HAPPY VALLEY
Transportation System Plan

Adopted November 15, 2016

HAPPY VALLEY, OR
EST. 1965

ACKNOWLEDGEMENTS

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Table of Contents

6. BICYCLE PLAN

7. TRANSIT

8. MOTOR VEHICLES

9. OTHER MODES

10. FINANCING AND IMPLEMENTATION

Table of Tables

Table of Figures

1. Summary

The first Happy Valley Transportation System Plan (TSP) was adopted December 1998. Major updates occurred in 2001, 2006, 2009, 2011, 2012 and 2014. The introduction to the 2011 update stated: "Since that time, the City has experienced growth in city limit coverage and Clackamas County has completed planning work on the proposed Sunrise Expressway. The primary purpose of this update is to address these recent changes, with a focus on:

- Incorporating a summary of the Sunrise Expressway interchange area management plans
- Updating all figures to include the current city limits, including recent property annexations along Highway 212 near SE 135th Avenue.

This plan update is aimed at fulfilling Transportation Planning Rule (TPR) requirements for comprehensive transportation planning in the cities of Oregon, meeting Metro Regional Transportation Functional Plan (RTFP) requirements for planning in cities in the Portland Metro area and presenting the investments and priorities for the Pedestrian, Bicycle, Transit, and Motor Vehicle systems along with new transportation programs to correct existing shortfalls and enhance critical services. For each travel mode, a Master Plan project map and list are identified to support the City's transportation goals and policies. Projects that are reasonably expected to be funded through the year 2040 were identified and are referred to as Financially Constrained Plans.

The TSP update provides specific information regarding transportation needs to guide future transportation investment in the City and determine how land use and transportation decisions can be brought together beneficially for the City and is based on needs required to meet transportation demand based on 2040 future needs.

The TSP will be amended as the City grows and undertakes planning and capital improvements. The following is a summary of the adopted amendments to the TSP.

Table 1-1: Summary of TSP Adoption and Amendments

Date	Ordinance	Purpose
1998	183	First Happy Valley TSP
2001	230	Updates and added territory (Rock Creek Comprehensive Plan area)
2006	331	Updates (design standards) and added territory
2009	390	Updates (Pedestrian Master Plan) and added territory (East Happy Valley Comprehensive Plan area),
January, 2011	409	Updates (Sunrise Expressway/IAMP's) and added territory

		(Hwy. 212/224 area)
January, 2012	421	Incorporate 172nd Avenue/190th Drive Corridor Management Plan (CMP)
March, 2012	422	Incorporate Happy Valley Town Center Plan
September, 2014	455	Updated Roadway Functional Classification Map

PLAN COMMITTEES

The plan was developed in close coordination with Happy Valley city staff, citizen representatives and key representatives from the surrounding communities. Two formal committees were formed to guide in the TSP development. These committees met regularly through the plan development process to update the goals and policies, review interim work products, assist in developing and ranking transportation solutions, and to refine master plan elements to ensure consistency with community goals.

- **Technical Advisory Committee (TAC)** – Agency staff from Metro, the Oregon Department of Transportation (ODOT), TriMet, Clackamas County and City of Damascus participated in reviewing the technical methods and findings of the study. Four meetings were held throughout the planning process. The focus of this group was on consistency with the plans and past decisions in adjoining jurisdictions, and consensus on new recommendations for the transportation system.

PLAN PROCESS

The planning process included the following steps:

- Inventory/Data Collection to a year 2015 baseline
- Update Goals and Policies
- Evaluate Existing Conditions and Future Travel Needs Through Forecasting
- Update Needs by Mode and Consider Alternatives
- Refine Improvement Lists to Mitigate Deficiencies by Mode For 2040 Conditions
- Determine Planning and Cost Estimates of Improvements
- Identify Financing Sources
- Produce Draft

PLAN ORGANIZATION

This document is divided into ten chapters and a separate Technical Appendix. The title and focus of each chapter is summarized below:

Chapter 1: Summary – This chapter provides a brief overview of the plan recommendations and presents the estimated funding needed to implement it.

Chapter 2: Goals and Policies – This chapter presents the recommended goals and policies applied to develop implementing measures for each of the travel modes.

Chapter 3: Existing Conditions – This chapter examines the current transportation system in terms of the built facilities, how well they perform and comply with existing policies, and where current deficiencies exist.

Chapter 4: Future Needs and Improvements – This chapter presents the details of how the City of Happy Valley is expected to grow over the next 20 years, and how travel demands on the city and regional facilities will change from general growth in the Metro and nearby areas.

Chapter 5: Pedestrian Plan – This chapter presents plan recommendations to enhance pedestrian facilities and focus new improvements in areas with the highest concentration of activity.

Chapter 6: Bicycle Plan – This chapter presents plan recommendations to enhance bicycle facilities and focus new improvements in areas with the highest concentration of activity.

Chapter 7: Transit Plan – This chapter makes recommendations to be considered by TriMet in their future enhancements to transit services.

Chapter 8: Motor Vehicle Plan – This chapter presents plan recommendations to provide adequate mobility and access to the city, county and state facilities as travel demands grow to 2025 levels. This chapter also recommends new street design standards, access spacing standards, functional class designations and other programs to monitor and manage travel demand.

Chapter 9: Other Modes Plan – This chapter discusses transportation issues related to rail, air and water transportation.

Chapter 10: Financing and Implementation – This chapter presents the complete estimated revenues and costs for the transportation projects and programs developed in the plan. New funding alternatives are presented to bridge the gaps between the two.

GOALS AND POLICIES

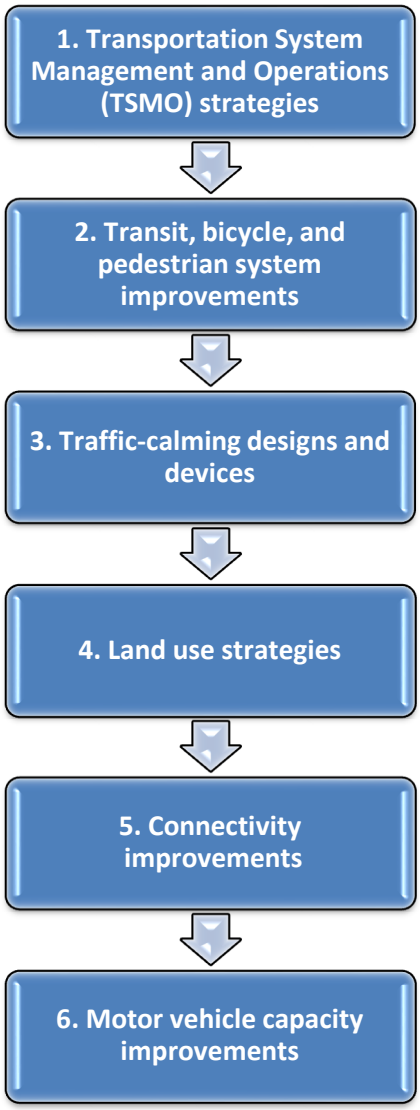
The goals and policies established in the original TSP and through subsequent amendments were adopted to guide transportation system development in Happy Valley. Goals are defined as brief guiding statements that describe the desired result. Policies associated with each of the individual goals describe the actions needed to move the community in the direction of completing each goal.

In addition to retaining and refining previously adopted goals and policies that are still applicable, new goals and policies have been incorporated into the TSP update to expand the vision for the City's transportation system and meet recent changes to state and regional transportation plan policies and regulations. A primary objective of the TSP update is to work towards compliance with the Metro RTFP. The goals and policies of this TSP are not prioritized and are presented in

Chapter 2. These goals and policies were applied to develop implementing measures for each of the travel modes applied in the Happy Valley TSP study area.

TRANSPORTATION PLANS

The Happy Valley TSP update identifies projects and programs needed to support the City's goals and policies and to serve planned growth over the next 25 years. This document presents the recommended investments and priorities for the Pedestrian, Bicycle, Transit, and Motor Vehicle systems along with new transportation programs to enhance critical transportation services. For each travel mode, a Master Plan project map and list are identified to support the city's transportation goals and policies. Projects that are reasonably expected to be funded over the next 25 years were identified and are referred to as Financially Constrained Plans. Project prioritization was evaluated based on the RTFP hierarchy of strategies. As outlined in section 3.08.220, the hierarchy of strategies is as follows:



This includes Transportation Demand Management (TDM), safety, operational, and access management improvements.

Improving connectivity and providing better amenities for pedestrians, bicyclists, and transit users presents motorists with an attractive alternative to driving. Projects presented in chapters 5, 6 and 7.

Improving safety (or perceived safety) for bicyclists and pedestrians through traffic calming techniques may increase non-motorized travel.

These land use strategies—set forth in the Oregon Administrative Rules (OAR), section 660-012-0035 (2)—are designed to reduce trip distances and to promote walking, biking, and transit use.

Connectivity improvements to provide parallel routes, including pedestrian and bicycle facilities. This includes connectivity improvements for roadways of all functional classifications.

These improvements will only be considered if it is determined that other strategies are not appropriate or cannot adequately address identified transportation needs.

Pedestrian Plan

The existing pedestrian system in Happy Valley has significant needs. Sidewalks are provided in many newer residential neighborhoods, but are limited on arterials and collectors in older areas creating poor pedestrian connectivity throughout the city. Gaps within the sidewalk and trail system discourage pedestrian travel and put pedestrians at an increased safety risk by requiring them to share the roadway with vehicles in certain locations.

Based on these needs, a Pedestrian Master Plan was developed and is shown in Figure 5-1. The Pedestrian Master Plan will require incremental implementation. As development occurs, streets are rebuilt and other project funding opportunities (such as grant programs) arise, projects on the Master Plan will be integrated into project development.

The pedestrian goals and input from the TAC were reviewed to create a Pedestrian Financially Constrained Plan, which are projects that are reasonably expected to be funded by the year 2040. The highest ranking City projects that are reasonably expected to be funded were combined with projects from other agencies identified in the RTP Financially Constrained scenario to create the project list shown in Table 1-2.

Table 1-2: Pedestrian Financially Constrained Plan

Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
Ridgecrest Road – 132nd Avenue to Parkwood Way	Add sidewalks on both sides of roadway	City of Happy Valley	Medium Term	$340
145th Avenue – King Road to Denali Drive	Add sidewalks on the east side of roadway	Joint SDC Fund/Developer	Medium Term	**
145th Avenue – Clatsop Street to Northern Heights Drive	Add sidewalks on the east side of roadway	Joint SDC Fund/Developer	Medium Term	**
145th Avenue – Wallowa Way to Northern Heights Drive	Add sidewalks on the east side of roadway	Joint SDC Fund/Developer	Medium Term	**
147th Avenue – Alta Vista to Monner Road	Add sidewalks on the west side of roadway	Joint SDC Fund/Developer	Medium Term	**
147th Avenue – King Road to Monner Road	Add sidewalks on the east side of roadway	Joint SDC Fund/Developer	Medium Term	**
122nd/129th Avenue – Sunnyside Rd to Scott Creek Ln	Add sidewalks on the west side of roadway	Joint SDC Fund/Developer	Medium Term	**
122nd/129th Ave – Mountain Gate Rd to Scott Creek Ln	Add sidewalks on the east side of roadway	Metro Grant	Near Term	**
122nd/129th Avenue – King Road to Scott Creek Lane	Add sidewalks on the east side of roadway	Joint SDC Fund/Developer	Medium Term	**
162nd Avenue – Misty Drive to Hagen Road*	Add sidewalks on the both sides of roadway	Joint SDC Fund/Developer	Medium Term	**
King Road – 132nd Avenue to Regina Court	Add sidewalks on the north side of roadway	Joint SDC Fund/Developer	Near Term	**
King Road – 132nd Avenue to east of Regina Court	Add sidewalks on the south side of roadway	Joint SDC Fund	Near Term	**
King Road – 129th Avenue to 132nd Avenue	Add sidewalks on the both sides of roadway	Joint SDC Fund/Developer	Near Term	$110
132nd Avenue – King Road to Ridgecrest Road	Add sidewalks on the west side of roadway	Joint SDC Fund/Developer	Medium Term	$340
147th Avenue – Alta Vista to Monner Road	Add sidewalks on the west side of roadway	Joint SDC Fund/Developer	Medium Term	$120

Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
William Otty Road – Valley View Terrace to 119th Avenue	Add sidewalks on both sides of roadway	City of Happy Valley	Long Term	$330
172nd Avenue – Misty Drive to Clatsop Street*	Add sidewalks on both sides of roadway	Joint SDC Fund/Developer	Medium Term	**
Clatsop Street Extension East	Construct sidewalks between 162nd Ave and 172nd Ave	Joint SDC/ Developer	Long Term	**
162nd Avenue Extension North*	Construct sidewalks between Hagen Road and Clatsop St	Joint SDC/ Developer	Long Term	**
162nd Avenue Extension South*	Construct sidewalks between 157th Avenue to Highway 212	Joint SDC/ Developer	Long Term	**
Sager Road Extension West	Construct sidewalks from 162nd Avenue to 172nd Avenue	Joint SDC/ Developer	Long Term	**
Wooden Heights Road	Construct sidewalks from 162nd Avenue to 177th Avenue	Joint SDC/ Developer	Medium Term	**
Hemrick Road Extension	Construct sidewalks from 162nd Avenue to 177th Avenue	Joint SDC/ Developer	Medium Term	**
Scouter Mountain Road	Construct sidewalks between 147th Ave and 177th Ave	Joint SDC/ Developer	Medium Term	**
Troge Road Extension*	Construct sidewalks between 162nd Avenue and 177th Avenue	Joint SDC/ Developer	Near Term	**
169th Avenue Extension	Construct sidewalks from Sunnyside Road to 177th Ave	Joint SDC/ Developer	Near Term	**
Misty Drive Extension*	Construct sidewalks from 162nd Ave and 177th Ave	Joint SDC/ Developer	Medium Term	**
Rock Creek Boulevard West Extension*	Construct sidewalks from 162nd Avenue to the Sunrise Corridor Rock Creek interchange	Joint SDC/ Developer	Medium Term	**
Parklane Drive North Extension	Construct sidewalks from 162nd Avenue to Stadium Way	Joint SDC/ Developer	Medium Term	**
Sunnyside East Extension*	Construct sidewalks east to Foster Road	Joint SDC/ Developer	Long Term	**
			City of Happy Valley	$670
			Joint SDC/Developer	$570
			Other	$0
			Total Pedestrian Financially Constrained Project Costs	**$1,240**

* Project identified in the 2014 Regional Transportation Plan Financially Constrained scenario.
**These project costs are included in a motor vehicle financially constrained plan, and may include a combination of Joint SDCs and other potential funding sources such as state/federal grants.

Bicycle Plan

The existing bike lane system on arterial and collector streets in Happy Valley does not provide adequate connections from neighborhoods to schools, parks, retail centers, or transit stops. Continuity and connectivity are key issues for bicyclists and the lack of facilities (or gaps) cause significant problems for bicyclists. Without connectivity of the bicycle system, this mode of travel is severely limited.

A Bicycle Master Plan (Figure 6-1) was developed based on these identified needs. The Bicycle Master Plan will require incremental implementation. As development occurs, streets are rebuilt and other project funding opportunities (such as grant programs) arise, projects on the Master Plan will be integrated into project development.

The bicycle goals and input from the TAC were reviewed to create a Bicycle Financially Constrained Plan, which are projects that are reasonably expected to be funded by the year 2040. The highest ranking City projects that are reasonably expected to be funded were combined with projects from other agencies identified in the RTP Financially Constrained scenario to create the project list shown in Table 1-3.

Table 1-3: Bicycle Financially Constrained Plan

Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
172nd Avenue Widening South*	Add bike lanes between Sunnyside Road and 172nd-190th Connector Rd	Joint SDC/ Developer	Medium Term	**
172nd Avenue Widening North*	Add bike lanes between 172nd-190th Connector to Cheldelin Road	Joint SDC/ Developer	Medium Term	**
122nd/129th Avenue Widening	Add bike lanes between Sunnyside Road and King Road	Joint SDC/ Developer	Near Term	**
King Road Widening	Add bike lanes between 129th Avenue and 145th Avenue	Joint SDC/ Developer	Medium Term	**
132nd Avenue Widening*	Add bike lanes from Ridgecrest Road to King Road	Joint SDC/ Developer	Long Term	**
145th-147th Avenue Widening	Add bike lanes from Clatsop Street to Monner Road	Joint SDC/ Developer	Medium Term	**
162nd Avenue Widening*	Add bike lanes from Palermo Avenue to Hagen Road	Joint SDC/ Developer	Medium Term	**
Clatsop Street Extension East	Construct bikes lanes between 162nd Avenue and 172nd Avenue	Joint SDC/ Developer	Long Term	**
162nd Avenue Extension North*	Construct bikes lanes between Hagen Road and Clatsop Street	Joint SDC/ Developer	Long Term	**
162nd Avenue Extension South*	Construct bikes lanes between 157th Avenue to Highway 212	Joint SDC/ Developer	Long Term	**
Sager Road Extension West	Construct bikes lanes from 162nd Avenue to 172nd Avenue	Joint SDC/ Developer	Long Term	**
Wooden Heights Road	Construct bikes lanes from 162nd Avenue to 177th Avenue	Joint SDC/ Developer	Medium Term	**
Hemrick Road Extension	Construct bikes lanes from 162nd Avenue to 177th Avenue	Joint SDC/ Developer	Medium Term	**
Scouter Mountain Road	Construct bikes lanes between 147th Avenue and 177th Avenue	Joint SDC/ Developer	Medium Term	**

Troge Road Extension*	Construct bikes lanes between 162nd Avenue and 177th Avenue	Joint SDC/ Developer	Near Term	**
169th Avenue Extension	Construct bikes lanes from Sunnyside Road to 177th Avenue	Joint SDC/ Developer	Near Term	**
Misty Drive Extension*	Construct bikes lanes from 162nd Avenue and 177th Avenue	Joint SDC/ Developer	Medium Term	**
Rock Creek Boulevard West Extension*	Construct bikes lanes from 162nd Avenue to the Sunrise Corridor Rock Creek interchange	Joint SDC/ Developer	Medium Term	**
Parklane Drive North Extension	Construct bikes lanes from 162nd Avenue to Stadium Way	Joint SDC/ Developer	Medium Term	**
Sunnyside East Extension*	Construct bikes lanes east to Foster Road	Joint SDC/ Developer	Long Term	**
			Total Bicycle Financially Constrained Project Costs	**$****

* Project identified in the 2014 Regional Transportation Plan Financially Constrained scenario.

**These project costs are included in a motor vehicle financially constrained plan, and may include a combination of Joint SDCs and other potential funding sources such as state/federal grants.

Transit Plan

TriMet is the regional transit provider for the Portland metro area and operates three bus routes within Happy Valley today, #155, #156, and #157 (see Figure 7-1). A need for improvements to the existing transit facilities was identified to support the future household and employment growth within the study area. Based on these needs, a Transit System Master Plan was created that is shown in Figure 7-2.

A Transit Financially Constrained Plan was developed to identify projects that are reasonably expected to be funded by the year 2040. The projects that are reasonably expected to be funded were combined with projects from other agencies identified in the RTP Financially Constrained scenario to create the project list shown in Table 1-4.

Table 1-4: Transit Financially Constrained Plan

Project	Description	Cost ($1,000s)
TriMet District	Bring remaining areas of Happy Valley into the TriMet district.	$0
Bus Stop Enhancements	Coordinate with TriMet to provide transit stop amenities including bus shelters and street lighting at all transit stops.	-
RTP Designated Major Transit Stops	To meet RTP requirements, amend development code regulations to require new retail, office, and institutional buildings on sites at major transit stops to: ▪ Locate buildings within 20 feet of or provide a pedestrian plaza at the major transit stops. ▪ Provide reasonably direct pedestrian connections between the transit stop and building entrances on the site. ▪ Provide a transit passenger landing pad accessible to disabled persons (if not already existing to transit agency standards). ▪ Provide an easement or dedication for a passenger shelter and underground utility connection from the new development to the transit amenity if requested by the public transit provider. ▪ Provide lighting at a transit stop (if not already existing to transit agency standards).	$0
Transit Corridors	Direct growth to increase the density of development along transit routes in the study area in an effort to support regional transit service goals.	$0
	Transit Projects to be Funded by the City	**$0**

- These projects are under the jurisdiction of, and/or will be funded by, TriMet.

Motor Vehicle Plan

Motor vehicle projects were evaluated to address system mobility needs that have been identified in Happy Valley. Corridor projects were identified using the regional 2040 travel demand model as a tool to screen for potential mobility deficiencies. Study intersection projects were identified based on a detailed operational analysis of forecasted 2040 traffic volumes. The evaluation process was based on Metro's RTFP requirement that local TSPs consider lower cost and impact intersection enhancement projects before assessing major projects related to corridor widening.

The following sections summarize the recommended motor vehicle system plans that meet the demands of future growth and comply with local and regional planning requirements.

Transportation System Management (TSM)

TSM focuses on low cost strategies to enhance operational performance of the transportation system by seeking solutions to immediate transportation problems, finding ways to better manage transportation, maximizing urban mobility, and treating all modes of travel as a coordinated system. TSM measures focus primarily on region wide improvements, however there are a number of TSM measures that are recommended for use in Happy Valley, which include:

Intelligent Transportation Systems (ITS): In order to support future ITS projects including traffic signal operations, the City of Happy Valley and Clackamas County will require the installation of two conduits with a three- inch diameter along arterial and collector roadways during roadway improvement projects. ITS projects require additional fiber optic cable to serve the new equipment along a roadway.

Neighborhood Traffic Management (NTM): The City will consider traffic calming measures as appropriate and work with the community to find the traffic calming solution that best meets their needs and maintains roadway function. Table 8-1 lists common NTM applications and suggests which devices may be supported by the Clackamas Fire District No. 1 (CFD #1). Neighborhood traffic management projects will include coordination with emergency agency staff to assure public safety.

Access Management: Access management is the control or limiting of vehicular access to maintain the capacity of the facilities and preserve their functional integrity. Numerous driveways or street intersections can erode the capacity of arterial and collector roadways and increase the number of conflicts and potential for collisions. New development and roadway projects located on City street facilities will meet the recommended access spacing standards summarized in Table 1-4. Access points include public streets, private streets, and private commercial or residential driveways. A variation to the access spacing standards may be granted in areas with limited property frontage and/or environmental constraints. Any variation to these spacing standards will require an access management plan to be approved by the City engineer. The maximum access spacing listed in this table is consistent with Metro[1].

[1] Metro Regional Transportation Plan, 2014.

Table 1-5: Access Spacing Standards for City Street Facilities

Street Facility	Maximum Access Spacing	Minimum Access Spacing with Full Access	Minimum Access Spacing with Limited Access*
Major Arterial	-	1,000 feet	500 feet
Minor Arterial	-	600 feet	300 feet
Collector	530 feet	400 feet	200 feet
Neighborhood	530 feet	-	-
Local	530 feet	-	-

Note: Intersection and driveway spacing measured from centerline to centerline. Special access management requirements may be required in Corridor Management Plans, master plans, etc.
* Limited Access – Vehicles are restricted to right-in/right-out turn movements. In some cases, left-in turn movements may be permitted based on City engineer approval.

Traffic Signal Spacing: Traffic signal spacing standards have been established as part of this TSP update. A minimum traffic signal spacing of 1,000-feet is required for major arterial, minor arterial and collector facilities. A variation to the traffic signal spacing standard may be granted in areas with limited property frontage and/or environmental constraints. Any variation to the traffic signal spacing standard will require the approval of the City engineer.

Local Street Connectivity: A Local Street Connectivity Plan is shown in Figure 8-2. In most cases, the connector alignments are not specific and are aimed at reducing potential neighborhood traffic impacts by better balancing traffic flows on neighborhood routes. To protect existing neighborhoods from potential traffic impacts of extending stub end streets, connector roadways will incorporate neighborhood traffic management into their design and construction. All stub streets will have signs indicating the potential for future connectivity.

Additionally, new development that constructs new streets, or street extensions, shall meet the following connectivity standards:

- Provides full street connections with spacing of no more than 530 feet between connections except where prevented by barriers
- Provides bike and pedestrian access ways in lieu of streets with spacing of no more than 330 feet except where prevented by barriers
- Limits use of cul-de-sacs and other closed-end streets to situations where barriers prevent full street connections
- Includes no cul-de-sacs and other close-end streets longer than 200 feet or having no more than 10 dwelling units
- Includes street cross-sections demonstrating dimensions of ROW improvements, with streets designed for posted or expected speed limits

Functional Classification: A proposed roadway system has been developed within the planned growth areas of the TSP study area. The proposed functional classification of these roadways is shown in Figure 8-3.

Roadway Cross-Section Standards: The City of Happy Valley has current standards for street cross sections that apply citywide to residential, neighborhood, collector and minor arterial roadways. The recommended roadway cross-sections are shown in Figures 8-4 through 8-8. The proposed street system standards for each functional classification are summarized in Table 1-5. Cross-sections consistent with the 172nd Avenue/190th Drive CMP are included in this TSP.

Intersection Performance Standards: Policy 5a establishes minimum intersection operating standards to be maintained for the City of Happy Valley. The City shall utilize these standards to evaluate land use actions and proposed mitigations. All public facilities shall be designed to meet these standards.

- All signalized intersections shall operate at level of service D and V/C ratio of 0.90 or better during the peak hours of analysis. Individual movements must meet level of service E and a V/C ratio of 1.0.
- All roundabout intersections shall operate at level of service D or better during the peak hours of analysis. Each approach must meet level of service E and a V/C ratio of 0.85.
- All unsignalized two-way stop controlled intersections shall operate at level of service E or better (based on average approach delay) for all side street approaches during the peak hours of analysis.
- All unsignalized all-way stop controlled intersections shall operate at level of service D or better based on average intersection delay during the peak hours of analysis.

Table 1-6: Street System Standards

Functional Classification	Desirable Maximum Volume	Right-of-way	Paved Width	Number of Lanes	Sidewalks	Bike Lanes	Parking	Landscaping	Access Limitations*
Major Arterial	-	103 feet	74 feet	5	7 feet	6 feet	none	7 foot planting strip with street trees on both sides. 10 foot planting strip with street trees in 12 foot median.	No direct access allowed for new dwelling units fronting roadway. Consolidation of access points must be considered.
Minor Arterial	-	69 feet	48 feet	3	5 feet	6 feet	none	5 foot planting strip with street trees on both sides. 10 foot planting strip with street trees in 12 foot median.	No direct access allowed for new dwelling units fronting roadway. Consolidation of access points must be considered.
Collector	-	57 to 69 feet	36 to 48 feet	2 or 2 + median/ center turn lane	5 feet	6 feet	none	5 foot planting strip with street trees on both sides. 10 foot planting strip with street trees in 12 foot median (if provided).	No direct access allowed for new dwelling units fronting roadway. Consolidation of access points must be considered.
Hillside Collector	-	57 feet	32 feet	2	5 feet on uphill side, 12 feet on downhill side	5 feet	none	5 foot planting strip with street trees on downhill side.	No direct access allowed for new dwelling units fronting roadway. Consolidation of access points must be considered.
Collector With Parking	-	73 to 85 feet	52 to 64 feet	2 or 2 + median/ center turn lane	5 feet	6 feet	8 feet both sides	5 foot planting strip with street trees on both sides. 10 foot planting strip with street trees in 12 foot median (if provided).	No direct access allowed for new dwelling units fronting roadway. Consolidation of access points must be considered.
Neighborhood	1,500 vpd	55 feet	34 feet	2	5 feet	none	both sides	5 foot planting strip with street trees on both sides next to curb.	No direct property access within 50 feet of adjacent intersection.
Local	1,000 vpd	53 feet	32 feet	2	5 feet	none	both sides	5 foot planting strip with street trees on both sides.	No direct property access within 25 feet of adjacent intersection.
Local Commercial	-	63 feet	38 feet	2	12 feet	none	8 feet both sides	Street tree wells within the sidewalk area next to curb.	No direct property access within 50 feet of adjacent intersection.
Local Industrial	1,000 vpd	61 feet	40 feet	2	5 feet next to curb	none	8 feet both sides	5 foot planting strip with street trees on both sides behind sidewalk.	No direct property access within 25 feet of adjacent intersection.

Note: VPD = vehicles per day

*Access spacing standards shown in Table 1-4 and 8-2.

Traffic calming measures are appropriate on neighborhood and local streets only.

See TSP, Chapter 8 for cross-sections and street system standards that apply within the 172nd Avenue/190th Drive Corridor Management Plan.

Transportation Demand Management (TDM)

Transportation Demand Management (TDM) is the general term used to describe any action that removes single occupant vehicle trips from the roadway network during peak travel demand periods. The City of Happy Valley will coordinate with Clackamas County and TriMet to implement strategies to assure that the TDM assumptions in the RTP are implemented. The recommended TDM action plan includes:

- Support continued efforts by TriMet, Metro, ODOT, and Clackamas County to develop productive TDM measures that reduce commuter vehicle miles and peak hour trips.
- Encourage the development of high speed communications. The objective is to provide employers and residents a full range of options for conducting business and activities (such as home office, telecommuting), which can contribute to a reduction in peak hour travel on the roadway system.
- Encourage developments that effectively mix land uses to reduce vehicle trip generation. Development proposals will consider linkages (particularly non-auto) to support greater use of alternative travel modes.
- Increase industrial, commercial and institutional land uses within Happy Valley to provide additional employment opportunities and reduce the average commute length.
- Continued implementation of motor vehicle minimum and maximum parking ratios for new development.
- Continued implementation of street connectivity requirements.
- Require new development to install bicycle parking.
- Continued implementation of the bicycle, pedestrian, transit and motor vehicle system financially constrained plans.

Roadway Improvements

The 2040 analysis found that significant improvements would be required to accommodate the forecasted growth. These improvements include intersection projects, roadway connectivity projects and roadway widening projects. Based on these needs, a Motor Vehicle Master Plan was created that is shown in Figure 8-11. The Motor Vehicle Master Plan will require incremental implementation. As development occurs, streets are rebuilt and other project funding opportunities (such as grant programs) arise, projects on the Master Plan will be integrated into project development.

The motor vehicle goals and input from city staff and the TAC were reviewed to create a Motor Vehicle Financially Constrained Plan, which are projects that are reasonably expected to be funded by the year 2040. The highest ranking City projects that are reasonably expected to be funded were combined with projects from other agencies identified in the RTP Financially Constrained scenario to create the project list shown in Table 1-7. The construction of new collector and arterial facilities would only occur to support future development or redevelopment and would not be initiated by the City.

Table 1-7: Motor Vehicle Financially Constrained Plan

Project #	Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
I1	129th Avenue/Mt. Scott Boulevard/King Road	Install a traffic signal or one-lane roundabout, add eastbound right turn lane	Joint SDC/ Developer	Medium Term	$1,500
I2	Mt. Scott Boulevard/Idleman Road/Ridgecrest Road	Install a traffic signal or one-lane roundabout, improve vertical curve, align eastbound and westbound approaches	Joint SDC/ Developer	Long Term	$2,000
I3	145th Avenue/King Road	Install a traffic signal	Joint SDC/ Developer	Long Term	$500
I4	172nd Avenue/Rock Creek Boulevard	Add second eastbound left turn lane, add southbound right lane	Joint SDC/ Developer	Medium Term	$200
I5	172nd Avenue/Scouter Mountain Road	Install a two-lane roundabout	Joint SDC/ Developer	Medium Term	$1,500
I6	Sunnyside Road/169th Avenue	Install a traffic signal	Joint SDC/ Developer	Near Term	$500
I7	162nd Avenue/Rock Creek Boulevard	Install a traffic signal or one-lane roundabout	Joint SDC/ Developer	Medium Term	$1,000
I8	172nd Avenue/OR 212	Add second eastbound left turn lane, add second southbound right turn lane, add second westbound through lane	ODOT	Medium Term	$1,000
I9	172nd Avenue/Vogel Road*	Install a traffic signal	Joint SDC/ Developer	Medium Term	$500
I10	172nd Avenue/Troge Road*	Install a traffic signal, rebuild creek bridges	Joint SDC/ Developer	Medium Term	$8,000
I11	172nd Avenue/Hemrick Road*	Install a two-lane roundabout	Joint SDC/ Developer	Medium Term	$1,500
I12	172nd Avenue/172nd-190th Connector*	Install a two-lane roundabout	Joint SDC/ Developer	Medium Term	$1,500
I13	172nd Avenue/Sager Road*	Install a one-lane roundabout	Joint SDC/ Developer	Medium Term	$1,000
I14	172nd Avenue/ Cheldelin Road*	Install a traffic signal	Joint SDC/ Developer	Medium Term	$500
I15	Foster Road/172nd-190th Connector*	Install a two-lane roundabout	Joint SDC/ Developer	Medium Term	$1,500
I16	147th Avenue/Scouters Mountain Road	Install a roundabout	Joint SDC/ Developer	Near Term	$1,000
I17	129th Avenue/ Mountain Gate Road	Install a traffic signal	Joint SDC/ Developer	Long Term	$500

Project #	Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
W2	172nd Avenue Widening South*	Widen to 5-lane facility between Sunnyside Road and 172nd-190th Connector Road	Joint SDC/ Developer	Medium Term	$14,200
W3	172nd Avenue Widening North*	Widen to 3-lane facility between 172nd-190th Connector to Cheldelin Road	Joint SDC/ Developer	Medium Term	$5,100
W4	122nd/129th Avenue Widening	Widen to 3-lane facility between Sunnyside Road and King Road and smooth curves	Joint SDC/ Developer	Medium Term	$5,400
W5	King Road Widening	Widen to a continuous 3-lane facility cross-section between 129th Avenue and 145th Avenue	Joint SDC/ Developer	Medium Term	$3,900
W6	132nd Avenue Widening*	Widen to 3-lane facility from Ridgecrest Road to King Road	Joint SDC/ Developer	Long Term	$4,900
W7	145th-147th Avenue Widening	Widen to 3-lane facility from Clatsop Street to Monner Road	Joint SDC/ Developer	Medium Term	$8,300
W9	162nd Avenue Widening*	Widen to 3-lane facility from Palermo Avenue to Hagen Road	Joint SDC/ Developer	Medium Term	$2,400
W12	OR 212/224*	Widen to 5-lane facility from Rock Creek Junction and 172nd Ave	ODOT	Medium Term	$30,000
R1	Clatsop Street Extension East	Construct a new 3-lane facility between 162nd Avenue and 172nd Avenue, may follow a portion of Baxter Road right-of-way	Joint SDC/ Developer	Long Term	$2,800
R3	162nd Avenue Extension North*	Construct a new 2/3-lane facility from Hagen Rd to Clatsop St	Joint SDC/ Developer	Long Term	$6,700
R4	162nd Avenue Extension South*	Construct a new 3-lane facility 157th Avenue to Highway 212, new bridge over Rock Creek	Joint SDC/ Developer	Long Term	$13,600
R6	Sager Road Extension West	Upgrade to 2-lane facility from 162nd Ave to 172nd Ave	Joint SDC/ Developer	Long Term	$2,000
R8	Wooden Heights Road	Construct new 2-lane facility from 162nd Ave to 177th Ave	Joint SDC/ Developer	Medium Term	$1,100
R9	Hemrick Road Extension	Construct a new 3-lane east-west facility from 162nd Avenue to 177th Avenue	Joint SDC/ Developer	Medium Term	$2,200
R10	Scouter Mountain Road	Construct a new east-west 2/3-lane facility over Scouter's Mountain between 147th Ave and 177th Ave	Joint SDC/ Developer	Medium Term	$9,500

Project #	Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
R11	Troge Road Extension*	Construct a new 3-lane facility between 162nd Ave and 177th Ave	Joint SDC/ Developer	Near Term	$2,900
R12	169th Avenue Extension	Construct a new 3-lane facility from Sunnyside Road to 177th Avenue	Joint SDC/ Developer	Near Term	$4,300
R13	Misty Drive Extension*	Construct a new 3-lane east-west facility from 162nd Avenue and 177th Avenue, new bridge over Rock Creek	Joint SDC/ Developer	Medium Term	$10,100
R16	Rock Creek Boulevard West Extension*	Construct a new 5-lane east-west facility from 162nd Avenue to the Sunrise Corridor Rock Creek interchange	Joint SDC/ Developer	Medium Term	$12,300
R19	Parklane Drive North Extension	Construct a new 3-lane north-south facility from 162nd Avenue to Stadium Way	Joint SDC/ Developer	Medium Term	$2,300
R23	Sunnyside East Extension*	Construct a new alignment to the east to Foster Road	Joint SDC/ Developer	Long Term	$10,400
R24	Sunrise Project Phase 2*	Construct new 6-lane expressway to Rock Creek Junction	ODOT	Long Term	$100,000
				Total Motor Vehicle Financially Constrained Project Costs	**$181,900**

* Project identified in the 2014 Regional Transportation Plan Financially Constrained scenario.
Joint SDC/Developer projects would only occur with development or redevelopment and would not be initiated by the City.

Trucks

Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The establishment of through truck routes provides for this efficient movement while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. Sunnyside Road, 172nd, Avenue, and 190th Drive are recommended as designated through truck routes in the TSP study area. The objective of these route designations is to allow these routes to focus on design criteria that are "truck friendly"; i.e. 12-foot travel lanes, longer access spacing, 35-foot (or larger) curb returns and pavement design that accommodates a larger share of trucks (see the 172nd Avenue/190th Drive CMP for street standards specific to that corridor).

Other Modes

While auto, transit, bicycle and pedestrian transportation modes are the primary means of travel in Happy Valley, other modes of transportation must be considered and addressed. Future needs for alternative fuel vehicles, rail, air and water infrastructure are identified and summarized below.

Alternative Fuel Vehicles

The use of alternative fuel vehicles shall be encouraged in Happy Valley. This could be achieved by providing incentives for electric car charging spaces at key activity centers and biodiesel stations within the City. Alternative fuel vehicles would use the same right-of-way as gasoline-powered vehicles.

Rail

There are no rail facilities within the City of Happy Valley. There are not expected to be any rail facilities within the City in the near future. Due to these considerations, no policies or recommendations in this area of transportation is provided for Happy Valley.

Air

There are no airports within the City of Happy Valley. Passenger service to Happy Valley residents is provided via Portland International Airport, approximately 10 miles to the north of Happy Valley.

Water

There are no navigable waterways in the Happy Valley TSP study area. No policies or recommendations in this area of transportation are provided.

FUNDING

Transportation funding is commonly viewed as a user fee system where the users of the system pay for infrastructure through motor vehicle fees (such as gas tax and registration fees) or transit fares. However, a great share of motor vehicle user fees goes to road maintenance, operation and preservation of the system rather than construction of new system capacity. Much of what the public views as new construction is commonly funded (partially or fully) through property tax levies, traffic impact fees and fronting improvements to land development. The City of Happy Valley utilizes a number of mechanisms to fund construction of its transportation infrastructure, including:

- State Fuel Tax and Vehicle License Fee
- Local Gas Tax
- Transportation System Development Charge

Under the above funding programs, Happy Valley would collect a total revenue of $187.2 million over the next 20 years. The majority of these funds are from estimated SDC fees which are based on the future land use forecasts and would be obtained from development. If the forecasted future growth does not occur than the amount of SDC revenue would be reduced drastically.

The cost estimates outlined in the Transportation System Plan to implement the financially constrained project list for motor vehicles, transit, bicycles and pedestrians total $143.23 million, and the recommended transportation operations and maintenance programs would add $49.3 million for a total cost over 25 years of $192.6 million. Refer to Chapter 4 through 9 for details on

the individual projects by travel mode. Note that some projects included in the financially constrained project list are expected to be funded by other agencies (Metro, TriMet, etc.). These non-city project costs have not been included in the estimates in Table 10-2, but are identified in the master plans.

Table 1-8: Happy Valley Financially Constrained Plan Costs over 20 years (2015 Dollars)

Transportation Element	Approximate Cost
Improvement Projects (Financially Constrained projects to be funded by City + SDC/Developer)	
Pedestrian	$1,300,000
Bicycle	$0
Transit	$0
Motor Vehicle (does not include ODOT projects)	$141,900,000
Total Capital Projects	**$143,200,000**
Operations and Maintenance Programs and Services	
Road Maintenance ($980,000/yr plus 100%)	$49,000,000
School Safety Program ($5,000/yr)	$125,000
Neighborhood Traffic Management ($10,000/yr)	$250,000
Total Operations and Maintenance Programs	**$49,375,000**
25 YEAR TOTAL	**$192,575,000**

The estimated $143 million for transportation capital projects is expected to be adequately funded by the 25-year SDC revenue estimate of $143 million. Combined with the $49.3 million operations and maintenance costs, the estimated total funding need is $192.6 million which will not be adequately funded by the forecasted transportation revenue (see Table 10-1). New funding sources to cover the future roadway maintenance needs and funding shortfall are discussed in the next section. New funding sources to allow additional project on future Financially Constrained Plans are discussed in Chapter 10.

Next Steps

Happy Valley is currently investigating the use of a transportation maintenance fee to help fund local transportation projects. A transportation maintenance fee program will identify potential fees for various land uses in the city, estimate annual revenue generation, identify priority transportation projects to be constructed and evaluate implementation of the program.

2. Goals and Policies

Goals and policies to guide transportation system development in Happy Valley were first established by the 1998 TSP and were later updated in the 2006 TSP. In addition to retaining and refining previously adopted policies that are still applicable, new policies have been incorporated to meet recent changes to state and regional transportation plan policies and regulations.

The following transportation-related goals and policies were developed with input from the Citizen's Advisory Committee and Technical Advisory Committee. Some policies are provided with additional background information and explanation regarding their implementation.

Goal 1: <u>Livability</u> - Transportation facilities shall be planned, designed and constructed in a manner which enhances the livability of Happy Valley.

Policy 1a: Build residential and neighborhood streets to discourage speeding.

The City will develop and maintain design standards and criteria for neighborhood traffic management for use in new development as well as existing neighborhoods for City streets.

Policy 1b: Encourage pedestrian accessibility by providing safe, secure and desirable pedestrian routes.

The City will maintain a pedestrian plan in Happy Valley that meets the needs of existing and future residents and will require that sidewalk standards that have been developed for City street types be maintained.

Policy 1c: Encourage the use of alternative fuel vehicles and the use of more efficient transportation modes.

The City shall consider providing incentives to encourage development which supports the use of alternative fuel vehicles within Happy Valley (i.e. charging stations for electric cars, biodiesel stations, etc.)

Policy 1d: Consider alternative designs such as roundabouts, etc.

Policy 1e: Support and promote an integrated approach to land use and transportation planning and implementation that encourages livable and sustainable communities, decreases average trip length and increases accessibility for all modes.

Policy 1f: Allow the designation of residential parking districts where it can be demonstrated that existing residential areas require protection from the impacts of spillover parking resulting from existing or planned development. Proposed parking district plans created to mitigate the impacts of spillover parking must be supported by a fiscal analysis addressing the long-term management needs of the district. Proposed parking districts and associated requirements will be considered as part of legislative amendments to the adopted transportation system plan.

Policy 1g: Over time, as new uses are planned and developed in Happy Valley's Town Center, monitor parking supply and, where necessary, work with property owners to prepare parking management plans that manage supply and demand for parking areas and reduce impacts to adjacent residential neighborhoods.

Goal 2: **Mobility - Transportation facilities shall accommodate commercial, industrial and residential growth and provides access though and around Happy Valley.**

Policy 2a: The City shall work with the community to minimize traffic on local streets within the city. The City will consider additional traffic calming measures and work with affected neighborhoods to find the traffic calming solution that best meets their needs and maintains roadway function.

Policy 2b: In development of roadway projects, impacts to adjacent homes/properties will be considered, minimized, and balanced between providing a safe and efficient transportation facility.

The City shall create a balance between neighborhood impacts and traffic safety by considering varying street widths (via removal of planter strips and/or center turn lane/median or by narrowing travel lanes) as well as traffic needs when roadway improvements are made.

Policy 2c: Balance the functional classification system throughout the City.

The City shall design and maintain an appropriate balance of local, collector, and arterial streets to accommodate the mobility needs of the City.

Policy 2d: Require new development to accommodate bicyclists and pedestrians, and to provide non-motorized transportation facilities consistent with the proposed use and pursuant to applicable code requirements.

Goal 3: Multi-Modal Travel - Happy Valley shall strive to achieve a balanced transportation system that reduces the number of trips by single occupant vehicles by meeting the needs of auto, bicycle, pedestrian, and transit and increasing the connectivity for alternate travel modes.

Policy 3a: Bicycle lanes must be constructed on all arterials and collectors within Happy Valley (with construction or reconstruction projects). All schools, parks, public facilities and retail areas shall have direct access to a bikeway.

The City will plan for and maintain a bicycle plan which connects key activity centers (such as schools, parks, public facilities and retail areas) with adjacent access. Standards for bicycle facilities within Happy Valley will be developed and maintained. Where activity centers are on local streets, connections to bicycle lanes shall be designated.

Policy 3b: Sidewalks must be constructed on all streets within Happy Valley (with construction or reconstruction projects). All schools, parks, public facilities and retail areas shall have direct access to a sidewalk.

The City will plan for and maintain a pedestrian plan which connects key activity centers with adjacent access. Standards for pedestrian facilities within Happy Valley will be developed and maintained.

Policy 3c: Bicycle and pedestrian plans shall be developed which link to existing and planned recreational trails.

The City will prioritize bicycle and pedestrian linkages to existing and planned recreational facilities.

Policy 3d: Coordinate with TriMet to improve transit service in Happy Valley. Fixed route transit will use arterial and collector streets in Happy Valley. Park & Ride lots will be provided to accommodate concentrated transit demands where feasible.

The Regional Transportation Plan (RTP) and TriMet service plan will be the guiding documents for development of Happy Valley's transit plan. The City will provide input to Tri-Met regarding their specific needs, such as maintaining the existing dial-a-ride service provided within the Happy Valley City limits or regarding desired new routes.

Policy 3e: Local streets shall be designed to encourage a reduction in trip length by providing connectivity and limiting out-of-direction travel. Connectivity shall be provided according to the City's adopted Local Street Connectivity Plan.

Policy 3f: Participate in vehicle trip reduction strategies developed regionally. The City will coordinate with Clackamas County and TriMet to implement pedestrian, bicycle and transit system improvements that offer alternative modes of travel to the motor vehicle.

Policy 3g: Continue to prioritize and improve pedestrian and bicycle access to transit as service demands increase in the future.

This includes filling in gaps in the sidewalks near transit stops, locating transit stops near building entrances and proving adequate street lighting.

Policy 3h: Pursue the expansion of the regional and local trail system with new development.

The City will coordinate regional trail development with Metro. Design standards for recreational elements will need to be developed and maintained.

Policy 3i: Implement regional alternative mode share targets to reduce the reliance on single occupancy vehicles.

The City's policies and standards are intended to achieve the 2040 Non-SOV Modal Targets established by Metro (2004 Regional Transportation Plan, Metro, July 8, 2004, Chapter 1). Improvement in non-single-occupancy vehicle mode share will be used to demonstrate compliance with per capita travel reductions required by the State Transportation Planning Rule.

Policy 3j: Provide convenient, well-connected, and direct pedestrian and bicycle facilities to promote the health and physical well-being of Happy Valley residents and its work force, to enhance commuting and recreations opportunities, and to reduce vehicular traffic congestion.

The purpose of this policy is to provide accessibility via non-motorized modes of transportation within Happy Valley, with a focus on pedestrian and bicycle connectivity, and promote health in the community. Where street connections are not possible, provide bicycle and pedestrian linkages to connect neighborhoods with each other and with surrounding destinations, except if prevented by physical barriers.

Policy 3k: Ensure trail uses are compatible to the natural area to protect the scenic and aesthetic values of the open space area.

Policy 3l: Restrict trails designated as a Pedestrian Trail to use by pedestrians (hikers) only. Restrict trails designated as a Multi-use Trail to use by pedestrians (hikers), bicyclists and other approved non-motorized/electrical wheeled vehicles, including wheelchairs. Authorized acceptable motorized/electrical vehicles on all trails should include vehicles used for emergency and maintenance purposes. Multi-use trail use should be prohibited for bicycle racing and skateboarding to ensure the safety of trail users and the protection of natural resources.

Policy 3m: Allow trail users to bring pets with exception to designated "No Pet" areas. All pets must be kept on a leash no longer than six feet and kept in complete physical control by its owner at all times. Owners shall be responsible for cleaning up after their pets.

Policy 3n: Monitor trail user needs to ensure their concerns, quality of experience and compatibility with various uses are addressed. Walking (hiking) users should be the primary trail users in order to reduce environmental impacts. To ensure that all trails will be accessible to walking (hiking), non-walking users may be restricted or redirected if adverse impacts to user safety occur.

Policy 3o: Restrict use of the trail system within City parks to the set park hours. Use of the trail system located outside City parks should generally be limited to one hour before sunrise and one hour after sunset.

Policy 3p: Prioritize personal safety for the trail system. Trail features should be provided, when appropriate, to increase user safety. Trail safety features to consider include:

- Lighting on paved trails

- Signage for location and trail direction
- Emergency call boxes
- Enforcement of trail regulations
- Public monitoring and patrol

Policy 3q: Provide signage along pedestrian and multi-use trails with directions to destinations and mileage (consider kilometers).

Policy 3r: Provide signage on all roadways where the trail crosses the roadway alerting motorists of the trail crossing and the presence of cyclists and pedestrians.

Policy 3s: Select roadway and trail crossing locations to reduce pedestrian safety issues (such as poor sight distance). Traffic control measures may be necessary to warn roadway vehicles and trail users of approaching intersections/roadways and to facilitate the safe pedestrian crossing of the intersection/roadway.

Policy 3t: Clear vegetation at trail intersections within natural areas to provide adequate sight distance.

Policy 3u: Clearly mark known hazardous conditions such as sharp curves, low clearance and poor sight distance for trail users.

Policy 3v: Establish a buffer area adjacent to all environmentally sensitive habitat areas. The purpose of this buffer area should be to provide for a sufficient area to protect the environmentally sensitive habitat from degradation resulting from trail use and should be compatible with the continuance of such habitat areas.

Policy 3w: Encourage users to remain on designated trails. The creation and use of trails not part of the trail system should be discouraged. This should include short-cut trails or trails to adjacent private property.

Policy 3x: Encourage users to limit contact with creeks, streams and natural waterways. Users should not be allowed to enter waterways (swim, bathe, etc.), obstruct or divert waterways, and deposit any materials or substances near or in waterways.

Policy 3y: Support trail education including proper trail etiquette and low impact use to reduce negative trail use impacts.

Policy 3z: Provide trails that are enjoyable, educational, safe, and compatible with habitats and managed in a sustainable manner.

Policy 3aa: Maintain the scenic quality of the area and minimize operations and maintenance costs with new trails.

Policy 3ab: Consider the construction of new trails within existing and newly acquired public land and open space.

Policy 3ac: Provide accurate and up to date trail maps and use guidelines to citizens and visitors.

Policy 3ad: Provide trail signage throughout the City with a cohesive design to brand the City trail system and indicate to trail users that jurisdictional boundaries are being crossed.

Policy 3ae: Consider pedestrian safety at intersections and designated mid-block pedestrian crossings. Pedestrian design elements (painted crosswalk, pedestrian signal) and traffic calming measures (speed hump, raised median) may be appropriate.

Policy 3af: Provide a high quality pedestrian environment along sidewalks to encourage walking trips. Design elements such as a landscape buffer or street trees, benches, lighting should be considered.

Policy 3ag: Consider trail amenities to ensure the trail system is accessible and enjoyable for everyone. Trailheads (for major trails) serve as primary access to the trail system. Trailhead amenities should be considered such as parking areas, restrooms, drinking fountains, trash cans, information kiosks (maps and points of interest), and destination signage with mileage. Other trail amenities should be considered such as mileage markers along the trail, roadway signage at under/over-crossings, markers at all trail access points, way finding signage, drinking fountains, viewpoints, picnic tables and resting areas (benches).

Policy 3ah: Consider potential impacts to adjacent properties regarding trail placement and design. Design aids such as signs, vegetative screen and fencing should be considered to limit potential impacts such as noise and significant activity levels.

Policy 3ai: Provide signage to discourage trespassing by trail users onto adjacent property where appropriate.

Policy 3aj: Encourage trail use and volunteer trail maintenance assistance to help reduce vandalism and maintain safety.

Policy 3ak: Retain maintenance responsibility records for each trail segment in Happy Valley. The maintenance responsibility of the trail system varies but is typically the responsibility of the Home Owners' Association, North Clackamas Parks and Recreation District or the City of Happy.

Policy 3al: Ensure the trail system is maintained which includes but is not limited to:

- Caring for plants - weeding, pruning, watering
- Keeping trails clear of down trees, danger trees and limbs, washouts, etc.
- Cleaning storm water facilities
- Repairs to foot bridges, benches, signage, trailhead amenities
- Maintaining screening and fencing

Policy 3am: Enforce pedestrian system maintenance agreements with established Homeowners' Association that are established or through other negotiated mechanisms.

Policy 3an: Ensure the trail system implements risk management strategies. These strategies may include:

- Avoid placement of trails near hazardous conditions
- Develop a list of permitted trail uses and the associated risks
- Construct trails within design guidelines
- Conduct regular trail inspections
- Take quick action to remedy identified problems

- Develop a plan for medical emergencies on the trails

Policy 3ao: Print a trail user liability release for the City of Happy Valley on all pedestrian materials and maps provided to the public.

Policy 3ap: Hold users liable for any damage incurred to the trail system by themselves, their children or their pets, in addition to any penalties imposed for the violation.

Policy 3aq: Pursue the acquisition of open space and right-of-way land to provide trail connections through vacant private parcels to create a complete trail system.

Policy 3ar: Pursue easements from adjacent property owners to implement the adopted Happy Valley Pedestrian Master Plan and to provide adequate access to the trail system and pedestrian network.

Policy 3as: Require short-term and long-term bicycle parking as part of commercial, industrial, institutional, and multi-family residential projects.

Policy 3at: Increase public awareness of transit and transportation options other than motor vehicles, such as walking and bicycling, so that individuals can make informed decisions.

Policy 3au: Support bicycle, pedestrian and transit projects that serve the needs of transportation disadvantaged populations.

Policy 3av: Ensure that new development and redevelopment provide connections to transit streets and facilities, providing protected street crossings and bus stop amenities, if needed.

Policy 3aw: When evaluating potential transportation options, the City will consider the distribution of benefits and impacts and will work towards fair access to transportation facilities for all users, all ages, and all abilities.

Policy 3ax: Manage and regulate on- and off-street parking facilities as part of the transportation system to ensure sufficient parking is provided, maximize efficient use of land, minimize impacts to traffic in the right-of-way, and reduce environmental impacts.

Policy 3ay: In collaboration with Clackamas County and property owners, participate in the preparation of a parking study for the Clackamas County Regional Center. The parking study will include an inventory and recommendations related to the need for a comprehensive parking management plan and management strategies such as permit parking, structured parking, and priced parking.

Goal 4: <u>Safety</u> - Happy Valley shall strive to achieve a safe transportation system by developing street standards, access management policies when constructing streets and by making street maintenance a priority.

Policy 4a: Design of streets shall relate to their intended use and function.

The City shall plan for and maintain a functional classification system that meets the City's needs and respects the needs of other agencies (Clackamas County, Metro, City of Portland). Appropriate design standards for these roadways will be developed and maintained by the appropriate jurisdiction.

Policy 4b: Safe and secure routes to schools shall be designated for each school and any new residential project shall identify the safe path to school for children.

The City will continue to work with the school district and citizens to identify, improve, and maintain safe routes to school.

Policy 4c: Safe and secure pedestrian and bikeways shall be designed between parks and other activity centers in Happy Valley.

Policy 4d: Street maintenance shall be a priority to improve safety in Happy Valley.

The City shall coordinate with Clackamas County for the maintenance of those facilities within the City maintained by the County.

Policy 4e: Access management standards shall be developed in conjunction with the functional classification system for Happy Valley to improve safety in Happy Valley.

The City shall develop and maintain access spacing standards for each street classification. These standards shall be applied to all new road construction and new development. For roadway reconstruction, existing driveways shall be compared with the standards and a reasonable attempt shall be made to comply.

Policy 4f: New roadways shall meet lighting standards. Existing roadways shall be systematically retrofitted with roadway lighting.

Priority locations for roadway lighting include schools, parks, town center. The City shall coordinate with the County lighting district.

Goal 5: <u>Evaluation</u> - Transportation performance measures shall be maintained in the City.

Policy 5a: Minimum intersection level of service standards shall be maintained for the City of Happy Valley. The City shall utilize these standards to evaluate land use actions and proposed mitigations. All public facilities shall be designed to meet these standards.

All intersections shall meet performance standards provided in TSP Chapter 8: Motor Vehicles.

Policy 5b: Parking ratios shall be set to provide adequate parking, while providing an incentive to limit the use of the single occupant vehicle consistent with Title 2 regional standards.

Parking standards shall be listed in the Land Development Code (LDC) for the City of Happy Valley. DEQ is encourages lower parking ratios to encourage use of alternative modes (walking, biking, transit, car pooling, etc.).

Policy 5c: For purposes of compliance with OAR 660-12-060 (Transportation Planning Rule), the City will consider only improvements listed in the Financially Constrained funding scenario of the Regional Transportation Plan, and/or in the City's Capital Improvement Plan (CIP), in determining the planned capacity, function and level of service of transportation facilities and services. This policy will apply to all plan and ordinance amendments.

Goal 6: Accessibility - Develop transportation facilities which are accessible to all members of the community.

Policy 6a: Design and construct transportation facilities to meet the requirements of the Americans with Disabilities Act.

Goal 7: Cooperation - Implement the Transportation System Plan (TSP) in a coordinated manner.

Policy 7a: Coordinate and cooperate with adjacent agencies when necessary to develop transportation projects which benefit the region as a whole in addition to the City of Happy Valley.

Policy 7b: Plan transportation projects which are consistent with the amount of funding available.

Goal 8: Goods Movement - Provide for efficient movement of goods and services.

Policy 8a: All neighborhood route and local streets in Happy Valley shall limit through truck traffic.

Policy 8b: Specific arterials shall be designated as freight routes for through truck movements.

Policy 8c: Develop adjacent land uses in ways that facilitate the efficient movement of goods and services.

Goal 9: Interchange Management Areas - Protect the public's investment in the interchange management areas.

Policy 9a: Protect the long term function and operation of the Sunrise interchanges, the Sunrise Expressway, OR 212 and OR 224 and the local street network within the Interchange Management Area.

Policy 9b: Ensure that changes to the planned land use system are consistent with protecting the long-term function of the interchange and the local street system for a 20 year planning horizon from 2009.

Policy 9c: Require that any comprehensive plan map/zoning map amendments or development code amendments that provide changes to land uses allowed by the existing zoning designations within the Interchange Management Areas shall be reviewed for transportation impacts in a manner that is consistent with OAR 660-012-0060.

Policy 9d: Provide notice to ODOT for any land use actions proposed within the Interchange Management Areas

Goal 10: 172nd Avenue/190th Drive Corridor Management Plan – Implement the 172nd/190th Corridor Management Plan.

Policy 10a: The 172nd/190th Avenue Corridor Management Plan (CMP) is adopted as an ancillary document to the Happy Valley Transportation Plan and Happy Valley Comprehensive Plan.

Policy 10b: Happy Valley's applicable planning, development and capital improvements shall be consistent with, and help implement, the CMP.

Policy 10c: The City shall coordinate with Clackamas County and Gresham regarding implementation of the CMP.

Policy 10d: The City shall provide notice to Clackamas County and Gresham of proposed substantial amendments to the Happy Valley TSP, Comprehensive Plan, and Development Code that impact the CMP.

Policy 10e: The City shall participate in discussions regarding an interagency funding strategy outlining improvement prioritization, affected area, and agency roles and responsibilities to implement the CMP.

Policy 10f: The City shall review corridor right-of-way and access management needs prior to adopting Comprehensive Plan amendments and approving local land use actions.

Policy 10g: The success of the CMP will depend, in part, on the development of a connected local street network in areas adjacent to the corridor. The City shall evaluate, and require as practical, the provision of a connected local street system adjacent to arterials and collectors in the CMP area. This local network is intended to reduce reliance on 172nd and 190th Avenues for local trips and provide a street system that parallels those arterials. Access spacing consistent with the CMP shall be implemented in concert with this policy.

3. Existing Conditions

This chapter presents the existing condition of the transportation network in the study area for the Happy Valley transportation system plan. The purpose of this chapter is to document existing transportation facilities in the study area. The findings will be a basis for determining the existing transportation needs and developing future transportation projects within the study area.

OVERVIEW

Existing transportation conditions were evaluated as part of the City of Happy Valley TSP Update. An analysis of current conditions provides an understanding of facility development, service and performance. This chapter summarizes existing transportation operation in the City for all travel modes including pedestrians, bicycles, transit, motor vehicles, freight, water and air, as applicable. To understand existing travel patterns and conditions, multiple aspects of the city's transportation system were considered. An inventory was conducted to establish base year conditions for the TSP in the fall of 2014. Much of this data provides a basis of comparison for future assessment of transportation performance in Happy Valley relative to desired policies.

The study area includes the City of Happy Valley and the surrounding area transportation system network. The study area for this TSP update is shown in Figure 3-1.

Twenty one intersections (19 existing and two planned) within the study area were selected for focused operational analysis. Data was gathered at these locations to evaluate transportation conditions including pedestrian and bicycle volumes, vehicle delays and levels of service. The following sections review the existing transportation systems including pedestrian, bicycle, transit, motor vehicle and other modes (such as heavy vehicle, rail, etc.) and their performance within the City of Happy Valley.

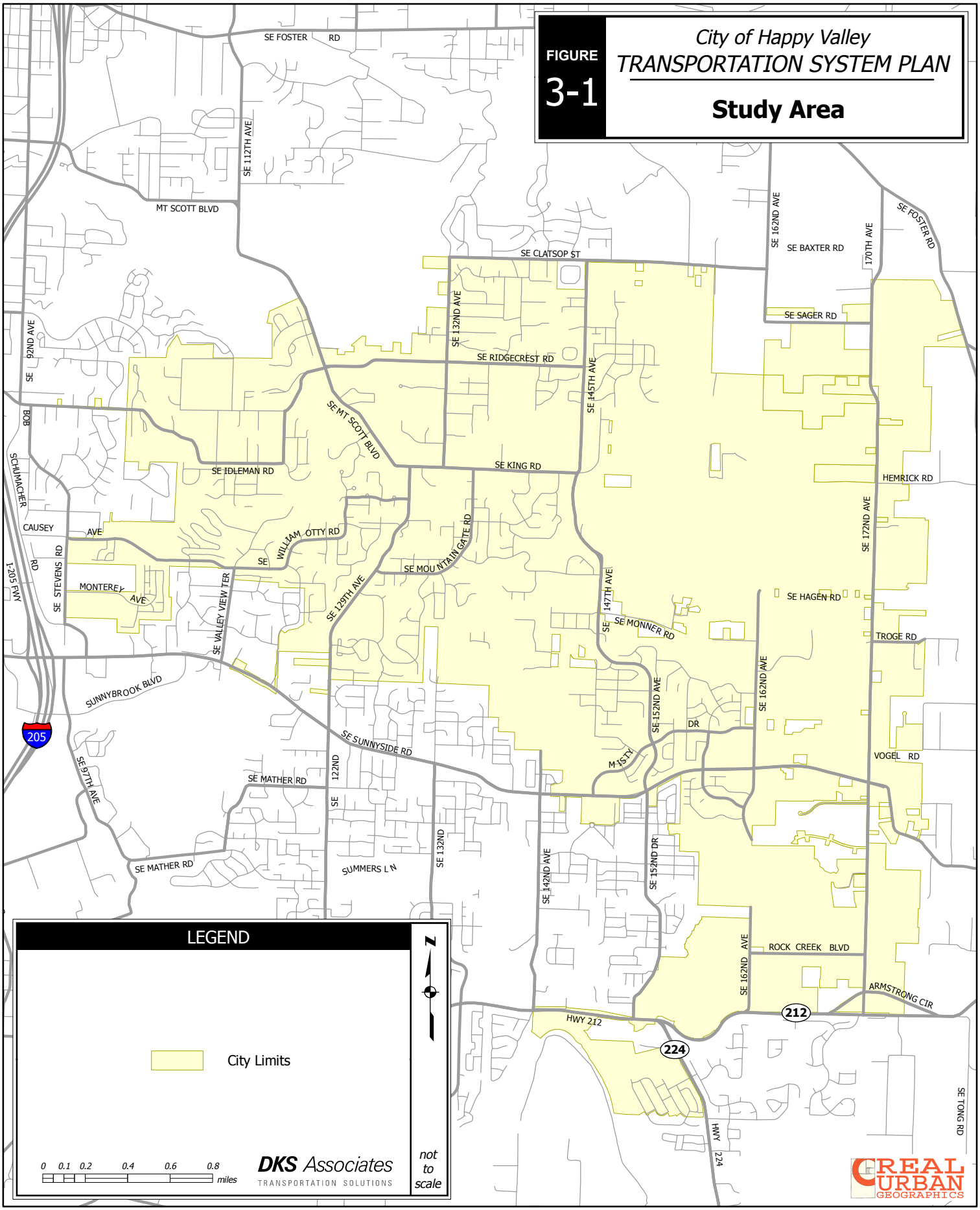


FIGURE 3-1
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Study Area
SE FOSTER RD
SE 112TH AVE
MT SCOTT BLVD
SE CLATSOP ST
SE 162ND AVE
SE BAXTER RD
170TH AVE
SE FOSTER RD
SE SAGER RD
SE 132ND AVE
SE RIDGECREST RD
SE 145TH AVE
SE 92ND AVE
SE MT SCOTT BLVD
SE KING RD
SE IDLEMAN RD
HEMRICK RD
SCHUMACHER RD
CAUSEY AVE
SE WILLIAM OTTY RD
SE MOUNTAIN GATE RD
SE 172ND AVE
I-205 FWY
SE STEVENS RD
MONTEREY AVE
SE VALLEY VIEW TER
SE 129TH AVE
SE 147TH AVE
SE HAGEN RD
SE MONNER RD
TROGE RD
SUNNYBROOK BLVD
SE 162ND AVE
SE 152ND AVE
DR
205
SE SUNNYSIDE RD
MISTY
VOGEL RD
SE 97TH AVE
SE MATHER RD
SE 122ND
SE 132ND
SUMMERS LN
SE 142ND AVE
SE 152ND DR
ROCK CREEK BLVD
ARMSTRONG CIR
HWY 212
212
224
SE TONG RD
HWY 224
LEGEND
City Limits
0 0.1 0.2 0.4 0.6 0.8 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
REAL URBAN GEOGRAPHICS

PEDESTRIANS

To assess the current adequacy of the pedestrian system in the study area, an inventory was conducted in July and August 2008 and updated for arterial and collector facilities in October 2014. The pedestrian system includes local sidewalks, paths, trails, multi-use trails and regional trails. The inventory serves as the basis to identify the opportunities and constrains of the existing pedestrian system. Other existing conditions used to help develop the future pedestrian plan were evaluated, such as transit routes and traffic signals. The inventory summary for sidewalks and trails are summarized in the following sections.

Sidewalks

An inventory of existing sidewalks on public roadways in the Plan area was undertaken to assess the current needs of the on street pedestrian system. The existing sidewalk inventory is shown in Figure 3-2A. In general, arterials and collectors have sidewalks present on at least one side of the roadway. The presence of sidewalks on local and neighborhood streets is typically dependent on the age of the neighborhood or development. Many older neighborhoods and some newer neighborhoods outside the city limits lack sidewalks which force pedestrians to walk on the roadway shoulder. Newer neighborhoods within the city limits provide a sidewalk on both side of the street.

Pedestrian counts were conducted during the PM peak hour at the study intersections. These counts represent a sample of the existing pedestrian activity based on one evening peak period. Pedestrian activity is influenced by factors such as time of year and weather conditions; variations would be expected with data collection over time based on these factors. Generally, the proximity to adjacent land uses (i.e. schools, parks, commercial developments) are the most significant predictors of pedestrians and thus represent key areas for sidewalk placement and connectivity. Pedestrian crossing volumes are shown in Table 3-1 for study intersections with pedestrian crossing volume of at least one. The volumes collected during an evening peak hour represent the number of pedestrians which cross any leg of the intersection.

Table 3-1: Pedestrian Crossing Volumes (Weekday PM Peak Hour)

Intersection	Pedestrian Crossing Volume
Sunnyside Road/122nd Avenue	18
Sunnyside Road/132nd Avenue	17
Sunnyside Road/142nd Avenue	13
Sunnyside Road/152nd Avenue	7
Sunnyside Road/162nd Avenue	11
Sunnyside Road/169th Avenue	8
Sunnyside Road/172nd Avenue	2
Mt. Scott Boulevard/Idleman Road/Ridgecrest Road	1
132nd Avenue/Ridgecrest Road	2
145th Avenue/Ridgecrest Road	10
129th Avenue/King Road/Mt. Scott Boulevard	0
132nd Avenue/King Road	2
145th Avenue/ King Road	6
147th Avenue/Monner Road	4
Rock Creek Boulevard/162nd Avenue	0
Rock Creek Boulevard/172nd Avenue	1
OR 212/224/162nd Avenue	0
OR 212/224/172nd Avenue	3

The highest pedestrian volumes were observed on Sunnyside Road at 122nd Avenue and 132nd Avenue. These pedestrian trips are likely generated by the adjacent commercial land use. Study intersections in the east portion of the city and on Mt. Scott Boulevard were observed with little or no pedestrian activity. This is likely due to the lack of adequate pedestrian facilities and the adjacent land uses.

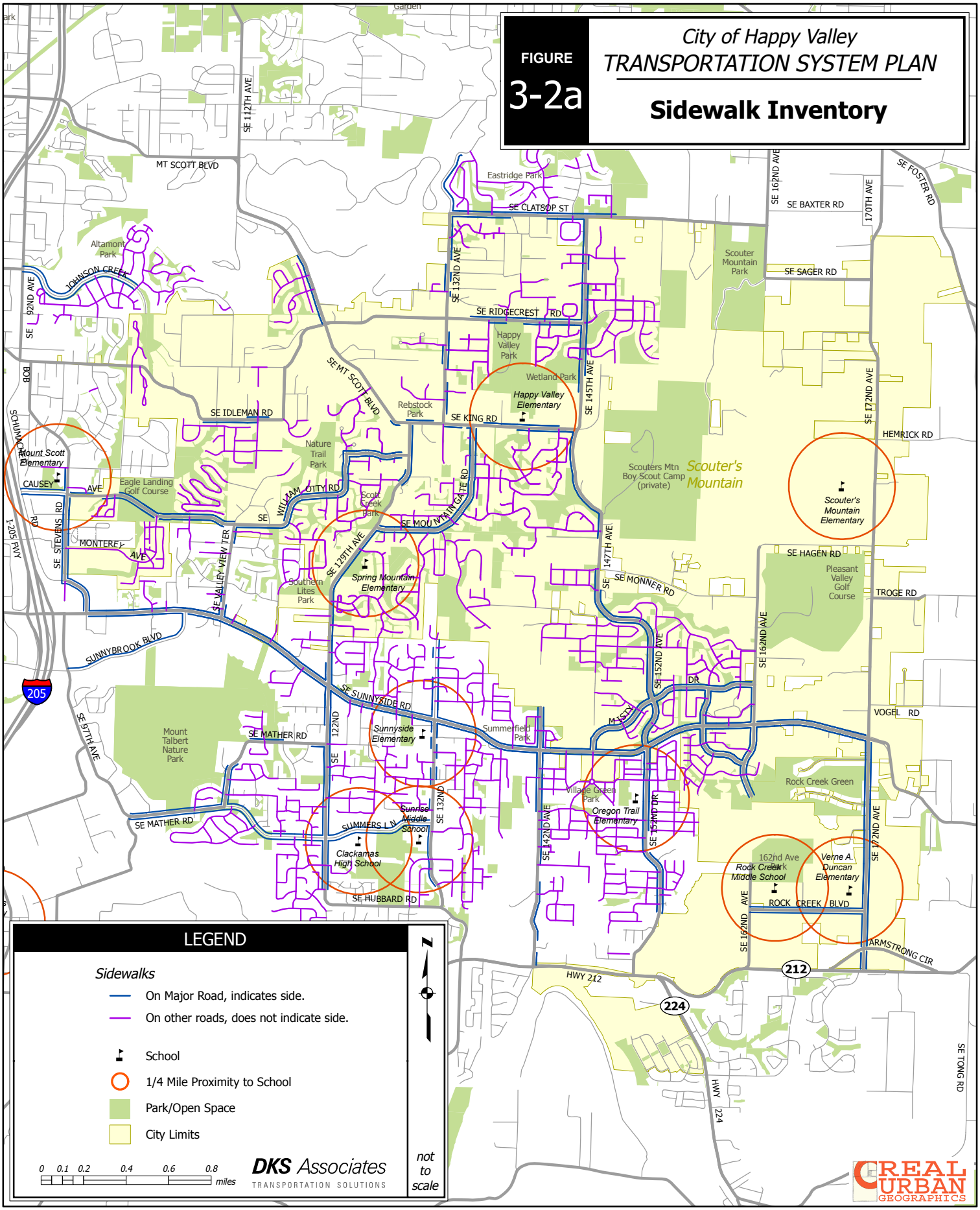


FIGURE
3-2a
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Sidewalk Inventory
MT SCOTT BLVD
SE 112TH AVE
Eastridge Park
SE CLATSOP ST
SE 162ND AVE
SE BAXTER RD
170TH AVE
SE FOSTER RD
Altamont Park
JOHNSON CREEK
SE 92ND AVE
SE 132ND AVE
Scouter Mountain Park
SE SAGER RD
SE RIDGECREST RD
Happy Valley Park
Wetland Park
Happy Valley Elementary
SE 145TH AVE
SE 172ND AVE
SE MT SCOTT BLVD
Rebstock Park
SE IDLEMAN RD
SE KING RD
HEMRICK RD
SCHUMACHER RD
Mount Scott Elementary
Nature Trail Park
Scouters Mtn Boy Scout Camp (private)
Scouter's Mountain
CAUSEY AVE
Eagle Landing Golf Course
WILLAMETTE RD
Scott Creek Park
SE MOUNTAIN GATE RD
Scouter's Mountain Elementary
I-205 FWY
SE STEVENS RD
MONTEREY AVE
SE VALLEY VIEW TER
SE 129TH AVE
Southern Lites Park
Spring Mountain Elementary
SE 147TH AVE
SE MONNER RD
SE HAGEN RD
Pleasant Valley Golf Course
TROGE RD
SUNNYBROOK BLVD
SE 162ND AVE
SE 152ND AVE
205
SE SUNNYSIDE RD
VOGEL RD
SE 97TH AVE
Mount Talbert Nature Park
SE MATHER RD
122ND
Sunnyside Elementary
Summerfield Park
Rock Creek Green
SE 132ND
Village Green Park
Oregon Trail Elementary
SE 152ND DR
SUMMERS LN
Sunrise Middle School
SE 142ND AVE
162nd Ave Park
Rock Creek Middle School
Verne A. Duncan Elementary
ROCK CREEK BLVD
SE 172ND AVE
Clackamas High School
SE HUBBARD RD
ARMSTRONG CIR
212
HWY 212
224
HWY 224
SE TONG RD
LEGEND
Sidewalks
On Major Road, indicates side.
On other roads, does not indicate side.
School
1/4 Mile Proximity to School
Park/Open Space
City Limits
0 0.1 0.2 0.4 0.6 0.8 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
N
REAL URBAN GEOGRAPHICS

There are several existing deficiencies in the sidewalk system, which prevent adequate pedestrian connectivity to key pedestrian destinations such as schools, parks, retail centers and bus stops. Sidewalk connectivity is relatively good near most schools and community services. However, there are locations where sidewalk coverage could be more complete and gaps could be filled to provide greater connectivity. Gaps within the sidewalk network discourage pedestrian use and put pedestrians at an increased safety risk by requiring them to share the roadway with vehicles.

- The existing pedestrian sidewalk deficiencies include: Sidewalk gaps along King Road west of Regina Court and on 145th Avenue north of King Road create difficulty for students who wish to walk to Happy Valley Elementary School and Middle School.
- The lack of sidewalks along 129th Avenue north of Mountain Gate Road prevents adequate pedestrian access to Spring Mountain Elementary School, and Scott Creek Park.
- Sidewalk gaps along Ridgecrest Road limit connectivity for pedestrians destine to Happy Valley Park.
- The lack of sidewalks along 172nd Avenue near Scouter's Mountain Elementary School significantly impacts pedestrian access to the school.
- Sidewalk gaps along 132nd Avenue south of Sunnyside Road prevent adequate pedestrian access to nearby schools, and community services and bus stops along Sunnyside Road.
- A lack of sidewalks on 162nd Avenue north of Misty Drive limits pedestrian access to community services and bus stops along Sunnyside Road.
- Sidewalk gaps along Valley View Terrace prevent adequate pedestrian access between the residential neighborhood and community services and bus stops along Sunnyside Road.
- The lack of sidewalks on Idleman Road and Mt. Scott Boulevard significantly limits pedestrian connectivity in the northwest portion of the city.

Trails

An inventory of paved and unpaved trails was conducted for the Happy Valley Pedestrian Master in 2006 as shown in Figure 3-2B. These trails include recreational trails in natural areas, park trails, connections within subdivisions and paved alleys. The trails within the Mt. Talbert Nature Park are primarily unpaved, however, short sections of the trail system are paved. Several trails within the study area are comprised of stairways due to the steep topography.

Table 3-2 summarizes the 2006 inventory of trails by name, ownership, maintenance, surface type, approximate length and location. The trail identification number coincides with the trails shown in Figure 3-2B. In general, the City of Happy Valley owns most of the trails that have names, while those marked N/A are homeowner association owned and maintained with public easements over them.

Table 3-2: Existing Happy Valley Trails

ID	Trail Name	Maintenance	Ownership	Type	Length	Location
1	Mt. Talbert Nature Park Trail	METRO and NCPRD	Happy Valley, NCPRD(1) and METRO	Paved, some unpaved	20,100'	South of Sunnybrook Rd and east of 97th Ave
2	Southern Lites Park Trail	NCPRD	NCPRD	Paved and unpaved	2,500'	East of 117th Ave and north of Sunnyside Rd
3	Ashley Meadows Park Trail	NCPRD	NCPRD	Paved	600'	Connects Oregon Trail Dr and Park Tree Dr
4	Mt. Scott Nature Park Trail	Happy Valley Public Works	Happy Valley and NCPRD	Paved and unpaved	8,600'	North of William Otty Rd and west of Kimberly Way
5	Scott Creek Trail	Happy Valley Public Works	Happy Valley, Metro and N. Clackamas SD	Paved	5,450'	Near 129th Ave at Scott Creek Ln
6	Mountain Gate Trail	Happy Valley Public Works	Happy Valley and NCPRD	Paved and unpaved	2,400'	Connects Mountain Gate Rd and Masa Ln
7	Happy Valley City Park Trail	Happy Valley Public Works	Happy Valley	Paved, unpaved, boardwalk	14,000	Happy Valley Park
8	N/A	HOA	HOA	Unpaved	3,400'	East of Spring Mountain Dr
9	N/A	HOA	HOA	Unpaved	300'	Southeast of Rimrock
10	N/A	HOA	HOA	Unpaved	250'	South of Caldera Ct
11	N/A	HOA	HOA	Unpaved	450'	South end of 134th
12	Kensington Bluff	HOA	HOA(2)	Paved, unpaved and stairs	3,250'	North of William Otty Rd
13	N/A	HOA	HOA	Unpaved	700'	Connects Isaac Dr and Mt Scott Blvd
14	Bella Casa	HOA	HOA	Paved and unpaved	6,250'	Connects 152nd Ave and Palermo Ave
15	Bella Casa/ Burgundy Rose	HOA	HOA	Paved	4,500'	Connects Palermo Ave and Misty Dr

ID	Trail Name	Maintenance	Ownership	Type	Length	Location
16	Powerline Trail	HOA	HOA	Paved	3,250’	Within the powerline easement, connects Monner Rd to 142nd
17	Rolling Acres	HOA	HOA	Paved	300’	Connects 152nd Ave and Nia Dr
18	Burgundy Rose	HOA	HOA	Paved	160’	Connects Sunrunner Ct and Misty Dr
19	Happy Valley Village	HOA	HOA	Paved	400’	Connects Nyla Way and 157th Ave
20	Sunrise Heights	HOA	HOA	Paved	1,800’	West of 155th Ave and north of Sunnyside Rd
21	Sunrise Heights	HOA	HOA	Paved	900’	Connects Jubilee St and Shaunte Ln to 152nd Ave
22	Happy Valley Village	HOA	HOA	Paved	500’	Connects Vivian Way and 157th Ave
23	Sunrise Heights	HOA	HOA	Paved	450’	Connects Misty Dr and Kempton Ct
24	Sunrise Heights	HOA	HOA	Paved	160’	Connects 152nd and Autumnwood Ln
25	147th Avenue Trail	HOA	HOA	Paved and stairs	200’	Connects Misty Dr and 147th north of Verlie St
26	Sunrise Heights	HOA	HOA	Paved and stairs	500’	Connects Page Park Ct and Donley Ln
27	Taralon	HOA	HOA	Paved	2,900’	Connects Taralon neighborhood to adjacent open space
28	N/A	HOA	HOA	Unpaved	430’	East of Mountain Gate
29	N/A	HOA	HOA	Paved	270’	Connects 153rd Dr and Oregon Trail Elementary School
30	N/A	HOA	HOA	Unpaved	2,000’	Connects 152nd Dr and Sieben Pkwy
31	N/A	HOA	HOA	Unpaved	600’	Connects Sieben Pkwy and Hines Dr
32	Sunrise Heights	HOA	HOA	Paved	150’	Connects Meadehill Ave and Sunnyside Rd
33	N/A	HOA	HOA	Paved	150’	Connects Honey Suckle Way and Sunnyside Rd
34	Lincoln Heights	HOA	HOA	Unpaved	5,200’	Connects Lincoln Heights, Mt. Scott Blvd, Idleman Rd and open space
35	Jackson Hills	HOA	HOA	Paved	1,500’	Connects Jackson Hills neighborhood to 145th Ave and open space

(1) NCPRD: North Clackamas Parks and Recreation District, a service district of Clackamas County government, community partner (volunteer dept).
(2) HOA: Homeowner's Association, with public easements over them.

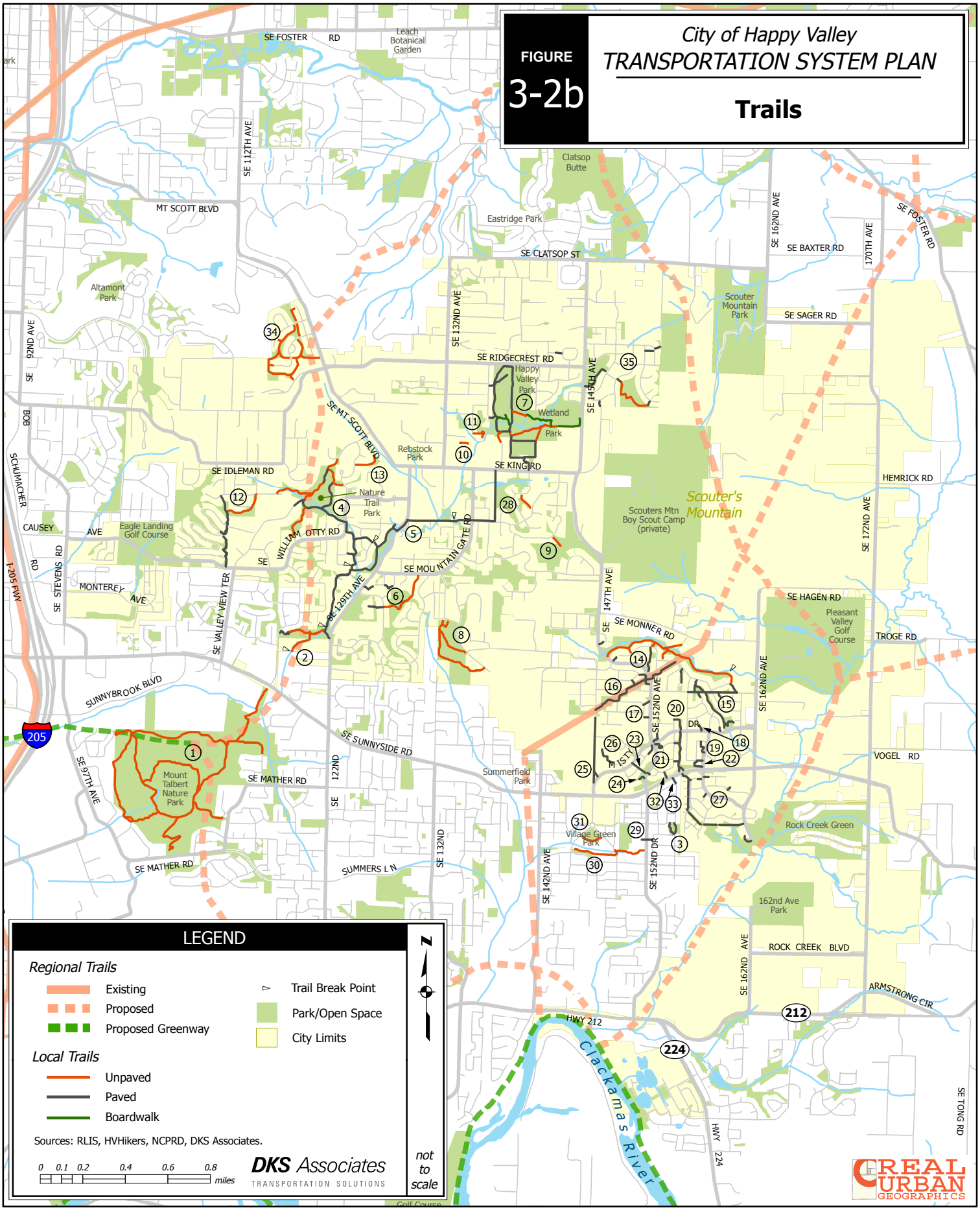


FIGURE
3-2b
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Trails
SE FOSTER RD
Leach Botanical Garden
SE 112TH AVE
MT SCOTT BLVD
Clatsop Butte
Eastridge Park
SE CLATSOP ST
SE 162ND AVE
SE BAXTER RD
170TH AVE
SE FOSTER RD
Altamont Park
SE 92ND AVE
SE 132ND AVE
Scouter Mountain Park
SE SAGER RD
SE RIDGECREST RD
Happy Valley Park
SE 145TH AVE
Wetland Park
SE MT SCOTT BLVD
Rebstock Park
SE KING RD
SE IDLEMAN RD
Nature Trail Park
SCHUMACHER RD
CAUSEY AVE
Eagle Landing Golf Course
WILLIAM OTTY RD
SE MOUNTAIN GATE RD
Scouter's Mountain
Scouters Mtn Boy Scout Camp (private)
HEMRICK RD
SE 172ND AVE
I-205 FWY
SE STEVENS RD
MONTEREY AVE
SE VALLEY VIEW TER
SE 129TH AVE
SE 147TH AVE
SE MONNER RD
SE HAGEN RD
Pleasant Valley Golf Course
TROGE RD
SUNNYBROOK BLVD
SE 162ND AVE
SE 152ND AVE
205
SE SUNNYSIDE RD
VOGEL RD
SE 97TH AVE
Mount Talbert Nature Park
SE MATHER RD
SE 122ND
Summerfield Park
SE 132ND
SUMMERS LN
Village Green Park
Rock Creek Green
SE 142ND AVE
SE 152ND DR
162nd Ave Park
ROCK CREEK BLVD
ARMSTRONG CIR
212
HWY 212
224
Clackamas River
HWY 224
SE TONG RD
LEGEND
Regional Trails
Existing
Proposed
Proposed Greenway
Local Trails
Unpaved
Paved
Boardwalk
Trail Break Point
Park/Open Space
City Limits
N
Sources: RLIS, HVHikers, NCPRD, DKS Associates.
0 0.1 0.2 0.4 0.6 0.8 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
REAL URBAN GEOGRAPHICS

BICYCLES

The arterial and collector roadway system within the study area has intermittent bicycle facilities. Sunnyside Road, a major arterial, provides an important bicycle connection with continuous bike lanes through the city. Minor arterials and collectors in the older section of the city lack bike lanes on the majority of the roadway. Mountain Gate Road has bicycle lanes in both directions and Clatsop Street has bicycle lanes between 132nd Avenue and 145th Avenue. The majority of arterials and collectors near the Happy Valley Town Center (Misty Drive, 152nd Avenue, 157th Avenue) provide continuous bike lanes. Arterials and collector roadways in the eastern portion of the City are unimproved and do not provide bike lanes on either side of the street. An exception is 172nd Avenue south of Sunnyside Road which was recently constructed with bike lanes.

Many collectors in the area have intermittent bike lanes, particularly around schools or other newer residential developments that do not connect and leave the bicyclist forced to share the travel lane with motor vehicles or use the shoulder. In many cases, this is not a desirable option for bicyclists due to narrow widths and uneven pavement conditions. The hilly topography also poses additional safety issues for bicycles sharing the traveled lane with motor vehicles. Figure 3-3 shows the existing inventory of bicycle lanes throughout the study area.

The existing bicycle network deficiencies include:

- Bike lane gaps on north-south routes; specifically 129th Avenue – Mt. Scott Boulevard and 147th Avenue – 145th Avenue
- Lack of bike lanes on 172nd Avenue north of Sunnyside Road, as the area develops frontage improvements will be constructed with bike lanes
- Lack of east-west bike route north of Sunnyside Road, Idleman Road and Ridgecrest Road are candidates but provide construction challenges

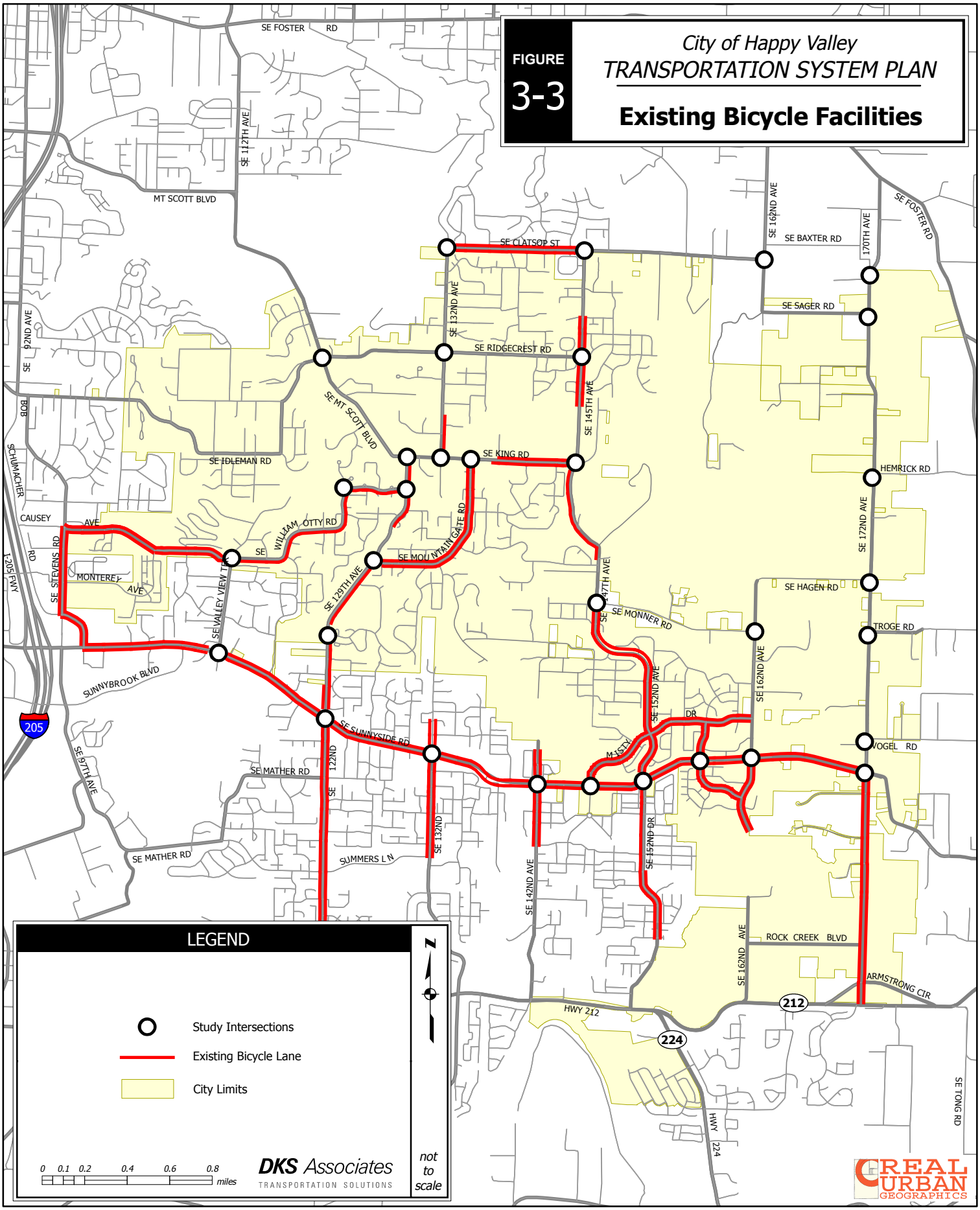


FIGURE
3-3
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Existing Bicycle Facilities
SE FOSTER RD
SE 112TH AVE
MT SCOTT BLVD
SE 92ND AVE
BOB SCHUMACHER RD
I-205 FWY
CAUSEY AVE
SE STEVENS RD
MONTEREY AVE
SE VALLEY VIEW TER
SUNNYBROOK BLVD
205
SE 97TH AVE
SE MATHER RD
SE 122ND
SE SUNNYSIDE RD
SE 129TH AVE
SE IDLEMAN RD
SE MT SCOTT BLVD
SE WILLIAM OTTY RD
SE MOUNTAIN GATE RD
SE 132ND AVE
SE RIDGECREST RD
SE CLATSOP ST
SE KING RD
SE 145TH AVE
SE 147TH AVE
SE MONNER RD
SE 152ND AVE
SE 152ND DR
SE 132ND
SUMMERS LN
SE 142ND AVE
SE 162ND AVE
SE BAXTER RD
SE SAGER RD
HEMRICK RD
SE 172ND AVE
SE HAGEN RD
TROGE RD
VOGEL RD
ROCK CREEK BLVD
ARMSTRONG CIR
HWY 212
224
212
HWY 224
SE TONG RD
LEGEND
Study Intersections
Existing Bicycle Lane
City Limits
0 0.1 0.2 0.4 0.6 0.8 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
N
REAL URBAN GEOGRAPHICS

TRANSIT

Transit service is provided in Happy Valley by TriMet. Currently there are four bus routes and one light rail transit line serving the greater Happy Valley area.

- Bus Route 19: Woodstock/Glisan connects Portland City Center to Mt. Scott Boulevard/112th Avenue. Runs daily with 20 to 30 minute headways.
- Bus Route 30: Estacada serves OR 212/224 between Clackamas Town Center and Estacada. Runs weekdays with approximate 30 minute headways and Saturdays with one hour headways.
- Bus Route 155: Sunnyside serves Sunnyside Road and extends from the Clackamas Town Center to 157th Avenue then travels north on a loop to Misty Drive and south to 162nd Avenue and Sunnyside Road. Runs daily with approximate 45 minute headways.
- Bus Route 156: Mather Road extends from the Clackamas Town Center, serves the area south of Sunnyside Road and along OR 212/224, then travels north to a loop at 147th and 152nd Avenues. Runs weekdays only with approximate 80 minute headways.
- MAX Green Line connects Portland City Center and Clackamas Town Center, transfers to Bus Routes 30, 155 and 156. Runs with 10 to 15 minute headways.

Figure 3-4 shows the transit routes and transit stops serving the greater Happy Valley area. There is a MAX Green Line park and ride lot located at the Clackamas Town Center. Most of the bus stops along these bus routes have minimal amenities, many only have a bench.

Annual weekday bus ridership was obtained from the 2014 Tri-Met Census[1]. Table 3-3 shows the transit stop locations and the weekday passenger on and offs for stops on routes 19, 30, 155, 156 and the MAX Green Line that are within or near the study area.

Table 3-3: Transit Stop Locations and Daily Weekday Ridership

Route	Stop Location	Direction	On	Off	Total
19	Mt. Scott Boulevard/112th Avenue	Eastbound	4	12	16
19	Mt. Scott Boulevard/112th Avenue	Westbound	5	7	12
	Total Route 19		**9**	**19**	**28**
30	SE Hwy 212/Evelyn	Eastbound	3	14	17
30	SE Hwy 212/102nd	Westbound	7	5	12
30	10800 Block SE Hwy 212	Eastbound	3	9	12
30	10700 Block SE Hwy 212	Westbound	14	3	17
30	Hwy 212/Fred Meyer Entrance	Eastbound	1	14	15
30	11400 Block SE Hwy 212	Westbound	10	0	10
30	SE Hwy 212/122nd	Eastbound	0	13	13
30	SE Hwy 212/122nd	Westbound	4	0	4
30	12700 Block SE Hwy 212	Eastbound	0	2	2
30	12700 Block SE Hwy 212	Westbound	2	0	2
30	SE Hwy 212/130th	Eastbound	1	8	9

[1] TriMet Passenger Census, TriMet Transportation Planning, Spring of 2014.

Route	Stop Location	Direction	On	Off	Total
30	SE Hwy 212/130th	Westbound	5	2	7
30	SE Hwy 212/135th	Eastbound	2	15	17
30	SE Hwy 212/135th	Westbound	14	3	17
30	13600 Block SE Hwy 224	Eastbound	0	3	3
30	SE Hwy 224/142nd	Eastbound	1	7	8
30	SE Hwy 224/142nd	Westbound	8	1	9
30	SE Hwy 224/152nd	Eastbound	0	3	0
30	SE Hwy 224/152nd	Westbound	5	0	5
30	SE Hwy 224/Hwy 212	Eastbound	0	5	5
30	SE Hwy 224/Hwy 212	Westbound	1	0	1
30	SE Hwy 224/Goose Hollow	Eastbound	1	5	6
30	SE Hwy 224/Goose Hollow	Westbound	6	1	7
30	SE Hwy 224/Eckert Ln	Eastbound	0	3	3
30	SE Hwy 224/Eckert Ln	Westbound	3	1	4
	Total Route 30		**91**	**117**	**205**
155	Sunnyside/Valley View	Eastbound	2	12	14
155	Sunnyside/Valley View	Westbound	12	1	13
155	Sunnyside/117th	Eastbound	3	5	8
155	Sunnyside/117th	Westbound	4	1	5
155	Sunnyside/119th	Eastbound	5	26	31
155	Sunnyside/119th	Westbound	10	1	11
155	Sunnyside/122nd	Eastbound	5	21	26
155	Sunnyside/122nd	Westbound	26	4	30
155	Sunnyside/128th	Eastbound	0	2	2
155	Sunnyside/128th	Westbound	2	0	2
155	Sunnyside/132nd	Eastbound	2	15	17
155	Sunnyside/132nd	Westbound	10	1	11
155	Sunnyside/139th	Eastbound	2	5	7
155	Sunnyside/140th	Westbound	3	0	3
155	Sunnyside/142nd	Eastbound	4	12	16
155	Sunnyside/142nd	Westbound	6	1	7
155	Sunnyside/145th	Eastbound	3	7	10
155	Sunnyside/145th	Westbound	6	0	6
155	Sunnyside/147th	Eastbound	10	27	37
155	Sunnyside/Misty Dr	Westbound	10	0	10
155	Sunnyside/152nd	Eastbound	4	12	16
155	Sunnyside/152nd	Westbound	7	0	7
155	157th/Sunnyside	Eastbound	4	17	21
155	157th/Misty Dr	Eastbound	3	4	7
155	Misty Dr/162nd	Eastbound	2	2	4
155	162nd/Sunnyside	Eastbound	8	8	16

Route	Stop Location	Direction	On	Off	Total
155	Sunnyside/157th	Eastbound	0	0	0
155	Sunnyside/157th	Westbound	9	0	9
	Total Route 155		**162**	**184**	**346**
156	13600 Block SE Hwy 224	Eastbound	0	3	3
156	SW Hwy 224/135th	Westbound	2	1	3
156	SE Hwy 224/142nd	Eastbound	1	2	3
156	SE Hwy 224/142nd	Westbound	3	0	3
156	152nd/Morning Way	Eastbound	1	0	1
156	152nd/Morning Way	Westbound	0	0	0
156	152nd/Ranger Dr	Eastbound	1	2	3
156	152nd/Sedona Dr	Westbound	1	0	1
156	152nd/Bollam Dr	Eastbound	1	1	2
156	152nd/Territory Dr	Westbound	1	0	1
156	152nd/Oregon Trail	Eastbound	1	1	2
156	Oregon Trail/152nd	Westbound	1	0	1
156	Sunnyside/152nd	Eastbound	1	2	3
156	14600 Block 147th	Eastbound	4	5	9
156	Oregon Trail/Hines	Eastbound	0	1	1
156	Oregon Trail/Hines	Westbound	5	0	5
	Total Route 156		**23**	**18**	**41**
MAX	Clackamas Town Center	Northbound + Southbound	2277	2353	4630

As shown by the 2014 census data, ridership is moderately low on the bus routes serving Happy Valley. Route 155 along Sunnyside Road has the highest ridership with approximately 350 ons and offs during a typical weekday. Route 30 along OR 212/224 has the second highest ridership with approximately 200 ons and offs during a typical weekday. The current bus routes have bus stops located close together, which require frequent stops which may contribute to slower overall transit service. None of the bus routes serving Happy Valley are currently designated Frequent Service (15 minute peak headways) by TriMet.

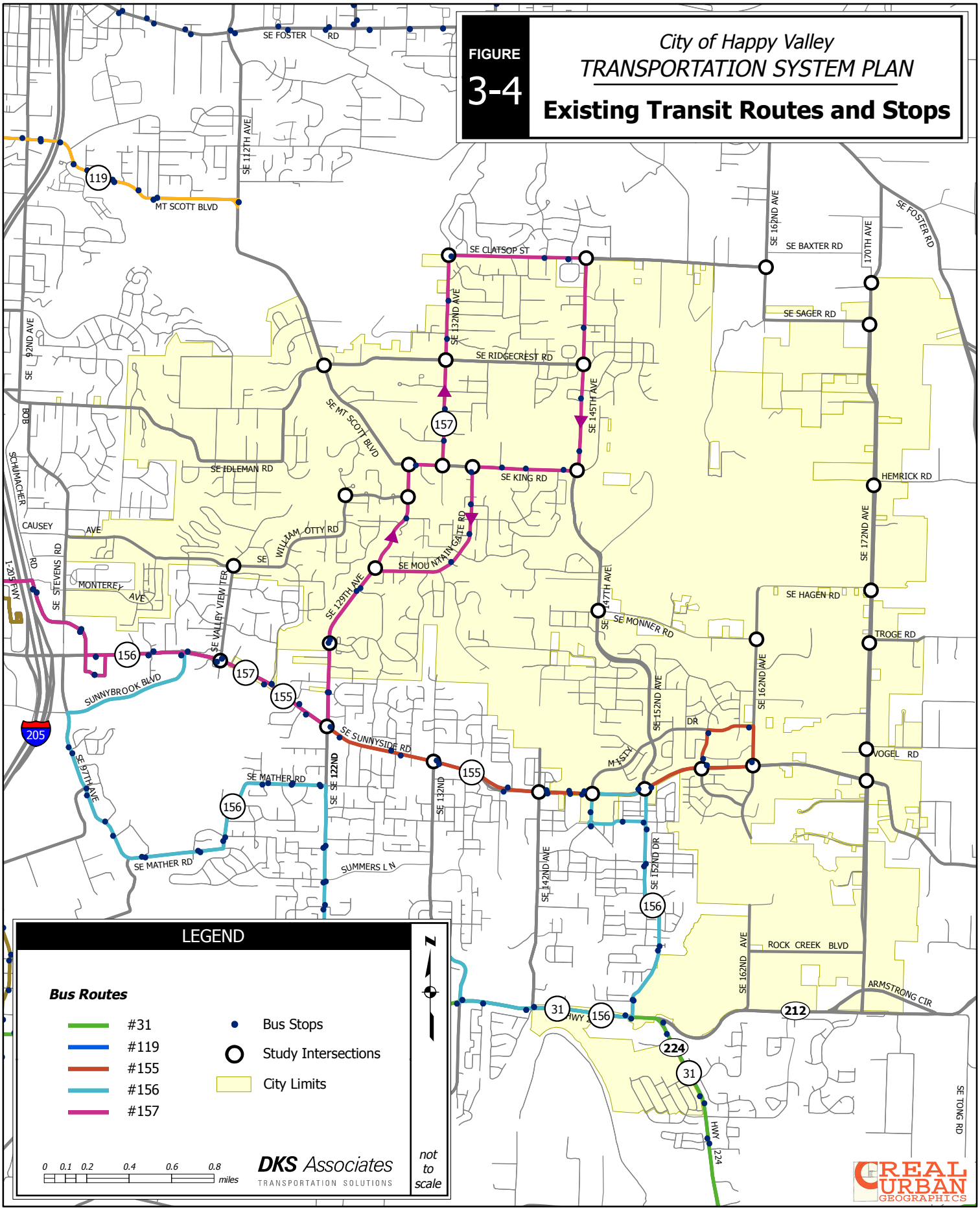


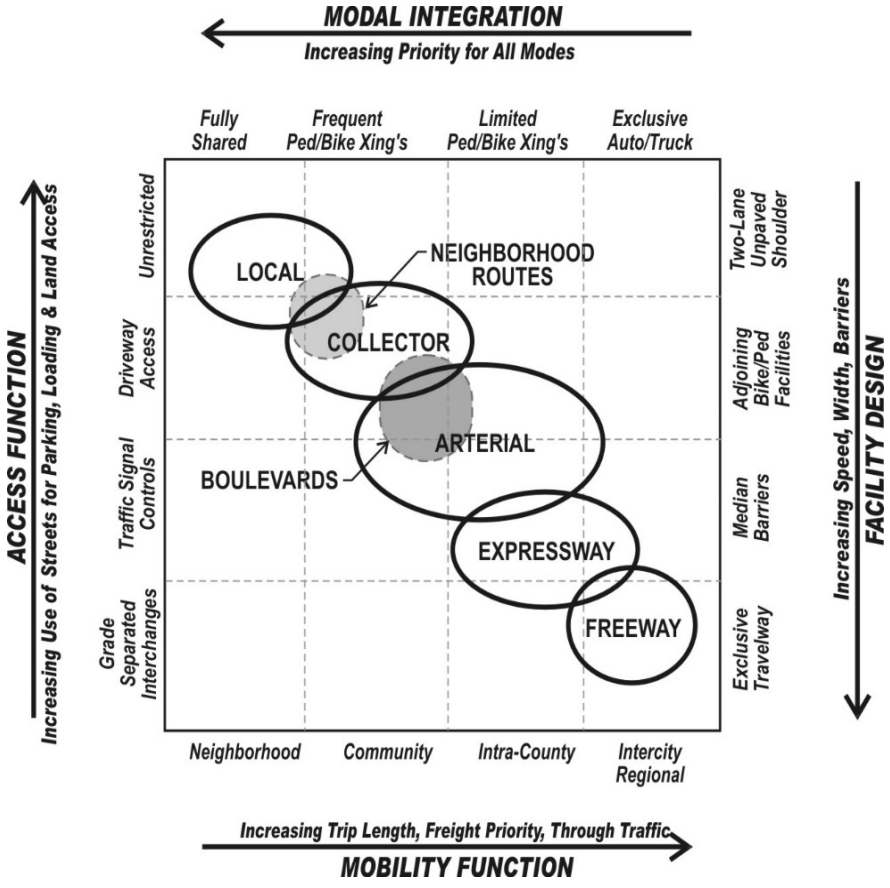
FIGURE
3-4
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Existing Transit Routes and Stops
SE FOSTER RD
SE 112TH AVE
119
MT SCOTT BLVD
SE CLATSOP ST
SE 132ND AVE
SE RIDGECREST RD
SE 145TH AVE
157
SE MT SCOTT BLVD
SE IDLEMAN RD
SE KING RD
SE 162ND AVE
SE BAXTER RD
170TH AVE
SE FOSTER RD
SE SAGER RD
HEMRICK RD
SE 172ND AVE
SE HAGEN RD
TROGE RD
SE 92ND AVE
BOB SCHUMACHER
CAUSEY AVE
SE STEVENS RD
I-205 FWY
MONTEREY AVE
SE WILLAMETTE FALLS DR
SE MOUNTAIN GATE RD
SE 129TH AVE
SE 147TH AVE
SE MONNER RD
SE VALLEY VIEW TER
156
157
155
SUNNYBROOK BLVD
205
SE SUNNYSIDE RD
SE 97TH AVE
SE MATHER RD
SE 122ND
SE 132ND
SE 152ND AVE
DR
M1STY
VOGEL RD
SUMMERS LN
SE 142ND AVE
SE 152ND DR
ROCK CREEK BLVD
ARMSTRONG CIR
212
224
31
HWY 224
SE TONG RD
LEGEND
Bus Routes
#31
#119
#155
#156
#157
Bus Stops
Study Intersections
City Limits
0 0.1 0.2 0.4 0.6 0.8 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
REAL URBAN GEOGRAPHICS

MOTOR VEHICLES

Functional Classification

The functional classification system is designed to serve transportation needs within the community. The schematic diagram below shows the competing functional nature of roadway facilities as it relates to access, mobility, multi-modal transport, and facility design. The diagram is useful to understand how worthwhile objectives can have opposing effects. For example, as mobility is increased (bottom axis), the provision for non-motor vehicle modes (top axis) is decreased accordingly. Similarly, as access increases (left axis), the facility design (right axis) dictates slower speeds, narrower roadways, and non-exclusive facilities. The goal of selecting functional classes for particular roadways is to provide a suitable balance of these four competing objectives.

The diagram shows that as street classes progress from local to freeway the following occurs:



Mobility Increases – Longer trips between destinations, greater proportion of freight traffic movement, and a higher proportion of through traffic.

Integration of Pedestrian and Bicycle Decreases – Provisions for sidewalks and bike facilities are required up through the arterial class, however, the frequency of intersection or mid-block crossings for non-motorized vehicles steadily decreases with higher functional classes. The expressway and freeway facilities typically do not allow pedestrian and bike facilities adjacent to the roadway and crossings are grade-separated to enhance mobility and safety.

Access Decreases – The shared uses for parking, loading, and direct land access is reduced. This occurs through parking regulation, access control and spacing standards (see opposite axis).

Facility Design Standards Increase – Roadway design standards require increasingly wider, faster facilities leading to exclusive travel ways for autos and trucks only. The opposite end of the scale is the most basic two-lane roadway with unpaved shoulders.

Two additional areas are noted on the diagram for Neighborhood Routes and Boulevards that span two conventional street classes.

The existing functional classifications are shown in Figure 3-5. . The figure identifies five roadway classifications: major arterial (Clackamas County), minor arterial, collector, neighborhood and local. Two state roadways are located south of the TSP study area. The Oregon Highway Plan provides the functional classification of state roadways. OR 212 is designated as a Statewide Highway and OR 224 is designated as a District Highway.

This TSP update should address the limitations of the existing functional class and establish a system that meets City and regional policy issues. A functional class system based primarily on connectivity would allow the design flexibility to handle each of the issues identified above.

Roadway Jurisdiction

Roadway ownership and maintenance responsibilities of arterial and collector roadways in the TSP study area are identified in Figure 3-6. The City of Happy Valley uses the ODOT Routine Road Maintenance/Water Quality and Habitat Guide, when applicable, during roadway maintenance activities. Most arterial and collector roadways north of Sunnyside Road and west of 152nd Avenue are under City jurisdiction. The remaining arterial and collector roadways in the TSP study area are under County jurisdiction. OR 212 and OR 224 along the south border of the TSP study area are under State jurisdiction.

Connectivity

The existing street network within Happy Valley is bounded by OR 212/224 on the south. Sunnyside Road serves as the primary arterial and represents the only direct connector between the east and west boundaries of town. Currently Hubbard Road/122nd Avenue/129thAvenue/Mt. Scott Boulevard, 152nd Avenue/147th Avenue/145th Avenue and 172nd Avenue provide the only direct north/south roadways that connect OR 212/224 with the northern most limits of the city. The remaining street network is made up of roadways with limited connectivity through the study area. Many of the collectors in the northern or “bowl” section of the city and the east portion of the study area consist of older roadways and narrow travel lanes, mixed with some newer facilities with bike lanes and sidewalks.

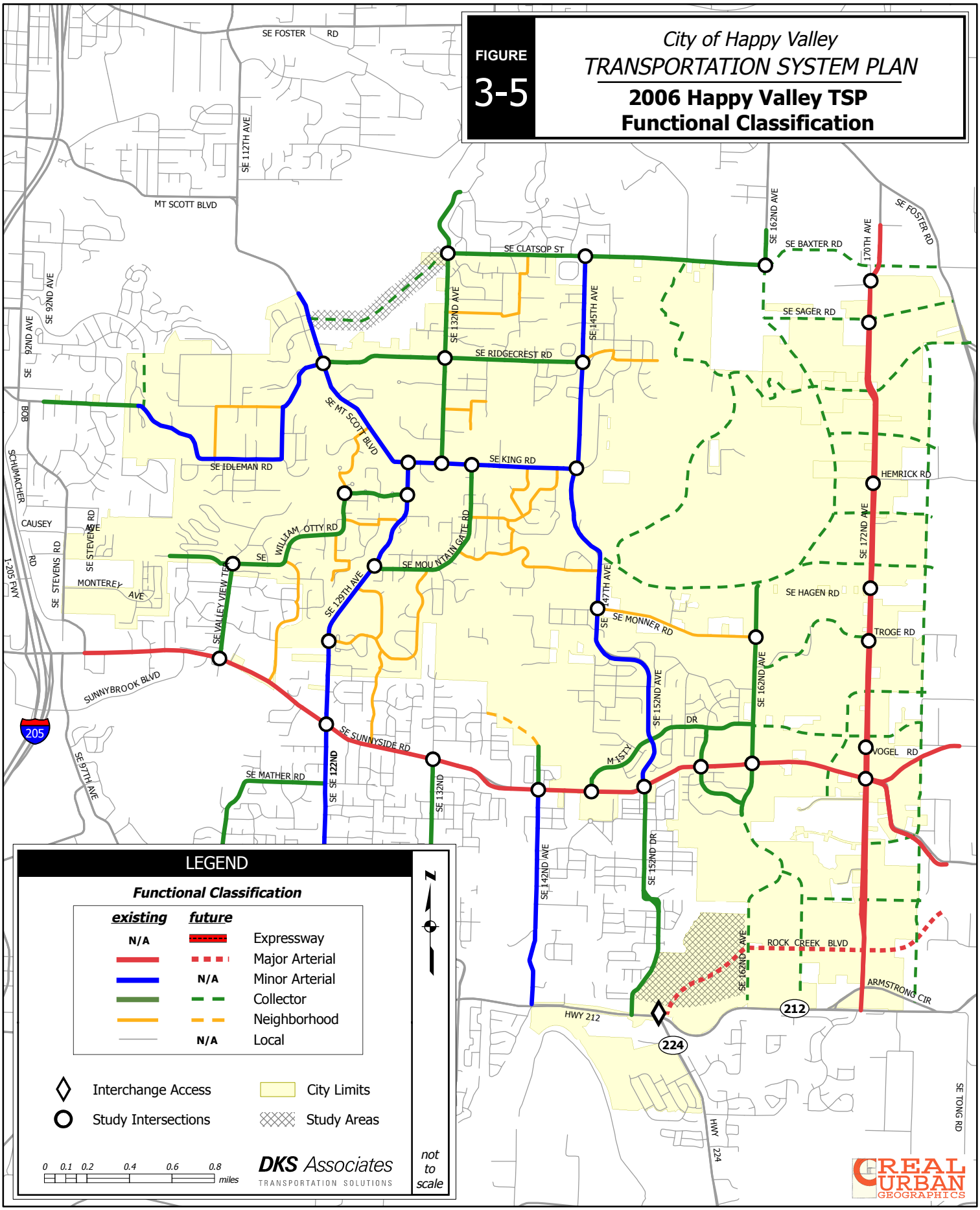


FIGURE
3-5
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
2006 Happy Valley TSP
Functional Classification
SE FOSTER RD
SE 112TH AVE
MT SCOTT BLVD
SE CLATSOP ST
SE 162ND AVE
SE BAXTER RD
170TH AVE
SE FOSTER RD
SE 92ND AVE
SE 132ND AVE
SE 145TH AVE
SE SAGER RD
SE RIDGECREST RD
SE MT SCOTT BLVD
SE IDLEMAN RD
SE KING RD
HEMRICK RD
SE 172ND AVE
BOB SCHUMACHER
CAUSEY AVE
SE STEVENS RD
WILLIAM OTTY RD
SE MOUNTAIN GATE RD
MONTEREY AVE
SE VALLEY VIEW TER
SE 129TH AVE
SE 147TH AVE
SE HAGEN RD
SE MONNER RD
TROGE RD
I-205 FWY
SUNNYBROOK BLVD
SE 152ND AVE
SE 162ND AVE
DR
205
SE SUNNYSIDE RD
VOGEL RD
SE 97TH AVE
SE MATHER RD
SE 122ND
SE 132ND
M-1ST-Y
SE 142ND AVE
SE 152ND DR
ROCK CREEK BLVD
ARMSTRONG CIR
HWY 212
212
224
HWY 224
SE TONG RD
LEGEND
Functional Classification
existing
future
N/A
Expressway
Major Arterial
N/A
Minor Arterial
Collector
Neighborhood
N/A
Local
Interchange Access
Study Intersections
City Limits
Study Areas
0 0.1 0.2 0.4 0.6 0.8 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
N
REAL URBAN GEOGRAPHICS

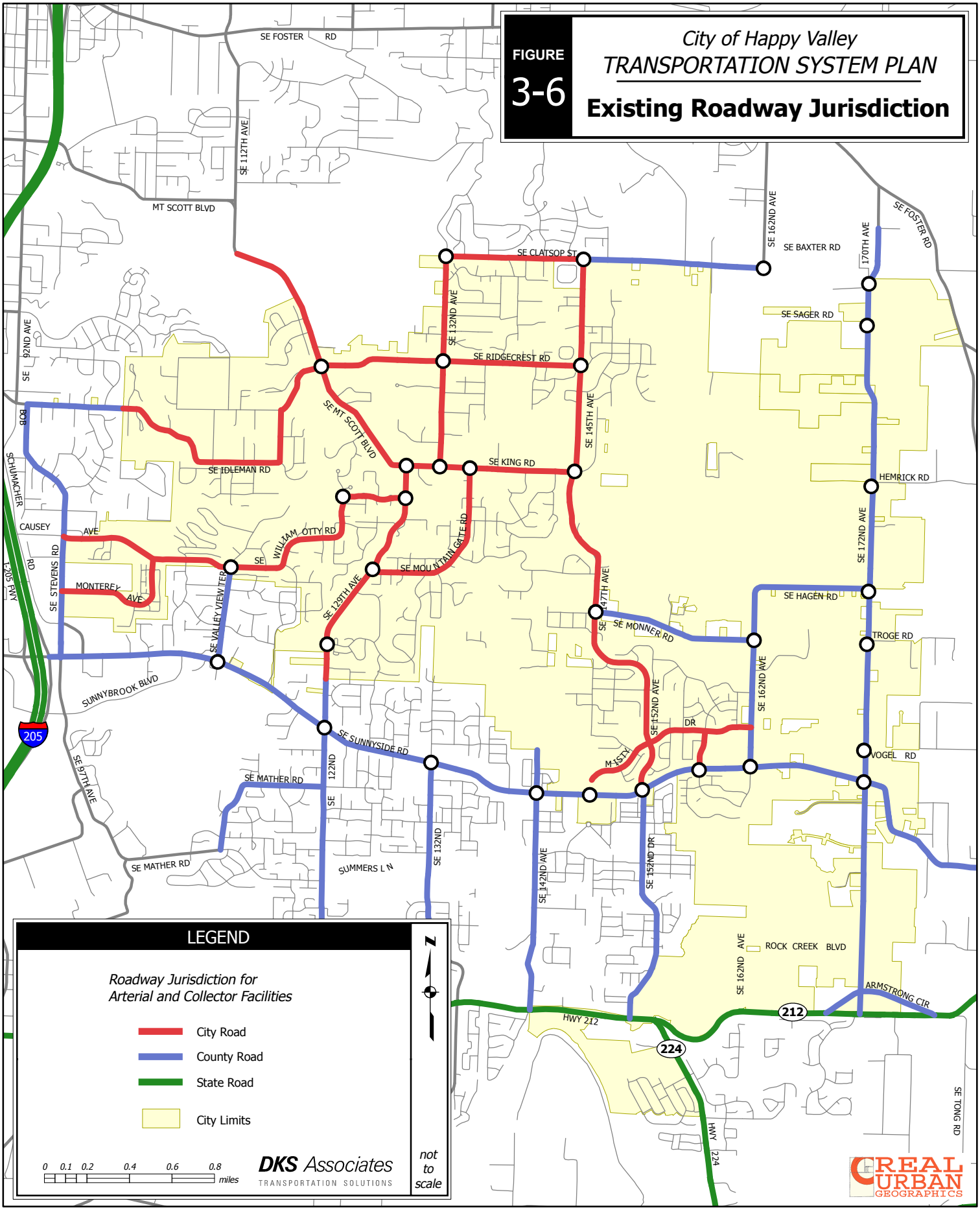


FIGURE
3-6
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Existing Roadway Jurisdiction
SE FOSTER RD
SE 112TH AVE
MT SCOTT BLVD
SE CLATSOP ST
SE 162ND AVE
SE BAXTER RD
170TH AVE
SE FOSTER RD
SE SAGER RD
SE 132ND AVE
SE RIDGECREST RD
SE 92ND AVE
SE MT SCOTT BLVD
SE 145TH AVE
SE IDLEMAN RD
SE KING RD
HEMRICK RD
SE 172ND AVE
CAUSEY AVE
SE WILLIAM OTTY RD
SE MOUNTAIN GATE RD
SE STEVENS RD
MONTEREY AVE
SE 129TH AVE
SE 147TH AVE
SE HAGEN RD
SE MONNER RD
TROGE RD
SE VALLEY VIEW TER
SUNNYBROOK BLVD
SE 152ND AVE
SE 162ND AVE
DR
SE SUNNYSIDE RD
VOGEL RD
205
SE 97TH AVE
SE MATHER RD
SE 122ND
SE 132ND
SUMMERS LN
SE 142ND AVE
SE 152ND DR
ROCK CREEK BLVD
ARMSTRONG CIR
HWY 212
212
224
HWY 224
SE TONG RD
LEGEND
Roadway Jurisdiction for
Arterial and Collector Facilities
City Road
County Road
State Road
City Limits
0 0.1 0.2 0.4 0.6 0.8 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
REAL URBAN GEOGRAPHICS

ROADWAY CHARACTERISTICS

Field observations were conducted to determine existing characteristics of collectors and arterials within the TSP study area. Data collected included posted speed limits, roadway lanes and intersection controls. These characteristics define roadway capacity and operating speeds through the street system, which affects travel path choices for drivers in Happy Valley.

Vehicle Speeds

Figure 3-7 shows an inventory of posted speeds in Happy Valley. Sunnyside Road is posted at 40 mph through the entire length of the study area. 172nd Avenue is posted 45 miles per hour from Sunnyside Road to 170th Avenue and 35 miles per hour from 170th Avenue to Foster Road. In general, local and collector roadways are posted at 25 or 35 mph with a few sections posted higher at 40 or 45 mph. There are signed school zones on King Road, Rock Creek Boulevard, 132nd Avenue, 122nd Avenue and 172nd Avenue that have posted speed limits of 20 mph during school periods.

Available roadway speed survey data was reviewed at two locations over a 24 hour period to determine existing vehicle speed conditions. The 85th percentile vehicle speed represents a condition when 15 percent of the vehicles surveyed were traveling faster than the 85th percentile speed and 85 percent of the vehicles were traveling slower than the 85th percentile speed. Table 3-4 summarizes the available speed survey data findings.

Table 3-4 Roadway Speed Survey Data

Speed Survey Location	Northbound Daily Volume	Southbound Daily Volume	85th Percentile Speed	50th Percentile Speed
Idleman Road north of Tyler Road	2070	1770	40	35
129th Avenue north of Mt. Gate Road	4780	4740	40	35

Note: Idleman Road count on Tuesday July 8, 2014; 129th Avenue count on Wednesday July17, 2013.

Intersection Control

The only signalized intersections within the City of Happy Valley are located along Sunnyside Road and OR 212/224. The remaining intersections are controlled by stop signs either on the minor street approaches or as an all stop intersection. The existing study intersection locations and the existing intersection controls are shown in Figure 3-7. The existing study intersections include nine signalized intersections, six intersections with stop sign control and four all-way stop controlled intersections.

Roadway Cross-section

The existing number of travel lanes on key roadways in Happy Valley is shown in Figure 3-8. The widest roadways are Sunnyside Road, which ranges from seven lanes west of 122nd Avenue to five lanes at 172nd Avenue and 172nd Avenue which provides five lanes between Sunnyside Road and OR 212. The remaining roads in Happy Valley generally provide two to three lanes.

The key roadways in Happy Valley were measured in various locations to determine typical cross-section widths. Many of the streets within the study area have new sections intermixed with older sections, resulting in ranges of roadway widths depending on location. Figure 3-8 also shows the existing roadway widths.

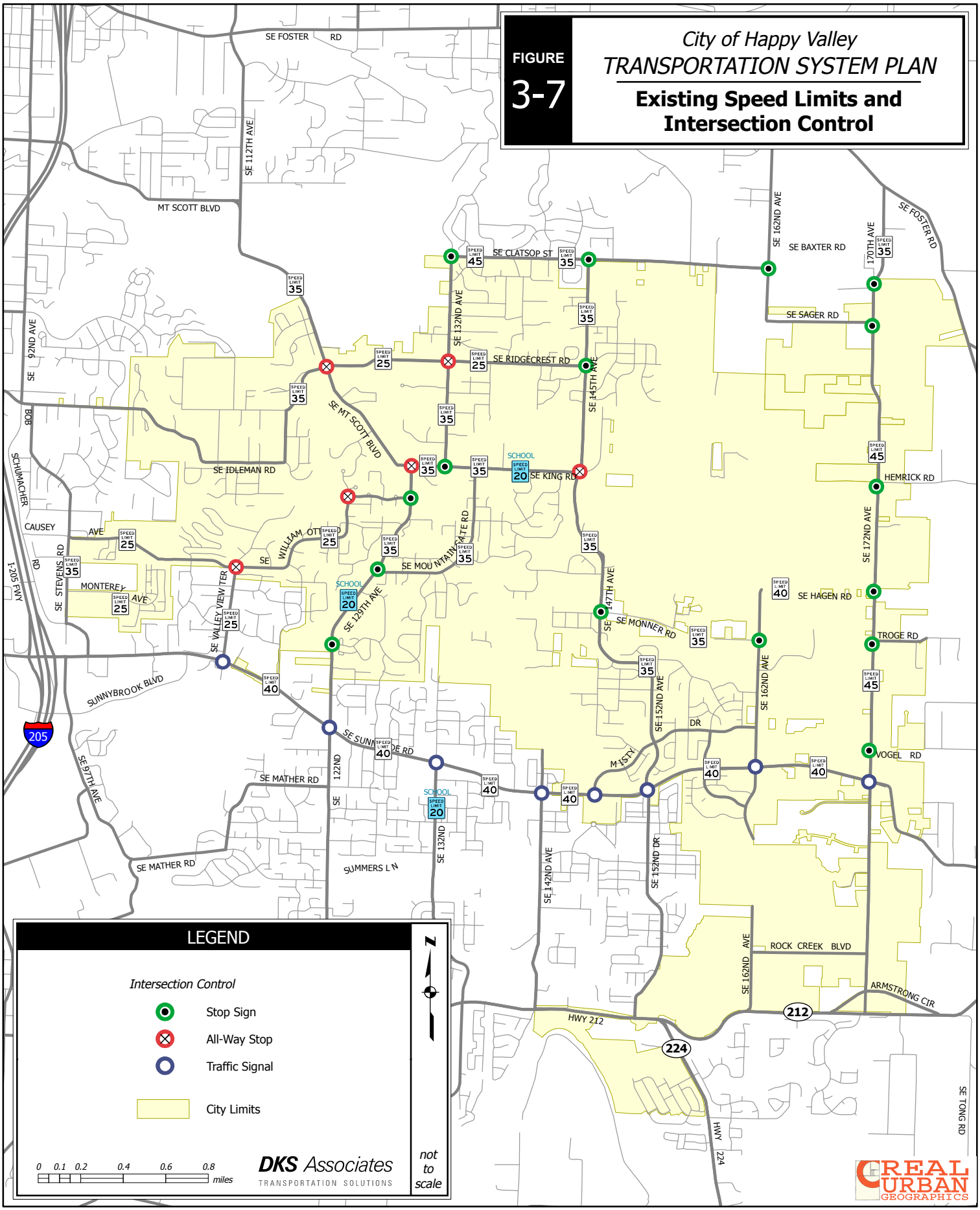


FIGURE
3-7
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Existing Speed Limits and Intersection Control
SE FOSTER RD
MT SCOTT BLVD
SE 112TH AVE
SE 92ND AVE
BOB SCHUMACHER
I-205 FWY
SE STEVENS RD
CAUSEY AVE
MONTEREY AVE
SE IDLEMAN RD
SE MT SCOTT BLVD
SE 132ND AVE
SE RIDGECREST RD
SE CLATSOP ST
SE 145TH AVE
SE KING RD
SE WILLIAM OTT RD
SE MOUNTAIN GATE RD
SE VALLEY VIEW TER
SE 129TH AVE
SE 147TH AVE
SE MONNER RD
SE 162ND AVE
SE BAXTER RD
SE SAGER RD
SE 170TH AVE
SE FOSTER RD
HEMRICK RD
SE 172ND AVE
SE HAGEN RD
TROGE RD
VOGEL RD
SE 152ND AVE
SE 152ND DR
SUNNYBROOK BLVD
SE SUNNYSIDE RD
SE MATHER RD
SE 97TH AVE
SE 122ND
SE 132ND
SUMMERS LN
SE 142ND AVE
ROCK CREEK BLVD
ARMSTRONG CIR
HWY 212
HWY 224
SE TONG RD
SCHOOL
205
212
224
LEGEND
Intersection Control
Stop Sign
All-Way Stop
Traffic Signal
City Limits
0 0.1 0.2 0.4 0.6 0.8 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
REAL URBAN GEOGRAPHICS

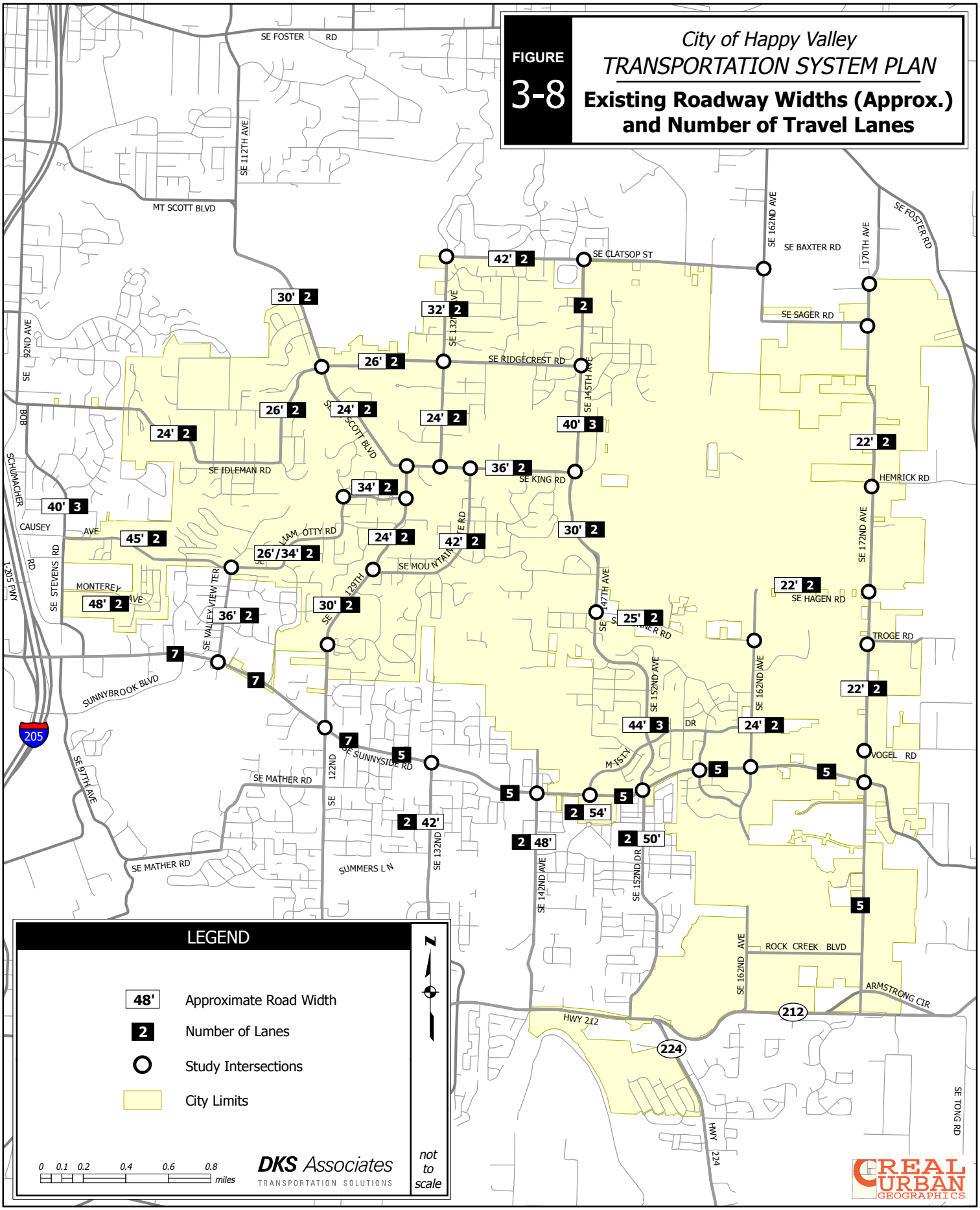


FIGURE 3-8
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Existing Roadway Widths (Approx.) and Number of Travel Lanes
SE FOSTER RD
SE 112TH AVE
MT SCOTT BLVD
SE 92ND AVE
SE BOB SCHUMACHER RD
I-205 FWY
SE STEVENS RD
CAUSEY AVE
MONTEREY AVE
SE VALLEY VIEW TER
SUNNYBROOK BLVD
SE 97TH AVE
SE MATHER RD
SE IDLEMAN RD
SE SCOTT BLVD
SE 129TH AVE
SE 132ND AVE
SE RIDGECREST RD
SE KING RD
SE MOUNTAIN RD
SE CLATSOP ST
SE 145TH AVE
SE 147TH AVE
SE 152ND AVE
SE 142ND AVE
SE 122ND AVE
SUMMERS LN
SE SUNNYSIDE RD
SE 162ND AVE
SE BAXTER RD
SE SAGER RD
SE HAGEN RD
HEMRICK RD
TROGE RD
VOGEL RD
SE 172ND AVE
SE 170TH AVE
SE FOSTER RD
ROCK CREEK BLVD
ARMSTRONG CIR
HWY 212
HWY 224
SE TONG RD
42' 2
30' 2
32' 2
26' 2
24' 2
40' 3
36' 2
34' 2
45' 2
26'/34' 2
48' 2
22' 2
25' 2
44' 3
54' 2
50' 2
48' 2
42' 2
7
5
LEGEND
48' Approximate Road Width
2 Number of Lanes
Study Intersections
City Limits
0 0.1 0.2 0.4 0.6 0.8 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
REAL URBAN GEOGRAPHICS

Emergency Response Routes

Emergency fire services are provided in Happy Valley by Clackamas Fire District #1 (CFD #1). Three fire stations are located within Happy Valley; Mt. Scott Station #5 on Causey Avenue near Bob Schumacher Road, Happy Valley Station #6 on King Road near 129th Avenue, and Pleasant Valley Station #7 on 172nd Avenue north of Hagen Road.

Response times are a high priority for emergency services, as patient care is time-sensitive. Roadway connectivity can play a key role in reducing emergency response times. Generally, restrictive or deflective traffic calming devices (e.g. raised intersections, and diverters) should not be located on primary emergency response routes. Primary emergency response routes include arterial and collector roadways as identified in Figure 3-5. Current Happy Valley design standards for speed cushions provide cut-outs for emergency vehicle tires to reduce impacts to response times.

Motor Vehicle Volume

The existing daily traffic volumes on key roadways in the study area are shown in Figure 3-9. Available 24-hour traffic count data was reviewed at two locations to determine existing daily vehicle volumes. The remaining average daily traffic volumes (ADT) were obtained from available Clackamas County 2012 average daily traffic counts.

Intersection traffic turn movement counts were also obtained at key locations to provide the basis for analyzing existing problem areas as well as establishing a base condition for future comparisons. The City of Happy Valley staff contributed to the selection of the study intersections based on specific areas of concern on major roadways and other issues affecting the residents of the city.

Turn movement counts were conducted at the study intersections in 2014 during the weekday evening peak period to determine existing operating conditions. Most of the study intersections experience peak hour volumes between 5:00 and 6:00 PM, with a few intersections exhibiting slightly earlier peak hours beginning between 4:00 and 5:00 PM

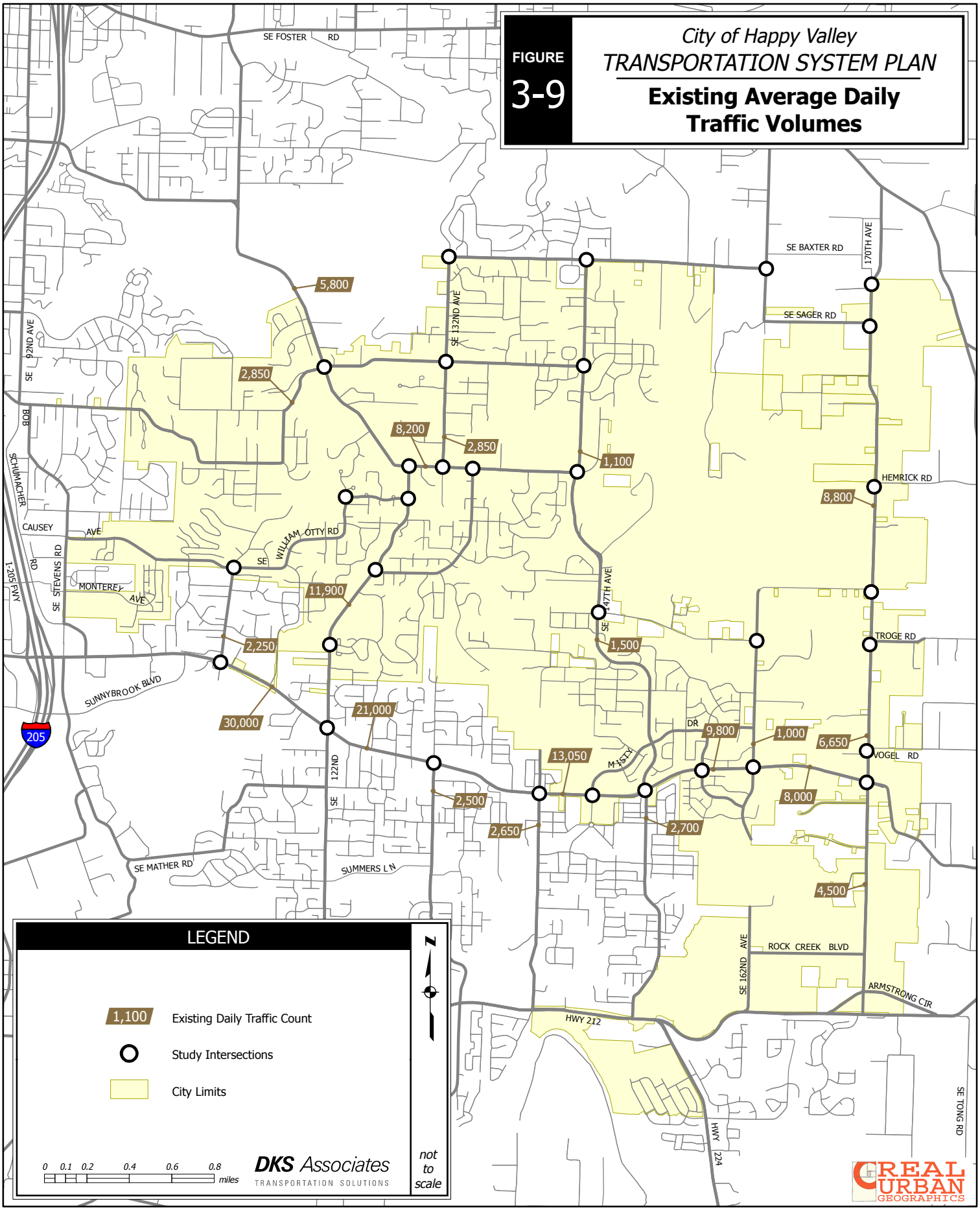


FIGURE
3-9
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Existing Average Daily Traffic Volumes
SE FOSTER RD
SE BAXTER RD
170TH AVE
SE SAGER RD
SE 132ND AVE
SE 92ND AVE
BOB SCHUMACHER
CAUSEY AVE
SE STEVENS RD
I-205 FWY
MONTEREY AVE
SE WILLIAM OTTY RD
HEMRICK RD
SE 147TH AVE
TROGE RD
SUNNYBROOK BLVD
205
SE 122ND
DR
M-1-STY
VOGEL RD
SE MATHER RD
SUMMERS LN
ROCK CREEK BLVD
SE 162ND AVE
ARMSTRONG CIR
HWY 212
HWY 224
SE TONG RD
5,800
2,850
8,200
2,850
1,100
8,800
11,900
2,250
1,500
30,000
21,000
9,800
1,000
6,650
13,050
8,000
2,500
2,650
2,700
4,500
LEGEND
1,100 Existing Daily Traffic Count
Study Intersections
City Limits
0 0.1 0.2 0.4 0.6 0.8 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
REAL URBAN GEOGRAPHICS

TRAFFIC LEVELS OF SERVICE

Level of Service (LOS) is used as a measure of effectiveness for intersection operation. It is similar to a "report card" rating based upon average vehicle delay. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse peak hour operating conditions. LOS F represents conditions where demand has exceeded available capacity. This condition is typically evident in long queues and delays.

The unsignalized intersection LOS calculation evaluates each movement separately to identify problems (typically left turns from side streets). The calculation is based on the average total delay per vehicle for stop-controlled movements (typically on the minor side street or left turn movements). LOS F indicates that there are insufficient gaps of suitable size to allow minor street traffic to safely enter or cross the major street. This is generally evident by long delays and queuing on the minor street. LOS F may also result in more aggressive driving, with side street vehicles accepting shorter gaps. It should be noted that the major street traffic moves without delay and the LOS F is for side street or left turns, which may be only a small percentage of the total intersection volume. It is for these reasons that LOS results must be interpreted differently for signalized and unsignalized locations. A summary of the descriptions for LOS is provided in the TSP technical appendix.

The volume to capacity ratio (V/C) is used as a measure of effectiveness for signalized and unsignalized intersection operation. The V/C is calculated by dividing the volume entering the intersection by the total capacity (maximum volume the intersection could serve). The V/C describes the amount of intersection capacity that is utilized by the volume. A V/C of 1.0 suggests there is no available capacity at that intersection and not one more vehicle could be accommodated.

The PM peak hour intersection counts were used to determine the existing LOS based on the *Highway Capacity Manual* methodology. Traffic counts and LOS calculation sheets are provided in the TSP appendix. The performance standards for each jurisdiction are summarized below. Table 3-5 and Figure 3-10 summarizes the existing weekday PM peak hour study intersection operation conditions. All study intersections currently meet mobility standards.

State Highway Mobility Standards:

- OR 212/224 has a mobility standard requiring the highway operate at or below a V/C ratio of 0.99 during the peak first and second hours.

City Mobility Standards:

- All signalized intersections shall operate at LOS D and V/C ratio of 0.90 or better during the peak hours of analysis. Individual movements must meet level of service E and a V/C ratio of 1.0.
- All roundabout intersections shall operate at LOS D or better during the peak hours of analysis. Each approach must meet LOS E and a V/C ratio of 0.85.
- All unsignalized two-way stop controlled intersections shall operate at LOS E or better (based on average approach delay) for all side street approaches during the peak hours of analysis.

- All unsignalized all-way stop controlled intersections shall operate at LOS D or better based on average intersection delay during the peak hours of analysis.

County Mobility Standards:

- Requires a LOS D as the minimum acceptable performance standard[2] for signalized and unsignalized intersections on arterial and collector roadways under Clackamas County jurisdiction.

Table 3-5: Existing Weekday Intersection Level of Service (PM Peak Hour)

Intersection	Level of Service	Delay	Volume/ Capacity
Unsignalized Intersections			
129th Avenue/King Road	A/D	16.6	-
132nd Avenue/King Road*	B	11.2	0.44
132nd Avenue/Ridgecrest Road*	A	9.7	0.31
145th Avenue/King Road*	B	10.9	0.41
145th Avenue/Ridgecrest Road*	A	9.6	0.30
147th Avenue/Monner Road	A/B	12.9	-
162nd Avenue/OR 212	A/B	10.4	-
169th Avenue/Sunnyside Road	B/C	19.3	-
Stevens Road/Causey Avenue	A/B	10.0	-
Mt Scott Boulevard/Ridgecrest Road*	B	14.4	0.57
Signalized Intersections			
122nd Avenue/Sunnyside Road	D	54.1	0.99
132nd Avenue/Sunnyside Road	C	22.5	0.83
142nd Avenue/Sunnyside Road	B	16.3	0.72
152nd Avenue/Sunnyside Road	C	23.9	0.63
162nd Avenue/Sunnyside Road	B	17.3	0.46
172nd Avenue/Sunnyside Road	C	31.1	0.46
172nd Avenue/Rock Creek Boulevard	A	6.6	0.44
172nd Avenue/OR 212	C	32.0	0.83
Stevens Road/Bob Schumacher Road	B	19.5	0.41

Notes: A/A=major street LOS/minor street LOS
Signalized and all-way stop delay = average vehicle delay in seconds for entire intersection
Unsignalized delay = highest minor street approach delay
*All-way stop control intersection

[2] Clackamas County Comprehensive Plan, Chapter 5- Transportation.

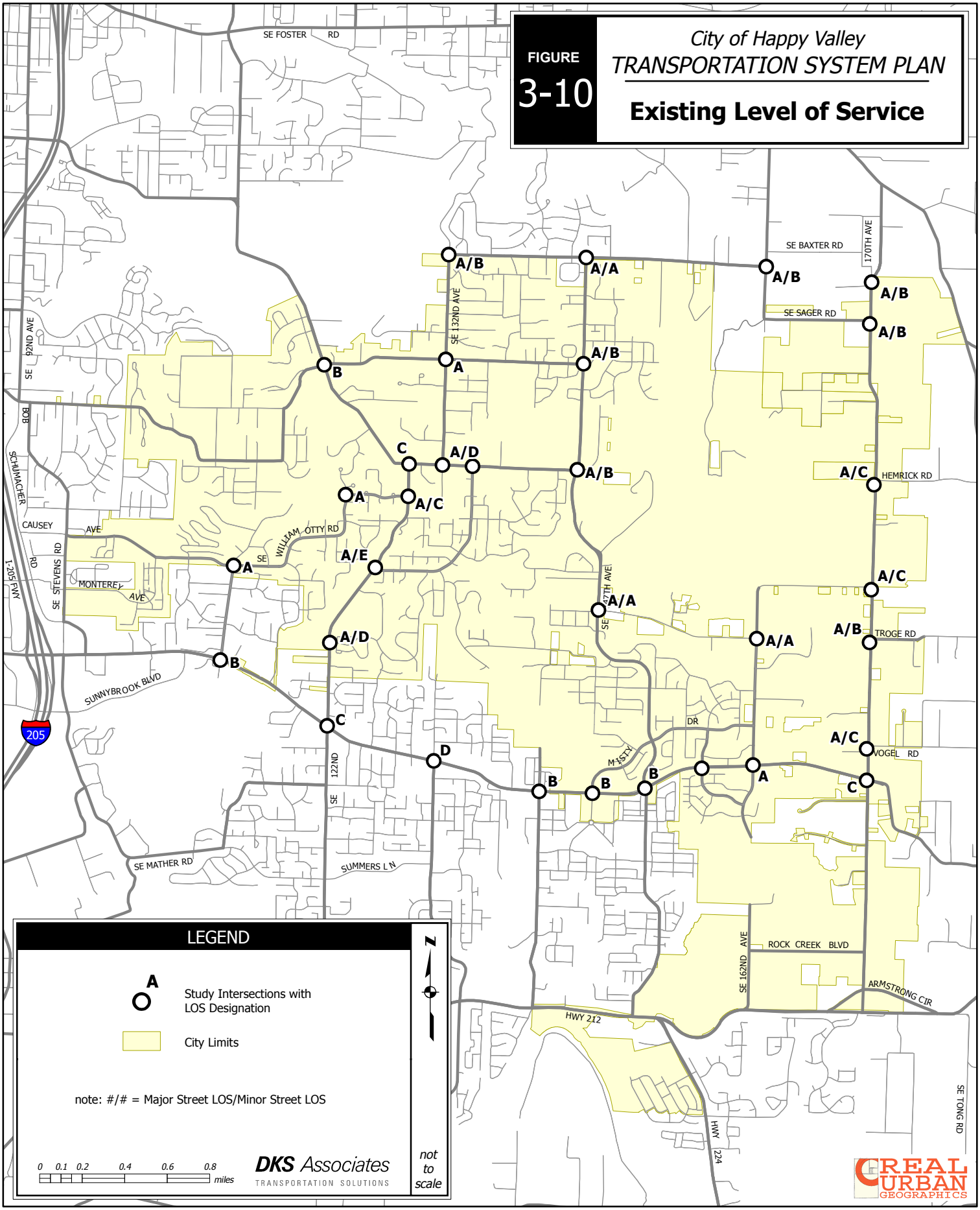


FIGURE
3-10
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Existing Level of Service
SE FOSTER RD
SE BAXTER RD
170TH AVE
SE SAGER RD
HEMRICK RD
TROGE RD
VOGEL RD
ROCK CREEK BLVD
ARMSTRONG CIR
SE 132ND AVE
SE 147TH AVE
SE 162ND AVE
SE 122ND
92ND AVE
BOB SCHUMACHER
CAUSEY AVE
SE STEVENS RD
MONTEREY AVE
SE WILLIAM OTTY RD
SUNNYBROOK BLVD
SE MATHER RD
SUMMERS LN
MISTY DR
HWY 212
HWY 224
SE TONG RD
I-205 FWY
205
LEGEND
A
Study Intersections with LOS Designation
City Limits
note: #/# = Major Street LOS/Minor Street LOS
0 0.1 0.2 0.4 0.6 0.8 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
REAL URBAN GEOGRAPHICS

TRAFFIC SAFETY

Collision data was also obtained from the Oregon Department of Transportation for the period from 2009 through 2013 for each of the study area intersections in the Happy Valley area. In 2009 there were 45 crashes, rising to 50 in 2010 and peaking at 57 in 2011. The number reduced to 49 in 2012 and fell further to 46 in 2013. Table 3-6 includes collision data for the study intersections, classified by severity as fatal, serious injury (injury A), evident injury (injury B), possible injury (injury C), and property damage only (PDO) incidents. There were no fatal incidents during this time at the study intersections. Two serious injury crashes occurred at the study intersections. One was a turning movement crash at Sunnyside Road and 122nd Avenue, while the other was a collision with a guardrail at Sunnyside Road and 172nd Avenue. Overall the severity of crashes was low, with nearly 90 percent of study intersection crashes categorized as possible injury or property damage only.

The most collisions occurred at the intersection of Sunnyside Road and 122nd Avenue. Over the most recent five year period, 79 collisions occurred at this intersection. A large majority (70 percent) of these crashes were classified as rear end collisions, typical for a busy urban signalized intersection. Sunnyside Road intersections at 132nd Avenue had the next highest number of crashes, with 33 crashes at the intersection. These crashes showed an almost even split between rear end collisions (45 percent) and turn movement collisions (40 percent).

There were three crashes involving pedestrians and three crashes involving bicyclists at study intersections, the location and severity of these are indicated in Table 3-6 with a superscript P and B respectively.

The crash rate for each study intersection was calculated to standardize the existing data by accounting for vehicle volume at the intersection. The equivalent crash rates per million entering vehicles (MEV) are shown in Table 3-6. Crash rates were compared to statewide 90th percentile crash rates published by ODOT[3] for similar intersections. Three intersections had crash rates above the 90th percentile rate, as highlighted in Table 3-6. High crash rates indicate a possible safety-related problem, and these locations should be considered for implementing targeted safety countermeasures. The historic collision data is summarized by location in Figure 3-11.

Happy Valley is characterized by significant changes in elevations on roadways throughout the City. This may have additional safety implications related to sight distance at some of the intersections within the study area.

[3] Exhibit 4-1, Analysis Procedures Manual Version 2. Oregon Department of Transportation, Transportation Planning and Analysis Unit. Updated October 2014.

Table 3-6: Intersection Collision Classification

Intersection	Serious Injury (Inj. A)	Evident Injury (Inj. B)	Possible Injury (Inj. C)	Property Damage Only (PDO)	Total Crashes	Crash Rate**
Unsignalized Intersections						
129th Ave./King Rd.	-	1[B]	1	2	**4**	0.21
132nd Ave./King Rd.*	-	-	1	4	**5**	0.31
132nd Ave./Ridgecrest Rd.*	-	-	1	2	**3**	0.24
145th Ave./King Rd.*	-	-	2[P]	1	**3**	0.22
145th Ave./Ridgecrest Rd.*	-	1[B]	2	2	**5**	**0.49**
147th Ave./Monner Rd.	-	-	-	-	**-**	-
162nd Ave./OR 212	-	2	2	4	**8**	0.22
169th Ave./Sunnyside Rd.	-	-	-	-	**-**	-
Stevens Rd./Causey Ave.	-	1	10	1	**12**	**2.06**
Mt Scott Blvd./Ridgecrest Rd.*	-	-	4	2	**6**	0.32
Signalized Intersections						
122nd Ave./Sunnyside Rd.	1	3[PB]	42	33	**79**	**0.94**
132nd Ave./Sunnyside Rd.	-	4	17	12	**33**	0.54
142nd Ave./Sunnyside Rd.	-	-	10	12	**22**	0.36
152nd Ave./Sunnyside Rd.	-	1	8	7	**16**	0.33
162nd Ave./Sunnyside Rd.	-	3	6	1	**10**	0.29
172nd Ave./Sunnyside Rd.	1	1	14[P]	3	**19**	0.26
172nd Ave./Rock Creek Blvd.	-	-	1	-	**1**	0.06
172nd Ave./OR 212	-	7	5	6	**18**	0.66
Stevens Rd./Bob Schumacher Rd.	-	-	2	1	**3**	0.14

* All way stop controlled intersection

**Average annual accidents per million entering vehicles

[P] Indicates number includes one collision with a pedestrian

[B] Indicates number includes one collision with a bicyclist

Bold and shaded values exceed the ODOT statewide averages for similar intersections published in the Analysis Procedures Manual, Exhibit 4-1

Note: Based on ODOT collision data from 2009 through 2013.

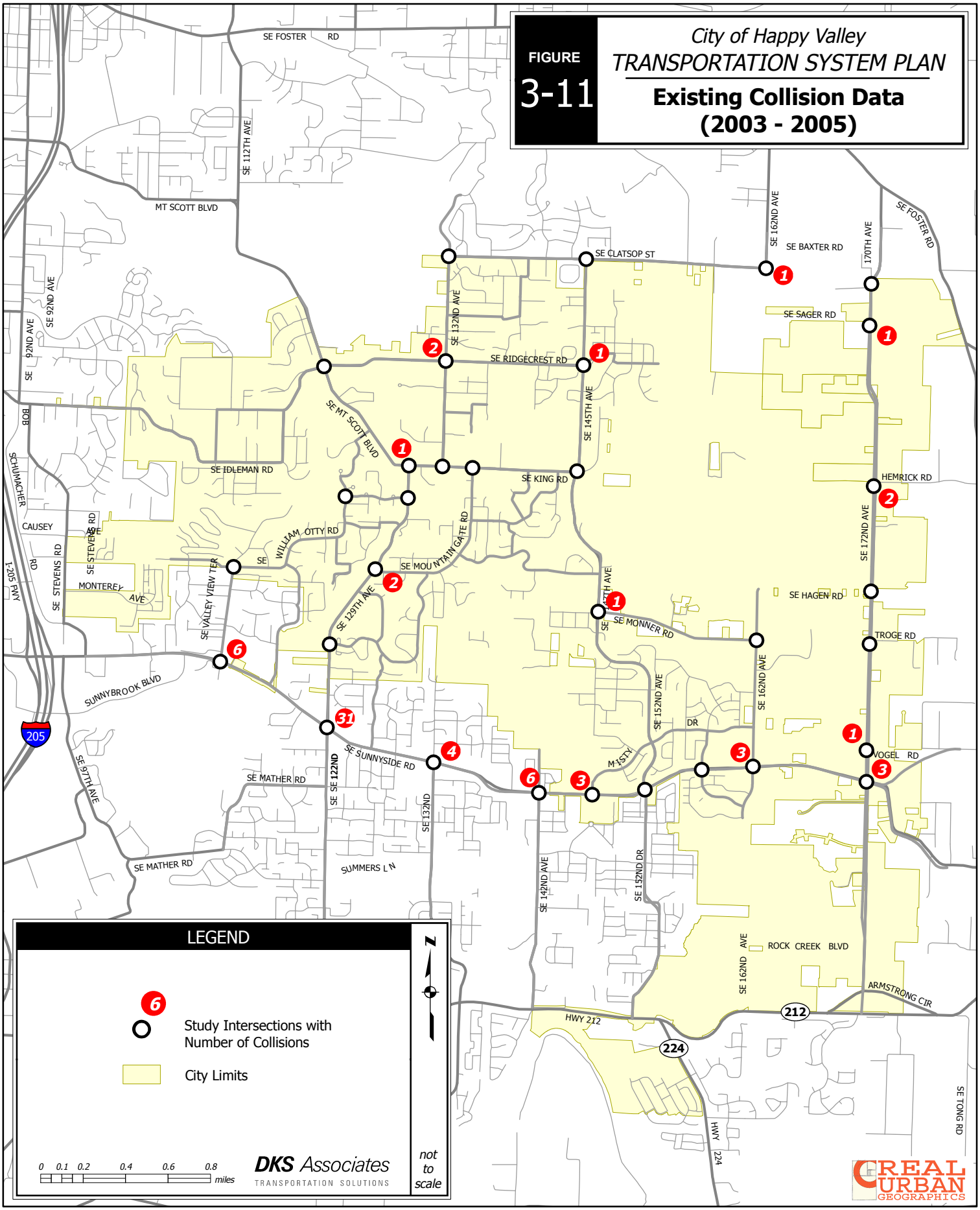


FIGURE
3-11
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Existing Collision Data
(2003 - 2005)
SE FOSTER RD
MT SCOTT BLVD
SE 112TH AVE
SE 92ND AVE
SE BAXTER RD
SE CLATSOP ST
SE 162ND AVE
170TH AVE
SE FOSTER RD
SE SAGER RD
SE 132ND AVE
SE RIDGECREST RD
SE 145TH AVE
SE MT SCOTT BLVD
SE IDLEMAN RD
SE KING RD
HEMRICK RD
SE 172ND AVE
SCHUMACHER
CAUSEY
SE STEVENS RD
SE WILLIAM OTTY RD
SE MOUNTAIN GATE RD
SE VALLEY VIEW TER
SE 129TH AVE
SE 145TH AVE
SE MONNER RD
SE HAGEN RD
TROGE RD
I-205 FWY
SUNNYBROOK BLVD
205
SE 97TH AVE
SE SUNNYSIDE RD
SE 152ND AVE
SE 162ND AVE
DR
MISTY
VOGEL RD
SE MATHER RD
SE 122ND
SE 132ND
SUMMERS LN
SE 142ND AVE
SE 152ND DR
ROCK CREEK BLVD
ARMSTRONG CIR
HWY 212
212
224
HWY 224
SE TONG RD
LEGEND
Study Intersections with Number of Collisions
City Limits
0 0.1 0.2 0.4 0.6 0.8 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
REAL URBAN GEOGRAPHICS

TRUCKS

Heavy vehicle percentages for each intersection were also determined from the traffic counts during the PM peak hour. This count only provides a sampling of truck volumes. Typically, heavy vehicle traffic is focused on Sunnyside Road and OR 212/224 with trips traveling through Happy Valley to regional destinations or to adjacent commercial land uses which require freight deliveries. Many streets throughout the city restrict thru truck traffic. OR 212/224 is classified as an Oregon Freight Route. Metro's Regional Freight Plan[4] identifies a regional freight network that highlights OR 212 as a main roadway route and 172nd Avenue as a road connector, both providing connectivity for industrial and employment areas along Happy Valley's southern and eastern boundaries.

OTHER MODES

No transportation facilities related to other modes of travel, including rail, air and water are located within the TSP study area.

[4] Metro Regional Freight Plan 2035. Published June 30, 2010. http://www.oregonmetro.gov/regional-freight-plan

4. Future Needs and Improvements

Travel Demand and Land Use

The TSP addresses existing system needs and additional facilities that are required to serve future growth in the forecast year 2040. Metro's urban area transportation forecast model was used to determine future traffic volumes in Happy Valley. This forecast model translates assumed land uses into person travel, selects travel modes and assigns motor vehicles to the roadway network. These traffic volume projections form the basis for identifying potential roadway deficiencies and for evaluating alternative circulation improvements. This section describes the forecasting process including key assumptions and the land use scenario developed from the existing Comprehensive Plan designations and allowed densities.

Projected Land Use Growth

Land use is a key factor in developing a functional transportation system. The amount of land that is planned to be developed, the type of land uses and how the land uses are mixed together have a direct relationship to expected demands on the transportation system. Understanding the amount and type of land use is critical to taking actions to maintain or enhance transportation system operation.

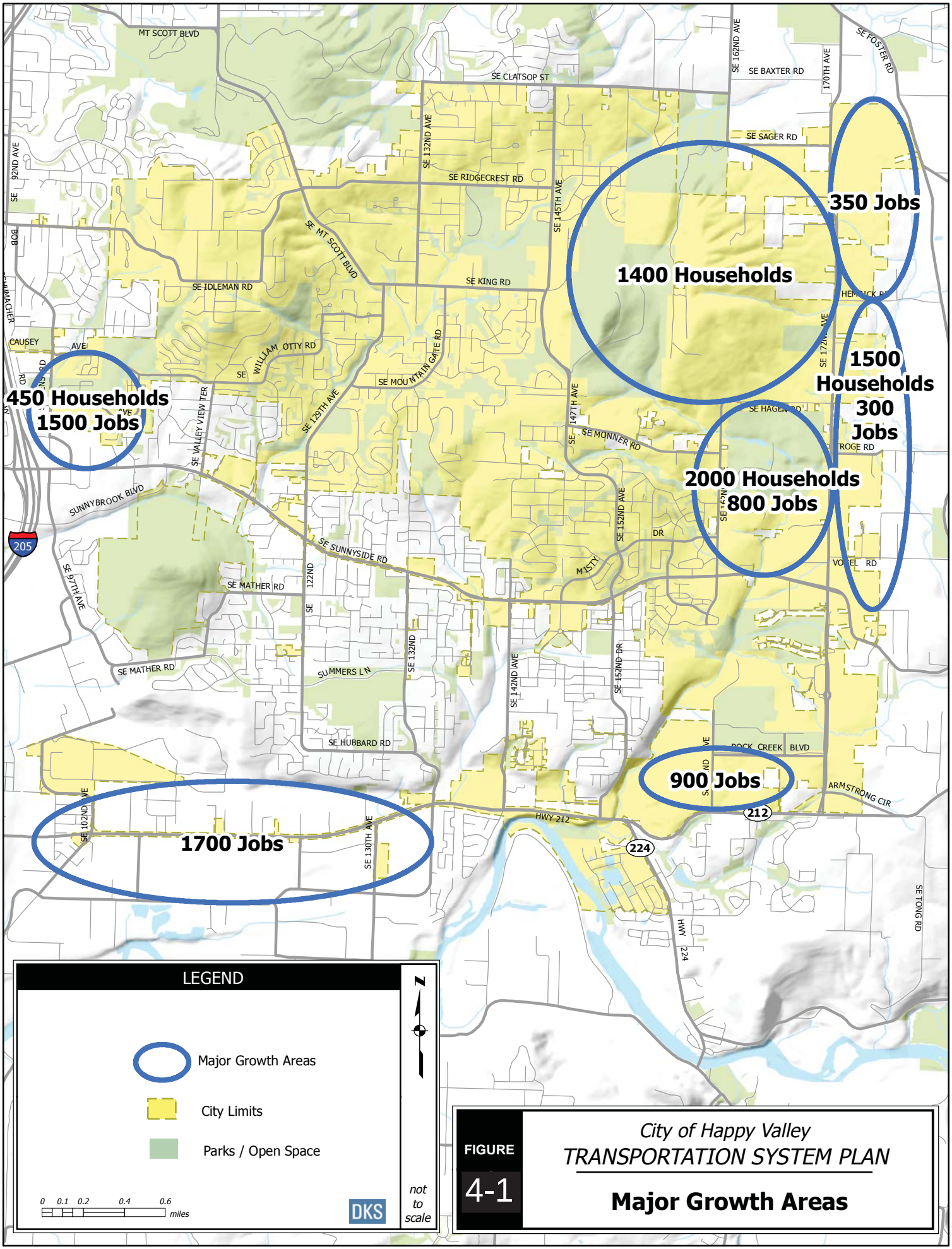
Projected land uses were developed for the study area and reflect the Comprehensive Plan and Metro's land use assumptions for the year 2040. Complete land use data sets were developed for the following conditions.

- Existing 2010 Conditions (base travel forecast for the region)
- Future 2040 Conditions

The following sections summarize the estimated growth that will affect travel within Happy Valley.

Growth Within Happy Valley

To address the future needs of the transportation system, it is important to evaluate how Happy Valley and surrounding area are expected to grow. Growth in and around Happy Valley have the potential to add traffic in Happy Valley, whether originating/destined in Happy Valley or as through vehicle trips. As shown in Figure 4-1, significant growth is expected in Happy Valley as well as in the areas surrounding the city limits. These potential growth areas are focused within the East Happy Valley Comprehenisve Plan Area (including Rock Creek Employment Center), Eagle Landing (located near Stevens Road/Monterey Avenue), and should areas continue to be annexed within the city limits, the OR 212/224 industrial corridor.


350 Jobs
1400 Households
1500 Households
300 Jobs
450 Households
1500 Jobs
2000 Households
800 Jobs
900 Jobs
1700 Jobs
MT SCOTT BLVD
SE CLATSOP ST
SE 162ND AVE
SE BAXTER RD
SE FOSTER RD
SE SAGER RD
SE RIDGECREST RD
SE 132ND AVE
SE 145TH AVE
SE MT SCOTT BLVD
SE KING RD
SE IDLEMAN RD
SE WILLIAM OTTY RD
SE MOUNTAIN GATE RD
SE 129TH AVE
SE VALLEY VIEW TER
SUNNYBROOK BLVD
SE MONNER RD
SE 147TH AVE
SE 152ND AVE
SE SUNNYSIDE RD
SE MATHER RD
SE 97TH AVE
SE 122ND
SE 132ND
SE 142ND AVE
SE 152ND DR
SUMMERS LN
SE HUBBARD RD
ROCK CREEK BLVD
ARMSTRONG CIR
HWY 212
SE 130TH AVE
SE 102ND AVE
SE TONG RD
HWY 224
205
212
224
LEGEND
Major Growth Areas
City Limits
Parks / Open Space
0 0.1 0.2 0.4 0.6 miles
DKS
N
not to scale
FIGURE 4-1
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Major Growth Areas

The base year travel model is updated periodically and for this study effort, the available base model provided by Metro was for year 2010. This land use database includes the number of dwelling units, and employees for various categories. Table 4-1 summarizes the land uses for the 2010 base and future 2040 scenarios within the Happy Valley TSP study area. From 2010 to 2040, combined growth is projected to increase population (+74 percent), households (+79 percent) and jobs (+79 percent) in and around Happy Valley. Table 4-1 summarizes projected growth for the base year 2010 and future year 2040 in the Happy Valley TSP study area.

These land use projections are significantly higher than the previous 2025 forecasts due to the additional 15 years of growth and the expanded TSP study area. For transportation forecasting, the land use data is stratified into geographical areas called transportation analysis zones (TAZs), which represent the sources of vehicle trip generation. A detailed summary of the land uses for each TAZ within the Happy Valley study area is provided in the technical appendix.

Table 4-1: Happy Valley TSP Study Area Land Use Summary

Land Use	2005	2040	Growth
Population	44,840	77,957	33,117 (+74%)
Households	14,603	26,120	11,517 (+79%)
Jobs	13,310	23,796	10,486 (+79%)

Note: Land use growth and household size forecasts are consistent with Metro's projections.

At the existing level of land development, the transportation system generally operates without significant motor vehicle deficiencies in the study area. As land uses are changed in proportion to each other (i.e. there is a significant increase in employment relative to household growth), there will be a shift in the overall operation of the transportation system. Retail land uses generate higher amounts of trips per acre of land than households do and other land uses. The location and design of retail land uses in a community can greatly affect transportation system operation. Additionally, if a community is homogeneous in land use character (i.e. all employment or residential), the transportation system must support significant trips coming to or from the community rather than within the community. Typically, there should be a mix of residential, commercial, and employment type land uses so that some residents may work and shop locally, reducing the need for residents to travel long distances.

For transportation forecasting, the land use data is stratified into geographical areas called transportation analysis zones (TAZs), which represent the sources of vehicle trip generation. There are approximately 18 Metro TAZs within the Happy Valley TSP Update study area. These 18 TAZs were subdivided, as part of this plan, into approximately 105 TAZs to more specifically represent land use and access to the transportation system in Happy Valley. The disaggregated model zone boundaries are shown in Figure 4-2.

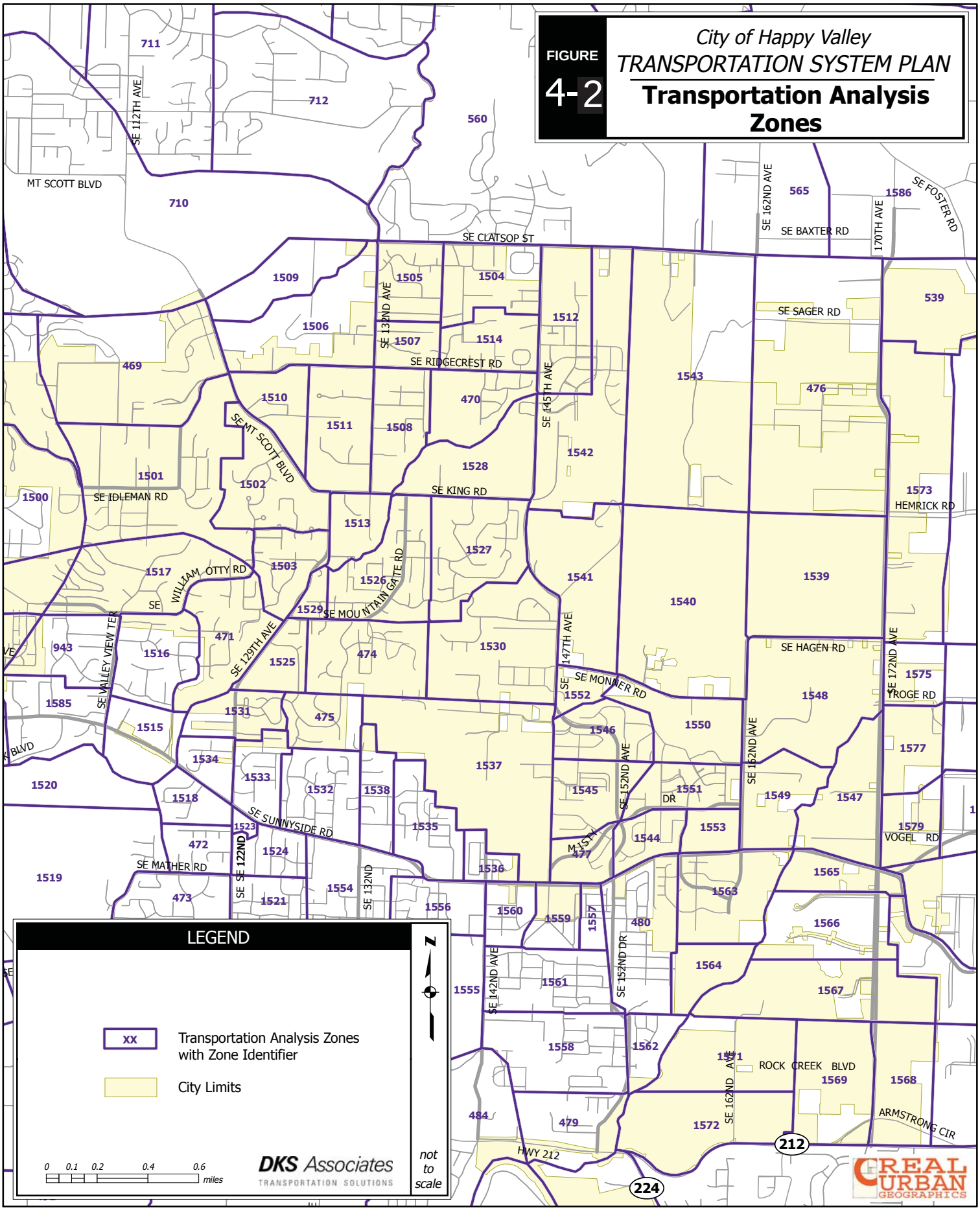


FIGURE 4-2
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Transportation Analysis Zones
LEGEND
XX
Transportation Analysis Zones with Zone Identifier
City Limits
0 0.1 0.2 0.4 0.6 miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
N
711
712
560
710
565
1586
539
1509
1505
1504
1512
1506
1507
1514
469
1510
1511
1508
470
1543
476
1542
1528
1501
1500
1502
1513
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1573
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224
SE 112TH AVE
MT SCOTT BLVD
SE CLATSOP ST
SE 162ND AVE
SE BAXTER RD
170TH AVE
SE FOSTER RD
SE 132ND AVE
SE SAGER RD
SE RIDGECREST RD
SE 145TH AVE
SE MT SCOTT BLVD
SE IDLEMAN RD
SE KING RD
HEMRICK RD
SE WILLIAM OTTY RD
SE MOUNTAIN GATE RD
SE VALLEY VIEW TER
SE 129TH AVE
SE 147TH AVE
SE HAGEN RD
SE 172ND AVE
SE MONNER RD
TROGE RD
SE 152ND AVE
SE SUNNYSIDE RD
SE 122ND
SE MATHER RD
VOGEL RD
SE 142ND AVE
SE 152ND DR
ROCK CREEK BLVD
SE 162ND AVE
ARMSTRONG CIR
HWY 212

Metro Area Transportation Model

A determination of future traffic system needs in Happy Valley requires the ability to accurately forecast travel demand resulting from estimates of future population and employment for the City. The objective of the transportation planning process is to provide the information necessary for making decisions on when and where improvements should be made to the transportation system to meet travel demand as developed in an urban area travel demand model as part of the Regional Transportation Plan update process. For the Happy Valley TSP, the regional 2040 travel demand model associated with the 2014 RTP was used to develop future forecasts.

Traffic forecasting can be divided into several distinct but integrated components that represent the logical sequence of travel behavior (see Figure 4-3). These components and their general order in the traffic forecasting process are as follows:

- Trip Generation
- Trip Distribution
- Mode Choice
- Traffic Assignment

The initial roadway network used in the traffic model was the existing streets and roadways. Future 2040 land use scenarios were tested and roadway improvements were added to mitigate the impacts of motor vehicle traffic growth, using the RTP Financially Constrained List and the current Happy Valley TSP improvements as a starting basis. Improvements in each of these plans (the RTP and TSP) were validated in the study process. Forecasts of PM peak period traffic flows were produced for every major roadway segment within Happy Valley. Traffic volumes were projected on all arterials and most collector streets.

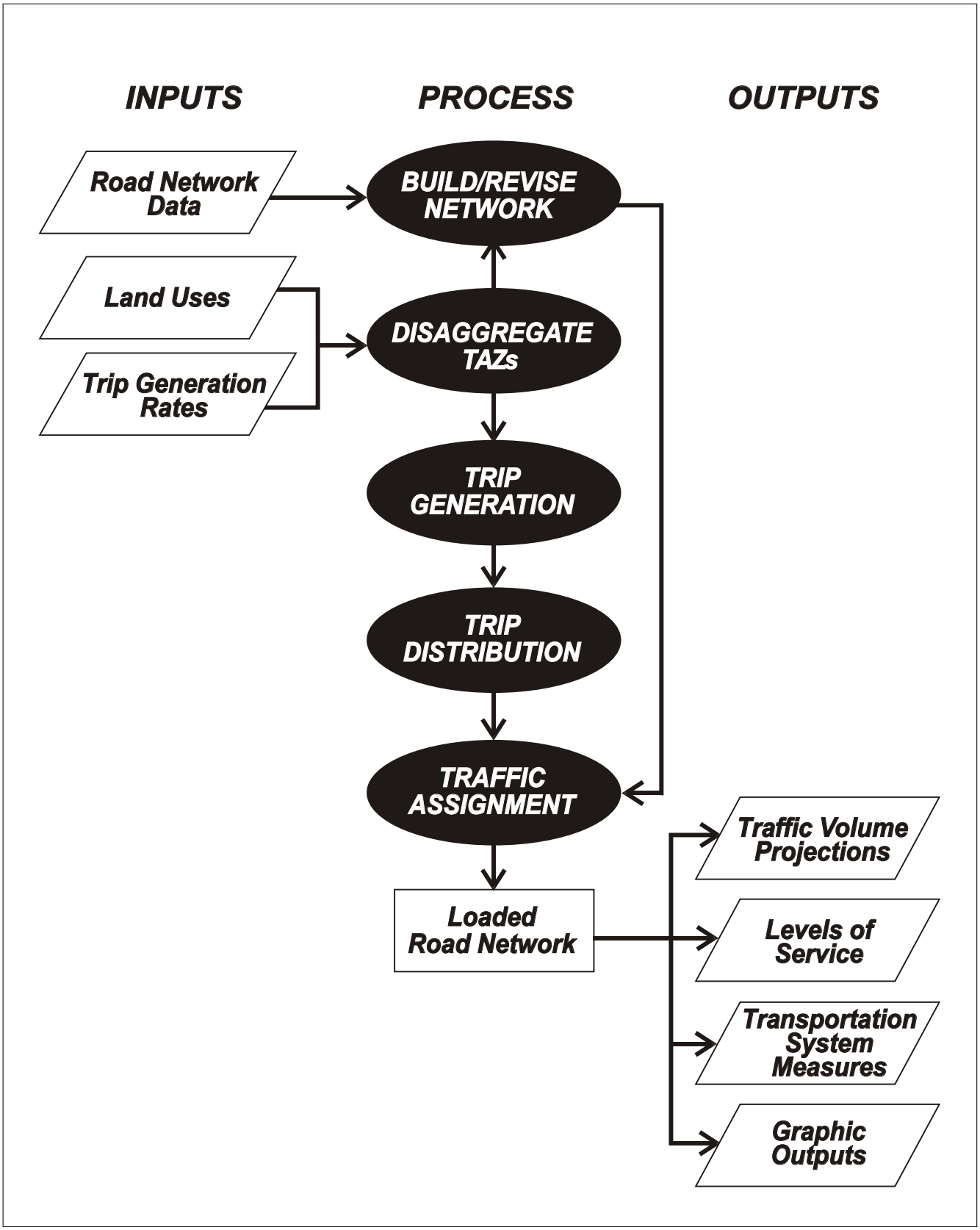


Figure 4-3
MODEL PROCESS

Trip Generation

The trip generation process translates land use quantities (number of dwelling units, retail, and other employment) into vehicle trip ends (number of vehicles entering or leaving a TAZ or sub-TAZ) using trip generation rates established during the model verification process. The Metro trip generation process is elaborate, entailing detailed trip characteristics for various types of housing, retail employment, non-retail employment, and special activities. The model process is tailored to variations in travel characteristics and activities in the region.

Table 4-2 illustrates the estimated growth in vehicle trips generated within the Happy Valley TSP study area during the PM peak period between 2010 and 2040. It indicates that vehicle trips in Happy Valley would grow by approximately 147 percent between 2010 and 2040 if the land develops according to Metro's 2040 land use assumptions. Assuming a 25-year horizon to the 2040 scenario, this represents annualized growth rate of about 4.5 percent per year.

Table 4-2: Happy Valley Vehicle Trip Generation (1-Hour PM Period)

	2010 Trips	2040 Trips	Percent Increase
Happy Valley TSP Update Study Area	12,100	29,000	140%

Trip Distribution

This step estimates how many trips travel from one zone in the model to any other zone. Distribution is based on the number of trip ends generated in each zone pair and on factors that relate the likelihood of travel between any two zones to the travel time between zones. In projecting long-range future traffic volumes, it is important to consider potential changes in regional travel patterns. Although the locations and amounts of traffic generation in Happy Valley are essentially a function of future land use in the city, the distribution of trips is influenced by regional growth. External trips (trips that have either an origin and not a destination in Happy Valley or have a destination but not an origin in Happy Valley) and through trips (trips that pass through Happy Valley and have neither an origin nor a destination in Happy Valley) were projected using trip distribution patterns based upon census data and traffic counts performed at gateways into the Metro area Urban Growth Boundary (UGB) calibration.

Mode Choice

This step determined how many trips will be by various modes (single-occupant vehicle, transit, carpool, pedestrian, bicycle, etc.). The 2010 mode splits are incorporated into the base model and adjustments to that mode split may be made for the future scenario, depending on any expected changes in transit or carpool use. These considerations are built into the forecasts used for 2040.

Traffic Assignment

In this process, trips from one zone to another are assigned to specific travel routes in the network, and resulting trip volumes are accumulated on links of the network until all trips are assigned.

Network travel times are updated to reflect the congestion effects of the traffic assigned through an equilibrium process. Congested travel times are estimated using what are called "volume-delay functions". There are different forms of volume/delay functions, all of which attempt to simulate the impact of congestion on travel times (greater delay) as traffic volume increases. The volume-delay functions take into account the specific characteristics of each roadway link, such as capacity, speed and facility type. This allows the model to reflect conditions somewhat similar to driver behavior.

Model Verification

The base 2010 modeled traffic volumes were compared against actual traffic volume counts across screenlines, on key arterials and at key intersections. Most arterial traffic volumes meet screenline tolerances for forecast adequacy. Based on this performance, the model was used for future forecasting and assessment of circulation changes.

Model Application to Happy Valley

Intersection turn movements were extracted from the model at key intersections for both the base year 2010 and forecast year 2040 scenarios. These intersection turn movements were not used directly, but a portion of the increment of the year 2040 turn movements over the 2010 turn movements was applied (added) to existing (actual 2010 and 2014) turn movement counts in Happy Valley. A post processing technique is utilized to refine model travel forecasts to the volume forecasts utilized for 2040 intersection analysis. The turn movement volumes used for future year intersection analysis can be found in the technical appendix.

5. Pedestrian Plan

This chapter summarizes existing and future pedestrian system needs in the City of Happy Valley. The pedestrian system includes sidewalks, paths, multi-use trails, and access ways. The following sections identify the policies for implementing a pedestrian plan, evaluate needs and recommend a pedestrian master plan for the City of Happy Valley. The policies used in evaluating pedestrian needs were identified through work with the TSP Citizen Advisory Committee and the Pedestrian Master Plan Citizen Working Group. Policies for pedestrian facilities are provided in Chapter 2. The existing conditions for pedestrian facilities are provided in Chapter 3.

NEEDS

The existing pedestrian system in Happy Valley varies greatly depending on the location (see Figure 3-2). In general, arterials and collectors have sidewalks present on at least one side of the roadway. The presence of sidewalks on local and neighborhood streets is typically dependent on the age of the neighborhood or development. Most older neighborhoods and some newer neighborhoods outside the city limits have gaps in the sidewalk and trail system which discourage pedestrians and put them at an increased safety risk by requiring them to share the roadway with vehicles in certain locations. Typically, newer neighborhoods within the city limits have a sidewalk and a landscape strip on both side of the street and provide a trail system within dedicated green space areas.

Overall, the goal of the City is to provide a safe and interconnected pedestrian system for the walking mode of travel, especially for trips less than one mile in length. The major pedestrian needs in Happy Valley are providing sidewalks on at least one side of all arterial and collector roadways and providing pedestrian connections (sidewalks or trails) between popular walking destinations. Planning pedestrian facilities should consider the three most prevalent trip types:

- Residential based trips – home to school, home to home, home to retail, home to park, home to transit, home to entertainment
- Service based trips – multi-stop retail trips, work to restaurant, work to services, work/shop to transit
- Recreational based trips – home to park, exercise trips, casual walking trips

Residential trips need a set of interconnected sidewalks and trails radiating out from homes to destinations within one-half to one mile. Beyond these distances, walking trips of this type become substantially less common (over 20 minutes). Service based trips require direct, conflict-free sidewalk and trail connections between uses (for example, a shopping mall with its central spine walkway that connects multiple destinations). Service based trips need a clear definition of sidewalk and trail connectivity. This requires mixed use developments to locate front doors which relate directly to the public right-of-way and provide walking links between uses within one-half mile. Recreational walking trips have different needs such as a trail system with connections to

parks and natural areas, user amenities (benches, viewpoints, signage, etc.) and sidewalks with street lighting and landscaping.

There is a need for the City to implement this Plan and provide an off-street trail network to promote pedestrian and bicycle trips, reduce vehicle trips and provide an alternative to the sidewalk system. There are major sidewalk gaps on several roadways. A trail system could be used to connect popular walking destinations when sidewalks are limited. Also, trails could allow for shorter connections between destinations by cutting through properties and not being dependent on roadway alignments. The hilly topography throughout the City contributes to poor sight distances and further justification for providing safe pedestrian facilities separate from the roadway. The abundant natural areas (creeks, wetlands, vistas) and varied topography within Happy Valley provide an opportunity to develop a successful trail system.

FACILITIES

A variety of potential pedestrian improvements to address the needs of the transportation system through 2040 are displayed in Table 5-1.

Table 5-1: Potential Tools to Address Pedestrian Needs

TOOL	EXAMPLE
Crosswalks High-visibility markings, often consisting of a "zebra" striping pattern, can be effective at locations with high pedestrian crossing volumes, near schools, and/or areas where motorist awareness of pedestrian crossings may be poor.	
Pedestrian Refuge Islands Refuge islands allow pedestrians to cross one segment of the street to a relatively safe location out of the travel lanes, and then continue across the next segment in a separate gap in traffic. Refuge islands are most appropriate at midblock crossings where right-of-way allows for adequate space between opposing travel lanes.	

TOOL	EXAMPLE
Sidewalks and Sidewalk Infill Good sidewalks are continuous, accessible to everyone, provide adequate travel width and feel safe. Sidewalks can provide social spaces for people to interact and contribute to quality of place. Completing sidewalk gaps improves the connectivity of the pedestrian network. Sidewalk gap infill should be prioritized in higher demand areas. Sidewalk infill can often be addressed as frontage improvements when land develops or redevelops.	
Curb Extensions Curb extensions reduce the pedestrian crossing distance and improve motorists' visibility of pedestrians waiting to cross the street. Curb extensions can also serve as good locations for bike parking, benches, public art, and other streetscape features. Curb extensions are most appropriate where travel lanes are excessively wide, or where on-street parking is provided.	
Rectangular Rapid Flashing Beacon (RRFB) The RRFB is designed to encourage greater motorist compliance at crosswalks. The RRFB is a rectangular shaped lightbar with two high intensity LED lightheads that flash in a wig-wag flickering pattern. The lights are installed below the pedestrian crosswalk sign (located on each side of the road near the crosswalk button) and are activated when a pedestrian pushes the crosswalk button. RRFB's are most applicable at midblock locations when pedestrians must cross multi-lane roadways, near schools, at locations with pedestrian safety issues, and at locations where pedestrian visibility is restricted.	

TOOL	EXAMPLE
Streetscape Improvements Streetscape improvements are features that enhance the pedestrian experience. These include public art, pocket parks, ornamental lighting, gateway features and street furniture. Many of these improvements can easily integrate environmentally- friendly "green" elements. Potential streetscape improvements are often constrained by available right-of-way, and do not directly address the connectivity or gap needs. Streetscape improvements can typically be provided along facilities where sidewalks are greater than six feet in width, or where roadways are excessively wide.	
Pedestrian Countdown Signals Countdown signals display the number of seconds remaining for a pedestrian to complete a crossing, enabling users to make their own judgment whether to cross or wait based on their speed and comfort. The allotted time can be adjusted to accommodate slower pedestrians, such as seniors or children.	
Curb Ramp Retrofits Retrofitting ADA-compliant curb ramps to existing sidewalks greatly improves mobility and accessibility for mobility-impaired users. Curb ramps also improve the walking environment for pedestrians with strollers, delivery carts, and other "wheel" devices.	

Pedestrian facilities should be built to current design standards of the City of Happy Valley and in compliance with the Americans with Disabilities Act (at least four feet of unobstructed sidewalk).[1] Typically, wider pedestrian facilities are desirable to encourage walking trips. An exception would be an off-street trail facility located in a constrained environment (steep topography, wetlands, etc.) where a smaller footprint is desirable to limit the impact of the surrounding area. The Happy Valley Design Manual provides the construction standards for pedestrian facilities such as sidewalks, paths, trails and curb ramps. The Happy Valley Trail Development Handbook outlines the City's approval process for constructing a trail and provides guidelines for trail construction including cross-sections standards for various trail conditions.

The street cross-sections in chapter 8 of this TSP provide pedestrian facilities. Typical roadways include five foot wide sidewalks on both sides of the road along a five foot wide landscape strip with street trees. The local commercial cross-section (Figure 8-7B), to be used adjacent to commercial, mixed-use residential and mixed-use employment land uses, includes 12 foot wide sidewalks with street trees in tree wells to encourage pedestrian trips. The hillside collector cross-section (Figure 8-5A), to be used on the future 162nd Avenue along the base of Scouter Mountain, includes a twelve foot wide pedestrian path on the downhill side of the roadway to accommodate recreational pedestrian use.

REGIONAL PLANS

Metro 2040 Regional Transportation Plan (RTP)[2] identifies Sunnyside Road, 122nd/129th Avenue, Mt. Scott Boulevard and 172nd Avenue with a pedestrian system designation as transit/mixed use corridors. The RTP defines transit/ mixed-use corridors as priority areas for pedestrian travel that are served by good quality transit service and that will generate substantial pedestrian traffic near neighborhood-oriented retail development, schools, parks, and bus stops. These corridors should include features to provide a high quality pedestrian environment such as wide sidewalks buffered from traffic, pedestrian-scale lighting, bus shelters, and street trees.

The Mt. Scott/Scouters Mountain Trail Loop Master Plan was developed in 2013 as a joint effort between City of Happy Valley, City of Portland, Metro and North Clackamas County Parks and Recreation District. The proposed 34-mile regional Loop will create a loop around its namesake buttes, connecting town centers, neighborhoods, schools and natural areas in Clackamas County.

The Metro Regional Trails and Greenways Plan[3] identifies four regional trails through Happy Valley; Mt. Scott Trail, Scouters Mountain Trail, Sunrise Corridor Trail and East Buttes Powerline Trail. The Mt. Scott Trail and Scouters Mountain Trail are included as financially constrained projects in the Metro RTP.

[1] *Americans with Disabilities Act*, Uniform Building Code.

[2] 2040 RTP Financially Constrained System Project List, Metro, Approved 2014.

[3] Metro Regional Trails and Greenways, June 2015

ROUTE SELECTION CRITERIA

Criteria measures were developed to guide the selection of path and multi-use trail routes. The route selection criteria defined characteristics that are important to planning an effective pedestrian system. The trail use policies presented in the beginning of this chapter were used to develop the route selection criteria. The route selection criteria are described below.

Criteria 1 - Access to Natural Areas

Providing pedestrian access to premiere natural areas such as creeks, forests, wetlands and viewpoints should be a priority. . The boardwalk trails within Happy Valley Park and the trails within the Mt. Scott Nature Park are examples. The areas adjacent to Rock Creek and the Scouters Mountain are premiere natural areas and potential locations for future trails.

Criteria 2 - Connections to Pedestrian Destinations

Pedestrian routes should be located near facilities with a potential for significant pedestrian demand. In general, pedestrian trips are likely to occur within one-quarter mile of a destination. This one-quarter mile area should be a priority for planning route connections to destinations.

Key pedestrian destinations include:

Schools and Parks – Providing pedestrian routes to schools and parks are especially important due to the age of the intended users. Special focus should be made to provide pedestrian connections from schools and parks to adjacent neighborhoods.

Community Services – Pedestrian routes connecting to community services such as commercial centers, post offices, libraries and community centers should be a priority to encourage walking trips.

Transit Facilities – Pedestrian routes that connect transit stops to nearby residential neighborhoods and commercial areas should be provided to encourage transit ridership.

Existing Trail Systems – Pedestrian route connections to existing trail systems and open spaces should be provided to encourage recreational activity.

Criteria 3 – Construction, Maintenance and Management Costs

Trail and pedestrian routes should be selected with consideration for construction, maintenance and management costs. Trails located near constrained areas may require stairways or other special features. Providing access for persons with disabilities should be balanced with costs.

Criteria 4 - Environmental Constraints

Environmental constraints such as steep slopes, creeks, rivers and ravines present a potential hazard for pedestrians. Planning trails near these constrained areas should balance the appeal of a trail near interesting geography with protecting natural resources.

Criteria 5 - Existing Roadway Pedestrian Network

Completing existing gaps in the pedestrian system should be a priority.

Criteria 6 - Pedestrian Safety

Planned pedestrian routes should provide dedicated pedestrian facilities set back a safe distance from roadway curb lines to separate pedestrians from vehicular traffic. The location where planned pedestrian routes would cross a roadway should consider the appropriate crossing type (signalized, striped, signed, etc.), roadway volume and speed and available sight distance.

Criteria 7 - Public Support

Pedestrian route selection should balance private property owner's need for privacy with the community's need for access throughout the community.

Criteria 8 - Roadway Functional Classification

The designated functional classification of a roadway should be considered when selecting pedestrian routes. Roadway functional classifications are provided in the Happy Valley Transportation System Plan (Figure 8-3). Arterial and collector roadways provide connections to major community destinations along key transportation corridors. Arterial and collector roadways typically experience higher vehicle travel speeds where pedestrian facilities may improve safety. Local and neighborhood streets provide connections to pedestrian destinations such as parks and schools. With lower vehicle volumes and speeds, local and neighborhood streets would provide ideal on-street trail connections.

PEDESTRIAN MASTER PLAN

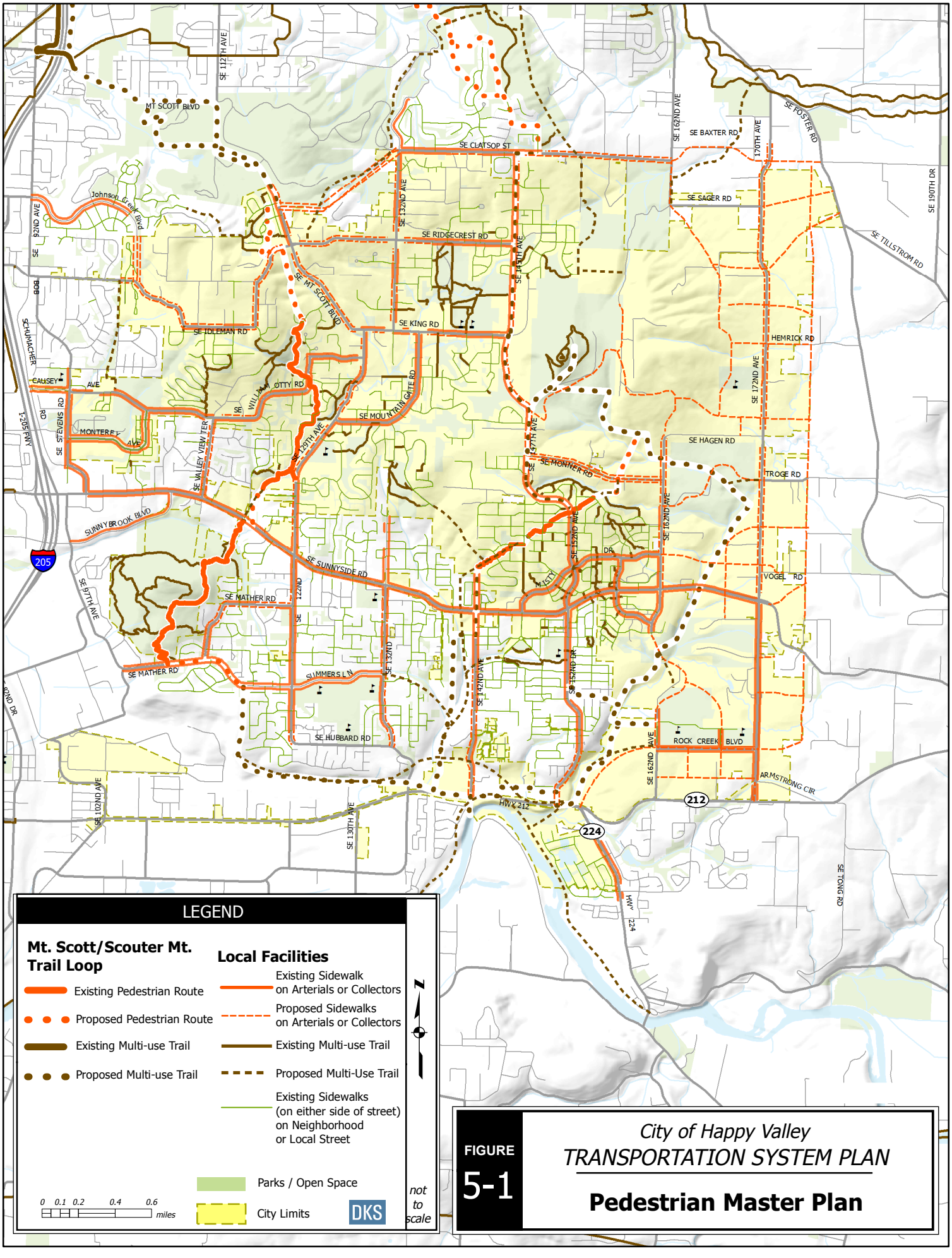
The future transportation system needs multi-modal improvements to meet transportation performance standards, serve future growth and promote pedestrian, bicycle and transit trips. The extent of the recommended multi-modal improvements for Happy Valley is significant. Future growth can be accommodated with a significant investment in transportation improvements.

Pedestrian Projects

A list of potential pedestrian projects to meet the identified needs and achieve these policies was developed into a Pedestrian Master Plan. The projects include sidewalk infill on existing roadways, sidewalks on planned roadways, new paths and multi-use trails. The Master Plan shown in Figure 5-1 and summarized in Table 5-1 is an overall plan and summarizes the 'wish list' of pedestrian related projects in Happy Valley. These projects will be used to create a Pedestrian Financially Constrained Plan (Table 5-2). The Financially Constrained Plan consists of projects that the City should give priority to in funding. As development occurs, streets are rebuilt and other opportunities (grant programs) arise, projects on the Master Plan should be pursued as well.

The trail projects shown in Table 5-1 are intended to complete the pedestrian system as planned. Portions of the proposed trail system exist today as either off-street trails or sidewalks. The regional multi-use trails are based on the Metro RTP[4] and the Mt. Scott/Scouters Mountain Trail Loop Master Plan. Although some of the planned trail network would be utilized by bicyclists, all of the proposed trails would benefit pedestrians. Therefore, the recommended trail system is included in the Pedestrian Master Plan.

[4] 2040 RTP Financially Constrained System Project List, Metro, Approved June 2014.


LEGEND
Mt. Scott/Scouter Mt. Trail Loop
Existing Pedestrian Route
Proposed Pedestrian Route
Existing Multi-use Trail
Proposed Multi-use Trail
Local Facilities
Existing Sidewalk on Arterials or Collectors
Proposed Sidewalks on Arterials or Collectors
Existing Multi-use Trail
Proposed Multi-Use Trail
Existing Sidewalks (on either side of street) on Neighborhood or Local Street
Parks / Open Space
City Limits
0 0.1 0.2 0.4 0.6 miles
not to scale
DKS
FIGURE 5-1
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Pedestrian Master Plan
MT SCOTT BLVD
SE 112TH AVE
SE CLATSOP ST
SE 162ND AVE
SE BAXTER RD
SE FOSTER RD
170TH AVE
SE 190TH DR
SE SAGER RD
SE TILLSTROM RD
Johnson Creek Blvd
92ND AVE
SE 132ND AVE
SE RIDGECREST RD
SE 145TH AVE
SE MT SCOTT BLVD
SE KING RD
SE IDLEMAN RD
HEMRICK RD
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SE HUBBARD RD
ROCK CREEK BLVD
SE 162ND AVE
ARMSTRONG CIR
212
HWY 212
224
SE 102ND AVE
SE 130TH AVE
HWY 224
SE TONG RD

Table 5-1: Pedestrian Master Plan Projects

Project	Location	From	To	Cost Estimate ($1,000s)
Sidewalks on Existing Arterials and Collectors				
Ridgecrest Road	Both	132nd Avenue	Parkwood Way	$340
Ridgecrest Road	Both	Mt. Scott Boulevard	132nd Avenue	$820
King Road	North	132nd Avenue	145th Avenue	$360
King Road	South	132nd Avenue	Happy Valley Drive	$275
King Road	South	129th Avenue	132nd Avenue	$115
147th Avenue	West	Krause Lane	Monner Road	$125
147th Avenue	East	King Road	South of Monner Road	$500
145th Avenue	East	King Road	South of Denali Drive	$250
145th Avenue	East	Clatsop Street	Wallowa Way	$220
145th Avenue	East	King Road	Denali Drive	$225
132nd Avenue	Both	Clatsop Street	Ridgecrest Road	$460
132nd Avenue	Both	Ridgecrest Road	King Road	$450
122nd /129th Avenue	East	Mountain Gate Road	Scott Creek Lane	$200
122nd/129th Avenue	West	Sunnyside Road	King Road	$950
Mt. Scott Boulevard	Both	Ridgecrest Road	129th Avenue	$900
Mt. Scott Boulevard	East	North city limits	Ridgecrest Road	$500
Clatsop Street	South	East of 138th Drive	East of 141st Court	$300
Clatsop Street	Both	145th Avenue	162nd Avenue	$1,200
Valley View Terrace	Both	Sunnyside Road	William Otty Road	$630
162nd Avenue	Both	Sunnyside Road	Hagen Road	$900
Idleman Road	North	West City limits	Mt. Scott Blvd	$980
Idleman Road	South	West City limits	Walnut Drive	$330
Idleman Road	South	Hillside Court	Mt. Scott Blvd	$475
William Otty Road	Both	Valley View Terrace	119th Avenue	$330
172nd Avenue	Both	Sunnyside Road	Clatsop Road	$3,400
Sidewalks on New Arterials & Collectors				
Clatsop Street Extension East	Both	162nd Avenue	172nd Avenue	**
Clatsop Street – Cheldelin Road Extension	Both	172nd Avenue	Foster Road	**
162nd Avenue Extension North	Both	Hagen Road	Clatsop Street	**

Project	Location	From	To	Cost Estimate ($1,000s)
162nd Avenue Extension South	Both	157th Avenue	OR 212	**
Sager Road Extension East	Both	172nd Avenue	Foster Road	**
Sager Road Extension West	Both	162nd Avenue	172nd Avenue	**
172nd-190th Connector	Both	172nd Avenue	Foster Road	**
Wooden Heights Road	Both	162nd Avenue	177th Avenue	**
Hemrick Road Extension	Both	162nd Avenue	177th Avenue	**
Scouter Mountain Road	Both	147th Avenue	177th Avenue	**
Troge Road Extension	Both	162nd Avenue	177th Avenue	**
169th Avenue Extension	Both	Sunnyside Road	177th Avenue	**
Misty Drive Extension	Both	162nd Avenue	177th Avenue	**
Rock Creek Court Extension	Both	162nd Avenue	177th Avenue	**
Big Timber Court Extension	Both	172nd Avenue	177th Avenue	**
Rock Creek Boulevard West Extension	Both	162nd Avenue	Sunrise Corridor Rock Creek interchange	**
Rock Creek Boulevard East	Both	162nd Avenue	177th Avenue	**
Rock Creek East-West Roadway	Both	162nd Avenue	172nd Avenue	**
Parklane Drive North Extension	Both	162nd Avenue	Stadium Way	**
Parklane Drive South Extension	Both	Rock Creek Boulevard	Rock Creek East-West Roadway	**
167th Avenue	Both	Rock Creek Boulevard	Rock Creek East-West Roadway	**
177th Avenue	Both	Rock Creek Boulevard	Sager Road Extension East Roadway	**
Sunnyside East Extension	Both	172nd Avenue	Foster Road	**
Regional Multi-Use Trails				
Mt. Scott Trail	Runs north-south through Happy Valley to connect the Springwater Trail near Johnson Creek, Mount Talbert Nature Park, future Sunrise Corridor Trail and Clackamas River Greenway			$6,400
Scouters Mountain Trail	Connects Springwater Trail north of Clatsop Butte Park through Happy Valley to the future Sunrise Corridor Trail and Clackamas River Greenway			$7,600
Sunrise Corridor Trail	Runs adjacent to the future Sunrise Highway Corridor, connecting			$3,000

Project	Location	From	To	Cost Estimate ($1,000s)
	the I-205 Trail to the Rock Creek Trail near 152nd Avenue			
East Buttes Powerline Trail	Connects Scouters Mountain Trail near 162nd Avenue/Hagen Road to Clackamas River Trail near OR 212/242 east of 132nd Avenue			$3,200
Local Paths and Multi-Use Trails				
Town Center Local Trail System	Local off-street path system connecting the regional Rock Creek Trail to destinations within the Town Center			$400
Idleman Loop	West Happy Valley Trail near Lincoln Heights open space to West Happy Valley Trail near Idleman Road			$1,500
The Reserve Trail	West Happy Valley Trail at Scott Creek Park to Powerline Trail at Southern Ridge open space			$620
			Sidewalks on Existing Arterials and Collectors	$15,240
			Sidewalks on New Arterials/Collectors (included in Motor Vehicle Plan)	$24,660
			Regional Multi-Use Trails	$20,400
			Local Paths and Multi-Use Trails	$2,520
			Total Pedestrian Master Plan Project Costs	**$62,820**

The planning level cost estimates for sidewalks are based on general unit costs, but do not reflect the unique project elements that can significantly add to project costs. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with special design details as projects are pursued.

The planning level cost estimates for trails were based on the construction of the trail network gaps only and assumed the existing trail and sidewalk sections would be available. The unit costs used were a preliminary estimate and assumed the construction of a multi-use trail with a paved surface but no significant structural needs such as retaining walls, bridges or stairs. The actual cost estimates based on detailed alignment and design efforts may be moderately lower or higher than the preliminary cost estimates provided. The cost estimate for the Mt. Scott and Scouters Mountain trails was obtained from the Metro RTP.

Pedestrian Financially Constrained Plan

The pedestrian financially constrained plan identifies projects that are reasonably expected to be funded by 2040, which meets the requirements of the updated TPR[5]. The TSP goals were used to rank the projects. The highest ranking projects that are reasonably expected to be funded (see Chapter 10) were combined with projects identified in the RTP Financially Constrained scenario and projects with anticipated funding from other agencies to create the list shown in Table 5-2.

Table 5-2: Pedestrian Financially Constrained Plan

Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
Ridgecrest Road – 132nd Avenue to Parkwood Way	Add sidewalks on both sides of roadway	City of Happy Valley	Medium Term	$340
145th Avenue – King Road to Denali Drive	Add sidewalks on the east side of roadway	Joint SDC Fund/Developer	Medium Term	**
145th Avenue – Clatsop Street to Northern Heights Drive	Add sidewalks on the east side of roadway	Joint SDC Fund/Developer	Medium Term	**
145th Avenue – Wallowa Way to Northern Heights Drive	Add sidewalks on the east side of roadway	Joint SDC Fund/Developer	Medium Term	**
147th Avenue – Alta Vista to Monner Road	Add sidewalks on the west side of roadway	Joint SDC Fund/Developer	Medium Term	**
147th Avenue – King Road to Monner Road	Add sidewalks on the east side of roadway	Joint SDC Fund/Developer	Medium Term	**
122nd/129th Avenue – Sunnyside Rd to Scott Creek Ln	Add sidewalks on the west side of roadway	Joint SDC Fund/Developer	Medium Term	**
122nd/129th Avenue – Mountain Gate Rd to Scott Creek Ln	Add sidewalks on the east side of roadway	Metro Grant	Near Term	**
122nd/129th Avenue – King Road to Scott Creek Lane	Add sidewalks on the east side of roadway	Joint SDC Fund/Developer	Medium Term	**
162nd Avenue – Misty Drive to Hagen Road*	Add sidewalks on the both sides of roadway	Joint SDC Fund/Developer	Medium Term	**
King Road – 132nd Avenue to Regina Court	Add sidewalks on the north side of roadway	Joint SDC Fund/Developer	Near Term	**
King Road – 132nd Avenue to east of Regina Court	Add sidewalks on the south side of roadway	Joint SDC Fund	Near Term	**
King Road – 129th Avenue to 132nd Avenue	Add sidewalks on the both sides of roadway	Joint SDC Fund/Developer	Near Term	$110
132nd Avenue – King Road to	Add sidewalks on the west	Joint SDC	Medium	$340

[5] *OAR Chapter 660*, Department of Land Conservation and Development, Division 012, Transportation Planning, adopted on March 15, 2005, effective April 2005.

Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
Ridgecrest Road	side of roadway	Fund/Developer	Term	
147th Avenue – Alta Vista to Monner Road	Add sidewalks on the west side of roadway	Joint SDC Fund/Developer	Medium Term	$120
William Otty Road – Valley View Terrace to 119th Avenue	Add sidewalks on both sides of roadway	City of Happy Valley	Long Term	$330
172nd Avenue – Misty Drive to Clatsop Street*	Add sidewalks on both sides of roadway	Joint SDC Fund/Developer	Medium Term	**
Clatsop Street Extension East	Construct sidewalks between 162nd Ave and 172nd Ave	Joint SDC/ Developer	Long Term	**
162nd Avenue Extension North*	Construct sidewalks between Hagen Road and Clatsop St	Joint SDC/ Developer	Long Term	**
162nd Avenue Extension South*	Construct sidewalks between 157th Avenue to Highway 212	Joint SDC/ Developer	Long Term	**
Sager Road Extension West	Construct sidewalks from 162nd Avenue to 172nd Avenue	Joint SDC/ Developer	Long Term	**
Wooden Heights Road	Construct sidewalks from 162nd Avenue to 177th Avenue	Joint SDC/ Developer	Medium Term	**
Hemrick Road Extension	Construct sidewalks from 162nd Avenue to 177th Avenue	Joint SDC/ Developer	Medium Term	**
Scouter Mountain Road	Construct sidewalks between 147th Ave and 177th Ave	Joint SDC/ Developer	Medium Term	**
Troge Road Extension*	Construct sidewalks between 162nd Avenue and 177th Avenue	Joint SDC/ Developer	Near Term	**
169th Avenue Extension	Construct sidewalks from Sunnyside Road to 177th Ave	Joint SDC/ Developer	Near Term	**
Misty Drive Extension*	Construct sidewalks from 162nd Ave and 177th Ave	Joint SDC/ Developer	Medium Term	**
Rock Creek Boulevard West Extension*	Construct sidewalks from 162nd Avenue to the Sunrise Corridor Rock Creek interchange	Joint SDC/ Developer	Medium Term	**
Parklane Drive North Extension	Construct sidewalks from 162nd Avenue to Stadium Way	Joint SDC/ Developer	Medium Term	**
Sunnyside East Extension*	Construct sidewalks east to Foster Road	Joint SDC/ Developer	Long Term	**
			City of Happy Valley	$670
			Joint SDC/Developer	$570
			Other	$0
			Total Pedestrian Financially Constrained Project Costs	**$1,240**

* Project identified in the 2014 Regional Transportation Plan Update Financially Constrained scenario.

** These project costs are included in a motor vehicle financially constrained plan and may include a combination of Joint SDCs and other potential funding sources such as state/federal grants.

PLAN IMPLEMENTATION

Complementing Land Use Actions

Land use actions enable significant improvements to the pedestrian system to occur. A change in land use from vacant or underutilized land creates two key impacts to the pedestrian system:

- Added vehicle trips that conflict with pedestrian flows
- Added pedestrian volume that requires safe facilities

The above mentioned impacts require mitigation to maintain a safe pedestrian system. Pedestrians walking in the traveled way of motor vehicles are exposed to potential conflicts that can be minimized or removed entirely with sidewalk installation. The cost of a fronting sidewalk to an individual single family home would be roughly $1,000 to $2,000 (representing less than one percent of the cost of a house). Over a typical 50-year life of a house, this would represent less than $50 per year assuming that cost of money is 4% annually. This cost is substantially less than the potential risk associated with the cost of an injury accident or fatality without safe pedestrian facilities (injury accidents are likely to be $10,000 to $50,000 per occurrence and fatalities are $500,000 to $1,000,000). Sidewalks are essential for the safety of elderly persons, the disabled, transit patrons and children walking to school, a park or a neighbor's house. No area of the city can be isolated from the needs of these users (not residential, employment areas or shopping districts). Therefore, fronting improvements including sidewalks are required on every change in land use or roadway project.

For any developing or redeveloping property in Happy Valley, the cost savings to the private developer is the only benefit of not providing sidewalks – at the potential risk and future expense to the public. Therefore, sidewalks are required in Happy Valley with all new development and roadway projects.

Developments should be responsible for providing a pedestrian connection from the site main entrance to the public right-of-way. Also, buildings should be sited to be supportive and convenient to pedestrians, bicyclists and transit riders. This is most critical for residential, commercial and public service (library, community center) developments where higher pedestrian volumes would be expected. Pedestrian circulation through large parking lots should generally be provided in the form of access ways. Conflict free paths and traffic calming elements should be identified, as appropriate.

It is important that, as new development occurs, connections or access ways are provided to link the development to the existing pedestrian facilities in as direct manner as possible. As a guideline, the sidewalk distance from the building entrance to the public right-of-way should not exceed 1.25 times the straight line distance. It is also very important that residential developments consider the routes that children will use to walk to school. Safe and accessible sidewalks should be provided to accommodate these routes, particularly within one mile of a school site.

For any developing or redeveloping property in Happy Valley, the trails included in the Pedestrian Master Plan should be reviewed to determine if a trail is planned on the property. The developer would be responsible for the construction of the trail based on City standards.

Trail Development Handbook

The Happy Valley Trail Development Handbook provides guidance for implementing the construction of the off-street pedestrian system. The Handbook outlines the City's approval process for constructing a trail which is completed by either a development review process, acquisition of property by the City or private land donation. The handbook provides information on trail easement agreements and trail maintenance agreements with samples of each document. The handbook includes general trail design and construction guidelines and provides multi-use trail and pedestrian pathway cross-sections standards for various conditions (steep slopes with retaining walls, cross-drainage, points of interest, mid-block trail crossings).

6. Bicycle Plan

This chapter summarizes existing and future facility needs for bicycles in the City of Happy Valley. The following sections identify the policies for implementing a bikeway plan, evaluate needs and recommend a bikeway plan for the City of Happy Valley. The policies used in evaluating bicycle needs were identified through work with the City's Citizen Advisory Committee. Policies for bicycle facilities are provided in Chapter 2. The existing conditions for bicycle facilities are provided in Chapter 3.

NEEDS

The existing bike lane system on arterial and collector streets does not provide adequate connections from neighborhoods to schools, parks, retail centers, or transit stops (see Figure 3-3). Continuity and connectivity are key issues for bicyclists and the lack of facilities (or gaps) cause significant problems for bicyclists in Happy Valley. Without connectivity of the bicycle system, this mode of travel is severely limited.

Local streets do not require dedicated bike facilities since the lower motor vehicle volumes and speeds typically allow for both autos and bikes to share the roadway. Cyclists desiring to travel through the City generally either share the roadway with motor vehicles on major streets or find alternate routes on lower volume local streets. There are several major streets without on-street bike facilities that are used by cyclists due to a lack of alternative routes. These include 122nd Avenue/129th Avenue, Mt. Scott Boulevard and Idleman Road.

The major designated on-street bike facilities (striped bike lane or cycle track) within the study area are Sunnyside Road (I-205 to 172nd Avenue) and 172nd Avenue (Sunnyside Road to Highway 212). Additional bike lanes are provided (some intermittently) along 122nd/129th Avenue, King Road, 145th Avenue, Mountain Gate Road and Clatsop Street within the Happy Valley City limits.

Bicycle trips are different from pedestrian and motor vehicle trips. Common bicycle trips are longer than walking trips and generally shorter than motor vehicle trips. Where walking trips are attractive at lengths of a quarter mile (generally not more than a mile), bicycle trips are attractive up to three miles. Bicycle trips can generally fall into three groups: commuting, activity-based and recreational. Commuter trips are typically home/work/home (sometimes linking to transit) and are made on direct, major connecting roadways and/or local streets. Bicycle lanes provide good accommodations for these trips. Activity based trips can be home-to-school, home-to-park, home-to-neighborhood commercial or home-to-home. Many of these trips are made on local streets with some connections to arterials and collectors. Their needs are for lower volume/speed traffic streets, safety and connectivity.

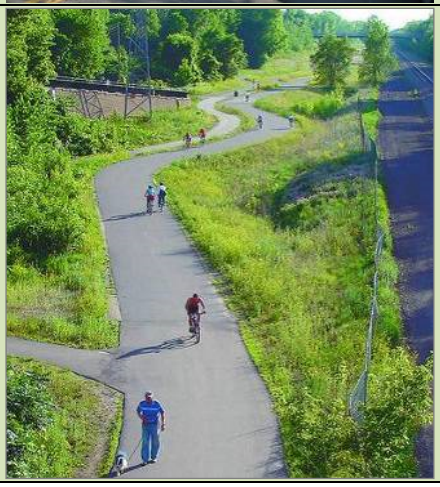
Recreational trips share many of the needs of both the commuter and activity-based trips, but create greater needs for off-street routes, connections to rural routes and safety. Typically, recreational bike trips will exceed the normal bike trip length.

FACILITIES

A variety of potential bicycle improvements to address the needs of the transportation system through 2040 are displayed in Table 6-1.

Table 6-1: Potential Tools to Address Bicycle Needs

TOOL	EXAMPLE
Bike Lanes Designated exclusively for bicycle travel, bike lanes are separated from vehicle travel lanes with striping and also include pavement stencils. Bike lanes are typically recommended along arterials and collectors, especially for roadways with high vehicle volumes and speeds. Right-of-way often constrains quick installation of bike lanes and can often lead to tradeoffs with parking availability.	
Bike Box A bike box is a designated area at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible way to get ahead of stopped traffic during the red signal phase. When a bike box is present, vehicles are prohibited from turning right during a red phase. Bike boxes may not be appropriate at signalized intersections with existing or expected congestion issues.	
Bike Box for Left-turns at Signalized Intersections A bike box for left turns (otherwise known as a Copenhagen Left) allows bicyclists to make left-turns at intersections without having to veer across traffic. A bicyclist turns left by traveling through the intersection in the direction they are heading, and then waiting in the designated left-turn box before proceeding across the street on a green light. These are most appropriate for multi-lane roadways, especially those with high vehicles volumes and speeds.	

TOOL	EXAMPLE
Share the Road Signage 'Share the Road' signage can be used to raise awareness and legitimize the presence of bicycles on the roadways. This signage is applicable to roadways where bike lanes are not necessarily appropriate (e.g., roadways with low vehicle volumes and speeds). 'Share the Road' signage can be used to supplement shared lane markings.	
Shared Lane Marking Shared-lane markings or "sharrows" are designed to inform motorists to expect cyclists to be in the middle of the travel lane, and to inform cyclists that they should be in the travel lane and away from parked cars. An uphill bike lane and downhill shared lane markings can be used on hilly routes that do not have room to accommodate bike lanes in both directions. Shared lane markings should not be used on facilities where vehicle speeds are significantly greater than bicyclist speeds. Roads with under 3,000 vehicles per day and speeds under 25 miles per hour are typically best suited for shared lane markings.	
Bicycle Boulevard/Neighborhood Greenway Traffic calming can be used to optimize neighborhood streets for bicycle and pedestrian travel. Intersection improvements can be made to assist bicyclists at difficult roadway crossings. A roadway should only be converted to a bicycle boulevard where it is appropriate to discourage through-motor vehicle traffic. Bicycle boulevards work well when a parallel route is available to motorists.	
Shared-use paths Shared-use paths can provide a desirable facility particularly for novice riders, recreational trips, and cyclists of all skill levels preferring separation from traffic. Facilities may be constructed adjacent to roads, through parks, or along linear corridors such as active or abandoned railroad lines or waterways. Shared-use paths are a useful tool when both bicycle and pedestrian gaps are present, especially when right-of-way is constrained along one side of the roadway. When right-of-way is constrained, shared-use paths may provide a less impactful solution to providing full pedestrian and bicycle facilities than a typical cross-section with bike lanes and sidewalks.	

TOOL	EXAMPLE
Wayfinding Signage and Pavement Markings Directional signage indicating locations of destinations and travel time/distance to those destinations increases users' comfort and accessibility to the pedestrian and bicycle systems. Pavement markings can be used on bicycle boulevards, which are low-traffic bike routes without bike lanes. Wayfinding signage also helps direct bicyclists to routes with comfortable bicycle facilities.	
Colored Bike Lanes Colored bike lanes are used in areas where automobiles and bicycles cross paths and it is not clear who has the right-of-way. Colored bike lanes and accompanying signs assign priority to the bicyclist. Due to required maintenance of repainting the bike lane, colored bike lanes are not typically a system-wide solution.	
Bicycle Detection at Signalized Intersections Bicycle-activated loop detectors are installed within the roadway to allow the presence of a bicycle to trigger a change in the traffic signal. Detectors that are sensitive enough to detect bicycles should have pavement markings to instruct cyclists how to activate them. Bicycle detection is most effective at locations with significant bicycle activity and where traffic signal phases are often skipped due to low motor vehicle traffic.	
Bicycle Parking <u>Short-term parking:</u> parking meant to accommodate visitors, customers and others expected to depart within two hours; requires approved standard rack, appropriate location and placement, and weather protection. <u>Long-term parking:</u> parking meant to accommodate employees, students, residents, commuters, and others expected to park more than two hours. This parking should be provided in a secure, weather-protected manner and location. Bicycle parking is typically most appropriate at bus stops, schools, parks, major commercial or employment locations, and other trip attractors.	

Signing and marking of bicycle lanes should follow the *Manual on Uniform Traffic Control Devices*.

Design features in the roadway can improve bicycle safety. For example, using curb storm drain inlets rather than catch basins significantly improves bicycle facilities.

The Metro Regional Transportation System Plan (RTP) identifies the following corridors within the regional bicycle system:

- Sunnyside Road — Regional on-street bikeway
- 122nd/129th Avenue — Regional on-street bikeway
- Mt. Scott Boulevard — Regional on-street bikeway
- Idleman Road — Community connector bikeway
- Mt. Scott Trail — Proposed regional corridor off-street bikeway
- East Buttes Power Line Trail — Proposed regional corridor off-street bikeway
- Scouter Mountain Trail — Proposed regional corridor off-street bikeway

A regional corridor bikeway provides point-to-point connections between the central city, regional centers, and larger town centers. They generally carry higher automobile speeds and volumes than community connector bikeways. By complying with the RTP designation, the Happy Valley Bicycle Master Plan is consistent with plans developed by Metro and Clackamas County.

The Pedestrian Master Plan (chapter 5) provides details on the development of the proposed trail system for Happy Valley. The proposed regional trails within the study area are shown on the Bicycle Master Plan (Figure 6-1) to illustrate how they integrate within the bicycle system. The locations of the regional trails are conceptual. Before decisions are made about specific trail alignment and appropriate use, there will be detailed planning and design process and many opportunities for public involvement.

Recommended Bicycle Master Plan

To meet transportation performance standards and serve future growth, the future transportation system needs multi-modal improvements to manage the forecasted travel demand. The extent of the recommended multi-modal improvements for Happy Valley is significant.

A list of potential bicycle projects to meet the identified needs and achieve these strategies was developed into a Bicycle Master Plan. The Master Plan shown in Figure 6-1 and summarized in Table 6-1 is an overall plan and summarizes the 'wish list' of bicycle related projects in Happy Valley, providing a long-term map for planning bicycle facilities. These projects will be used to create an updated Bicycle Financially Constrained Plan. The Financially Constrained Plan consists of projects that the City should give priority to in funding. As development occurs, streets are rebuilt and other opportunities (such as grant programs) arise, projects on the Master Plan should be pursued as well. Additional local facilities such as bike lanes, bike routes, off-street trails and crossing enhancements recommended in this plan extend beyond the regional scope of the RTP.

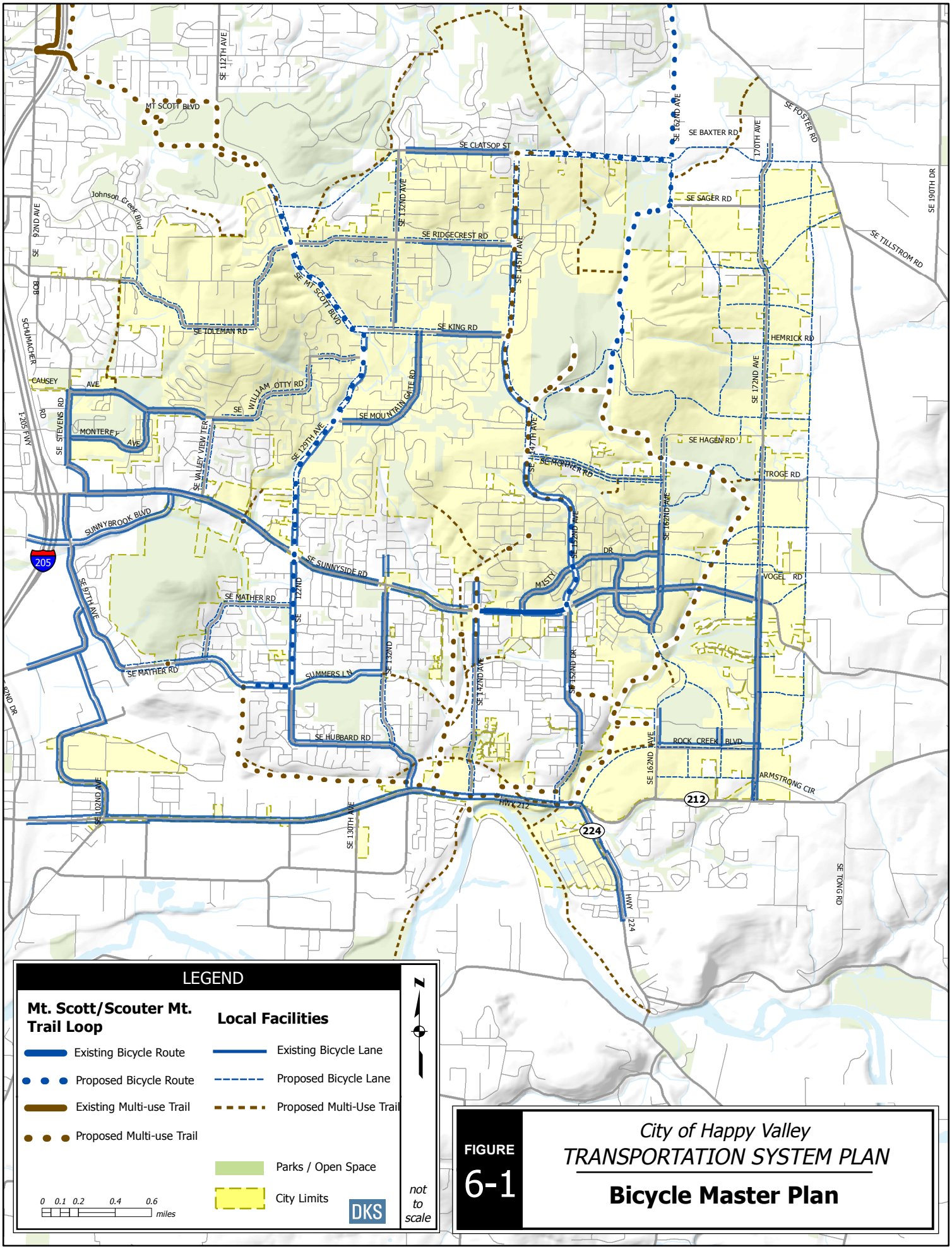
The planning level cost estimates provided are based on general unit costs for transportation improvements, but do not reflect the unique project elements that can significantly add to project costs. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with special design details as projects are pursued.

Table 6-1: Bicycle Master Plan Projects

Project	Location	From	To	Cost Estimate
Bike Lanes on Existing Arterials & Collectors				
145th Avenue	Both	Wallowa Way	Clatsop Street	$310
145th Avenue	Both	King Road	Purple Finch Loop	$330
147th Avenue	East	King Road	Monner Road	$360
147th Avenue	West	Alta Vista Drive	Monner Road	$90
King Road	Both	129th Avenue	Regina Court	$430
Mt. Scott Boulevard	Both	Northern City limits	129th Avenue	$1,000
132nd Avenue	West	King Road	Clatsop Street	$500
132nd Avenue	East	Clatsop Street	Geneva Way	$430
162nd Avenue	Both	Palermo Avenue	Hagen Road	$620
122nd /129th Avenue	West	Sunnyside Road	King Road	$660
122nd /129th Avenue	East	Mountain Gate Road	Scott Creek Lane	$140
Ridgecrest Road	Both	Mt. Scott Boulevard	132nd Avenue	$580
Ridgecrest Road	North	132nd Avenue	145th Avenue	$320
Ridgecrest Road	South	132nd Avenue	Parkwood Way	$60
Idleman Road	Both	West City Limit	Mt. Scott Boulevard	$1,400
William Otty Road	Both	Valley View	129th Avenue	$1,100
Monner Road	Both	147th Avenue	162nd Avenue	$750
172nd Avenue North	Both	Misty Drive	Clatsop Extension East	**
152nd Avenue	Both	Sedona Drive	OR 212	$1,000
142nd Avenue	Both	Territory Drive	OR 212	$450
132nd Avenue	Both	Hubbard Road	Summers Lane	$410
Mather Road	Both	Summer Lane	122nd Avenue	$700
Mather Road	Both	Cranberry Loop	97th Avenue	$280
Bike Lanes on New Arterials & Collectors				
Clatsop Street Extension East	Both	162nd Avenue	172nd Avenue	**
Clatsop Street – Cheldelin Road	Both	172nd Avenue	Foster Road	**
162nd Avenue Extension North	Both	Hagen Road	Clatsop Street	**
162nd Avenue Extension South	Both	157th Avenue	OR 212	**
Sager Road Extension East	Both	172nd Avenue	Foster Road	**
Sager Road Extension West	Both	162nd Avenue	172nd Avenue	**
172nd-190th Connector	Both	172nd Avenue	Foster Road	**
Wooden Heights Road	Both	162nd Avenue	177th Avenue	**
Hemrick Road Extension	Both	162nd Avenue	177th Avenue	**
Scouter Mountain Road	Both	147th Avenue	177th Avenue	**
Troge Road Extension	Both	162nd Avenue	177th Avenue	**
169th Avenue Extension	Both	Sunnyside Road	177th Avenue	**
Misty Drive Extension	Both	162nd Avenue	177th Avenue	**

Project	Location	From	To	Cost Estimate
Rock Creek Court Extension	Both	162nd Avenue	177th Avenue	**
Big Timber Court Extension	Both	172nd Avenue	177th Avenue	**
Rock Creek Boulevard West Extension	Both	162nd Avenue	Sunrise Corridor Rock Creek interchange	**
Rock Creek Boulevard East	Both	162nd Avenue	177th Avenue	**
Rock Creek East-West Roadway	Both	162nd Avenue	172nd Avenue	**
Parklane Drive North Extension	Both	162nd Avenue	Stadium Way	**
Parklane Drive South Extension	Both	Rock Creek Boulevard	Rock Creek East-West	**
167th Avenue	Both	Rock Creek Boulevard	Rock Creek East-West	**
177th Avenue	Both	Rock Creek Boulevard	Sager Road Extension	**
Sunnyside East Extension	Both	172nd Avenue	Foster Road	**
			Total Bicycle Master Plan Project Costs	**$11,920**

**These project costs are included in a motor vehicle plan.


SE 112TH AVE
MT SCOTT BLVD
SE CLATSOP ST
SE 162ND AVE
SE BAXTER RD
SE FOSTER RD
170TH AVE
SE 190TH DR
Johnson Creek Blvd
SE 92ND AVE
SE 132ND AVE
SE SAGER RD
SE RIDGECREST RD
SE 145TH AVE
SE TILLSTROM RD
SE MT SCOTT BLVD
SE IDLEMAN RD
SE KING RD
HEMRICK RD
SCHUMACHER RD
CAUSEY AVE
SE STEVENS RD
SE WILLIAM OTTY RD
SE MOUNTAIN GATE RD
SE 172ND AVE
I-205 FWY
MONTEREY AVE
SE VALLEY VIEW TER
SE 129TH AVE
SE HAGEN RD
SE MONNER RD
SE 147TH AVE
TROGE RD
SUNNYBROOK BLVD
SE 152ND AVE
SE 162ND AVE
205
SE SUNNYSIDE RD
VOGEL RD
SE 87TH AVE
SE MATHER RD
SE 122ND
SE 132ND
SE 142ND AVE
SE 152ND DR
SUMMERS LN
SE HUBBARD RD
ROCK CREEK BLVD
SE 162ND AVE
ARMSTRONG CIR
212
HWY 212
224
SE 102ND AVE
SE 130TH AVE
HWY 224
SE TONG RD
LEGEND
Mt. Scott/Scouter Mt. Trail Loop
Existing Bicycle Route
Proposed Bicycle Route
Existing Multi-use Trail
Proposed Multi-use Trail
Local Facilities
Existing Bicycle Lane
Proposed Bicycle Lane
Proposed Multi-Use Trail
Parks / Open Space
City Limits
0 0.1 0.2 0.4 0.6 miles
DKS
N
not to scale
FIGURE 6-1
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Bicycle Master Plan

Bicycle Financially Constrained Plan

A bicycle financially constrained plan was created to identify projects that are reasonably expected to be funded by the year 2040, which meets the requirements of the updated Transportation Planning Rule[1]. The TSP goals and policies were used to rank the bicycle projects. The highest ranking City projects that are reasonably expected to be funded (see Chapter 10) were combined with projects identified in the RTP Financially Constrained scenario and projects with anticipated funding from other agencies to create the project list shown in Table 6-2.

Table 6-2: Bicycle Financially Constrained Plan

Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
172nd Avenue Widening South*	Add bike lanes between Sunnyside Road and 172nd-190th Connector Rd	Joint SDC/ Developer	Medium Term	**
172nd Avenue Widening North*	Add bike lanes between 172nd-190th Connector to Cheldelin Road	Joint SDC/ Developer	Medium Term	**
122nd/129th Avenue Widening	Add bike lanes between Sunnyside Road and King Road	Joint SDC/ Developer	Near Term	**
King Road Widening	Add bike lanes between 129th Avenue and 145th Avenue	Joint SDC/ Developer	Medium Term	**
132nd Avenue Widening*	Add bike lanes from Ridgecrest Road to King Road	Joint SDC/ Developer	Long Term	**
145th-147th Avenue Widening	Add bike lanes from Clatsop Street to Monner Road	Joint SDC/ Developer	Medium Term	**
162nd Avenue Widening*	Add bike lanes from Palermo Avenue to Hagen Road	Joint SDC/ Developer	Medium Term	**
Clatsop Street Extension East	Construct bikes lanes between 162nd Avenue and 172nd Avenue	Joint SDC/ Developer	Long Term	**
162nd Avenue Extension North*	Construct bikes lanes between Hagen Road and Clatsop Street	Joint SDC/ Developer	Long Term	**
162nd Avenue Extension South*	Construct bikes lanes between 157th Avenue to Highway 212	Joint SDC/ Developer	Long Term	**
Sager Road Extension West	Construct bikes lanes from 162nd Avenue to 172nd Avenue	Joint SDC/ Developer	Long Term	**
Wooden Heights Road	Construct bikes lanes from 162nd Avenue to 177th Avenue	Joint SDC/ Developer	Medium Term	**
Hemrick Road Extension	Construct bikes lanes from 162nd Avenue to 177th Avenue	Joint SDC/ Developer	Medium Term	**
Scouter Mountain Road	Construct bikes lanes between 147th Avenue and 177th Avenue	Joint SDC/ Developer	Medium Term	**
Troge Road Extension*	Construct bikes lanes between 162nd Avenue and 177th Avenue	Joint SDC/ Developer	Near Term	**
169th Avenue Extension	Construct bikes lanes from Sunnyside Road to 177th Avenue	Joint SDC/ Developer	Near Term	**
Misty Drive	Construct bikes lanes from 162nd	Joint SDC/	Medium	**

[1] *OAR Chapter 660*, Department of Land Conservation and Development, Division 012, Transportation Planning, adopted on March 15, 2005, effective April, 2005.

Extension*	Avenue and 177th Avenue	Developer	Term	
Rock Creek Boulevard West Extension*	Construct bikes lanes from 162nd Avenue to the Sunrise Corridor Rock Creek interchange	Joint SDC/ Developer	Medium Term	**
Parklane Drive North Extension	Construct bikes lanes from 162nd Avenue to Stadium Way	Joint SDC/ Developer	Medium Term	**
Sunnyside East Extension*	Construct bikes lanes east to Foster Road	Joint SDC/ Developer	Long Term	**
			City of Happy Valley	$0
			Joint SDC/Developer	$**
			Other	$0
			Total Bicycle Financially Constrained Project Costs	**$****

* Project identified in the 2014 Regional Transportation Plan Financially Constrained scenario.
**These project costs are included in a motor vehicle financially constrained plan and may include a combination of Joint SDCs and other potential funding sources such as state/federal grants.

Plan Implementation

It is important that, as new development occurs, connections or accessways are provided to link the development to the existing bicycle and pedestrian facilities in as direct manner as is reasonable. If a development fronts a bikeway or sidewalk (as shown in the Bicycle or Pedestrian Master Plans), the developer shall be responsible for providing the bikeway or walkway facility as part of any half-street improvement required for project mitigation.

7. Transit Plan

This chapter summarizes existing and future transit needs in the City of Happy Valley. The following sections outline the evaluation of future needs and the recommended transit plan for the City of Happy Valley. The method used to develop the transit plan combined Tri-County Metropolitan Transportation District of Oregon (TriMet), city staff and other agencies input. Policies for transit facilities are provided in Chapter 2. The existing conditions for transit facilities are provided in Chapter 3.

NEEDS

TriMet is the regional transit provider for the Portland metro area and operates four bus routes within the Happy Valley TSP study area. TriMet's Transit Investment Plan (TIP) is a guide for making investments in bus and rail service, capital projects and customer information, and strategies to improve financial stability. The TIP focuses on short-term issues and long-term transportation needs, including making transit better for riders and planning for the future of transit.

TriMet is improving current services by increasing frequency, expanding service, maintaining and improving bus and rail vehicles and systems, and enhancing the quality of the rider experience through technology, information and amenities. TriMet prioritizes near-term service improvements for investment and implementation each Fiscal Year through our Annual Service Plan. The Annual Service Plan has three service categories:

1. Maintain: Investments in capacity and reliability of existing services to help reduce crowding and make travel times and service more predictable.
2. Optimize: Investments in frequency and route restructuring to optimize existing service to make it faster and more convenient. If previous years saw service cuts, especially to Frequent Service lines, this step would include restoring service to policy levels.
3. New lines: Investments in new and substantially reconfigured lines, including increases in frequency and earlier morning and later evening service.

TriMet's Service Enhancement Plans are shared visions for the future of bus service and help guide the Annual Service Plan process. They have been developed in collaboration with Happy Valley, Clackamas County, and other government agencies, riders, residents, neighborhood groups, schools, and businesses and identify current and future service needs. Recommendations for improved bus service in Happy Valley have been identified in the Southeast Service Enhancement Plan. Future service will be made in coordination with Happy Valley staff and guided by the time and scale of future development.

In addition, TriMet continually works to improve access to the transit system for those who connect by walking, rolling, and riding a bike. Working closely with our partners ensures that TriMet can focus on strategic investments in access to transit. TriMet's Pedestrian Network Analysis Project and Bike Plan guide current and future investments in access to transit.

The quality of transit service within Happy Valley can be characterized by the following indicators:

- Transit route coverage,
- Frequency,
- Reliability, and
- User amenities

The following sections present an assessment for each of these service characteristics, and identify potential needs for future transit service improvements in Happy Valley.

Transit Route Coverage

Transit coverage in Happy Valley can be improved by providing adequate access to transit service. Typically, the recommended transit stop spacing[1] in urban areas is approximately 780 to 1,000 feet. Today, the bus stops on Sunnyside Road are located approximately 1,000-feet to 1,800-feet apart. As development occurs and ridership demand increases, the bus stop spacing on Sunnyside Road will be reduced but not spaced so closely as to compete with each other, increasing overall travel times for transit riders.

It is important to continue TriMet's LIFT Program and Ride Connection operated by the American Red Cross to areas within the City not supported by transit service. By law, TriMet must offer ADA complementary service such as LIFT within three-quarters of a mile from a fixed transit route.

Several transit service recommendations from the TSP have seen extensive coordination efforts with TriMet staff. The Happy Valley Town Center and East Happy Valley Comprehensive Plan areas located along Sunnyside Road and 172nd Avenue are expected to develop as major employment and residential centers, with a need for future transit coverage.

Bus route #155 currently provides service on Sunnyside Road west to 162nd Avenue. Future increases in residential and employment density in Happy Valley Town Center and further to 172nd Avenue are expected to increase potential ridership east of the existing route terminus, potentially justifying extension of the route on Misty Drive and Sunnyside Road to 172nd Avenue. This extended transit service would include additional bus stops on both sides of Sunnyside Road, Misty Drive, and 172nd Avenue. Bus shelters should be considered at select bus stops within the town center based on future ridership. The pedestrian connections to the bus stops should also provide adequate lighting to increase rider safety.

Happy Valley is partially inside and partially outside the designated TriMet district. The district boundary (as of 2015) extends to 172nd Avenue at Sunnyside Road, and has a "sawtooth" pattern to 145th Avenue near Clatsop, 147th Avenue at Monner Road and 162nd Avenue near Highway 212. The TriMet district boundary should be extended to the east to 177th Avenue to include all of Happy Valley. This would allow for the future expansion of transit service in the City and the collection of transit revenue. A portion of the payroll taxes collected by the Oregon Department of Revenue are allocated to mass transit. The current rate[2] is $7.237 per $1,000 of the wages paid by an employer within the TriMet district.

[1] Bus Stop Guidelines 2002, TriMet, October 2002.

[2] Information provided on TriMet Self-Employment Tax Form, 2015.

Service Frequency

In addition to providing service to a geographic area, transit route frequency is a measure of transit quality of service and mode attractiveness. As development occurs within the study area and transit demand increases, bus service frequency will be increased to every 15 to 30 minutes, first during the peak period but over time if warranted by density and ridership demand.

Service Reliability

Transit service reliability is a key performance characteristic for retaining riders. Congested roadways, bottlenecks and traffic signals can delay transit vehicles and cause transit vehicles to arrive off schedule and close together. In the future, the Sunnyside Road and 172nd Avenue transit corridors (both under Clackamas County jurisdiction) will be faced with numerous traffic signal control delays and forecasted congestion.

Individual intersections and stops can benefit from signal priority and timing improvements right away without a full BRT system being implemented. The City in coordination with Clackamas County will consider implementing signal priority and individual management improvements as soon as practical in consultation with TriMet.

Bus stop relocation can improve transit reliability. Transit stops will be spaced appropriately to provide adequate accessibility to riders while limiting bus delays from frequent stops. Typically, the recommended transit stop spacing in urban areas is approximately 780 feet to 1000 feet in less dense areas. Transit stop relocations will be coordinated with pedestrian improvements, such as curb extensions, as they are constructed.

User Amenities

The purpose of transit stop amenities is to improve the convenience and attractiveness of using the transit system. Good public transportation is important to the livability of a community. Accessible transit stops are essential to a useable system. TriMet prioritizes the need for bus stop amenities by ridership and special circumstances (senior center, etc.). A variety of potential transit improvements to address the needs of the transportation system through 2040 are displayed in Table 7-1.

Table 7-1: Potential Tools to Address Transit Needs

TOOL	EXAMPLE
Transit Stop Enhancements Provision of passenger amenities at bus stops creates a more pleasant and attractive environment for bus riders and may encourage people to use the transit system. Common amenities include: shelters, benches, trash cans, and bus route information. Shelters should be placed at least 2 feet from the curb when facing away from the street and at least 4 feet away when facing toward it. The adjacent sidewalk must still have a 5-foot clear passage. Orientation of the shelter should consider prevailing winter winds. Transit riders can utilize Transit Tracker by mobile phone to access next bus arrival times using the bus stop ID number provided at the bus stop. This feature is also available via the web.	

TOOL	EXAMPLE
Construct Bus Pullouts Bus pullouts allow transit vehicles to pick up and drop off passengers in an area outside the traveled way and are generally provided on high-volume and/or high-speed roadways. They are frequently constructed at bus stops with a high number of passenger boardings such as large shopping centers and office buildings. By removing stopped buses from travel lanes, delay to traffic is considerably reduced and operational safety is enhanced by removing an obstruction from the traveled way. They also help better define bus stop locations, can be used for bus layovers, and create a more relaxed environment for loading and unloading. Available right-of-way often constrains the ability to provide a bus pullout. Pedestrian safety is enhanced when pullouts are located near and associated with controlled pedestrian crossings.	
Move Bus Stops to Far Side of Signalized Intersections On multi-lane streets or streets with wide shoulders where motor vehicles may pass uncontrolled around a stopped bus, bus stops located on the far side of intersections are preferred to provide needed sight distance. At signalized intersections, bus stops may be located on either the near side or far side of the intersection. However, in locations where bus pullouts are desired, far-side stops should be used. In general, far-side bus stops are desired because they reduce conflicts with right turning vehicles, encourage pedestrians to cross behind the bus, minimize the area needed for curbside bus zones, make it easier for buses to reenter traffic at signalized intersections, and have fewer impacts on roadway capacity. However, far-side stops also require passengers to access the bus further from the crosswalks, may interfere with right turns from the side street, and where pullouts are not used, can result in blockages of an intersection.	

One of the most significant user amenities for bus services is a shelter at the transit stop. Most of the bus stops within the study area today have minimal amenities. These user amenity improvements are particularly important along the transit route #155 serving Sunnyside Road due to the higher volumes of passengers expected along this corridor. Though current ridership levels may not meet warrants for amenity inclusion, streamlining the planning and permitting process will help support the placement of future improvements. Potential park and ride lots are located on Sunnyside Road at the northeast corner of 132nd Avenue and the southwest corner of 142nd Avenue, both at adjacent church parking lots.

Metro RTP

In addition to the performance based needs discussed above, the Happy Valley TSP needs to consider Metro RTP designations for consistency. The RTP identifies regional bus transit designation[3] for the following facilities:

- Sunnyside Road
- 172nd Avenue
- 122nd/129th Avenue

Regional bus service operates with minimum frequencies of 15 minutes with conventional stop spacing along the route. Covered bus shelters, special lighting, signal preemption and curb extensions are appropriate at high ridership locations along these routes.

Also, the RTP identifies several major transit stops on Sunnyside Road. Major bus stops are intended to provide a high degree of transit passenger comfort and access. Major transit stops shall provide schedule information, lighting, benches, shelters and trash cans.

Recommended Transit Plan

To meet performance standards and serve growth, the future system needs multi-modal improvements to manage the forecasted travel demand. TriMet is responsible for any changes in transit routes through their annual TIP report. In order for the City to have its transit needs assessed, the City can provide input to TriMet's TIP through the Clackamas County Coordinating Committee or through the TIP Open House held every January.

Transit projects were determined based on the identified needs, policies and project feasibility. Proposed transit master plan projects are summarized in Table 7-2 and shown in Figure 7-1. Transit enhancements within the Tri-Met service area are ultimately decided based on regional transit goals. New and extended bus service projects will be coordinated with TriMet and guided by future development transit needs.

Table 7-2: Transit Master Plan Projects

Project	Description	Cost ($1,000s)
TriMet District	Bring all of Happy Valley city limits into the TriMet district.	$0
Bus Stop Enhancements	Coordinate with TriMet to provide transit stop improvements that enhance safety and ADA access at all transit stops. Include bus shelters and transit passenger amenities where ridership meets warrants.	$0
RTP Designated Major Transit Stops	To meet RTP requirements, amend development code regulations to require new development on sites at major transit stops to: ▪ Locate buildings within 20 feet of or provide a pedestrian plaza at the major transit stops. ▪ Provide reasonably direct pedestrian connections between the transit stop and building entrances on the site. ▪ Provide a transit passenger landing pad accessible to disabled persons (if not already existing to transit agency standards). ▪ Provide an easement or dedication for a passenger shelter and underground utility connection from the new development to the transit amenity if requested by the public transit provider. ▪ Provide lighting at a transit stop.	$0

[3] *2014 Regional Transportation Plan*, Metro, adopted July 17, 2014.

Park & Ride Lots	Coordinate with TriMet to provide future park and ride lots.	$0
Sunnyside Road Transit Signal Priority	Coordinate with TriMet to construct and implement transit signal priority on Sunnyside Road as congested conditions occur and ridership volumes increase.	$25 per intersection
172nd Avenue Transit Signal Priority	Coordinate with TriMet to construct and implement transit signal priority on 172nd Avenue as congested conditions occur and ridership volumes increase.	$25 per intersection
Extend Bus Route #155	Extend bus route #155 further east on Sunnyside Road to serve future transit demand. Future service will be made in coordination with Happy Valley staff and guided by the time and scale of future development.	$-
New Bus Route #10	Add bus route #10 to provide new service on 172nd Avenue and to the planned major employment center north of Highway 212. Future service will be made in coordination with Happy Valley staff and guided by the time and scale of future development.	$-
New Bus Route #31	Add bus route #31 to provide new service Sunnyside Road connecting the Happy Valley Town Center to destinations further east. Future service will be made in coordination with Happy Valley staff and guided by the time and scale of future development.	$-
Transit Corridors	Direct growth to increase the density of development along transit routes in the study area in an effort to support regional transit service goals.	$0
	Total Transit Master Plan Project Costs	**$-**

- These projects are under the jurisdiction of, and/or will be funded by, other agencies.

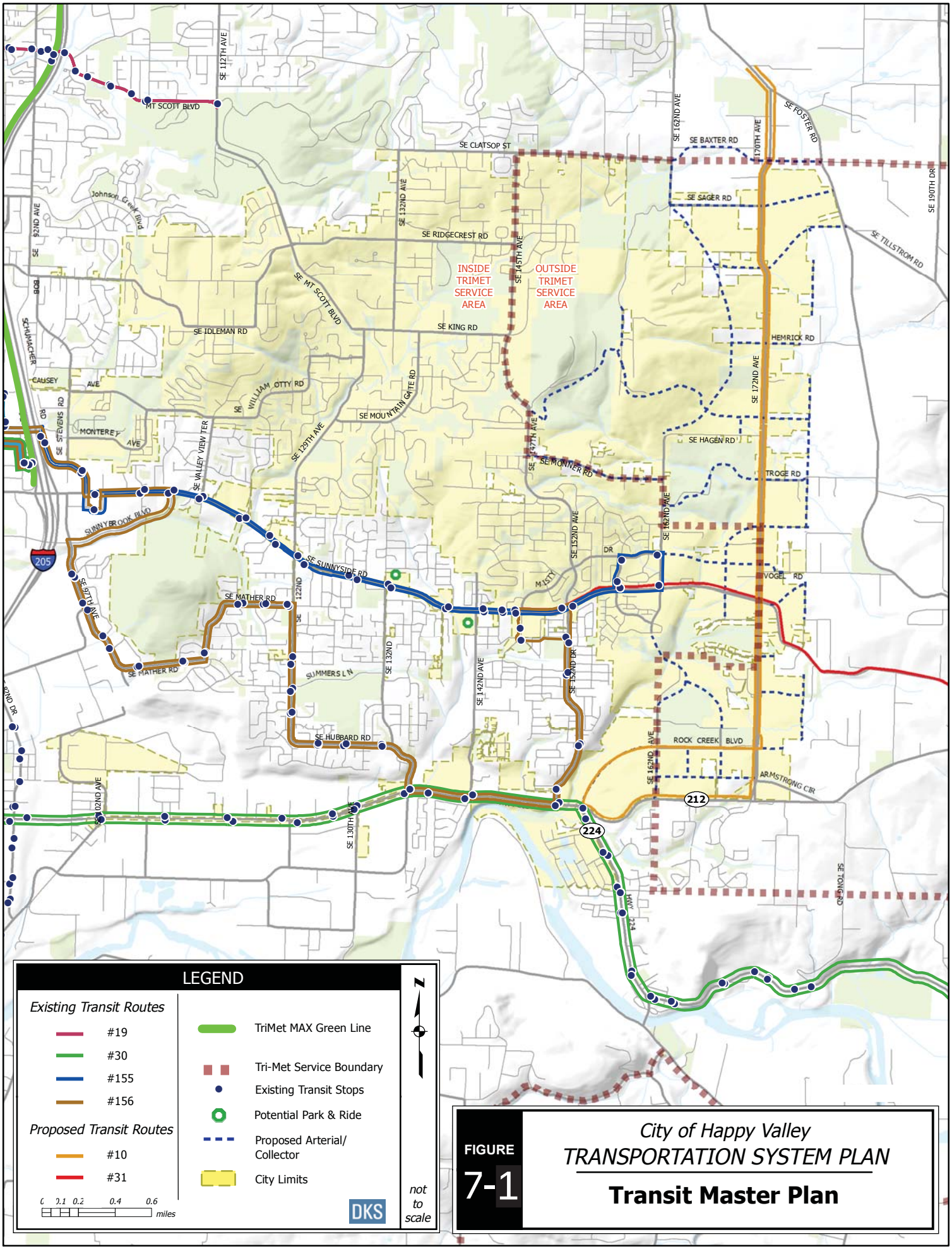


FIGURE 7-1

City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Transit Master Plan

Transit Financially Constrained Plan

A transit financially constrained plan was created to identify transit projects that are reasonably expected to be funded or implemented by the year 2040, which meets the requirements of the updated TPR[4]. Projects that are reasonably expected to be funded or implemented (see Chapter 10) were combined with projects identified in the RTP Financially Constrained scenario to create the project list shown in Table 7-3.

Table 7-3: Transit Financially Constrained Plan

Project	Description	Cost ($1,000s)
TriMet District	Bring remaining areas of Happy Valley into the TriMet district.	$0
Bus Stop Enhancements	Coordinate with TriMet to provide transit stop improvements that enhance safety and ADA access at all transit stops. Include bus shelters and transit passenger amenities where ridership meets warrants.	-
RTP Designated Major Transit Stops	To meet RTP requirements, amend development code regulations to require new retail, office, and institutional buildings on sites at major transit stops to: ▪ Locate buildings within 20 feet of or provide a pedestrian plaza at the major transit stops. ▪ Provide reasonably direct pedestrian connections between the transit stop and building entrances on the site. ▪ Provide a transit passenger landing pad accessible to disabled persons (if not already existing to transit agency standards). ▪ Provide an easement or dedication for a passenger shelter and underground utility connection from the new development to the transit amenity if requested by the public transit provider. ▪ Provide lighting at a transit stop (if not already existing to transit agency standards).	$0
Transit Corridors	Direct growth to increase the density of development along transit routes in the study area in an effort to support regional transit service goals.	$0
	Transit Projects to be Funded by the City	**$0**

- These projects are under the jurisdiction of, and/or will be funded by, TriMet.

[4] *OAR Chapter 660*, Department of Land Conservation and Development, Division 012, Transportation Planning, adopted on March 15, 2005, effective April, 2005.

8. Motor Vehicle Plan

This chapter summarizes needs for the motor vehicle system for future conditions in the City of Happy Valley. It also outlines the strategies to be used in evaluating needs and recommends plans for motor vehicles (automobiles, trucks, buses and other vehicles). The Motor Vehicle modal plan is intended to be consistent with other jurisdictional plans including Metro's Regional Transportation System Plan (RTP), Clackamas County's Transportation System Plan (TSP), Sunrise Interchange Area Management Plan, the 172nd Avenue/190th Drive Corridor Management Plan, and the Happy Valley Town Center Plan. Policies for future motor vehicle facilities are provided in Chapter 2. The existing conditions for motor vehicle facilities are provided in Chapter 3.

STRATEGIES

To meet performance standards and serve future growth, the future transportation system needs multi-modal improvements and strategies to manage the forecasted travel demand. The extent and nature of the multi-modal improvements for Happy Valley are significant. The impact of future growth would be severe without investment in transportation improvements.

When determining the prioritization and inclusion of projects in the Happy Valley TSP Update, proposed projects were evaluated based on the Metro RTFP hierarchy of strategies shown in Chapter 1. For motor vehicle needs, operational and safety projects were identified first, followed by new roadways and lastly, widening existing roadways.

The following sections outline the type of improvements that would be necessary as part of a long-range Motor Vehicle Master Plan. As shown in the above hierarchy, Transportation System Management and Operations (TSMO) projects were prioritized above all other projects, and motor vehicle capacity improvement projects were considered last. The improvements outlined in the following sections are a guide to managing growth in Happy Valley as it occurs over the next 25 years.

Transportation System Management and Operations

Transportation System Management and Operations focus on low cost strategies to enhance operational performance of the transportation system by seeking solutions to immediate transportation problems, finding ways to better manage transportation, maximizing urban mobility, and treating all modes of travel as a coordinated system. These types of measures include such things as signal improvements, traffic signal coordination, traffic calming, access management, local street connectivity and intelligent transportation systems (ITS). Typically, the most significant measures that can provide tangible benefits to the traveling public are traffic signal coordination and systems.

TSM measures focus primarily on region wide improvements, however there are a number of TSM measures that could be used in a smaller scale environment such as the Happy Valley area. The following sections discuss TSM measures that could be appropriate for the Happy Valley 2025 TSP study area.

Intelligent Transportation Systems (ITS)

ITS involves the application of advanced technologies and proven management techniques to relieve congestion, enhance safety, provide services to travelers and assist transportation system operators in implementing suitable traffic management strategies. ITS focuses on increasing the efficiency of existing transportation infrastructure, which enhances the overall system performance and reduces the need to add capacity (e.g. travel lanes). Efficiency is achieved by providing services and information to travelers so they can (and will) make better travel decisions and to transportation system operators so they can better manage the system and improve system reliability.

Clackamas County has prepared an ITS plan for the urbanized area of the County. The Clackamas County ITS Plan[1] has identified arterial signal control ITS projects on major streets throughout the county. Sunnyside Road and 122nd/129th Avenue within the TSP study area have been identified for planned fiber optic cable and closed-circuit cameras at several major intersections.

Other ITS projects to consider in the future may include:

- Transit signal priority
- Signal coordination and optimization
- Traffic monitoring and surveillance
- Information availability
- Incident management

In order to support future ITS projects including traffic signal operations, the City of Happy Valley and Clackamas County should require the installation of three inch conduit along arterial and selected collector roadways during roadway improvement projects. ITS projects can require additional fiber optic cable to serve the new equipment along a roadway. A three inch conduit would ensure adequate wiring capacity to accommodate future ITS projects.

Transportation Demand Management (TDM)

Transportation Demand Management (TDM) is the general term used to describe any action that removes single occupant vehicle trips from the roadway network during peak travel demand periods. As growth in the Happy Valley area occurs, the number of vehicle trips and travel demand in the area will also increase. The ability to change a user's travel behavior and provide alternative mode choices will help accommodate this growth.

Generally, TDM focuses on reducing vehicle miles traveled and promoting alternative modes of travel for large employment areas. This is due in part to the Employee Commute Options (ECO) rules that were passed by the Oregon Legislature in 1993 to help protect the health of Portland area residents from air pollution and to ensure the area complied with the Federal Clean Air Act.[2]

[1] Clackamas County ITS Plan, DKS Associates, Inc. and Zenn Associates, February 2003.

[2] Oregon Administrative Rules, Chapter 340, Division 30.

Research has shown that a comprehensive set of complementary policies implemented over a large geographic area can have an effect on the number of vehicle miles traveled to/from that area.[3] However, the same research indicates that in order for TDM measures to be effective, they should go beyond the low-cost, uncontroversial measures commonly used such as carpooling, transportation coordinators/associations, priority parking spaces, etc. Setting TDM goals and policies for new development will be necessary to help implement TDM measures in the future.

The more effective TDM measures include elements related to parking and congestion pricing, improved services for alternative modes of travel, and other market-based measures. However, TDM includes a wide variety of actions that are specifically tailored to the individual needs of an area. Table 8-1 provides a list of several strategies outlined in the ECO program that could be applicable to the Happy Valley area.

Table 8-1: Transportation Demand Management Strategies

Strategy	Description	Potential Trip Reduction	
Telecommuting	Employees work at home or at a work center closer to home, rather than commuting from home to work. This can be full time or on selected workdays. This can require computer equipment to be most effective.	82-91% (Full Time) 14-36% (1-2 day/wk)	
Compressed Work Week	Schedule where employees work their regular scheduled number of hours in fewer days per week.	7-9% (9 day/80 hr) 16-18% (4 day/40 hr) 32-36% (3 day/36 hr)	
Transit Pass Subsidy	For employees who take transit to work on a regular basis, the employer pays for all or part of the cost of a monthly transit pass.	19-32% (full subsidy, high transit service) 2-3% (half subsidy, medium transit service)	
Cash Out Employee Parking	An employer that has been subsidizing parking (free parking) discontinues the subsidy and charges all employees for parking. An amount equivalent to the previous subsidy is then provided to each employee, who then can decide which mode of travel to use.	Reduction 8-20% 5-9% 2-4%	Transit High Medium Low
Reduced Parking Cost for HOVs	Parking costs charged to employees are reduced for high occupancy vehicles (HOV) such as carpools and vanpools.	1-3%	
Alternative Mode Subsidy	For employees that commute to work by modes other than driving alone, the employer provides a monetary bonus to the employee.	21-34% (full subsidy of cost, high alternative modes) 2-4% (half subsidy of cost, medium alternative modes)	
Bicycle Program	Provides support services to those employees that bicycle to work. Examples include: safe/secure bicycle storage, shower facilities and subsidy of commute bicycle purchase.	0-10%	
On-site Rideshare Matching for HOVs	Employees who are interested in carpooling or vanpooling provide information to a transportation coordinator regarding their work hours, availability of a vehicle and place of residence. The coordinator then matches employees who can reasonably rideshare together.	1-2%	
Provide Vanpools	Employees that live near each other are organized into a	15-25% (company provided	

[3] *The Potential for Land Use Demand Management Policies to Reduce Automobile Trips*, ODOT, by ECO Northwest, June 1992.

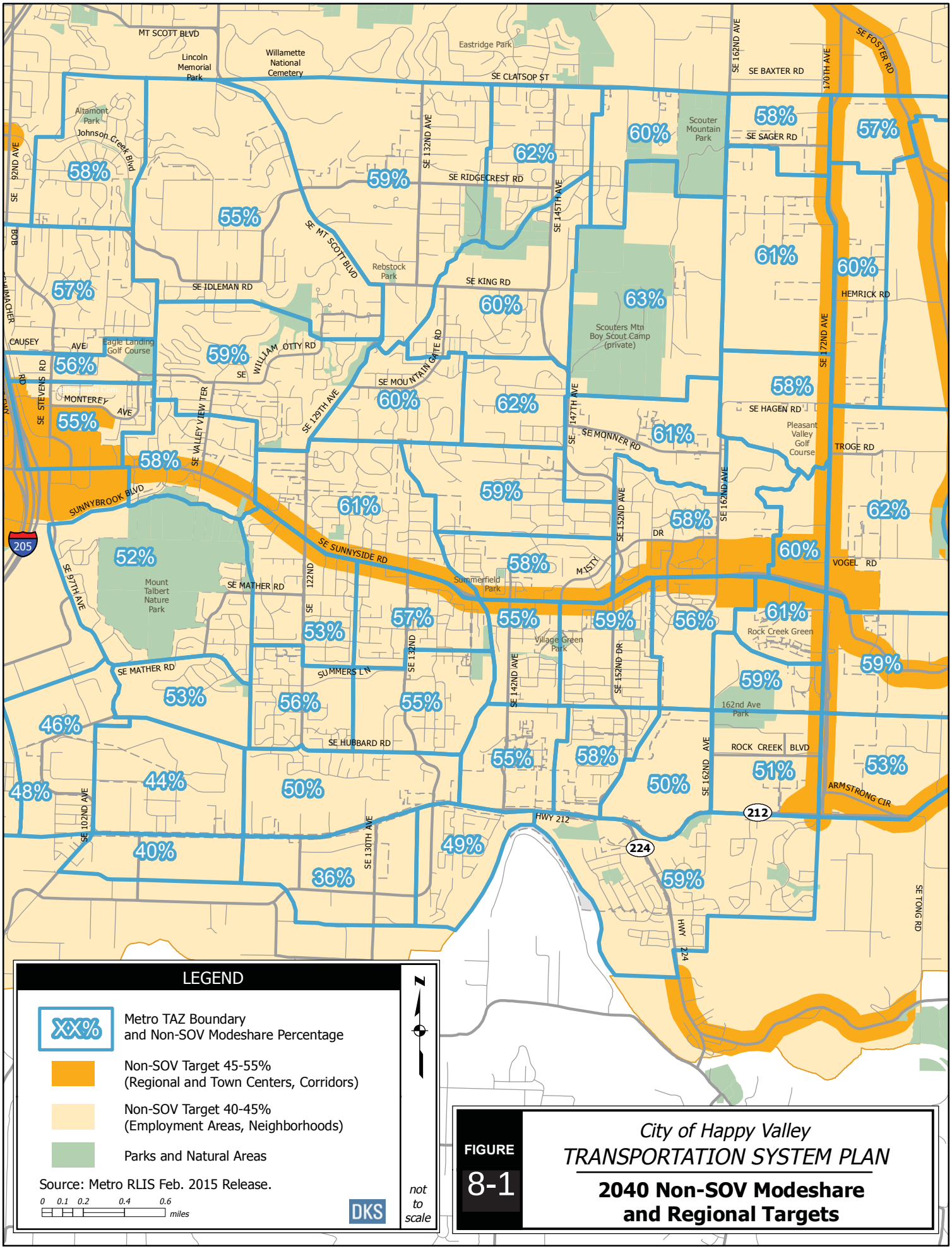
Strategy	Description	Potential Trip Reduction
	vanpool for their trip to work. The employer may subsidize the cost of operation and maintaining the van.	van with fee) 30-40% (subsidized van)
Gift/Awards for Alternative Mode Use	Employees are offered the opportunity to receive a gift or an award for using modes other than driving alone.	0-3%
Walking Program	Provide support services for those who walk to work. This could include buying walking shoes or providing lockers and showers.	0-3%
Company Cars for Business Travel	Employees are allowed to use company cars for business-related travel during the day	0-1%
Guaranteed Ride Home Program	A company owned or leased vehicle or taxi fare is provided in the case of an emergency for employees that use alternative modes.	1-3%
Time off with Pay for Alternative Mode Use	Employees are offered time off with pay as an incentive to use alternative modes.	1-2%

Source: G*uidance for Estimating Trip Reductions from Commute Options*, Oregon Department of Environmental Quality, August 1996.

Metro sets regional targets for the amount of trips that are made by means other than someone driving alone, also referred to as a "single occupant vehicle" (SOV). These regional targets are set for the portion of non-SOV travel (trips made by pedestrian, bike, transit, carpool, etc.) based on the target land use density (the 2040 design type). The targets are structured so that more dense areas have a higher share of non-SOV trips. Each design type and non-SOV target is as follows:

- Portland Central City (60-70%)
- Regional Centers, Town Centers, Main Streets, Station Communities, Corridors, Passenger Intermodal Facilities (45-55%)
- Industrial Areas, Freight Intermodal Facilities, Employment Areas, Inner Neighborhoods, Outer Neighborhoods (40-45%)

Figure 8-1 summarizes the level of non-SOV mode share estimated for 2040 using the regional travel demand model in comparison to the modal targets set in Metro's RTP. These non-SOV targets are aggregated by RTP design type groupings and colored in Figure 8-1 as orange (45-55% target for regional centers, town centers and corridors) and peach (40-45% target for remaining areas). Based on the model data, all of the Transportation Analysis Zones (TAZ) achieve their non-SOV target except for the TAZ located south of OR 212/224 at 130th Avenue (36%).


MT SCOTT BLVD
Lincoln Memorial Park
Willamette National Cemetery
Eastridge Park
SE CLATSOP ST
SE 162ND AVE
SE BAXTER RD
170TH AVE
SE FOSTER RD
Altamont Park
Johnson Creek Blvd
SE 92ND AVE
SE 132ND AVE
SE RIDGECREST RD
SE 145TH AVE
Scouter Mountain Park
SE SAGER RD
58%
57%
60%
62%
59%
55%
SE MT SCOTT BLVD
Rebstock Park
SE KING RD
SE IDLEMAN RD
61%
60%
63%
HEMRICK RD
SE 172ND AVE
Scouters Mtn Boy Scout Camp (private)
CAUSEY AVE
Eagle Landing Golf Course
SE WILLIAM OTTY RD
SE MOUNTAIN GATE RD
SE STEVENS RD
MONTEREY AVE
SE VALLEY VIEW TER
SE 129TH AVE
SE 147TH AVE
SE HAGEN RD
SE MONNER RD
Pleasant Valley Golf Course
TROGE RD
56%
59%
62%
61%
SUNNYBROOK BLVD
SE SUNNYSIDE RD
SE 152ND AVE
SE 162ND AVE
205
SE 97TH AVE
Mount Talbert Nature Park
SE MATHER RD
122ND
SE 132ND
Summerfield Park
MISTY DR
VOGEL RD
Village Green Park
SE 142ND AVE
SE 152ND DR
Rock Creek Green
162nd Ave Park
SUMMERS LN
ROCK CREEK BLVD
SE HUBBARD RD
SE 102ND AVE
SE 130TH AVE
HWY 212
224
ARMSTRONG CIR
SE TONG RD
HWY 224
52%
53%
57%
55%
59%
56%
61%
46%
48%
44%
50%
40%
36%
49%
51%
53%
LEGEND
XX%
Metro TAZ Boundary and Non-SOV Modeshare Percentage
Non-SOV Target 45-55% (Regional and Town Centers, Corridors)
Non-SOV Target 40-45% (Employment Areas, Neighborhoods)
Parks and Natural Areas
Source: Metro RLIS Feb. 2015 Release.
0 0.1 0.2 0.4 0.6 miles
DKS
N
not to scale
FIGURE 8-1
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
2040 Non-SOV Modeshare and Regional Targets

The City of Happy Valley will coordinate with Clackamas County and Tri-Met to implement pedestrian, bicycle and transit system improvements, which offer alternative modes of travel. The recommended TDM action plan includes:

- Support continued efforts by TriMet, Metro, ODOT, and Clackamas County to develop productive TDM measures that reduce commuter vehicle miles and peak hour trips.
- Encourage the development of high speed communications. The objective is to provide employers and residents a full range of options for conducting business and activities (such as home office, telecommuting), which can contribute to a reduction in peak hour travel on the roadway system.
- Encourage developments that effectively mix land uses to reduce vehicle trip generation. Development proposals will consider linkages (particularly non-auto) to support greater use of alternative travel modes.
- Increase industrial, commercial and institutional land uses within Happy Valley to provide additional employment opportunities and reduce the average commute length.
- Continued implementation of motor vehicle minimum and maximum parking ratios for new development.
- Continued implementation of street connectivity requirements.
- Require new development to install bicycle parking.
- Continued implementation of the bicycle, pedestrian, transit and motor vehicle system financially constrained plans.

Access Management

Access Management is a broad set of techniques that balance the need to provide efficient, safe and timely travel with the ability to allow access to individual properties. Proper implementation of access management techniques will guarantee reduced congestion, reduced accident rates, less need for roadway widening, conservation of energy, and reduced air pollution.

Access management is the control or limiting of vehicular access to maintain the capacity of the facilities and preserve their functional integrity. Access management strives to strike a balance between maintaining the integrity of the facility and providing access to adjacent parcels. Numerous driveways and street intersections can erode the capacity of arterial and collector roadways and increase the number of conflicts and potential for collisions. Preservation of capacity is particularly important on higher volume roadways for maintaining traffic flow and mobility. Whereas local and neighborhood streets function to provide access, collector and arterial streets serve greater traffic volume. Happy Valley, as with every city, needs a balance of streets that provide access with streets that serve mobility.

Several access management strategies were identified to improve local access and mobility:

- Develop specific access management plans for major and minor arterial streets in Happy Valley to maximize the capacity of the existing facilities and protect their functional integrity.
- Work with land use development applications to consolidate driveways where feasible.
- Provide left turn lanes where warranted for access onto cross streets.
- Construct raised medians to provide for right-in/right-out driveways as appropriate.

New development and roadway projects located on City street facilities shall meet the access spacing standards summarized in Table 8-2. Access spacing standards for the Rock Creek Junction interchange is provided in the Sunrise Expressway Final Environmental Impact Statement (FEIS).[4] Access points include public streets, private streets, and private commercial or residential driveways. A variation to the access spacing standards may be granted in areas with limited property frontage and/or environmental constraints. Any variation to these spacing standards will require an access management plan to be approved by the City engineer. The maximum access spacing listed in this table is consistent with Metro[5] guidelines.

Table 8-2: Access Spacing Standards for City Street Facilities**

Street Facility	Maximum Access Spacing	Minimum Access Spacing with Full Access	Minimum Access Spacing with Limited Access*
Major Arterial	-	1,000 feet	500 feet
Minor Arterial	-	600 feet	300 feet
Collector	530 feet	400 feet	200 feet
Neighborhood	530 feet	-	-
Local	530 feet	-	-

Note: Intersection and driveway spacing measured from centerline to centerline.
* Limited Access – Vehicles are restricted to right-in/right-out turn movements. In some cases, left-in turn movements may be permitted.
** Special access spacing standards may be established in Corridor Management Plans and master plans.

Access management is not easy to implement and often requires long institutional memory of the impacts of short access spacing – increased collisions, reduced capacity, poor sight distance and greater pedestrian exposure to vehicle conflicts. The most common opposition response to access control is that "there are driveways all over the place at closer spacing than mine – just look out there".

These statements are commonly made without historical reference. Many of the pre-existing driveways that do not meet access spacing requirements were put in when traffic volumes were substantially lower and no access spacing criteria were mandated. With higher and higher traffic volume in the future, the need for access control on all arterial and collector roadways is critical – the outcome of not managing access properly is additional wider roadways which have much greater impact than access control.

[4] Sunrise Project, I-205 to Rock Creek Junction, Final Environmental Impact Statement, Figure PA-5, December 2010.
[5] Metro Regional Transportation Plan, 2014.

Traffic Calming Designs and Devices

Happy Valley has traffic management elements in place, such as speed humps, on streets within the study area. The city will consider additional traffic calming measures and work with the community to find the traffic calming solution that best meets their needs and maintains roadway function. Table 8-3 lists common traffic management applications and suggests which devices may be supported by the Clackamas County Fire District. Traffic management projects will include coordination with emergency agency staff to assure public safety.

Table 8-3: Traffic Management Measures by Roadway Functional Classification

Traffic Calming Measure	Roadway Classification		
	Arterial	**Collector**	**Neighborhood/ Local Street**
Curb Extensions	Not Supported	Supported*	Traffic calming measures are acceptable on lesser emergency response routes that have connectivity (more than two accesses) and are accepted by the City of Happy Valley.
Raised Medians	Supported	Supported	
Pavement Texture	Not Supported	Supported	
Speed Hump	Not Supported	Not Supported	
Roundabout	Supported**	Supported	
Raised Crosswalk	Not Supported	Not Supported	
Speed Cushion (provides emergency pass-through with no vertical deflection)	Not Supported	Not Supported	
Choker[6]	Not Supported	Not Supported	
On-Street Parking	Not Supported	Not Supported	
Traffic Circle	Not Supported	Not Supported	
Diverter (with emergency vehicle pass through)	Not Supported	Not Supported	

* Only supported on roadways with on-street parking.

** In special cases to be determined by City staff.

Note: It is desirable to have all traffic calming measures meet Clackamas County Fire District guidelines including minimum street width, emergency vehicle turning radius, and accessibility/connectivity.

Connectivity Improvements

Local Street Connectivity

Much of the local street network in Happy Valley is built but is not well connected. Multiple access opportunities for entering or exiting neighborhoods are limited. There are a number of locations where neighborhood traffic is funneled onto one single street. This type of street network results in out-of-direction travel for motorists and an imbalance of traffic volumes that may impact residential frontage. The outcome can result in the need for wider roads, traffic signals and turn lanes (which can negatively impact traffic flow). By providing connectivity between neighborhoods, out-of-direction travel and vehicle miles traveled (VMT) can be reduced,

[6] Chokers are not supported when they do not shadow parking. If parking is shadowed, see curb extensions.

accessibility between various travel modes can be enhanced and traffic levels can be balanced out between various streets. Additionally, public safety response time is reduced.

Some of these local connections can contribute with other street improvements to mitigate capacity deficiencies by better dispersing traffic. Several roadway connections will be needed within neighborhood areas to reduce out of direction travel for vehicles, pedestrians and bicyclists. This is most important in the areas where a significant amount of new development is possible.

Figure 8-2 shows the proposed Local Street Connectivity Plan for Happy Valley. In most cases, the connector alignments are not specific and are aimed at reducing potential neighborhood traffic impacts by better balancing traffic flows on local neighborhood routes. The arrows shown in the figure represent potential connections and the general direction for the placement of the connection. In each case, the specific alignments and design will be better determined upon development review.

The criteria used for providing local connections are based on the Metro RTP requirements for new residential or mixed-use developments.

- Every 330 feet, a grid for pedestrians and bicycles
- Every 530 feet, a grid for automobiles

To protect existing neighborhoods from potential traffic impacts of extending stub end streets, connector roadways will incorporate neighborhood traffic management into their design and construction. All stub streets will have signs indicating the potential for future connectivity. Additionally, new development that constructs new streets, or street extensions, must provide a proposed street plan that:

- Provides full street connections with spacing of no more than 530 feet between connections except where prevented by barriers
- Provides bike and pedestrian access ways in lieu of streets with spacing of no more than 330 feet except where prevented by barriers
- Limits use of cul-de-sacs and other closed-end streets to situations where barriers prevent full street connections
- Includes no cul-de-sacs and other close-end streets longer than 200 feet or having no more than 10 dwelling units
- Includes street cross-sections demonstrating dimensions of ROW improvements, with streets designed for posted or expected speed limits

The arrows shown on Figure 8-2 indicate priority for local and neighborhood connections only. Other stub end streets in the road network may become cul-de-sacs, extended cul-de-sacs or provide collector or arterial connections. Pedestrian connections from the end of any stub end street that results in a cul-de-sac will be considered mandatory as future development occurs. The goal would continue to be improved city connectivity for all modes of transportation.

Topography and environmental conditions limit the level of connectivity in several areas of Happy Valley. The area north and south of Sunnyside Road between 152nd Avenue and Rock Creek and the Scouter Mountain area between 145th Avenue and 162nd Avenue are recognized as being particularly challenging and may require exceptional treatment to avoid overloading of narrow local streets.

The local street networks that are created adjacent to arterial street corridors, such as 172nd Avenue, are particularly important. They reduce reliance on the arterials for local trips and provide a street system that parallels those arterials. The City and community have carefully planned East Happy Valley and the 172nd Avenue-190th Drive corridors. These plans integrate land use and transportation planning. Their success will depend, in part, on the development of a connected local street network in areas adjacent to the corridor. The ideal situation is that there is a continuous and connected local street system that parallels 172nd Avenue and 190th Drive for the length of the corridor.

Functional Classification

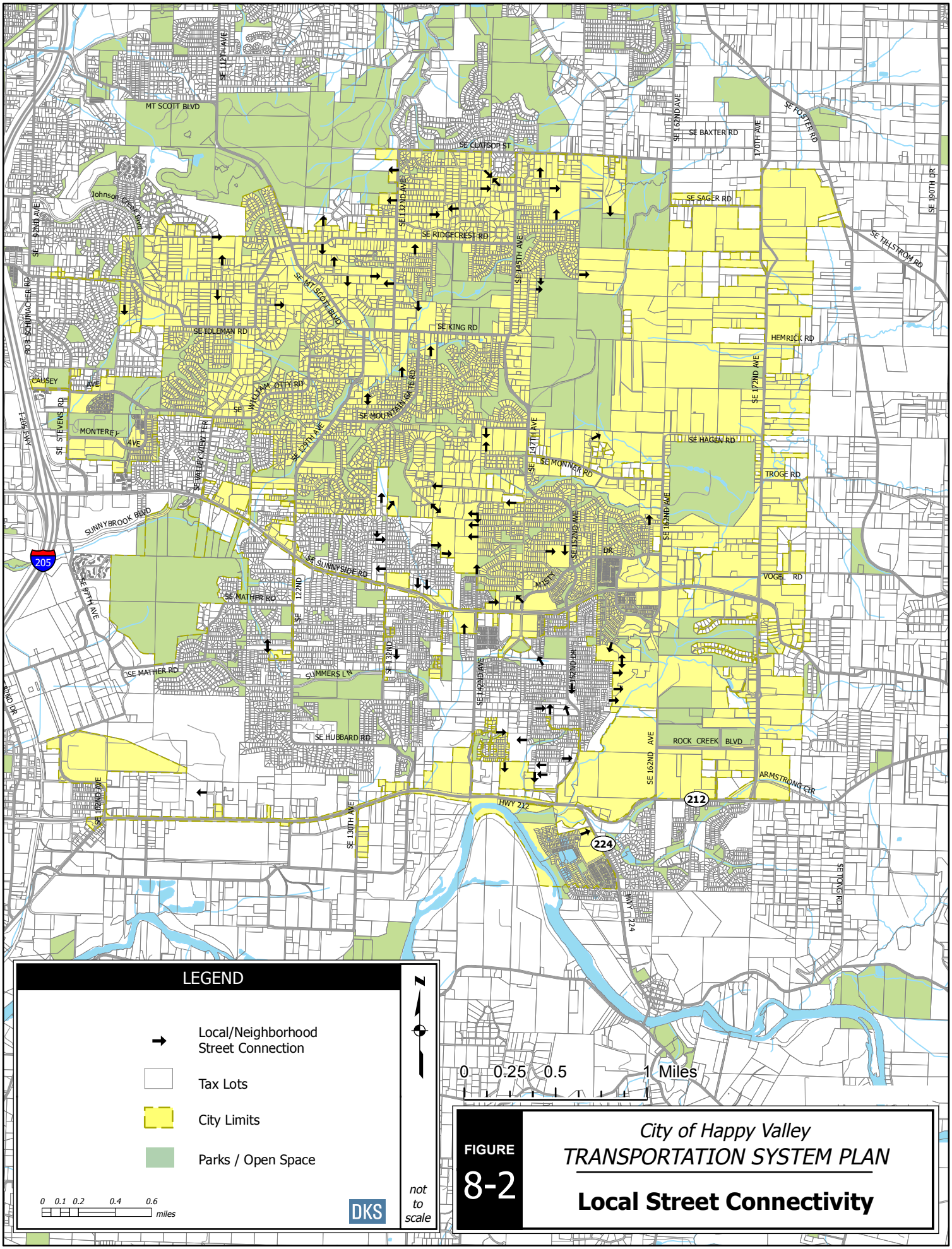
The proposed functional classification of roadways was developed following detailed review of the existing Happy Valley TSP, Clackamas County TSP, the Rock Creek Comprehensive Plan, the East Happy Valley Comprehensive Plan, the 172nd Avenue-190th Drive Corridor Management Plan, and the Happy Valley Town Center Plan. A proposed roadway system has been developed within the planned growth areas of the TSP study area. The proposed functional classification of these roadways is shown in Figure 8-3.

The following revisions are included in the TSP update:

- Armstrong Circle changed from a collector to a local street
- Clatsop Street West Extension removed as a future collector
- Johnson Creek Road Extension removed as a future collector
- Frye Street east of 152nd Avenue added as a neighborhood street
- Rock Creek Boulevard east of 172nd Avenue changed from arterial to collector
- Vradenburg Road removed as future collector
- East-west collector between 162nd and 172nd Avenue near Huckleberry Street changed from collector to neighborhood street

The criteria used to assess functional classification have two components: the extent of connectivity and the frequency of the facility type. Maps can be used to determine regional, city/district and neighborhood connections. The frequency or need for facilities of certain classifications is not routine or easy to package into a single criterion. While planning textbooks call for arterial spacing of a mile, collector spacing of a quarter to a half-mile, and neighborhood connections at an eighth to a sixteenth of a mile, this does not form the only basis for defining functional classification.

Changes in land use, environmental issues or barriers, topographic constraints, and demand for facilities can change the frequency for routes of certain functional classifications. While spacing standards can be a guide, they must consider other features and potential long term uses in the area (some areas would not experience significant changes in demand, where others will). It is acceptable for the city to re-classify street functional designations to have different naming conventions than the RTP street functional classifications, however, the general intent and purpose of the facility, whatever the name, will be consistent with regional, state and federal guidelines.


LEGEND
Local/Neighborhood Street Connection
Tax Lots
City Limits
Parks / Open Space
0 0.1 0.2 0.4 0.6 miles
DKS
not to scale
N
0 0.25 0.5 1 Miles
FIGURE 8-2
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Local Street Connectivity
MT SCOTT BLVD
SE 112TH AVE
SE 92ND AVE
Johnson Creek Blvd
BOB SCHUMACHER RD
CAUSEY AVE
SE STEVENS RD
MONTEREY AVE
I-205
SE IDLEMAN RD
SE MT SCOTT BLVD
SE 131ND AVE
SE RIDGECREST RD
SE CLATSOP ST
SE 145TH AVE
SE 162ND AVE
SE BAXTER RD
170TH AVE
SE FOSTER RD
SE SAGER RD
SE 190TH DR
SE TILLSTROM RD
SE KING RD
HEMRICK RD
SE 172ND AVE
SE WILLIAM OTTY RD
SE MOUNTAIN GATE RD
SE 125TH AVE
SE 141TH AVE
SE MONNER RD
SE HAGEN RD
TROGE RD
SUNNYBROOK BLVD
SE SUNNYSIDE RD
SE 122ND
SE 152ND AVE
SE 162ND AVE
DR
VOGEL RD
SE MATHER RD
SE 87TH AVE
SE 132ND
SE 142ND AVE
SE 152ND DR
SUMMERS LN
SE HUBBARD RD
ROCK CREEK BLVD
ARMSTRONG CIR
SE 102ND AVE
SE 130TH AVE
HWY 212
212
224
SE TONG RD

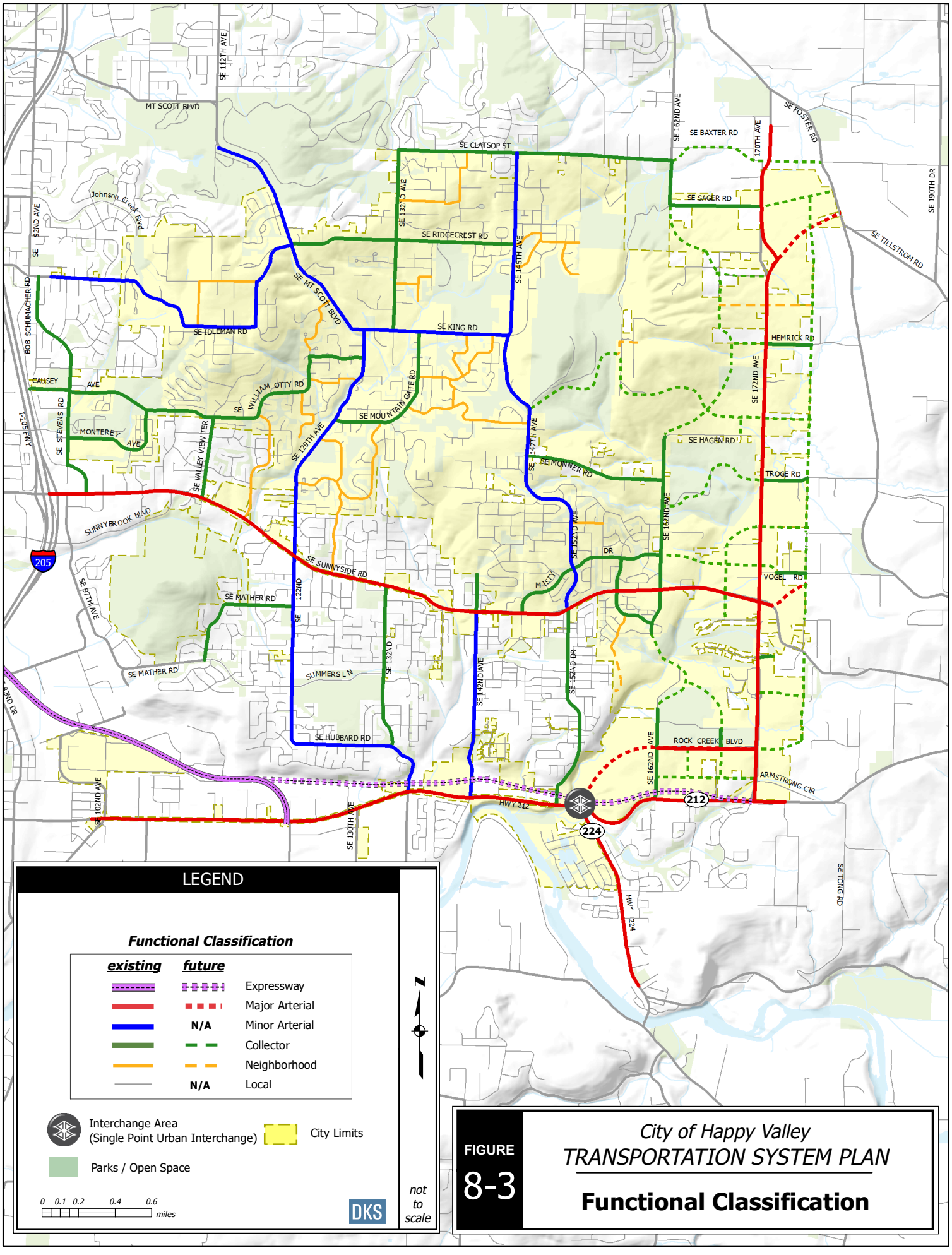


FIGURE 8-3

City of Happy Valley
TRANSPORTATION SYSTEM PLAN

Functional Classification

Transportation Management Areas

Sunrise Project Interchange Management Areas

The Sunrise Project is being undertaken by the Oregon Department of Transportation (ODOT) and Clackamas County to address congestion and safety problems in the existing OR 212/224 corridor and to serve the growing demand for regional travel and access to the state highway system through the year 2040. The Sunrise Project is a multi-lane highway with three through lanes and auxiliary lanes associated with the interchanges planned to be built in phases to provide safe and efficient high speed and high volume traffic movement. The primary function is to provide for interurban travel including for freight mobility. Speeds are moderate to high. Public road connections are highly controlled and parking is prohibited. Pedestrian facilities are separated from the roadway and bikways are part of the roadway. Private access is discouraged and the FHWA's Sunrise Project, I-205 to Rock Creek Junction Record of Decision reflects the planned, public access. . The first phase of the project was completed in 2016, providing a four-lane expressway between the I-205/OR 224 interchange and a traffic signal at the OR 212/122nd Avenue intersection.

Oregon Administrative Rule (OAR) 734-051-0155(6) requires that an IAMP be prepared for any new or significantly reconstructed interchange. The purpose of an IAMP is to protect the function of the interchange over time, to ensure safe and efficient operations between connecting roadways, and to minimize the need for future major interchange improvements. The purpose of an IAMP is also to protect the state's investment in the facility. Because new interchanges are very costly, state and local governments and citizens have an interest in ensuring that they function as intended and for as long a period as possible, while still supporting planned land use.

Three Interchange Area Management Plans (IAMPs) have been prepared for new highway interchanges on the Sunrise Expressway; the Rock Creek IAMP, Midpoint IAMP and Sunrise West IAMP. The IAMPs were prepared in conjunction with a Final Environmental Impact Statement (SDEIS) for the Sunrise Project[7]. The Sunrise Project Interchange Management Areas are shown in Figure 8-4.

Midpoint Interchange Management Area

The Midpoint interchange will be located in the vicinity of 122nd Avenue and mostly located north of Highway 212. The purpose of the interchange is to provide much needed access to/from the Clackamas Industrial Area, thereby helping maintain the economic viability of this major industrial/distribution center. Land in this management area is contained within two jurisdictions: Clackamas County and the City of Happy Valley. The boundary was defined by Clackamas County in conjunction with ODOT and has been deemed sufficient and approved by the Sunrise Policy Review Committee. The Midpoint IAMP is shown in Figure 8-5.

Most of the Midpoint IAMP study area was developed with a variety of industrial and commercial uses including warehouse and distribution; construction-related businesses; automotive-related sales, repair and storage; and business parks for commercial, light industrial and manufacturing uses. Many of the industrial uses have frontage on and direct access to Highway 212/224. South

[7] Sunrise Project, I-205 to Rock Creek Junction, Final Environmental Impact Statement, December 2010.

of Highway 212/224, the UPRR runs east/west through the study area, providing direct rail access for many businesses.

The comprehensive plan designations and the zoning designations in the Sunrise Midpoint IAMP study area are completely consistent, which means there is little opportunity for re-zoning under the current Comprehensive Plan. Land designated for employment uses dominate, with more than 96 percent of the land area designated either industrial or commercial. Residential designations take up just under four percent of the study area.

Generally, the existing land uses correspond to the adopted plan and zoning designations. Inconsistencies include preexisting nonconforming single family residential uses and some commercial uses in the Light Industrial zone.

Employment uses dominate in the Midpoint IAMP, with nearly 82 percent land area in industrial, office, commercial and warehouse uses. Residential use takes up approximately two percent of the land use area with single family and manufactured home park development. The remaining developed land area is occupied by emergency services or military uses and rights-of-way.

Rock Creek Interchange Management Area

The Rock Creek interchange will be located at the eastern end of the Clackamas Industrial Area and connect the eastern terminus of the Sunrise Expressway to OR 224 and OR 212. The primary function of this interchange will be to provide access to the emerging Rock Creek Employment Center (RCEC) area. Land in this management area is contained within two jurisdictions: Clackamas County and the city of Happy Valley. The boundary was defined by Clackamas County in conjunction with ODOT and has been deemed sufficient and approved by the Sunrise Policy Review Committee. This Interchange Management Areas is focused on the new Sunrise Rock Creek interchange that is approximately 400 feet north of the existing Rock Creek Junction. The Rock Creek IAMP is shown in Figure 8-6.

Much of the area surrounding the Rock Creek interchange is undeveloped urban. Highway approaches are mostly driveways and at-grade intersections. To the east are rural Clackamas County and eventually the OR 212 interchange with US 26. To the west are urban Clackamas County and the interchange of OR 212/224 and I-205. The primary land uses and zoning in the vicinity of the proposed interchange are Mixed Employment (to accommodate the planned Providence hospital center), Regionally Significant Industrial lands (RSIA), and residential lands. The Comprehensive Plans for the City of Happy Valley and Clackamas County show that similar future land uses are projected for this area, with the lands to the north being mixed employment and industrial, and the lands to the south being residential.

The Rock Creek interchange will improve connections between the Sunrise Expressway and OR 212 and OR 224 to the east and south, and the local street network of Happy Valley. The interchange will be used to support the development that is authorized in the Clackamas County and Happy Valley Comprehensive Plans rather than to encourage rezoning of property for uses that generate greater volumes of traffic than planned by the Comprehensive Plans for the Interchange Management Areas.

Sunrise West Interchange Management Area

The Sunrise West interchange will serve as the western connection to the Sunrise Expressway. The primary function of this interchange will be to provide direct connections to I-205 and OR 224 and secondary connections to 82nd Avenue, 82nd Drive and OR 212. Land in this management area is contained within Clackamas County jurisdiction. Much of the area surrounding the interchange is developed urban Clackamas County and the Lawnfield Business Area.

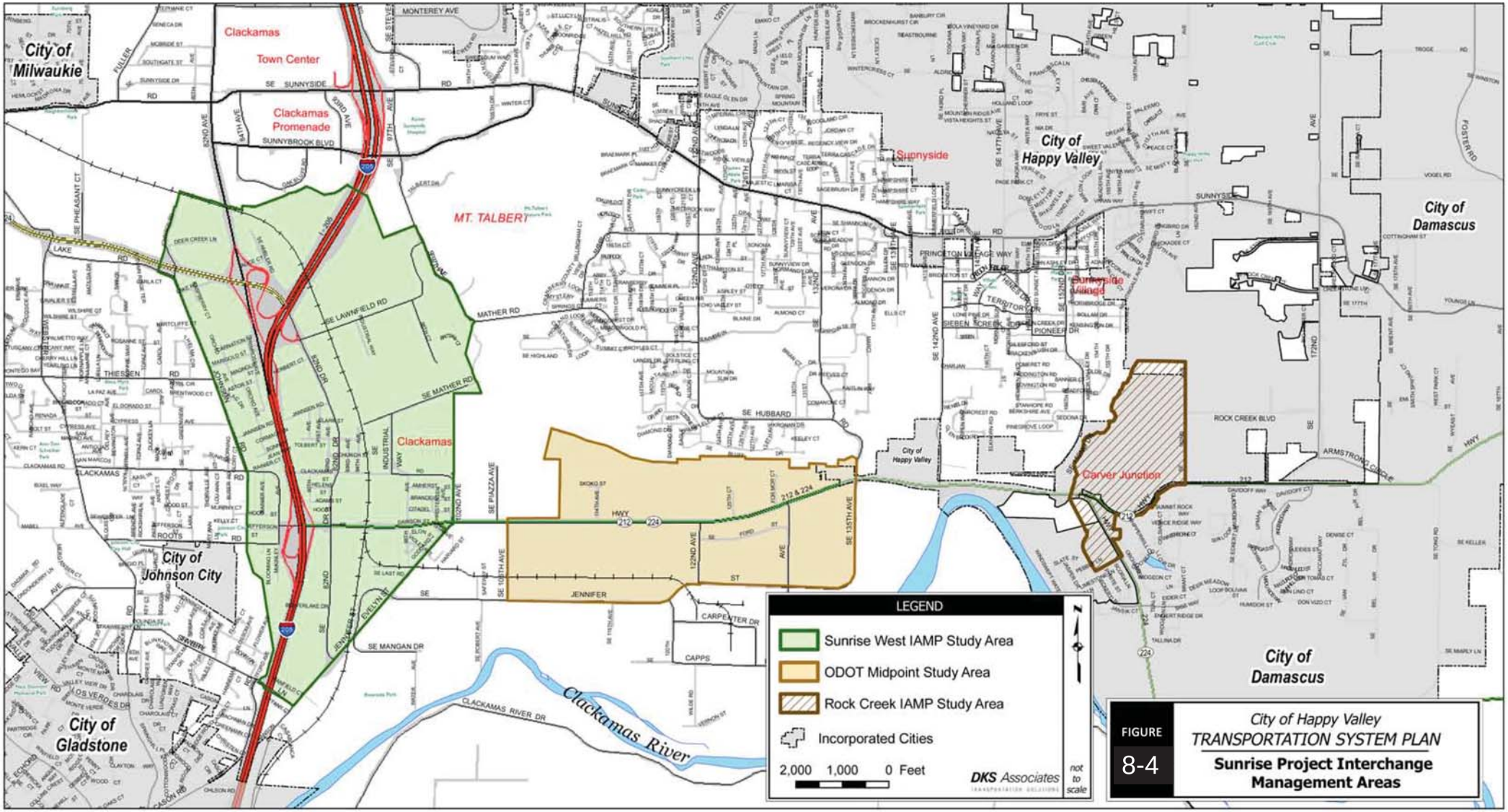
Sunrise IAMP Implementation

The IAMPs for the Sunrise management areas provide the policies and standards to be applied to the roadway network. The IAMPs include the following elements.

- Interchange Area Management policies
- ODOT mobility standards
- ODOT minimum access spacing standards
- Future traffic operation projections
- Access Management Plan with existing and future access points

The City of Happy Valley will coordinate with Clackamas County and ODOT to support the implementation of the Sunrise Project Interchange Management Areas. This effort will include the following actions for Rock Creek, Midpoint and Sunrise West interchange management areas.

- Require that any comprehensive plan map/zoning map amendments or development code amendments that provide changes to land uses allowed in the existing zoning designations within the Interchange Management Areas shall be reviewed for transportation impacts in a manner that is consistent with OAR 660-012-0060. If the proposed new land uses are shown to exceed mobility standards at the interchange, the change either shall not be allowed or the developer shall be held responsible for required improvements to bring the interchange operation in line with urban mobility standards.
- Support the implementation of state access management standards (OAR Chapter 734 Division 51 as amended and the Oregon Highway Plan) on state highway facilities within the Interchange Management Areas.
- Proposed development within the interchange management areas shall comply with the acknowledged comprehensive plan and land use regulations that implement the identified access management plan to maintain safe operations of the Sunrise interchanges. This may include property access consolidation, restriction or closure.
- Proposed future actions that would amend the local jurisdictional boundaries in the vicinity of the Sunrise interchanges will be monitored.
- Improve highway operations and safety by supporting construction of public roads that provide reasonable alternative access within the Interchange Management Areas. When reasonable access is provided, the City supports eliminating direct highway access to state highway facilities.
- Provide notice to ODOT for any land use actions proposed within the Interchange Management Areas.
- Prohibit encroachments and land divisions in order to preserve the Sunrise Expressway corridor and interchanges consistent with the Sunrise Project I-205 to Rock Creek Junction Record of Decision.


City of Milwaukie
Clackamas Town Center
Clackamas Promenade
SUNNYBROOK BLVD
SE SUNNYSIDE
MONTEREY AVE
MT. TALBERT
Sunnyside
City of Happy Valley
City of Damascus
Sunnyside Village
Carver Junction
Clackamas
SE LAWNFIELD RD
SE MATHER RD
MATHER RD
SE HUBBARD
SE PIAZZA AVE
HWY 212 & 224
JENNIFER
CARPENTER DR
SE MANGAN DR
CAPPS
CLACKAMAS RIVER DR
Clackamas River
City of Johnson City
City of Gladstone
ROCK CREEK BLVD
ARMSTRONG CIRCLE
LEGEND
Sunrise West IAMP Study Area
ODOT Midpoint Study Area
Rock Creek IAMP Study Area
Incorporated Cities
2,000 1,000 0 Feet
DKS Associates
not to scale
FIGURE 8-4
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Sunrise Project Interchange Management Areas

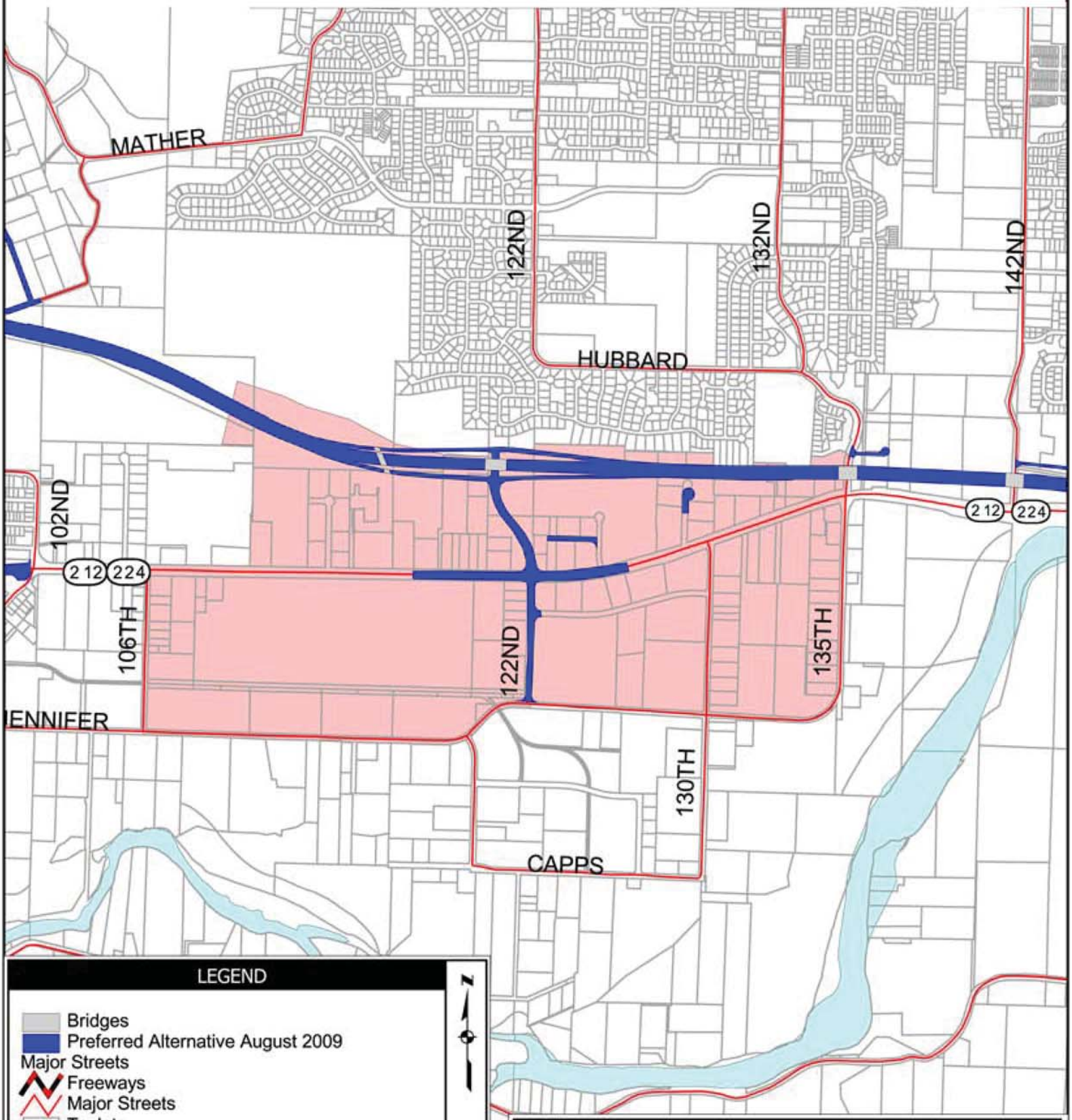
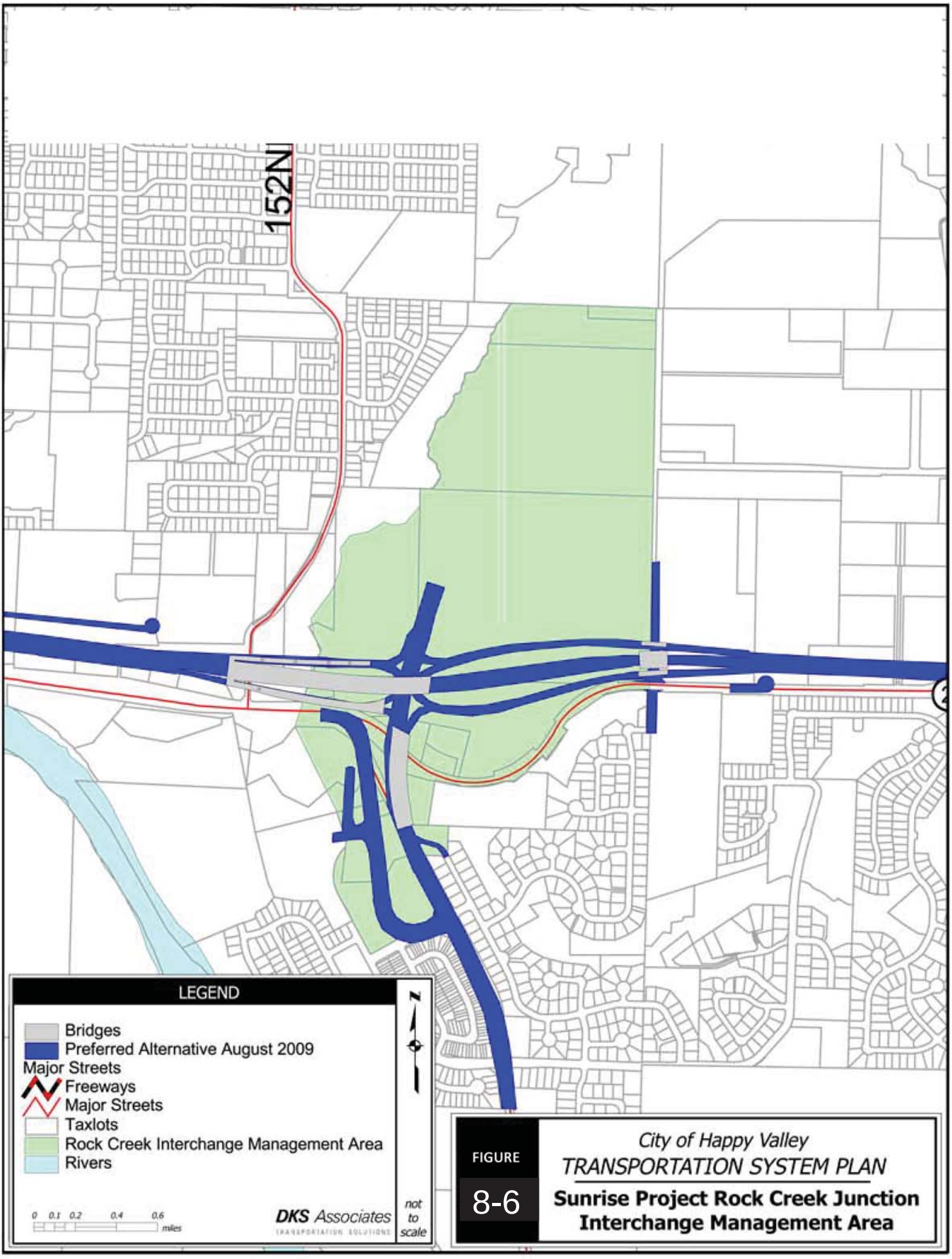


FIGURE 8-5

City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Sunrise Midpoint Interchange Management Area


152N
LEGEND
Bridges
Preferred Alternative August 2009
Major Streets
Freeways
Major Streets
Taxlots
Rock Creek Interchange Management Area
Rivers
0 0.1 0.2 0.4 0.6
miles
DKS Associates
TRANSPORTATION SOLUTIONS
not to scale
FIGURE
8-6
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Sunrise Project Rock Creek Junction
Interchange Management Area

172nd Avenue-190th Drive Corridor Management Plan

Clackamas County, in coordination with Happy Valley and Gresham, initiated the 172nd Avenue-190th Drive Corridor Management Plan (CMP) to identify the future look and alignment of 172nd Avenue north of Sunnyside Road and to determine how it will connect to 190th Drive in the Gresham area. The project's purpose is to accommodate the future traffic demand that will come with the buildout of developable land in Happy Valley and Gresham and, provide a north-south connection to accommodate local and regional traffic growth. The CMP carefully evaluated multiple options for the 172nd Avenue-190th Drive connection in the context of the area-wide transportation network, existing and planned land uses, environmental conditions and extensive community input. The CMP's recommendations, as shown in Figure 8-7 A to F are consistent with Happy Valley's land use and transportation planning conducted to date for East Happy Valley. The CMP elevates past work to a more specific level of planning and design.

Happy Valley supports the CMP and will implement it. Accordingly, the CMP is adopted by reference as a part of this Transportation System Plan. Where a conflict arises between the CMP and other requirements of this TSP, the CMP supersedes.

The CMP includes intersection lane configurations and traffic control treatments that are adopted as part of this TSP. They are listed in Table 8-4.

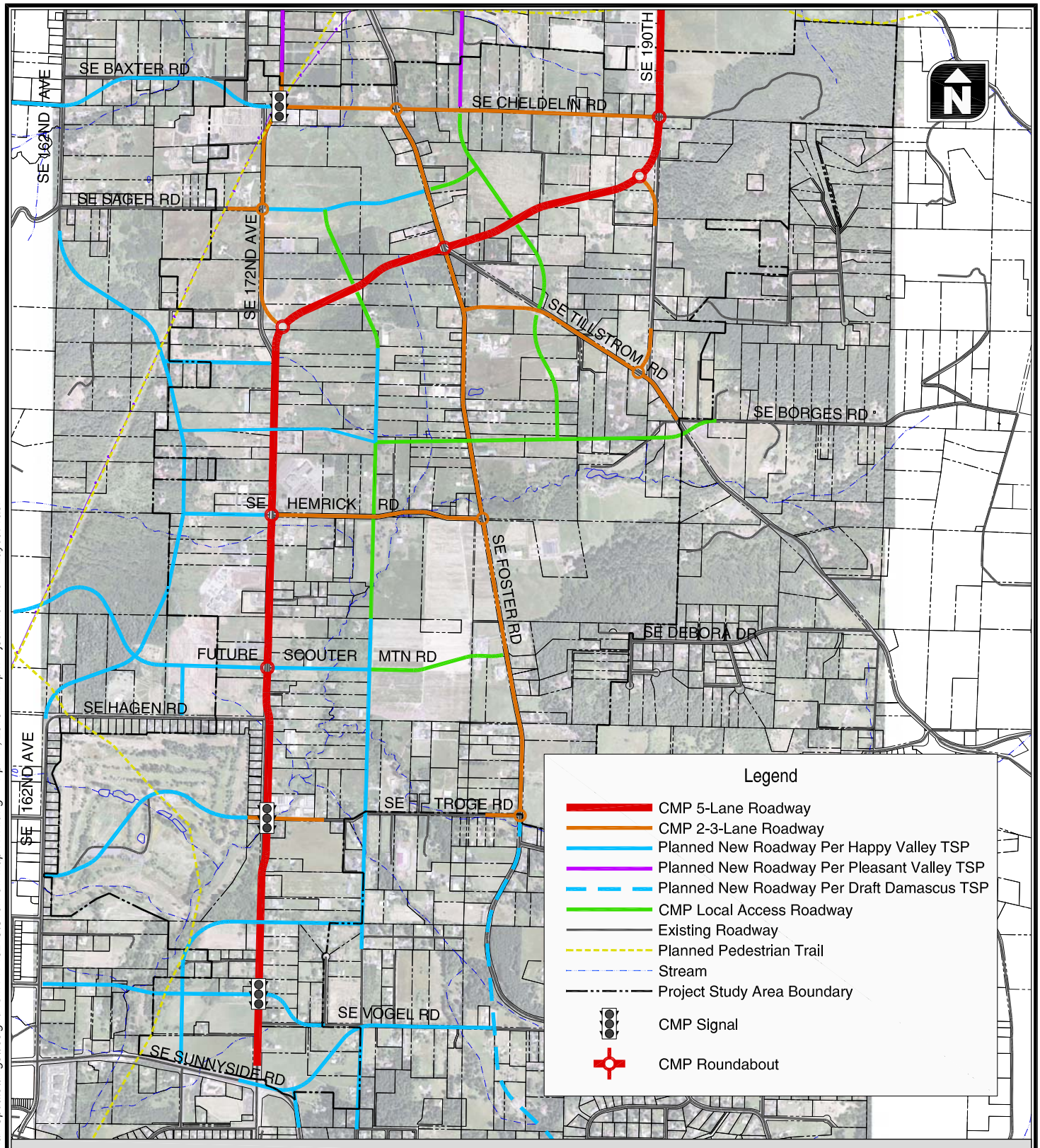
Table 8-4: Intersection Treatments 172nd Avenue / 190th Drive Corridor

Intersection	Proposed Intersection Treatment
172nd Ave / Vogel Rd	Signal
172nd Ave / Troge Rd	Signal
172nd Ave / Future Scouters Mountain Rd	2-Lane Roundabout
172nd Ave / Hemrick Rd	2-Lane Roundabout
172nd Ave / 172nd – 190th Connector	2-Lane Roundabout
172nd – 190th Connector / Foster Rd	2-Lane Roundabout
172nd Ave / Sager Rd	1-Lane Roundabout

Happy Valley Town Center Plan

The City of Happy Valley initiated the Happy Valley Town Center Plan (HVTCP) to re-locate the City of Happy Valley's Metro designated "Town Center" along Sunnyside Road. The new location, between approximately 157th and 172nd Avenues, is an area partially served by transit and designated for medium to high density housing, commercial, and mixed uses. The HVTCP evaluated future year traffic operating conditions with the proposed land use changes in place, and provides recommendations for improvements that are included in this TSP. Figure 8-8 shows the urban design diagram for the Happy Valley Town Center, providing the general locations of transportation elements such as local streets and trails.

The HVTCP has been implemented through amendments to the City's Comprehensive Plan Policies, Development Code, Comprehensive Plan Map/Zoning Map, and this Transportation System Plan.



Corridor Management Plan Overview Map

172nd / 190th Corridor Plan

CLACKAMAS COUNTY

Figure 8-7

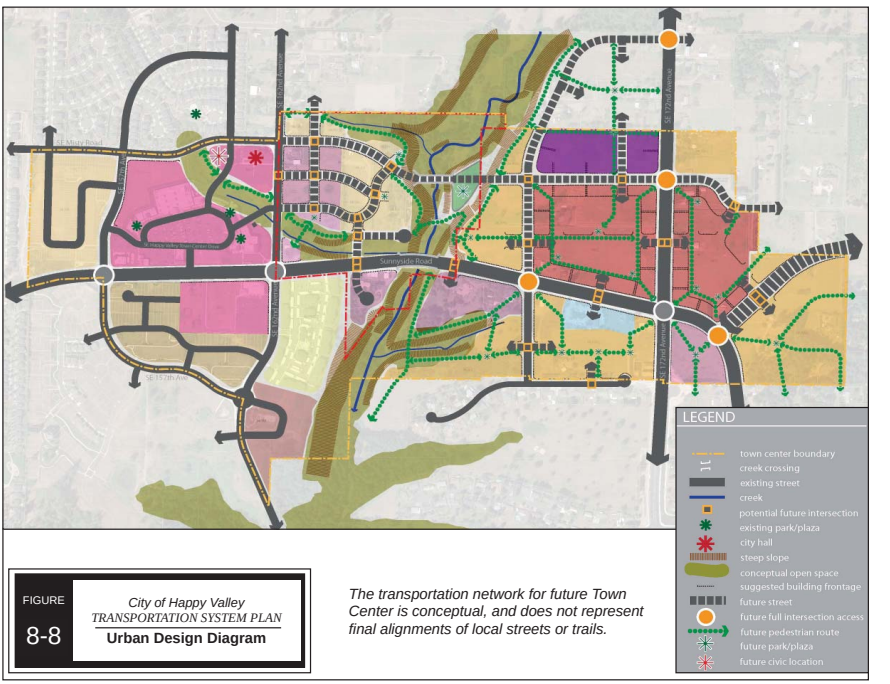


FIGURE 8-8

City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Urban Design Diagram

The transportation network for future Town Center is conceptual, and does not represent final alignments of local streets or trails.

Mobility Needs

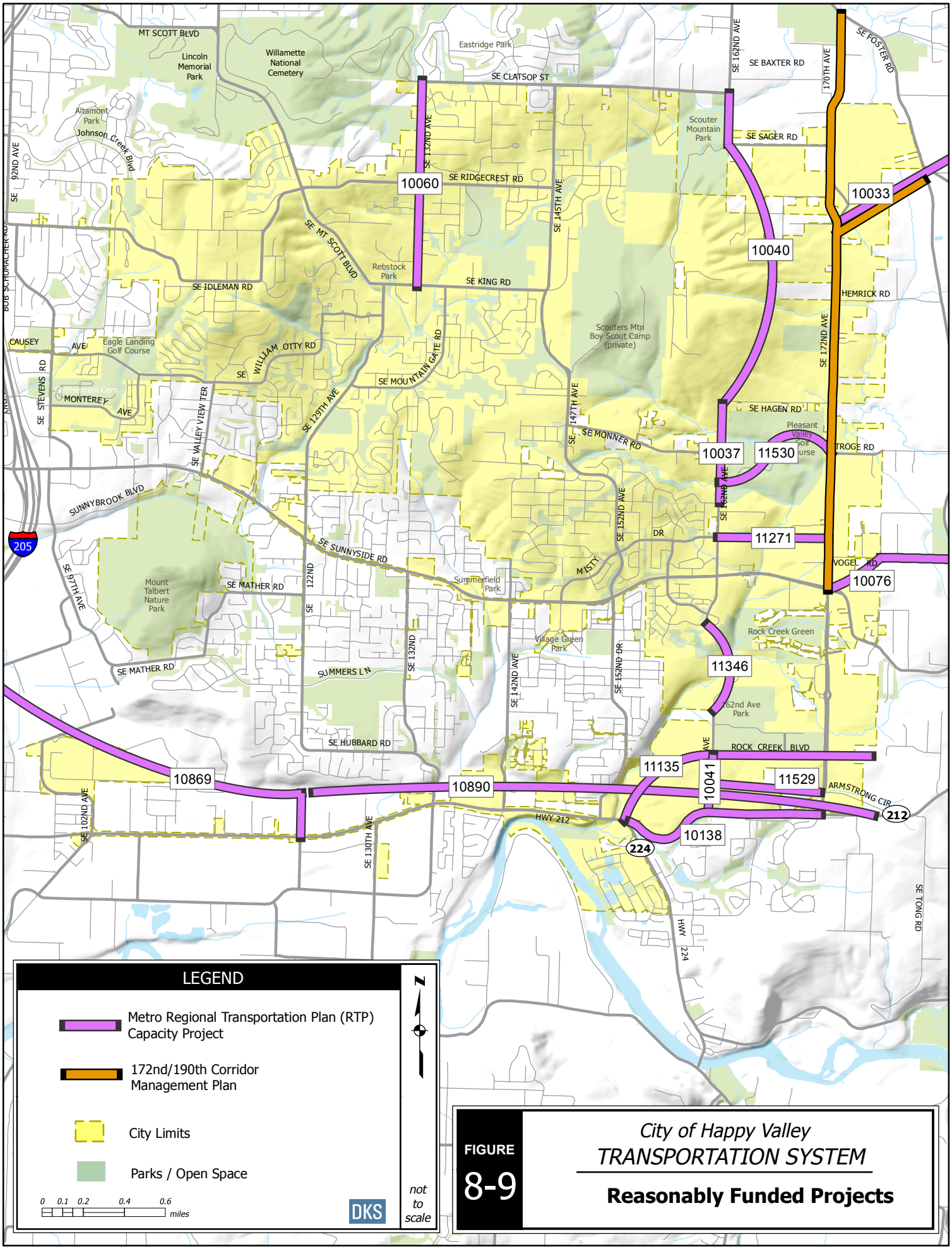
The Metro travel demand models were used to assess 2040 operating conditions and identify locations that may require additional operational or capacity improvements. Metro's current regional 2040 model was refined to include capacity projects from the RTP financially constrained list and the County's 172nd Avenue/190th Drive corridor project.[8] Other model refinements included network updates to capture local circulation patterns and performance. Table 8-5 summarizes the modeled future improvement projects from investments already committed or deemed reasonably likely to be committed by 2040. The modeled RTP and County project locations are shown in Figure 8-9.

Table 8-5: Future Transportation System Improvement Projects with Reasonable Funding

Project	Description	Project Number	Nominating Agency
172nd Avenue – 190th Drive Connector	Construct five-lane connector from 172nd Avenue to 190th Drive	RTP 10033	Damascus Happy Valley
162nd Avenue	Widen to three-lanes from Hagen Road to Palermo Avenue	RTP 10037	Happy Valley
162nd Avenue Extension North	Construct three-lane extension from Hagen Road to Clatsop Street	RTP 10040	Happy Valley
162nd Avenue Extension South Phase 1	Construct three-lane extension from Rock Creek Boulevard to OR 212	RTP 10041	Happy Valley
132nd Avenue	Widen to three-lanes from King Road to Clatsop Road	RTP 10060	Happy Valley
Sunnyside East Extension	Construct five-lane roadway from 172nd Avenue to Foster Road	RTP 10076	Damascus Happy Valley
Highway 212 Widening	Widen to five-lanes between Rock Creek Junction and 172nd Avenue	RTP 10138	Damascus Happy Valley
Sunrise Project	Construct 6-lane expressway I-205 to 122nd Ave	RTP 10869	ODOT
Sunrise Project Phase 2	Construct 6-lane expressway I-205 to 172nd Ave	RTP 10890	ODOT
Rock Creek Boulevard	Construct five-lane extension from Sunrise Corridor to 177th Avenue	RTP 11135	Happy Valley
Misty Drive	Construct three-lane extension from 162nd Avenue to 177th Avenue	RTP 11271	Happy Valley
162nd Avenue Extension South Phase 2	Construct three-lane extension from 157th Avenue to Rock Creek Boulevard	RTP 11346	Happy Valley
Armstrong Extension	Widen to three-lanes from 162nd Avenue to 172nd Avenue	RTP 11529	Happy Valley
Troge Extension West	Construct three-lane extension from 162nd Avenue to 172nd Avenue	RTP 11530	Happy Valley
172nd Avenue Widening	Widen to five-lanes from Sunnyside Road to 190th Connector	SE 172nd Avenue/ 190th Drive Plan	Clackamas County

Source: Metro Regional Transportation Plan, Appendix 1.1 Final Project List, September 11, 2014
SE 172nd Avenue/190th Drive Corridor Management Plan, Clackamas County, February 2012

[8] SE 172nd Avenue/190th Drive Corridor Management Plan, Clackamas County, February 2012


MT SCOTT BLVD
Lincoln Memorial Park
Willamette National Cemetery
Eastridge Park
SE CLATSOP ST
SE 162ND AVE
SE BAXTER RD
170TH AVE
SE FOSTER RD
Altamont Park
Johnson Creek Blvd
92ND AVE
SE
SE 132ND AVE
10060
SE RIDGECREST RD
SE 145TH AVE
Scouter Mountain Park
SE SAGER RD
10033
10040
SE MT SCOTT BLVD
Rebstock Park
SE KING RD
SE IDLEMAN RD
HEMRICK RD
SE 172ND AVE
Scouters Mtn Boy Scout Camp (private)
CAUSEY AVE
Eagle Landing Golf Course
SE WILLIAM OTTY RD
SE MOUNTAIN GATE RD
SE STEVENS RD
MONTEREY AVE
SE VALLEY VIEW TER
SE 129TH AVE
SE 147TH AVE
SE HAGEN RD
SE MONNER RD
Pleasant Valley Golf Course
TROGE RD
10037
11530
SE 142ND AVE
SUNNYBROOK BLVD
SE 152ND AVE
DR
11271
205
SE SUNNYSIDE RD
MISTY
VOGEL RD
10076
SE 97TH AVE
Mount Talbert Nature Park
SE MATHER RD
122ND
SE
Summerfield Park
Rock Creek Green
SE 132ND
Village Green Park
SE 152ND DR
11346
SUMMERS LN
SE 142ND AVE
162nd Ave Park
SE HUBBARD RD
ROCK CREEK BLVD
AVE
11135
10041
11529
ARMSTRONG CIR
10869
10890
SE 102ND AVE
SE 130TH AVE
HWY 212
212
224
10138
HWY 224
SE TONG RD
LEGEND
Metro Regional Transportation Plan (RTP) Capacity Project
172nd/190th Corridor Management Plan
City Limits
Parks / Open Space
0 0.1 0.2 0.4 0.6 miles
DKS
N
not to scale
FIGURE 8-9
City of Happy Valley
TRANSPORTATION SYSTEM
Reasonably Funded Projects

Even with the RTP transportation system improvements, the additional growth on the transportation system through year 2040 would increase congestion at many locations. The following road segments were identified as year 2040 locations that are projected to be congested during evening peak hour conditions and may require additional capacity improvements.

- OR 212 both directions, east of 172nd Avenue
- OR 224 southbound, south of Sunrise Expressway

Intersection Analysis

A traffic operations model was used to determine intersection needs within the TSP study area for future 2040 conditions. Phasing of implementation will be necessary since not all the improvements can be done at once. This will require prioritization of projects and periodic updating to reflect current needs. The improvements outlined in the following section are a guide to defining the types of right-of-way and street needs that will be required as development occurs.

Year 2040 traffic volume forecasts were analyzed to identify locations where evening peak hour performance will drop below minimum desirable levels. Traffic volumes were developed as described previously (Chapter 4). The value in reviewing the motor vehicle system performance is that it highlights where the planned system fails to meet performance standards. These locations will be reviewed to consider street improvements alternatives that could better serve planned growth.

2040 Financially Constrained

The 2040 financially constrained scenario includes transportation improvements that are reasonably funded and likely to be constructed by the year 2040. This scenario comprises projects identified in the RTP financially constrained system and the County's 172nd Avenue/190th Drive Corridor Plan, shown in Table 8-5 and on Figure 8-9.

The construction of the 172nd Avenue widening project south of Sunnyside Road has been completed. The most significant project included in the financially constrained system within the study area is the Sunrise Project Phase 2.

Table 8-6summarizes the study intersection performance for the 2040 financially constrained scenario. Based on the analysis, several study intersections would not meet demands with the capacity improvements identified in the RTP financially constrained system. Additional capacity improvements are recommended to accommodate the forecasted growth within the TSP study area.

Table 8-6: Future 2040 Financially Constrained Intersection Level of Service (PM Peak Hour)

Intersection	Level of Service	Delay	Volume/ Capacity
Unsignalized Intersections			
129th Avenue/King Road	E	53.8	-
132nd Avenue/King Road*	D	26.3	-
132nd Avenue/Ridgecrest Road*	C	22.9	-
145th Avenue/King Road*	F	>60.0	-
145th Avenue/Ridgecrest Road*	D	32.3	-
147th Avenue/Monner Road	A/F	>60.0	-
162nd Avenue/OR 212	A/B	10.4	-
169th Avenue/Sunnyside Road	B/C	19.3	-
Stevens Road/Causey Avenue	A/C	17.8	-
Mt Scott Boulevard/Ridgecrest Road*	F	>60.0	-
Signalized Intersections			
122nd Avenue/Sunnyside Road	F	>60.0	1.11
132nd Avenue/Sunnyside Road	C	32.8	0.96
142nd Avenue/Sunnyside Road	C	33.5	0.90
152nd Avenue/Sunnyside Road	E	57.6	1.01
162nd Avenue/Sunnyside Road	C	33.7	0.97
172nd Avenue/Sunnyside Road	D	37.7	0.87
172nd Avenue/Rock Creek Boulevard	F	>60.0	1.13
172nd Avenue/OR 212	F	>60.0	>1.2
Stevens Road/Bob Schumacher Road	B	17.3	0.69

Notes: A/A=major street LOS/minor street LOS
Signalized and all-way stop delay = average vehicle delay in seconds for entire intersection
Unsignalized delay = highest minor street approach delay
*All-way stop control intersection

Roadway Widening Needs

Several roadway widening projects included in the prior Happy Valley TSP would not be required to provide additional capacity based on the future 2040 model V/C ratios shown in Figure 5. The following projects would be dropped from the TSP motor vehicle project list:

- Clatsop Street Widening West – Future forecasted demand decreases west of 145th Avenue suggesting the existing two-lane cross-section would be adequate
- 132nd Avenue Widening – Future forecasted demand could be accommodated with the existing two-lane cross-section
- 145th Avenue Widening – Future forecasted demand could be accommodated with the existing two-lane cross-section
- Idleman Road Widening – Future forecasted demand could be accommodated with the existing two-lane cross-section
- Valley View Terrace Widening – Future forecasted demand could be accommodated with the existing two-lane cross-section
- Armstrong Circle – Reclassified as a local street between 162nd Avenue and 172nd Avenue

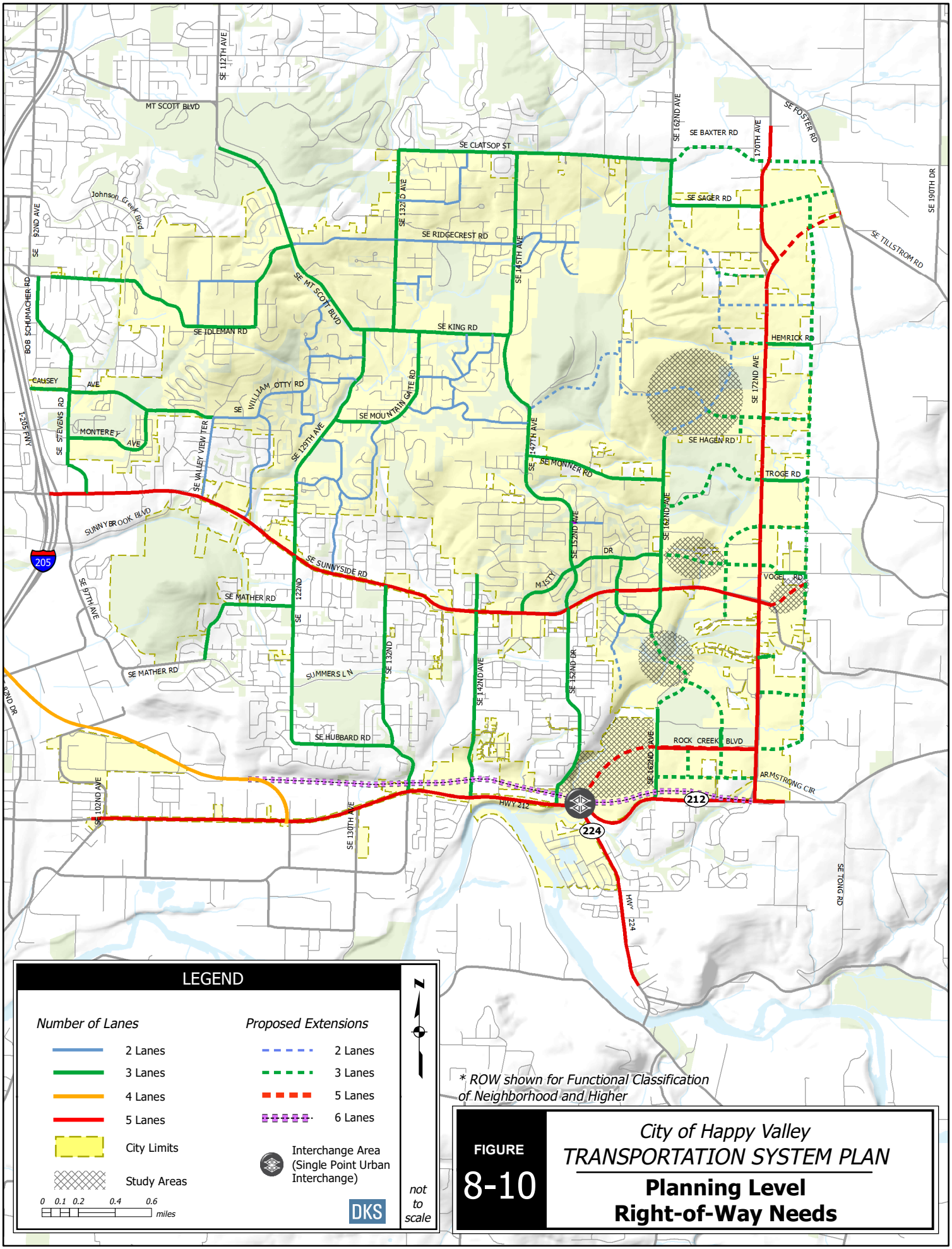
Due to environmental constraints and constructability issues, two connectivity projects from the prior Happy Valley TSP were dropped from consideration for the motor vehicle project list. The Johnson Creek Extension and Clatsop Street Extension West were not included in the regional 2040 travel demand model local assessment to ensure the initial screening of projects did not incorporate these capacity projects. No nearby roadway capacity deficiencies were found in the model with the removal of these two roadway extension projects.

Street Right-of-Way Needs

Figure 8-10 summarizes the anticipated right-of-way needs for existing and proposed roadways within the TSP planning horizon. Further detail for future right-of-way needs for the Rock Creek interchange are provided in the Sunrise Expressway FEIS.[9] Planning level right-of-way needs can be determined utilizing street cross-sections outlined in this chapter. Special consideration was given to the proposed roadway network with environmental constraints such as creeks and steep grades. Several proposed roadways within the Scouter Mountain Area have been identified as two-lane roadways to reduce potential environmental impacts.

Wherever arterial or collectors cross each other, planning for additional right-of-way to accommodate turn lanes will be considered within 500 feet of the intersection. Specific right-of-way needs will need to be monitored continuously through the development review process to reflect current needs and conditions. This will be necessary since more specific detail may become evident in development review which requires improvements other than those outlined in this 20 year general planning assessment of street needs.

[9] Sunrise Project, I-205 to Rock Creek Junction, Final Environmental Impact Statement, Figure PA-5, December 2010.


LEGEND
Number of Lanes
2 Lanes
3 Lanes
4 Lanes
5 Lanes
City Limits
Study Areas
0 0.1 0.2 0.4 0.6 miles
Proposed Extensions
2 Lanes
3 Lanes
5 Lanes
6 Lanes
Interchange Area (Single Point Urban Interchange)
DKS
N
not to scale
* ROW shown for Functional Classification of Neighborhood and Higher
FIGURE 8-10
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Planning Level Right-of-Way Needs
MT SCOTT BLVD
SE 112TH AVE
SE 92ND AVE
Johnson Creek Blvd
BOB SCHUMACHER RD
CAUSEY AVE
MONTEREY AVE
SE STEVENS RD
I-205
SE IDLEMAN RD
SE MT SCOTT BLVD
SE 132ND AVE
SE RIDGECREST RD
SE CLATSOP ST
SE KING RD
SE WILLIAM OTTY RD
SE MOUNTAIN GATE RD
SE VALLEY VIEW TER
SE 129TH AVE
SUNNYBROOK BLVD
SE 145TH AVE
SE 147TH AVE
SE MONNER RD
SE 162ND AVE
SE BAXTER RD
SE SAGER RD
SE FOSTER RD
170TH AVE
SE 190TH DR
SE TILLSTROM RD
HEMRICK RD
SE 172ND AVE
SE HAGEN RD
TROGE RD
SE 152ND AVE
DR
VOGEL RD
SE SUNNYSIDE RD
SE 122ND
SE MATHER RD
SE 87TH AVE
SE 132ND
SUMMERS LN
SE 142ND AVE
SE 152ND DR
SE HUBBARD RD
SE 162ND AVE
ROCK CREEK BLVD
ARMSTRONG CIR
212
224
HWY 212
SE 102ND AVE
SE 130TH AVE
HWY 224
SE TONG RD

Motor Vehicle Master Plan

The Motor Vehicle Master Plan combines both improvement projects identified in current plans (Happy Valley TSP, Clackamas County TSP, Rock Creek Comprehensive Plan, East Happy Valley Comprehensive Plan, Metro RTP, 172nd Avenue-190th Drive CMP, Happy Valley Town Center Plan, etc.) and those determined as the outcome of the Happy Valley TSP update analysis. These improvements are shown in Figure 8-11 and listed in Table 8-7.

Projects from the RTP list include the cost estimate provided by Metro if applicable. The planning level cost estimates for the remaining projects are based on general unit costs for transportation improvements, but do not necessarily reflect the unique project elements that can significantly add to project costs. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with special design details as projects are pursued. The estimated cost to obtain required right-of-way was included in all of the roadway widening projects. It was assumed that the new roadway/extension projects would be constructed on land dedicated by the associated development, therefore, right-of-way costs are not included in their cost estimates.

Table 8-7: Motor Vehicle Master Plan Projects

ID	Project	Improvement	Cost Estimate ($1,000s)
Intersection Improvement			
I1	129th Avenue/Mt. Scott Boulevard/King Road	Install a traffic signal or roundabout, add eastbound right turn lane	$500
I2	Mt. Scott Boulevard/Idleman Road/Ridgecrest Road	Install a traffic signal or roundabout, improve vertical curve, align eastbound and westbound approaches	$500
I3	145th Avenue/King Road*	Install a traffic signal or roundabout	$400
I4	172nd Avenue/Rock Creek Blvd	Add second eastbound left turn lane	$200
I5	172nd Avenue/Scouter Mountain Road**	Install a two-lane roundabout	$500
I6	Sunnyside Road/169th Avenue	Install a traffic signal	$400
I7	162nd Avenue/Rock Creek Boulevard	Install a traffic signal or roundabout	$500
I8	172nd Avenue/OR 212	Add second eastbound left turn lane, second southbound right turn lane, widen to two eastbound and westbound lanes	$1,000
I9	172nd Avenue/Vogel Road**	Install a traffic signal	$400
I10	172nd Avenue/Troge Road**	Install a traffic signal, rebuild creek bridges	$3,500
I11	172nd Avenue/Hemrick Road**	Install a two-lane roundabout	$500
I12	172nd Avenue/172nd-190th Connector**	Install a two-lane roundabout	$500

I13	172nd Avenue/Sager Road**	Install a one-lane roundabout	$500
I14	172nd Avenue/Cheldelin Road**	Install a traffic signal	$400
I15	Foster Road/172nd-190th Connector**	Install a two-lane roundabout	$500
I16	147th Avenue/Scouters Mountain Road	Install a traffic signal or roundabout	$400
I17	129th Avenue/Mountain Gate Road	Install a traffic signal	$400
I18	162nd Avenue/Misty Drive	Install a traffic signal	$400
I19	162nd Avenue Extension North/Scouters Mountain Road	Install a traffic signal or roundabout	$400
Roadway Widening			
W1	Clatsop Street Widening East	Widen to 3-lane facility between 145th Avenue and 162nd Avenue	$4,300
W2	172nd Avenue Widening South*	Widen to 5-lane facility between Sunnyside Road and 172nd-190th Connector Road	$37,480
W3	172nd Avenue Widening North*	Widen to 3-lane facility between 172nd-190th Connector to Cheldelin Road	$5,100
W4	122nd/129th Avenue Widening	Widen to 3-lane facility between Sunnyside Road and King Road and smooth curves	$5,400
W5	King Road Widening	Widen to a continuous 3-lane facility cross-section between 129th Avenue and 145th Avenue	$3,900
W6	132nd Avenue Widening*	Widen to 3-lane facility from Clatsop St to King Rd	$4,900
W7	145th – 147th Avenue Widening	Widen to 3-lane facility from Clatsop Street to Monner Road	$8,300
W8	Mt. Scott Boulevard	Widen to 3-lane facility from 129th Avenue to north City limits	$4,800
W9	162nd Avenue Widening*	Widen to 3-lane facility from Palermo Avenue to Hagen Road	$2,400
W10	Idleman Road Widening	Widen to 3-lane facility from Mt. Scott Boulevard to west city limits, correct roadway alignment.	$7,600
W11	Rock Creek Boulevard East	Widen to 5-lane facility from 162nd Avenue to 177th Avenue	$2,500
W12	OR 212/224*	Widen to 5-lane facility from Rock Creek Junction and 172nd Avenue	$30,000
New Roadway			
R1	Clatsop Street Extension East	Construct a new 3-lane facility between 162nd Avenue and 172nd Avenue. May follow a portion of Baxter Road right-of-way	$2,800

R2	Clatsop Street – Cheldelin Road Extension	Construct a new 3-lane facility between 172nd Avenue and Foster Road	$1,400
R3	162nd Avenue Extension North*	Construct a new 2/3-lane facility between Hagen Road and Clatsop Street	$27,970
R4	162nd Avenue Extension South*	Construct a new 3-lane facility 157th Avenue to Highway 212	$19,600
R5	Sager Road Extension East	Construct a new 3-lane east-west facility from 172nd Avenue to Foster Road	$2,000
R6	Sager Road Extension West	Upgrade to a 2-lane east-west facility from 162nd Avenue to 172nd Avenue	$2,000
R7	172nd-190th Connector*	Construct a new 5-lane facility between 172nd Avenue and Foster Road	$4,600
R8	Wooden Heights Road	Construct a new 2-lane east-west facility from 162nd Avenue to 177th Avenue	$1,100
R9	Hemrick Road Extension	Construct a new 3-lane east-west facility from 162nd Avenue to 177th Avenue	$2,200
R10	Scouters Mountain Road	Construct a new east-west 2/3-lane facility over Scouter's Mountain between 147th and 177th Ave	$9,500
R11	Troge Road Extension*	Construct a new 3-lane facility between 162nd Avenue and 177th Avenue, construct new bridge over Rock Creek at 172nd Avenue	$2,900
R12	169th Avenue Extension	Construct a new 3-lane facility from Sunnyside Road to 177th Avenue	$4,300
R13	Misty Drive Extension*	Construct a new 3-lane east-west facility from 162nd Avenue and 177th Avenue	$10,100
R14	Rock Creek Court Extension	Construct a new 2/3-lane east-west facility from 172nd Avenue and 177th Avenue	$1,200
R15	Big Timber Court Extension	Construct a new 2/3-lane east-west facility from 172nd Avenue and 177th Avenue	$1,200
R16	Rock Creek Boulevard West Extension*	Construct a new 5-lane east-west facility from 162nd Avenue to the Sunrise Corridor Rock Creek interchange	$2,600
R17	Rock Creek Boulevard East*	Construct a new 3-lane east-west facility from 172nd Avenue to 177th Avenue	$2,800
R18	Rock Creek East-West Roadway	Construct a new 3-lane facility south of Rock Creek Boulevard between 162nd and 172nd Ave	$2,800
R19	Parklane Drive North Extension	Construct a new 3-lane north-south facility from 162nd Avenue to Stadium Way	$2,300
R20	Parklane Drive South Extension	Construct a new 3-lane north-south facility from Rock Creek Boulevard to Rock Creek East-West Collector	$900

R21	167th Avenue	Construct a new 3-lane north-south facility from Rock Creek Boulevard to Rock Creek East-West Collector	$900
R22	177th Avenue	Construct a new 3-lane north-south facility from Rock Creek Boulevard to Sager Road Extension East	$16,600
R23	Sunnyside East Extension*	Construct a new alignment to the east to Foster Road	$1,200
R24	Sunrise Project Phase 2*	Construct new 6-lane expressway to Rock Creek Junction	$100,000
		Intersection Improvements	$11,900
		New Roadways	$222,970
		Roadway Widening	$116,180
		Total	$351,050

* Project identified in the 2014 Federal Regional Transportation Plan (RTP) Update Financially Constrained scenario.
**Intersection project per the 172nd / 190th Corridor Management Plan preferred alternative.
Sunrise Expressway defined on page 8-13.

Table 8-8 summarizes study intersection capacity operations for the 2040 Preferred scenario which includes the recommended Motor Vehicle Master Plan projects. The recommended improvements for each study intersection are summarized in Table 8-7. The majority of study intersections meet City operating standards.

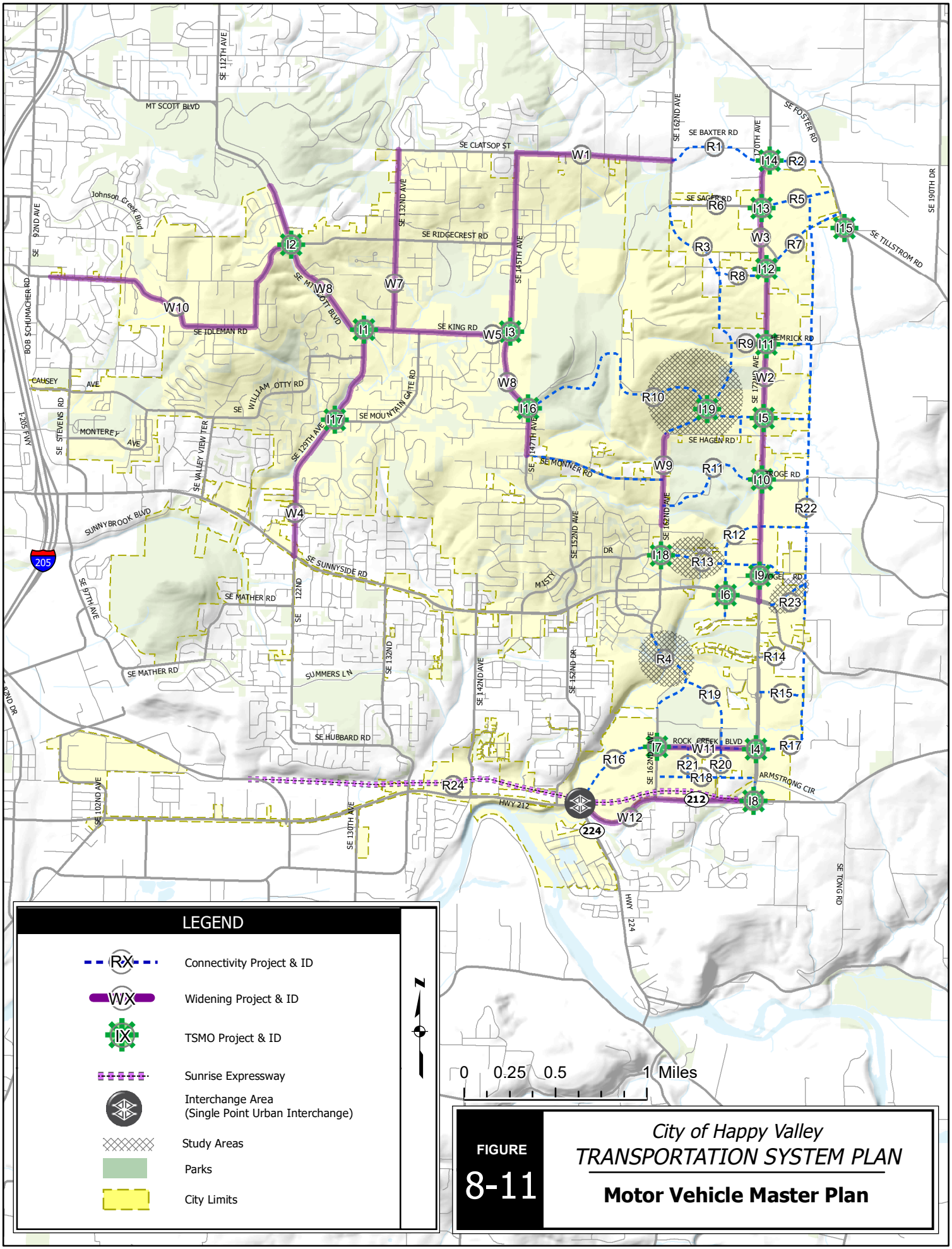

LEGEND
Connectivity Project & ID
Widening Project & ID
TSMO Project & ID
Sunrise Expressway
Interchange Area
(Single Point Urban Interchange)
Study Areas
Parks
City Limits
N
0 0.25 0.5 1 Miles
FIGURE
8-11
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Motor Vehicle Master Plan

Table 8-8: 2040 Preferred Scenario Intersection Level of Service (PM Peak Hour)

Intersection	Level of Service	Delay	Volume/ Capacity
Unsignalized Intersections			
132nd Avenue/King Road*	D	26.3	-
132nd Avenue/Ridgecrest Road*	C	22.9	-
145th Avenue/Ridgecrest Road*	D	29.6	-
147th Avenue/Monner Road	A/F	>60.0	-
162nd Avenue/OR 212	A/B	10.4	-
169th Avenue/Sunnyside Road	B/C	19.3	-
Stevens Road/Causey Avenue	A/C	17.8	-
Signalized Intersections			
122nd Avenue/Sunnyside Road	F	>60.0	1.11
132nd Avenue/Sunnyside Road	C	32.8	0.96
142nd Avenue/Sunnyside Road	C	33.5	0.90
152nd Avenue/Sunnyside Road	E	57.6	1.01
162nd Avenue/Sunnyside Road	C	33.7	0.97
169th Avenue/Sunnyside Road	D	35.2	0.55
172nd Avenue/Sunnyside Road	D	37.7	0.87
172nd Avenue/Rock Creek Boulevard	B	19.8	0.76
172nd Avenue/OR 212	D	38.0	0.92
172nd Avenue/Scouters Mountain Road	D	34.6	0.92
162nd Avenue/Rock Creek Boulevard	D	41.9	0.93
Stevens Road/Bob Schumacher Road	B	17.3	0.69
Mt Scott Boulevard/Ridgecrest Road	B	18.3	0.78
129th Avenue/King Road	C	30.4	0.85
145th Avenue/King Road	B	11.1	0.69

Notes: A/A=major street LOS/minor street LOS
Signalized and all-way stop delay = average vehicle delay in seconds for entire intersection
Unsignalized delay = highest minor street approach delay
*All-way stop control intersection

The 147th Avenue/Monner Road intersection continues to operate with LOS F for the westbound minor street approach under the 2040 Preferred scenario. Based on the 2040 volumes, this intersection does not meet warrants for a traffic signal or additional turn lanes. Roadway connectivity for Monner Road is limited to 147th Avenue and 162nd Avenue. There are no local street connections due to environmental constraints. No improvements to the 147th Avenue/Monner Road intersection are recommended.

The 122nd Avenue/Sunnyside Road intersection continues to operate at LOS F with high vehicle delay. Sunnyside Road is a five-lane major arterial and the intersection currently provides separate left and right turn lanes for most approaches. This intersection is under the jurisdiction of Clackamas County and there are no identified plans to construct additional lanes.

Motor Vehicle Financially Constrained Plan

A motor vehicle system financially constrained plan project list was created to identify motor vehicle projects that are reasonably expected to be funded by the year 2040, which meets the requirements of the RTFP[10]. Table 8-9 shows the financially constrained plan which combines projects identified in the RTP with projects that have been identified in the TSP update analysis. The construction of new collector and arterial facilities would only occur to support future development or redevelopment and would not be initiated by the City. The potential funding source serves as a guide for financing options the City should pursue. The estimated schedule is based on the RTP time line and current local planning information.

Table 8-9: Motor Vehicle Financially Constrained Plan

Project #	Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
I1	129th Avenue/Mt. Scott Boulevard/King Road	Install a traffic signal or one-lane roundabout, add eastbound right turn lane	Joint SDC/ Developer	Medium Term	$1,500
I2	Mt. Scott Boulevard/Idleman Road/Ridgecrest Road	Install a traffic signal or one-lane roundabout, improve vertical curve, align eastbound and westbound approaches	Joint SDC/ Developer	Long Term	$2,000
I3	145th Avenue/King Road	Install a traffic signal	Joint SDC/ Developer	Long Term	$500
I4	172nd Avenue/Rock Creek Boulevard	Add second eastbound left turn lane, add southbound right turn lane	Joint SDC/ Developer	Medium Term	$200
I5	172nd Avenue/Scouter Mountain Road	Install a two-lane roundabout	Joint SDC/ Developer	Medium Term	$1,500
I6	Sunnyside Road/169th	Install a traffic signal	Joint SDC/	Near	$500

[10] *OAR Chapter 660*, Department of Land Conservation and Development, Division 012, Transportation Planning, adopted on March 15, 2005, effective April 2005.

Project #	Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
	Avenue		Developer	Term	
I7	162nd Avenue/Rock Creek Boulevard	Install a traffic signal or one-lane roundabout	Joint SDC/ Developer	Medium Term	$1,000
I8	172nd Avenue/OR 212	Add second eastbound left turn lane, add second southbound right turn lane, add second westbound through lane	ODOT	Medium Term	$1,000
I9	172nd Avenue/Vogel Road*	Install a traffic signal	Joint SDC/ Developer	Medium Term	$500
I10	172nd Avenue/Troge Road*	Install a traffic signal, rebuild creek bridges	Joint SDC/ Developer	Medium Term	$8,000
I11	172nd Avenue/Hemrick Road*	Install a two-lane roundabout	Joint SDC/ Developer	Medium Term	$1,500
I12	172nd Avenue/172nd-190th Connector*	Install a two-lane roundabout	Joint SDC/ Developer	Medium Term	$1,500
I13	172nd Avenue/Sager Road*	Install a one-lane roundabout	Joint SDC/ Developer	Medium Term	$1,000
I14	172nd Avenue/ Cheldelin Road*	Install a traffic signal	Joint SDC/ Developer	Medium Term	$500
I15	Foster Road/172nd-190th Connector*	Install a two-lane roundabout	Joint SDC/ Developer	Medium Term	$1,500
I16	147th Avenue/Scouters Mountain Road	Install a roundabout	Joint SDC/ Developer	Near Term	$1,000
I17	129th Avenue/ Mountain Gate Road	Install a traffic signal	Joint SDC/ Developer	Long Term	$500
W2	172nd Avenue Widening South*	Widen to 5-lane facility between Sunnyside Road and 172nd-190th Connector Road	Joint SDC/ Developer	Medium Term	$14,200
W3	172nd Avenue Widening North*	Widen to 3-lane facility between 172nd-190th Connector to Cheldelin Road	Joint SDC/ Developer	Medium Term	$5,100
W4	122nd/129th Avenue Widening	Widen to 3-lane facility between Sunnyside Road and King Road and smooth curves	Joint SDC/ Developer	Medium Term	$5,400
W5	King Road Widening	Widen to a continuous 3-lane facility cross-section between 129th Avenue and 145th Avenue	Joint SDC/ Developer	Medium Term	$3,900
W6	132nd Avenue Widening*	Widen to 3-lane facility from Ridgecrest Road to King Road	Joint SDC/ Developer	Long Term	$4,900

Project #	Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
W7	145th – 147th Avenue Widening	Widen to 3-lane facility from Clatsop Street to Monner Road	Joint SDC/ Developer	Medium Term	$8,300
W9	162nd Avenue Widening*	Widen to 3-lane facility from Palermo Avenue to Hagen Road	Joint SDC/ Developer	Medium Term	$2,400
W12	OR 212/224*	Widen to 5-lane facility from Rock Creek Junction and 172nd Avenue	ODOT	Medium Term	$30,000
R1	Clatsop Street Extension East	Construct a new 3-lane facility between 162nd Avenue and 172nd Avenue. May follow a portion of Baxter Road right-of-way.	Joint SDC/ Developer	Long Term	$2,800
R3	162nd Avenue Extension North*	Construct a new 2/3-lane facility between Hagen Road and Clatsop Street.	Joint SDC/ Developer	Long Term	$6,700
R4	162nd Avenue Extension South*	Construct a new 3-lane facility 157th Avenue to Highway 212, new bridge over Rock Creek	Joint SDC/ Developer	Long Term	$13,600
R6	Sager Road Extension West	Upgrade to a 2-lane east-west facility from 162nd Avenue to 172nd Avenue.	Joint SDC/ Developer	Long Term	$2,000
R8	Wooden Heights Road	Construct a new 2-lane east-west facility from 162nd Avenue to 177th Avenue.	Joint SDC/ Developer	Medium Term	$1,100
R9	Hemrick Road Extension	Construct a new 3-lane east-west facility from 162nd Avenue to 177th Avenue.	Joint SDC/ Developer	Medium Term	$2,200
R10	Scouter Mountain Road	Construct a new east-west 2/3-lane facility over Scouter's Mountain between 147th Avenue and 177th Avenue.	Joint SDC/ Developer	Medium Term	$9,500
R11	Troge Road Extension*	Construct a new 3-lane facility between 162nd Avenue and 177th Avenue	Joint SDC/ Developer	Near Term	$2,900
R12	169th Avenue Extension	Construct a new 3-lane facility from Sunnyside Road to 177th Avenue	Joint SDC/ Developer	Near Term	$4,300
R13	Misty Drive Extension*	Construct a new 3-lane east-west facility from 162nd Avenue and 177th Avenue, new bridge over Rock Creek	Joint SDC/ Developer	Medium Term	$10,100

Project #	Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
R16	Rock Creek Boulevard West Extension*	Construct a new 5-lane east-west facility from 162nd Avenue to the Sunrise Corridor Rock Creek interchange	Joint SDC/ Developer	Medium Term	$12,300
R19	Parklane Drive North Extension	Construct a new 3-lane north-south facility from 162nd Avenue to Stadium Way	Joint SDC/ Developer	Medium Term	$2,300
R23	Sunnyside East Extension*	Construct a new alignment to the east to Foster Road	Joint SDC/ Developer	Long Term	$10,400
R24	Sunrise Project Phase 2*	Construct new 6-lane expressway to Rock Creek Junction	ODOT	Long Term	$100,000
				City of Happy Valley	$0
				Joint SDC/Developer	$141,900
				ODOT	$131,000
				Total Motor Vehicle Financially Constrained Project Costs	**$181,900**

* Project identified in the 2014 Regional Transportation Plan Financially Constrained scenario.

Trucks

Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The establishment of through truck routes provides for this efficient movement while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. Sunnyside Road and 172nd Avenue are recommended as designated through truck routes in the TSP study area. The objective of these route designations is to allow these routes to focus on design criteria that are "truck friendly"; i.e. 12-foot travel lanes, longer access spacing, 35-foot (or larger) curb returns and pavement design that accommodates a larger share of trucks.

Standards

Traffic Signal Spacing

Traffic signal spacing standards have been established as part of this Happy Valley TSP update. Traffic signals that are spaced too closely on a corridor can result in poor operating conditions and safety issues due to the lack of adequate storage for vehicle queues. Optimum traffic signal spacing allows for the coordination of traffic signals along a corridor resulting in reduced overall vehicle delay.

A minimum traffic signal spacing of 1,000-feet is required for major arterial, minor arterial and collector facilities. A variation to the traffic signal spacing standard may be granted in areas with limited property frontage and/or environmental constraints. Any variation to the traffic signal spacing standard will require the approval of the City Engineering Manager.

Intersection Performance Standards

Policy 5a establishes minimum intersection operating standards to be maintained for the City of Happy Valley. The City shall utilize these standards to evaluate land use actions and proposed mitigations. All public facilities shall be designed to meet these standards.

- All signalized intersections shall operate at level of service D and V/C ratio of 0.90 or better during the peak hours of analysis. Individual movements must meet level of service E and a V/C ratio of 1.0.
- All roundabout intersections shall operate at level of service D or better during the peak hours of analysis. Each approach must meet level of service E and a V/C ratio of 0.85.
- All unsignalized two-way stop controlled intersections shall operate at level of service E or better (based on average approach delay) for all side street approaches during the peak hours of analysis.
- All unsignalized all-way stop controlled intersections shall operate at level of service D or better based on average intersection delay during the peak hours of analysis.

Roadway Cross-Section Standards

The design characteristics of streets in Happy Valley were developed to meet the function and demand for each facility type. Because the actual design of a roadway can vary from segment to segment due to adjacent land uses and demands, the objective was to define a system that allows standardization of key characteristics to provide consistency, but also to provide criteria for application that provides some flexibility, while meeting the design standards.

Table 8-10 summarizes the proposed street characteristics for Happy Valley. Figures 8-11 through 8-15 show the cross-sections for arterials, collectors, neighborhood, and local streets, streets in Happy Valley. Where center left turn lanes are identified (3 lane section), the actual design of the street may include sections without center turn lanes (2 lane section) near environmentally sensitive or physically constrained areas or with median treatments. The actual treatment will be determined within the design for implementation of each project.

Alternative collector and local cross-sections have been developed to allow for flexibility in design with an emphasis on streetscape elements. A hillside collector cross-section was developed for 162nd Avenue and the east-west collector along the base of Scouter Mountain with a 12 foot path on the downhill side of the roadway and a narrower width to reduce environmental impacts. A collector cross-section with on-street parking was developed for the newly planned area east of 162nd Avenue to provide a neighborhood streetscape. Collector and local cross-sections were developed for roadways along commercial and industrial zoned parcels to provide an appropriate streetscape.

A set of unique cross-sections apply within the 172nd Avenue-190th Drive CMP area. They are shown in Figures 8-19 through 8-22.

Table 8-10: Proposed Street Characteristics*

Street Element	Characteristic	Width/Options
Vehicle Lane Widths: (Minimum widths)*	Truck Route Bus Route Arterial Collector Neighborhood Local Turn Lane	12 feet 11 feet 12 feet 12 feet 10 feet 10 feet 12 feet[11]
On-Street Parking:*		8 feet
Bicycle Lanes: (minimum widths)*	New Construction Reconstruction	6 feet 5 to 6 feet
Sidewalks: (Minimum width)*	Neighborhood/Local Collector Arterial	5 to 12 feet 5 to 12 feet 5 to 7 feet
Planter Strips:*	Required on all streets	5 to 7 feet
Medians:*	Arterial Collector	Required Set by functional classification
Neighborhood Traffic Management:*	Local Neighborhood Collectors Arterials	Consider if appropriate Consider if appropriate Under special conditions Prohibited
Transit:*	Arterial/Collectors Neighborhood/Local Local	Appropriate Only in special circumstances Not appropriate
*Special street characteristics apply within the 172nd-190th Corridor Plan		

Under some conditions a variation to the cross-sections may be requested from the City Engineer. Typical conditions that may warrant a variation include (but are not limited to) the following:

- Infill sites
- Innovative designs (roundabouts)
- Severe topographic or environmental constraints
- Existing developments and/or buildings that make it extremely difficult or impossible to meet the design standards.

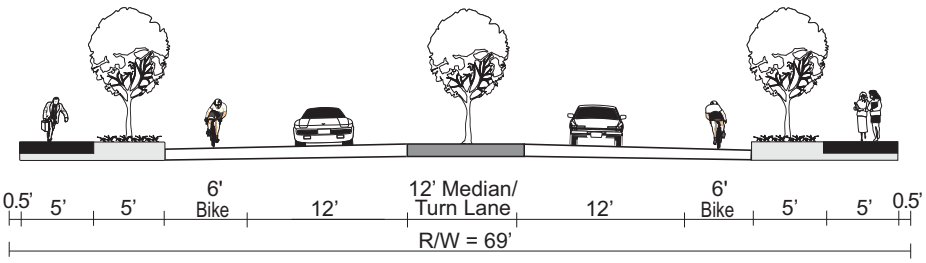
[11] In constrained conditions on collector and neighborhood facilities, a minimum width of 11 feet may be considered.

FIGURE 8-12

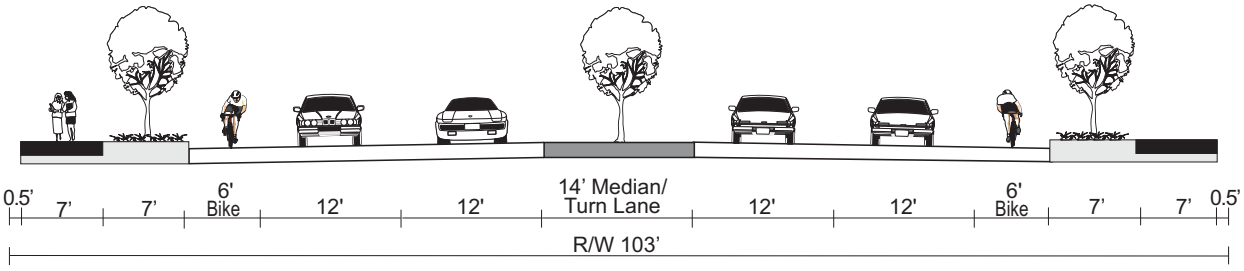
City of Happy Valley
TRANSPORTATION SYSTEM PLAN

Arterial Facility Cross-Section

MINOR ARTERIAL
3 Lane Section



MAJOR ARTERIAL
5 Lane Section



Note: Along commercial zoning frontage and major transit stops, the sidewalk and planter strip width may be combined to provide sidewalks and street tree wells. Other design elements in these areas may include narrower travel lanes, on-street parking, and other boulevard treatments.

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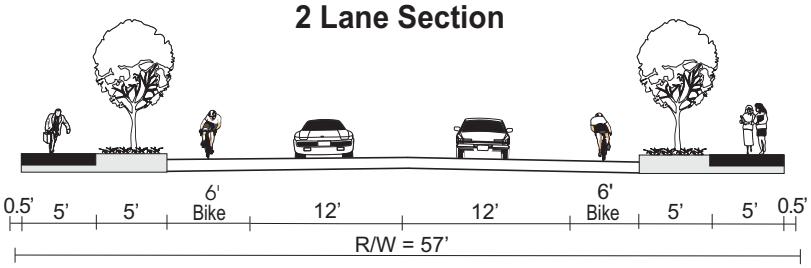
FIGURE 8-13

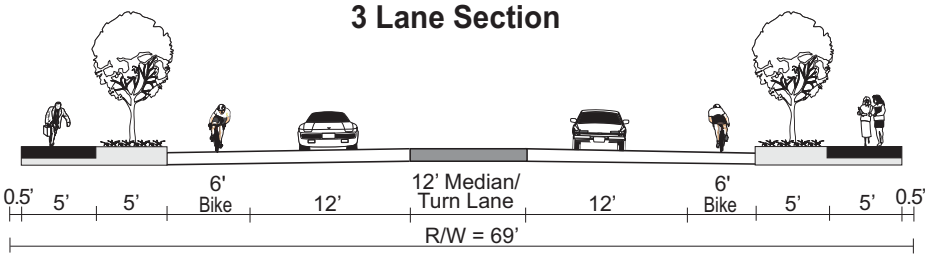
City of Happy Valley
TRANSPORTATION SYSTEM PLAN

Collector Facility Cross-Section With No Parking

2 Lane Section

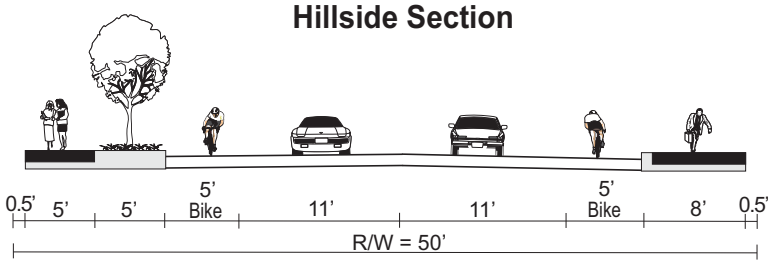


3 Lane Section



Hillside Section

Downhill Side



Uphill Side

Note: Two lane cross-section may be considered when environmental constraints (creeks, topography, etc.) are present to limit the impacts of the roadway. A two lane cross-section may only be considered when a center left turn lane is not required. Use of this cross-section requires City Engineer's approval.

Note: Hillside cross-section to be used on the future 162nd Avenue along the eastern base of Scouter Mountain and the future east-west roadway along the southern base of Scouter Mountain. The uphill sidewalk may be omitted if expected pedestrian usage is expected to be very low due to the frontage development per the City Engineer's approval. If the uphill sidewalk is omitted, any retaining wall must be at least 3 feet back from the face of curb.

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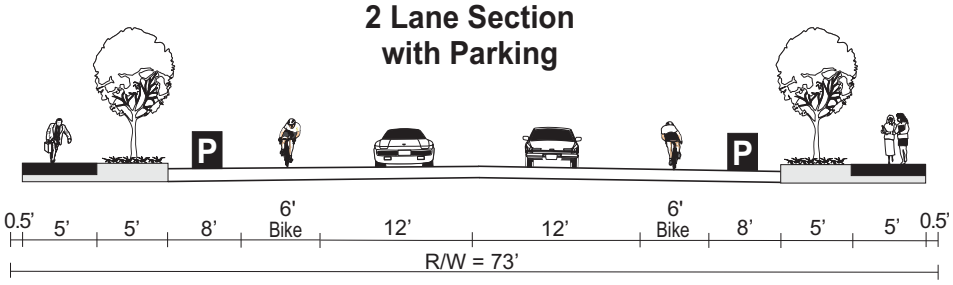
FIGURE 8-14

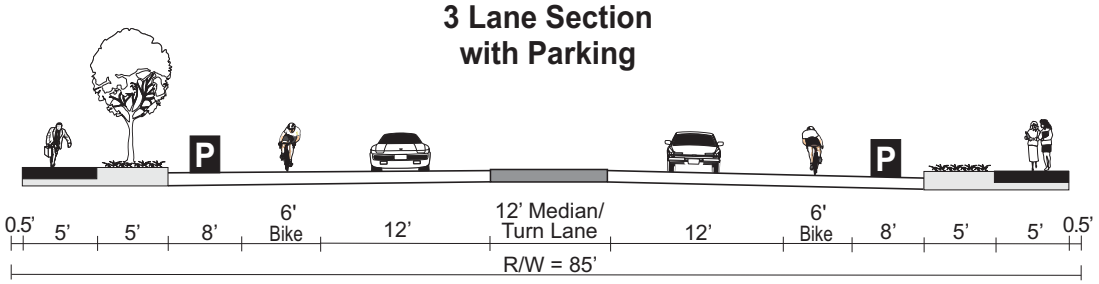
City of Happy Valley
TRANSPORTATION SYSTEM PLAN

Collector Facility Cross-Section With Parking

2 Lane Section with Parking



3 Lane Section with Parking



Note: Collector cross-sections with on-street parking may be considered on roadways located east of SE 162nd Avenue when the frontage property is zoned attached residential, multi-family residential or commercial. On-street parking should not be allowed within 100 feet of an intersection. The posted speed limit should be 30 miles per hour or less with on-street parking. Angled on-street parking may be considered based on a review of vehicle speed, volume and safety. Angled on-street parking would require additional right-of-way, typically 20 feet minimum.

No single family driveways are allowed on collector roadways, therefore alleyways should be considered for residential fronting properties. Along commercial zoning frontage, the five foot wide sidewalk and five foot wide planter strip may be replaced with ten foot wide sidewalk with street tree wells.

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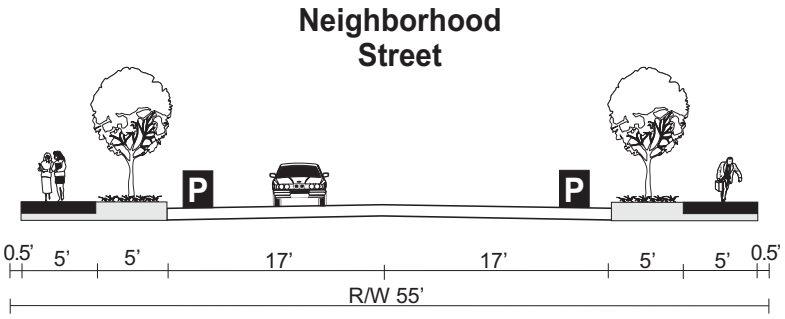
FIGURE
8-15

City of Happy Valley
TRANSPORTATION SYSTEM PLAN

Neighborhood Facility Cross-Section



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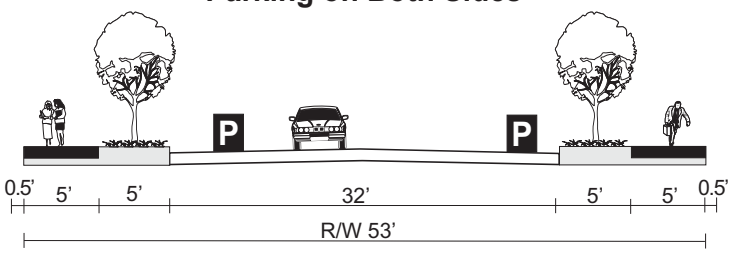
EST. 1965

FIGURE 8-16

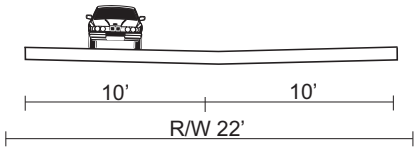
City of Happy Valley
TRANSPORTATION SYSTEM PLAN

Local Facility Cross-Section

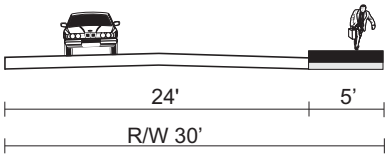
Local Street
Parking on Both Sides



Private Alleyway



Private Street



Note: Local street includes half-foot space behind sidewalk on each side. Alleyway cross-section should provide a minimum of 22 feet of clear distance (between buildings, dumpsters, etc.) to accommodate emergency vehicle access. Alleyway drainage design per City Design Manual.

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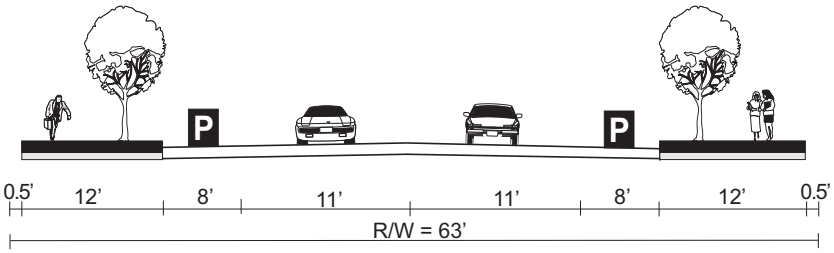
EST. 1965

FIGURE 8-17

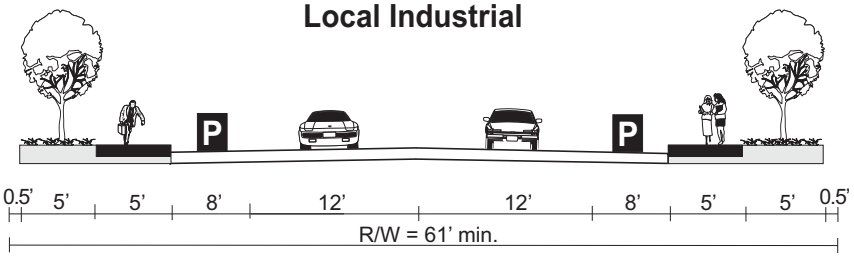
City of Happy Valley
TRANSPORTATION SYSTEM PLAN

Local Facility Cross-Section
Commercial & Industrial

Local Commercial



Local Industrial



Note: Local Commercial cross-section to be used when any of the frontage property is zoned General Commercial, Community Commercial, Mixed Use Residential or Mixed Use Employment (retail/office use). Angled on-street parking may be considered based on a review of vehicle speed, volume and safety. Angled on-street parking would require additional right-of-way, typically 20 feet minimum.

Note: Local Industrial cross-section to be used when the majority of the frontage property is zoned Regional Significant Industrial Area or Mixed Use Employment (industrial use).

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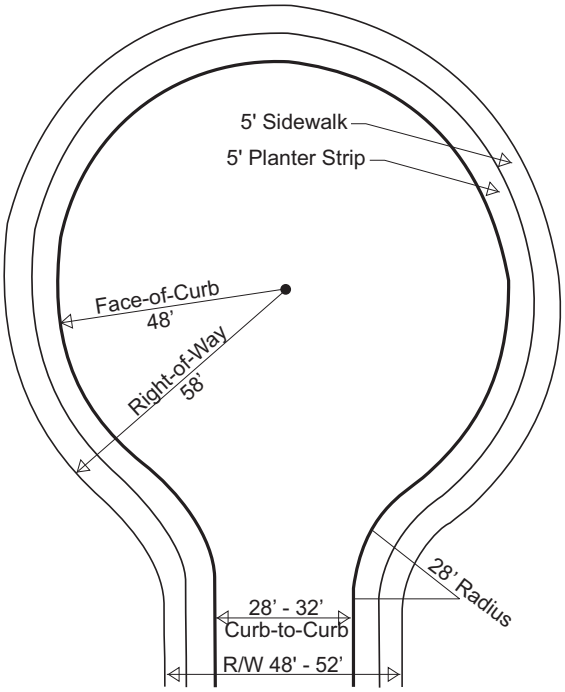
FIGURE 8-18

City of Happy Valley
TRANSPORTATION SYSTEM PLAN

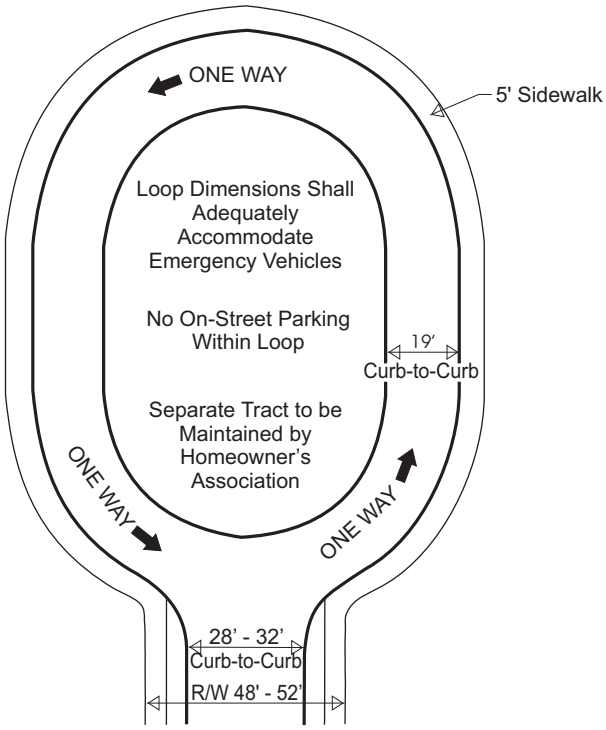
Cul de Sac & Loop Turn-Around Cross-Sections

CUL DE SAC



Sketch Not to Scale

LOOP TURN-AROUND



Sketch Not to Scale

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Roadway Cross-Section Standards - SE 172nd/190th Drive Corridor

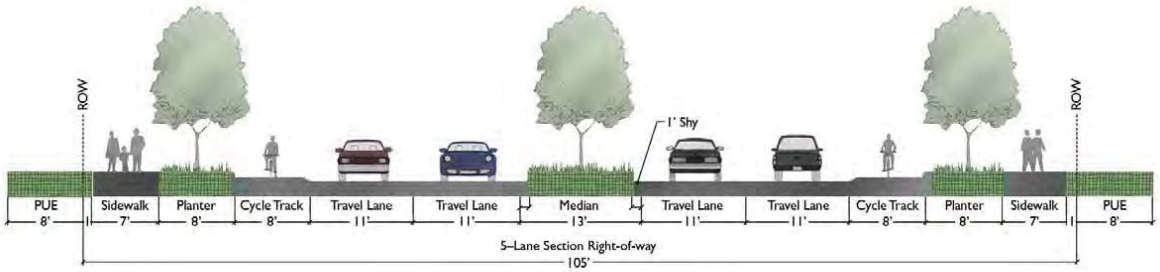
A set of unique cross-sections were prepared as part of the SE 172nd/190th Drive Corridor Management Plan (CMP), and are reference in this TSP. The cross-sections are shown in Figures 8-19 through 8-22. Table 8-11 lists where each of the CMP cross-sections should be applied. All streets not listed in Table 8-11 are subject to the applicable City cross-sections shown in Figures 8-12 through 8-18.

Table 8-11: Roadway Cross-Sections in the SE 172nd Avenue/190th Drive Corridor

Roadway Segment	Applicable Cross-Section *(See Figures 8-19 through 8-22 and Cross-Section Numbers)*	
	All Zones Other Than Mixed Commercial Center and Community Commercial Center	**Mixed Commercial Center and Community Commercial Center**
SE 172nd Avenue (Sunnyside Road to 172nd-190th Connector, except between Troge Road and Hagen Road)	5A (1 or 2)	5B if on-street parking is provided. 5C if no on-street parking is provided.
SE 172nd Avenue and New Frontage Road (between Troge Road and Hagen Road)	5D	-
SE 172nd Avenue (172nd-190th Connector to Cheldelin Road)	3A (1 or 2)	-
SE 172nd-190th Connector (SE 172nd Avenue to Foster Road)	5A (1 or 2)	-

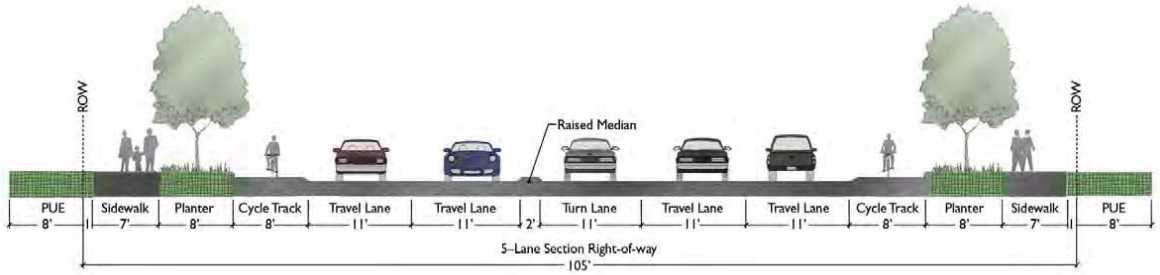
FIGURE 8-19

City of Happy Valley
TRANSPORTATION SYSTEM PLAN
172nd/190th Avenue Corridor Management Plan
Typical Roadway Sections



5–Lane Section with Median

5A-1



5–Lane Section with Left Turn Lane

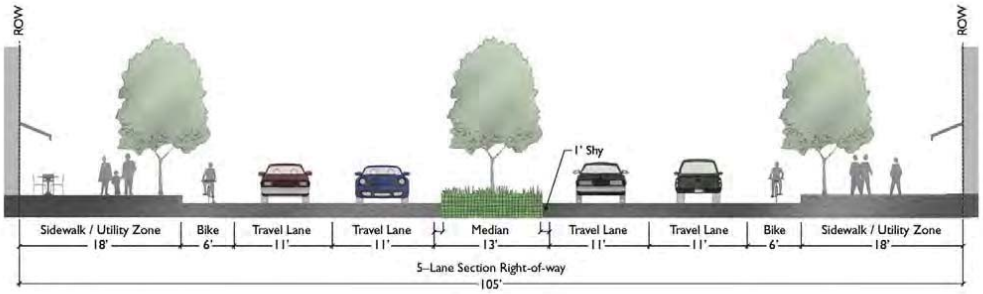
5A-2

172nd / 190th Corridor Plan

City of Happy Valley

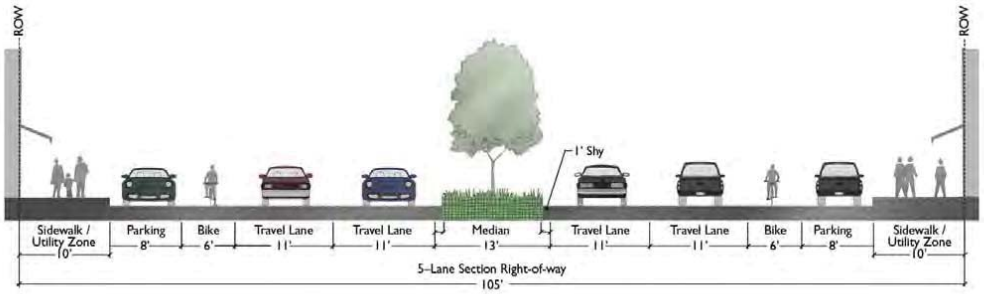
FIGURE 8-20

City of Happy Valley
TRANSPORTATION SYSTEM PLAN
172nd/190th Avenue
Corridor Management Plan
Typical Roadway Sections



5–Lane Section in Urban Center

5C



5–Lane Section with On-street Parking in Urban Center

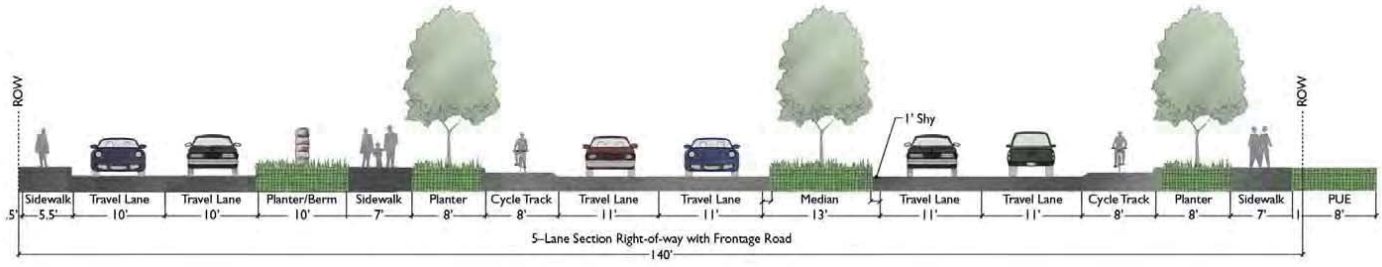
5B

172nd / 190th Corridor Plan

City of Happy Valley

FIGURE 8-21

City of Happy Valley
TRANSPORTATION SYSTEM PLAN
172nd/190th Avenue Corridor Management Plan
Typical Roadway Sections

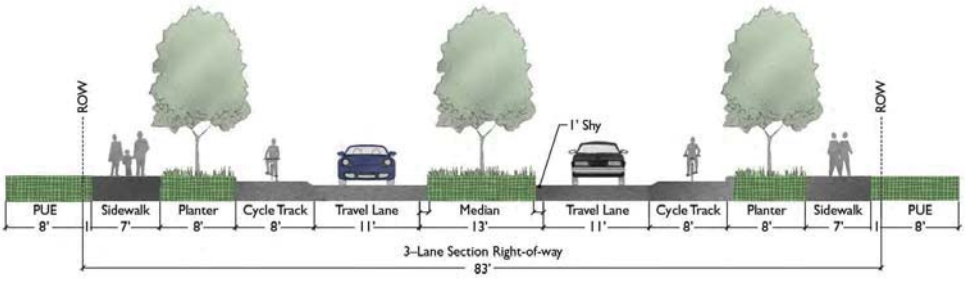


5-Lane Section with Median and Frontage Road

5D

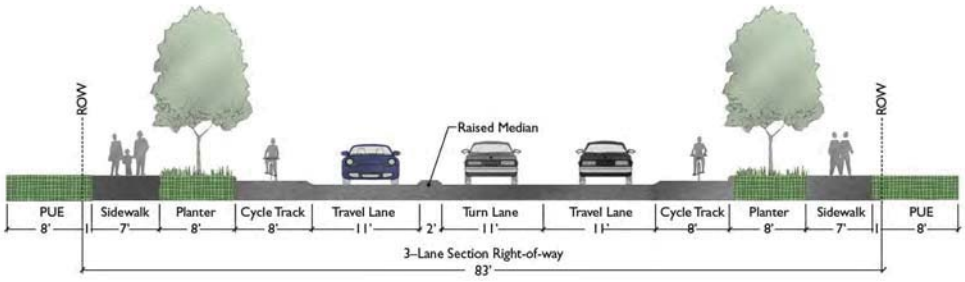
FIGURE 8-22

City of Happy Valley
TRANSPORTATION SYSTEM PLAN
172nd/190th Avenue
Corridor Management Plan
Typical Roadway Sections



3–Lane Section with Median

3A-1



3–Lane Section with Left Turn Lane

3A-2

172nd / 190th Corridor Plan

City of Happy Valley

Parking Requirements

The City of Happy Valley currently has off-street parking management standards for automobiles and bicycles consistent with the TPR and RTP requirements. In addition, there are several parking policies that will be considered including:

- Allow the designation of residential parking districts to protect residential areas from spillover parking generated by adjacent commercial, employment, or mixed-use areas, or other uses that generate a high demand for parking.
- Require on-street freight loading and unloading areas at appropriate locations in centers to support local freight delivery activities.

9. Other Modes Plan

This chapter summarizes existing and future rail, air and water transportation needs in the City of Happy Valley. While auto, transit, bicycle and pedestrian transportation modes have a more significant effect on the quality of life in Happy Valley, other modes of transportation must be considered and addressed.

RECOMMENDED FACILITIES

Alternative Fuel Vehicles

The use of alternative fuel vehicles should be encouraged in Happy Valley. This could be achieved by providing incentives for electric car charging spaces at key activity centers and biodiesel fuel stations within the City. Alternative fuel vehicles would use the same right-of-way as gasoline-powered vehicles.

Rail

There are no rail facilities within the City of Happy Valley. There are not expected to be any rail facilities within the City in the near future. Due to these considerations, no policies or recommendations in this area of transportation is provided for Happy Valley.

Air

There are no airports within the City of Happy Valley. Passenger service to Happy Valley residents is provided via Portland International Airport, approximately 10 miles to the north of Happy Valley.

Water

There are no navigable waterways in the Happy Valley TSP study area. No policies or recommendations in this area of transportation are provided.

10. Financing & Implementation

This chapter outlines the funding sources that can be used to meet the needs of the transportation system. The costs for the elements of the transportation system plan are outlined and compared to the potential revenue sources. Options are discussed regarding how the costs of the plan and revenues can be balanced.

CURRENT FUNDING STRATEGIES

Transportation funding is commonly viewed as a user fee system where the users of the system pay for infrastructure through motor vehicle fees (such as gas tax and registration fees) or transit fares. However, a great share of motor vehicle user fees goes to road maintenance, operation and preservation of the system rather than construction of new system capacity. Much of what the public views as new construction is commonly funded (partially or fully) through local improvement districts (LIDs) and frontage or off-site improvements required as mitigation for land development.

The City of Happy Valley currently utilizes several sources to fund construction of its transportation infrastructure as described below. These sources collect revenue each year that is used to maintain street facilities or construct new roadway improvements, with some restrictions on the type and location of projects.

State Fuel Tax and Vehicle License Fee

The State of Oregon Highway Trust Fund collects various taxes and fees on fuel, vehicle licenses, and permits. A portion is paid to cities annually on a per capita basis. By statute, the money may be used for any road-related purpose. Happy Valley uses it for roadway maintenance needs.

Oregon gas taxes are collected as a fixed amount per gallon of gasoline served. Gas tax in Oregon last increased in 2011 (currently 30 cents per gallon), and no adjustment for inflation is tied to the gas tax. Fuel efficiency in new vehicles has further reduced the total dollars collected through this system. Oregon vehicle registration fees are collected as a fixed amount at the time a vehicle is registered with the Department of Motor Vehicles. Vehicle registration fees in Oregon have increased from $27 per vehicle per year to $43 per vehicle per year for passenger cars, with similar increases for other vehicle types. There is no adjustment for inflation tied to vehicle registration fees.

In fiscal year 2013/2014, Happy Valley received about $875,000 in State gas tax and vehicle license fee revenue. Essentially all of these funds are spent on roadway maintenance of City streets. Because there is no index for cost inflation, this revenue level will increase only proportionate with the city's population growth, which is expected to be significant. Happy

Valley is forecasted to receive approximately $41 million in State gas tax over the next 25 years based on population estimates.

Local Gas Tax

In 2009, the City of Happy Valley established a $0.02 gas tax. Until 2016, there had not been a gas station in the city limits. However, with a new gas station planning to open in November of 2016, additional revenues are expected to be approximately $120,000 per year. Revenues must be used for the planning, financing, design, construction, maintenance, repair, operation and use of streets within the city.

System Development Charge

The System Development Charge (SDC) for streets is used as a funding source for all capacity adding projects for the transportation system. The current Happy Valley/Clackamas County Joint Transportation SDC District (Joint District) was adopted in 2014. This district is bordered by I-205 to the west, Multnomah County to the north, 172nd Avenue to the east and Highway 212 to the south. The funds collected can be used to construct or improve portions of streets with the district.

The SDC fee is collected from new development based on the proposed land use and size. The SDC fees are determined based on each land use's potential to generate vehicle trips. The current SDC rate[1] for a single family home is $7,682 per dwelling unit and it is among the highest transportation SDC rates in the State of Oregon. Other current SDC rates range from $9,367 per 1,000 square feet for a general office building to $44,310 per 1,000 square feet for a supermarket.

For fiscal year 2013/2014, the income from the SDC for development within Happy Valley's area of the Joint District was $2,280,000. The SDC income potential over the next 25 years was estimated based on the forecasted household and employment growth within the future city limits. Happy Valley is expected to collect approximately $143 million from SDC fees through the year 2040 based on Metro land use forecasts.

Transportation Grants

The city has been awarded several grants to fund transportation projects in recent years, including a $2,485,000 Regional Flexible Fund Allocation (RFFA) grant for partial funding of improvements to a section of 129th Avenue.

Summary

Table 10-1 summarizes the current funding sources and the estimated revenue over the next 20 years. Total revenues collected over 20 years would be $187 million with the current sources. The majority of these funds are from estimated SDC fees which are based on the future land use forecasts and would be obtained from potential development. If the forecasted future growth does not occur, then the amount of SDC revenue would be reduced.

[1] Transportation System Development Charges, City of Happy Valley/Clackamas County Joint Area, 2014.

Table 10-1: Current and Forecasted Transportation Revenue for Happy Valley

Funding Category	2013/2014 Annual Amount Collected	Estimated 25 Year Revenues
State Fuel Apportionment & Vehicle License Fee	$875,000	$41,200,000
Local Gas Tax	$120,000	$3,000,000
System Development Charge (Transportation)	$2,300,000	$143,000,000
Total Revenue	$3,288,000	**$187,200,00**

Source: City of Happy Valley

PROJECTS AND PROGRAMS

This section presents the recommended projects and programs developed for the City of Happy Valley to serve local travel for the coming 25 years. The Pedestrian, Bicycle Transit, and Motor Vehicle projects were identified in the Financially Constrained Plan for each mode, and represent those projects that have the highest short-term need for implementation to satisfy performance standards, or other policies established for the Happy Valley Transportation System Plan. The costs for the remaining motor vehicle projects noted in the Motor Vehicle Master Plan are identified, but these have not been included in the funding needs analysis for the city because the Financially Constrained Plan is limited to projects most likely to be funded within the planning horizon. Other projects on the Master Plan list require additional funding, and they are expected to be built beyond the 25-year horizon.

Project Cost Estimates

Planning level cost estimates (in 2015 dollars) were developed for the projects identified in the pedestrian, bicycle, transit and motor vehicle elements. Cost estimates from the existing RTP, County and/or City projects in Happy Valley were used in this plan, if available. Other project costs were estimated using general unit costs for transportation improvements, but do not reflect the unique project elements that can significantly add to project costs[2]. Development of more detailed project costs can be prepared in the future with more refined financial analysis.

Since many of the projects overlap elements of various modes, the costs were developed at a project level incorporating all modes, as appropriate. It may be desirable to break project mode elements out separately, however, in most cases, there are greater cost efficiencies of undertaking a combined, overall project. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with special design details as projects are pursued.

[2] General plan level cost estimates do not reflect specific project construction costs, but represent an average estimate. Further preliminary engineering evaluation is required to determine impacts to right-of-way, environmental mitigation and/or utilities. Experience has shown that individual projects costs can increase by 25 to 75 percent as a result of the above factors.

Other Transportation Programs and Services

In addition to the physical system improvements identified in the previous section, the transportation facilities will require on-going operation and maintenance improvements across a variety of areas. These other transportation programs are recommended to respond to the specific policies and needs in maintaining roadway pavement quality, supporting safe routes to schools programs, allocations for implementing neighborhood traffic management, and on-going update and support of related planning documents.

Roadway Maintenance

The current annual cost of maintaining roadways under the jurisdiction of Happy Valley is approximately $1,700,000 with $980,000 apportioned annually and approximately $749,000 per year deferred. Future annual maintenance costs for Happy Valley roadways will likely increase as the City takes jurisdiction over existing roadways from Clackamas County and new roadways within the city limits. It was assumed that over the next 25 years, the number of roadway miles the City would be responsible for maintaining would triple.

To estimate the City's road maintenance responsibility over the next 25 years, the annual maintenance costs (in 2015 dollars) for Happy Valley was increased by 100% resulting in an estimated cost of $85 million to adequately maintain roadways. Based on the State gas tax revenue estimate of $41 million which is used to fund maintenance, the City is expected to have a $44 million dollar roadway maintenance funding shortfall.

School Safety Program

Each school within the city should be evaluated to review the convenience and safety of connections for pedestrians and bicycle travel from the neighborhoods that they serve. A "Safe Route to School" plan identifies key routes for pedestrian and bike circulation around the schools, and suggests needed improvements to traffic controls, crossing management, and on-site circulation that would improve safety for school-aged children. An annual allocation of $5,000 identified for this purpose.

Neighborhood Traffic Management (NTM)

Specific NTM projects are not defined. These projects will be subject to neighborhood consensus based upon City placement and design criteria. A City-wide NTM program, if desired, should be developed with criteria and policies adopted by the City Council. Speed humps can cost $5,000 to $10,000 each and traffic circles can cost $6,000 to $12,000 each. A speed trailer can cost about $10,000. It is important, where appropriate, that any new development incorporate elements of NTM as part of its on-site mitigation of traffic impacts. Annual allocation of $10,000 is identified for the program development and implementation of NTM projects.

HAPPY VALLEY COSTS FOR TSP FINANCIALLY CONSTRAINED PLANS

The cost estimates outlined in the Transportation System Plan to implement the financially constrained project list for motor vehicles, transit, bicycles and pedestrians total $143.23 million, and the recommended transportation operations and maintenance programs would add $49.3 million for a total cost over 25 years of $192.6 million. Refer to Chapter 4 through 9 for details on the individual projects by travel mode. Note that some additional projects are listed in the financially constrained project list that are expected to be funded by other agencies (Metro, TriMet, etc.). These non-city project costs have not been included in the estimates in Table 10-2, but are identified in the master plans.

Table 10-2: Happy Valley Financially Constrained Costs over 25 years (2015 Dollars)

Transportation Element	Approximate Cost
Improvement Projects (Financially Constrained projects to be funded by City + SDC/Developer)	
Pedestrian	$1,240,000
Bicycle	$0
Transit	$0
Motor Vehicle* (does not include ODOT projects)	$141,900,000
Total Capital Projects	**$143,140,000**
Operations and Maintenance Programs and Services	
Road Maintenance ($980,000/yr plus 100%)	$49,000,000
School Safety Program ($5,000/yr)	$125,000
Neighborhood Traffic Management ($10,000/yr)	$250,000
Total Operations and Maintenance Programs	**$49,375,000**
25 YEAR TOTAL	**$192,575,000**

*Motor vehicle financially constrained plan includes sidewalks and bike lanes are new roadways

The estimated $143 million for transportation capital projects is expected to be adequately funded by the 25-year SDC revenue estimate of $143 million. Combined with the $49.3 million operations and maintenance costs, the estimated total funding need is $192.6 million which will not be adequately funded by the forecasted transportation revenue (see Table 10-1). New funding sources to cover the future roadway maintenance needs and funding shortfall are discussed in the next section.

NEW FUNDING SOURCES AND OPPORTUNITIES

The new transportation improvement projects and recommended programs will require funding beyond the levels currently collected by the City. There are several potential funding sources for transportation improvements. This section summarizes several funding options available for transportation improvements. These are sources that have been used in the past by agencies in Oregon. In most cases, these funding sources, when used collectively, are sufficient to fund transportation improvements for local communities. Due to the complexity of today's transportation projects, it is necessary to seek several avenues of funding projects. Unique or hybrid funding of projects generally will include these funding sources combined in a new package.

Within the Portland region, funding for major transportation projects often is brought to a vote of the public for approval. This is usually for a large project or list of projects. Because of the need to gain public approval for transportation funding, it is important to develop a consensus in the community that supports needed transportation improvements. That is the value of the Transportation System Plan. In most communities where time is taken to build a consensus regarding a transportation plan, funding sources can be developed to meet the needs of the community.

Transportation program funding options range from local taxes, assessments, and charges to state and federal appropriations, grants, and loans. All of these resources can be constrained based on a variety of factors, including the willingness of local leadership and the electorate to burden citizens and businesses; the availability of local funds to be dedicated or diverted to transportation issues from other competing City programs; and the availability and competitiveness of state and federal funds. Nonetheless, it is important for the City to consider all of its options and understand where its power may exist to provide and enhance funding for its Transportation programs.

The following funding sources have been used by cities to fund the capital and maintenance aspects of their transportation programs. There may be means to begin to or further utilize these sources, as described below, to address new needs identified in the Transportation System Plan.

General Fund Revenues

At the discretion of the City Council, the City can allocate General Fund revenues to pay for its Transportation program (General Fund revenues primarily include property taxes, use taxes, and any other miscellaneous taxes and fees imposed by the City). This allocation is completed as a part of the City's annual budget process, but the funding potential of this approach is constrained by competing community priorities set by the City Council. General Fund resources can fund any aspect of the program, from capital improvements to operations, maintenance, and administration. Additional revenues available from this source to fund new aspects of the Transportation program are only available to the extent that either General Fund revenues are increased or City Council directs and diverts funding from other City programs.

Local Gas Tax

The City recently approved a development with a gas station at Sunnyside Road/172nd Avenue. As forecasted growth occurs, especially along Sunnyside Road and 172nd Avenue, there is a potential for several additional gas stations to be constructed within the City and additional transportation revenue to be generated.

Transportation Maintenance Fee

A number of Oregon cities supplement their street funds with transportation maintenance fees. Local cities with adopted transportation maintenance fees include Lake Oswego, Wilsonville and Tualatin. Establishing user fees to fund applicable transportation activities and/or capital construction ensures that those who create the demand for service pay for it proportionate to their use. The transportation maintenance fees are recurring monthly or bi-monthly charges that are paid by all residential, commercial, industrial, and institutional users. The fees are charged proportionate with the amount of traffic generated, so a retail commercial user pays a higher rate than a residential user. Typically, there are provisions for reduced fees for those that can demonstrate they use less than the average rate implies, for example, a resident that does not own an automobile or truck.

From a system health perspective, forming a utility also helps to support the ongoing viability of the program by establishing a source of reliable, dedicated funding for that specific function. Fee revenues can be used to secure revenue bond debt used to finance capital construction. A transportation maintenance program can be formed by Council action and does not require a public vote.

Other Funding Sources

Urban Renewal District

An Urban Renewal District (URD) would be a tax-funded district within the City. The URD would be funded with the incremental increases in property taxes that result from construction of applicable improvements. This type of tax increment financing has been used in Oregon since 1960. Uses of the funding include, but are not limited to, transportation. It is tax-increment funded rather than fee funded and the URD could provide for renewal that includes, but is not limited to, transportation projects.

Local Improvement District Assessment Revenue

The City may set up Local Improvement Districts (LIDs) to fund specific capital improvement projects within defined geographic areas, or zones of benefit. LIDs impose assessments on properties within its boundaries. LIDs may not fund ongoing maintenance costs. They require separate accounting, and the assessments collected may only be spent on capital projects within the geographic area. Citizens representing 33% of the assessment can terminate a LID and overturn the planned projects so projects and costs of a LID must meet with broad approval of those within the boundaries of the LID.

Direct Appropriations

The City can seek direct appropriations from the State Legislature and/or U.S. Congress for transportation capital improvements. There may be projects identified in the Plan for which the City may want to pursue these special, one-time appropriations.

Special Assessments

A variety of special assessments are available in Oregon to defray costs of sidewalks, curbs, gutters, street lighting, parking and CBD or commercial zone transportation improvements. These assessments would likely fall within the Measure 50 limitations. A regional example would be the Westside LRT where the local share of funding was voter approved as an addition to property tax.

Debt Financing

While not a direct funding source, debt financing can be used to mitigate the immediate impacts of significant capital improvement projects and spread costs over the useful life of a project. Though interest costs are incurred, the use of debt financing can serve not only as a practical means of funding major improvements, but is also viewed as an equitable funding strategy, spreading the burden of repayment over existing and future customers who will benefit from the projects. The obvious caution in relying on debt service is that a funding source must still be identified to fulfill annual repayment obligations.

Voter-Approved General Obligation Bond Proceeds

Subject to voter approval, the City can issue General Obligation (G.O.) bonds to debt finance capital improvement projects. G.O. bonds are backed by the increased taxing authority of the City, and the annual principal and interest repayment is funded through a new, voter-approved assessment on property City-wide (a property tax increase). Depending on the critical nature of any projects identified in the Transportation Plan, and the willingness of the electorate to accept increased taxation for transportation improvements, voter-approved G.O. bonds may be a feasible funding option for specific projects. Proceeds may not be used for ongoing maintenance.

Revenue Bonds

Revenue bonds are debt instruments secured by rate revenue. In order for the City to issue revenue bonds for transportation projects, it would need to identify a stable source of ongoing rate funding. Interest costs for revenue bonds are slightly higher than for general obligation bonds, due to the perceived stability offered by the “full faith and credit” of a jurisdiction.

Oregon Transportation Infrastructure Bank Loans

A statewide revolving loan fund designed to promote innovative transportation funding solutions. State support for the program is provided by the Financial Services Branch of ODOT. In general, eligible projects include highway, transit, bikeway and pedestrian access projects. Projects are rated on established criteria and recommended based on the rankings. Repayment of loans must begin within five years of project completion and must be complete within 30 years or at the end of the useful life of the project.

Next Steps

Happy Valley is currently investigating the use of a transportation maintenance fee to help fund local transportation projects. A transportation maintenance fee program will identify potential fees for various land uses in the city, estimate annual revenue generation, identify priority transportation projects to be constructed and evaluate implementation of the program.