



Technical Memorandum

Date: October 13, 2022

Kittelson Project No: 23021.041

To: Project Management Team

From: Matt Kittelson, PE, Julia Kuhn, PE, and Miranda Barrus, PE

Subject: Final TM #7: Transportation System Improvements

Introduction

The Winston Transportation System Plan (TSP) will represent a coordinated set of multimodal policies, programs, and projects that address transportation needs within the City's Urban Growth Boundary (UGB) over the next 20 years. This memorandum summarizes proposed transportation system changes to support the needs identified through the existing and future conditions analyses (and as previously summarized in Technical Memorandums #4 and #5).

The projects presented herein recognize that although driving will continue to be important between now and 2045, increased transportation choices are equally important for meeting the needs of people traveling in and through Winston. The TSP projects, in partnership with the City's adopted land use plans and regulations, will ultimately result in land use patterns and transportation systems that make walking, cycling, and use of transit convenient so that, on balance, people can rely less on driving than they do today. Further, the projects identified help to achieve a number of objectives related to safety; provide transportation links that serve people of all ages, incomes, and abilities, and that support social, cultural, and health needs; promote sustainability; support continued economic growth and diversification within the city and region; and capitalize on investments that the City, County, and State have made in the existing infrastructure.

The remainder of this memorandum summarizes the transportation projects identified through technical analyses of existing and future needs as well as input from the Project Management Team (PMT), Project Advisory Committee (PAC), and the public. These groups, along with other Oregon Department of Transportation (ODOT) and City staff and City Council and Planning Commission members will review and help refine the transportation solutions documented in this memo. The refined solutions will then be presented in Technical Memorandum #8 (Preferred Solutions) with accompanying Project Sheets, including associated cost estimates, for incorporation into the TSP.

Summary of Identified Transportation Needs

The solutions presented herein address all modes of travel and include programs that could reduce vehicular travel demand. Further, these potential system changes avoid principal reliance on any one mode of transportation and increase transportation choices for all users.

The PMT completed an initial screening of potential projects that could address the identified needs based on the TSP's goals and objectives and key City priorities. The potential solutions were reviewed and refined to form the projects presented. Some of the considerations that shaped the draft list of recommended projects include:

- All studied intersections meet volume-to-capacity (v/c) thresholds both now and in 2045 with their current configuration, except for OR 42 / Lookingglass Road, which slightly exceeds its side-street v/c threshold.
- The City may consider reclassifying the Abraham Avenue corridor from a Major Collector to a Residential Collector. No other changes to the existing City's roadway functional classification system are necessary to support anticipated needs in 2045.
- ODOT is evaluating installation of a roundabout at the OR 42 / Brockway Road intersection to address existing safety needs. This project will be incorporated into the TSP.
- OR 42 / Lookingglass Road could benefit from safety countermeasures to reduce its observed crash rate and address its excess proportion of turning movement crashes, such as installing a traffic signal or roundabout. Either traffic control change would also increase intersection capacity.
- The highest percentage of people who may be transportation disadvantaged and/or underserved reside north of Lookingglass Road.
- Many of the collector streets in the City do not have sidewalks, curb and gutter, and/or bike lanes, and in some cases, centerline or edge line striping.
- OR 42 may be a community barrier to people walking and biking, especially in areas with higher posted speeds, such as south of Abraham Avenue and north of Brosi Orchard Road.
- The Umpqua Public Transit District (UPTD) plan is currently being developed and has identified the need for a potential downtown transit hub in Winston, bus-on-shoulder stop locations, and high priority locations where infrastructure is needed to support transit stop facilities. Findings from the UPTD plan will be incorporated into the TSP.
- The OR 42 bridge over Lower Lookingglass Creek has a sufficiency rating below 50. ODOT and the City will continue monitoring the need to modify or repair this and other bridges in the City as appropriate, including the Adair Bridge on Lookingglass Road over Applegate Creek.

- There are no rail or air facilities within the Winston UGB and no deficiencies related to pipelines were identified.

Several projects proposed for this TSP are identified on or along ODOT facilities. It is important to note that in all such cases further coordination with ODOT will be required, including refinement of design elements through preliminary and final design processes, and are subject to future ODOT approvals by the State Roadway-Traffic Engineer, pursuant with the ODOT Traffic Manual. In addition, any roundabouts considered along ODOT facilities are subject to Highway Directive DES-02, which will require additional coordination and documentation with the trucking industry at multiple steps throughout the planning, design, and construction of such facilities.

The resultant 20-year list of solutions is intended to address the identified transportation needs, meet the TSP goals, and reflect criteria included in Oregon Revised Statute (ORS) 660-012-0035. These projects are also intended to provide the City with flexibility to adapt to changing economic development and community needs over the next 20 years. The project lists and maps of the potential locations will be posted to the project website prior to the September 2022 Open House and PAC meeting.

Transportation System Improvements

The recommended multimodal transportation projects are organized into the following categories for implementation based on complexity, likely availability of funding, and assessment of need:

- Intersection and Street Solutions
- Priority Pedestrian Corridors and Crossing Locations
- Bike Facilities
- Transit

Some projects may be accelerated and others postponed due to changing conditions, funding availability, public input, or more detailed study performed during programming and budgeting processes. Further, project design details may change before construction commences as public input, available funding, and unique site conditions are taken into consideration. Projects identified herein may be funded through a variety of sources including federal, state, county, or local transportation funds, system development charges (SDCs), partnerships with private developers, or a combination of these sources, as described in Technical Memorandum #6 (Funding for Transportation System Improvements).

Intersection and Street Solutions

The needs assessment at intersections focused on vehicular capacity and safety whereas the street solutions identified priority street corridors where changes are needed to enhance safety, serve people driving, walking, riding bikes, rolling, and taking transit, and/or to help support future economic growth and community prosperity. The TSP is not inclusive of all intersection and street projects that the City will pursue over the next 20 years. Rather, these have been identified as projects that the City and ODOT can pursue to strategically improve the operational efficiency and safety of specific intersections and important streets. These projects can enhance safety, operations, and can be completed as opportunities arise. In all cases, the City will review the appropriate design treatments at the time of project development and delivery. The recommended intersection and street projects are illustrated in Figure 1.

Intersection Projects

Two intersections were identified for needing traffic control changes to address intersection safety and operations. Both intersections are located along OR 42 and include Lookingglass Road (intersection project I1) and Brockway Road (intersection project I2). ODOT is currently evaluating installation of a roundabout at the OR 42 / Brockway Road intersection. This intersection change offers strong support for the TSP goals and objectives presented in Technical Memorandum #2 (Community Transportation Framework) when assessed against the associate evaluation criteria.

OR 42 / Lookingglass Road has also been identified for an intersection project to address safety and capacity needs. As the intersection is on an ODOT facility, an alternatives analysis consistent with applicable ODOT procedures and review will be required prior to selection of a preferred intersection treatment. However, this memorandum includes an alternatives analysis to inform the possible intersection modification that could be considered through the future process. Details of that analysis are summarized in the following section.

OR 42 / LOOKINGGLASS ROAD INTERSECTION MODIFICATION

Multiple changes to the OR 42 / Lookingglass Road intersection were evaluated with the intent to improve traffic operations and safety conditions and with consideration of near-term and long-term needs, including:

- Separating the left- and right-turn movements on Lookingglass Road
- Implementing an eastbound acceleration lane or two-stage median on OR 42
- Signalizing the intersection
- Converting the intersection to a roundabout



Intersection and Street Solutions Winston, Oregon

It is important to note that these intersection changes differ from the recommendations in the OR 42 Expressway Plan, which plans to realign Lookingglass Road east to Pepsi Road and create a four-leg intersection. Feedback received from the project team and public during this TSP update indicate that environmental constraints and current operational conditions may make this planned realignment infeasible. Should the City pursue one of the intersection changes presented in this memo, the Expressway Plan will need to be amended.

Table 1 summarizes year 2045 resultant peak hour traffic operations for the alternatives, including their level of service (LOS), volume-to-capacity (v/c), and delay. As shown, the traffic signal and two-lane roundabout are forecast to provide the greatest increase in capacity and reduction in delay. *Attachment A includes the traffic operations worksheets for these alternatives.*

Table 1: OR 42 / Lookingglass Road Alternatives – 2045 Peak Hour Traffic Operations

Alternative	LOS	V/C	Delay
Separate side-street turn lanes	F	0.87	81.9
Traffic Signal	A	0.39	9.1
Single-lane roundabout	B	0.76 (EBLT)	14.6
Two-lane roundabout	A	0.38 (EBT & WBTR)	6.6

Further, a traffic signal or a roundabout at OR 42 / Lookingglass Road have the potential to improve safety conditions at the intersection based on ODOT's Crash Reduction Factor (CRF) List.

A high-level cost and safety benefit comparison between the two show that:

- Roundabouts have the potential to reduce all crashes at all injury levels (excluding property damage only) by up to 82 percent.
- In rural environments, traffic signals have the potential to reduce angle crashes (specifically) by up to 77 percent but also have the potential to increase rear-end crashes by up to 58 percent. In urban environments, these percentages change to a potential reduction in angle crashes by up to 67 percent but a potential increase in rear-end crashes by up to 143 percent.

Detailed crash prediction analyses should be conducted as part of a future alternatives analysis consistent with ODOT analysis procedures.

The intersection alternatives identified above were assessed against the TSP project evaluation criteria to determine how well they support the associated goals and objectives. The results of that evaluation are summarized in Table 2.

Table 2: OR 42 / Lookingglass Road Alternatives Evaluation Results

Description	Level of Support for TSP Goals & Objectives
Separate turn movements	Low
Implement eastbound acceleration lane	Low
Install traffic signal	Medium
Install roundabout	Medium

These results can assist the City in identifying its preferred intersection projects in the near- and long-term.

Street Projects

Three street corridors were identified as priorities for urban upgrades, including reconstruction of the following roads to major collector street standards:

- Lookingglass Road from west UGB to OR 42,
- Thompson Avenue from Hall Street to Winston Road, and
- Winston Road from Thompson Avenue to Tokay Street

These three corridors, both individually and taken together, provide important connections for people to access the civic uses and schools in the city. In lieu of a full roadway upgrade, the City may consider investigating the feasibility of a shared-used path along the Lookingglass corridor due to existing physical constraints, available space within the existing street cross section, and right-of-way needs to construct the street to major collector standard or to provide a path adjacent to the roadway.

Additional street project recommendations include:

- Further evaluation of traffic calming measures along Thompson Avenue to enhance the comfort and convenience for people walking, riding bikes, and rolling along this street to access the key activity centers in this corridor.
- Implementation of speed feedback signs on OR 42 near NW Civil Bend Avenue to encourage slower vehicular speeds through school zones.

As with the intersection alternatives, each street project was assessed against the TSP project evaluation criteria to determine how well it supports the associated goals and objectives. The results of that evaluation are summarized in Table 3.

Table 3: Street Projects Evaluation Results

ID	Street	Limits/Location	Description	Level of Support for TSP Goals & Objectives
S1	Lookingglass Road	West UGB to OR 42	Upgrade to Major Collector standard cross section	High
S2	OR 42	NW Civil Bend Avenue	Install feedback signs on north side of highway near intersection	Low
S3	Thompson Avenue	Main Street (OR 99) to Hall Street	Implement traffic calming measures (e.g., adding crossings, enhancing existing crossings, intersection bulb-outs, lighting, travel width reduction strategies)	High
S4		Hall Street to Winston Road	Upgrade to Major Collector standard cross section	High
S5	Winston Road	Thompson Avenue to Tokay Street	Upgrade to Major Collector standard cross section	High

These results indicate that most all identified street projects show strong support for the TSP goals and objectives and are key roadway facilities to include as priorities in the TSP.

Functional Classification Changes

Most of the City is served by an established network of streets. It is expected that automobiles will continue to be the primary method of personal travel for the next 20 years. The street system is also important for conveying freight, public transit, and emergency responders.

The City's street functional classification system organizes the roadway network into a balanced hierarchy of mobility and access to, through, and between different types of land uses. Some factors that are considered in setting a roadway's functional classification are average daily traffic (ADT) volumes, street connectivity, spacing of streets, the mix and amounts of different travel modes on a typical segment (e.g., bikes and cars), etc. Over time, as the community continues to grow and establish, functional classifications are periodically revisited to ensure that particular street classifications are still appropriate.

The City's functional classification is based on the following hierarchy:

- **Arterials:** these streets are the two state highways in the city and are intended to provide access to major centers, carry the highest traffic volumes, and connect the city to other areas in the county and region.
- **Major Collectors:** these streets serve as the “backbone” of the city street system and connect people between neighborhoods, commercial areas, and employment sites, and also provide connections to the two highways.
- **Residential Collectors:** these streets have a dual function of balancing livable streets with higher levels of traffic, indicating primary bike routes within neighborhoods and carrying higher traffic volumes than on other residential streets.
- **Residential Streets:** these are the primary local streets within neighborhoods.
- **Local Access Ways:** these typically serve a limited number of homes and are often narrower in width than other City streets.

Based on direction from the City, Abraham Avenue may be reclassified from a Major Collector to a Residential Collector due to the current and expected future traffic volumes along the corridor. The primary differences in the street cross sections of these classifications are slightly narrower right-of-way requirements and travel lane widths. Otherwise, all other cross section features are similar. Reclassifying this street does not conflict with the pedestrian and bicycle projects proposed later in the memo.

Figure 2 shows the proposed functional classification of streets within the city. In reviewing Figure 2, it is helpful to note that many of the existing streets are not built to current City standards and that not all will be rebuilt to match these standards over the next 20 years. It is also important to note that changes to existing streets (beyond those identified in the TSP) may be required as part of future land use approvals consistent with street functional classification requirements.

City Street Design Standards

Street design standards provide information on how streets within each of the functional classifications “look and feel.” The City's adopted Roadway Design Standards set forth how existing streets can be modified and new streets can be constructed to accommodate the needs of people with disabilities, riding bicycles, using transit, walking, driving automobiles, and moving freight. The roadway design standards are also shown in Table 4.

As identified in Tech Memo #4 (Existing Transportation Conditions), many streets within the project study area are not built to the standards summarized in Table 4, lacking sidewalks, curbs and gutters, and/or bike lanes, and in some cases, centerline or edge line striping.

Table 4: City Street Standards

Functional Classification	Right-of-Way	Sidewalks	Curb and Gutter	Bike Lanes	Travel Lanes	Center Turn Lane	On-Street Parking
Arterials	90'	6'	2'	6'	Four 12'	14'	N/A
	76'	6'	2'	6'	Four 12'	N/A	N/A
	66'	6'	2'	6'	Two 12'	14'	N/A
Major Collectors	68'	6'	2'	6'	Two 12'	N/A	8'
	56'	6'	2'	N/A	Two 12'	N/A	8'
	52'	6'	2'	6'	Two 12'	N/A	N/A
	44'	6'	2'	N/A	Two 14'	N/A	N/A
Residential Collectors	64'	6'	2'	6'	Two 10'	N/A	8'
	52'	6'	2'	N/A	Two 10'	N/A	8'
	48'	6'	2'	6'	Two 10'	N/A	N/A
	36'	6'	2'	N/A	Two 10'	N/A	N/A
Residential Streets	52'	6'	2'	N/A	Two 10'	N/A	8'
	36'	6'	2'	N/A	Two 10'	N/A	N/A
Local Access Ways	30'	6' (One Side)	2'	N/A	Two 10'	N/A	N/A

In addition to the urban upgrade projects recommended previously for the three key corridors, the City can work in coordination with the community and in public and private partnerships to bring remaining streets up to standard as community priorities evolve.

No changes to the existing street design standards are proposed through this TSP update, including those for walking and biking facilities.

ODOT Highways and Standards

Future changes to OR 42 are included as prioritized in the City's street and intersection projects. In addition to those shown, the City will continue to partner with ODOT to monitor and identify future projects that help to address the needs of local, regional, and statewide travel. OR 42 through Winston is subject to the ODOT design standards summarized in Table 5. Much of the highway meets these standards apart from the median treatments needed for the area designated as an Expressway east of Lookingglass Road. As the road authority for projects on the state highway system, ODOT rules and regulations will direct the timing, need, and funding for projects.

Access Management

The TSP recognizes the importance of collaborating with ODOT to encourage access point consolidation along OR 42 as redevelopment occurs in order to move closer to meeting Oregon Highway Plan (OHP) spacing standards. The TSP policy language will include coordination and access management language to achieve this objective.

Truck Routes

Both the TSP and the Oregon Transportation Plan recognize that an efficient and reliable transportation system plays an important role in supporting the region's economy, growth, and quality of life. Within the city, highways, city streets, and bridges provide freight mobility. Connections via freight vehicles are provided to rail and air service at other locations in the region. At the regional level, trucks, rail, and air service must function together to ensure the efficient and timely movement of freight to, within, and through the community.

The primary freight route is provided along OR 42 within the city. OR 42 is designated as a Reduction Review Route, which requires that ODOT consider load restriction and oversize-dimension load needs as part of planning, project development, development review, and maintenance. Localized truck service is primarily expected along the major collectors and residential collector streets, however, no freight designations are assigned to these facilities.

In addition to maintaining streets used by freight in a state of "good repair," the TSP supports future technological and information systems that will make freight delivery times more reliable.

Table 5: Oregon Highway Design Manual (HDM) Standards for OR 42

Posted Speed	Travel Lanes	Right Side Shoulder/ Bike Lane	Median				Bicycle Facility	Curbside or Separated Sidewalk	On-Street Parking
			Concrete Barrier	Striped (Multi-Lane)	Continuous Left Turn Lane	Raised Curb Median			
55 MPH ¹	12'	8'	10' (4 lane) 18' (6 lane)	10'	N/A	20'	Undesignated, Shoulder Designated, Separated Path or Parallel Streets	6' (separated)	N/A
45 MPH ¹	12'	8'	10' (4 lane) 18' (6 lane)	10'	N/A	18'		8' / 6'	N/A
55 MPH ²	12'	8'	8'	4'	14'	19'	Bike Lanes, Buffered Bike Lanes, or Separated Pathway	6'	N/A
45 MPH ²	12'	6'	N/A	2'	14'	16'		6'	N/A
45 MPH ³	12'	6'	N/A	2'	14'	16'	6'	6'	N/A
30 MPH ³	12'	6'	N/A	2'	14'	15'	6'	6'	N/A

¹HDM Table 6-1: Urban Expressways

²HDM Table 6-4: Urban Fringe/Suburban Area

³HDM Table 6-3: Urban Business Area

Note: These ODOT standards are for reference only and will not be included in the City's TSP. These standards have recently been updated as part of the 2023 HDM. The City will coordinate with ODOT on future improvements to the state highway system.

Traffic Impact Analysis Requirements

The City does not currently have adopted standards for when transportation review is required to support a development application or adopted standards that define the scope and scale of such a study. Currently, the City works with applicants and partner agencies on a case by case basis to determine appropriate analysis requirements.

As part of TSP implementation, the City should consider adopting formal transportation review requirements to ensure a clear and objective process for analyzing the transportation system. These requirements should:

- Identify clear thresholds for when analysis is or is not required
- When analysis is required, identify an expected scope of that analysis including a review and assessment of the multimodal transportation system.
- Identify City review practices, including expected operating standards for the transportation system.

Recommendations for these standards will be developed as part of the TSP Update.

Priority Pedestrian Corridors and Crossing Locations

The City relies on two primary types of pedestrian facilities to best serve different walking trips for people of all ages and abilities. Pedestrians must feel safe and comfortable and have convenient access to their desired destinations. These facility types include:

- Paved sidewalks adjacent to roadways: these are important for basic mobility of all people walking and rolling and particularly those with disabilities. Setback sidewalks (featuring a planted barrier between the sidewalk and travel way) can create more comfort and safety for people walking.
- Shared-use pathways are separate from the street and are designed for walking, rolling, and bicycling. Where space allows, corridors with more pedestrian and bicycle traffic may be developed with redundant paths to separate people walking from people biking. The paths for people walking or running may be unpaved depending on intended use. Where space is more constrained, a wider paved path with striping can serve people walking and biking and delineate uses.

The priority pedestrian corridors include both new sidewalks and pathways that address the following needs identified through analysis of existing and future system deficiencies:

- Filling gaps in the sidewalk network between neighborhoods, schools, parks, recreational areas, activity centers, transit stops, and to regional attractions;
- Incorporating arterial and collector street crossings and safety enhancements;

- Providing a sidewalk or shared-use pathway along all arterial, major collector and residential collector streets in the City; and
- Educating on walking safety and access to key routes.

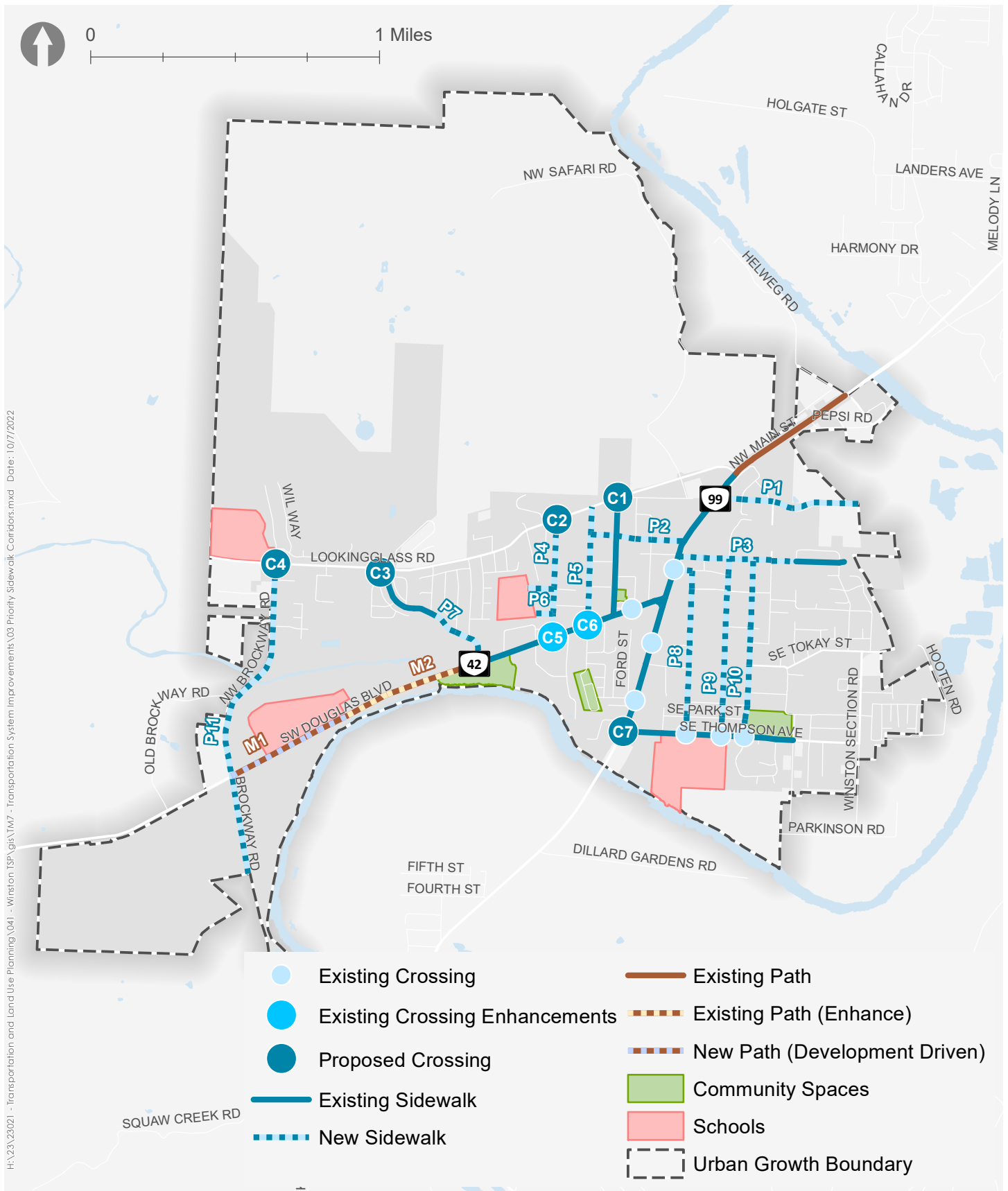
City leadership and residents should work together to interpret and enforce City code to create an unobstructed and safe route for pedestrians to walk along the sidewalk within the right-of-way. The prioritized locations for pedestrian system improvements are identified in Figure 3 and summarized in Table 6.

Coordination with ODOT will be necessary for any proposed improvements along the state highway. Further investigation will be required to determine the appropriate location of any enhanced crossings and the specific treatments. It is recommended that such crossing enhancement features are determined through crossing studies that consider roadway context (e.g., vehicular traffic volumes, roadway speeds, number of vehicular travel lanes to cross, etc.). Enhancements for crosswalks include treatments such as curb extensions, pedestrian refuge islands, pavement markings, illumination, signs, Rectangular Rapid Flashing Beacons (RRFBs), etc. As part of implementing these sidewalk and path projects, and as identified in Figure 3, the pedestrian crossing locations summarized in Table 7 support a more comprehensive pedestrian network.

Each sidewalk, path, and pedestrian crossing project was evaluated against the TSP evaluation criteria to determine how well it supported the goals and objectives. The results of that evaluation are also summarized in Table 6 and Table 7. These results can assist the City in identifying priorities and implementation timeframe.

Additional changes to the system of sidewalks and pathways as well as pedestrian crossing locations will occur over time as funding opportunities are available and/or as part of adjacent land development.

Further, the City will continue to partner with ODOT to apply for other funding sources including Safe Routes to School (SRTS) grants to prioritize changes to the facilities for people walking and rolling in the future.



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Figure 3

Priority Pedestrian Corridors Winston, Oregon

Table 6: Sidewalk and Path Projects and Evaluation Results

ID	Street	Limits	Description	Level of Support for TSP Goals & Objectives
M1	OR 42	Brockway Road to Douglas High School	Install new path wider than 6 feet (to achieve BLTS 2) that ties into existing path. Consider buffering (to achieve PLTS 2) and/or elevating.	High
M2		Douglas High School to Abraham Avenue	Enhance existing path. Consider buffering and/or elevating to improve LTS.	High
P1	Brosi Orchard	OR 42 to east UGB	Install 6-foot sidewalks per City street standards	Medium
P2	Sherry Street	Civil Bend Avenue to OR 42	Install 6-foot sidewalks per City street standards	High
P3	Jorgen Street	OR 42 to sidewalk tie-in	Install 6-foot sidewalks per City street standards	High
P4	Cary Street	OR 42 to Lookingglass Road	Install 6-foot sidewalks per City street standards	High
P5	Civil Bend Avenue	OR 42 to Lookingglass Road	Install 6-foot sidewalks per City street standards	High
P6	Tumlin Avenue / Elwood Drive	McGovern Elementary School to Cary Street	Install 6-foot sidewalks per City street standards	High
P7	Abraham Avenue	Sidewalk tie-in to OR 42	Install 6-foot sidewalks per City street standards	High
P8	Gregory Drive	Thompson Avenue to Baker Street	Install 6-foot sidewalks per City street standards	High
P9	Darrell Avenue	Thompson Avenue to Jorgen Street	Install 6-foot sidewalks per City street standards	High
P10	Grape Street	Thompson Avenue to Jorgen Street	Install 6-foot sidewalks per City street standards	High
P11	Brockway Road	Lookingglass Road to south UGB	Install 6-foot sidewalks per City street standards	High

Table 7: Crossing Projects and Evaluation Results

ID	Location	Description	Level of Support for TSP Goals & Objectives
C1	Glenhart Avenue / Lookingglass Road	Enhance crossing with features appropriate for the roadway context	High
C2	Cary Street / Lookingglass Road	Enhance crossing with features appropriate for the roadway context	High
C3	Abraham Avenue / Lookingglass Road	Enhance crossing with features appropriate for the roadway context	High
C4	Brockway Road / Lookingglass Road	Enhance crossing with features appropriate for the roadway context	High
C5	OR 42 / Cary Street	The SRTS Plan may identify improving this existing marked crosswalk in the school route with an RRFB in coordination with ODOT.	High
C6	OR 42 / NW Civil Bend Avenue	The SRTS Plan may identify improving this existing marked crosswalk in the school route with an RRFB in coordination with ODOT.	High
C7	OR 99 (Main Street) / Thompson Avenue	Enhance crossing with features appropriate for the roadway context (e.g., marked crosswalks, lighting, warning signs, active flashing beacons, refuge islands, etc.)	High

Bike Facilities

To encourage increased travel by bicycle, the TSP provides a list of prioritized bike facility projects as well as programs that will improve safety, convenience, and direct connections for this mode. Riding bikes can help promote health, has a lower environmental impact, and allows people to move independently throughout the community without motorized vehicles, including many who cannot or choose not to drive.

The City relies on shared-use pathways and on-street bike lanes to serve people riding bikes of all ages and abilities.

A description of the two types of facilities needed to provide comfortable and convenient travel by bike include:

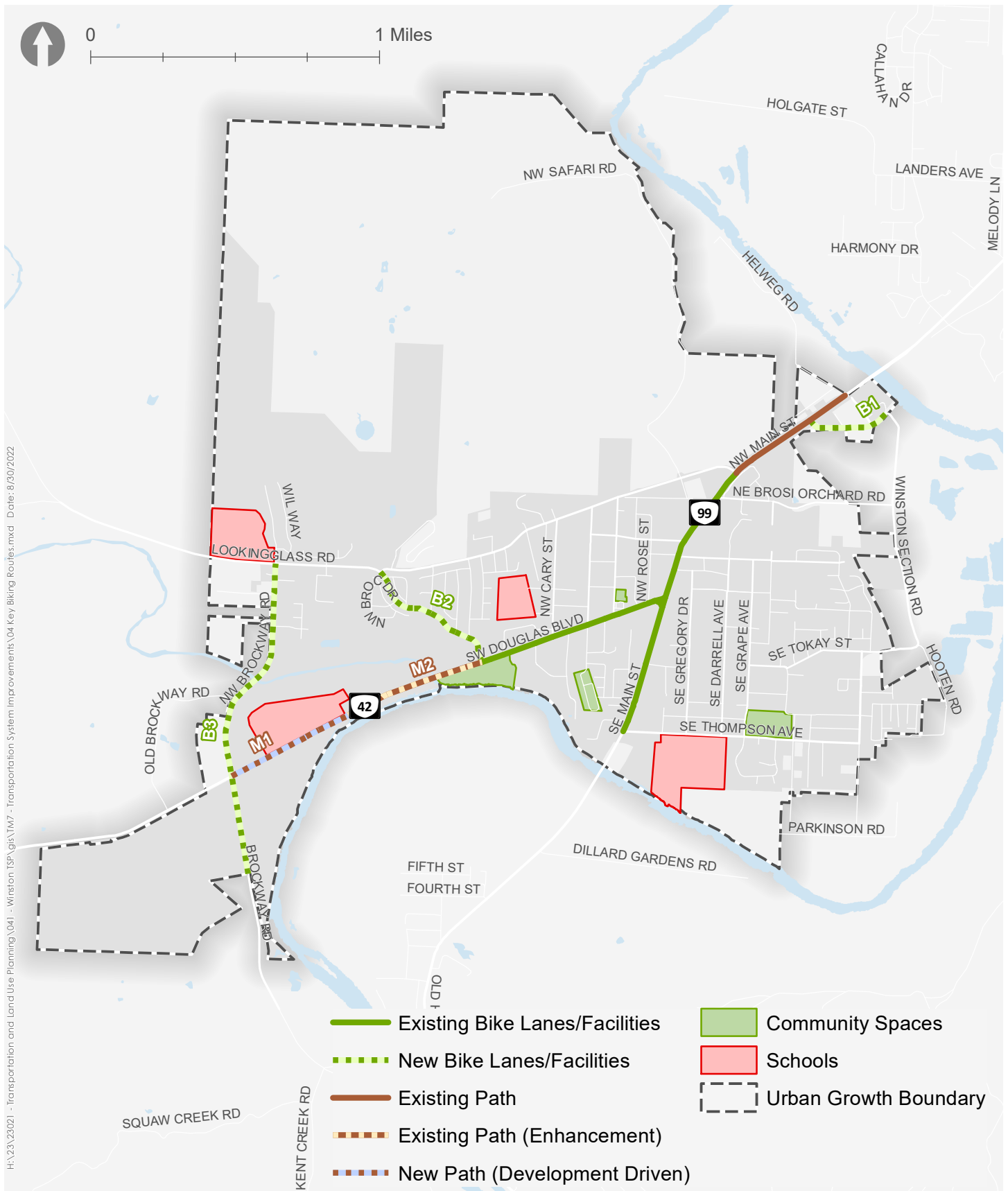
- A bike lane is a marked space along a length of street that is designated for use by people bicycling. Wheelchair users and some motorized scooters are allowed in bike lanes. In the future, some bike lanes may include a buffer strip to provide space between the bike lane and the auto lane or parked cars. Further, the City may also make use of green colorant where an auto lane crosses the bike lane.
- Shared-use pathways are separate from the street and are designed for walking, rolling, and bicycling. Where space allows, corridors with more pedestrian and bicycle traffic may be developed with redundant paths to separate people walking from people biking. The paths for people walking or running may be unpaved depending on intended use. Where space is more constrained, a wider paved path with striping can serve people walking and biking and delineate uses.

The bicycle-oriented projects and programs in the TSP focus on:

- Providing a more complete bicycle route network throughout the City, including parallel routes to OR 42 and Main Street (OR 99) for less experienced riders;
- Creating a loop of bicycle facilities/pathways around the City (i.e., providing a continuous connection along Lookingglass Road to Abraham Avenue to Thompson Avenue to Winston Section Road) that can be comfortably be used by children and teens as well as people who chose not to or are unable to travel by car for daily activities, including recreation;
- Educational programs;
- Connections to transit stops and a potential transit hub.

Figure 4 and Table 8 identify projects for key biking routes in Winston. As with intersection, street, and pedestrian corridor projects, each bike project was evaluated against the TSP evaluation criteria to determine how well it supports the goals and objectives. The results of that evaluation are also summarized in Table 8. These results can assist the City in identifying priorities and implementation timeframe. As with pedestrian facilities, coordination with ODOT will be necessary for any proposed improvements for bike facilities along the state highway.

As additional funding becomes available and/or as part of development activities, bike lanes may be incorporated into additional streets over time.



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Figure 4

Key Biking Routes Winston, Oregon

Table 8: Bike Projects and Evaluation Results

ID	Street	Limits	Description	Level of Support for TSP Goals & Objectives
B1	Pepsi Road	OR 42 to Winston Section Road	Install shared roadway treatments (e.g., signage, pavement markers)	Low
B2	Abraham Avenue	Lookingglass Road to OR 42	Install 6-foot bike lanes consistent with Major/Residential Collector standard	High
B3	Brockway Road	Lookingglass Road to south UGB	Install 6-foot bike lanes consistent with Major Collector standard	Medium

Transit

The TSP promotes the provision of high-quality, available, and reliable transit service that fundamentally supports the environment, economic development, and equity for all travelers. Based on the needs analysis, the TSP focuses on collaboration with UPTD to provide service enhancements, capital improvements, and policies that support:

- Changes to streets and intersections to facilitate bus movement;
- Amenities that also serve pedestrians and people on bikes, and intermodal connections to transit;
- Refinements to transit routes and schedules.

The City is working with UPTD on the Transit Plan recommendations. Ultimately, the Transit Plan will be adopted by reference into the TSP. At this point, the Transit Plan includes the following recommendations:

- Changes to the Greyline (connects Winston to Roseburg with a loop in Winston) to increase the service frequency and extend the current route along OR 99 (Main Street) to Dillard (with an emphasis on serving workforce)
- Changes to Route 99 (connects Roseburg to Canyonville with stops in Winston) to expand service to seven days per week
- Changes to the Roseburg Express (connects Roseburg to Coos Bay with a stop in Winston) to add more service during the day and additional days per week
- Provision of a downtown Transit Hub, possibly including Electric Vehicle (EV) charging
- Provision of bus-on-shoulder stop locations
- Additional facilities at high-priority bus stop locations to increase the comfort and access for people waiting for their bus

Table 9 and Figure 5 identify the draft transit recommendations. Each transit project was evaluated against the TSP evaluation criteria to determine how well it supports the goals and objectives. The results of that evaluation are also summarized in Table 9. These results can assist the City in identifying priorities and implementation timeframe.

Table 9: Public Transportation Projects and Evaluation Results

Location	Description	Level of Support for TSP Goals & Objectives
Jorgen Street / Grape Avenue / Thompson Avenue	Expand Greyline route and provide vicinity bus stops	Medium
Downtown	Implement mobility hub to interline transit routes and promote mobility throughout the city (e.g., bikeshare, park-n-ride, electric vehicle charging, etc.)	Medium

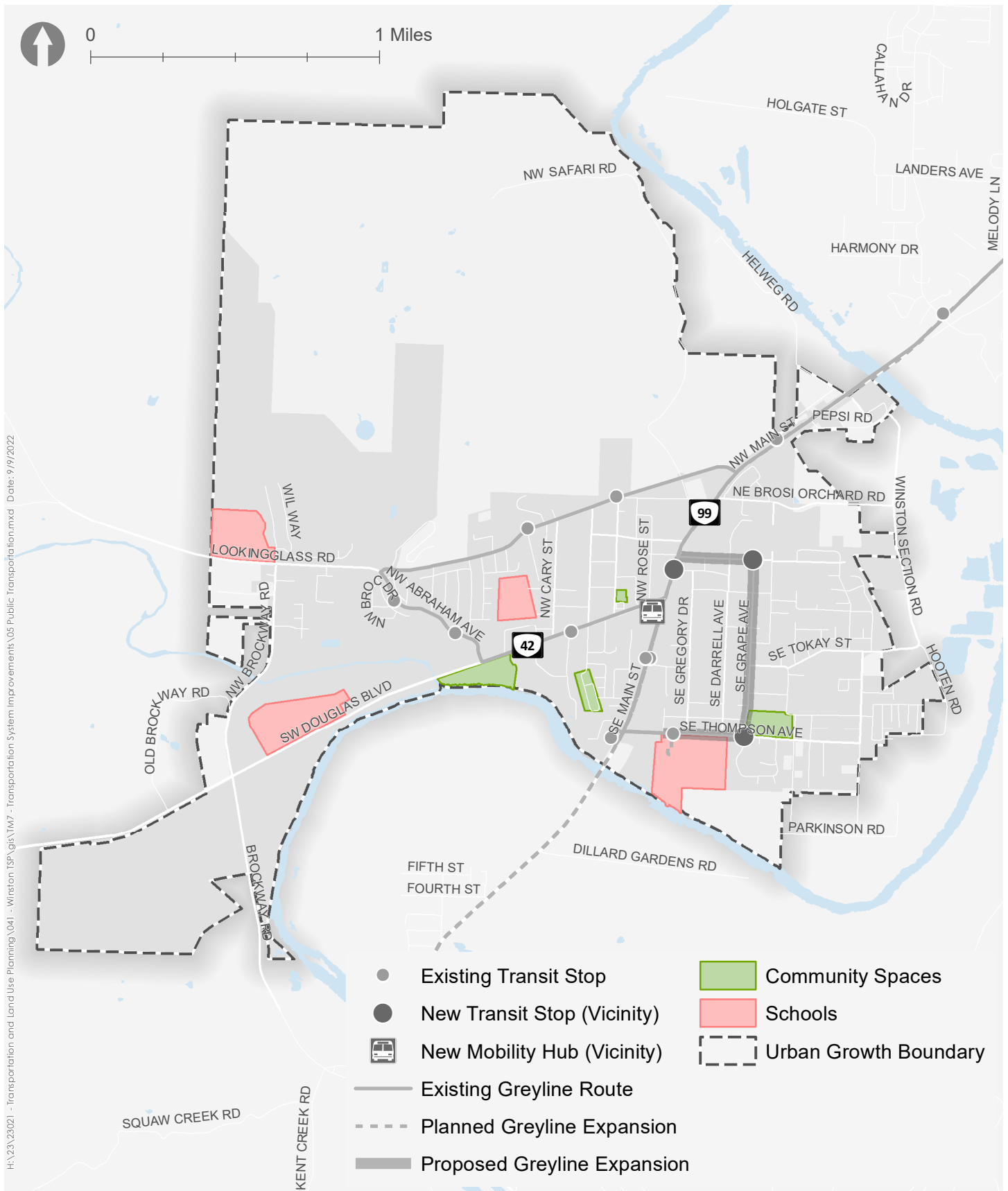


Figure 5

Public Transportation Services and Facilities Winston, Oregon

Next Steps

The input received by the public on the draft recommendations summarized in this memo will inform a finalized list of projects and priorities, as well as cost estimates for future funding considerations. The preferred list of TSP projects will be presented in Technical Memorandum #8 (Preferred Solutions) with accompanying Project Sheets.

Attachment A – Future 2045 Build Traffic Operations Worksheets for OR 42 / Lookingglass Road

Option 1: Side Street Turn Lanes

Number	9					
Intersection	OR 42 / NW Lookingglass Road					
Control Type	Two-way stop					
Analysis Method	HCM 6th Edition					
Name	Lookingglass Road		OR 42		OR 42	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Base Volume Input [veh/h]	143	21	9	784	747	171
Total Analysis Volume [veh/h]	149	22	9	817	778	178

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Capacity Analysis

Calculated Rank	3	2	2	1	1	1
v_c, Conflicting Flow Rate	1206	390	957	0	0	0
v_c, Stage 1	779	390	956	0	0	0
v_c, Stage 2	427	0	1	0	0	0
c_p,x, Potential Capacity [veh/h]	173	614	727	0	0	0
c_p,x, Stage 1 [veh/h]	408	1298	2161	0	0	0
c_p,x, Stage 2 [veh/h]	620	1091	1637	0	0	0
c_m,x, Movement Capacity [veh/h]	171	614	726	100000	100000	100000
c_m,x, Stage 1 [veh/h]	0	0	0	0	0	0
c_m,x, Stage 2 [veh/h]	0	0	0	0	0	0
c_T, Total Capacity [veh/h]	171	614	726	100000	100000	100000

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.87	0.04	0.01	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	92.35	11.08	10.02	0.00	0.00	0.00
Movement LOS	F	B	B	A	A	A
Critical Movement	Yes	No	No	No	No	No
95th-Percentile Queue Length [veh/ln]	6.22	0.11	0.04	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	155.54	2.78	0.94	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	81.90		0.11		0.00	
Approach LOS	F		A		A	
V/C_I, Worst Movement V/C Ratio	0.87					
d_I, Worst Movement Control Delay [s/veh]	92.35					
d_I, Intersection Delay [s/veh]	7.22					
Intersection LOS	F					

Option 5: Traffic Signal

Number	9					
Intersection	OR 42 / NW Lookingglass Road					
Control Type	Signalized					
Analysis Method	HCM 6th Edition					
Name	Lookingglass Road		OR 42		OR 42	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Base Volume Input [veh/h]	143	21	9	784	747	171
Total Analysis Volume [veh/h]	149	22	9	817	778	178

Intersection Settings

Cycle Length [s]	90					
Coordination Type	Free Running					
Actuation Type	Fully actuated					
Lost time [s]	0.00					
Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	7	0	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	Lag	-	-	-
Minimum Green [s]	8	0	5	10	10	0
Maximum Green [s]	25	0	10	30	30	0
Amber [s]	4.3	0.0	5.0	5.0	5.0	0.0
All red [s]	0.5	0.0	1.0	1.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Walk [s]	7	0	0	0	7	0
Pedestrian Clearance [s]	22	0	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	No		Yes	Yes	Yes	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Pedestrian Signal Group	0					
Pedestrian Walk [s]	0					
Pedestrian Clearance [s]	0					

Lane Group Calculations




g / C, Green / Cycle	0.18	0.01	0.35	0.53	0.53
(v / s)_i Volume / Saturation Flow Rate	0.11	0.02	0.27	0.25	0.12
so, Base Saturation Flow per Lane [pc/h/ln]	1900	1900	1900	1900	1900
Arrival type	3	3	3	3	3
s, saturation flow rate [veh/h]	1604	537	3050	3102	1441
c, Capacity [veh/h]	290	195	1074	1634	759
X, volume / capacity	0.59	0.05	0.76	0.48	0.23
d, Delay for Lane Group [s/veh]	15.78	18.43	11.74	5.74	4.88
Lane Group LOS	B	B	B	A	A

Critical Lane Group	Yes	Yes	Yes	NO	NO
50th-Percentile Queue Length [veh/ln]	1.12	0.07	1.89	0.72	0.29
50th-Percentile Queue Length [ft/ln]	27.99	1.63	47.16	17.91	7.35
95th-Percentile Queue Length [veh/ln]	2.02	0.12	3.40	1.29	0.53
95th-Percentile Queue Length [ft/ln]	50.39	2.93	84.90	32.23	13.23

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	15.78	15.78	18.43	11.74	5.74	4.88
Movement LOS	B	B	B	B	A	A
Critical Movement	No	No	Yes	No	No	No
d_A, Approach Delay [s/veh]	15.78		11.81		5.58	
Approach LOS	B		B		A	
d_I, Intersection Delay [s/veh]	9.11					
Intersection LOS	A					
Intersection V/C	0.391					

Option 5: Roundabout (Single-Lane)

Number	9					
Intersection	OR 42 / NW Lookingglass Road					
Control Type	Roundabout					
Analysis Method	HCM 6th Edition					
Name	Lookingglass Road		OR 42		OR 42	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Base Volume Input [veh/h]	143	21	9	784	747	171
Total Analysis Volume [veh/h]	149	22	9	817	778	178

Intersection Settings

Number of Conflicting Circulating Lanes	1		1		1	
Circulating Flow Rate [veh/h]	825		155		9	
Exiting Flow Rate [veh/h]	189		847		1037	
Demand Flow Rate [veh/h]	143	21	9	784	747	171
Adjusted Demand Flow Rate [veh/h]	149	22	9	817	778	178

Lanes

Overwrite Calculated Critical Headway	No		No		No	
User-Defined Critical Headway [s]	4.00		4.00		4.00	
Overwrite Calculated Follow-Up Time	No		No		No	
User-Defined Follow-Up Time [s]	3.00		3.00		3.00	
A (intercept)	1380.00		1380.00		1380.00	
B (coefficient)	0.00102		0.00102		0.00102	
HV Adjustment Factor	0.97		0.93		0.95	
Entry Flow Rate [veh/h]	177		892		1005	
Capacity of Entry and Bypass Lanes [veh/h]	596		1179		1368	
Pedestrian Impedance	1.00		1.00		1.00	
Capacity per Entry Lane [veh/h]	576		1092		1302	
X, volume / capacity	0.30		0.76		0.73	

Movement, Approach, & Intersection Results

Average Lane Delay [s/veh]	10.38	16.51	13.65
Lane LOS	B	C	B
95th-Percentile Queue Length [veh]	1.24	7.59	7.12
95th-Percentile Queue Length [ft]	30.98	189.65	177.99
Approach Delay [s/veh]	10.38	16.51	13.65
Approach LOS	B	C	B
Intersection Delay [s/veh]	14.57		
Intersection LOS	B		

Option 3: Roundabout (2 Thru Lanes)

Number	9					
Intersection	OR 42 / NW Lookingglass Road					
Control Type	Roundabout					
Analysis Method	HCM 6th Edition					
Name	Lookingglass Road		OR 42		OR 42	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Base Volume Input [veh/h]	143	21	9	784	747	171
Total Analysis Volume [veh/h]	149	22	9	817	778	178

Intersection Settings

Number of Conflicting Circulating Lanes	2		1		1	
Circulating Flow Rate [veh/h]	825		155		9	
Exiting Flow Rate [veh/h]	189		847		1037	
Demand Flow Rate [veh/h]	143	21	9	784	747	171
Adjusted Demand Flow Rate [veh/h]	149	22	9	817	778	178





Lanes

Override Calculated Critical Headway	No	No	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00	4.00
Override Calculated Follow-Up Time	No	No	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00	3.00
A (intercept)	1350.00	1420.00	1420.00	1420.00	1420.00	1420.00
B (coefficient)	0.00092	0.00085	0.00091	0.00091	0.00091	0.00091
HV Adjustment Factor	0.96	1.00	0.93	0.93	0.94	0.95
Entry Flow Rate [veh/h]	155	22	419	473	477	533
Capacity of Entry and Bypass Lanes [veh/h]	633	705	1234	1234	1409	1409
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	608	705	1143	1142	1329	1341
X, volume / capacity	0.25	0.03	0.34	0.38	0.34	0.38

Movement, Approach, & Intersection Results

Average Lane Delay [s/veh]	9.06	5.43	6.46	7.02	5.78	6.20
Lane LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.96	0.10	1.52	1.83	1.51	1.79
95th-Percentile Queue Length [ft]	23.96	2.42	37.97	45.68	37.80	44.78
Approach Delay [s/veh]	8.60		6.75		6.00	
Approach LOS	A		A		A	
Intersection Delay [s/veh]	6.55					
Intersection LOS	A					

Option 1: Roundabout

Number	4											
Intersection	OR 42 / Brockway Road											
Control Type	Roundabout											
Analysis Method	HCM 6th Edition											
Name	Brockway Road			Brockway Road			OR 42			OR 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Base Volume Input [veh/h]	64	44	45	22	32	14	7	230	45	50	323	32
Total Analysis Volume [veh/h]	70	48	49	24	35	15	8	250	49	54	351	35

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	302			512			119			147		
Exiting Flow Rate [veh/h]	153			98			471			343		
Demand Flow Rate [veh/h]	64	44	45	22	32	14	7	230	45	50	323	32
Adjusted Demand Flow Rate [veh/h]	70	48	49	24	35	15	8	250	49	54	351	35

Lanes

Override Calculated Critical Headway	No			No			No	No	No		
User-Defined Critical Headway [s]	4.00			4.00			4.00	4.00	4.00		
Override Calculated Follow-Up Time	No			No			No	No	No		
User-Defined Follow-Up Time [s]	3.00			3.00			3.00	3.00	3.00		
A (intercept)	1380.00			1380.00			1420.00	1420.00	1380.00		
B (coefficient)	0.00102			0.00102			0.00091	0.00091	0.00102		
HV Adjustment Factor	0.90			0.94			0.94	0.82	0.95		
Entry Flow Rate [veh/h]	187			79			276	60	462		
Capacity of Entry and Bypass Lanes [veh/h]	1015			819			1274	1274	1188		
Pedestrian Impedance	1.00			1.00			1.00	1.00	1.00		
Capacity per Entry Lane [veh/h]	908			770			1193	1045	1132		
X, volume / capacity	0.18			0.10			0.22	0.05	0.39		

Movement, Approach, & Intersection Results

Average Lane Delay [s/veh]	5.78	5.66	4.93	3.85	7.14
Lane LOS	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.67	0.32	0.82	0.15	1.87
95th-Percentile Queue Length [ft]	16.79	7.95	20.55	3.69	46.74
Approach Delay [s/veh]	5.78	5.66	4.76		7.14
Approach LOS	A	A	A		A
Intersection Delay [s/veh]	6.06				
Intersection LOS	A				