HAPPY VALLEY

Transportation System Plan

March 2023

HAPPY VALLEY, OR
EST. 1965

ACKNOWLEDGEMENTS

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The Transportation System Plan (TSP) prepares Happy Valley for accommodating traffic within the city in the best manner possible through 2040. The TSP's big picture view allows it to guide the city in developing and maintaining acceptable transportation network performance more efficiently than a piecemeal or unorganized approach.

As the transportation element of the city's Comprehensive Plan, the TSP embodies the community's vision for an efficient, safe, and diverse transportation system. The TSP attempts to balance the needs of walking, bicycling, driving, transit and freight with strategies and projects that are important for protecting and enhancing the quality of life in Happy Valley through the next 20 years. The TSP is a collection of current inventory, forecasts, past and current project ideas, decisions, and standards housed in a single document. The city, Clackamas County, private developers, and state (e.g., Oregon Department of Transportation) or federal agencies all have a role in implementing elements of the TSP.

This update was 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. By setting priorities for available and anticipated funds in the 20-year planning period, the TSP provides a foundation for budgeting, grant writing, and requiring public improvements of private development.

This plan is intended to serve areas within the Happy Valley planning area. Other nearby jurisdiction, including City of Portland, City of Gresham and Clackamas County, have their own TSPs.

The first Happy Valley Transportation System Plan (TSP) was adopted December 1998. Several major updates have occurred, the most recent in July 2021. The primary purpose of this update is to address recent changes, with a focus on:

- Incorporating transportation facilities identified in the Pleasant Valley North Carver Comprehensive Plan

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. The history of the Happy Valley TSP is shown in Table 1-1.

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
November 2016	507	RTFP Compliance, year 2040 horizon year
December 2017	532	Incorporated recent development approvals, TSDC update
July 2021	xxx	Incorporate Rock Creek Employment Infrastructure Plan and Pedestrian and Trail Master Plan
March 2023	xxx	Incorporate Pleasant Valley North Carver Comprehensive Plan

THE PLANNING PROCESS

The Happy Valley TSP is the result of a collaboration among city staff, citizen representatives and key representatives from the surrounding communities. Throughout this process, the project team took time to understand multiple points of view, obtain fresh ideas, and encourage broad participation, as it collected and analyzed data and possible solutions. 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. The project process is illustrated in Figure 1-1.

- **Technical Advisory Committee (TAC)** – Agency staff from the City, Metro, the Oregon Department of Transportation (ODOT), TriMet, and Clackamas County participated in reviewing the technical methods and findings of the study. Several 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.

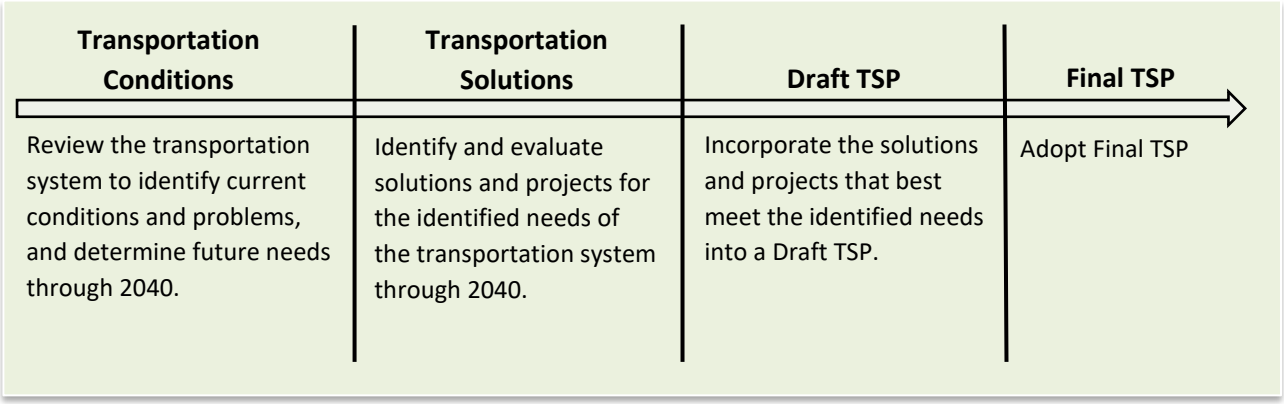


Figure 1-1: The TSP Process

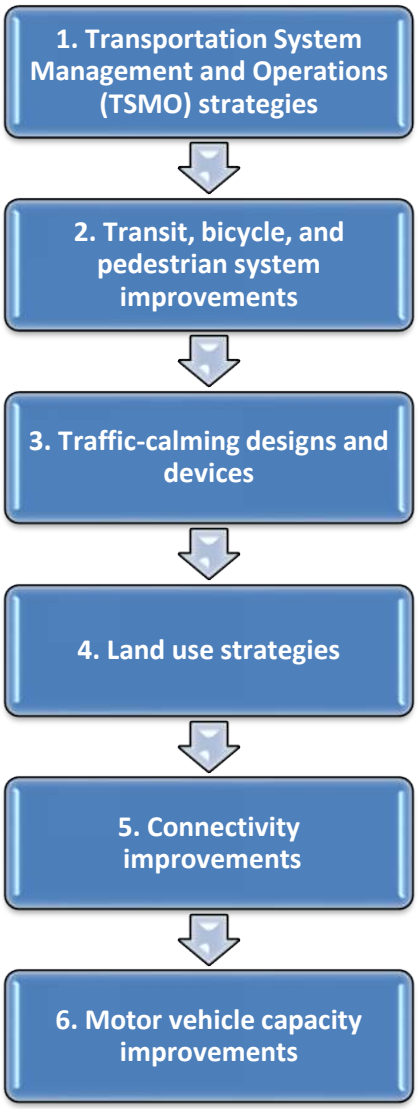
GOALS AND POLICIES

The goals and policies 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. 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 Figures 5-1 through 5-4. 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 5-2.

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, shown in 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 6-2.

Transit Plan

TriMet is the regional transit provider for the Portland metro area and operates three bus routes within Happy Valley today (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. A Transit 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 7-3.

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.

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 8-10. 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 8-9. 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.

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 system development charges and fronting improvements to land development.

Under the above funding programs, Happy Valley would collect a total revenue of $217 million over the next 20 years. The majority of these funds are from estimated TSDC 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 TSDC revenue would be reduced drastically.

The cost estimates outlined in the TSP to implement the financially constrained project list for motor vehicles, transit, bicycles and pedestrians total $175 million, and the recommended transportation operations and maintenance programs would add $50 million for a total cost over 20 years of $225 million. Refer to Chapter 5 through 8 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 cost estimates but are identified in the master plans.

The estimated $175 million for transportation capital projects is expected to be adequately funded by the 20-year revenue estimate of $217 million. Combined with the $50 million operations and maintenance costs, the estimated total funding need is $225 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.

2. Goals and Policies

Goals and policies to guide transportation system development in Happy Valley were first established by the 1998 TSP and were 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: <u>Multi-Modal Travel</u> - 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: <u>Accessibility</u> - 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: <u>Cooperation</u> - 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: <u>Goods Movement</u> - 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

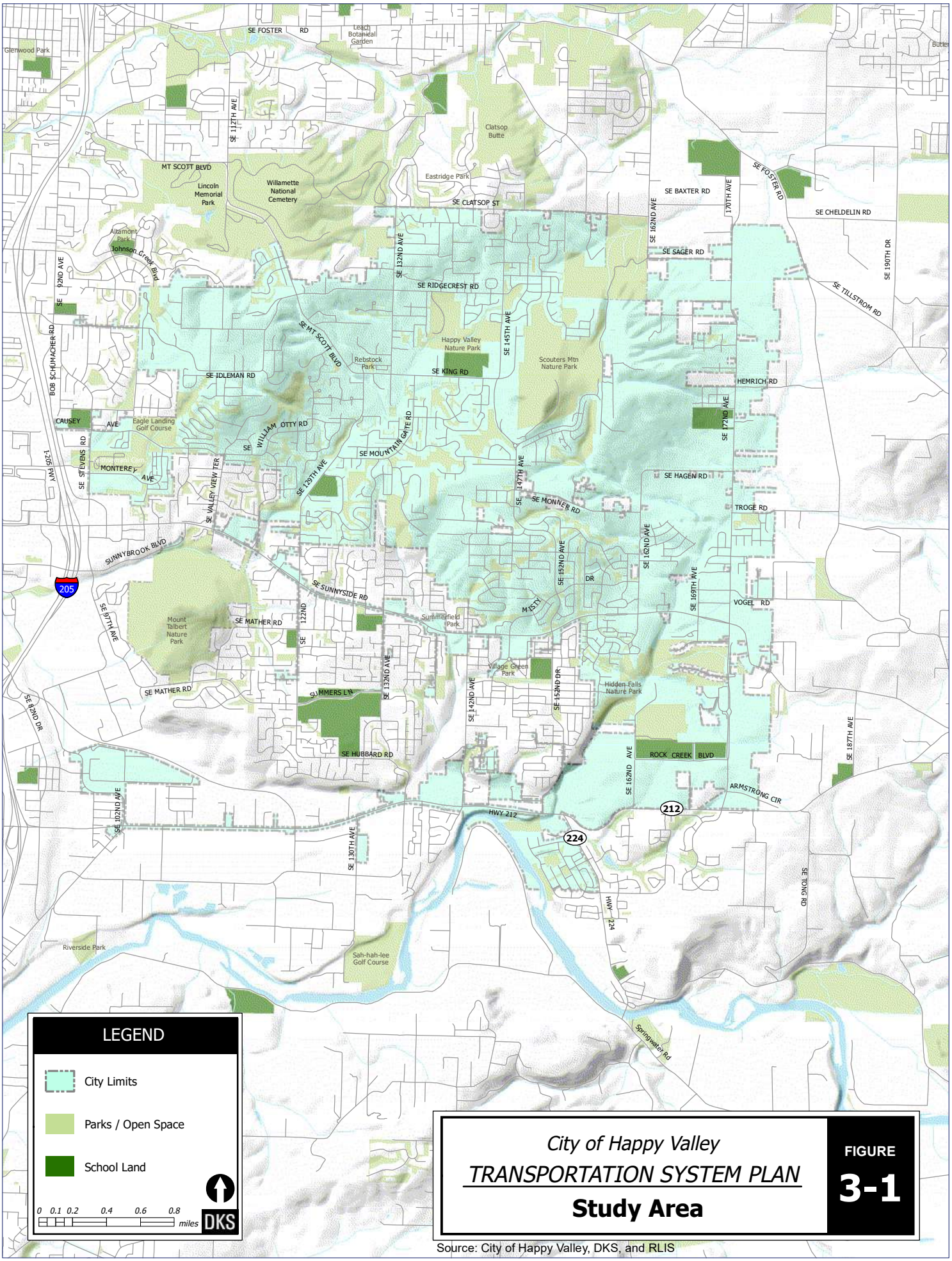
This chapter presents the existing condition of the transportation network in the study area for the Happy Valley transportation system plan. The purpose of this chapter is to document existing transportation facilities in the study area. The findings will be a basis for determining the existing transportation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

Thirty one intersections 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.



City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Study Area

FIGURE 3-1

Source: City of Happy Valley, DKS, and RLIS

PEDESTRIANS

Pedestrian transportation provides a crucial link in an active transportation network and can be used as a means of physical activity, a first or last mile trip connection, and to provide transportation choices for all users. The pedestrian system includes sidewalks, paths, marked crosswalks, local multi-use trails and regional trails.

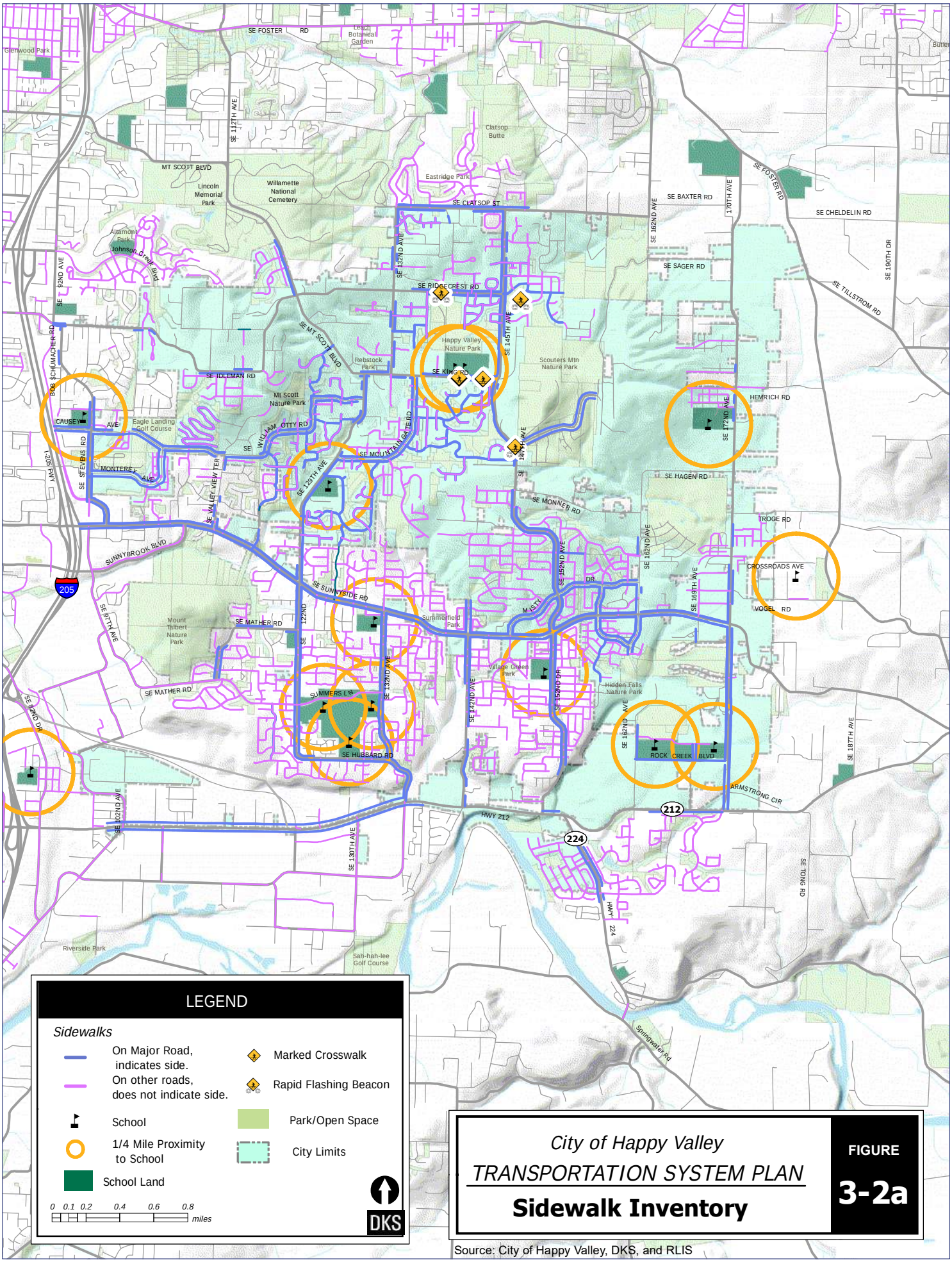
To assess the current adequacy of the pedestrian system in the study area, an inventory was conducted. The inventory is summarized in the following sections.

Sidewalks and Enhanced Crosswalks

An inventory of existing sidewalks and enhanced crosswalks on public roadways in the Plan area was undertaken to assess the current needs of the on-street pedestrian system. The existing inventory is shown in Figure 3-2A. Sidewalks are provided on most major streets within the core of Happy Valley, although sidewalks are more limited on the periphery of Happy Valley, including on 172nd Avenue, OR 212, Mt. Scott Boulevard, and Idleman Road. Within the core of Happy Valley, sidewalks are provided on at least one side of most arterial and collector roads. Small gaps and limited connectivity do exist, particularly in older portions of Happy Valley, however, these gaps are often constrained by topology or drainage needs which could make increasing sidewalk connectivity in these locations challenging. Sidewalks are included on most local streets, particularly in new developments within Happy Valley.

Crosswalks are typically marked at traffic signals, roundabouts, and on select legs of all-way stop control intersections throughout Happy Valley. Crosswalks are typically unmarked at mid-block crossing locations and across the major road at two-way stop control intersections; however, at key crossing locations, marked crosswalks or a rapid flashing beacon are provided. Pedestrian volumes are the highest along Sunnyside Road, corresponding to the high number of pedestrian destinations on this corridor, and can approach 30 pedestrians an hour at key intersections based on traffic counts previously collected throughout Happy Valley. Pedestrian volumes tend to be lower in the morning with most intersections seeing five or fewer pedestrians while volumes increase during the mid-day and evening where most intersections see between five and 30 pedestrians. Trail crossings or other key intersections, including those near schools, likely serve a higher number of pedestrians; however, no data is available at these locations.

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. In the western portion of the study area, 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. In the eastern portion of the study area, many facilities are not improved to urban standards and lack any sidewalks Missing sidewalk network discourage pedestrian use and put pedestrians at an increased safety risk by requiring them to share the roadway with vehicles.



LEGEND

Sidewalks

- On Major Road, indicates side.
- On other roads, does not indicate side.
- School
- 1/4 Mile Proximity to School
- School Land
- Marked Crosswalk
- Rapid Flashing Beacon
- Park/Open Space
- City Limits

0 0.1 0.2 0.4 0.6 0.8 miles

DKS

City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Sidewalk Inventory

FIGURE 3-2a

Source: City of Happy Valley, DKS, and RLIS

The major existing sidewalk deficiencies include:

- Sidewalk gaps along King Road west of Regina Court 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 Pleasant Valley Parkway 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.
- The lack of sidewalks on Vogel Road near Beatrice Morrow Cannady Elementary School significantly impacts pedestrian access to the school.
- The lack of sidewalks on Foster Road, Troge Road, Hemrich Road, Sager Road and Tillstrom Road limited pedestrian connectivity in the eastern portion of the study area.

Safe Routes to School

Students access the Happy Valley Elementary School and Middle School site primarily through by crossing in three locations: The Happy Valley Nature Park to the north, across King Road to the south, and across 145th Avenue to the east. A survey of parents at the Happy Valley Elementary School identified the existing sidewalk and pathways (over 40% of respondents) and the safety of crossings (57% of respondents) as barriers to walking and biking for their students.

Students access the Happy Valley Elementary School and Middle School site primarily through by crossing in three locations: The Happy Valley Nature Park to the north, across King Road to the south, and across 145th Avenue to the east. A survey of parents at the Happy Valley Elementary School identified the existing sidewalk and pathways (over 40% of respondents) and the safety of crossings (57% of respondents) as barriers to walking and biking for their students.

Students access the Mt. Scott Elementary School primarily from the south along Stevens Road although residential areas surround the school to both the north and east. Sidewalks are typically available to the south as part of recent residential developments while more significant gaps exist to the north which makes it more challenging for students to walk to school from the north. Previous observations indicated that students used the marked bike lanes on Stevens Way as a sidewalk, creating a significant safety concern.

Trails

An inventory of paved and unpaved trails was conducted for the Happy Valley Pedestrian Master in 2020 as shown in Figure 3-2B. These trails include recreational trails in natural areas, park trails, connections within subdivisions and paved alleys. Several trails within the study area are comprised of stairways due to the steep topography.

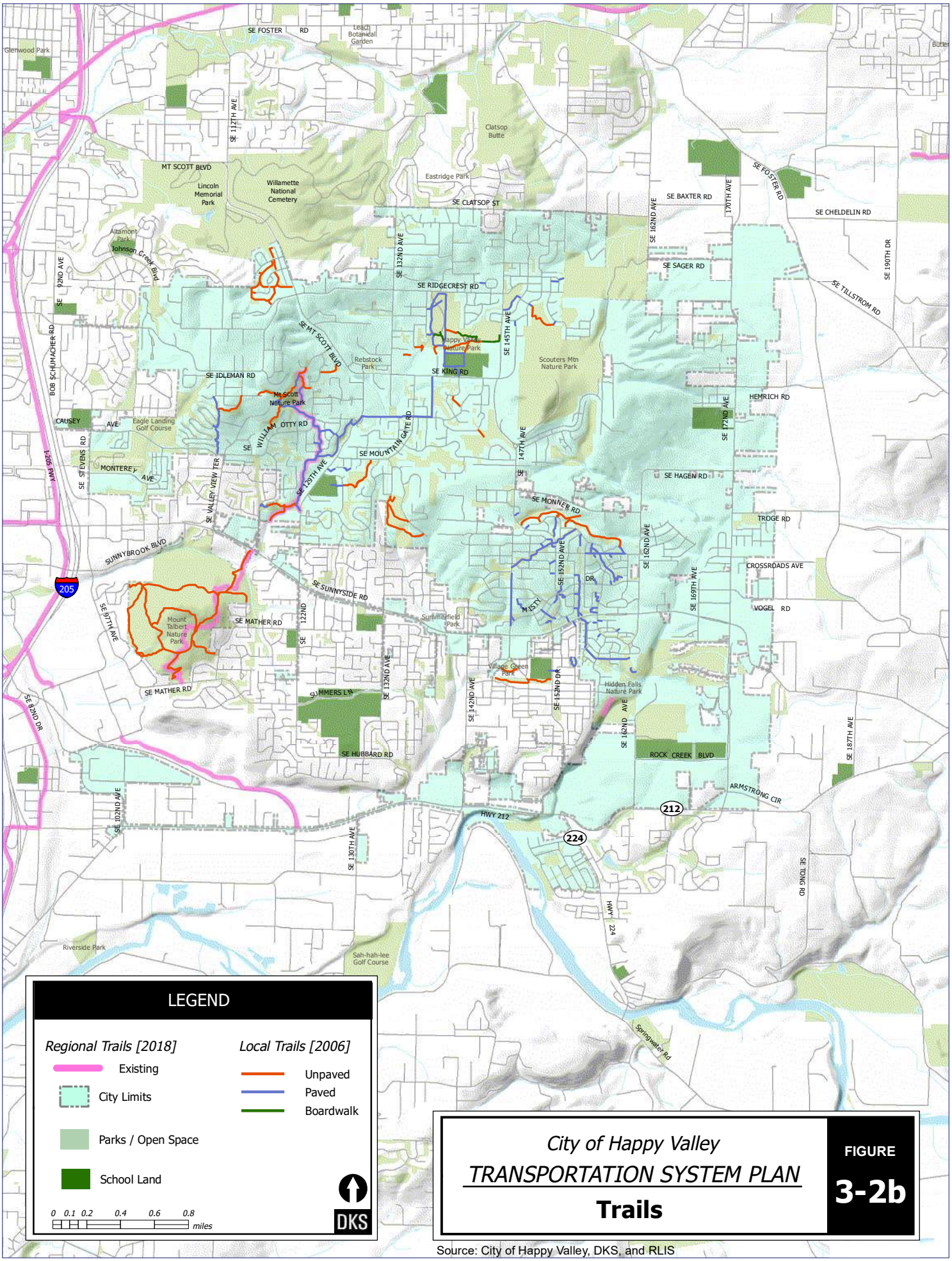
Table 3-1 summarizes the 2006 inventory of trails by name, ownership, maintenance, surface type, approximate length, and location. The trail identification number coincides with the trails shown in Figure 3-2B. In general, the City of Happy Valley owns most of the trails that have names, while those marked N/A are homeowner association owned and maintained with public easements over them.

Table 3-1: 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.



City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Trails

FIGURE 3-2b

Source: City of Happy Valley, DKS, and RLIS

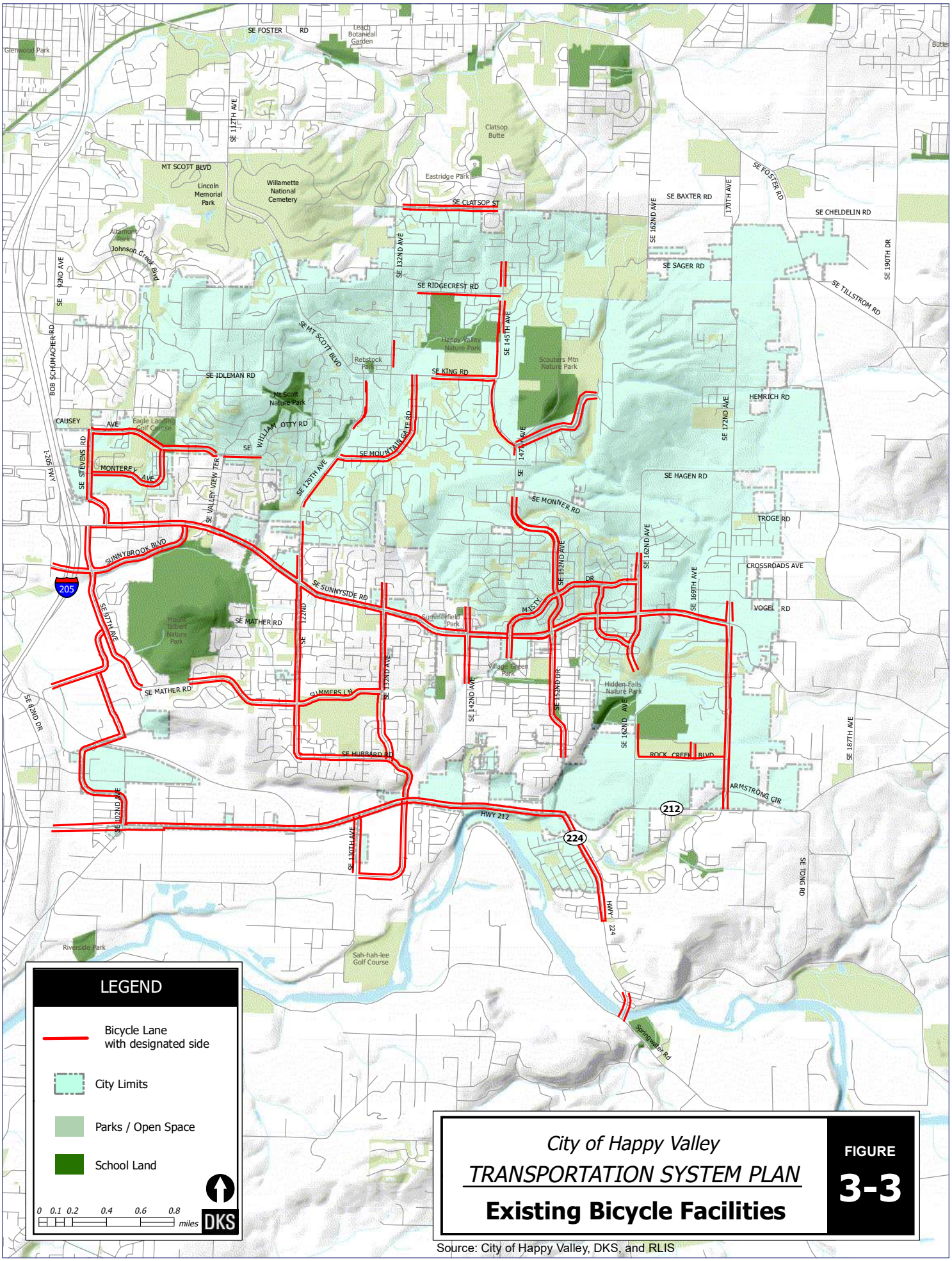
BICYCLES

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. The majority of 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 and sections of 172nd Avenue and 162nd Avenue that have been recently improved or constructed with new development.

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; 129th Avenue – Mt. Scott Boulevard, 147th Avenue – 145th Avenue, 162nd Avenue and Foster Road
- Lack of continuous bike lanes on 172nd Avenue north of Sunnyside Road
- Lack of east-west bike routes north of Sunnyside Road; Idleman Road and Ridgecrest Road are candidates but provide construction challenges, other include Hemrich Road, Troge Road, Vogel Road and Sunnyside Road (east of 172nd Avenue)


LEGEND
Bicycle Lane with designated side
City Limits
Parks / Open Space
School Land
0 0.1 0.2 0.4 0.6 0.8 miles
DKS
SE FOSTER RD
MT SCOTT BLVD
SE 112TH AVE
Lincoln Memorial Park
Willamette National Cemetery
Clatsop Butte
Eastridge Park
SE CLATSOP ST
SE BAXTER RD
SE 162ND AVE
170TH AVE
SE FOSTER RD
SE CHELDELIN RD
SE 190TH DR
SE SAGER RD
SE TILLSTROM RD
SE 132ND AVE
SE RIDGECREST RD
Johnson Creek Blvd
SE 92ND AVE
BOB SCHUMACHER RD
SE MT SCOTT BLVD
Happy Valley Nature Park
SE 145TH AVE
Scouters Mtn Nature Park
Rebstock Park
SE KING RD
SE IDLEMAN RD
Mt Scott Nature Park
HEMRICH RD
SE 172ND AVE
CAUSEY AVE
Eagle Landing Golf Course
SE WILLAMETTE OTTY RD
SE MOUNTAIN GATE RD
SE 147TH AVE
SE STEVENS RD
I-205
MONTEREY AVE
SE 129TH AVE
SE VALLEY VIEW TER
SE HAGEN RD
SE MONNER RD
TROGE RD
SUNNYBROOK BLVD
SE 152ND AVE
SE 162ND AVE
CROSSROADS AVE
205
SE SUNNYSIDE RD
SE 97TH AVE
Mount Talbert Nature Park
SE MATHER RD
SE 122ND
Summerfield Park
MISTY DR
SE 169TH AVE
VOGEL RD
Village Green Park
SE 132ND AVE
SUMMERS LN
SE 142ND AVE
SE 152ND DR
Hidden Falls Nature Park
SE 162ND AVE
SE 82ND DR
SE HUBBARD RD
ROCK CREEK BLVD
SE 187TH AVE
ARMSTRONG CIR
212
HWY 212
224
SE 102ND AVE
SE 130TH AVE
SE TONG RD
HWY 224
Riverside Park
Sah-hah-lee Golf Course
Springwater Rd
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Existing Bicycle Facilities
FIGURE
3-3
Source: City of Happy Valley, DKS, and RLIS

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.

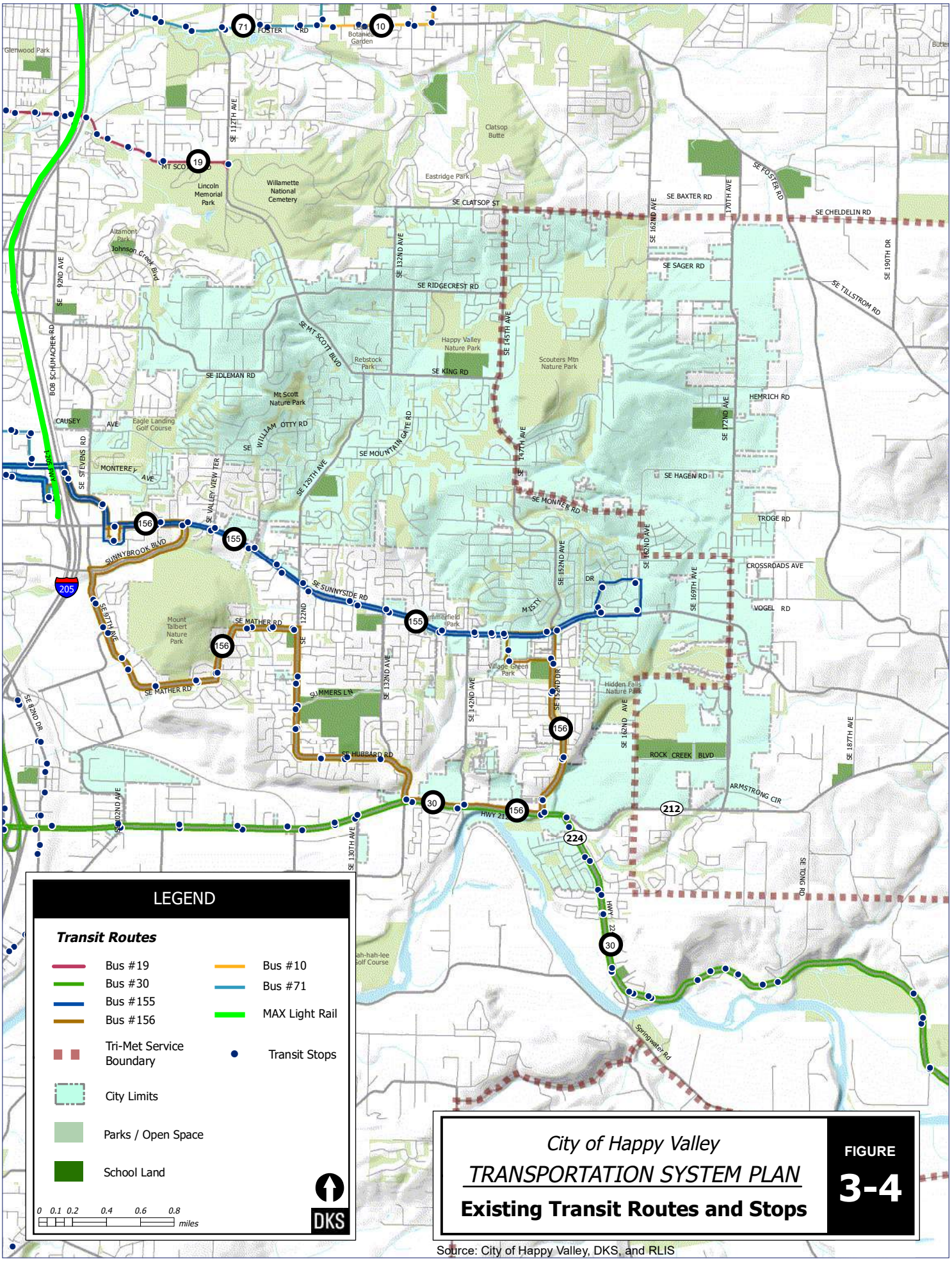
Annual weekday bus ridership was obtained from the 2019 Tri-Met Census[1]. Table 3-2 shows the weekday passenger on and offs on routes 10, 19, 30, 155, 156 and the MAX Green Line that are within or near the study area.

Table 3-2: Transit Weekday Ridership in Happy Valley Planning Area

Route	Limits	On	Off	Total
10 – Harold	I-205 MAX – 136th Avenue	211	199	410
19 – Woodstock/Glisan	I-205 MAX – 112th Avenue	176	131	307
30 – Estacada	82nd Drive – Eckert Lane	158	192	350
155 – Sunnyside	Bob Schumacher Road – 172nd Avenue	308	361	669
156 – Mather Rd	Bob Schumacher Road – Oregon Trail Drive	101	92	193
MAX Green Line	Clackamas Town Center	2,200	2,393	4,593

As shown by the 2019 census data, ridership is moderate on the bus routes serving Happy Valley. The MAX Green Line provides almost 5,000 trips per weekday. Route 155 along Sunnyside Road has the highest bus ridership with approximately 670 ons and offs during a typical weekday. This weekday ridership has doubled since the 2014 census, likely due to recent commercial and multifamily development along the Sunnyside Road corridor. None of the bus routes serving Happy Valley are currently designated Frequent Service (15-minute peak headways) by TriMet.

[1] TriMet Passenger Census, TriMet Transportation Planning, Fall of 2019.

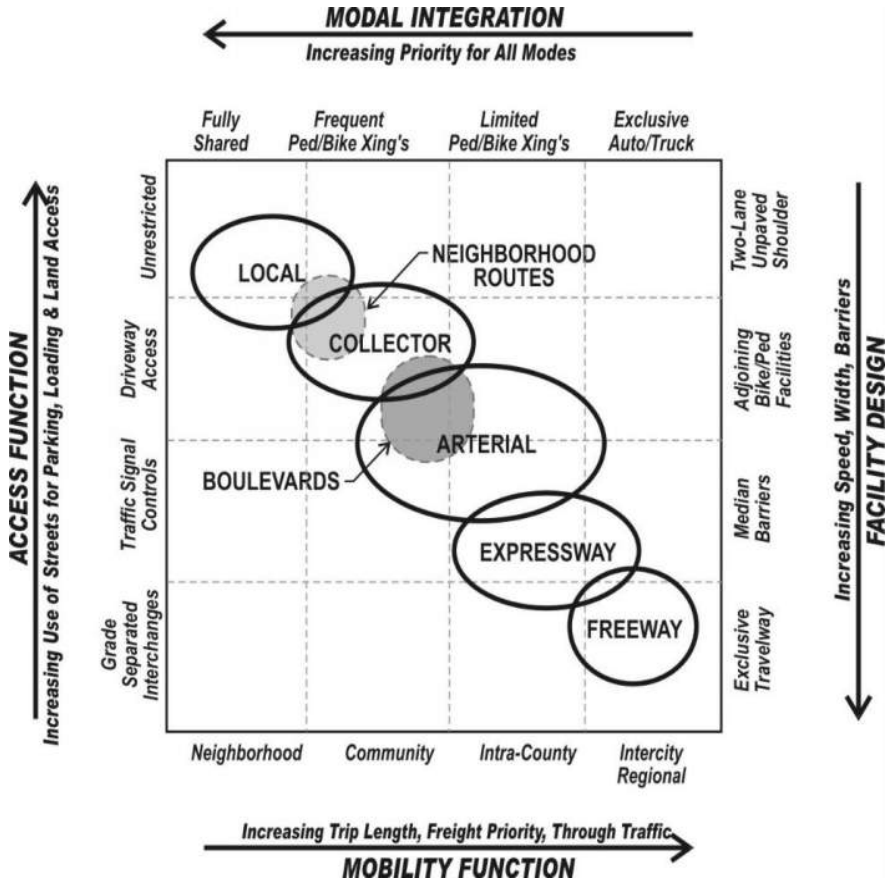

LEGEND
Transit Routes
Bus #19
Bus #30
Bus #155
Bus #156
Bus #10
Bus #71
MAX Light Rail
Tri-Met Service Boundary
Transit Stops
City Limits
Parks / Open Space
School Land
0 0.1 0.2 0.4 0.6 0.8
miles
DKS
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Existing Transit Routes and Stops
FIGURE
3-4
Source: City of Happy Valley, DKS, and RLIS

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 functional classifications from the 2017 TSP 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.

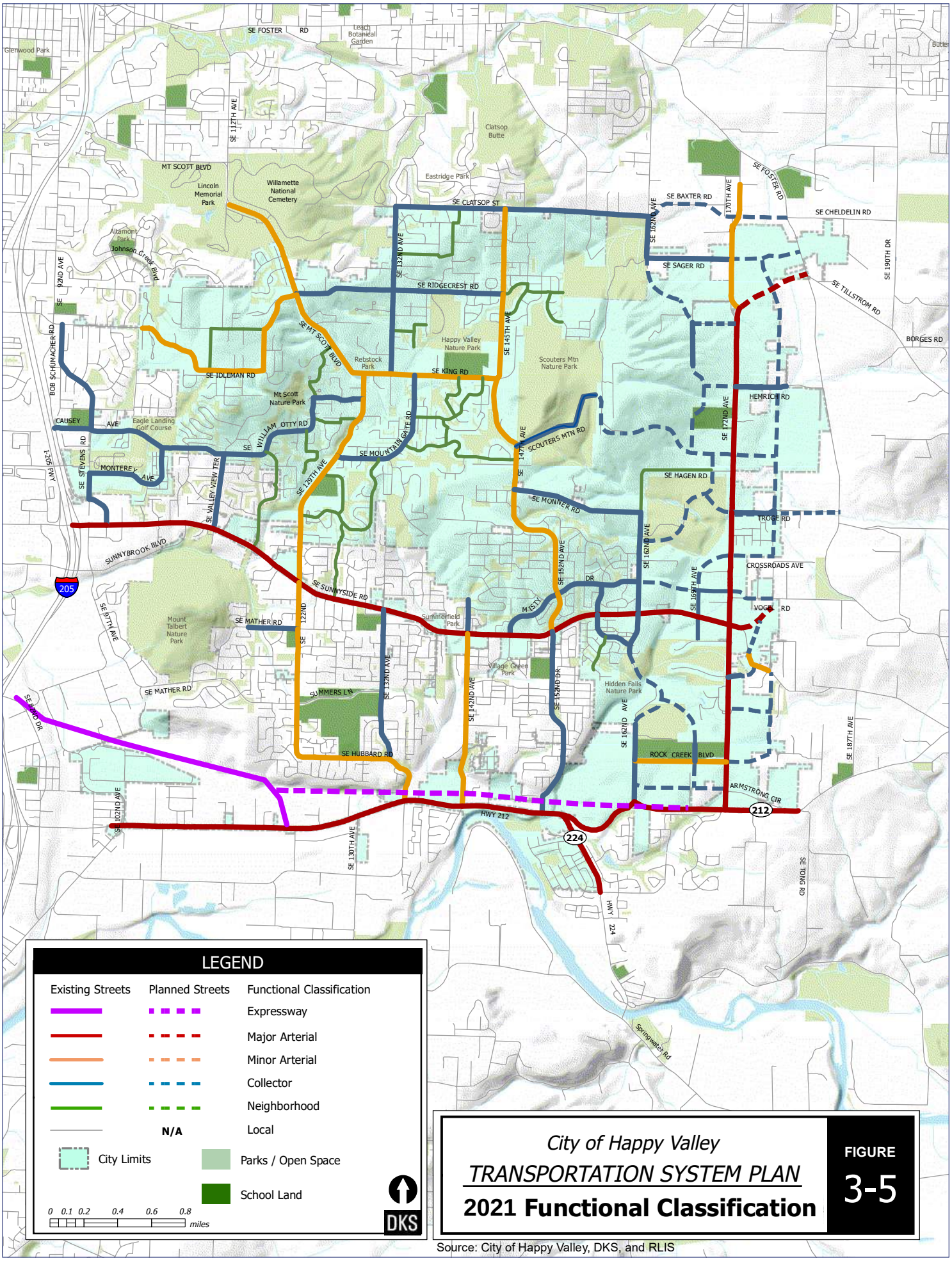
This TSP update should address the limitations of the existing functional class and establish a system that meets City and regional policy issues. A functional class system based primarily on connectivity would allow the design flexibility to handle each of the issues identified above.

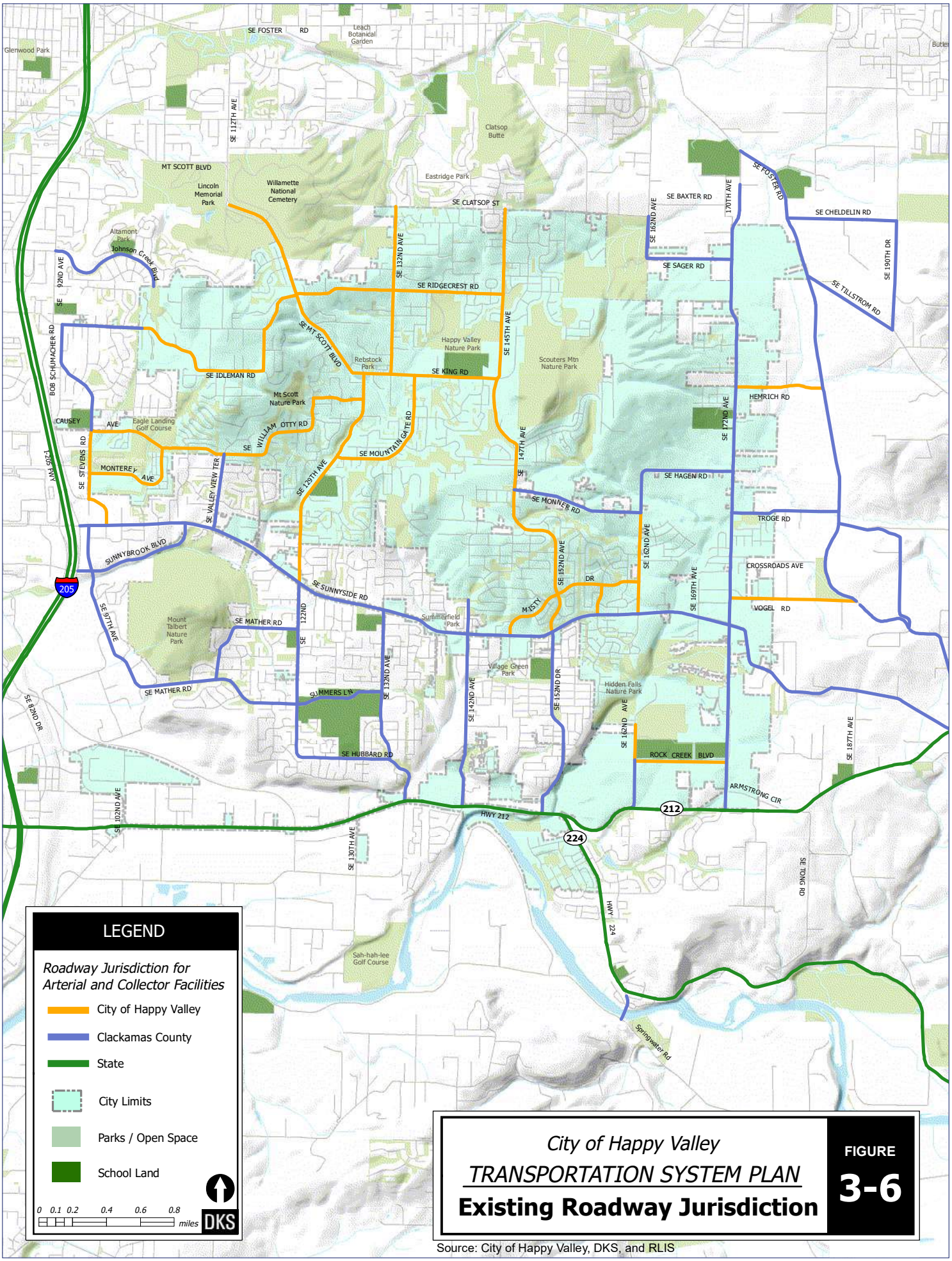
Roadway Jurisdiction

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.


LEGEND
Existing Streets
Planned Streets
Functional Classification
Expressway
Major Arterial
Minor Arterial
Collector
Neighborhood
N/A
Local
City Limits
Parks / Open Space
School Land
0 0.1 0.2 0.4 0.6 0.8
miles
DKS
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
2021 Functional Classification
FIGURE
3-5
Source: City of Happy Valley, DKS, and RLIS



City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Existing Roadway Jurisdiction

FIGURE 3-6

Source: City of Happy Valley, DKS, and RLIS

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 the study area. 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. Foster Road is posted 45 miles per hour. 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 3-3 summarizes the available speed survey data findings.

Table 3-3 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 July 17, 2013.

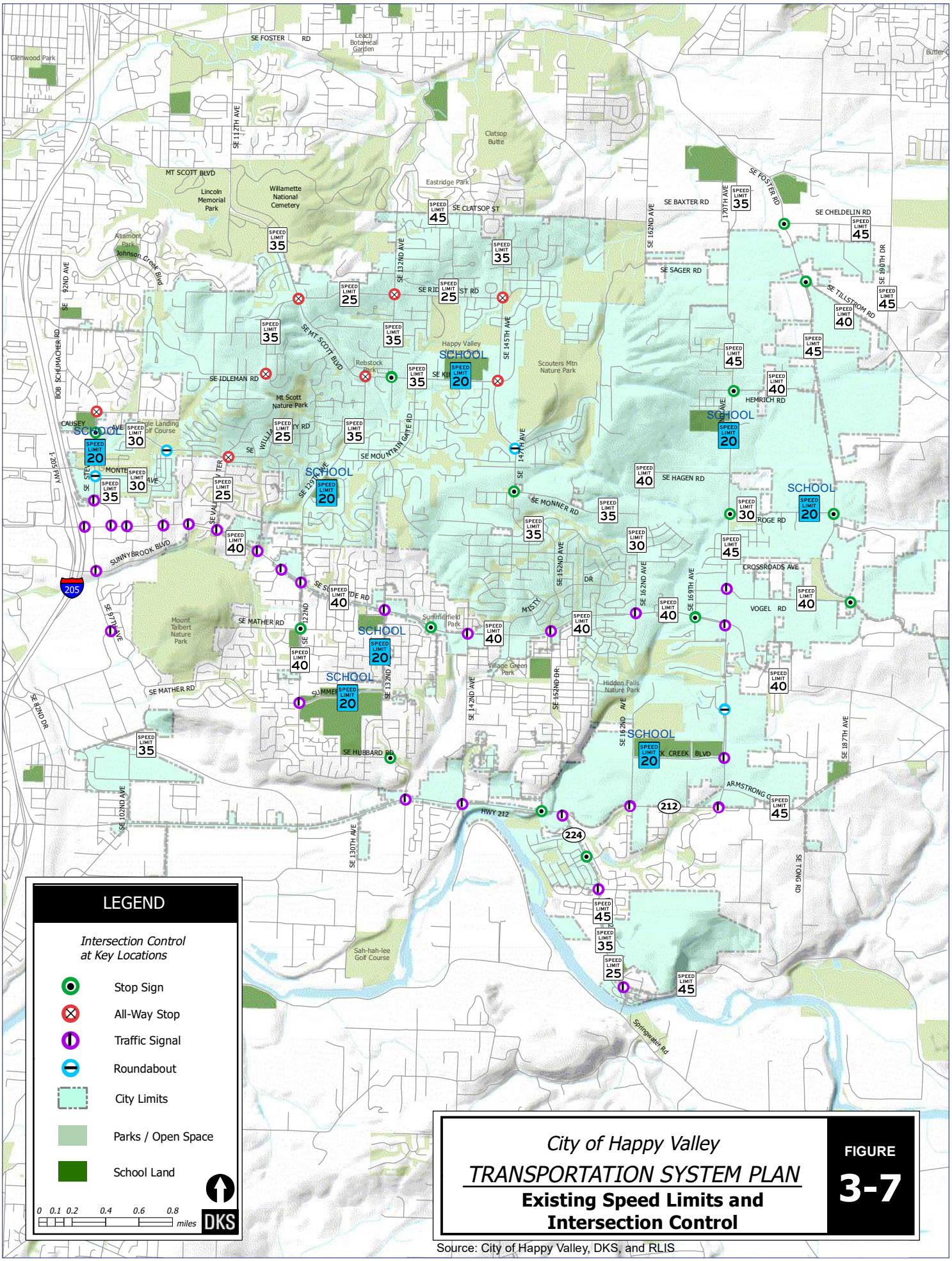
Intersection Control

The only signalized intersections within the City of Happy Valley are located along Sunnyside Road, 172nd Avenue and OR 212/224. The remaining intersections are controlled by stop signs either on the minor street approaches or as an all stop intersection and roundabouts. The existing study intersection locations and the existing intersection controls are shown in Figure 3-7.

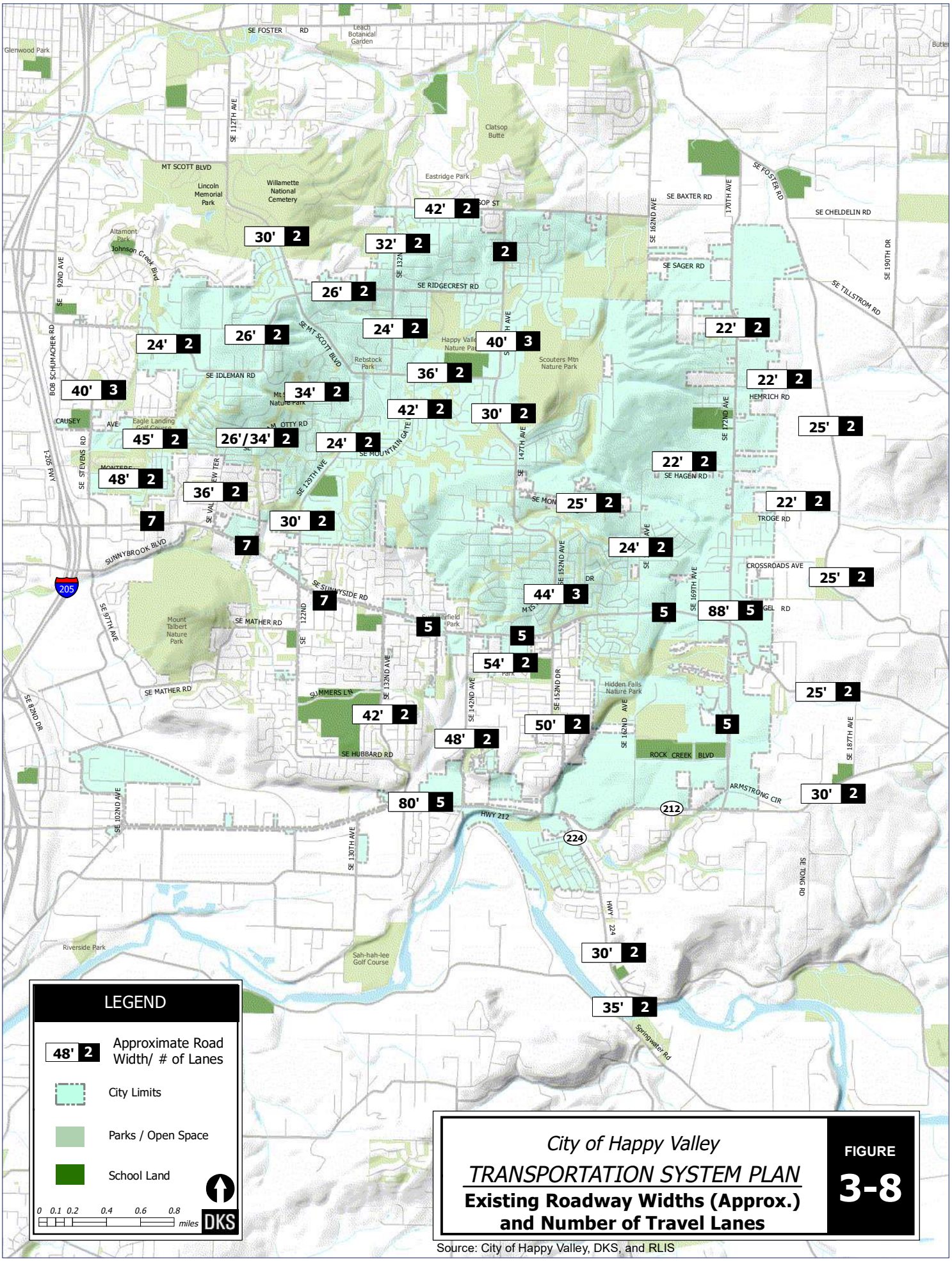
Roadway Cross-section

The existing number of travel lanes on key roadways in the study area 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 Vogel Road and OR 212. The remaining roads generally provide two to three lanes.

The key roadways 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.



Source: City of Happy Valley, DKS, and RLIS



City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Existing Roadway Widths (Approx.) and Number of Travel Lanes

FIGURE 3-8

Source: City of Happy Valley, DKS, and RLIS

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.

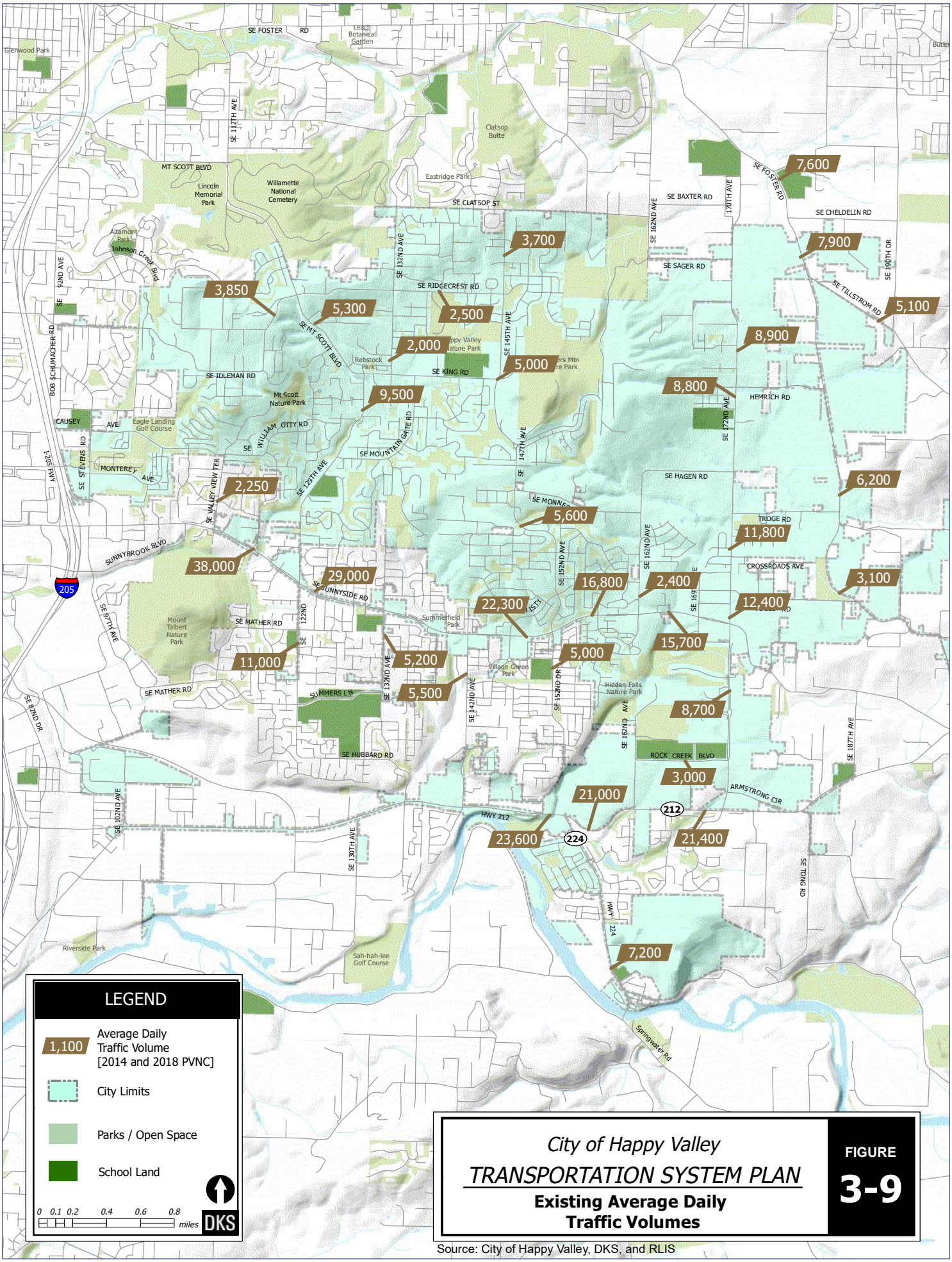
Response times are a high priority for emergency services, as patient care is time-sensitive. Roadway connectivity can play a key role in reducing emergency response times. Generally, restrictive or deflective traffic calming devices (e.g. raised intersections, and diverters) should not be located on 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 and estimates from recent turn movement 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 and 2018 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



City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Existing Average Daily Traffic Volumes

FIGURE 3-9

Source: City of Happy Valley, DKS, and RLIS

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 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 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 3-4 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.

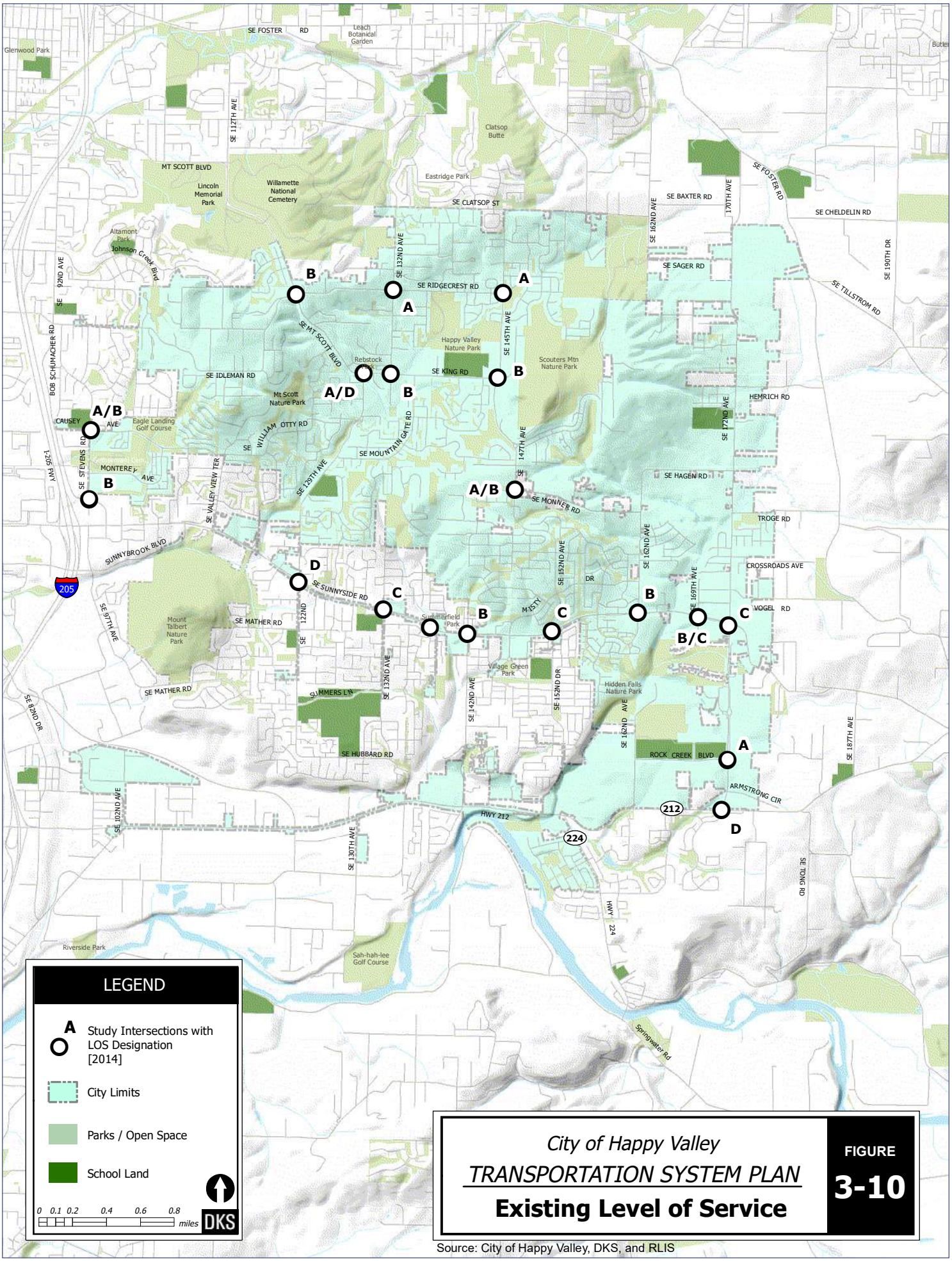
City Mobility Standards:

- 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.

Table 3-4: 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
Foster Road/Cheldelin Road	A/C	18.1	0.16
Foster Road /Tillstrom Road	A/D	31.8	0.55
190th Drive/Tillstrom Road	A/C	15.4	0.27
172nd Avenue/Hemrich Road	A/D	27.7	0.40
Foster Road /Troge Road	A/B	13.0	0.27
Foster Road /Vogel Road	A/B	13.0	0.35
OR 224/Springwater Road	B/F	>200.0	1.42
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
OR 212/OR 224	D	45.4	1.00

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



City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Existing Level of Service

FIGURE 3-10

Source: City of Happy Valley, DKS, and RLIS

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 3-5. Crash rates were compared to statewide 90th percentile crash rates published by ODOT[2] 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.

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

Table 3-5: 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

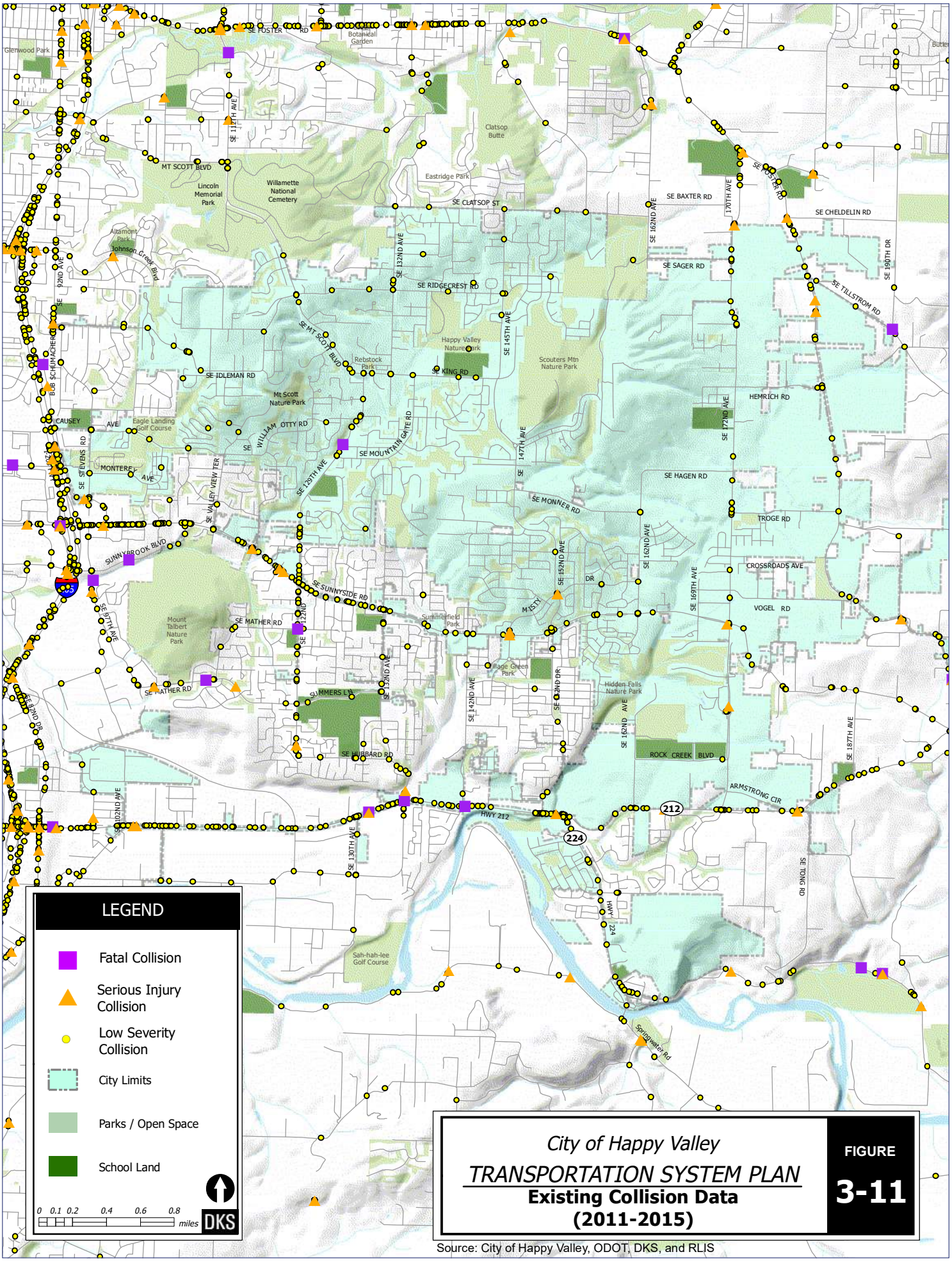
**Average annual accidents per million entering vehicles

[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.



City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Existing Collision Data (2011-2015)

FIGURE 3-11

Source: City of Happy Valley, ODOT, DKS, and RLIS

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[3] 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.

[3] 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

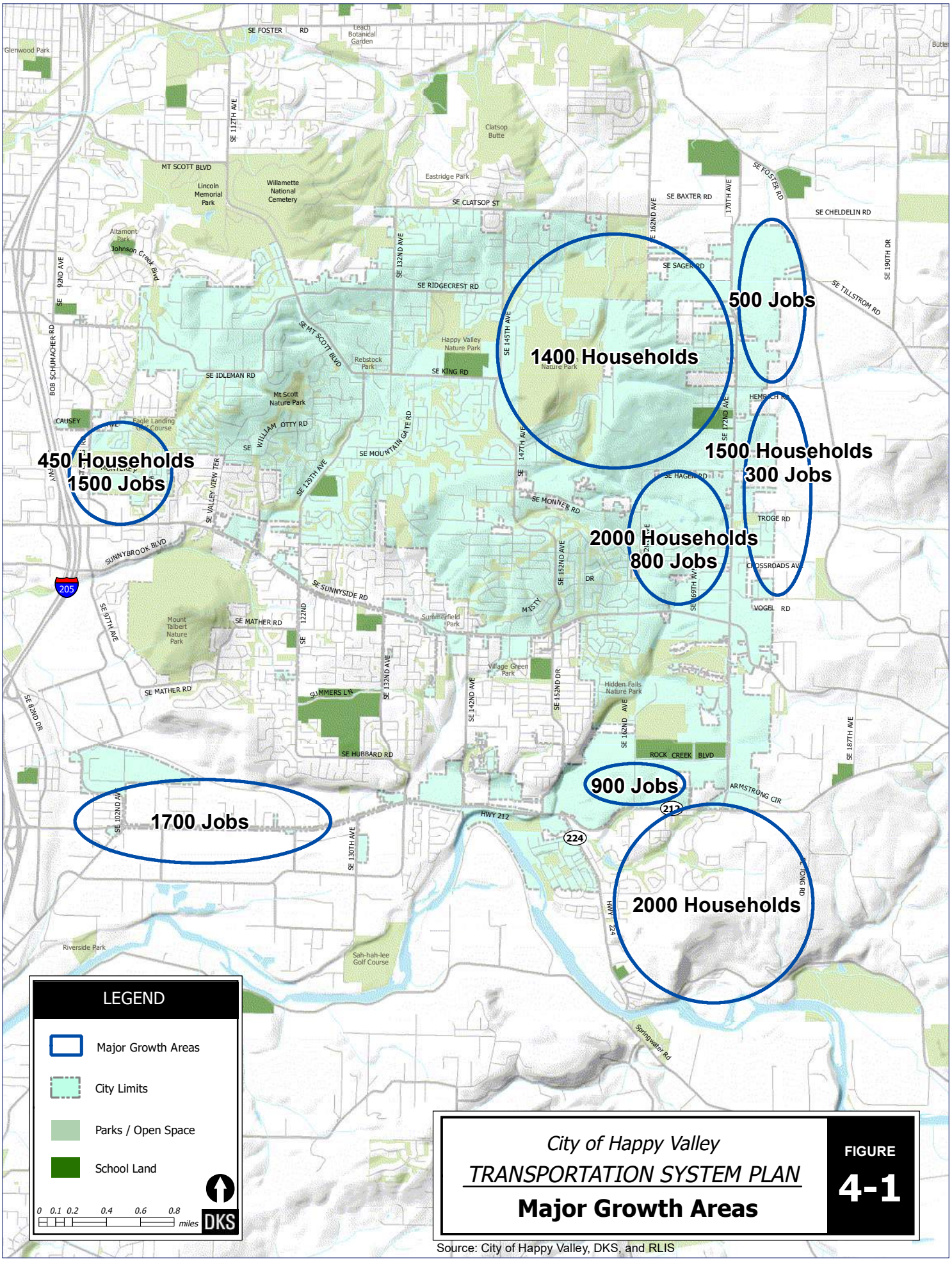
Land use is a key factor in developing a functional transportation system. The amount of land that is planned to be developed, the type of land uses and how the land uses are mixed together have a direct relationship to expected demands on the transportation system. Understanding the amount and type 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 2015 Conditions (base travel forecast for the region)
- Future 2040 Conditions

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 Comprehensive Plan area (including Rock Creek Employment Center), Eagle Landing (located near Stevens Road/Monterey Avenue), Pleasant Valley/North Carver Comprehensive Plan area and should areas continue to be annexed within the city limits, the OR 212/224 industrial corridor.



City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Major Growth Areas

FIGURE 4-1

Source: City of Happy Valley, DKS, and RLIS

The base year travel model is updated periodically and for this study effort, the available base model provided by Metro was for year 2015. This land use database includes the number of dwelling units and employees for various categories. Table 4-1 summarizes the land uses for the 2015 base and future 2040 scenarios within the Happy Valley TSP study area.

These land use projections are higher than the previous 2040 forecasts due to the expanded TSP study area in the Pleasant Valley and North Carver areas. 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.

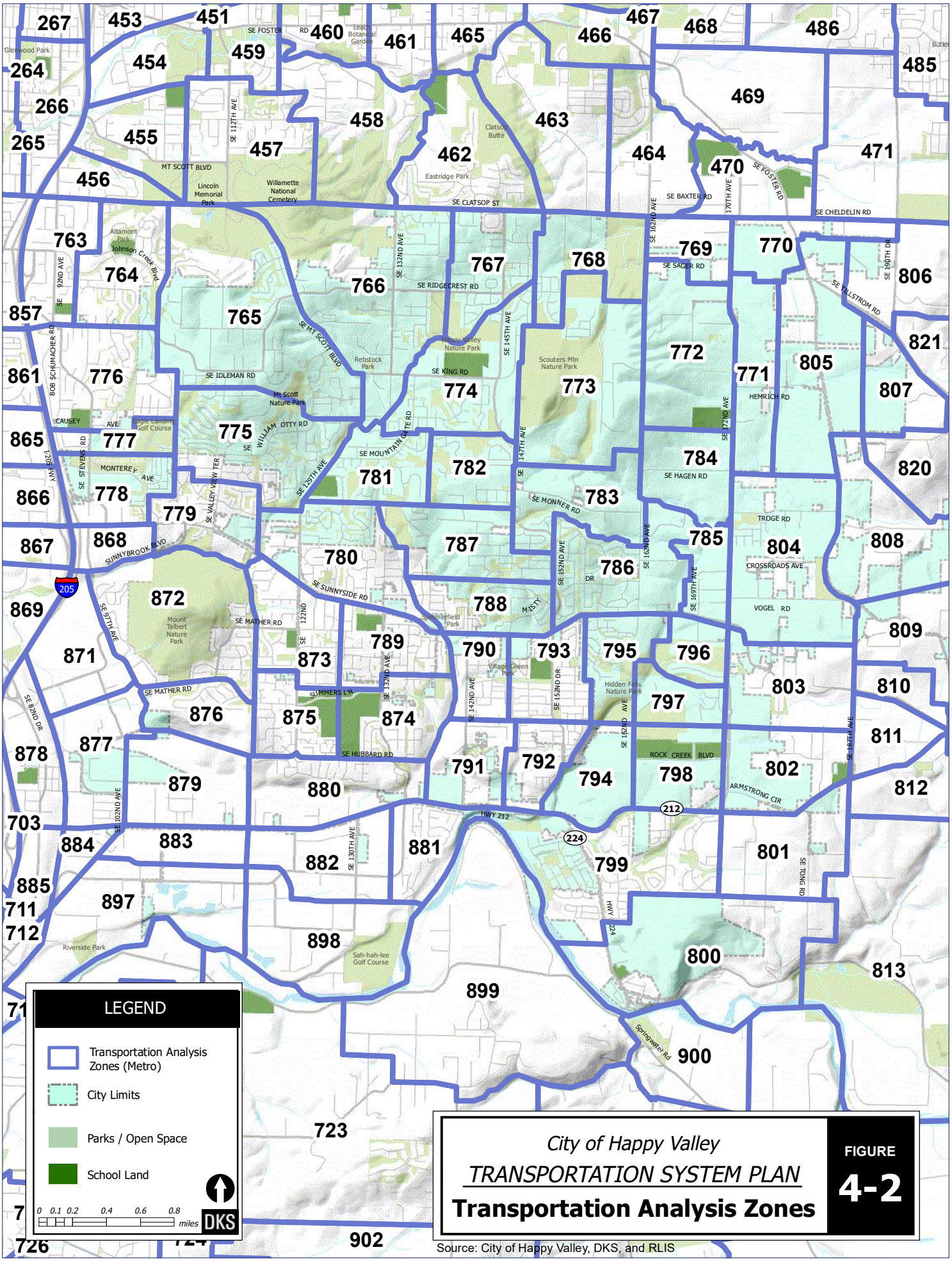
Table 4-1: Study Area Land Use Summary

Scenario	Growth (2015 to 2040)		Total (2040)	
	Households	Employees	Households	Employees
2040 TSP Land Use Projection	8,400	1,200	10,800	1,700

Note: Future land use projections for housing and employment include PV/NC growth added to the Metro travel demand base model land use data.

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 60 Metro TAZs within the Happy Valley TSP study area. The disaggregated model zone boundaries are shown in Figure 4-2.


LEGEND
Transportation Analysis Zones (Metro)
City Limits
Parks / Open Space
School Land
0 0.1 0.2 0.4 0.6 0.8 miles
DKS
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Transportation Analysis Zones
FIGURE
4-2
Source: City of Happy Valley, DKS, and RLIS

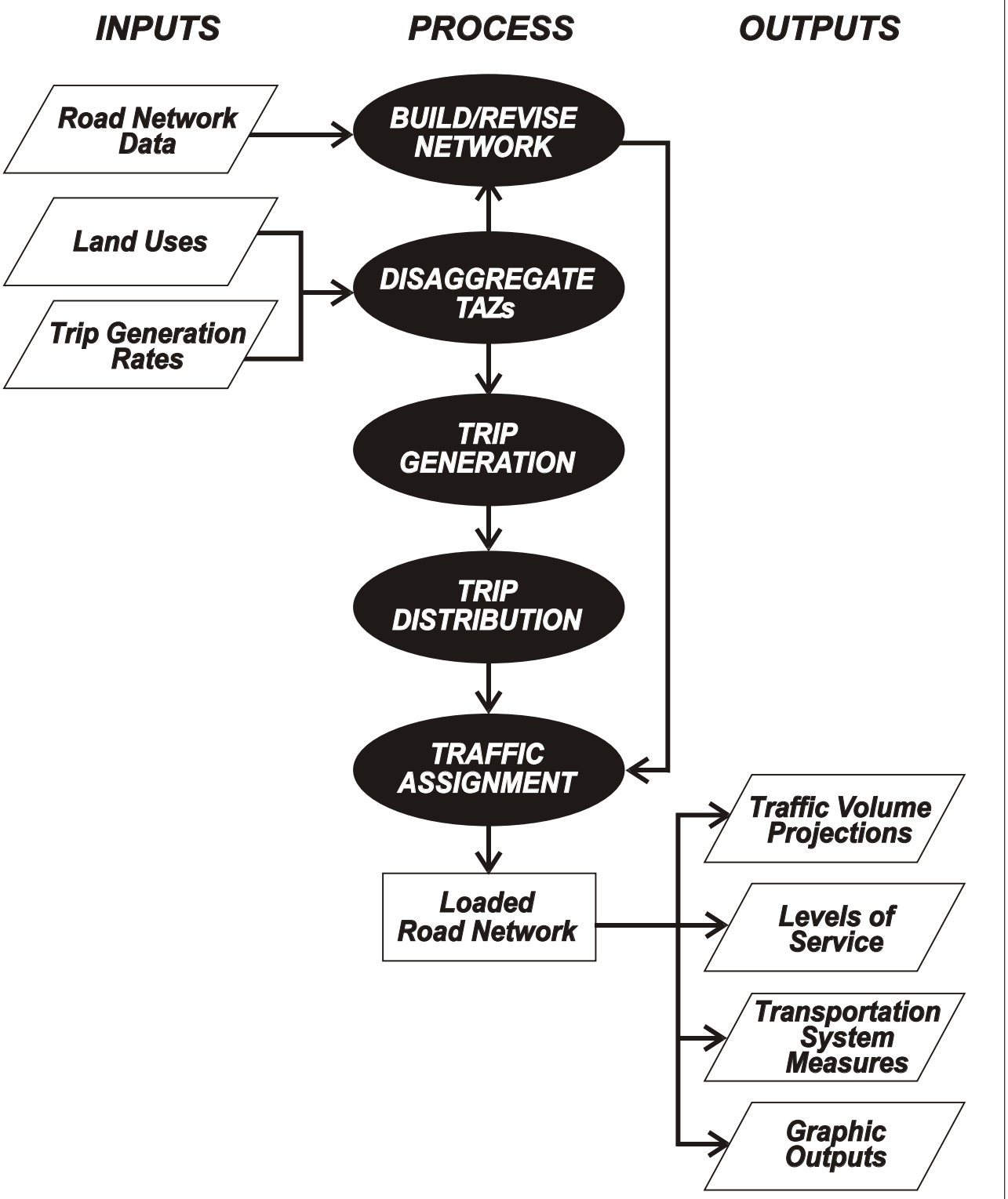
Metro Area Transportation Model

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 2018 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.



DKS

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 2015 and 2040. It indicates that vehicle trips in the study area would grow by approximately 90 percent over the next 20 years if the land develops according to Metro's 2040 land use assumptions and the Pleasant Valley/North Carver Comprehensive Plan.

Table 4-2: Vehicle Trip Growth (1-Hour PM Peak)

	2015 Trips	2040 Trips	Percent Increase
TSP Study Area	16,400	31,300	90%

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 consider 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 Happy Valley TSP study area. 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, new 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 Treatments to Address Pedestrian Needs

TREATMENT	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.	

TREATMENT	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.	

TREATMENT	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, 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, to be used on the future 162nd Avenue along the base of Scouter Mountain, includes a 12-foot wide pedestrian path to accommodate recreational pedestrian use.

REGIONAL PLANS

Metro 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.

Metro's Regional Land Information System [3]identifies several regional trails through the Happy Valley planning area; including the Mt. Scott -Scouters Mountain Loop Trails, Sunrise Corridor Trail, East Buttes Powerline Trail and Butler Butte Trail. All planned regional trails are shown in Figure 5-1. The Mt. Scott-Scouters Mountain Loop Trails are included as financially constrained projects in the Metro RTP.

[1] *Americans with Disabilities Act*, Uniform Building Code.
[2] Metro 2018 Regional Transportation Plan.
[3] Metro RLIS Data, June 2020.

EVALUATION CRITERIA

Characteristics of the proposed projects and role in the pedestrian transportation network were used to evaluate the benefits of each identified project. Sidewalks are typically used to provide connectivity to pedestrian destinations (*e.g.* work, school, home, and shopping destinations). Therefore, infill projects closer to pedestrian destinations within Happy Valley are expected to better serve residents. Additional characteristics of the adjacent roadway network, including posted speed, functional classification, pedestrian crash history, and current sidewalk availability were also evaluated to prioritize projects that could pose higher risks to pedestrians or enhance the overall sidewalk connectivity within Happy Valley. Similar criteria were also used to evaluate intersection crossing projects where pedestrians are at a greater safety risk. Conversely, trail projects are typically located away from roadways and serve primarily recreational trips. These projects were evaluated based on their ability to enhance the off-street pedestrian connectivity and provide a comprehensive recreational network within Happy Valley.

The feasibility and cost effectiveness were considered for all identified pedestrian projects. The identified evaluation criteria used for the initial scoring and specific score thresholds are outlined below in Table 1.

Table 5-2: Pedestrian Project Evaluation Criteria

Sidewalk Infill Project Evaluation Criteria	
Sidewalk proximity to Happy Valley Pedestrian Destinations	Within pedestrian priority area/town center: 5 ¼ mile walkshed: 3 ½ mile walkshed: 1
Sidewalk reduces distance to transit	Project within ¼ mile of Sunnyside: 5
Sidewalk on arterial/collector roadway	On major arterial: 5 On minor arterial: 4 On collector: 3 On neighborhood route: 2
Sidewalk located on high-speed facility	40 mph or higher posted speed: 5 35 mph posted speed: 3 30 mph or lower posted speed: 1
Sidewalk reduces trip length to pedestrian destination	Long sidewalk gap: 5 Medium sidewalk gap: 3 Short sidewalk gap: 1
Sidewalk already available on one side of street	Sidewalk not available on either side of street: 5 Limited sidewalk availability on one side of street: 3 Sidewalk currently available on one side of street: 1
Sidewalk enhances larger connectivity of sidewalks	Part of larger package of projects: 5
Sidewalk feasibility and cost effectiveness	No significant constraints, within Happy Valley city limit: 5 Possible constraints, within Happy Valley city limits: 4 No significant constrains, outside Happy Valley city limits: 3 Possible constrains, outside Happy Valley city limits: 2
Sidewalk improves safety	Pedestrian crash on segment: 5 No pedestrian crash history: 1

Trail Project Evaluation Criteria	
Trail promotes regional connectivity	On regional trail: 5 Neighborhood connection to regional trail: 3
Trail reduces trip length to pedestrian destination	Long trail gap: 5 Medium trail gap: 3 Short trail gap: 1
Trail enhances larger connectivity of trail system	Part of larger package of projects: 5
Trail feasibility and cost effectiveness	No significant constraints, land owned by Happy Valley/Metro: 5 Possible constraints, land owned by Happy Valley/Metro: 4 No significant constraints, re-development potential: 3 Possible constraints, re-development potential, some constraints: 2 Significant constraints or requires HOA coordination: 1
Crossing Enhancement Project Evaluation	
Crossing on wide roadway facility	Crossing width exceeds 50 feet: 5 Crossing width exceeds 25 feet: 3
Crossing located close to pedestrian generators	High pedestrian demand: 5 Medium pedestrian demand: 3 Low pedestrian demand: 1
Crossing located near a school (Intersection Crosswalk Evaluation Only)	Project identified as a Safe Routes to School project *or* in the Happy Valley Super Block plan: 5
Crossing improves safety	Pedestrian crash at crossing location *or* Bicycle crash at crossing location (Trail Crossing Evaluation Only): 5
Crossing located on a high-speed facility	40 mph or higher posted speed: 5 35 mph posted speed: 3 30 mph or less posted speed: 1
Crossing proximity to Happy Valley Pedestrian Destinations (Intersection Crosswalk Evaluation Only)	Pedestrian priority area/town center: 5 ¼ mile walkshed: 3 ½ mile walkshed: 1
Crossing feasibility and cost effectiveness	Likely low cost (e.g. signing and striping project): 5 Likely medium cost (e.g. Rectangular Rapid Flashing Beacon): 3 Likely high cost (e.g. pedestrian signal): 1

PEDESTRIAN MASTER PLAN

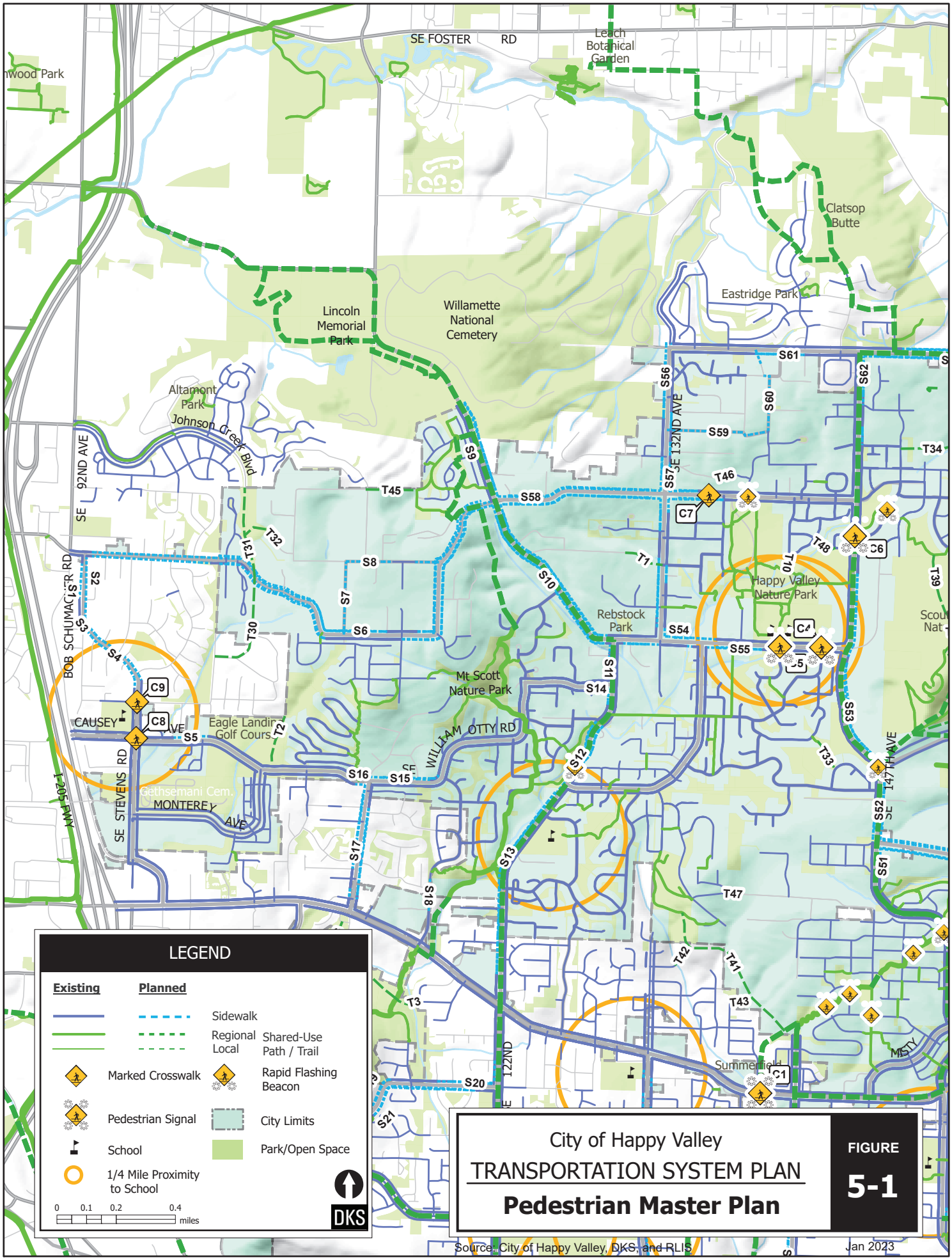
The future transportation system needs multi-modal improvements to meet transportation performance standards, serve future growth and promote pedestrian, bicycle and transit trips. The extent of the recommended multi-modal improvements for Happy Valley is significant. Future growth can be accommodated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

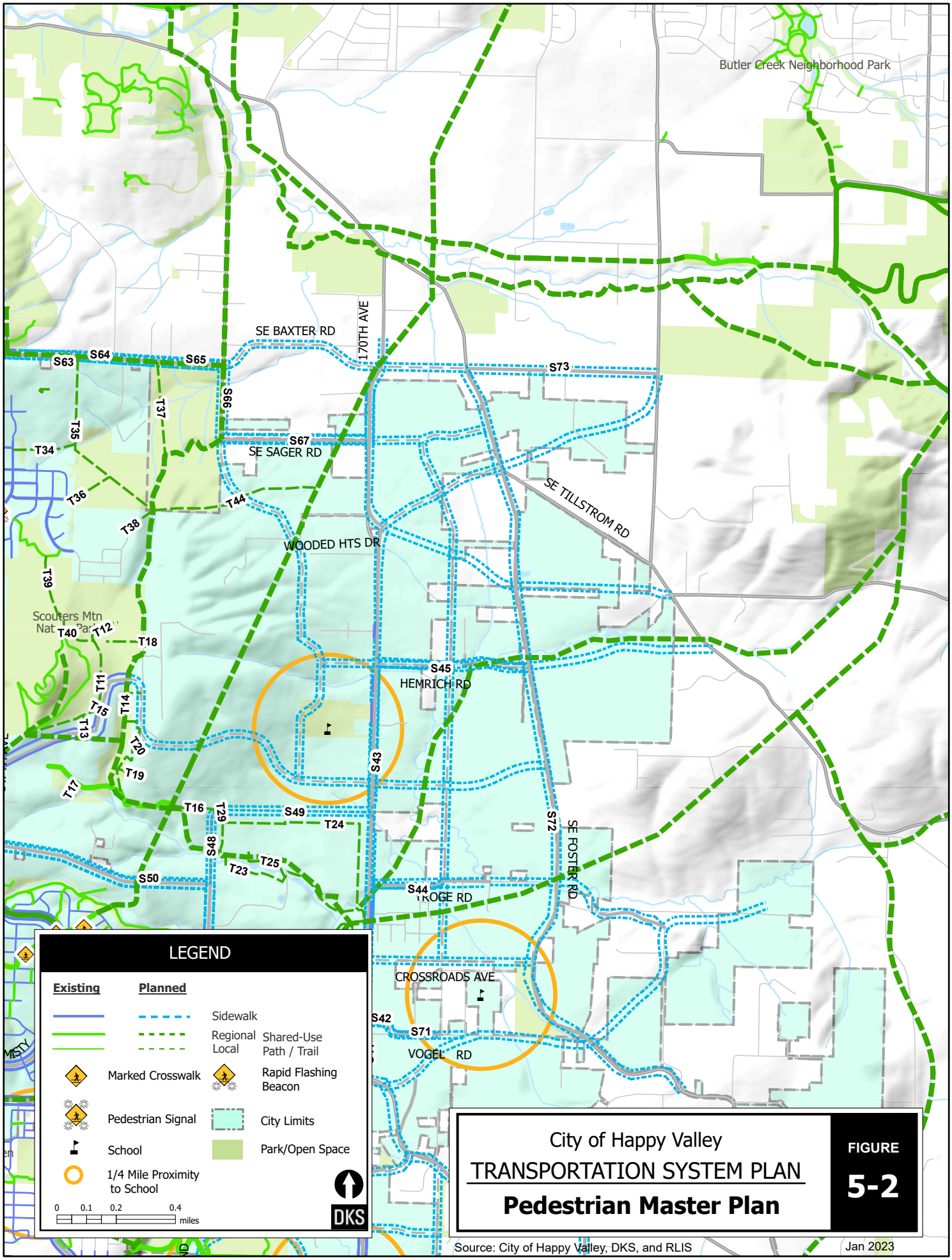
Pedestrian Projects

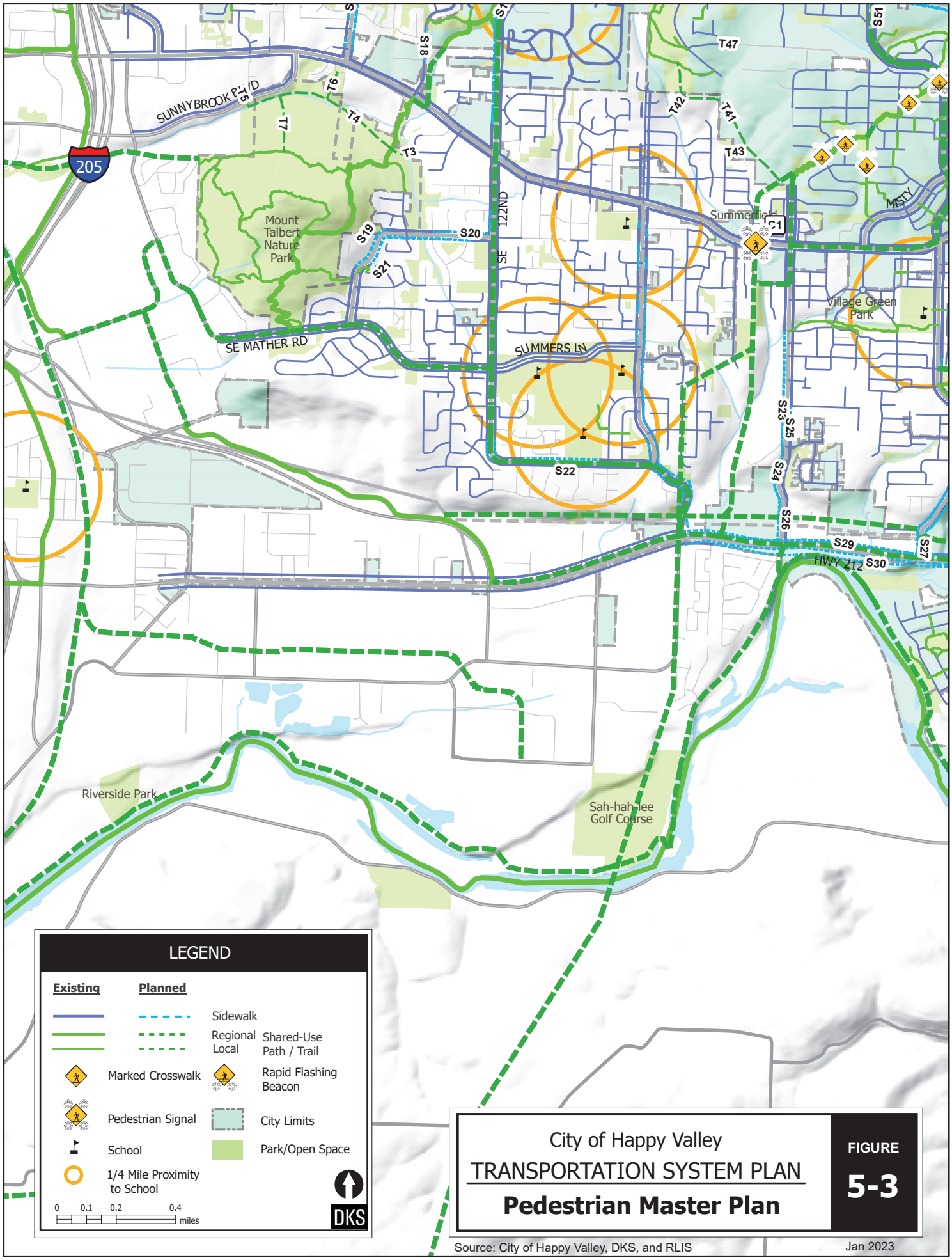
A list of pedestrian projects was developed to meet the identified community needs. The projects include enhanced crossings, multi-use trails, sidewalk infill on existing roadways, and new sidewalks on planned roadways. Although some of the planned trail network would be utilized by bicyclists, all proposed trails would benefit pedestrians. Therefore, the recommended trail system is included with pedestrian projects.

The Master Plan shown in Figures 5-1 through 5-4 and summarized in Table 5-3 is an overall plan and 'wish list' of pedestrian related projects in Happy Valley. Based on the evaluation criteria, projects were grouped into classifications for high, medium and low priority. To allow more project detail to be shown in project maps, the study area was separated into four sections (NW, NE, SW, SE). These projects were used to create a Pedestrian Financially Constrained Plan (Table 5-4). The Financially Constrained Plan consists of projects that the City should give priority to in funding. The financially constrained list does not include projects on state or county facilities or projects expected to be constructed with private development. As other opportunities (grant programs) arise and private development occurs, streets are rebuilt and, pedestrian projects on the Master Plan should be pursued as well.

Planning-level cost estimates were developed for the unfunded projects which includes design and construction costs. Right of way costs were estimated for sidewalk infill projects if the project could be completely independently, without re-construction of the entire roadway to the current design standards.


SE FOSTER RD
Leach Botanical Garden
Clatsop Butte
Eastridge Park
Lincoln Memorial Park
Willamette National Cemetery
Altamont Park
Johnson Creek Blvd
92ND AVE
SE
BOB SCHUMACHER RD
SE STEVENS RD
CAUSEY AVE
MONTEREY AVE
Gethsemani Cem.
Eagle Landing Golf Course
WILLIAM OTTY RD
Mt Scott Nature Park
Rebstock Park
Happy Valley Nature Park
122ND
147TH AVE
MISTY
Summerfield
I-205 FWY
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18
S20
S21
S51
S52
S53
S54
S55
S56
S57
S58
S59
S60
S61
S62
T1
T2
T3
T30
T31
T32
T33
T34
T39
T41
T42
T43
T45
T46
T47
T48
C1
C4
C5
C6
C7
C8
C9
LEGEND
Existing
Planned
Sidewalk
Regional
Local
Shared-Use Path / Trail
Marked Crosswalk
Rapid Flashing Beacon
Pedestrian Signal
City Limits
School
Park/Open Space
1/4 Mile Proximity to School
0 0.1 0.2 0.4 miles
DKS
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Pedestrian Master Plan
FIGURE
5-1
Source: City of Happy Valley, DKS, and RLIS
Jan 2023


Butler Creek Neighborhood Park
SE BAXTER RD
170TH AVE
S63
S64
S65
S66
S67
S73
SE SAGER RD
T34
T35
T36
T37
T38
T39
T44
SE TILLSTROM RD
WOODED HTS DR
Scouters Mtn
Nat Par
T40
T12
T18
T11
T14
T15
T13
T20
T19
T17
T16
T29
S45
HEMRICH RD
S43
S49
T24
S48
T25
T23
S50
S44
TROGE RD
S72
SE FOSTER RD
CROSSROADS AVE
S42
S71
VOGEL RD
LEGEND
Existing
Planned
Sidewalk
Regional
Local
Shared-Use Path / Trail
Marked Crosswalk
Rapid Flashing Beacon
Pedestrian Signal
City Limits
School
Park/Open Space
1/4 Mile Proximity to School
0 0.1 0.2 0.4
miles
DKS
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Pedestrian Master Plan
FIGURE
5-2
Source: City of Happy Valley, DKS, and RLIS
Jan 2023


SUNNYBROOK BLVD
205
Mount Talbert Nature Park
SE MATHER RD
122ND
SE
SUMMERS LN
Summerfield
MISTY
Village Green Park
HWY 212
Riverside Park
Sah-hah-lee Golf Course
T1
T3
T4
T6
T41
T42
T43
T47
S18
S19
S20
S21
S22
S23
S24
S25
S26
S27
S29
S30
S51
C1
LEGEND
Existing
Planned
Sidewalk
Regional
Local
Shared-Use Path / Trail
Marked Crosswalk
Rapid Flashing Beacon
Pedestrian Signal
City Limits
School
Park/Open Space
1/4 Mile Proximity to School
0 0.1 0.2 0.4
miles
DKS
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Pedestrian Master Plan
FIGURE
5-3
Source: City of Happy Valley, DKS, and RLIS
Jan 2023

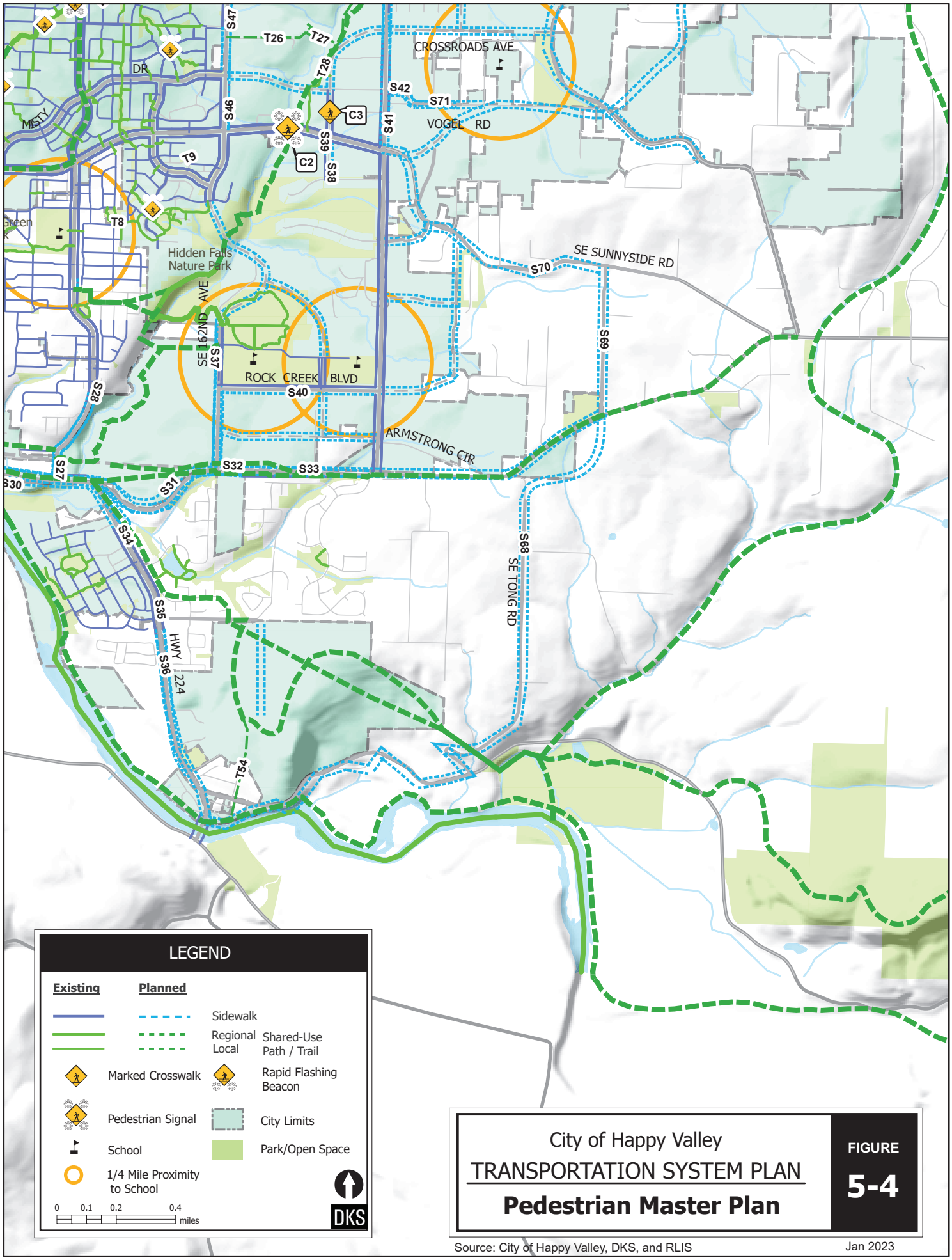

CROSSROADS AVE
VOGEL RD
SE SUNNYSIDE RD
ROCK CREEK BLVD
ARMSTRONG CIR
SE TONG RD
HWY 224
SE 162ND AVE
Hidden Falls Nature Park
MISTY DR
T26
T27
T28
T9
T8
T54
S47
S46
S41
S42
S71
S39
S38
S70
S69
S40
S37
S28
S27
S30
S31
S32
S33
S34
S35
S36
S68
C2
C3
LEGEND
Existing
Planned
Sidewalk
Regional
Local
Shared-Use Path / Trail
Marked Crosswalk
Rapid Flashing Beacon
Pedestrian Signal
City Limits
School
Park/Open Space
1/4 Mile Proximity to School
0 0.1 0.2 0.4 miles
DKS
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Pedestrian Master Plan
FIGURE
5-4
Source: City of Happy Valley, DKS, and RLIS
Jan 2023

Table 5-3: Pedestrian Master Plan Projects

#	Project	Description	Map ID	Cost Estimate ($1,000s)
Crossing Enhancement Projects				
C1	Sunnyside Road/Powerline Trail	Enhanced crossing at Powerline Trail crossing on Sunnyside Road	NW, SW	$300
C2	Sunnyside Road/Scouter's Mountain Trail	Enhanced crossing at Scouter's Mountain Trail crossing on Sunnyside Road	NE, SE	$350
C3	169th Avenue/Fred Meyer Driveway	Crosswalks/signage crossing 169th Avenue at Fred Meyer Driveway	NE, SE	$5
C4	King Road/Rolling Meadows Drive	Enhanced crossing (RRFB) at King Road/Rolling Meadows Drive intersection	NW	Funded
C5	King Road/Happy Valley Drive	Enhanced crossing (RRFB) at King Road/Happy Valley Drive intersection	NW	Funded
C6	145th Avenue/Purple Finch Loop/Denali Drive	Enhanced crossing (RRFB) at 145th Avenue/Purple Finch Loop/Denali Drive intersection	NW	Funded
C7	Ridgecrest Road west of Parkwood Way	Mid-block crosswalk/signage on Ridgecrest Road west of Parkwood Way	NW	Funded
C8	Stevens Road/Causey Avenue	Crosswalks, signage and ADA ramps Stevens Road at Causey Avenue	NW	$45
C9	Stevens Road/Hillcrest Road	Complete crosswalks/signage and enhanced crossing (RRFB) at Stevens Road/Hillcrest Road intersection	NW	$100
Sidewalk Infill on Existing Collectors and Arterials				
S1	92nd Avenue: Idleman Rd to 92nd Place; Lynn Ln to Stevens Way	Sidewalk infill on west side of 92nd Avenue	NW	$450
S2	92nd Avenue: Idleman Road to Stevens Way	Sidewalk infill east side of 92nd Avenue	NW	$850
S3	92nd Avenue: Stevens Way intersection	Sidewalk infill on west side of 92nd Avenue at Stevens Way	NW	$65
S4	Stevens Way: 92nd Avenue to 99th Drive	Sidewalk infill on both sides of Stevens Way	NW	$1,950
S5	Causey Avenue: Happy Valley City Limits to Ella V. Osterman Park	Sidewalk infill on north side of Causey Avenue	NW	$500
S6	Idleman Road: 92nd Avenue to Mt Scott Boulevard	Sidewalk infill on both sides of Idleman Road, right of way is limited	NW	**
S7	Walnut Drive: Tyler Road to Idleman Road	Sidewalk infill on Walnut Drive	NW	$650
S8	Tyler Road: Walnut Drive to Idleman Road	Sidewalk infill on Tyler Road	NW	$750
S9	Mt Scott Boulevard: Happy Valley City Limits to Idleman Rd	Sidewalk infill on east side of Mt Scott Boulevard	NW	**

#	Project	Description	Map ID	Cost Estimate ($1,000s)
S10	Mt Scott Bouelvard: Idleman Road/Ridgecrest Road to 129th Avenue	Sidewalk infill on both sides of Mt Scott Boulevard	NW	**
S11	129th Avenue: Mt Scott Boulevard/King Road to Scott Creek Lane	Sidewalk infill on west side of 129th Avenue	NW	**
S12	129th Avenue: Scott Creek Lane to Mountain Gate Road	Sidewalk infill on east side of 129th Avenue	NW	Funded
S13	129th Avenue: Mountain Gate Road to Sunnyside Road	Sidewalk infill on west side of 129th Avenue, right of way is limited	NW, SW	**
S14	William Otty Road: 129th Avenue intersection	Sidewalk infill on south side of William Otty Road at 129th Avenue	NW	$90
S15	William Otty Road: 119th Avenue to Valley View Terrace	Sidewalk infill on north side of William Otty Road	NW	$800
S16	William Otty Road: Valley View Terrace intersection	Sidewalk infill on south side of William Otty Road at Valley View Terrace	NW	$150
S17	Valley View Terrace: William Otty Road to Sunnyside Road	Sidewalk infill on both sides of Valley View Terrace	NW, SW	$3,350
S18	117th Avenue: Westgate Way to Southern Lites Drive	Sidewalk infill on 117th Avenue	NW, SW	$350
S19	Mather Road: Willingham Court to Cedar Park Drive	Sidewalk infill on north/west side of Mather Road	NW, SW	$600
S20	Mather Road: 119th Court to 122nd Avenue	Sidewalk infill on north side of Mather Road	NW, SW	$850
S21	Mather Road: Willingham Court to 122nd Avenue	Sidewalk infill on south/east side of Mather Road	NW, SW	$1,650
S22	Hubbard Road: Village Sunrise Apartments Driveway to 130th Drive	Sidewalk infill on north side of Hubbard Road	SW	$950
S23	142nd Avenue: Territory Drive to Happy Valley City Limits	Sidewalk infill on west side of 142nd Avenue	SW	$1,350
S24	142nd Avenue: Happy Valley City Limits to OR-212	Sidewalk infill on west side of 142nd Avenue	SW	$1,200
S25	142nd Avenue: Charjan Street to Happy Valley City Limits	Sidewalk infill on east side of 142nd Avenue	SW	$300
S26	142nd Avenue: Property north of EZ Storage	Sidewalk infill on east side of 142nd Avenue	SW	$200
S27	152nd Avenue: Happy Valley City Limits to OR-212	Sidewalk infill on both sides of 152nd Avenue	SW	$1,850
S28	152nd Avenue: Happy Valley City Limits (north) to Happy Valley City Limits (south)	Sidewalk infill on east side of 152nd Avenue	SW, SE	$100
S29	OR 212: 135th Avenue to 152nd Avenue	Sidewalk infill on north side of OR 212	SW, SE	$3,050
S30	OR 212: Shadowbrook Homes to OR 224	Sidewalk infill on south side of OR 212	SW, SE	$3,150

#	Project	Description	Map ID	Cost Estimate ($1,000s)
S31	OR 212: OR 224 to Happy Valley City Limits (west)	Sidewalk infill on both sides of OR 212	SE	$3,850
S32	OR 212: Happy Valley City Limits (west) to Happy Valley City Limits (east)	Sidewalk infill on both sides of OR 212	SE	$650
S33	OR 212: Happy Valley City Limits (east) to 172nd Avenue	Sidewalk infill on north side of OR 212	SE	$1,500
S34	OR 224: OR 212 to Goosehollow Drive	Sidewalk infill on both sides of OR 224	SE	$1,250
S35	OR 224: Eckert Lane intersection	Sidewalk infill on east side of OR 224 at Eckert Lane	SE	$,2000
S36	OR-224: Eckert Lane to Happy Valley City Limits	Sidewalk infill on both sides of OR-224	SE	$3,600
S37	162nd Avenue: Rock Creek Blvd to north end	Sidewalk infill on the west side of 162nd Avenue	SE	**
S38	169th Avenue: Sunnyside Road to Stonybrook Court	Sidewalk infill on east side of 169th Avenue	NE, SE	$5,000
S39	169th Avenue: Sunnyside Road to Fox Glen Court	Sidewalk infill on west side of 169th Avenue	NE, SE	$250
S40	Rock Creek Boulevard: 162nd Avenue to 172nd Ave	Sidewalk on south side of Rock Creek Boulevard	SE	**
S41	172nd Avenue: Sunnyside Road to Vogel Road	Sidewalk infill on east side of 172nd Avenue	NE, SE	**
S42	Vogel Road: East end to Happy Valley Boulevard	Sidewalk infill on both sides of Vogel Road	NE, SE	**
S43	172nd Avenue: Tristin Avenue to Happy Valley City limits	Sidewalk infill on both sides of 172nd Avenue	NE, SE	**
S44	Troge Road: 172nd Avenue to Happy Valley Boulevard/Winston Road	Sidewalk infill on both sides of Troge Road	NE, SE	**
S45	Hemrich Road: 172nd Avenue to Foster Road	Sidewalk infill on both sides of Hemrich Road	NE	**
S46	162nd Avenue: Sunnyside Road to Misty Drive	Sidewalk infill on east side of 162nd Avenue	NE, SE	**
S47	162nd Avenue: Misty Drive to Monner Road	Sidewalk infill on both sides of 162nd Avenue	NE, SE	**
S48	162nd Avenue: Monner Road to Hagen Road	Sidewalk infill on 162nd Avenue	NE	**
S49	Hagen Road: 162nd Avenue to 172nd Avenue	Sidewalk infill on Hagen Road	NE	$1,650
S50	Monner Road: 147th Avenue to 162nd Avenue	Sidewalk infill on both sides of Monner Road	NW, NE, SE	$5,650
S51	147th Avenue: Taryn Court/Mia Garden Dr to Scouters Mountain Road	Sidewalk infill on east side of 147th Avenue	NW	**

#	Project	Description	Map ID	Cost Estimate ($1,000s)
S52	147th Avenue: Viola Vineyard Drive/Monner Road to Krause Lane	Sidewalk infill on west side of 147th Avenue	NW	**
S53	145th Avenue: Scouters Mountain Road to Denali Drive	Sidewalk infill on east side of 145th Avenue	NW	**
S54	King Road: 132nd Avenue to Regina Court	Sidewalk infill on north side of King Road	NW	**
S55	King Road: 129th Avenue to Happy Valley Drive	Sidewalk infill on south side of King Road	NW	**
S56	132nd Avenue: Gateway Drive to Clatsop Street	Sidewalk infill on west side of 132nd Avenue	NW	**
S57	132nd Avenue: King Road to Lucille Street	Sidewalk infill on east side of 132nd Avenue	NW	**
S58	Ridgecrest Road: Mt Scott Boulevard to Parkwood Way	Sidewalk infill on both sides of Ridgecrest Road	NW	$5,050
S59	Kanne Road: 132nd Avenue to 139th Avenue	Sidewalk infill on both sides of Kanne Road	NW	$1,100
S60	139th Avenue: Kanne Road to Clatsop Street	Sidewalk infill on both sides of 139th Avenue	NW	$800
S61	Clatsop Street: 139th Avenue to 141st Avenue	Sidewalk infill on south side of Clatsop Street	NW	$650
S62	145th Avenue: Wallowa Way to Clatsop Street	Sidewalk infill on east side of 145th Avenue	NW	$600
S63	Clatstop Street: 145th Avenue to 156th Avenue	Sidewalk infill on south side of Clatsop Street	NW, NE	**
S64	Clatsop Street: 147th Avenue to 156th Avenue	Sidewalk infill on north side of Clatsop Street	NW, NE	**
S65	Clatsop Street: 156th Avenue to 162nd Avenue	Sidewalk infill on both sides of Clatsop Street	NE	**
S66	162nd Avenue: Clatsop Street to Sager Road	Sidewalk infill on both sides of 162nd Avenue	NE	**
S67	Sager Road: 162nd Avenue to Happy Valley City Limits	Sidewalk infill on both sides of Sager Road	NE	$3,250
S68	Tong Road: OR 212 to OR 224	Sidewalks on both sides of Tong Road	SE	**
S69	187th Avenue: OR 212 to Sunnyside Road	Sidewalks on both sides of 187th Avenue	SE	**
S70	Sunnyside Road: 172nd Avenue to 187th Avenue	Sidewalks on both sides of Sunnyside Road	SE	**
S71	Vogel Road: east end to Happy Valley Blvd	Sidewalks on both sides of Vogel Road	NE	**
S72	Foster Road: Cheldelin Road to Vogel Road/Happy Valley Blvd	Sidewalks on both sides of Foster Road	NE	**
S73	Cheldelin Road: Foster Road to 190th Drive	Sidewalks on both sides of Cheldelin Road	NE	**
Sidewalks on New Arterials & Collectors				

#	Project	Description	Map ID	Cost Estimate ($1,000s)
-	Clatsop Street Extension East: 162nd Avenue to 172nd Avenue	Sidewalks on both sides of new facility	NE	**
-	Clatsop Street – Cheldelin Road Extension: 172nd Avenue to Foster Road	Sidewalks on both sides of new facility	NE	**
-	162nd Avenue Extension North: Scouters Mountain Road to Clatsop Street	Sidewalks on both sides of new facility	NE	**
-	162nd Avenue Extension South: 157th Avenue to OR 212	Sidewalks on both sides of new facility	SE	**
-	Sager Road Extension East: 172nd Avenue to Foster Rd	Sidewalks on both sides of new facility	NE	**
-	Sager Road Extension West: 162nd Avenue to 172nd Avenue	Sidewalks on both sides of new facility	NE	**
-	172nd-190th Connector: 172nd Avenue to 190th Drive	Sidewalks on both sides of new facility	NE	**
-	Wooden Heights Drive	Sidewalks on both sides of new facility	NE	**
-	Hemrich Road Extension: 162nd Avenue to Foster Rd	Sidewalks on both sides of new facility	NE	**
-	Scouter Mountain Road Extension: Scouters Mountain Rd to Foster Rd	Sidewalks on both sides of new facility	NE, SE	**
-	Troge Road Extension: 172nd Avenue to Foster Road	Sidewalks on both sides of new facility	NE, SE	**
-	169th Avenue – Crossroads Avenue Extension: Misty Drive to Foster Road	Sidewalks on both sides of new facility	NE, SE	**
-	Misty Drive Extension: 162nd Avenue to 169th Avenue	Sidewalks on both sides of new facility	SE	**
-	Rock Creek Court Extension: 172nd Avenue to 177th Avenue	Sidewalks on both sides of new facility	SE	**
-	Big Timber Court Extension: 172nd Avenue to 177th Avenue	Sidewalks on both sides of new facility	SE	**
-	Rock Creek Boulevard Extension: 172nd Avenue to 172nd Avenue	Sidewalks on both sides of new facility	SE	**
-	Rock Creek East-West Roadway: 162nd Avenue to 172nd Avenue	Sidewalks on both sides of new facility	SE	**
-	Parklane Drive North Extension: 162nd Avenue to Stadium Way	Sidewalks on both sides of new facility	SE	**
-	Parklane Drive South Extension: Rock Creek Boulevard to Rock Creek East-West Roadway	Sidewalks on both sides of new facility	SE	**

#	Project	Description	Map ID	Cost Estimate ($1,000s)
-	177th Avenue South Extension: Rock Creek Boulevard to Sunnyside Rd	Sidewalks on both sides of new facility	SE	**
-	177th Avenue North Extension: Crossroads Avenue to Sager Road Extension East	Sidewalks on both sides of new facility	SE	**
-	Happy Valley Boulevard: 172nd Ave to Foster Road	Sidewalks on both sides of new facility	SE	**
-	Borges Road: Tillstrom Road to 172nd-190th Connector	Sidewalks on both sides of new facility	NE	**
-	Eckert Lane: OR 224 to Tong Road	Sidewalks on both sides of new facility	SE	**
Regional Multiuse Trails				
-	West Mount Scott-Scouters Mountain Loop Trail	Build loop trail from Clatsop Street to OR 212/Clackamas River, connects Springwater Corridor, Mt. Talbert, Scouters Mountain Nature Park and the Clackamas River	NW, NE	$7,100
-	East Mount Scott-Scouters Mountain Loop Trail	Build loop trail from Clatsop Street to OR 212/Clackamas River, connects Springwater Corridor, Mt. Talbert, Scouters Mountain Nature Park and the Clackamas River	NE	$10,500
-	Sunrise Corridor Trail	Runs adjacent to the future Sunrise Corridor, connecting the I-205 Trail and West Mount Scott-Scouters Mountain Loop Trail	SW, SE	$3,000
-	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	NE, SE	$2,800
-	Butler Butte Trail	Connects Springwater Trail in Gresham to Happy Valley, traversing Gabbert, Towle, and Butler buttes along the way	NE, SE	$2,100
-	Clackamas Bluffs Trail	Connects Sunrise Corridor Trail and Richardson Creek Trail	NE, SE	$3,300
-	Clackamas River Greenway	Runs along north side of the Clackamas River	SW, SE	$4,100
Local Multiuse Trails				
T1	Neighborhood Trail	Connects Crest Drive with 132nd Ave	NW	$600
T2	Ella V. Osterman Park Trail	Connects Fairway Drive (Sunnyside Highlands-Kensington Bluff HOA Trail) to Ella V. Osterman Park	NW	$1,150
T3	Mt. Talbert Nature Park Trail	Connects Braemark Court with Mt. Talbert Nature Park Trails	NW, SW	$1,050
T4	Mt. Talbert Nature Park Trail	Trail in Mt. Talbert Nature Park	NW, SW	$4,600
T5	Neighborhood Trail	Connects 105th Avenue with New Mt. Talbert Nature Park Trail	NW, SW	$100
T6	Neighborhood Trail	Connects 110th Court with New Mt. Talbert Nature Park Trail	NW, SW	$450
T7	Mt. Talbert Nature Park Trail	Trail in Mt. Talbert Nature Park	NW, SW	$1,350

#	Project	Description	Map ID	Cost Estimate ($1,000s)
T8	Neighborhood Trail	Connects residential neighborhoods to east with Ashley Meadows Park Trail	SE	$95
T9	Neighborhood Trail	Connects Starling Court with existing driveways	NE, SE	$150
T10	Neighborhood Trail	Connects Plover Drive with Wetland Park trails	NW	$300
T11	Scouter's Mountain Trail	Regional trail link as part of the Scouter's Mountain Development	NW, NE	Funded
T12	Neighborhood Trail	Connects Scouter's Mountain Trail with Compass Court Street	NE	$500
T13	Neighborhood Trail	Connects Scouter's Mountain Trail) with Scouters Mountain Road	NE	$350
T14	Scouter's Mountain Trail	Regional trail link as part of the Scouter's Mountain Development	NE	Funded
T15	Neighborhood Trail	Connects Scouter's Mountain Trail with Scouters Mountain Road	NE	$85
T16	Scouter's Mountain Trail	Regional trail link as part of the Scouter's Mountain Development	NE	Funded
T17	Neighborhood Trail	Connects Scouter's Mountain Trail with Livingstone Lane	NE	$250
T18	Neighborhood Trail	Connects Vradenburg Road with Heritage Road	NE	$550
T19	Neighborhood Trail	Connects Scouter's Mountain Trail with Eagle Overlook Lane	NE	$150
T20	Neighborhood Trail	Connects Scouter's Mountain Trail with Volunteer Road	NE	$150
T21	Neighborhood Trail	Connects Christilla Lane with Spyglass Drive	NW, NE	$150
T22	Neighborhood Trail	HOA trail	NW, NE	$100
T23	Scouter's Mountain Trail	Regional trail link in Pleasant Valley Villages Development	NE, SE	$4,350
T24	Neighborhood Trail	Connects Pleasant Valley Villages Development to Scouter's Mountain Trail	NE, SE	$3,200
T25	Neighborhood Trail Connection	Connects Pleasant Valley Villages Development to Scouter's Mountain Trail	NE	$800
T26	Neighborhood Trail Connection	Connects 162nd Avenue to Pleasant Valley Villages Development	NE, SE	$1,350
T27	Neighborhood Trail Connection	Connects New Neighborhood Trail Connection to New Trail (Scounter's Mountain Trail)	NE, SE	$1,050
T28	Scouter's Mountain Trail	New regional trail connecting existing and planned pieces of Scouter's Mountain Trail	NE, SE	$500
T29	Scouter's Mountain Trail	New regional trail connecting planned pieces of Scouter's Mountain Trail	NE	$300
T30	NW Happy Valley Loop Trail	Trail (NW Happy Valley Loop Trail) connecting Idleman Road and Stevens Way - Alternate Route	NW	$3,150
T31	NW Happy Valley Loop Trail	Trail (NW Happy Valley Loop Trail) connecting Idleman Road and Happy Valley City Limits	NW	$2,200
T32	Neighborhood Trail Connection	Connects NW Happy Valley Loop Trail with Sunset View Court	NW	$1,000

#	Project	Description	Map ID	Cost Estimate ($1,000s)
T33	Neighborhood Trail Connection	Connects Highland View HOA Trail with Norwood Loop	NW	$800
T34	Neighborhood Trail Connection	Connects Denali Drive and New Trail (152nd Avenue Trail)	NW, NE	$900
T35	152nd Avenue Trail	Connects Clatsop Street Trail and Scouter's Mountain Trail	NE	$4,600
T36	Neighborhood Trail Connection	Connects 152nd Avenue Trail and Spanish Bay Drive	NE	$1,050
T37	Upper Mitchell Creek Trail	Connects Scouter's Mountain Trail and Clastop Street Trail	NE	$2,225
T38	Neighborhood Trail Connection	Connects Scouter's Mountain Trail and Charbonneau Way	NE	$450
T39	Neighborhood Trail Connection	Connects Bommer Trail and Jackson Creek HOA Trail	NW, NE	$2,050
T40	Neighborhood Trail Connection	Connects to Bommer Trail	NE	$150
T41	Happy Valley Connector	Connects proposed East Buttes Powerline Trail and Revere HOA Trail	NW, SW	$4,200
T42	Neighborhood Trail Connection	Connects Happy Valley Connector and Jordan Court	NW, SW	$600
T43	Neighborhood Trail Connection	Connects Happy Valley Connector and 139th Avenue	NW, SW	$450
T44	Middle Mitchell Creek Trail	Connects Scouter's Mountain Trail and East Buttes Powerline Trail	NE	$4,050
T45	NW Happy Valley Loop Trail	Connects Ridgeway Drive and Lincoln Heights trail	NW	$1,250
T46	Neighborhood Trail Connection	Fills existing gap on Callahan Road	NW	$150
T47	Neighborhood Trail Connection	Fills existing gap on Aldrige Road	NW, SW	$250
T48	Neighborhood Trail Connection	Connects Dunlin Drive and Purple Finch Loop	NW	$650
		Crossing Enhancements		$800
		Sidewalks on Existing Arterials and Collectors		$60,055
		Sidewalks on New Arterials/Collectors (included in Motor Vehicle Plan)		$**
		Regional Multi-Use Trails		$32,900
		Local Multi-Use Trails		$53,855
		Total Pedestrian Master Plan Project Costs		**$147,610**

* Planned collectors and arterials with sidewalks are shown in Figure 8-10.

**These projects are included in the motor vehicle plan.

The planning level cost estimates for pedestrian facilities 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 estimates for regional trails were 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[4]. The evaluation criteria in Table 5-2 were used to rank the projects. The highest ranking projects that are reasonably expected to be funded (see Chapter 10) were combined with projects with anticipated funding from other agencies or development to create the list shown in Table 5-4.

Table 5-4: Pedestrian Financially Constrained Plan

#	Project	Description	Map ID	Potential Funding Source	Estimated Schedule	Cost Estimate ($1,000s)
Crossing Enhancement Projects						
C1	Sunnyside Road/Powerline Trail	Enhanced crossing at Powerline Trail crossing on Sunnyside Road	NW, SW	City	Long Term	$300
C2	Sunnyside Road/Scouter's Mountain Trail	Enhanced crossing at Scouter's Mountain Trail crossing on Sunnyside Road	NE, SE	City	Long Term	$350
C3	169th Avenue/Fred Meyer Driveway	Crosswalks/signage crossing 169th Avenue at Fred Meyer Driveway	NE, SE	City	Medium Term	$5
C8	Stevens Road/Causey Avenue	Crosswalks, signage and ADA ramps Stevens Road at Causey Avenue	NW	City	Medium Term	$45
C9	Stevens Road/Hillcrest Road	Complete crosswalks/signage and enhanced crossing (RRFB) at Stevens Road/Hillcrest Road intersection	NW	City	Medium Term	$100

Sidewalk Infill on Existing Collectors and Arterials						
S1	92nd Avenue: Idleman Rd to 92nd Place; Lynn Ln to Stevens Way	Sidewalk infill on west side of 92nd Avenue	NW	City	Medium Term	$450
S2	92nd Avenue: Idleman Road to Stevens Way	Sidewalk infill east side of 92nd Avenue	NW	City	Medium Term	$850
S3	92nd Avenue: Stevens Way intersection	Sidewalk infill on west side of 92nd Avenue at Stevens Way	NW	City	Medium Term	$65
S4	Stevens Way: 92nd Avenue to 99th Drive	Sidewalk infill on both sides of Stevens Way	NW	City	Medium Term	$1,950
S5	Causey Avenue: Happy Valley City Limits to Ella V. Osterman Park	Sidewalk infill on north side of Causey Avenue	NW	City	Long Term	$500
S20	Mather Road: 119th Court to 122nd Avenue	Sidewalk infill on north side of Mather Road	NW, SW	City	Medium Term	$850
S21	Mather Road: Willingham Court to 122nd Avenue	Sidewalk infill on south/east side of Mather Road	NW, SW	City	Medium Term	$1,650
S51	147th Avenue: Taryn Court/Mia Garden Dr to Scouters Mountain Road	Sidewalk infill on east side of 147th Avenue	NW	City	Long Term	**
S52	147th Avenue: Viola Vineyard Drive/Monner Road to Krause Lane	Sidewalk infill on west side of 147th Avenue	NW	City	Medium Term	**
Sidewalks on New Arterials & Collectors						
-	Clatsop Street Extension East: 162nd Avenue to 172nd Avenue	Sidewalks on both sides of new facility	NE	TSDC/ Developer	Long Term	**
-	Clatsop Street – Cheldelin Road Extension: 172nd Avenue to Foster Road	Sidewalks on both sides of new facility	NE	TSDC/ Developer	Long Term	**
-	162nd Avenue Extension North: Hagen Road to Clatsop Street	Sidewalks on both sides of new facility	NE	TSDC/ Developer	Medium Term	**
-	162nd Avenue Extension South: 157th Avenue to OR 212	Sidewalks on both sides of new facility	SE	TSDC/ Developer	Medium Term	**

-	Sager Road Extension East: 172nd Avenue to Foster Rd	Sidewalks on both sides of new facility	NE	TSDC/ Developer	Medium Term	**
-	Sager Road Extension West: 162nd Avenue to 172nd Avenue	Sidewalks on both sides of new facility	NE	TSDC/ Developer	Medium Term	**
-	172nd-190th Connector: 172nd Ave to 190th Dr	Sidewalks on both sides of new facility	NE	TSDC/ Developer	Medium Term	**
-	Hemrich Road Extension: 162nd Ave to Foster Rd	Sidewalks on both sides of new facility	NE	TSDC/ Developer	Medium Term	**
-	Scouter Mountain Road Extension: Scouters Mountain Rd east end to Foster Rd	Sidewalks on both sides of new facility	NE, SE	TSDC/ Developer	Medium Term	**
-	Troge Road Extension: 172nd Avenue to Foster Road	Sidewalks on both sides of new facility	NE, SE	TSDC/ Developer	Medium Term	**
-	169th Avenue Extension: Sunnyside Road to 177th	Sidewalks on both sides of new facility	NE, SE	TSDC/ Developer	Medium Term	**
-	Misty Drive Extension: 162nd Avenue to 169th Avenue	Sidewalks on both sides of new facility	SE	TSDC/ Developer	Medium Term	**
-	Rock Creek Court Extension: 172nd Avenue to 177th Avenue	Sidewalks on both sides of new facility	SE	TSDC/ Developer	Medium Term	**
-	Big Timber Court Extension: 172nd Avenue to 177th Avenue	Sidewalks on both sides of new facility	SE	TSDC/ Developer	Medium Term	**
-	Rock Creek Boulevard Extension: 172nd Avenue to 172nd Avenue	Sidewalks on both sides of new facility	SE	TSDC/ Developer	Medium Term	**
-	Rock Creek East-West Roadway: 162nd Avenue to 172nd Avenue	Sidewalks on both sides of new facility	SE	TSDC/ Developer	Medium Term	**
-	Parklane Drive North Extension: 162nd Avenue to Stadium Way	Sidewalks on both sides of new facility	SE	TSDC/ Developer	Medium Term	**

-	Parklane Drive South Extension: Rock Creek Boulevard to Rock Creek East-West Roadway	Sidewalks on both sides of new facility	SE	TSDC/ Developer	Medium Term	**
-	177th Avenue South Extension: Rock Creek Boulevard to Sunnyside Rd	Sidewalks on both sides of new facility	SE	TSDC/ Developer	Medium Term	**
-	177th Avenue North Extension: Crossroads Avenue to Sager Road Extension East	Sidewalks on both sides of new facility	SE	TSDC/ Developer	Medium Term	**
-	Sunnyside Road East Extension: 172nd Ave to Vogel Rd	Sidewalks on both sides of new facility	SE	TSDC/ Developer	Medium Term	**
Local Multiuse Trails						
T5	Neighborhood Trail	Connects 105th Avenue with New Mt. Talbert Nature Park Trail	NW, SW	City	Near Term	$100
T28	Scouter's Mountain Trail	New regional trail connecting existing and planned pieces of Scouter's Mountain Trail	NE, SE	City	Near Term	$500
T29	Scouter's Mountain Trail	New regional trail connecting planned pieces of Scouter's Mountain Trail	NE	City	Near Term	$300
T38	Neighborhood Trail Connection	Connects Scouter's Mountain Trail and Charbonneau Way	NE	City	Near Term	$450
T40	Neighborhood Trail Connection	Connects to Bommer Trail	NE	City	Near Term	$150
T45	NW Happy Valley Loop Trail	Connects Ridgeway Drive and Lincoln Heights trail	NW	City	Near Term	$1,250
					City of Happy Valley – Sidewalks and Crossings	$7,115
					City of Happy Valley – Local Trails	$2,750
					TSDC/Developer	**
					Other	$0
					Total Pedestrian Financially Constrained Project Costs	**$9,865**

* 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 TSDCs 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 impacts listed above 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 the cost of money is four percent 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 Happy Valley TSP study area. 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) 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, 162nd Avenue 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.

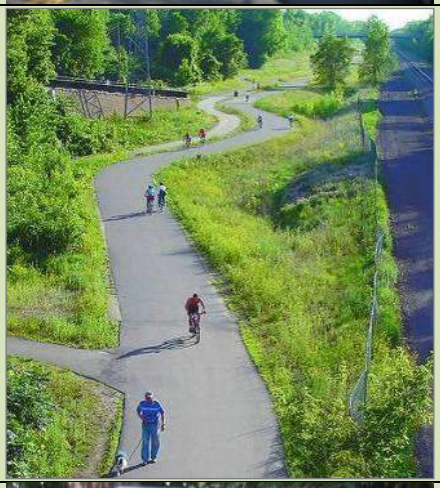
Recreational trips share many of the needs of both the commuter and activity-based trips, but create greater needs for off-street routes, connections to rural routes and safety. Typically, recreational bike trips will exceed the normal bike trip length.

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 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.	
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.	

TOOL	EXAMPLE
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.	
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.	

TOOL	EXAMPLE
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 RTP[1] 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
- 172nd Avenue — Regional on-street bikeway
- Foster Road — 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 6-2 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.

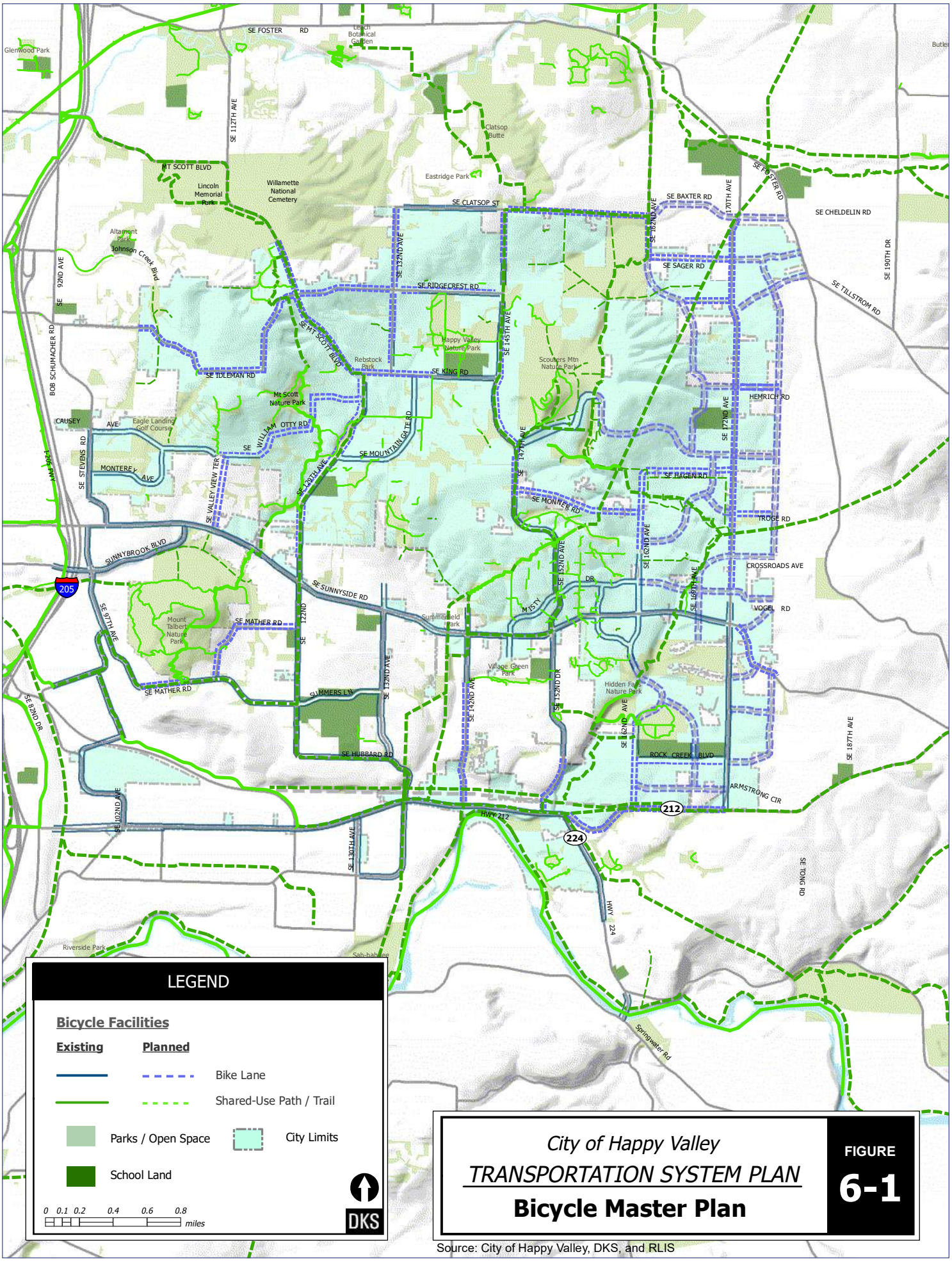
[1] Metro 2018 Regional Transportation Plan.

Table 6-2: Bicycle Master Plan Projects

Project	Location	From	To	Cost Estimate($1,000s)
Bike Lanes on Existing Arterials & Collectors				
145th Avenue	Both	Wallowa Way	Clatsop Street	**
145th Avenue	Both	King Road	Purple Finch Loop	**
147th Avenue	East	King Road	Monner Road	**
147th Avenue	West	Alta Vista Drive	Monner Road	**
King Road	Both	129th Avenue	Regina Court	**
Mt. Scott Boulevard	Both	North city limits	129th Avenue	**
132nd Avenue	West	King Road	Clatsop Street	**
132nd Avenue	East	Clatsop Street	Geneva Way	**
162nd Avenue	Both	Palermo Avenue	Monner Road	**
122nd /129th Avenue	West	Sunnyside Road	King Road	**
122nd /129th Avenue	East	Mountain Gate Road	Scott Creek Lane	**
Clatsop Street	Both	145th Avenue	162nd Avenue	**
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	**
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	**
Rock Creek Boulevard	South	162nd Avenue	172nd Avenue	**
Vogel Road	Both	East end of Vogel Road	Happy Valley Boulevard	**
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
Tong Road	Both	OR 224	OR 212	**
187th Avenue	Both	OR 212	Sunnyside Road	**
Sunnyside Road	Both	172nd Avenue	187th Avenue	**
Vogel Road	Both	East end of Vogel Road	Happy Valley Blvd	**
Foster Road	Both	Cheldelin Road	Vogel Road/Happy Valley Boulevard	**
Cheldelin Road	Both	Foster Road	190th Drive	**
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	Scouters Mountain 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	190th Drive	**
Wooden Heights Drive	Both	162nd Avenue	172nd Avenue	**
Hemrich Road Extension	Both	162nd Avenue	Foster Road	**
Scouters Mountain Road Extension	Both	East end Scouter's Mountain	Foster Road	**
Troge Road Extension	Both	172nd Avenue	Foster Road	**
169th Avenue Extension	Both	Misty Drive	177th Avenue	**
Misty Drive Extension	Both	162nd Avenue	169th Avenue	**
Rock Creek Court Extension	Both	162nd Avenue	177th Avenue	**
Big Timber Court Extension	Both	172nd Avenue	177th Avenue	**
Rock Creek Boulevard Extension	Both	172nd 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	**
177th Avenue South Extension	Both	Rock Creek Boulevard	Sunnyside Road	**
177th Avenue North Extension	Both	Crossroads Avenue	Sager Road Extension East	**
Happy Valley Boulevard	Both	172nd Avenue	Foster Road	**
Borges Road	Both	Tillstrom Road	172nd-190th Connector	**
Eckert Lane	Both	OR 224	Tong Road	**
			Bike Lanes on Existing Arterials & Collectors	$5,650
			Bike Lanes on New Arterials & Collectors	**
			Total Bicycle Master Plan Project Costs	**$5,650**

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



City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Bicycle Master Plan

FIGURE 6-1

Source: City of Happy Valley, DKS, and RLIS

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[2]. 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 6-3.

Table 6-3: 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	TSDC/ Developer	Medium Term	**
172nd Avenue Widening North*	Add bike lanes between 172nd-190th Connector to Cheldelin Road	TSDC/ Developer	Medium Term	**
122nd/129th Avenue Widening	Add bike lanes between Sunnyside Road and King Road	TSDC/ Developer	Near Term	**
King Road Widening	Add bike lanes between 129th Avenue and 145th Avenue	TSDC/ Developer	Medium Term	**
132nd Avenue Widening*	Add bike lanes from Ridgecrest Road to King Road	TSDC/ Developer	Long Term	**
145th-147th Avenue Widening	Add bike lanes from Clatsop Street to Monner Road	TSDC/ Developer	Medium Term	**
162nd Avenue Widening*	Add bike lanes from Palermo Avenue to Hagen Road	TSDC/ Developer	Medium Term	**
Clatsop Street Extension East	Construct bikes lanes between 162nd Avenue and 172nd Avenue	TSDC/ Developer	Long Term	**
162nd Avenue Extension North*	Construct bikes lanes between Hagen Road and Clatsop Street	TSDC/ Developer	Long Term	**
162nd Avenue Extension South*	Construct bikes lanes between 157th Avenue to Highway 212	TSDC/ Developer	Long Term	**
Sager Road Extension West	Construct bikes lanes from 162nd Avenue to 172nd Avenue	TSDC/ Developer	Long Term	**
Wooden Heights Road	Construct bikes lanes from 162nd Avenue to 177th Avenue	TSDC/ Developer	Medium Term	**
Hemrich Road Extension	Construct bikes lanes from 162nd Avenue to Foster Road	TSDC/ Developer	Medium Term	**
Scouter Mountain Road	Construct bikes lanes between 147th Avenue and Foster Road	TSDC/ Developer	Medium Term	**
Troge Road Extension*	Construct bikes lanes between 162nd Avenue and Foster Road	TSDC/ Developer	Near Term	**
169th Avenue Extension	Construct bikes lanes from Sunnyside Road to 177th Avenue	TSDC/ Developer	Near Term	**

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

Misty Drive Extension*	Construct bikes lanes from 162nd Avenue and 169th Avenue	TSDC/ Developer	Medium Term	**
Rock Creek Boulevard West Extension*	Construct bikes lanes from 162nd Avenue to the Sunrise Corridor Rock Creek interchange	TSDC/ Developer	Medium Term	**
Parklane Drive North Extension	Construct bikes lanes from 162nd Avenue to Stadium Way	TSDC/ Developer	Medium Term	**
Happy Valley Boulevard*	Construct bikes lanes east to Foster Road	TSDC/ 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 TSDCs 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 were coordinated with TriMet staff. The East Happy Valley Comprehensive Plan and Rock Creek Employment Infrastructure Plan areas located along Sunnyside Road, OR 212 and 172nd Avenue are expected to develop as major employment and residential centers, with a need for future transit coverage.

Future increases in residential and employment density in the eastern portion of Happy Valley are expected to increase potential transit ridership demand . Future bus service should be considered on OR 212 (east of 152nd Avenue), 172nd Avenue, planned 190th Connector and Foster Road. 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 outside the designated TriMet district. The district boundary (as of 2020) 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 the Happy Valley city limits. 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 $7.737 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 website https://trimet.org/taxinfo/#employer.

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.

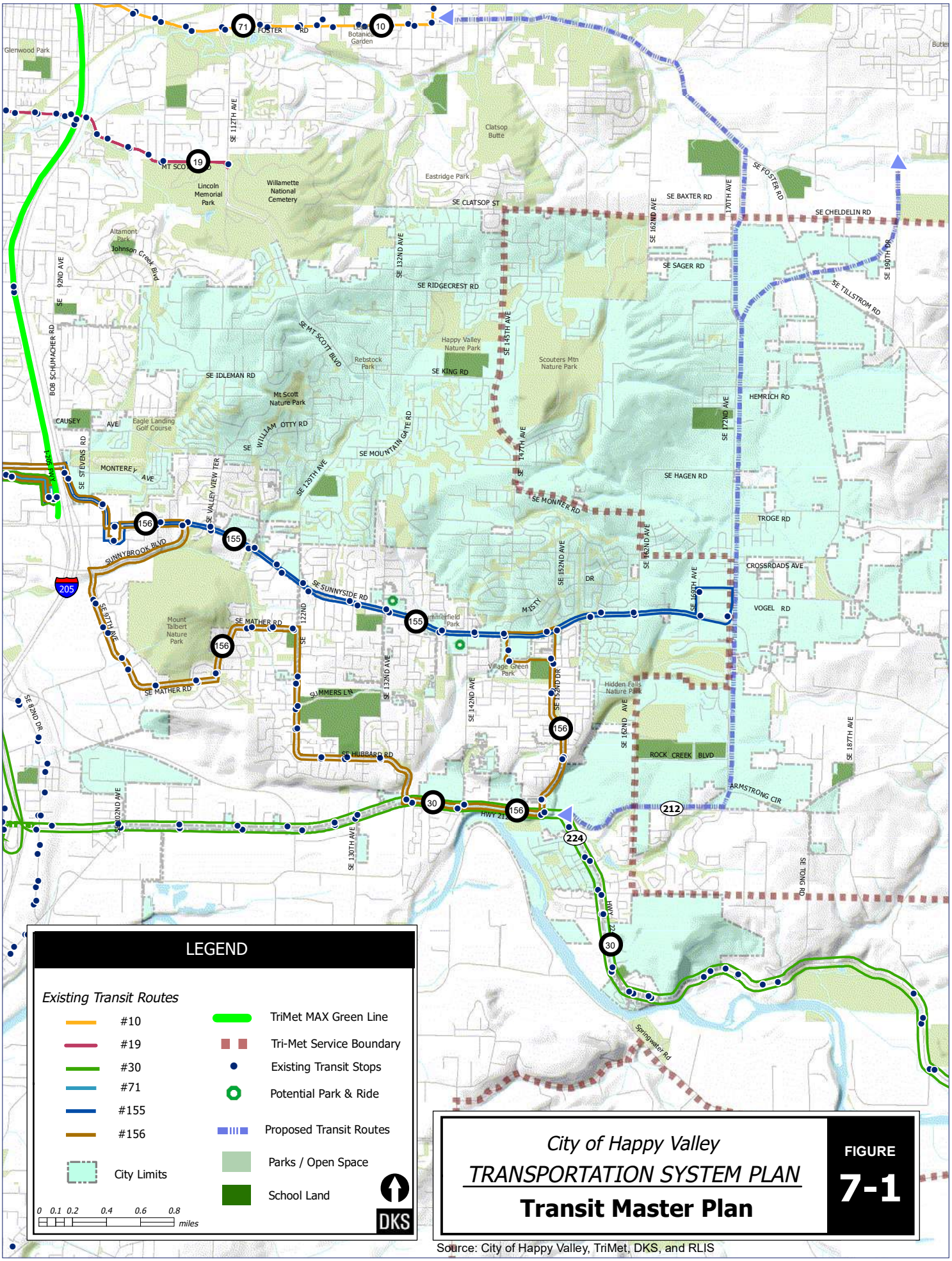
Table 7-2: Transit Master Plan Projects

Project	Description	Cost ($1,000s)
TriMet District	Bring all of the 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.


LEGEND
Existing Transit Routes
#10
#19
#30
#71
#155
#156
City Limits
TriMet MAX Green Line
Tri-Met Service Boundary
Existing Transit Stops
Potential Park & Ride
Proposed Transit Routes
Parks / Open Space
School Land
0 0.1 0.2 0.4 0.6 0.8 miles
DKS
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Transit Master Plan
FIGURE
7-1
Source: City of Happy Valley, TriMet, DKS, and RLIS

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 used to evaluate 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, 172nd Avenue/190th Drive Corridor Management Plan, Happy Valley Town Center Plan, Sunnyside Road East Extension Design Report, Rock Creek Employment Infrastructure Plan and Pleasant Valley North Carver Comprehensive Plan. Policies for 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 improvements 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 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

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.	<u>Reduction</u> 8-20% 5-9% 2-4%	<u>Transit</u> 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 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%	

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

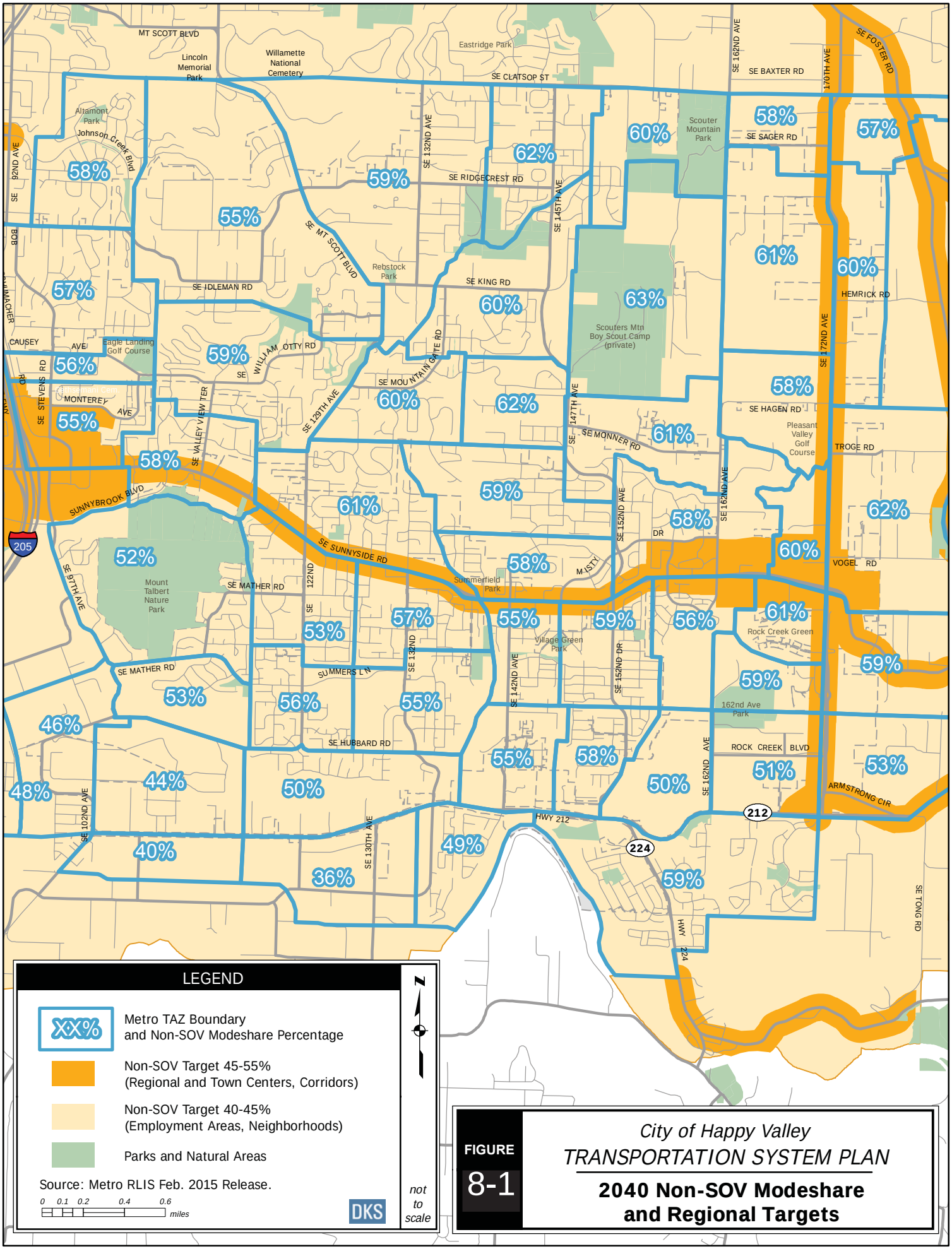
Strategy	Description	Potential Trip Reduction
Provide Vanpools	Employees that live near each other are organized into a vanpool for their trip to work. The employer may subsidize the cost of operation and maintaining the van.	15-25% (company provided van with fee) 30-40% (subsidized van)
Gift/Awards 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 percentage 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
92ND AVE
SE
BOB
SCHUMACHER
CAUSEY AVE
Eagle Landing Golf Course
SE STEVENS RD
MONTEREY AVE
SE VALLEY VIEW TER
SE WILLIAM OTTY RD
SE MT SCOTT BLVD
SE IDLEMAN RD
Rebstock Park
SE 132ND AVE
SE RIDGECREST RD
SE 145TH AVE
SE KING RD
SE MOUNTAIN GATE RD
SE 129TH AVE
Scouter Mountain Park
SE SAGER RD
Scouters Mtn Boy Scout Camp (private)
SE 147TH AVE
SE MONNER RD
SE HAGEN RD
Pleasant Valley Golf Course
TROGE RD
HEMRICK RD
SE 172ND AVE
SUNNYBROOK BLVD
205
SE 97TH AVE
Mount Talbert Nature Park
SE SUNNYSIDE RD
SE MATHER RD
SE 122ND
SE 152ND AVE
SE 162ND AVE
DR
MISTY
Summerfield Park
VOGEL RD
Village Green Park
SE 132ND
SUMMERS LN
SE 142ND AVE
SE 152ND DR
Rock Creek Green
162nd Ave Park
ROCK CREEK BLVD
SE HUBBARD RD
SE 102ND AVE
SE 130TH AVE
HWY 212
212
224
ARMSTRONG CIR
HWY 224
SE TONG RD
58%
60%
62%
59%
55%
57%
61%
63%
56%
53%
46%
44%
48%
50%
40%
36%
49%
51%
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	-	400 feet	200 feet
Neighborhood	530 feet	-	-
Local	530 feet	-	-

Note: Intersection and driveway spacing is measured parallel to the edge of the roadway, from the nearest edge of pavement of the first access to the nearest edge of pavement of the second access.
* 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 constructed 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, 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.

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

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.

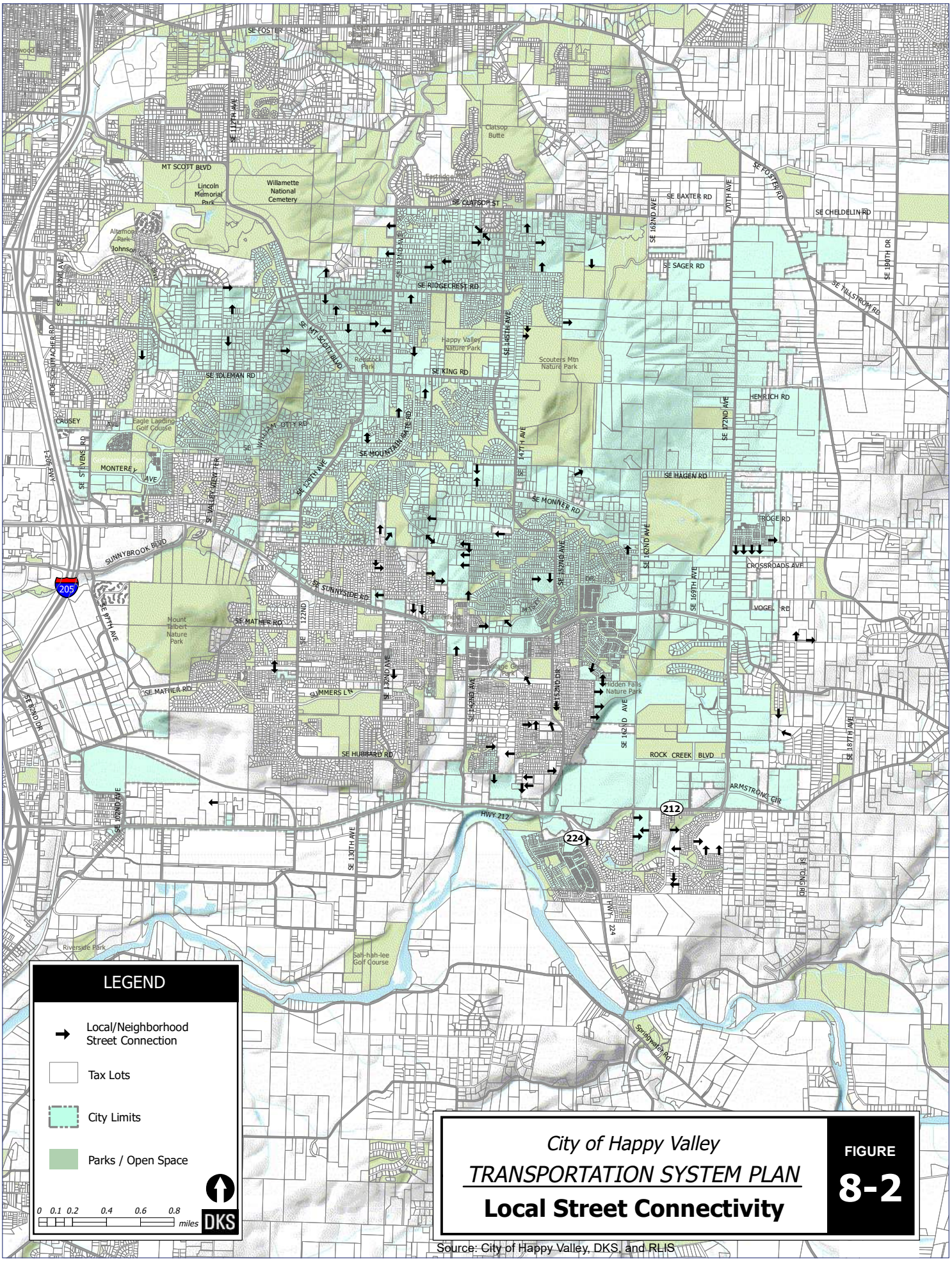
The local street networks that are created adjacent to arterial street corridors, such as 172nd Avenue, are particularly important. They reduce reliance on the arterials for local trips and provide a street system that parallels those arterials. The city and community have carefully planned East Happy 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.

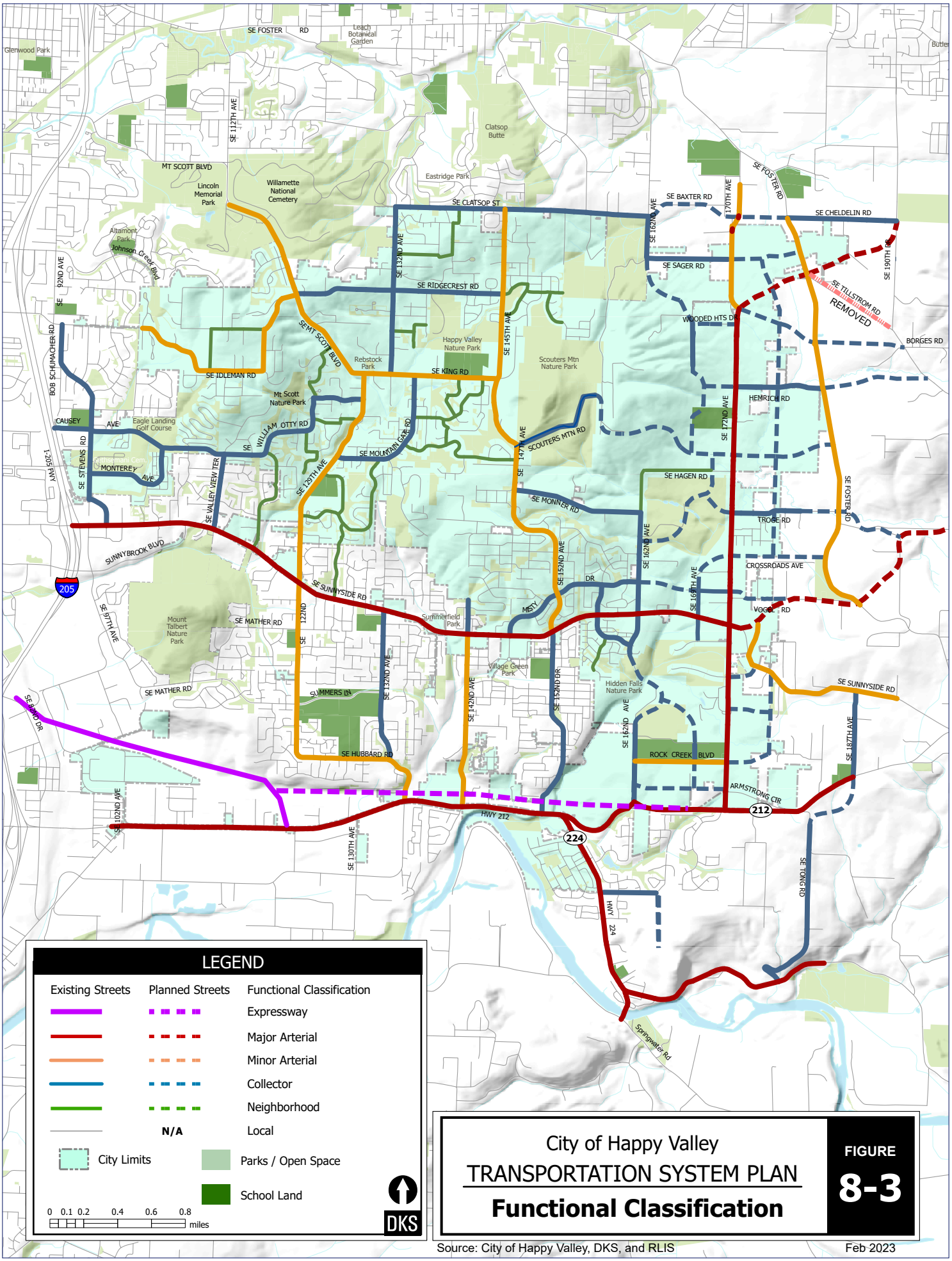
Functional Classification

The 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, the Happy Valley Town Center Plan, Rock Creek Employment Infrastructure Plan and Pleasant Valley North Carver Comprehensive Plan. A proposed roadway system has been developed within the planned growth areas of the TSP study area. The functional classification of these roadways is shown in Figure 8-3.

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 0.8 miles
DKS
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Local Street Connectivity
FIGURE
8-2
Source: City of Happy Valley, DKS, and RLIS


LEGEND
Existing Streets
Planned Streets
Functional Classification
Expressway
Major Arterial
Minor Arterial
Collector
Neighborhood
N/A
Local
City Limits
Parks / Open Space
School Land
0 0.1 0.2 0.4 0.6 0.8
miles
DKS
SE FOSTER RD
Leach Botanical Garden
Glenwood Park
Clatsop Butte
SE 112TH AVE
MT SCOTT BLVD
Lincoln Memorial Park
Willamette National Cemetery
Eastridge Park
SE CLATSOP ST
SE BAXTER RD
SE 170TH AVE
SE FOSTER RD
SE CHELDELIN RD
SE 162ND AVE
SE 190TH AVE
Altamont Park
Johnson Creek Blvd
SE 92ND AVE
SE 132ND AVE
SE SAGER RD
SE RIDGECREST RD
SE TILLSTROM RD
REMOVED
WOODED HTS DR
BORGES RD
SE MT SCOTT BLVD
Happy Valley Nature Park
SE 145TH AVE
Rebstock Park
SE KING RD
Scouters Mtn Nature Park
BOB SCHUMACHER RD
SE IDLEMAN RD
Mt Scott Nature Park
HEMRICH RD
SE 172ND AVE
CAUSEY AVE
Eagle Landing Golf Course
SE WILLIAM OTTY RD
SE MOUNTAIN GEAR RD
SE SCOUTERS MTN RD
SE 147TH AVE
SE STEVENS RD
Finnsmani Cem.
MONTEREY AVE
SE VALLEY VIEW TER
SE 129TH AVE
SE HAGEN RD
SE FOSTER RD
SE MONNER RD
TROGE RD
SUNNYBROOK BLVD
SE 152ND AVE
SE 162ND AVE
CROSSROADS AVE
SE 167TH AVE
205
SE SUNNYSIDE RD
SE 97TH AVE
Mount Talbert Nature Park
SE MATHER RD
SE 122ND
Summerfield Park
MISTY DR
VOGEL RD
SE SUNNYSIDE RD
SE 132ND AVE
Village Green Park
SE 142ND AVE
SE 152ND DR
Hidden Falls Nature Park
SE 162ND AVE
SE 187TH AVE
SE MATHER RD
SUMMERS LN
SE HUBBARD RD
ROCK CREEK BLVD
ARMSTRONG CIR
212
HWY 212
224
SE 102ND AVE
SE 130TH AVE
SE TONG RD
HWY 224
Springwater Rd
City of Happy Valley
TRANSPORTATION SYSTEM PLAN
Functional Classification
FIGURE
8-3
Source: City of Happy Valley, DKS, and RLIS
Feb 2023

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) were prepared for 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 (FEIS) for the Sunrise Project[7]. The Sunrise Project Interchange Management Areas are shown in Figure 8-4.

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

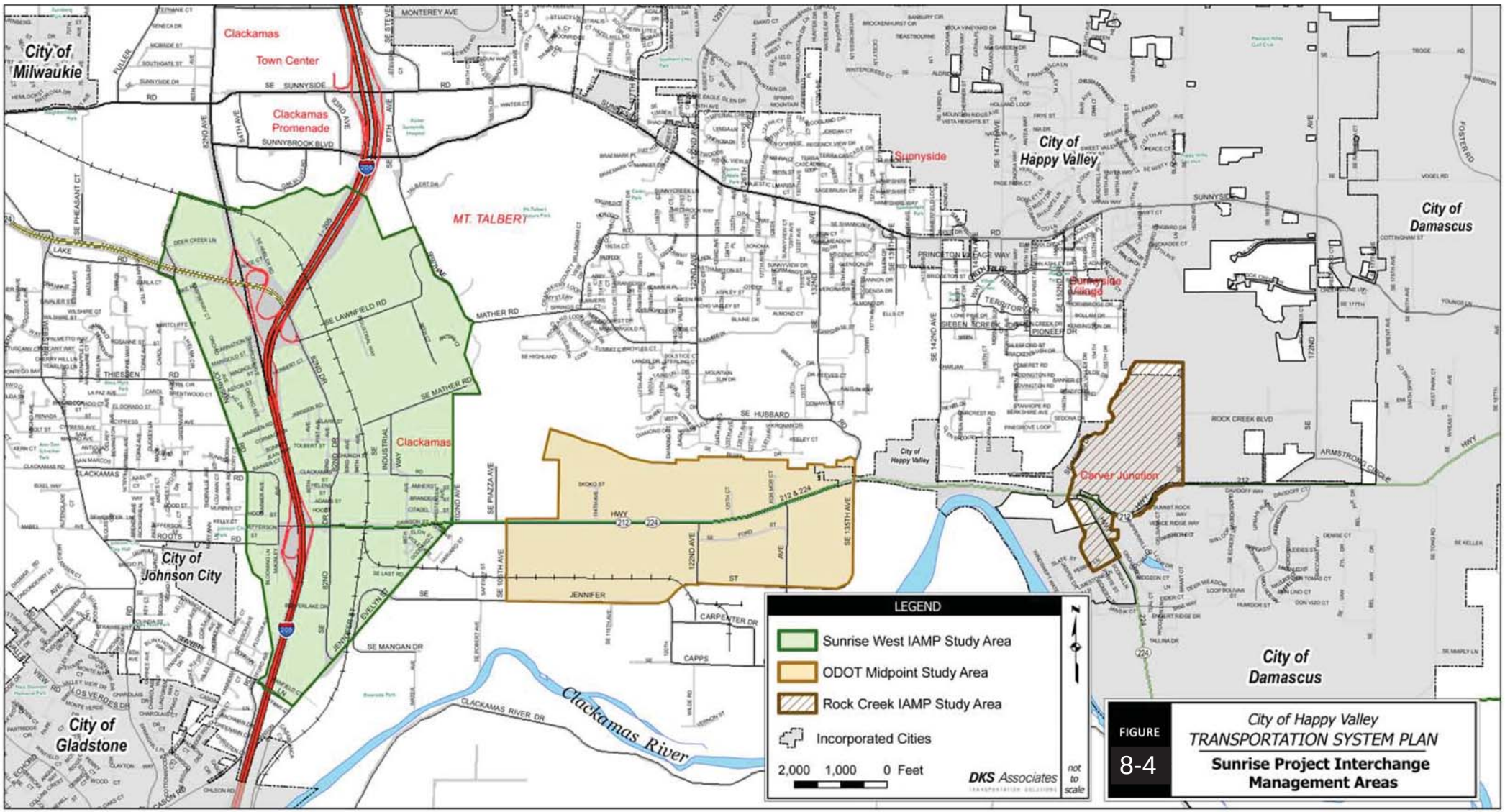
The City of Happy Valley will coordinate with Clackamas County and ODOT to support the implementation of the Sunrise Project Interchange Management Areas. This effort will include the following actions for Rock Creek, Midpoint and Sunrise West interchange management areas.

- 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

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

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

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 8-5 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.

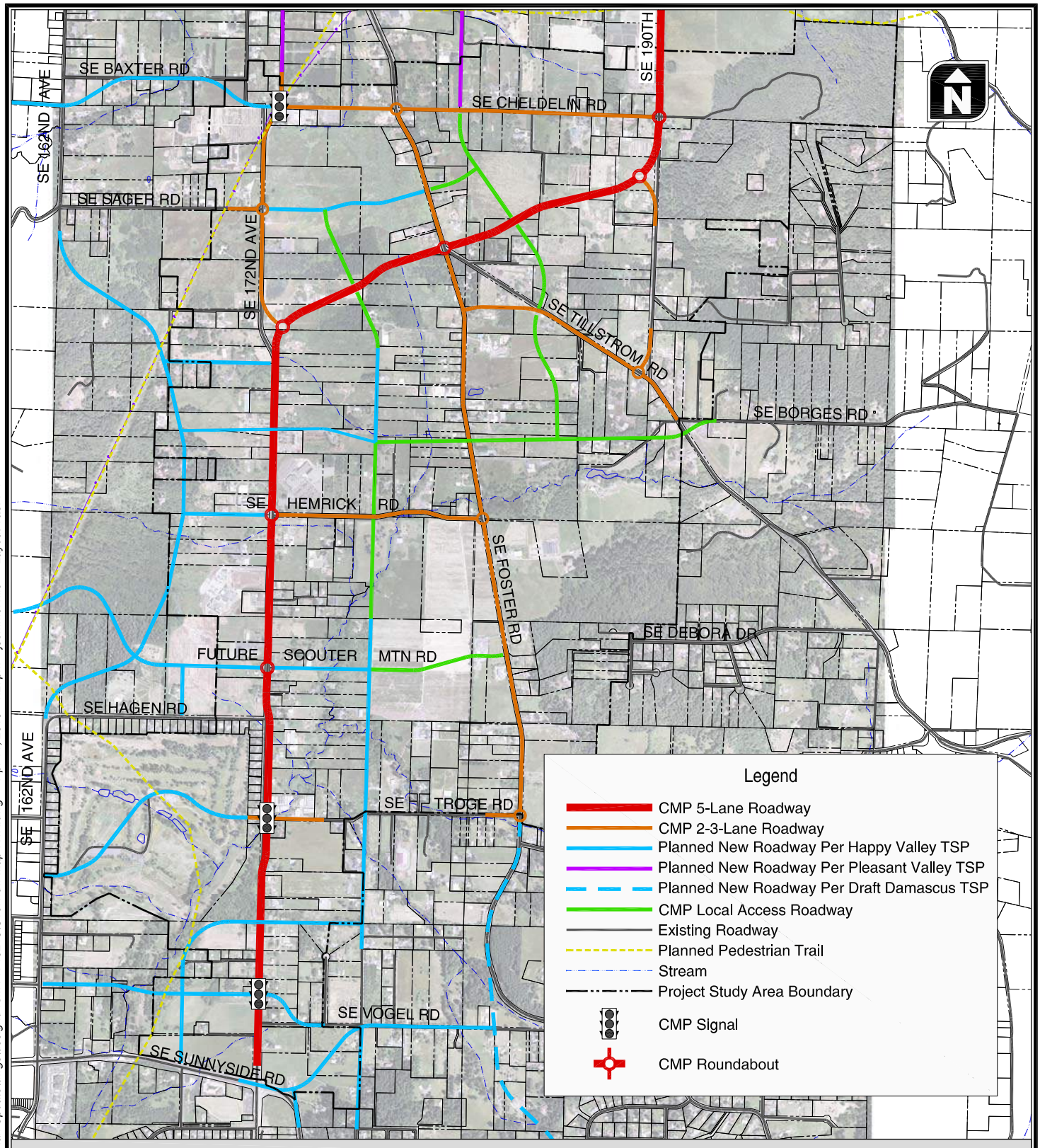
Table 8-4: Intersection Treatments 172nd Avenue / 190th Drive Corridor

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 / Hemrich 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 8-6 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 8-5

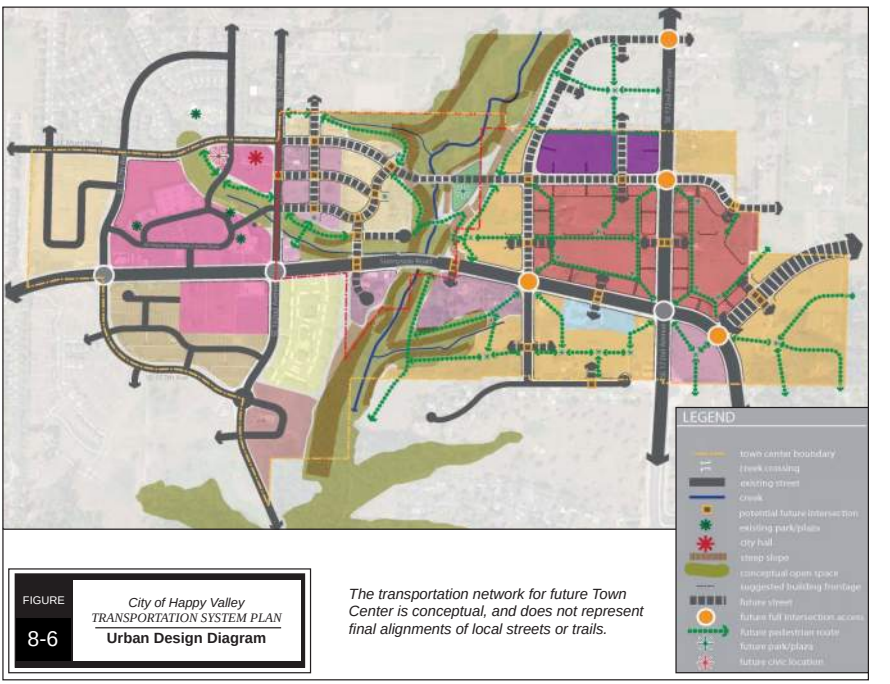


FIGURE 8-6

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.

Sunnyside Road East Extension Design Report

The City of Happy Valley recently conducted a design study[8] for the extension of a new arterial east of 172nd Avenue to further define the project description. The alignment for this planned roadway project was identified as a study area in the previous Happy Valley Transportation System Plan. Now that conceptual planning for the new arterial has been completed, the study area has been removed and the preliminary design is shown in Figure 8-7.

The preliminary design shows a new arterial roadway extending northeast from Sunnyside Road towards Vogel Road. It would be constructed following the City standard for a five-lane, major arterial. The existing Sunnyside Road would continue to extend to the southeast connecting to OR 212. To avoid creating a five-leg intersection at Sunnyside Road/172nd Avenue, a portion of the existing Sunnyside Road is planned to be relocated east of 172nd Avenue and a two-lane roundabout is planned where the new arterial and the new Sunnyside Road alignments intersect. The preliminary design of new roadways and the roundabout intersection was based on several considerations such as topography, environmental constraints, year 2040 traffic demand, spacing from the traffic signal at 172nd Avenue, property boundaries, future development adjacent to the corridor and future local street connections. As the planning and design of the new arterial extension to the east progresses, further considerations, investigations, and refinement of the preliminary plans may affect the overall impact limits to the width and geometry of the corridor.

[8] Southeast Sunnyside Road Extension East Design Report, BergerABAM, June 2017.

LEGEND

The project preliminary design is conceptual in nature and subject to change with City approval. As the planning and design of the project progresses, further considerations, investigations, and refinement of the preliminary plans may affect the overall impact limits to the width and geometry of the project.

DKS

not to scale

Revised August 29, 2017

FIGURE 8-7

City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Sunnyside Road East Extension

Mobility Needs

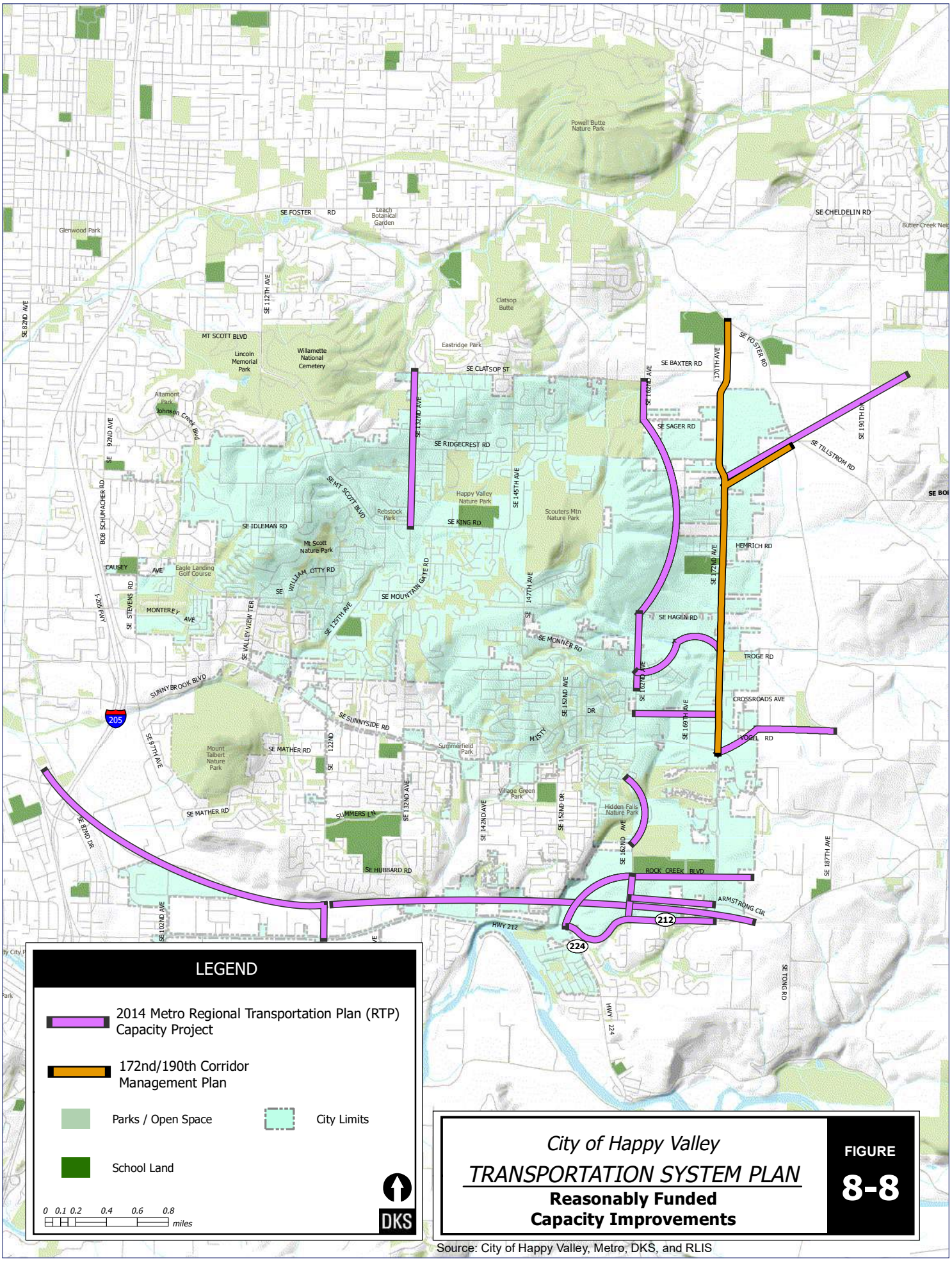
The Metro travel demand models were used to assess 2040 operating conditions and identify locations that may require additional operational or capacity improvements. Metro's current regional 2040 model was refined to include capacity projects from the RTP Strategic (financially constrained) list and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

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

Project	Description	Project Number	Nominating Agency
172nd Avenue – 190th Drive Connector	Design five-lane connector from 172nd Avenue to Clatsop Street	RTP 10033	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
Sunnyside East Extension	Construct five-lane roadway from 172nd Avenue to Foster Road	RTP 10076	Happy Valley
King Road/145th Avenue	Realign intersection and construct a single-lane roundabout	RTP 10084	Happy Valley
Sunrise Project Phase 2 (PE and ROW)	Conduct preliminary engineering (PE) and acquire right-of-way (ROW) from I-205 to SE 172nd Ave consistent with the Final Environmental Impact Statement (FEIS)/Record of Decision (ROD).	RTP 10890	ODOT
Sunrise Project Phase 2 (CON)	Construct (CON) a 4-lane roadway from SE 122nd Ave to SE 172nd Ave, consistent with the FEIS/ROD.	RTP 11301	ODOT
Rock Creek Boulevard	Construct five-lane extension from Sunrise Corridor to 177th Avenue	RTP 11135	Happy Valley
162nd Avenue Extension South Phase 2	Construct three-lane extension from 157th Avenue to Rock Creek Boulevard	RTP 11346	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, Constrained Project List, March 15, 2019
SE 172nd Avenue/190th Drive Corridor Management Plan, Clackamas County, February 2012

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



City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Reasonably Funded Capacity Improvements

FIGURE 8-8

Source: City of Happy Valley, Metro, DKS, and RLIS

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 OR 212

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

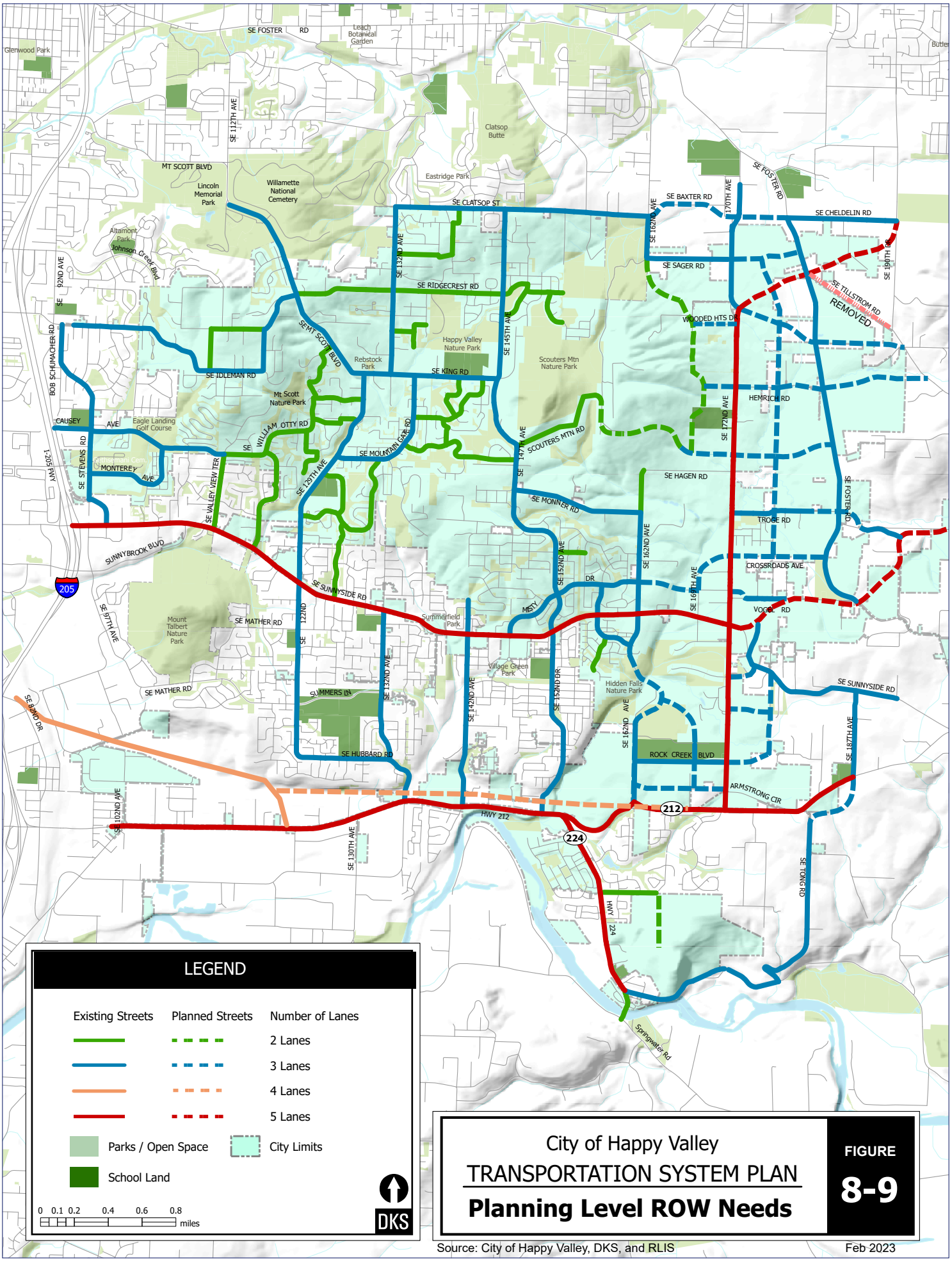
The 2040 financially constrained scenario includes transportation improvements that are reasonably funded and likely to be constructed by the year 2040. This scenario comprises projects identified in the RTP financially constrained system and the County's 172nd Avenue/190th Drive Corridor Plan, shown in Table 8-5 and on Figure 8-8. The most significant project included in the financially constrained system within the study area is the Sunrise Project Phase 2.

Key study intersections were evaluated 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.

Street Right-of-Way Needs

Figure 8-9 summarizes the anticipated right-of-way needs for existing and proposed roadways within the TSP planning horizon. 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 and Carver Butte 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.



City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Planning Level ROW Needs

FIGURE **8-9**

Source: City of Happy Valley, DKS, and RLIS

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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, Rock Creek Employment Infrastructure Plan, Pleasant Valley/North Carver Plan etc.) and those determined as the outcome of the Happy Valley TSP update. These improvements are shown in Figure 8-10 and listed in Table 8-6. A refinement area plan is identified for the OR 224 corridor through the Carver area. Further analysis is required to evaluate realignment alternatives for the highway to the east to improve operations at the OR 224/Springwater Road intersection and create a low volume and speed street network in the downtown area.

Projects from the RTP list include the cost estimate provided by Metro if applicable. Projects from the 172nd Avenue-190th Drive CMP include the cost estimate provided by Clackamas County. 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.

Table 8-6: Motor Vehicle Master Plan Projects

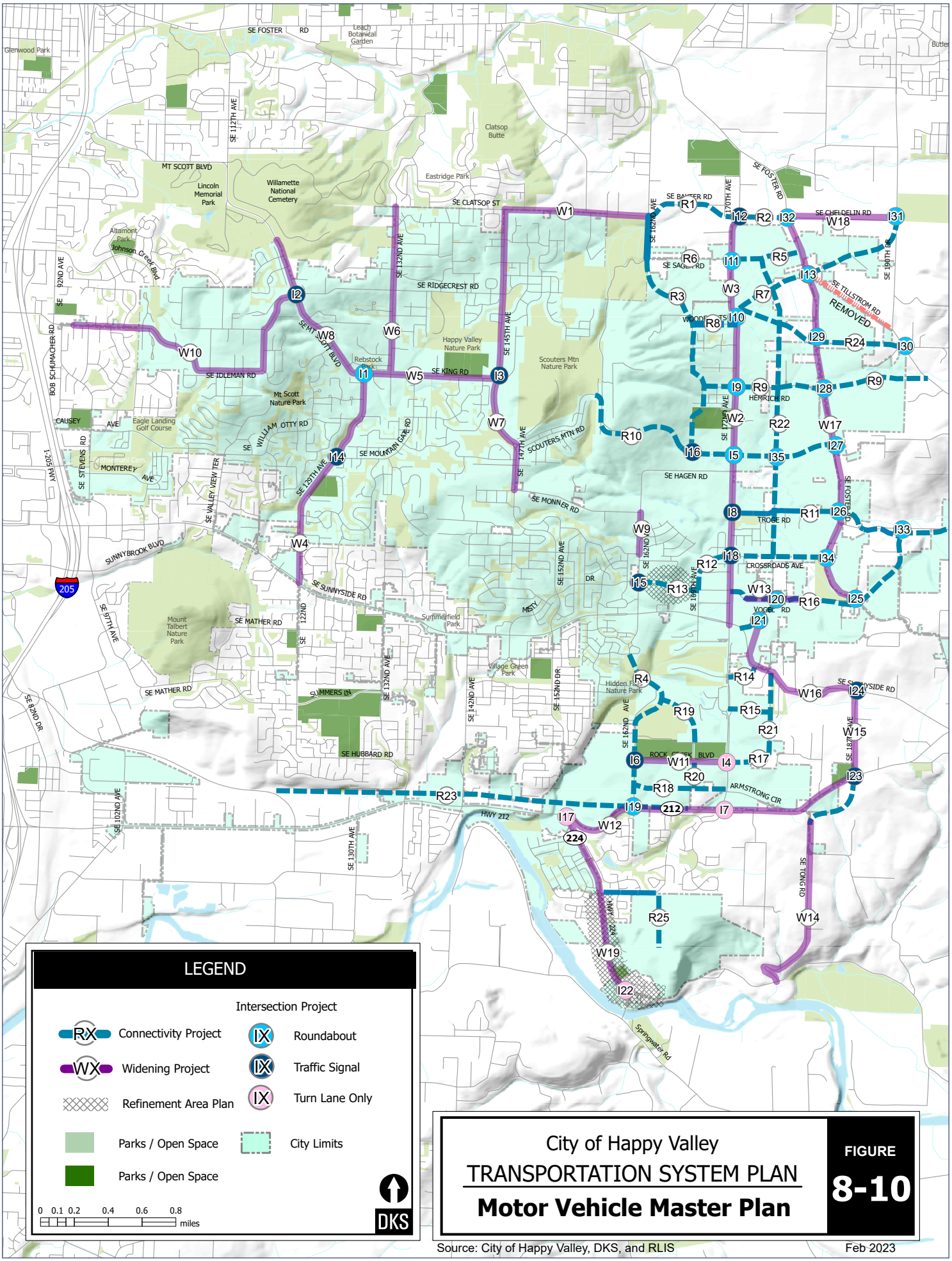
ID	Project	Improvement	Cost Estimate ($1,000s)
Intersection Improvement			
I1	129th Avenue/Mt. Scott Boulevard/King Road	Install a roundabout, add eastbound right turn lane	$1,500
I2	Mt. Scott Boulevard/Idleman Road/Ridgecrest Road	Install a traffic signal, improve vertical curve, align eastbound and westbound approaches	$1,500
I3	145th Avenue/King Road	Install a traffic signal	$1,500
I4	172nd Avenue/Rock Creek Blvd	Add second eastbound left turn lane	$200
I5	172nd Avenue/Scouter Mountain Road*	Install a two-lane roundabout	$2,000
I6	162nd Avenue/Rock Creek Boulevard	Install a traffic signal	$1,000
I7	172nd Avenue/OR 212	Add second eastbound left turn lane	$500
I8	172nd Avenue/Troge Road*	Install a traffic signal, rebuild creek bridges	$8,000
I9	172nd Avenue/Hemrich Road*	Install a two-lane roundabout	$2,000
I10	172nd Avenue/172nd-190th Connector*	Install a two-lane roundabout	$2,000
I11	172nd Avenue/Sager Road*	Install a one-lane roundabout	$1,500
I12	172nd Avenue/Baxter Road/Cheldelin Road*	Install a traffic signal	$500
I13	Foster Road/172nd-190th Connector*	Install a two-lane roundabout	$2,000
I14	129th Avenue/Mountain Gate Road	Install a traffic signal	$500
I15	162nd Avenue/Misty Drive	Install a traffic signal	$500
I16	162nd Avenue Extension	Install a traffic signal	$1,000

	North/Scouters Mountain Road		
I17	OR 212/OR 224	Add a second eastbound right turn lane, widen OR 224 to provide a southbound receiving lane	$7,000
I18	Crossroads Avenue/172nd Avenue	Install a traffic signal	$500
I19	OR 212/162nd Avenue	Install a one-lane roundabout	$1,500
I20	Happy Valley Boulevard/Vogel Road	Install a two-lane roundabout	$1,500
I21	Happy Valley Boulevard/Sunnyside Road	Install a two-lane roundabout	$2,000
I22	OR 224/Springwater Road	Add westbound left turn lane and southbound right turn lane	$1,000
I23	OR 212/187th Avenue/Tong Road	Install a traffic signal	$500
I24	Sunnyside Road/187th Avenue	Install a one-lane roundabout	$1,500
I25	Happy Valley Boulevard/Foster Road	Install a two-lane roundabout	$2,000
I26	Troge Road/Winston Road/Foster Road	Install a one-lane roundabout	$1,500
I27	Scouters Mountain Road/Foster Road	Install a one-lane roundabout	$1,500
I28	Hemrich Road/Foster Road	Install a one-lane roundabout	$1,500
I29	Borges Road Extension/Foster Road	Install a one-lane roundabout	$1,500
I30	Borges Road/Tillstrom Road	Install a one-lane roundabout	$1,500
I31	Cheldelin Road/172nd-190th Connector	Install a two-lane roundabout	$2,000
I32	Baxter Road/Foster Road/Cheldelin Road	Install a one-lane roundabout	$1,500
I33	Happy Valley Boulevard/Winston Road	Install a two-lane roundabout	$2,000
I34	Crossroads Avenue/Foster Road	Install a one-lane roundabout	$1,500
I35	Scouters Mountain Road/177th Avenue	Install a one-lane roundabout	$1,500
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	$14,200
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 Street to King Road	$4,900
W7	145th – 147th Avenue Widening	Widen to 3-lane facility from Clatsop Street to	$8,300

		Monner Road	
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 Monner 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	Widen to 3-lane facility from 162nd Avenue to 172nd Avenue	$7,500
W12	OR 212	Widen to 5-lane facility from OR 224 to 187th Avenue	$28,500
W13	Vogel Road	Widen to 3-lane facility to the east to Happy Valley Boulevard	$900
W14	Tong Road	Widen to 3-lane facility between OR 224 and OR 212, realign north segment to align with 187th Avenue/OR 212	$7,800
W15	187th Avenue	Widen to 3-lane facility between OR 212 and Sunnyside Road	$4,300
W16	Sunnyside Road	Widen to 3-lane facility between Happy Valley Boulevard and 187th Avenue	$7,400
W17	Foster Road	Widen to 3-lane facility between Cheldelin Road and Happy Valley Boulevard	$13,600
W18	Cheldelin Road	Widen to 3-lane facility between Foster Road and 190th Drive	$3,100
W19	OR 224	Widen to 5-lane facility from OR 212 to Carver Junction	$22,200
New Roadway			
R1	Clatsop Street Extension	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 Scouters Mountain Road and Clatsop Street	$7,700
R4	162nd Avenue Extension South	Construct a new 3-lane facility between 157th Avenue and OR 212 with Rock Creek bridge and realignment north of OR 212	$20,900
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 190th Drive	$9,600
R8	Wooden Heights Road	Construct a new east-west facility from 162nd Avenue to 172nd Avenue	$1,100
R9	Hemrich Road Extension	Construct a new 3-lane east-west facility from 162nd Avenue to Tillstrom Road	$5,800

R10	Scouters Mountain Road Extension	Construct a new east-west 2/3-lane facility between the east end of Scouter's Mountain and Foster Road	$11,000
R11	Troge Road Extension	Construct a new 3-lane facility between 172nd Avenue and Happy Valley Boulevard/Winston Road, construct new bridge over Rock Creek at 172nd Avenue	$4,200
R12	169th Avenue – Crossroads Avenue Extension	Construct a new 3-lane facility from Misty Drive to Foster Road	$6,600
R13	Misty Drive Extension	Construct a new 3-lane east-west facility from 162nd Avenue and 169th Avenue, new bridge over Rock Creek	$7,900
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	$3,300
R16	Happy Valley Boulevard	Construct a new 5-lane east-west facility from 172nd Avenue to Winston Road, realign existing Sunnyside Road to south	$12,600
R17	Rock Creek Boulevard Extension	Construct a new 3-lane east-west facility from 172nd Avenue to 177th Avenue	$3,100
R18	Rock Creek East-West Roadway	Construct a new 3-lane facility south of Rock Creek Boulevard between 162nd and 172nd Ave	$8,300
R19	Parklane Drive North Extension	Construct a new 3-lane north-south facility from 162nd Avenue to Stadium Way	$6,800
R20	Parklane Drive South Extension	Construct a new 3-lane north-south facility from Rock Creek Boulevard to Rock Creek East-West Collector	$3,300
R21	177th Avenue South Extension	Construct a new 3-lane facility from Rock Creek Boulevard to Sunnyside Road	$6,300
R22	177th Avenue North Extension	Construct a new 3-lane facility from Crossroads Avenue to Sager Road Extension East	$8,800
R23	Sunrise Parkway Phase 2	Construct new 4-lane expressway from 122nd Avenue to 172nd Avenue	$477,000
R24	Borges Road Extension	Construct a new 3-lane east-west facility from Tillstrom Road to 172nd-190th Connector, close Tillstrom Road between 190th Drive and Foster Road	$8,600
R25	Eckert Lane East Extension	Construct a new 2 or 3-lane facility connecting OR 224 to Carver Butte area	$2,200
		Intersection Improvements	$60,200
		Roadway Widening	$156,200
		New Roadways	$624,500
		Total	**$840,900**

* Intersection project per the 172nd / 190th Corridor Management Plan preferred alternative.



City of Happy Valley

TRANSPORTATION SYSTEM PLAN

Motor Vehicle Master Plan

FIGURE 8-10

Source: City of Happy Valley, DKS, and RLIS

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Table 8-7 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 8-6. The Motor Vehicle Master Plan includes the Sunrise Parkway Phase 2 project which is a significant regional corridor project currently in the planning phase. Several intersections are not expected to meet operating standards in 2040 without construction of the Sunrise Parkway Phase 2 project.

Table 8-7: 2040 Preferred Scenario Intersection Level of Service (PM Peak Hour)

Intersection	Delay	LOS	Volume/ Capacity
Signalized Intersections			
172nd Avenue/Sunnyside Road	36.1	D	0.78
172nd Avenue/OR 212	30.2	C	0.81
OR 212/OR 224	6.5	A	0.57
Foster Road/Tillstrom Road/172nd-190th Connection	44.6	D	0.89
172nd Avenue/Hemrich Road	11.2	B	0.71
OR 224/Springwater Road	37.1	D	0.92
Foster Road/Vogel Road	25.2	C	0.68
Foster Road/Cheldelin Road	4.4	A	0.60
Foster Road /Troge Road	8.5	A	0.62

Notes: Signalized delay = average vehicle delay in seconds for entire intersection

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 8-8 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 timeline and current local planning information for future developments and capital projects.

Table 8-8: 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 roundabout, add eastbound right turn lane	TSDC	Medium Term	$1,500

[10] *OAR Chapter 660*, Department of Land Conservation and Development, Division 012, Transportation Planning, adopted in 2018.

Project #	Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
I2	Mt. Scott Boulevard/Idleman Road/Ridgecrest Road	Install a traffic signal, improve vertical curve, align eastbound and westbound approaches	Developer	Long Term	$1,500
I3	145th Avenue/King Road	Install a traffic signal	Developer	Long Term	$1,500
I4	172nd Avenue/Rock Creek Blvd	Add second eastbound left turn lane	TSDC	Medium Term	$200
I5	172nd Avenue/Scouter Mountain Road*	Install a two-lane roundabout	TSDC	Medium Term	$2,000
I6	129th Avenue/Mt. Scott Boulevard/King Road	Install a roundabout, add eastbound right turn lane	TSDC	Medium Term	$1,000
I7	172nd Avenue/OR 212	Add second eastbound left turn lane	ODOT	Medium Term	$500
I8	172nd Avenue/Hemrich Road*	Install a two-lane roundabout	TSDC	Medium Term	$2,000
I9	172nd Avenue/172nd-190th Connector*	Install a two-lane roundabout	TSDC	Medium Term	$2,000
I10	172nd Avenue/Sager Road*	Install a one-lane roundabout	TSDC	Medium Term	$1,500
I11	172nd Avenue/Baxter Road/Cheldelin Road*	Install a traffic signal	TSDC	Medium Term	$500
I12	Foster Road/172nd-190th Connector*	Install a two-lane roundabout	TSDC	Medium Term	$2,000
I13	129th Avenue/Mountain Gate Road	Install a traffic signal	TSDC	Medium Term	$500
I14	172nd Avenue/Troge Road*	Install a traffic signal, rebuild creek bridges	Developer	Medium Term	$8,000
I17	OR 212/OR 224	Add a second eastbound right turn lane, widen OR 224 to provide a southbound receiving lane	Developer	Medium Term	$7,000
I18	Crossroads Avenue/172nd Avenue	Install a traffic signal	Developer	Medium Term	$500
I21	Happy Valley Boulevard/Sunnyside Road	Install a two-lane roundabout	Developer	Long Term	$2,000
W2	172nd Avenue Widening South	Widen to 5-lane facility between Sunnyside Road and 172nd-190th Connector Road	TSDC	Medium Term	$14,200
W3	172nd Avenue Widening North	Widen to 3-lane facility between 172nd-190th Connector to Cheldelin Road	TSDC	Medium Term	$5,100
W4	122nd/129th Avenue Widening	Widen to 3-lane facility between Sunnyside Road and King Road and smooth curves	TSDC	Medium Term	$5,400
W5	King Road Widening	Widen to a continuous 3-lane facility cross-section between	TSDC	Medium Term	$3,900

Project #	Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
		129th Avenue and 145th Avenue			
W6	132nd Avenue Widening	Widen to 3-lane facility from Clatsop Street to King Road	TSDC	Medium Term	$4,900
W7	145th – 147th Avenue Widening	Widen to 3-lane facility from Clatsop Street to Monner Road	TSDC	Medium Term	$8,300
W9	162nd Avenue Widening	Widen to 3-lane facility from Palermo Avenue to Monner Rodd	TSDC	Medium Term	$2,400
W12	OR 212	Widen to 5-lane facility from OR 224 and 172nd Avenue	ODOT	Medium Term	$23,500
W13	Vogel Road	Widen to 3-lane facility to the east to Happy Valley Boulevard	Developer	Long Term	$900
R1	Clatsop Street Extension	Construct a new 3-lane facility between 162nd Avenue and 172nd Avenue, may follow Baxter Road right-of-way	TSDC	Long Term	$2,800
R3	162nd Avenue Extension North	Construct a new 2/3-lane facility between Scouters Mountain Road and Clatsop Street	TSDC	Medium Term	$7,700
R4	162nd Avenue Extension South	Construct a new 3-lane facility between 157th Avenue and OR 212 with Rock Creek bridge and realignment north of OR 212	TSDC	Medium Term	$20,900
R5	Sager Road Extension East	Construct a new 3-lane east-west facility from 172nd Avenue to Foster Road	TSDC	Medium Term	$2,000
R6	Sager Road Extension West	Upgrade to a 2-lane east-west facility from 162nd Avenue to 172nd Avenue	TSDC	Long Term	$2,000
R9	Hemrich Road Extension	Construct a new 3-lane east-west facility from 162nd Avenue to Tillstrom Road	TSDC	Medium Term	$5,800
R10	Scouters Mountain Road Extension	Construct a new 3-lane east-west facility between the east end of Scouter's Mountain and Foster Road	TSDC	Medium Term	$11,000
R11	Troge Road Extension	Construct a new 3-lane facility between 172nd Avenue and Happy Valley Boulevard/ Winston Road, construct new bridge over Rock Creek at 172nd Avenue	TSDC	Near Term	$4,200

Project #	Project	Improvement	Potential Funding Source	Estimated Schedule	Cost ($1,000s)
R12	169th Avenue – Crossroads Avenue Extension	Construct a new 3-lane facility from Misty Drive to Foster Road	TSDC	Near Term	$6,600
R13	Misty Drive Extension	Construct a new 3-lane east-west facility from 162nd Avenue and 169th Avenue, new bridge over Rock Creek	TSDC	Medium Term	$7,900
R16	Happy Valley Boulevard	Construct a new 5-lane east-west facility from 172nd Avenue to Winston Road, realign existing Sunnyside Road to south	TSDC	Medium Term	$12,600
R17	Rock Creek Boulevard Extension	Construct a new 3-lane east-west facility from 172nd Avenue to 177th Avenue	TSDC	Medium Term	$3,100
R19	Parklane Drive North Extension	Construct a new 3-lane north-south facility from 162nd Avenue to Stadium Way	TSDC	Medium Term	$6,800
R22	Sunrise Parkway Phase 2	Construct new 4-lane expressway from 122nd Avenue to 172nd Avenue	ODOT	Long Term	$477,000
				TSDC	$158,300
				Developer	$13,900
				ODOT	$506,000
				Total Motor Vehicle Financially Constrained Project Costs	**$678,200**

* 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. OR 212, OR 224, 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 mobility standards to be maintained for facilities under the City of Happy Valley's jurisdiction. The City shall utilize these standards to evaluate land use actions and proposed mitigations. Facilities under state and county jurisdiction shall meet the applicable standards of those agencies.

- 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 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 a 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 8-9 summarizes the street cross-section standards for Happy Valley. Figures 8-13 through 8-19 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 and a narrower width to reduce environmental impacts.
- A collector cross-section with on-street parking was developed for the 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 parkway minor arterial cross-section was developed for Foster Road between the future 172nd-190th Connector and future Happy Valley Boulevard to accommodate all modes of travel along a safe and attractive street adjacent to the Pleasant Valley Downtown District and neighborhoods.
- A local street was developed for the Carver Riverfront Overlay to provide urban features such as sidewalks, tree wells, and curb extensions with crosswalks at intersections.

A set of unique cross-sections apply within the 172nd Avenue-190th Drive Corridor Management Plan area. They are shown in Figures 8-20 through 8-22.

Under some conditions a variation to the cross-sections may be requested from the City Engineering Manager. 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.

Table 8-9: Street System Standards

Functional Classification	Desirable Maximum Volume	Right-of-way	Paved Width (curb to curb)	Number of Lanes	Sidewalk and Path	Bike Lane	Parking	Landscaping	Access Limitations*
Major Arterial	-	103 feet	74 feet	4 + median/ center turn lane	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. Access management needs must be considered.
Minor Arterial	-	69 feet	48 feet	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.	
Parkway Minor Arterial	-	89 feet	38 feet	2 + median/ center turn lane	5 feet on east side 12 feet on west side	none	none	8-foot planning strip with street trees on both sides of sidewalk and path. 10-foot planting strip with street trees in 12-foot median.	
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.	
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.	
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.	
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.	No direct property access within 25 feet of adjacent intersection.

Note: vpd = vehicles per day

*Access spacing standards shown in Table 8-2.

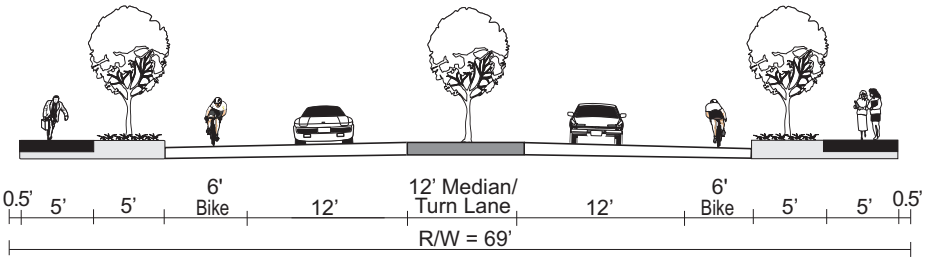
Traffic calming measures are appropriate on neighborhood and local streets only.

FIGURE 8-11

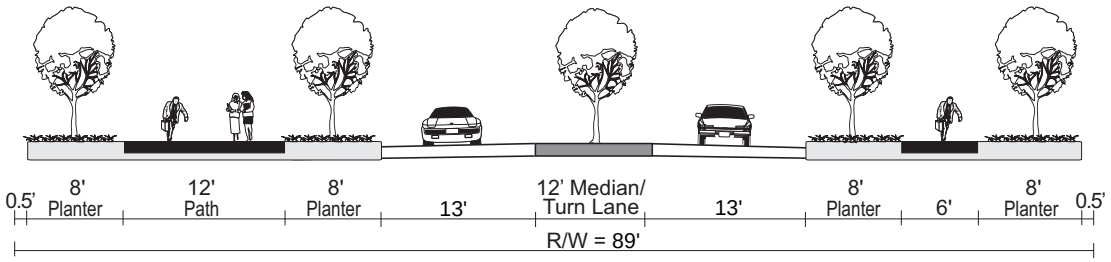
City of Happy Valley
TRANSPORTATION SYSTEM PLAN

Arterial Facility Cross-Section

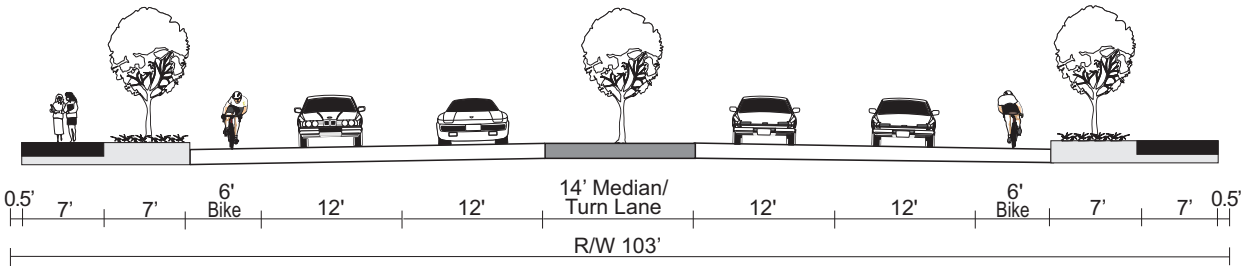
MINOR ARTERIAL
3 Lane Section



MINOR ARTERIAL
Foster Road Parkway



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. 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: On Foster Road Parkway, features may include pedestrian scale lighting and amenities and consideration of vehicles pull-over areas in single-lane segments.

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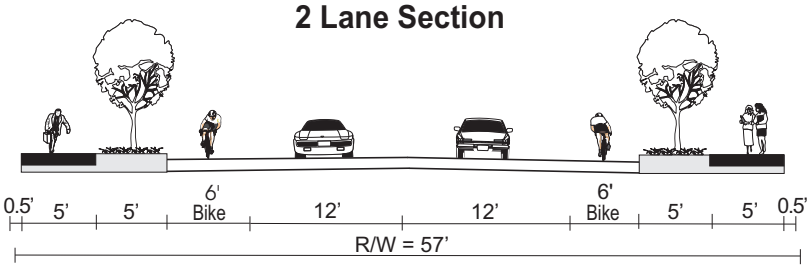
FIGURE 8-12

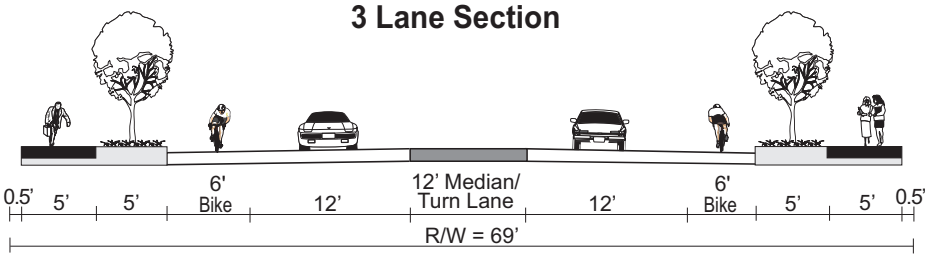
City of Happy Valley
TRANSPORTATION SYSTEM PLAN

Collector Facility Cross-Section With No Parking

2 Lane Section

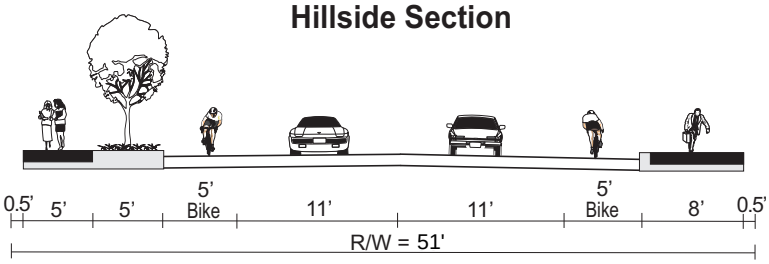


3 Lane Section



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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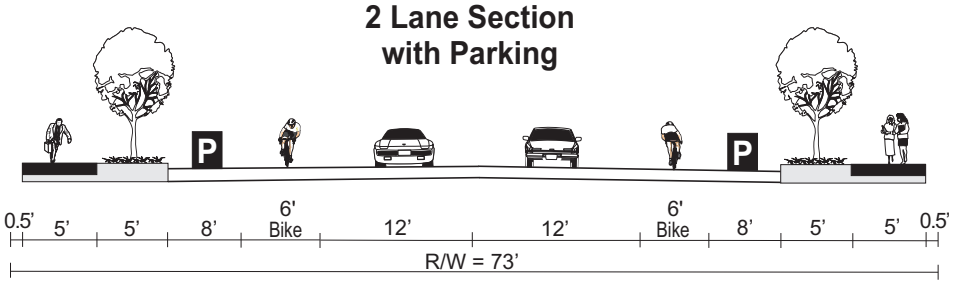
FIGURE 8-13

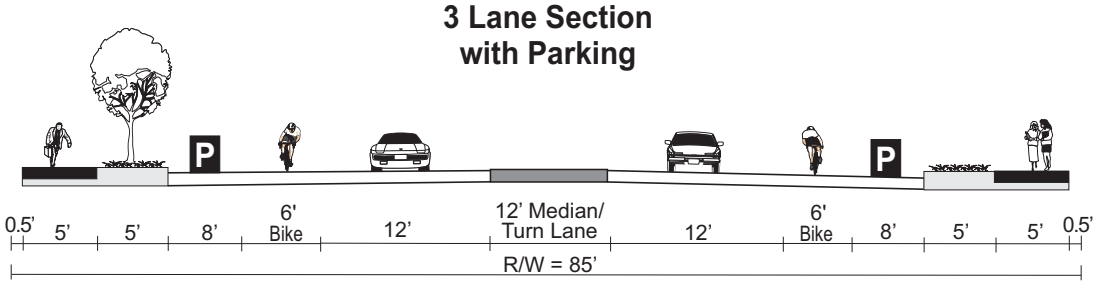
City of Happy Valley
TRANSPORTATION SYSTEM PLAN

Collector Facility Cross-Section With Parking

2 Lane Section with Parking



3 Lane Section with Parking



Note: Collector cross-sections require on-street parking on roadways generally located east of 162nd Avenue when the frontage property is zoned attached residential, multi-family residential, commercial and institutional (schools etc.). 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 conditions. Angled on-street parking would require additional right-of-way, typically 20 feet.

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 8-14

City of Happy Valley
TRANSPORTATION SYSTEM PLAN

Neighborhood Facility Cross-Section

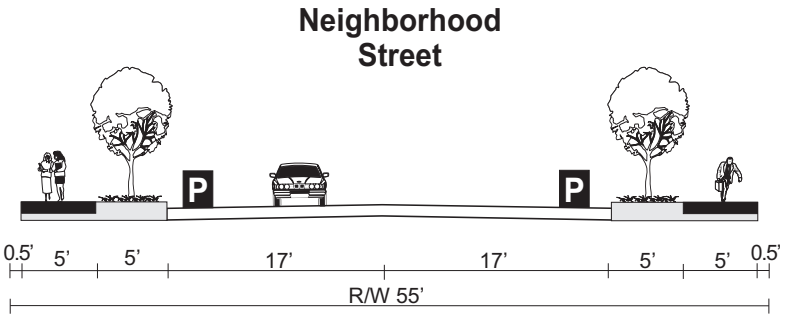

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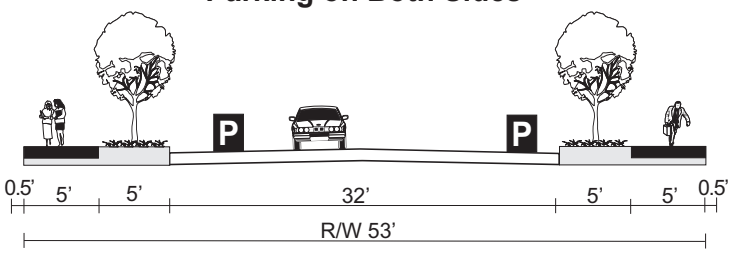
FIGURE 8-15

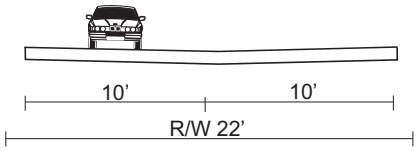
City of Happy Valley
TRANSPORTATION SYSTEM PLAN

Local Facility Cross-Section

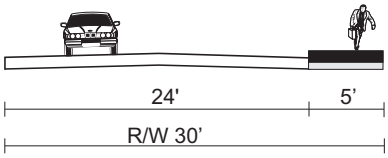
Local Street
Parking on Both Sides



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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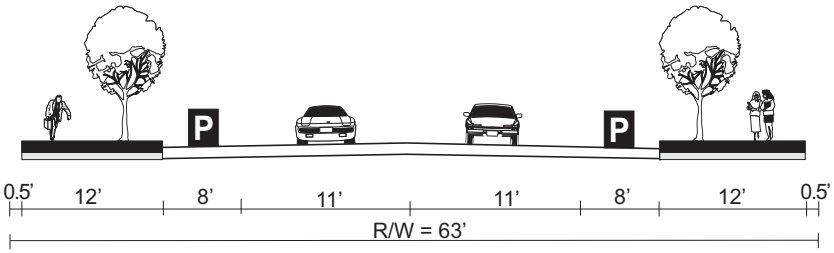
FIGURE 8-16

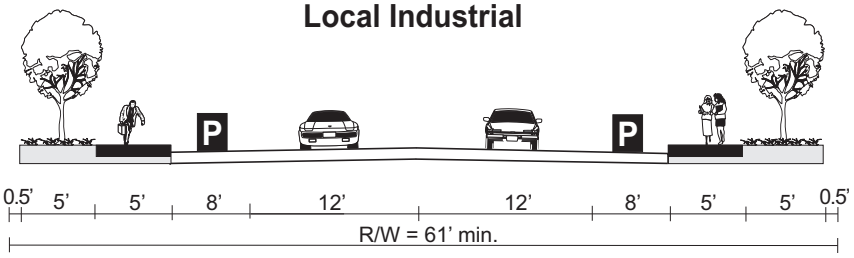
City of Happy Valley
TRANSPORTATION SYSTEM PLAN

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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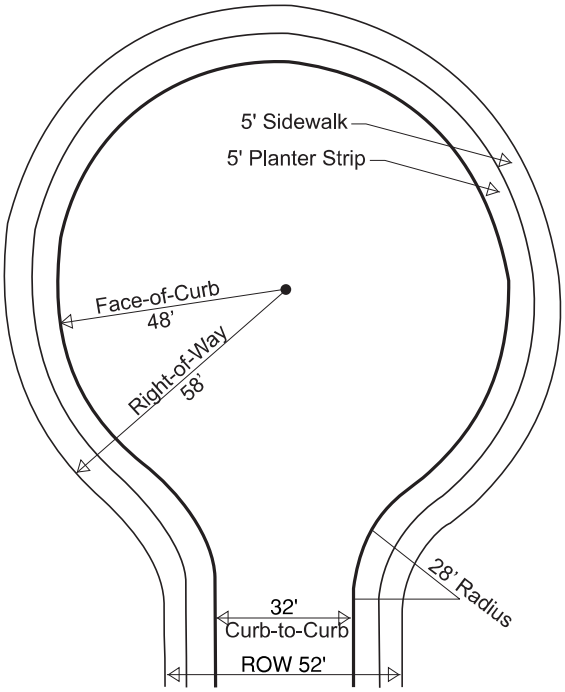
FIGURE 8-17

City of Happy Valley
TRANSPORTATION SYSTEM PLAN

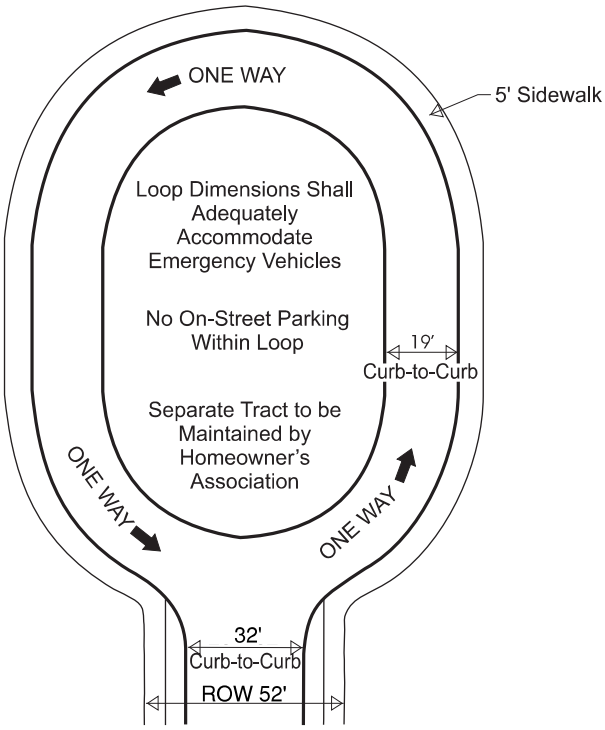
Cul de Sac & Loop Turn-Around Cross-Sections

CUL DE SAC



Sketch Not to Scale

LOOP TURN-AROUND



Sketch Not to Scale

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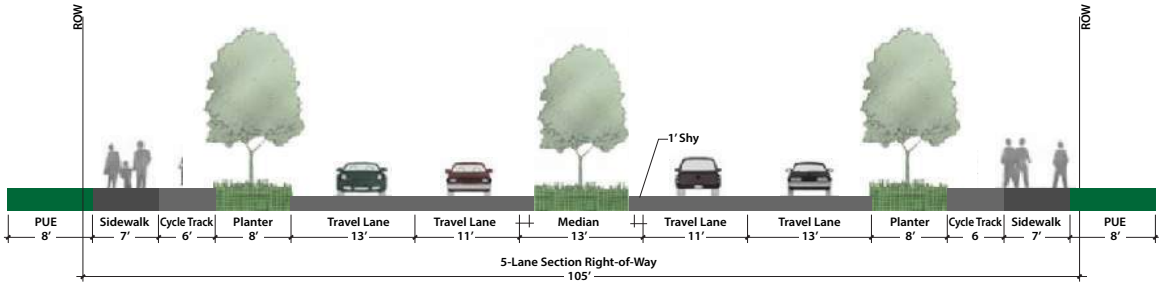
FIGURE 8-18

City of Happy Valley
TRANSPORTATION SYSTEM PLAN

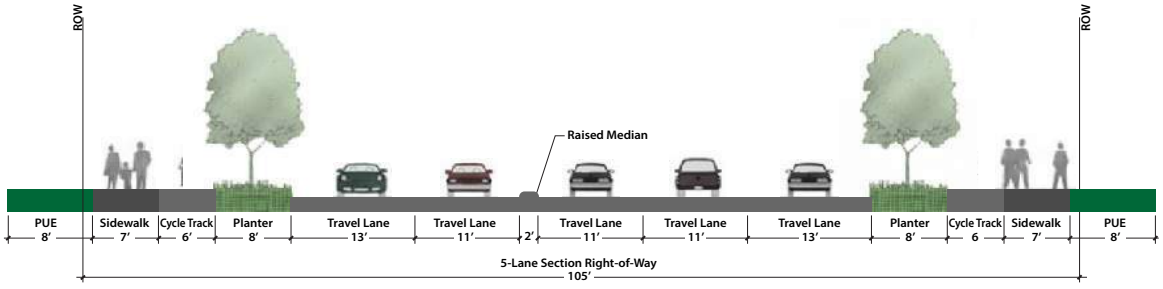
172nd/190th Avenue Corridor Management Plan
Typical Roadway Sections

5A-1



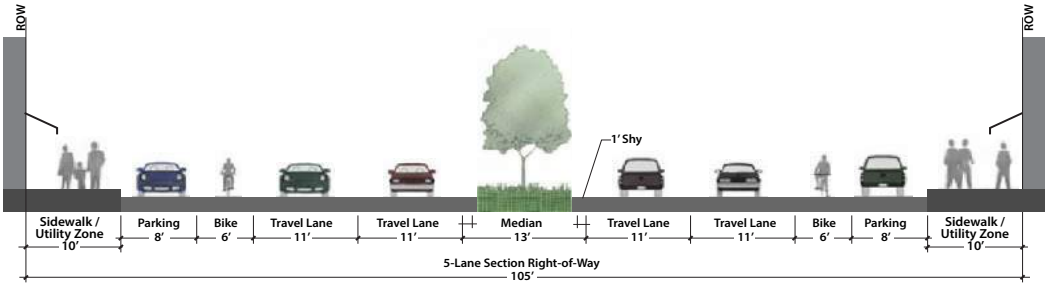
5-Lane Section with Median

5A-2



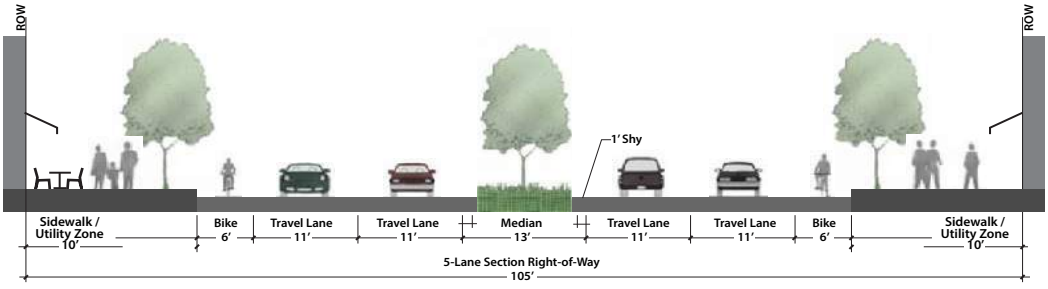
5-Lane Section with Left Turn Lane

5B



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

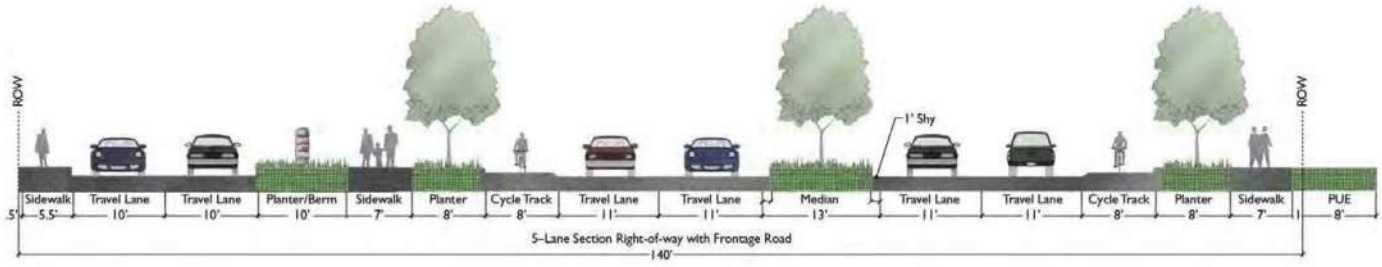
5C



5-Lane Section in Urban Center

FIGURE 8-19

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



5-Lane Section with Median and Frontage Road

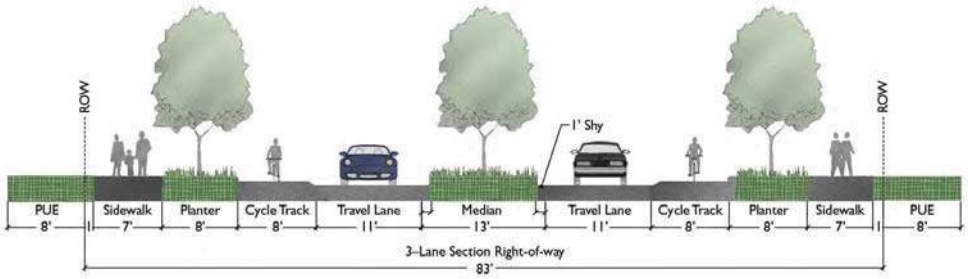
5D

172nd / 190th Corridor Plan

City of Happy Valley

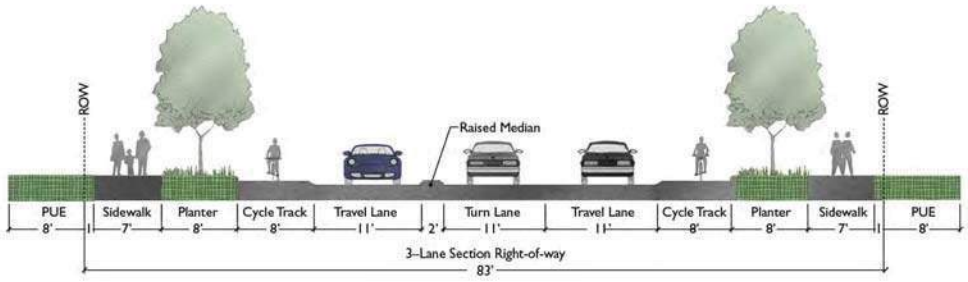
FIGURE 8-20

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



3–Lane Section with Median

3A-1



3–Lane Section with Left Turn Lane

3A-2

172nd / 190th Corridor Plan

City of Happy Valley

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

A set of unique cross-sections were prepared as part of the SE 172nd/190th Corridor Management Plan (CMP), and are reference in this TSP. The cross-sections are shown in Figures 8-18 through 8-20. Table 8-10 lists where each of the CMP cross-sections should be applied. All streets not listed in Table 8-10 are subject to the applicable City cross-sections shown in Figures 8-11 through 8-17.

Table 8-10: Roadway Cross-Sections in the SE 172nd Avenue/190th Drive Corridor

Roadway Segment	Applicable Cross-Section *(See Figures 8-20 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)	-

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.

Heavy Rail

There are no heavy 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.

HISTORIC AND PROJECTED 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 frontage or off-site improvements required as mitigation for land development.

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 January 2020 to 36 cents per gallon with no adjustment for inflation. 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 are $122 to $306 per vehicle per year for passenger cars, with similar increases for other vehicle types and no adjustment for inflation.

In fiscal year 2019, Happy Valley received about $1,465,500 in state gas tax and $107,000 in 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 $35 million over the next 20 years based on population estimates.

Clackamas County Vehicle Registration Fee

Clackamas County commissioners approved a $30 per year vehicle registration fee to fund road maintenance and construction projects. Forty percent of the fees will go directly to cities in the county. Happy Valley will receive an estimated $420,000 annually which will be used to construct pedestrian projects including new sidewalks and crossing improvements. These funds will not be used to construct off-street trails. Happy Valley is forecasted to receive approximately $9.4 million over the next 20 years based on population estimates. This funding source does not have an expiration date.

Happy Valley Gas Tax

In 2009, the City of Happy Valley established a $0.02 per gallon gas tax. The City's first gas station opened in 2017. In fiscal year 2019, Happy Valley received about $127,000 from the local gas tax Happy Valley is forecasted to receive approximately $2.8 million from local gas taxes over the next 20 years based on population estimates. Revenues must be used for the planning, financing, design, construction, maintenance, repair, operation and use of streets within the city.

Happy Valley Transportation System Development Charge

The Transportation System Development Charge (TSDC) for streets is used as a funding source for all capacity adding projects for the transportation system. The current Happy Valley Transportation SDC District was adopted in 2017. 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 TSDC fee is collected from new development based on the proposed land use and size. The TSDC fees are determined based on each land use's potential to generate vehicle trips. The current TSDC rate[1] is $10,385 per PM peak hour trip generated. The TSDC income potential over the next 20 years was estimated based on the forecasted household and employment growth within the TSP planning area. Happy Valley is expected to collect approximately $167 million from TSDC fees through the year 2040 based on land use projections.

Happy Valley Parks General Fund

Happy Valley's Parks General Fund is used to pay for pedestrian improvements in parks, including the maintenance and construction of new trails. The city also manages funds provided by Metro for the construction of regional trail projects. The City funded $580,000 over a five-year period (2012-2018) and is expected to continue. Happy Valley is forecasted to receive approximately $2.6 million over the next 20 years.

[1] Transportation System Development Charges, City of Happy Valley, increased July 1, 2021.

Metro Regional Flexible Funding for Transportation Projects

This program provides funding and support for local transportation priorities focused on areas of equity, safety, climate, and congestion. The 2022-2024 funding cycle will provide $29.74 million dollars for active transportation and complete street projects in the Portland metro area.[2] 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. Grant awards are not guaranteed therefore future awards are not included in the forecasted revenue.

SUMMARY

Table 10-1 summarizes the current funding sources and the estimated revenue over the next 20 years. Total funding collected through 2040 would be $184.3 million with the current sources. The majority of these funds are from estimated TSDC 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 TSDC revenue would be reduced.

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

Funding Category	Estimated Revenue through 2040
State Fuel Tax	$32,700,000
State Vehicle License Fee	$2,400,000
Clackamas County Vehicle Registration Fee	$9,400,000
Happy Valley Gas Tax	$2,800,000
Happy Valley Transportation System Development Charge	$167,000,000
Happy Valley Parks General Fund	$2,600,000
Total Revenue	**$216,900,000**

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 20 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 year 2040 horizon.

[2] Oregon Metro. *Regional flexible funding for transportation projects.* https://www.oregonmetro.gov/tools-partners/grants-and-resources/regional-flexible-funding. Accessed July 12, 2019.

Project Cost Estimates

Planning level cost estimates were developed for the projects identified in the pedestrian, bicycle, transit and motor vehicle elements. Cost estimates from the 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[3]. 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.

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 school 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 20 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 20 years, the annual maintenance costs 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 and vehicle registration fee revenue estimate of $35 million which is used to fund maintenance, the City is expected to have a $50-million 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-

[3] 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.

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 TSP to implement the financially constrained project list for motor vehicles, transit, bicycles and pedestrians total $182 million, and the recommended transportation operations and maintenance programs would add $50 million for a total cost over 20 years of $232 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 (ODOT, TriMet, etc.).

Table 10-2: Happy Valley Financially Constrained Costs over 20 years (2020 Dollars)

Transportation Element	Approximate Cost
Improvement Projects (Financially Constrained projects to be funded by City + TSDC/Developer)	
Pedestrian*	$9,865,000
Bicycle*	$0
Transit	$0
Motor Vehicle* (no ODOT projects)	$172,200,000
Total Capital Projects	**$182,065,000**
Operations and Maintenance Programs and Services	
Road Maintenance ($980,000/yr plus 100%)	$50,000,000
School Safety Program ($5,000/yr)	$125,000
Neighborhood Traffic Management ($10,000/yr)	$250,000
Total Operations and Maintenance Programs	**$50,375,000**
20 YEAR TOTAL	**$232,440,000**

*Motor vehicle financially constrained plan includes sidewalks and bike facilities on new roadways

The estimated $182 million for transportation capital projects is expected to be adequately funded by the 20-year revenue estimate of $217 million. Combined with the $50.4 million operations and maintenance costs, the estimated total funding need is $232 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. 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.

Transportation Maintenance Fee

A number of Oregon cities supplement their street funds with transportation maintenance fees. 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 helps to support the ongoing viability of the program by establishing a source of 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.

ODOT Grants

The Oregon Department of Transportation manages federal and state transportation funds to support projects throughout Oregon, including dedicated funds for pedestrian projects.

All Roads Transportation Safety

This program provides funding for safety projects on all public roadways within Oregon based on historic crash data. Hotspot safety projects are identified based on existing SPIS sites and Safety Implementation Plans, including ODOT's Pedestrian and Bicycle Plan. Additionally, each project site must have had one fatal or serious injury crash within the last five years. Pedestrian projects at locations with a documented safety issue and apply an approved safety countermeasure are eligible for these funds. Approximately $30 million annually is available for All Roads Transportation Safety projects, with a third of these funds available for projects within ODOT's Region 1 which includes Happy Valley.[4]

Connect Oregon

This program provides dedicated funding for air, rail, marine, bicycle, and pedestrian infrastructure throughout Oregon. Since the program's inception, over $1 billion has been awarded, including a dedicated bicycle and pedestrian project funding stream.[5]

Safe Routes to Schools

This program supports efforts to increase the proportion of students walking or biking to school. Annually, ODOT awards $10 million to support infrastructure projects which could apply to projects identified in a Safe Routes to Schools plan.[6]

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[4] *All Roads Transportation Program: Frequently Asked Questions.* https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/ARTS_FAQ.pdf. Accessed July 22, 2019.

[5] *Connect Oregon.* https://www.oregon.gov/ODOT/Programs/Pages/ConnectOregon.aspx. Accessed July 22, 2019.

[6] *Safe Routes to School Programs.* https://www.oregon.gov/ODOT/Programs/Pages/SRTS.aspx. Accessed July 22, 2019.

Metro Grants

Metro manages federal, state and local funds to support community grants, including those focused on transportation:

Travel Options Grants

This program supports regional transportation demand management strategies intended to increase the use of travel options. Funding from this grant can support Safe Routes to School projects, including student education, with an estimated $900,000 available.[7]

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 33percent 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.

[7] Oregon Metro. *Regional travel options 2019-2022 grant application handbook.* https://www.oregonmetro.gov/sites/default/files/2019/01/22/2019-22-Regional-Travel-Options-grant-application-handbook.pdf. Accessed July 12, 2019.

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.