	6
19:00	4	2	1	0	0	0	0	0	0	0	0	0	0	0	7	16-25	3
20:00	1	5	3	0	0	0	0	0	0	0	0	0	0	0	9	16-25	8
21:00	0	1	1	1	0	0	0	0	0	0	0	0	0	0	3	14-23	2
22:00	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3	11-20	3
23:00	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2	14-23	2
Total	26	82	70	8	0	0	0	0	0	0	0	0	0	0	186		
Percent	14.0%	44.1%	37.6%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	09:00	11:00	11:00	00:00												11:00	
Vol.	2	10	4	1												15	
PM Peak	12:00	17:00	13:00	14:00												17:00	
Vol.	6	13	11	2												21	
Total	26	82	70	8	0	0	0	0	0	0	0	0	0	0	186		
Percent	14.0%	44.1%	37.6%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 15 MPH  
50th Percentile : 19 MPH  
85th Percentile : 23 MPH  
95th Percentile : 24 MPH

Stats  
10 MPH Pace Speed : 16-25 MPH  
Number in Pace : 152  
Percent in Pace : 81.7%  
Number of Vehicles > 25 MPH : 8  
Percent of Vehicles > 25 MPH : 4.3%  
Mean Speed(Average) : 19 MPH

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WB

[illegible]

15th Percentile :	9 MPH
50th Percentile :	18 MPH
85th Percentile :	24 MPH
95th Percentile :	27 MPH

Stats	10 MPH Pace Speed :	16-25 MPH
	Number in Pace :	77
	Percent in Pace :	66.4%
	Number of Vehicles > 25 MPH :	11
	Percent of Vehicles > 25 MPH :	9.5%
	Mean Speed(Average) :	18 MPH



Site Code: 4  
DELAWARE AVE E.O LAVA RD

Start Time	12-Dec-23 Tue	EB	WB	Total
12:00 AM		3	2	5
01:00		1	0	1
02:00		0	0	0
03:00		1	0	1
04:00		0	0	0
05:00		0	0	0
06:00		2	0	2
07:00		4	2	6
08:00		8	22	30
09:00		8	11	19
10:00		7	5	12
11:00		15	7	22
12:00 PM		20	7	27
01:00		16	8	24
02:00		18	11	29
03:00		16	8	24
04:00		14	8	22
05:00		21	10	31
06:00		8	5	13
07:00		7	2	9
08:00		9	5	14
09:00		3	2	5
10:00		3	0	3
11:00		2	1	3
Total		186	116	302
Percent		61.6%	38.4%	
AM Peak	-	11:00	08:00	-
Vol.	-	15	22	-
PM Peak	-	17:00	14:00	-
Vol.	-	21	11	-
Grand Total		186	116	302
Percent		61.6%	38.4%	
ADT		ADT 302	AADT 302	

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CUMBERLAND AVE E.O 13TH ST

## EB

[illegible]

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CUMBERLAND AVE E.O 13TH ST

WB[illegible]

Site Code: 5  
CUMBERLAND AVE E.O 13TH ST

EB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12/12/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	*	1
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	9-18	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
06:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	15-24	1
07:00	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	*	2
08:00	2	3	1	0	0	0	0	0	0	0	0	0	0	0	6	16-25	4
09:00	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	*	1
10:00	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8-17	1
11:00	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1-10	3
12 PM	3	6	0	0	0	0	0	0	0	0	0	0	0	0	9	11-20	7
13:00	4	1	4	0	0	0	0	0	0	0	0	0	0	0	9	16-25	5
14:00	3	4	0	0	0	0	0	0	0	0	0	0	0	0	7	11-20	5
15:00	3	4	0	0	0	0	0	0	0	0	0	0	0	0	7	11-20	5
16:00	0	3	1	0	0	0	0	0	0	0	0	0	0	0	4	14-23	4
17:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	4	11-20	3
18:00	2	0	3	0	0	0	0	0	0	0	0	0	0	0	5	21-30	3
19:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	9-18	1
20:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	9-18	1
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
22:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	*	1
23:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	*	1
Total	33	27	10	0	0	0	0	0	0	0	0	0	0	0	70		
Percent	47.1%	38.6%	14.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	08:00	08:00													08:00	
Vol.	4	3	1													6	
PM Peak	13:00	12:00	13:00													12:00	
Vol.	4	6	4													9	
Total	33	27	10	0	0	0	0	0	0	0	0	0	0	0	70		
Percent	47.1%	38.6%	14.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 4 MPH  
50th Percentile : 15 MPH  
85th Percentile : 19 MPH  
95th Percentile : 23 MPH

Stats      10 MPH Pace Speed : 11-20 MPH  
             Number in Pace : 38  
             Percent in Pace : 54.3%  
Number of Vehicles > 25 MPH : 0  
Percent of Vehicles > 25 MPH : 0.0%  
Mean Speed(Average) : 14 MPH



## Page 2

WB

Stats	10 MPH Pace Speed :	16-25 MPH
	Number in Pace :	74
	Percent in Pace :	69.8%
	Number of Vehicles > 25 MPH :	4
	Percent of Vehicles > 25 MPH :	3.8%
	Mean Speed(Average) :	17 MPH

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CUMBERLAND AVE E.O 13TH ST

Start Time	12-Dec-23 Tue	EB	WB							Total
12:00 AM		0	0							0
01:00		0	0							0
02:00		1	1							2
03:00		1	0							1
04:00		0	0							0
05:00		0	0							0
06:00		2	1							3
07:00		3	3							6
08:00		6	4							10
09:00		2	9							11
10:00		2	0							2
11:00		4	8							12
12:00 PM		9	11							20
01:00		9	10							19
02:00		7	9							16
03:00		7	10							17
04:00		4	10							14
05:00		4	8							12
06:00		5	6							11
07:00		1	5							6
08:00		1	4							5
09:00		0	4							4
10:00		1	1							2
11:00		1	2							3
Total		70	106							176
Percent		39.8%	60.2%							
AM Peak	-	08:00	09:00	-	-	-	-	-	-	11:00
Vol.	-	6	9	-	-	-	-	-	-	12
PM Peak	-	12:00	12:00	-	-	-	-	-	-	12:00
Vol.	-	9	11	-	-	-	-	-	-	20
Grand Total		70	106							176
Percent		39.8%	60.2%							
ADT		ADT 176		AADT 176						

[illegible]

Site Code: 6  
6TH ST S.O ISABELLA LN

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
01/03/24	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
06:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
07:00	0	4	1	0	1	0	0	0	0	0	0	0	0	6
08:00	0	<b>19</b>	1	0	1	0	0	0	0	0	0	0	0	21
09:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
10:00	0	10	0	0	0	0	0	<b>1</b>	0	0	0	0	0	11
11:00	0	19	<b>3</b>	0	<b>4</b>	0	0	0	0	0	0	0	0	<b>26</b>
12 PM	0	9	1	0	0	0	0	0	0	0	0	0	0	10
13:00	0	15	0	0	0	0	0	0	0	0	0	0	0	15
14:00	0	18	6	0	<b>3</b>	0	0	0	0	0	0	0	0	27
15:00	0	15	6	0	2	0	0	0	0	0	0	0	0	23
16:00	0	<b>33</b>	<b>8</b>	0	1	0	0	0	0	0	0	0	0	<b>42</b>
17:00	0	27	1	0	2	0	0	0	0	0	0	0	0	30
18:00	0	20	5	0	0	0	0	0	0	0	0	0	0	25
19:00	0	15	4	0	0	0	0	0	0	0	0	0	0	19
20:00	0	9	2	0	1	0	0	0	0	0	0	0	0	12
21:00	0	5	0	0	1	0	0	0	0	0	0	0	0	6
22:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
23:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Day Total	0	235	40	0	16	0	0	1	0	0	0	0	0	292
Percent	0.0%	80.5%	13.7%	0.0%	5.5%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		08:00	11:00		11:00			10:00						11:00
Vol.		19	3		4			1						26
PM Peak		16:00	16:00		14:00									16:00
Vol.		33	8		3									42
Grand Total	0	235	40	0	16	0	0	1	0	0	0	0	0	292
Percent	0.0%	80.5%	13.7%	0.0%	5.5%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	



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Site Code: 6  
6TH ST S.O ISABELLA LN

NB

Start Time	15	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	Pace Speed	Number in Pace
01/03/24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	14-23	1
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	9-18	1
05:00	0	3	2	0	0	0	0	0	0	0	0	0	0	0	5	15-24	5
06:00	5	3	4	0	0	0	0	0	0	0	0	0	0	0	12	16-25	7
07:00	6	13	7	1	0	0	0	0	0	0	0	0	0	0	27	16-25	20
08:00	6	14	9	4	0	0	0	0	0	0	0	0	0	0	33	16-25	23
09:00	6	12	5	0	0	0	0	0	0	0	0	0	0	0	23	16-25	17
10:00	1	4	7	0	0	0	0	0	0	0	0	0	0	0	12	16-25	11
11:00	4	4	8	2	0	0	0	0	0	0	0	0	0	0	18	16-25	12
12 PM	6	12	5	1	0	0	0	0	0	0	0	0	0	0	24	16-25	17
13:00	5	6	3	0	0	0	0	0	0	0	0	0	0	0	14	15-24	9
14:00	4	10	3	2	0	0	0	0	0	0	0	0	0	0	19	16-25	13
15:00	6	15	11	2	0	0	0	0	0	0	0	0	0	0	34	16-25	26
16:00	10	19	14	1	0	0	0	0	0	0	0	0	0	0	44	16-25	33
17:00	0	11	9	1	0	0	0	0	0	0	0	0	0	0	21	16-25	20
18:00	4	6	8	1	0	0	0	0	0	0	0	0	0	0	19	16-25	14
19:00	0	5	3	1	0	0	0	0	0	0	0	0	0	0	9	16-25	8
20:00	1	5	1	0	0	0	0	0	0	0	0	0	0	0	7	13-22	6
21:00	2	1	2	0	0	0	0	0	0	0	0	0	0	0	5	15-24	3
22:00	1	1	2	0	0	0	0	0	0	0	0	0	0	0	4	15-24	3
23:00	0	1	2	0	0	0	0	0	0	0	0	0	0	0	3	15-24	3
Total	67	146	106	16	0	0	0	0	0	0	0	0	0	0	335		
Percent	20.0%	43.6%	31.6%	4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	07:00	08:00	08:00	08:00											08:00		
Vol.	6	14	9	4											33		
PM Peak	16:00	16:00	16:00	14:00											16:00		
Vol.	10	19	14	2											44		
Total	67	146	106	16	0	0	0	0	0	0	0	0	0	0	335		
Percent	20.0%	43.6%	31.6%	4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 11 MPH  
50th Percentile : 18 MPH  
85th Percentile : 23 MPH  
95th Percentile : 24 MPH

Stats  
10 MPH Pace Speed : 16-25 MPH  
Number in Pace : 252  
Percent in Pace : 75.2%  
Number of Vehicles > 25 MPH : 16  
Percent of Vehicles > 25 MPH : 4.8%  
Mean Speed(Average) : 18 MPH

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Site Code: 6  
6TH ST S.O ISABELLA LN

SB

Start Time	15	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	Pace Speed	Number in Pace
01/03/24	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	9-18	1
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	9-18	1
02:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	*	1
03:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	10-19	2
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	10-19	2
06:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	15-24	1
07:00	0	5	0	1	0	0	0	0	0	0	0	0	0	0	6	16-25	5
08:00	5	9	6	1	0	0	0	0	0	0	0	0	0	0	21	16-25	15
09:00	1	2	3	0	0	0	0	0	0	0	0	0	0	0	6	16-25	5
10:00	1	5	5	0	0	0	0	0	0	0	0	0	0	0	11	16-25	10
11:00	2	15	4	5	0	0	0	0	0	0	0	0	0	0	26	16-25	19
12 PM	0	4	4	1	1	0	0	0	0	0	0	0	0	0	10	16-25	8
13:00	0	5	8	2	0	0	0	0	0	0	0	0	0	0	15	16-25	13
14:00	8	9	9	1	0	0	0	0	0	0	0	0	0	0	27	16-25	18
15:00	3	14	6	0	0	0	0	0	0	0	0	0	0	0	23	16-25	20
16:00	6	17	19	0	0	0	0	0	0	0	0	0	0	0	42	16-25	36
17:00	5	17	8	0	0	0	0	0	0	0	0	0	0	0	30	16-25	25
18:00	4	12	9	0	0	0	0	0	0	0	0	0	0	0	25	16-25	21
19:00	1	10	7	1	0	0	0	0	0	0	0	0	0	0	19	16-25	17
20:00	2	4	6	0	0	0	0	0	0	0	0	0	0	0	12	16-25	10
21:00	2	2	2	0	0	0	0	0	0	0	0	0	0	0	6	15-24	4
22:00	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3	14-23	3
23:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	9-18	1
Total	42	140	97	12	1	0	0	0	0	0	0	0	0	0	292		
Percent	14.4%	47.9%	33.2%	4.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	11:00	08:00	11:00												11:00	
Vol.	5	15	6	5												26	
PM Peak	14:00	16:00	16:00	13:00	12:00											16:00	
Vol.	8	17	19	2	1											42	
Total	42	140	97	12	1	0	0	0	0	0	0	0	0	0	292		
Percent	14.4%	47.9%	33.2%	4.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 15 MPH  
50th Percentile : 18 MPH  
85th Percentile : 23 MPH  
95th Percentile : 24 MPH

Stats  
10 MPH Pace Speed : 16-25 MPH  
Number in Pace : 237  
Percent in Pace : 81.2%  
Number of Vehicles > 25 MPH : 13  
Percent of Vehicles > 25 MPH : 4.5%  
Mean Speed(Average) : 19 MPH

Site Code: 6  
6TH ST S.O ISABELLA LN

Start Time	03-Jan-24 Wed	NB	SB							Total
12:00 AM		0	1							1
01:00		0	1							1
02:00		0	1							1
03:00		1	2							3
04:00		1	0							1
05:00		5	2							7
06:00		12	2							14
07:00		27	6							33
08:00		33	21							54
09:00		23	6							29
10:00		12	11							23
11:00		18	26							44
12:00 PM		24	10							34
01:00		14	15							29
02:00		19	27							46
03:00		34	23							57
04:00		44	42							86
05:00		21	30							51
06:00		19	25							44
07:00		9	19							28
08:00		7	12							19
09:00		5	6							11
10:00		4	3							7
11:00		3	1							4
Total		335	292							627
Percent		53.4%	46.6%							
AM Peak	-	08:00	11:00	-	-	-	-	-	-	08:00
Vol.	-	33	26	-	-	-	-	-	-	54
PM Peak	-	16:00	16:00	-	-	-	-	-	-	16:00
Vol.	-	44	42	-	-	-	-	-	-	86
Grand Total		335	292							627
Percent		53.4%	46.6%							
ADT		ADT 627		AADT 627						

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Site Code: 7  
6TH ST S.O MARSHALL AVE

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
01/03/24	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
06:00	0	1	2	0	0	0	0	0	0	0	0	0	0	3
07:00	0	17	3	0	0	0	0	0	0	0	0	0	0	20
08:00	0	<b>18</b>	5	0	0	0	0	0	0	0	0	0	0	23
09:00	0	18	3	0	0	0	0	0	0	0	0	0	0	21
10:00	0	15	<b>6</b>	0	1	0	0	0	0	0	0	0	0	22
11:00	0	18	4	0	<b>2</b>	0	0	<b>1</b>	0	0	0	0	0	<b>25</b>
12 PM	0	20	2	0	1	0	0	0	0	0	0	0	0	23
13:00	0	16	2	0	1	0	0	0	0	0	0	0	0	19
14:00	0	17	2	0	1	0	0	0	0	0	0	0	0	20
15:00	0	<b>28</b>	2	0	<b>2</b>	0	0	0	0	0	0	0	0	32
16:00	0	27	<b>4</b>	0	2	0	0	0	0	0	0	0	0	<b>33</b>
17:00	0	10	1	0	0	0	0	0	0	0	0	0	0	11
18:00	0	7	2	0	1	0	0	0	0	0	0	0	0	10
19:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
20:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
21:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
22:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Day Total	0	229	39	0	11	0	0	1	0	0	0	0	0	280
Percent	0.0%	81.8%	13.9%	0.0%	3.9%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak Vol.		08:00 18	10:00 6		11:00 2			11:00 1						11:00 25
PM Peak Vol.		15:00 28	16:00 4		15:00 2									16:00 33
Grand Total	0	229	39	0	11	0	0	1	0	0	0	0	0	280
Percent	0.0%	81.8%	13.9%	0.0%	3.9%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	



[illegible]

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Site Code: 7  
6TH ST S.O MARSHALL AVE

NB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
01/03/24	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	*	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	*	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	9-18	1
05:00	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	*	2
06:00	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3	14-23	3
07:00	10	10	0	0	0	0	0	0	0	0	0	0	0	0	20	11-20	13
08:00	9	8	6	0	0	0	0	0	0	0	0	0	0	0	23	16-25	14
09:00	5	15	1	0	0	0	0	0	0	0	0	0	0	0	21	11-20	17
10:00	5	14	3	0	0	0	0	0	0	0	0	0	0	0	22	15-24	17
11:00	10	13	2	0	0	0	0	0	0	0	0	0	0	0	25	12-21	16
12 PM	5	15	3	0	0	0	0	0	0	0	0	0	0	0	23	15-24	18
13:00	9	10	0	0	0	0	0	0	0	0	0	0	0	0	19	11-20	13
14:00	7	13	0	0	0	0	0	0	0	0	0	0	0	0	20	11-20	15
15:00	11	19	2	0	0	0	0	0	0	0	0	0	0	0	32	11-20	23
16:00	11	21	1	0	0	0	0	0	0	0	0	0	0	0	33	11-20	25
17:00	3	7	1	0	0	0	0	0	0	0	0	0	0	0	11	12-21	8
18:00	4	6	0	0	0	0	0	0	0	0	0	0	0	0	10	12-21	7
19:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	15-24	1
20:00	4	2	0	0	0	0	0	0	0	0	0	0	0	0	6	12-21	3
21:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	10-19	2
22:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	10-19	2
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
Total	99	161	20	0	0	0	0	0	0	0	0	0	0	0	280		
Percent	35.4%	57.5%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	07:00	09:00	08:00													11:00	
Vol.	10	15	6													25	
PM Peak	15:00	16:00	12:00													16:00	
Vol.	11	21	3													33	
Total	99	161	20	0	0	0	0	0	0	0	0	0	0	0	280		
Percent	35.4%	57.5%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 6 MPH  
50th Percentile : 16 MPH  
85th Percentile : 19 MPH  
95th Percentile : 21 MPH

Stats            10 MPH Pace Speed : 11-20 MPH  
                    Number in Pace : 194  
                    Percent in Pace : 69.3%  
Number of Vehicles > 25 MPH : 0  
Percent of Vehicles > 25 MPH : 0.0%  
Mean Speed(Average) : 15 MPH

Site Code: 7  
6TH ST S.O MARSHALL AVE

SB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
01/03/24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	*	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	15-24	1
06:00	4	1	0	0	0	0	0	0	0	0	0	0	0	0	5	1-10	3
07:00	3	5	2	0	0	0	0	0	0	0	0	0	0	0	10	16-25	7
08:00	10	6	3	0	0	0	0	0	0	0	0	0	0	0	19	15-24	9
09:00	7	8	2	0	0	0	0	0	0	0	0	0	0	0	17	15-24	10
10:00	11	12	5	0	0	0	0	0	0	0	0	0	0	0	28	15-24	17
11:00	11	10	0	0	0	0	0	0	0	0	0	0	0	0	21	11-20	14
12 PM	12	15	3	0	0	0	0	0	0	0	0	0	0	0	30	11-20	19
13:00	20	21	3	0	0	0	0	0	0	0	0	0	0	0	44	11-20	28
14:00	11	19	4	1	0	0	0	0	0	0	0	0	0	0	35	11-20	23
15:00	14	20	6	0	0	0	0	0	0	0	0	0	0	0	40	16-25	26
16:00	14	23	1	0	0	0	0	0	0	0	0	0	0	0	38	11-20	28
17:00	9	15	5	1	0	0	0	0	0	0	0	0	0	0	30	15-24	20
18:00	5	7	0	1	0	0	0	0	0	0	0	0	0	0	13	11-20	9
19:00	2	2	2	0	0	0	0	0	0	0	0	0	0	0	6	15-24	4
20:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	10-19	2
21:00	3	1	1	0	0	0	0	0	0	0	0	0	0	0	5	16-25	2
22:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	*	1
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
Total	139	168	37	3	0	0	0	0	0	0	0	0	0	0	347		
Percent	40.1%	48.4%	10.7%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	10:00	10:00	10:00												10:00		
Vol.	11	12	5												28		
PM Peak	13:00	16:00	15:00	14:00											13:00		
Vol.	20	23	6	1											44		
Total	139	168	37	3	0	0	0	0	0	0	0	0	0	0	347		
Percent	40.1%	48.4%	10.7%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 5 MPH  
50th Percentile : 16 MPH  
85th Percentile : 19 MPH  
95th Percentile : 23 MPH

Stats            10 MPH Pace Speed : 11-20 MPH  
                    Number in Pace : 214  
                    Percent in Pace : 61.7%  
Number of Vehicles > 25 MPH : 3  
Percent of Vehicles > 25 MPH : 0.9%  
Mean Speed(Average) : 15 MPH

Start Time	03-Jan-24										Total
	Wed	NB	SB								
12:00 AM		1	0								1
01:00		0	0								0
02:00		1	0								1
03:00		0	1								1
04:00		1	0								1
05:00		3	2								5
06:00		3	5								8
07:00		20	10								30
08:00		23	19								42
09:00		21	17								38
10:00		22	28								50
11:00		25	21								46
12:00 PM		23	30								53
01:00		19	44								63
02:00		20	35								55
03:00		32	40								72
04:00		33	38								71
05:00		11	30								41
06:00		10	13								23
07:00		2	6								8
08:00		6	2								8
09:00		2	5								7
10:00		2	1								3
11:00		0	0								0
Total		280	347								627
Percent		44.7%	55.3%								
AM Peak	-	11:00	10:00	-	-	-	-	-	-	10:00	
Vol.	-	25	28	-	-	-	-	-	-	50	
PM Peak	-	16:00	13:00	-	-	-	-	-	-	15:00	
Vol.	-	33	44	-	-	-	-	-	-	72	
Grand Total		280	347								627
Percent		44.7%	55.3%								
ADT		ADT 627	AADT 627								



## **APPENDIX C: SUMMARY OF ESTIMATED COSTS**

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### **SHARED-USE/PROTECTED PATH IMPROVEMENT CONCEPTS**

CONSTRUCTION COST ESTIMATE					
Milestone: Concept					
DESCHUTES COUNTY					
BEND BIKEWAYS - 9TH AVE (West Side SUP)					
KIND OF WORK Grading, Drainage, Structures, & Paving			DATE 3/25/24		PREPARED BY David Evans and Associates, Inc.
SECTION	ITEM DESCRIPTION	UNIT	AMOUNT	UNIT COST	TOTAL
TEMPORARY FEATURES AND APPURTENANCES		TOTAL FOR GROUP		\$158,000	
0210-0100000A	MOBILIZATION	LS	1	10.0% Biddable	\$ 93,000
0221-0100000A	TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC	LS	1	\$ 38,000.00	\$ 38,000
0280-0100000A	EROSION CONTROL	LS	1	\$ 27,000.00	\$ 27,000
ROADWORK		TOTAL FOR GROUP		\$149,320	
0305-0100000A	CONSTRUCTION SURVEY WORK	LS	1	2.0% Biddable	\$ 20,000
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	2.0% Biddable	\$ 20,000
0320-0100000A	CLEARING AND GRUBBING	LS	1	\$ 75,300.00	\$ 75,300
0330-0105000K	GENERAL EXCAVATION	CUYD	756	\$ 45.00	\$ 34,020
DRAINAGE AND SEWERS		TOTAL FOR GROUP		\$33,600	
0470-0307000E	CONCRETE INLETS, TYPE CG-2	EACH	8	\$ 4,200.00	\$ 33,600
BRIDGE		TOTAL FOR GROUP		\$297,500	
0596-B002000A	RETAINING WALL, PREFABRICATED MODULAR GRAVITY	SQFT	3,500	\$ 85.00	\$ 297,500
BASES		TOTAL FOR GROUP		\$45,890	
0640-0100000M	AGGREGATE BASE	TON	706	\$ 65.00	\$ 45,890
WEARING SURFACES		TOTAL FOR GROUP		\$300,137	
0744-0302000M	LEVEL 3, 1/2 INCH ACP MIXTURE	TON	620	\$ 150.00	\$ 93,000
0749-0100000E	EXTRA FOR ASPHALT APPROACHES	EACH	2	\$ 1,300.00	\$ 2,600
0759-0100000F	CONCRETE CURBS	FOOT	2,191	\$ 40.00	\$ 87,629
0759-0126000J	CONCRETE DRIVEWAYS	SQFT	1,364	\$ 18.00	\$ 24,560
0759-0128000J	CONCRETE WALKS	SQFT	5,083	\$ 13.00	\$ 66,076
0759-0154100E	EXTRA FOR NEW CURB RAMPS	EACH	6	\$ 3,000.00	\$ 18,000
0759-0510000J	TRUNCATED DOMES ON NEW SURFACES	SQFT	60	\$ 48.00	\$ 2,892
0310-0119000F	ASPHALT PAVEMENT SAW CUTTING	FOOT	2,152	\$ 2.50	\$ 5,379
PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES		TOTAL FOR GROUP		\$15,000	
860	STRIPING	LS	1	\$ 15,000.00	\$ 15,000
PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS		TOTAL FOR GROUP		\$15,000	
940	SIGNING	LS	1	\$ 15,000.00	\$ 15,000
RIGHT OF WAY DEVELOPMENT AND CONTROL		TOTAL FOR GROUP		\$25,000	
	LANDSCAPING	SF	5,000	\$ 5.00	\$ 25,000
ANTICIPATED ITEMS		TOTAL FOR GROUP		\$0	
	UTILITY RELOCATIONS (REIMBURSABLE - GUY WIRE ADJUSTMENT)	LS	0	\$ 50,000.00	\$ -
SUBTOTAL, BIDDABLE ITEMS (w/o % Biddable)					\$ 906,447
SUBTOTAL, BIDDABLE ITEMS					\$1,039,447
CONTINGENCIES / CONSTRUCTION ENGINEERING		TOTAL FOR GROUP		\$ 706,824	
	CONTINGENCIES			40%	\$ 415,779
	CONSTRUCTION ENGINEERING			20%	\$ 291,045
TOTAL CONSTRUCTION COST					\$1,746,271
Inflation Escalation (to Construction Year 2025) - 4% per year		LS		\$69,850.83	\$69,850.83
GRAND TOTAL CONSTRUCTION COST					\$1,816,121

CONSTRUCTION COST ESTIMATE					
Milestone: Concept					
DESCHUTES COUNTY					
BEND BIKEWAYS - Franklin Alt A1					
ALTERNATE ROUTE - NEIGHBORHOOD GREENWAY TREATMENTS ALONG 6TH STREET AND EMERSON AVENUE					
KIND OF WORK Grading, Drainage, Structures, & Paving		DATE 3/25/24		PREPARED BY David Evans and Associates, Inc.	
SECTION	ITEM DESCRIPTION	UNIT	AMOUNT	UNIT COST	TOTAL
TEMPORARY FEATURES AND APPURTENANCES		TOTAL FOR GROUP		\$24,350	
0210-0100000A	MOBILIZATION	LS	1	10.0% Biddable	\$ 14,350
0221-0100000A	TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC	LS	1	\$ 6,000.00	\$ 6,000
0280-0100000A	EROSION CONTROL	LS	1	\$ 4,000.00	\$ 4,000
ROADWORK		TOTAL FOR GROUP		\$6,000	
0305-0100000A	CONSTRUCTION SURVEY WORK	LS	1	2.0% Biddable	\$ 1,500
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	2.0% Biddable	\$ 1,500
0320-0100000A	CLEARING AND GRUBBING	LS	1	\$ 3,000.00	\$ 3,000
0330-0105000K	GENERAL EXCAVATION	CUYD	0	\$ 45.00	\$ -
DRAINAGE AND SEWERS		TOTAL FOR GROUP		\$0	
0470-0307000E	CONCRETE INLETS, TYPE CG-2	EACH	0	\$ 4,200.00	\$ -
BRIDGE		TOTAL FOR GROUP		\$0	
0596-B002000A	RETAINING WALL, PREFABRICATED MODULAR GRAVITY	SQFT	0	\$ 85.00	\$ -
BASES		TOTAL FOR GROUP		\$0	
0640-0100000M	AGGREGATE BASE	TON	0	\$ 65.00	\$ -
WEARING SURFACES		TOTAL FOR GROUP		\$0	
0744-0302000M	LEVEL 3, 1/2 INCH ACP MIXTURE	TON	0	\$ 150.00	\$ -
0749-0100000E	EXTRA FOR ASPHALT APPROACHES	EACH	0	\$ 1,300.00	\$ -
0759-0100000F	CONCRETE CURBS	FOOT	0	\$ 40.00	\$ -
0759-0126000J	CONCRETE DRIVEWAYS	SQFT	0	\$ 18.00	\$ -
0759-0128000J	CONCRETE WALKS	SQFT	0	\$ 13.00	\$ -
0759-0154100E	EXTRA FOR NEW CURB RAMPS	EACH	0	\$ 3,000.00	\$ -
0759-0510000J	TRUNCATED DOMES ON NEW SURFACES	SQFT	0	\$ 48.00	\$ -
0310-0119000F	ASPHALT PAVEMENT SAW CUTTING	FOOT	0	\$ 2.50	\$ -
PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES		TOTAL FOR GROUP		\$8,000	
860	STRIPING	LS	1	\$ 8,000.00	\$ 8,000
XXXX	DURA CURB	FT	0	\$ 250.00	\$ -
PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS		TOTAL FOR GROUP		\$16,000	
940	SIGNING	LS	1	\$ 16,000.00	\$ 16,000
RIGHT OF WAY DEVELOPMENT AND CONTROL		TOTAL FOR GROUP		\$0	
	LANDSCAPING	SF	0	\$ 5.00	\$ -
ANTICIPATED ITEMS		TOTAL FOR GROUP		\$0	
	UTILITY RELOCATIONS	LS	1	\$ -	\$ -
ENHANCED CROSSINGS		TOTAL FOR GROUP		\$100,000	
	6TH/FRANKLIN	LS	1	\$ 50,000.00	\$ 50,000
	8TH/EMERSON	LS	1	\$ 50,000.00	\$ 50,000
SUBTOTAL, BIDDABLE ITEMS (w/o % Biddable)				\$ 137,000	
SUBTOTAL, BIDDABLE ITEMS				\$154,350	
CONTINGENCIES / CONSTRUCTION ENGINEERING		TOTAL FOR GROUP \$		104,958	
	CONTINGENCIES			40%	\$ 61,740
	CONSTRUCTION ENGINEERING			20%	\$ 43,218
TOTAL CONSTRUCTION COST				\$259,308	
Inflation Escalation (to Construction Year 2025) - 4% per year		LS		\$10,372.32	\$10,372.32
GRAND TOTAL CONSTRUCTION COST				\$269,680	

**CONSTRUCTION COST ESTIMATE****Milestone: Concept****DESCHUTES COUNTY****BEND BIKEWAYS - Franklin Alt A2****ALTERNATE ROUTE - SHARED USE PATH ALONG ONE SIDE OF 6TH STREET AND EMERSON AVENUE**

KIND OF WORK Grading, Drainage, Structures, & Paving		DATE 3/25/24		PREPARED BY David Evans and Associates, Inc.	
SECTION	ITEM DESCRIPTION	UNIT	AMOUNT	UNIT COST	TOTAL
<b>TEMPORARY FEATURES AND APPURTENANCES</b>		<b>TOTAL FOR GROUP</b>		<b>\$94,000</b>	
0210-0100000A	MOBILIZATION	LS	1	10.0% Biddable	\$ 55,000
0221-0100000A	TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC	LS	1	\$ 30,000.00	\$ 30,000
0280-0100000A	EROSION CONTROL	LS	1	\$ 9,000.00	\$ 9,000
<b>ROADWORK</b>		<b>TOTAL FOR GROUP</b>		<b>\$27,335</b>	
0305-0100000A	CONSTRUCTION SURVEY WORK	LS	1	2.0% Biddable	\$ 5,000
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	2.0% Biddable	\$ 5,000
0320-0100000A	CLEARING AND GRUBBING	LS	1	\$ 10,000.00	\$ 10,000
0330-0105000K	GENERAL EXCAVATION	CUYD	163	\$ 45.00	\$ 7,335
<b>DRAINAGE AND SEWERS</b>		<b>TOTAL FOR GROUP</b>		<b>\$8,400</b>	
0470-0307000E	CONCRETE INLETS, TYPE CG-2	EACH	2	\$ 4,200.00	\$ 8,400
<b>BASES</b>		<b>TOTAL FOR GROUP</b>		<b>\$9,750</b>	
0640-0100000M	AGGREGATE BASE	TON	150	\$ 65.00	\$ 9,750
<b>WEARING SURFACES</b>		<b>TOTAL FOR GROUP</b>		<b>\$68,340</b>	
0744-0302000M	LEVEL 3, 1/2 INCH ACP MIXTURE	TON	110	\$ 150.00	\$ 16,500
0749-0100000E	EXTRA FOR ASPHALT APPROACHES	EACH	2	\$ 1,300.00	\$ 2,600
0759-0100000F	CONCRETE CURBS	FOOT	350	\$ 40.00	\$ 14,000
0759-0126000J	CONCRETE DRIVEWAYS	SQFT	1,200	\$ 18.00	\$ 21,600
0759-0128000J	CONCRETE WALKS	SQFT	400	\$ 13.00	\$ 5,200
0759-0154100E	EXTRA FOR NEW CURB RAMPS	EACH	2	\$ 3,000.00	\$ 6,000
0759-0510000J	TRUNCATED DOMES ON NEW SURFACES	SQFT	30	\$ 48.00	\$ 1,440
0310-0119000F	ASPHALT PAVEMENT SAW CUTTING	FOOT	400	\$ 2.50	\$ 1,000
<b>PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES</b>		<b>TOTAL FOR GROUP</b>		<b>\$20,000</b>	
860	STRIPING	LS	1	\$ 20,000.00	\$ 20,000
<b>PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS</b>		<b>TOTAL FOR GROUP</b>		<b>\$20,000</b>	
940	SIGNING	LS	1	\$ 20,000.00	\$ 20,000
<b>ENHANCED CROSSINGS</b>		<b>TOTAL FOR GROUP</b>		<b>\$100,000</b>	
	6TH/FRANKLIN	LS	1	\$ 50,000.00	\$ 50,000
	8TH/EMERSON	LS	1	\$ 50,000.00	\$ 50,000
<b>SUBTOTAL, BIDDABLE ITEMS (w/o % Biddable)</b>					<b>\$ 282,825</b>
<b>SUBTOTAL, BIDDABLE ITEMS</b>					<b>\$347,825</b>
<b>CONTINGENCIES / CONSTRUCTION ENGINEERING</b>		<b>TOTAL FOR GROUP</b>		<b>\$ 236,521</b>	
	CONTINGENCIES			40%	\$ 139,130
	CONSTRUCTION ENGINEERING			20%	\$ 97,391
<b>TOTAL CONSTRUCTION COST</b>					<b>\$584,346</b>
Inflation Escalation (to Construction Year 2025) - 4% per year		LS		\$23,373.84	<b>\$23,373.84</b>
<b>GRAND TOTAL CONSTRUCTION COST</b>					<b>\$607,720</b>



CONSTRUCTION COST ESTIMATE					
Milestone: Concept					
DESCHUTES COUNTY					
BEND BIKEWAYS - Franklin Alt B					
RAISED/PROTECTED BIKE LANE ON NORTH SIDE					
KIND OF WORK Grading, Drainage, Structures, & Paving			DATE 3/25/24		PREPARED BY David Evans and Associates, Inc.
SECTION	ITEM DESCRIPTION	UNIT	AMOUNT	UNIT COST	TOTAL
TEMPORARY FEATURES AND APPURTENANCES			TOTAL FOR GROUP	\$205,000	
0210-0100000A	MOBILIZATION	LS	1	10.0% Biddable	\$ 120,000
0221-0100000A	TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC	LS	1	\$ 50,000.00	\$ 50,000
0280-0100000A	EROSION CONTROL	LS	1	\$ 35,000.00	\$ 35,000
ROADWORK			TOTAL FOR GROUP	\$101,950	
0305-0100000A	CONSTRUCTION SURVEY WORK	LS	1	2.0% Biddable	\$ 25,000
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	2.0% Biddable	\$ 25,000
0320-0100000A	CLEARING AND GRUBBING	LS	1	\$ 11,000.00	\$ 11,000
0330-0105000K	GENERAL EXCAVATION	CUYD	910	\$ 45.00	\$ 40,950
DRAINAGE AND SEWERS			TOTAL FOR GROUP	\$8,400	
0470-0307000E	CONCRETE INLETS, TYPE CG-2	EACH	2	\$ 4,200.00	\$ 8,400
BRIDGE			TOTAL FOR GROUP	\$42,500	
0596-B002000A	RETAINING WALL, PREFABRICATED MODULAR GRAVITY	SQFT	500	\$ 85.00	\$ 42,500
BASES			TOTAL FOR GROUP	\$48,750	
0640-0100000M	AGGREGATE BASE	TON	750	\$ 65.00	\$ 48,750
WEARING SURFACES			TOTAL FOR GROUP	\$387,580	
0744-0302000M	LEVEL 3, 1/2 INCH ACP MIXTURE	TON	420	\$ 150.00	\$ 63,000
0749-0100000E	EXTRA FOR ASPHALT APPROACHES	EACH	25	\$ 1,300.00	\$ 32,500
0759-0100000F	CONCRETE CURBS	FOOT	860	\$ 40.00	\$ 34,400
0759-0126000J	CONCRETE DRIVEWAYS	SQFT	7,500	\$ 18.00	\$ 135,000
0759-0128000J	CONCRETE WALKS	SQFT	6,500	\$ 13.00	\$ 84,500
0759-0154100E	EXTRA FOR NEW CURB RAMPS	EACH	8	\$ 3,000.00	\$ 24,000
0759-0510000J	TRUNCATED DOMES ON NEW SURFACES	SQFT	160	\$ 48.00	\$ 7,680
0310-0119000F	ASPHALT PAVEMENT SAW CUTTING	FOOT	2,600	\$ 2.50	\$ 6,500
PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES			TOTAL FOR GROUP	\$459,300	
860	STRIPING	LS	1	\$ 25,000.00	\$ 25,000
XXXX	DURA CURB	FT	1,204	\$ 350.00	\$ 421,400
XXXX	12" DETECTABLE GUIDANCE STRIP	FT	860	\$ 15.00	\$ 12,900
PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS			TOTAL FOR GROUP	\$25,000	
940	SIGNING	LS	1	\$ 25,000.00	\$ 25,000
RIGHT OF WAY DEVELOPMENT AND CONTROL			TOTAL FOR GROUP	\$11,000	
	LANDSCAPING	SF	2,200	\$ 5.00	\$ 11,000
ANTICIPATED ITEMS			TOTAL FOR GROUP	\$90,000	
	PRIVATE PROPERTY IMPACTS (Per Lot)	EA	12	\$ 7,500.00	\$ 90,000
ENHANCED CROSSINGS			TOTAL FOR GROUP	\$50,000	
	6TH/FRANKLIN	LS	1	\$ 50,000.00	\$ 50,000
SUBTOTAL, BIDDABLE ITEMS (w/o % Biddable)					\$ 1,259,480
SUBTOTAL, BIDDABLE ITEMS					\$1,429,480
CONTINGENCIES / CONSTRUCTION ENGINEERING			TOTAL FOR GROUP	\$ 972,046	
	CONTINGENCIES			40%	\$ 571,792
	CONSTRUCTION ENGINEERING			20%	\$ 400,254
TOTAL CONSTRUCTION COST					\$2,401,526

CONSTRUCTION COST ESTIMATE						
Milestone: Concept						
DESCHUTES COUNTY						
BEND BIKEWAYS - Franklin - Alt C						
RAISED/PROTECTED BIKE LANE ON BOTH SIDES						
KIND OF WORK			DATE		PREPARED BY	
Grading, Drainage, Structures, & Paving			3/25/24		David Evans and Associates, Inc.	
SECTION	ITEM DESCRIPTION	UNIT	AMOUNT	UNIT COST	TOTAL	
TEMPORARY FEATURES AND APPURTENANCES			TOTAL FOR GROUP		\$275,000	
0210-0100000A	MOBILIZATION	LS	1	10.0% Biddable	\$ 162,000	
0221-0100000A	TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC	LS	1	\$ 65,000.00	\$ 65,000	
0280-0100000A	EROSION CONTROL	LS	1	\$ 48,000.00	\$ 48,000	
ROADWORK			TOTAL FOR GROUP		\$232,350	
0305-0100000A	CONSTRUCTION SURVEY WORK	LS	1	2.0% Biddable	\$ 35,000	
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	5.0% Biddable	\$ 85,000	
0320-0100000A	CLEARING AND GRUBBING	LS	1	\$ 30,000.00	\$ 30,000	
0330-0105000K	GENERAL EXCAVATION	CUYD	1,830	\$ 45.00	\$ 82,350	
DRAINAGE AND SEWERS			TOTAL FOR GROUP		\$36,800	
0470-0307000E	CONCRETE INLETS, TYPE CG-2	EACH	4	\$ 4,200.00	\$ 16,800	
	MODIFYING EXISTING DRYWELLS	EACH	2	\$ 5,000.00	\$ 10,000	
	IMPACTS TO EXISTING STORMWATER SWALE	EACH	1	\$ 10,000.00	\$ 10,000	
BRIDGE			TOTAL FOR GROUP		\$289,000	
0596-B002000A	RETAINING WALL, PREFABRICATED MODULAR GRAVITY	SQFT	3,400	\$ 85.00	\$ 289,000	
BASES			TOTAL FOR GROUP		\$107,900	
0640-0100000M	AGGREGATE BASE	TON	1,660	\$ 65.00	\$ 107,900	
WEARING SURFACES			TOTAL FOR GROUP		\$659,182	
0744-0302000M	LEVEL 3, 1/2 INCH ACP MIXTURE	TON	820	\$ 150.00	\$ 123,000	
0749-0100000E	EXTRA FOR ASPHALT APPROACHES	EACH	25	\$ 1,300.00	\$ 32,500	
0759-0100000F	CONCRETE CURBS	FOOT	2,470	\$ 40.00	\$ 98,800	
0759-0126000J	CONCRETE DRIVEWAYS	SQFT	10,000	\$ 18.00	\$ 180,000	
0759-0128000J	CONCRETE WALKS	SQFT	14,200	\$ 13.00	\$ 184,600	
0759-0154100E	EXTRA FOR NEW CURB RAMPS	EACH	6	\$ 5,000.00	\$ 30,000	
0759-0510000J	TRUNCATED DOMES ON NEW SURFACES	SQFT	84	\$ 48.00	\$ 4,032	
0310-0119000F	ASPHALT PAVEMENT SAW CUTTING	FOOT	2,500	\$ 2.50	\$ 6,250	
PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES			TOTAL FOR GROUP		\$32,000	
860	STRIPING	LS	1	\$ 32,000.00	\$ 32,000	
PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS			TOTAL FOR GROUP		\$32,000	
940	SIGNING	LS	1	\$ 32,000.00	\$ 32,000	
RIGHT OF WAY DEVELOPMENT AND CONTROL			TOTAL FOR GROUP		\$34,550	
	LANDSCAPING	SF	6,910	\$ 5.00	\$ 34,550	
ANTICIPATED ITEMS			TOTAL FOR GROUP		\$138,000	
	PRIVATE PROPERTY IMPACTS (Per Lot)	EA	27	\$ 5,000.00	\$ 135,000	
	DRYWELL TEST	LS	1	\$ 3,000.00	\$ 3,000	
ENHANCED CROSSINGS			TOTAL FOR GROUP		\$50,000	
	6TH/FRANKLIN	LS	1	\$ 50,000.00	\$ 50,000	
SUBTOTAL, BIDDABLE ITEMS (w/o % Biddable)					\$ 1,604,782	
SUBTOTAL, BIDDABLE ITEMS					\$1,886,782	
CONTINGENCIES / CONSTRUCTION ENGINEERING			TOTAL FOR GROUP		\$ 1,283,012	
	CONTINGENCIES			40%	\$ 754,713	
	CONSTRUCTION ENGINEERING			20%	\$ 528,299	
TOTAL CONSTRUCTION COST					\$3,169,794	

CONSTRUCTION COST ESTIMATE					
Milestone: Concept					
DESCHUTES COUNTY					
BEND BIKEWAYS - Franklin Ave - 5th to 6th					
Midtown Treatment					
KIND OF WORK Grading, Drainage, Structures, & Paving			DATE 3/25/24		PREPARED BY David Evans and Associates, Inc.
SECTION	ITEM DESCRIPTION	UNIT	AMOUNT	UNIT COST	TOTAL
TEMPORARY FEATURES AND APPURTENANCES		TOTAL FOR GROUP		\$96,500	
0210-0100000A	MOBILIZATION	LS	1	10.0% Biddable	\$ 57,000
0221-0100000A	TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC	LS	1	\$ 22,500.00	\$ 22,500
0280-0100000A	EROSION CONTROL	LS	1	\$ 17,000.00	\$ 17,000
ROADWORK		TOTAL FOR GROUP		\$63,725	
0305-0100000A	CONSTRUCTION SURVEY WORK	LS	1	2.0% Biddable	\$ 10,000
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	2.0% Biddable	\$ 11,000
0320-0100000A	CLEARING AND GRUBBING	LS	1	\$ 11,000.00	\$ 11,000
0330-0105000K	GENERAL EXCAVATION	CUYD	705	\$ 45.00	\$ 31,725
DRAINAGE AND SEWERS		TOTAL FOR GROUP		\$0	
BRIDGE		TOTAL FOR GROUP		\$34,000	
0596-B002000A	RETAINING WALL, PREFABRICATED MODULAR GRAVITY	SQFT	400	\$ 85.00	\$ 34,000
BASES		TOTAL FOR GROUP		\$41,600	
0640-0100000M	AGGREGATE BASE	TON	640	\$ 65.00	\$ 41,600
WEARING SURFACES		TOTAL FOR GROUP		\$260,582	
0744-0302000M	LEVEL 3, 1/2 INCH ACP MIXTURE	TON	300	\$ 150.00	\$ 45,000
0749-0100000E	EXTRA FOR ASPHALT APPROACHES	EACH	25	\$ 1,300.00	\$ 32,500
0759-0100000F	CONCRETE CURBS	FOOT	890	\$ 40.00	\$ 35,600
0759-0126000J	CONCRETE DRIVEWAYS	SQFT	4,000	\$ 18.00	\$ 72,000
0759-0128000J	CONCRETE WALKS	SQFT	4,400	\$ 13.00	\$ 57,200
0759-0154100E	EXTRA FOR NEW CURB RAMPS	EACH	4	\$ 3,000.00	\$ 12,000
0759-0510000J	TRUNCATED DOMES ON NEW SURFACES	SQFT	84	\$ 48.00	\$ 4,032
0310-0119000F	ASPHALT PAVEMENT SAW CUTTING	FOOT	900	\$ 2.50	\$ 2,250
PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES		TOTAL FOR GROUP		\$12,000	
860	STRIPING	LS	1	\$ 12,000.00	\$ 12,000
PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS		TOTAL FOR GROUP		\$12,000	
940	SIGNING	LS	1	\$ 12,000.00	\$ 12,000
RIGHT OF WAY DEVELOPMENT AND CONTROL		TOTAL FOR GROUP		\$11,000	
	LANDSCAPING	SF	2,200	\$ 5.00	\$ 11,000
ANTICIPATED ITEMS		TOTAL FOR GROUP		\$90,000	
	PRIVATE PROPERTY IMPACTS (Per Lot)	EA	12	\$ 7,500.00	\$ 90,000
ENHANCED CROSSINGS		TOTAL FOR GROUP		\$50,000	
	6TH/FRANKLIN	LS	1	\$ 50,000.00	\$ 50,000
SUBTOTAL, BIDDABLE ITEMS (w/o % Biddable)					\$ 593,407
SUBTOTAL, BIDDABLE ITEMS					\$671,407
CONTINGENCIES / CONSTRUCTION ENGINEERING		TOTAL FOR GROUP		\$ 456,557	
	CONTINGENCIES			40%	\$ 268,563
	CONSTRUCTION ENGINEERING			20%	\$ 187,994
TOTAL CONSTRUCTION COST					\$1,127,964
Inflation Escalation (to Construction Year 2025) - 4% per year		LS		\$45,118.55	\$45,118.55
GRAND TOTAL CONSTRUCTION COST					\$1,173,082

CONSTRUCTION COST ESTIMATE						
Milestone: Concept						
DESCHUTES COUNTY						
BEND BIKEWAYS - BEAR CREEK ROAD (NORTH SIDE SUP)						
KIND OF WORK			DATE		PREPARED BY	
Grading, Drainage, Structures, & Paving			3/25/24		David Evans and Associates, Inc.	
SECTION	ITEM DESCRIPTION		UNIT	AMOUNT	UNIT COST	TOTAL
TEMPORARY FEATURES AND APPURTENANCES			TOTAL FOR GROUP		\$103,000	
0210-0100000A	MOBILIZATION		LS	1	10.0% Biddable	\$ 67,000
0221-0100000A	TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC		LS	1	\$ 21,000.00	\$ 21,000
0280-0100000A	EROSION CONTROL		LS	1	\$ 15,000.00	\$ 15,000
ROADWORK			TOTAL FOR GROUP		\$77,010	
0305-0100000A	CONSTRUCTION SURVEY WORK		LS	1	2.0% Biddable	\$ 15,000
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS		LS	1	2.0% Biddable	\$ 15,000
0320-0100000A	CLEARING AND GRUBBING		LS	1	\$ 21,000.00	\$ 21,000
0330-0105000K	GENERAL EXCAVATION		CUYD	578	\$ 45.00	\$ 26,010
DRAINAGE AND SEWERS			TOTAL FOR GROUP		\$130,000	
0470-0307000E	CONCRETE INLETS, TYPE CG-2		EACH	0	\$ 4,200.00	\$ -
	IMPACTS TO EXTG STORMWATER PONDS		SF	5,000	\$ 10.00	\$ 50,000
0470-0108000E	CONCRETE MANHOLES, DROP TYPE, LARGE		EACH	2	\$ 20,000.00	\$ 40,000
0470-0113000E	CONCRETE MANHOLES, SEDIMENTATION		EACH	2	\$ 20,000.00	\$ 40,000
BRIDGE			TOTAL FOR GROUP		\$51,000	
0596-B002000A	RETAINING WALL, PREFABRICATED MODULAR GRAVITY		SQFT	600	\$ 85.00	\$ 51,000
BASES			TOTAL FOR GROUP		\$29,640	
0640-0100000M	AGGREGATE BASE		TON	456	\$ 65.00	\$ 29,640
WEARING SURFACES			TOTAL FOR GROUP		\$306,636	
0744-0302000M	LEVEL 3, 1/2 INCH ACP MIXTURE		TON	0	\$ 150.00	\$ -
0749-0100000E	EXTRA FOR ASPHALT APPROACHES		EACH	2	\$ 1,300.00	\$ 2,600
0759-0100000F	CONCRETE CURBS		FOOT	0	\$ 40.00	\$ -
0759-0126000J	CONCRETE DRIVEWAYS		SQFT	1,583	\$ 18.00	\$ 28,496
0759-0128000J	CONCRETE WALKS		SQFT	17,144	\$ 13.00	\$ 222,868
0759-0154100E	EXTRA FOR NEW CURB RAMPS		EACH	8	\$ 5,000.00	\$ 40,000
0759-0510000J	TRUNCATED DOMES ON NEW SURFACES		SQFT	264	\$ 48.00	\$ 12,672
0310-0119000F	ASPHALT PAVEMENT SAW CUTTING		FOOT	0	\$ 2.50	\$ -
PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES			TOTAL FOR GROUP		\$15,000	
860	STRIPING		LS	1	\$ 15,000.00	\$ 15,000
PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS			TOTAL FOR GROUP		\$15,000	
940	SIGNING		LS	1	\$ 15,000.00	\$ 15,000
RIGHT OF WAY DEVELOPMENT AND CONTROL			TOTAL FOR GROUP		\$13,984	
	LANDSCAPING		SF	4,661	\$ 3.00	\$ 13,984
ANTICIPATED ITEMS			TOTAL FOR GROUP		\$20,000	
	UPGRADES TO ENHANCED CROSSING AT NE ALPENVIEW LN		LS	1	\$ 20,000.00	\$ 20,000
	UTILITY RELOCATIONS (REIMBURSABLE - GUY WIRE ADJUSTMENT)		LS	0	\$ 50,000.00	\$ -
SUBTOTAL, BIDDABLE ITEMS (w/o % Biddable)					\$ 664,270	
SUBTOTAL, BIDDABLE ITEMS					\$761,270	
CONTINGENCIES / CONSTRUCTION ENGINEERING			TOTAL FOR GROUP \$		517,664	
	CONTINGENCIES				40%	\$ 304,508
	CONSTRUCTION ENGINEERING				20%	\$ 213,156
TOTAL CONSTRUCTION COST					\$1,278,934	
Inflation Escalation (to Construction Year 2025) - 4% per year			LS	\$51,157.34		\$51,157.34
GRAND TOTAL CONSTRUCTION COST					\$1,330,091	



## **APPENDIX D: PROJECT OPEN HOUSE #1 SUMMARY & SURVEY**

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**FEBRUARY 29<sup>TH</sup>, 2024**

# BEND BIKEWAY

## OPEN HOUSE #1

### OPEN HOUSE SUMMARY



CITY OF BEND

**March 2024**

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# OVERVIEW

## Goals of the open house:

- Share information about the project, specifically the:
  - Evaluation criteria that will be used to create the final design
  - Improvements being considered including the three shared-use path segments with the Franklin Avenue segment having three (3) alternative options and the cost for each in relation to each other and the project budget.
- Ask people about:
  - What parts of routes feel unsafe to travel
  - What parts of each shared-use path option they would like to see in the final design and that they like the best, considering budgetary constraints
  - The evaluation criteria, and if they are right / if anything is missing

## Engagement Opportunities

Opportunities for the community to provide feedback for this phase of the project included:

- **February 21<sup>st</sup> through March 6<sup>th</sup>** – Online open house
- **February 29<sup>th</sup>** – 5-7pm in-person open house at Municipal Court

## Promotion

To promote the project and the open house, the project team:

- Mailed bilingual English/Spanish postcards to all addresses (owners and occupants) along the routes considered. (745 addresses total).
- Advertised on the official City project webpage.
- Media release ahead of in-person open house.
  - KTVZ, Bend Bulletin and Central Oregon Daily shared information.
- Promoted the open house by email to interested community members signed up for previous program (Neighborhood Greenways) project updates (175 emails sent).
- Open House Invitation Post on all City of Bend social media channels.

## Participation

107 people participated in the online survey and approximately 86 visited the in-person open house. A few participants also reached out via email or phone calls during the time the open house was posted.

## Key Takeaways

Some key takeaways from this round of engagement:

- People are generally excited about new bike infrastructure the City is planning but are not sure how all the planned projects would be tied together, or when a project would be constructed closer to their house/work.
  - Specifically, regarding proposed Franklin improvements and the Hawthorn Bridge project, how they will link together or create redundancy.
- People want shared streets included in this project to offer a higher level of service than the existing neighborhood greenway routes by further limiting vehicles speeds and volumes and offering more protection that “just paint” to set a better baseline for Bend’s Bikeways and led to increased use.
- People would mostly prefer protected paths that separate users from vehicle traffic to the maximum extent possibly, citing this improvement being worth added costs and potential impacts to adjacent property.
  - Feedback noted that while user protection was paramount, they also believe the City should look for inventive ways to create ride protection at a lower cost where possible.
- People want to bike infrastructure that is better maintained/swept, landscaped and lit.
- This event collected a lot of information about locations on this project, as well as general locations throughout the City, where people feel unsafe. This information has been consolidated onto the GIS Feedback Map tool.



# FEEDBACK SUMMARY

*Throughout this document, numbers (#) preceding a comment indicate the number of people who made a similar comment.*

## In-person Open House

In-person event was held at Municipal Court on February 29, 2024 from 5 to 7 p.m. Approximately 86 people visited with the project team. A Spanish translator was available at the event but not utilized by the community. People at the In-Person Open House were also directed to utilize online feedback tools. Staff attending the event recorded Interactions and direct the public to use sticky provided to provide comments on display boards. The Open House Event Plan, Display Boards with comments and Event Interaction Logs are included as Appendices A, B and C, respectively.

### Station 1 – General Information

- People are generally excited about new bike infrastructure the City is planning but are not sure how all the planned projects would be tied together, or when a project would be constructed closer to their house/work.
  - Specifically, regarding proposed Franklin improvements and the Hawthorn Bridge project, how they will link together or create redundancy.
- People want shared streets included in this project to offer a higher level of service than the existing neighborhood greenway routes by further limiting vehicles speeds and volumes and offering more protection that “just paint” to set a better baseline for Bend’s Bikeways and led to increased use.
- People would mostly prefer protected paths that separate users from vehicle traffic to the maximum extent possibly, citing this improvement being worth added costs and impacts to adjacent property.
  - Feedback noted that while user protection was paramount, they believe the City should have more inventive ways to create ride protection at a lower cost.
- People want to bike infrastructure that is better maintained/swept, landscaped and lit.
- This station collected a lot of information about locations on this project, as well as general locations throughout the City, where people feel unsafe. This information has been consolidated onto the GIS Feedback Map tool.
- **Unsafe Travel Locations**, an activity at the in-person open house was to place a dot on the map at places where you feel unsafe traveling along the routes. These results have been added to the GIS map tool that was available online for people to select locations they felt unsafe, and are discussed below.

### 9<sup>th</sup> Street Concept:

- People like the idea of having a separate path but would like even more of a buffer zone to accommodate kids riding not too close to traffic, and would like path to be wider to accommodate range of users.
- People want to see raised driveways off of SUP while also maintaining access and parking for local businesses.

- People want this corridor to be lit.

## **Bear Creek:**

- People also want protected facility on south side of the road.

## **Franklin Alt A1 and A2**

- Respondents favoring these segments typically liked the lower cost, and less traffic on Emerson.
- Respondents do not like having to bike through Juniper Park, noting their preference to cross instead at 5<sup>th</sup> Street, which would also lower cost.
- People want shared streets included in this project to offer a higher level of service than the existing neighborhood greenway routes by further limiting vehicles speeds and volumes and offering more protection than “just paint” to set a better baseline for Bend’s Bikeways and led to increased use.
- Mixed feedback about crossing 9<sup>th</sup> Street at a new Emerson crossing or using the existing RAB.

## **Franklin Alt B**

- Respondents favoring this alternative like the protection and the direct route.
- Respondents want raised bike facilities to be maintained year round.
- Respondents would prefer raised bike facilities on both sides of road, even if it means narrowing westbound bike width.
- Want this option to connect Hawthorn bridge.
- People want more separation from on-street bike facilities than just paint, such as delineators, which people acknowledge also do not last a long time.
- Mixed feedback about crossing 9<sup>th</sup> Street at a new Emerson crossing or using the existing RAB.

## **Evaluation Criteria**

### **People were asked if our Franklin Avenue Goals and Evaluation criteria look right to you?**

One person commented, stating “Protected lanes are the only respectable separation, and the only way to reclaim the road for biking.”

## Online Survey Feedback

Below is a summary of the feedback we received. The PDF survey results and spreadsheet of result are attached as Appendices D and E, respectively.

### *Q1: Typical modes of travel, Q3: Proximity to routes and Q10: Impact on vehicle trips*

The majority of respondents (67 out of 106) indicated that they usually travel around town by driving. Biking is the second most common mode, with 30 respondents choosing it as their primary means of transportation. Many respondents (42 out of 106) have multiple trips per week to destinations within 1/4 mile of a route and the majority (68 respondents) believe that completion of this project will reduce their trips taken by vehicle.

### *Q2: What Neighborhood District do you live in?*

Larkspur (18), Old Farm (16), Orchard (16) and River West (15) had the highest representation among respondents, which represents areas where the most work is planned. All other districts had at least some representation, ranging from 2 to 6 respondents.

### *Q6: Ranking considerations for improvements*

Respondents ranked "Comfort level for roadway users" as the most important consideration, closely followed by "Quickest implementation" and "Cost." "Impacts on adjacent properties" was ranked as the least important consideration by respondents.

### *Q7: Prioritizing improvements for the project*

Respondents ranked "Protected shared use path" as the most important improvement. This was followed by "Large intersection improvements," "Enhanced crosswalks," "Modal filters to reduce vehicle traffic on local roads along the routes," and "Reducing vehicle speed and vehicle use of roads along these routes" in descending order of importance. "Filling sidewalk gaps" was considered the least important improvement by respondents.

### *Q8: Preference for transportation concept near Franklin Avenue and Q9: Reasons for preference*

Respondents favored raised and protected bike lanes along Franklin as it provides a direct and safe option for cyclists that separates users from vehicle traffic.

- Alternative B: Raised and Protected Bike Lanes along Franklin received the highest number of votes (53). Respondents favored this option for reasons including:
  - Perception of increased safety due to separation from vehicle traffic.
  - The ability of raised and protected bike lanes to provide more space for cyclists and pedestrians, particularly students walking to and from school.
  - Safety concerns were cited as a primary reason, along with the perception that this option prioritizes cyclists' needs and enhances the overall biking experience.
- Alternative A2: Shared-Use Paths along Sixth Street and Emerson received 22 votes. Reasons for choosing this option include:
  - Perception that a dedicated shared-use path would appeal to a broader range of users, including commuters, families, and pedestrians.
  - Connectivity advantages and flexibility, such as linking to the Hawthorne bridge.

- Some respondents felt that this option struck a good balance between safety and directness for cyclists, especially for those who may not feel confident riding near traffic.
- Alternative A1: Neighborhood Greenway along Sixth Street and Emerson received 21 votes.
- Reasons for preference include:
  - Appreciation for the potential of a neighborhood greenway to naturally accommodate various users.
  - Practicality and lower cost compared to other options, as well as potential connectivity advantages.
  - Safety considerations and the perception that it would make the neighborhood less car-friendly and better for bikes.
- 3 people commented that they did not want any improvements for biking.
- 3 respondents commented on their preference of route that doesn't meander through the park.

## Online Map Tool Feedback

Below is a summary of the feedback we received, where people feel unsafe. The Map tool results are available on the a City maintained GIS layer “Crosstown Bikeway – Public Feedback”.

Many respondents also utilized the map tool to provide general questions/comments. These questions and comments not related to Unsafe Locations are summarize on the Open House materials observations section.

### North-South Route: from south to north

- 2 comments regarding Nottingham is a private trail
- 2 comments stating excitement for the trail to be open to public again
- 1 comment about preference to have SUP on 15<sup>th</sup> if COHCT will not be available soon
- 5 comments about Reed Market crossings and 15<sup>th</sup> RAB
- 1 comment about trick entrance onto Larkspur Trail
- 2 comments about preference to have SUP route on 15<sup>th</sup> added noting Larkspur trail is great but not direct, accessible, or able to accommodate lots of bikes due to it's current use/feel.
- 2 comments about adding raised crossings to new and existing crossings where Larkspur trail crosses roads.
- 1 comment about Wilson/15<sup>th</sup> RAB being difficult to cross.
- 4 comments about Coyner trail not being great for bikes due tight corners and conflicts with park users.
- 8 comments about not wanting to bike through Juniper Park.
- 1 comment about Emerson/ 6<sup>th</sup> being wide and has fast vehicles due to through traffic.
- 1 comment about Irving traffic being too fast.
- 4 comments about US-20 crossing at 6<sup>th</sup> being not great for bikes or small children.
- 1 comment about cut through traffic on Kearny making 6<sup>th</sup> unsafe.
- 5 comments on high vehicle use of 6<sup>th</sup>/Olney and no refugee when crossing
- 3 comments about not having protection crossing revere on 6<sup>th</sup>
- 3 comments about not having cars slowdown/stop on Seward/6<sup>th</sup>.
- 3 comments about Butler/Boyd intersection not feeling safe.
- 2 comments not feeling safe accessing NUID Canal Trail from Brinson.

### East-west Route: from east to west

- 1 comment about needing safe crossing of Bear Creek at SE Craven.
- 2 comments about difficulty crossing BC/15<sup>th</sup> RAB
- 1 comment about ADA ramp at SE corner of Franklin and 4<sup>th</sup> filling with water regularly
- 1 comment about Harriman/Georgia wide intersection.
- 2 comments about stop sign orientation at Harriman/Florida.
- Multiple very similar comments about parking block lines of sight on Existing neighborhood greenway in Old Bend.
- 1 comment about missing SW on Shasta
- 1 comment about steep grade on Shasta
- 1 comment about wide intersection of Gilchrist and Shasta



- 2 comments about bumpy Gilchrist bridge
- 3 comments about tough navigation through Columbia Park
- 4 comments about difficult crossing 14<sup>th</sup> on Cumberland
- 2 comments about vehicle volumes on 15<sup>th</sup> near Elgin
- 5 comments about tough crossing Galveston at 15<sup>th</sup>.
- 1 comment about frequently ran stop sign at 18<sup>th</sup> and Hartford,
- 1 comment about trough transition to West Bend trail
- 2 comments about WBT crossing of York being difficult due to vehicles turning onto street
- 1 comment advance warning signage ahead of Skyliner road crossing.

### **Neighborhood Greenway General=**

- A few comments to Daylight all intersections on existing/new greenways.
- 2 comments expressing how wayfinding would benefit users.
- Comment about wayfinding near Mt Shasta =turn that could be placed to let users know they missed a sharp turn and need to turn around to stay on route.
- 1 comment about adding artistic elements.

### **9<sup>th</sup> Street:**

- 2 comments about Reed Market crossings near 9th Street feeling unsafe.

### **Route comments**

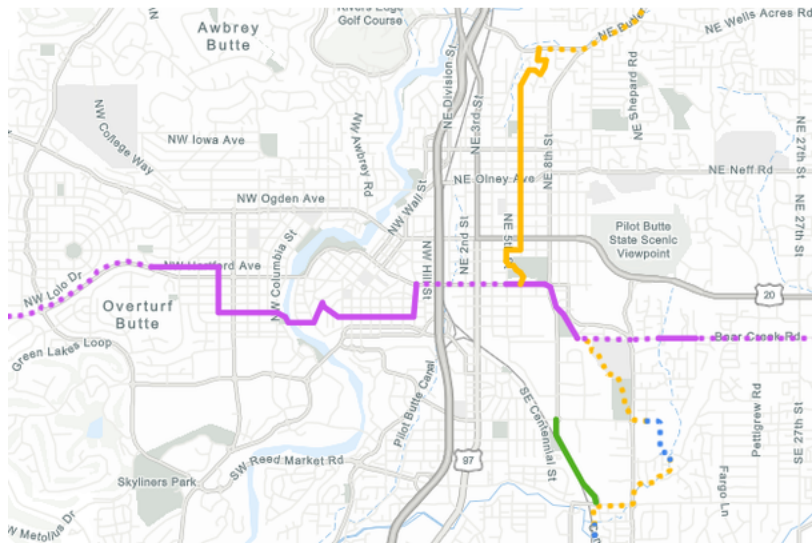
- Use Galveston.
- Use 9<sup>th</sup> if COHCT becomes public.
- 2 comments to create paths on 15<sup>th</sup> Street to create direct route.

### **Other project comments:**

- Comments related to other locations or projects are left on map for future reference, and not analyzed as part of this database.



CITY OF BEND

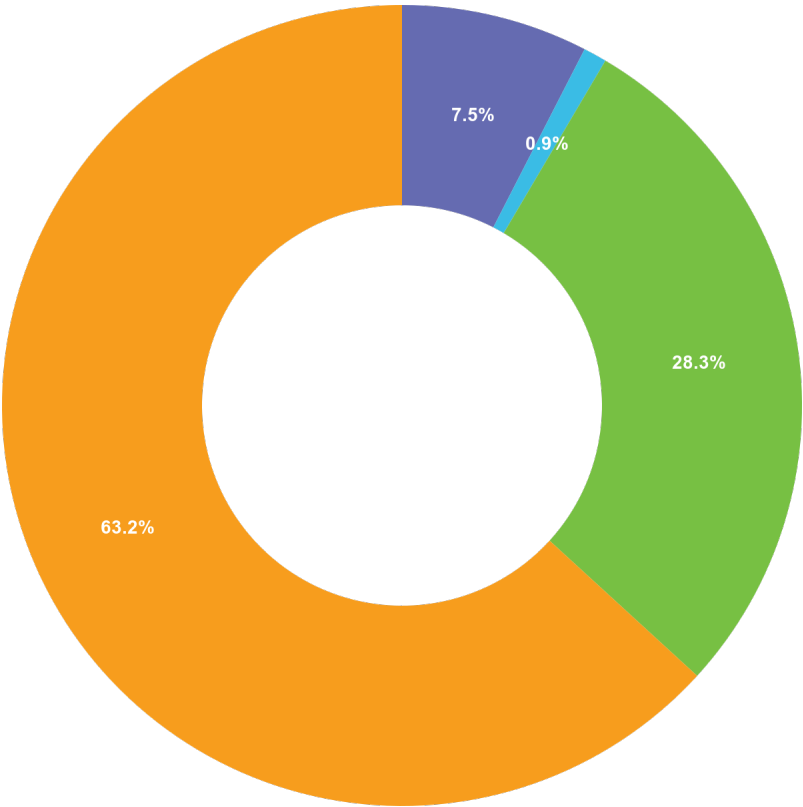


## Bend Bikeway Open House Survey - 2024

The Bend Bikeway project will make improvements to enhance the safety and enjoyment of walking and biking for everyone in our community.

After reviewing the open house materials, complete this survey to provide your input on the potential design configurations for portions of the Bend Bikeway.

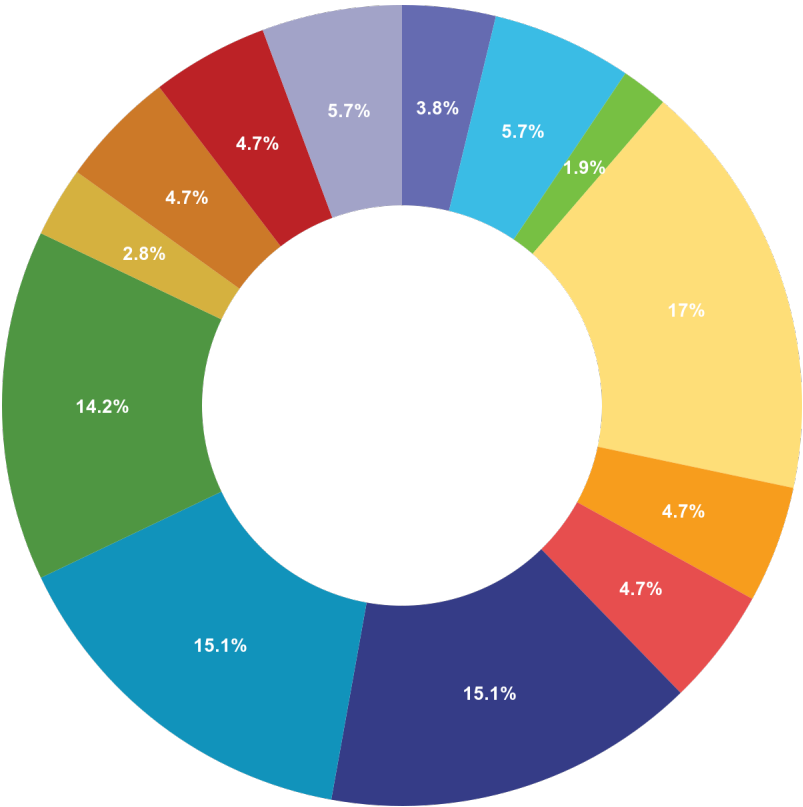
Q1 How do you usually travel around town?



Answered: 106    Unanswered: 1

Choice		Total
	Walk	8
	Roll	1
	Bike	30
	Transit	0
	Drive	67

Q2 What Neighborhood District do you live in? See map.

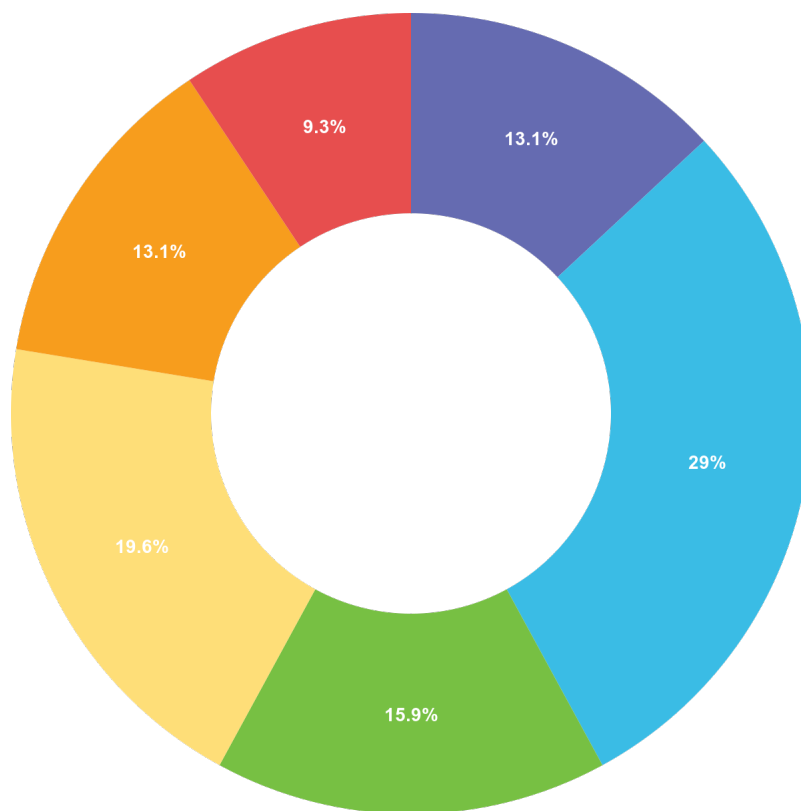


Answered: 106    Unanswered: 1

Choice	Total
<div></div> Awbrey Butte	4
<div></div> Boyd Acres	6
<div></div> Century West	2
<div></div> Larkspur	18
<div></div> Mountain View	5
<div></div> Old Bend	5

Choice	Total
Old Farm District	16
Orchard District	16
River West	15
Southeast Bend	3
Southern Crossing	5
Southwest Bend	5
Summit West	6

**Q3** What is your living/working proximity to one of the routes shown?





Answered: 107    Unanswered: 0

Choice	Total
 On a route	14
 Within 0.25 mile	31
 Within 0.5 mile	17
 Within 1 mile	21
 Within 2 miles	14
 Greater than 2 miles	10

Q4 Enter your street address\*

Thursday, March 7, 2024 at 12:18 AM UTC  
854 NE 12th St. Bend, OR 97701

Tuesday, March 5, 2024 at 7:28 PM UTC  
102 NW Jefferson Place

Tuesday, March 5, 2024 at 6:59 AM UTC  
20740 Alan A Dale Court  
Bend or 97703

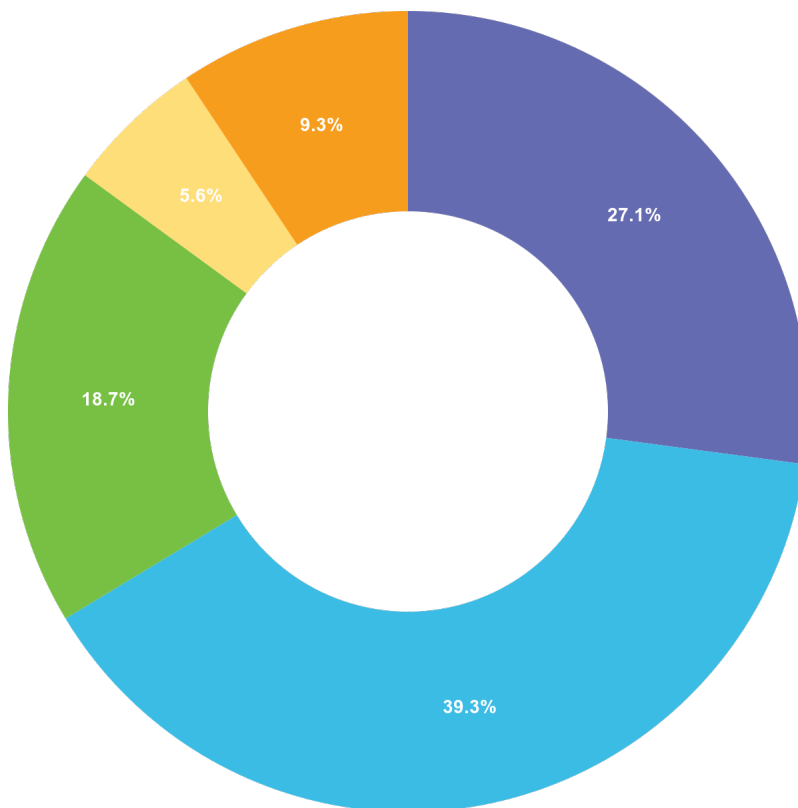
Saturday, March 2, 2024 at 5:01 PM UTC  
504 NE 10th St

Saturday, March 2, 2024 at 3:51 PM UTC

504 ne 10th,  
477 ne Franklin

**Answered:** 14 **Unanswered:** 93

**Q5** How often do you have trips to a destination (work, school, recreation, dining, shopping, etc.) that are within 1/4 mile of a route?

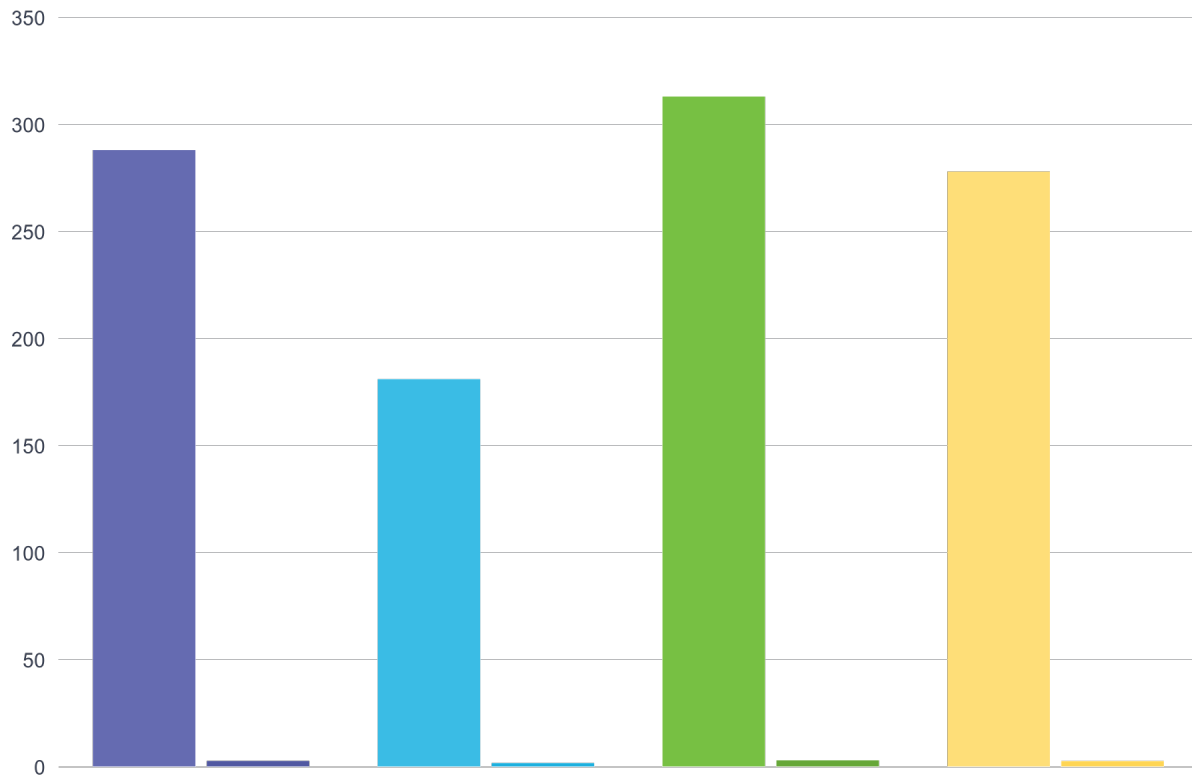


Answered: 107   Unanswered: 0

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Choice	Total
 Daily	29
 Multiple times per week	42
 Weekly	20
 Monthly	6
 Rarely	10

**Q6** Each improvement will consider roadway user safety and will be assessed based on the following other criteria as well. Please rank the following considerations by level of importance. (1=most important, 4=least important)

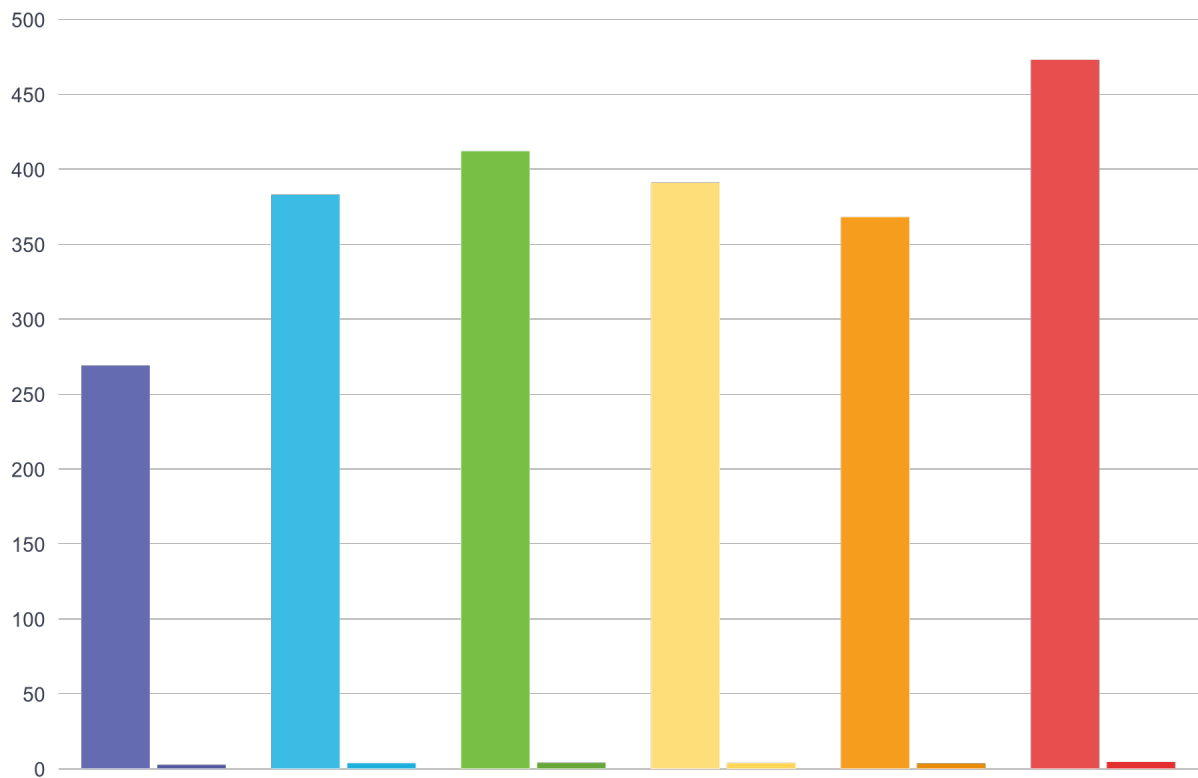


Answered: 106 Unanswered: 1







Choice	Score	Average
 Cost	288	2.72
 Comfort level for roadway users	181	1.71
 Impacts on adjacent properties	313	2.95
 Quickest implementation	278	2.62

**Q7** Which types of improvements do you believe this project should prioritize? Rank in order of importance.

Enter other important improvement not included above.



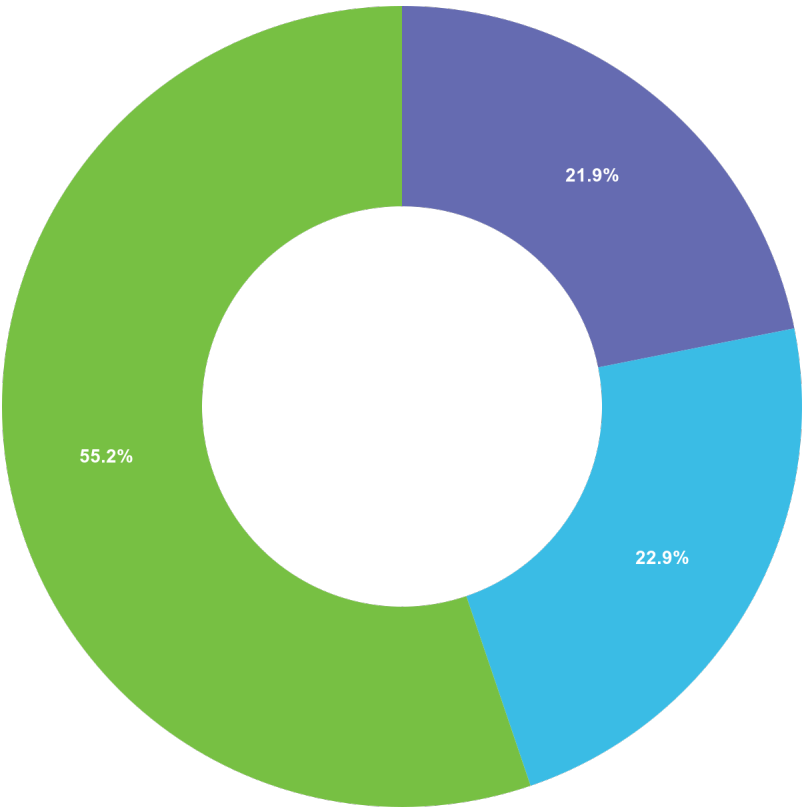
Answered: 105   Unanswered: 2

Choice	Score	Average
 Protected shared use path	269	2.56
 Large intersection improvements	383	3.65
 Enhanced crosswalks	412	3.92
 Modal filters to reduce vehicle traffic on local roads along the routes	391	3.72
 Reducing vehicle speed and vehicle use of roads along these routes	368	3.5
 Filing sidewalk gaps	473	4.5



**Q8** Which concept most appeals to you near Franklin Avenue between Fifth and Eighth streets?

Explain why you chose the option in the Comments box below,



**Answered:** 96    **Unanswered:** 11

Choice	Total
<div></div> Alternative A1: Neighborhood Greenway along Sixth Street and Emerson.	21
<div></div> Alternative A2: Shared-Use Paths along Sixth Street and Emerson.	22
<div></div> Alternative B: Raised and Protected Bike Lanes along Franklin.	53

**Q9** What elements of the concept you preferred for Franklin Avenue made it most appealing to you?

Thursday, March 7, 2024 at 2:45 AM UTC

A neighborhood greenway is a naturally wide corridor that cheaply allows for widely varied speed users with easy passing. The changes required to calm traffic will appeal to the residents as much as the non-motorized users.

---

Thursday, March 7, 2024 at 1:07 AM UTC

The round about is already a good way to navigate through the intersection at Franklin/8th/9th and it'd be a straight connection to 5th to get to Hawthorne.

---

Thursday, March 7, 2024 at 12:18 AM UTC

The raised and protect bike lane that give more separation from people driving. The 2' buffer combined with the 8' bike lane will give people walking more space than the current curb tight sidewalk. All the High school students using Franklin to walk downtown and to the Safeway area will also be safer and more comfortable.

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Wednesday, March 6, 2024 at 5:30 PM UTC

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Wednesday, March 6, 2024 at 4:00 PM UTC

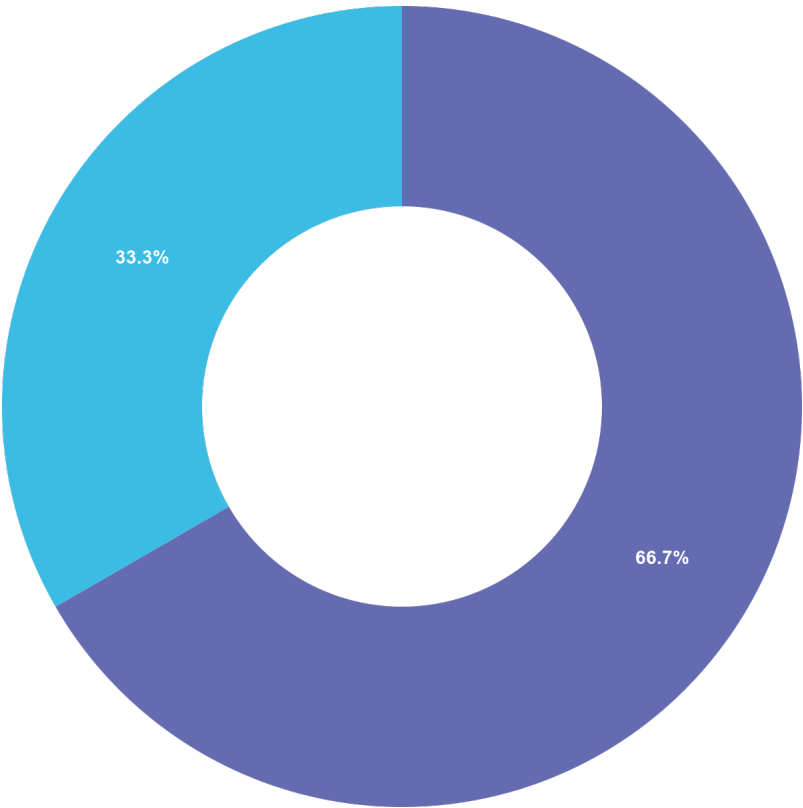
Dedicated shared use path, requires no extra space on 6th Street and fits within existing hardscape/landscape areas.

---

**Answered:** 107   **Unanswered:** 0

**Q10** Will completion of this project reduce your trips taken by vehicle?

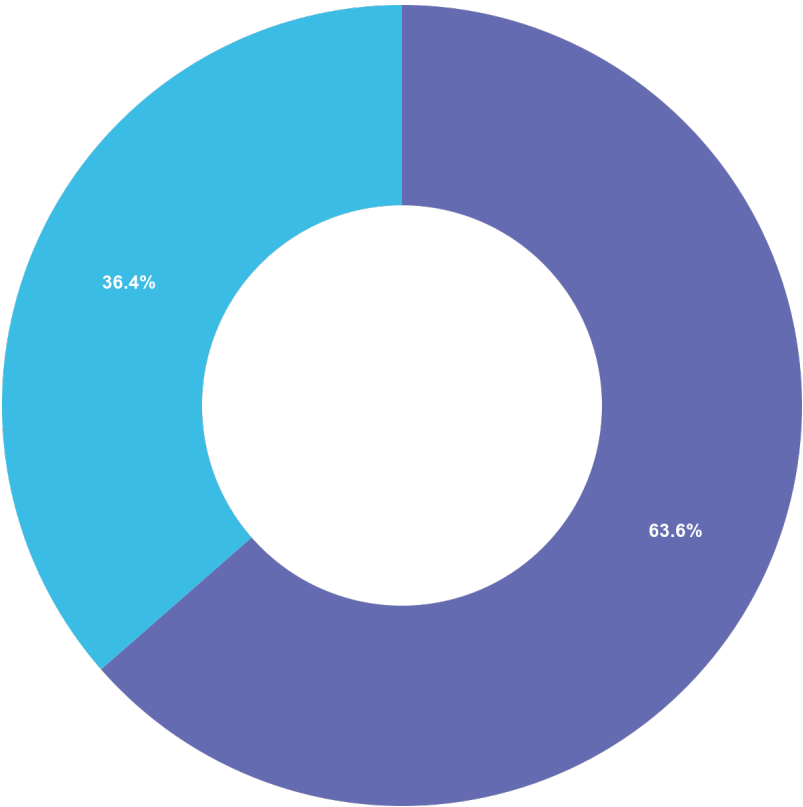
Use Comment box below to explain why and provide recommendation what the project team could do better to meet the projects goals.



Answered: 102    Unanswered: 5

Choice		Total
<div></div>	Yes	68
<div></div>	No	34

**Q11** Would you like to sign up for email updates on the project?\*



Answered: 107    Unanswered: 0

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Choice		Total
	Yes	68
	No	39

## **APPENDIX E: HARRIMAN STREET/GEORGIA AVENUE**

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### **INTERSECTION IMPROVEMENT CONCEPT**



# Harriman Crossing Option



Stop sign

NW Georgia Ave

NW Harriman St

11'-0"

2' Cycle Track Buffer

On Street Parking

Stop Sign

Stop Sign (Facing South)  
"Do Not Enter" Sign (Facing North)

Approx. 3 Diagonal  
Parking Stalls

On Street Parking

NW Hunter Pl

Stop sign  
"No Right Turn" Sign

8'-0"

NW Georgia Ave

3' Cycle Track Buffer

NW Harriman St

On Street Parking

12'-0"





## **APPENDIX F: BUTLER MARKET ROAD/BOYD ACRES ROAD**

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### **INTERSECTION IMPROVEMENT CONCEPTS**









# LEGEND:

PROPOSED DESIGN	
EXISTING DESIGN	
TAXLOT	
EXISTING ROW	
PROPOSED ROW	
ROADWAY CENTERLINE	
STAMPED CONCRETE	
PLANTER	



## PLANTER

NE 8TH ST.



## **APPENDIX G: NSSP DRAFT PROJECT PROSPECTUS**

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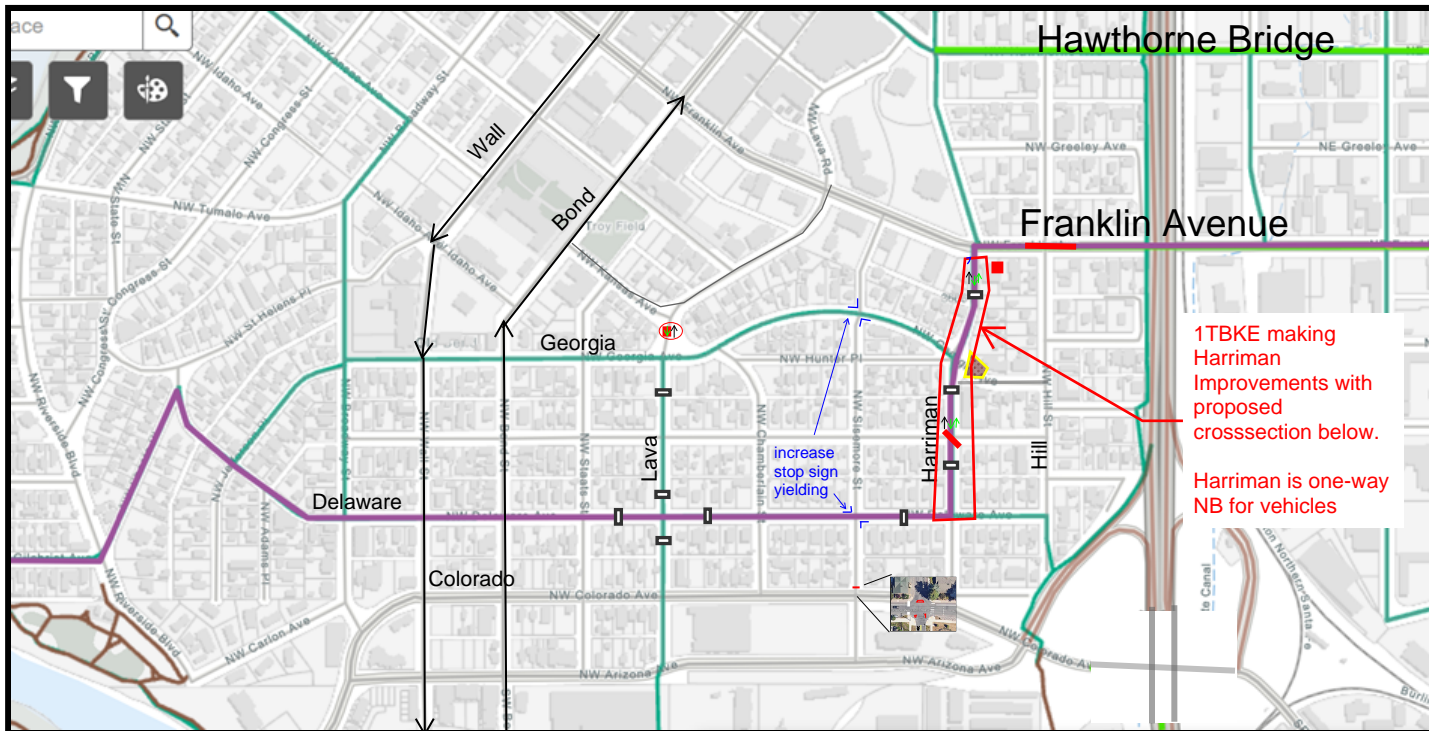
### **OLD BEND NEIGHBORHOOD**

20: Neighborhood Traffic Safety – Old Bend Neighborhood

From:	Old Bend NA	To:	
Project Type:	Speed Reduction and Safety Enhancement		
Length:		Planning Level Cost Estimate:	\$ 130,626
Description:	▶ Implement a portion of the TSP's planned bikeway network using traffic calming, signing and striping.		
Considerations & Constraints:	<p>There is a companion CIP project, "1TBKE-Bikeways," which will set the bikeway routes through this neighborhood. Once those routes are established, this NSSP Phase 2 concept can be finalized to implement the routes. Broadly, the concept can include:</p> <ul style="list-style-type: none"><li>* speed cushions and diagonal diverters/modal filters on the bikeway routes</li><li>* curb extensions for drivers on Sisemore to enhance bikeway safety (Georgia and/or Delaware)</li><li>* Harriman/Georgia wide pavement re-organization</li><li>* Review of stop sign orientation within neighborhood</li><li>* turn restrictions at Lava/Kansas to decrease traffic crossing the Georgia and/or Delaware bikeway</li><li>* turn restrictions at Sisemore/Colorado to decrease traffic crossing the Georgia and/or Delaware bikeway.</li></ul> <p>These turn restrictions will be deployed as an interim solution until the Timber Yards Master Planned "safety improvement" at Colorado/Sisemore is built (first building's occupancy after Sisemore is connected)</p> <p>Attached draft concept drawing will be finalized once bikeway routes are set with 1TBKE project.</p>		
Potential Funding Sources	1GLRS - NSSP Phase 2 Funding 1TBKE - Bikeway CIP Funding Timber Yards Master Plan mitigation funding (safety project at Colorado/Sisemore)		

Midtown Crossings is consider intersection improvements at Franklin/Harriman (not 1TBKE)

# One-way Streets and Speed Cushions



Speed Cushion



Turning restrictions



Wide intersection re-organization



One-way flow



Contra-flow bike lane



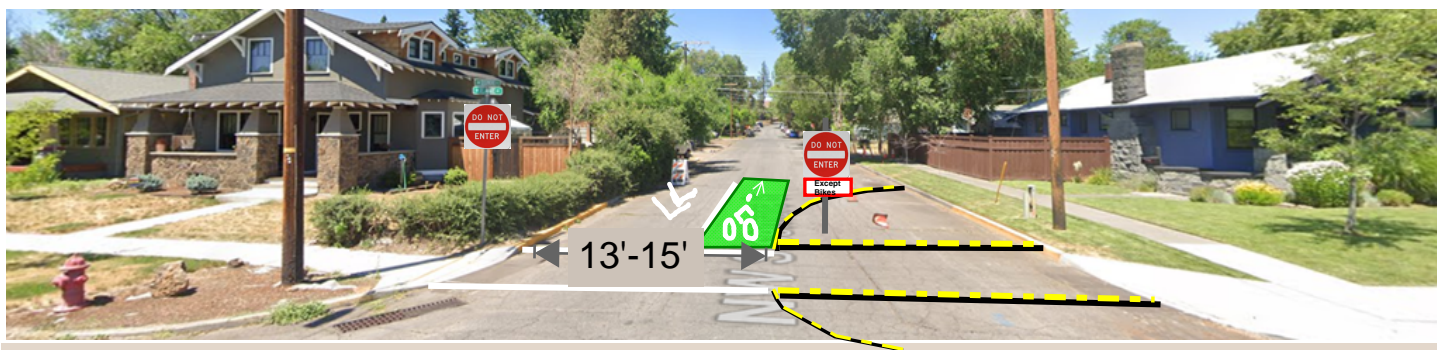
TSP Planned Bikeway Network



Crosstown Bikeway (draft alignment)



Curb Extension



Example of a one-way street with contra-flow bike lane. This will be considered for Lava/Kansas and Harriman/Franklin intersections to reduce volume on the bikeways routes.

