



## PROJECT OPTIONS

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This document summarizes the transportation system improvements needed to accommodate existing and future travel needs in Sherwood. The following sections include a summary of the process used to develop and analyze the project options, summaries of each project for locations that have multiple options, and an initial prioritization of the project list using the evaluation criteria. Additional appendix material provides the comprehensive list of transportation needs and full set of transportation projects that were considered.

### Document Reader Guide

These items summarize key elements of the analysis methodology presented in this document.

- Developing a List of Potential Projects
  - The list of potential projects includes projects that were previously identified in prior plans as well as new projects to address the needs that have been identified through the TSP update process.
  - The complete list of projects is included in the Appendix and is shown in Figures 1, 2, and 3.
- Initial Project Evaluation
  - An initial project evaluation was conducted using criteria based on Sherwood's transportation goals and policies. This primary evaluation provided a basis for comparing projects with different transportation elements that serve different modes.
  - Secondary criteria were applied to distinguish between projects within each mode that received the same evaluation score.
- Assessment of Alternative Projects
  - A summary of project advantages and disadvantages was provided in cases where multiple options have been identified to address a particular transportation need.
  - A dashed line appears around the project options that initially appear to be most favorable for addressing a given transportation need. This is primarily based on the evaluation criteria but may consider other factors. Note that this is only the initial assessment and that the project evaluation has not been fully vetted by TSP review committees and the public.
  - Transportation needs that have only a single identified fix are not described in additional detail. However, these projects are included in the overall project list.



- Improvements to Mobility
  - Motor vehicle projects were grouped by project type based on the regional strategies included in the Regional Transportation Functional Plan (RTFP) hierarchy. Some of these groups were not analyzed directly since they would require analysis outside the scope of the TSP update. The groups that were assessed, and corresponding RTFP level, include:
    - Group 1 – TSMO Projects (RTFP Level 1)
    - Group 2 – Connectivity Projects (RTFP Level 5)
    - Group 3 – Widening Projects (RTFP Level 6)
- Prioritization of Potential Projects
  - An initial prioritization was performed based on potential revenue streams and the project evaluation. This prioritization has not yet been fully vetted by the TSP review committees and the public and is subject to change.

## Developing a List of Potential Projects

Transportation projects that have been previously identified but have not been constructed were reviewed to determine how they address the needs identified in the *Needs, Opportunities, Constraints and Tools Technical Report* (a summary of these needs appears in the Appendix). While not all of these previously planned projects satisfy the specific needs that were identified through the TSP update, many of these projects do complement the goals and policies of the Sherwood TSP. Therefore, these projects were carried forward for consideration with this TSP update since they could address other needs that were not directly assessed through this update. Projects from the following plans were used to identify the initial project list:

- Sherwood TSP
- Metro RTP
- Ice Age Tonquin Trail Master Plan
- Sherwood Town Center Plan
- Concept Plans (Brookman Addition, Tonquin Employment Area, Adams Avenue North)

Where needs are unsatisfied by previously planned projects, new solutions were developed. In some cases, multiple alternative solutions are presented to meet a need. A complete list of potential projects is provided in the Appendix and displayed in Figures 1 through 3.

Figure 1: Motor Vehicle Projects

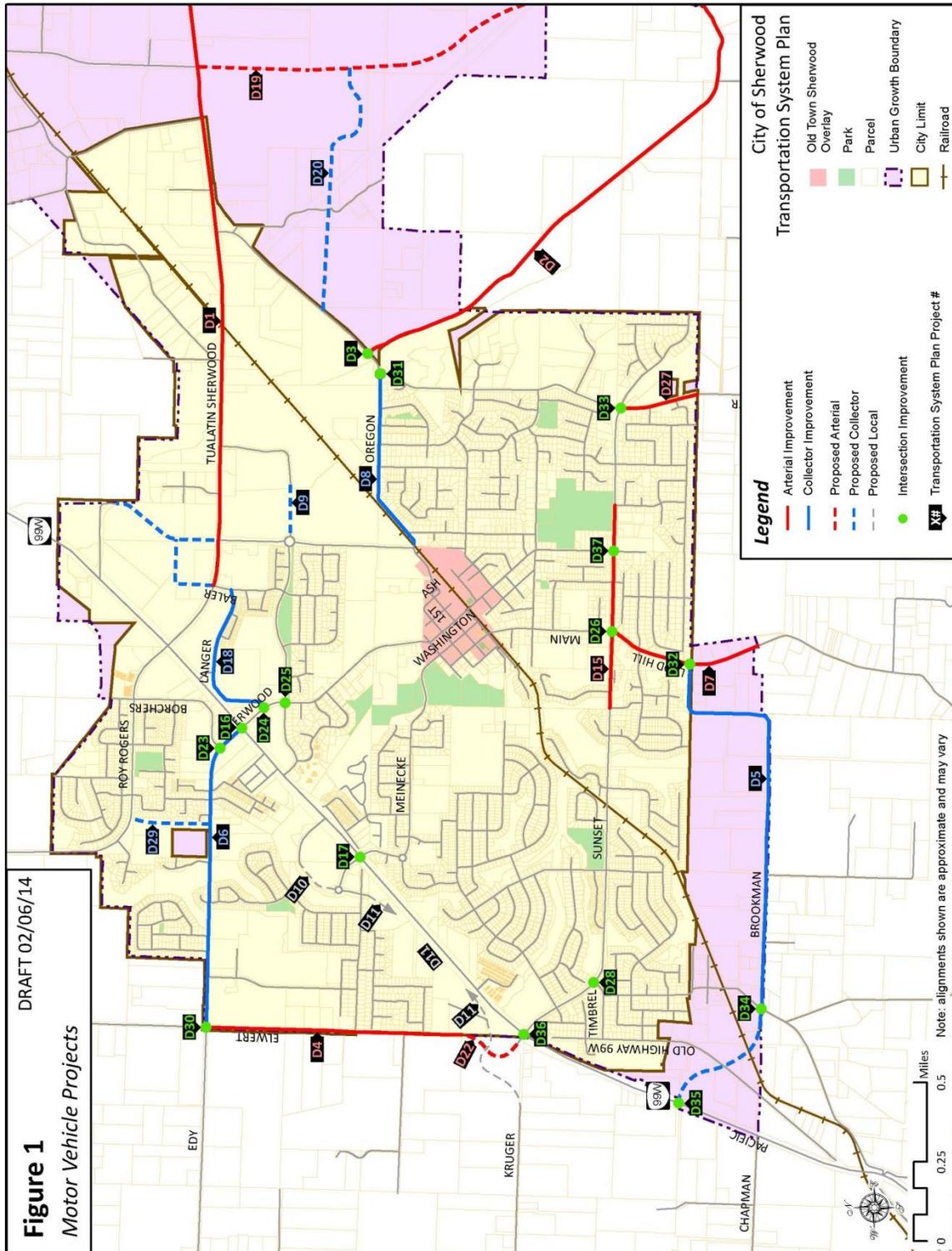


Figure 2: Pedestrian Projects

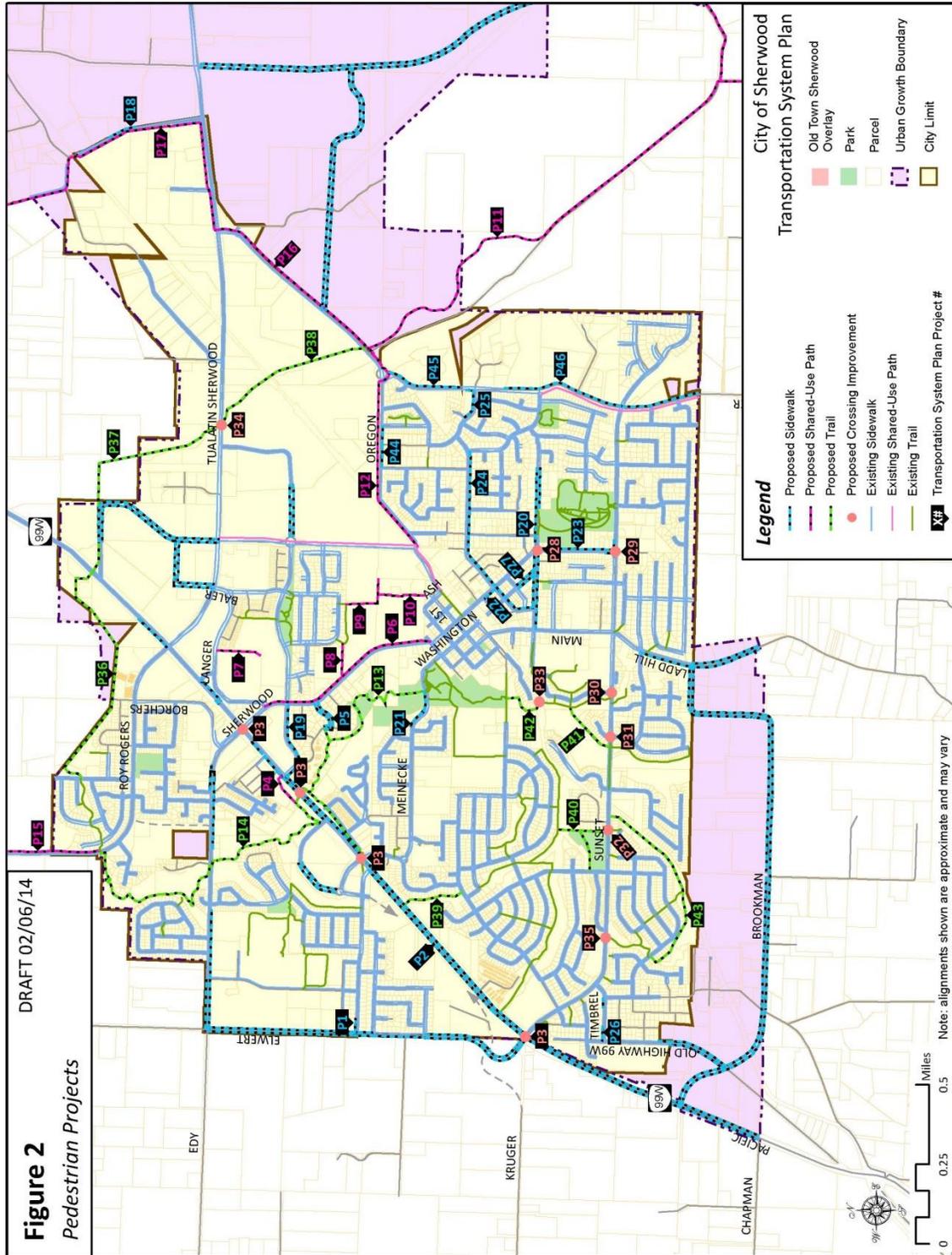
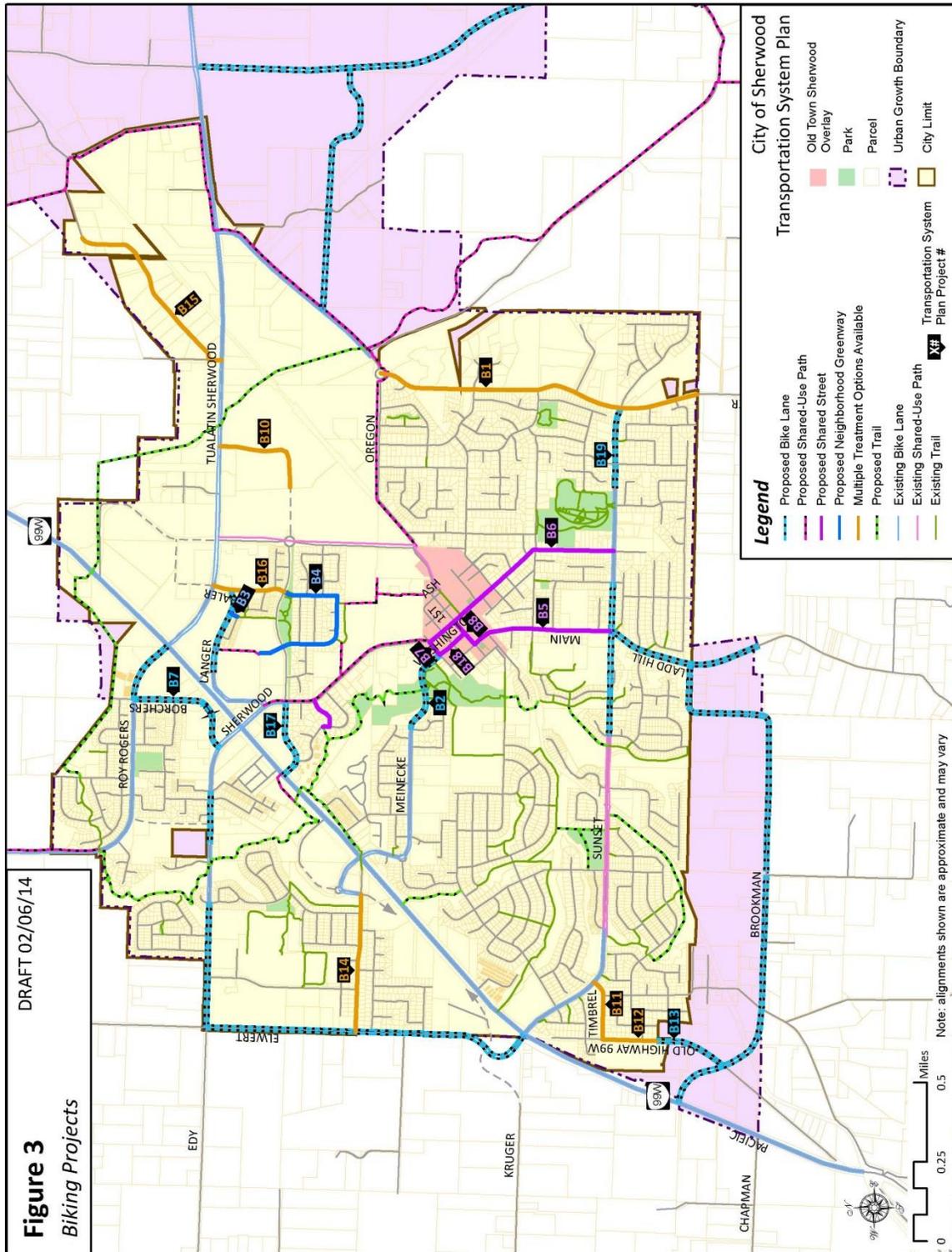


Figure 3: Biking Projects





## Initial Project Evaluation

The identified projects were evaluated with evaluation criteria to provide a relative comparison across all modes of travel. This evaluation provides an initial prioritization of projects to determine funding priorities for the City through year 2035.

### Evaluation Criteria

Sherwood’s Comprehensive Plan includes eight transportation goals with several objectives and strategies to achieve the goals. These strategies were grouped and condensed into draft evaluation criteria to measure how well transportation projects addressed Sherwood’s goals. Feedback received from the TSP Citizen Advisory Committee was used to focus on specific measures that represented the community. Through this process, the final evaluation criteria were developed by taking the top one or two performance metrics for each transportation goal. In cases that more than one strategy was identified for a goal, each strategy was given half of the score so that all eight of the goals remained equally weighted.

Table 1 lists the evaluation criteria used to assess potential projects. The full scoring of projects is included in the Appendix.

**Table 1: Evaluation Criteria for Project Analysis**

Policy Measure		Evaluation Score
<b>Goal 1: Provide a transportation network supportive to land use plans and alternative modes.</b>		
<b>Circulation</b> Improves mobility through separation of local and through traffic	+1	Increases separation of through and local trips on differentiated facilities
	0	No change
	-1	Further mixes local and through traffic on same facilities
<b>Goal 2: Develop a transportation system consistent with adopted local, state and regional plans</b>		
<b>Compatibility</b> Compatible with other jurisdiction’s plans and policies, (including adjacent cities, counties, Metro or ODOT)	+1/2	Compatible with other plans and contributes to their implementation
	0	Compatible with other plans, but does not contribute to implementation
	-1/2	Not compatible with other plans
<b>Agency Standards</b> Consistent with the standards of the City, Region, and State as a whole	+1/2	Consistent with all standards
	0	May require some deviations to standards, but likely to be approved
	-1/2	Inconsistent with standards and not expected that deviations would be approved
<b>Goal 3: Establish design and development regulations to promote multi-modal transportation</b>		
<b>Land Development Standards</b> Promotes standardized processes for developers to assess and accommodate transportation impacts from development	+1	Creates or abides by standardized development procedures
	0	No impact on development processes
	-1	Avoids standardizing procedures
<b>Goal 4: Develop bicycle &amp; pedestrian infrastructure to provide residents more options</b>		
<b>Pedestrian and Bicycle Facilities</b> Adds bikeway and walkways that fill in system gaps, improve	+1	Improves pedestrian or bicycle connectivity or accessibility
	0	No change
	-1	Reduces connectivity or accessibility



system connectivity, and are accessible to all users		
<b>Goal 5: Provide reliable, convenient transit service and special options to residents and businesses</b>		
<b>Expands Transit Service</b>	+1/2	Improves/ increases transit service
Adds service hours, additional routes, stops or special ride services	0	No change
	-1	Negatively impact on transit services
<b>Transit Supportive Infrastructure</b>	+1/2	Improves transit infrastructure
Improves transit supportive infrastructure and facilities	0	No change
	-1/2	Negatively impacts transit infrastructure
<b>Goal 6: Provide safe and convenient connections within and between Old Town and the Six Corners Area</b>		
<b>Designs Standards</b>	+1/2	Contributes to pedestrian & transit friendly environment in Old Town/ Six Corners Area
Develops or refines special standards to facilitate pedestrian and transit friendly development in Old Town and Six Corners	0	No Change
	-1/2	Has adverse effect on pedestrian or transit environment in Old Town/ Six Corners Area
<b>Corridor Connectivity</b>	+1/2	Improves roadway connectivity
Improves connectivity through acquisitions and dedications to achieve better street spacing and enhance off-street trail system	0	No change
	-1/2	Negative impact on roadway connectivity
<b>Goal 7: Develop and maintain freight infrastructure to support local and regional economic expansion and diversification goals</b>		
<b>Freight Mobility</b>	+1/2	Improves freight mobility
Invests in infrastructure and services needed to meet current and future demand	0	No change
	-1/2	Degrades freight mobility
<b>Freight Access</b>	+1/2	Improves freight access
Regulates and improves access, including loading and transfer facilities	0	No change
	-1/2	Degrades freight mobility
<b>Goal 8: Manage the system to ensure timely implementation and updates to comply with evolving local and regional priorities</b>		
<b>Funding</b>	+1	Funding sources and partnerships available
Leverages local, regional, state, federal or private funds	0	Feasible costs, but no identified funding
	-1	High costs and no identified funding

The evaluation criteria listed in Table 1 represent the primary basis for evaluating projects across all modes. A secondary set of criteria were applied to provide a basis for sub-prioritize projects that received the same evaluation score. These criteria were based on the following items:

- Pedestrian/Bicycle – Project location and proximity to activity generators (as previously mapped).
- Motor Vehicle – Hierarchy of projects based on regional strategies (intersection improvements are highest priority and major corridor widening is lowers priority).



## Assessment of Alternative Projects

There are several transportation needs that were identified where multiple options are available. This section lists the alternative projects that could be carried forward to the TSP project list and describes the advantages and disadvantages for each option. In addition, the evaluation score is listed for each alternative and the most favorable alternative is highlighted by a dashed box—note that the highest scoring alternative is not necessarily the recommended improvement as there are context factors to consider that might not be captured in the evaluation criteria.

Note that this section only addresses locations where multiple options have been identified. The Appendix includes the full set of projects (which are mapped in Figures 1, 2 and 3).

### *Reader Notes*

- A summary of project advantages and disadvantages was provided in cases where multiple options have been identified to address a particular transportation need. This summary is provided in the blue boxes on the following pages.
- A dashed line appears around the project options that initially appear to be most favorable for addressing a given transportation need. This is primarily based on the evaluation criteria but may consider other factors. Note that this is only the initial assessment and that the project evaluation has not been fully vetted by TSP review committees and the public.
- Transportation needs that have only a single identified fix are not described in additional detail (i.e., they do not appear in the blue boxes on the following pages). However, these projects are included in the overall project list (see Appendix).

Motor Vehicle Project Alternatives

***Need: Traffic control enhancement at Oregon Street/Tonquin Road.***

**D3.A:** Install a traffic signal

Advantages: A traffic signal at this location will have a smaller footprint and will likely have a lower cost than a roundabout as a roundabout would likely require additional right-of-way

Disadvantages: Queues from the signal could potentially back into the Murdock roundabout, which could impact safety and mobility

Evaluation Score: **4.0**

**D3.B:** Install a single lane roundabout with dual westbound through lanes

Advantages: Roundabouts typically experience 25% less crashes than signalized and unsignalized intersections<sup>1</sup>; queuing issues likely less than queuing issues related to a signal. The hybrid configuration would allow both intersections (Tonquin/Oregon and Murdock/Oregon) to operate well and meet mobility standards. This option would continue to offer a full accessibility of movements, unlike a combined “dumbbell” configuration. The additional westbound lane could fit within the existing roadway width.

Disadvantages: Roundabouts have large footprints, and the area is constrained by wetlands—it may be difficult to fit a roundabout within the available space. The existing roundabout at Oregon/Murdock would need to be reconfigured in order for the westbound lane configuration to fit.

Evaluation Score: **4.0**

**D3.C:** Install a “dumbbell” (elongated oval) roundabout with combined with the existing roundabout at Murdock. The combined configuration would require that a vehicle would pass through both intersections to make a left turn movement.

Advantages: Roundabouts typically experience 25% less crashes than signalized and unsignalized intersections<sup>2</sup>; this solution would fully mitigate the queuing issue between intersections since the space between the roundabouts two intersections would be part of the roundabout circulation.

Disadvantages: It may be difficult to fit a roundabout within the available space, travel distances would be increased, and delays would likely be greater than two individual roundabouts due to more circulating vehicles

Evaluation Score: **1.5**

<sup>1</sup> CMF Clearinghouse, [www.cmfclearinghouse.org](http://www.cmfclearinghouse.org).

<sup>2</sup> Ibid.



**Need: Roadway improvements along Brookman Road.**

**D5.A:** Rebuild Brookman Road as a three lane collector facility

Advantages: Provides a balance of mobility and access to Brookman Concept area, which in turn provides relief to Sunset Boulevard from future urban growth.

Disadvantages: N/A

Evaluation Score: **2.5**

**D5.B:** Rebuild Brookman Road as a five lane arterial

Advantages: Further increases east-west mobility for through traffic

Disadvantages: Would inhibit access to the Brookman Concept Area and is not consistent with findings and recommendations of the Concept Plan or the I-5 to 99W Connector Project. The I-5 to 99W Connector project proposed a new, separate access-restricted facility to serve as a regional corridor and provide mobility for traffic between 99W and I-5. Concept planning for the Brookman area identified Brookman Road to serve the function of providing access to the area for future urban development.

Limiting access to future development in Brookman area would force traffic to the north and further burden Sunset Boulevard.

Evaluation Score: **1.5**

**Need: Traffic control enhancement at Sherwood Boulevard/Century Drive.**

**D25.A:** Install a traffic signal

Advantages: A traffic signal at this location will have a smaller footprint and will likely have a lower cost than a roundabout as a roundabout would likely require acquiring additional right-of-way

Disadvantages: High side street delay

Evaluation Score: **4.0**

**D25.B:** Install a roundabout

Advantages: Roundabouts typically experience 25% less crashes than signalized and unsignalized intersections<sup>3</sup>; could provide for gateway treatments for the Town Center; provides U-turn opportunities for traffic leaving businesses west of Sherwood Boulevard

Disadvantages: Roundabouts have large footprints and could require acquiring additional right-of-way; the property on the southwest corner may be significantly impacted

Evaluation Score: **4.0**

<sup>3</sup> Ibid.



**Need: Traffic control enhancement at Edy Road/Borchers Drive.**

**D23.A:** Install a traffic signal

Advantages: A traffic signal at this location will have a smaller footprint and will likely have a lower cost than a roundabout as a roundabout would likely require acquiring additional right-of-way; a signal could coordinate with the Highway 99W/Edy Road signal, which would require coordination with ODOT

Disadvantages: Potential for queuing to back up to the Highway 99W/Edy Road intersection due to limited space, which has the potential to impact both safety and mobility

Evaluation Score: **3.5**

**D23.B:** Install a roundabout

Advantages: Roundabouts typically experience 25% less crashes than signalized and unsignalized intersections<sup>4</sup>; high turn volumes from Borchers could be served without having to wait for a green signal if no conflicting volumes are present

Disadvantages: There is potential for queuing from the Highway 99W/Edy Road intersection to back up to the intersection, which can gridlock a roundabout and poses a safety concern if a queued vehicle is stopped in the roundabout due to sight issues; roundabout have large footprints and could require acquiring additional right-of-way; through movements on Edy Road may experience more delay due to high turn volumes

Evaluation Score: **3.5**

**D23.C:** Prohibit left turn movements from Borchers and install a roundabout west on Edy Road

Advantages: Mitigates safety issues related to potential vehicle queue stacking between adjacent Highway 99W/Edy Road intersection that could exist with either a traffic signal or roundabout treatment; provides opportunity for a new roundabout to the west that could be used for U-turns and potential future connections to Roy Rogers Road and/or access for future development along 99W frontage to avoid need for highway access.

Disadvantages: Increases travel distance by removing left turn movements from Borchers Drive, may cause some traffic to shift to other routes. This alternative would need to provide internal access from medical offices to new roundabout at west since left turns from Borchers would be removed. Adjacent roundabout project would not be well-suited to existing roadway network and may be difficult to place without a roadway extension to the north or development access to the south.

Evaluation Score: **3.0**<sup>5</sup>

<sup>4</sup> Ibid.

<sup>5</sup> While this project does not score as highly as the other two options, it provides additional safety benefits.



***Need: Traffic control enhancement at Elwert Road/Edy Road.***

**D30.A:** Install a traffic signal

Advantages: A traffic signal would have a smaller footprint than a roundabout and would best fit in the constrained space

Disadvantages: Opportunities for additional turn lanes at the traffic signal are limited due to constrained right of way; the signal would need to be signed well to alert drivers with advanced warning.

Evaluation Score: **1.5**

**D30.B:** Install a roundabout

Advantages: Roundabouts typically experience 25% less crashes than signalized and unsignalized intersections<sup>6</sup>; delay will likely be less than as a signalized intersection.

Disadvantages: Roundabouts have large footprints and could require acquiring additional right-of-way; while adjacent properties are undeveloped, the adjacent creek and wetlands would make widening for a roundabout difficult

Evaluation Score: **2.5**

***Need: Traffic control enhancement at Brookman Road/Highway 99W.***

**D35.A:** Install a traffic signal

Advantages: Provides access to future growth areas; provides relief to Sunset Boulevard; may increase safety at Sunset due to improving expectancy for traffic as the urban fringe is shifted south

Disadvantages: Increases the potential for rear-end incidents on Highway 99W due to signal located on the urban fringe

Evaluation Score: **4.0**

**D35.B:** Install a traffic signal and realign Brookman Road to the north to be located in urban area

Advantages: Consistent with Brookman Concept Plan and provides spacing for potential I-5 to 99W connection to south. Provides access to future growth areas; provides relief to Sunset Boulevard; may increase safety at Sunset due to improving expectancy for traffic as the urban fringe is shifted south. Realigning the road to the north would provide urban context and move it away from the southern fringe, providing a safety benefit due to driver expectancy.

Disadvantages: May impact future connections north/west of 99W (Chapman Road) as urban growth areas urbanize.

Evaluation Score: **5.0**

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<sup>6</sup> Ibid.



*Bicycle Project Alternatives*

**Need: Bicycle facilities on Murdock Road between Oregon Street and the Urban Growth Boundary.**

**B1.A:** Widen the roadway to provide bike lanes

Advantages: Provides bicycle facilities on both sides of the roadway; cross-section would fit within existing right-of-way

Disadvantages: Requires extensive roadway widening

Evaluation Score: **2.0**

**B1.B:** Build a shared-use path between Oregon Street and Upper Roy Street

Advantages: Connects the existing shared-use path south of Upper Roy Street to the proposed path on Oregon Street, and has fewer impacts

Disadvantages: Replaces existing sidewalk and therefore provides little benefit to pedestrians; northbound bicyclists may be inclined to ride in the two-lane roadway

Evaluation Score: **3.0**

**Need: Bicycle facilities on Timbrel Lane between Sunset Boulevard and Old Highway 99W.**

**B11.A:** Widen the roadway to provide bike lanes

Advantages: Provides dedicated space for bicycle travel that is separated from the motor vehicle space

Disadvantages: Requires widening the roadway, which would require obtaining an additional 4 feet of right-of-way

Evaluation Score: **2.0**

**B11.B:** Provide shared lane markings

Advantages: Low cost solution, and is located along a low volume and low speed roadway in a school zone for an elementary school

Disadvantages: Bicyclists must share the roadway with vehicles and it does not meet the standard design for collector roadways

Evaluation Score: **3.0**



***Need: Bicycle facilities on Century Drive between Tualatin-Sherwood Road and its existing terminus.***

**B10.A:** Widen the roadway to provide bike lanes

Advantages: Provides an alternative route to riding along an arterial, meets collector standards, and provides dedicated space for bicyclists

Disadvantages: Requires widening the newly built facility; would require obtaining an additional 12 feet of right-of-way

Evaluation Score: **4.0**

**B10.B:** Direct bicyclists to use Tualatin-Sherwood Road and Langer Farms Parkway instead of Century Drive east of Langer Farms Parkway

Advantages: Low cost solution

Disadvantages: Bicyclists must travel on an arterial for a longer distance, bike facilities would not be available for bicyclists using this segment of Century Drive, and it does not meet the standard design for collector roadways

Evaluation Score: **1.0**

**B10.C:** Add shared lane markings

Advantages: Low cost solution

Disadvantages: This facility could become a higher volume facility as an alternative route to Tualatin-Sherwood Road; this facility is also adjacent to commercial land uses

Evaluation Score: **1.5**

**B10.D:** Continue the Century Drive path along this segment by widening sidewalk on the north/west side

Advantages: Provides a continuous path from Sherwood Boulevard to Tualatin-Sherwood Road

Disadvantages: Eastbound bicyclists may be inclined to ride in the roadway; would require obtaining additional right-of-way to widen sidewalk

Evaluation Score: **4.5**



**Need: Bicycle facilities on Old Highway 99W between Timbrel Lane and Crooked River Lane.**

**B12.A:** Remove on-street parking to provide bike lanes

Advantages: Low cost solution, and provides dedicated space for bicycle travel that is separated from the motor vehicle space

Disadvantages: Requires removing parking on the east side of the roadway, which may be critical for school and resident parking

Evaluation Score: **4.0**

**B12.B:** Provide shared lane markings

Advantages: Low cost solution and is located in a low speed facility in a school zone for an elementary school

Disadvantages: Bicyclists must share the roadway with vehicles; it does not meet the standard design for collector roadways, and bicyclists would be forced back into the roadway if the segment from Brookman Road to Crooked River Lane is widened to provide bike lanes

Evaluation Score: **3.0**

**B12.C:** Widen the roadway to provide bike lanes

Advantages: Provides dedicated space for bicycle travel that is separated from the motor vehicle space, and maintains parking

Disadvantages: Requires widening the roadway, which would require obtaining an additional 3 feet of right-of-way from the east side of the roadway, and is the highest cost option

Evaluation Score: **3.0**

**B12.D:** Widen the sidewalk along the west side to provide a shared-use path

Advantages: Does not impact the physical roadway space, parking, or private properties

Disadvantages: Does not provide bike facilities on the east side of the roadway; the path could be heavily populated with young children during drop-off and pick-up times

Evaluation Score: **2.5**



***Need: Bicycle facilities on Handley Street between Cedar Brook Way and Elwert Road.***

**B14.A:** Remove curb extensions and chokers to provide bike lanes

Advantages: Provides dedicated space for bicycle travel that is separated from the motor vehicle space

Disadvantages: Requires removing chokers and curb extensions, which calm traffic speeds along this 25mph facility; removal of curb extensions increase pedestrian crossing distance and reduce visibility of pedestrians; it would also remove on-street parking, which is minimal

Evaluation Score: **1.0**

**B14.B:** Provide shared lane markings

Advantages: Low cost solution, is a low speed facility (25 mph), and space is available between curb extensions for bicyclists to move out of the motor vehicle way

Disadvantages: Bicyclists must share the roadway with vehicles, and it does not meet the standard design for collector roadways

Evaluation Score: **2.0**

***Need: Bicycle facilities on Baler Way between Tualatin-Sherwood Road and Century Drive.***

**B16.A:** Rebuild Baler Way between Tualatin-Sherwood Road and Century Drive to provide bike lanes (Sherwood Town Center project)

Advantages: Provides dedicated space for bicycle travel that is separated from the motor vehicle space, and provides a continuous treatment between Tualatin-Sherwood Road and Century Drive

Disadvantages: Requires removing on-street parking and curb extensions along the local road segment between Langer Drive and Century Drive; removal of curb extensions increase pedestrian crossing distance and reduce pedestrian visibility

Evaluation Score: **3.0**

**B16.B:** Add neighborhood greenway improvements between Century Drive and Langer Drive, and rebuild Baler Way between Langer Drive and Tualatin-Sherwood road to provide bike lanes

Advantages: Lower cost solution, and maintains on-street parking, and provides a more appropriate treatment to the local segment of Baler Way, and ties into the planned neighborhood greenway improvements on Baler Way south of Century Drive

Disadvantages: Bicyclists must share the roadway with vehicles between Baler Way and Langer Drive; however, this segment is a 25mph local road

Evaluation Score: **4.0**



***Need: Bicycle facilities on Galbreath Drive/Gerda Lane between Tualatin-Sherwood Road and City Limits.***

**B15.A:** Remove on-street parking on Galbreath Drive and widen Gerda Lane to provide bike lanes

Advantages: Lower cost solution than widening Galbreath Drive, and provides dedicated space for bicycle travel that is separated from the motor vehicle space

Disadvantages: Requires removing parking on both sides of Galbreath Drive, which is currently used as overflow parking for adjacent businesses

Evaluation Score: **3.5**

**B15.B:** Widen Galbreath Drive and Gerda Lane to provide bike lanes and to maintain parking on Galbreath Drive

Advantages: Provides dedicated space for bicycle travel that is separated from the motor vehicle space, and maintains parking on Galbreath Drive

Disadvantages: High cost, and bicycle demand along this facility is likely low; widening may impact site circulation and on-site parking; would require obtaining an additional 6 feet of right-of-way

Evaluation Score: **3.0**

**B15.C:** Direct bikes to use the future Herman Road extension instead of Galbreath Drive and Gerda Lane

Advantages: Bicyclists using Galbreath can potentially take refuge from motor vehicles in the on-street parking space when not occupied

Disadvantages: Bike facilities would not be available for bicyclists using this corridor, travel distance for rerouted bicyclists may increase, and it does not meet the standard design for collector roadways; this is also contingent on the Herman Road extension, which is not a guaranteed project and the location of its western terminus is currently undecided

Evaluation Score: **3.5**



*Pedestrian Project Alternatives*

**Need: Highway 99W pedestrian crossing improvements**

**P3.A:** Add missing crosswalks at existing traffic signal locations

Advantages: Low cost project; reduces pedestrian travel distance – in some cases only one leg of intersection would need to be crossed instead of three.

Disadvantages: Would introduce pedestrian conflicts to some new vehicle movements. Depending on location, traffic operations for the cross street would degrade.

Evaluation Score: **3.5**

**P3.B:** Install pedestrian crossings enhancements on Highway 99W at Cedar Creek Trail (project to be refined through project development)

Advantages: Provides protected pedestrian crossing on the highway. A two-stage (offset) crossing would only stop one direction of traffic travel at a time. The crossing would be located outside of the coordinated traffic signal corridor. Would provide more direct access at Cedar Creek trail than having to travel out of direction between the trail and existing traffic signals. Lower cost alternative to grade-separated crossing.

Disadvantages: Would add some delay to traffic movement along the highway.

Evaluation Score: **3.5**

**P3.C:** Build a grade-separated crossing

Advantages: Provides a safe and comfortable bike and pedestrian crossing of Highway 99W, and improves signal operations; adequate space across the northeast approach for a bridge—the property on the west corner may constrain building a bridge across the southwest approach

Disadvantages: High cost project; requires right-of-way for bridge ramps; located only ¼ mile from the proposed Ice Age Tonquin Trail grade separated crossing

Evaluation Score: **4.5**

**Need: Pedestrian crossing across Tualatin-Sherwood Road at Rock Creek Trail.**

**P34.A:** Install a marked crosswalk with pedestrian refuge islands

Advantages: Low cost project; provides pedestrians refuge crossing a five lane arterial

Disadvantages: Refuge may conflict with motorists turning left onto Century Drive

Evaluation Score: **3.5**

**P34.B:** Install a marked crosswalk with pedestrian refuge islands and Rectangular Rapid Flashing Beacons (RRFBs)

Advantages: Provides pedestrians refuge crossing a five lane arterial, and alerts oncoming motorists of crossing pedestrians

Disadvantages: Higher cost; refuge may conflict with motorists turning left onto Century Drive

Evaluation Score: **3.5**



## Improvements to Mobility in Sherwood

Motor vehicle projects were evaluated to address system mobility needs that have been identified in Sherwood. Projects that match identified needs were grouped into three system alternatives (based on similar project types) and were analyzed at both a system-level and location-specific perspective to determine:

- Would the project address the identified mobility need? (Individual Need)
- Would the group of projects provide an overall system benefit? (System Measures)

The following sections describe how the projects were grouped into system alternatives and the results of the mobility analysis. Previously identified projects that do not address any of the identified needs are still included in the overall project list but were not included in this analysis.

### Motor Vehicle System Alternatives

The evaluation process was based on Metro’s Regional Transportation Functional Plan (RTFP) requirements that local TSPs consider lower cost and impact intersection enhancement projects before assessing major projects related to corridor widening. This general order for considering six different types of projects is summarized in Figure 4.

Motor vehicle projects that had been identified to address Sherwood’s mobility needs were grouped into three categories based on the RTFP project hierarchy: Transportation System Management and Operations (TSMO) projects (Group 1), connectivity projects (Group 2), and widening projects (Group 3). Group 1 projects are lower-cost improvements at the intersection level, and will be prioritized before Group 2 and Group 3 projects. Group 2 projects will be prioritized over Group 3 projects as new connections not only reduce vehicle demand on existing facilities, but they also improve connectivity for pedestrian and bicycle modes. Group 2 projects will only include collector and arterial connections.

#### Group1: TSMO Projects

- **D3:** Install a roundabout at Tonquin Road/Oregon Street intersection with dual westbound through lanes and a single eastbound through/right lane.



Figure 4: RTFP Project Hierarchy



- **D16:** At the Highway 99W/Edy Road intersection, restripe the east approach to have exclusive left, through, and right turn lanes, and change the eastbound left and westbound left turn phasing to protective-permissive phasing.
- **D17:** Change the eastbound left and westbound left turn phasing to protective-permissive phasing at the Highway 99W/Meinecke Road intersection.
- **D22:** Realign Elwert Road to provide more storage at Highway 99W and realign the Kruger Road intersection to the Cedarbrook extension as a single lane roundabout.
- **D23:** Add traffic control enhancements to the Edy Road/Borchers Drive intersection. Model assumes D23.A: install a traffic signal.
- **D24:** Remove the signal at the Sherwood Boulevard/Langer Drive intersection. Change the intersection to a two-way stop-control intersection with right-in, right-out, left-in movements allowed.
- **D25:** Add traffic control enhancements to the Sherwood Boulevard/Century Drive intersection. Model assumes D25.A: add a traffic signal and add eastbound left and westbound left turn lanes.
- **D28:** Install a single lane roundabout at the Sunset Boulevard/Timbrel Lane intersection.
- **D30:** Add traffic control enhancements to the Elwert Road/Edy Road intersection. Model assumes D30.A: install a traffic signal with an added westbound right turn lane (all other approaches are single lane approaches).
- **D31:** Add a second westbound approach lane to the Murdock Road/Oregon Street roundabout for separated westbound left and westbound through lanes. Keep three lanes on the bridge structure.
- **D32:** Add a southbound right turn lane at the Ladd Hill Road/Brookman Road intersection.
- **D33:** Add a southbound right turn lane and a northbound left turn lane at the Murdock Road/Sunset Boulevard intersection.
- **D34:** Move the existing stops signs at the Brookman Road/Middleton Road intersection to the north and south approaches, and add a southbound left turn lane.
- **D35:** Install a signal at the realigned Highway 99W/Brookman Road intersection, and add a westbound left and southbound right turn lane.
- **D36:** Add westbound and eastbound left turn lanes at Highway 99W/Sunset Boulevard with protective-permissive phasing.
- **D37:** Restripe Sunset Boulevard at Pine Street to add eastbound and westbound left turn lanes.

#### *Group 2: Connectivity Projects*

- **D29:** Build a new collector connection between Edy Road and Roy Rogers Road.

#### *Group 3: Widening Projects*

- **D1:** Widen Tualatin-Sherwood Road to five lanes from Langer Farms Parkway to 124th Avenue



## Mobility Improvements - Local Evaluation

The travel demand model developed for the TSP was used to estimate future year 2035 system mobility for each alternative. The model was based on Washington County's latest 2035 Gamma model with additional refinements and detail (all public roads, lane turn lanes, and intersection control) to capture estimated future circulation patterns and congestion. The figures on the following pages show the mobility conditions<sup>7</sup> for each of the three groups that were analyzed. Key findings include:

- **Group 1 (TSMO Projects) [Figure 5]** – The majority of motor vehicle capacity needs would be met with the addition of these projects, which generally include intersection control or additional turn lanes. Locations that would not meet standards include:
  - Edy/Elwert – With the addition of a traffic signal or roundabout this intersection would operate near capacity. Additional turn lanes for a traffic signal would be beneficial, however may not fit within the available right of way.
  - 99W/Sunset – With the additional turn lanes (that would require the reconfiguration of the Kruger/Elwert intersection) this intersection would continue to operate just over capacity during the PM peak hour.
  - Roy Rogers and Tualatin-Sherwood corridor - The high amount of future traffic projected on the corridor indicates the need for future widening to five lanes.
  - Sunset corridor – High traffic volumes on Sunset Road would lead to higher side street delay at intersections east of Main Street, which are primarily low volume approaches.
- **Group 2 (Connectivity Projects) [Figure 6]** – The north-south collector connection between Roy Rogers Road and Edy Road would provide limited additional benefit to Roy Rogers Road. However this project would have the potential to reduce neighborhood cut-through traffic.
- **Group 3 (Widening Projects) [Figure 7]** – This group of projects included major corridor widening to increase throughput.
  - **Tualatin-Sherwood Road** - Widening to Tualatin-Sherwood Road (east of Langer Farms Parkway) to five lanes would provide the needed capacity for this corridor. This widening has been identified in Washington County's TSP and Metro's RTP.
  - **Roy Rogers Road** – The high amount of traffic projected on the corridor indicates the need for future widening to five lanes. This widening has not been previously identified in plans but may be explored through Washington County's current TSP update.

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<sup>7</sup> Mobility needs were measured using volume-to-capacity (V/C) ratios rather than level of service (LOS) to focus on system mobility and filter out locations that may experience high side street delay but serve low traffic volumes.

Figure 5: Year 2035 PM Peak Hour Projected Congestion Locations (V/C) - Group 1 (TSMO)

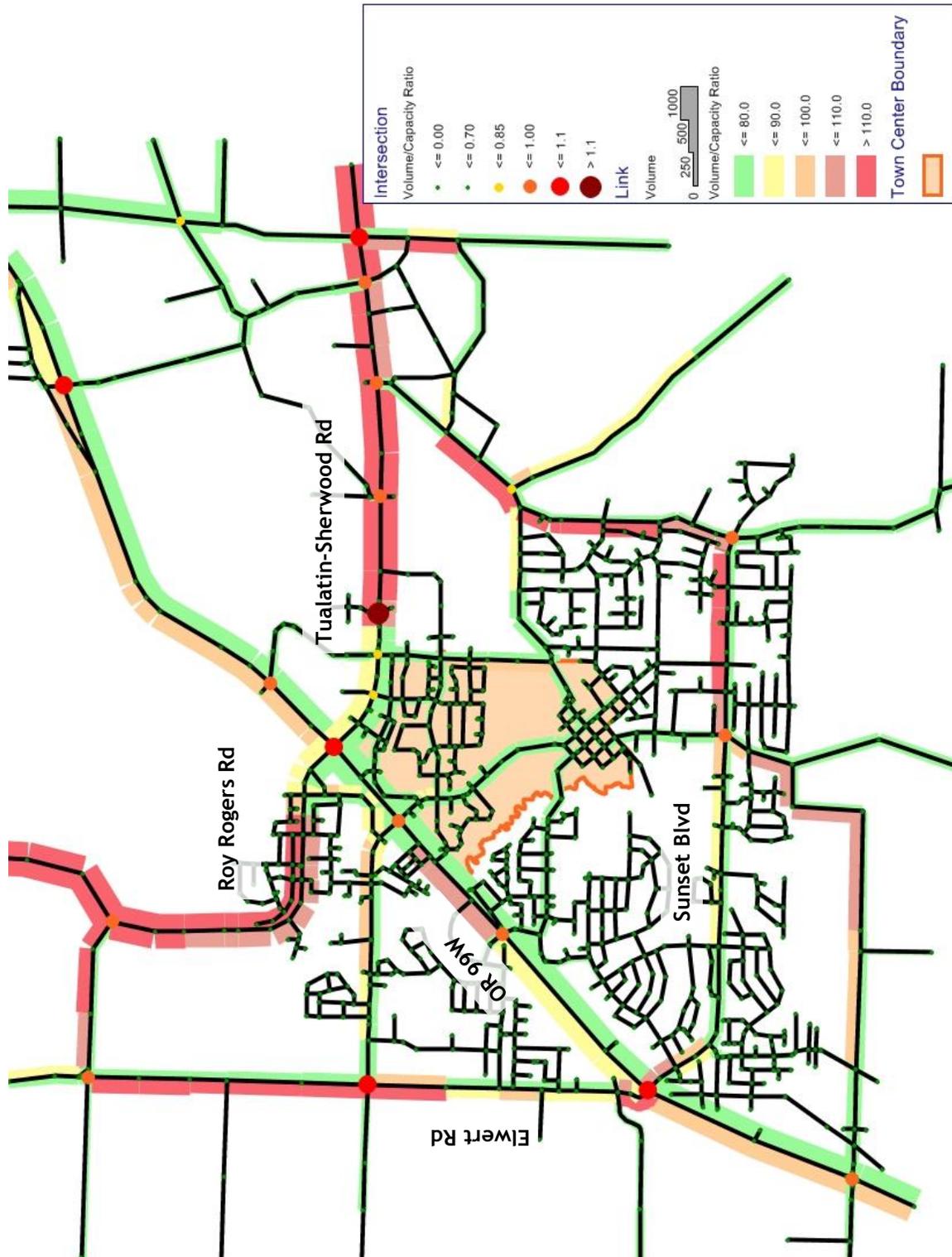


Figure 6: Year 2035 PM Peak Hour Projected Congestion Locations (V/C) - Group 2 (Connectivity)

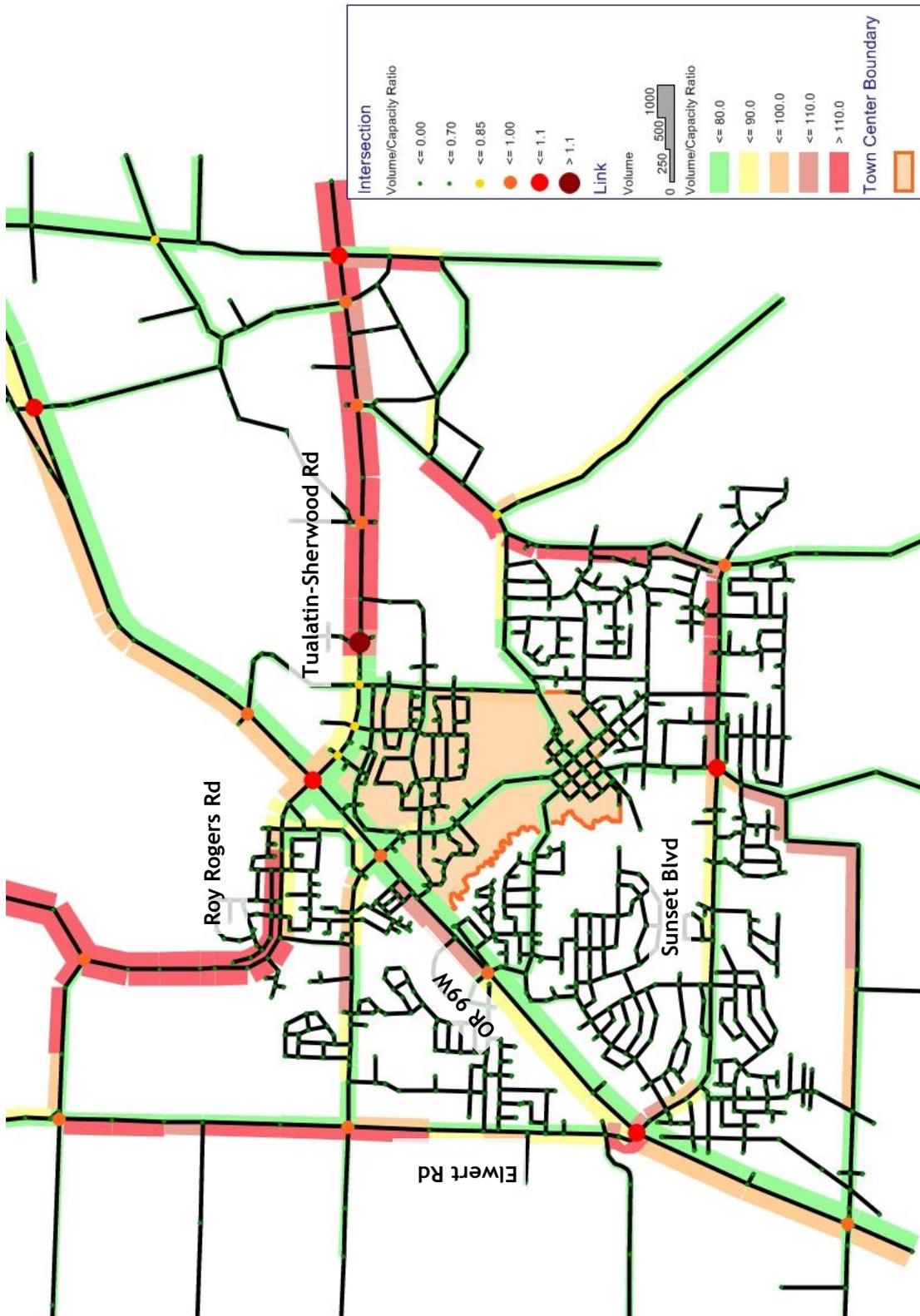
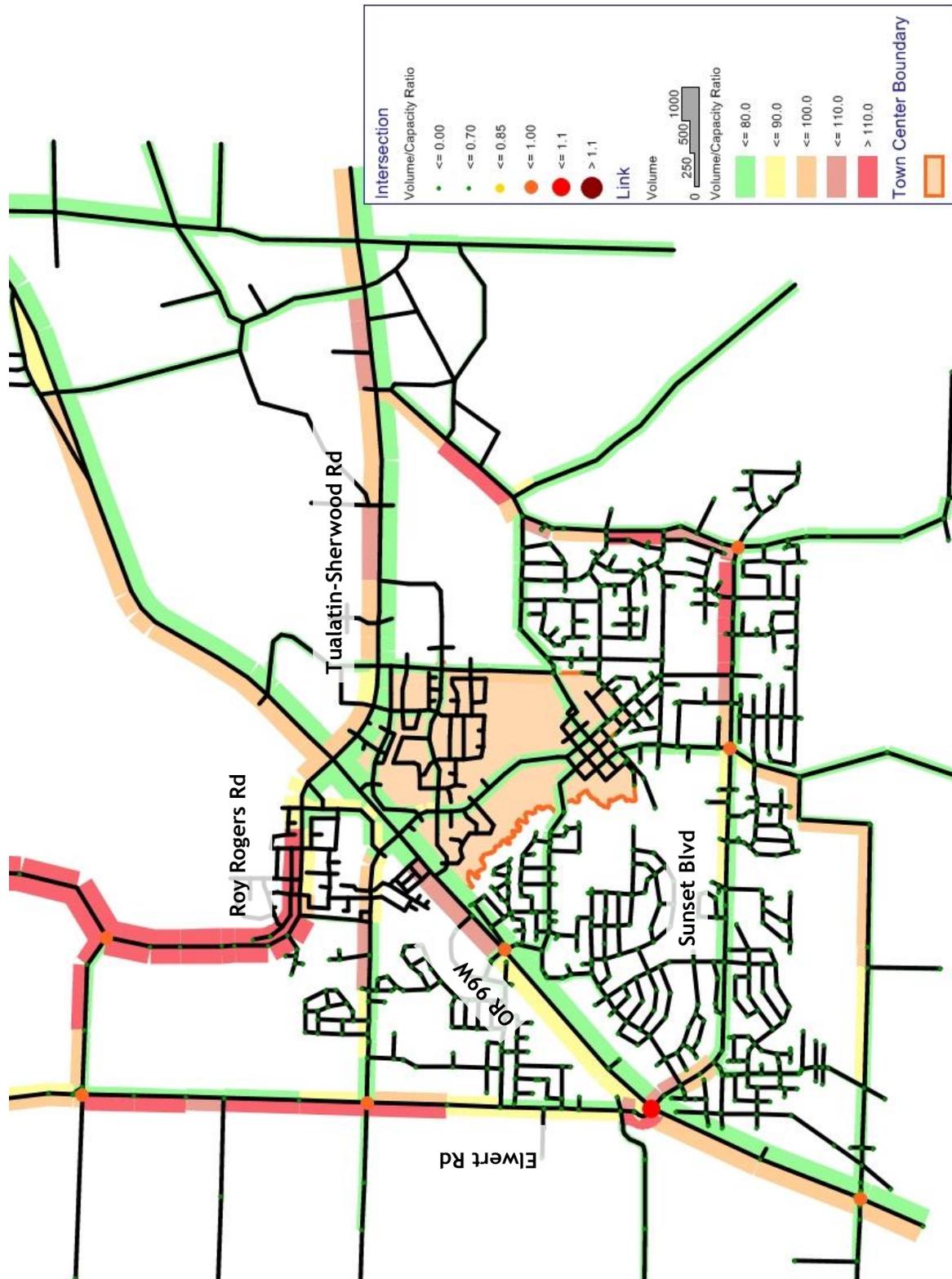


Figure 7: Year 2035 PM Peak Hour Projected Congestion Locations (V/C) - Group 3 (Widening)





## Mobility Improvements - System Evaluation

A system planning-level evaluation of the transportation conditions for each of the three year 2035 alternative scenarios was conducted using the travel demand model. The alternatives were evaluated during the p.m. peak hour based on the following system measures of effectiveness (MOE's):

- **Vehicle Miles Travelled (VMT), VMT per capita** - VMT is the total vehicle miles of travel associated with the study-area trips (vehicle trips beginning and/or ending in the study area) on roadways within the Metro region boundary. The VMT per person living in the study area is estimated by traffic volumes from the travel demand model and the 2035 population estimates provided by Metro.
- **Vehicle Hours of Delay (VHD), VHD on Freight Corridors** – VHD is the difference between the total vehicle travel time under congested conditions and free-flow conditions. The study-area VHD is a measure of the overall congestion in the study area. The freight corridors include Roy Rogers Road, Tualatin-Sherwood Road, and Hwy 99W.

The MOE's collectively can generally be considered as a rough proxy for several other measures such as fuel use and greenhouse-gas emissions. One of the primary goals of the transportation improvements is to positively impact the above MOE's. The p.m. peak hour MOE's for the base year and each of the future alternatives are listed in Table 2. Key observations for these system measures include:

- VMT would reduce due to mobility improvements and vehicles travelling on more direct routes. However, the overall VMT reduction (even with Group 3) would be less than one percent.
- VHD would improve under each group of alternatives, particularly with improvements to Tualatin-Sherwood Road. These improvements would significantly reduce freight delay along the corridor.

**Table 2: System Performance Measures (PM Peak Hour)**

Measure	Year 2010	Year 2035 (Baseline)	Group 1: TSMO	Group 2: Connectivity	Group 3: Widening
Total Vehicle Miles Travelled (VMT)	34,100 vmt	55,600 vmt	55,550 vmt	55,500 vmt	55,350 vmt
VMT per capita	1.4 vmt/capita	1.3 vmt/capita	1.3 vmt/capita	1.3 vmt/capita	1.3 vmt/capita
Vehicle Hours of delay (VHD)	440	1,420	1,360	1,360	1,130
VHD on Freight Corridors*	240	870	960	950	780

Note: \*Freight corridors include OR 99W, Tualatin-Sherwood Road, and Roy Rogers Road.



## Prioritization of Potential Projects

The previous sections summarized how the full project list was developed and evaluated. The following section describes the process that was used to determine the initial prioritization of the project list.

### Developing the Prioritized List of Projects

The list of potential projects was prioritized to identify which projects could likely be funded through 2035 based on transportation funding assumptions and the project prioritization process.

#### *Transportation Funding*

Sherwood must make investment decisions to develop a set of transportation improvements that could reasonably be funded to best meet identified transportation needs through 2035. As summarized in the Existing Conditions Technical Report, it is estimated that Sherwood would have approximately \$11.3 million to spend on capital improvement projects through 2035 based on historical growth that has occurred over the last several years. However, assuming the level of growth related to urbanization of surrounding areas through 2035 (which in turn leads to additional trips and triggers transportation needs), Sherwood's available funds for transportation projects would grow to approximately \$60 million. These potential funding levels were both considered in the development of the project lists and the prioritization process.

#### *Prioritization Process*

The prioritized project list was developed based on a three-tier evaluation process, which included:

- **Tier 1: Screening for Needs** – Previously identified projects were screened to determine if they addressed a specific need identified in the TSP update. Additional projects were developed to address the needs that were not otherwise addressed with previously identified projects. Projects that were previously identified but did not directly address a given need were given a “low” priority (regardless of the Tier 2 and Tier 3 evaluation).
- **Tier 2: Primary Evaluation Criteria** – Evaluation criteria were applied to projects across all modes based on consistency with Sherwood's transportation goals. These criteria provided a means to evaluate very different projects using the broad criteria that was applied to all project types.
- **Tier 3: Secondary Criteria** – In order to further differentiate projects that received the same primary evaluations score within a given mode, sets of secondary criteria were applied. These criteria were different for each mode and were only used to compare projects relative to other projects of the same mode. These criteria were:
  - Pedestrian/Bicycle – Project location and proximity to schools and other activity generators (previously mapped).



- Motor Vehicle – Hierarchy of projects based on regional strategies (intersection improvements are highest priority and major corridor widening is lower priority).

Through application of the above criteria and consideration for the City's transportation budget available for capital improvements, the following general prioritization groups were identified.

- High priority – The highest scoring projects (based on evaluation criteria) that fall within Sherwood's anticipated transportation budget for capital improvements through 2035. This list is broken into a Group-1 (historical revenue stream of \$11 million) and additional Group-2 (projected revenue stream of \$60 million) projects.
- Medium priority – Projects that address an identified transportation need but exceed the anticipated available funding.
- Low priority – Projects that were previously identified that do not directly address one of the identified needs.

### High Priority Projects

Projects that are currently identified as high priority (those assumed likely to be funded through 2035) are listed in Table 3 (Group 1, total funds of approximately \$11 million) and Table 4 (Group 2 total funds of approximately \$60 million including Group 1 projects). These project groups were identified based on initial assumptions about approximate project costs. However, the project lists will be further refined as project costs are developed. The full prioritized project list is located in the Appendix. The Group 1 high priority project list includes:

- Bicycle Projects (4)
- Motor vehicle projects (4)
- Pedestrian Projects (5)

The additional Group 2 high priority projects (assuming a revenue stream of \$60 million) are listed in Table 4. While there are many projects that are not expected to be funded through 2035, improvements to Sherwood's revenue stream, project-specific grants, and intergovernmental contributions can help Sherwood build additional projects. The initial prioritization of the project list is likely to be refined as additional information is provided about unique elements of project needs and constraints that were not captured in the overall system analysis. Additionally, assumptions about project costs and potential funding sources can affect the overall project list.



**Table 3: Preliminary High Priority (Financially Constrained) Project List - Group 1**

Project #	Project Name	Project Description
		<b>Bicycle Projects</b>
B2	Meinecke Bike Lanes	Add bike lanes on Meinecke Road from Marshall Street to 3rd Street.
B10.D	Century Drive Shared-Use Path	Widen the sidewalk on the north/west side of Century Drive between Tualatin-Sherwood Road and the existing terminus to provide a shared-use path
B12.A	Old Highway 99W Bike Lanes	Reconfigure Old Highway 99W between Timbrel Lane and Crooked River Lane to add bike lanes (requires on-street parking removal).
B16.B	Baler Way Bike Facilities	Add neighborhood greenway improvements (e.g., shared lane markings) to Baler Way between Century Drive and Langer Drive, and rebuild Baler Way between Langer Drive and Tualatin-Sherwood Road to include bike lanes.
		<b>Motor Vehicle Projects</b>
D16	Edy/Sherwood/ Highway 99W Intersection Improvements	Restripe the westbound Sherwood Boulevard approach to have a single left turn lane, a single through lane, and a single right turn lane. Eliminate the split phase timing for the side streets, and maintain the existing green time on OR 99W for the northbound and southbound through movements. Add the missing crosswalk to the south approach.
D18	Langer Drive Improvements	Construct improvements to Langer Drive between Baler Way and Sherwood Boulevard that are consistent with the Sherwood Town Center Plan. Major improvements include: buffered bike lanes, on-street parking, wider sidewalks, narrower travel lanes, removal of the center turn lane, and landscaping.
D25.A	Sherwood/Century Traffic Signal	Install a traffic signal at the Sherwood Boulevard/Century Drive intersection, and add eastbound and westbound left turn lanes.
D35	Highway 99W/Brookman Traffic Signal and Realignment	Concurrent with urbanization of the Brookman Concept area, realign Brookman Road to intersect with Highway 99W approximately 1/4 mile north of its existing intersection to be located within the urban area; this improvement includes a traffic signal at the realigned intersection with a westbound left and southbound right turn lane, and a grade separated railroad crossing.
		<b>Pedestrian Projects</b>
P3.B	Highway 99W Cedar Creek Crossing	Install an enhanced pedestrian crossing on Highway 99W at Cedar Creek Trail.



Project #	Project Name	Project Description
P6	Sherwood Boulevard Improvements	Construct improvements to Sherwood Boulevard between Langer Drive and 3rd Street that are consistent with the Sherwood Town Center Plan. Major improvements include: a shared-use path on the east side, wider sidewalks on the west side, narrower travel lanes, and landscaping.
P12	Ice Age Tonquin Trail Segment 7	Implement Tonquin Trail Segment 7 improvements from immediately west of the Tonquin/Oregon Street intersection to immediately north of Park Street.
P14	Ice Age Tonquin Trail Segment 9	Implement Tonquin Trail Segment 9 improvements from immediately south of Highway 99W to Roy Rogers Road (including Roy Rogers intersection).
P23	Pine Street Sidewalk Infill Segment 2	Construct sidewalk along the east side of Pine Street from Division Street to Sunset Boulevard, and fill the sidewalk gap along the west side of Pine Street just north of Sunset Boulevard.

**Table 4: Preliminary High Priority (Financially Constrained) Project List - Group 2**

Project #	Project Name	Project Description
		<b>Bicycle Projects (plus Group 1)</b>
B1.B	Murdock Shared-Use Path	Build a shared-use path along the west side of Murdock Road from Oregon Street to Upper Roy Street.
B6	Pine Street Shared Lane Markings	Add shared lane markings to Pine Street between 3rd Street and Sherwood Boulevard.
B7	Borchers Bike Lanes	Build bike lanes on Borchers Road between Edy Road and Roy Rogers Road.
B11.B	Timbrel Lane Shared Lane Markings	Add shared lane markings on Timbrel Lane from Sunset Boulevard to Old Highway 99W.
B13	Old Highway 99W Improvements Segment 2	Upgrade Old Highway 99W (from Crooked River Lane to Brookman Road) to a two lane collector with bike lanes and sidewalks.
B17	12th Street Bike Lanes	Add bike lanes on 12th Street between Highway 99W and Sherwood Boulevard.
B19	Sunset Bike Lanes	Add bike lanes on Sunset Boulevard between Aldergrove Avenue and Murdock Road
		<b>Motor Vehicle Projects (plus Group 1)</b>



Project #	Project Name	Project Description
D3.B	Oregon/Tonquin Roundabout	Install a roundabout at the Tonquin Road/Oregon Street intersection with dual westbound through lanes and a single eastbound through/right lane.
D4	Elwert Road Improvements	Upgrade Elwert Road (from Highway 99W to Edy Road) to a three lane arterial with bike lanes and sidewalks.
D6	Edy Road Improvements	Upgrade Edy Road (from Borchers Drive to City Limits) to a three lane collector with bike lanes and sidewalks.
D7	Ladd Hill Road Improvements	Upgrade Ladd Hill Road (from Sunset Boulevard to the Urban Growth Boundary) to a three arterial with bike lanes and sidewalks.
D8	Oregon Street Improvements	Upgrade Oregon Street (from Murdock Road to the railroad crossing) to a three lane collector with sidewalks on south side and a shared-use path on the north side (part of the Ice Age Tonquin Trail).
D15	Sunset Boulevard Improvements	Upgrade Sunset Boulevard (from Aldergrove Avenue to Eucalyptus Terrace) to a three lane arterial with sidewalks and bike lanes. Address vertical crest sight distance issues near Pine Street.
D17	Meinecke/Highway 99W Intersection Improvements	Change the eastbound and westbound left turn phasing on Meinecke Road from permitted to permitted/protected and maintaining the existing green time on OR 99W for the northbound and southbound through movements.
D27	Baker Road Improvements	Upgrade Baker Road (from Sunset Boulevard to the urban growth boundary) to a two lane arterial with bike lanes and sidewalks.
D31	Oregon/Murdock	Add a second westbound approach lane to the Murdock Road Oregon Street roundabout for separated westbound left and westbound through lanes. Keep three lanes on the bridge structure. (concurrent with Oregon/Tonquin roundabout improvement)
D36	Highway 99W/Sunset Improvements	Add westbound and eastbound left turn lanes at Highway 99W/Sunset Boulevard with protective-permissive phasing.



Project #	Project Name	Project Description
D37	Sunset/Pine Improvements	Restripe Sunset Boulevard at Pine Street to add eastbound and westbound left turn lanes.
		<b>Pedestrian Projects (plus Group 1)</b>
P2	Highway 99W Sidewalk Infill (placeholder)	Construct sidewalks along both sides of Highway 99W between the north Urban Growth Boundary and the south Urban Growth Boundary. (Project may be refined through identification of 99W Cross section).
P11	Ice Age Tonquin Trail Segment 6	Implement Tonquin Trail Segment 6 improvements from immediately west of the Tonquin Road/Morgan Road intersection to the Tonquin Road/Oregon Street intersection.
P16	Ice Age Tonquin Trail Segment 11	Implement Tonquin Trail Segment 11 improvements from immediately east of the Tonquin Road/Oregon Street intersection to immediately west of Cipole Road.
P19	12th Street Sidewalk Infill	Construct sidewalk along the south side of 12th Street from Highway 99W to Sherwood Boulevard.
P20	Division Street Sidewalk Infill	Construct sidewalk along both sides of Division Street from Main Street to Cuthill Place.
P21	Meinecke Road Sidewalk Infill	Construct sidewalk along the north side of Meinecke Road from Lee Drive to the existing sidewalk terminus to the east (approximately 400 feet).
P22	Pine Street Sidewalk Infill Segment 1	Construct sidewalk along the west side of Pine Street from Willamette Street to Columbia Street.
P30	Sunset Boulevard/St Charles Way Crossing Improvements	Install marked crosswalks at the Sunset Boulevard/St Charles Way intersection.
P31	Sunset Boulevard/Redfern Drive Crossing Improvements	Install enhanced pedestrian crossing at the Sunset Boulevard/Redfern Drive intersection.
P32	Sunset Boulevard/Galewood Drive Crossing Improvements	Install enhanced pedestrian crossing at the Sunset Boulevard/Galewood Drive intersection.



Project #	Project Name	Project Description
P44	Oregon Street Sidewalk Infill	Construct sidewalk along the south side of Oregon Street between Hall Street and Orland Street.
T1	Provide Transit Amenities at Major Transit Stops.	Provide Transit Amenities at Major Transit Stops .
T2	Improve Pedestrian Connections to Transit Facilities.	Improve Pedestrian Connections to Transit Facilities.