Mount Scott / Scouters Mountain Trail Loop Master Plan

February 2014

Metro | *Making a great place*

North Clackamas Parks and Recreation District | Portland Parks & Recreation | City of Happy Valley | Clackamas County

Prepared for:

Metro Sustainability Center

North Clackamas Parks and Recreation District

City of Happy Valley

Portland Parks & Recreation

Clackamas County

Prepared by:

Otak, Inc.

808 SW Third Avenue, Suite 300

Portland, Oregon 97204

503.287.6825

www.otak.com

David Haynes

Mandy Flett

Brad Swearingen

Alta Planning+Design

711 SE Grand Avenue

Portland, Oregon 97214

503.230.9862

www.altaplanning.com

George Hudson

Karen Vitkay

Plans and Appendices will be available online at Metro and partner websites. CDs of plans are available at cost from Metro. A printed version will be placed in local libraries.

Mount Scott / Scouters Mountain Trail Loop Master Plan

February 2014

Metro | *Making a great place*

600 NE Grand Avenue

Portland, Oregon 97232

Mel Huie, Project Manager

503.797.1731

Mel.Huie@oregonmetro.gov

PORTLAND PARKS & RECREATION
Healthy Parks, Healthy Portland

Portland Parks & Recreation

1120 SW Fifth Avenue, Suite 1302

Portland, Oregon 97204

503.823.6007

www.portlandoregon.gov/parks

NORTH CLACKAMAS PARKS & RECREATION DISTRICT

North Clackamas Parks and Recreation District

150 Beavercreek Road

Oregon City, Oregon 97045

503.742.4348

www.ncprd.com

CLACKAMAS COUNTY

Clackamas County

150 Beavercreek Road

Oregon City, Oregon 97045

503.742.4500

www.clackamas.us

City of Happy Valley

16000 SE Misty Drive

Happy Valley, Oregon 97086

503.783.3800

www.ci.happy-valley.or.us

Printed on Recycled Paper

ACKNOWLEDGEMENTS

Metro

Mel Huie, Regional Trails Coordinator and Project Manager

Heather Coston

Kate Holleran

Leslie Knight

John Mermin

Dan Moeller

Tim Richard

Elaine Stewart

Max Woodbury

North Clackamas Parks and Recreation District (NCPRD)

Katie Dunham

Portland Parks & Recreation

Lynn Barlow

Mart Hughes

Emily Roth

City of Happy Valley

Carol Earle

Rich Feucht

Justin Popilek

Jason Tuck

Michael Walter

Mount Scott/Scouters Mountain Trail Project Advisory Committee

Carlotta Collette - Metro Council

Shirley Craddick - Metro Council

Bob Stacey - Metro Council

Michael Morrow - Happy Valley City Council/NCPRD Advisory Board

Janet Alley - North Clackamas School District

Russell Aldridge - Lincoln Memorial Park Cemetery

Linda Bauer - Portland Citizen

John Berry - Happy Valley Citizen

Bill Garity - Clackamas County

Jeff Johnson - Volunteer for Metro

Peter Lent - Community of Future of Damascus

Lori Mastrantonio - Clackamas County Department of Transportation and Land Use

Sara McClurg - Clackamas County Sheriff's Office

Mike Oleson - Clackamas County

Bret Richards - Oregon Department of Transportation

Introduction

The Mount Scott/Scouters Mountain Trail Loop Master Plan is the continuation of an ambitious multi-jurisdictional goal to establish a regional trail network connecting the communities of the Portland Metropolitan area. The Trail Loop will put in place an important piece of the trail network that will provide Clackamas County, Happy Valley, Damascus, and Portland residents with non-motorized recreation and transportation connections to regional destinations and facilities. The roughly 37.5-mile trail project will offer a route for alternative transportation modes with a looped, north-south oriented multi-use trail system that will link the Springwater Corridor with the Sunrise Corridor, Clackamas River, and encompass Mount Talbert Nature Park, Powell Butte and Buttes Natural Areas, and Scouters Mountain Nature Park. The proposed regional trail will connect numerous schools, community parks, local trails, businesses, retail stores and the Happy Valley Town Center. The new trail will facilitate potential access to Mount Scott Creek, Rock Creek, and have connections to the future East Buttes Loop Trail and Powerline Corridor Trail.

Planning Process/Relationship to Other Plans

To guide the project planning, a Project Advisory Committee (PAC) was formed with representatives from agency stakeholders, both public and private. Through a public involvement process, the project brings together multiple jurisdictions, private partners, neighbors, and trail advocates including The Intertwine Alliance to provide a regional trail network through many areas lacking safe walking and biking options.

The trail meets the goals of Metro's Active Transportation Program and is identified in the Metro Greenspaces Master Plan and Regional Trails System Map, as well as the Regional Transportation Plan (RTP) bike and pedestrian network and system maps. The Springwater Corridor, which will be the northern terminus of the trail, is listed in the Metro regional trail and transportation plans and is identified as an Oregon Parks and Recreation Department Trail of Statewide Significance. The proposed trail alignments have also been coordinated with local Transportation System Plans (TSP), local trail plans, and land use plans.

Project Goals

The vision for the Trail Loop is to provide a non-motorized trail between the existing Springwater Corridor in the north and the Clackamas River in the south, while connecting significant open space areas including Mount Scott, Mount Talbert Nature Park, Buttes Natural Area, Leach Botanical Garden, Powell Butte Natural Area, and Scouters Mountain Nature Park.

The primary goals for the Mount Scott/Scouters Mountain Trail Loop Master Plan include the following:

- identifying alternatives for a regional trail, which will have bike and pedestrian separated routes in certain areas and multi-use trails in other areas;
- avoiding negative impacts to sensitive natural resource areas and riparian corridors and seeking opportunities to improve habitat and connectivity;
- planning for wildlife corridors where appropriate;
- designing green trails;
- considering ease of construction, maintenance, and longevity; and
- providing a safe and enjoyable experience for multiple user groups as well as adjacent neighbors.

Equestrian use in the Trail Loop system will be limited to the existing Springwater Corridor trail. While one goal of the master plan is to accommodate as many user groups as possible, careful evaluation of the other existing and proposed trail segments by the Project Advisory Committee determined that the Trail Loop is not well-suited for equestrian use.

Natural Resources and Habitats

The trail loop system will pass through pristine natural resource areas. To address the primary objective of avoiding negative impacts to sensitive areas, the PAC analyzed "Regional Conservation Strategy" data and convened meetings with several natural resource stakeholders to solicit input. Stakeholders included the Oregon Department of Fish and Wildlife, the Audubon Society of Portland, North Clackamas Parks and Recreation District, the Johnson Creek Watershed Council, Portland Parks and Recreation, and representatives of Metro's Natural Areas Program. The PAC guided the stakeholders through an evaluation of proposed trail alignments to identify general guidelines and garner site-specific recommendations that can be applied to trail development. The outcome of this process is a list of considerations recorded in a memorandum and included in Appendix F of this document. **All future planning of the Trail Loop in sensitive natural resource areas should begin with review of this document.**

Trail Design

An effort has been made to simplify the trail loop system by minimizing the number of different trail types, while recognizing that physical and environmental constraints within the 37-mile loop make a variety of trail types necessary. While the goal is to build the trail to regional multi-use trail guidelines, the trail will need to branch into different mode types to separately accommodate cyclists and pedestrians in order to minimize impacts to sensitive natural resource areas and locations with significant slopes.

Table ES-1 lists the three general trail categories (within which the various trail typologies are defined) and both existing and proposed lengths within the Trail Loop system:

Table ES-1. Mount Scott/Scouters Mountain Trail Length in Miles

Typology (Modes)	Existing	Conceptual	Total
Multi-use	3.95	17.95	21.90
Bicycle	0.00*	7.54	7.54
Pedestrian	3.45	4.62	8.07
Total	**7.40**	**30.11**	**37.51**

**Bike lanes exist in some areas; however, the concept of the master plan is that bike lanes be upgraded to buffered cycle tracks.*

This report will describe all trail typologies (modes), with maps showing the location of each trail type.

Because of the bifurcations (i.e., separate bike and pedestrian routes) needed to facilitate use of the trail route by different users, it is important to emphasize that a well-implemented trail signage program needs to play a major role in the success of the trail loop system.

Trail Alignment Alternatives

Working with the Project Advisory Committee, stakeholders and local community members; an extensive process was carried out to identify and evaluate trail alignment options. The evaluation was based on project goals developed during the planning process. Each alignment was considered with respect to fatal flaws reflecting the project evaluation criteria. Alignments without fatal flaws were further evaluated based on the criteria described in this document. This approach provided an objective means to compare segment options against one another as well as identify specific recommendations for improving alignments. The Project Team vetted the findings of the analysis with stakeholders, local decision makers and the public, and made refinements as needed to develop the recommended Trail Loop alignments.

Recommendations

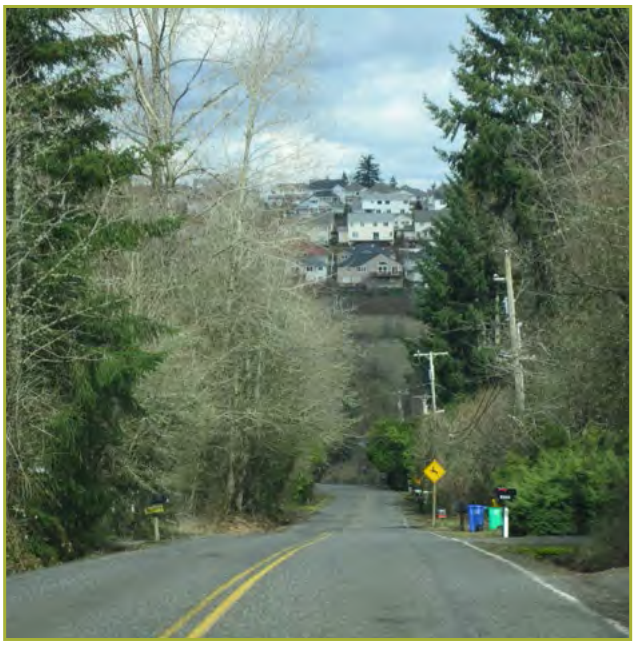
Spanning approximately 37.5 miles (when bifurcations are taken into account), the recommended Trail Loop alignment will provide an active transportation and recreation link between the Springwater Corridor, I-205 bike path and Clackamas River while connecting area residents to open space jewels including Powell Butte, Buttes Natural Area, Mitchell Creek property, Scouters Mountain, Mount Talbert and Happy Valley Nature Park. The preferred alignment will provide a convenient, comfortable and safe atmosphere for trail users of all ages and abilities; provide access and enhancements to natural and cultural resources while limiting impacts; and enhance non-motorized connectivity in the region. This Master Plan document describes the opportunities, constraints and recommendations associated with each preferred alignment by segment.

Figure ES-1. Mount Scott/Scouters Mountain Trail Loop - Final Alignment Recommendations

This page was intentionally left blank.

1. INTRODUCTION





The trail loop will traverse a wide variety of settings.

Project Background

The Mount Scott/Scouters Mountain Trail Loop will provide Clackamas County, Happy Valley, Damascus, and Portland residents with non-motorized recreation and transportation connections to regional destinations and facilities with a looped, north-south oriented multi-use trail system that will link the Springwater Corridor with the Clackamas River, and encompass Mount Talbert Nature Park, Powell Butte and Buttes Natural Areas, and Scouters Mountain Nature Park. The proposed regional trail will connect numerous schools, community parks, local trails, businesses, retail stores and the Happy Valley Town Center. The new trail will facilitate potential access to Mount Scott Creek, Rock Creek, and have connections to the future East Buttes Loop Trail and Powerline Corridor Trail.

Through a public involvement process, the project brings together multiple jurisdictions, private partners, neighbors, and trail advocates to design a multi-use trail through many areas lacking safe walking and biking options. The project also meets the goals of Metro's Active Transportation Program – a regional partnership to implement the recommendations of the Blue Ribbon Committee for Trails to develop non-motorized transportation modes – integrating on-street and off-street walkways and bikeways connected to transit, communities, and retail and employment centers.

A large portion of the trail corridor resides in the North Clackamas Parks and Recreation District (NCPRD) and the City of Happy Valley. The NCPRD Parks and Recreation Master Plan (2004) outlines proposed trails within the District, and includes the Trail Loop. The City of Happy Valley conducted a Transportation System Plan (TSP) process in 2009 that included outreach to the community and trail neighbors. This process concluded with a Trail Development Handbook, Chapter 5: Pedestrian Plan in the Happy Valley Transportation System Plan, and the stand-alone Happy Valley Pedestrian System and Trail Master Plan. These documents provide information that guides the Mount Scott/Scouters Mountain Trail Loop Master Plan process.

The trail loop is identified in the Metro Greenspaces Master Plan and Regional Trails System Map and the Regional Transportation Plan (RTP) bike and pedestrian network and system maps. The Springwater Corridor, which will be the northern terminus of the trail, is listed in the Metro regional trail and transportation plans and is an Oregon Parks and Recreation Department Trail of Statewide Significance.

Trail Loop will connect to natural resource areas.

Location

The proposed Trail Loop will serve as a multi-use commuter and recreational trail connecting the Springwater Corridor regional trail to the Clackamas River. The trail's southern terminus is envisioned to be the Sunrise Corridor and Clackamas River. The final trail alignment is proposed to be 37.5 miles in length and was identified through the findings of a trail alignment alternatives analysis.

The project study area focuses on a roughly quarter-mile wide corridor or buffer that generally follows a conceptual trail alignment identified by agency partners. The study area corridor is shown in Figure 1-1 and is divided into seven segments based on relatively unified land use characteristics. The master plan identifies up to two different alignment options for each of the seven segments.

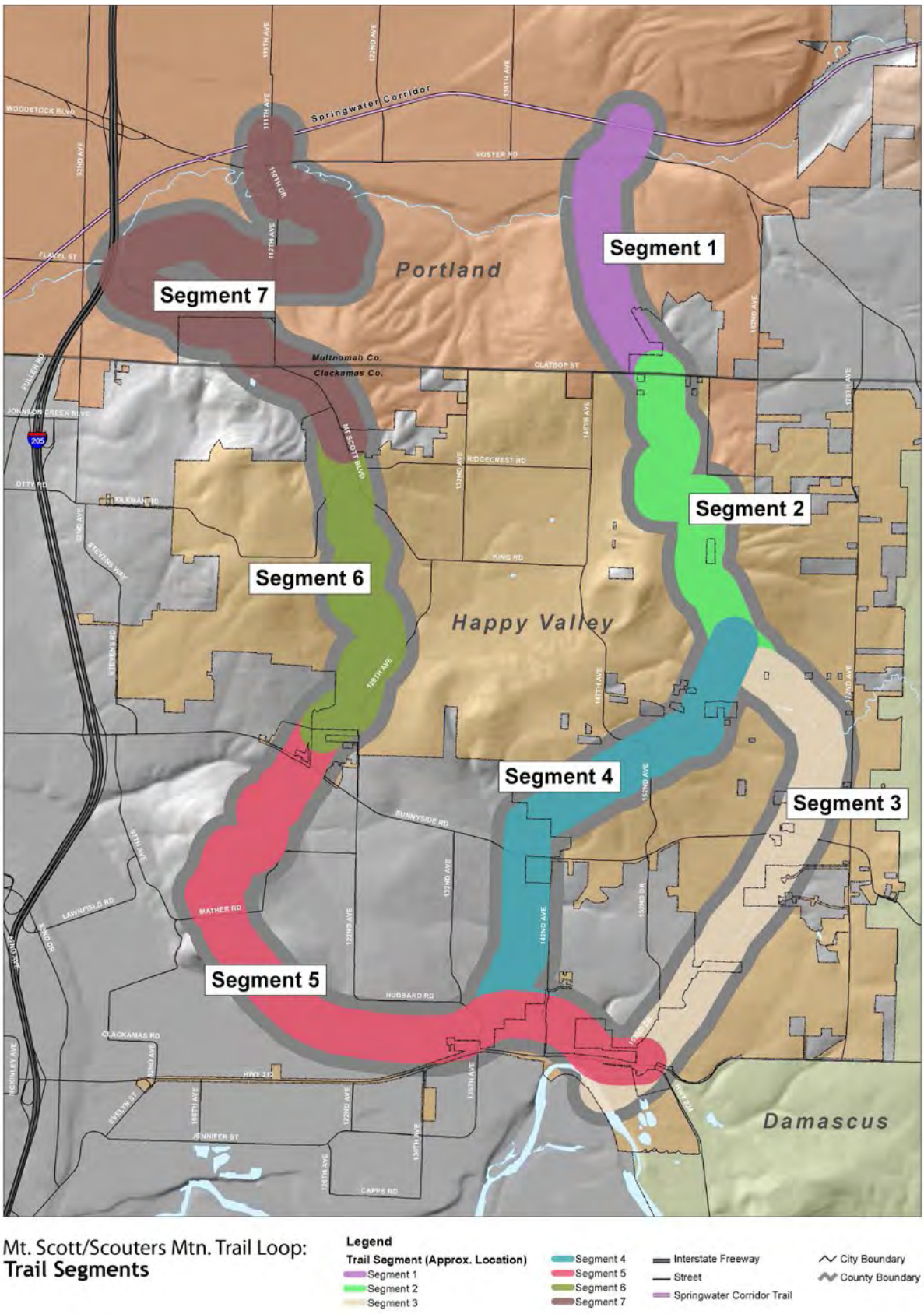
Segment 1 begins at the Springwater Corridor regional trail near the southwest corner of the Powell Butte Nature Park and runs generally south to SE Clatsop Street. This segment is entirely within the City of Portland. Opportunities within the segment include connections to the Buttes Natural Area. Steep topography and forested lands dominate much of the terrain of this segment.

Segment 2 begins at SE Clatsop Street southeast of the Buttes Natural Area and runs south to SE Hagen Road, just north of the former Pleasant Valley Golf Club, and is characterized by steep slopes. This segment is within the City of Happy Valley. Opportunities for creating a link to the Metro-owned summit of Scouters Mountain Nature Park were explored in this segment.

Segment 3 begins at SE Hagen Road and runs generally southeast, then southwest, ending near the intersection of Clackamas Highway (212) and SE 152nd Avenue. This segment is primarily within the City of Happy Valley with minor portions that cross into unincorporated Clackamas County. Opportunities exist to locate much of this trail segment within large undeveloped parcels along the forested Rock Creek corridor. Connections to the Happy Valley Town Center, Hood View Park, Rock Creek Middle School, Verne A. Duncan Elementary School, a Pioneer Park, future employment centers, and the banks of the Clackamas River at public locations are the primary opportunities within this segment.

Segment 4 offers a second route for the southeast area covered by the Trail Loop, following the East Buttes Powerline Corridor. This segment could begin at a point along the corridor northwest of the former Pleasant Valley Golf Club and run southwest, crossing SE Sunnyside Road and continuing south to end near the intersection of Clackamas Highway (212) and SE 142nd Avenue. This segment is typified by extreme slopes and has many opportunities for connections to residential areas and undeveloped forested lands to

Figure 1-1. Mount Scott/Scouters Mountain Trail Loop Study Area (1/4 mile buffer)



Schematic alignment shown is superseded by this Master Plan. See the Master Planning Map on page 68 & 69.

increase access and opportunities for outdoor recreation. A 0.67-mile length of this segment has been built between SE Chelsea Morning Drive and the point where the corridor crosses SE 142nd Avenue. However, it includes stairs and steep slopes, which are not ADA accessible, with expansive views to the south.

Segment 5 begins near the intersection of Clackamas Highway (212) and SE 152nd Avenue and travels west roughly parallel to Clackamas Highway (212) then follows the proposed Sunrise Corridor and Clackamas Bluffs Trail alignment. It then turns north to cross SE Mather Road and connects with an existing pedestrian trail through Mount Talbert Nature Park. The portion of this segment between SE 142nd Avenue and SE Mather Road is owned by ODOT and is part of the Sunrise Corridor project. While still in the early phases of design, a multi-use trail is being planned parallel to the highway corridor. This segment is in unincorporated Clackamas County and crosses a variety of land uses including commercial, light industrial, residential, and open space areas. The section of this trail north of SE Mather Road (constituting one of the two alignments to be studied in this segment) will capitalize on quality natural areas within the Mount Talbert Nature Park and open spaces associated with Scott Creek and related tributaries. North of Mount Talbert, the trail crosses SE Sunnyside Road and follows the Scott Creek drainage to the north. The conceptual alignment creates good opportunities to provide several access points serving a wide spectrum of the community and several schools including Clackamas High School.

Segment 6 begins in the Scott Creek drainage corridor north of Sunnyside Road and runs north to end near the intersection of SE Mount Scott Boulevard and SE Ridgecrest Road. This segment follows both natural resource areas and residential streets as it continues north through Happy Valley Nature Park and other open spaces associated with the Scott Creek drainage. This segment is nearly all within the City of Happy Valley. Opportunities within this segment include utilizing existing trail routes and creating several connections between residential areas and natural resource areas. The proposed trail has separate routes for bicyclists and pedestrians.

Segment 7 begins near the intersection of SE Mount Scott Boulevard and SE Ridgecrest Road and runs generally northwest to end near the intersection of the Springwater Corridor trail and the I-205 Pathway, about three miles west of the starting point of Segment 1. The southern portion of this segment is characterized by steep slopes. Opportunities include an alignment option through Lincoln Memorial Park Cemetery and connection to two schools. The end point of Segment 7 would be connected to the beginning point of Segment 1 via the Springwater Corridor, completing the loop system.

Project Significance

The Mount Scott/Scouters Mountain Trail Loop Master Plan will be a crucial regional trail linking numerous regional and local trails in the Happy Valley-Portland area. This area is a fast growing area and requires alternative and active transportation options such as trails, bike lanes, and sidewalks. The trail offers nearly 37 miles of proposed routes between the I-205 bike/ped path, Springwater Corridor, Clackamas River Bluffs, and future Sunrise Corridor and SE 162nd/172nd. In many cases, bike lanes and pedestrian pathways are separated because of the need to protect natural areas and sensitive habitat. It will be the major trail along with the Springwater Corridor for the outer southeast quadrant of the metropolitan region.

The future trail will offer opportunities to protect wildlife, sensitive habitat and provide access for people. The trail will accommodate both recreational, commuter, and general transportation needs.

This trail provides a key link with the overall regional trail system and regional trails plan. The Happy Valley, Pleasant Valley, and north Clackamas locations are fast growing urban areas with many natural features such as the east buttes. Metro and local partners have been protecting these buttes for nearly 20 years through acquisition, restoration, and providing nature parks. A trail system to connect these buttes is needed.

Project Implementation

Over the next 20-25 years, the trail will enter into an implementation phase. Currently, there are no dedicated funding sources to design and build the trail. To solicit additional support, the master plan will be discussed with a broad spectrum of stakeholders in the Winter/ Spring of 2014 including the following:

- parks, transportation and planning staff;
- local parks and trails citizen committees;
- city councils and other governing boards; and
- the general public including property owners and neighborhood groups.

The Plan will also be recommended for inclusion in or with local acquisitions of right-of-way and easements, capital improvement lists, as well as included in the queue for funding.

Project Goals

The vision for the Trail Loop is to provide a non-motorized trail opportunity between the existing Springwater Corridor in the north, and the Sunrise Corridor/Clackamas River in the south, while

connecting significant open space areas including Mount Scott, Mount Talbert Nature Park, Buttes Natural Area, Powell Butte Natural Area, and Scouters Mountain Nature Park.

The primary goals for the Mount Scott/Scouters Mountain Trail Loop Master Plan include the following:

- identifying alternatives for a regional trail, which will have bike and pedestrian separated routes in certain areas and multi-use trails in other areas;
- avoiding negative impacts to sensitive natural resource areas and riparian corridors and seeking opportunities to improve habitat and connectivity;
- planning for wildlife corridors where appropriate;
- designing green trails;
- considering ease of construction, maintenance, and longevity; and
- providing a safe and enjoyable experience for multiple user groups as well as adjacent neighbors.

Equestrian use in the Trail Loop system will be limited to the existing Springwater Corridor trail. While one goal of the master plan is to accommodate as many user groups as possible, careful evaluation of the other existing and proposed trail segments by the Project Advisory Committee determined that the Trail Loop is not well-suited for equestrian use.

Accessibility

Due to topographic constraints, achieving Americans with Disabilities Act (ADA) accessibility throughout the system may not be feasible. While the preference is to achieve fully accessible routes, more challenging alignments will need to be included to complete the system. While a goal is to build the trail to regional guidelines, the trail may branch into different types to separately accommodate cyclists and pedestrians in order to minimize impacts to sensitive natural resource areas and locations with significant slopes. Trail alignments which are off-street or outside of road right-of-way offer a safe and pleasant user experience worthy of regional status. Metro's regional trail guidelines strive for 75% of a system to be off-street. Trail bifurcations due to steep terrain and sensitive natural resource areas have made this goal difficult to achieve. In locations where alignments are within road right-of-ways, protected bikeways or cycle tracks are recommended to provide comfort and safety similar to that provided by an off-street setting.

Existing and proposed trail segments such as the Springwater Corridor, I-205 Bike/Ped Pathway, and Sunrise Corridor offer accessibility to all levels of trail users and are generally less than 5% slope.

Project Approach/Process

In the fall of 2011, Metro, in partnership with North Clackamas Parks and Recreation District, Clackamas County, and the cities of Happy Valley and Portland, began working with Otak, Inc., and Alta Planning + Design to prepare the Mount Scott/Scouters Mountain Trail Loop Master Plan. A Project Advisory Committee (PAC) was assembled from agencies of the various jurisdictions, citizens, and those with private property the trail would pass through or be adjacent to. The following agencies were represented in the PAC:

- Clackamas County Sheriff, Transportation and Land Use Departments
- City of Happy Valley
- Intertwine Alliance
- Lincoln Park Memorial Cemetery
- Metro
- North Clackamas Parks and Recreation District
- North Clackamas School District
- Oregon Department of Transportation
- Portland Parks & Recreation
- Neighborhood associations

The project consultant team began review of the land use and regulatory requirements governing the planning and implementation of the proposed trail. The project was officially launched with a kick-off meeting with members of the PAC to clarify roles and responsibilities and to tour the conceptual trail alignment as a group. Many opportunities and constraints of the conceptual alignment were identified and recorded on map exhibits that were prepared to display during the public involvement process. Information gathered during the kickoff tour was also used to inform the narrative of the existing conditions report.

Based on a conceptual alignment identified by agency partners, a trail corridor was established as the limits of the project study area and geographic information system (GIS) mapping of the study area was developed by Metro and local partner staff for use by the consultant team in identifying alignment alternatives. GIS mapping

was combined with natural resource evaluation, traffic analysis findings, property ownership data, and transportation system planning information to develop evaluation criteria for trail alignment options for the alternatives analysis.

A stakeholder interview process was initiated by Metro staff to begin a dialogue with public and private entities affected by the proposed trail alignment.

Once a sufficient amount of information was gathered and documented, the PAC conducted the first of two public open houses (June 2012) that would provide a venue for presentation and discussion of the proposed trail project. Meetings were held at the Happy Valley City Hall. With input from the community and stakeholders, trail alignment alternatives were further refined and preferred alignments were identified.

Based on the preferred trail alignments, trail typologies (modes) were established that suited the various conditions – both inside and outside of road right-of-ways – through which the trail would pass. A trail design framework was developed based on trail typologies (modes), anticipated construction requirements, and the trail planning logistics of safety, security, and wayfinding. The preferred alignment and design framework information was presented at the second of two public open houses where additional comments were recorded to guide the final modifications of the trail master plan.

Building on the information accumulated throughout the trail master planning process, an implementation meeting was convened with the PAC to discuss and document trail project priorities, timelines, and funding strategies for trail segments studied during plan development. Information concerning implementation strategies including cost estimating data was compiled and organized for reference in future trail planning efforts. Appendix A has the meeting agendas, minutes, and attachments from each PAC meeting.

Public Involvement and Stakeholder Interviews

Metro and local partners hosted two public open houses with over 120 persons in attendance. The open houses were held on June 7, 2012, and January 31, 2013. See Appendix B for the open house summaries.

In addition, 17 stakeholder interviews were conducted. See Appendix C for details.

Local neighborhood groups and associations, the David Douglas School District administrative staff, two school principals, Willamette National Cemetery staff, Lincoln Park Memorial Cemetery staff, and Boys Scouts of America staff were briefed and interviewed as well.

The trails planning effort was also highlighted on the Metro and local partner web sites and in local newsletters.

Additional public outreach will occur in the Winter/Spring of 2014 when various parks and trails boards and government bodies are asked to endorse the recommendations of the plan.

Master Plan Purpose

The Master Plan details the trail network into a series of developable phases. The built-out trail system creates a regional trail network connecting the Springwater Corridor, Powell Butte in the north to Mount Talbert and the Sunrise Corridor/Clackamas River Bluffs and Greenway in the south. The system is extensive and comprehensive, and at the same time provides a realistic program for satisfying the needs of local residents regarding access to outdoor resources and linkage to popular destinations.

The early action network is designed to form an inner loop of trails through some of the most densely populated areas of the community, linking residents to existing resources that are in close proximity to where they live and work. This will create a critical mass of trail facilities that will offer the citizens many of the benefits that have been outlined in the plan. Among these benefits are improving access to outdoor resources for recreation, linking schools to residential neighborhoods providing children with the opportunity to walk or bike to school, and capitalizing on tourism and economic development opportunities.

The plan lays the groundwork for future planning of trails, right-of-way or easement acquisition, construction, and maintenance costs for state, regional, local, and private property owners.

This page was intentionally left blank.

2. EXISTING CONDITIONS

Site reconnaissance by the Project Advisory Committee

Planning Context

The Mount Scott/Scouters Mountain Trail Loop Master Plan project connects Clackamas County, Happy Valley, and Portland, joining together several governmental agencies and organizations in a cooperative effort to make the trail system a reality. Development codes, planning documents, and design guidelines from each agency and from State and Federal sources serve as the foundation for the trail master plan. The identification of—and basis of design for—trail alignment alternatives will be guided by the planning documents listed below.

Clackamas County

- NCPRD Parks and Recreation Master Plan
- Clackamas County Comprehensive Plan
- Clackamas County Zoning and Development Ordinance
- Sunrise Corridor Project Final Environmental Impact Statement
- Connecting Clackamas webpage

City of Happy Valley

- Happy Valley Parks Master Plan
- Happy Valley Pedestrian System & Trail Master Plan
- Happy Valley Trail Development Handbook

Metro

- Metro Greenspaces Master Plan and Regional Trails System Map
- Metro Regional Transportation Plan
- Metro Active Transportation Plan
- Metro Target Area Plans from 2006 Voter Approved Bond
- Metro Wildlife and Habitat Protection Plans
- Metro Vision 2040 Growth Concept
- Resource Conservation Plan

City of Portland

- City of Portland Comprehensive Plan
- Portland Bicycle Plan for 2030
- Trail Design Guidelines for Portland's Park System
- Portland Parks & Recreation: Recreational Trails Strategy
- Natural Area Acquisition Strategy (Vegetation Studies by Portland Parks)
- Multnomah County Transportation System Plan

A list of planning documents with detailed information and specific provisions relevant to the trail master plan are summarized in Appendix D. Many provisions established

The Power Line Corridor trail is a key link to the regional trail system.

by governing agencies are supportive of trail planning objectives and help formulate strategies for trail location. For instance, the City of Happy Valley's Development Code specifically requires that all developments "provide a continuous pedestrian and/or multi-use pathway system as shown in the City's TSP, Happy Valley Parks Master Plan, or NCPRD Parks and Recreation Master Plan."

Jurisdictions & Ownership

The proposed Trail Loop is located within the cities of Portland and Happy Valley, as well as unincorporated areas of Multnomah and Clackamas Counties. Trail ownership and management responsibilities will span a number of involved agencies (Figure 2-1).

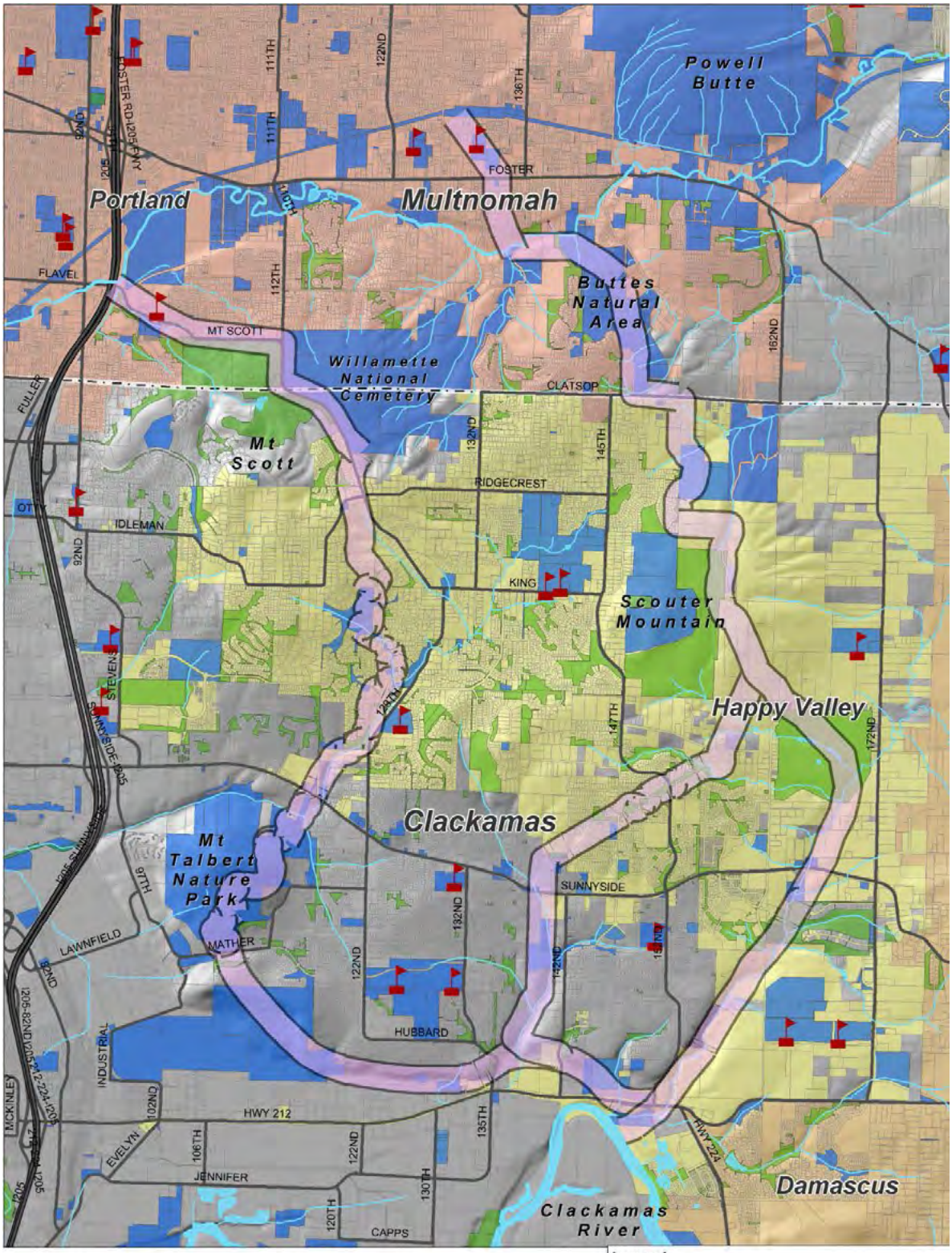
Large publicly-owned parcels present opportunities for trail alignments. Potential public agency project partners include: Metro, Clackamas County, City of Portland Parks and Recreation, City of Happy Valley, North Clackamas Parks and Recreation District, North Clackamas School District, David Douglas School District, and Oregon Department of Transportation (ODOT).

The terrain rises steeply over ODOT's future Sunrise Corridor.

Segments within privately held properties are also necessary for a complete trail system. Opportunities for trail development on private lands are most feasible on large parcels which are not developed. These include lands owned by home owner associations, developers, private individuals, cemeteries, hospitals, and utility companies. Trail easements and/or right-of-way shall only be purchased from willing sellers.

The Rock Creek area remains largely in private ownership.

Figure 2-1. Mount Scott/Scouters Mountain Trail Loop: Ownership and Jurisdictional Boundaries



Mt. Scott/Scouters Mtn. Trail Loop:
Ownership & Jurisdictions

0 0.25 0.5 1 Miles

Legend

- Schools
- Study Segments
- County Boundary
- Private Open Space
- Public Ownership
- Private Unincorporated

Private Property by Jurisdiction

- Damascus
- Gresham
- Happy Valley
- Portland

Schematic alignment shown is superseded by this Master Plan. See the Master Planning Map on page 68 & 69.

Land Use and Zoning

An area's zoning dictates which land uses may occur on individual parcels, thereby driving the regional development pattern. The identification of residential, open space, commercial, and industrial areas shown in Figure 2-2 gives a broad view of where potential trail users may originate and travel. The Mount Scott/Scouters Mountain Trail Loop study further evaluates natural resource area and slope overlay zones which impose development and design restrictions (discussed in the permitting section below).

The majority of the Trail Loop study area is comprised of privately owned residential zoned properties. Commercial destinations are primarily concentrated along Sunnyside Road within mixed use developments. Highway 212 in the south is predominantly industrial and thus serves as an employment center for the region. Large parcels adjacent to Rock Creek between Sunnyside Road and Highway 212 have development potential. While most are owned by banks or private developers, Providence Health holds two properties just north of the highway. Discussions should occur with Providence regarding a partnership and the health benefits of trails. Parks, open spaces, and public facilities occur throughout the area providing destinations and connections along the trail route.

Destinations

In addition to commercial centers and employment opportunities, area destinations include local schools, parks, open spaces, cemeteries, and historic resources. Figure 2-3 highlights the study area's many destinations.

Schools

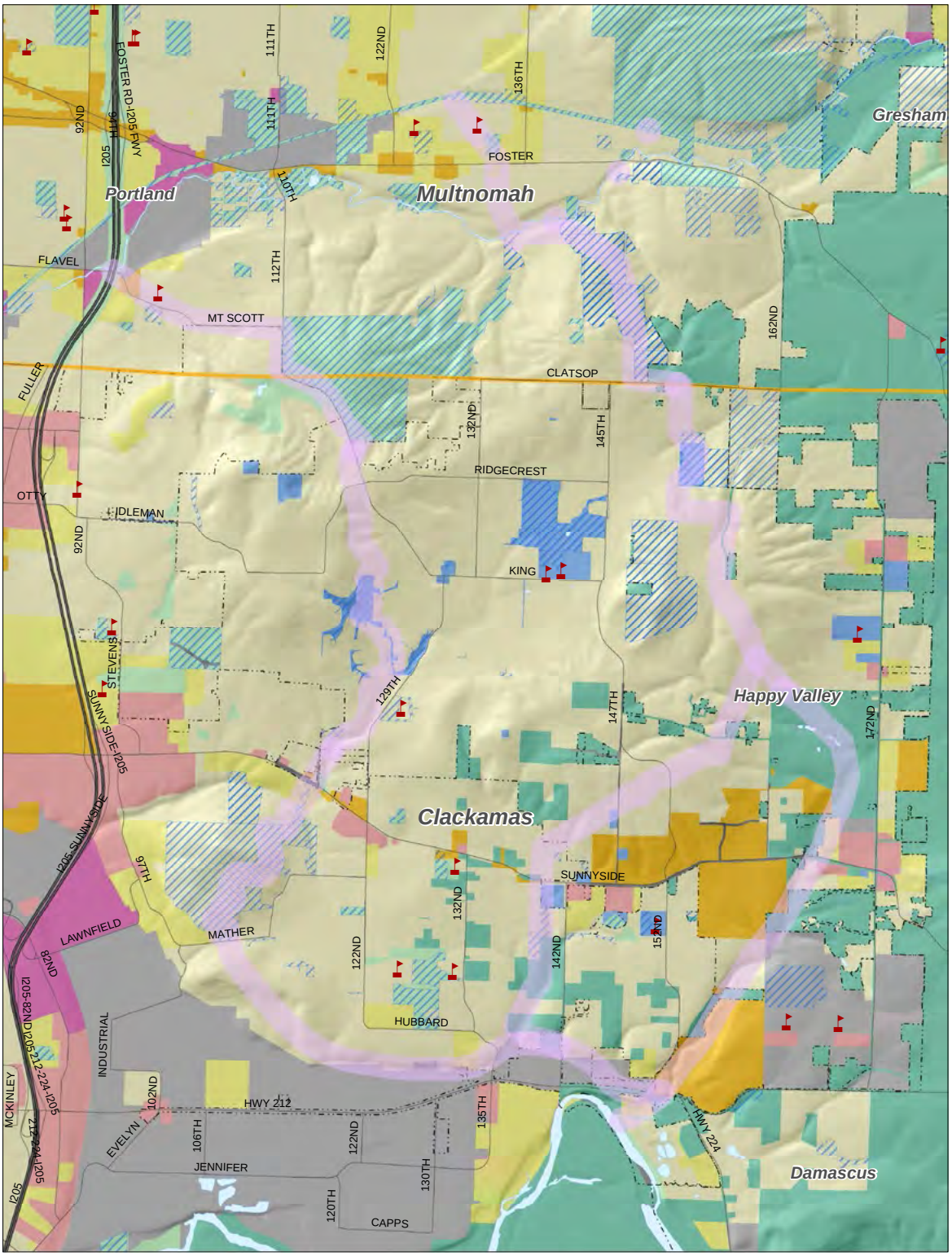
The Trail Loop has the potential to improve non-motorized access to 17 elementary, middle, and high schools, as well as one planned school in the David Douglas School System. Currently, opportunities to safely walk and bicycle to area schools are lacking.

Parks and Open Spaces

Recreational destinations include neighborhood and regional parks, open spaces, and cemeteries. A series of ancient lava domes comprise the East Buttes, creating a ring of forested peaks around the study area.

Mount Talbert Nature Park is a prominent destination offering a connection to nature close to home. At over 220 acres, it is the largest undeveloped butte in Northern Clackamas County, offers miles of hiking trails and interpretive information about local cultural

Figure 2-2: Mount Scott/Scouters Mountain Trail Loop: Zoning Map



Mt. Scott/Scouters Mtn. Trail Loop: Zoning

Legend

- Schools
- County Boundary
- City Boundary
- Water
- Public Open Space

Generalized Zoning

- Public Facilities
- Commercial
- Industrial
- Mixed Use Employment
- Mixed Use Residential
- Multi Family
- Single Family
- Parks & Open Spaces
- Rural

0 0.25 0.5 1 Miles

Schematic alignment shown is superseded by this Master Plan. See the Master Planning Map on page 68 & 69.

and natural resources. The nature park is owned by Metro and NCPRD and managed by NCPRD.

Another exciting destination along the trail will be Scouters Mountain Nature Park. East of SE 145th, the nearly 100 acre park is planned to open to the public in early 2014. Planned improvements include hiking trails, a picnic shelter, parking, and restroom facilities.

Metro's newly acquired Scouters Mountain is an exciting destination for trail users

North of the Springwater Corridor, the City of Portland's Powell Butte Nature Park is a unique 600-acre open space opportunity. It provides nine miles of hiking, bicycling, and equestrian trails as well as a variety of wildlife habitat areas and exceptional views of five Cascade peaks and several nearby buttes, including Mount Hood.

The City of Portland's Buttes Natural Area is a significant natural resource area north of Clatsop Road and west of Barbara Welch Road. Areas of intact mature forests, wetlands, stream tributaries, and rugged terrain make this a valuable natural resource area.

The Leach Botanical Garden showcases plant collections including Oregon native plants, the historic Leach collection, flora of the southeastern United States, an extensive fern collection, and a Camellia exhibit. The site also provides a botanical library and environmental education opportunities.

Brookside Natural Area south of Foster Road and 110th Drive provides public access to Johnson Creek. The site includes a playground, walking trails, and opportunities to view wildlife. The site also provides important flood storage capacity, wetland improvements, and restored fish and wildlife habitat. Additional public amenities are currently being planned.

Within the study area, the City of Portland's park assets include PlayHaven Park. PlayHaven provides users with a basketball court, accessible play area, and picnic facilities, restrooms, and parking.

The 32-acre Happy Valley Park on Ridgecrest Road offers a variety of sport courts and fields, a walking loop, splash pad area, off-leash dog area, picnic facilities, skatepark, playground, restrooms, parking, and 24 acres of wetlands accessible by boardwalks.

NCPRD's Hood View Park is a 35-acre community park off of 162nd Avenue in the southeastern portion of the study area. It accommodates 200,000 visitors each year with four all-weather ballfields, picnic facilities, restrooms and parking. Views from the park include Mount Hood and Mount St. Helens. Currently, visitors can only arrive by car due to a lack of connectivity for non-motorized users.

A trail alignment along Rock Creek will improve non-motorized access to Hood View Park

Southern Lites Park is a 3-acre park on SE 117th Avenue. It offers a basketball court, picnic facilities, playground area, and parking. The two-acre Pioneer Park on SE 153rd Drive features climbable rocks, picnic facilities and loop trial that opened in September, 2013.

Numerous residential developments or home owners associations (HOA) within the area include built parks, trails, and open space areas.

Zenger Farm is a six-acre urban farm situated between Foster Road and the Springwater Corridor which provides educational opportunities for youth, farmers, and families in sustainable agriculture, wetland ecology, and food security. Since 2011, the farm includes the Furey Community Garden which offers 36 community plots for East Portlanders. Originally purchased by the City of Portland's Bureau of Environmental Services (BES), the farm is currently operated by the non-profit group Friends of Zenger Farm.

Lincoln Memorial Park Cemetery and Willamette National Cemetery (WNC) offer unique pastoral settings and spectacular view opportunities. Lincoln Memorial already welcomes walkers, runners and cyclists. The trail is not planned to go through WNC.

The quiet roadways of Lincoln Memorial Cemetery welcome pedestrians and cyclists to enjoy the serene setting

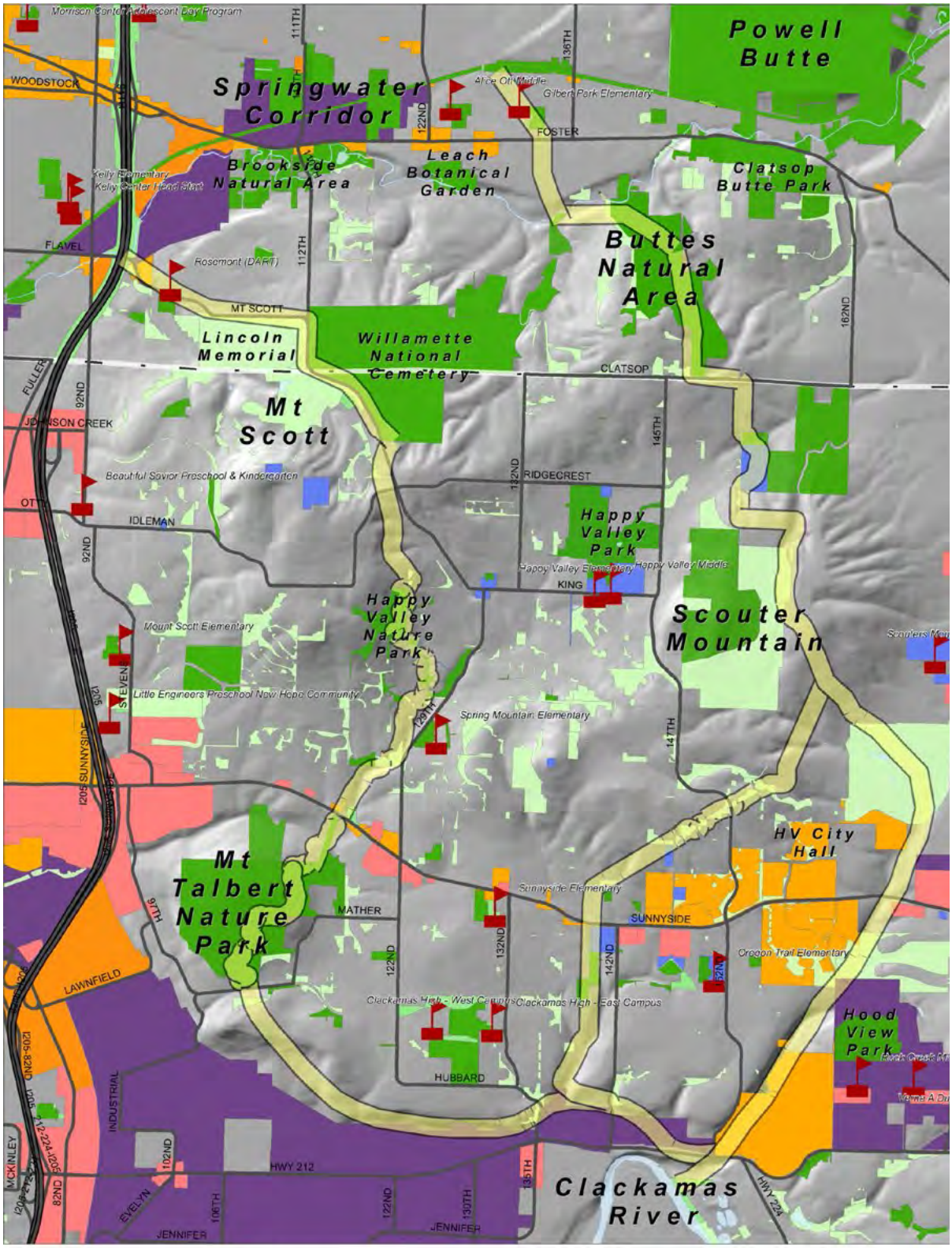
Historic Resources

Historic properties create opportunities to showcase local history and culture. Two properties within the study area are included on the National Historic Register (Figure 2-4). The 300+ acre Willamette National Cemetery dates to 1949. The second property is the 1923 Miller home in the Gilbert neighborhood, showcasing the Craftsman Bungalow architectural style.

Additionally, other properties in the study area have been inventoried and are eligible for historic status by the Oregon State Historic Preservation Office. These include the following:

- 1890 Strickrott Residence – Home on Mount Scott Boulevard, thought to be the oldest home in Happy Valley.
- 1956 Camp Withycomb – Over two dozen historically significant buildings and features. The site has been used as a military installation since 1910 when it was known as the Clackamas Rifle Range.
- 1933 Pleasant Valley Grange – The meeting hall has both social and political significance for local farmers.
- 1920 Haberlach House and Silverthread Kraut and Pickle Works Building – Located off of Hwy 212 on an old wagon road. Eligible buildings within this property include the bungalow style residence and agricultural product processing facility.

Figure 2-3: Mount Scott/Scouters Mountain Trail Loop: Destinations



Mt. Scott/Scouters Mtn. Trail Loop: Destinations

0 0.25 0.5 1 Miles

Legend

School

Zoning
- Commercial
- Industrial
- Mixed use Employment
- Mixed Use Residential
- Public Facility
- Public Open Space

Study Segments

Schematic alignment shown is superseded by this Master Plan. See the Master Planning Map on page 68 & 69.

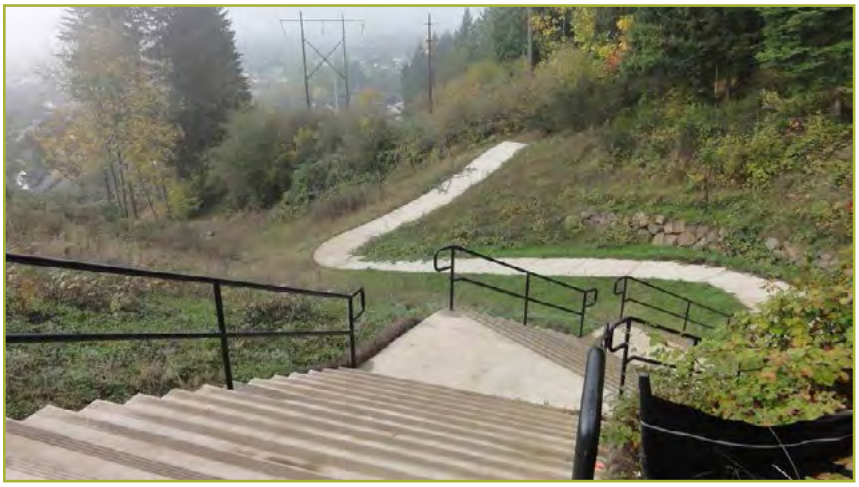
Figure 2-4: Mount Scott/Scouters Mountain Trail Loop: Historic Sites

Connectivity & Circulation

Trails

Trails are a popular means of transportation and recreation year-round within the study area. Counts of trail users conducted by NCPRD and Metro in September of 2011 found that on average, 5.7 users are encountered every fifteen minutes on nearby regional trails and bike facilities. The trail count process found that 72% of users were cyclists, while 28% were pedestrians. Intercept surveys revealed that most people use the trails because they are accessible or close to home, are a safe alternative to roadways, and are relatively flat (e.g., Springwater Corridor).

Currently, segments of built trails exist that may be designated as portions of the Trail Loop. These include both unpaved hiking paths as well as segments of well-established regional trails including Mount Talbert Nature Park trails, hiking paths within Happy Valley's Nature Trail Park, local trails within the Lincoln Heights and Southern Lites neighborhoods, paved portions of the Powerline Trail, a segment of the paved multi-use Springwater Corridor, and a portion of the I-205 bike and pedestrian path. The City of Happy Valley requires as a condition of approval that private parcels to be developed provide a trail easement on the final plat. Affected property owners are further required to establish an agreement with the City which conveys trail maintenance and liability responsibilities to the property owners.



While portions of the Powerline Trail are built, stairs and slopes limit its use.

The Springwater Corridor and I-205 bike/ped path are significant regional trails which offer connectivity to the urban areas of downtown Portland, Gresham, and Vancouver, WA, as well as the rural setting of unincorporated Clackamas County to the east and possible future connections to Mount Hood and the Pacific Crest Trail. Future proposed trail connection opportunities including the North Clackamas Greenway to the west, Scouters Mountain Trail

Extension towards Damascus, and Sunrise Corridor/Clackamas River Greenway in the south are documented within Clackamas County's Comprehensive Plan, NCPRD's Park Master Plan, and Metro's Regional Trails and Greenways publication.

Trailheads and Access

Access to the trail system exists in many locations where trails are already built. Mount Talbert Nature Park currently has neighborhood connections as well as two trailheads with parking spaces and interpretive signage. The built portion of the Powerline Corridor Trail is adjacent to residential properties and has numerous existing access points. The Southern Lites neighborhood also has access points to its existing local trail system as well as trails within Nature Trail Park (Figure 2-5). There is a parking lot at Powell Butte and there will be parking at East Lents Floodplain Restoration site off of SE Foster Road adjacent to where the Springwater Corridor crosses Foster Road.

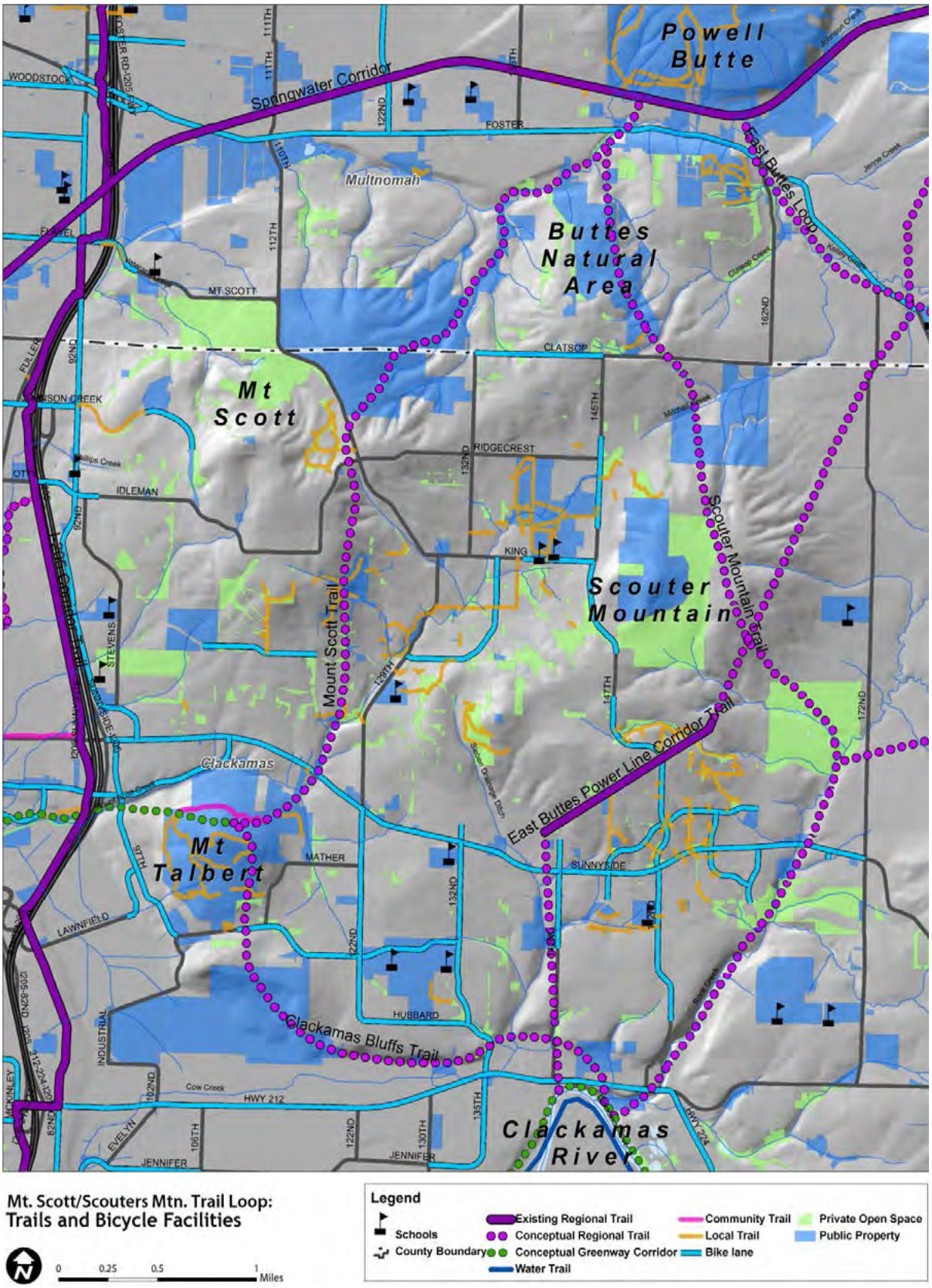
The Scouters Mountain property is a relatively new acquisition for Metro. Plans for developing site amenities are in process and include a covered shelter, vehicle parking, and pedestrian trails.

Nature Trail Park includes neighborhood access and earthen hiking paths

Bicycle Facilities

Access to the Trail Loop by bicycle will occur easily via the various entry points along streets and trailheads. Bicycle access is adequate within the study area, though many routes are on high-speed and/or high-volume roads without much protection from vehicle traffic. On-street, striped bike lanes exist primarily on the major arterials, including Sunnyside Road, Highway 212, and the minor arterials such as Foster Road and Mount Scott Boulevard. Partial bike lanes

Figure 2-5: Mount Scott/Scouters Mountain Trail Loop: Trails and Bicycle Facilities



Schematic alignment shown is superseded by this Master Plan. See the Master Planning Map on page 68 & 69.

or widened shoulders are prevalent on the collector roadways. Bike lanes are not typical or warranted on local roadways with low speed and traffic volumes. Of the roadways within the study area, those with the highest speeds and traffic volumes are currently outfitted with striped bike lanes.

Access to the trail from outside the immediate study area will likely be through the fastest, most direct routes. Typically, these lie within the arterial road alignments, all of which are furnished with bike lanes. The I-205 bike/ped path and Springwater Corridor are dedicated bicycle facilities that have potential to intersect with the Trail Loop; however, no formal connections between the facilities currently exist between the established facilities and the conceptual Mount Scott/Scouters Mountain alignments. Such connections will be explored as part of this project.

Public Transit

Transit facilities exist within the study area on the arterial roadways only. Due to a low incidence of ridership and lack of employment centers or destinations, the frequency with which the buses or trains operate (also called headway) is nominal and few stops are provided with shelter amenities. A complete list of transit connections is provided below.

Light Rail Service

- Light rail service to the Trail Loop is available via two lines: the green line, running north-south along I-205 with stations located at SE Foster Road, SE Flavel Avenue, SE Fuller Road, and Clackamas Town Center; and the blue line, running east-west to Gresham, with one nearby station option at SE 122nd Avenue and Burnside. In general, MAX trains operate every 15-20 minutes on weekdays and Saturdays, and up to 30 minutes between trains on Sundays. This service will allow trail users from as far west as Hillsboro to access the Trail Loop.

Bus Service

- TriMet line #10 operates on Foster Road to SE 136th Avenue; no other line continues east toward Barbara Welch Road, a possible trail crossing location. This line intersects with the grade-separated Foster Road light rail station and operates on 20-minute headways, weekdays only.
- TriMet line #71 operates on Foster Road to SE 122nd Avenue, also intersecting with the Foster Road light rail station. Of the transit connections to the Trail Loop, the #71 operates most frequently on 20-minute headways, both weekdays and weekends.

  - Line #71 has a unique route through east Portland. Riders from as far north as Parkrose can board the #71 south along SE 122nd Avenue to Foster Road. Likewise, riders from outer southeast could use the #71 to transfer to lines #30, 155, and 156 at the Clackamas Town Center transit center.
  - Further north, line #71 intersects with the MAX Blue Line to Gresham at SE 122nd Avenue and Burnside.

- TriMet line #19 travels east on Mount Scott Boulevard to SE 112th Avenue where it turns around at the end of the residential zone, which is also the boundary of the two cemetery properties. The #19 will easily connect bicyclists to the Trail Loop, as the crossing near the Willamette National Cemetery is only 0.7 miles south. This line is intersects with the Flavel Street light rail station on I-205. Service varies between 15-45 minute headways.
- Sunnyside Road is served by TriMet line #155, with 45-minute headways between Clackamas Town Center and SE 157th. This line is accessible from the Clackamas Town Center light rail station, connecting those who travel to/from Clackamas County via MAX.
- TriMet line #156 weaves its way across several potential trail crossings as it travels east-west between Sunnyside and Highway 212. With 90-minute headways on weekdays only, users must plan trips to the Trail Loop carefully. This line is also accessible from the Clackamas Town Center light rail station, connecting those who travel to Clackamas County via MAX.
- TriMet line #30 runs along Highway 212 on 60-minute headways; no service is available on Sundays. This line is also accessible from the Clackamas Town Center light rail station.

Roadway Analysis and Trail Crossings

Because the region is continuing to develop, the current roadside accessibility and crossing options are poor and will require improvements to create a safe bicycle and pedestrian environment.

Major roadways are often barriers which affect paths of travel for cyclists and pedestrians. Major arterials within the study area include Sunnyside Road and Highway 212. These two roadways consist of two travel lanes in each direction with center turn lanes, and bike lanes on each side. The crossing distance ranges between 81- and 120-feet. Because the speeds are posted at 40-45 mph, trail crossings must be protected, either by signals or by grade separation. Planning for the future Sunrise Corridor, a proposed high-speed highway will also impact the Mount Scott/Scouters Mountain Trail Loop alignment (Figures 2-6 and 2-6a).

Minor arterial and collector road crossings also exist within the Trail Loop alignment. Roadways such as Foster Road, Clatsop Street, 162nd and 152nd Avenues have a narrower crossing distance but maintain higher speeds and lower volumes. In these instances, trail crossings must be located in areas of good sight distance and designated through advance signage and striping.

Local roadways, with lower traffic volumes and speeds, are preferred by cyclists and pedestrians. The majority of on-roadway alignment and roadway crossings will occur at local roadways. Examples within the corridor include Hagen Road, Vradenburg Road, and Spanish Bay Drive. Crossing distance, however, is significantly shorter due to the narrower roadway widths.

All primary roadways were analyzed for compatibility with trail alignments as shown Appendix E. In cases where on-street alignments will be used for the trail, designs will need to be as "trail-like" as possible, by providing comfort and protection for less-confident cyclists.

152nd Avenue south of Clatsop Road is a quiet unpaved road.

Intersections

In some circumstances, the Trail Loop will attempt to align with existing signalized intersections at the major arterial crossings to capitalize on existing infrastructure. Most of the signalized intersections are equipped with pedestrian countdown signals and crosswalk striping, providing a safe crossing treatment as all through-traffic is stopped during the pedestrian phase. Some intersections also include a pedestrian island when the crossing distance is extremely long.

Some crossings may occur at unsignalized intersections. In these cases, the trail may utilize a grade-separated crossing or a pedestrian activated signal such as a High-Intensity Activated Crosswalk (HAWK) or Rectangular Rapid Flashing Beacon (RRFB). ODOT has recently

included rectangular rapid flashing beacons as standard details (see DET4436-4438). Examples of crossings not near existing signalized intersections include Highway 212 at SE 152nd Avenue where the nearest signal is approximately 700 feet east and Sunnyside Road at Rock Creek where the trail may be able to proceed under the existing bridge. Installing grade-separated crossings or new traffic signals are costly. New signals may also require re-timing of subsequent signals. The volume of potential trail users should be considered when determining the appropriate design for the crossing.

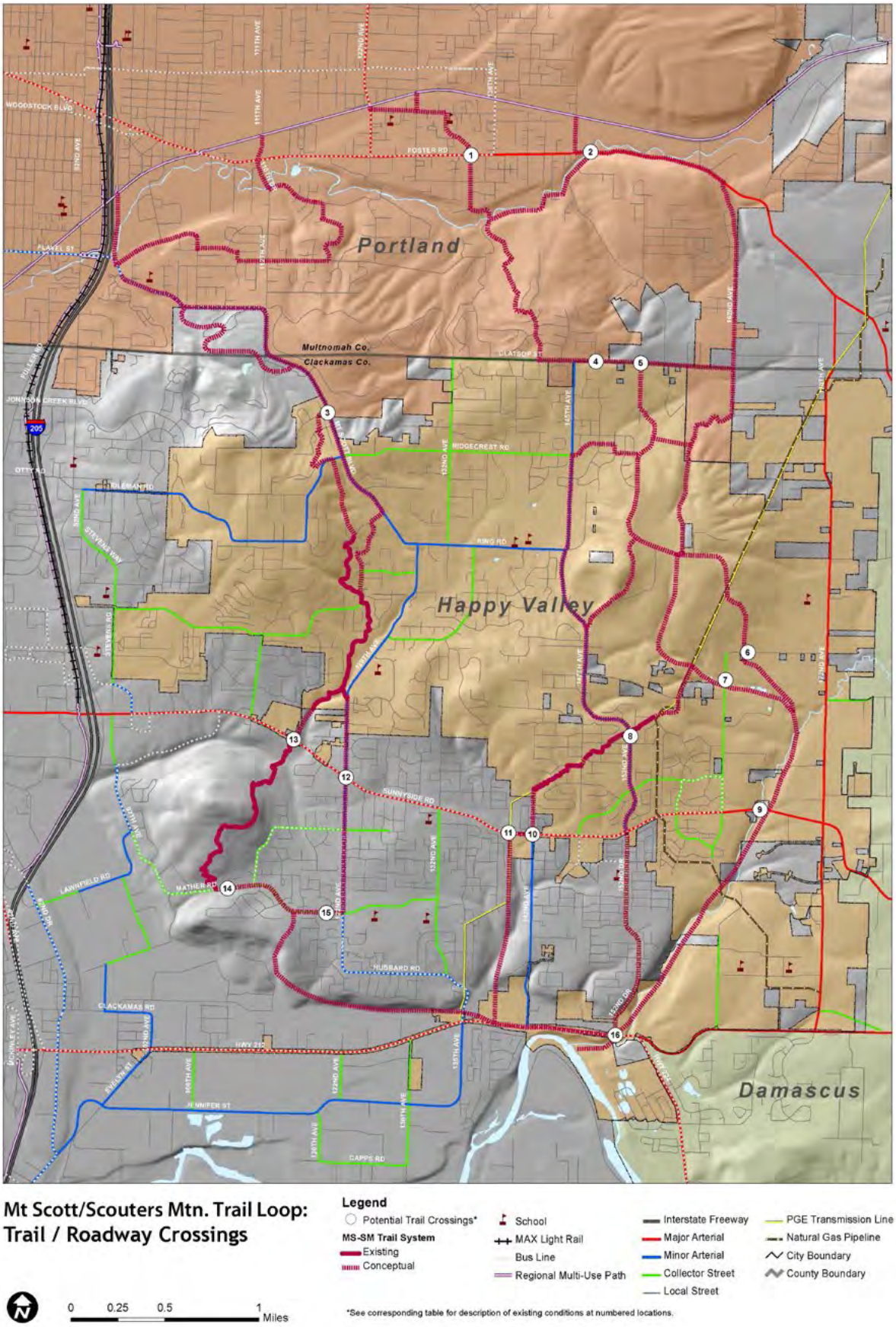
Mid-block crossings are advantageous when the nearest intersection is too far away for pedestrians to safely choose that option. Mid-block crossings also do not experience turning traffic, thereby eliminating a safety concern that occurs at intersection crossings. Examples of potential Trail Loop mid-block trail crossings are along Mather Road, SE 162nd Avenue, Hagen Road, Mount Scott Boulevard, and Clatsop Street. Depending on the existing conditions, treatments can include a range of items such as signage, crosswalk striping, speed table (flattened speed hump), HAWK, RRFB, or median island. An example of an existing mid-block crossing treatment is at SE 152nd Avenue at the Powerline Corridor Trail crossing.

All roadway crossings, regardless of the roadway's functional classification, should be reviewed by an engineer to determine the crossing treatments. Regulatory traffic control devices should be installed on the trail at every road intersection. Conversely, roadway markings, including crosswalk stripes, will be designed and installed on a case-by-case basis. AASHTO's Guide for the Development of Bicycle Facilities offers several options for signage, striping/markings, and hard-surface improvements. Likewise, the Manual on Uniform Traffic Control Devices (MUTCD) describes warrants for proposed signals as well as detailed marking treatments.

Utilities

Various utilities traverse the landscape of the Trail Loop, and more will continue to infill before the trail is completed in this developing fringe of the urban growth boundary. Underground utilities include typical storm and sanitary sewer, domestic water lines, and communication ducts. Both electrical distribution and transmission (trunk) lines exist within the project study area. Working around these utilities is generally uncomplicated unless the trail grades demand a large amount of earthwork near an underground utility. Early and constant communication with the utility providers and agencies is important. Permanent easements for crossing the utilities will likely be unnecessary.

Figure 2-6: Mount Scott/Scouters Mountain Trail Loop: Trail / Roadway Crossings



Schematic alignment shown is superseded by this Master Plan. See the Master Planning Map on page 68 & 69.

Figure 2-6a: Mount Scott/Scouters Mountain Trail Loop: Trail/Major Roadway Crossings Key Map

Item Number	Description
1	"Foster Road/SE 134th Sidewalk, bike lane access 40 mph Signalized crosswalk 60' crossing distance"
2	"Foster Road/SE Barbara Welch Sidewalk, bike lane access 40 mph Signalized crosswalk 48' crossing distance, with islands No sidewalks on Barbara Welch"
3	"Mt. Scott Blvd./Carter Bike lane access (one direction only) 35 mph Unsignalized (future signal planned) 30' crossing distance Entrance to Willamette Nat'l Cemetery"
4	"Clatsop/SE 147th Sidewalk access only, widened shoulder on south 45 mph Unsignalized (future signal planned at 145th) 40' crossing distance Redirect users to nearest signal at 145th"
5	"Clatsop/SE 152nd No sidewalk or bike access 45 mph Unsignalized (future signal planned at 145th) 21' crossing distance Rural location will require sight distance treatment and signage"
6	"Hagen/east of 162nd No sidewalk or bike access 40 mph Unsignalized (future signal planned at 162nd/Hagen, extension of 162nd north) 22' crossing distance Rural location; steep cross slopes/banks"
7	"162nd/south of Hagen No sidewalk or bike access 40 mph Unsignalized (future signal planned at 162nd/Misty, extension of 162nd north) 22' crossing distance Rural location; imprvt's to 162nd may improve crossing opportunity"
8	"152nd/SE Frye (Powerline crossing) Sidewalk, bike lane access 40 mph Unsignalized; median island, marked crosswalk 46' crossing distance Existing Powerline Trail crossing"

Figure 2-6a: Mount Scott/Scouters Mountain Trail Loop: Trail/Major Roadway Crossings Key Map (Cont.)

Item Number	Description
9	"Sunnyside/Rock Creek Sidewalk and bike lane access 40 mph Unsignalized, no crosswalk 91' crossing distance (includes median) Opportunity for trail to go under Sunnyside/Rock Creek bridge"
10	"Sunnyside/SE 142nd Sidewalk, bike lane access 40 mph Signalized crosswalk 85'-99' crossing distance"
11	"Sunnyside/SE 140th Sidewalk, bike lane access 40 mph Unsignalized, no crosswalk 81' crossing distance Redirect users to nearest signal at 142nd"
12	"Sunnyside/SE 122nd Sidewalk, bike lane access 40 mph Signalized crosswalk 120' crossing distance with islands Skewed intersection increases crossing distance"
13	"Sunnyside/SE 117th Sidewalk, bike lane access 40 mph Signalized crosswalk 100' crossing distance Heaviest traffic crossing on trail loop"
14	"Mather Road/SE Cranberry Loop Sidewalk, partial bike lane access 35 mph Unsignalized, no crosswalk 30' crossing distance Adequate sight distance"
15	"Summers/west of 122nd Sidewalk, bike lane access 35 mph Unsignalized, no crosswalk 36' crossing distance Steep side slope on south"
16	"Highway 212/224/SE 152nd Partial sidewalk, bike lane access 45 mph Unsignalized, no crosswalk 81' crossing distance Redirect users to nearest signal 700' east; May be impacted by Sunrise Corridor Plan"

Additionally, the trail alignment may cross or run near to large, private utilities. These include a high-pressure gas transmission line located adjacent to the aerial electrical transmission line in the eastern portion of the study area. Crossing either of these utilities will require careful communication and notifications with the utility providers. A temporary easement for construction and a permanent easement for trail use will be required from each provider.

Environmental Conditions

Natural Resources

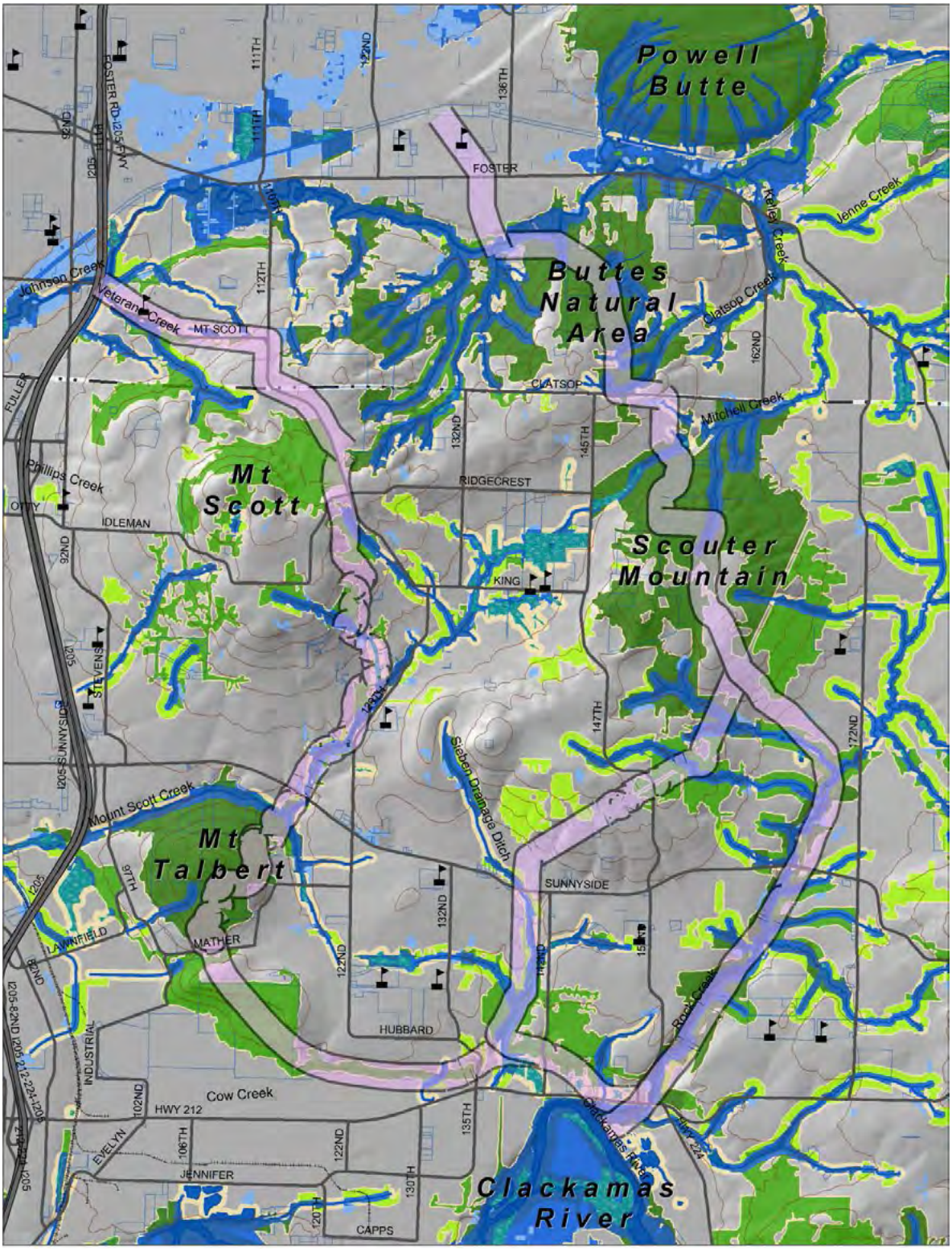
A group of extinct volcanoes and lava domes in north Clackamas and east Multnomah counties lend unique geographic character to the region, providing wildlife habitat and panoramic vistas. The buttes consist of some of the largest contiguous habitat in the region, while offering water quality protection of stream headwaters, as well as recreation opportunities close to home. Figure 2-7 shows regionally significant riparian and upland wildlife habitat, habitats of concern, and impacted areas as classified by Metro staff.

The buttes are characterized by large tracts of upland forests including old cedar trees, big-leaf maple, Douglas fir, and alders. Mount Talbert is home to conifer and streamside forests, a revitalized oak savanna, and a wet prairie meadow. Powell Butte contains a variety of wildlife habitats including an expansive grassland meadow, a scrub shrub transition area, and a mid-seral stage forest area.

Scouters Mountain is another important natural area along the proposed route. The future nature park includes Mitchell Creek and its tributaries feeding Kelley Creek and ultimately Johnson Creek. Scouters Mountain features a small wet meadow and a large Douglas-fir forest with Western red cedar and hemlock trees. Management and restoration plans for Scouters Mountain, including the removal of invasive plant species, are currently being written.

The Mount Scott/Scouters Mountain Trail Loop study area falls within three watersheds: Johnson Creek, Mount Scott, and Rock Creek. These watersheds include many streams which are attractive recreation corridors for trail users. One of the most important natural resources for the City of Portland is Johnson Creek. It is one of the last free-flowing streams in the Portland area and provides important habitat for Coho and Chinook salmon, Steelhead, and Cutthroat trout. Over the last 200 years, people have attempted to alter the creek in an effort to reduce flooding. Despite these efforts, over the last 60 years flooding has occurred at a rate of more than once every two years (Portland Bureau of Environmental Services

Figure 2-7: Mount Scott/Scouters Mountain Trail Loop: Natural Resources



Mt. Scott/Scouters Mtn. Trail Loop:
Natural Resources

0 0.25 0.5 1 Miles

Legend

- Study Segments
- 100' Contours
- Wetland
- PublicProperties

River and streams
- Class 1
- Class 2
- Class 3
- Class 4

Title 13 Inventory
Upland Wildlife Habitat Quality
- Class A
- Class B
- Class C

Riparian Wildlife Habitat Quality
- Class I
- Class II
- Class III

Other
- Resource Impact Area

Schematic alignment shown is superseded by this Master Plan. See the Master Planning Map on page 68 & 69.

website). Wetlands within the Johnson Creek watershed have been highly impacted by development as well. Despite these impacts many wetlands in the basin retain good connectivity with undeveloped open space, upland habitats, and the Johnson Creek riparian corridor. Wetland areas provide significant areas of wildlife breeding and nesting with dense populations of amphibians, including red-legged frogs.

Similarly, Mount Scott Creek and Rock Creek provide important ecosystem functions within Clackamas County. Water Environment Services (WES) of Clackamas County has developed the Rock Creek and Kellogg/Mount Scott Watershed Action Plans in order to protect and enhance the health and function of each watershed, including water quality, aquatic habitat, and hydrologic functions. The action plans describe general concerns and challenges of the watersheds, such as impervious area, fish passage, flooding, poor streamside practices, lack of riparian vegetation, in-stream erosion and down cutting, and water quality concerns. Despite these challenges, adult salmon, steelhead, and cutthroat trout have been documented in Kellogg and Mount Scott creeks (Oregon Department of Fish and Wildlife [ODFW], 2008).

Rock Creek begins in the hills of western Damascus, flowing southwest through eastern Happy Valley, until it reaches its confluence with the Clackamas River. The Rock Creek watershed forms a patchwork of forested habitats and riparian corridors mixed with agricultural lands, roads, houses, and other development. The influences of development in the watershed have fragmented habitat connections and impacted the water and habitat quality of the riparian zones. However, there are still large patches of upland forest habitat and vegetated riparian corridors that provide dwelling, feeding, and nesting habitat and movement and migration for many of the region's resident wildlife species. While the Rock Creek watershed has not yet been heavily developed, its urban areas are expected to grow significantly in the future within both the Cities of Happy Valley and Damascus. The watershed's streams have been impacted by agriculture, roads, and other rural development since the early 1900s. Despite these impacts, Rock Creek supports a diverse array of native aquatic life. Recent sampling conducted by ODFW in 2008 indicates that Steelhead and Rainbow trout, Coho salmon, Chinook salmon and Cutthroat trout are present within the watershed (WES Rock Creek Watershed Action Plan, 2009).

The creeks act as wildlife corridors for the passage of wildlife species not normally observed in large cities, including deer, coyote, and many woodland and meadow birds. The natural areas provide food and shelter for deer, coyotes, raccoons, Western gray squirrel, rubber boa, pileated and hairy woodpeckers, white-breasted nuthatch,

Western tanager and many more species of wildlife. The combination of the upland habitats, seasonal wetlands and steams found within the natural areas of the study area provide forage, perch, roost and nest opportunities for birds, mammals and reptiles.

Topography

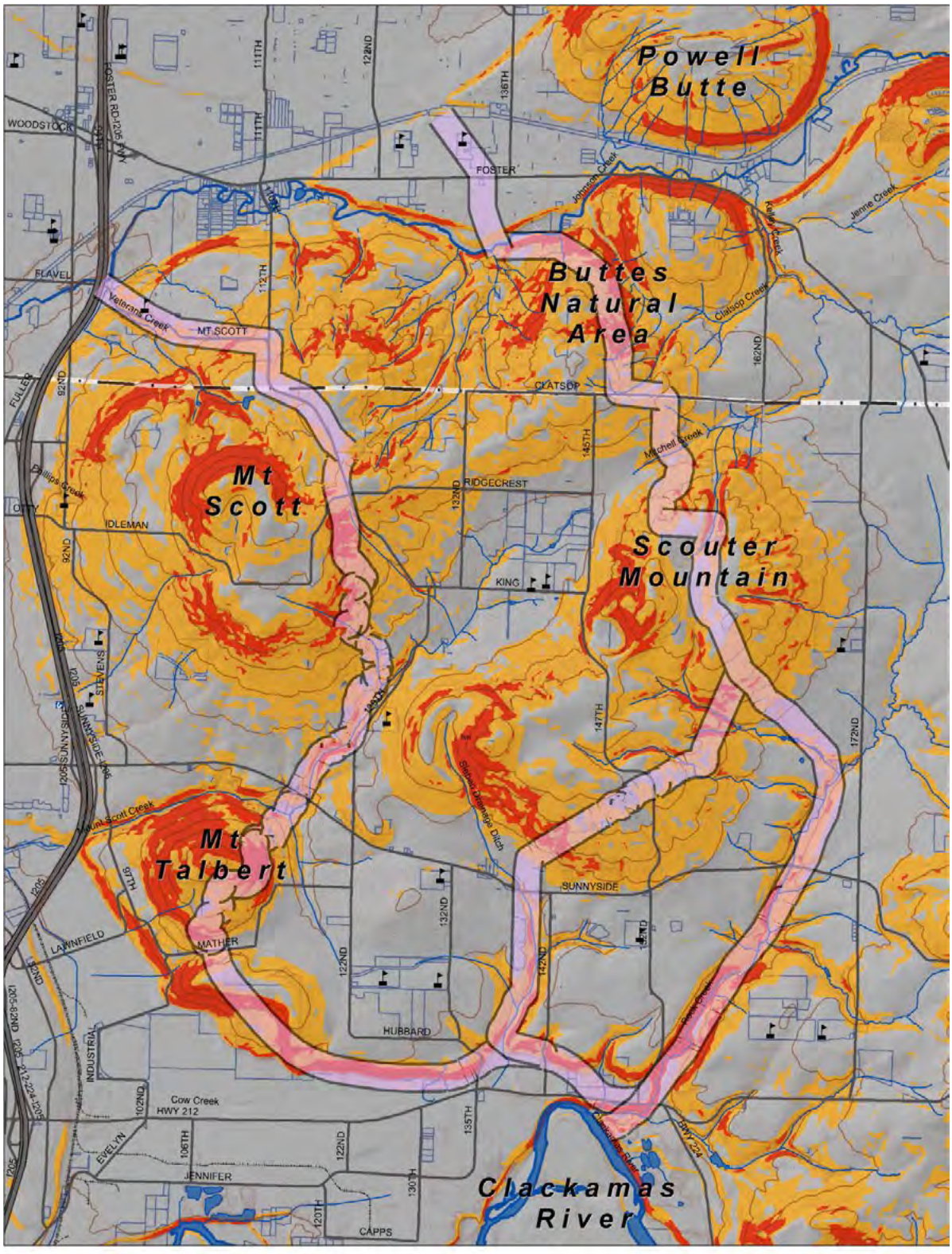
The Boring Fields are a series of extinct lava domes which formed the buttes and rolling hills of the Trail Loop study area, defining the area's scenic landscape and local identity. The buttes provide visual relief for urban residents. Within the study area, elevations range between 70 and 1,055 feet above sea level.

Mount Scott has the highest peak in the study area. While much of the butte is covered by residential development, public access and views can be gained from Lincoln Memorial Park Cemetery situated on the mountain's northern slope. Rising more than 900 feet above the valley floor, Scouters Mountain offers views of the Cascades and Pleasant Valley. At over 240 acres, Mount Talbert is the largest undeveloped butte in northern Clackamas County, a forested green sentinel overlooking the busy I-205 and Sunnyside Road interchange just to the west. The lowest elevations within the study area are found along the Clackamas River in the south.

The buttes have steep slopes which present challenges for trail development as well as achieving grades required by ADA guidelines. Figure 2-8 shows area contours and highlights steep slopes. Slopes equal to or greater than 25% are shown in red. Areas shaded in orange have slopes less than 25%, but equal to or greater than 10%. Steep slopes will present challenges for aligning trails and achieving ADA accessibility and Regional Trail Status.

The Mount Scott/Scouters Mountain Trail Loop study area is defined by its buttes and rolling terrain

Figure 2-8: Mount Scott/Scouters Mountain Trail Loop: Topography & Slopes



Mt. Scott/Scouters Mtn. Trail Loop:
Topography & Slopes

Legend
- Study Segments
- 5' Contours
- 100' Contours
- County Boundary
- Slope >25%
- Slope >10%
- PublicProperties

0 0.25 0.5 1 Miles

Schematic alignment shown is superseded by this Master Plan. See the Master Planning Map on page 68 & 69.

Approvals and Regulatory Requirements

Permits and applications are required for the multi-use trail at the state, regional, and local agency levels. A permit will ensure the trail is designed, located, and constructed safely and responsibly for trail users, maintenance providers, property owners, and the impacted environment. Permits allow the enforcement of codes and standards that are adopted to protect the public health, safety, and welfare. Permits and applications needed for the Trail Loop project will address the following items:

- Land use planning
- Civil and structural engineering construction standards, including demolition
- Electrical standards for trail lighting
- Stormwater impacts, erosion control
- Compliance with fill/removal requirements within floodplains (if applicable)
- Protection or low-impact to historical properties, parks, cemeteries
- Protection or low-impact to wildlife, plants, streams/wetlands, steep slopes
- Tree/vegetation removals

The projected timeframes and costs for each permit vary widely across the jurisdictions and, therefore, are not listed in this document. As the Trail Loop project gets closer to final design, definition of permits' time and cost will become clear for planning and budgetary purposes. Due to the variety of permits necessary, jurisdictions provide options for permits to be combined to save review time and costs to the applicant. Likewise, many permit costs depend on a total construction cost; this information will be available upon an established trail design.

The possible permits anticipated for this project are addressed in the following table.

Table 2-1: Mount Scott/Scouters Mountain Trail Loop: Anticipated Permits

No.	Discipline	Requiring Agency	Notes
Planning Permits/Applications			
1	Code Interpretation Application	City of Happy Valley	
2	Conditional Use	City of Happy Valley	
3	Design Review - Major	City of Happy Valley	
4	Flood Mgmt Overlay Zone	City of Happy Valley	
5	Habitat Conservation Area Verification	City of Happy Valley	
6	Land Partition	City of Happy Valley	
7	Master Plan	City of Happy Valley	
8	Natural Resource Overlay Zone	City of Happy Valley	
9	Property Line Adjustment	City of Happy Valley	
10	Steep Slopes Development Overlay Zone	City of Happy Valley	
11	Variance	City of Happy Valley	
12	Site Development	City of Happy Valley	
13	Land Use Application	Clackamas County	
14	Conditional Use	Clackamas County	
15	Flood Development Permit	Clackamas County	
16	Habitat Conservation Area District/ Development Permit	Clackamas County	
17	Water Quality Resource Area District Construction Mgmt Plan	Clackamas County	
18	Hydrogeologic Review	Clackamas County	
19	Principal River Conservation Area Review	Clackamas County	Needed for river access
20	Land Partition	Clackamas County	
21	Natural Resource Overlay Zone	Clackamas County	
22	Property Line Adjustment	Clackamas County	
23	Steep Slope Review	Clackamas County	
24	Environmental Review	City of Portland	
25	Land Division	City of Portland	
26	Adjustments	City of Portland	For any planning/design standard
27	Conditional Use	City of Portland	
28	Property Line Adjustment	City of Portland	
29	Johnson Creek Basin Plan District Review	City of Portland	
30	Pleasant Valley Resource Review	City of Portland	
31	Tree Review	City of Portland	
32	Lot Consolidation	City of Portland	
Construction Permits/Applications			
33	Demolition	City of Happy Valley	List all structures, sewer line dis/connections, water meter removal/ relocations, private system decommissioning(s). Need letter of no hazmat.

Table 2-1: Mount Scott/Scouters Mountain Trail Loop: Anticipated Permits (cont.)

No.	Discipline	Requiring Agency	Notes
34	Grading	City of Happy Valley	Submit 2 sets of plans and geotech report
35	Grading	Clackamas County	Submit 3 sets of plans and geotech report
36	Erosion Control Permit	City of Happy Valley	Submit plans, schedule inspections
37	Erosion Control Permit	Clackamas County	
38	Erosion Control: 1200C	DEQ	
39	Sensitive Areas Certification Form	Clackamas County	
40	Sanitary & Storm Drainage Esmt	Clackamas County	
41	Sewer Permit	City of Happy Valley	Includes storm drain
42	Plumbing Permit	City of Happy Valley	Needed for sewer pipes, drinking fountain
43	Electrical Permit	City of Happy Valley	Needed for trail lighting
44	Septic System Permit	Clackamas County	Needed for restrooms (if applicable)
45	Utility Placement Permit	Clackamas County	Submit 2 sets of plans and traffic control plans
46	Building Permit	City of Happy Valley	Needed for restrooms
47	Building Permit	Clackamas County	Covers planning, development, soils, sewer, building
48	Entrance Application Permit	Clackamas County	Needed for new driveways
49	Sign Permit	City of Happy Valley	Needed for monument signs
50	Type "B" Tree Removal Permit	City of Happy Valley	Needed for more than 3 trees
51	DSL Removal/Fill Permit	Dept of State Lands	Needed for wetland delineation
52	Section 10 Permit	US Army Corp	Needed for fill in navigable waters (Clackamas River)
53	Public Improvements Permit	City of Portland	Includes inquiry meeting, consultation meeting, concept development meeting
54	Bureau of Transportation Review	City of Portland	
55	Bureau of Environmental Services Review	City of Portland	
56	Water Bureau Review	City of Portland	Needed for restrooms (if applicable)
57	Wetland/Waterways Fill Permit	Corps - 404 DSL - Removal Fill DEQ - 401	Fill/removal in streams and/or wetlands.
Environmental Permits/Applications			
58	ESA consultation letter		
59	SHPO Section 106 Clearance		
60	FHWA 4(f) Permit	FHWA	

Table 2-1: Mount Scott/Scouters Mountain Trail Loop: Anticipated Permits (cont.)

No.	Discipline	Requiring Agency	Notes
61	FHWA 6(f) Permit	FHWA	
62	Wetland and Stream Buffer Variance	Clackamas County	
63	Floodplain Development	FEMA	

Environmental Protection

The City of Portland's environmental overlay zones limit development within sensitive natural resource areas. The Environmental Protection (EP) Zone depicts areas where development is limited. The Environmental Conservation Zone (EC) allows environmentally sensitive development to occur. Per the City of Portland's development code, trails meeting all of the following criteria are exempt from the regulations of the environmental overlay zone:

- trails must be confined to a single residential ownership;
- construction must take place between May 1 and October 30 with hand-held equipment;
- trail widths must not exceed 30 inches and trail grade must not exceed 20 percent;
- trail construction must leave no scars greater than three inches in diameter on live parts of native plants; and
- trails must not be placed between the tops of banks of water bodies.

Similarly, the intent of the City of Happy Valley's Natural Resource Overlay Zone (NROZ) is to implement the goals and policies of Metro's Comprehensive Plan relating to natural resources, open space and the environment. Section 16.34.030 of Happy Valley's Municipal Code describes exemptions including trails:

> *Low-impact outdoor recreation facilities for public use, including, but not limited to, multi-use paths, access ways, trails, picnic areas, or interpretive and educational displays and overlooks that include benches and outdoor furniture, provided that the facility meets the following requirements:*
>
> *a. It contains less than five hundred (500) square feet of new impervious surface; and*
>
> *b. Its trails shall be constructed using nonhazardous, pervious materials, with a maximum width of four feet.*

Title 13: Nature in Neighborhoods Code

The purpose of Metro's Title 13 Nature in Neighborhoods Code is to conserve, protect, and restore a continuous ecologically viable streamside corridor system that is integrated with upland wildlife habitat and the surrounding urban landscape. Title 13 Habitat Conservation Areas, generally describe sensitive natural resource

areas where development is to be avoided, minimized or mitigated. As shown in Figure 2-7 above, upland habitat areas depicted as Class A and riparian areas noted as Class I are considered of the highest habitat value for wildlife. Local cities are required to apply the development requirements of Title 13 to their local land use code in order to minimize impacts to our most sensitive natural resource areas.

Natural resource preservation and protection is essential for a number of reasons including providing wildlife habitat, fostering biodiversity, protecting water quality, and providing outdoor recreation opportunities. The Trail Loop will provide unique opportunities for the public to experience nature through access to the numerous streams, buttes and large tracts of intact forest within the area. As a goal of this planning effort is natural resource protection and enhancement, environmentally sensitive approaches to trail planning and design are described within the design chapter of this document.

Steep Slopes

The City of Happy Valley's Steep Slopes Development Overlay (SSDO) limits development activities on slopes as a means of minimizing seismic and landslide hazards. Areas with slopes in excess of 25% may not be developed. Section 16.32.050 Exempt or Permitted Uses allows trails constructed that comply with provisions of the City's Engineering Design and Standard Details Manual. Thus, trails are a non-competitive use of space for lands where the SSDO applies.

The City of Portland's Environmental conservation (Ec) and Environmental protection (Ep) zones provide the highest level of protection and conserves important resources and functional values while allowing environmentally sensitive urban development. Development in the Ep zone will be approved only in rare, unusual circumstances. Areas within the zones are subject to the standards within Chapter 33.430 Environmental Zones.

3. DESIGN FRAMEWORK

Trail Project Advisory Committee meeting and site tour

Introduction

This section discusses some of the implications of trail development that need to be considered, and recommendations for the types of trail that may be appropriate for specific alignments of the Mount Scott/Scouters Mountain Trail Loop system.

An effort has been made to simplify the trail loop system by minimizing the number of different trail types, while recognizing that physical and environmental constraints within the 37.5-mile loop make a variety of trail types necessary. The trail types that have been selected in this study include:

- Multi-use Trail: Outside of Right-of-Way
- Multi-use Trail: Inside of Right-of-Way
- Separated Sidewalk
- Buffered Cycle Track
- Under Crossing
- Pedestrian Trail
- Boardwalk

Each of these trail typologies is described in detail below. Figure 3-1 is a map showing the location of each trail type, and includes important notations concerning site-specific deviations from the seven typologies listed.

The approach to signage and trail amenities (site furnishings) is also summarized in this section. It is important to emphasize that a well-implemented signage and wayfinding program will play a major role in the success of the trail loop system.

Trail Categories

With the challenging topography and existing land use that occurs within the Mount Scott/Scouters Mountain Trail Loop area, creating a single alignment for a 12-foot paved width multi-use trail is not feasible for the entire trail system. In order to meet the functional objectives of a multi-use trail by accommodating all users, the alignments are frequently split into two routes to serve specific user types separately. This means that the connection between one trail point and the next is in many cases achieved by more than one trail alignment. In other less restrictive areas, a single multi-use trail is indicated that can accommodate a variety of users.

Three trail categories are applied in this master plan:

- Multi-use: accommodates pedestrians, ADA users, and bicyclists. Ideally, this type of trail will be a 12’ wide, paved trail separated from roadways by a landscaped buffer.

- Pedestrian only: this type of trail can be either on-street, coinciding with a sidewalk, or off-street as a hard- or soft-surface trail. Because of the steep slopes or right-of-way constraints, this trail is narrow in width, limiting the use to pedestrians only.
- Bicycle only: accommodates casual and commuter bicycle users via on-street protected bikeways or cycle tracks. These alignments are placed along existing roadways to provide routes having manageable rates of elevation change for bicyclists.

Natural Resource Considerations

Trails that are located outside of the road right-of-way will often pass through undeveloped open space areas. Indeed it is preferable to locate trails away from roadways as much as possible to reduce potential safety concerns inherent with roadside facilities, and to improve the trail user experience. When planning trails through open space tracts, consideration must be given to striking a balance between protection of natural resource areas on one hand, and both trail functionality and the desire to allow users to experience beautiful natural settings on the other. Detailed trail planning analyses of alignments traversing undeveloped areas need to proceed in consultation with a natural resource biologist familiar with trail development. Many issues need to be considered when trail planning in sensitive areas. A brief sampling of issues to consider include the following:

- avoiding fragmentation of small habitat areas
- locating trails on the perimeter of watersheds
- minimizing stream crossings
- on-site reconnaissance of proposed trail alignment to identify habitat conflicts
- opportunities for restoration of poor quality habitat
- procuring wide easements that encompass sensitive areas and buffers for long-term protection
- choosing construction materials with little or no toxicity

In the process of developing the Mount Scott/Scouters Mountain Trail Loop master plan, Metro has engaged several local agency stakeholders for input on the issue of natural resource area protection. The information obtained from stakeholder interviews is included in the Consolidated Natural Resource Comments in Appendix F. This document includes valuable location-specific guidance and recommendations for trail planning and construction.

Trail Security and Liability

New public trail projects often raise questions about trail security and liability. This is particularly true of trails that traverse private

property within public access easements. Occasionally there is a perception that trails may bring crime to an area. While this is a reasonable concern, it can often be addressed through proper trail design. There are numerous national studies (e.g., Rail-Trails and Safe Communities, Burke-Gilman Trail's Effect on Property Values and Crime in Seattle and King County, Washington) that indicate that trail projects have positive effects on adjacent neighborhoods. In fact, the rate of crime on suburban trails is usually lower than the national statistics for suburban crime on nearby streets and in homes (Rail-Trails and Safe Communities, 1998). In other words, less crime is generally committed in trails and parks than in the neighborhoods they serve. Obviously, any crime committed is undesirable, regardless of location, but there is no evidence that trails introduce above average crime levels.

A well-used trail is usually the best deterrent to crime. Crimes are less likely to be committed if there is a high risk of being seen. First responders recommend that trail access points from road connections be as accessible for their vehicles, as practical. Additional recommendations to maximize trail security are:

- eliminate overgrown vegetation immediately adjacent to the trail;
- provide security lighting at trail heads;
- place emergency phones at call-boxes at strategic locations;
- keep the trail corridor clean and well-maintained to encourage community ownership; and
- encourage community litter and safety patrols along the trail.

Other security-related recommendations are for the police department to be equipped with bicycles, motorcycles, or all-terrain vehicles for emergency response and patrolling trails; constructing trails with pavement sections suitable for emergency vehicles; and providing water supply stand pipes along the trail or at access points, as practical.

In addition, a Trail Watch program may be considered that is organized by neighborhood associations or other trail advocacy groups. The Clackamas County Sheriff's Office has developed the following recommendations for Trail Watch programs:

- patrol the trail regularly;
- watch out for negative users of the trail;
- keep an eye out for things like graffiti or littering;
- "observe and report" strategy (do not confront negative users);
- foot and bike patrols should be done on an unpredictable schedule;
- persons should try to go out in teams – there is safety in numbers and the more eyes and ears the better;

- patrol participants should always carry a cell phone and be prepared to take pictures;
- carry a pad of paper and a pen; and
- bring a flashlight at dusk or at night.

Trail Watch participants need to avoid confronting negative users because this could create a dangerous situation. Suspicious activity needs to be reported to law enforcement officials. It is a good idea for patrol participants to share information about the trail via Email Group List, Phone Tree, FaceBook, and/or a Newsletter.

The issue of trail liability is discussed in detail in the report Rail-Trails and Liability: A Primer on Trail-related Liability Issues & Risk Management Techniques (Rails-to-Trails Conservancy, 2000).

Again, proper design of the trail and its amenities will limit the risk of injury or harm to the trail user. The trail manager, in this case the jurisdiction hosting the trail, carries liability insurance as a last line of defense against claims of injury by users of the trail.

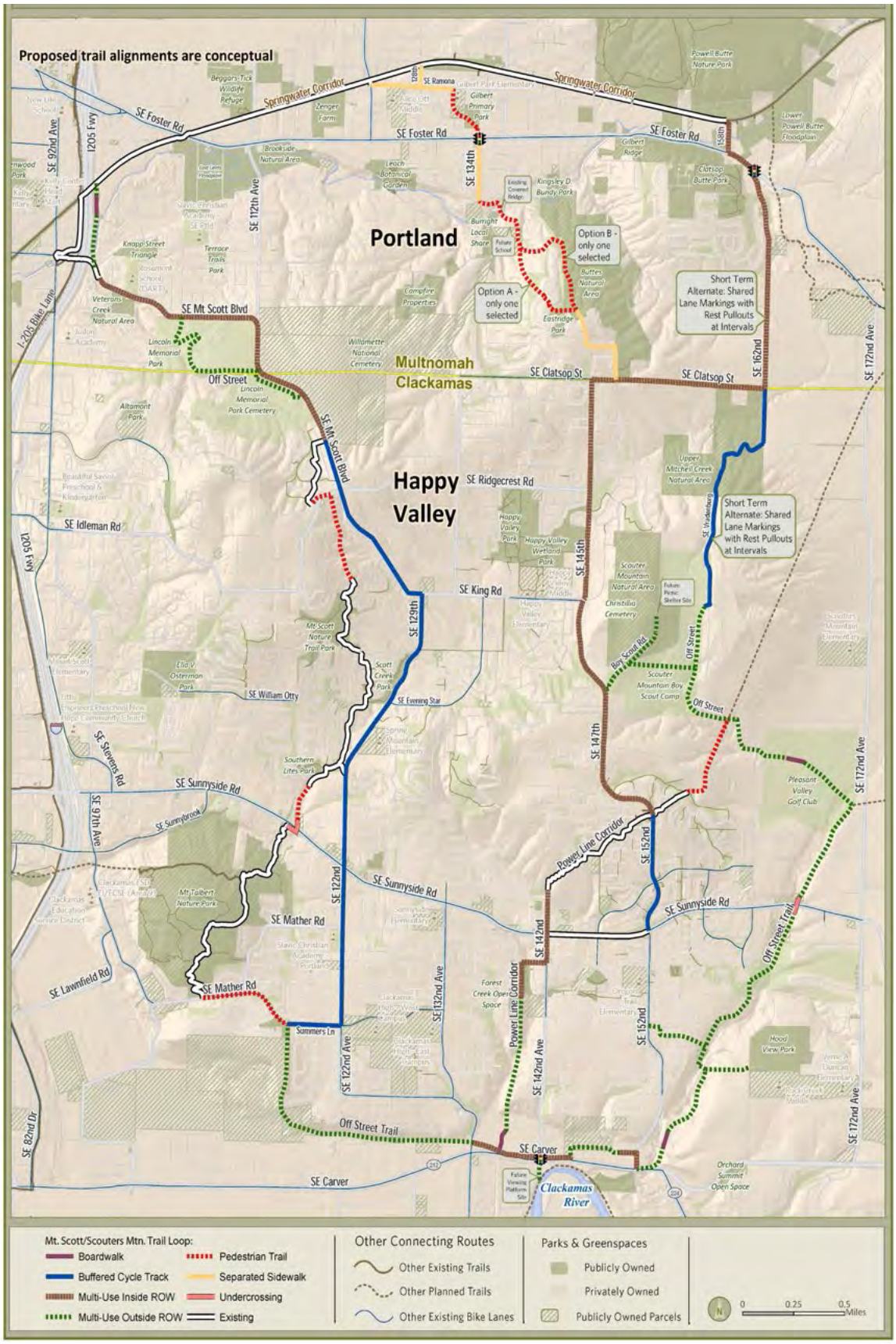
Most states, including Oregon, also have laws that limit public and private landowner liability when providing access to lands for recreational use. These Recreational Use Statutes (RUS) have been established to encourage recreational access to lands while limiting exposure to liability and tort claims. The Recreational Use Statute for Oregon is contained in Oregon Revised Statutes (ORS) Chapter 105 - Public Use of Lands. Section 105.682 of the ORS specifically states that "an owner of land is not liable in contract or tort for any personal injury, death, or property damage that arises out of the use of the land for recreational purposes." Recreational Purposes are defined in the ORS to include hiking, nature study, outdoor educational activities, and viewing or enjoying scenic sites, and volunteering for any public purpose project.

It should be noted that this report is not intended to provide legal advice. Advice of counsel is recommended for specific questions regarding agency and property owner liabilities.

Trail Typologies

Within each segment, a variety of trail types are utilized to accommodate the trail within the existing conditions. As proposed, all segments will serve multiple users by means of trail bifurcations (forks in the trail) where site constraints make it necessary to separate cyclist and pedestrian routes. For the purposes of this master plan and high-level analysis, a general palette of design elements were identified for construction of each typology. Upon final design of the trail segment, each typology will be further detailed to account for the variability in existing conditions. (See Appendix G for the

Figure 3-1: Mount Scott/Scouters Mountain Trail Loop: Trail Typologies Map



Schematic alignment shown is superseded by this Master Plan. See the Master Planning Map on page 68 & 69.

alignment details for each segment.) Below is a table showing the trail standards within each jurisdiction that the trail loop travels through.

Table 3-1. Trail standards within each jurisdiction

		Jurisdiction			
		Portland	**Happy Valley**	**North Clackamas County**	**Metro**
Trail Type	Bike Lane (Bike only)	5'-6'	5'-6'	N/A	5'-6'
	Curb-tight Sidewalk (Ped only)	5' (only in special cases)	5'-6'	N/A	5'
	Separated Sidewalk (Ped only)	5'-6'	5'-7' (12' in special case)	N/A	5'-6'
	Widened Shoulder (Bike, Ped)	4'-5' raised button detectable warnings/ device 4' swale separation where possible Continuation of road section	6' path, 10'-12' trail raised button detectable warnings	N/A	N/A
	Multi-use Trail (Bike, Ped)	8'-14' AC or concrete	Dwg. 400 10'-12' AC or concrete, 2' shoulders geotextile	8'-12' AC or concrete	10'-12' AC or concrete 2'-4' shoulders
	Hard Surface Trail (Ped only)	6'-12' AC, concrete, pavers, lumber	6' min 2' shoulders	8'-12' pavement	N/A
	Gravel Trail (Ped only)	4'-10'	6' min	N/A	N/A
	Soft-Surface Trail (ped only)	18"-30"	6' min	N/A	N/A
	Remarks	See PPR Trail Guidelines for Cross Sections			

*The trail standard applied may vary depending on funding sources. ODOT and the Federal Highway Administration generally require more stringent requirements on trail widths and surface materials.

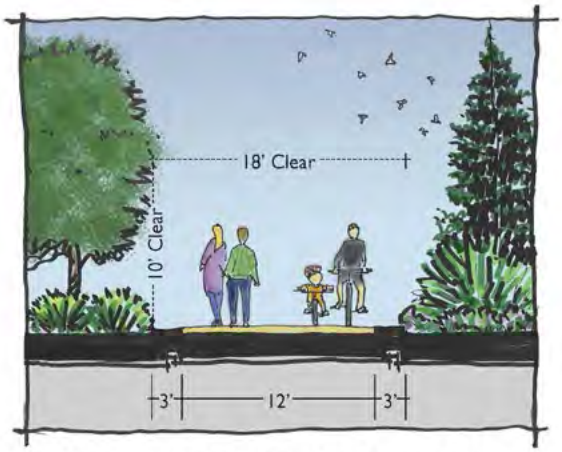
Multi-use Trail: Outside of Right-of-Way

Using asphalt or occasional concrete surfacing, this multi-use trail type can serve all users, except equestrian. The trail is typically 12 feet wide with 3-foot shoulders on each side. Low landscaping or gravel will cover the area immediately adjacent to the trail, with larger trees and shrubs 3 feet or further from edge of pavement. In locations where ample width is available, use types may be on separate parallel tracks with a vegetated buffer inbetween.

Representative segment: The proposed alignment in Segment 3 between SE Sunnyside Rd and Hwy 224 that follows the Rock Creek drainage corridor.

Multi-use Trail: Inside of Right-of-Way

Using asphalt or occasional concrete surfacing, this multi-use trail type can serve all users, except equestrian. The trail is typically 12-feet wide with 2-foot shoulders on each side. Constrained right-of-way widths will require right-of-way acquisition or trail width adjustments. Trails will in all cases be separated from vehicular travel lanes by a physical buffer. Buffer options include curb, curb and guardrail barrier, vegetated buffer with trees and shrubs, or a combination of these options.



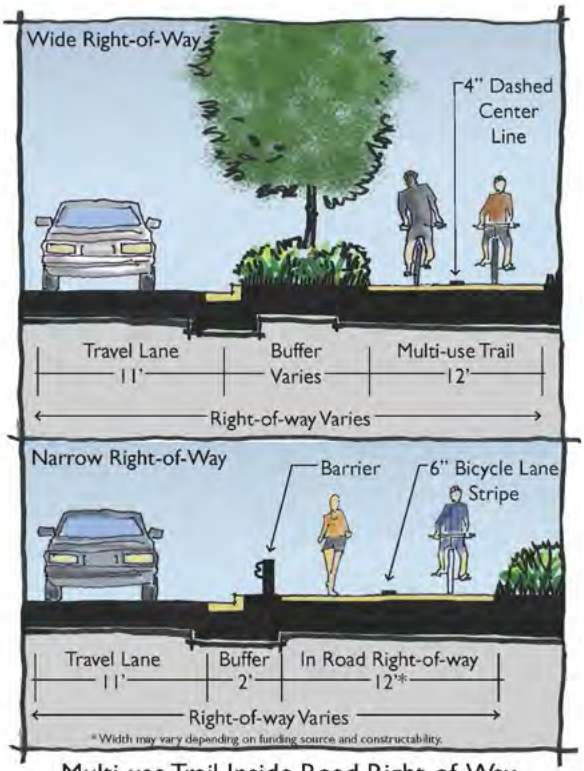
Multi-use Trail Outside Road Right-of-Way

Representative segment: The proposed alignment along SE Mount Scott Blvd. between SE Carter Ln. and SE Aspen Summit Dr.

Discussion:

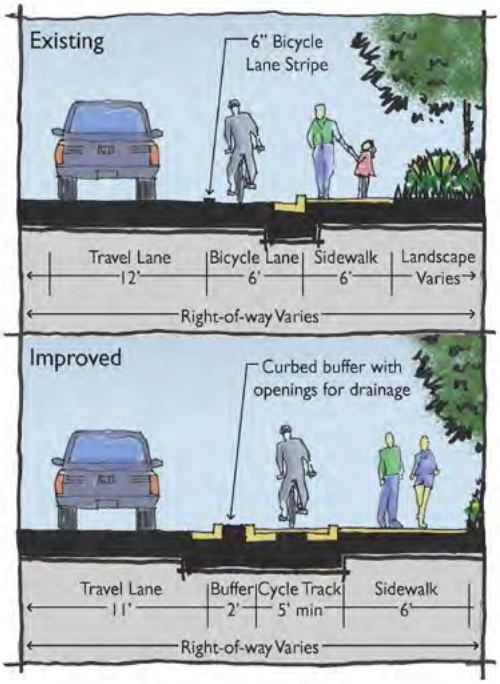
The master plan trail map shows SE 162nd Ave. as a bicycle route, but given the low density of the area, low driveway frequency, and adjacent rural land uses, ideally this segment would have a multi-use trail. Improvements may require widening the road travel lanes and would include constructing a separated two way path on one side. This option would allow accommodation of pedestrians, who are underserviced in the area. The trail would be located on the west side to avoid challenging environmental constraints on the east. A 12-foot path on one side would require not much more room than two 6-foot bike lanes. Planning and involvement with additional adjacent property owners, residents, and the general public would be required.

If funding for multi-use trail improvements is not forthcoming then at a minimum improvements should include shared lane markings (SLMs), occasional safety pull-outs for cyclists, and reduced speed limit to make this roadway more safe and comfortable for cyclists. Other traffic calming measures may be considered. Simply widening each side and striping a bike lane would encourage drivers to travel faster. SLMs are not recommended on roadways with speeds greater than 35 mph. SLMs are to be placed directly after intersections and every 250 linear feet thereafter. Improvements would also include wayfinding signs and signs stating: "Bicyclists may use full lane."



Multi-use Trail Inside Road Right-of-Way

Buffer Options: • Curb Only • Curb and Barrier • Vegetation



Buffered Cycle Track

Separated Sidewalk

Separated sidewalks mimic a standard sidewalk structure. A trail alignment overlapping a typical sidewalk location will feature trail signage and occasional trail amenities such as benches, educational display panels, etc. Sidewalks will be separated from the roadway by a 6-foot wide landscape strip and are constructed of concrete.

Representative segment: The proposed alignment along SE 147th Ave. between SE Tenino St. and SE Clatsop St.

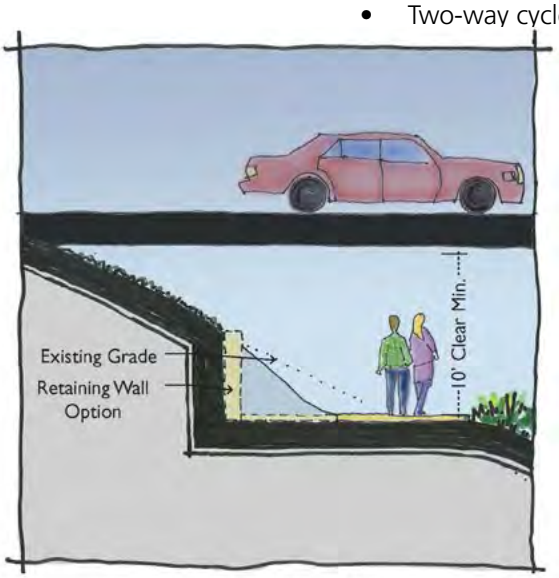
Buffered cycle tracks are exclusively for bicyclists and can be used in combination with a new or existing sidewalk to provide a multi-use route with minimal impacts to existing roadway infrastructure. Improvements may include a 5-foot minimum width cycle track with 2-foot wide curbed buffer with openings to facilitate existing storm drainage. Existing curb, gutter, and sidewalk can remain in place.

Representative segment: The proposed alignment along SE 122nd Ave. between SE Spring Mountain Dr. and SE Hubbard Rd.

Discussion:

Alignments in road right-of-ways where sidewalks exist may consider cycle track configuration instead of multi-use facilities:

- One-way cycle track: 6.5-foot width preferred (5-foot minimum), + 3-foot buffer (1.5-foot minimum).
- Two-way cycle track: 12-foot width preferred (8-foot width allowed at pinch points/obstructions) + 6-foot buffer (2-foot minimum)



Under Crossing

Under Crossing

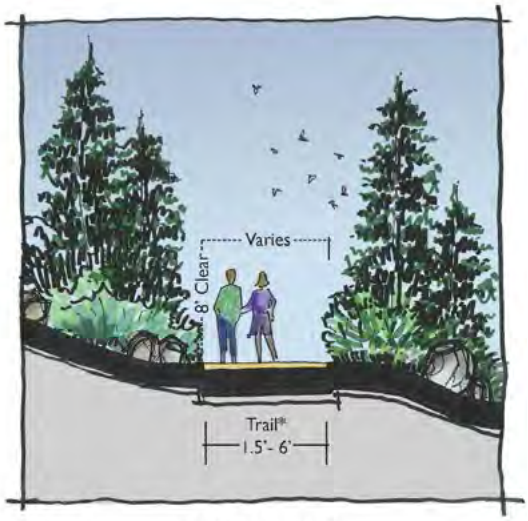
Under crossings are proposed at existing roadway bridges where traffic volumes render surface crossings undesirable and where sufficient vertical clearance exists below the bridge structure. Trail construction will involve grading a trail bed into existing embankments which may require retaining walls. American Association of State Highway and Transportation Officials (AASHTO) standards set the minimum vertical clearance below structures at 10 feet.

Representative segment: The proposed alignment crossing SE Sunnyside Rd. at the north side of Mount Talbert Nature Park near Miramont Pointe Senior Living Community.

Pedestrian Trail

Between 18-inches and 6-feet wide, this trail type will vary in surface treatment and width to address various site conditions within natural areas or other limited access routes. Areas with severe slopes may require engineered structures to construct the trail. In residential areas, this trail may be a standard sidewalk. In natural areas, it will be more typical of a hiking trail. Bicycles will be prohibited within these segments.

Representative segment: The proposed alignment from the intersection of SE Foster Rd and SE 134th Ave south to SE Clatsop St.



Pedestrian Trail

Surface Options:
- Earthen
- Wood Chip
- Aggregate
- Asphalt (limited)
- Porous Concrete

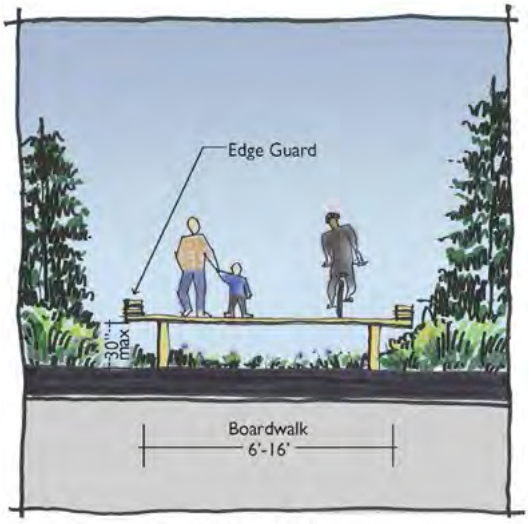
*Width varies depending on site constraints and sensitive area impacts.

Overcrossings

A bridge or culvert crossing may be necessary along some trails traversing hillsides with frequent or intermittent streams. Each overcrossing must be engineered from both a structural and geotechnical perspective and designed and built to International Building Code (IBC) standards. For example, a 42-inch height pedestrian guard railing (54-inch for bicycle railing) is required where a vertical or nearly vertical drop of over 30 inches occurs from trail surface to adjacent grade.

Boardwalk

A boardwalk would be used in ecologically sensitive areas in order to minimize environmental impacts. The trail is built on a post and beam frame so the trail surface is suspended above the ground. The surface of the trail will be engineered wood, steel grating, or concrete composite material. Non-slip surfaces are strongly preferred. Such a trail must be engineered from both a structural and geotechnical perspective.



Boardwalk

- For environmentally sensitive area crossings.
- Stable, sustainable, non-toxic materials.
- Non-slip surface.
- Width dependant on trail context.

Urban Trail Consideration

The Mount Scott/Scouters Mountain Trail Loop will run alongside busy streets, follow suburban neighborhood sidewalks, and bifurcate or fork into two separate trails in order to accommodate different users. Urban trails present a specialized set of challenges for consideration including trail typologies such as buffered cycle tracks, shared street routes, and bridge undercrossings (see Trail Typologies above). Other aspects of trail development to consider are discussed below including roadway crossings, drainage, signage, and furnishings.

Roadway Crossings

There are numerous roadway crossings throughout the Mount Scott/Scouters Mountain Trail Loop system. Generally, the trail alignment guides users to the safest crossing, typically along the roadway to an intersection where drivers expect to see pedestrians cross. Where crossings coincide with arterial roads, the trail alignment shall cross at signalized intersections wherever possible to offer the highest protection from traffic. At crossings that occur at unsignalized intersections, utilization of a grade-separated crossing or a trail user-activated pedestrian signal such as a High-Intensity Activated Crosswalk (HAWK) or Rectangular Rapid Flashing Beacon (RRFB) shall be investigated. At lower classification roadways, the trail alignment shall also cross at intersections when possible. Such intersections may or may not be stop-controlled and the crosswalk may or may not be striped.

Mid-block crossings are advantageous when the nearest intersection is too far away for pedestrians to reasonably choose that option. Depending on the existing conditions, pedestrian crossing treatments can vary in level of infrastructure. In areas with good sight distance and low traffic volumes, a signed and striped crossing may be adequate. As the existing conditions become more challenging, treatments such as curb extensions, speed tables, pedestrian refuge islands, and additional signage shall be investigated. When crossing high-volume roadways, the use of a mid-block trail user-activated pedestrian signal such as a HAWK or RRFB may be warranted.

At the time of final design, each crossing type will be analyzed by an engineer for traffic conditions, safety, and proper design. Regulatory traffic control devices shall be installed on the trail at every roadway intersection. Roadway markings, including crosswalk striping, shall be designed and installed as warranted on a case-by-case basis. AASHTO's Guide for the Development of Bicycle Facilities and the Manual on Uniform Traffic Control Devices (MUTCD) shall be consulted for options for signalization, signage, striping, marking treatments, and hard-surface improvements.

Drainage Treatments

Hard surfaced trails generate a small amount of stormwater runoff. Water quality treatment is not usually required for separated non-motorized multi-use pathways in areas where the pathway runoff is not interacting with the runoff from adjacent roadways. However, it is necessary to provide proper drainage and stormwater conveyance to prevent ponding and erosion along the pathway. Landscaped or gravel shoulders can usually accommodate the stormwater through infiltration. Where topography prohibits adequate infiltration, conveyance systems may be required to transport runoff to downstream storm facilities or areas more conducive to stormwater disbursement. Trail segments constructed adjacent to (and flowing to) existing roadways may require water quality treatment based on jurisdictional requirements.

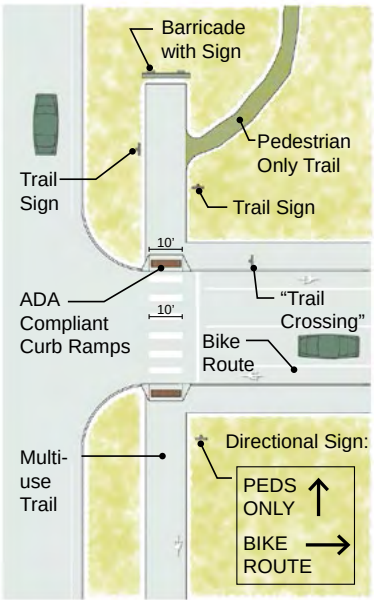
Should certain segments of the Mount Scott/Scouters Mountain Trail Loop system require stormwater treatment, low-impact, parallel water quality facilities such as bioswales or rain gardens shall be evaluated as treatment options. These types of facilities can be fitted into landscape buffer zones or immediately adjacent to pathway alignments if feasible. Other forms of treatment could include larger regional basins or ponds and mechanical treatment devices such as filter-cartridge vaults and catch basins. These types of facilities usually require modification to existing or construction of additional conveyance systems to transport flows.

Trail Signage and Wayfinding

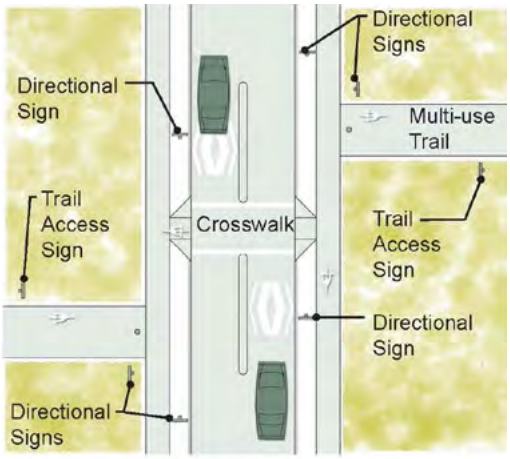
The highly variable landscape characteristics and topographic extremes of the Mount Scott/Scouters Mountain Trail Loop corridor offer a diverse trail experience for users. This same variability also presents logistic challenges to trail planning. Each of the seven trail segments studied in this master plan has at least two routes for getting users from one location to another, and trail routes often rely on existing sidewalks or residential streets to fill gaps in the trail system. To provide users with clear direction on how to navigate a trail of this nature will depend heavily on a trail signage strategy.

Ideally, trail signage will not only provide direction but will help unify the trail system through the consistent use of color, form, and graphic style that is readily recognizable. The Intertwine Regional Trails Signage Guidelines published by Metro in June 2012 provides a useful framework for this purpose. Excerpts from the Signage Guidelines are included in Appendix H. This document is available online in its entirety:

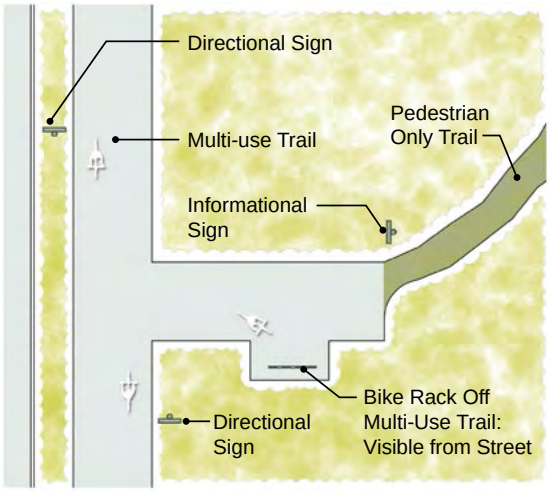
http://theintertwine.org/sites/theintertwine.org/files/file_attachments/Intertwine%20Regional%20Trail%20Signage%20Guidelines.pdf



Traffic Bifurcation



Road Crossing



Trailhead at Pedestrian Trail

The following images depict several typical trail bifurcations where one trail type (e.g., multi-use trail) makes a transition into two different trail types (e.g., bicycle route and pedestrian-only route). An example is included in these figures of how signage may be applied to provide direction to trail users. Signage will be most effective when, in addition to trail identification, a schematic map is included showing the location where the trail bifurcation converges again, and the distance that each trail traverses to get there.

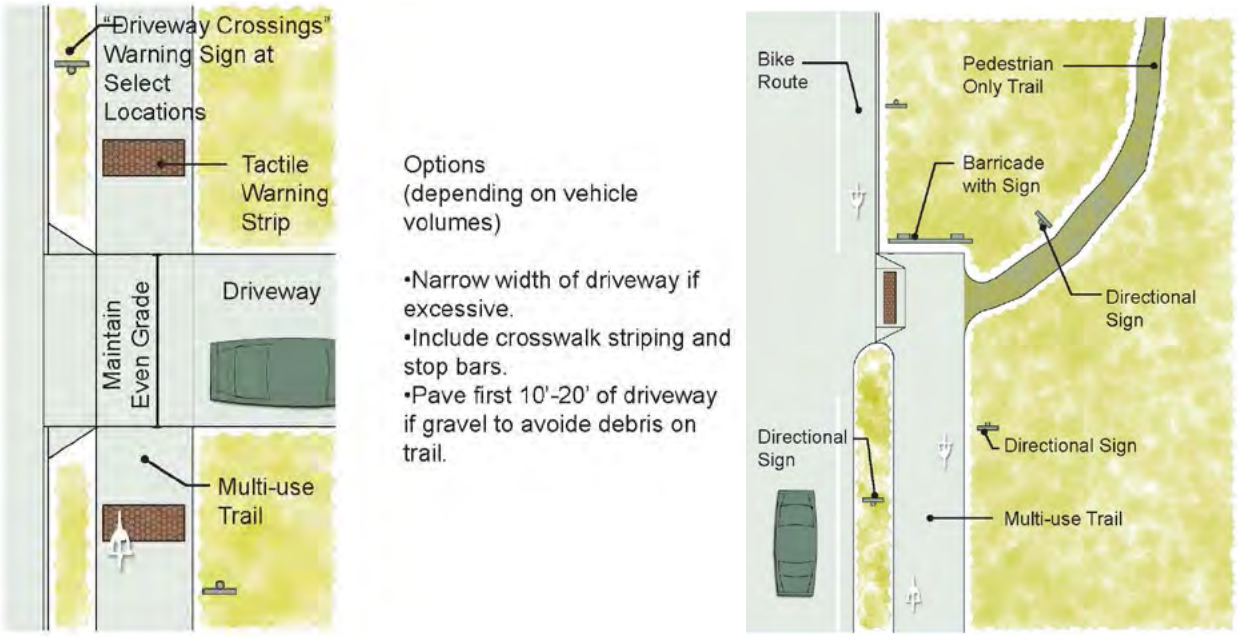
Trail Amenities

Site furnishings for the Mount Scott/Scouters Mountain Trail Loop corridor may include any or all of the following trail amenities:

- Benches
- Bike Racks
- Chicanes (changes in trail alignment or z-gates that help control speed)
- Viewing Platforms or Pull-outs
- Educational Display Panels
- Signs (trailhead, trail access, off-street trail signs, on-street connection signs, maps, mile markers)
- Restrooms
- Water fountains
- Public art

Locations along the trail loop that are near popular destinations or employment centers may warrant development of a trailhead facility provided with some

Viewpoint



or all of the above amenities. Following are topics to consider when making decisions concerning trail amenity installation at trailheads or other locations along the trail system.

Design Style

The Mount Scott/Scouters Mountain Trail Loop takes users through many different contexts, both developed and pristine. Rather than identifying a specific design style to be applied at all locations for all trail amenities, selection of site furnishings should be based on site-specific characteristics. For instance, a bench constructed of heavy lumber may be appropriate to a remote, woodland setting, while a bench built from stainless steel may be best suited for an urban context.

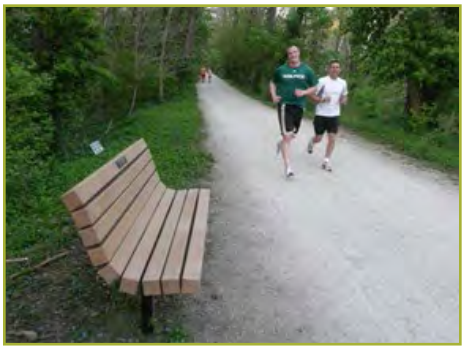
Cost

The decision to install trail amenities will need to consider both short- and long-term costs. Initial construction costs may be relatively low compared with the ongoing costs of maintenance and eventual replacement. Materials should resist corrosion and vandalism, and be readily available and sustainable. Construction should be simple and designed for ease of repair.

Benches

While all of the listed amenities fulfill important functions depending on site-specific opportunities, the most popular item among trail users is a bench. Benches can be installed at certain intervals or at destinations depending on trail characteristics. Benches for trail segments with steep slopes will better serve users if provided at more frequent intervals. Benches are a welcomed addition at viewpoints, trailheads, and areas that offer educational opportunities. Benches and the setting should be ADA compliant where appropriate.

Bike Racks



A bike rack should be considered at locations where bikes may be left unattended, including trailheads of pedestrian-only trails, and at destinations such as viewpoints. The level of use anticipated at bike rack sites will help determine the appropriate bike rack capacity. Bike racks are available in a vast array of shapes to suit nearly any context.

Chicanes

Traffic calming measures, usually thought of in connection with motor vehicles, also apply to trails. Chicanes consist of an apparent change in the horizontal alignment of the trail, and take many forms including anything from a simple jog in the alignment to a roundabout. They help to reduce the speed of cyclist and can be included at certain intervals along the trail or at specific locations such as intersections or before a significant change in slope. A variation of the trail chicane is a z-gate that requires cyclists to dismount or greatly reduce speed. Z-gates should be considered as a "last resort" option for controlling speed, but may be appropriate where there is a higher potential for collisions.

Viewing Platforms or Pull-Outs

Many locations within the Mount Scott/Scouters Mountain Trail Loop will provide opportunities for spectacular views of the surrounding area, and for natural area educational displays. Viewpoints need to be carefully designed to minimize potential collisions between viewpoint visitors and trail users. Viewpoints attract users so provision for litter clean-up and other maintenance should be considered.

Educational Display Panels

With several schools near the proposed trail loop corridor, there is good potential along the trail for educational opportunities that support curricula. A highly successful

material for display panels is phenolic resin with subsurface sign graphics fused to the resin through a process using heat and pressure. Placement needs to carefully consider accessibility and maintenance concerns.

Wayfinding Signs

Providing trail users with clear direction on how to navigate the Mount Scott/Scouters Mountain Trail Loop will depend on a cohesive wayfinding sign system. Ideally, trail signage will not only provide direction but will help unify the trail system through the consistent use of color, form, and graphic style that is readily recognizable from a distance. See also the section on Trail Signage on page 55.

Restrooms

A number of options exist for restroom facilities, including plumbed structures, prefab over pit, and portable. The decision to provide restrooms—and which type is most appropriate—will depend on the anticipated level of use and the resources available to service the facility over the long term. Meeting accessibility guidelines need to be considered. Restrooms will most likely be located at parks along the trail route.

Trail segments will be located both inside and outside of the road right-of-way.

4. ALTERNATIVES ANALYSIS



Powerline corridors are a valuable alignment alternative for trail development.

Alignment Options Analysis and Recommended Alignments

Working with the Project Advisory Committee, stakeholders, and local community members, the Project Team undertook an extensive process to identify and evaluate trail alignment options. The evaluation was based on project goals developed during the planning process. Each alignment was considered with respect to fatal flaws reflecting the project evaluation criteria. Alignments which were evaluated and eliminated may be viewed in Appendix I. Alignments without fatal flaws were further evaluated based on the criteria described below. This approach provided an objective means to compare segment options against one another as well as identify specific recommendations for improving alignments. The Project Team vetted the findings of the analysis with stakeholders, local decision makers and the public, and made refinements as needed to develop the recommended Mount Scott/Scouters Mountain Trail Loop Master Plan alignments.

Evaluation Criteria

The Mount Scott/Scouters Mountain Trail Loop study area is divided into seven tile maps, with each map having one or more potential trail alignments. Potential alignments were screened using evaluation criteria. For the screening, a high, moderate or low score was given to determine the most feasible alignments. A one indicated an unfavorable condition, a two indicated mixed or neutral conditions, and a three was given when favorable conditions were present. Criteria which reflected the primary goals of the project received a higher weight than other criteria in the final total score of each alignment. The evaluation scores were considered with respect to recommended design treatments to improve trails for alignments that achieved a recommended status. For example, an alignment with an overall high rating which scored low in the safety category received recommended design improvements which would improve safety.

Connection Value

This criterion evaluates connectivity and directness of route between area destinations. Destinations include schools, parks, residential, commercial and employment areas, as well as access to other trails, bikeways or transit. A high score was given to trail options that provide a direct route between area destinations. A low value was given to circuitous or indirect routes or those not in close proximity to area destinations.

Safety

Alignments were evaluated based on safety criteria including interactions with vehicle traffic. The assessment and evaluation considered existing crossing treatments (if any), roadway traffic speed, sight visibility, and traffic volumes. Alignments were further considered with respect to the following safety criteria: screening, visibility, presence of natural surveillance, emergency access, and proximity to hazards. Typically, alignments separate from traffic and having fewer roadway crossings received higher evaluative scores. Alignments within the road right-of-way, those which lack crossing improvements across roadways or those lacking natural surveillance opportunities were given a low score. Safety improvements are proposed for alignments which received low safety scores based on existing conditions, but were otherwise determined valuable.

Topography

Site topography is a prevalent natural feature in the study area which affects potential trail alignment, user types and construction requirements. Steep grades prohibit some user groups from trail use. They also require more site disturbance and infrastructure to implement. Thus, alignments through generally flat areas received a positive score, whereas alignments in areas with significant slopes received a negative rating.

Environmental Enhancement or Impact

Alignments were scored based on their potential to positively enhance or negatively impact environmentally sensitive areas. Options which present opportunities for environmental enhancement or benefit, such as degraded areas, received a high score. Alignments not interfacing with sensitive areas received a neutral score. Alignments through or near wetlands or other sensitive natural resource areas, were considered to have a potentially negative impact and thus received a low score. Environmentally sensitive design treatments are proposed for options that occur within or near sensitive areas, while otherwise having an overall positive or highly feasible rating, (i.e., the use of boardwalk through a wetland area, constrained trail widths and natural surfaces).

Public and Political Support

Having the support of local community members and political figures is essential to trail implementation. Alignments that have been favorably received by the general public and that have agency support received a high rating.

Aesthetics/Quality of Experience

This criterion measures the quality of the proposed trail from the perspective of the user. It considers potential views, environmental aesthetics, and characteristics of the alignment context such as noise, and air quality. For example, an on-street route along a major roadway received a lower rating than an off-street route adjacent to a stream. Design improvements are recommended for alignments within the road right-of-way which otherwise score high or provide an essential connection.

Ownership/Private Property Impacts

Alignments were scored based on their occurrence within parcels owned by public entities versus privately held properties. Trail proximity to private property is often a sensitive topic with landowners – it is important to gain input from land holders to ensure trail designs and location meet local needs, do not create maintenance or management issues, and provide positive experiences for neighbors. Trail segments identified as not requiring easements received the highest rating. Alignments on properties owned by identified willing sellers were given a moderate score, whereas alignments occurring on properties where the willingness of the owner to grant and easement or property sale was unknown received a low rating.

Operations and Maintenance

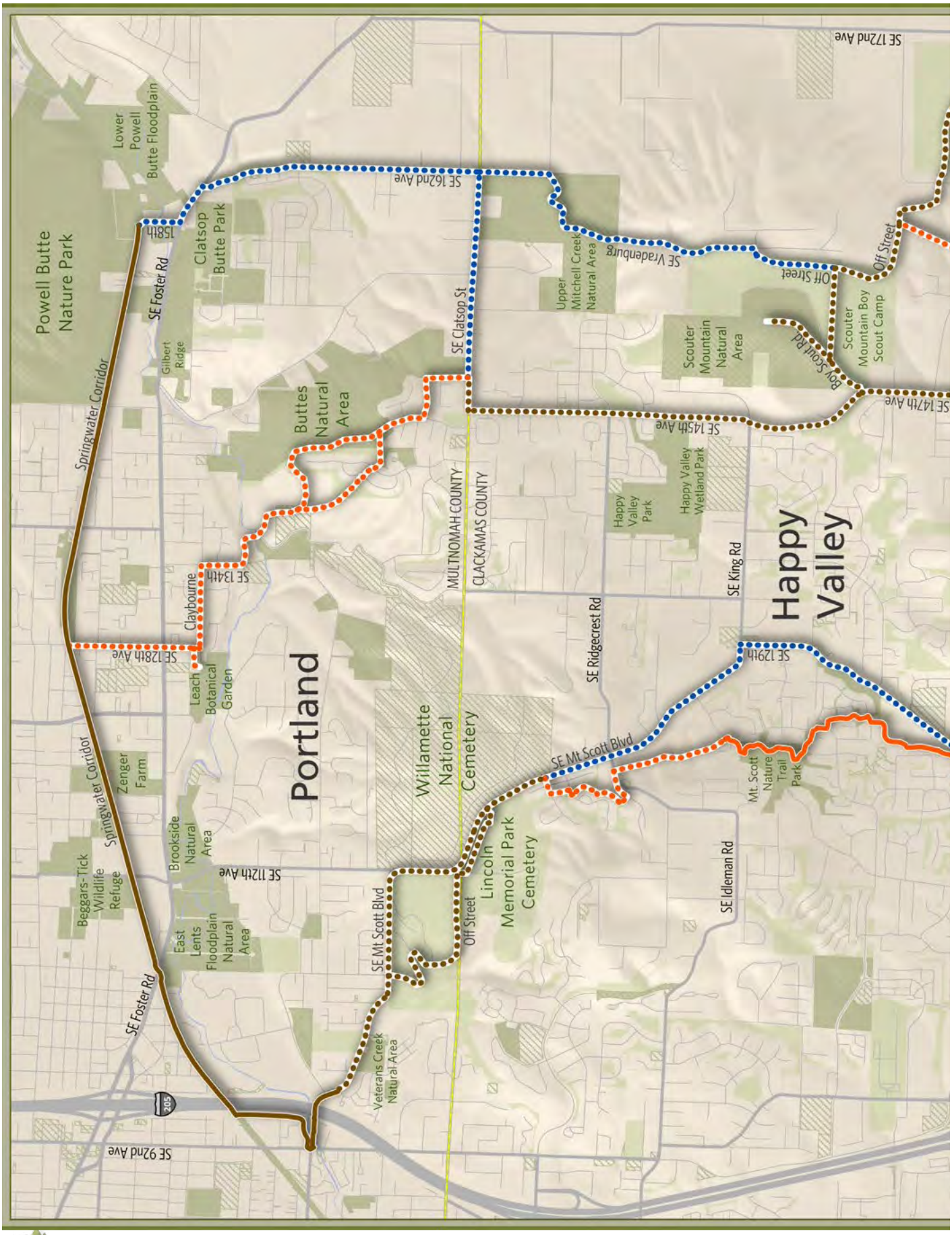
Implementation of any trail alignment will require that a trail manager operate and maintain the facility. Alignments having fewer anticipated maintenance requirements (debris removal, resurfacing, flooding) and ready access received a high rating. Alignments expected to require intensive maintenance investment were scored lower.

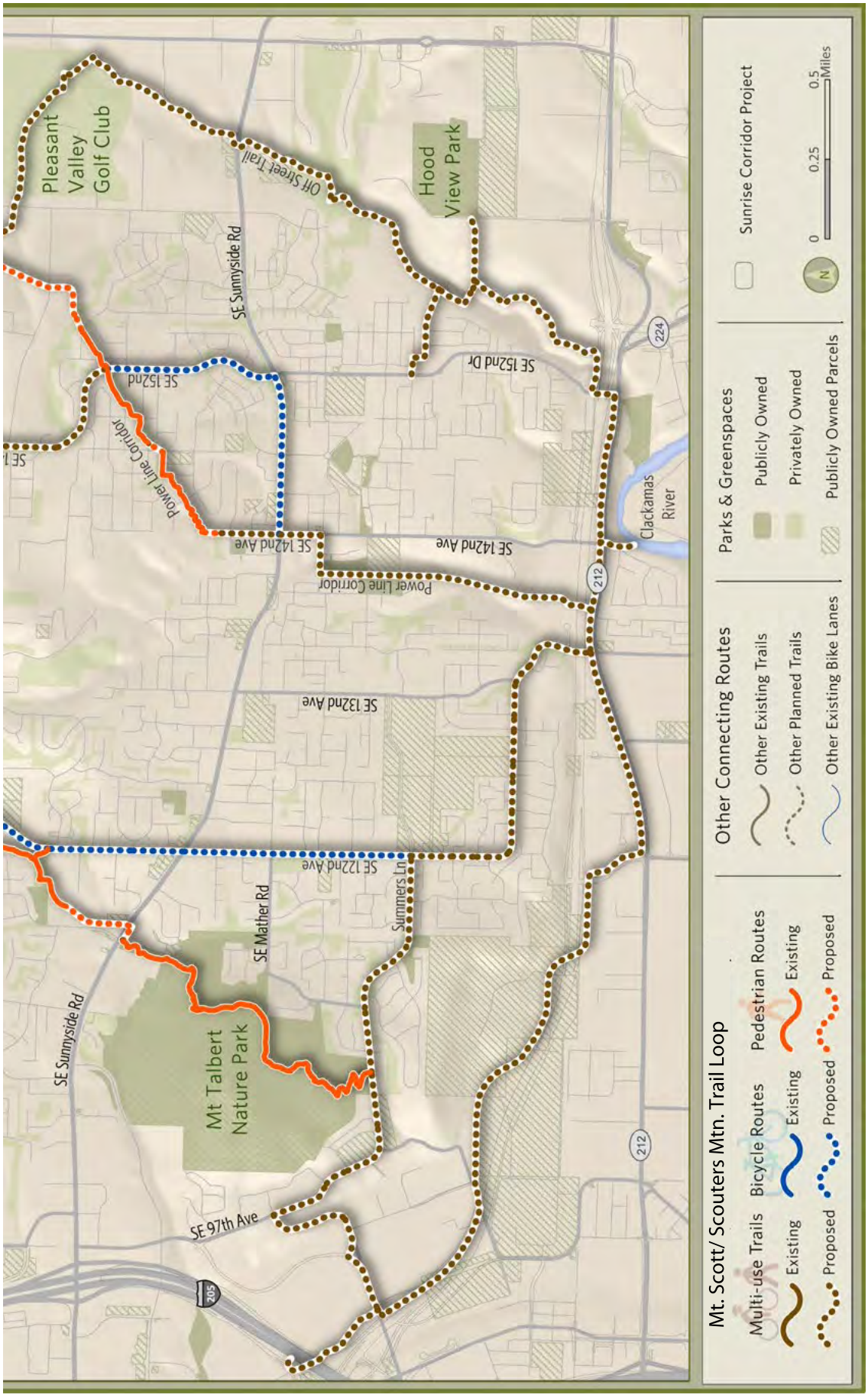
Environmental Education and Access

This criterion identified the ability of the trail segment to provide opportunities for environmental education, interpretation or access. This includes visual and proximal access to ponds, wetlands, streams, rivers and geological formations.

Cost/Ease of Implementation

This criterion scored options that may have a relatively high cost for acquisitions, design, engineering, and/or construction, especially where crossing improvements, fencing, or other expensive infrastructure improvements would be necessary. Trails which may require boardwalks, environmental mitigation, or grade separated crossings will score lower than a flat, upland trail through a publicly-owned parcel.


Powell Butte Nature Park
Lower Powell Butte Floodplain
SE 162nd Ave
158th
SE Foster Rd
Clatsop Butte Park
Springwater Corridor
Gilbert Ridge
SE Clatsop St
Upper Mitchell Creek Natural Area
SE Vradenburg
Off Street
Off Street
Scouter Mountain Natural Area
Boy Scout Rd
Scouter Mountain Boy Scout Camp
SE 147th Ave
Buttes Natural Area
SE 145th Ave
MULTNOMAH COUNTY
CLACKAMAS COUNTY
Happy Valley Park
Happy Valley Wetland Park
SE King Rd
Happy Valley
SE 134th
Claybourne
SE 128th Ave
Leach Botanical Garden
Portland
Willamette National Cemetery
SE Ridgecrest Rd
SE 129th
SE Mt Scott Blvd
Mt. Scott Nature Trail Park
Springwater Corridor
Zenger Farm
Brookside Natural Area
SE 112th Ave
Beggars-Tick Wildlife Refuge
East Lents Floodplain Natural Area
SE Mt Scott Blvd
Off Street
Lincoln Memorial Park Cemetery
SE Idleman Rd
SE Foster Rd
Veterans Creek Natural Area
205
SE 92nd Ave
SE 172nd Ave


Mt. Scott/ Scouters Mtn. Trail Loop
Multi-use Trails
Existing
Proposed
Bicycle Routes
Existing
Proposed
Pedestrian Routes
Existing
Proposed
Other Connecting Routes
Other Existing Trails
Other Planned Trails
Other Existing Bike Lanes
Parks & Greenspaces
Publicly Owned
Privately Owned
Publicly Owned Parcels
Sunrise Corridor Project
0
0.25
0.5
Miles
N
Pleasant Valley Golf Club
Hood View Park
Mt Talbert Nature Park
Off Street Trail
SE Sunnyside Rd
SE 152nd
SE 152nd Dr
Power Line Corridor
SE 142nd Ave
Power Line Corridor
SE 132nd Ave
SE 122nd Ave
SE Mather Rd
Summers Ln
SE Sunnyside Rd
SE 97th Ave
Clackamas River
212
224
205

Possible trail locations near Scouters Mountain.

5. RECOMMENDATIONS

The Lincoln Memorial Park Cemetery is a pedestrian-friendly alternative to Mount Scott Boulevard.

Recommended Trail Alignments

The preceding map shows more than 37 miles of recommended trails comprising the Mount Scott/Scouters Mountain Trail Loop. The trail system will provide an active transportation and recreation link between the Springwater Corridor, I-205 bike/ped path and Sunrise Corridor/Clackamas River while connecting area residents to open space and park jewels including Powell Butte, Buttes Natural Area, the Mitchell Creek property, Scouters Mountain, Mount Talbert, Happy Valley Nature Park and Hood View Park. The preferred alignment will provide a convenient, comfortable and safe atmosphere for trail users of all ages and abilities; provide access to and enhancement of natural and cultural resources while limiting impacts; and enhance non-motorized connectivity in the region.

The following pages describe the opportunities, constraints and recommendations associated with each preferred alignment by segment.

Figure 5-1 Recommendations: Tile 1 - Springwater Corridor to Clatsop Road

SEGMENT 1 - SPRINGWATER CORRIDOR TO CLATSOP ROAD

1E - A pedestrian alignment connecting the Springwater Corridor to Leach Botanical Garden, the Buttes Natural Area, and crossing Clatsop Road. Preferred alignment to be selected with input from PP&R.

Opportunities

- Connect two area schools and one future planned
- Cross Foster Road at existing signalized intersection
- Connect to Leach Botanical Garden
- Cross Johnson Creek via existing covered bridge
- Limit environmental impacts by following existing skid road within Buttes property and/or private property
- Alignment passes home on National Historic Register

Constraints

- Property easements or agreements needed
- Natural areas require environmentally sensitive design treatments
- Roadway crossing improvements needed on SE Deardorff Road to provide safe crossing to existing sidewalk on west side of covered bridge as well as at Clatsop and SE 147th

SE 147th north of Clatsop

Recommendations

Sidewalks for portions within road right of way and natural surface hiking trail for sections on independent right-of-way. Wetlands and creeks to be bridged with boardwalk structures. Intersection improvements (pedestrian and wildlife) at Foster and SE 128th, Clatsop and SE 147th and across Deardorff. Provide bicycle parking at access point to Buttes Natural Area. Provide way-finding and interpretive information for historic home on Claybourne. Final alignment connection to or through Buttes to be confirmed with Portland Parks & Recreation. Intention is to be one alignment and not a loop trail.

1F - A bicycle facility connecting the Springwater Corridor to SE Clatsop Road. From north to south, alignment follows SE 158th, SE Foster, SE 162nd and Vradenburg Roads with a spur alignment providing a connection to the Buttes Natural Area.

Opportunities

- Utilize existing low volume road right of way on SE 158th, 162nd and Vradenburg Roads
- Existing light at SE Foster and 162nd
- Improve habitats along Kelly Creek with native plantings
- No property acquisition required

Constraints

- Crossing improvements needed at Foster and SE 162nd and SE Clatsop and 152nd
- Narrow road right-of-way and environmental conditions limit design options
- Intersections with priority habitat areas require environmentally sensitive design treatments

SE 162nd is a low volume road within a rural setting

Recommendations

Short term: add wayfinding signs, reduce travel speeds to 35 mph, add shared lane markings and bicycle safety pull-outs.

Long term: install multi-use path on west side of SE 162nd. Intersection improvements at SE Foster and SE 162nd and SE Clatsop and 152nd. Provide bicycle parking at Buttes Natural Area. Improve riparian habitat and connectivity with trail design, construction and native plantings.

Figure 5-2 Recommendations: Tile 2 - Clatsop Road to Former Golf Club

SEGMENT 2 - CLATSOP ROAD TO FORMER GOLF CLUB

2D - Alignment follows SE 145th and 147th to connect the Buttes Natural Area to the Scouters Mountain entrance and Powerline Trail. Alignment spur provides a connection to the top of Scouters Mountain via an existing access road.

Opportunities

- Connection to Scouters Mountain
- Connection to Happy Valley Park, Wetlands Park and Happy Valley Elementary School
- Connection to existing Powerline Trail.
- Most facilities are in place for a short-term solution

Constraints

- Property easements or agreements needed at pinch point
- Alignment within constrained road right-of-way provides a less than scenic experience
- Crossing improvements needed at SE 147th and Clatsop

Much of SE 145th already includes bike lanes and sidewalk facilities

Recommendations

A route accommodating both cyclists and pedestrians from Buttes Natural Area at SE 147th and Clatsop Road along SE 145th and 147th to Scouters Mountain and the existing Powerline Trail. Cyclists to use existing bike lanes and bicycle route as short-term solution. Seek easement on SE 147th between Kraus Lane and Monner to accommodate bicycles and pedestrians. Expand sidewalk facilities to provide a separated trail experience for both pedestrians and cyclists. Use existing Scouters Mountain access road as connection to the top of Scouters Mountain.

2E - A bicycle facility within SE 162nd and Vrandenburg road right-of-way as well as Boy Scouts property (if approved).

Opportunities

- Utilize existing low volume road right-of-way on SE 162nd and Vrandenburg Roads
- Scenic quality of Vradenburg Road through Mitchell Creek property
- Connect to Scouters Mountain and Powerline Trail
- Potential to improve Mitchell Creek fish passage and red legged frog habitat at SE 162nd south of Clatsop
- Alignment within private property to be built when developed as condition of approval

Constraints

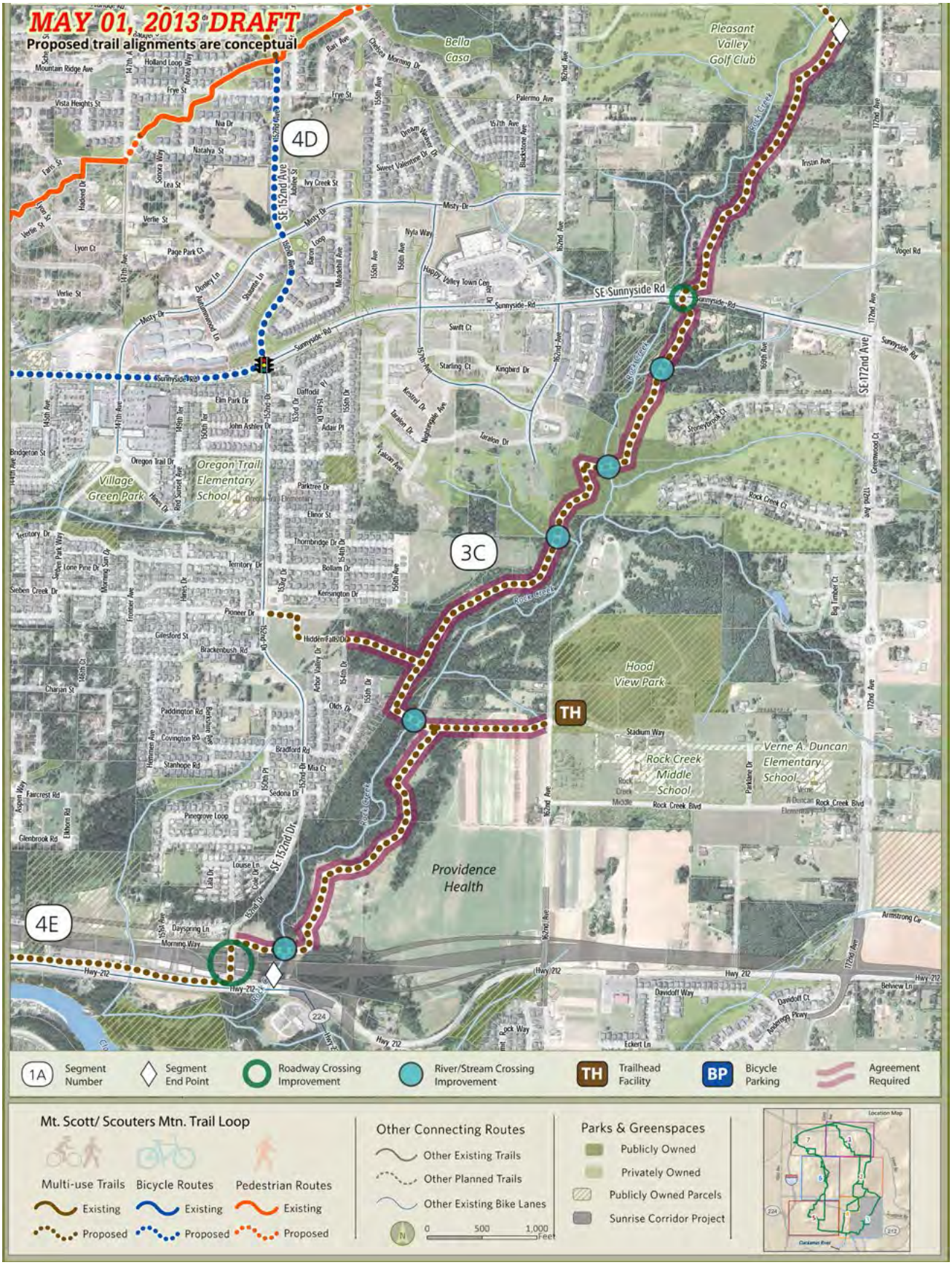
- Crossing improvements needed on SE 162nd at Clatsop
- Property easements or agreements required
- Natural areas require environmentally sensitive design treatments

Vradenburg Road through the Metro owned Mitchell Creek property

Recommendations

A signed bicycle route, south of Clatsop on SE 162nd and Vradenburg. Provide wayfinding signs, bicycle safety pull-outs, vehicle travel speed of 35 mph or less. Continue alignment within private Boy Scout Camp property to beginning of multi-use segment. Expand Mithcell Creek culvert under SE 162nd south of Clatsop to improve fish passage.

Figure 5-3 Recommendations: Tile 3 - Former Golf Club to Clackamas River



Continued from previous page:

2F - A multi-use alignment from Boy Scouts Lodge Road, through private parcels to former golf club.

Opportunities

- Connect to Scouters Mountain and former golf club property
- Alignment within private property to be built when developed as condition of approval
- Follow scenic riparian drainage, potential for enhancement

Constraints

- Crossing improvements needed on SE 162nd north of Monner
- Alignment follows a riparian drainage and would require environmentally sensitive design treatments

SE 162nd would require crossing improvements

Recommendations

A multi-use path from Boy Scouts access drive to former Golf Club property. Provide crossing improvements on SE 162nd, north of Monner. Locate trail up slope from creek drainage and to the edge of habitat blocks to reduce negative impacts. Secure a wide trail easement and couple trail development with habitat enhancement. Permission from private property owners will be required.

SEGMENT 3 - FORMER GOLF CLUB TO HIGHWAY 212 VIA ROCK CREEK

3C - Alignment connects the former Pleasant Valley Golf Club to Highway 212 along Rock Creek.

Opportunities

- Alignment occurs within several large undeveloped parcels
- Providence Health is a landowner and potential project partner
- Alignment within private property to be built when developed as condition of approval
- Opportunity for environmental enhancement of degraded areas
- Provide connections to Hood View Park, Verne Duncan Elementary, Rock Creek Middle School and Pioneer Park on SE 153rd.

Constraints

- Property easements or agreements needed
- Natural areas require sensitive design treatments
- Crossing improvements needed at Sunnyside Road, and across Rock Creek and tributaries
- Alignment to be compatible with Sunnyside Corridor planned improvements

Development is anticipated along Lower Rock Creek

Recommendations

A multi-use path following Rock Creek between former golf club and Highway 212. Provide environmentally sensitive design treatments including wide setback from creek (200' desired), bridges and boardwalks across creek crossings, tributaries and wetlands. Alignment to cross Sunnyside Road and Sunrise Corridor below grade. Include connections to Pioneer Park on SE 153rd as well as Hood View Park and area schools. Explore opportunities for environmental interpretation.

Figure 5-4 Recommendations: Tile 4 - Powerline Corridor to Hwy 212

SEGMENT 4 - POWERLINE CORRIDOR TO HIGHWAY 212 VIA SIEBEN DRAINAGE

4D - A bicycle alignment from the existing Powerline Trail, on SE 152nd to Sunnyside Road. The alignment travels on Sunnyside to the intersection of Sunnyside and SE 142nd.

Opportunities

- Cross Sunnyside Road at existing signalized intersections at 142nd and 152nd
- Connect to existing Powerline Trail
- Utilize road right-of-way and existing bike lanes as a short term solution

Constraints

- Steep grades and high traffic volumes on SE 152nd
- High traffic volumes on Sunnyside Road

SE 152nd north of Sunnyside Road

Recommendations

Route to utilize existing bike lanes on Sunnyside and SE 152nd. Upgrade to buffered bicycle facility in long term. Include wayfinding signs per Intertwine Regional Trail guidelines.

4E - Alignment connects existing portion of the Powerline Trail to Highway 212. Alignment follows SE 142nd from Powerline Trail to Bridgeton Street, then connects to the Sieben Drainage. The segment follows the Sieben Drainage through NCPRD and private parcels before connecting to Highway 212. Alignment continues east and west near Highway 212 to connect to Rock Creek (segment 3C) and ODOT property (segment 5E).

Opportunities

- Connect existing Powerline Trail and Highway 212 commercial area
- Connect to Pfeifer Park through Forest Creek open Space
- Cross Sunnyside Road and Highway 212 at existing signalized intersections on 142nd
- Provide wetland access via raised boardwalks
- Provide environmental enhancement of degraded areas

Constraints

- Property easements or agreements required
- Wetland areas require environmentally sensitive design treatments including boardwalk structures
- Requires three drainage crossings and crossing of Hwy 212
- High traffic volumes on Highway 212

The northern terminus of SE 142nd nearly connects to the existing Powerline Trail

Recommendations

A multi-use path between existing Powerline Corridor and Highway 212. Crossing of Sunnyside Road to occur at SE 142nd signalized intersection. Multi-use path through wetland areas and across drainages to be on boardwalks or bridge structures to minimize environmental impacts. Couple trail development with habitat restoration. Alignment within Highway 212 right-of-way to be buffered from vehicle traffic. Crossing of Highway 212 at SE 142nd to be improved. Provide overlook of Clackamas River as southern terminus. Coordination with private property owners, ODOT, Clackamas County, and Sunrise Water Authority required.

Figure 5-5 Recommendations: Tile 5 - Sieben Drainage to Mount Talbert

SEGMENT 5 - SIEBEN DRAINAGE TO MOUNT TALBERT

5D - A pedestrian hiking trail through Mount Talbert utilizing existing trail. Path continues on Mather within road right-of-way.

Opportunities

- Utilize existing Mount Talbert trail as pedestrian-only connection to Sunnyside and Mather Roads
- Connect to existing trailheads and trails at Mount Talbert
- Cross Sunnyside Road at existing signalized intersection (SE 117th) or by going under existing Mount Scott Creek bridge
- Existing sidewalks on Mather
- Minimal improvements needed to function as regional trail

Constraints

- Requires separation of bicycle users due to steep terrain

Existing bridge over Mount Scott Creek in Mount Talbert

Recommendations

Sign and designate existing trail as regional trail. Improve Mather Road crossing at Cranberry for trail users and wildlife. Expand sidewalks on Mather to provide buffered trail experience.

5E - A multi-use route within road right-of-way between the I-205 bike/ped path and the intersection of Highway 212 and SE 135th. Alignment follows Lawnfield, Mather, SE 122nd and Hubbard Road.

Opportunities

- Provides an alternative route to the Sunrise Corridor
- Utilize road right-of-way, existing sidewalks, bike lanes and signalized intersections as short term solution
- Connect to existing trailhead and trails at Mount Talbert
- Improve connection to Clackamas High School

Constraints

- Not all sections have sidewalks
- Alignment requires infrastructure improvements to improve safety and comfort of cyclists in road right-of-way

SE Mather, 122nd and Hubbard Roads are transit routes with bike lanes, some sidewalk facilities and views of Mount Hood

Recommendations

Utilize existing bike lanes in the short term. Improve to buffered bicycle or multi-use facility in the long term.

5F - An off-street multi-use path paralleling the Sunrise Corridor project and Highway 212.

Opportunities

- Coordinate with ODOT regarding multi-use path planned with Sunrise Corridor project
- Buffer experience from planned and existing highways

Constraints

- Non-aesthetically pleasing trail experience

Undeveloped property provides an alignment opportunity away from Highway 212

Recommendations

Multi-use facility from I-205 bike path to Segment 4E along Sunrise Corridor project through ODOT and private properties.

Figure 5-6 Recommendations: Tile 6 - Mount Talbert to Lincoln Memorial Park Cemetery

SEGMENT 6 - MOUNT TALBERT TO LINCOLN MEMORIAL

6C - A pedestrian alignment following existing trails through the Lincoln Heights community, Happy Valley Nature Park and along Mount Scott Creek.

Opportunities

- Utilize existing trails through Lincoln Heights neighborhood and Happy Valley Nature Park as well as along Mount Scott Creek
- Planned signalized intersection at Carter and Mount Scott Boulevard

Constraints

- Requires separation of bicycle users
- Alignment through sensitive natural resource area
- Property easements or agreements required

Existing earthen trail at Happy Valley Nature Park

Recommendations

Work with HOAs and private property owners to sign and designate existing trails as regional trail. Trails through natural areas to be pedestrian only natural surface hiking trails. Provide road crossing improvements at Mount Scott Boulevard and Carter Road, as well as Idelman Road. Provide wide setback from Mount Scott Creek as well as environmental enhancement.

6D - Alignment follows Mount Scott Boulevard, SE 129th and SE 122nd within road right-of-way.

Opportunities

- Limited impacts on natural resource areas by accommodating cyclists within the road right-of-way
- Improve non-motorized connection to elementary school
- Route passes oldest home in Happy Valley (corner of Mount Scott and Greiner) as well as Willamette National Cemetery and Lincoln Memorial Park Cemetery
- Existing signalized intersection at SE 122nd and Sunnyside

Constraints

- Infrastructure improvements required for cyclist comfort and safety issues in road right-of-way

Mount Scott Boulevard currently has no facilities to accommodate cyclists north of Greiner

Recommendations

Buffered bicycle facilities within road right-of-way along Mount Scott Boulevard, SE 129th and SE 122nd. Provide interpretation for oldest home and Willamette National Cemetery.

6E - A pedestrian alignment between existing community trail and Mount Talbert trailhead.

Opportunities

- Connect to existing trails and trailhead at Mount Talbert
- Separate users from roadway
- Cross Sunnyside under existing Mount Scott Creek bridge

Constraints

- Sunnyside under-crossing requires significant infrastructure investment

Recommendations

A paved pedestrian path from existing Scott Creek Park trails to Mount Talbert trailhead. Crossing of Sunnyside to occur under existing bridge along Mount Scott Creek. Signalized intersection at SE 117th may be used as short term solution.

Figure 5-7 Recommendations: Tile 7 - Lincoln Memorial Park Cemetery to Springwater Corridor

SEGMENT 7 - LINCOLN MEMORIAL PARK CEMETERY TO I-205 BIKE/PED PATH AND SPRINGWATER CORRIDOR

7C - Alignment within Mount Scott Boulevard right-of-way.

Opportunities

- Connect I-205 bike/ped path and Happy Valley
- Road right-of-way available adjacent to Lincoln Memorial Park Cemetery

Constraints

- Steep grade on roadway
- Proximity to vehicle traffic
- Infrastructure improvements required for user comfort and safety

Mount Scott Boulevard looking east with Lincoln Memorial to the right

Recommendations

A multi-use path on the south and west sides of Mount Scott Boulevard. Coordination to occur with Lincoln Memorial.

7D - Alignment through Lincoln Memorial Park Cemetery

Opportunities

- Separated from heavy vehicle traffic
- A scenic alternative to Mount Scott Boulevard with viewpoints and historic points of interest
- Grade is gentler than Mount Scott Boulevard
- Property owner willing to accommodate cyclists and pedestrians

Constraints

- Access to be during daylight hours only
- Out-of-direction travel for commuters

Low volume roadways within Lincoln Memorial offer a serene alternative to Mount Scott Boulevard

Recommendations

A day use multi-use route through historic cemetery on existing roads. Coordinate access and signs with Lincoln Memorial.

Wayfinding signage will be key to success of the trail loop system.

6. IMPLEMENTATION

This page was intentionally left blank.

Implementation

Building on the information accumulated throughout the trail master planning process, an implementation workshop was convened with the PAC in February 2013 to discuss and document trail project priorities, timelines, funding strategies and the agency roles and responsibilities for each trail segment. An overview of implementation actions, including budgetary cost estimating data, is included in this section.

The February 2013 workshop with the PAC included a segment-by-segment discussion to identify which implementing actions were needed for each segment and which agency would take the lead for each action. Much of the discussion focused on opportunities to integrate the implementation of the Mount Scott/Scouters Mountain Trail Loop Master Plan with other plans and funding sources within each jurisdiction. An outcome of the workshop was a consensus on which actions would be taken by each partner agency. Examples of implementing actions include integration into existing Transportation System Plans or Parks and Recreation Master Plans, initiating property owner discussions and acquisitions, identifying new funding sources, and initiating design engineering for construction.

The agreed-to actions and timelines are included in the matrix in Table 6-1. The matrix is intended to help determine a strategy for ensuring the implementation of the final plan. The implementation meeting that informed the development of the matrix was also intended to help identify mechanisms to facilitate trail project implementation such as land acquisition and capital fund allocation, procuring operations and maintenance (O&M) funds, identifying governing entities with the authority and commitment to trail development, trail construction and management, and discuss where right-of-way or easement acquisitions may be required. The matrix summarizes discussion outcomes pertaining to appropriate and actionable implementation strategies for the various trail segments.

Metro will continue to convene meetings on an annual or semi-annual basis and facilitate agency efforts to ensure progress on trail implementation is being made.

Mount Scott / Scouters Mountain Trail Loop Proposed Implementation Strategy

Segment Number	Alignment Description	Action(s)	Timeline (yrs)	Agency
1E*	A pedestrian only alignment connecting the Springwater Corridor to the Buttes Natural Area, Clatsop Road and Metro owned properties.	Refine alignment	1-3	PP&R
		Incorporate master plan alignments into TSP update	1-3	PP&R
		Initiate funding	1-3	Regional Effort, need partners
		Coordination with David Douglas School regarding design and funding options (Safe Routes to School)	1-3	PP&R
	PP&R's priority #1.	Work with PBOT on identifying street improvements	3-5	PP&R/PBOT
		Geotechnical Design	3-5	PP&R
		Establish an advocacy group	3-5	PP&R - Pleasant Valley Neighborhood Group
		Design engineering	5-10	PP&R/PBOT
		Acquire property rights	1-20	PP&R
		Construction	10-15	PP&R/PBOT
1F*	A bicycle facility connecting the Springwater Corridor to SE Clatsop Road. From north to south, alignment follows SE 158th, SE Foster, SE 162nd and Vradenburg Roads with a spur alignment providing a connection to the Buttes Natural Area.	Initiate funding	one to three	Regional Effort, need partners
	162nd (long term) buffered bike lane, multi-use	Design engineering	one to three	PP&R/PBOT
		Construction	one to three	PP&R/PBOT
	NOTE: Phased implementation. Phase 1 to include signing and striping. Phase 2 to include buffered cycle track or multi-use trail.	Incorporate master plan alignments into TSP update	one to three	PP&R
		Work with PBOT on identifying street improvements	5-10	PP&R/PBOT
	Crossing safety improvements at SE 158th is PP&R's priority #3.	Possible Geotechnical Design	5-10	PP&R/PBOT
2D	SE 145th and 147th to connect the Buttes Natural Area to the Scouters Mountain entrance and Powerline Trail. Alignment spur provides a connection to the top of Scouter Mountain via an existing access road.	Formally adopt master plan alignments	immediate	Happy Valley
		Initiate pursuit of funding/Acquire funding	one to three	Happy Valley/NCPRD
		Sign and dedicate existing facilities for immediate use	one to three	Happy Valle/NCPRD
		Design engineering	three to five	Happy Valley (Inside ROW)/NCPRD (Outside ROW)
		Construction	three to five	Happy Valley (Inside ROW)/NCPRD
				Metro will have a leadership role with this process
2E**	A bicycle facility within SE 162nd and Vrandenburg road right of way as well as Boy Scouts property.	Formally adopt master plan alignments	immediate	Happy Valley
		Initiate funding	immediate	Happy Valley/NCPRD
		Sign and dedicate existing facilities for immediate use	one to three	Happy Valley/NCPRD
		Work with developer to ensure regional trail standards are met	one to three	Metro
		Acquire easement property rights	three to five	NCPRD/Happy Valley/Metro
2F	A multi-use alignment from Boy Scout Lodge Road, through private parcels to former Golf Club.	Refine alignment	immediate	Happy Valley

Table 6-1: Implementation Matrix

Table 6-1: Implementation Matrix (cont.)

Segment Number	Alignment Description	Action(s)	Timeline (yrs)	Agency
		Formally adopt master plan alignments	immediate	Happy Valley
		Establish an advocacy group	immediate	Happy Valley
		Initiate funding	one to three	Happy Valley/NCPRD/ PP&R (location dependent)
		Acquire property rights	one to three	Happy Valley/NCPRD
		Work with developers to ensure regional trail standards are met	three to five	Happy Valley
		Design engineering*	three to five	Happy Valley/NCPRD
		Construction*	three to five	Happy Valley/NCPRD
		* Condition of approval.		
3C	Alignment connects the former Pleasant Valley Golf Club to the Clackamas River along Rock Creek.	Formally adopt master plan alignments	immediate	NCPRD/Happy Valley
		Refine alignment	one to three	Happy Valley/NCPRD
	NOTE: Early parcel development likely in south, less likely in north.	Establish an advocacy group	one to three	Happy Valley/NCPRD
		Initiate funding	one to three	NCPRD/Happy Valley
		Acquire property rights	one to three	NCPRD/Happy Valley
		Work with developers to ensure that regional trail standards are met	three to five	NCPRD
		Determine if ESA Consultation is needed	three to five	NCPRD
		Design engineering*	three to five	NCPRD/Happy Valley
		Construction*	three to five	NCPRD/Happy Valley
		* Condition of approval.		
4D	A bicycle alignment from the existing Powerline Trail, on SE 152nd to Sunnyside Road. The alignment travels on Sunnyside to the intersection of Sunnyside and SE 142nd.	Formally adopt master plan alignments	immediate	Happy Valley
		Initiate funding	immediate	Happy Valley
		Sign and dedicate existing facilities for immediate use	one to three	Happy Valley
		Design engineering*	three to five	Happy Valley
		Construction*	five to seven	Happy Valley
	Phase 1 - sign existing facilities			
	Phase 2 - buffered cycletrack			
		* Condition of approval.		
4E	Alignment connects an existing portion of the Powerline Trail to Highway 212. Alignment follows SE 142nd south Bridgeton Street, then connects to the Sieben Drainage via NCPRD property. The segment follows the Sieben Drainage through private parcels before connecting to Highway 212. Segment continues east and west near Highway 212 to connect to Rock Creek and ODOT property.	Formally adopt master plan alignments	immediate	NCPRD
	East/West - Clackamas County Lead	Work with ODOT to ensure that multi-use path is integrated into Sunrise Corridor planning, design and construction	one to three	Clackamas Co.
	North/South - NCPRD Lead	Begin conversations with neighbors and property owners	three to five	
		Initiate funding	five to ten	NCPRD/Clackamas Co./ODOT/WES
		Acquire property rights	five to ten	NCPRD/Clackamas Co./WES
		Update code to require trails with development	five to ten	NCPRD/Clackamas Co.
		Design engineering*	ten to fifteen	NCPRD/Clackamas Co.
		Construction*	ten to fifteen	NCPRD/Clackamas Co.
		* Condition of approval.		

Segment Number	Alignment Description	Action(s)	Timeline (yrs)	Agency
5D	A pedestrian hiking trail through Mt. Talbert utilizing existing trail. Path continues on Mather within road right-of-way. Crosswalk at Cranberry.	Formally adopt master plan alignments and include in TSP update.	immediate	NCPRD/Clackamas Co.
		Initiate funding	immediate	NCPRD/Clackamas Co.
		Sign and dedicate existing facilities for immediate use	immediate	NCPRD/Clackamas Co.
5E	A bicycle facility between NCPRD property and existing bicycle/pedestrian bridge. Alignment follows Summers Lane and SE 122nd.	Formally adopt master plan alignments with TSP update.	immediate	NCPRD/Clackamas Co.
		Acquire Phase 1 funding	one to three	Clackamas Co.
		Sign and dedicate existing facilities for immediate use	one to three	Clackamas Co.
	NOTE: Phased implementation. Phase 1 to include signage.	Acquire Phase 2 funding	three to five	Clackamas Co./NCPRD
	include buffered cycle track.	Design engineering	three to five	Clackamas Co./NCPRD
		Construction	three to five	Clackamas Co./NCPRD
5F	An off-street multi-use path between Summers Road and the Sieben Drainage (to Segment 4E).	Refine alignment	immediate	NCPRD/Clackamas Co.
		Formally adopt master plan alignments and include in TSP update.	immediate	NCPRD/Clackamas Co.
		Work with ODOT to ensure that multi-use path is integrated into Sunrise Corridor planning, design and construction	immediate	Clackamas Co./ODOT
		Initiate funding	one to three	Clackamas Co./NCPRD
		Acquire property rights	three to five	Clackamas Co./NCPRD
		Design engineering	five to ten	Clackamas Co./NCPRD
		Construction	five to ten	Clackamas Co./NCPRD
6C	A pedestrian alignment from the Lincoln Heights community through Happy Valley Nature Park and continuing on existing trail.	Initiate funding	ten to twenty	Happy Valley
		Sign and dedicate existing facilities for immediate use	ten to twenty	NCPRD
		Refine alignment of new trail	ten to twenty	Clackamas Co.
		Formally adopt master plan alignments	ten to twenty	Metro
	NOTE: these parcels may be too challenging for a developer to pursu	Acquire property rights	ten to twenty	Happy Valley/NCPRD
	May need to be agency driven	Design engineering	ten to twenty	Happy Valley/NCPRD
		Construction	ten to twenty	Happy Valley/NCPRD
6D	Alignment follows Mt. Scott Boulevard and SE 129th within road right-of-way.	Formally adopt master plan alignments	immediate	Happy Valley/NCPRD
		Initiate Phase 1 funding	immediate	Happy Valley
		Sign and dedicate existing facilities for immediate use	one to three	Happy Valley
	NOTE: Phased implementation. Phase 1 to include signage.	Initiate Phase 2 funding	one to three	Happy Valley/NCPRD
	include buffered cycle track.	Design engineering	three to five	Happy Valley/NCPRD
		Construction	five to seven	Happy Valley/NCPRD
	**Top priority for Happy Valley*			

Table 6-1: Implementation Matrix (cont.)

Table 6-1: Implementation Matrix (cont.)

Segment Number	Alignment Description	Action(s)	Timeline (yrs)	Agency
6E	A pedestrian alignment between existing community trail and Mt. Talbert trailhead.	Formally adopt master plan alignment	immediate	Happy Valley/NCPRD
		Initiate funding	immediate	Happy Valley/NCPRD
		Determine if ESA Consultation is needed	one to three	Happy Valley/NCPRD
		Design engineering	one to three	Happy Valley/NCPRD
		Construction	one to three	Happy Valley/NCPRD
	**Top priority for Happy Valley*			
7C	Alignment within Mt. Scott Boulevard right-of-way.	Include master plan alignments in TSP update	one to three	PP&R
		Initiate funding	three to five	PP&R
		Design engineering	three to five	PP&R/PBOT
		Construction	three to five	PP&R/PBOT
	PP&R's priority #2.			
7D	Lincoln Memorial Park Cemetery alignment.	Establish use agreement with Lincoln Memorial	one to three	Metro/PP&R
		Initiate funding	three to five	PP&R
		Sign and dedicate existing facilities for public use	three to five	Metro/PP&R
		Acquire easement from Lincoln Memorial	three to five	Metro/PP&R

* PBOT is responsible for improvements on-street ROW and PP&R is responsible for off-street ROW.

** NCPRD - Primary control with multi-use trails. Happy Valley takes control with road development.

Permitting

The purpose of this section of the report is to review resource agency permitting requirements associated with construction of the proposed trail in the Mount Scott/Scouters Mountain Trail Loop system.

State and Federal Agencies

Wetlands are subject to the jurisdiction of both the Oregon Department of State Lands (DSL) and the U.S. Army Corps of Engineers (USACE). Limited areas within the proposed trail corridor meet the wetland jurisdictional criteria of both these agencies (see Boardwalk locations in Figure 3-1). Disturbance to these resources as a result of trail construction will require permits from each of these agencies. Permit requirements will include plans for mitigating resource impacts.

Formal studies will need to be conducted for wetlands and stream areas impacted by trail plans.

Findings of these studies will need to be submitted for agency concurrence to support wetland fill permit applications.

Impacts for any disturbance below the ordinary high water mark (OHWM) of streams where crossings are proposed would come under the more detailed process for Endangered Species Act (ESA) compliance if streams are listed as salmonid habitat. The permitting process for this work would start with an agency consultation with National Marine Fisheries Service (NMFS) to determine what level of biological assessment would be required. NMFS would review the nature of the disturbance, the anticipated duration of the disturbance, alternative designs, and mitigation of unavoidable impacts to the stream and wetland. After consultation with NMFS, one of two processes will be completed: (1) a basic abbreviated Biological Assessment (BA) outlining project impacts and mitigation or (2) a more detailed Biological Opinion (BO) with formal agency consultation. The abbreviated BA is typically a six-month process. The BO process is a typically a one-year process.

Some portions of the trail may come under National Environmental Policy Act (NEPA) regulations and require an Environmental Assessment (EA), depending on the funding sources (e.g., Federal).

Local Jurisdictions

Construction of the trail project may result in disturbance to protected resources that require mitigation in compliance with local agency regulations (see Table 2-1 in the Existing Conditions chapter). Resource enhancement within the project area will likely be a key

component in any project mitigation plan. Mitigation to address impacts to wetlands could include enhancement of existing low-quality wetland areas. Other wetland mitigation options include restoration of historic wetland or creation of wetland in an area of upland.

Wetland impacts could be reduced by using a boardwalk trail alternative. Impacts under this alternative could be limited to the boardwalk footings, depending on the height of the structure.

Low-value wetlands adjacent to the boardwalk could be enhanced by planting dense wetland shrub and tree species.

Mitigation for impacts could include enhancing upland areas in or near the project area determined to be in "degraded" or "marginal" condition. This enhancement could include some combination of invasive species removal, native shrub and tree planting and, in some cases, supplementing existing native herbaceous cover with plantings.

Other Permits

Construction of the trail project near Oregon Highway 224 will require coordination and permitting from the Oregon Department of Transportation (ODOT). Early coordination for the crossing improvements at the highway is strongly advised.

Cost Analysis

The construction cost estimate for the Mount Scott/Scouters Mountain Trail Loop Master Plan was developed based on a linear foot cost in 2012 dollars for each trail type specified within the master plan. Trail types identified include:

- Multi-use Trail: Outside of Right-of-Way
- Multi-use Trail: Inside of Right-of-Way
- Separated Sidewalk
- Buffered Cycle Track
- Under Crossing
- Pedestrian Trail
- Boardwalk

In addition, costs are included for a pre-fabricated pedestrian bridge at anticipated river or stream crossings. Costs for roadway crossing improvements include lighting, signage, sidewalk ramps, and cross walks. An additional cost for extensive trail signage has been included for segments 1, 2, and 6 due to the trail bifurcations and number of potential trail connections/destinations associated with these segments. Trail segments 1 and 3 include areas of difficult

terrain for trail construction. A "Technical Contingency" cost of 15% has been added to these segments to account for additional grading, walls, or other engineered structures required to construct trails within these sections.

The estimated construction costs are organized based on trail segments one through seven, as described in the master plan. Costs included are based on current dollars and were developed using unit prices from recent construction projects. An inflation factor of 2% per year was used to develop the 5- and 10-year costs

Table 3-2 summarizes the estimated construction costs per trail segment:

Table 3-2. Estimated Construction Costs Per Trail Segment

Segment	Estimated Construction Cost		
	2012 Dollars	2017 Dollars	2022 Dollars
1	$12.4 M	$13.7 M	$15.1 M
2	$13.3 M	$14.7 M	$16.2 M
3	$5.1 M	$5.6 M	$6.2 M
4	$7.2 M	$8.0 M	$8.8 M
5	$5.6 M	$6.2 M	$6.8 M
6	$7.1 M	$7.8 M	$8.7 M
7	$5.1 M	$5.6 M	$6.2 M
Total	**$55.8 M**	**$61.6 M**	**$68.0 M**

The detailed cost estimates and a list of assumptions used in developing the estimates are included in Appendix J.

Maintenance and Operations

Both labor and funding resources required for maintenance of the Trail Loop may be higher than trails built in less environmentally dynamic conditions. Portions of the trail will need to be built in wetlands, forested/shaded areas, and sloping areas possibly requiring retaining structures and/or railings.

Following is a summary of typical trail maintenance tasks and the anticipated frequency required for each task. Since materials, finishes, infrastructure, and various amenities associated with bridge or tunnel structures are not known at the time of this report, maintenance tasks are limited to trail facilities only. Inspection of trail facilities will be required annually or semiannually to establish the need for conducting each task.

Table 3-3. Typical Trail Maintenance Tasks and Schedule

Task	Schedule
Clean pavement/boardwalk	Spring, biweekly in fall
Repair/replace trail amenities, furnishings	As required based on inspections
Remove flood debris	Late winter, late spring
Repair damage, natural causes or vandalism	Prioritize based on inspections
Replace/repair signs	2-3 years
Seal/repair asphalt pavement	4-12 years
Trim/clear vegetation at trail edge	Early summer, late fall
Remove/dispose trash	Weekly May-Sept., then bimonthly
Replace crosswalk markings	1-3 years
Clear drainage ditches, culverts	As required based on inspections
Maintain animal waste bag dispensers/ receptacles	Biweekly

This list includes tasks that occur frequently and does not include major repair or replacement of trail materials that may be required after 15-20 years.

The costs associated with maintenance of trail segments within the Trail Loop project can vary widely depending on the type of trail, amount of use, incidents of vandalism, wildlife and insect activity, decisions about construction materials (for example, conventional asphalt or porous paving), and the actual frequency (versus estimated frequency) that a task is deemed necessary. That being said, an average level of maintenance can be assumed based on the maintenance history of similar projects and used as a starting point for estimating annual budget level maintenance costs for one mile of trail.

Table 3-4. Average Level of Annual Maintenance Per Mile

Task	Estimated Avg. Annual Cost per Mile
Clean pavement/boardwalk	$1,500
Repair/replace trail amenities, furnishings	$1,000
Repair damage, natural causes or vandalism	$2,000
Replace/repair signs	$750
Seal/repair asphalt pavement	$500
Trim/clear vegetation at trail edge	$2,000
Remove/dispose trash	$1,500
Repaint crosswalk markings	$750
Clear drainage ditches, culverts	$2,000
Maintain animal waste bag dispensers/receptacles	Included in trash disposal above
Total	**$12,000**

This page was intentionally left blank.

REFERENCES



This page was intentionally left blank.

American Association of State Highway and Transportation Officials. (1999). *AASHTO Guide for Development of Bicycle Facilities*. Washington, DC. www.transportation.org

Clackamas County. (2011). *Clackamas County Comprehensive Plan*. http://www.clackamas.us/transportation/planning/comprehensive/

City of Happy Valley, August 2012. Happy Valley Municipal Code.

City of Happy Valley. (2011). *Happy Valley Transportation System Plan*. http://www.ci.happy-valley.or.us/DocumentView.aspx?DID=829

City of Portland, April 2012.The Portland Plan
.

City of Portland. (2006). *City of Portland Comprehensive Plan*. http://www.portlandonline.com/bps/index.cfm?c=34249

Clackamas County Water and Environment Services, June 2009. Rock Creek Watershed Action Plan.

Clackamas County Water and Environment Services. June 2009. Watershed Action Plan, Kellogg/Mount Scott Watershed.

Federal Highway Administration. (2009). *Manual on Uniform Traffic Control Devices (MUTCD)*. Washington, DC. http://mutcd.fhwa.dot.gov

Federal Highway Administration. (2005). Report HRT-04-100, *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations*. http://www.tfhrc.gov/safety/pubs/04100/

Federal Highway Administration. (1999). *Designing Sidewalks and Trails or Access*. http://www.fhwa.dot.gov/environment/sdiewalks/index.htm

Johnson Creek Watershed Council. Johnson Creek Watershed Action Plan: An Adaptive Approach.

Metro 2012: RLIS Live, Geographic Information System data.

Metro, January 2012. Urban Growth Management Functional Plan.

Metro. (2012). *The Intertwine Regional Trail Signage Guidelines*.

Metro. (2004). *Green Trails: Guidelines for Environmentally Friendly Trails*.

Metro. (2003). *Metro Greenspaces Master Plan and Regional Trails System Map*. http://www.oregonmetro.gov/index.cfm/go/by.web/id=595

Metro, June 2003. Regional Trails & Greenways: Connecting neighborhoods to nature.

Multnomah County. (2005). *Multnomah County Transportation System Plan*. http://web.multco.us/sites/default/files/transportation-planning/documents/mult_co_urb_pockets_tsp.pdf

North Clackamas Parks and Recreation District website, accessed June 2012. http://ncprd.com/parks-and-trails.

North Clackamas County Parks and Recreation District. (2004). *NCPRD Parks and Recreation Master Plan.* http://ncprd.com/wp-content/uploads/2010/10/North_Clackamas_County_Parks_Plan1.pdf

National Center on Accessibility. (Fall 2001, revised October 2007). *Trail Surfaces: What Do I Need to Know?* http://www.ncaonline.org

Natural Resources Program Annual Report 2010-2011. North Clackamas Parks and Recreation District.

Oregon Historic Site Database, accessed February 2012. heritagedata.prd.state.or.us/historic.

Portland Bureau of Transportation, February 2010.Portland Bicycle Plan for 2030.

Portland Bureau of Environmental Studies website, accessed June 2012. www.portlandoregon.gov/bes/article/214282 Johnson Creek Watershed History.

Portland Bureau of Environmental Studies website, accessed June 2012. www.portlandoregon.gov/bes/article/214247 Biological Communities in the Johnson Creek Watershed.

Portland Bureau of Environmental Studies website, accessed June 2012. www.portlandoregon.gov/bes/article/214233 Johnson Creek Watershed Habitat.

Portland Bureau of Planning, January 1991. Portland Zoning Code.

Portland Parks & Recreation. May 2009. Trail Design Guidelines for Portland's Park System.

Portland Parks & Recreation. June 2006.Recreational Trails Strategy.

Portland Parks & Recreation, November 2006.Natural Area Acquisition Strategy.

Portland Parks & Recreation, March 2009.Clatsop Butte Park Master Plan.

Rails-to-Trails Conservancy. (1998). *Rail-Trails and Safe Communities.*

Rails-to-Trails Conservancy. (2000). *Rail-Trails and Liability: A Pimer on Trail-related Liability Issues & Risk Management Techniques.*

State of Oregon. (2011). *Oregon Revised Statutes (ORS) Chapter 105 Public Use of Lands.*

State of Oregon. (Ongoing). State of Oregon/DEQ Reports on environmental problems in project area. http://www.deq.state.or.us/lq/ECSI/ecsi.htm http://theintertwine.org/sites/theintertwine.org/files/file_attachments/Intertwine%20Regional%20Trail%20Signage%20Guidelines.pdf

United States Access Board. (2006). *Public Rights-of-Way Accessibility Guidelines (PROWAG).* Wahsington, DC. http://www.access-board.gov/PROWAG/alterations//guide.htm

Vegetation Studies (http://www.portlandonline.com/parks/index.cfm?c=39872)