KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
354 SW Upper Terrace Drive, Suite 101, Bend, Oregon 97702 P 541.312.8300 F 541.312.4585

THE DALLES TRANSPORTATION SYSTEM PLAN

Technical Memorandum #5: Alternatives Analysis and Funding Program

Date:	March 29, 2016	Project #: 18495.0
To:	Public Advisory and Technical Advisory Committees	
CC:		
From:	Casey Bergh, PE and Chris Brehmer, PE - Kittelson & Associates, Inc. Darci Rudzinski, AICP and CJ Doxsee - Angelo Planning Group	

This memorandum presents transportation alternatives for addressing the multimodal transportation needs that were identified through:

1. Analysis of existing and future (2035) traffic conditions, as documented in Technical Memorandums #3 and #4.
2. Input during and as follow-up to the November 18, 2015 and February 10, 2016 meetings of the Technical and Public Advisory Committees.
3. Comments submitted via the online interactive map.

Alternatives are evaluated independently, by mode, to allow for comparison of projects. The recommendations in this memorandum were provided to the Technical Advisory Committee (TAC) and the Public Advisory Committee (PAC) members for input and guidance on a set of preferred projects. The material presented in this memorandum was refined based on feedback received from the Committee and community member.

TABLE OF CONTENTS

TRANSPORTATION NEEDS

Technical Memorandums #3 and #4 identified multimodal transportation needs related to safety, operations, and connectivity through the year 2035. These specific needs, as well as comments and input from the advisory teams, are addressed within this memorandum. This document addresses system-wide issues, pedestrian and bicycle connectivity needs (trails, sidewalks, bicycle lanes, etc.), and individual intersection improvements.

RECOMMENDED ROADWAY DESIGN GUIDELINES

The City's Roadway Functional Classification system identifies where collector and arterial roadways will be located and how they will be connected to accommodate forecast growth within The Dalles urban growth boundary. Functional classification also characterizes a roadway's intended purpose, amount and type of vehicular traffic it is expected to carry, provisions for non-auto travel, and its design standards. Recommendations related to functional classification influence the TSP as follows:

- Identify City connectivity and general alignment needs to serve urban development.
- Inform right-of-way preservation and roadway construction needs as part of property development or redevelopment.
- Provide guidance on priorities.
- Identify a process for exceptions or deviations from the standards based on area-specific context or other considerations.

Functional Classification System Background

Proposed classifications identified for The Dalles include: State (Interstate and Highways), Arterial, Major Collector, Minor Collector, and Local Road. Table 5-1 describes the roadway functional classifications to be applied within The Dalles. This recommended functional classification system categorizes the City's primary roadways as *Arterials* and *Collectors.* All other roadways are classified as *Local Roads.*

Changing the functional classification of a given roadway does not in and of itself warrant the need to construct, extend, or improve specific corridors to meet the roadway standard. Improvement of a road to meet functional classification standards is often required upon development of adjacent land, or when land sales occur (particularly in developing or redeveloping areas). The overall functional classification system is intended to serve as a blueprint that provides an orderly plan for growth, so that right-of-way and connectivity will be preserved when development occurs. Functional Classification map edits that result in the need for construction of a new roadway connection are identified in the Roadway Improvements subsection of the Transportation Alternatives section of this memorandum.

Table 5-1. The Dalles Functional Classification Descriptions

Functional Classification	Description
State	State highways provide mobility and serve long-distance travel. These roadways are high-speed roadways with limited access. These can include interstates that link urban areas across the United States.
Arterial	Arterials are the primary roadways within an urban area. They provide less access, but carry more volume than collectors. Travel speeds are relatively high, and serving through-movements is the priority on Arterials. Arterials include all roads designated by The Dalles as "Commercial Network Streets", indicating they are the most critical to providing connections to and circulation within, residential areas.
Major Collector	Collectors connect local roads and arterials. These roads seek to balance access with through movement mobility, maintaining circulation for all users. Major Collectors carry lower traffic volumes at slower speeds than arterials. Major collectors include all roads designated by The Dalles as "Residential Network Streets", indicating they are the most critical to providing connections to, and circulation within, residential areas. Within The Dalles, the only Major Collector that is not designated as a "Residential Network Street" is River Road/Webber Street (north of W 2nd Street).
Minor Collector	Minor Collectors serve a similar purpose as Major Collectors, except they carry less traffic. They typically have lower speeds and fewer signalized intersections than Major Collectors.
Local Road	Local roads account for the largest percentage of all roadways in terms of mileage within the City. Their primary function is to provide direct access to adjacent land uses. They are characterized by short roadway distances, slow speeds, and low volumes. Local roads offer a high level of accessibility, serving passenger cars, pedestrians, and bicycles. Use of local roads by large trucks should only be for local deliveries, not though movements.
Public Access Road	Add description. City jurisdiction, but maintained. These are on the West End of The Dalles between 6th and 10th St. (e.g., Floral Ct) Dale to send a PDF map, if not in our GIS map.

Functional Classification Recommendations

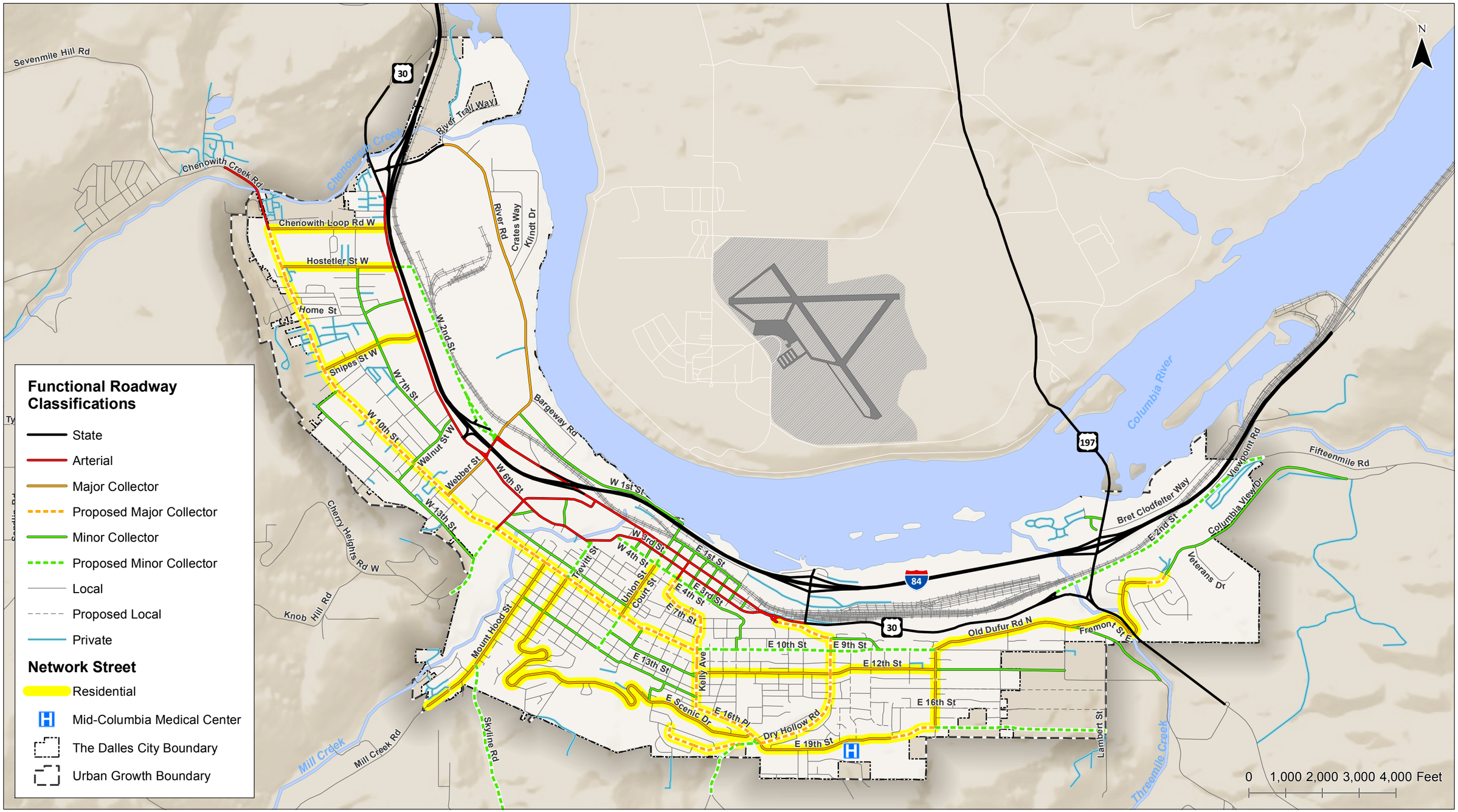
Figure 5-1 illustrates the recommended functional classifications for roadways within the City. Generally, the following changes are being recommended:

- Establish Major and Minor Collector categories to provide differentiation for roadways previously identified by The Dalles as "Residential Network Streets".
- Reclassify several Collectors (Nevada St., Oregon Ave., and Oakwood Dr/Quinton St.) near the Mid-Columbia Medical Center (MCMC) as local streets. These routes currently serve as lower-order enter/exit routes for MCMC traffic. However, the alignment, topography, and grade of these roadways and existing cross-sections reflect their purpose of providing access to individual residential properties more than that of a collector. Alternative access to MCMC is proposed through a new Major Collector connection to Thompson Street.
- Extend E 19th Street to provide a new connection to Thompson Street (i.e., filling a gap in the Major Collector network and improving circulation to MCMC).

- Provide new east-west connections between Thompson Street to Lambert Street as development occurs, including:
    - E 18th Street as a minor collector
    - E 14th and E 16th Streets as local streets
- Designate a single east-west route as a Major Collector route and prioritize roadway improvements to that route over other east-west Minor Collectors. These roadways include 10th Street (from west UGB to Kelly Avenue) and 12th Street (from Kelly Avenue to Thompson Street) to serve as an east-west alternative to I-84 for all modes of travel.

Proposed Roadway Cross-sections

Roadway cross-sections, together with access spacing standards, identify the function of a road and its balance between mobility and accessibility. Establishment of these standardized sections is intended to provide consistent performance along a roadway for a given mode, and to help establish consistent guidance and an understanding of costs as new development occurs. The sections presented are intended to allow flexibility for a roadway to fit within its surrounding context (for example, whether that context is a location within an industrial complex, in a new or built-out neighborhood, along a sensitive environmental area, or adjacent to a school) and do not represent a rigid standard. The standards are also intended to convey the priority of service provided to a given travel mode.



Proposed Functional Classifications
The Dalles, Oregon

Figure **5-1**

Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

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Elements that comprise typical roadway cross-sections are listed below, along with their intended function.

- **Median**: The median can serve a variety of purposes and take a variety of forms. Raised medians for access control may only be appropriate on Arterials or State facilities where throughput is a priority. Painted medians may be appropriate for designated turn lanes or continuous two-way left-turn lanes. Medians may also be used to provide landscaping, water/snow storage or treatment, or pedestrian refuge areas. There are a variety of functions a median can provide. Medians can also reduce crashes by reducing conflict points, physically separating opposing motorists, removing stopping or decelerating vehicles from the higher-speed through lanes, and allowing pedestrians improved opportunities to cross a roadway. The design and dimensions of medians can vary significantly depending on the desired landscape/hardscape treatment, intended purpose, and type of facility.
- **Travel lanes**: Travel lanes provide width for motor vehicles and freight traffic, and in lower speed environments may serve as a shared area for bicyclists. Travel lanes should provide a minimum width of 11 feet and a maximum width of 14 feet along straight roadway sections, and may require a larger minimum width along curves. The travel lane width should consider the posted speed, type of user (trucks, cars, bicyclists), location and design of storm grates, adjacent vegetation, and presence of on-street parking to allow these widths to serve as a clear and unimpeded travel way.
- **Bicycle lanes**: Bicycle lanes provide a separate designated travel lane for bicyclists to travel in, allowing them to operate independently from auto traffic. Bicycle lanes also serve as a buffer for pedestrians by designating the limits of a travel lane to motorists. Design guidance of bicycle lanes (to include minimum effective widths, height, grades, and obstructions) should be based on information contained in the current edition of the *Oregon Pedestrian and Bicycle Design Guide*.
- **Curb**: Curbing provides a physical barrier between parked or moving cars, bicyclists, and pedestrians. It also serves a function in channelizing storm runoff.
- **Planter Strip/Swale**: Planter strips can serve several purposes such as containing above or underground utilities, luminaires, and signs, providing runoff pre-treatment or storage, beautification, shade/comfort to pedestrians, and buffering between vehicles and pedestrians.
- **Sidewalks**: Dimensions for sidewalks should follow the *Oregon Pedestrian and Bicycle Design Guide*, and consider both horizontal and vertical clearance. Of particular importance along sidewalks is the clear space around poles, utilities, and other obstructions. The design of sidewalks should also consider accessibility design guidance, accounting for slopes and vertical displacement.
- **Shared***-Use Path: A facility separated from motor vehicle traffic by an open space or barrier, either within the roadway right-of-way or within an independent right-of-way. These are typically used by pedestrians, joggers, skaters and bicyclists. Shared-use paths are appropriate in corridors not well served by the street system, to create short cuts that link origin and*

destination points and as elements of a community trail plan. (as defined in the Oregon Bicycle and Pedestrian Design Guide)

- **Right-of-way**: The right-of-way contains all of the elements described above for public use, and typically provides additional space either for future improvements or utilities.

Exhibits 5-1 through 5-4 are the existing cross-sections by functional classification, as documented in the The Dalles TSP (1999). Recommended changes to each cross-section are provided for each functional classification. These cross-sections apply to all roadways, except streets designated by The Dalles as "Residential Network Streets." Each Residential Network Street is shown in Figure 5-1 and the adopted cross-sections are provided in *Appendix A*. In addition to the recommendations for cross-section design, consideration should be given to:

- Review/modify City design specifications to require flush-mounted storm grates compatible with bicyclists.
- Review/modify City design specifications to require clearance around signs, utilities, and other obstructions on curb-tight sidewalks.

Arterial/State

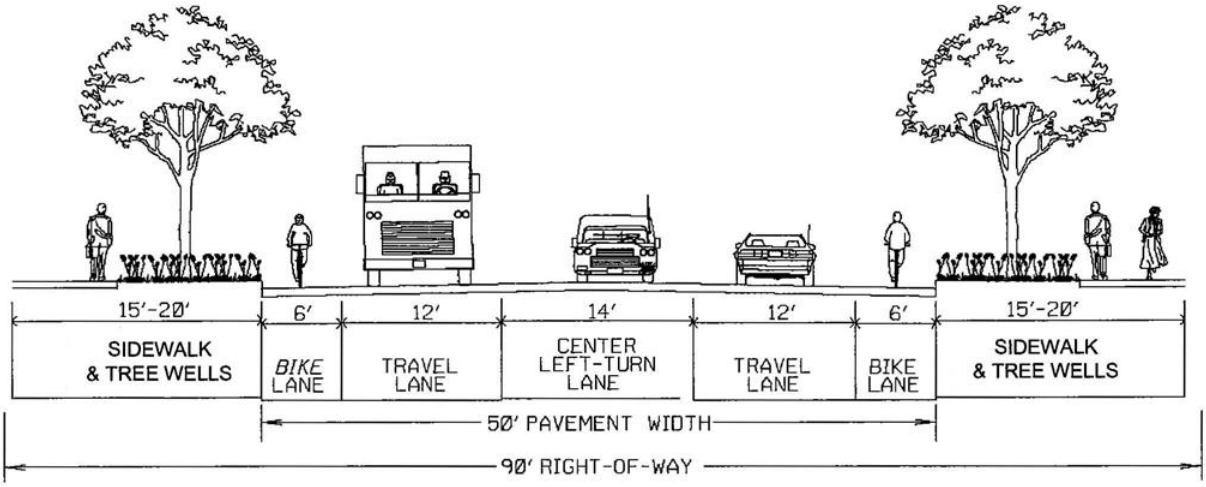


Exhibit 5-1: Existing Cross-section Standards for Arterial/State Roadways.
(Source: *The Dalles TSP - 1999*)

Recommended changes:

- Provide a minimum sidewalk width of 5 feet, except on state highways where the minimum is 6 feet.
- Remove landscape buffer.
- Include on-street parking on west side of 6th Street.
- Incorporate buffers between travel lanes and bicycle lanes, wherever possible.
- Travel lanes along freight routes should include 14-foot travel lanes or a 2-foot striped buffer between the travel lane and the bicycle lane.
- Roadways that may require deviation from this standard are limited to US 30 and 2nd and 3rd Streets within the downtown couplet.

Major Collector

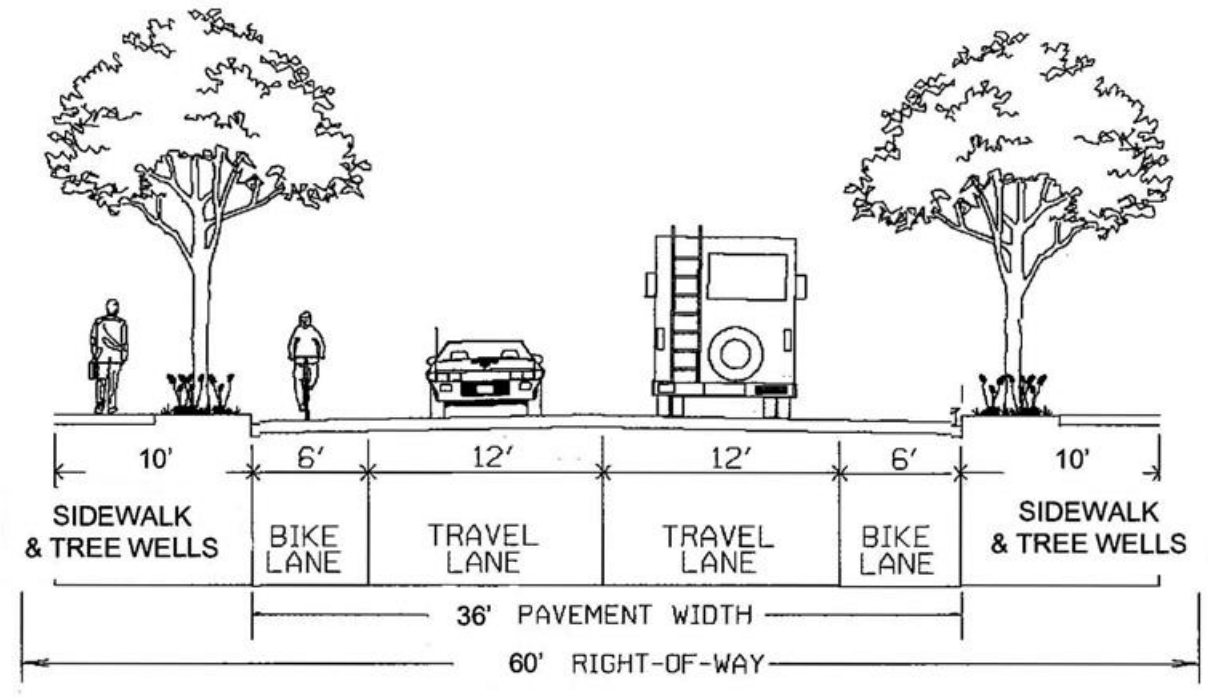


Exhibit 5-2: Existing Cross-section Standards for Major Collector Roadways.
(Source: *The Dalles TSP - 1999*)

Recommended changes:

- Provide a minimum sidewalk width of 5 feet, remove landscape buffer.
- Consider curb bulb-outs at intersection corners with on-street parking areas to improve pedestrian visibility, and reduce roadway crossing widths.
- Replace bicycle lane with 8-foot parking lane when adjacent to residential properties with primary access to the Major Collector.
- Include widening for turn lanes (with a minimum width of 12 feet) at major intersections with other collector and arterial facilities as deemed appropriate.
- All major collectors, except for Webber Street and River Road are identified as Residential Network Streets and have specific cross-sectional standards.

Minor Collector

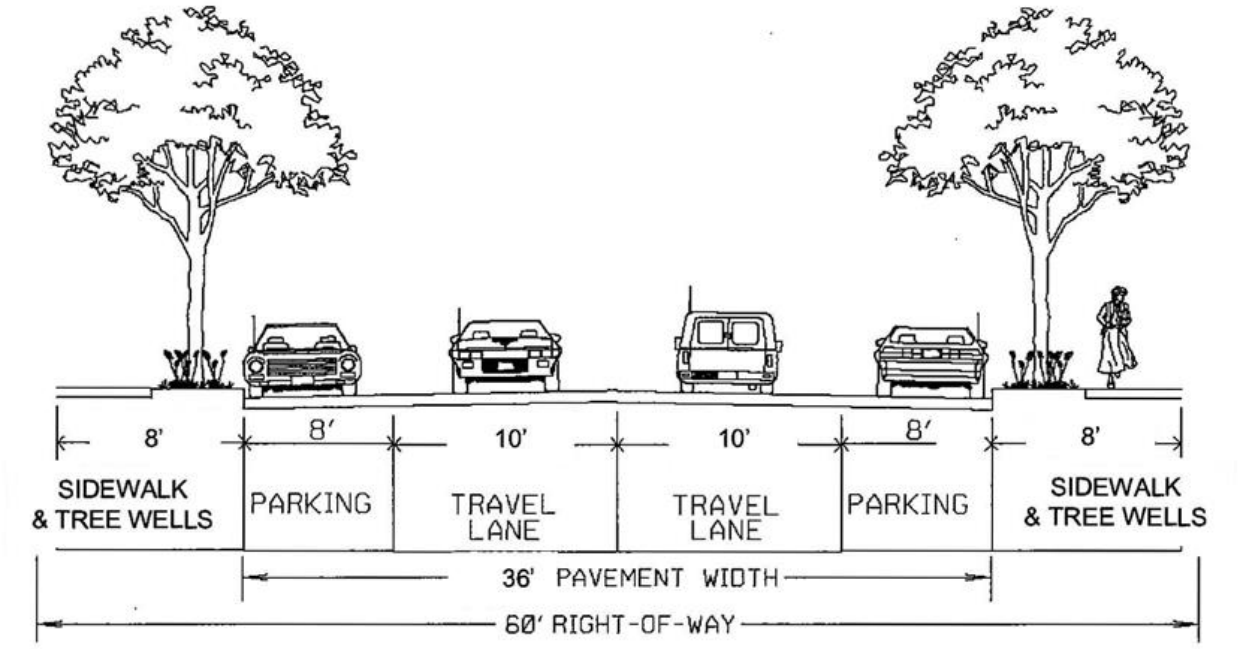


Exhibit 5-3: Existing Cross-section Standards for Minor Collector Roadways.
(Source: *The Dalles TSP - 1999*)

Recommended changes:

- Replace parking lane with 6-foot wide bicycle lane. Allow exceptions to replace the bicycle lane with 8-foot on-street parking lane when adjacent to residential properties with primary access to the Minor Collector.
- Provide a minimum sidewalk width of 6 feet, remove landscape buffer.
- Consider curb bulb-outs at intersection corners where on-street parking to improve pedestrian visibility, and reduce roadway crossing widths.

Local

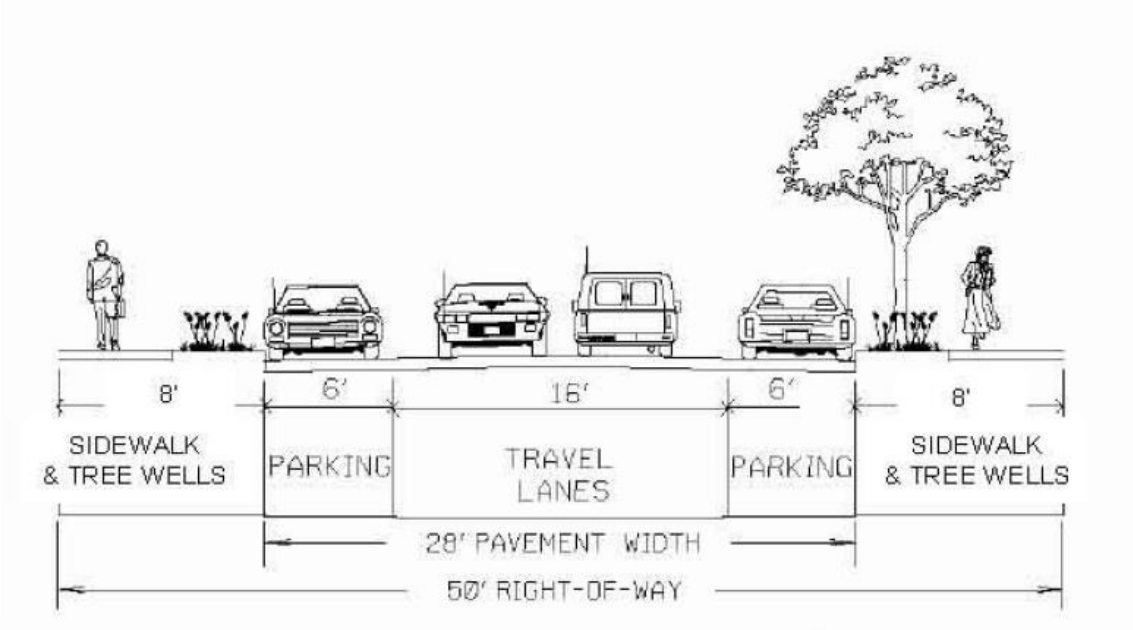


Exhibit 5-4: Existing Cross-section Standards for Local Roadways.
(Source: *The Dalles TSP - 1999*)

Recommended changes:

- Increase pavement width to 32 feet, with on-street parking.
- Allow removal of on-street parking lane in industrial areas to accommodate two 16-foot travel lanes for heavy vehicles.
- Provide a minimum sidewalk width of 6 feet, remove landscape buffer.
- Consider curb bulb-outs at intersection corners to define parking areas, improve pedestrian visibility, and reduce roadway crossing widths (except in industrial areas).

Local Street Policies

In addition to the functional classification for major roadways, it is also recommended that the City adopt local roadway policies and access spacing standards to support and preserve the function of major roadways. These policies[1] should accomplish the following:

[1] Policy topics addressed in this memo are not exhaustive. Goal 12 Transportation policies in the adopted Comprehensive Plan will be replaced or amended as part of TSP adoption. Specific policies to guide future land use and development decisions will be proposed later, as part of the implementation phase of the TSP update.

- Enable direct trips to and from nearby compatible uses with shorter block lengths; this can be provided with shared-use paths, roadways, or other types of connections designed primarily for non-motorized users.
- Ensure local streets are interconnected to form a grid network, providing redundancy and reducing reliance on higher-order roadways. For example, in The Dalles there is an established grid network south of downtown, but limited east-west connections from the west side of the city to the east side, except via I-84.
- Driveway policies, as outlined in the Land Use Development Ordinance (LUDO), promote access from the lowest-order (or lowest-volume where classifications are the same) roadway adjacent to a parcel. For example, this would encourage the majority of access to any new commercial development on 6th Street to be provided on the nearest minor street. Exhibit 5-5 illustrates how this principle was applied to the development around K-Mart; three accesses are provided on Snipes Street and only one is provided on 6th Street.
- Discourage cul-de-sacs while providing other options for traffic calming.

Exhibit 5-5: Example of Promoting Access on the Lowest-order Roadway Adjacent to a Parcel. (Source: Google Earth)

Engineering Options Assessments

An engineering option assessment is recommended that will allow the City to review proposed cross-sections that deviate from the standards. This system is intended to adapt to the surrounding context, and allow the City to consider deviations based on adjacent land use, topographical, environmental (natural and man-made), historical, or other contextual opportunities and constraints. Options should

not be allowed for self-imposed hardships, but to provide alternative ways to meet the functional purpose. The deviation process should specifically address the code standard, the proposed option, and how the functional intent will continue to be met or why it would be unreasonable to do so. The options evaluated should include the longitudinal considerations. For example, if an eight-foot wide shared-use path were proposed on one side of the roadway in lieu of sidewalks on both side, the process should consider how and where pedestrian crossings would be accommodated.

LAND USE DEVELOPMENT ORDINANCE AMENDMENTS

Elements of The Dalles' Transportation System Plan (TSP) are implemented in the requirements of the Land Use Development Ordinance (LUDO). The LUDO regulates development within City limits and implements the long-range land use vision embodied in The Dalles' Comprehensive Plan, of which the TSP is a part.

The LUDO has been audited to ensure that City requirements reflect the goals and objectives of the TSP update, as well as address transportation-related issues that have been raised over the course of the project to date. The intent of this exercise is to identify potential consistency issues between local code requirements and the TSP goals and objectives, as well as note any possible Oregon Transportation Planning Rule (TPR) compliance concerns, early in the planning process. Table 5-2 is a preliminary list of recommendations resulting from this audit. Information provided includes an overview of existing requirements and how these provisions may be modified in order to better implement the City's new TSP. Note that this list may be modified to reflect advisory committee and City staff feedback, as well as to be responsive to issues that develop during the TSP update planning process. Specific "adoption-ready" amendments to the LUDO will be drafted later in the project to coincide with the compilation of the TSP document.

Table 5-2. Land Use Development Code Recommendations

	Recommendation	LUDO Section	Relevant TSP Goal/Objective
1.	**Permit outright transportation improvements that are consistent with the adopted TSP.** Specific transportation facilities, services, and improvements are commonly not subject to land use regulation due to the minimal impact on land use.[2] These should be listed as permitted outright in individual zones, or made exempt through a provision added to land use regulations in LUDO Chapter 3 (Application Review Procedures) or Chapter 10 (Improvements Required with Development).	Applications Review Procedures 3.020 (Review Procedures) Or General Regulations 10.060 (Street Requirements)	Goal #3: Integration OAR 660-012-0045(1)
2.	**Require ordinance amendments to be consistent with the TSP.** Review criteria for ordinance amendments can be strengthened by directly referencing the TSP as part of required conformance with the Comprehensive Plan. In addition, the City should consider adopting language requiring proposals that "significantly affect" an existing or planned transportation facility (pursuant to the TPR, Section OAR 660-012-0060) demonstrate consistency with the identified function, capacity, and performance standards of the facility.	Ordinance Amendments 3.110.030 (Review Criteria)	Goal #3: Integration OAR 660-012-0045(2)(g) OAR 660-012-0060
3.	**Modify site plan review and conditional use permit evaluation criteria to include multi-modal transportation and safety considerations.** Both conditional use review and site plan review (which is a condition of approval for a CUP) approval require consistency with the transportation system. Requirements in both Sections can be improved to include bike and pedestrian access and circulation improvements, as well as reference to TSP access	Site Plan Review 3.030.040.B (Public Facilities Capacity) Conditional Use Permits 3.050.040.C (Impact)	Goal #3: Integration Goal #4: Economic Development OAR 660-012-0045(2)(e)

[2] Operation, maintenance, and repair of existing transportation facilities identified in the TSP, such as road, bicycle, pedestrian, port, airport and rail facilities, and major regional pipelines and terminals. Dedication of right-of-way, authorization of construction and the construction of facilities and improvements, where the improvements are consistent with clear and objective dimensional standards. Changes in the frequency of transit, rail, and airport services.

	Recommendation	LUDO Section	Relevant TSP Goal/Objective
	management and spacing standards.		
4.	**Develop clear and objective standards for the Airport Approach Zone.** Provisions are in place in LUDO 5.120 and 6.090(B) to prevent development that would negatively impact the airport. However, clear and objective standards are not currently included, and the LUDO states that regulations should be developed.	Zone District Regulations 5.120 (Airport Approach Zones)	Goal #4: Economic Development OAR 660-012-0045(2)(c)
5.	**Ensure access management requirements are consistent with the updated TSP.** Where new or modified access management and spacing standards are proposed in the updated TSP, the LUDO will need to be updated to be consistent with the standards.	General Regulations 6.050 (Access Management)	Goal #2: Accessibility and Connectivity OAR 660-012-0045(2)(a)
6.	**Allow for the redevelopment of existing parking areas for transit-oriented uses.** The City currently allows existing developments to replace up to 10% of existing parking spaces with landscaping, pedestrian amenities, or bicycle parking. This provision should be expanded to allow for transit amenities, such as bus stops and pullouts, bus shelters, and park and ride stations.	Parking Standards 7.020.040(C) (Reductions for Existing Uses)	Goal #2: Accessibility and Connectivity OAR 660-012-0045(4)(e)
7.	**Review traffic study requirements and modify to be consistent with the recommendations of the updated TSP.** Thresholds for requiring a traffic impact study to be submitted as part of development proposal, as well as the requirements of the analysis, should be evaluated for consistency with TSP findings. Improvements to existing code language could include clarifying the thresholds and requirements of the "limited traffic study" vs. "full traffic study." Site Plan Review Traffic System Impact requirements (Section 3.030.020 Review Procedures) may also need to be revised for consistency, or to include a cross-reference to Section 10.060.	General Regulations 10.060.A (Traffic Studies)	Goal #1 Safety and Mobility OAR 660-012-0045(2)(b)

	Recommendation	LUDO Section	Relevant TSP Goal/Objective
8.	**Update local street standards to be consistent with the updated TSP.** In updating the City's street requirements, consider the following: • Removing street standards from the LUDO and referencing the (updated) table in the TSP. Adopting the TSP standards into the LUDO by reference would eliminate the need to modify standards in both documents in the future. If design standards are to be retained in both the TSP and the LUDO, the LUDO should also include local street standards (not just arterial and collector). • Incorporating the "network streets" from the Residential Street Public Improvement Guidelines in the TSP street classifications. If these streets are addressed in the TSP, the list can be removed from the LUDO. In addition, the City should distinguish "guidelines" from development requirements, eliminating or modifying the resolution language so that the LUDO retains only relevant applicability provisions and development requirements.	Improvements Required with Development 10.060 (Street Requirements)	Goal #1: Safety and Mobility OAR 660-012-0045(7)
9.	**Consider incorporating transit-supportive development requirements.** The Dalles' is evaluating fixed-route transit within City limits, with a new transit center under construction on Chenoweth Loop near W 6th Street. Transit stops are permitted outright as accessory uses; however, there are no additional transit supportive provisions in the LUDO. Amendments to increase transit supportive language should be discussed and considered given the current transit improvements underway in the City and the enhanced emphasis on multi-modal transportation in the TSP update project.	Chapter 10 Improvements Required with Development (new Section)	Goal #2: Accessibility and Connectivity OAR 660-012-0045(4)(a)

TRANSPORTATION ALTERNATIVES

As summarized in Technical Memorandums #3 and #4, the greatest transportation needs within The Dalles relate to traffic operations, safety, and multimodal facilities. The following sections identify several alternatives to address these needs. The alternatives were identified by the Project Management Team for review by the Technical and Public Advisory Committees. The alternatives are grouped by project type to allow for evaluation and prioritization of projects that address each of the key areas of need.

The traffic conditions analyses indicate few intersections will exceed City or ODOT operational performance thresholds in 2035, warranting improvements. Priority operational improvements focus on providing additional capacity to minor-street (stop-controlled) traffic approaching US 197 and addressing existing and projected future capacity needs at the Webber Street interchange.

Safety improvements are identified throughout the City, including improvements to reduce crash risk and conflict points on W 6th Street and at the US 197/Fremont Street/Columbia View Drive intersection.

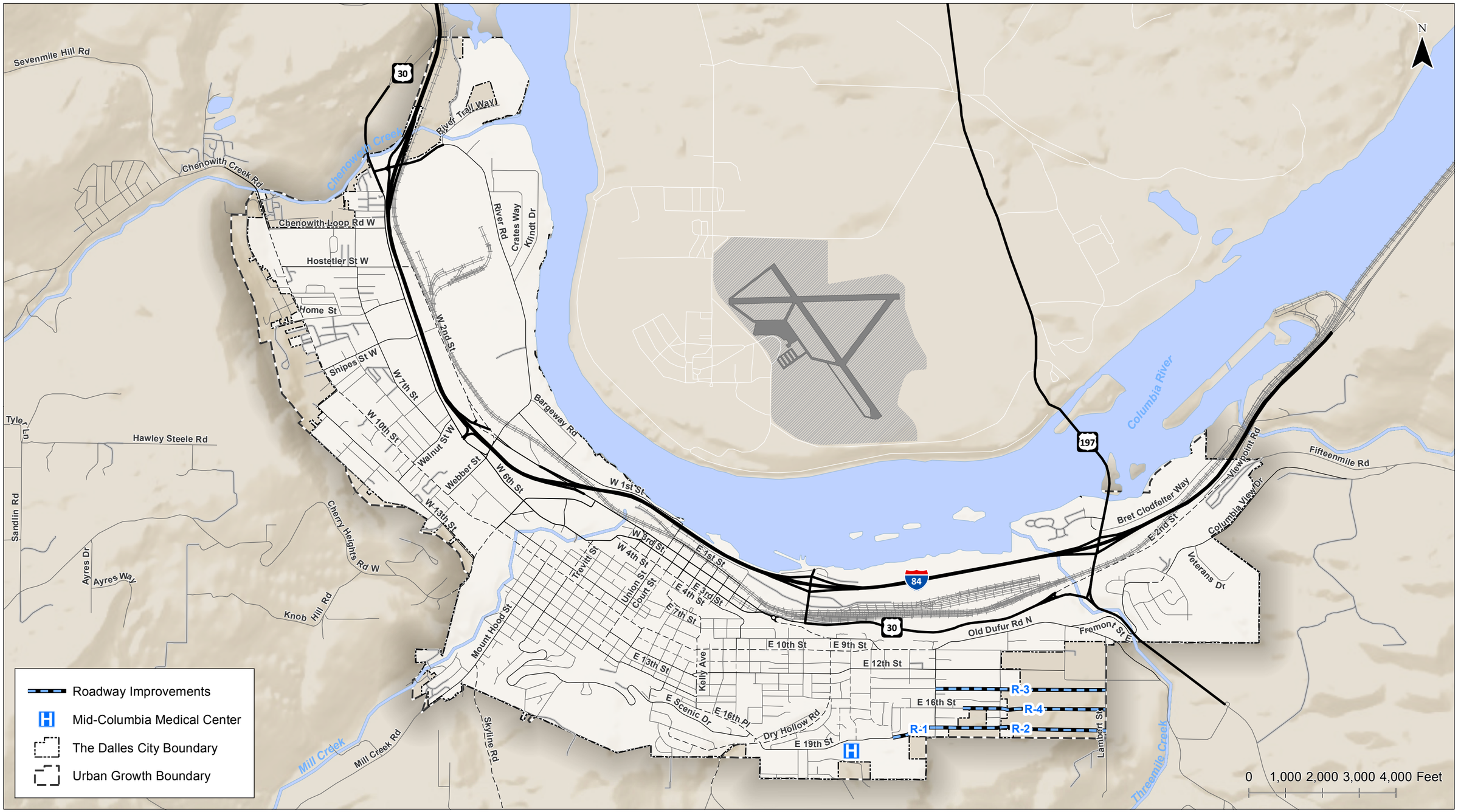
Providing alternative modes, particularly bicycle, pedestrian, and transit is a priority considering the construction of The Dalles Transit Center, increasing numbers of tourists arriving in The Dalles via The Dalles Marine Terminal, and a continued need to provide transportation options for all residents. An east-west bicycle route connecting to the Transit Center will include several improvements ranging from new shared-use paths to new bicycle lanes.

Roadway Improvements

Roadway improvements were identified for the major roadways with proposed functional classification changes and new connections identified in the functional classification map. The roadway improvements are summarized in Table 5-3 and shown in Figure 5-2. These roads may be serving or expected to serve higher traffic volumes than they were originally intended to serve. These upgrades cannot be conducted as part of regular maintenance activities and may include activities such as widening or full reconstruction of a roadway. Some of these projects include new roadway construction to improve connectivity and circulation within the city. These improvements are intended to capture the major upgrades or new connections needed to support the functional classification changes and may not include all changes associated with the functional classification changes. Other upgrades may occur over time as development occurs or in conjunction with other roadway projects.

Table 5-3. Roadway Improvements

Project No.	Project Name	Project Description	Cost Estimate	Recommended Priority	Potential Funding Source		
					ODOT	City	Private
R-1	E 19th Street Extension	Construct new Major Collector between Thompson Street and MCMC	$900,000	Near-Term		✓	
R-2	E 18th Street Connection	Construct new Minor Collector between Lambert Street and Morton Street, as development occurs	$1.9 million	Long-Term/As Development Occurs		✓	✓
R-3	E 14th Street Connection	Construct new local street between Morton Street and Lambert Street	$2.0 million	Long-Term/As Development Occurs		✓	✓
R-4	E 16th Street Connection	Construct new local street between Morton Street and Lambert Street	$1.3 million	Long-Term/As Development Occurs		✓	✓



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Roadway Improvements
The Dalles, Oregon

Figure
5-2

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Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

Operational Improvements

Preliminary intersection improvement alternatives were identified throughout the City, based upon operational, safety, or geometric needs. The alternatives have been evaluated to confirm they will meet City and ODOT operational performance thresholds based on forecast 2036 traffic conditions.[3]

The City's level of service (LOS) standard of "D" correlates to a maximum delay of 55 seconds/vehicle for signalized intersections and 35 seconds/vehicle on the minor street approach at unsignalized intersections.

Table 10-1 of the ODOT *2012 Highway Design Manual* (HDM) provides volume-to-capacity (v/c) ratios used to assist in evaluating future alternatives on state highways. Oregon Highway Plan (OHP) mobility targets were used to determine future deficiencies, as summarized in Technical Memorandum #4. However, HDM standards should be considered when potentially investing significant funds to enhance the capacity of the roadway system. HDM standards are not applicable when addressing safety issues as they are not significant capacity enhancements. Table 5-4 summarizes the respective ODOT performance requirements applicable to the study intersections.

Table 5-4. Summary of ODOT Intersection Performance Standards

ID Number	Street 1	Street 2	Traffic Control[1]	HDM 20-year Design Mobility Standards
2	US 30	River Road	TWSC	0.80
3	I-84 EB Ramps	River Road	TWSC	0.65
4	I-84 WB Ramps	River Road	TWSC	0.65
7	I-84 EB Ramps	W 6th Street	TWSC	0.65
24	Brewery Overpass Road	US 30	TWSC	0.80
25	Brewery Overpass Road	I-84 EB Ramps	TWSC	0.65
26	Brewery Overpass Road	I-84 WB Ramps	TWSC	0.65
28	East 2nd Street	US 30	TWSC	0.80
29	US 197	US 30	TWSC	0.75
30	US 197	Fremont Street/ Columbia View Drive	TWSC	0.75
31	US 197	I-84 EB Ramps	TWSC	0.65
32	US 197	I-84 WB Ramps	TWSC	0.65
33	US 197	Bret Clodfelter Way	TWSC	0.75
34	US 197	Lone Pine Blvd	TWSC	0.75

[1]TWSC: Two-way stop-controlled (unsignalized)

[3] Although future deficiencies were identified in Technical Memorandum #4 using the 2035 forecast traffic conditions (the 20-year horizon from the existing conditions analysis conducted with 2015 traffic counts), future alternatives were evaluated using 2036 forecast volumes to result in a Plan that serves the 20-year horizon from the expected adoption year of 2016.

Intersection projects are summarized in Table 5-5 and their locations are illustrated in Figure 5-3. A description of the need for individual projects and improvement elements is presented after the referenced tables and figures. The table also includes a column indicating whether the project is related to other projects in this Plan. For example, US 197/US 30 was identified for an intersection improvement based on both operational and safety needs. It is included in both sections of this memorandum but will only result in one project.

Several intersection projects should be coordinated with one another. For example, the J-turn at US 197/Fremont Street may only be successful if it is coordinated with a roundabout to the north to allow full access throughout the US 197 corridor. Recommended coordination is also indicated below each project description.

When multiple alternatives are available for a specific location, the evaluation criteria summarized in Technical Memorandum #2: Goals and Objectives were used to evaluate each alternative. The full evaluation criteria is provided in *Appendix B*, and a summary of the results by each project goal is provided at the end of each section below when relevant. The evaluation criteria and the input received from the advisory committee and public were used to determine a preferred alternative, which is described in *italic text*.

Table 5-5. Preliminary Intersection Alternatives

Project No.	Project Name	Project Description	Related Projects	Cost Estimate[1]	Source	Recommended Priority	Potential Funding Source		
							ODOT	City	Private
I-1a	Intersection Traffic Control Improvements at US 197/US 30	Install a traffic signal to increase capacity.	S-1	$1.5 to $2.0 million	KAI	Medium-Term	✓		✓
I-1b	Intersection Traffic Control Improvements at US 197/US 30	Install a single-lane roundabout to increase capacity.	S-1	$2.0 to $2.5 million	KAI	Medium-Term	✓		✓
I-2a	Intersection Traffic Control Improvements at US 197/Fremont Street/ Columbia View Drive	Restrict left-turns from minor-street approaches with raised median and construct median U-turn to south on US 197 (install a J-turn) to improve safety.	S-2	See Project S-2	KAI	See Project S-2	✓	✓	
I-2b	Intersection Traffic Control Improvements at US 197/Fremont Street/ Columbia View Drive	Install a single-lane roundabout to increase capacity and improve safety.	S-2	>$2 million	KAI	Long-Term	✓	✓	
I-2c	Intersection Traffic Control Improvements at US 197/Fremont Street/ Columbia View Drive	Install an overpass/interchange over US 197 and improve safety.	S-2	>$1.3 million	Previous TSP	Long-Term	✓	✓	
I-3	Intersection Traffic Control Improvements at US 197/ I-84 EB Ramps	Install a traffic signal to increase capacity.	S-8 S-9	$1.25 to $1.5 million	KAI	Medium-Term	✓		✓
I-4	Intersection Traffic Control Improvements at US 197/ Lone Pine Boulevard	Construct single-lane roundabout.	None	$1.5 to $2.0 million	Lone Pine TIA	Long-Term	✓		✓
I-5	I-84 Chenoweth Interchange Area Management Plan (IAMP)	Implement projects from the I-84 Chenoweth Interchange Area Management Plan.	None	--	IAMP	Vision	✓	✓	✓
I-6a	Intersection Improvements at Thompson St/E 10th St/ Old Dufur Road	Convert the existing two-way stop controlled configuration to two offset "T" intersections.	None	$85,000	KAI	Near-Term		✓	
I-6b	Intersection Improvements at Thompson St/E 10th St/ Old Dufur Road	Convert the existing two-way stop controlled configuration to two mini roundabouts.	None	$175,000	KAI	Medium-Term		✓	
I-6c	Hybrid of Alternatives I-6a and I-6b	Convert the existing intersection to an off-set "T" and a mini-roundabout.	None	$130,000	KAI	Medium-Term		✓	
I-6d	Intersection Improvements at Thompson St/E 10th St/ Old Dufur Road	Convert the existing two-way stop controlled configuration to all-way stop and provide curb and sidewalks on all approaches.	None	$40,000	KAI	Medium-Term		✓	
I-7	Intersection Realignment at E 2nd St/US 30	Realign this intersection into a more traditional T-intersection.	None	$100,000	Previous TSP	Long-Term	✓	✓	
I-8	Signal Modifications and Lane Reallocation at Cherry Heights Rd/W 6th Street	Convert the southbound approach to a shared left-through lane and an exclusive right-turn lane and modify the signal to provide permitted left-turn phasing. Extend the northbound left-turn lane on Cherry Heights Rd to accommodate future queue lengths.	None	$20,000	KAI	Near-Term		✓	
I-9	Signal Timing Modifications at W 2nd St/ Webber Road and W 6th St/Webber Road	Modify signal phasing to provide split phasing in combination with signal coordination for northbound and southbound movements.	None	$20,000	KAI	Near-Term	✓	✓	
I-10	Increase Queue Storage at W 2nd St/ Webber Road and W 6th Street/ Webber Road	Extend the northbound right-turn lane at W 2nd Street and the southbound right-turn at W 6th Street as far as possible without impacting the I-84 overpass structure.	None	$100,000	KAI	Near-Term	✓	✓	
I-11a	Realign Webber Street approaches at W 2nd Street and W 6th Street (Phase 1)	Realign north and south approaches to provide dedicated left-turn lanes. Modify signal timing to provide protected/permitted left-turn phasing with Flashing Yellow Arrow display.	S-5	$500,000	KAI	Medium-Term	✓	✓	
I-11b	Realign Northbound Webber Street approach at W 2nd Street (Phase 2)	Extend northbound left-turn storage lane by widening intersection to the west	S-5	$200,000	KAI	Long-Term	✓	✓	

[1] Preliminary cost estimates do not include Right-of-Way and include 30% contingency.

I-5
(Chenoweth IAMP Area)

Chenowith Creek Rd
Chenoweth Creek
30
River Trail Way
River Rd
Crates Way
Klindt Dr
Hostetler St W
Home St
Snipes St W
W 7th St
W 10th St
W 13th St
Hawley Steele Rd
Walnut St
Webber St
I-9/I-10
I-11
Bargeway Rd
W 1st St
W 2nd St
W 6th St
I-8
W 3rd Pl
W 3rd St
W 4th St
Cherry Heights Rd W
Union St
Court St
E 1st St
E 3rd St
E 4th St
E 7th St
Trevitt St
Mount Hood St
Ayres Way
Knob Hill Rd
Brewery Grade
E 9th St
E 10th St
E 12th St
E 13th St
Kelly Ave
E Scenic Dr
E 16th Pl
Dry Hollow Rd
E 19th St
Thompson St
Lambert St
Skyline Rd
Mill Creek Rd
Creek
Columbia River
197
I-4
I-3
I-7
I-1
84
30
I-6
I-2
Bret Clodfelter Way
E 2nd St
Columbia View Dr
Veterans Dr
Viewpoint Rd
Fifteenmile Rd
Old Dufur Rd N
Fremont St E
Threemile Creek

N

0 1,000 2,000 3,000 Feet

Operations Improvement Project
Intersection Realignment Project
The Dalles City Boundary
Urban Growth Boundary

C:\Users\agriffin\Documents\KAI Projects\031316_temp\temp copy of pdx gis folders\18495 the dalles\gis\TM #5\5-3 Intersection Improvement.mxd - agriffin - 5:38 PM 3/29/2016

Intersection Alternatives
The Dalles, Oregon

Figure
5-3

Oregon Department of Transportation

Kittelson & Associates, Inc.
Transportation Engineering/Planning

APG

Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

Project I-1: Intersection Traffic Control Improvements at US 197/US 30 (Intersection #29)

The southbound left-turn movement is forecast to exceed ODOT's v/c ratio targets in 2035 and exceed capacity on the southbound US 197 approach. In addition, the intersection exceeded the statewide critical crash rate. Capacity could be increased by installing a signal or by constructing a roundabout. Each would have a varying level of costs and impacts on operations and safety. The relative difference in cost between the two alternatives generally reflects the size of the intersection and the amount of pavement required.

Forecast 2036 operations for the no-build condition were compared to a signalized control alternative and a roundabout improvement alternative. The results are summarized in Table 5-1. The roundabout was analyzed with single lanes on all approaches and the signal was analyzed assuming existing lane configurations.

Table 5-1. US 197 at US 30 – 2036 Operational Summary

Intersection Scenario	Eastbound			Westbound			Southbound		
	Delay (sec/veh)	v/c ratio	Queue (ft)	Delay (sec/veh)	v/c ratio	Queue (ft)	Delay (sec/veh)	v/c ratio	Queue (ft)
No Build	8.1 (A)	0.21	25	-	-	-	>50 (F)	>1.0	310
Signal Control Alternative	15.1 (B)	0.70	200	16.9 (B)	0.33	75	18.2 (B)	0.63	150
Roundabout Alternative	13.9 (B)	0.62	100	10.9 (B)	0.47	75	8.5 (A)	0.42	50

*Note: Performance measures (delay, LOS, v/c ratio, 95th percentile queue) reported for the critical lane group on each approach

As shown in Table 5-1, both alternatives are expected to meet City and ODOT performance thresholds. The signalized alternative and roundabout are both projected to operate at LOS B or better during the 2036 PM peak hour. Queue lengths are expected to be less for the roundabout configuration compared to the signalized configuration. Operational Analysis worksheets are provided in *Appendix C*.

Consistent with the ODOT roundabout policy, further discussion of a roundabout would need to include a range of stakeholders given US 197 serves as a critical freight route, particularly for over-dimensional loads. As discussed as part of roundabout evaluations on other state highways in Oregon, consideration of a gated central "pass-through" lane could be useful in accommodating these over-dimensional users, while still maintaining the safety a roundabout provides for other highway users.

If a traffic signal were to be installed at this intersection the design would need to provide special accommodation of the rural nature of the highway and the expectancy of drivers to encounter a traffic signal. Similar to the roundabout, the design of the traffic signal would need to include a high degree of roadside context to help inform approaching drivers of the potential need to stop, which could include dynamic feedback signs, advance warning signs, longer all-red and yellow signal clearance intervals, and changes to the physical approach geometry and aesthetics. Installation of a traffic signal requires that the signal meet warrants outlined in the Manual on Uniform Traffic Control Devices (MUTCD) and is subject to State Traffic Engineer review and approval.

Alternatives Evaluation and Recommendation

Alternatives 1a (traffic signal) and 1b (roundabout) were evaluated against the evaluation criteria based on the project goals and objectives. The results are summarized in Table 5-6; the full evaluation criteria results are provided in *Appendix B*.

Table 5-6. Project I-1 Evaluation Criteria Summary

	Evaluation Criteria Score by Goal				
Project ID	**Goal 1: Safety and Mobility**	**Goal 2: Multimodal Options**	**Goal 3: Integration**	**Goal 4: Economic Development**	**Total Score**
Alternative I-1a (Signal)	8	1	3	6	18
Alternative I-1b (Roundabout)	12	1	2	7	22

The roundabout received positive feedback during discussions with the Public Advisory Committee (PAC) and Technical Advisory Committee (TAC) as an alternative to improve both operations and safety. In addition, the roundabout was discussed to potentially help reduce the speeds and acceleration taking place heading southbound up the grade along US 197. The roundabout could also serve as a gateway feature into the City.

Recommendation: Based on the alternatives evaluation and the public input, a roundabout is recommended as the preferred alternative at this location. The intersection is expected to continue functioning within ODOT's mobility standards during the PM peak hour for approximately 10 years under the existing two-way stop-controlled (TWSC) configuration. This project could be considered as a short-term to medium-term project based on operations, but a short-term need has been identified since it was also identified as a safety need. The design of this project should consider the fact that trucks currently use this route to gain momentum when traveling uphill on US 197 towards the landfill.

Coordination: Construction of this project should be coordinated with the recommended J-turn alternative at the intersection of US 197 at Fremont Street/Columbia View Drive because the roundabout will operate in conjunction with the J-turn to provide access to side streets and properties along the US 197 corridor.

Project I-2: Intersection Traffic Control Improvements at US 197/Fremont Street/Columbia View Drive

The eastbound and westbound approaches along Fremont Street and Columbia View Drive (Intersection #30) are forecast to exceed the City's LOS "D" standard in 2035. The eastbound approach is estimated to operate at LOS F during the future PM peak hour with the westbound approach expected to operate at LOS E. However, the intersection is expected to satisfy ODOT's v/c target. Vehicles attempting through or left-turn movements from the side street are projected to experience the majority of the delay on the approach.

This intersection was also identified as a key intersection to improve due to safety (the intersection exceeded the statewide critical crash rate) and is a potential connection for a new school along Columbia View Lane. Project S-2 further describes the safety issue.

A J-Turn intersection provides an at-grade alternative that could effectively reduce left-turn and angle conflicts at the intersection. This project would be implemented in conjunction with a roundabout at the US 197/US 30 intersection (Project I-1). The alternative would allow right-in, right-out movements from Fremont Street and right-in, left-in, right-out movements at Columbia View Drive. The restricted turn movements would be enforced with a directional raised median. All drivers approaching the highway from Fremont Street or Columbia View Drive would make a right-turn at US 197. Traffic from Columbia View Drive could use the proposed roundabout at US 197/US 30 to make a U-turn to go south on US 197. Traffic from Fremont Street could make a U-Turn at a median opening proposed south of the intersection to return north on US 197. The U-turning traffic would be accommodated by using a bulb-out or loon at the U-turn crossover location. The loon can be sized accordingly to accommodate the selected design vehicle.

Figure 5-4 provides a conceptual sketch of a J-Turn intersection at US 197/Fremont Street/Columbia View Drive. This treatment has proven effective at reducing high-speed angle and turning-related crashes and will be discussed in further detail as part of Project S-2 in the Safety Alternatives section.

A single lane roundabout was also considered at this location. However, there are geometric constraints due to elevation that would add significant costs to the roundabout. There is a large cut area on the northeast corner of the intersection between US 197 and Columbia View Lane that would need to be filled in order to accommodate a roundabout. There are also constraints limiting the approach alignments of Fremont Street and Columbia View Lane, as illustrated by the concept sketch in Figure 5-5.

Another alternative is an overpass/interchange at this location. There are several options for the design of the overpass. One option would include maintaining the existing intersection as it is today to provide full access to US 197, while another would combine the J-turn with the overpass to reduce left-turn conflicts at the intersection of US 197/Fremont Street. For the purpose of this analysis, the overpass was analyzed without the J-turn and it was assumed that only the eastbound and westbound through movements along Fremont Street and Columbia View Lane would utilize the overpass.

The future 2036 PM peak hour operational results for the no-build scenario, J-turn, single-lane roundabout, and overpass are summarized in Table 5-7. All three alternatives are expected to improve operations over the existing stop-controlled approaches along Fremont Street and Columbia View Lane. The alternatives are also expected to meet the 20-year design-mobility standards established in the *Highway Design Manual.*

Table 5-7. US 197 at Fremont Street/Columbia View Lane – 2036 Operational Summary

Intersection Scenario	Eastbound			Northbound			Westbound			Southbound		
	Delay (sec/veh)	v/c ratio	Queue (ft)	Delay (sec/veh)	v/c ratio	Queue (ft)	Delay (sec/veh)	v/c ratio	Queue (ft)	Delay (sec/veh)	v/c ratio	Queue (ft)
No Build	55.2 (F)	0.74	125	8.0 (A)	0.03	<25	46.1 (E)	0.78	155	7.8 (A)	0.10	<25
J-Turn	11.3 (B)	0.22	25	8.0 (A)[1]	0.10[1]	<25[1]	11.2 (B)	0.30	35	7.9 (A)	0.10	<25
Roundabout	8.4 (A)	0.25	25	7.5 (A)	0.27	25	8.0 (A)	0.31	25	10.8 (B)	0.53	75
Overpass	20.1 (C)	0.35	40	8.0 (A)	0.03	<25	18.4 (C)	0.44	55	7.8 (A)	0.10	<25

*Note: Performance measures (delay, LOS, v/c ratio, 95th percentile queue) reported for the critical lane group on each approach

[1] These operations are for the northbound U-turn movement associated with the J-Turn. U-turns are not analyzed as part of the HCM; therefore, this movement was analyzed as a left-turn movement as vehicles could utilize the loon as a staging area to perform a two-stage maneuver.

Alternatives Evaluation and Recommendation

Alternatives 2a (J-turn), 2b (roundabout), and 2c (overpass) were evaluated against the evaluation criteria based on the project goals and objectives. The results are summarized in 0; the full evaluation criteria results are provided in *Appendix B*.

Table 5-8. Project I-2 Evaluation Criteria Summary

	Evaluation Criteria Score by Goal				
Project ID	Goal 1: Safety and Mobility	Goal 2: Multimodal Options	Goal 3: Integration	Goal 4: Economic Development	Total Score
Alternative I-2a (J-Turn)	7	1	1	5	14
Alternative I-2b (Roundabout)	10	2	0	5	17
Alternative 1-2c (Overpass)	8	3	0	6	17

The J-turn was well received during the discussions with the PAC/TAC members based on the ability to improve safety.

Recommendation: Based on the evaluation criteria, relative cost, and public input, a J-turn is the preferred project in the near-term, and either an overpass or roundabout is recommended in the long-term. The J-turn should include an acceleration lane to allow for safer merging back into traffic along northbound US 197. The bulb-out or loon will need to accommodate emergency vehicles and school buses.

A roundabout was discussed at this location; however, due to constraints with the grade and the approach alignments, a roundabout may not be a feasible option at this location. An overpass was also discussed at this location but would also be relatively high in cost due to the structure. A feasibility study is recommended to determine whether a roundabout or overpass is feasible and preferred in the

long-term at the location. If considered in the future, a more detailed cost estimate will need to be developed that considers the amount of fill or structures needed to allow a roundabout in this location.

The intersection improvements at this location could be phased. The J-turn should be considered as a short-term priority project due to the safety benefits this at-grade, lower cost configuration could provide, and an overpass or roundabout should be considered as a long-term solution. If the overpass were to be constructed, the J-turn could remain in place to provide access to and from US 197 while the overpass served as a connection between the City and the Columbia View Lane area.

Coordination: The J-turn should be coordinated with Project I-1, the roundabout at the intersection of US 197 and US 30, which would provide an opportunity for U-turn maneuvers from Columbia View Drive. The proposed roundabout at US 197 and US 30 was also analyzed to include the new traffic distribution from the turn restrictions at the J-turn. A single-lane roundabout is still expected to provide adequate operations and meet the 20-year design-mobility standards established in the Highway Design Manual. Ideally, the roundabout and J-turn intersection improvements at US 30 and Fremont Street/Columbia View Drive, respectively, would be programmed as one project.

PROJECT I-2: CONCEPTUAL J-TURN ALTERNATIVE
US 197/FREMONT ST/COLUMBIA VIEW DR
THE DALLES, OR

Figure **5-4**

PROJECT I-2: CONCEPTUAL ROUNDABOUT ALTERNATIVE
THE DALLES, OR

Figure **5-5**

Project I-3: Intersection Traffic Control Improvements at US 197/I-84 EB

The 2035 no-build analysis projects the eastbound I-84 off-ramp volumes will exceed both the intersection's capacity and the intersection's v/c target. This intersection was also identified as a safety project and is further discussed in projects S-8 and S-9.

This intersection is located between two bridges so any widening of US 197 would require reconstructing the 275-foot long I-84 overpass structure. An option for increasing capacity on the eastbound approach is the installation of a signal. Installation of a traffic signal requires that the signal meet warrants outlined in the Manual on Uniform Traffic Control Devices (MUTCD) and is subject to State Traffic Engineer review and approval. Roundabouts were considered at the US 197/I-84 ramp intersections, but are not recommended to move forward due to the extensive fill, reconstruction of the ramps, and widening of the two nearby overcrossings likely required.

Intersection operations were analyzed under no-build and signalized alternatives, as summarized in Table 5-9. The signal was analyzed assuming the existing lane configurations.

Table 5-9. US 197 at I-84 EB Ramps – 2036 Operational Summary

Intersection Scenario	Eastbound			Northbound			Southbound		
	Delay (sec/veh)	v/c ratio	Queue (ft)	Delay (sec/veh)	v/c ratio	Queue (ft)	Delay (sec/veh)	v/c ratio	Queue (ft)
No Build	>50 (F)	>1.0	350	-	-	-	8.9 (A)	0.06	<25
Signal Control Alternative	12.8 (B)	0.61	175	11.0 (B)	0.65	200	8.0 (A)	0.35	100

*Note: Performance measures (delay, LOS, v/c ratio, 95th percentile queue) reported for the critical lane group on each approach

As shown in Table 5-9, the signalized alternative is expected to provide adequate operations, and the 95th percentile queue length for the southbound approach is projected to be accommodated within the length of the existing bridge. Operational Analysis worksheets are provided in *Appendix D*.

Alternatives Evaluation and Recommendation

The summary of the evaluation for the traffic signal alternative is provided in Table 5-10.

Table 5-10. Project I-3 Evaluation Criteria Summary

	Evaluation Criteria Score by Goal				Total Score
Project ID	Goal 1: Safety and Mobility	Goal 2: Multimodal Options	Goal 3: Integration	Goal 4: Economic Development	
Alternative I-3 (Signal)	8	2	1	7	18

Recommendation: The traffic signal alternative for project I-3 is the preferred alternative for project I-3. The eastbound left-turn movement at this intersection is expected to exceed ODOT's v/c mobility target near year 2022.

The timing and need for this improvement will likely be heavily dependent upon the build-out of the development in the Lone Pine Village area. This location was briefly discussed with the PAC/TAC members; however, a clear alternative (roundabout vs. signal) was not decided on. Due to the constraints associated with installing a roundabout at this location, a traffic signal was determined to be the preferred solution for this location.

Coordination: The improvements at this location will likely need to occur at the WB off-ramp intersection to provide consistency within the interchange area. The improvements should also consider any potential improvements along the US 197 corridor (US 30 and Lone Pine Blvd).This location should be considered as a short-term to medium-term priority project.

Project I-4: Intersection Traffic Control Improvements at US 197/Lone Pine Boulevard

While satisfying ODOT's mobility target, the Lone Pine Boulevard eastbound left-turn movement at US 197 (Intersection #34) is forecast to exceed the City's LOS D threshold. The projected delay impacts less than 50 vehicles during the weekday PM peak hour.

ODOT and the developer of the Lone Pine project have an agreement which identifies a roundabout as the appropriate solution at this intersection and to be funded by Lone Pine. The timing of the improvement is dependent on the build-out of the project and future traffic conditions.

Alternatives Evaluation and Recommendation

Table 5-11 provides a summary of the evaluation criteria scores for project I-4.

Table 5-11. Project I-4 Evaluation Criteria Summary

	Evaluation Criteria Score by Goal				
Project ID	**Goal 1: Safety and Mobility**	**Goal 2: Multimodal Options**	**Goal 3: Integration**	**Goal 4: Economic Development**	**Total Score**
Alternative I-4 (Roundabout)	8	2	3	5	18

Recommendation: The appropriate solution identified for this location is a roundabout. The PAC/TAC members identified that development will drive the need for an intersection improvement at this location. This location is not expected to exceed ODOT's mobility target over the 20-year period. This project should be considered as a long-term priority or Vision Project.

Considerations: Consideration should be given to the potential for queue spillback into the upstream intersections of Bret Clodfelter Way and the westbound I-84 off ramp in the near- and mid-term. Currently, there is approximately 300 feet and 500 feet between the intersections, respectively.

Project I-5: I-84 Chenoweth Interchange Area Management Plan

An Interchange Area Management Plan (IAMP) was completed and adopted for the I-84 Chenoweth Interchange in 2009. The IAMP identified transportation improvements that would be needed to support development in the area. The TSP did not identify a need for all of these improvements because the model assumed growth was spread throughout the city. However, if development were to occur more quickly in this area, these projects may be needed. Therefore, the IAMP projects are included as Vision projects which may not be needed in the 20-year horizon unless development patterns occur more quickly than anticipated.

Intersection Realignment

Several intersections within The Dalles have skewed approach geometry, which has been correlated to increased crash potential (1). The following locations have unique geometry that could be considered for realignment.

Project I-6: Intersection Improvements at Thompson Street/East 10th Street/Old Dufur Road

This intersection (Intersection #27) does not exceed the City or ODOT's operational standard but was identified as an issue via community feedback. The skew at this intersection creates sight distance issues for drivers facing westbound when approaching the intersection from East 10th Street or Old Dufur Road. The existing configuration includes stop sign control on the northbound Thompson Street and westbound East 10th Street approaches.

The following alternatives could improve operations and safety at this intersection:

a) Realign the westbound Old Dufur Road approach to intersect E 10th Street at a 90-degree angle, creating two off-set "T" intersections, as shown in Figure 5-6.
b) Construct two mini roundabouts, as shown in Figure 5-7.
c) Construct an off-set "T" intersection and a mini-roundabout, as shown in Figure 5-8.
d) Conversion of the TWSC variation to an all-way stop-control (AWSC) configuration with new sidewalks and crossing treatments.

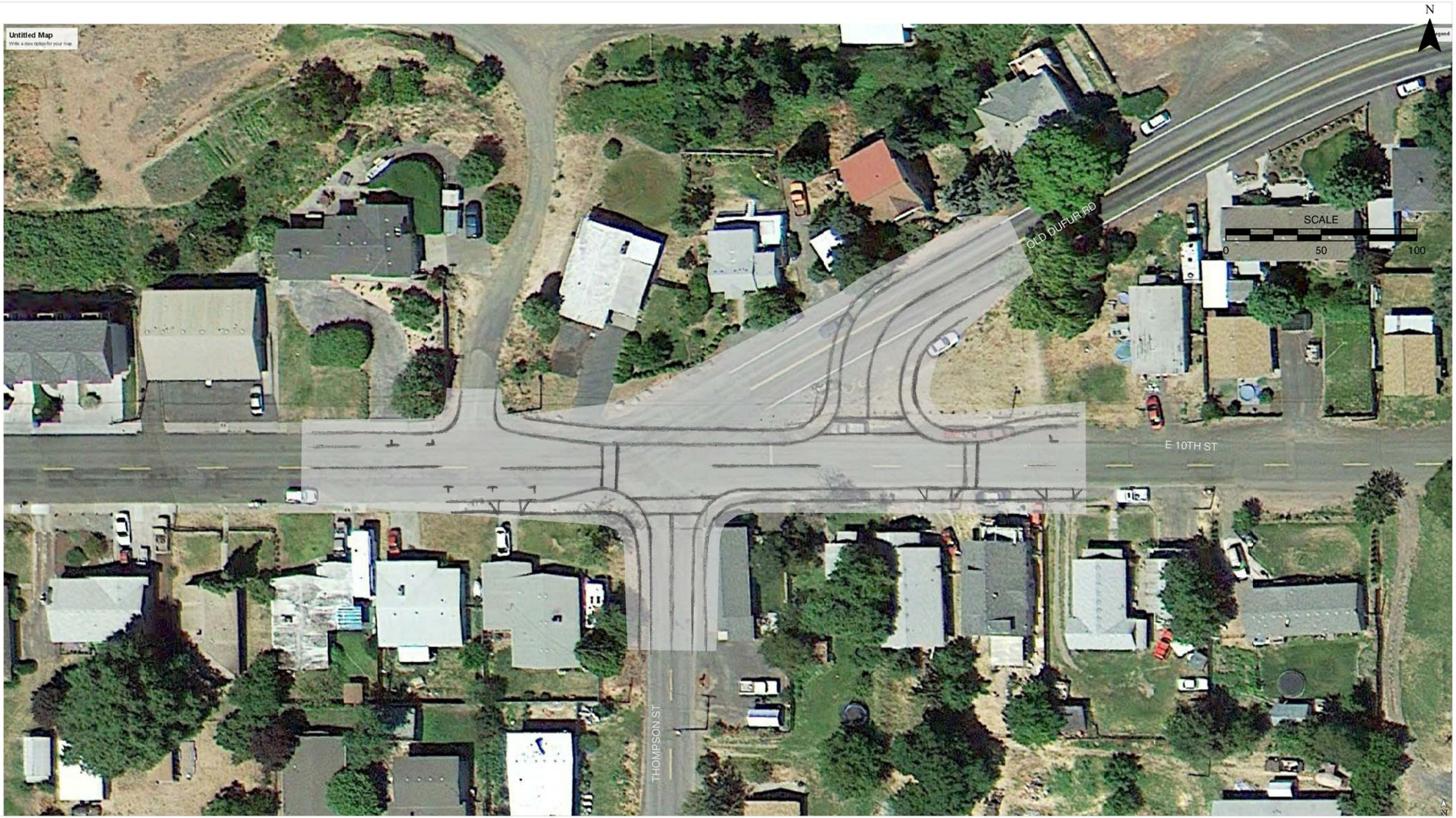
Alternatives Evaluation and Recommendation

This intersection was identified to be an issue for all roadway users (vehicles, pedestrians, and bicyclists) due to a lack of sidewalks, crosswalks, and sight distance. Two alternatives were initially discussed at this location with the TAC/PAC. The first included two offset T-intersections. The second included two roundabouts. Based on PAC/TAC feedback, it was suggested to create an additional concept that is a hybrid of the two concepts. This would include an offset T-intersection along the Thompson Street approach with Old Dufur Road and the east leg of East 10th Street tying into a roundabout, as illustrated in Figure 5-8. Table 5-12 summarizes the evaluation criteria for each alternative.

Table 5-12. Project I-6 Evaluation Criteria Summary

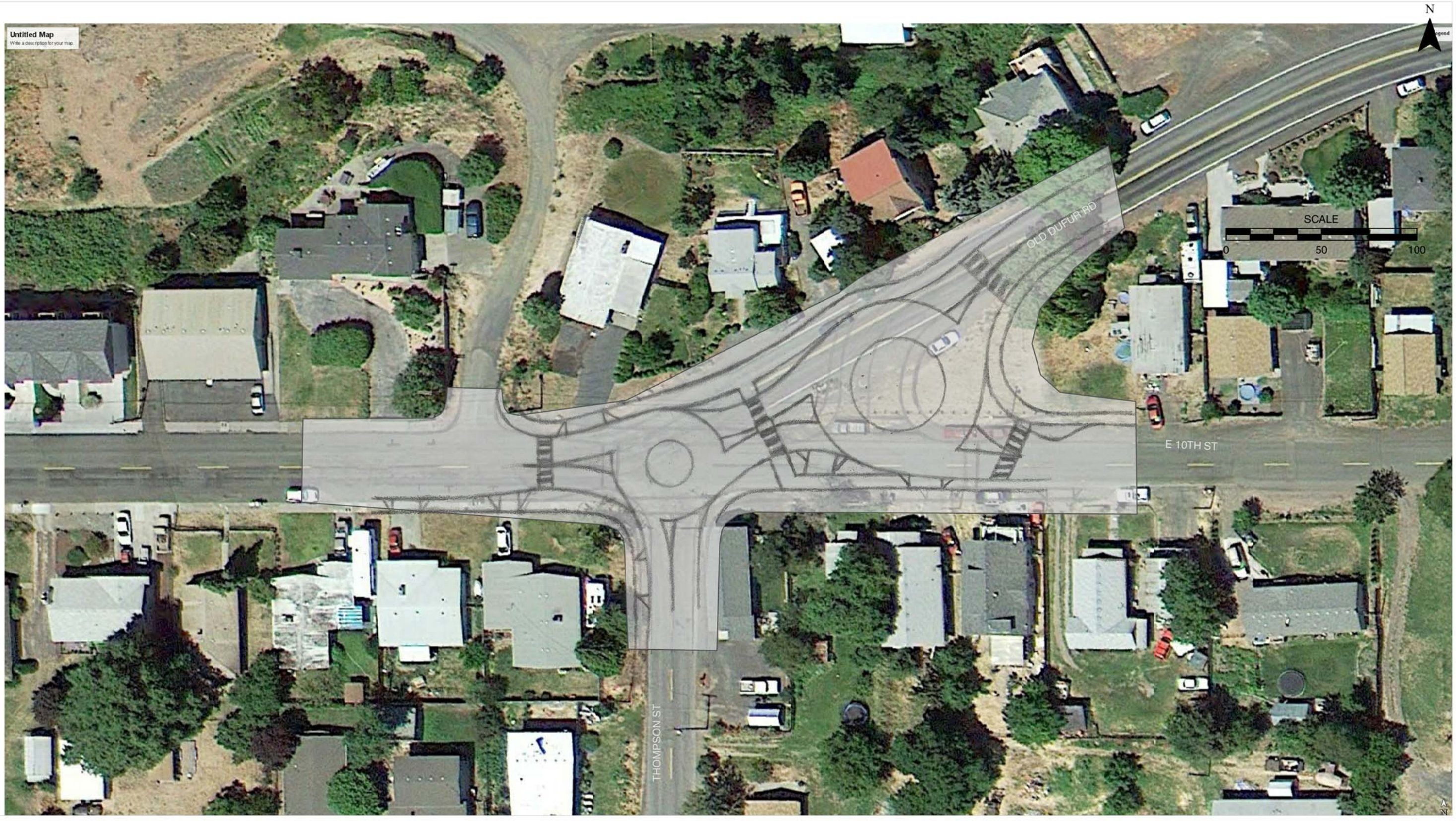
	Evaluation Criteria Score by Goal				
Project ID	**Goal 1: Safety and Mobility**	**Goal 2: Multimodal Options**	**Goal 3: Integration**	**Goal 4: Economic Development**	**Total Score**
Alternative I-6a (two off-set "T" intersections)	4	1	1	0	6
Alternative I-6b (two mini roundabouts)	10	4	1	1	16
Alternative I-6c (Hybrid of Alternatives I-6a and I-6b)	8	4	1	1	14
Alternative I-d (AWSC)	4	3	1	0	8

Recommendation: Based on the evaluation criteria and public input, the hybrid concept that includes an offset T-intersection and a roundabout is the preferred alternative.
The concept provides sidewalks, defined crossings for pedestrians, improves sight distance, and will help slow speeds making it more comfortable for bicyclists. This refined concept should be considered as a short-term to medium-term priority project.



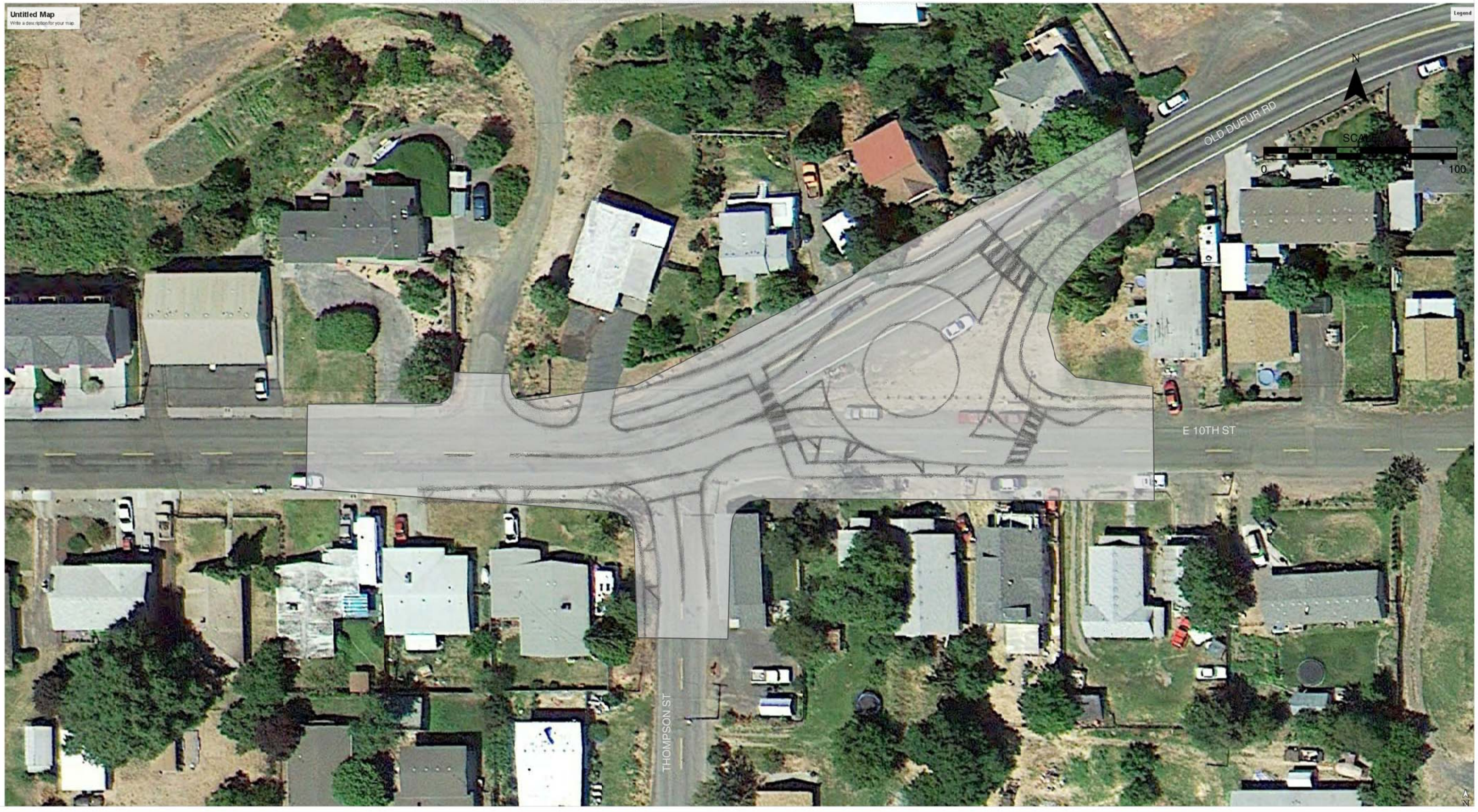
PROJECT I-6a: CONCEPTUAL OFFSET "T" INTERSECTION
THOMPSON ST/E 10TH ST/OLD DUFUR RD
THE DALLES, OR

Figure **5-6**



PROJECT I-6b: CONCEPTUAL MINI ROUNDABOUT INTERSECTION
THOMPSON ST/E 10TH ST/OLD DUFUR RD
THE DALLES, OR

Figure **5-7**



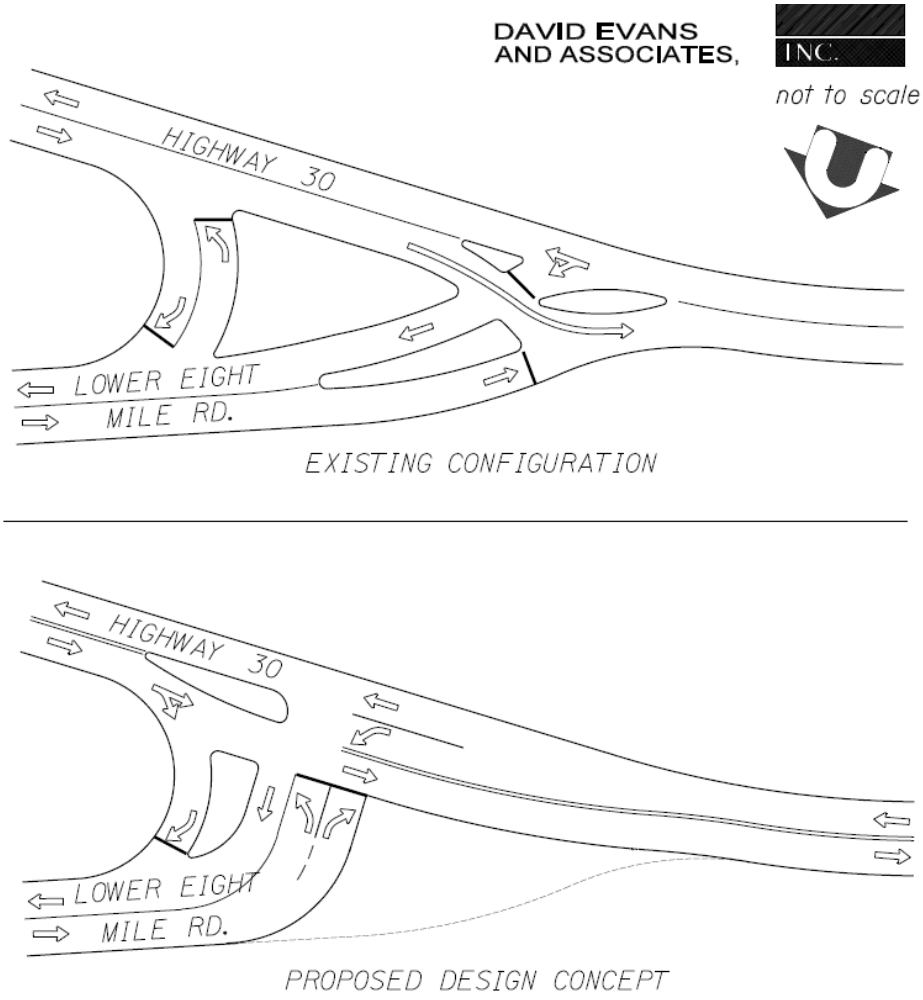
PROJECT I-6: CONCEPTUAL ROUNDABOUT & T-INTERSECTION
THOMPSON ST/E 10TH ST/OLD DUFUR RD
THE DALLES, OR

Figure **5-8**

Project I-7: Intersection Realignment at East 2nd Street/US 30

The intersection of East 2nd Street and US 30 (Intersection #28) has a unique TWSC configuration. The eastbound and westbound through movements are free-flow; however, the eastbound left-turn, westbound right-turn, and southbound movements are all stop-controlled. Westbound vehicles along US 30 are shifted to the north to accommodate the eastbound left-turn movement onto East 2nd Street.

As shown in Exhibit 5-6, realignment of the intersection was proposed in the 1999 The Dalles TSP. Realignment would eliminate the shift in alignment experienced by westbound vehicles.



Source: 1999 The Dalles TSP
Exhibit 5-6: East 2nd Street/US 30 Intersection Geometry

Alternatives Evaluation and Recommendation

Table 5-13 summarizes the evaluation criteria for this project.

Table 5-13. Project I-7 Evaluation Criteria Summary

	Evaluation Criteria Score by Goal				
Project ID	**Goal 1: Safety and Mobility**	**Goal 2: Multimodal Options**	**Goal 3: Integration**	**Goal 4: Economic Development**	**Total Score**
Alternative I-7 (Realignment)	5	0	2	1	8

Recommendation: This intersection realignment project was carried forward from the previous TSP through this update since it has not been constructed and is still needed. Based upon feedback from the PAC/TAC members, this intersection is not a major priority. The realignment to a traditional T-intersection was proposed in the City's previous TSP, but was not constructed. Operations are not anticipated to be a factor in the next 20 years and a safety need has not been identified based upon the historical crash data. This project should be considered as a long-term project.

Intersection Queue Length

Based upon the future operational analysis completed as part of Technical Memorandum #4, there were three signalized intersections identified with 95th percentile queue lengths expected to exceed the existing available queue storage lengths during the 2035 PM peak hour. No unsignalized queues are expected to exceed the available queue storage.

As shown in Table 5-14, the future 95th percentile queues lengths exceed storage at three study intersections. The following projects were identified to address these queue spillover issues.

Table 5-14. Comparison between 95th Percentile Queues and Available Storage

Intersection	Movement Exceeding the Existing Available Queue Storage	Weekday PM 95th Percentile Queue Length (feet)	Available Queue Storage (feet)	Length Exceeding Available Storage (feet)
Cherry Heights Road/West 6th Street	Northbound left	150	100	50
Webber Street/W 6th Street	Southbound right	125	50	75
Webber Street/W 2nd Street	Northbound right	50	25	25

Project I-8: Signal Modifications and Lane Reallocation at Cherry Heights Rd/W 6th Street

The southbound right-turn volume exceeds the total volume of the through and left-turns, indicating that an exclusive right-turn lane is needed. A near-term alternative is to reallocate the southbound approach to provide a shared left-through lane and an exclusive right-turn lane. The southbound left-turn phasing at the signal will need to be modified to accommodate this change.

The existing shared through/right lane has a storage length of approximately 150 feet. If the northbound left-turn queue extends past 150 feet, through and right-turning vehicles are prevented from entering the lane. In order to provide intersection continuity consistent with the proposed lane configurations on the southbound approach, the existing shared through/right lane should be converted to an exclusive right-turn lane. Northbound through vehicles and left-turning vehicles will be able to utilize the 400 feet of available distance between West 6th Street and West 8th Street. The northbound left-turn phasing will also need to be modified to accommodate the proposed change.

This intersection was analyzed with the proposed lane configurations, as shown in Figure 5-9, and with split signal timing phasing for the northbound and southbound approaches. The results showed similar intersection operations and all queue lengths are expected to be accommodated at the intersection. It is anticipated that the City's Maintenance Department could complete this project as part of routine restriping.

Alternatives Evaluation and Recommendation

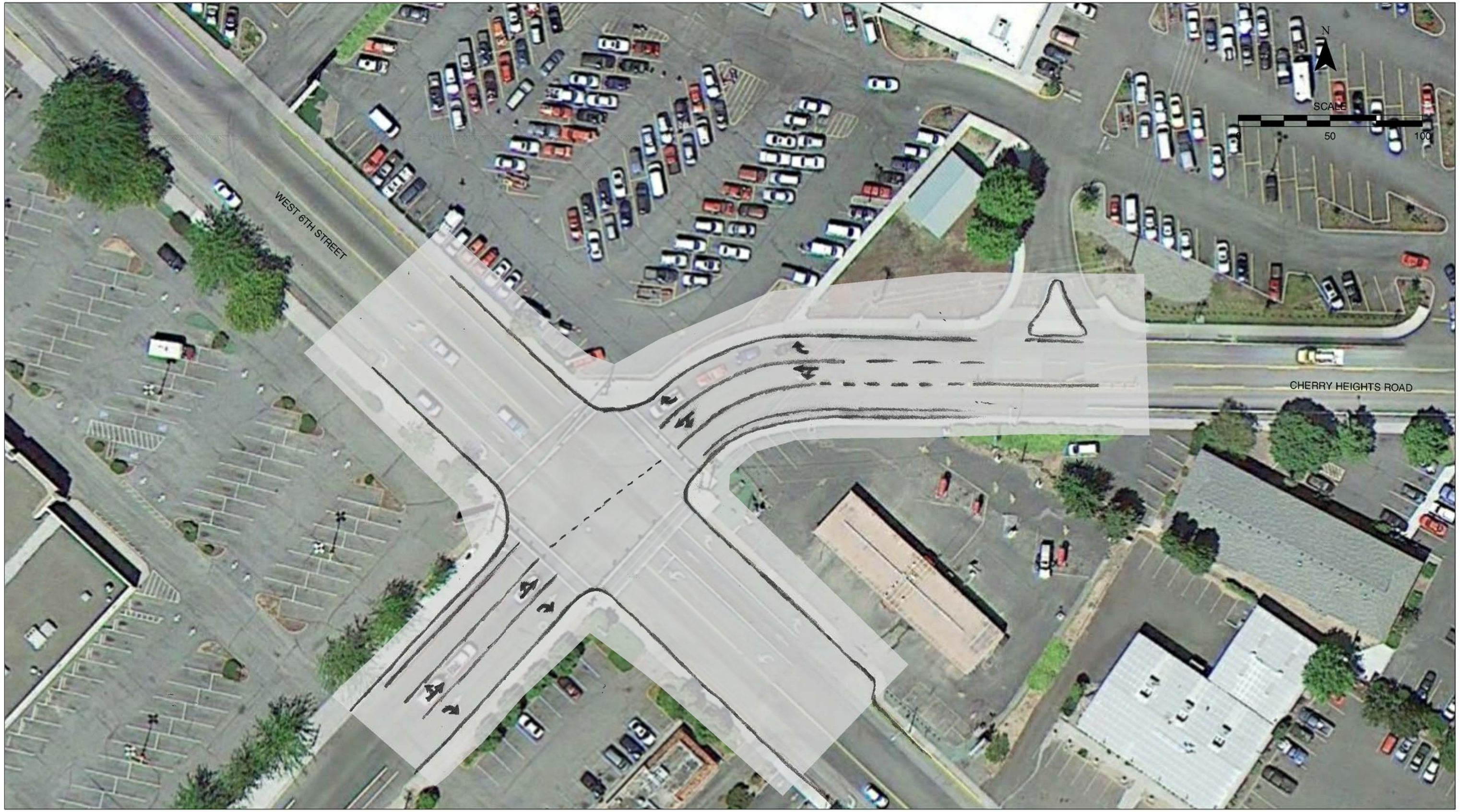
Table 5-15 summarizes the evaluation criteria for Project I-8.

Table 5-15. Project I-8 Evaluation Criteria Summary

	Evaluation Criteria Score by Goal				
Project ID	**Goal 1: Safety and Mobility**	**Goal 2: Multimodal Options**	**Goal 3: Integration**	**Goal 4: Economic Development**	**Total Score**
Alternative I-8 (Lane Reallocation)	3	0	1	1	5

This project was not discussed during the PAC/TAC meeting. However, feedback received indicated that they would like to see this improvement implemented. It is expected that this project could be completed in the short-term at a relatively low cost to the City.

Recommendation: Modifications to the lane configurations and signal timing phasing for the northbound and southbound approaches are recommended at this location.



PROJECT I-8: CONCEPTUAL LANE RESTRIPING
CHERRY HEIGHTS ROAD/W 6TH STREET
THE DALLES, OR

Figure **5-9**

Projects I-9 through I-11: Lane Alignment and Signal Optimization at Webber Street Signals

City staff has observed southbound queues from W 6th Street backing through the W 2nd Street intersection during midday peak periods due to the delay associated with permitted southbound left-turns. Ideally, the existing right-turn lanes would be extended beyond the queue in the shared through/left lanes to accommodate forecast demand queues at the Webber/6th Street (Intersection #9) and Webber/2nd Street (Intersection #10) intersections. Due to restrictions in width under the I-84 overpass, extending these turn lanes beyond 100 feet may not be feasible within the constraints of the existing structure.

To increase capacity at the intersections, the north and south approaches should be realigned to provide exclusive left-turn lanes, as shown in Figure 5-10 and Figure 5-11. Providing left-turn lanes would facilitate running concurrent left-turn phases and provide a protected left-turn phase. Additional alternatives include signal coordination of the north and southbound through traffic to minimize queueing between the signals.

Alternatives Evaluation and Recommendation

Table 5-16. Table 5-16 summarizes the evaluation criteria for projects associated with the queues at Webber Street/2nd Street and Webber Street/6th Street. Projects I-9 through I-11 Evaluation Criteria Summary

	Evaluation Criteria Score by Goal				
Project ID	**Goal 1: Safety and Mobility**	**Goal 2: Multimodal Options**	**Goal 3: Integration**	**Goal 4: Economic Development**	**Total Score**
Alternative I-9 (Signal Timing Modifications)	2	0	1	2	5
Alternative I-10 (Extend right-turn lanes for queue storage)	2	0	1	2	5
Alternative I-11a (Realign Webber Street approaches to provide dedicated north and southbound left-turn lanes)	2	0	1	2	5
Alternative I-11b (Realign northbound Webber Street approach to extend northbound left-turn storage lane))	2	0	1	2	5

The TAC/PAC discussion and the feedback received about these locations was positive.

Recommendation: This project could be a phased project as follows:

Short-Term

- *Extend the northbound right-turn lane at the Webber and 2nd Street intersection and the southbound right-turn lane at the Webber and 6th Street intersection.*

Medium-Term to Long-Term

- *Add an exclusive northbound and southbound left-turn lane at the 2nd and 6th Street intersections, respectively.*
- *Alter the signal timings to accommodate the new lane configurations.*
- *Coordinate the signals.*

The medium-term to long-term improvements at these intersections will require some right-of-way to accommodate the additional lanes.

PROJECT I-11a: CONCEPTUAL REALIGNMENT
WEBBER STREET/W 2ND STREET
THE DALLES, OR

Figure
5-10

PROJECT I-11a: CONCEPTUAL REALIGNMENT
WEBBER STREET/W 6TH STREET
THE DALLES, OR

Figure
5-11

DOWNTOWN COUPLET CIRCULATION

Within The Dalles downtown, the roadway system operates as a one-way couplet with westbound traffic on 2nd Street and eastbound traffic on 3rd Street. While there are few issues with the couplet today, the City is making efforts to revitalize downtown and attract new businesses that could be supported by a conversion.

Successful one-way to two-way conversions have been documented in several Oregon cities, one of the most notable being downtown Oregon City. Oregon City's conversion resulted in a complete street project that filled gaps in transportation infrastructure by linking transit, pedestrian, and bicycle networks. The project has been credited as "bolstering Oregon City's downtown, with 37 new downtown businesses opening in…32 months."

The advantages and disadvantages of a one-way to two-way conversion in The Dalles have been qualitatively evaluated relative to economic development, and motorized and non-motorized travel. Table 5-17 provides a general summary of the factors to be considered by the City and its stakeholders. If the consensus is that the conversion warrants further review after reviewing this qualitative comparison, additional quantitative evaluations of projects and costs could be completed to further inform decisions. An operational analysis of a two-way street couplet would require a new model run by ODOT's Transportation Planning Analysis Unit (TPAU) to understand how changes in traffic patterns would influence operations.

Table 5-17. Qualitative Evaluation of a One-Way to Two-Way Street Conversion in Downtown The Dalles

Evaluation Category	Advantages of Conversion	Disadvantages of Conversion

Motor Vehicles	• Easy-to-navigate network	• Impacts to existing local circulation downtown, potentially reducing traffic on 3rd Street while increasing through traffic on 2nd Street.
		• Increases congestion by introducing more conflicting movements at every intersection
		• Upgrades required to existing signals and intersections, including:
		  ○ Westbound left-turn lane at 2nd Street/Lincoln Street ($100,000)
		  ○ Signal modifications at 4 existing signals ($30,000), assuming permissive only left-turn phasing
		• New signals may be required to accommodate increased left-turn demand on 2nd Street at Taylor Street and Lincoln Street ($400,000)

Economic Development	• Supports other ongoing economic development efforts • Increases the visibility and accessibility of retail offerings • Slower speeds and congestion may make downtown appear busy, which could attract more retail customers	• Not a stand-alone catalyst for economic development.
Pedestrian/Bicycle	• Reduced speeds due to congestion may encourage more bicyclists to share the road with motor vehicles • Reduced potential for multi-threat crossing conflicts	• Additional delay at intersections.

Economic Development

Economic development is often cited as a primary benefit of a conversion and is associated with making the streets more "customer friendly" and "easier to navigate" – especially for tourist and infrequent customers. The level of these benefits is difficult to estimate, but given that The Dalles downtown is only 10 blocks long within the couplet, these benefits to potential customers appear minimal.

The conversion of one-way to two-way streets should not be considered a catalyst for economic development, but it could support other downtown revitalization efforts currently underway by The Dalles Main Street organization. According to the National Trust for Historic Preservation (www.preservationnation.org) the retail area affected by the conversion should be "experiencing a comeback" before a conversion can be effective.

Pedestrian and Bicycles

Experts from the Pedestrian and Bicycle Information Center within the University of North Carolina Highway Safety Research Center (www.pedbikeinfo.org) suggest one-way to two-way street conversions can "also help reduce motor vehicle speeds and vehicle miles traveled and provide improved conditions and access for bicyclists."

For pedestrians the potential for a multiple-threat crossing conflict is reduced by providing two-way traffic. This conflict occurs when a pedestrian is crossing a two-lane roadway and the vehicle in the lane nearest to the pedestrian stops for the pedestrian and a vehicle in the second lane does not stop. A two-way traffic flow eliminates this conflict since both drivers theoretically have an unobstructed view of the crosswalk on the approach.

Other pedestrian and bicycle enhancements, such as bulb-outs at intersections to reduce crossing distance, can be implemented without a conversion to two-way traffic.

Public Input and Recommendation

The Downtown Couplet conversion was not discussed with the PAC/TAC members due to time constraints; however, this was discussed as part of the public open house. The feelings were mixed with some people for the conversion and some against it. Both sides agreed that a comprehensive economic impact assessment needs to be completed before any decisions are made. Many of the supporters of the conversion stated that if the study did not indicate an economic benefit they would change their views on the conversion.

Recommendation: A study should be conducted as a short-term to medium-term term priority project as more information will be needed before making a decision on the potential conversion.

SAFETY ALTERNATIVES

The TSP Safety goal recognizes the importance of a safe transportation system that is reliable and in a state of good repair. Objectives include:

1A. Reduce the number of fatal and serious crashes in the plan area.

1B. Develop a multi-modal transportation system that incorporates safety and operational improvements for bicyclists and pedestrians.

1E. Improve safety and operational components of existing transportation facilities not meeting agency standards or industry best practices.

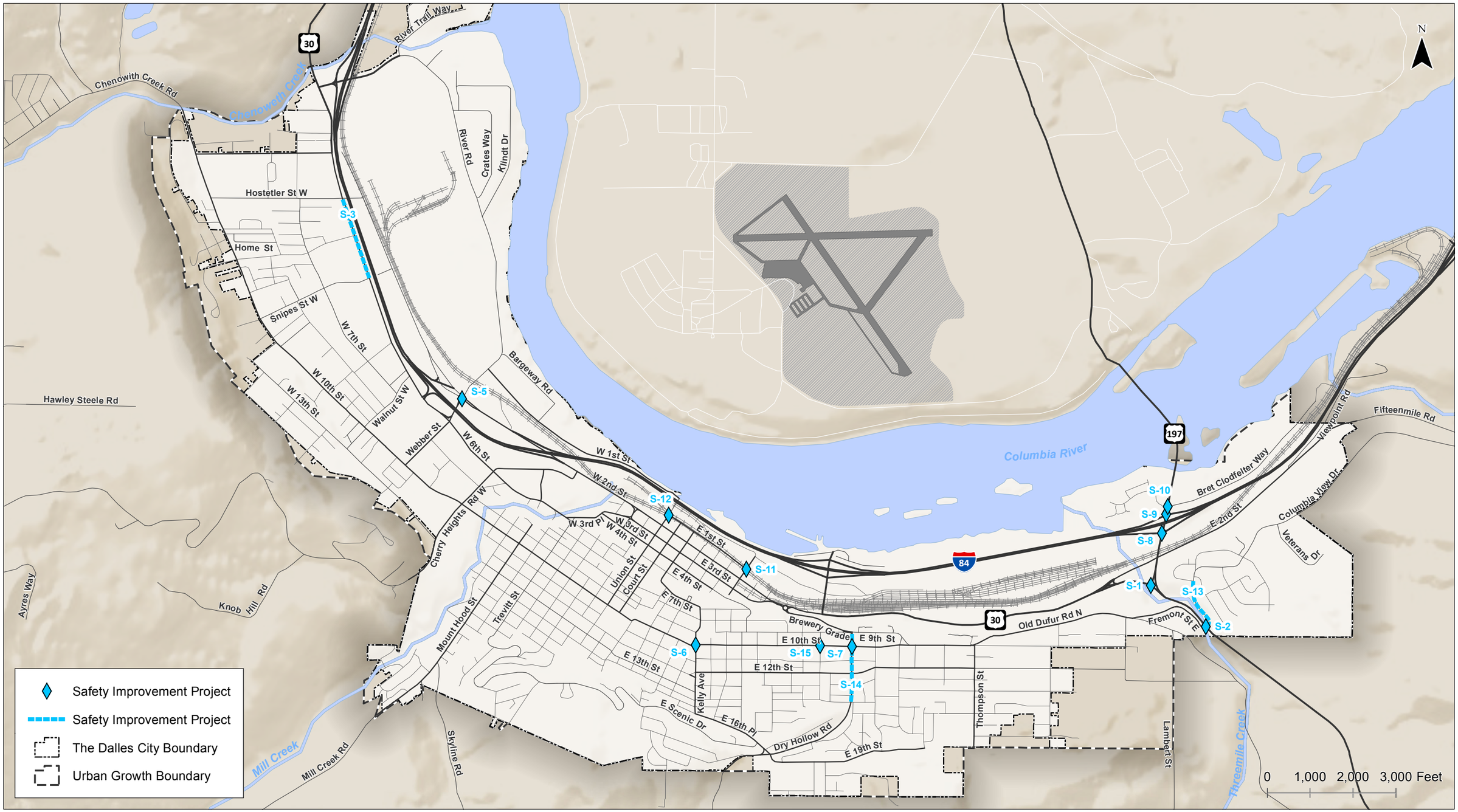
Based upon the crash trends and safety needs documented in Technical Memorandum #4, a range of safety alternatives were identified to address the crash patterns and trends observed during the five-year historical crash review period. Suggested countermeasures are provided in Table 5-18 and project

locations are illustrated in Figure 5-12. Individual projects are described in further detail after the table and figure. Some of the safety projects identified were also identified through the operational analysis and are therefore included in both sections. These projects have a corresponding number in the "Related Projects" column to indicate the operations project ID.

Table 5-18. Preliminary Safety Alternatives

Project No.	Project Name	Project Description	Related Projects	Reported Crash History	Recommended Priority	Cost Estimate[4]	Potential Funding Source		
							ODOT	City	Private
S-1	US 197/US 30	Systemic safety improvements (signing and markings)	I-1	14 of 15 crashes were left-turn/angle related.	Short-term	$2,000	✓		
S-2	US 197/Fremont Street/Columbia View Drive	Safety improvements including sign upgrades, rumble strips, dynamic message signage, and a J-Turn intersection conversion. As identified in project I-2, an overpass or roundabout may be a longer-term solution.	I-2	8 of 12 crashes were left-turn/angle related. One crash resulted in Injury A. A top 15% SPIS site; crash rate exceeded the critical crash rate.	Short-term / Long-term	$350,000	✓	✓	
S-3	West 6th Street from Snipes Street to Hostetler Street	Restripe roadway and widen, as necessary, to provide a consistent 3-lane section with center two-way, left-turn lane. Further study is needed to determine the preferred solution.	B-27	Rear-end and angle/turning movement crashes are the most-frequent crash types along this segment.	Medium-term	$250,000	✓	✓	
S-5	Webber Street at W 2nd Street and W 6th Street	Realign approaches to provide protected left-turn phasing to reduce left-turn crashes on the Webber Street approaches.	I-11	10 of 14 crashes were reported as angle or turning movement.	Medium-term	See Project I-11	✓	✓	
S-6	Kelly Avenue/East 10th Street	Potential safety improvements include installing Stop Ahead signage (W3-1) on the East 10th Street approaches, use of a larger stop sign size, use of retroreflective tape on the sign post, and/or addition of Light Emitting Diode (LED) lights on the STOP sign border.	None	4 of the 6 crashes were reported as angle and the crash cause identified in half of those crashes indicated that "the driver passed the stop sign."	Short-term	$2,000		✓	
S-7	Dry Hollow Road/East 10th Street	Potential safety improvements include the use of a larger stop sign size, use of retroreflective tape on the sign post, or addition of LED lights on the STOP sign border.	None	All six crashes were angle or turning movement related.	Short-term	$2,000		✓	
S-8	US 197/I-84 EB Ramps	Systemic sign upgrades as potential candidates for the ODOT All Roads Transportation Safety (ARTS) Program.	I-3	6 of 9 crashes were reported as angle or turning movement.	Short-term	$1,000	✓		
S-9	US 197/I-84 WB Ramps	Systematic sign upgrades as potential candidates for the ODOT ARTS program.	I-3	3 of 6 reported crashes were angle or turning movement.	Short-term	$1,000	✓		
S-10	US 197/Bret Clodfelter Way	Illumination and systemic sign upgrades as potential candidates for the ODOT ARTS program.	None	All 5 reported crashes at this intersection were angle or turning movement where the driver failed to yield the right-of-way.	Short-term	$14,000	✓		
S-11	1st St/Madison Street	Potential options include installation of part time restriction signage (sign that illuminates with railroad crossing activation) restricting eastbound left-turns during the approach and passage of trains.	None	N/A	Short-term	$2,000		✓	
S-12	1st St/Union Street	Installation of signage prohibiting drivers from stopping on the railroad tracks similar to Do Not Block Intersection signage.	None	A fatal crash was reported on July 5, 2015.	Short-term	$1,000		✓	
S-13	Columbia View Drive Guardrail	Install guardrail along Columbia View Drive as it ascends the hill east of Highway 197.	None	N/A	Medium-Term	$60,000		✓	
S-14	Dry Hollow Road Corridor Study	Conduct a corridor study of Dry Hollow Road between E 9th Street and E 14th Street to evaluate speeds and determine whether corridor and/or intersection treatments such as mini-roundabouts or low-cost treatments such as signing and striping enhancements are needed.	None	Public comments indicated a perceived safety concern at Dry Hollow Road/10th Street and Dry Hollow Road/12th Street. Six crashes were reported at Dry Hollow Road/10th Street.	Medium-Term	$10,000		✓	
S-15	Lewis Street/10th Street Intersection Enhancements	Stripe stop bars on Lewis Street at the approaches to 10th Street; Install advanced warning signage for the Lewis Street approaches.	None	Public comments indicated a perceived safety concern at this intersection.	Short-Term	$5,000		✓	

[4] Cost estimates include a 30% contingency



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Preliminary Safety Alternatives
The Dalles, Oregon

Figure
5-12

Oregon Department of Transportation

Kittelson & Associates, Inc.
Transportation Engineering/Planning

APG

Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

Project S-1: US 197/US 30

This intersection is a potential candidate for systematic sign upgrades as part of the ODOT All Roads Transportation Safety (ARTS) program. Some other mitigation options in addition to sign upgrades to consider could include the following:

- Install retroreflective tape on the sign post to increase sign visibility.
- Install transverse rumble strips to alert drivers of the intersection ahead.
- Convert the painted medians and channelizing right-turn bypass island into raised curb to reduce speeds and create an urban-like environment at the intersection.
- Reduce lane widths within the intersection influence area.
- Change in traffic control to alternative form such as:
    - Traffic signal
    - Roundabout

Roundabouts have proven to be an effective intersection treatment for improving safety – particularly for reducing severe and fatal crashes. NCHRP Report 572 found that converting a minor-road stop controlled intersection to a modern roundabout can reduce total crash frequency by 44 percent and injury crashes by 82 percent.

Project S-2: US 197/Fremont Street/Columbia View Drive

The majority of crashes occurring at unsignalized intersections on high-speed rural highways are right-angle crashes resulting from turning movements (1). The proportion of reported angle and turning crashes suggests that drivers may be accepting inadequate gaps when turning onto US 197 from Fremont Street or Columbia View Drive. The 6-percent grade on US 197 is expected to influence vehicle speed on uncontrolled approaches.

As described by Project I-2, a J-turn provides one at-grade alternative to reduce crash potential at this intersection. The J-Turn has been proven effective in reducing total crash frequency in other states, including Maryland (44% reduction) and North Carolina (27.2% reduction) (2, 3).

This intersection is also for a potential candidate for systematic sign upgrades as part of the ODOT ARTS program. The following alternative mitigation options could be considered in addition to the J-Turn intersection:

- Install retroreflective tape on the sign post to increase sign visibility.
- Install dynamic message signs that indicate when the roadway is icy or snowy.
- Install variable speed signs that display a lower advisory speed when the roadway is icy or snowy.
- Install transverse rumble strips to alert drivers of the intersection ahead.
- Reduce uncontrolled-approach lane widths and install rumble strips within the lane lines. This option has been effective in reducing crashes at rural two-lane stop-controlled intersections.
- As described in Project I-2, an overpass or roundabout may be a potential long-term solution.

Project S-3: West 6th Street from Snipes Street to Hostetler Street

There are 11 driveways along W 6th Street between Snipes Street and Hostetler Street (a 1,900 foot segment). Within this same segment 27 crashes were reported over the 5-year crash data review period. Restriping the existing pavement and widening the pavement, as needed, to provide a two-way left-turn lane (TWLTL) could reduce conflicts between northbound through and northbound left-turning vehicles.

The addition of a center TWLTL would also provide a refuge for vehicles exiting a driveway to travel northbound on West 6th Street. Vehicles attempting an eastbound left-turn would be able to perform a two-stage crossing, meaning they would look for a gap in southbound traffic and then a gap in northbound traffic rather than waiting to find a simultaneous gap in both directions. Creating a two-stage crossing could help reduce the number of angle crashes along the corridor and would also provide an operational benefit by reducing the delay for the vehicles exiting the driveways. Providing a center TWLTL in this section would also provide overall corridor continuity given West 6th Street includes a center TWLTL from Walnut Street to a point south of the Snipes Street intersection.

As parcels with access to 6th Street redevelop, the City should also pursue access consolidation, restrictions, and other access management strategies to reduce the number of vehicle-vehicle and vehicle-pedestrian conflicts.

As illustrated by the photos in Exhibit 5-7 and Exhibit 5-8, the existing cross section of 6th Street could allow for the addition of a center TWLTL. Where sidewalk has been constructed on W 6th Street there is approximately 75 feet from the edge of the sidewalk to the edge of pavement. Right-of-way dedication will be required on two parcels to obtain width for the TWLTL. Filling sidewalk gaps on these two parcels is identified as Project P-14.

Exhibit 5-7***: 6th Street 700 feet north of 6th Street/Snipes Street intersection***

Exhibit 5-8**: 6th Street in front of Bi-Mart**

There are several options for how to assign the available pavement width to include a TWLTL while maintaining on-street parking and enhancing bicycle facilities. One alternative cross-section is shown in Exhibit 5-9. A conceptual view of this cross-section on W 6th Street is illustrated in Figure 5-13.

PROJECT S-3: CONCEPTUAL CROSS-SECTION ON W 6TH STREET
SNIPES ST TO HOSTETLER ST
THE DALLES, OR

Figure **5-13**

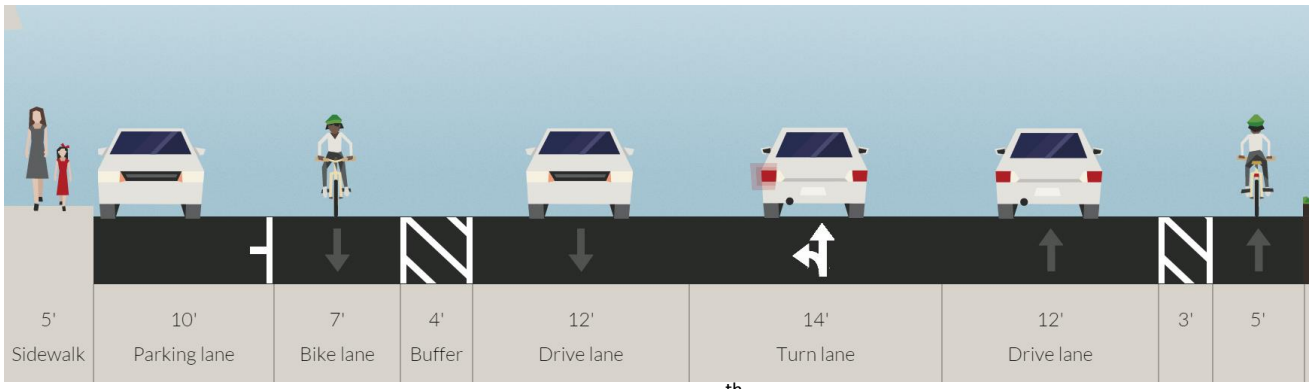


Exhibit 5-9: Example Cross-section Looking North on W 6th Street Between Snipes Street and Hostetler Street (Source: www.streetmix.net)

Public Input and Recommendation

The PAC/TAC members were positive to the idea of making changes to the existing cross section. The members indicated that in addition to the rear-end crashes, they have observed near misses involving northbound drivers using the southbound travel lane as a left-turn lane. The section of 6th Street to the south includes a center TWLTL. The members of the PAC/TAC were supportive including a center TWLTL and bike lanes along this section.

There were also discussions of including a buffered two-way cycle track on the west side of the road since there are no destinations on the east side of 6th Street. Due to the existing right-of-way and pavement width, there are many options to consider. One potential cross section that includes a center TWLTL and a buffered two way bicycle area is shown in Exhibit 5-10. This project should be further evaluated as a feasibility study and considered as a medium-term priority project.

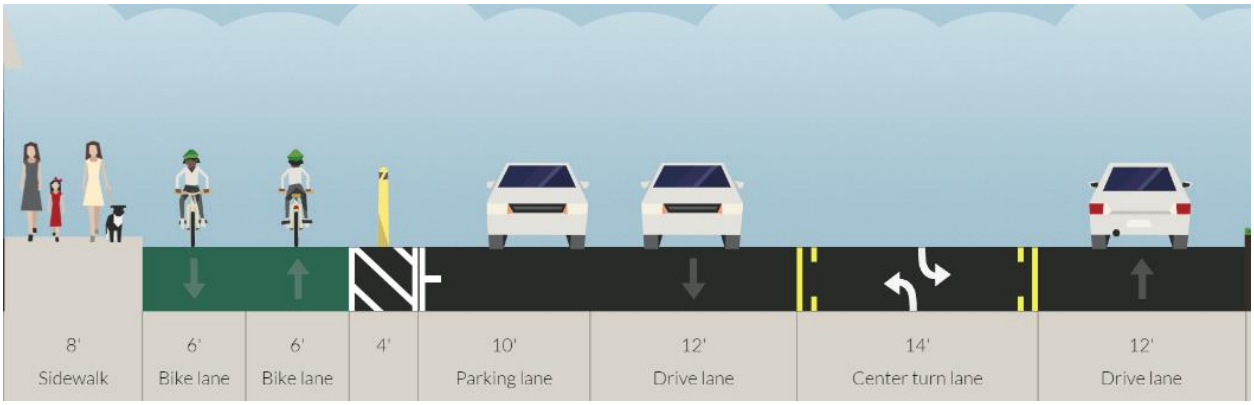


Exhibit 5-10*: 6th Street 700 feet north of 6th Street/Snipes Street intersection*

ACTIVE TRANSPORTATION ALTERNATIVES

Active transportation options, including walking and bicycling, are transportation alternatives that not only provide physical benefits to people but also reduce traffic and congestion on roadways. In order for people to choose walking and bicycling as viable modes of transportation, adequate facilities are needed to provide separation from motor vehicles and connectivity throughout the City.

Several pedestrian, bicycle, and transit projects have been identified in the following sections. Preliminary cost estimates are provided, but no evaluation has been prepared to prioritize these projects. Input from the Technical and Public Advisory Committees, general public, and an evaluation of how well each project meets goals established in Technical Memorandum #2 will inform prioritization. Project priorities will be summarized in Technical Memorandum #6.

Pedestrian System Alternatives

Pedestrian system alternatives were identified based on pedestrian facilities needs summarized in Technical Memorandum #4. Additional inventory data on accessible pedestrian ramps, obtained from the City on January 6, 2016, is summarized in *Appendix E*.

Pedestrian facilities could include sidewalks, shared-use paths, signing/striping at pedestrian crossings, and enhanced pedestrian crossing treatments (e.g., Rapid Rectangular Flashing Beacon). Pedestrian system alternatives serve a variety of needs, including:

- Relatively short trips (generally considered to be under a mile) to major pedestrian attractors, such as schools, parks, and public facilities;
- Recreational trips (e.g., jogging or hiking) and circulation within parks;
- Access to transit (generally trips under 1/2 –mile to bus stops); and,
- Commute trips, where mixed-use development is provided and/or people have chosen to live near where they work.

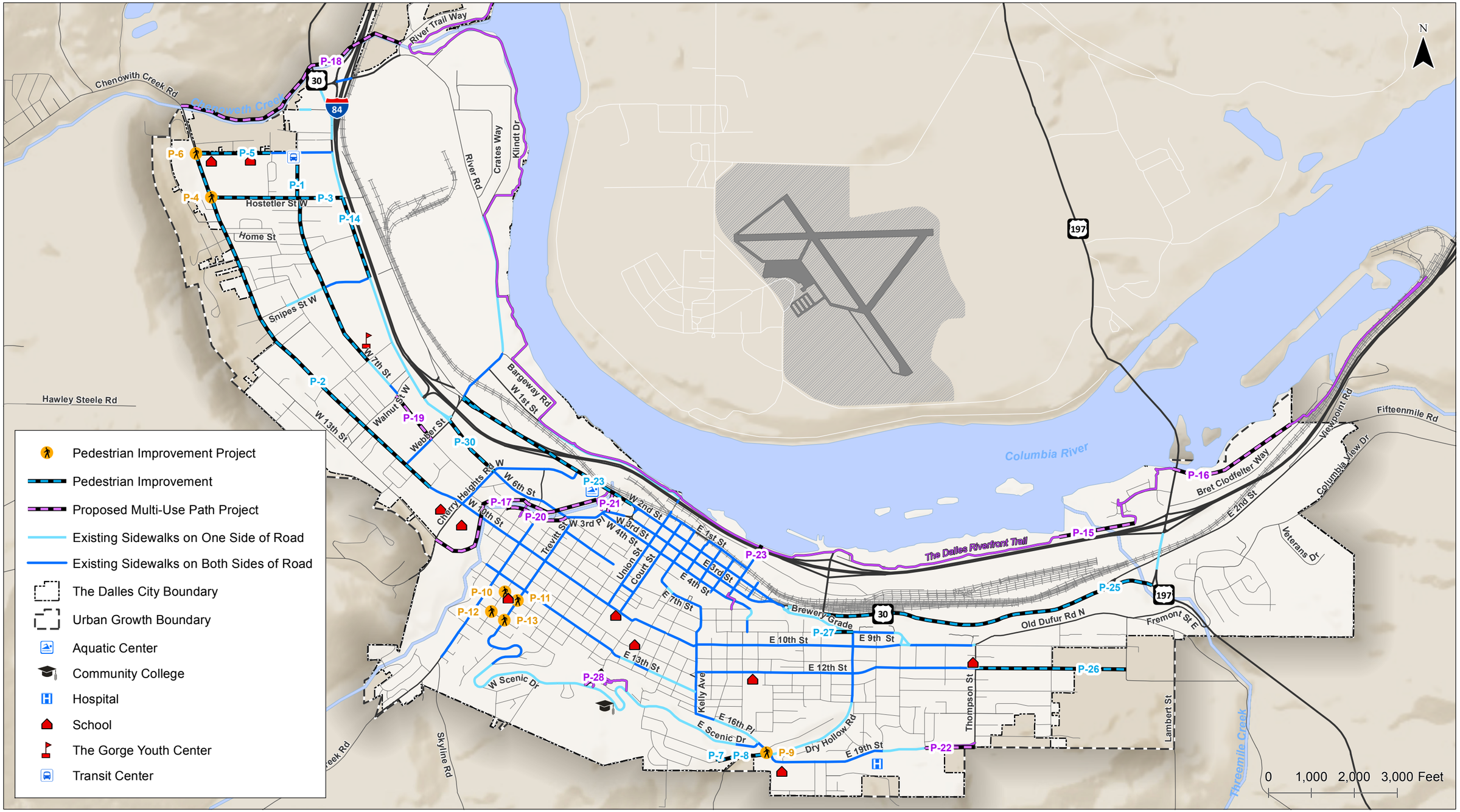
Future pedestrian facilities identified in Table 5-19 and illustrated in Figure 5-14 include strategic improvements to provide east-west connectivity throughout The Dalles, connectivity between residential areas and key destinations (transit center, aquatic center, and schools), crossing and route enhancements consistent with recommendations from Safe Routes to School Action Plans, and trail improvements to complete The Dalles Riverfront Trail.

Table 5-19. Proposed Pedestrian Facilities

Project No.	Project Name	Project Description	Project Category	Cost Estimate*	Source	Recommended Priority	Potential Funding Source		
							ODOT	City	Private
P-1	W 7th Street Sidewalk	Add a sidewalk on both sides of the street to fill sidewalk gaps from Chenowith Loop Road to Walnut Street.	Sidewalk	$ 330,000	KAI	Long-Term		✓	
P-2	W 10th Street Sidewalk	Add a sidewalk on both sides of the street to fill sidewalk gaps from Chenowith Loop Road to Vey Way	Sidewalk	$ 611,000	KAI	Long-Term		✓	
P-3	Hostetler Street Sidewalk	Add a sidewalk on both sides of the street from West 10th Street to West 6th Street	Sidewalk	$ 200,000	KAI	Long-Term		✓	
P-4	W 10th Street/Hostetler Street intersection	Stripe high emphasis crosswalk markings and install appropriate school crossing signal	Crossing	$ 2,000	SRTS	Near-Term		✓	
P-5	Chenowith Loop Road Sidewalk	Add sidewalk on the south side of the street from Chenowith Elementary School to W 10th Street	Sidewalk	$ 46,000	SRTS	Medium-Term		✓	
P-6	W 10th Street/Chenowith Loop Road Crosswalk	Stripe crosswalk markings and install appropriate school crossing signage	Crossing	$ 2,400	SRTS	Near-Term		✓	
P-7	E 18th Street Sidewalk	Complete the sidewalk connection on both sides of the street along East 18th Street to East 19th Street.	Sidewalk	$ 64,000	KAI	Medium-Term		✓	
P-8	E 19th Street Sidewalk	Add sidewalk on the north side of the street from East 18th Street to Dry Hollow Road	Sidewalk	$ 30,000	KAI	Medium-Term		✓	
P-9	E 16th Place/E 19th Street/Dry Hollow Road Crosswalk	Stripe crosswalk markings and install upgraded school crossing signage	Crossing	$ 2,500	SRTS	Near-Term		✓	
P-10	W 14th Street/Bridge Street Crosswalk	Stripe crosswalk markings and install upgraded school crossing signage	Crossing	$ 2,200	SRTS	Near-Term		✓	
P-11	W 14th Street/Trevitt Street Crosswalk	Stripe crosswalk markings and install upgraded school crossing signage	Crossing	$ 2,200	SRTS	Near-Term		✓	
P-12	W 16th Street/Bridge Street Crosswalk	Stripe crosswalk markings and install upgraded school crossing signage	Crossing	$ 2,200	SRTS	Near-Term		✓	
P-13	W 16th Street/Trevitt Street Crosswalk	Stripe crosswalk markings and install upgraded school crossing signage	Crossing	$ 2,200	SRTS	Near-Term		✓	
P-14	W 6th Street Sidewalk	Fill gaps between Snipes Street and Hostetler Street	Sidewalk	$34,000	KAI	Near-Term		✓	
P-15	The Dalles Riverfront Trail	Fill gap in Riverfront Trail from Lone Pine to existing trail. *Note that this project has been opposed by one of the tribes and is unlikely to be developed.*	Shared-Use Path	Unknown	City	Vision		✓	
P-16	The Dalles Riverfront Trail	Complete Riverfront Trail from US 197 to The Dalles Dam	Shared-Use Path	Unknown	City	Medium-Term		✓	
P-17	Mill Creek Trail	Construct path on the west bank of Mill Creek from Cherry Heights Road/13th Street intersection to The Dalles Riverfront Trail	Shared-Use Path	Unknown	1999 TSP	Long-Term		✓	
P-18	Chenoweth Creek Trail	Construct trail along the creek from W 10th Street to the Riverfront Trail, including an at-grade crossing of US 30 (Historic Columbia River Highway) and an undercrossing of I-84.	Shared-Use Path	Unknown	1999 TSP	Long-Term		✓	
P-19	Shared Use Path between West 7th Street and West 8th Street	Construct a shared-use path between West 7th Street and West 8th Street (from Walnut to Webber)	Shared-Use Path	$30,000	KAI	Medium-Term		✓	
P-20	Shared-Use Path along between W 8th Place and West 6th Street	Construct a shared-use path between Wright Street and West 6th Street. Pre-engineering for part of this trail has begun. Further plans should be coordinated with The Dalles Watershed Council and the Riverfront Trail Committee.	Shared-Use Path	$37,000	KAI	Near-Term		✓	
P-21	Shared-Use Path to the Aquatic Center	Construct a shared-use path between the intersection of West 3rd Place and West 4th Street to connect to the Aquatic Center and the Thompson City Park	Shared-Use Path	$7,000	KAI	Medium-Term		✓	
P-22	Shared-Use Path between East 19th Street and Thompson Street	Construct a shared-use path that connects East 19th Street to Thompson Street	Shared-Use Path	$26,000	KAI	Medium-Term		✓	

Project No.	Project Name	Project Description	Project Category	Cost Estimate*	Source	Recommended Priority	Potential Funding Source		
							ODOT	City	Private
P-23	W 2nd Street: Lincoln Street to Webber Street	Add a sidewalk on both sides of the street from Lincoln Street to Webber Street.	Sidewalk	$250,000	KAI	Medium-Term		✓	
P-24	Bike Hub	Install bike hub.	Bike Hub	$70,000	ODOT	Near-Term	✓	✓	✓
P-25	E 2nd Street Sidewalks	Construct sidewalks on one side of East Second Street between Brewery Overpass Road and Highway 197	Sidewalk	$380,000	KAI	Long-Term	✓	✓	
P-26	E 12th Street Sidewalks	Construct sidewalks on E 12th Street between Thompson and Richmond	Sidewalk	$170,000	KAI	Long-Term		✓	
P-27	E 9th Street Sidewalk Infill	Construct sidewalks on E 9th Street from Lewis Street to Brewery Grade to provide a complete connection.	Sidewalk	$13,000	KAI	Long-Term		✓	
P-28	Sorosis Park Trail Connection Study	Study the feasibility of improving the trail connections between Sorosis Park and Washington Street.	Study	$20,000	KAI	Long-Term		✓	
P-29	Pedestrian Access Study	Evaluate the best locations for pedestrian/bicycle connections across the interstate and railroad to access the river, Riverfront trail, and Lonepine.	Study	$20,000	KAI	Near-Term	✓	✓	
P-30	6th Street/Cherry Heights Road Pedestrian Access Study	Complete a study to examine pedestrian access in the area and determine the appropriate location and design for a mid-block crossing of 6th Street between Cherry Heights Road and Webber Street.	Study	$5,000	KAI	Medium-Term	✓	✓	

SRTS = Safe Routes to School
*Cost estimates do not include right-of-way costs and include 30% contingency.



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The Hub of the Pacific Northwest CITY OF THE DALLES OREGON

Future Pedestrian Facilities
The Dalles, Oregon

Figure **5-14**

Oregon Department of Transportation

KITTELSON & ASSOCIATES, INC. TRANSPORTATION ENGINEERING/PLANNING

APG

Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

Bicycle System Alternatives

Bicycle system alternatives on roadway segments include: markings and signs, shared lanes, dedicated bicycle lanes, protected bicycle lanes, and bicycle boulevards. Each range in the level of perceived safety and comfort provided to the bicyclist. Bicycle system alternatives considered at intersections include: signing and striping, bicycle signals, bike boxes, and median refuge islands.

The bicycle system alternatives include many bicycle routes and intersections where new or enhanced bicycle facilities are needed to provide additional connections, address safety concerns, or improve a route to encourage more users, as reflected by the transportation needs identified in Technical Memorandum #4.

As included in Technical Memorandum #3, there were several roadways throughout The Dalles that had a bicycle level of traffic stress (LTS) of 3 or 4. Bicycle LTS 2 is considered appealing to a majority of the bike-riding population and therefore, is the desired target on most roadways. A range of low-cost countermeasures were considered to address the segments with a bicycle level of stress of 3 or 4. The following improvements would allow the segments to have a bicycle LTS of 2 or less:

- Provide a 7-foot wide buffered bike lane to give bicyclists a buffer distance between the bike lane and adjacent travel lane,
- Reduce the posted speed limits to 30 miles per hour (mph) or less[5],
- Provide a paved bike lane where one does not exist today, and/or
- Improve intersection approach design of turn lanes to reduce difficulty for a bicyclist to traverse the intersection without having to change multiple lanes on the approach.

Proposed Bicycle Facilities

The proposed bicycle facilities were developed by identifying gaps in existing bicycle facilities, where additional east-west or north-south connectivity was needed, and where connectivity to local schools was requested in the Safe Routes to School Action Plans. Input was also received from the Bicycle Advisory Committee with their recommended bicycle network. The recommendations from the Bicycle Advisory Committee are summarized in Table 5-20 and illustrated in Figure 5-15.

Several projects were identified as high priority projects based on their ability to provide increased connectivity within the City and between residential areas and schools. These routes include many of

[5] Reducing the posted speed limit requires an engineering investigation and State Traffic Engineer Approval unless it meets the statutory speed zone criteria. Posted speeds are based on the existing 85th percentile speed. This recommendation to reduce the posted speed limit is subject to ORS processes.

the future connections shown on the east side of the urban area. The priority routes for constructing bike lanes could include:

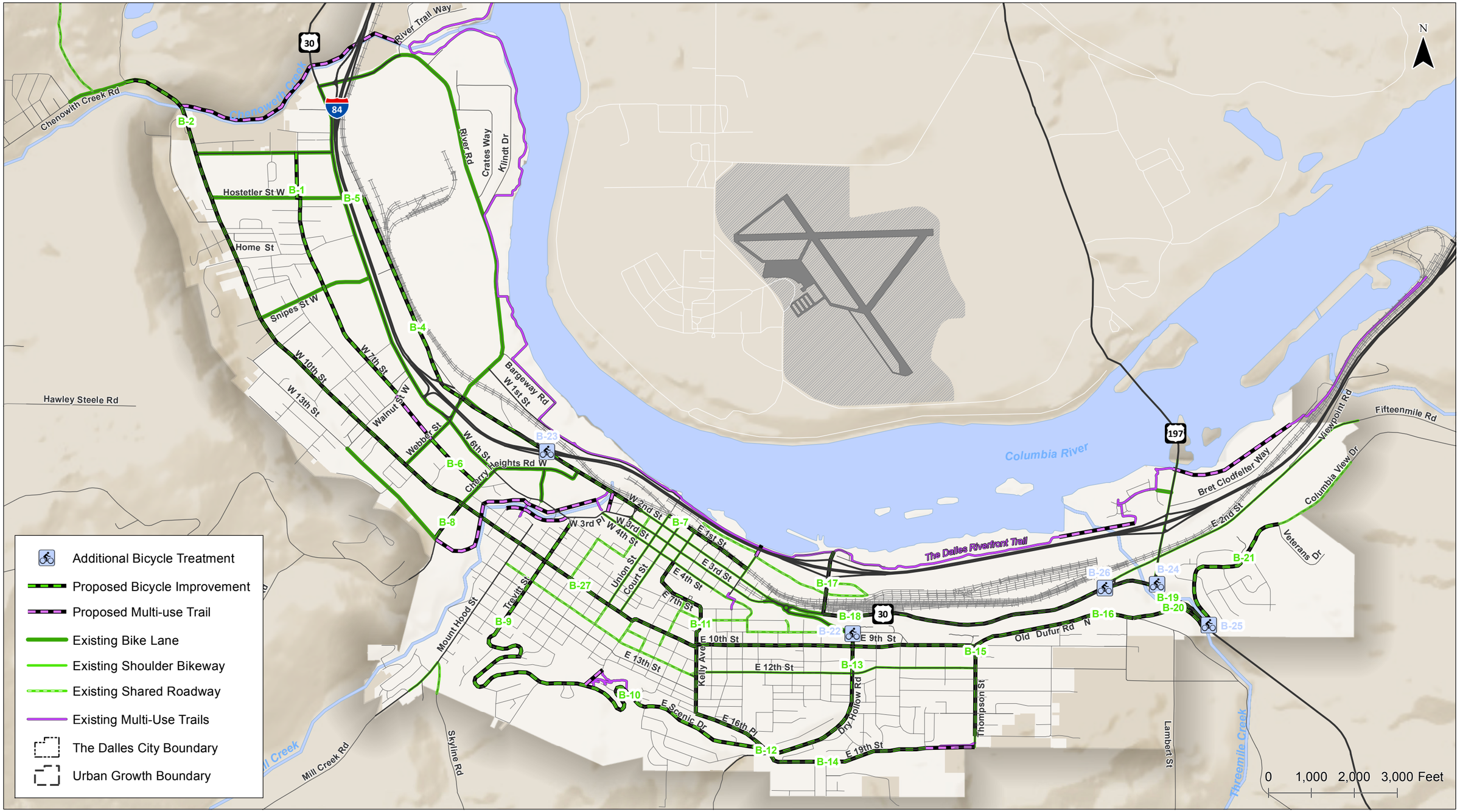
- West 7th Street (B-1): Add a bicycle lane to provide connectivity between local schools and the proposed Gorge Youth Center and to provide alternative east-west connectivity.
- East and West 10th Street (B-2, B-28): Add a bicycle lane or widen the existing bicycle lane to provide east-west connectivity and connectivity to residential areas of the City.

The following are additional roadways or intersections identified by the Bicycle Advisory Group for consideration for improvements including, new primary bicycle routes, new shared-used paths, and intersection improvements. These routes and associated improvements will be prioritized in Technical Memorandum #6 based on input from the Advisory Committees at the February 10, 2016 meeting.

Table 5-20. Bicycle Improvement Project Summary

Project No.	Project Name	Project Description	Project Category	Cost Estimate[1]	Source	Recommended Priority	Potential Funding Source		
							ODOT	City	Private
B-1	West 7th Street from the new Transit center to Walnut Street	Add a bicycle lane(s) along West 7th Street from Chenowith Loop Road to Hostetler Street	Shared Use Path	$31,000	Bicycle Advisory Committee	Short-Term		✓	
		Add a bicycle lane(s) along West 7th Street from Hostetler Street to Pomona Street	Shared Roadway	$1,000					
		Add a bicycle lane(s) along West 7th Street from Pomona Street to Walnut Street	Bicycle Lane without Pavement Widening	$10,000					
B-2	West 10th Street from Foley Lakes to Cherry Heights Road	Widen the existing bicycle lane to a 7-ft buffered bicycle lane from Foley Lakes to Cherry Heights Road	Bicycle Lane without Pavement Widening	$7,000	Bicycle Advisory Committee	Medium-Term		✓	
B-3	West 2nd Street from Hostetler Street to Webber Street	Add a bicycle lane(s) along West 2nd Street from Hostetler Street to Webber Street	Bicycle Lane with Pavement Widening	$800,000	Bicycle Advisory Committee	Long-term		✓	
B-4	West 2nd Street from Webber Street to Lincoln Street	Add a bicycle lane(s) along West 2nd Street from Webber Street to Lincoln Street	Bicycle Lane with Pavement Widening	$1,250,000	Bicycle Advisory Committee	Long-term		✓	
B-5	Hostetler Street from West 2nd Street to West 6th Street	Add a bicycle lane(s) along Hostetler Street from West 2nd Street to West 6th Street	Bicycle Lane with Pavement Widening	$67,000	Bicycle Advisory Committee	Medium-Term		✓	
B-6	West 8th Street from Webber Street to Cherry Height Road	Add a bicycle lane(s) along West 8th Street from Webber Street to Cherry Height Road	Bicycle Lane without Pavement Widening	$6,000	Bicycle Advisory Committee	Short-Term		✓	
B-7	East 1st Street from Union Street to Madison Street	Add a bicycle lane(s) along East 1st Street from Union Street to Madison Street	Bicycle Lane without Pavement Widening	$5,000	Bicycle Advisory Committee	Medium-Term		✓	
B-8	Cherry Heights Road from West 13th Street to West 10th Street	Add a bicycle route Cherry Heights Road from West 13th Street to 525ft north	Bicycle Lane with Pavement Widening	$111,000	Bicycle Advisory Committee	Long-term		✓	
		Add a bicycle route Cherry Heights Road from 525ft north of West 13th Street to W 10th Street	Bicycle Lane without Pavement Widening	$1,000					
B-9	Trevitt Street from West 6th Street to West 17th Street	Add a bicycle route along Trevitt Street from West 6th Street to W 10th Street	Bicycle Lane without Pavement Widening	$1,000	Bicycle Advisory Committee	Medium-Term		✓	
		Add a bicycle route along Trevitt Street from West 10th Street to W 17th Street	Bicycle Lane without Pavement Widening	$4,000					
B-10	Scenic Drive from West 17th Street to E16th Street	Add a bicycle route on Scenic Drive from West 17th Street to E 19th Street	Bicycle Lane without Pavement Widening	$14,000	Bicycle Advisory Committee	Medium-Term		✓	
B-11	Kelly Avenue from East 5th Street to E 16th Place	Add a bicycle route along Kelly Avenue from East 5th Street to E 7th Street	Shared Roadway	$4,000	Bicycle Advisory Committee	Short-Term		✓	
		Add a bicycle route along Kelly Avenue from East 7th Street to E 10th Street	Shared Roadway	$1,000					
		Add a bicycle route along Kelly Avenue from E 10th Street to East 14th St	Shared Roadway	$4,000					
		Add a bicycle route along Kelly Avenue from East 16th Street to East 14th St	Shared Roadway	$1,000					
B-12	E 16th Place from Kelly Avenue to Dry Hollow Road	Add a bicycle route along East 16th Street from Kelly Avenue to East 17 Street	Uphill Bicycle Lane with Pavement Widening	$39,000	Bicycle Advisory Committee	Short-Term		✓	

Project No.	Project Name	Project Description	Project Category	Cost Estimate[1]	Source	Recommended Priority	Potential Funding Source		
							ODOT	City	Private
		Add a bicycle route along East 16th Street from East 17 Street to Dry Hollow Road	Bicycle Lane without Pavement Widening	$3,000					
B-13	Dry Hollow Road from East 16th Street to Brewery Grade	Add a bicycle route along Dry Hollow Road from East 16th Street to Montana St	Bicycle Lane without Pavement Widening	$1,000	Bicycle Advisory Committee	Short-Term		✓	
		Add a bicycle route along Dry Hollow Road from Montana St to East 14th Street	Bicycle Lane without Pavement Widening	$3,000					
		Add a bicycle route along Dry Hollow Road from East 14th Street to Brewery Grade	Shared Roadway	$1,000					
B-14	East 19th Street from Dry Hollow Road to Oakwood Drive	Add a bicycle route along East 19th Street from Dry Hollow Road to Oakwood Drive	Bicycle Lane without Pavement Widening	$7,000	Bicycle Advisory Committee	Short-Term		✓	
B-15	Thompson Street from East 18th Street to East 10th Street	Add a bicycle route along Thompson Street from East 18th Street to East 10th Street	Bicycle Lane with Pavement Widening	$144,000	Bicycle Advisory Committee	Short-Term		✓	
B-16	Old Dufur Road from Fremont Street to East 10th Street	Add a bicycle route along Old Dufur Road from Fremont Street to East 10th Street	Bicycle Lane with Pavement Widening	$400,000	Bicycle Advisory Committee	Long-term		✓	
B-17	Brewery Overpass	Add a bicycle route along Brewery Overpass	Shared Roadway	$1,000	Bicycle Advisory Committee	Short-Term		✓	
B-18	US 30 from US 197 to Brewery Overpass	Add a bicycle route along East 2nd Street from US 197 to Brewery Overpass	Bicycle Lane with Pavement Widening	$979,000	Bicycle Advisory Committee	Long-term	✓		
B-19	US 197 from Fremont Street/Columbia View Drive to Lone Pine Boulevard	Add a bicycle route along US 197 from Fremont Street/Columbia View Drive to US30	Bicycle Lane without Pavement Widening	$5,000	Bicycle Advisory Committee	Medium-Term	✓		
B-20	Fremont Street	Add a bicycle route along Fremont Street	Shared Roadway	$1,000	Bicycle Advisory Committee	Short-Term		✓	
B-21	Columbia View Drive	Add a bicycle route along Columbia View Drive from US197 to East Knoll Drive	Uphill Bicycle Lane without Pavement Widening	$2,000	Bicycle Advisory Committee	Short-Term		✓	
		Add a bicycle route along Columbia View Drive from East Knoll Drive to Summit Ridge Drive	Bicycle Lane without Pavement Widening	$5,000					
		Add a bicycle route along Columbia View Drive from Summit Ridge Drive to Veterans Drive	Bicycle Lane without Pavement Widening	$3,000					
B-22	Dry Hollow at Brewery Grade	Additional bike treatment to improve bicycle safety	Bicycle	$3,000	Bicycle Advisory Committee	Short-Term		✓	
B-23	I-84 and 2nd Street	Additional bike treatment to improve bicycle safety	Bicycle	$3,000	Bicycle Advisory Committee	Short-Term	✓		
B-24	US 197 at US 30	Additional bike treatment to improve bicycle safety	Bicycle	$2,000	Bicycle Advisory Committee	Short-Term	✓		
B-25	US 197 at Fremont Street/Columbia View Drive	Additional bike treatment to improve bicycle safety	Bicycle	$3,000	Bicycle Advisory Committee	Short-Term	✓		
B-26	US 30 and E 2nd Street	Additional bike treatment to improve bicycle safety	Bicycle	$2,000	Bicycle Advisory Committee	Short-Term	✓		
B-27	E 10th Street Bike Lanes	Install bike lanes on E 10th Street between Cherry Heights Road and Old Dufur Road to create complete east-west connection, as identified in the network streets cross sections.	Bicycle Lane without Pavement Widening	$30,000	KAI	Medium-Term		✓	



C:\Users\agriffin\Documents\KAI Projects\031316_temp\temp copy of pdx gis folders\18495 the dalles\gis\TM #5\5-15 Proposed Bicycle Facilities.mxd - agriffin - 1:19 PM 3/29/2016

Future Bicycle Facilities
The Dalles, Oregon

Figure
5-15

Oregon Department of Transportation

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Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

East-West Connectivity

An emphasis has been placed on east-west connectivity through The Dalles. As mentioned in the previous sections, there are schools on the northwest side of the City as well as a new transit center currently under construction and a planned youth center. A high priority has been placed on providing safe and efficient bicycle facilities to connect these locations and to provide connection to the Downtown area.

West 7th Street (Project B-1)

West 7th Street was also identified as a high priority segment as it provides an alternative east-west roadway to West 10th Street and W 6th Street. With the recently completed connection to Chenowith Loop Road, this would provide a direct east-west connection from the new transit center currently under construction. Currently there are no marked bicycle lanes along West 7th Street from Chenowith Loop Road to Walnut Street.

The existing pavement width along the segment of West 7th Street varies from approximately 30 feet to 55 feet. Approximately 36 to 38 feet of pavement would be needed to provide two 11- or 12-foot travel lanes and a 7-foot buffered bike lane. Lane widths could be narrowed to encourage lower speeds and on-street parking could be removed to provide for bike lanes. In the locations where only 30 feet of pavement exists, an additional 6 to 8 feet of pavement could be added to provide for bike lanes. Right-of-way would need to be assessed in these locations; however, based on aerial imagery, it appears that the right-of-way on the south side of the roadway is approximately 10 feet off of the existing edge of pavement.

Downtown Historic Area (Project B-7)

The Downtown Historic Area currently does not provide bicycle lanes. Some bicyclists traveling in this area along 2nd Street or 3rd Street have indicated they do not feel comfortable sharing the lanes with vehicular traffic. One alternative to provide bicycle lanes along the east-west segments of Downtown would remove on-street parking on one side of 2nd Street and 3rd Street to provide a 7-foot buffered bike lane. Based on feedback from the City, this option is not feasible due to the value of on-street parking for local businesses.

A second option would use a parallel route on E 1st Street to provide a two-way bicycle boulevard. As shown in Exhibit 5-11, E 1st Street currently is a one-way street with a wide lane and on-street parking. The existing cross-section and one option to be considered are shown in Exhibits 5-12 and 5-13. Given the current use of E 1st Street for industrial purposes, a 14-foot minimum lane width is assumed.

Exhibit 5-11: Looking West on E 1st Street at Court Street (Source: Google Streetview)

Exhibit 5-12: Existing Cross-section Looking West on E 1st Street (Source: www.streetmix.net)

Exhibit 5-13: Alternative #1: Protected Bike Lane on E 1st Street (Source: www.streetmix.net)

Transit

MCCOG's Link service provides dial-a-ride service (door-to-door, on request). To enhance transit service within The Dalles, the City should evaluate the feasibility of implementing a fixed-route service. The service should prioritize routes between residential areas and key destinations (e.g., MCMC, Columbia Gorge Community College, downtown, Aquatic Center, etc.). A fixed route system could help reduce single-occupant motor vehicle trips and provide accessibility and connectivity, consistent with TSP Goal #2C.

Additional evaluation of fixed-route services will be conducted in summer 2016 and specific recommendations will be included in the final TSP.

COLUMBIA REGIONAL AIRPORT

The Columbia Gorge Regional Airport – Airport Master Plan, completed in August 2010, includes plans to construct new hangars, replace the existing terminal building, expand the runway ramps, install a new fuel farm, and utilize excess airport property for revenue generation. A plan to generate revue includes a planned business park area located in the southwest corner of the airport property. The Master Plan also identified a unique opportunity to utilize the excess airport property for a golf course and resort.

The business park is currently in a phase of development including the completion of 35 acres and 17 lots. The lots are shovel-ready for construction with the completed roadway infrastructure and utilities (water, sewer, electricity, cable, and high speed internet. *Appendix F* includes an exhibit of the recommended Master Plan Concept from the Airport Master Plan.

FUNDING PROGRAMS

Funding for the implementation of the projects identified in the Transportation System Plan will be shared between the City of The Dalles, ODOT, and private development. The proportional contributions are to be determined at the time that development occurs or some land use change triggers the need for implementation. Contributions of each agency, if any, should reflect facility usage by local, regional, or statewide trips.

To assist with the future implementation efforts, this section of the TSP outlines the existing revenue stream for transportation funding in the City of The Dalles, summarizes project costs by type for the recommended projects, and potential funding sources.

For the City of The Dalles, there are two strategic considerations related to transportation funding:

- The City's existing transportation System Development Charge (SDC) program should be updated following adoption of the TSP. The City Council needs to carefully consider the implications on the future rate assessed on both economic development potential and the

percentage of future transportation revenue needs that can be reasonably relied upon for funding by SDC.

- Due to declining revenue, both traditional and non-traditional partnerships and funding sources should actively be pursued by the City of The Dalles. This can include volunteer efforts to initiate trail construction, staff pursuit of grants, public/private partnerships, and coordination with State and County interests to help fund transportation projects.

Estimated Revenue

The City of The Dalles has three primary sources for funding transportation projects: a three-cent fuel tax, the State Motor Vehicle Fund, and the FAU Exchange Funds. The Transportation SDC Fund accounts for the receipt and expenditures of revenues to construct collector and arterial street improvements and is funded by SDC fees assessed on new development.

The primary sources of revenue for the Transportation Fund have been the State of Oregon gas tax and, to a lesser extent, state revenue sharing and the FAU fund exchange program. Recognizing the impact that the installation of public utilities have on the need for street repairs, the City of The Dalles recently established two new revenue sources for the Transportation Fund: franchise fees from the City's water and wastewater funds. The Transportation Fund covers the City's street, bike lane, right-of-way, and storm water maintenance. Table 5-21 summarizes transportation-related funding for the past five fiscal years (FY) as well as projections for the most recent fiscal year, which ends June 2016.

Table 5-21. Transportation Revenue

	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16
State Motor Vehicle Fund	$658,647	$783,286	$789,715	$825,100	$835,291	$832,610
FAU Exchange Funds	$303,202		$304,776		$566,438	$303,202
Local Fuel Tax	$396,102	$434,026	$442,468	$449,660	$476,806	$498,814
System Development Charges	$39,010	$168,629	$276,341	$95,479	$35,334	$100,000
Other Local Revenue Sources	$286,779	$290,878	$284,792	$296,364	$409,895	$581,231
Total	$ 1,683,740	$ 1,676,819	$ 2,098,092	$ 1,666,603	$ 2,242,777	$ 1,781,253

Based on the information provided in Table 5-21, the city has an average of $1.87 million per year in transportation revenues. The City's FY 15-16 budget for Street Fund Revenues is $2.27 million.

Records provided by the City indicate revenues have exceeded expenditures in FY 12-13 and FY 13-14 (FY 14-15 was not complete at the time of review). Budgeted Expenditures for FY 15-16 are summarized in Table 5-22.

Table 5-22. Fiscal Year 2015-2016 Budgeted Transportation Expenditures

	FY 12-13	FY 13-14	FY 14-15	FY 15-16
Personnel	$646,000	$600,000	$718,700	$759,700
Materials and Services	$442,000	$384,500	$605,300	$626,000
Capital Outlay	$121,900	$284,000	$249,200	$299,200
Other	$302,600	$538,300	$438,200	$585,600
Total	$1,512,500	$1,806,800	$2,011,400	$2,270,500

Based on records of expenditures in the current budget, the City anticipates spending 13 percent of the annual Street Fund budget on capital projects. If this level of funding is maintained for capital projects over the 20-year planning horizon, the City could fund approximately $6 million in capital projects.

Local Funding Mechanisms

At the local level, the City can draw on a number of potential funding mechanisms to increase funding for the TSP improvements.

Typically, as properties with road frontage develop, developers are required to build the road frontage along their property, consistent with City standards. This allows the transportation system to be developed incrementally at the same time as land develops. Property owners are only required to pay for improvements in proportion to the development's impact on the transportation system.

Table 5-23 outlines other potential funding sources at the local level that could be implemented in the future in the City of The Dalles. In general, local funding sources are more flexible than funding obtained from state or federal grant sources.

Table 5-23. Potential Local Funding Mechanisms

Funding Source	Description	Potential Application in Prineville
User Fee	Fees tacked on to a monthly utility bill or tied to the annual registration of a vehicle to pay for improvements, expansion, and maintenance on the street system.	Preliminary street improvements
Street Utility Fees/Road Maintenance Fee	The fee is based on the number of trips a particular land use generates and is usually collected through a regular utility bill.	System-wide transportation facilities including streets, sidewalks, bike lanes, and trails
Stormwater SDCs, Grants, and Loans	Systems Development Charges, Grants, and Loans obtained for the purposes of making improvements to stormwater management facilities.	Primarily street improvements
Optional Tax	A tax that can be used to fund improvements, and gives the taxpayer the option to pay. Generally paid at the same time other taxes are collected, optional taxes are usually less controversial and easily collected since they give the taxpayer a choice whether or not to pay the additional tax.	System-wide transportation facilities including streets, sidewalks, bike lanes, trails, and transit
Public/Private Partnerships	Public/private partnerships have been used in several places around the country to provide public transportation amenities within the public right-of-way in exchange for operational revenue from the facilities. These partnerships could be used to provide services such as charging stations, public parking lots, bicycle lockers, or carshare facilities.	System-wide transportation facilities including streets, sidewalks, bike lanes, trails, and transit
Tax Increment Financing (TIF)	A tool cities use to create special districts (tax increment areas) where public improvements are made in order to generate private-sector development. During a defined period, the tax base is frozen at the pre-development level. Property taxes for that period can be waived or paid, but taxes derived from increases in assessed values (the tax increment) resulting from new development can go into a special fund created to retire bonds issued to originate the development or leverage future improvements. A number of small-to-medium sized communities in Oregon have implemented, or are considering implementing, urban renewal districts that will result in a TIF revenue stream.	System-wide transportation facilities including streets, sidewalks, bike lanes, trails, and transit
Local Improvement Districts (LID)	A local improvement district is a geographic area where local property owners are assessed a fee to cover the cost of a public improvement in that area.	Improvements to the transportation system in a local area where local property owners will benefit from the improvement.

State and Federal Grants

In addition to local funding sources, the City of The Dalles can seek to leverage opportunities for funding from grants at the State and Federal levels for specific projects. The current Federal transportation bill, Fixing America's Surface Transportation (FAST) Act, was signed into law on December 4, 2015 providing long-term funding certainty for surface transportation.

In Oregon, most federal monies are administered through ODOT and regional planning agencies. Most, but not all, of these programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system.

Table 5-24 outlines those sources and their potential applications.

Table 5-24. Potential State and Federal Grants

Source ID	Source Title	Award Cycle	Intended Use	Applicable Project Types	Administration Agency	Deadline	Local Match	Website
1	STIP - Enhance	Biennial	Activities that enhance, expand, or improve the transportation system. Projects that improve or enhance the state's multimodal transportation system.	All	ODOT	August	10%	http://www.oregon.gov/ODOT/TD/STIP/Pages/WhatsChanged.aspx
2	*Connect*Oregon	Biennial	Non-highway transportation projects that promote economic development in Oregon.	Non-highway modes	ODOT	November	20%	http://www.oregon.gov/ODOT/TD/TP/pages/connector.aspx
3	Immediate Opportunity Funds	Biennial	Support primary economic development through the construction and improvement of street and roads.	All	ODOT	On-going	50%	http://www.oregon.gov/ODOT/TD/EA/reports/IOF_PolicyGuidelines2015%20doc.pdf
4	All Roads Transportation Safety (ARTS)	Biennial	Address safety needs on all public roads in Oregon; reduce fatal and serious injury crashes.	All hot spot and systemic safety projects	ODOT	Varies	8%	http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/Pages/ARTS.aspx
5	Federal Transit Administration Discretionary Grant Programs	Varies	Fund design, construction, and maintenance of pedestrian and/or bicycle projects that enhance or are related to public transportation facilities.	Pedestrian projects within one-half mile and bicycle projects within three miles of a public transit stop	FTA	Varies	Varies	http://www.fta.dot.gov/grants/FAST.html
6	Rivers, Trails, and Conservation Assistance Program	Annual	Technical assistance for recreation and conservation projects.	Shared-use paths	National Park Service	August	None	http://www.nps.gov/ncrc/programs/rtca/contactus/cu_apply.html
7	Oregon Parks and Recreation Local Government Grants	Annual	Primary use is recreation; transportation allowed. Construction limited to outside road right-of-way, only in public parks or designated recreation areas	Shared-use paths	OPRD	Varies	20%	http://www.oregon.gov/oprd/grants/pages/local.aspx
8	Recreational Trails Program	Annual	Recreational trail-related projects, such as hiking, running, bicycling, off-road motorcycling, and all-terrain vehicle riding.	Shared-use paths	OPRD	Varies	20%	http://www.oregon.gov/oprd/grants/pages/trails.aspx
9	Land and Water Conservation Fund	Annual	Acquire land for public outdoor recreation or develop basic outdoor recreation facilities	Shared-use paths, bikeways, sidewalks	OPRD	Varies	50%	http://www.oregon.gov/oprd/grants/pages/lwcf.aspx

Many funding opportunities target specific project types, including bicycle and pedestrian projects. In order to utilize City and State funding as efficiently as possible, these alternative funding opportunities should be considered for specific projects, as applicable.

The following sections provide more detail on some of the identified funding sources.

1) Statewide Transportation Improvement Program - Enhance

The Statewide Transportation Improvement Program (STIP) is ODOT's short-term capital improvement program, providing project funding and scheduling information for the department and Oregon's metropolitan planning organizations. STIP project lists are updated every two years, with four-year project lists. Project lists are developed through the coordinated efforts of ODOT, federal and local governments, Area Commissions on Transportation, tribal governments, and the public.

In developing this program, ODOT must verify that the identified projects comply with the Oregon Transportation Plan, ODOT Modal Plans, Corridor Plans, local comprehensive plans, and FAST Act planning requirements. The STIP must fulfill federal planning requirements for a staged, multi-year, statewide, intermodal program of transportation projects. Specific transportation projects are prioritized based on federal planning requirements and the different state plans. ODOT consults with local jurisdictions before highway-related projects are added to the STIP. Stand-alone bicycle/pedestrian projects are an eligible funding category, and multi-modal roadway projects that contain a planned pedestrian or bicycle improvement can also be funded through this mechanism.

In 2012, the Oregon Transportation Commission (OTC) and ODOT changed how the State Transportation Improvement Program (STIP) is developed. The STIP is no longer developed as a collection of projects for specific pools of funding dedicated to specific transportation modes or specialty programs. The STIP primarily divided into two broad categories: Fix-It and Enhance. Enhance activities expand or improve the transportation system and Fix-It activities preserve the transportation system.

The Fix-It project selection process is similar to prior STIPs, as these projects are developed mainly from ODOT management systems that help identify needs based on technical information for things like pavement and bridges.

The Enhance process was a significant change and reflects ODOT's goal to become a more multimodal agency and make investment decisions based on the system as a whole, not for each mode or project type separately. The agency has requested assistance from our local partners in developing the STIP and identifying those projects that assist in moving people and goods through the transportation system.

More information: http://www.oregon.gov/ODOT/TD/STIP/Pages/WhatsChanged.aspx

Surface Transportation Program

The Surface Transportation Program (STP) provides states with flexible funds that may be used for a variety of projects on any Federal-Aid Highway including the National Highway System, bridges on any public road, and transit facilities. Bicycle and pedestrian improvements are eligible activities under the STP.

The STIP-Enhance statewide multi-modal selection process awards STP funds in conjunction with TAP and other funds.

Transportation Alternative Program

The Transportation Alternative Program (TAP) is intended to promote projects that improve all modes of transportation. A federal program administered by ODOT, the TE program is funded by a set-aside of Surface Transportation Program (STP) monies. Ten percent of STP funds are designated for Transportation Enhancement (TE) activities, which include the "provision of facilities for pedestrians and bicycles, provision of safety and educational activities for pedestrians and bicyclists," and the "preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian and bicycle trails).

The STIP-Enhance statewide multi-modal selection process awards TAP funds in conjunction with STP and other funds.

2) ConnectOregon

*Connect*Oregon is a lottery-backed bond initiative to invest in air, rail, marine, transit, and bicycle/pedestrian infrastructure to ensure Oregon's transportation system is strong, diverse, and efficient.

*Connect*Oregon projects are eligible for up to 70% of project costs for grants. A minimum 30% cash match is required from the recipient for all grant funded projects. Projects eligible for funding from state fuel tax revenues (section 3a, Article IX of the Oregon Constitution, the Highway Trust Fund), are not eligible for *Connect*Oregon funding. If a highway or public road element is essential to the complete functioning of the proposed project, applicants are encouraged to work with their ODOT region, city, or county to identify the necessary funding sources.

All Oregonians will reap the benefits from enhancing Oregon's transportation infrastructure. People and businesses, as well as the environment, will benefit by having a more efficient, productive transportation system that improves Oregon's business environment, ultimately leading to more jobs and a more sound economy.

3) Immediate Opportunity Funds

The purpose of the "Immediate Opportunity Fund" (IOF) is to support primary economic development in Oregon through the construction and improvement of streets and roads. The 1987 Oregon

Legislature created state funding for immediate economic opportunities with certain motor vehicle gas-tax increases. Access to this fund is discretionary and the fund may only be used when other sources of financial support are unavailable or insufficient. The IOF is not a replacement or substitute for other funding sources. The IOF is designed to meet the following objectives:

A. Provide needed street or road improvements to influence the location, relocation or retention of a firm in Oregon.
B. Provide procedures and funds for the Oregon Transportation Commission (OTC) to respond quickly to economic development opportunities.
C. Provide criteria and procedures for Business Oregon, other agencies, local governments and the private sector to work with the Oregon Department of Transportation (ODOT) in providing road improvements needed to ensure specific job development opportunities for Oregon or to revitalize business or industrial centers.

4) ODOT All Roads Transportation Safety (ARTS) program

In late 2012 ODOT reached out to the League of Oregon Cities (LOC) and the Association of Oregon Counties (AOC) to mutually agree upon principles for a program that allocates funding for safety improvement projects to all agencies throughout the state. The program applies Federal Highway funding from the Highway Safety Improvement Program (HSIP) to roads managed by Oregon Counties and Cities.

ARTS currently splits funding between hot-spot and systemic safety projects. Hot spot safety projects are individual locations where a unique countermeasure could be applied to reduce the frequency and severity of crashes. Systemic safety projects include multiple locations where many low-cost countermeasures can be applied. Hot spot projects are most-likely to be funded if the project addresses a crash location with a history of fatal or debilitating (Injury A) crashes, consistent with the FAST Act.

ARTS project funding will be allocated through the Statewide Transportation Improvement Program (STIP).

5) Federal Transit Administration Discretionary Grant Programs

The Federal Transit Administration (FTA) views walking and bicycling as modes that complement public transit, as many people either begin or end a trip on public transportation, on foot, or by bicycle. The FTA issued a policy statement that defines a catchment area around transit stops within which bicycle and pedestrian projects are eligible for FTA financial support. All pedestrian projects within one-half mile and bicycle projects within three miles of a public transit stop are considered to have a de facto relationship with public transportation. Projects within this catchment area are thereby eligible for one of the grant programs administered by the FTA to fund the design, construction, and maintenance of pedestrian and/or bicycle projects that enhance or are related to public transportation facilities.

More information: http://www.fta.dot.gov/grants/FAST.html

6) Rivers, Trails, and Conservation Assistance Program

The Rivers, Trails, and Conservation Assistance Program (RTCA) is a National Parks Service (NPS) program providing technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance—there are no implementation monies available. Projects are prioritized for assistance based on criteria including conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. This program may benefit trail development in The Dalles indirectly through technical assistance, particularly for community organizations, but should not be considered a future capital funding source.

More information: http://www.nps.gov/ncrc/programs/rtca/contactus/cu_apply.html

7) Oregon Parks and Recreation Local Government Grants

The Oregon Parks and Recreation Department (OPRD) administers a Local Government Grants program using Oregon Lottery revenues. The grants may pay for acquisition, development, and major rehabilitation projects for public outdoor park and recreation areas and facilities. The amount of money available for grants varies depending on the approved OPRD budget. Grants are available for three categories of projects: small projects (maximum $50,000 request), large projects (maximum $750,000 request, or $1,000,000 for land acquisition), and small community planning projects (maximum $25,000 request). Several projects identified in this Plan would meet the grant eligibility requirements.

More information: http://www.oregon.gov/OPRD/GRANTS/local.shtml

8) Recreational Trails Program

OPRD administers Recreational Trails Grants for recreational-related projects including trails for hiking, biking, running, all-terrain vehicle riding, etc. The grants are administered by the Oregon Parks and Recreation Department (OPRD) and awarded annually.

More information: **http://www.oregon.gov/OPRD/GRANTS/Pages/trails.aspx**

9) Land and Water Conservation Fund

OPRD administers The Land and Water Conservation Fund grants to state and local governments for developing outdoor recreation areas for public use. These grants require the local governments to match the funding.

More information: http://www.oregon.gov/OPRD/GRANTS/Pages/lwcf.aspx

FINDINGS AND RECOMMENDATIONS

The improvement alternatives presented herein are not intended to be an all-inclusive list, but represent a range of suggestions. Prioritization of these alternatives will be established through evaluation of the goals, policies, and criteria that were previously developed to help guide the development of the City's Transportation System Plan, and input from the Project Management Team, Public Advisory Committee, and Technical Advisory Committee.

APPENDICES

A. The Dalles Network Streets
B. Evaluation Criteria Matrix
C. Future Alternatives Operational Analysis Worksheets, US 197/US 30
D. Future Alternatives Operational Analysis Worksheets, US 197 at I-84 EB Ramps
E. Pedestrian Ramp Accessibility Inventory
F. Columbia Gorge Regional Airport Master Plan

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