CITY OF MOLALLA
TRANSPORTATION SYSTEM PLAN

VOLUME 1: TRANSPORTATION SYSTEM PLAN

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CITY OF MOLALLA
TRANSPORTATION SYSTEM PLAN

Molalla, Oregon

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- Councilor Glen Boreth
- Councilor Elizabeth Klein
- Councilor Keith Swigart
- Councilor DeLise Palumbo
- Councilor Cindy Dragowsky

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CHAPTER 1: INTRODUCTION

INTRODUCTION

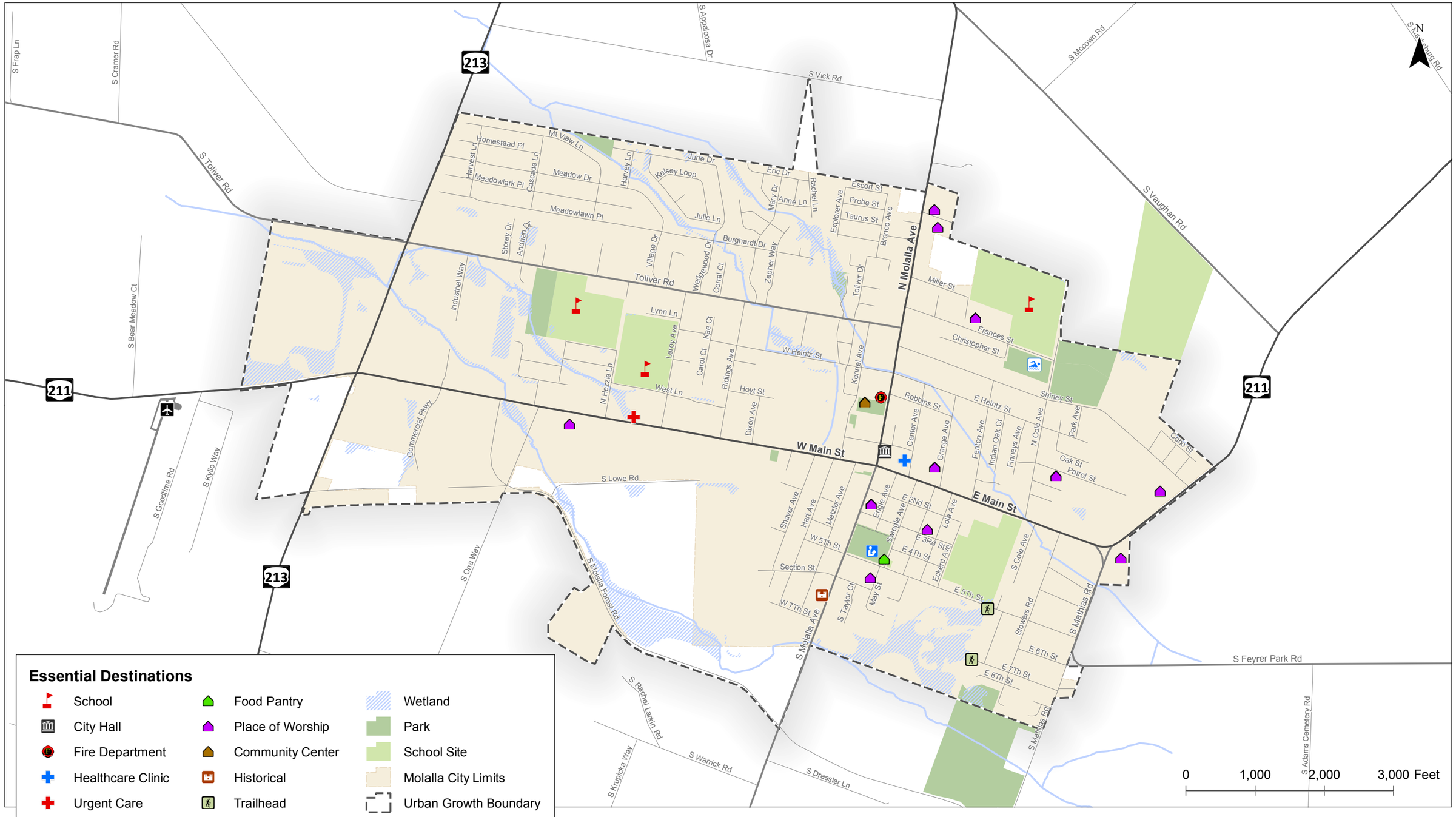
The Molalla transportation system plan (TSP) is a long-range plan that sets the vision for the city's transportation system, facilities and services to meet state, regional, and local needs for the next 20 years. The TSP was developed through community and stakeholder input and is based on the system's existing and projected future needs and anticipated available funding. The plan also serves as the Transportation Element of the Molalla Comprehensive Plan. The purpose of the 2018 TSP update is to address growth in Molalla and its surrounding communities as well as address regulatory changes that have occurred in the region since 2001. The TSP addresses compliance with new or amended federal, state, and local plans, policies, and regulations including the Oregon Transportation Plan (OTP), the state's Transportation Planning Rule (TPR), the Oregon Highway Plan (OHP), and presents the investments and priorities for the Pedestrian, Bicycle, Transit, Motor Vehicle, and other transportation systems.

MOLALLA 2018

The City of Molalla, incorporated in 1913, is located in the western portion of Clackamas County, and is home to a population of approximately 9,900 people. The city lies outside of the Portland Metro Service District, roughly 15 miles south of Oregon City and 13 miles east of Interstate 5. Bounded by the farm lands and rural development of unincorporated Clackamas County, the city is best known for the Molalla Buckeroo; an annual event held since the city's annexation to celebrate the Nations birthday during the first week of July. The city's commercial district is concentrated around the confluence of Molalla Avenue and OR 211. OR 211 runs east-west through the heart of Molalla's commercial district and is commonly referred to as Main Street due to its character of abutting businesses and attractions. Traveling to and from Molalla is most commonly achieve along OR 213 and OR 211. OR 213 travels north-south along the western edge of the city limits whereas, OR 211 travels east-west through the heart of the downtown commercial area serving as the city's "main street." Figure 1 illustrates the study area for the TSP update.

KEY DESTINATIONS

Establishing key destinations as "activity generators" is an essential step in planning for the future of a city's transportation system. These destinations often fall under the categories of residential, employment, shopping, schools, civic buildings, recreation, and entertainment. Figure 1 illustrates the city's key destinations used as part of the existing transportation system and future needs analysis as well as the development and prioritization of the multimodal projects. These key destinations include, but are not limited to, the Molalla Library, City Hall, Post Office, Long Park, Urgent Care, Health Clinics, Trailheads, and places of worship.



Essential Destinations

- School
- City Hall
- Fire Department
- Healthcare Clinic
- Urgent Care
- Aquatic Center
- Library
- Food Pantry
- Place of Worship
- Community Center
- Historical
- Trailhead
- Airport
- Wetland
- Park
- School Site
- Molalla City Limits
- Urban Growth Boundary

Study Area
Molalla, Oregon

Figure **1**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, City of Molalla

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City of Molalla, Long Park

City of Molalla, City Hall

TRANSPORTATION PLAN FOCUS AREAS

The following elements are of particular focus in addressing Molalla's transportation system needs:

Pedestrians

- Address gaps and deficiencies in the sidewalks that connect residents to schools, parks, churches, etc.
- Enhanced crossings along major roadway and at major intersections
- Provide safe and interconnected pedestrian facilities that encourage people to walk, especially for trips less than one-half mile in length.

Bicyclist

- Address gaps and deficiencies in the bicycle facilities (e.g., bike lanes) that connect residents to schools, parks, churches, etc.
- Enhanced crossings along major roadway and at major intersections
- Provide safe and interconnected bicycle facilities that encourage people to ride their bicycles, especially for trips less than three miles

Transit Users

- Improve awareness of existing transit facilities and services
- Improve service hours, frequency of service, and service coverage
- Improve service to regional centers, such as Woodburn, Salem, and Estacada
- Improve signage and visibility of transit stops and transit stop amenities

Motorist

- Address streets with deficiencies in pavement width and condition
- Address intersections with deficiencies in current or projected future operations
- Address roadways and intersections with a history of fatal or serious injury crashes
- Address street connectivity due to recent development and environmental issues
- Address designated freight routes or restrictions on freight movements within the city

TSP ORGANIZATION AND METHODOLOGY

The TSP is organized into chapters that address each individual mode of transportation available and its network in the overall Molalla transportation system. **Chapter 2** presents the goals and objectives along with the evaluation criteria used to evaluate and prioritize projects and programs. **Chapters 3 through 8** present the transportation system improvement projects identified by the project team to address needs and deficiencies in the City's transportation system. **Chapter 9** presents the funding, implementation, and monitoring plan for the TSP update, including existing and potential future funding sources to finance the identified transportation system improvements. **Volume II: Technical Appendix** contains the Technical Memorandums completed throughout the TSP update process, which showcase the inventory, analysis, and project list identification efforts.

TSP UPDATE PROCESS

The TSP update process began with a review of local, regional, and statewide plans and policies that guide land use and transportation planning in the City. Goals and objectives and evaluation criteria were then developed to guide the evaluation of existing and project future transportation system conditions as well as the development of planned improvements. An inventory of the multimodal transportation system was then conducted to serve as the basis for the existing and future conditions analyses. The existing and future conditions analyses focused on identifying gaps and deficiencies in the multimodal transportation system based on current and forecast future performance. For each gap and deficiency, several solutions were evaluated to address the system needs. This process led to the development of a large number of plans, programs, and projects. The plans, programs, and projects were then prioritized using the project evaluation criteria and organized into high, medium, and low priority.[1] The culmination of the TSP update process is this document, which presents the plans, programs, and projects identified to address the existing and future gaps and deficiencies in the City's transportation system.

COMMITTEES

The project team developed the TSP update in close coordination with city staff along with key stakeholders and representatives from the community. Two formal committees participated in the TSP update, including a Technical Advisory Committee (TAC) and a Policy Advisory Committee (PAC). The TAC consisted of representatives from Molalla, Clackamas County, Oregon Department of Transportation (ODOT), South Clackamas Transit District (SCTD), Molalla River School District, Molalla Police Department, and Molalla Rural Fire Protection District. The TAC provided technical guidance and coordination

[1] Given the funding shortfalls identified in this Plan, none of the projects identified as high, medium, or low priority would be considered "financially constrained" or "reasonably likely" for purposes of compliance with section 0060 of the Oregon Transportation Planning Rule. The high, medium, and low designations will be used to guide the City's efforts to pursue funding for the transportation system. Furthermore, inclusion of projects in this TSP and identification of state funding as a possible source of revenue does not ensure that state funding will be available or allocated to these projects.

throughout the project. TAC members reviewed and commented on technical memorandums and participated in committee meetings, community meetings, and workshops. The PAC consisted of local residents and property owners with an interest in transportation who were appointed to serve on the PAC. The PAC served as the voice of the community and the caretakers of the goals and objectives of the TSP update. Much like the TAC, PAC members reviewed and commented on technical memorandums and participated in committee meetings, community meetings, and workshops.

PUBLIC INVOLVEMENT

Opportunities for public involvement were made available throughout the TSP update process. The opportunities consisted of continuous web-based communications about upcoming committee meetings, community meetings, and workshops via the project website (www.molallatsp.com). The project website also included an interactive map that allowed anyone with access to a computer to provide comments to the project team about transportation-related issues within the community. The project team met with the project advisory committees seven times throughout the TSP update process (three TAC meetings, four PAC meetings). Each PAC meeting was open to the general public. The project team also hosted two community meetings at the Molalla Adult Community Center. Both community meetings were accompanied by an online community meeting that offered participants the same opportunities to provide input on project materials and share their concerns related to the transportation system. Additionally, the project team also met with the Planning Commission and City Council several times throughout the planning process (one joint training session, two joint workshops, and two hearings). Each meeting/workshop/hearing was open to the general public. The goal of the public involvement process was to develop a TSP update that addressed the gaps and deficiencies in the transportation system while meeting the needs of the community.

LAND USE

Land use plays an important role in developing a comprehensive 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 impact on how the transportation system will be used in the future. Understanding land use is critical to taking actions to maintain or enhance the transportation system.

Changes in population, housing, and employment within Molalla's urban growth boundary (UGB) will have a significant impact on the existing transportation system and will create new travel demands. These growth projections and how they translate to new trips on the transportation network are key elements of the future conditions and performance analysis.

POPULATION AND HOUSEHOLD FORECAST

Population data for Molalla was obtained from Portland State University's Population Research Center (PRC). The PRC's Coordinated Population Forecast for Clackamas County and areas within Urban Growth Boundaries (UGB) includes base year 2017 and forecast year 2035 and 2067 population estimates for Molalla as well as estimates of persons per household. Based on the data, the population is currently 9,939 persons and is projected to be 15,841 persons in the year 2040; this reflects an Average Annual Growth Rate (AAGR) of approximately 2.2 percent per year between 2017 and 2035 and an AAGR of approximately 1.5 percent per year between 2035 and 2040. The persons per household is currently 2.8 and is projected to be 2.8 in 2040. Dividing the population data by 2.8 results in an estimated 3,550 households in 2017 and 5,658 households in the year 2040.

EMPLOYMENT FORECAST

Employment data for Molalla was obtained from the draft Economic Opportunities Analysis (EOA) prepared by Johnson Economics. The data includes base year 2016 and forecast year 2036 employment estimates for six typologies, including office, institution, flex space/business park, industrial, warehouse, and retail. The EOA provides an estimated number of employees for each typology and an estimated acreage of employment space needed to support the employees. Based on the data, there is currently 3,586 employees and 238.9 acres of employment space within Molalla and there is projected to be 6,295 employees and 420.9 acres of employment space in the year 2040.

Table 1 summarizes the population and employment data for year 2017 and forecast year 2040 conditions. As shown, employment is expected to grow at a higher rate than the population over the 23-year period.

Table 1: Molalla Population and Land Use Summary

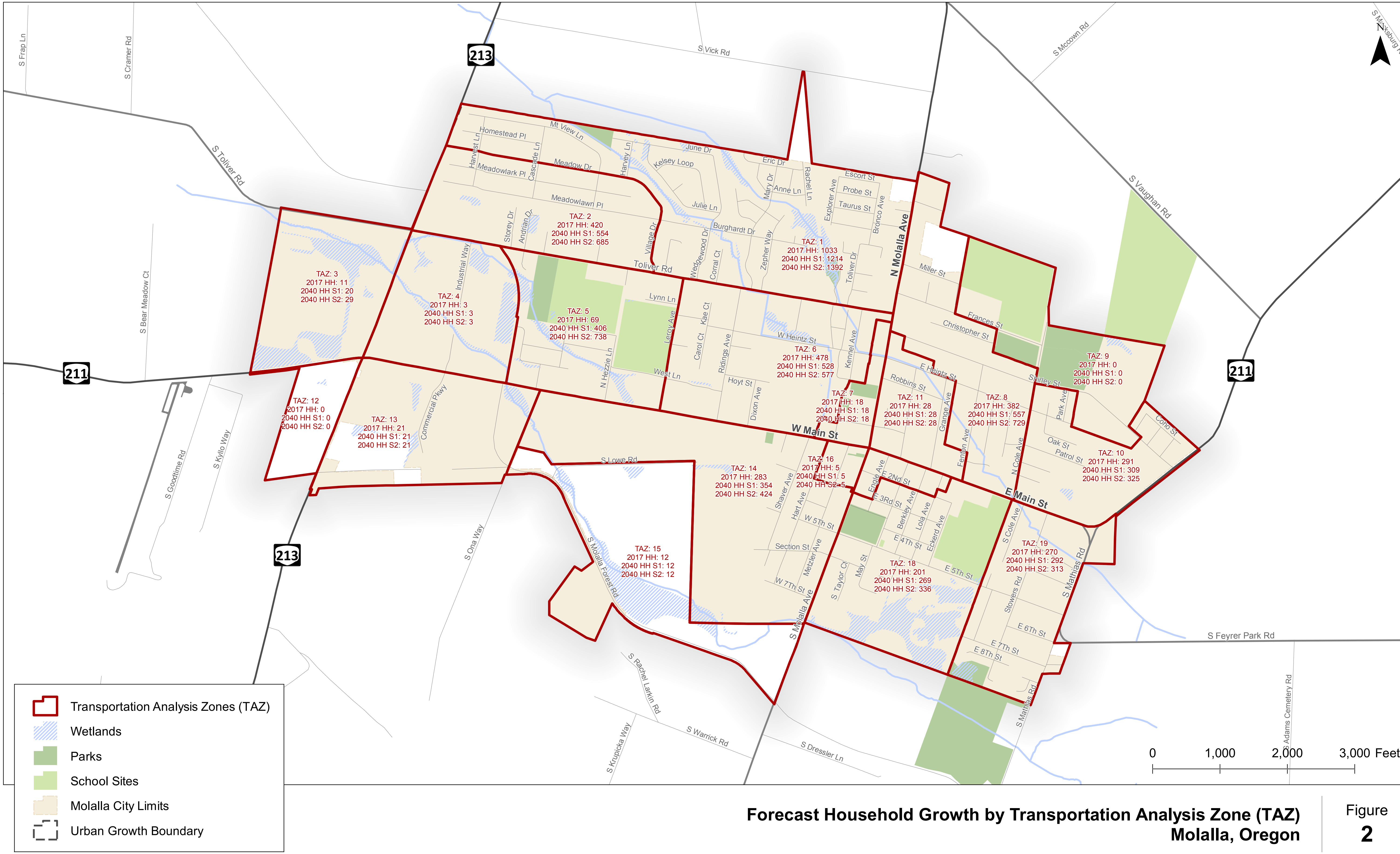
Land Use	2017	2040	Change	Annual Percent Change
Population	9,939	15,841	5,902	2.2%/1.5%
Households	3,550	5,658	2,108	2.2%/1.5%
Employment	3,586	6,295	2,709	3.3%
Acres	238.9	420.9	182.1	3.3%

The population and employment data shown in Table 1 was distributed throughout the City based on information provided in a recent Buildable Lands Inventory (BLI) prepared by Winterbrook Planning. The BLI identifies the amount of vacant land within the city and the type of households and employment uses that can be accommodated by the land based on the current comprehensive plan and zoning designations. Based on the BLI, the city cannot accommodate all the household and employment growth that is expected within the planning period without changes to current zoning designations, development patterns, and/or the UGB.

Given that the changes necessary to accommodate household and employment growth within the City are likely to occur within the planning horizon of the TSP, but following the development of the TSP Update, two land use scenarios were developed for the future conditions analysis: The first scenario reflects the level of development that can be accommodated within the City based on the current zoning designations and development patters; the second scenario reflects all the development associated with the population and employment growth; both scenarios reflect conditions within the current UGB.

Figures 2 and 3 illustrate the changes in households and employment (jobs) associated with each land use scenario by Transportation Analysis Zone (TAZ). The TAZs shown in Figures 2 and 3 were developed as part of the TSP Update based on the current zoning designations and the location of major roadways and intersections throughout the City. The TAZs provide a convenient way of evaluating and summarizing the population and household data for the City.

As land uses change 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 a higher number of trips per acre of land than residential 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 all 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. The data shown in Table 1 indicates that significant growth is expected in Molalla in the coming years, particularly employment opportunities. The transportation system should be monitored to make sure that land uses in the plan are balanced with transportation system capacity.



Forecast Household Growth by Transportation Analysis Zone (TAZ)
Molalla, Oregon

Figure
2

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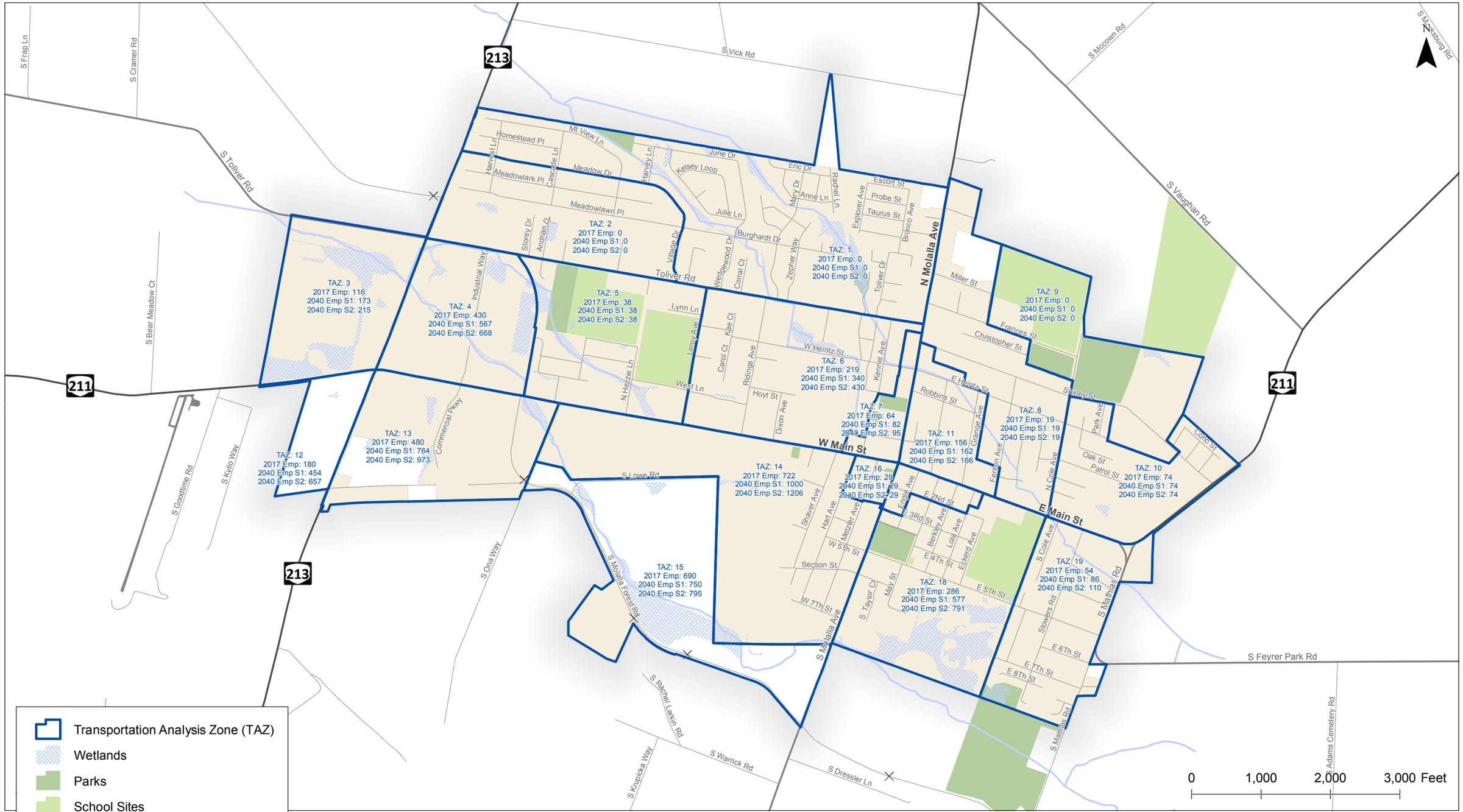
Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, City of Molalla



Forecast Employment Growth by Transportation Analysis Zone (TAZ)
Molalla, Oregon

Figure
3

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Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, City of Molalla

CHAPTER 2: GOALS AND OBJECTIVES

GOALS AND OBJECTIVES

The project team developed goals and objectives for the TSP update to help guide the review and documentation of existing and future transportation system needs, the development and evaluation of potential solutions to address the needs, and the selection and prioritization of preferred solutions for inclusion in the TSP update. The goals and objectives also inform recommendations for policy language that will serve as guidance for future land use decision making, such as approval criteria related to zone change and comprehensive plan amendments. The goals and objectives will enable the City to plan for, and consistently work towards, achieving the vision of a connected community.

GOALS AND OBJECTIVES

The goals and objectives for the Molalla TSP update are based on an evaluation of the existing goals and policies in the current Molalla TSP and Comprehensive Plan. The goals provide direction for where the City would like to go, while the objectives provide a more detailed breakdown of the goals with specific outcomes the City desires to achieve. In order to ensure compliance with the Transportation Planning Rule (TPR) and other state, regional, and local planning requirements, the goals and objectives presented below tend to favor improvements in active transportation facilities and services over capacity improvements.

GOAL 1 – MOBILITY

Provide a balanced, safe, and efficient transportation system for all members of the community.

Objectives

A. Reduce reliance on single occupancy vehicles by improving the quality of available transit service and developing bicycle and pedestrian facilities that encourage non-vehicular modes of transportation.

B. Reduce reliance on state facilities for making local trips by providing a network of arterials, collectors, and local streets that are interconnected, appropriately spaced, and reasonably direct.

C. Provide for adequate intersection and street capacity by identifying existing and potential future capacity constraints and developing strategies to address those constraints, including potential intersection improvements, future roadway needs, and future street connections.

GOAL 2 – CONNECTIVITY AND ACCESSIBILITY

Objectives

Develop an interconnected, multimodal transportation system that connects all members of the community to destinations within the City and beyond.

A. Improve existing connections between households and schools, parks, transit stops and other community destinations.

B. Create new connections between households and schools, parks, transit stops and other community destinations.
C. Provide for the needs of the transportation disadvantaged to the greatest extent possible.
D. Ensure that the transportation systems include adequate facilities to address truck and rail freight mobility needs for the local and regional movement of goods and services.

GOAL 3 – SAFETY

Provide a transportation system that enhances the safety and security of all transportation modes.

Objectives

A. Address existing and potential future safety issues by identifying high collision locations and locations with a history of fatal, severe injury, and/or pedestrian/bicycle-related crashes and developing strategies to address those issues.
B. Reduce the potential for future crashes by providing separation between travel modes (i.e. separated pedestrian/bicycle facilities, enhanced crossings, etc.).

GOAL 4 – HEALTH

Provide a transportation system that enhances the health of local residents by promoting active modes of transportation.

Objectives

A. Develop a comprehensive system of pedestrian and bicycle routes that link major activity centers within the City.
B. Encourage the use of active modes of transportation (walking and biking) and identify improvements to further promote their use in the community.
C. Encourage the use of public transportation facilities and services and identify improvements to further promote their use in the community.

GOAL 5 – STRATEGIC INVESTMENT

Provide a sustainable transportation system through responsible stewardship of assets and financial resources.

Objectives

A. Preserve and protect the function of locally and regionally significant corridors.
B. Preserve and maintain the existing transportation system assets to extend their useful life.
C. Ensure adequacy of existing funding sources to serve projected improvement needs.
D. Identify new and innovative funding sources for transportation improvements.

GOAL 5 – COORDINATION AND INTEGRATION

Ensure that the local transportation system is integrated with county and state transportation systems and objectives, and with other related aspects of the community in Molalla, including land use planning, natural resource protection, housing and economic development.

Objectives

A. Design transportation facilities and connections to support adjacent land uses and developments.
B. Minimize and/or mitigate the effects of transportation projects and systems on natural resources and systems.
C. Consider County and State goals and policies in design and implementation of the TSP and associated projects.
D. Engage community members and organizations in the development and design of transportation facilities identified in the TSP.

PROJECT SELECTION AND PRIORITIZATION

The selection and prioritization of the projects included in the TSP update was determined based on the project evaluation criteria, which are a reflection of the goals and objectives described above. A qualitative process using the project evaluation criteria was used to evaluate solutions and prioritize projects developed through the TSP update. The rating method used to evaluate the solutions is described below.

- Most Desirable: The concept addresses the criterion and/or makes substantial improvements in the criteria category. (+1)
- No Effect: The criterion does not apply to the concept or the concept has no influence on the criteria. (0)
- Least Desirable: The concept does not support the intent of and/or negatively impacts the criteria category. (-1)

Table 2 presents the project evaluation criteria that were used to qualitatively evaluate the solutions developed through the TSP update. The initial screening ratings were used to inform discussions about the benefits and tradeoffs of each solution, while the final priorities presented in the following chapters reflect input from the project, advisory committees and the general public.

Table 2: Project Evaluation Criteria

Objective	Evaluation Criteria	Evaluation Score
Goal 1: Mobility		
A. Reduce reliance on single occupancy vehicles	Project could reduce reliance on single occupancy vehicle	+1
	Project would not impact reliance on single occupancy vehicles	0
	Project could increase reliance on single occupancy vehicle	-1
B. Reduce reliance on state facilities for making local trips	Project could reduce reliance on state facilities	+1
	Project would not impact reliance on state facilities	0
	Project could increase reliance on state facilities	-1
C. Provide for adequate intersection and street capacity	Project will provide adequate intersection and/or street capacity	+1
	Project will have no impact on intersection and/or street capacity	0
	Project will reduce intersection and/or street capacity below acceptable levels	-1
Goal 2: Connectivity and Accessibility		
A. Improve existing connections	Project will improve an existing connection	+1
	Project will not improve an existing connection	0
	Project will impede an existing connection	-1
B. Create new connections	Project will create a new connection	+1
	Project will not create a new connection	0
	Project will impede the creation of a new connection	-1
C. Provide for the needs of the transportation disadvantaged	Project will improve options for transportation disadvantaged	+1
	Project will have no impact on transportation disadvantaged	0
	Project will reduce options for transportation disadvantaged	-1
C. Ensure that the transportation systems include adequate facilities to address truck and rail freight mobility needs for the local and regional movement of goods and services.	Project will improve effectiveness of local and regional freight movement	+1
	Project will have no impact on effectiveness of local and regional freight movement	0
	Project will reduce effectiveness of local and regional freight movement	-1
Goal 3: Safety		
A. Address existing and potential future safety issues	Project will address existing or potential future safety issue	+1
	Project will have no impact on an existing or potential future safety issue	0
	Project will worsen existing or potential future safety issue	-1
B. Reduce potential for future crashes	Project could reduce potential for future conflicts	+1
	Project would have no impact on the potential for future conflicts	0
	Project could increase the potential for future conflicts	-1
Goal 4: Health		

A. Develop a comprehensive system of pedestrian and bicycle routes	Project will contribute to a comprehensive pedestrian and bicycle system	+1
	Project will not contribute to a comprehensive pedestrian and bicycle system	0
	Project will impede a comprehensive pedestrian and bicycle system	-1
B. Encourage the use of active modes of transportation	Project could encourage the use of active modes of transportation	+1
	Project would not encourage the use of active modes of transportation	0
	Project could discourage the use of active modes of transportation	-1
C. Encourage the use of public transportation facilities and services	Project could encourage the use of public transportation	+1
	Project would not encourage the use of public transportation	0
	Project could discourage the use of public transportation	-1
Goal 5: Strategic Investment		
A. Preserve and protect the function of locally and regionally significant corridors	Project will preserve and protect the function of locally and regionally significant corridors	+1
	Project will not impact the function of locally and regionally significant corridors	0
	Project will have a negative impact on the function of locally and regionally significant corridors	-1
B. Preserve and maintain the existing transportation system assets to extend their useful life	Project will preserve and maintain the existing transportation system	+1
	Project will not impact the existing transportation system	0
	Project will have a negative impact on the existing transportation system	-1
C. Ensure adequacy of existing funding sources to serve projected improvement needs	Project can be funded through existing funding sources	+1
	Project can be funded through known funding sources	0
	Project cannot be funded through existing or known funding sources	-1
D. Identify new and innovative funding sources for transportation improvements	Project is eligible for new and/or innovative funding	+1
	Project may not be eligible for new and/or innovative funding	0
	Project is not eligible for new and/or innovative funding	-1
Goal 6: Coordination and Integration		
A. Design transportation facilities and connections to support adjacent land uses and developments	Project will support community and local area land use and development goals	+1
	Project has no direct relationship to community and local area land use and development goals	0
	Project is inconsistent with community and local area land use and development goals	-1
B. Minimize and/or mitigate the effects of transportation projects	Project will enhance the quality of potentially affected natural resources	+1

and systems on natural resources and systems	Project will not impact the quality of potentially affected natural resources	0
	Project will have a negative impact on the quality of potentially affected natural resources	-1
C. Consider County and State goals and policies in design and implementation of the TSP and associated projects	Project is supportive of County and/or State transportation goals and policies	+1
	Project has no direct relationship to County and/or State transportation goals and policies	0
	Project is inconsistent with County and/or State transportation goals and policies	-1
D. Engage community members and organizations in the development and design of transportation facilities identified in the TSP	Project is consistent with or addresses community opinions expresses during project planning and design process	+1
	Project is unrelated to community opinions expresses during project planning and design process	0
	Project is inconsistent with community opinions expresses during project planning and design process	-1

CHAPTER 3: PEDESTRIAN SYSTEM

PEDESTRIAN SYSTEM

The pedestrian system within Molalla consists of sidewalks, shared-use paths, and off-street trails, as well as marked and unmarked, signalized and unsignalized pedestrian crossings. These facilities provide residents with the ability to access local retail/commercial centers, recreational areas, and other land uses by foot. A safe, convenient, and continuous network of pedestrian facilities is essential to establishing a vibrant and healthy community while supporting the local economy within the City.

Sidewalks are currently provided along at least one side of most major streets within the city and marked crosswalks are provided at most major intersections. Therefore, the pedestrian plan includes projects to fill-in the gaps in the sidewalk network along the city's arterial and collector streets and a few local streets that provide access to essential destinations such as schools, parks, churches, etc. The pedestrian plan also includes enhanced pedestrian crossings as well as multi-use paths and trails that augment and support the pedestrian system.

PEDESTRIAN FACILITIES

Pedestrian facilities are the elements of the transportation system that enable people to walk safely and efficiently between neighborhoods, retail centers, employment areas, and transit stops. These include facilities for pedestrian movement along key roadways (e.g., sidewalks, multi-use paths, and off-street trails) and for safe roadway crossings (e.g., crosswalks, crossing beacons, pedestrian refuge islands). Each facility plays an important role in developing a comprehensive pedestrian system.

This section summarizes the pedestrian facilities that were determined to best address gaps and deficiencies in the pedestrian system and future needs. As indicated below, the most common overall need is to provide a safe and interconnected pedestrian system that encourages people to walk, especially for trips less than one-half mile in length.

SIDEWALKS

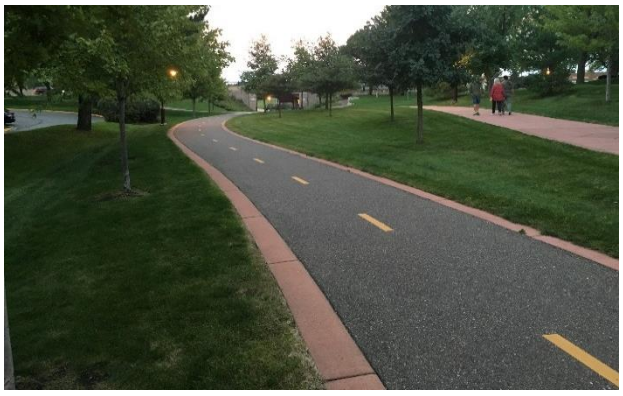
Sidewalks are the fundamental building blocks of the pedestrian system. They enable people to walk comfortably, conveniently, and safely from place to place. They also provide an important means of mobility for people with disabilities, families with strollers, and others who may not be able to travel on an unimproved roadside surface. Sidewalks are usually 6 to 8-feet wide and constructed from concrete. They are also frequently separated from the roadway by a curb, landscaping, and/or on-street parking. Sidewalks are widely used in urban and suburban settings. Ideally, sidewalks could be provided along both sides of the roadway; however, some areas with physical or right-of-way constraints may require that sidewalk be located on only one side. The pedestrian plan includes a significant number of projects that involve filling in the gaps and installing new sidewalks.

Improved Sidewalk on Molalla Avenue

Improved Sidewalk on OR 211 (Main Street)

SHARED-USE PATH

Shared-use paths are paved, bi-directional, trails that can serve both pedestrians and bicyclists. Shared-use paths and trails can be constructed adjacent to roadways where the topography, right-of-way, or other issues don't allow for the construction of sidewalks and bike facilities. A minimum width of 10 feet is recommended for low-pedestrian/bicycle-traffic contexts; 12 to 20 feet should be considered in areas with moderate to high levels of bicycle and pedestrian traffic. Shared-use paths can be used to create longer-distance links within and between communities and provide regional connections. They play an integral role in recreation, commuting, and accessibility due to their appeal to users of all ages and skill levels. The pedestrian plan includes several projects that involve installing shared-use paths.



Example of Bi-directional Shared-use Path

Example of Shared-use Path

ENHANCED PEDESTRIAN CROSSINGS

Pedestrian crossing facilities enable pedestrians to safely and efficiently cross streets and other transportation facilities. Planning for appropriate pedestrian crossings requires the community to balance vehicular mobility needs with providing crossing locations at desired routes for people walking. Enhanced pedestrian crossing treatments include:

- Median refuge islands
- High visibility pavement markings and signs
- Curb extensions
- Pedestrian signals

- Rapid rectangular flashing beacons (RRFB)
- Pedestrian Hybrid Beacons (HAWK)
- Pedestrian countdown heads
- Leading Pedestrian interval

Many of the treatments listed above can be applied together at one crossing location to further alert drivers of the presence of pedestrians in the roadway. The pedestrian plan includes several projects that involve enhancing pedestrian crossings. See Attachment "A" for a detailed description of enhanced pedestrian crossing treatments.

SAFE ROUTES TO SCHOOL

Safe Routes to School (SRTS) programs are intended to encourage children to walk and bicycle to school; to make walking and bicycling to school safe and more appealing; and to facilitate the planning, development and implementation of projects that will improve safety, and reduce traffic, fuel consumption, and air pollution near schools. The Molalla River School District (MRSD) operates one elementary school, one middle school, and one high school in Molalla. The MRSD in partnership with the City of Molalla have developed a SRTS plan for the schools located in Molalla and have identified walking routes as well as critical intersections for crossings. Figure 4 illustrates the SRTS routes and critical intersections for crossing. Several projects are included in the pedestrian plan that will improve conditions along the SRTS routes.

PEDESTRIAN PLAN

Table 3 identifies the pedestrian plan projects for the Molalla TSP update. As shown, the projects are separated into projects on arterials, collectors, and neighborhood streets as well as projects at intersections and in other locations throughout the city. The priorities shown in Table 3 are based on the project evaluation criteria and reflect input from the project team and the general public. The cost estimates are based on average unit costs for roadway improvements. The cost estimates do not include the cost of right-of-way or the cost of filling in the ditches. Right-of-way and ditch costs are included in the motor vehicle plan as applicable. Figure 5 illustrates the location of the pedestrian plan projects.

Table 3: Pedestrian Plan Improvement Projects

Location		Type	Project	Priority	Cost Estimate
Arterials					
P1	OR 213[1]	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from the north city limits to OR 211 with sidewalks of appropriate width	High	$1,240,000
P2	OR 213[1]	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from OR 211 to the south city limits with sidewalks of appropriate width	Medium	$870,000
P3	OR 211[1]	Sidewalks	Install sidewalks on both sides of the roadway from the west city limits to OR 213	High	$750,000

Location		Type	Project	Priority	Cost Estimate
P4	OR 211[1]	Sidewalks – Fill in gaps	Fill in the gaps on both sides of the roadway from OR 213 to Molalla Avenue with sidewalks of appropriate width	High	$1,710,000
P5	OR 211[1]	Sidewalks – Fill in gaps	Install sidewalks on both sides of the roadway from Mathias Road to the east city limits	High	$940,000
P6	OR 211[1]	Lighting	Evaluate light levels and install new street lighting as necessary[2]	Low	$450,000
P7	N Molalla Avenue	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from the north city limits to Heintz Street with sidewalks of appropriate width	High	$485,000
P8	S Molalla Avenue	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from 5th Street to the south city limits with sidewalks of appropriate width	Medium	$955,000
P9	Molalla Avenue	Lighting	Evaluate light levels and install new street lighting as necessary[2]	Low	$450,000
Collectors					
P10	Toliver Road	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from the west city limits to OR 213 with sidewalks of appropriate width	Medium	$575,000
P11	Toliver Road	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from OR 213 to Molalla Avenue with sidewalks of appropriate width	High	$1,730,000
P12	Shirley Street	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from N Molalla Avenue to OR 211 with sidewalks of appropriate width	Medium	$1,240,000
P13	Ridings Avenue	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from Toliver Road to OR 211 with sidewalks of appropriate width	Medium	$795,000
P14	Leroy Avenue	Sidewalks – Fill in gaps	Fill in gaps on the east side of the roadway from Toliver Road to West Lane with sidewalks of appropriate width	Medium	$295,000
P15	E 5th Street	Sidewalks	Install sidewalks on both sides of the roadway from Stowers Road to Mathias Road	Medium	$330,000
P16	Cole Avenue	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from Frances Street to OR 211 with sidewalks of appropriate width	Medium	$270,000
P17	Mathias Road	Sidewalks	Install sidewalks on both sides of the roadway from OR 211 to the south city limits	Medium	$1,405,000
P18	Frances Street	Sidewalks – Fill in gaps	Fill in gaps on the south side of the roadway from N Molalla Avenue to Christopher Street with sidewalks of appropriate width	Medium	$350,000
Neighborhood Streets					

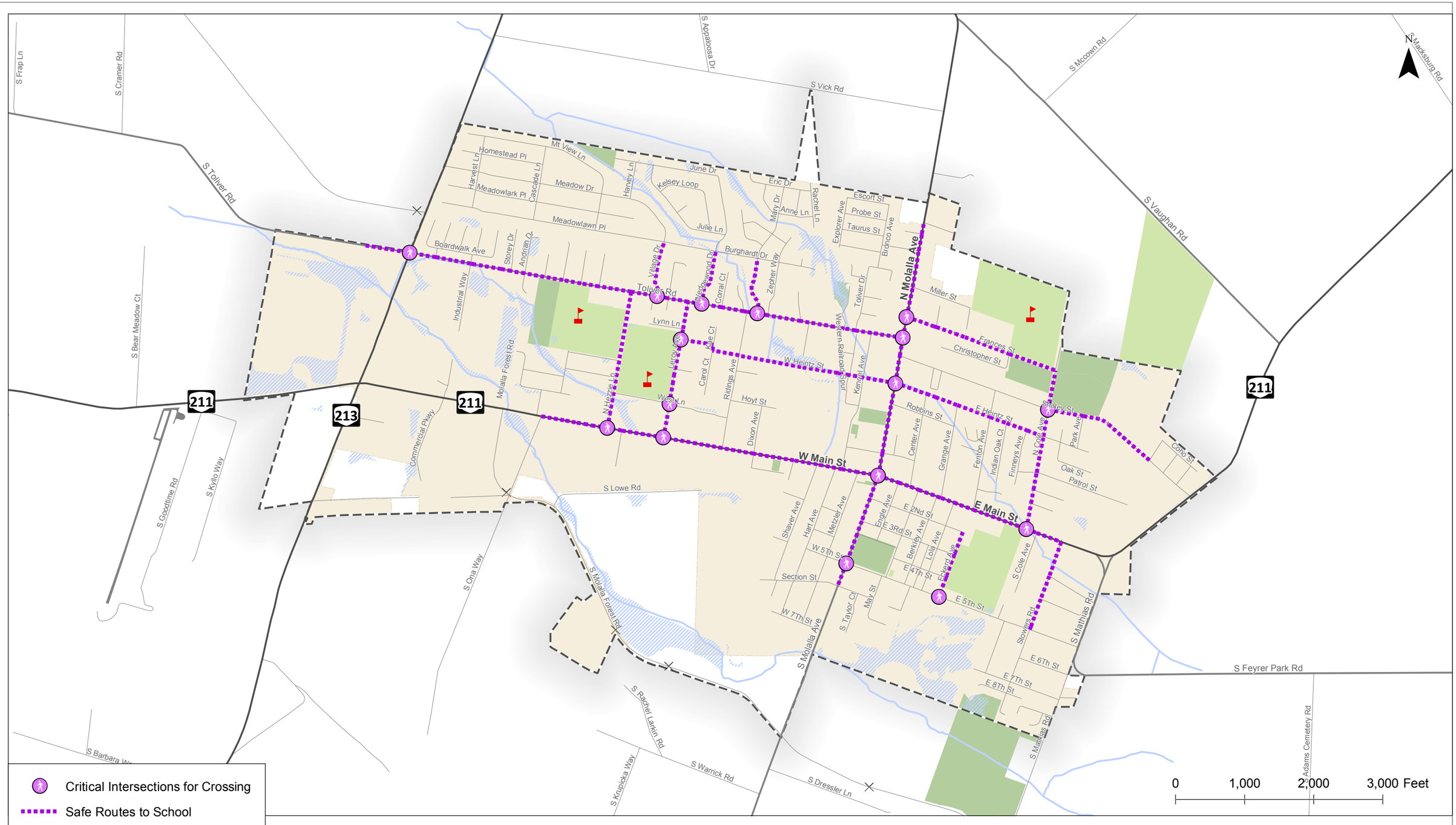
Location		Type	Project	Priority	Cost Estimate
P19	Toliver Drive	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from north of Berwick Court to Toliver Road with sidewalks of appropriate width	Low	$280,000
P20	Kennel Avenue	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from Ross Street to OR 211 with sidewalks of appropriate width	Medium	$130,000
P21	E Heintz Street	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from N Molalla Avenue to Fenton Avenue with sidewalks of appropriate width	Medium	$385,000
P22	Industrial Way	Sidewalks – Fill in gaps	Fill in gaps on the east side of the roadway from Toliver Road to the southern roadway terminus with sidewalks of appropriate width	Medium	$110,000
P23	Industrial Way	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from the northern roadway terminus to OR 211 with sidewalks of appropriate width	Medium	$170,000
P24	Stowers Road	Sidewalks – Fill in gaps	Fill in gaps on both sides of the roadway from OR 211 to E 7th Street with sidewalks of appropriate width	Medium	$470,000
P25	E 7th Street	Sidewalks	Install sidewalks on both sides of the roadway from Stowers Road to Mathias Road	Low	$335,000
Intersections					
P26	OR 213/ Meadow Drive[1]	Enhanced crossing	Install an enhanced pedestrian crossing at the OR 213/Meadow Drive intersection to increase access to transit stop on west side of OR 213[3]	Medium	$150,000
P27	OR 213/ Toliver Road[1]	Enhanced crossing	Install an enhanced pedestrian crossing at the OR 213/Toliver Road intersection[3]	Medium	$150,000
P28	OR 211/ Hezzie Lane[1]	Enhanced crossing	Install an enhanced pedestrian crossing at the OR 211/Hezzie Lane intersection[3]	High	$150,000
P29	OR 211/Molalla Forest Road[1]	Enhanced crossing	Install an enhanced pedestrian crossing at the OR 211/Molalla Forest Road intersection[3]	High	$150,000
P30	OR 211/ Grange Ave/ Berkeley Avenue[1]	Enhanced crossing	Install an enhanced pedestrian crossing at the OR 211/Grange Avenue/Berkley Avenue intersection[3]	Medium	$150,000
P31	OR 211/ N Cole Avenue[1]	Enhanced crossing	Install an enhanced pedestrian crossing at the OR 211/Cole Avenue intersection[3]	High	$150,000
P32	OR 211/ Stowers Road[1]	Enhanced crossing	Install an enhanced pedestrian crossing at the OR 211/Stowers Road intersection[3]	Medium	$150,000
P33	OR 211/ Metzler Street[1]	Enhanced crossing	Install curb extensions with American's with Disabilities Act (ADA) accessible curb ramps with tactile warning strips on the north and south sides of the roadway[3]	Medium	$150,000
P34	Toliver Road/ Industrial Way	Enhanced crossing	Install an enhanced pedestrian crossing at the Toliver Road/Industrial Way intersection[3]	Medium	$50,000

Location		Type	Project	Priority	Cost Estimate
P35	Toliver Road/ Zimmerman Lane	Enhanced crossing	Install an enhanced pedestrian crossing at the Toliver Road/Zimmerman Lane intersection[3]	Low	$50,000
P36	Toliver Road/ Leroy Avenue	Enhanced crossing	Install an enhanced pedestrian crossing at the Toliver Road/Leroy Avenue intersection[3]	Medium	$50,000
P37	Toliver Road/ Ridings Avenue	Enhanced crossing	Install an enhanced pedestrian crossing at the Toliver Road/Ridings Avenue intersection[3]	Medium	$50,000
P38	Toliver Road/ Kennel Avenue	Enhanced crossing	Install and enhanced pedestrian crossing at the Toliver Road/Kennel Avenue intersection[3]	Medium	$50,000
P39	Leroy Avenue/ Heintz Street	Enhanced crossing	Install an enhanced pedestrian crossing at the Leroy Avenue/Heintz Street intersection[3]	Low	$50,000
P40	E 5th Street/ May Street	Enhanced crossing	Install an enhanced pedestrian crossing at the E 5th Street/May Street intersection[3]	Low	$50,000
P41	E 5th Street/ Stowers Road	Enhanced crossing	Install an enhanced pedestrian crossing at the E 5th Street/Stowers Road intersection[3]	Low	$50,000
Off-street Improvements					
P42	Molalla Forest Road	Shared-use Path	Install a shared-use path along the former Molalla Forest Road right-of-way from Toliver Road to OR 211	Medium	$720,000
P43	Molalla Forest Road	Shared-use Path	Install a shared-use path along Molalla Forest Road from OR 211 to Mathias Road	Low	$0[4]
P44	Molalla Western Railway Spur	Shared-use Path	Install a shared-use path along the former Molalla Western Railway Spur right-of-way from the north city limits to OR 211	Low	$1,965,000
				TOTAL High Priority Costs	**$7,305,000**
				TOTAL Medium Priority Costs	**$10,020,000**
				TOTAL Low Priority Costs	**$3,680,000**
				TOTAL Program Costs (22 years)	**$21,005,000**

1. Project will require coordination with ODOT and approval from the State or Regional Traffic Engineer.
2. Street lighting will require an intergovernmental agreement (IGA) with the City for maintenance.
3. The types of enhanced crossing treatments are to be determined at the design/implementation stage.
4. Project cost included in Motor Vehicle Plan.

Other potential pedestrian projects include:

- Support Clackamas County's efforts to implement the Active Transportation Plan.
- Support MRSD and Clackamas County's efforts to implement the SRTS program.
- Identify opportunities to establish additional multi-use paths and trails that augment and support the pedestrian system.



Safe Routes to School
Molalla, Oregon

Figure
4

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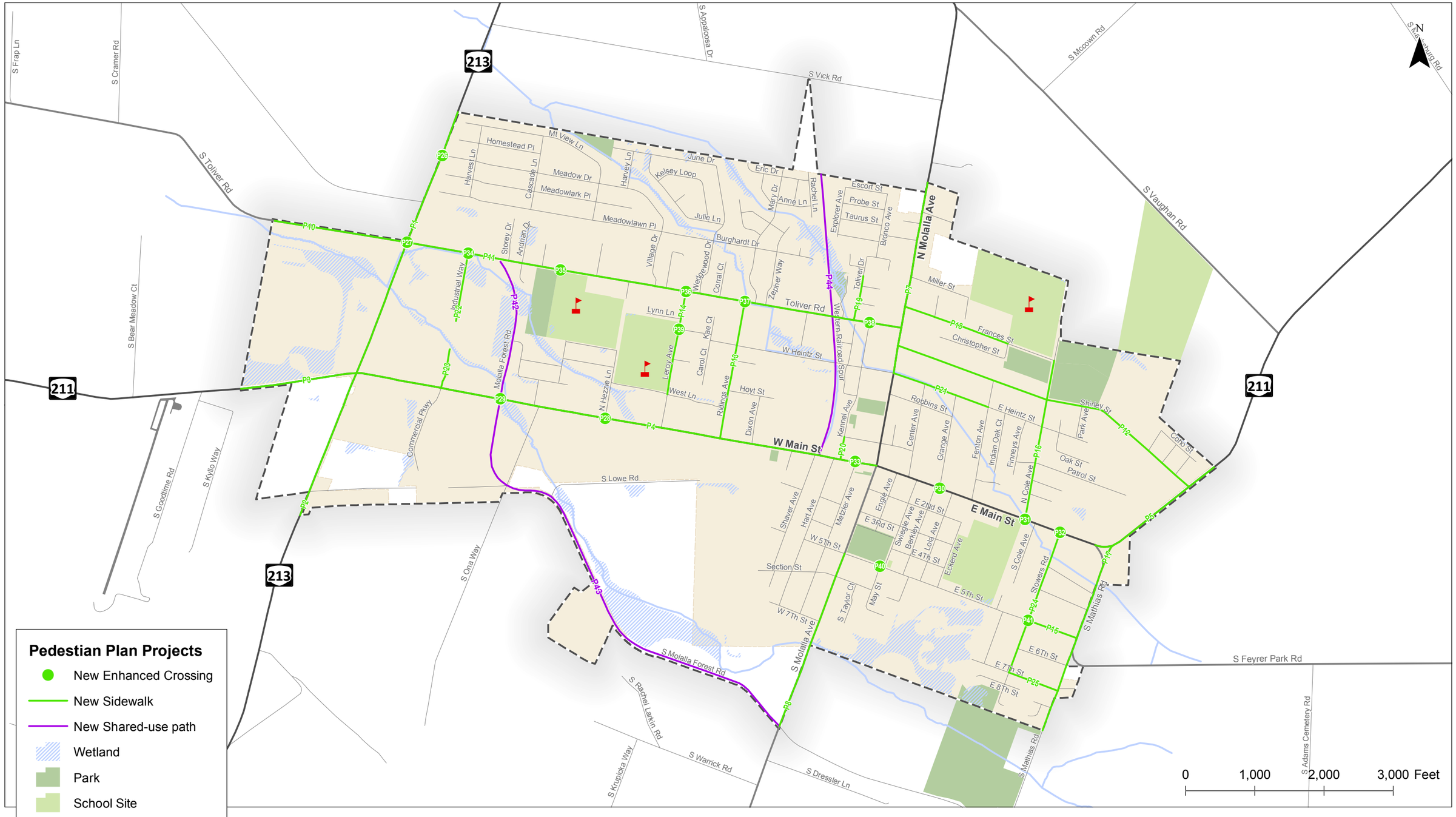
Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, City of Molalla



Pedestian Plan Projects

- New Enhanced Crossing
- New Sidewalk
- New Shared-use path
- Wetland
- Park
- School Site
- Molalla City Limits
- Urban Growth Boundary

Pedestrian Plan Projects
Molalla, Oregon

Figure **5**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, City of Molalla

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CHAPTER 4: BICYCLE SYSTEM

BICYCLE SYSTEM

The bicycle system within Molalla consists of on-street bike lanes, shoulder bikeways, and shared roadways as well as off-street bicycle facilities, such as bicycle parking. These facilities provide residents with the ability to access local retail/commercial centers, recreational areas, and other land uses within Molalla and neighboring areas by bicycle. A safe, convenient, and continuous network of bicycle facilities is essential to establishing a vibrant and healthy community while supporting the local economy within the City.

On-street bike lanes and other bicycle facilities are currently provided on a limited number of roadways within the city. Therefore, the bicycle plan includes several projects along the city's arterial and collector streets and a few local streets that provide direct access to essential destinations. The bicycle plans also includes several enhanced bicycle crossings as well as other off-street amenities that augment and support the bicycle system.

BICYCLE FACILITIES

Bicycle facilities are the elements of the transportation system that enable people to travel safely and efficiently by bike. These include facilities along key roadways (e.g., shared lane pavement markings, on-street bike lanes, and separated bike facilities) and facilities at key crossing locations (e.g., enhanced bike crossings). These also include end of trip facilities (e.g. secure bike parking, changing rooms, and showers at worksites); however, these facilities are addressed through the development code. Each facility plays a role in developing a comprehensive bicycle system.

This section summarizes the bicycle facilities that were evaluated throughout the planning process to address existing gaps and deficiencies in the bicycle system and future needs. As indicated below, the most common overall need is to provide a safe and interconnected bicycle system that encourages people to ride their bicycles, especially for trips less than three miles in length.

SHARED ROADWAYS

Shared-lane pavement markings (often called "sharrows") are not a bicycle facility, but a tool designed to accommodate bicyclists on roadways where bike lanes are desirable but infeasible to construct or not appropriate for the context of the roadway. Sharrows indicate a shared roadway space for cyclists and motorists and are typically centered in the roadway or approximately four feet from the edge of the travel lane and are recommended to be spaced approximately 50 to 250-feet apart dependent on the levels of traffic volume. Sharrows are suitable on roadways with relatively low travel speeds (<35 mph) and low ADT (<3,000 ADT); however, they may also be used to transition between discontinuous bicycle facilities or serve as wayfinding elements along neighborhood bicycle networks. Sharrows are identified in the bicycle plan along a variety of streets within Molalla where room for on-street bike lanes is limited.

Example of Shared Lane Pavement Marking (Sharrow)


Example of a Priority Shared-lane Pavement Marking

ON-STREET BIKE LANES

On-street bike lanes are striped lanes on the roadway dedicated for the exclusive use of cyclists. Bike lanes are typically placed at the outer edge of pavement (but to the inside of right-turn lanes and/or on-street parking). Bicycle lanes can improve safety and security of cyclists and (if comprehensive) can provide direct connections between origins and destinations. On-street bike lanes are identified in the bicycle plan along a majority of arterial and collector streets within Molalla.


Example of Striped Bike Lane

Example of Buffered Bike Lane

SEPARATED BIKE LANES

Separated bike facilities include buffered bike lanes and separated bike lanes, or "protected bike lanes". Buffered bike lanes are on-street bike lanes that include an additional striped buffer of typically 2-3 feet between the bicycle lane and the vehicle travel lane and/or between the bicycle lane and the vehicle parking lane. They are typically located along streets that require a higher level of separation to improve the comfort of bicycling. Separated bike lanes, also known as protected bike lanes, are bicycle facilities that are separated from motor vehicle traffic by a buffer and a physical barrier, such as planters, flexible posts, parked cars, or a mountable curb. One-way separated bike lanes are typically found on each side of the street, like a standard bike lane, while a two-way separated bike lanes are typically found on one side of the street. Buffered bike lanes are identified in the bicycle plan along segments of OR 213 and OR

211. While separated bike lanes are not included in the plan, they may be used in place of on-street bike lanes or buffered bike lanes where desirable.

Example of One-way Parking Protected Bike Lane

Example of Two-way Separated Bike Lane

ENHANCED BIKE CROSSINGS AND PROTECTED INTERSECTIONS

Enhanced bicycle crossing facilities enable cyclists to safely and efficiently cross streets and other transportation facilities. Planning for appropriate bicycle crossings requires the community to balance vehicular mobility needs with providing crossing locations along the desired routes of cyclists. Several enhanced bicycle crossings are identified in the bicycle plan. Enhanced bicycle crossings include:

- Bike Boxes – designated space at an intersection that allows cyclists to wait in front of motor vehicles while waiting to turn or continue through the intersection.
- Two-Stage Left-turn Boxes – designated space at a signalized intersection outside of the travel lane that provides cyclists with a place to wait while making a two-stage left-turn.
- Pavement marking through intersections – pavement markings that extend and bike lane through an intersection.
- Bike Only Signals – a traffic signal that is dedicated for cyclists
- Bicycle Detection – vehicle detection for bicycles

Example of a Bike Box

Example of Pavement Markings Through Intersection

BICYCLE PLAN

Table 4 identifies the bicycle plan projects for the Molalla TSP update. As shown, the projects are separated into projects on arterials, collectors, neighborhood streets, and local streets as well as projects at intersections and in other locations throughout the city. The priorities shown in Table 4 are based on the project evaluation criteria and reflect input from the project team and the general public. The cost estimates are based on average unit costs for roadway improvements. The cost estimates do not include the cost of right-of-way or the cost of filling in the ditches. These costs are included in the motor vehicle plan as applicable. Figure 6 illustrates the location of the bicycle plan projects.

Table 4: Bicycle Plan Improvement Projects

Location		Type	Project	Priority	Cost Estimate
Arterials					
B1	OR 213[1]	Buffered Bike Lane	Install buffered bike lanes on both sides of the roadway from the north city limits to OR 211	Medium	$0[3]
B2	OR 213[1]	Buffered Bike Lane	Install buffered bike lanes on both sides of the roadway from OR 211 to the south city limits	Low	$0[3]
B3	OR 211[1]	Buffered Bike Lane	Install buffered bike lanes on both sides of the roadway from the west city limits to OR 213	Low	$0[3]
B4	OR 211[1]	Buffered Bike Lane	Install buffered bike lanes on both sides of the roadway from OR 213 to Shaver Avenue	Medium	$0[3]
B5	OR 211[1]	Shared-lane	Install priority shared-lane pavement markings (super sharrows) and signs on both sides of the roadway from Shaver Avenue to Fenton Avenue	High	$15,000
B6	OR 211[1]	Buffered Bike Lane	Install buffered bike lanes on both sides of the roadway from Fenton Avenue to Mathias Road (Striping only)	High	$5,000
B7	OR 211	Buffered Bike Lane	Install buffered bike lanes on both sides of the roadway from Mathias Road to the east city limits	High	$0[3]
B8	N Molalla Avenue	Bike Lane	Install bike lanes on both sides of the roadway from the north city limits to Heintz Street	Low	$855,000
B9	N Molalla Avenue	Shared-lane	Install shared-lane pavement marking (sharrows) and signs on both sides of the roadway from Heintz Street to OR 211	Low	$20,000
B10	S Molalla Avenue	Shared-lane	Install shared-lane pavement marking (sharrows) and signs on both sides of the roadway from OR 211 to 5th Street	Low	$10,000

Location		Type	Project	Priority	Cost Estimate
B11	S Molalla Avenue	Bike Lane	Install bike lanes on both sides of the roadway from the 5th Street to the south city limits	Medium	$520,000
Collectors					
B12	Toliver Road	Bike Lane	Install bike lanes on both sides of the roadway from the west city limits to OR 213	High	$815,000
B13	Toliver Road	Bike Lane	Install bike lanes on both sides of the roadway from OR 213 to Zimmerman Lane	High	$930,000
B14	Shirley Street	Bike Lane	Install bike lanes on both sides of the roadway from N Molalla Avenue to OR 211	Medium	$0[3]
B15	Mathias Road	Bike Lane	Install bike lanes on both sides of the roadway from OR 211 to the south city limits	Low	0[3]
B16	Leroy Avenue	Bike Lane	Install bike lanes on both sides of the roadway from Toliver Road to OR 211	Medium	$0[3]
B17	E 5th Street	Bike Lane	Install bike lanes on the south side of the roadway from May Street to Eckerd Avenue and on both sides from Stowers Road to Mathias Road (Striping only)	Medium	$5,000
B18	W 5th Street	Bike Lane	Install bike lanes on both sides of the roadway from Hart Street to S Molalla Avenue (Striping only)	Medium	$5,000
B19	Ridings Avenue	Shared-lane	Install shared-lane pavement markings (sharrows) and signs on both sides of the roadway from Toliver Road to OR 211	Low	$15,000
B20	Cole Avenue	Shared-lane	Install shared-lane pavement markings (sharrows) and signs on both sides of the roadway from Frances Street to OR 211	Low	$20,000
B21	Frances Street	Shared-lane	Install shared-lane pavement markings (sharrows) and signs on both sides of the roadway from N Molalla Avenue to Cole Avenue	Low	$15,000
Neighborhood Streets					
B22	Meadow Drive	Shared lane	Install shared lane pavement markings (sharrows) and signs on both sides of the roadway from OR 213 to Meadowlawn Place	Low	$25,000
B23	Village Drive	Shared lane	Install shared lane pavement markings (sharrows) and signs on both sides of the roadway from Meadowlawn Place to Toliver Road	Low	$10,000
B24	Thunderbird Street	Shared lane	Install shared lane pavement markings (sharrows) and signs on both sides of the roadway from N Molalla Avenue to Bronco Avenue	Low	$10,000

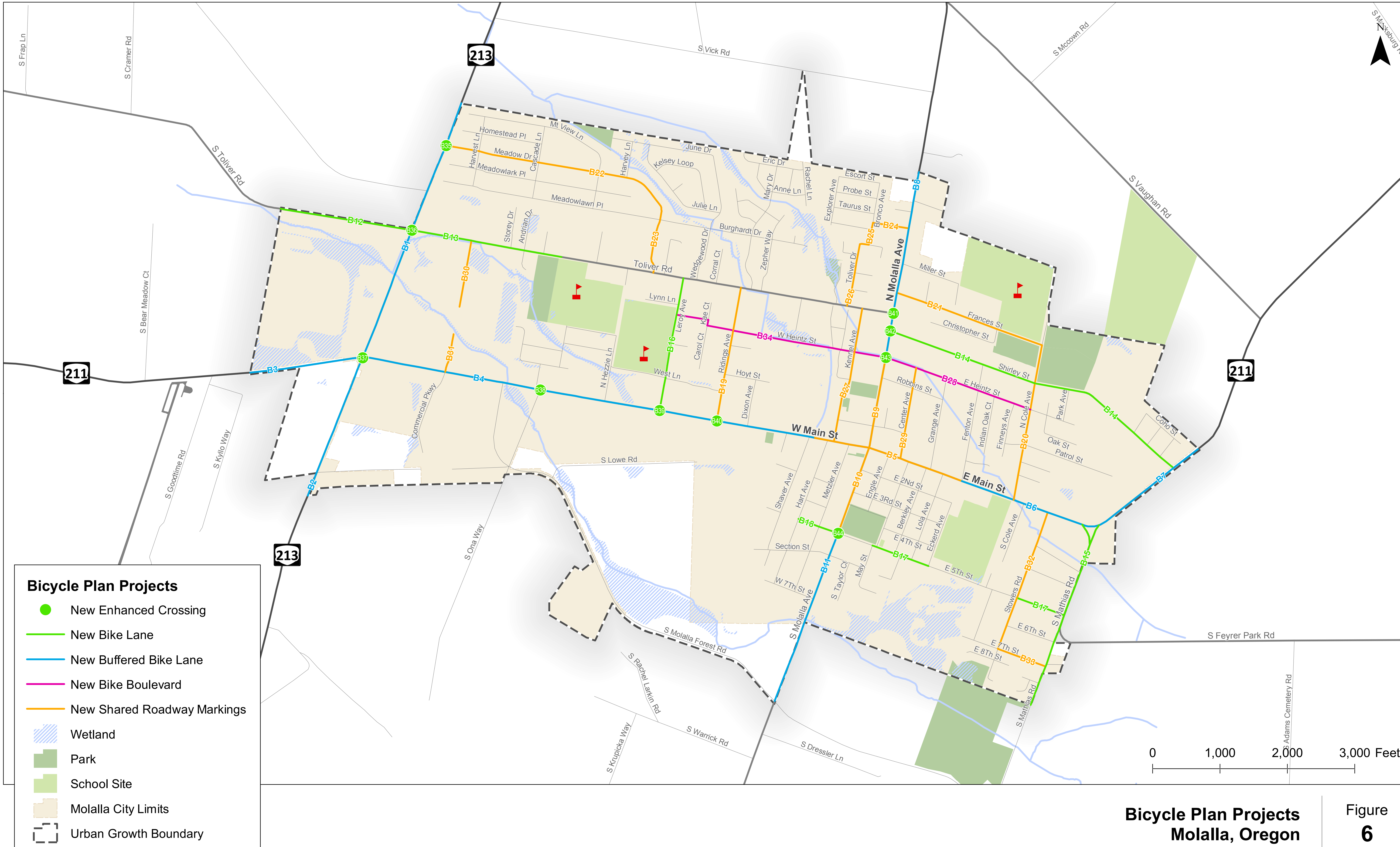
Location		Type	Project	Priority	Cost Estimate
B25	Bronco Avenue	Shared lane	Install shared lane pavement markings (sharrows) and signs on both sides of the roadway from Thunderbird Street to Toliver Drive	Low	$5,000
B26	Toliver Drive	Shared lane	Install shared lane pavement markings (sharrows) and sign on both sides of the roadway from Bronco Avenue to Toliver Road	Low	$10,000
B27	Kennel Avenue	Shared lane	Install shared lane pavement markings (sharrows) and signs on both sides of the roadway from Toliver Road to OR 211	Low	$15,000
B28	Heintz Street	Bicycle Boulevard/ Shared lane	Install bicycle boulevard treatments, including shared lane pavement markings (sharrows) and signs on both sides of the roadway from N Molalla Avenue to Cole Avenue	Medium	$15,000
B29	Center Avenue	Shared lane	Install shared lane pavement markings (sharrows) and signs on both sides of the roadway from Heintz Street to OR 211	Low	$10,000
B30	Industrial Way	Shared lane	Install shared lane pavement markings (sharrows) and signs on both sides of the roadway from Toliver Road to the southern roadway terminus	Low	$5,000
B31	Industrial Way	Shared lane	Install shared lane pavement markings (sharrows) and signs on both sides of the roadway from the northern roadway terminus to OR 211	Low	$5,000
B32	Stowers Road	Shared lane	Install shared lane pavement markings (sharrows) and signs on both sides of the roadway from OR 211 to E 7th Street	Low	$15,000
B33	E 7th Street	Shared lane	Install shared lane pavement markings (sharrows) and signs on both sides of the roadway from Stowers Road to Mathias Road	Low	$5,000
Local Streets					
B34	Heintz Street	Bicycle Boulevard/ Share lane	Install bicycle boulevard treatments, including shared lane pavement markings (sharrows) and signs on both sides of the roadway from Leroy Avenue to N Molalla Avenue	Medium	$25,000
Intersections					
B35	OR 213/ Meadow Drive[1]	Enhanced Crossing	Install an enhanced bicycle crossing at the OR 213/Meadow Drive Intersection[2]	High	$20,000
B36	OR 213/ Toliver Road[1]	Enhanced crossing	Install an enhanced bicycle crossing at the OR 213/Toliver Road intersection[2]	High	$20,000
B37	OR 213/ OR 211[1]	Enhanced crossing	Install skip striping along OR 213 and OR 211 through the intersection[2]	High	$20,000

Location		Type	Project	Priority	Cost Estimate
B38	OR 211/ Ona Way[1]	Enhanced Crossing	Install skip striping along OR 211 and consider other enhanced crossing treatments when signalized[2]	High	$20,000
B39	OR 211/ Leroy Avenue[1]	Enhanced crossing	Install skip striping along OR 211 and consider other enhanced crossing treatments when signalized[2]	High	$20,000
B40	OR 211/ Ridings Avenue[1]	Enhanced crossing	Install skip striping along OR 211 and consider other enhanced crossing treatments when signalized[2]	Medium	$20,000
B41	N Molalla Avenue/ Toliver Road	Enhanced Crossing	Install an enhanced bicycle crossing at the N Molalla Avenue/Toliver Road intersection – coordinate with project B41[2]	Medium	$15,000
B42	N Molalla Avenue/ Shirley Street	Enhanced Crossing	Install an enhanced bicycle crossing at the N Molalla Avenue/Shirley Street intersection – coordinate with project B40[2]	Medium	$15,000
B43	N Molalla Avenue/ Heintz Street	Enhanced Crossing	Install an enhanced bicycle crossing at the N Molalla Avenue/Heintz Street intersection[2]	Medium	$15,000
B44	S Molalla Avenue/ 5th Street	Enhanced Crossing	Install an enhanced bicycle crossing at the S Molalla Avenue/5th Street intersection[2]	Medium	$15,000
				TOTAL High Priority Costs	**$1,865,000**
				TOTAL Medium Priority Costs	**$650,000**
				TOTAL Low Priority Costs	**$1,050,000**
				TOTAL Program Costs (22 years)	**$3,565,000**

1. Project will require coordination with ODOT and approval from the State or Regional Traffic Engineer.
2. The types of enhanced crossing treatments are to be determined at the design/implementation stage.
3. Project cost included in Motor Vehicle Plan.

Other potential bicycle projects include:

- Support Clackamas County's efforts to implement the Active Transportation Plan.
- Support Clackamas County and Molalla River School District's efforts to implement the Safe Routes to School (SRTS) program.
- Identify opportunities to establish additional multi-use paths and trails that augment and support the bicycle system.



Bicycle Plan Projects
Molalla, Oregon

Figure
6

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Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, City of Molalla

CHAPTER 5: TRANSIT SYSTEM

TRANSIT SYSTEM

Transit service in Molalla is currently provided by the South Clackamas Transit District (SCTD), the Molalla Adult Community Center, Molalla River School District (MRSD), Clackamas County Social Services, and several local retirement communities. The service consists of fixed-route and paratransit service as well as school and shuttle bus service. Morning and evening peak hour service along OR 213 and OR 211 provides residents with the ability to use public transit for daily commuting, while mid-day service provides residents with the ability to use public transit to access retail/commercial centers, recreational areas, and other essential destinations located throughout Molalla, Clackamas County and the region.

The Transit Plan includes several projects to enhance the existing fixed-route service provided by SCTD. These projects are intended to improve connections to local destinations for people that do not drive or bike and provide additional options for all transportation system users for certain trips. Public transit complements walking, bicycling, or driving trips: users can walk to and from transit stops and their homes, shopping or work places, people can drive to park-and-ride locations to access a bus, or people can bring their bikes on transit vehicles and bicycle from a transit stop to their final destination. Implementation of the projects included in the Transit Plan will require coordination with SCTD and others to ensure consistent and continued service for local residents.

TRANSIT FACILITIES

Transit facilities are the elements of the transportation system that enable people to travel safely and efficiently throughout the city and the region by transit. These include fixed-route facilities and services, transit stops, and park-and-rides. This section summarizes the transit facilities that were evaluated throughout the planning process to address existing gaps and deficiencies in the transit system and future needs. As indicated below, the most common overall need is to provide a safe and interconnected transit system that encourages people to ride transit for local and regional trips.

FIXED-ROUTE SERVICE

Fixed-route transit service is provided via set routes for buses, shuttles, and other transit modes. Fixed routes include specified transit stops and services that normally operate on defined schedules. For the City, this service is provided by the SCTD bus routes that run through Molalla and provide connections to Canby, Clackamas Community College (CCC), and destinations around the City. The Transit Plan includes several potential changes to existing transit service, including:

- Increase the service frequency by reducing headways or time between arrivals,
- Increase hours of service by providing service earlier in the morning and/or later in the evening, and
- Increase service coverage by re-routing existing service or implementing new service.

STOP ENHANCEMENTS

Transit stops are designated locations where residents can access local transit service. Transit stops are normally located at major intersections. The types of amenities provided at each transit stop (i.e. pole, bench, shelter, ridership information, trash receptacles) tend to reflect the level of usage.

- Pole and bus stop sign – All bus stops require a pole and bus stop sign to identify the bus stop location. Some transit agencies prefer the bus stop signs to be provided on a separate dedicated pole instead of an existing utility pole, column, or other location.
- Bus stop shelters – Shelters are typically provided at stops with 50 or more boardings per day but may be considered at stops served by infrequent service (headways greater than 17 minutes) with 35 or more boardings per day.
- Seating – Seating can be considered at any stop as long as it is accessible and as long as the, safety and accessibility of the adjacent sidewalk or other facility are not compromised by seating placement.
- Trash cans – Trash cans can be considered at any stop; however, they are most commonly located at stops with shelters and/or seating. Trash cans will require pick-up from the local garbage company.
- Lighting – Lighting is an important amenity for bus stops as it provides visibility and increased security for transit users waiting, boarding, and aligning transit service.

TriMet Stop (Before)

TriMet Stop (After)

The Transit Plan includes several new transit stops and potential enhancements to existing transit stops throughout Molalla.

PARK-AND-RIDE FACILITIES

Park-and-ride facilities provide parking for people who wish to transfer from their personal vehicle to public transportation or carpools/vanpools. Park-and-rides are frequently located near major intersections, at commercial centers, or on express and commuter bus routes. It is Oregon state policy to encourage the development and use of park-and-ride facilities at appropriate urban and rural locations adjacent to or within the highway right-of-way. Park-and-ride facilities can provide an efficient method to provide transit service to low density areas such as Molalla, connecting people to jobs, and providing an alternate mode to complete long-distance commutes.

Park-and-ride facilities may be either shared-use, such as at a school or shopping center, or exclusive-use. Shared-use facilities are generally designated and maintained through agreements reached between the local public transit agency or rideshare program operator and the property owner. Shared-use lots can save the expense of building a new parking lot, increase the utilization of existing spaces, and avoid utilization of developable land for surface parking. In the case of shopping centers, the presence of a shared-use park-and-ride has frequently been shown to be mutually beneficial, as park-and-riders tend to patronize the businesses in the center.

SCTD Transit Stop at E Ross Street

SCTD City Bus Serves as a Fixed Route around Molalla

TRANSIT PLAN

Table 5 identifies the transit plan projects for the Molalla TSP update. As shown, several of projects are assumed to be funded by others or require coordination with SCTD. The City of Molalla can support improved transit service by providing easy and safe walking and bicycling connections between key roadways, neighborhoods, and local destinations; by providing amenities, such as shelters and benches, at transit stops; by encouraging an appropriate mix and density of uses that support public transit; and by providing and planning for park-and-ride locations. The priorities shown in Table 5 are based on the project evaluation criteria and reflect input from the project team and the general public. The cost estimates are based on average unit costs for roadway improvements and reflect input from RVTD. Figure 7 illustrates the location of the transit plan projects.

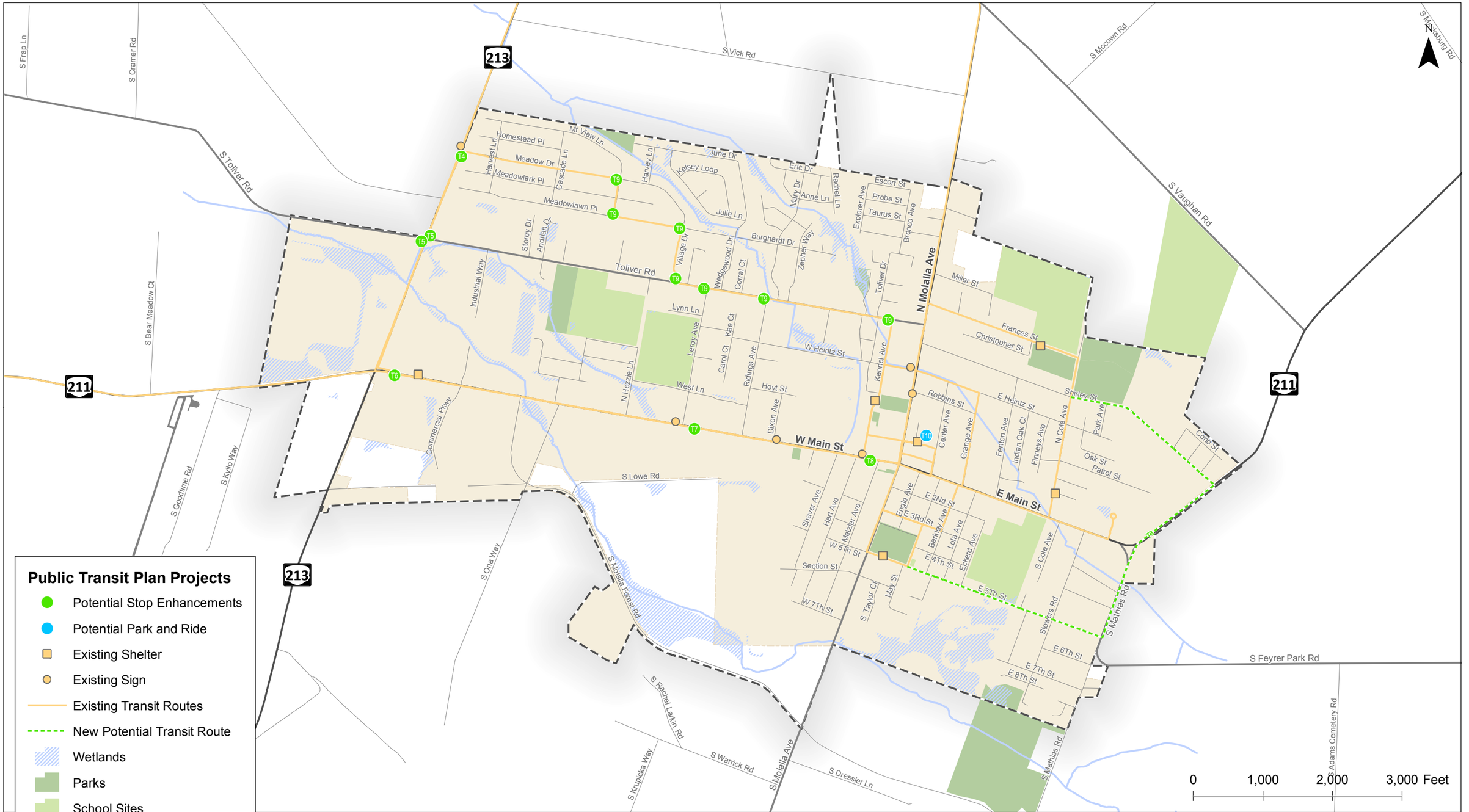
Table 5: Transit Plan Improvement Projects

Project Number	Location	Agency Responsible	Description	Priority	Cost Estimate
T1[2]	City-wide	City/SCTD	Coordinate with SCTD to increase the frequency of morning and evening peak hour service on the Canby and CCC Buses	Medium	$0[1]
T2[2]	City-wide	City/SCTD	Coordinate with SCTD to increase the hours of service on the Canby Bus	Medium	$0[1]
T3[2]	City-wide	City/SCTD	Coordinate with SCTD to reconfigure the Molalla City Bus to increase service coverage in the northeast and southeast parts of the city and increase the efficiency of the route	Medium	$0[1]
T4	OR 213/Meadow Drive (northbound)	City/SCTD	Relocate existing sign to south side of the intersection to increase the visibility of the stop	Medium	$5,000
T5	OR 213/Toliver Road	City/SCTD	Install bus stops at the far side of the northbound and southbound approaches to the intersection	Medium	$10,000
T6	OR 211/OR 213 (eastbound)	City/SCTD	Install a shelter within the public right of way or obtain an easement from the adjacent property owner	Medium	$50,000
T7	OR 211/Leroy Avenue (eastbound)	City/SCTD	Install a bus stop sign on the east side of the intersection to increase the visibility of the stop	Medium	$5,000
T8	OR 211/Kennel Avenue (eastbound)	City/SCTD	Install a bus stop sign on the east side of the intersection to increase the visibility of the stop	Medium	$5,000
T9	Meadow Drive/ Meadowlawn Place/ Toliver Road	City/SCTD	Provide designated transit stop between OR 213 and Kennel Avenue (Seven potential stop locations are shown for illustrative purposes)	Medium	$35,000
T10	City Wide	City/SCTD	Identify the location for a new park-and-ride within the city (the existing parking and ride is shown for illustrative purposes)	Medium	$50,000
				TOTAL Medium Priority Costs	**$160,000**
				TOTAL Program Costs (22 years)	**$160,000**

1. Project to be funded by others.
2. Project not shown on map.

Other potential transit projects include:

- Support South Clackamas Transit Districts (SCTD) efforts in obtaining House Bill (HB) 2017 Funding to enhance existing and future transit service in Molalla.



Public Transit Plan Projects

- Potential Stop Enhancements
- Potential Park and Ride
- Existing Shelter
- Existing Sign
- Existing Transit Routes
- New Potential Transit Route
- Wetlands
- Parks
- School Sites
- Molalla City Limits
- Urban Growth Boundary

Public Transit Plan Projects
Molalla, Oregon

Figure **7**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, City of Molalla

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KITTELSON & ASSOCIATES

CHAPTER 6: TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS (TSMO)

TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS (TSMO)

Transportation System Management and Operations (TSMO) is a set of integrated transportation solutions intended to improve the performance of existing transportation infrastructure. Transportation System Management (TSM) and Transportation Demand Management (TDM) strategies are two complementary approaches to managing transportation and maximizing the efficiency of the existing system. TSM strategies address the *supply* of the system: using strategies to improve the system efficiency without increasing roadway widths or building new roads. TSM measures are focused on improving operations by enhancing capacity during peak times, typically with advanced technologies to improve traffic operations. TDM strategies address the *demand* on the system: the number of vehicles traveling on the roadways each day. TDM measures include any method intended to shift travel demand from single occupant vehicles to non-auto modes or carpooling, travel at less congested times of the day, etc.

TRANSPORTATION SYSTEM MANAGEMENT (TSM)

Transportation System Management (TSM) focuses on low cost strategies that can be implemented within the existing transportation infrastructure to enhance operational performance. Finding ways to better manage transportation while maximizing urban mobility and treating all modes of travel as a coordinated system is a priority. TSM strategies include traffic signal timing and phasing optimization, traffic signal coordination, and intelligent transportation systems (ITS). Traffic signal coordination and ITS typically provide the most significant tangible benefits to the traveling public. The primary focus of TSM measures are region-wide improvements, however there are a number of TSM measures that can be used in a smaller scale environment such as Molalla.

SIGNAL RETIMING AND OPTIMIZATION

Signal retiming and optimization offers a relatively low-cost option to increase system efficiency. Retiming and optimization refers to updating timing plans to better match prevailing traffic conditions and coordinating signals. Timing optimization can be applied to existing systems or may include upgrading signal technology, such as signal communication infrastructure, signal controllers, or cabinets. Signal retiming can reduce travel times and be especially beneficial to improving travel time reliability. In high pedestrian or desired pedestrian areas, signal retiming can facilitate pedestrian movements through intersections by increasing minimum green times to give pedestrians time to cross during each cycle, eliminating the need to push pedestrian crossing buttons. Signals can also facilitate bicycle movements with the inclusion of bicycle detectors.

ADVANCED SIGNAL SYSTEMS

Signal upgrades often come at a higher cost and usually require further coordination between jurisdictions. However, upgrading signals provides the opportunity to incorporate advanced signal systems to further improve the efficiency of a transportation network. Strategies include coordinated signal operations across jurisdictions, centralized control of traffic signals, adaptive or active signal control,

and transit or freight signal priority. These advanced signal systems can reduce delay, travel time, and the number of stops for transit, freight, and other vehicles. In addition, these systems may help reduce vehicle emissions and improve travel time reliability.

- **Adaptive or active signal control** systems improve the efficiency of signal operations by actively changing the allotment of green time for vehicle movements and reducing the average delay for vehicles. Adaptive or active signal control systems require several vehicle detectors at intersections to detect traffic flows adequately, in addition to hardware and software upgrades.
- **Traffic responsive control** uses data collected from traffic detectors to change signal timing plans for intersections. The data collected from the detectors is used by the system to automatically select a timing plan best suited to current traffic conditions. This system can determine times when peak-hour timing plans begin or end; potentially reducing vehicle delays.
- **Truck signal priority** systems use sensors to detect approaching heavy vehicles and alter signal timings to improve truck freight travel. While truck signal priority may improve travel times for trucks, its primary purpose is to improve the overall performance of intersection operations by clearing any trucks that would otherwise be stopped at the intersection and subsequently have to spend a longer time getting back up to speed. Implementing truck signal priority requires additional advanced detector loops, usually placed in pairs back from the approach to the intersection.

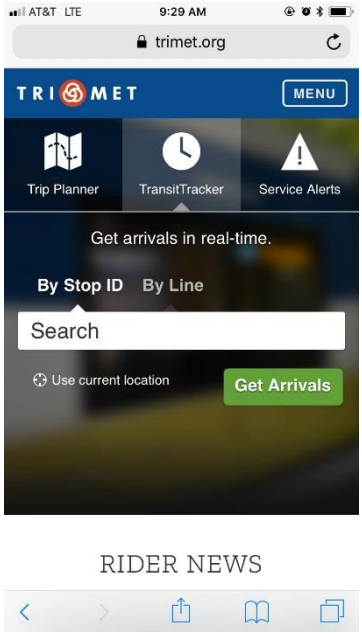
Real-Time Traveler Information

Traveler information consists of collecting and disseminating real-time transportation system information to the traveling public. This includes information on traffic and road conditions, general public transportation and parking information, interruptions due to roadway incidents, roadway maintenance and construction, and weather conditions. Traveler information is collected from roadway sensors, traffic cameras, vehicle probes, and more recently, media access control (MAC) devices such as cell phones or laptops. Data from these sources are sent to a central system and subsequently disseminated to the public so that drivers track conditions specific to their cars and can provide historical and real-time traffic conditions for travelers.

When roadway travelers are supplied with information on their trips, they may be able to avoid heavy congestion by altering a travel path, delaying the start of a trip, or changing which mode they can choose. This can reduce overall delay and fuel emissions. Traveler information projects can be prioritized over increasing capacity on roadway, often with high project visibility among the public.

Real-Time Transit Information

Transit agencies or third-party sources can disseminate both schedule and system performance information to travelers through a variety of applications, such as in-vehicle, wayside, or in-terminal dynamic message signs, as well as the Internet or wireless devices. Coordination with regional or multimodal traveler information efforts can increase the availability of this transit schedule and system performance information. TriMet has implemented this through its Transit Tracker system.



These systems enhance passenger convenience and may increase the attractiveness of transit to the public by encouraging travelers to consider transit as opposed to driving alone. They do require cooperation and integration between agencies for disseminating the information.

TRANSPORTATION SYSTEM MANAGEMENT (TSM) PLAN

The TSM Plan projects developed for the Molalla TSP update are summarized in Table 6. These projects are intended to address existing and projected future operational performance for motor vehicles as well as all other modes of transportation that depend on the roadway system for travel, such as pedestrians, bicyclists, transit users, and freight.

Table 6: Transportation System Management Projects

Project/Program Number	Name	Description	Priority	Cost Estimate
TSM1	Signal System Improvements	Update signal timing plans and coordinate signals to better match prevailing traffic conditions; implementing adaptive or active signal control, traffic responsive control, and/or truck signal priority	High/ Medium/ Low	$5,000/year
TSM2	Real-Time Traveler Information	Work with mobile and web applications to increase information on traffic and road conditions, general public transportation and parking information, interruptions due to roadway incidents, maintenance, construction, and weather conditions.	Medium	TBD
TSM3	Real-Time Transit Information	Work with transit agencies or third-party sources to disseminate schedule and system performance information to travelers through a variety of applications, such as in-vehicle, wayside, in-terminal dynamic message signs, live schedule arrival boards, as well as the internet or wireless devices.	Medium	TBD
			TOTAL High Priority Costs	**$25,000**
			TOTAL Medium Priority Costs	**$25,000**
			TOTAL Low Priority Costs	**$60,000**
			TOTAL Program Costs (22 years)	**$110,000**

Other potential TSM projects include:

- Support advancing technologies, transportation network company (TNC) platforms, and active transportation programs to support existing city infrastructure.

TRANSPORTATION DEMAND MANAGEMENT (TDM)

Transportation Demand Management (TDM) is a policy tool as well as a general term used to describe any action that removes single occupant vehicle trips from the roadway during peak travel demand periods. As growth in the City of Molalla 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 potential growth in trips. The following section provides more detail on programming and policy strategies that may be effective for managing transportation demand and increasing system efficiency over the next 22 years.

PROGRAMMING

Programming solutions can provide effective and low-cost options for reducing transportation demand. Some of the most effective programming strategies can be implemented by employers and are aimed at encouraging non-single occupancy vehicle commuting. These strategies are discussed below.

Carpool Match Services

Clackamas County promotes the use of Drive Less Connect, which is a rideshare/carpool program that regional commuters can use to find other commuters with similar routes to work. The program allows commuters to connect and coordinate with others on locations, departure times, and driving responsibilities. Local employers can also play a role in encouraging carpooling by sharing information about the system, providing preferential carpool parking, and allowing employees to have flexibility in workday schedules.

Collaborative Marketing

Public agencies, local business owners and operators, developers, and transit service providers can collaborate on marketing to get the word out to residents about transportation options that provide an alternative to single-occupancy vehicles.

POLICY

Policy solutions can be implemented by cities, counties, regions, or at the statewide level. Regional and state-level policies will affect transportation demand in Molalla, but local policies can also have an impact. These policies are discussed below.

Limited and/or Flexible Parking Requirements

Cities set policies related to parking requirements for new developments. In order to allow developments that encourage multi-modal transportation, cities can set parking maximums and low minimums and/or allow for shared parking between uses. Cities can also provide developers the option to pay in-lieu fees instead of constructing additional parking. This option provides additional flexibility to developers that can increase the likelihood of development, especially on smaller lots where surface parking would cover a high portion of the total property.

Cities can also set policies that require provision of parking to the rear of buildings, allowing buildings in commercial areas to directly front the street. This urban form creates a more appealing environment for walking and window-shopping. In-lieu parking fees support this type of development for parcels that do not have rear- or side-access points.

Parking Management

Parking plays a large role in transportation demand management, and effective management of parking resources can encourage use of non-single occupancy vehicle modes. Cities can tailor policies to charge for public parking in certain areas or impose time limits on street parking in retail centers. Cities can also monitor public parking supply and utilization in order to inform future parking strategy.

TRANSPORTATION DEMAND MANAGEMENT (TDM) PLAN

Table 7 identifies the TDM strategies included in the Molalla TSP update. Given Molalla's lack of experience with TDM strategies, it is important that decision-makers understand their long-term costs and benefits and are able evaluate these along-side arguments from opponents in achieving outcomes that best reflect the City's vision and goals while effectively reducing travel demand.

Table 7: Transportation Demand Management (TDM) Strategies

Program/Project Number	Name	Description	Priority	Cost Estimate
TDM1	Carpool Match Services Service	Coordinate rideshare/carpool programs to allow regional commuters to find other commuters with similar routes to work.	High/Medium/Low	$5,000/year
TDM2	Collaborative Marketing	Work with nearby cities, employers, transit service providers, and developers to collaborate on marketing for transportation options that provide an alternative to single-occupancy vehicles	High/Medium/Low	$5,000/year
TDM3	Limited and/or Flexible Parking Requirements	Update the Molalla Municipal Code to limit and/or allow for flexible parking requirements	Medium	$25,000
TDM4	Parking Management	Develop a parking management plan for downtown Molalla to impose time limits in commercial areas and allow for the potential to charge for parking	Medium	$25,000
			TOTAL High Priority Costs	**$50,000**
			TOTAL Medium Priority Costs	**$100,000**
			TOTAL Low Priority Costs	**$120,000**
			TOTAL Program Costs (22 years)	**$270,000**

Other potential TDM projects include:

- Support continued efforts by ODOT and Clackamas County to develop productive TDM measures that reduce commuter vehicle miles and peak hour trips.

- Encourage the development of high speed communication in all part of the city (fiber optic, digital cable, DSL, etc.). The objective would be to allow employers and residents the maximum opportunity to rely upon other systems for conducting business and activities than the transportation system during peak periods.
- Encourage developments that effectively mix land uses to reduce vehicle trip generation. These plans may include development linkages (particularly non-auto) that support greater use of alternative modes.

NEIGHBORHOOD TRAFFIC MANAGEMENT (NTM)

Neighborhood Traffic Management (NTM) is a term used to describe traffic control devices that reduce travel speeds and traffic volumes in residential neighborhoods. NTM is also commonly referred to as traffic calming because of its ability to calm traffic and improve neighborhood livability. NTM solutions have been implemented in locations throughout the city; however, there are many areas where additional NTM could be considered in the future. Table 8 lists several common NTM options that are typically supported by emergency response as long as minimum street criteria are met.

Table 8: Neighborhood Traffic Management (NTM) Options by Functional Classification

Traffic Calming Measures	Roadway Classifications		
	Arterial	Collector	Neighborhood Street/ Local Street
Curb Extensions	Supported	Supported	Traffic Calming measures are generally supported on lesser response routes that have connectivity (more than two accesses) and are accepted and field tested
Medians	Supported	Supported	
Pavement Texture	Supported	Supported	
Speed Hump	Not Supported	Not Supported	
Raised Crosswalk	Not Supported	Not Supported	
Speed Cushion	Not Supported	Not Supported	
Choker	Not Supported	Not Supported	
Traffic Circle	Not Supported	Not Supported	
Diverter (with emergency vehicle pass through)	Not Supported	Supported	
Meandering Alignments	Not Supported	Not Supported	

Note: Neighborhood Traffic Management (NTM) measures are supported with the qualification that they meet emergency response guidelines including minimum street width, emergency vehicle turning radius, and accessibility/connectivity.

While no specific NTM projects are identified in the TSP, they are an important part of the City's ongoing effort to improve livability. Any future NTM projects should be coordinated with emergency service providers to ensure public safety is not compromised. NTM engineering solutions are limited to neighborhood street and local streets; implementation of NTM solutions on arterial and collector streets is counterproductive and can lead to cut through traffic on local streets. NTM is also restricted on arterial and collector streets to avoid conflicts with emergency access/public safety as well as conflicts with public transit.

ACCESS MANAGEMENT PLAN

Access management is a set of measures regulating access to streets, roads, and highways, from public roads and private driveways. Access management is a policy tool which seeks to balance mobility, the need to provide efficient, safe and timely travel with the ability to allow access to individual properties. Proper implementation of access management techniques could result in reduced congestion, reduced crash rates, less need for roadway widening, conservation of energy, and reductions in air pollution. Measures may include but are not limited to restrictions on the type and amount of access to roadways, and use of physical controls, such as signals and channelization including raised medians, to reduce impacts of approach road traffic on the main facility.

ODOT ACCESS MANAGEMENT STANDARDS

Oregon Administrative Rule 734, Division 51 establishes procedures, standards, and approval criteria used by ODOT to govern highway approach permitting and access management consistent with Oregon Revised Statutes (ORS), Oregon Administrative Rules (OAR), statewide planning goals, acknowledged comprehensive plans, and the Oregon Highway Plan (OHP). The OHP serves as the policy basis for implementing Division 51 and guides the administration of access management rules, including mitigation and public investment, when required, to ensure highway safety and operations pursuant to this division.

Access spacing standards for approaches to state highways are based on the highway classification, highway designation, area type, and posted speed. Within Molalla, the OHP classifies OR 213 and OR 211 as District Highways. Future developments along OR 213 and OR 211 (new development, redevelopment, zone changes, and/or comprehensive plan amendments) is required to meet the OAR 734, Division 51 access management policies and standards. Table 9 summarizes ODOT's access management standards for OR 213 and OR 211.

Table 9: OR 213 and OR 211 ODOT Access Management Standards

Posted Speed	Spacing Standards Rural Areas1	Spacing Standards Urban Areas	Spacing Standards for Areas Designated as UBAs	Spacing Standards for areas Designated as STAs
55 or higher	700	700	-	
50	550	550	-	
40 & 45	500	500	-	
30 & 35	400	350	350[1]	300[2]
25 & lower	400	250	350[1]	300[2]

Note: These access spacing standards do not apply to approaches in existence prior to April 1, 2000 except as provided in OAR 734-051-5120(9).
1. Measurement of the approach road spacing is from the center on the same side of the roadway.
2. Minimum spacing standards for public road approaches is the existing city block spacing (approximately 300 feet in Molalla); private driveways spacing is a minimum of 175 feet.

Special Transportation Area

The segment of OR 211 from Hart Avenue to Grange Avenue (mile point 12.64 to 12.94) is designated as a Special Transportation Area (STA). An STA is a designated district of compact development along a state highway in which the need for appropriate local access outweighs the considerations of highway mobility. The STA designation allows for redevelopment to occur along OR 211 with access less than that standard spacing shown in Table 9.

While accessibility for automobiles plays an important role through a STA, convenience of movement within an STA is focused on pedestrian, bicycle, and transit modes. STAs look like traditional "Main Streets" and area generally located on both sides of the highway. The primary objective of an STA is to provide access to and circulation amongst community activities, businesses and residences and to accommodate pedestrian, bicycle, and transit movement along and across the highway .

CITY STANDARDS

Access spacing standards for approaches to City streets are based on the roadway functional classification. Chapter 17 of the Molalla Municipal Code indicates that the minimum distances shall be maintained between approaches and street intersections consistent with the current version of the Public Works Design Standards and Transportation System Plan. Table 10 identifies the minimum intersection spacing standards for public streets and private driveways as they relate to new development and redevelopment within the City. Table 11 identifies standards for private access driveway widths. These standards will help to preserve transportation system investments and guard against deteriorations in safety and increased congestion.

Table 10: Minimum Intersection Spacing Standards

Functional Classification	Public Street (Feet)	Private Access Drive (Feet)
Local Street	150	50
Neighborhood Collector	300	100
Major Collector/Arterial[1]	600	150
Molalla Forest Road	800	N/A[2]

1. ODOT standards supersede these values on ODOT facilities
2. Not allowed unless no other access possible. Access may be limited to right-in, right-out

Table 11: Private Access Driveway Width Standards

Land Use	Minimum (Feet)	Maximum (Feet)
Single Family Residential	12	24
Multi-family Residential	24	30
Commercial	30	40
Industrial	30	40

In cases where physical constraints or unique site characteristics limit the ability for the access spacing standards listed in Tables 9 and 10 to be met, the City retains the right to grant an access spacing variance.

ACCESS SPACING VARIANCES

Access spacing variances may be provided to parcels whose highway/street frontage, topography, or location would otherwise preclude issuance of a conforming permit and would either have no reasonable access or cannot obtain reasonable alternate access to the public road system. In such a situation, a conditional access permit may be issued by ODOT or the City, as appropriate, for a connection to a property that cannot be accessed in a manner that is consistent with the spacing standards. The permit can carry a condition that the access may be closed at such time that reasonable access becomes available to a local public street. The approval condition might also require a given land owner to work in cooperation with adjacent land owners to provide either joint access points, front and rear cross-over easements, or a rear access upon future redevelopment.

The requirements for obtaining a deviation from ODOT's minimum spacing standards are documented in OAR 734-051-3050. For streets under the City's jurisdiction, the City may reduce the access spacing standards at the discretion of the City Engineer if the following conditions exist:

- Joint access driveways and cross access easements are provided in accordance with the standards;
- The site plan incorporates a unified access and circulation system in accordance with the standards;
- The property owner enters into a written agreement with the City that pre-existing connections on the site will be closed and eliminated after construction of each side of the joint use driveway; and/or,
- The proposed access plan for redevelopment properties moves in the direction of the spacing standards.

The City Engineer may modify or waive the access spacing standards for streets under the City's jurisdiction where the physical site characteristics or layout of abutting properties would make development of a unified or shared access and circulation system impractical, subject to the following considerations:

- Unless modified, application of the access standard will result in the degradation of operational and safety integrity of the transportation system.
- The granting of the variance will meet the purpose and intent of the standards and will not be considered until every feasible option for meeting access standards is explored.
- Applicants for variance from these standards must provide proof of unique or special conditions that make strict application of the standards impractical. Applicants shall include proof that:

- Indirect or restricted access cannot be obtained; no engineering or construction solutions can be applied to mitigate the condition; and, no alternative access is available from a road with a lower functional classification than the primary roadway.

No variance shall be granted where such hardship is self-created. Consistency between access spacing requirements and exceptions in the TSP and MMC is an important regulatory solution to be addressed as part of this TSP update.

ACCESS CONSOLIDATION THROUGH MANAGEMENT

From an operational perspective, access management measures limit the number of redundant access points along roadways. This enhances roadway capacity, improves safety, and benefits circulation. Enforcement of the access spacing standards should be complemented with provision of alternative access points. Purchasing right-of-way and closing driveways without a parallel road system and/or other local access could seriously affect the viability of the impacted properties. Thus, if an access management approach is taken, alternative access should be developed to avoid "land-locking" a given property.

As part of every land use action, the City should evaluate the potential need for conditioning a given development proposal with the following items, in order to maintain and/or improve traffic operations and safety along the arterial and collector roadways.

- Provide access to the lower classification roadway when multiple roadways abut the property.
- Provide crossover easements on all compatible parcels (considering topography, access, and land use) to facilitate future access between adjoining parcels.
- Issue conditional access permits to developments that have access points that do not meet the designated access spacing policy and/or have the ability to align with opposing driveways.
- Right-of-way dedications to facilitate the future planned roadway system in the vicinity of proposed developments.
- Half-street improvements (sidewalks, curb and gutter, bike lanes/paths, and/or travel lanes) along site frontages that do not have full build-out improvements in place at the time of development.

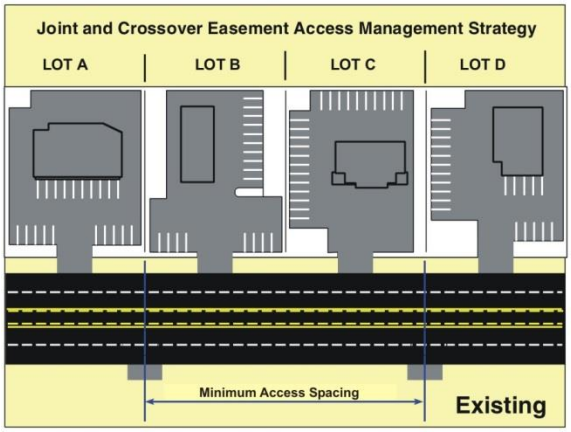
Exhibit 1 illustrates the application of cross-over easements and conditional access permits over time to achieve access management objectives. The individual steps are described in Table 12. As illustrated in the exhibit and supporting table, by using these guidelines, all driveways can eventually move in the direction of the access spacing standards as development and redevelopment occur along a given street.

Table 12: Example of Crossover Easement/Indenture/Consolidation

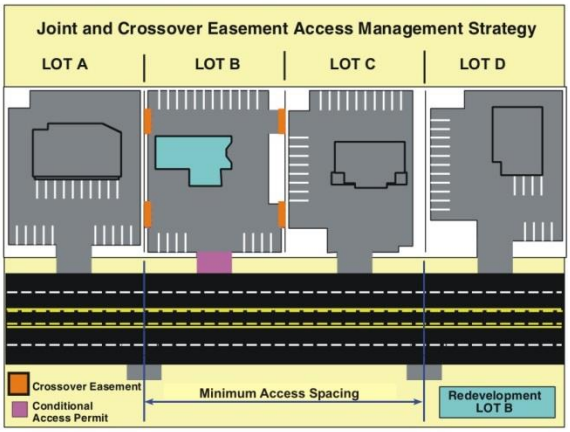
Step	Process
1	EXISTING – Currently Lots A, B, C, and D have site-access driveways that neither meet the access spacing criteria of 500 feet nor align with driveways or access points on the opposite side of the highway. Under these conditions motorists are into situations of potential conflict (conflicting left turns) with opposing traffic. Additionally, the number of side-street (or site-access driveway) intersections decreases the operation and safety of the highway
2	REDEVELOPMENT OF LOT B – At the time that Lot B redevelops, the City would review the proposed site plan and make recommendations to ensure that the site could promote future crossover or consolidated access. Next, the City would issue conditional permits for the development to provide crossover easements with Lots A and C, and ODOT/City would grant a conditional access permit to the lot. After evaluating the land use action, ODOT/City would determine that LOT B does not have either alternative access, nor can an access point be aligned with an opposing access point, nor can the available lot frontage provide an access point that meets the access spacing criteria set forth for segment of highway.
3	REDEVELOPMENT OF LOT A – At the time Lot A redevelops, the City/ODOT would undertake the same review process as with the redevelopment of LOT B (see Step 2); however, under this scenario ODOT and the City would use the previously obtained cross-over easement at Lot B consolidate the access points of Lots A and B. ODOT/City would then relocate the conditional access of Lot B to align with the opposing access point and provide and efficient access to both Lots A and B. The consolidation of site-access driveways for Lots A and B will not only reduce the number of driveways accessing the highway but will also eliminate the conflicting left-turn movements the highway by the alignment with the opposing access point.
4	REDEVELOPMENT OF LOT D – The redevelopment of Lot D will be handled in same manner as the redevelopment of Lot B (see Step 2)
5	REDEVELOPMENT OF LOT C – The redevelopment of Lot C will be reviewed once again to ensure that the site will accommodate crossover and/or consolidated access. Using the crossover agreements with Lots B and D, Lot C would share a consolidated access point with Lot D and will also have alternative frontage access the shared site-access driveway of Lots A and B. By using the crossover agreement and conditional access permit process, the City and ODOT will be able to eliminate another access point and provide the alignment with the opposing access points.
6	COMPLETE – After Lots A, B, C, and D redevelop over time, the number of access points will be reduced and aligned, and the remaining access points will meet the access spacing standard.

Exhibit 1: Cross Over Easement

Proposed Access Management Strategy



Step 1



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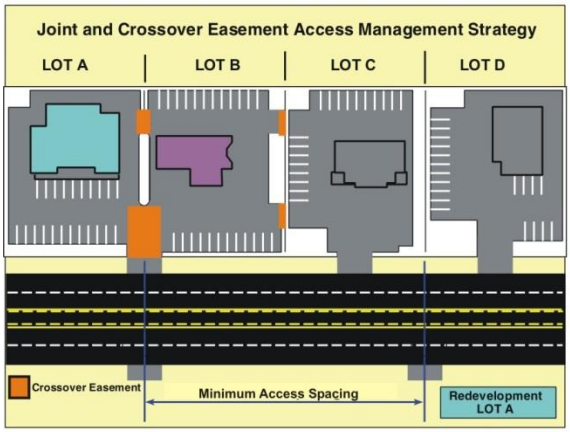
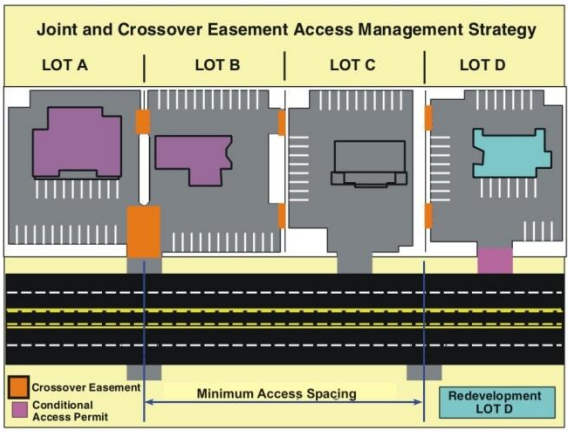
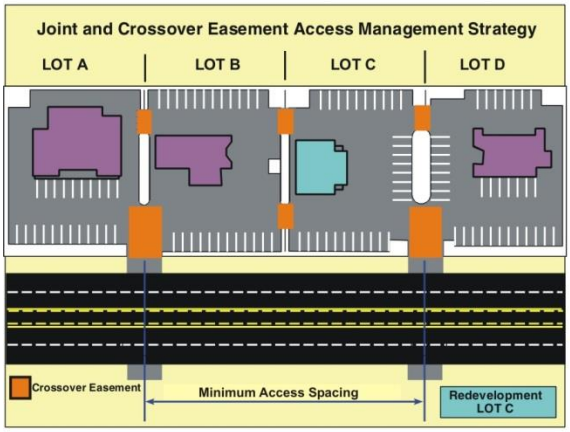


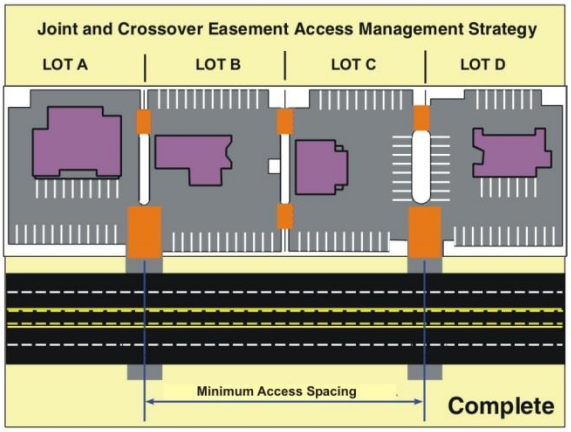
Step 3



Step 4



Step 5



Step 6

CHAPTER 7: MOTOR VEHICLE SYSTEM

MOTOR VEHICLE SYSTEM

The motor vehicle system within Molalla includes private streets, city streets, and state highways. These facilities provide residents with the ability to access retail, commercial, recreational, and other land uses within Molalla and neighborhood cities by vehicle. This section describes how the system has been developed to date and provides a more detailed review of how it is used and operated.

The street system within Molalla is well established in some areas; however, there are several areas where the existing roadways could be improved and other areas where new roadways could be constructed to increase the efficiency of the transportation system as well as improve access and circulation for all travel modes. There are also several intersections with operational issues under the existing and projected future traffic conditions. Therefore, the Motor Vehicle Plan includes projects to increase the efficiency of the transportation system through changes in the functional classification of roadways, development of roadway standards and standard cross sections, improvements to the street system connectivity, and improvements to the capacity of several roadways and several key intersections.

FUNCTIONAL CLASSIFICATION PLAN

A street's functional classification defines its role in the transportation system and reflects desired operational and design characteristics such as right-of-way requirements, pavement widths, pedestrian and bicycle features, and driveway (access) spacing standards. The functional classification plan includes the following designations:

- Arterials are primarily intended to serve traffic entering and leaving the urban area. While arterials may provide access to adjacent land uses, that function is subordinate to the travel service provided to major traffic movements. Arterials are the longest-distance, highest-volume roadways within the Urban Growth Boundary (UGB). Although the streets focus on serving longer distance trips, pedestrian and/or bicycle activities often are also associated with the arterial streetscape.
- Collectors facilitate the movement of city traffic within the UGB. Collectors provide some degree of access to adjacent properties, while maintaining circulation and mobility for all users. Major collectors are distinguished by their connectivity and higher traffic volumes, although they are designed to carry lower traffic volumes at slower speeds than arterials. Major collectors are characterized by two or three-lane facilities. Minor collectors carry lower volumes than major collectors and have two-lane cross sections.
- Neighborhood Streets connect neighborhoods with the collector and arterial street system, facilitate the movement of local traffic, and provide access to abutting land uses. Speeds on these facilities should remain low to ensure community livability and safety for pedestrians and bicyclists of all ages. On-street parking is more prevalent and pedestrian amenities are typically

provided. Striped bike lanes are unnecessary for most neighborhood streets because traffic volumes and speeds should allow cyclists to travel concurrently with motorists.

- Local Streets are primarily intended to provide access to abutting land uses. Local streets offer the lowest level of mobility and consequently tend to be short, low-speed facilities. As such, local streets should primarily serve passenger cars, pedestrians, and bicyclists; heavy truck traffic should be discouraged. On-street parking is common and sidewalks are typically present.

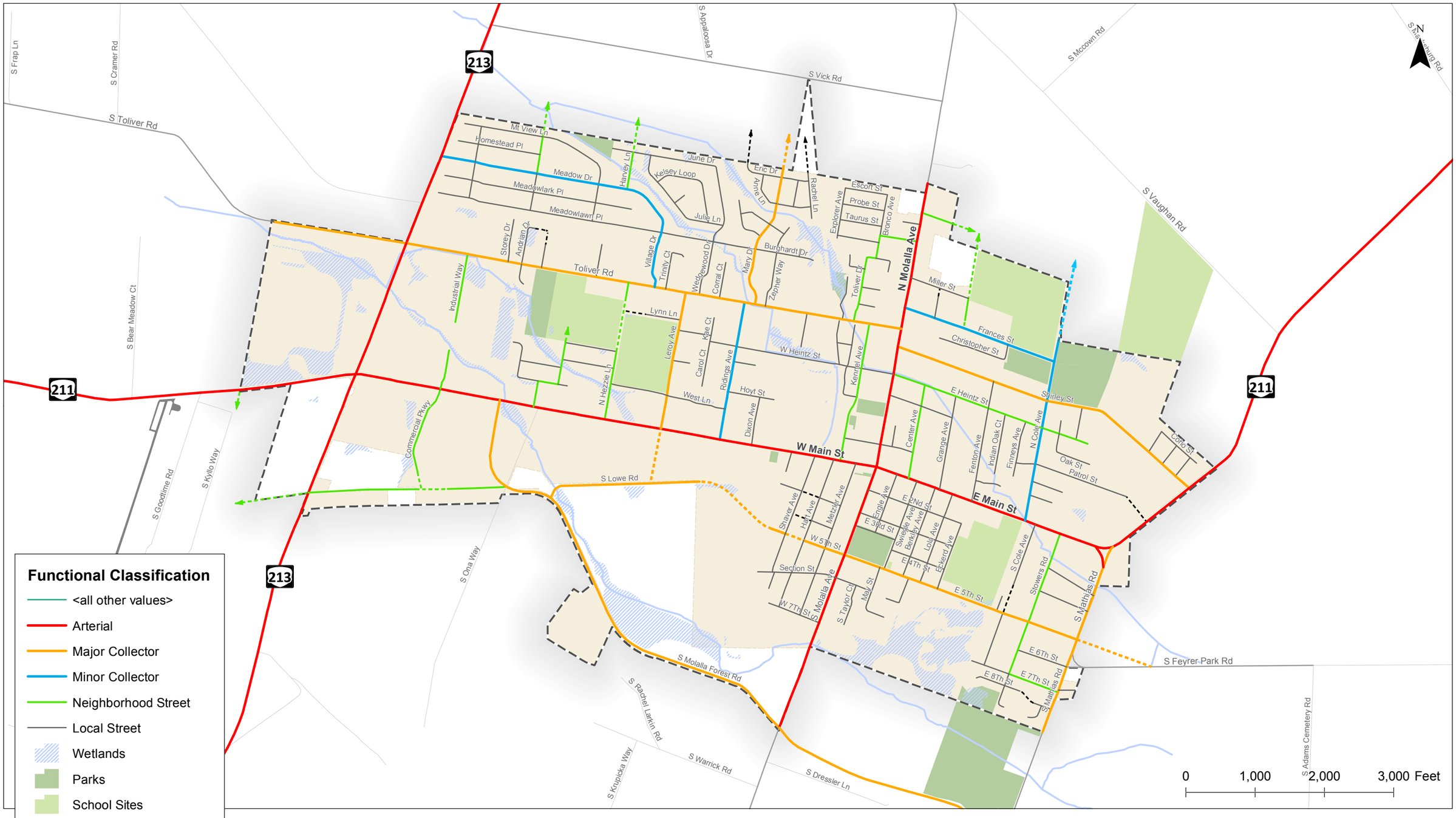
Figure 8 illustrates functional classification plan for all existing streets and future arterial and collector streets within the UGB. The alignments for future streets should be considered conceptual: the end points of the streets are fixed, but the alignments between intersections may vary depending on design requirements at the time the streets are constructed. Street stub connections to the UGB are indicated by arrows. Table 13 summarizes the streets by functional classification.

Table 13: Functional Classification Plan

Arterials	Collectors		Neighborhood Streets	Local Streets
	Major Collectors	Minor Collectors		
Molalla Avenue OR 213 OR 211	5th Street Leroy Avenue Lowe Road Mathias Road Molalla Forest Road Shirley Street Toliver Road	Cole Avenue Frances Street Meadow Drive Ridings Avenue	E 7th Street Affolter Avenue Bronco Avenue Cascade Lane Center Avenue Commercial Parkway Church Street Harvey Lane Heintz Street Hezzie Lane Industrial Way Kennel Avenue Lowe Road Stowers Road Toliver Drive Thunderbird Street	All remaining streets

ROADWAY CROSS SECTION STANDARDS

Roadway cross section standards were developed for the Molalla TSP update based on the characteristics of the existing roadways within the city. The design of a roadway can (and will) vary from street to street and segment to segment due to adjacent land uses and demand. The roadway cross sections are intended 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 14 outlines the roadway cross section standards for city streets. Exhibits 2 through 7 illustrate the cross-section standards for each functional classification.



Functional Classification

- <all other values>
- Arterial
- Major Collector
- Minor Collector
- Neighborhood Street
- Local Street
- Wetlands
- Parks
- School Sites
- Molalla City Limits
- Urban Growth Boundary

Functional Classification Plan
Molalla, Oregon

Figure **8**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, City of Molalla

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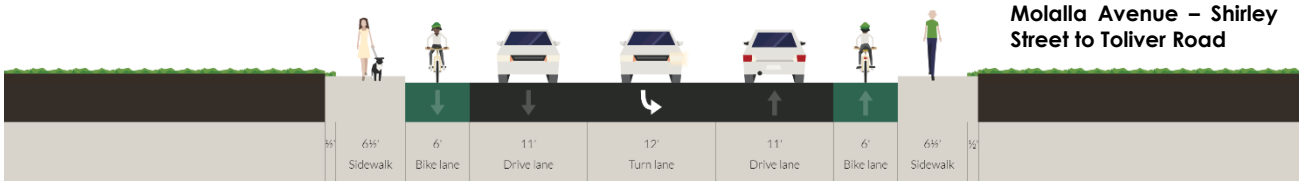
Unless prohibited by significant topographic or environmental constraint, newly constructed streets shall meet the maximum standards indicated in the cross sections. When widening an existing street, the City may use lesser standards than the maximum to accommodate physical and existing development constraints where determined to be appropriate by the Public Works Director. In some locations "green streets" (those that utilize vegetation or pervious material to manage drainage) may be appropriate due to design limitations or adjacent land use. Green street elements (as described in the notes for the cross section exhibits) may be used where appropriate and as determined by the Public Works Director.

Table 14: City of Molalla Roadway Cross Section Standards

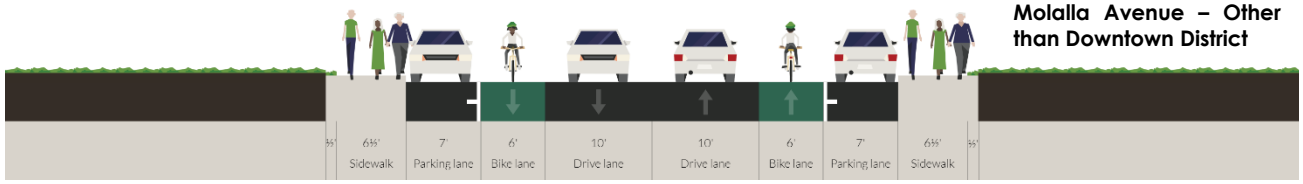
Street Element	Characteristic	Width/Options
Right-of-way	Arterial	60-68 feet
	Arterial (Downtown District)	60 feet
	Major Collector	60 feet
	Major Collector (Molalla Forest Road)	60 feet
	Minor Collector/Neighborhood Route	50 feet
	Local Street	50 feet
Vehicle Lane Widths (Typical widths)	Arterial	10-12 feet
	Arterial (Downtown District)	12 feet
	Major Collector	10-11 feet
	Major Collector (Molalla Forest Road)	12 feet
	Minor Collector/Neighborhood Route	11 feet
	Local Street	10 feet
On-Street Parking	Arterial	7 feet where applicable
	Arterial (Downtown District)	8 feet
	Major Collector	7 feet where applicable
	Major Collector (Molalla Forest Road)	None
	Minor Collector/Neighborhood Route	7 feet
	Local Street	8 feet
Bike Lanes	Arterial	6 feet; 5 feet with 2 feet Buffers on OR 213 and OR 211
	Arterial (Downtown District)	Shared
	Major Collector	6 feet
	Major Collector (Molalla Forest Road)	12 feet shared path
	Minor Collector/Neighborhood Route	Shared
	Local Street	Shared
Sidewalks	Arterial	6 feet, 8-10 feet in commercial areas
	Arterial (Downtown District)	10-12 feet
	Major Collector	6 feet
	Major Collector (Molalla Forest Road)	12 feet shared path
	Minor Collector/Neighborhood Route	6 feet
	Local Street	6 feet

Street Element	Characteristic	Width/Options
Landscape Strips	Arterial	Optional 5-6 feet where applicable
	Arterial (Downtown District)	5-6 feet
	Major Collector	None
	Major Collector (Molalla Forest Road)	12 ½ feet
	Minor Collector/Neighborhood Route	None
	Local Street	None
Median/Turn Lane	Arterial	12-14 feet
	Arterial (Downtown District)	12-14 feet
	Major Collector	12 feet
	Major Collector (Molalla Forest Road)	14 feet
	Minor Collector/Neighborhood Route	12-feet
	Local Street	None
Neighborhood Traffic Management (NTM)	Arterial	Not Appropriate
	Arterial (Downtown District)	Not Appropriate
	Major Collector	Not Appropriate
	Major Collector (Molalla Forest Road)	Not Appropriate
	Minor Collector/Neighborhood Route	At the discretion of the Public Works Director
	Local Street	At the discretion of the Public Works Director
Transit/Freight	Arterial	Appropriate
	Arterial (Downtown District)	Appropriate
	Major Collector	Local service only
	Major Collector (Molalla Forest Road)	Appropriate
	Minor Collector/Neighborhood Route	Local service only
	Local Street	Local service only

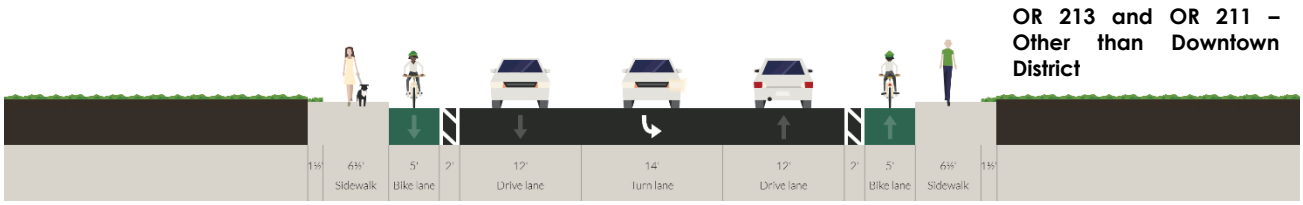
Exhibit 2: Arterial Cross Sections



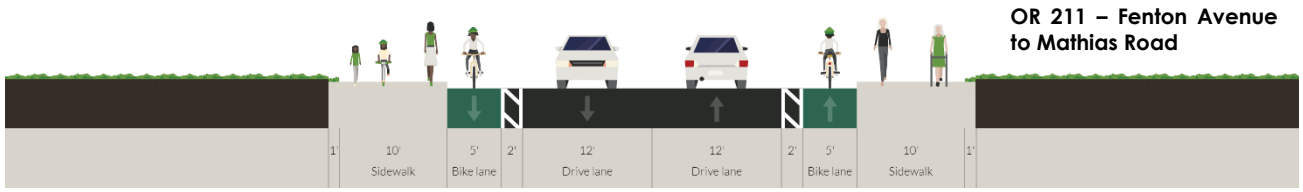
Arterial with Center Turn Lane (60-foot ROW, 46-foot Paved Width)



Arterial with On-Street Parking (60-foot ROW, 46-foot Paved Width)



Arterial with Buffered Bike Lanes and Center Turn Lane (68-foot ROW, 52-foot Paved Width)



Arterial with Buffered Bike Lanes (60-foot ROW, 38-foot Paved Width)

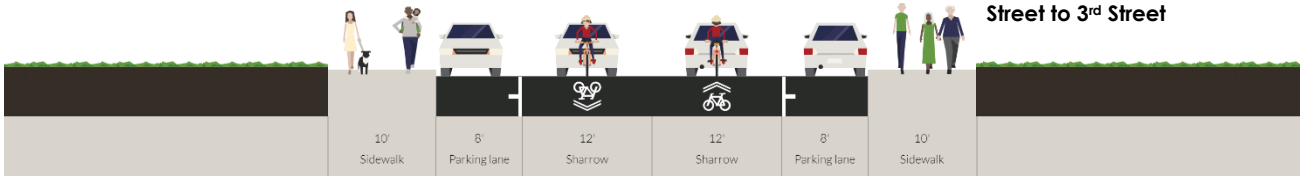
Table 15: Arterial Cross Section Standards

Standards	Arterial
Vehicle Lanes	10-12 feet[2]
On-Street Parking	7 feet
Bike Lanes	6 feet; 5 feet with 2 feet Buffers on OR 213 and OR 211
Sidewalks	6 feet, 8-10 feet in commercial areas
Landscape Strips	Optional 5-6 feet[1]
Median/Center Turn Lane	12-14 feet[2]
Neighborhood Traffic Management	Not Appropriate

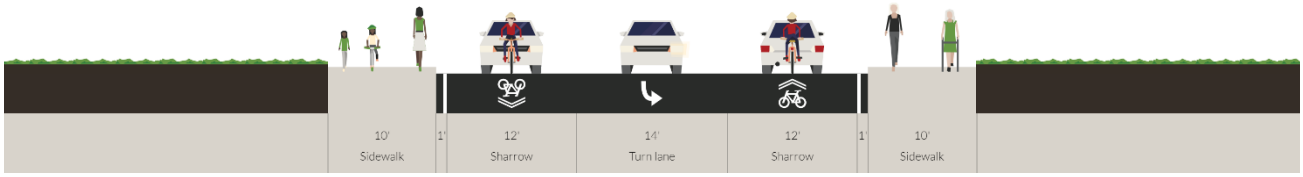
Note: The Public Works Director may require green street variations of each cross section. These variations may include installing rain gardens or swales, using pervious material for the sidewalks, and in some cases providing a sidewalk on only one side of the street.
1. Developer may provide landscape strips w/ dedication of additional right-of-way and maintenance agreement by developer.
2. On ODOT facilities, the minimum lane width is 12 feet and the minimum median/center turn lane width is 14 feet.
3. The 12-18" space reserved for utility easement along ODOT facilities can be paved or landscaped based on adjacent use.

Exhibit 3: Arterial (Downtown District) Cross Sections

OR 211 – Shaver Avenue to Fenton Avenue
Molalla Avenue – Heintz Street to 3rd Street



Arterial with On-Street Parking (60-foot ROW, 40-foot Paved Width)



Arterial with Center Turn Lane – Intersection Treatment (60-foot ROW, 40-foot Paved Width)

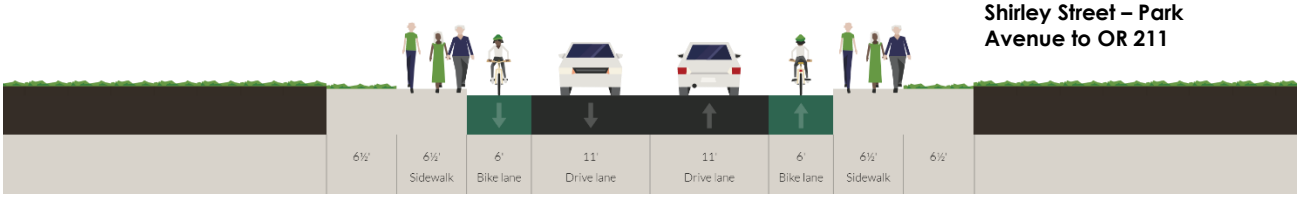
Table 16: Arterial (Downtown District) Cross Section Standards

Standards	Arterial
Vehicle Lanes	12 feet
On-Street Parking	8 feet[1]
Bike Lanes	Shared
Sidewalks	10-12 feet
Landscape Strips	5-6 feet[2]
Median/Center Turn Lane	12-14 feet
Neighborhood Traffic Management	Not Appropriate

Note: The Public Works Director may require green street variations of each cross section. These variations may include installing rain gardens or swales, using pervious material for the sidewalks, and in some cases providing a sidewalk on only one side of the street.
1. On-street parking may be reduced or removed at the discretion of the Public Work Director.
2. Landscape strips will be located within the 10-12 foot sidewalks and consist of street furniture and tree wells.

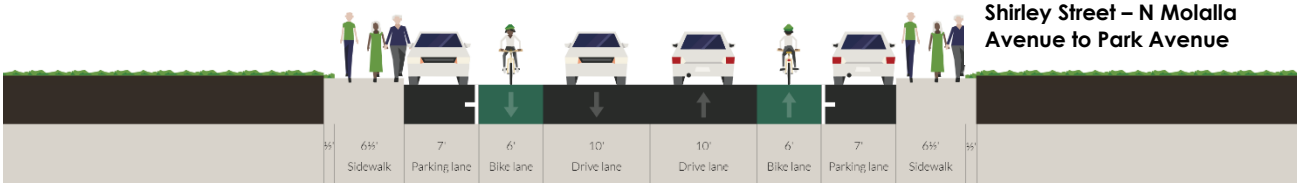
Exhibit 4: Major Collector Cross Section

Toliver Road – OR 213 to N Molalla Avenue
Shirley Street – Park Avenue to OR 211

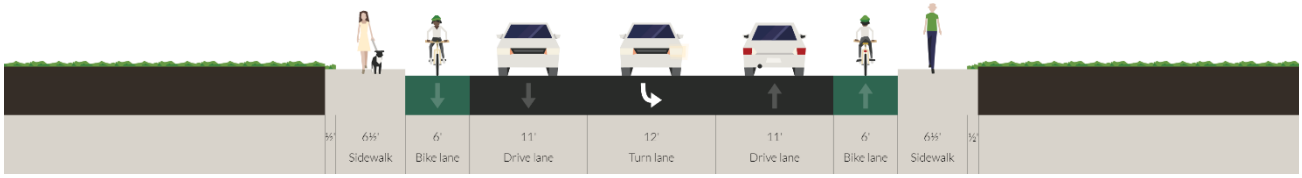


Major Collector (60-foot ROW, 34-foot Paved Width)

Shirley Street – N Molalla Avenue to Park Avenue



Major Collector with On-Street Parking (60-foot ROW, 46-foot Paved Width)



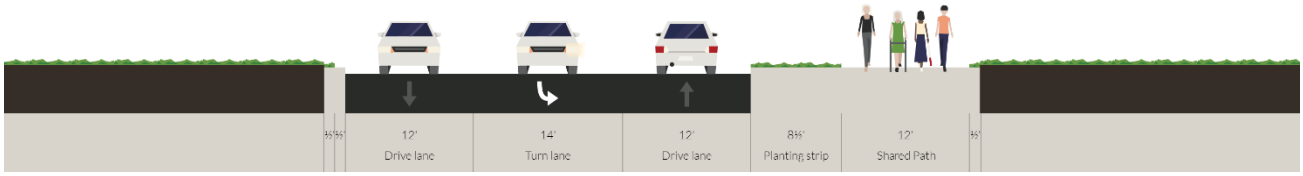
Major Collector – Intersection Treatment (60-foot ROW, 46-foot Paved Width)

Table 17: Major Collector Cross Section Standards

Standards	Arterial
Vehicle Lanes	10-11 feet
On-Street Parking	7 feet
Bike Lanes	6 feet
Sidewalks	6 feet
Landscape Strips	None
Median/Center Turn Lane	12 feet
Neighborhood Traffic Management	Not Appropriate

Note: The Public Works Director may require green street variations of each cross section. These variations may include installing rain gardens or swales, using pervious material for the sidewalks, and in some cases providing a sidewalk on only one side of the street.

Exhibit 5: Major Collector (Molalla Forest Road) Cross Section

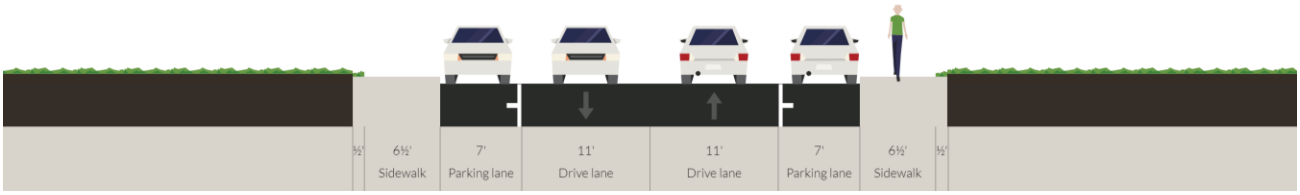


Major Collector with Shared-use Path (60-foot ROW, 34-foot Paved Width)

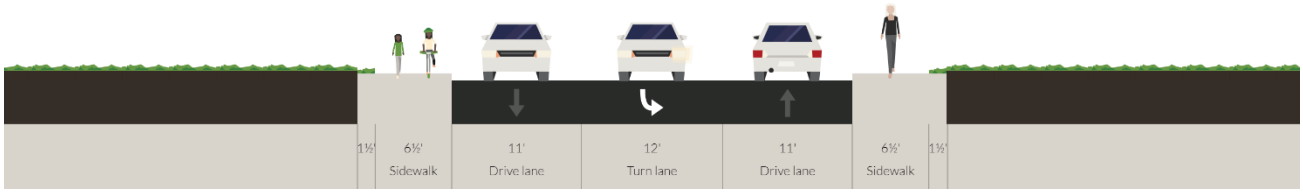
Table 18: Major Collector (Molalla Forest Road) Cross Section Standards

Standards	Arterial
Vehicle Lanes	11 feet
On-Street Parking	None
Bike Lanes	None
Sidewalks	12 feet shared path
Landscape Strips	12 ½ feet
Median/Center Turn Lane	12 feet
Neighborhood Traffic Management	Not Appropriate

Exhibit 6: Minor Collector/Neighborhood Route Cross Section



Minor Collector/Neighborhood Route (50-foot ROW, 36-foot Paved Width)



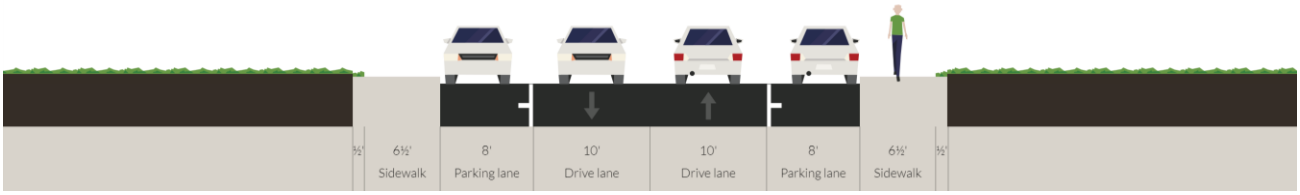
Minor Collector/Neighborhood Route with Center Turn Lane – Intersection Treatment (50-foot ROW, 34-foot Paved Width)

Table 19: Minor Collector/Neighborhood Route Cross Section Standards

Standards	Arterial
Vehicle Lanes	11 feet
On-Street Parking	7 feet
Bike Lanes	Shared
Sidewalks	6 feet
Landscape Strips	None
Median/Center Turn Lane	12 feet
Neighborhood Traffic Management	At discretion of the Public Works Director

Note: The Public Works Director may require green street variations of each cross section. These variations may include installing rain gardens or swales, using pervious material for the sidewalks, and in some cases providing a sidewalk on only one side of the street.

Exhibit 7: Local Street Cross Section



Local Street (50-foot ROW, 34-foot Paved Width)

Table 20: Local Street Cross Section Standards

Standards	Arterial
Vehicle Lanes	10 feet
On-Street Parking	8 feet
Bike Lanes	Shared
Sidewalks	6 feet
Landscape Strips	None
Median/Center Turn Lane	None
Neighborhood Traffic Management	At discretion of the Public Works Director

Note: The Public Works Director may require green street variations of each cross section. These variations may include installing rain gardens or swales, using pervious material for the sidewalks, and in some cases providing a sidewalk on only one side of the street.

STREET SYSTEM CONNECTIVITY

The future street system needs to balance the benefits of providing a well-connected grid system with the challenges associated with existing development patterns and environmental issues precluding street system connections. Incremental improvements to the street system can be planned carefully to provide route choices for pedestrians, bicyclists, and motorists while accounting for potential neighborhood impacts. In addition, the quality of the transportation system can be improved by making connectivity improvements to the pedestrian and bicycle system separate from street connectivity. Several new arterial and collector street connections are identified in the functional classification plan and the motor vehicle plan as future arterial, collector and neighborhood street connections. These connections should occur as development occurs or as funding becomes available. The following identifies several local street connections that can further support street system connectivity within Molalla.

LOCAL STREET CONNECTIVITY

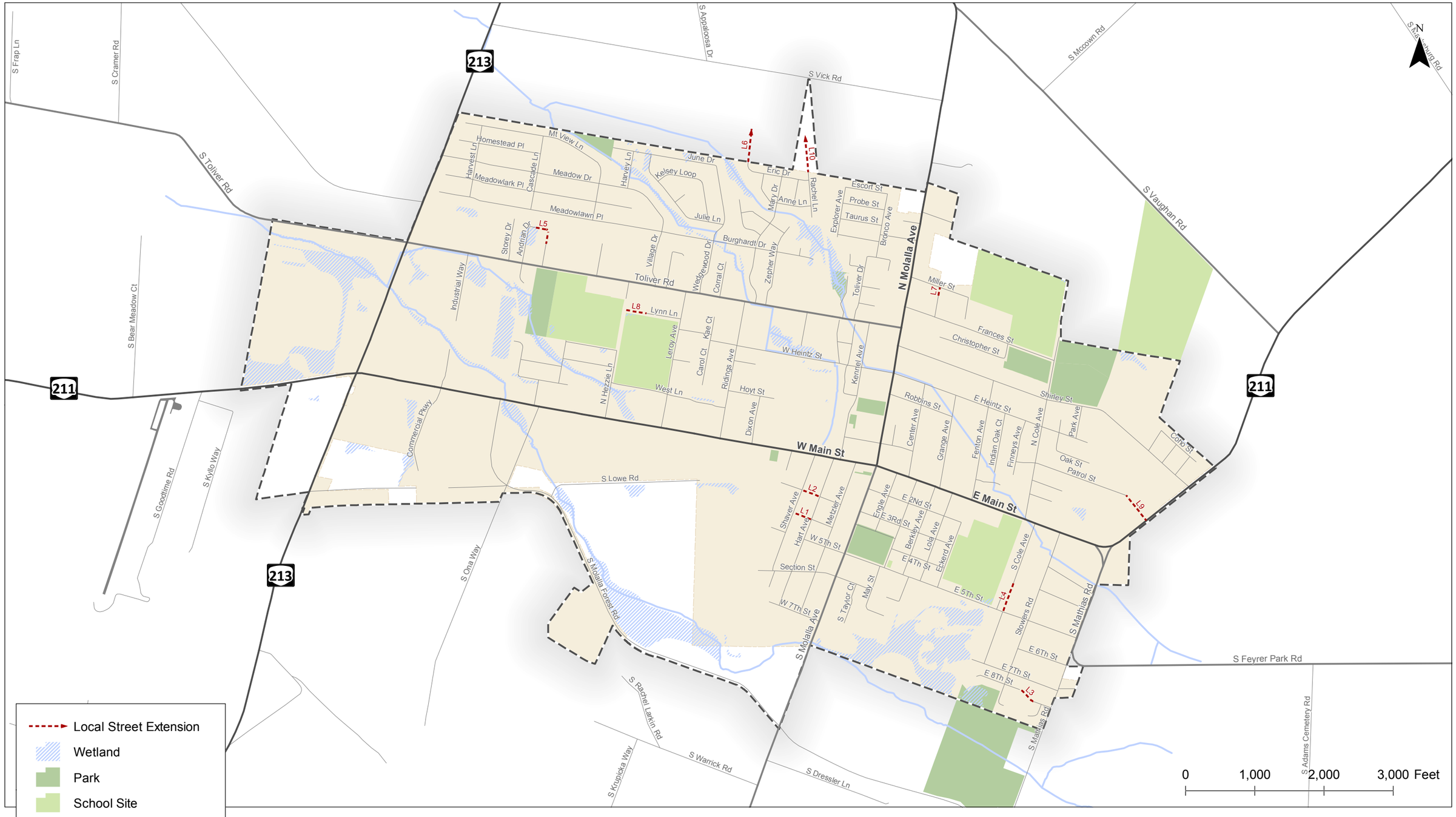
Figure 9 illustrates the location of the local street connections identified for the Molalla TSP update. Table 21 summarizes the connections and identifies their priority based on the project evaluation criteria. Costs are not provided for these projects as they are anticipated to be constructed by future development. Any local street connectivity projects that are desired to be city-initiated projects should be identified as a high priority and included in the cost-constrained plan.

Table 21: Local Street Connectivity

Project Number	Location	Description	Priority
L1	3rd Street	Extend 3rd Street from Metzler Street to Hart Avenue	Low
L2	4th Street	Extend 4th Street from Metzler Street to Hart Avenue	Low
L3	8th Street	Connect 8th Street to 8th Street	Low
L4	Cole Avenue	Extend Cole Avenue from roadway terminus to E 5th Street	Low
L5	Andrian Drive	Extend Andrian Drive east and south to Stewart Drive	Low
L6	Eric Drive	Extend Eric Drive from roadway terminus to north	Low
L7	Faurie Street	Extend Faurie Street from roadway terminus to Miller Street	Low
L8	Lynn Lane	Exten Lynn Lane from roadway terminus to Hezzie Lane	Low
L9	Patrol Street	Extend Patrol Street from roadway terminus to OR 211	Low
L10	Rachel Lane	Extend Rachel Lane from roadway terminus to north	Low

MOTOR VEHICLE FACILITIES

Streets serve a majority of all trips within Molalla across all travel modes. In addition to motorists, pedestrians, bicyclists, and public transit riders use streets to access areas locally and regionally. This section summarizes the motor vehicle facilities that were evaluated throughout the planning process to address existing deficiencies in the motor vehicle system and future needs.



Local Street Connectivity
Molalla, Oregon

Figure
9

KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, City of Molalla

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TURN LANES

Separate left- and right-turn lanes, as well as two-way left-turn lanes (TWLTL) can provide separation between slowed or stopped vehicles waiting to turn left and through vehicles. The design of turn lanes is largely determined based on a traffic study that identifies the need for the turn lane and the storage length needed to accommodate vehicle queues. Turn lanes are commonly used at intersections where the turning volumes warrant the need for separation.

TRAFFIC SIGNALS

Traffic signals allow opposing streams of traffic to proceed in an alternating pattern. National and state guidance indicates when it is appropriate to install traffic signals at intersections. Intersections along state facilities, such as OR 213 and OR 211 require approval from the State or Regional Traffic Engineer. When used, traffic signals can effectively manage high traffic volumes and provide dedicated times in which pedestrians and cyclists can cross roadways. Because they continuously draw from a power source and must be periodically re-timed, signals typically have higher maintenance costs than other types of intersection control. Signals can improve safety at intersections where signal warrants are met, however, they may result in an increase in rear-end crashes compared to other solutions. Signals have a significant range in costs depending on the number of approaches, how many through and turn lanes each approach has, and, if it is located in an urban or rural area. The cost of a new traffic signal ranges from approximately $250,000 in rural areas to $350,000 in urban areas and up to $750,000 on state owned facilities.

ROUNDABOUTS

Roundabouts are circular intersections where entering vehicles yield to vehicles already in the circle. They are designed to slow vehicle speeds to 20 to 30 mph or less before they enter the intersection, which promotes a more comfortable environment for pedestrians, bicyclists, and other non-motorized users. Roundabouts have fewer conflict-points and have been shown to reduce the severity of crashes, as compared to signalized intersections. Roundabouts can be more costly to design and install than other intersection control types, but they have a lower operating and maintenance cost than traffic signals. Topography must be carefully evaluated in considering a roundabout, given that slope characteristics at an intersection may render a roundabout infeasible. The cost of a new roundabouts ranges from approximately $1 million to $2 million depending upon the number of lanes and the slope conditions.

MOTOR VEHICLE PLAN

Table 22 identifies the motor vehicle plan projects for the Molalla TSP update. These projects are intended to address existing and projected future transportation system needs for motor vehicles as well as all other modes of transportation that depend on the roadway system for travel, such as pedestrians, bicyclists, transit users, and freight. As shown, the projects are separated into projects on arterial, collector, and neighborhood streets and projects at intersections and in other locations throughout the city. The priorities shown in Table 22 are based on the project evaluation criteria and reflect input from the project team and the general public. The cost estimates are based on average unit costs for roadway improvements.

The cost estimates include the cost of right-of-way and the cost of filling in the ditches as appropriate. Figure 10 illustrates the location of the motor vehicle plan projects.

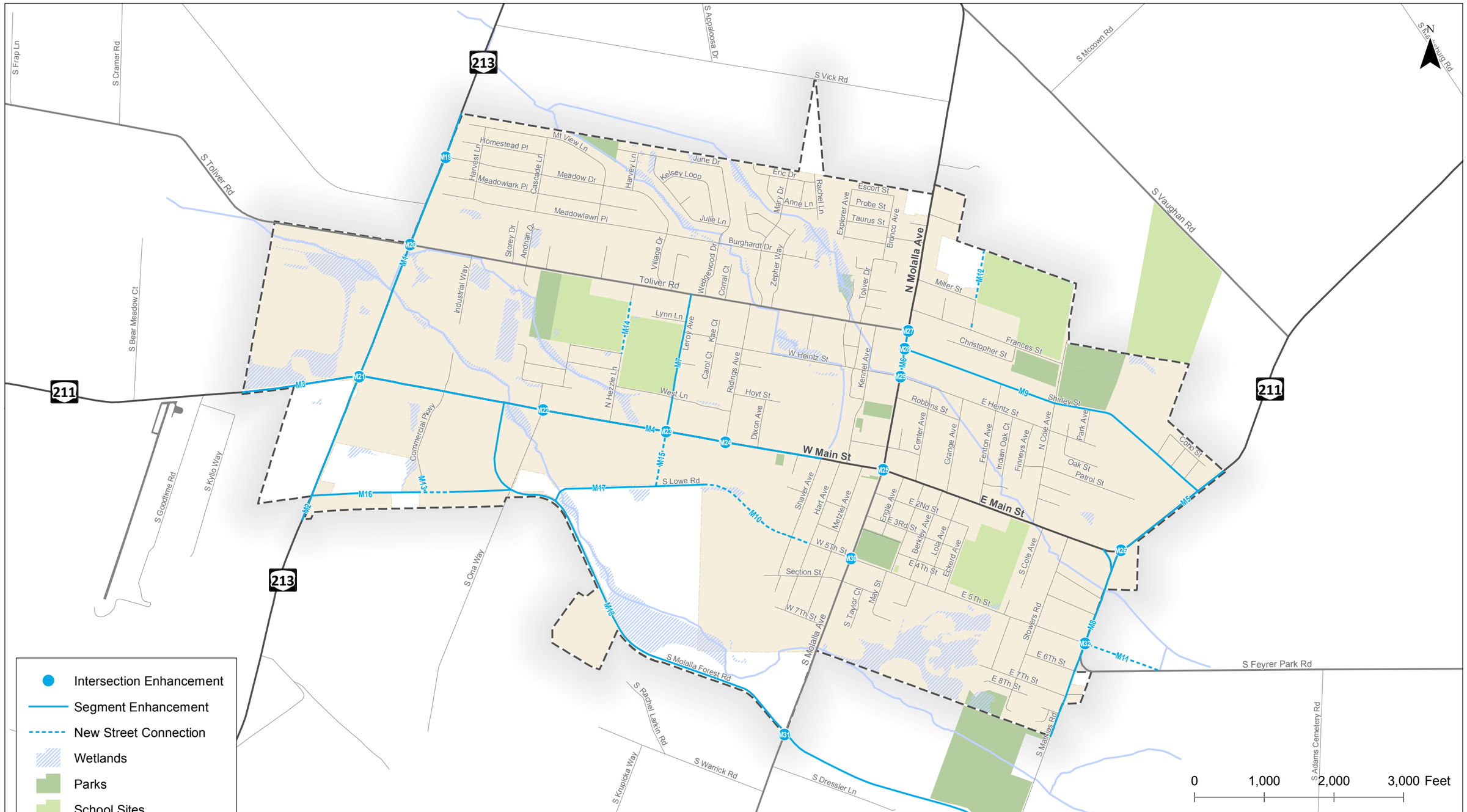
Table 22: Motor Vehicle Plan Projects

Project Number	Location	Description	Priority	Cost Estimate
M1	OR 213[1]	Widen OR 213 from the north city limits to OR 211 to provide a continuous 3-lane cross section	Medium	$8,825,000
M2	OR 213[1]	Widen OR 213 from OR 211 to the south city limits to provide a continuous 3-lane cross section	Low	$4,335,000
M3	OR 211[1]	Widen OR 211 from the west city limits to OR 213 to provide a continuous 3-lane cross section	Low	$1,365,000
M4	OR 211[1]	Widen OR 211 from OR 213 to Shaver Avenue to provide a continuous 3-lane cross section	Medium	$14,505,000
M5	OR 211[1]	Widen OR 211 from Matias Road to the east city limits to provide a continuous 3-lane cross section	Medium	$2,580,000
M6	N Molalla Avenue	Widen N Molalla Avenue from Toliver Road to Shirley Street to provide a continuous 3-lane cross section	Low	$175,000
M7	Leroy Avenue	Widen Leroy Avenue from Toliver Road to OR 211 to provide a continuous 2-lane cross section per City standards	Low	$580,000
M8	Mathias Road	Widen Mathias Road from OR 211 to the south city limits to provide a continuous 3-lane cross section	Low	$1,065,000
M9	Shirley Street	Widen Shirley Street from N Molalla Avenue OR 211 to provide a continuous 2-lane cross section per City standards	Low	$1,345,000
M10	W 5th Street	Construct W 5th Street from Lowe Road terminus to Hart Avenue	High	$2,845,000
M11	E 5th Street	Construct E 5th Street from Mathias Road to Feyrer Park Road	Low	$1,675,000
M12	Affolter Avenue	Construct Affolter Avenue from southern terminus to Frances Street and from Miller Street to north city limits	Low	$1,130,000
M13	Commercial Way	Construct Commercial Way from the roadway terminus to Lowe Road (west)	Low	$365,000
M14	Hezzie Lane	Construct Hezzie Lane from the southern roadway terminus to the northern roadway terminus	Low	$1,180,000
M15	Leroy Avenue	Construct Leroy Avenue from OR 211 to Lowe Road (east)	Low	$1,170,000
M16	Lowe Road (west)	Reconstruct and widen Lowe Road from OR 213 to Molalla Forest Road to City standards	Low	$4,170,000
M17	Lowe Road (east)	Reconstruct and widen Lowe Road from Molalla Forest Road to roadway terminus	Low	$3,265,000

M18	Molalla Forest Road	Reconstruct and widen Molalla Forest Road as a concrete street from OR 211 to Mathias Road to provide a continuous 3-lane cross section	Low	$10,740,000
Intersections				
M19	OR 213/ Meadow Road[1]	Reconfigure the intersection to provide a center two-way left-turn lane along OR 213 – coordinate with Project M[1]	Medium	$0
M20-1	OR 213/ Toliver Road[1]	Widen OR 213 to provide a separate left-turn lane at the northbound and southbound approaches and install a traffic signal with protected or protected-permitted phasing when warranted – Coordinate with Project M1, the signal should be designed to accommodate potential for separate left-turn lanes along Toliver Road[2]	High	$1,000,000
M20-2	OR 213/ Toliver Road[1]	Widen Toliver Road to provide separate left-turn lanes at the eastbound and westbound approaches and modify the traffic signal to provide permitted phasing[2]	Low	$850,000
M21	OR 213/ OR 211[1]	Install a separate right-turn lane at the southbound approach if/when adjacent property redevelops[2]	Low	$150,000
M22	OR 211/Ona Way[1]	Widen OR 211 to provide a westbound left-turn lane and install a traffic signal when warranted – Coordinate with Project M4[2]	Low	$1,000,000
M23	OR 211/ Leroy Avenue[1]	Widen OR 211 to provide an eastbound left-turn lane and install a traffic signal when warranted – Coordinate with Project M4[2]	Low	$1,000,000
M24	OR 211/ Ridings Avenue[1]	Widen OR 211 to provide an eastbound left-turn lane – Coordinate with Project M4	Low	$0[3]
M25	OR 211/ Molalla Avenue[1]	Install separate left-turn lanes at the eastbound and westbound approaches and a traffic signal with protected or protected-permitted phasing when warranted[2]	High	$750,000
M26	OR 211/ Mathias Road[1]	Install a roundabout when warranted[2]	Low	$2,500,000
M27	N Molalla Avenue/ Toliver Road	Widen N Molalla Avenue to provide a center two-way left-turn lane along N Molalla Avenue and install an eastbound right-turn lane when warranted – coordinate with Project M5	Low	$150,000
M28	N Molalla Avenue/ Shirley Street	Widen N Molalla Avenue to provide a center two-way left-turn lane along N Molalla Avenue and install a westbound right-turn lane when warranted – coordinate with Project M5	Low	$150,000
M29	N Molalla Avenue/ Heintz Street	Widen N Molalla Avenue to provide a center two-way left-turn lane along N Molalla Avenue and reconfigure the intersection as an all-way stop	High	$40,000

M30	S Molalla Avenue/ E 5th Street	Widen S Molalla Avenue to provide a center two-way left-turn lane along S Molalla Avenue and reconfigure the intersection as an all-way stop	High	$40,000
M31	S Molalla Avenue/ Molalla Forest Road	Install a roundabout when warranted	Low	$2,500,000
M32	Feyrer Park Road/ Mathias Road	Install a roundabout when warranted	Low	$2,500,000
			TOTAL High Priority Costs	**$4,675,000**
			TOTAL Medium Priority Costs	**$25,910,000**
			TOTAL Low Priority Costs	**$43,360,000**
			TOTAL Program Costs (22 years)	**$73,945,000**

1. Project will require coordination with ODOT and approval from the State or Regional Traffic Engineer.
2. Future evaluation may be required to determine the appropriate form of traffic control at this location.
3. Project cost included in Motor Vehicle Plan.



Motor Vehicle Projects
Molalla, Oregon

Figure
10

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KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, City of Molalla

TRAFFIC SAFETY PLAN

Traffic safety has a significant impact on how people use the transportation system within Molalla, particularly in areas where real or perceived safety risks may prevent people from using more active travel modes, such as walking, biking, and taking transit. The traffic safety solutions identified in TSP update process are largely focused on hotspot issues that occur along roadways and at intersections throughout the City. While projects that address systemic issues have not been identified for the TSP update, ODOT's All Roads Transportation Safety (ARTS) program has developed guidance on how to address various systemic issues, including roadway departures, intersection crashes, and pedestrian and bicycle-related crashes (See https://www.oregon.gov/ODOT/Engineering/Pages/ARTS.aspx). Table 23 identifies the traffic safety projects for the TSP update. Additional safety projects and improvements are identified as part of the pedestrian, bicycle, transit, and motor vehicle plans later in this memo. Figure 11 illustrates the traffic safety plan projects.

Table 23: Traffic Safety Plan Projects

Project Number	Location	Description	Priority	Cost Estimate
S1	OR 213[1]	Widen OR 213 from north city limits to OR 211 to include a center turn-lane, bike lanes, and sidewalks – Coordinate with Project M1	Medium	0[3]
S2	OR 211[1]	Widen OR 211 from OR 213 to Shaver Avenue to include a center turn-lane, bike lanes, and sidewalks – Coordinate with Project M4	Medium	0[3]
S3	OR 213/ Toliver Road[1]	Widen OR 213 to provide separate left-turn lanes at the north and southbound approaches and install a traffic signal with protected or protected-permitted phasing at the northbound and southbound approaches when warranted – Coordinate with Project M20[2]	High	0[3]
S4	OR 213/ OR 211[1]	Install flashing beacons on the advanced warning signs at all approaches and improve the signal hardware (i.e. lenses, reflective back plates, size, and number) to improve the visibility of the signal heads	High	$25,000
S5	OR 211/ Molalla Avenue[1]	Install separate left-turn lanes at the eastbound and westbound approaches and a traffic signal with protected or protected-permitted phasing when warranted – Coordinate with Project M25[2]	High	0[3]
S6	OR 211/ Leroy Avenue[1]	Widen OR 211 to provide a separate left-turn lane at the eastbound approach and install a traffic signal with protected or protected-permitted phasing at the eastbound approach when warranted – Coordinate with Project M23[2]	Low	0[3]
S7	OR 211/ Mathias Road[1]	Install a single lane roundabout[2]	Low	$0[3]
S8	City-wide[1]	Evaluate bicycle and pedestrian safety along OR 213, OR 211, Toliver Road, Molalla Avenue, and other key corridors to identify appropriate counter measures	Low	$50,000
		TOTAL High Priority Costs		**$25,000**
		TOTAL Low Priority Costs		**$50,000**
		TOTAL Program Costs (22 years)		**$75,000**

1. Project will require coordination with ODOT and approval from the State or Regional Traffic Engineer.
2. Future evaluation may be required to determine the appropriate form of traffic control at this location.
3. Project cost included in Motor Vehicle Plan.

Traffic Safety Plan Projects

- Intersection Enhancement
- Segment Enhancement
- Wetland
- Park
- School Site
- Molalla City Limits
- Urban Growth Boundary

Traffic Safety Plan Projects
Molalla, Oregon

Figure **11**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, City of Molalla

KITTELSON & ASSOCIATES

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CHAPTER 8: OTHER TRAVEL MODES

OTHER TRAVEL MODES

This chapter summarizes the plans for other travel modes in Molalla such as rail, air, water, freight and pipeline.

RAIL TRANSPORTATION

There are currently no rail lines within Molalla. Oregon Pacific Railroad (formerly Molalla Western Railroad) removed the rail lines because they were not serving any customers and the railroad wanted to eliminate the cost of maintaining the rail lines and rail crossings. Per the previous TSP, the railroad would be willing to replace the tracks and crossings if a customer were found in the area.

Freight Rail

There are currently no freight rail terminals within Molalla. The closest freight rail terminal is located in Oregon City.

Passenger Rail

There are currently no passenger rail terminals within Molalla. The closest passenger rail terminal is located in Oregon City and is served by Amtrak. Amtrak provides service between Oregon City (ORC) and downtown Portland (PDX) Monday through Friday at 7:24 a.m., 11:15 a.m., and 5:54 p.m. and between PDX and ORC at 6:00 a.m., 6:05 p.m., and 9:30 p.m. Travel times vary from 21 to 41 minutes depending on time of day and direction. From the ORC stop, the Amtrak Cascades rail line also provides passenger service north to Vancouver, British Columbia and south to Eugene.

PLAN

While there are no rail transportation projects included in the Molalla TSP update, the City will continue to support and promote improvements to the local and regional transportation system to ensure adequate access for Molalla residents to freight and passenger rail services. Molalla advocates for good connections and service for Amtrak and other passenger rail in the region.

AIR TRANSPORTATION

There are no airports located within the City of Molalla; however, a general aviation airport is located approximately five miles to the north along OR 213 in Mulino, OR. The Mulino Airport is owned by the Oregon Department of Aviation and is open to the general public. The airport has one paved 3,425 x 100-foot runway and services an average of 58 aircraft operations (takeoffs or landings) per day. A fixed-base operator is located at the airport to provide services for general aviation aircraft. Approximately 59 aircrafts are based at the airport.

A second airport is located approximately half a mile west of the OR 213/OR 211 intersection, outside the Molalla UGB. The Skydive Oregon Airport is owned and operated by Skydive Oregon, a parachute jumping operation. The airport has one paved 2,900 x 32-foot runway and services an average of 50 aircraft operations (takeoffs or landings) per month. Approximately 50 percent of the operations are

skydive-related. Approximately 20 aircrafts are based at the airport. The closest airport with scheduled passenger service is Portland International Airport (PDX), located approximately 35 miles north of Molalla.

PLAN

While there are no air transportation projects included in the Molalla TSP, the City will continue to support and promote improvements to the local and regional transportation system to ensure adequate access for Molalla residents to the Portland International airport and other public and private airports within the area.

WATER TRANSPORTATION

No navigable waterways are located within the City of Molalla; however, the Molalla River runs south to north along the eastern boundary of the city. The Molalla River is not used for transportation, per se; however, it is used for recreational purposes. In addition to several single-family homes with private access to the river, Feyrer Park, located approximately three miles southeast of Molalla, provides public access to the river. Several additional formal and informal accesses are located along OR 211 and the Molalla Forest Road, which travels along the western boundary of the river. These river accesses are used year-round; however, they experience the highest volume of visitors in the summer months.

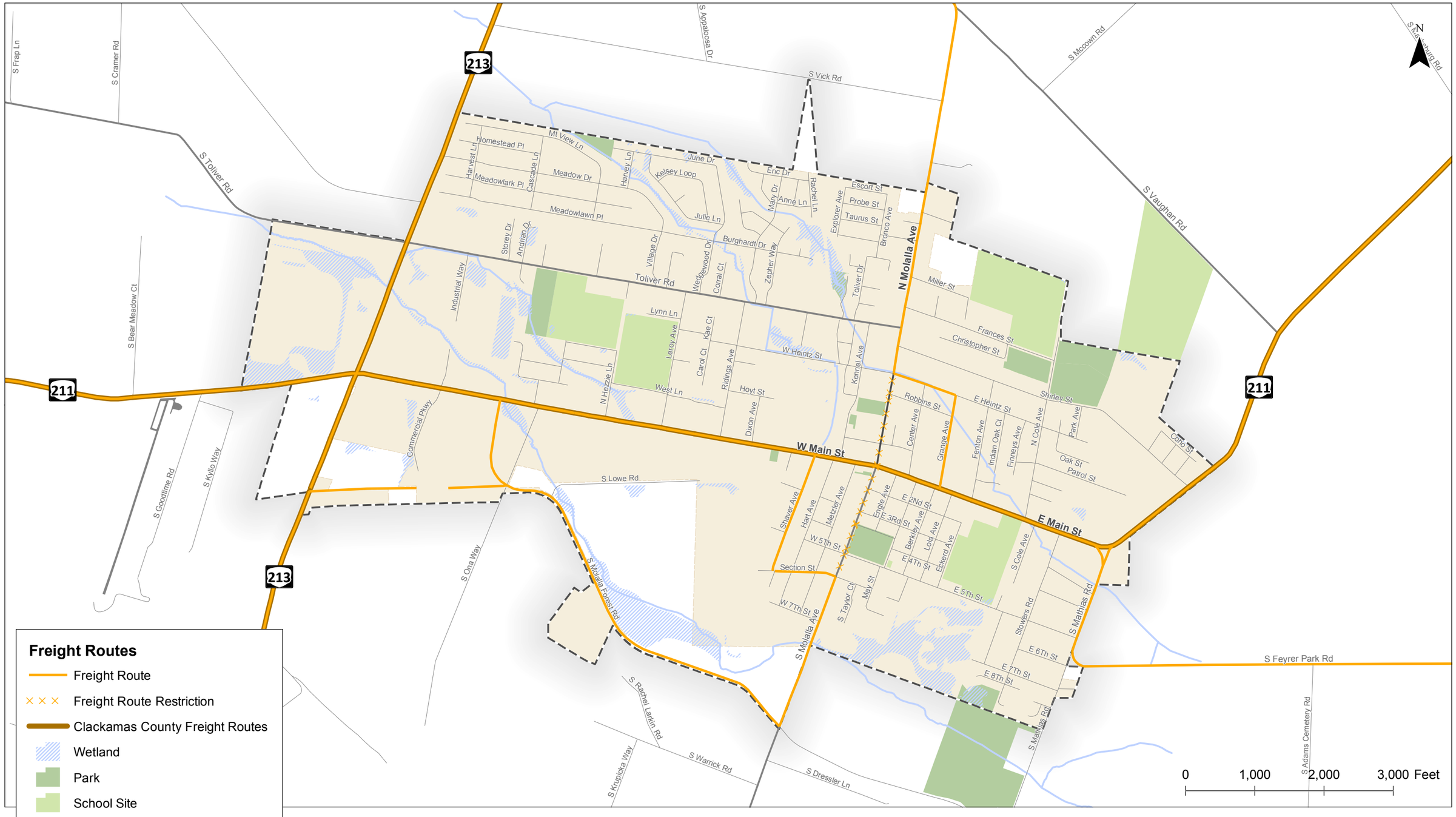
PLAN

While there are no water transportation projects included in the Molalla TSP, the City will continue to support and promote improvements to the local transportation system to ensure adequate access for Molalla residents to the Molalla River for recreational purposes.

FREIGHT TRANSPORTATION

Per the Oregon Highway Plan (OHP), there are no state designated freight routes within Molalla; however, ODOT's Motor Carrier Transportation Division (MCTD) identifies OR 213 and OR 211 as Blue Routes, or routes that are unrestricted to standard freight truck traffic, but are either weight or width restricted for non-divisible and/or heavy haul loads (See https://www.oregon.gov/ODOT/MCT/Pages/MotorCarrierAccount.aspx). The Clackamas County TSP also identifies OR 213 and OR 211 as truck freight routes that support freight traffic throughout the region.

Per input received throughout the planning process, the volume of trucks passing through downtown Molalla, as well as the difficulty some trucks experience turning at the OR 211/Molalla Avenue intersection, is a significant issue for the community. Therefore, the freight plan includes designated freight routes and freight route restriction on streets throughout the City. The designation of freight routes provides for the efficient movement of goods and services while the freight route restrictions maintains neighborhood livability, public safety, and minimizes maintenance costs of the roadway system. Figure 12 illustrates the designated freight routes and freight route restrictions within the City.



Freight Routes

- Freight Route
- Freight Route Restriction
- Clackamas County Freight Routes
- Wetland
- Park
- School Site
- Molalla City Limits
- Urban Growth Boundary

Freight Route
Molalla, Oregon

Figure
12

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KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Metro Data Resource Center, City of Molalla

PLAN

Designated freight routes have been identified to address freight mobility and reliability within the City. Additional TSMO solutions are identified in the TSMO Plan section for truck signal priority and capacity based solutions identified in the Motor Vehicle Plan at several key intersections along OR 213, OR 211, and Molalla Avenue to further address freight mobility and reliability. In addition to these improvements, the City will continue to support and promote improvements to the regional transportation system that improve freight and goods movement. The City will also encourage ODOT to monitor traffic and crash patterns along OR 213 and OR 211 and will encourage measures which reduce non-local freight trips on City streets.

PIPELINE

Power Transmission System

Portland General Electric (PGE) provides electric power to the Portland metropolitan area from eight hydroelectric plants (on the Willamette, Clackamas, Deschutes, and Bull Run Rivers) and six thermal plants (in Oregon, Washington, and Montana) with a total power generation capacity of 2,022 megawatts. Its service area covers 3,170 square miles and 45 percent of Oregon's population. As of December 1998, PGE system reliability is calculated to be 99.98 percent. In Molalla, a PGE transmission line runs south along OR 213 into the Molalla substation – from which distribution lines radiate out into the city – and then to Mount Angel. The substation is located southwest of the city along OR 213.

Natural Gas

Northwest Natural Gas provides natural gas to the City of Molalla. Northwest obtains its natural gas from the Northwest Pipeline via Northwest gate stations and high-pressure transmission lines located outside the City. No gate stations, high-pressure transmission lines, or storage facilities are currently located within Molalla nor are new ones planned for the area. The nearest high-pressure transmission line runs between Oregon City and Salem. Natural gas is transmitted to Molalla from the high-pressure line via smaller mains. There are no natural gas supply restrictions in Molalla because the compressibility of natural gas means that pipeline capacities are highly variable. Molalla residents who live on a street where natural gas distribution line already exists can be easily connected to that distribution line.

Water

Molalla operates its own water system and treatment plant. The water source for the city is the Molalla River. Two reservoirs are located at the treatment plant southeast of the city and one main line carries treated water to the city along Adam Cemetery Road, Freyrer Park Road, and E 5th Street to the athletic fields. The city is preparing to expand the capacity of its entire distribution system from two million gallons per day to four million gallons per day to accommodate increased demand.

PLAN

While there are no pipeline projects included in the Molalla TSP update, the City will continue to support and promote improvements to the regional and local pipeline system to ensure adequate services for Molalla residents.

CHAPTER 9: FUNDING, IMPLEMENTATION, AND MONITORING

FUNDING, IMPLEMENTATION, AND MONITORING

This section documents the City's historical revenue sources and expenditures and identifies the projected transportation funding for implementation of the TSP.

HISTORICAL REVENUE SOURCES

Historical revenue sources that have contributed to transportation funding for Molalla over the last five years includes the state gas tax, Portland General Electric (PGE) franchise fee, surface transportation program (STP), and miscellaneous funds. System Development Charges have also contributed to transportation funding for Molalla, although SDCs primarily fund transportation system improvements related to growth within the city.

Overall transportation funding has increased over the last five years and is projected to continue to increase through FY 2040-41. State gas tax and PGE franchise fees have experienced increases over the five year period; however, the state gas tax revenue is expected to plateau in future years due to the build out of residential units reaching its maximum zoning potential.

HISTORICAL EXPENDITURES

The City organizes historical expenditures into five categories, including personnel services, materials and services, capital improvements, fund transfers, and contingencies. The city's historical expenditures also include capital improvements; however, capital improvements are not accounted for in the projections; the projections are intended to determine the amount of funds available for capital improvements in the future.

Overall transportation expenditures have increased over the last five years and are projected to continue to increase through FY 2040-41. Personnel services and materials and services represent the largest portion of the expenditures along with contingencies, while the remainder of all available funding is spent on sidewalk and street repair, capital improvements, and transfers.

PROJECTED TRANSPORTATION FUNDING AND FUNDING OUTLOOK

Revenue estimates from each of the historical revenue sources were combined and projected out over the next 5, 10 and 22 year period to determine the total revenue that is estimated through 2040. Table 24 summarizes the potential future funding (in year 2018 dollars) through 2040.

Table 24: Future Transportation Funding Projections

Revenue Source	FY 2017-18	5-Year Forecast	10-Year Forecast	Estimated Through 2040
State Gas Tax	$540,000	$2,772,900	$5,545,800	$12,755,340
PGE Franchise Fee	$154,000	$855,202	$1,946,680	$6,412,195
Miscellaneous	$1,000	$5,000	$10,000	$23,000
Plan Review & Permit Fee	$9,000	$45,000	$90,000	$207,000
System Development Charge	$32,000	$160,000	$320,000	$736,000
Total	**$736,000**	**$3,838,102**	**$7,912,480**	**$20,133,535**

Estimated expenditures were also combined and projected out over the next 5, 10, and 23 year period. Table 25 provides a summary of the potential future expenses (in year 2017 dollars) through 2040.

Table 25: Future Transportation Expenditures Projections

Revenue Source	FY 2017-18	5-Year Forecast	10-Year Forecast	Estimated Through 2040
Personnel Service	$307,000	$1,781,187	$4,054,484	$13,355,114
Materials and Services	$435,609	$2,527,365	$5,752,995	$18,949,862
Contingency	$70,523	$430,855	$980,748	$3,230,498
Transfers	$50,000	$250,000	$500,000	$1,150,000
Total	**$863,132**	**$4,989,407**	**$11,288,227**	**$36,685,474**

As shown in Tables 24 and 25, the projected funding from now through FY 2040-41 is approximately $20,133,535, and the projected expenditures are approximately $36,685,474. Based on the information provided in Tables 24 and 25, the City is expected to have deficit of approximately $16,551,939 over the next 23 years. This suggests the City will need to identify other potential revenue sources to fund transportation, including implementation of the TSP projects.

PLANNED SYSTEM COSTS

Table 26 summarizes the costs associated with the planned transportation system. As shown, the full cost of the planned transportation system is approximately $99.1 million over the next 22-year period, including $13.9 million in high priority projects, $36.9 million in medium priority projects, and $48.3 million in low priority projects. Based on the anticipated funds available for capital improvement projects, there will be less than 1 million to fund the projects included in the planned transportation system. This suggests the city will need to identify other potential revenue sources to fund the transportation system, including implementation of the TSP projects over the 22-year period.

Table 26: Planned Transportation System Cost Summary

Project Type	High Priority	Medium Priority	Low Priority	Total
Planned Transportation System				
TSM[1]	$25,000	$25,000	$60,000	**$110,000**
TDM[1]	$50,000	$100,000	$120,000	**$270,000**
Access Management	$0	$0	$0	**$0**
Safety	$25,000	$0	$50,000	**$75,000**
Pedestrian	$7,305,000	$10,020,000	$3,680,000	**$21,005,000**
Bicycle	$1,865,000	$650,000	$1,050,000	**$3,565,000**
Transit	$0	$160,000	$0	**$160,000**
Motor Vehicle	$4,675,000	$25,910,000	$43,360,000	**$73,945,000**
Total	**$13,945,000**	**$36,865,000**	**$48,320,000**	**$99,130,000**

TSM: Transportation System Management
TDM: Transportation Demand Management
1: Includes annual costs occurred every year.

Given the lack of available funding, the City does not have a "financially constrained" or a "reasonably likely" plan. Funding for the projects identified in the TSP as high, medium, and low priority will likely come from a combination of private developers (i.e. street system improvements, frontage improvements, system development charges), the City (i.e. taxes, fees, bonds), and the State (i.e. Statewide Transportation Improvement Program, various other funding programs, grants).[2] A summary of these potential revenue sources is provided below.

POTENTIAL REVENUE SOURCES

This section summarizes potential federal, state, and local funding sources the City could pursue to fund the planned transportation system, including projects identified in the likely to be funded plan.

FEDERAL SOURCES

Fixing America's Surface Transportation (FAST) Act

Fixing America's Surface Transportation (FAST) Act) funds surface transportation programs, including, but not limited to, Federal-aid highways. The FAST Act is the first long-term surface transportation authorization enacted in a decade that provides long-term funding certainty for surface transportation. The FAST Act

[2] Given the funding shortfalls identified in this Plan, none of the projects identified as high, medium, or low priority would be considered "financially constrained" or "reasonably likely" for purposes of compliance with section 0060 of the Oregon Transportation Planning Rule. The high, medium, and low designations will be used to guide the City's efforts to pursue funding for the transportation system. Furthermore, inclusion of projects in this TSP and identification of state funding as a possible source of revenue does not ensure that state funding will be available or allocated to these projects.

improves mobility on highways by establishing and funding new programs to support critical transportation projects to ease congestion and facilitate the movement of freight on the Interstate System and other major roads. The FAST Act authorizes $226.3 billion in Federal funding for FY 2016 through 2020 for road, bridge, bicycling, and walking improvements.

More information is available at: https://www.fhwa.dot.gov/fastact/summary.cfm

Congestion Mitigation and Air Quality (CMAQ)

The Congestion Mitigation and Air Quality (CMAQ) program provides funding for projects that help reduce emissions and meet national air quality standards, such as transportation demand management programs, bicycle and pedestrian improvements, transit projects, diesel retrofits, and vehicle emissions reductions programs. States are required to provide a non-Federal match for program funds (which has not been the case historically for Federal lands highway funding).

More information is available at: http://www.fhwa.dot.gov/environment/air_quality/cmaq/

Surface Transportation Block Grant (STBG)

In 2015, the FAST Act amended the Surface Transportation Program (STP) and chanced the program name to the Surface Transportation Block Grant Program (STBG). STBG funds are contract authority. STBG funds are available for obligation for a period of 3 years after the last day of the fiscal year for which the funds are authorized. Thus funds are available for obligation for up to 4 years. The Federal share is generally 80 percent and 90 percent for projects on the Interstate System unless the project adds lanes that are not high-occupancy-vehicle or auxiliary lanes. For projects that add single occupancy vehicle capacity, that portion of the project will revert to 80 percent. Safety improvements may have a Federal share of 100 percent.

More information is available at: https://www.fhwa.dot.gov/specialfunding/stp/160307.cfm#c

Highway Safety Improvement Program (HSIP)

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose of achieving a significant reduction in traffic facilities and serious injuries on all public roads, including non-State-owned public roads and roads on tribal lands. Under the MAP-21, approximately seven percent of total Federal-aid highway funding is provided for HSIP, amounting to $2.2 billion each year. Highway safety improvement projects can be either infrastructure or non-infrastructure projects. All highway safety improvement projects must meet HSIP eligibility criteria. The HSIP program requires a local match for projects where HSIP funding will be used. For Oregon, this local match is 7.78 percent of the project cost.

More information on the HSIP Program is available at: https://safety.fhwa.dot.gov/hsip/

STATE SOURCES

All Roads Transportation Safety (ARTS)

The All Roads Transportation Safety (ARTS) program (formerly known as Jurisdictionally Blind Safety Program) is intended to address safety needs on all public roads in Oregon. By working collaboratively

with local jurisdictions (cities, counties, MPO's and tribes) ODOT expects to increase awareness of safety on all roads, promote best practices for infrastructure safety, compliment behavioral safety efforts and focus limited resources to reduce fatal and serious injury crashes in the state of Oregon. The program is *data driven* to achieve the greatest benefits in crash reduction and should be blind to jurisdiction. The ARTS program primarily uses federal funds from the HSIP with a required local match of 7.78 percent of the project cost

More information is available at: http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/Pages/ARTS.aspx

Connect Oregon

Connect Oregon is an initiative to invest in air, rail, marine, and bicycle/pedestrian infrastructure to ensure Oregon's transportation system is strong, diverse, and efficient. As a result of the passage of House Bill (HB) 2017, the following important changes have been made to Connect Oregon. Public transit projects are no longer included in Connect Oregon, Connect Oregon now has a portion of the new vehicle dealer private fee and the new $15 bicycle excise tax in addition to lottery-backed bonds as funding sources[3], and the Oregon Transportation Commission is directed to distribute Connect Oregon funds to four specific projects:

- Mid-Willamette Valley Intermodal Facility ($25 million)
- Treasure Valley Intermodal Facility ($26 million)
- Rail expansion in east Beach Industrial Park at the Port of Morrow ($6.55 million)
- Brooks rail siding extension ($2.6 million)

As a result of the allocated funds associated with the projects listed above, the ODOT does not anticipate available funding in the 2017 – 2019 biennium for projects that would have previously been competitive for Connect Oregon program funds. After the four projects listed above have been funded, and if funding is available, ODOT will announce next steps for the competitive grant process which is expected to occur in the 2019 – 2021 or 2021 – 2023 biennia. Project's eligible for competitive grant funds may receive up to 70 percent of the project cost through Connect Oregon. A minimum of 30 percent cash match is required from the recipient for all grant funded projects (with the exception of Class | Railroads which has a 50 percent cash match). Project eligible for funding from state fuel tax revenues are not eligible for Connect Oregon funding.

More information is available at: http://www.oregon.gov/ODOT/Programs/Pages/ConnectOregon.aspx

Statewide Transportation Improvement Program

The Statewide Transportation Improvement Program (STIP) is ODOT's four-year transportation capital improvement program. It is the document that identifies the funding for, and scheduling of, transportation projects and programs. It includes projects on the federal, state, city, and county transportation systems, multimodal projects (highway, passenger rail, freight, public transit, bicycle and pedestrian), and projects in the National Parks, National Forests, and Indian tribal lands. STIP project lists are developed through the

[3] Bicycle excise tax will only go towards bicycle/pedestrian projects.

coordinated efforts of ODOT, federal and local governments, Area Commissions on Transportation, tribal governments, and the public.

The STIP is divided into two broad categories: Fix-It and Enhance. The Enhance category funds activities that enhance, expand, or improve the transportation system. The project selection process for the Enhance category has undergone significant changes in the last few years and reflects ODOT's goal to become a more multimodal agency and make investment decisions based on the system as a whole, not for each mode or project type separately. The agency has requested assistance from its local partners in developing Enhancement projects that assist in moving people and goods through the transportation system. The projects are selected through a competitive application process. The Fix-it category funds activities that fix or preserve the transportation system. These projects are developed mainly from ODOT management systems that help identify needs based on technical information for things like pavement and bridges.

More information is available at: http://www.oregon.gov/ODOT/TD/STIP/Pages/default.aspx

House Bill (HB) 2017 Transportation Investments

In August 2017, Governor Kate Brown signed an eight-year transportation tax increase to raise roughly $5 billion for roads, bridges, mass transit, electric vehicles, and other transit options. House Bill (HB) 2017 affects drivers, bicyclists and payroll employees by increasing the gas tax, weight-mile tax, and other transportation-related fees such as excise tax on the sale of bicycles, new vehicles, and instituting a statewide payroll tax equivalent to 1/10th of 1 percent of wages, deducted by employer from payment to employee. Though this funding source is one that can be used to finance multitude of project types, the City has stated that additional funds received from HB 2017 will be primarily allocated to *Materials and Services* i.e. maintenance of existing transportation facilities and operations.

More information is available at: http://www.oregon.gov/ODOT/Documents/HB2017-FAQ.pdf

Safe Routes to School

Safe Routes to School programs are focused on getting more school-age children to walk and bike to school. ODOT provides Safe Routes to School grant funding for infrastructure programs, which help create and improve safe walking and biking routes to school, and non-infrastructure programs, which raise awareness by focusing on education and outreach. Non-motorized transportation projects related to getting schoolchildren to school safely are eligible for infrastructure program funding. HB 2017 reestablished dedicated funding to Safe Routes to School programs. The current funding cycle is focused on projects that address a safety risk factor, include a 20 percent cash match, and are within one mile of a Title I school.

More information is available at: https://www.oregon.gov/ODOT/Programs/Pages/SRTS.aspx

LOCAL SOURCES

Economic Improvement Districts (EIDs)

Transportation improvements can often be included as part of larger efforts aimed at business improvement and retail district beautification. Economic Improvement Districts collect assessments or fees on businesses in order to fund improvements that benefit businesses and improve customer access within the district. Adoption of a mutually agreed upon ordinance establishing guidelines and setting necessary assessments or fees to be collected from property owners is essential to ensuring a successful EID.

Local Improvement Districts (LID)

Local Improvement Districts (LIDs) are most often used to construct projects such as streets, sidewalks, or bikeways. Through the LID process, the costs of local improvements are generally spread out among a group of property owners within a specified area. The cost can be allocated based on property frontage or other methods such as trip generation. The costs of an LID project are borne primarily by property owners, moderate administrative costs must be factored in, and the public involvement process must still be followed. If the cost of the local improvement is not 100 percent funded by property owners, the City is required to contribute the remaining unfunded portion of the improvement.

Urban Renewal District

An Urban Renewal District (URD) is a tax-funded district within the City. An URD is normally funded by property taxes that are increased incrementally, which is a type of funding that has been used in Oregon since 1960. The taxes are increased as a result of construction of applicable improvements. The incremental taxes are used, rather than fees, to fund different types of improvements. Transportation projects are one type of potential funding use.

Local Bond Measures

Local bond measures, or levies, are usually initiated by voter-approved general obligation bonds for specific projects. Bond measures are typically limited by time, based on the debt load of the local government or the project under focus. Funding from bond measures can be used for right-of-way acquisition, engineering, design, and construction of transportation facilities. Transportation-specific bond measures have passed in other communities throughout Oregon. Though this funding source is one that can be used to finance a multitude of project types, it must be noted that the accompanying administrative costs are high and voter approval must be gained. In addition, local bonds for transportation improvements will compete with local bonds for other public needs, such as fire and rescue, parks and recreation, schools, libraries, etc.

Optional Tax

Optional taxes are taxes that a taxpayer elects to pay to fund projects and improvements. Usually not a legislative requirement to pay the tax and paid at the time other taxes are collected, optional taxes are usually less controversial and easily collected since they require the taxpayer to decide whether or not to pay the additional tax. The voluntary nature of the tax limits the reliability and stableness of the funding

source. In addition, optional taxes for transportation improvements will compete with optional taxes for other public needs, such as fire and rescue, parks and recreation, schools, libraries, etc.

Local Fuel Tax

A local tax assessed on fuel purchased within the jurisdiction that has assessed the tax. The taxes are paid to the city monthly by distributors of fuel. Voters would need to pass the tax, and the process for presenting such a tax to voters will need to be consistent with Oregon State law as well as the laws of the City. Nearby locations with a gas tax includes Milwaukie (two cents per gallon), Canby (three cents per gallon), Tigard (three cents per gallon), Multnomah County (three cents per gallon) and Washington County (one cent per gallon).

User Fees

Fees tied to the annual registration of a vehicle to pay for improvements, expansion, and maintenance to the street system. This may be a more equitable assessment given the varying fuel efficiency of vehicles. Regardless of fuel efficiency, passenger vehicles do equal damage to the street system. The cost of implementing such a system could be prohibitive given the need to track the number of vehicle miles traveled in every vehicle. Additionally, a user fee specific to a single jurisdiction does not account for the street use from vehicles registered in other jurisdictions.

Street Utility Fees/Road Maintenance Fee

The fee is based a flat fee charged to each property, on the number of trips a particular land use generates, or some combination of both and is usually collected through a regular utility bill. For the communities in Oregon that have adopted this approach, it provides a stable source of revenue to pay for street maintenance allowing for safe and efficient movement of people, goods, and services. As indicated previously, the city is currently considering implementation of a street utility fee, which could provide the City with an additional funding over the 22 year period.

General Fund (GF) Revenues

Revenue from the City's GF can be allocated to transportation funding at the discretion of the City Council during the annual budget process. GF revenues primarily include property taxes, use taxes, and any other miscellaneous taxes and fees imposed by the City. GF resources have the potential to fund any type of transportation expenditures but would only be available if it had increased revenues or if the City Council directs funding that is traditionally allotted to other City expenditures and programs, such as Police Departments and other GF programs.

IMPLEMENTATION

The Transportation Planning Rule (TPR), as codified in Oregon Administrative Rules (OAR) 660-012-0020(2) requires that local jurisdictions identify and adopt land use regulations and code amendments needed to implement the TSP. These land use regulations and code amendments are provided under separate cover in the staff report.

CHAPTER 10: GLOSSARY OF TERMS

GLOSSARY OF TERMS

The following terms are applicable only to the Molalla Transportation System Plan and shall be construed as defined herein.

Access Management: Refers to measures regulating access to streets, roads and highways from public roads and private driveways. Measures may include but are not limited to restrictions on the type and amount of access to roadways, and use of physical controls such as signals and channelization including raised medians, to reduce impacts of approach road traffic on the main facility.

Accessway: Refers to a walkway that provides pedestrian and or bicycle passage either between streets or from a street to a building or other destination such as a school, park, or transit stop.

Alternative Modes: Transportation alternatives other than single-occupant automobiles such as rail, transit, bicycles and walking.

American Association of State Highway Transportation Officials (AASHTO): The American Association of State Highway and Transportation Officials (AASHTO) is a standards setting body which publishes specifications, test protocols and guidelines which are used in highway design and construction throughout the United States.

Americans with Disabilities Act (ADA): A civil rights law that prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public.

Arterial (Street): A street designated in the functional class system as providing the highest amount of connectivity and mostly uninterrupted traffic flow through an urban area.

Arterial Corridor Management (ACM): a series of measures intended to improve access and circulation along arterial corridors.

Average Annual Daily Traffic (AADT): A measure used primarily in transportation planning and traffic engineering that represents the total volume of vehicular traffic on a highway or roadway for a year divided by 365 days.

Average Daily Traffic (ADT): This is the measurement of the average number of vehicles passing a certain point each day on a highway, road or street.

Bicycle Facility: Any facility provided for the benefit of bicycle travel, including bikeways and parking facilities.

Bicycle Network: A system of connected bikeways that provide access to and from local and regional destinations.

Bicycle Boulevard: Lower-order, lower-volume streets with various treatments to promote safe and convenient bicycle travel. Usually accommodates bicyclists and motorists in the same travel lanes, often with no specific vehicle or bike lane delineation. Assigns higher priority to through bicyclists, with secondary priority assigned to motorists. Also includes treatments to slow vehicle traffic to enhance the bicycling environment.

Bike Lane: Area within street right-of-way designated specifically for bicycle use.

Capital Improvement Plan (CIP): A community planning and fiscal management tool used to coordinate the location, timing and financing of capital improvements over a multi-year period.

Capacity: The maximum number of vehicles or individuals that can traverse a given segment of a transportation facility with prevailing roadway and traffic conditions.

Central Business District (CBD): This is the traditional downtown area, and is usually characterized by slow traffic speeds, on-street parking and a compact grid system.

Citizen Advisory Committee (CAC): An advisory committee consisting of volunteer citizens from the community they represent.

Collector (Street): A street designated in the functional class system that provides connectivity between local and neighborhood streets with the arterial streets serving the urban area. Usually shorter in distance than arterials, designed with lower traffic speeds and has more traffic control devices than the arterial classification.

Congestion Mitigation/Air Quality (CMAQ): A program within the federal ISTEA and TEA-21 regulations that address congestion and transportation-related air pollution.

Crosswalk: Portion of a roadway designated for pedestrian crossing and can be either marked or unmarked. Unmarked crosswalks are the national extension of the shoulder, curb line or sidewalk.

Cycle Track: An exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk.

Demand Management: Refers to actions which are designed to change travel behavior in order to improve performance of transportation facilities and to reduce need for additional road capacity. Methods may include subsidizing transit for the journey to work trip, charging for parking, starting a van or car pool system, or instituting flexible work hours.

Department of Environmental Quality (DEQ): A regulatory agency whose job is to protect the quality of Oregon's environment.

Department of Land Conservation and Development (DLCD): A public agency that helps communities and citizens plan for, protect and improve the built and natural systems that provide a high quality of life.

Driveway (DWY): A short road leading from a public road to a private business or residence.

Eastbound (EB): Leading or traveling toward the east.

Employee Commute Options (ECO): rules that were passed by the Oregon Legislature in 1993 (and revised in February 2007) to help protect the health of Portland area residents from air pollution and to ensure that the area complied with the Federal Clean Air Act

Fiscal Year (FY): A year as reckoned for taxing or accounting purposes.

Geographic Information Systems (GIS): A system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data.

Grade: A measure of the steepness of a roadway, bikeway or walkway, usually expressed in a percentage form of the ratio between vertical rise to horizontal distance, (e.g. a 5% grade means that the facility rises 5 feet in height over a 100 feet in length.)

Grade Separation: The vertical separation of conflicting travelways.

Green Street: A street designed to reduce or redirect stormwater runoff quantity and/or to improve stormwater runoff quality. Green street design generally involves using rain gardens, vegetated swales and/or pervious materials (porous pavement or permeable paving) as an alternative to conventional stormwater facilities.

High-capacity Transit (HCT): A form of public transit distinguished from local service transit such as bus lines by higher speeds, fewer stops, more passengers, and more frequent service.

Highway Design Manual (HDM): A manual that provides uniform standards and procedures for the design of new roadways and the major reconstruction, rehabilitation, restoration, and resurfacing of existing roadways.

High Occupancy Vehicle (HOV): A vehicle containing two or more occupants, generally a driver and one or more passengers.

Impervious Surfaces: Hard surfaces that do not allow water to soak into the ground, increasing the amount of stormwater running into the drainage system.

Intelligent Transportation Systems (ITS): 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.

Level of Service (LOS): A qualitative measure describing the perception of operation conditions within a traffic steam by motorists and or passengers. An LOS rating of "A" to "F" describes the traffic flow on streets and at intersections, ranging from LOS A, representing virtually free flow conditions and no impedance to LOS F representing forced flow conditions and congestion.

Local (Street): A street designated in the functional class system that's primary purpose is to provide access to land use as opposed to enhancing mobility. These streets typically have low volumes and are very short in relation to collectors and arterials.

Manual on Uniform Traffic Control Devices (MUTCD): A document issued by the Federal Highway Administration (FHWA) of the United States Department of Transportation (USDOT) to specify the standards by which traffic signs, road surface markings, and signals are designed, installed, and used.

Metropolitan Planning Organization (MPO): An organization in each federally recognized urbanized area (population over 50,000) designated by the Governor which has the responsibility for planning, programming and coordinating the distribution of federal transportation resources.

Metropolitan Transportation Improvement Program (MTIP): The list of projects selected by Metro to receive regional funding assistance.

Multi-Modal: Involving several modes of transportation including bus, rail, bicycle, motor vehicle etc.

Multi-Use Path: Off-street route (typically recreationally focused) that can be used by several transportation modes, including bicycles, pedestrians and other non-motorized modes (i.e. skateboards, roller blades, etc.)

National Highway System (NHS): The National Highway System is interconnected urban and rural principal arterial and highways that serve major population centers, ports, airports and other major travel destinations, meet national defense requirements and serve interstate and interregional travel.

Neighborhood Route (Street): A street designated in the functional class system that's primary purpose is to provide access to land use, but provides more mobility than a local street. These streets typically have moderate volumes and are shorter in relation to collectors and arterials.

Neighborhood Traffic Management (NTM): Traffic control devices typically used in residential neighborhoods to slow traffic or possibly reduce the volume of traffic.

Northbound (NB): Traveling or leading toward the north.

Oregon Administrative Rules (OAR): The official compilation of rules and regulations having the force of law in the U.S. state of Oregon. It is the regulatory and administrative corollary to Oregon Revised Statutes, and is published pursuant to ORS 183.360 (3).

Oregon Department of Transportation (ODOT): ODOT is a public agency that helps provide a safe, efficient transportation system that supports economic opportunity and livable communities throughout Oregon. ODOT owns and operates two roadways (OR 213 and OR 211) that are located in Molalla or provide access to the city. There are street design and operational standards for these roadways which supersede Molalla's street design and operational standards.

Oregon Highway Plan (OHP): The document that establishes long range policies and investment strategies for the state highway system in Oregon.

Oregon Revised Statutes (ORS): The codified body of statutory law governing the U.S. state of Oregon, as enacted by the Oregon Legislative Assembly, and occasionally by citizen initiative. The statutes are subordinate to the Oregon Constitution.

Peak Period or Peak Hour: The period of the day with the highest number of travelers. This is normally between 4:00 p.m. to 6:00 p.m. on weekdays.

Pedestrian Connection: A continuous, unobstructed, reasonability direct route between two points that is intended and suitable for pedestrian use. These connections could include sidewalks, walkways, accessways, stairways and pedestrian bridges.

Pedestrian District: A comprehensive plan designation or implementing land use regulation, such as an overlay zone, that establishes requirements to provide a safe and convenient pedestrian environment an area planned for a mix of uses likely to support a relatively high level of pedestrian activity.

Pedestrian Facility: A facility provided for the benefit of pedestrian travel, including walkways, crosswalks, signs, signals and benches.

Pedestrian Scale: Site and building design elements that are oriented to the pedestrian and are dimensionally less than those sites designed to accommodate automobile traffic.

Regional Transportation Functional Plan (RTFP): A planning document that contains policies and guidelines to help local jurisdictions implement the policies in the Regional Transportation Plan (RTP) and its modal plans, include those for active transportation, freight movement and high capacity transit.

Regional Transportation Plan (RTP): The transportation plan for the Portland Metro region.

Right-Of-Way (ROW or R/W): A general term denoting publicly-owned land or property upon which public facilities and infrastructure is placed.

Safety Priority Index System (SPIS): An indexing system used by Oregon Department of Transportation to prioritize safety improvements based on crash frequency and severity on state facilities.

Safe Routes to School (SRTS): Federal, state, and local programs that create safe, convenient, and fun opportunities for children to bicycle and walk to and from schools.

Shared Roadway: Roadways where bicyclists and autos share the same travel lane. May include a wider outside lane and/or bicycle boulevard treatment (priority to through bikes on local streets).

Single-Occupancy Vehicle or Single-Occupant Vehicle (SOV): A vehicle containing only a single occupant, the driver.

Southbound (SB): Traveling or leading toward the south.

Special Transportation Area (STA): An ODOT designation that allows state facilities that run through downtown business districts to have alternate mobility standards in an effort to accommodate other special needs (such as pedestrian, transit, business, etc.) in an area.

Statewide Transportation Improvement Plan (STIP): The capital improvement program that identifies founding and schedule of statewide projects.

System Development Charge (SDC): Fees that are collected when new development occurs in the city and are used to fund a portion of new streets, sanitary sewers, parks and water.

Technical Advisory Committee (TAC): An advisory committee consisting of state, county, and city staff that review and provide feedback on technical memorandums.

Technical Memorandum (TM): A document that is specifically targeted to technically capable persons, such as practicing engineers or engineering managers, who are interested in the technical details of the project or task.

Traffic Control Devices: Signs, signals or other fixtures placed on or adjacent to a travelway that regulates, warns or guides traffic. Can be either permanent or temporary.

Transportation Advisory Board (TAB): A standing advisory board made of up volunteers that comment on transportation issues within the City.

Transportation Analysis Zone (TAZ): A geographic sub-area used to assess travel demands using a travel demand forecasting model. Often defined by the transportation network and US Census blocks.

Transportation Demand Management (TDM): A policy tool as well as any action that removes single-occupant vehicle trips from the roadway network during peak travel demand periods.

Transportation and Growth Management (TGM): A program of the Oregon Department of Transportation (ODOT) that supports community efforts to expand transportation choices. By linking land use and transportation planning, TGM works in partnership with local governments to create vibrant, livable places in which people can walk, bike, take transit or drive where they want to go.

Transportation Management Area (TMA): A Transportation Management Area is an area designated by the Secretary of Transportation, having an urbanized area population of over 200,000, or upon special request from the Governor and the MPO designated for the area.

Transportation Planning Rule (TPR): A series of Oregon Administrative Rules intended to coordinate land use and transportation planning efforts to ensure that the planned transportation system supports a pattern of travel and land use in urban areas that will avoid the air pollution, traffic and livability problems faced by other large urban areas of the country through measures designed to increase transportation choices and make more efficient use of the existing transportation system.

Transportation System Management (TSM): Management strategies such as signal improvements, traffic signal coordination, traffic calming, access management, local street connectivity, and intelligent transportation systems

Transportation System Management and Operations (TSMO): An integrated program to optimize the performance of existing multimodal infrastructure through implementation of systems, services, and projects to preserve capacity and improve the security, safety, and reliability of our transportation system.

Transportation System Plan (TSP): Is a comprehensive plan that is developed to provide a coordinated, seamless integration of continuity between modes at the local level as well as integration with the regional transportation system.

Two-Way Stop Control (TWSC): An intersection, where one or more approaches is stop controlled and must yield the right-of-way to one or more approaches that are not stop controlled.

Urban Area: The area immediately surrounding an incorporated city or rural community that is urban in character, regardless of size.

Urban Growth Boundary (UGB): A regional boundary, set in an attempt to control urban sprawl by mandating that the area inside the boundary be used for higher density urban development and the area outside be used for lower density development.

Vehicle Miles Traveled (VMT): The cumulative distance a vehicle travels, regardless of number of occupants.

Volume to Capacity Ratio (V/C): A measure that reflects mobility and quality of travel of a roadways or a section of a roadways. It compares roadway demand (vehicle volumes) with roadway supply (carrying capacity).

Westbound (WB): Leading or traveling toward the west.