Lake Oswego
Trails and Pathways Master Plan

Prepared for: **City of Lake Oswego Parks & Recreation Department**

Prepared by: **Alta Planning + Design**

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Introduction

Plan Overview

Multi-use, shared-use paths, pathways, or trails are the foundation of a livable community. This Plan uses the terms 'pathways' and 'trails' interchangeably to describe off-road facilities designed for exclusive non-motorized usage. Many Lake Oswego pathways are currently directly adjacent to or on roadways; but the preferred design would be separated from the road. Many of these pathways are in fact sidewalks. Other terms used to describe such facilities include shared use paths and multi-use trails. Non-motorized users may include but are not limited to: bicyclists, scooters, in-line skaters, users of other wheeled devices like Segways or electric assist-bicycles, roller skaters, wheelchair users (both non-motorized and motorized), walkers, runners, and, in some cases, equestrians.

Trails and pathways offer numerous aesthetic and recreational opportunities, as well as commuter options for traveling to and from destinations in Lake Oswego. Residents desiring to bicycle or walk to work, go for a family bicycle ride to the park, library, or along the Willamette and Tualatin rivers will benefit from safe connecting pathways. Trails and pathways often help raise property values, provide common space for social interactions, improve overall community safety, and encourage healthy lifestyles.

Lake Oswego's village-like community offers numerous cultural, natural, and recreational resources. The trail system will wind through Lake Oswego's historic landscape and through its distinctive neighborhoods. Trails will connect more than 30 parks, public facilities, open spaces, and community/recreation centers to richly enhance Lake Oswego's quality of life.

The 1999 City of Lake Oswego *Quality of Life Task Force Final Report* recognized the need to develop non-motorized transportation alternatives that promote mobility and access for the entire community. A high quality system of interconnected multi-purpose trails achieves this by providing access to significant environmental features, public facilities and parks, local neighborhoods, schools, and business districts, as well as providing healthy recreation options and opportunities for reduced reliance on automobiles.

Lake Oswego is already well on its way to having a quality trail system. Many of its parks and greenspaces have their own internal trails. Many streets have sidewalks, and a roadside pathway system provides several bicycling, walking, and skating loops that highlight Oswego Lake, neighborhood parks, and natural areas.

The pathway and trail network includes Lake Oswego's network of on-street bicycle lanes - striped on-road lanes for exclusive bicycle use. In some cases, a roadway with both bicycle lanes and a sidewalk or pathway is considered part of the trail network.

As part of the development of the *Lake Oswego Trails and Pathways Master Plan* (referred to as *the Plan*), project staff analyzed the existing pathway and trail system. The Plan recommends improvements that will upgrade, where needed, the existing system, fill in the missing gaps, and connect to significant environmental features, schools, public facilities, local neighborhoods, and business districts in Lake Oswego and throughout the region.

The Plan proposes the development of a hierarchical trail system that integrates regional, community connector, and local access trails (*Figure 1*). This hierarchical system of trails–explained in more detail in the *Design* and *Recommendations* sections–gives community members a wide variety of trail options that access significant environmental features, public facilities, local neighborhoods, and business districts in Lake Oswego and throughout the region.

Vision

The recommended trail and pathway network proudly complements the wooded and grove-like character of Lake Oswego. It reflects the desire of Lake Oswego's leaders to leave future generations with a trail system that provides more than just a transportation option. Better, the trail system is intended to complement and enhance efforts to:

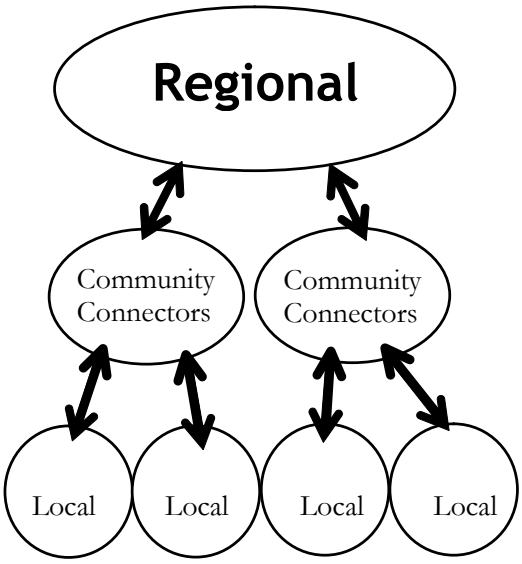


Figure 1. Pathway and Trail Hierarchy Concept

- Enhance residents' appreciation of the Willamette and Tualatin rivers and other natural resources.
- Deepen residents' understanding of Lake Oswego's history and culture.
- Provide educational opportunities for residents of all ages.
- Promote and offer healthy recreation, transportation, and community-gathering options.
- Boost regional economic growth.
- Improve community safety.
- Discover and appreciate the area's rich beauty, both now and into the future.

This Plan is intended to hold value for the next 50 to 100 years. By taking a long view, it includes projects that may be decades away and are dependent on a series of potentially major changes, which may or may not happen. This long view sets forth the vision, the implementation of which depends on City and resident leadership and support.

Plan Scope and Public Process

The Plan followed a series of research, field, and public process activities from Fall 2002 to Spring 2003.

Research activities included:

- Assessment of existing bicycling and walking conditions and facilities in Lake Oswego.
- Evaluation of bicycle and pedestrian needs, such as safety problems, demographic and geographic population and employment demands, and facility deficiencies.
- Research into publicly-held easements.
- Field assessment of missing gaps, system deficiencies, and trail opportunities.

Public outreach activities included:

- Four meetings with the Lake Oswego Trails Advisory Committee, a group with 10 stakeholders and group representatives (see inside cover.)
- Information in *Hello LO!* and other local publications.
- A public open house.
- Meetings with the Lake Oswego Transportation Advisory Board (TAB), Lake Oswego Neighborhood Advisory Committee (LONAC), Natural Resources Advisory Board (NRAB), Parks and Recreation Advisory Board (PRAB), and individual stakeholder groups.
- Presentations to three groups of youth at Waluga Middle School.
- Three City Council work sessions, and a final City Council hearing on June 17, 2003.

Related Plans and Background

To understand the vision and established goals of the City, planners reviewed relevant planning documents, including the:

- Community Development Code,
- Comprehensive Plan,
- Transportation System Plan,
- Lake Oswego Open Space Plan,
- Quality of Life Task Force Final Report, and
- Parks and Recreation Comprehensive Plan.

Staff also reviewed a number of local neighborhood and area plans. The primary components and goals of these plans are summarized below.

1994 Lake Oswego Comprehensive Plan (Transportation System Plan)

The Lake Oswego Comprehensive Plan embraces the Oregon statewide planning goals established in 1978. Goal 12 – Transportation - was updated and adopted into the Lake Oswego Comprehensive Plan as the Transportation System Plan in 1992, reflecting new policy and legislative decisions about alternative transportation, including bicycling and walking. The Plan recognizes the importance of travel alternatives to the automobile and has outlined City planning policies to include:

- *Integrating pedestrian and bicycle access needs into planning, design, construction and maintenance of all transportation projects.*
- *Connecting local walkways and bikeways to activity centers such as schools, employment areas, parks, commercial areas, and transit centers and corridors.*
- *Making the pedestrian environment safe, convenient, attractive and accessible for all users through:*
  - *Planning and developing a network of continuous sidewalks, pathways, and crossing improvements that are accessible per the requirements of the Americans with Disabilities Act (ADA).*
  - *Providing adequate and safe street crossing opportunities for pedestrians, and*
  - *Improving street amenities for pedestrians, particularly near transit centers, town centers, main street, employment centers, and transit corridors serving the primary transit network.*
- *Ensuring that planned bike and pedestrian paths are not obstructed as the result of new land development.*
- *Requiring developers to provide pathway connections from new development projects to the existing bicycle and pedestrian system.*
- *Working to preserve existing railroad rights-of-ways and other easements to maintain opportunities for future mass transit, bike, and pedestrian paths.*
- *Connecting local bicycle facilities for bicyclists to ride to local and regional destinations, activity centers, connections to other transportation modes, and the regional bicycle network.*

1999 City of Lake Oswego Quality of Life Task Force Final Report

This report identifies and develops quantifiable indicators to measure changes in the quality of life in Lake Oswego. Specific goal statements from the final report include:

Mobility and Access

- *Undertake measures to reduce automobile travel, encourage transit ridership and provide viable alternatives to automobile travel.*
- *Provide safe and efficient bicycle and pedestrian improvements to connect residential areas to other areas of the community.*
- *Plan for and implement a bike and pathway system to provide a viable alternative to automobile travel.*

Environment and Natural Resources

- *Reduce air pollution and improve air quality.*
- *Protect, enhance, maintain and expand a network of open space areas and scenic resources within and adjacent to the Urban Services Boundary.*

Culture and History

- *Preserve the historical, archaeological and cultural resources of the community.*

2001 Lake Oswego Open Space Plan

The Lake Oswego Open Space Plan outlines implementation strategies, long-term stewardship policies, actions, and recommendations for the City and its network of open spaces and natural resources. The goals and action measures that pertain to the establishment of a comprehensive trails network include:

- *Improve visibility and public access at all City owned waterfront properties.*
- *Acquire properties or water access easements along the Tualatin River.*
- *Provide a network of corridors linking natural systems.*
- *Fill in "missing links" in the Willamette River Greenway Trail.*
- *The City should be a proactive partner in the development of a feasibility study for the Willamette Shoreline Trolley Line Trail.*
- *Focus on the River to River Trail, Old River Road, and the Tryon Creek State Park to Willamette River connections.*
- *Pursue a trail along the Union Pacific Rail line.*
- *Strengthen the connection to the regional 40-Mile Loop Trail.*
- *Provide public canoe access to the Tualatin River Water Trail.*
- *Pursue opportunities to connect to the Lower Tualatin Greenway trail.*

2002 City of Lake Oswego Parks and Recreation Comprehensive Plan

The Parks and Recreation Comprehensive Plan details the existing inventory and forecasts future demand for park and recreational facilities. The Plan includes goals for development of a high quality system of multi-purpose park trails and corridors. The Plan suggests many trail locations. These suggestions have been reviewed and, where appropriate, incorporated into this trails Master Plan. The key goals in the Parks and Recreation Master Plan include:

- *Create a comprehensive system of multi-purpose off-road trails using alignments through Oregon State Parks, Pacific and Western Railroad landholdings, as well as cooperating private properties where appropriate.*
- *Create a comprehensive system of on-road bicycle routes for commuter, recreational, and touring enthusiasts using scenic, collector, and local road rights-of-way and alignments through the City and the surrounding area.*
- *Link residential neighborhoods to community facilities.*
- *Work with regional parties to link and extend the Willamette Riverfront Trail along the river shoreline south to West Linn and north to Portland.*
- *Link trails with parks, schools, athletic clubs, swimming pools, the downtown, as well as other commercial and retail activity centers within Lake Oswego.*
- *Extend trails through natural area corridors like Tryon Creek State Park, and the Tualatin and Willamette Rivers that will provide a high quality, diverse sampling of area environmental resources.*
- *Furnish trail systems with appropriate supporting trailhead improvements that include interpretive and directory signage systems, rest stops, drinking fountains, restrooms, parking and loading areas, water and other services.*
- *Where appropriate, locate trailheads at or in conjunction with park sites, schools, and other community facilities to increase local area access to the trail system and reduce duplication of supporting improvements.*
- *Install telephones, emergency call boxes, or other means by which trail users can summon fire, emergency aid, police, and other safety and security personnel should the need arise.*
- *Develop trail improvements of a design and development standard that is easy to maintain and access by maintenance, security, and other appropriate personnel, equipment, and vehicles.*

Neighborhood Plans and Other Significant Documents

Other plans reviewed and incorporated include:

- 1995 Luscher Farm: Opportunities and Constraints

- 1995 Oregon Department of Transportation (ODOT) Bicycle and Pedestrian Plan
- 1996 First Addition Neighborhood Plan
- 1998 Old Town Neighborhood Association Neighborhood Plan
- 1998 Lake Grove Neighborhood Plan
- 1999 AASHTO Guide
- 2000 Glenmorrie Neighborhood Plan
- 2001 Canal Area Master Plan
- 2002 Lake Forest Neighborhood Plan
- 2002 Lake Oswego Foothills Design District Project Summary
- 2002 Stafford Basin Pathway and Trail System Concept Plan
- 2002 Waluga Neighborhood Plan
- Lake Grove Town Center Plan
- Metro 2040 Plan

Plan Goals and Objectives

The goals outlined below draw upon previously summarized plans. Advisory committee members and other stakeholders and interested residents also provided input.

Primary Vision

Develop a high quality system of multi-purpose trails and pathways that access significant environmental features, public facilities and parks, developed local neighborhoods, Town Centers, and business districts in Lake Oswego and regionally.

Goal One

Provide a comprehensive trail system around Lake Oswego that seamlessly connects regionally significant trails with local trails and ensure that new development will adequately connect to this system.

Goal Two

Develop appropriate trails for use by people with disabilities, pedestrians, youth, equestrians, boaters, bicyclists, and other non-motorized trail users.

Goal Three

Enhance regional trail connections to the adjacent communities of Tigard, Tualatin, West Linn, Portland, Portland Community College (Sylvania Campus), and Clackamas and Washington Counties.

Goal Four

Preserve existing railroad rights-of-way and other easements to maintain opportunities for future pathways.

Goal Five

Locate trailheads at or in conjunction with park sites, schools, and other community facilities to increase local access to the trail system and reduce duplication of supporting improvements.

Goal Six

Develop trail design and development standards that are easy to maintain and access by maintenance, security, and emergency vehicles.

Goal Seven

Ensure that Trails Master plan projects are incorporated into private and public development.

Goal Eight

Furnish trail systems with trailhead improvements that include interpretive and directional signage systems, benches, drinking fountains, restrooms, parking and staging areas, and other services.

Goal Nine

Ensure the trail system links with current and future planned transit operations in Lake Oswego, and is designed to be complementary to transit and transportation systems.

Goal Ten

Enable at least 75 percent of all residents to reach their desired local destinations on foot, bicycle, or wheelchair with a safe, clear system of trails and pathways.

Design Guidelines

Plan Concept

In order to simplify and organize the pathway and trail system, this Plan moves away from classifying facilities by design. Instead, the trail and pathway network is organized by purpose and function. The new system – Regional Trails, Community Connectors, and Local Access Trails – is similar to the way Lake Oswego's streets are classified (e.g., arterials, collectors, and local streets. *See Figure 1, page 6).* This new categorization of trails and pathways will give community members a wide variety of options for commuting, running errands, exercise and recreation, leisure and nature viewing.

Regional Trails

Regional trails connect Lake Oswego to adjacent communities – Portland, Tigard, Tualatin and West Linn – and to regionally significant features such as the Willamette and Tualatin Rivers. There are six planned regional trails in the Lake Oswego area:

- The Willamette Shore Trolley Trail, which would connect Lake Oswego to Portland via the old Red Electric railroad line,
- the Willamette Greenway Trail,
- the River to River Trail, which connects the Willamette Greenway at George Rogers Park to the Tualatin River,
- the Surf to Turf Trail, which would follow the Pacific and Western railroad alignment,
- Terwilliger Boulevard, which would consist of a path on one side for walking and on-street bicycle lanes,
- Tryon Creek Walking Path, from Portland's Hillsdale neighborhood to downtown Lake Oswego.

All of the trails are on Metro's Regional Greenspaces and Trails Map and are eligible for regional funding. In addition, a potential trail connection is shown using the active railroad bridge over the Willamette River into Milwaukie.

Regional trails generally have their own right-of-way and users should have minimal conflict with automobile traffic. These trails are designed to meet the Americans with Disabilities Act (ADA) standards, American Association of State Highway and Transportation Officials (AASHTO) and the Manual on Uniform Traffic Control Devices (MUTCD) standards, Oregon Department of Transportation (ODOT) standards and other State and Federal guidelines, which make them eligible for State and Federal transportation funding. Regional trails serve bicyclists, pedestrians, wheelchair users, skaters, and others.

Regional Trail: Willamette Greenway

Community Connector Trail: Iron Mountain

Local Access Trail: Bryant Woods

Community Connector Trails

Community connector trails link important land uses and areas of interest within Lake Oswego. This includes shopping, schools, parks, transit centers, churches, employment districts, libraries, and others. They also connect users to adjacent communities and the regional trail system.

Community connector trail and pathway facilities vary according to the functional classification of the facility as well as the average daily traffic (ADT) on the adjacent roadway. Most community connector trails in Lake Oswego are either shared use paths or separate facilities (i.e., a sidewalk or pathway for pedestrians and on-street bike lanes for bicyclists) that meet State and Federal standards. Safety for bicyclists and pedestrians on these routes is paramount, as they often parallel or intersect busy roadways. However, some community connector trails follow neighborhood streets, in which case pedestrians are accommodated with a sidewalk or shared use path and bicyclists share the roadway with vehicles.

Local Access Trails and Accessways

Local access trails primarily serve pedestrians with safe and direct connections to local features, such as schools, parks and community centers. Some local access trails may also be appropriate for bicycling and skating.

Local trails may be sidewalks or accessways providing short connections

from surrounding neighborhoods to parks and schools. In addition, local access trails often are located within parks (e.g., the Cooks Butte and Bryant Woods systems). Trails within parks are primarily earthen or crushed gravel, but may also be a sidewalk or shared use path.

Cooks Butte offers an excellent natural experience close to the city

Park Trails

Park Trail: Beth Ryan Nature Reserve offers another hiking opportunity in Lake Oswego

Park Trail: Hiking path on Cooks Butte

Trail Design Types

Throughout Lake Oswego's history of planning parks, pathways, and trails, numerous terms have been used, including: sidewalk, separate sidewalk, separate asphalt pathway, road-separated trail, separate paved pathway, and dirt and gravel trail. In Table 1, the Plan provides a standardized set of trail and pathway design terms and options.

Table 1. Lake Oswego Trail and Pathway Standard Design Designations

Design Designation	Width	Surface	Treatment	Function
Sidewalk	5'-10'	Concrete	Separated vertically on curb or horizontally by planting strip.	Typical treatment for local access pathways. Pedestrian and wheelchair users, provides access to homes and businesses.
Bike Lane	4'-6'	Asphalt	On-street lane striped and signed to ODOT standards	For bicyclists on roadways.
Signed shared roadways	N/A	N/A	May either be a low volume (less than 3000 cars per day) roadway with trafffic calming and signage to create a safe shared use environment, OR a higher volume roadway with wide (14') outside lanes. See photo page of examples.	Used in combination with sidewalks or shared use paths on one side of road.
Shared Use Path	8'-14'	Asphalt, concrete or other smooth hard surface	Designed to ODOT standards. Separated from roadway by planting strip or vertical curbing.	Typical application for local accessways, regional trails, and community connector pathways. Accomodates bicycles, pedestrians, wheelchairs. Minimizes potential trail crossing conflicts with autos.
Hiking Path	1'-12'	Earthen or gravel surface	Vegetation cleared, slope stabilized.	Typical application for in-park non-primary circulation trails. Provides walking routes for pedestrians. May be designed for equestrians and bicyclists.

Pathway Examples

Low volume roadway (Westlake Dr.) with a shared-use path and shared use roadway for bicyclists and motorists

Hiking path in Bryant Woods

Portland's Springwater on the Willamette shared use path

Hiking path in Woodmont Natural Park

Bike lane on McVey originally intended for pedestrian use as well

Signed Shared Roadway Examples

An example from Troisdorf, Germany of a street with coloring and markings to indicate shared use between bicyclists and motorists (cars may drive in the shoulder space with the bike marking)

Many streets in the Netherlands are designed as "living streets" (woonerf) through color, texture, narrow width, signage, and design.

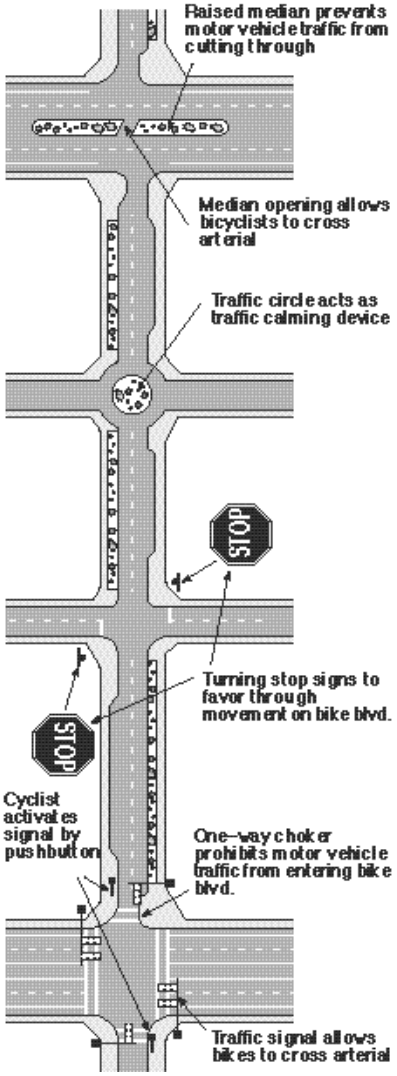


Figure from ODOT Bicycle and Pedestrian Plan of traffic-calmed street intended for shared bicycle and motorist use

Appropriate Trail Designs

The following trail cross-sections illustrate standard treatments for the primary trail and pathway design opportunities in Lake Oswego. Each schematic portrays only half of the roadway.

This section should be supplemented by other trail design documents, including ODOT's Bicycle and Pedestrian Master Plan, Metro's "Green Trails: Guidelines for Building Environmentally Friendly Trails," AASHTO, and the MUTCD.

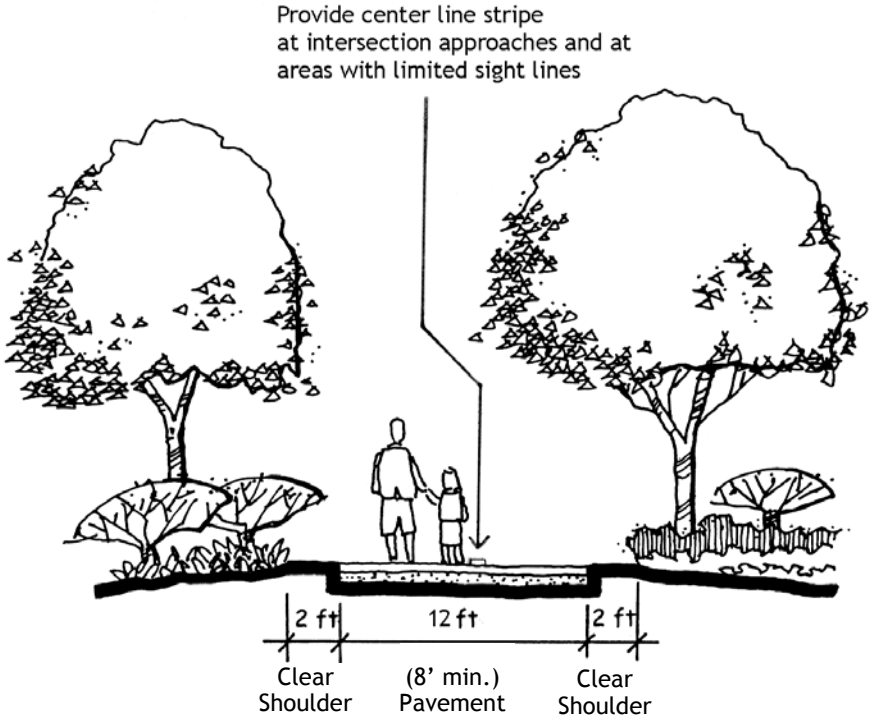


Figure 2. Regional Trail

The figure above illustrates a typical shared use path design that is appropriate for regional trails and local access trails to schools, parks, and neighborhoods. The path is also appropriate for some community connector trails and pathways. This path is designed for two-way bicycle and pedestrian traffic, typically has its own right-of-way, and is designed to accommodate maintenance and emergency vehicles.

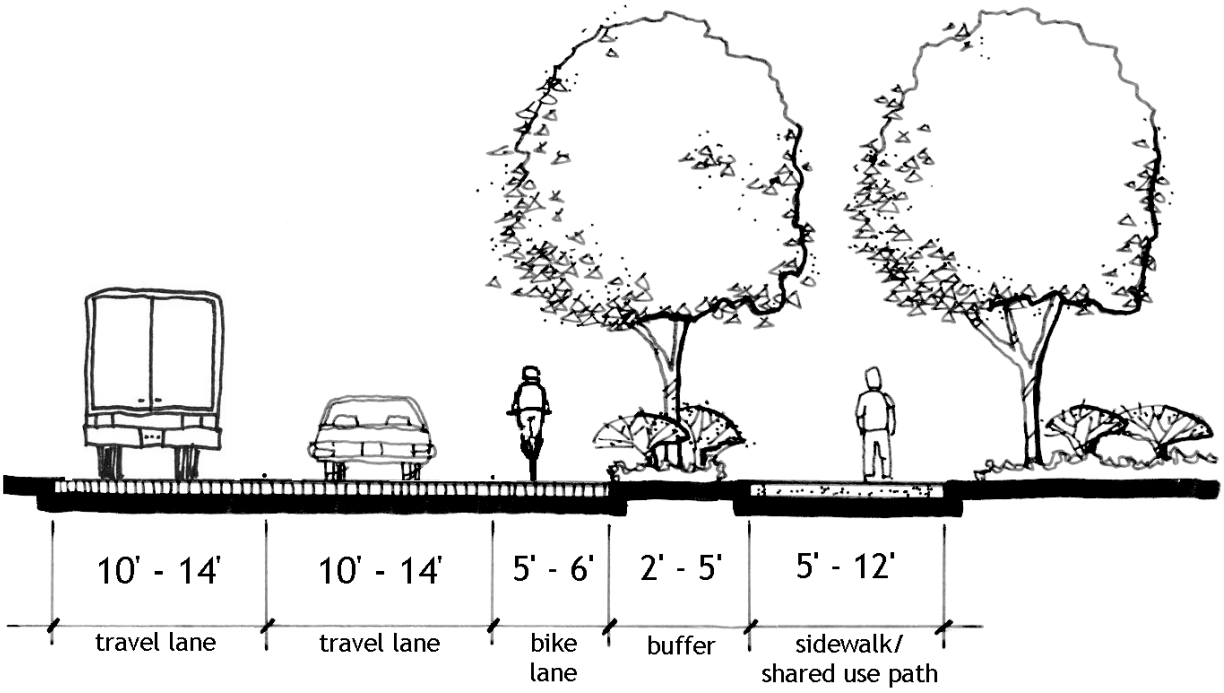


Figure 3. Community Connector with a Bike Lane and a Sidewalk/Shared Use Path

On roadways with 3,000 ADT or higher, bicycle lanes should be used to improve bicyclist safety and comfort. A buffer or curb must separate the shared use path or sidewalk from the roadway for pedestrian safety. The width of the bicycle lane, buffer, and sidewalk or shared use path should appropriately reflect the volume and speed of the vehicles using the roadway. Roadways with higher traffic volumes and speeds should have wider bicycle and pedestrian facilities.

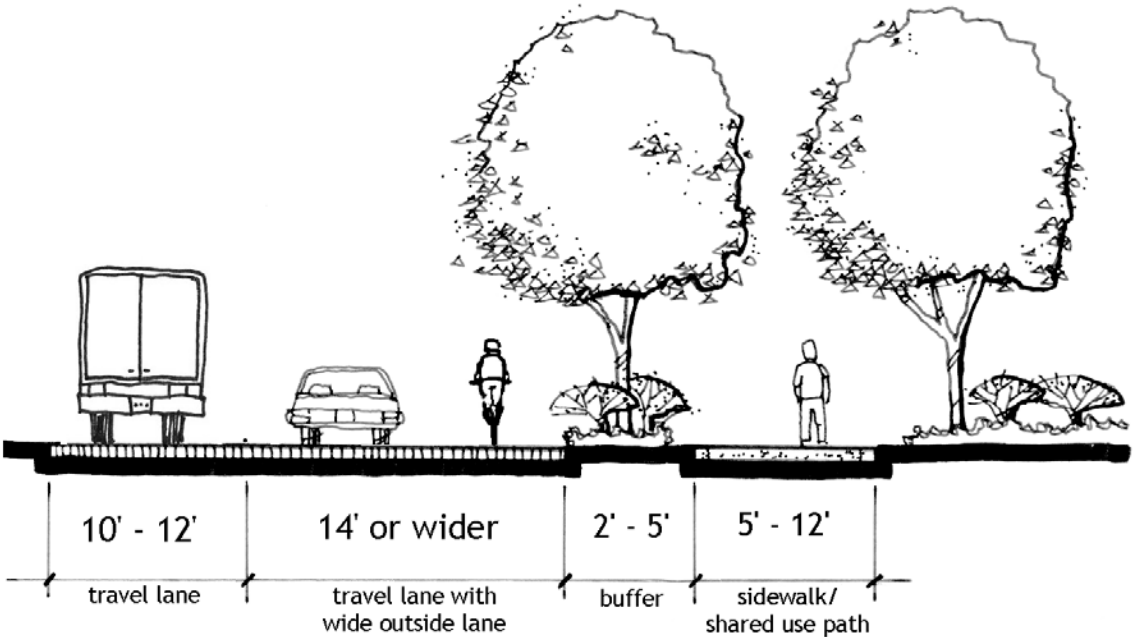


Figure 4. Community Connector with a Wide Outside Lane and a Sidewalk/Shared Use Path

Some urban roadways can accommodate bicyclists with a wide outside travel lane if there is no shoulder or insufficient space for a bicycle lane. The lane should be wider on roadways with steep grades where bicyclists need more maneuvering space.

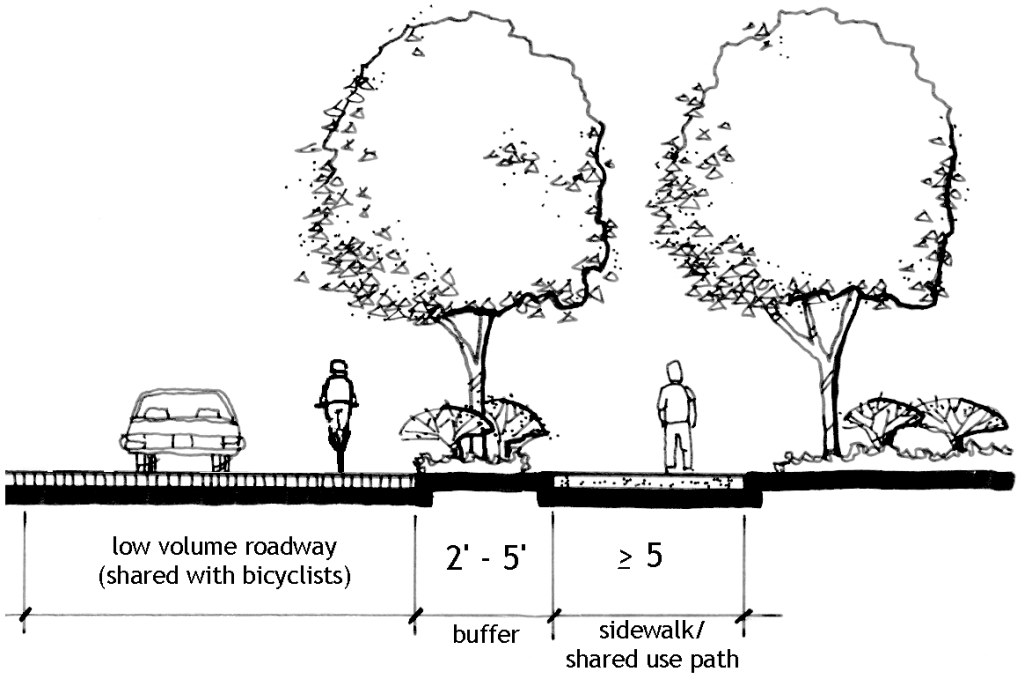


Figure 5. Community Connector or Local Access Trail/Pathway

On low volume, low speed roadways (i.e., residential or neighborhood streets), many bicyclists can safely share the road with vehicles. Pedestrians should be separated from the roadway with a buffer and a shared use path, or a sidewalk and a curb.

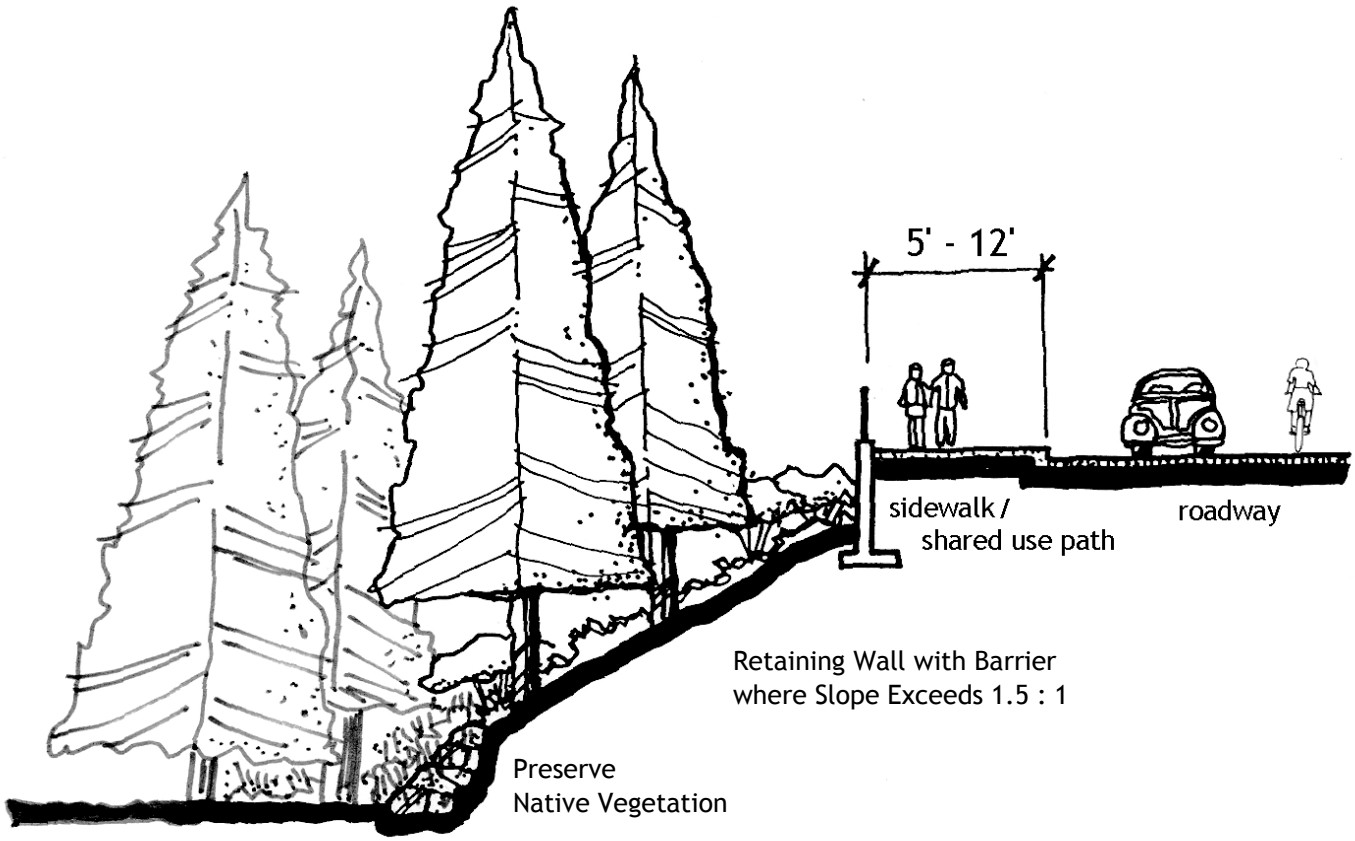


Figure 6. Local Access Trail/Pathway with a Curb-Separated Sidewalk or Shared Use Path

Pedestrians should be separated from low volume roadways by a curb if there is insufficient space for a buffer. The width of the sidewalk or shared use path should depend on the traffic volume and speeds of the adjacent roadway: higher volumes and speeds warrant wider facilities.

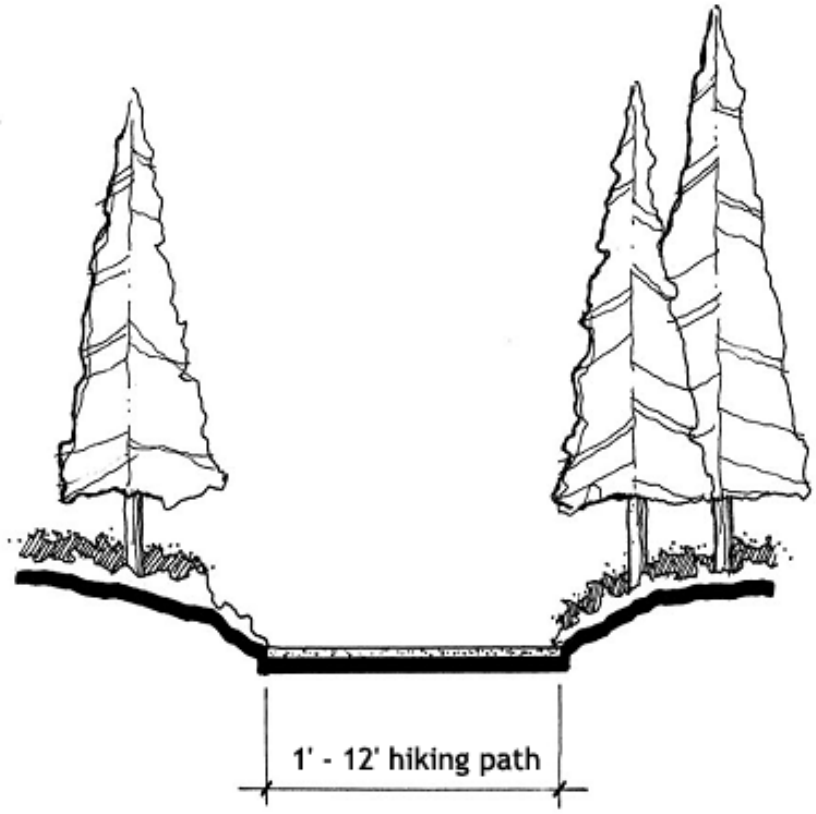


Figure 7. Hiking Path

Hiking paths can vary in width depending on the existing topographic and environmental constraints. Hiking paths should take into account issues like drainage, erosion, slope, presence of waterways, vegetation, riparian and habitat areas, environmental requirements and regulations, and others. Areas with hiking paths (i.e., parks and natural areas) should have a complimentary accessible route that meets or exceeds ADA standards in addition to the hiking paths. Trail width will depend on intended users. For example, narrower widths will be used in environmentally constrained area with only hiking uses intended. Wider widths are desirable for shared bicycle or equestrian use.

Trail-Roadway Crossings

Like most trails in built urban areas, Lake Oswego's trails must cross roadways at certain points. These roadway crossings may be designed at-, below-, or above-grade. At-grade crossings create a potentially high level of conflict between trail users and motorists. However, well-designed crossings have not historically posed a safety problem, as evidenced by the thousands of successful trails around the United States with at-grade crossings. Designing safe grade crossings is a key component of the safe implementation of this Plan.

Trail-Roadways crossings should comply with the AASHTO, ODOT, and MUTCD standards.

In some cases, a required bikeway crossing may be so dangerous or expensive (e.g., to build an undercrossing or undercrossing) as to affect the feasibility of the entire alignment. However, in most cases, trail and pathway crossings at-grade can be properly designed to a reasonable degree of safety and to meet existing traffic and safety standards.

Evaluation of bikeway crossings involves analysis of vehicular and trail user traffic pattern, including speeds, street width, traffic volumes (average daily traffic, peak hour traffic), line of sight, and trail user profile (age distribution, destinations). This study identifies the most appropriate crossing options given available information, which must be verified and/or refined through the actual engineering and construction document stage.

Basic Crossing Prototypes

The proposed intersection approach in this report is based on established standards, published technical reports, and the experiences on existing facilities. Virtually all crossings fit into one of four basic categories, described below.

- *Type 1: Unprotected/Marked*

  Unprotected crossings include crossings of residential, collector, and sometimes major arterial streets or railroad tracks.

- *Type 2: Route Users to Existing Intersection*

  Trails and pathways that emerge near existing intersections may be routed to these locations.

- *Type 3: Signalized/Controlled*

  Trail and pathway crossings that require signals or other control measures due to traffic volumes, speeds, and trail usage.

- *Type 4: Grade-separated*

  Bridges or undercrossings provide the maximum level of safety but also generally are the most expensive and have right-of-way, maintenance, and other public safety considerations.

Type 1 Unprotected/Marked Crossings

An unprotected crossing (Type 1) consists of a crosswalk, signing and often no other devices to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, trail traffic, use patterns, vehicle speed, road type and width and other safety issues such as the proximity of schools. The following thresholds outlined recommend where unprotected crossings may be acceptable:

- Install crosswalks at all trail-roadway crossings
- Maximum traffic volumes:
  - ≤ 9,000-15,000 ADT
  - up to 15,000 ADT on two-lane roads, preferably with a median.
  - up to 12,000 ADT on four-lane roads with median.
- Maximum travel speed
  - 35 mi/h (mph)
- Minimum line of sight:
  - 25 mi/h zone: 155 feet
  - 35 mi/h zone: 250 feet
  - 45 mi/h zone: 360 feet

On two lane residential and collector roads below 15,000 ADT with average vehicle speeds of 35 mi/h or less, crosswalks and warning signs ("Bike Xing") should be provided to warn motorists, stop signs and slowing techniques (bollards/geometry) should be used on the trail approach. Care should be taken to keep vegetation and other obstacles out of the sight line for motorists and trail users. Engineering studies should be done to determine the appropriate level of traffic control and design.

Type 1 Roadway Crossing

On roadways with low to moderate volumes of traffic (< 12,000 ADT) and a need to control traffic speeds, a raised crosswalk may be the most appropriate crossing design to improve pedestrian visibility and safety. The crosswalks are raised 150 mm above the roadway pavement, similar to speed humps, to an elevation that matches the adjacent sidewalk. The top of the crosswalk is flat and typically made of asphalt, patterned concrete, or brick pavers. Tactile treatments are needed at the sidewalk/street boundary so that visually impaired pedestrians can identify the edge of the street. Costs can range from $5,000 to $20,000 per crosswalk, depending on the width of the street, the drainage improvements affected, and the materials used for construction.

A flashing yellow beacon costing between $15,000 and $30,000, may be used, preferably one that is activated by the trail user rather than operating continuously. Some jurisdictions have successfully used a flashing beacon activated by motion detectors on the trail, triggering the beacon as trail users approach the intersection. This equipment, while slightly more expensive, helps keep motorists alert.

Crossings of higher volume arterials over 15,000 ADT may be unprotected in some circumstances – for example, if they have 85th percentile speeds of 30 mi/h or less and have only two lanes of traffic. Such crossings would not be appropriate, however, if a significant number of school children used the trail.

Type 1 crossings should be used throughout Lake Oswego at trail/roadway intersections. Examples include:

- 5th Street (Surf to Turf)
- Lakeview Blvd. (Surf to Turf)
- Bryant Rd. (Surf to Turf)
- Bergis Rd. (River to River)
- Childs Rd. (Canal Area)

Raised crosswalk

Type 2: Route Users to Existing Intersection

Crossings within 250 feet of an existing signalized intersection with pedestrian crosswalks are typically diverted to the signalized intersection for safety purposes. For this option to be effective, barriers and signing may be needed to direct trail users to the signalized crossings. In most cases, signal modifications would be made to add pedestrian detection and to comply with the ADA. In many cases, such as on most community connector pathways, parallel to roadways, crossings are simply part of the existing intersection and are not a significant problem for trail users.

Type 3: Signalized/Controlled Crossings

New signalized crossings are recommended for crossings more than 250 feet from an existing signalized intersection and where 85th percentile travel speeds are 40 mi/h and above and/or ADT exceeds 15,000 vehicles. Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity and safety.

Trail signals are normally activated by push buttons, but also may be triggered by motion detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street. The signals may rest on flashing yellow or green for motorists when not activated, and should be supplemented by standard advanced warning signs. Typical costs for a signalized crossing range from $150,000 to $250,000.

In Lake Oswego, only a few cases will warrant a new signalized crossing. These include Country Club Road and Highway 43 where trails intersect the roadway.

Type 2 Roadway Crossing

Type 3 Roadway Crossing

Type 4: Grade-separated Crossings

Practically all the crossings needed for this Plan can and should be accommodated at-grade. In one location, (Highway 43 at Tryon Creek), a Type 4, grade-separated crossing will likely be needed.

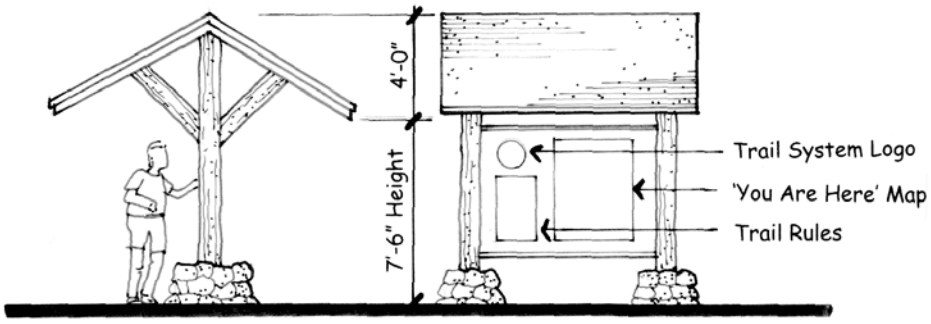
Grade-separated crossings may be needed where ADT exceeds 25,000 vehicles, and 85th percentile speeds exceed 45 mi/h. Safety is a major concern with both overcrossings and undercrossings. In both cases, trail users may be temporarily out of sight from public view and may have poor visibility themselves. Undercrossings, like parking garages, have the reputation of being places where crimes occur. Most crime on trails, however, appears to have more in common with the general crime rate of the community and the overall usage of the trail than any specific design feature.

Design and operation measures are available which can address trail user concerns. For example, an undercrossing can be designed to be spacious, well-lit, equipped with emergency cell phones at each end and completely visible for its entire length prior to entering.

Other potential problems with undercrossings include conflicts with utilities, drainage, flood control, and maintenance requirements. Overcrossings pose potential concerns about visual impact and functional appeal.

Grade-separated undercrossing

Grade separated overcrossing



Trail information installation

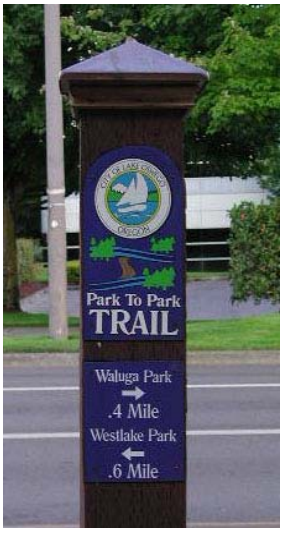
Signing and Striping

Crossing features for all roadways include warning signs both for vehicles and trail users. The type, location, and other criteria are identified in the Manual for Uniform Traffic Control Devices (MUTCD). Consideration must be given for adequate warning distance based on vehicle speeds and line of sight, with visibility of any signing absolutely critical. Catching the attention of motorists jaded to roadway signs may require additional alerting devices such as a flashing light, roadway striping or changes in pavement texture. Signing for trail users must include a standard stop sign and pavement marking, sometimes combined with other features such as bollards or a kink in the trail to slow bicyclists. Care must be taken not to place too many signs at crossings lest they begin to lose their impact.

Directional signing may be useful for trail users and motorists alike. For motorists, a sign reading "Bicycle Trail Xing" along with a Lake Oswego trail emblem or logo helps both warn and promote use of the trail itself. For trail users, directional signs and street names at crossings help direct people to their destinations.

The directional signing should impart a unique theme so trail users know which trail they are following and where it goes. The theme can be conveyed in a variety of ways: engraved stone, medallions, bollards, and mile markers. A central information installation at trailheads and major crossroads also helps users find their way and acknowledge the rules of the trail. They are also useful for interpretive education about plant and animal life, ecosystems, and local history.

A number of striping patterns have emerged over the years to delineate trail crossings. A median stripe on the trail approach will help to organize and warn trail users. The actual crosswalk striping is a matter of local and State preference, and may be accompanied by pavement treatments to help warn and slow motorists. The effectiveness of crosswalk striping is highly related to local customs and regulations. In communities where motorists do not typically defer to pedestrians in crosswalks, additional measures may be required.



Directional information on a bollard

Engraved stone

Medallion

Mile marker

Two samples of informational and directional signage

Trail Features

There are a number of amenities that make a trail inviting to the user. Below are some common items that make trail systems stand out.

Pedestrian-scale light fixtures, garbage cans, and rest areas

Benches, water fountains, and directional signage

Art installations

Historical placards

Water fountains

Existing Conditions

Summary of Existing Conditions

Geographically constrained in a natural basin, Lake Oswego is a relatively compact city. The community is characterized by its abundance of woods and creeks and attractive neighborhoods with lovely homes, gardens, parks, and open space. The City is proud of its historic landmarks and setting in view of Mount Hood and the Cascade mountains, bucolic pastureland and fields, Oswego Lake, and the Tualatin and Willamette rivers. The City also has a number of local shopping and business centers and a historic downtown. Both downtown Lake Oswego and Lake Grove are considered Town Centers in Metro's Region 2040 Plan. Lake Oswego takes great pride in the quality of life and amenities it offers its residents, rendering it one of the most desirable communities in the Portland metropolitan region.

The City currently has 120 miles of paved, trails and pathways (many of which are sidewalks), including a publicized recreational loop system designed to connect neighborhoods to schools, parks, and commercial centers. It also has 10.5 miles of unpaved pathways (hiking paths) in City parks. These trails and pathways are shown on the Conceptual Trails and Pathways Map, located in the back pocket of this report.

Many of the current trails and pathways, such as the Willamette Greenway from George Rogers Park to West Linn, are excellent and provide connections to parks and schools. Others, however, are in need of improvement and are incomplete. The system as a whole poorly serves residents with disabilities. It also poorly serves bicyclists, as the existing shoulder pathways, which typically consist of a patchwork of sidewalks, striped road shoulders, and separated paths, are intended for pedestrians rather than two-way bicycle traffic. Examples include South Shore Boulevard, Quarry Road, Bryant Road, and Iron Mountain Blvd.

Many park trails and pathways provide nice opportunities for able-bodied walkers. However, there are many gaps and challenging situations as well.

The existing Lake Oswego trail and pathway system is a tremendous resource. In the future, Lake Oswego needs to focus on upgrading and connecting the existing

Sidewalk – curb side – on Meadows Road

pathways, ensuring that they serve multiple users (i.e., bicyclists, skaters, and wheelchair users).

Existing Pathways

As previously explained, the types of pathways include sidewalks, shared use paths, walking/hiking trails, and on-street bicycle lanes.

Currently, many pathways are designed as **on-road shoulders**, characterized by a 3' – 6' wide shoulder, usually on one side of the roadway. These are intended for two-way pedestrian use. The shoulder pathway is demarcated by a wide fog line or the addition of humps or reflectors to discourage automobile traffic from drifting into the pathway. Existing shoulder pathways are found on:

- Bryant Road
- McVey Avenue
- South Shore Boulevard
- Iron Mountain Boulevard
- Westview Drive
- Overlook Drive

Sidewalks are distinguished from shoulder pathways in that they usually have a curb and are physically elevated from the roadway. Sidewalk connections for pedestrians are fairly comprehensive in downtown Lake Oswego and throughout many of the newer neighborhoods. Sidewalks are largely absent in many of the older neighborhoods and on the fringe of the community.

On-road shoulder intended for use as a shared use path on McVey Ave.

Bicycle lane and sidewalk on Boones Ferry Rd.

Bicycle lanes are often located on roadways with a significant volume of traffic. Bicycle lanes currently exist on Country Club Road, Highway 43 south of Oak Street, and sections of Boones Ferry Road. The bicycle lanes on some sections of Boones Ferry Road are sub-standard, spanning only 3 or 4 feet instead of the standard 5 to 6 feet. The City's Transportation System Plan identifies a number of other streets for future bicycle lanes:

- Stafford Road
- Childs Road
- South Shore Boulevard
- McVey Avenue
- Jean Road
- Pilkington Road
- Bryant Road
- Rosemont Road
- Bonita Road
- McEwan Road
- Fosberg Road
- Lesser Road
- Melrose Street
- Boones Ferry Road
- Terwilliger Boulevard
- Kerr Parkway
- Carman Drive
- Parts of A Avenue

Unpaved and hiking paths are found throughout many of Lake Oswego's parks and natural areas. These pathways can be formal, like the trails in Bryant Woods and Tryon Creek State Park, or more informal, like the trails on Cooks Butte and in Woodmont Natural Park. Other places with unpaved and hiking paths include:

- George Rogers Park
- Canal Acres Natural Area
- River Run Park (west)
- Springbrook Park
- Iron Mountain Park
- Beth Ryan Nature Preserve
- Waluga Park
- Southwood Park
- Lamont Springs Natural Area
- Sunnyslope Open Space
- Hallinan Park
- Pennington Park

For additional descriptions and recommended standards and designs, refer to Table 1 in the Design Guidelines section of this document.

Hiking path on Iron Mountain

Three types of pathways in 100' on Quarry Road

Current Challenges

Fragmentation

One of the major problems with the current trail and pathway system is a lack of continuity and consistency. Many different types of pathways are used in conjunction with one another, in turn creating a fragmented pathway system. For example, on Quarry Road (*see photo*), a sidewalk on the south side of the road leads into an on-road shoulder pathway, which immediately turns into a separated sidewalk. While this does function for able bodied pedestrians, it is unclear if it is intended to serve bicyclists. The on-road shoulder portion should be separated to comply with the ADA.

Access

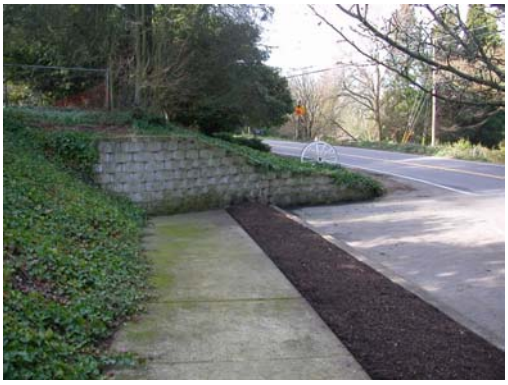
Many trails and pathways in Lake Oswego have impediments to disabled users. For example, on Meadows Road (*see photo*), a sidewalk was installed around an existing utility pole. Pathway obstructions can be more subtle, as on Country Club Road (*see photo)* where large mailboxes and residential plantings encroach into the pathway, making passage difficult. On this road it is also not clear if the shoulder pathway is intended for shared bicycle and pedestrian use, although parked automobiles in the shoulder force all users into the travel lane (*see photo on next page*). There are also repeated instances of pathways abruptly ending, forcing people into the roadway, such as on Carman Drive (*see photo on next page).*

Pathway obstruction on Meadows Rd.

Narrow pathway on Country Club Rd. due to vegetation and mailboxes

Limited Public Rights-of-Way and Encroachment

Lake Oswego, like many well-established communities, has the challenge of accommodating and balancing the needs of different roadway users within limited public rights-of-way. Pedestrians and bicyclists are often left without proper facilities. Even more problematic is the issue of private property encroachment into the public right-of-way, such as a property owner placing trees, shrubs, fences, or walls in the public right-of-way (*see photo.)* There are numerous examples like this all throughout Lake Oswego. Although it is within the City's rights to reclaim this space, it can be politically challenging to do so.



Pathway termination on Carman Drive

Limited rights-of-way can mean a dangerous pedestrian environment on Bryant Road

Parked automobiles block the shoulder pathway on Country Club Road

Private property encroachment into public right-of-way on Bryant Road

Park path in Freepons Park that is accessible to all users

Inaccessible park path in George Rogers Park

Park to Park Trail sign in Waluga Park

Paths in Parks

Lake Oswego has many wonderful hiking and walking paths in the local park system. However, many of the current trails are limited to able bodied pedestrians. Freepons Park (*see photo*) is an example of an excellent pathway through a park that is accessible to all users, while George Rogers Park (*see photo*) has a pathway that is too narrow for those in wheelchairs or with walking assistance devices. Ironically, the too-narrow walking path is adjacent to a disabled parking spot.

Though most of the hiking paths in Lake Oswego are in good or excellent condition, some paths in the parks like Iron Mountain and Cooks Butte are in poor condition due to erosion, channeling, and poor drainage.

Signage

Lake Oswego currently uses a bollard with some directional signage for the Park to Park pathway (*see photo)*, which provides limited mileage and directional information. However, other pathway loops lack distinct signage.

Accessways

There are approximately 20 accessway paths connecting cul-de-sac streets to nearby arterials, bus stops, and parks and open space. These paths provide critical bicycle and pedestrian connections. The City should employ more of these paths in future development to ensure safe and direct connections for non-motorized users.

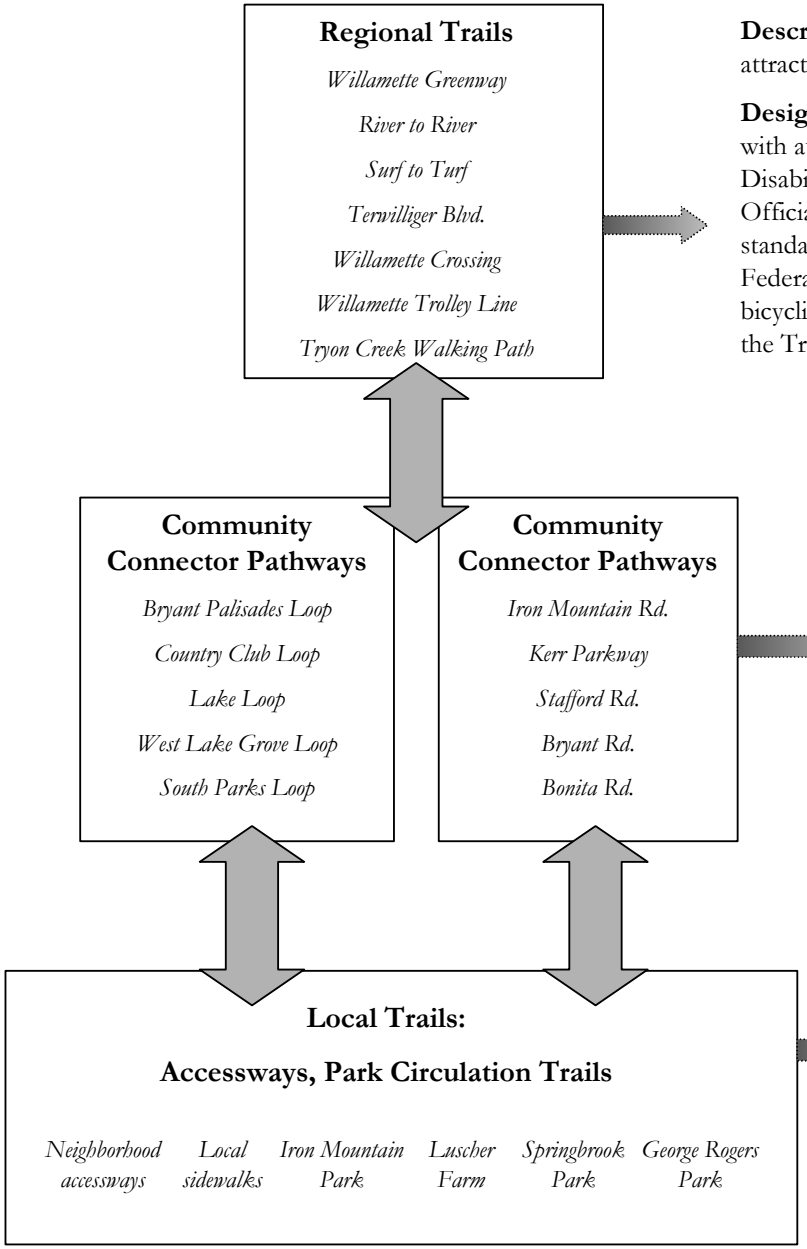
Recommendations

Comprehensive Trail and Pathway Network

The recommended trail and pathway network fulfills the vision and goals of this Plan. It provides a comprehensive network of trails and pathways that connect to every school, park, community center, business district, library, and natural resource. It connects to Lake Oswego's neighbors: West Linn, Portland, Tigard, Tualatin, and Milwaukie. It serves multiple users, and improves access for residents of varying physical capabilities, ages, and skill levels.

The following details of the network should be noted:

- The **Conceptual Trails and Pathways Plan Map** (*see back pocket)* includes both existing (shown as solid lines) and recommended trails and pathways (shown as dashed lines). Many community connector projects call for improvements to existing but substandard pathways.
- "Accessways" – those providing a direct connection from cul-de-sacs and other disconnected developments – will be determined through development review and permitting processes. Since accessway locations cannot be known until the development applicant provides a site plan, most accessways are not shown on the map. The proposed accessways currently shown on the map are desirable local connections but are subject to redevelopment and/or subdivision of private property. Therefore, the actual trail or pathway location may change.
- The trails and pathways shown are largely conceptual. Most need to be further studied and designed. The location may change as a result.
- Planners researched public easements, many of which are shown on the map when a desired pathway location coincided with an available easement. However, easements in locations where a trail was not currently intended to be located are not shown. A complete map of easements is available through the City of Lake Oswego Planning Department.
- Sidewalks are shown as local trails because they fulfill the needs of local pedestrian circulation and connections.
- Some local connections are on quasi-public property (e.g., through private open space owned/managed by a neighborhood association).



Description: Regional trails connect neighboring jurisdictions or regionally significant attractions.

Design: Regional trails generally have their own right-of-way and have minimal conflict with automobile traffic. These 8'-12' trails are designed to meet the Americans with Disabilities Act (ADA), American Association of State Highway and Transportation Officials (AASHTO) standards, Oregon Department of Transportation (ODOT) standards and other state and federal guidelines, which make them eligible for State and Federal transportation funding. Regional trails* serve multiple non-motorized users – bicyclists, pedestrians, wheelchair users, skaters, and others. (* With the exception of the Tryon Creek Walking Path)

Description: Community Connector pathways/trails link important land uses and areas of interest (e.g. parks, schools, shopping areas, natural areas, etc.), the region, and the regional trail system. These incorporate the pathway loops in existence today, many of which need to be upgraded or connected.

Design: These trails are generally shared use paths (8' – 10' paved path separated from the roadway) *or* separate facilities (i.e., a sidewalk or pathway for pedestrians and on-street bike lanes for bicyclists) that meet State and Federal standards.

Description: Local trails are: 1) accessway connections from surrounding neighborhoods to parks and schools, 2) sidewalks on local streets, or 3) trails located within parks. Local access trails connect pedestrians to local features, such as schools, parks and transit center, and community centers.

Design: Accessways are typically designed as shared use paths, whereas sidewalks are separated either horizontally or vertically from the road. Local park hiking/walking trails are primarily earthen or crushed gravel. Within parks, the local trail system must have a primary, ADA-compliant trail. Non-ADA compliant walking trails may be provided in concert with the primary trail.

Regional Trails

Willamette Greenway

River to River

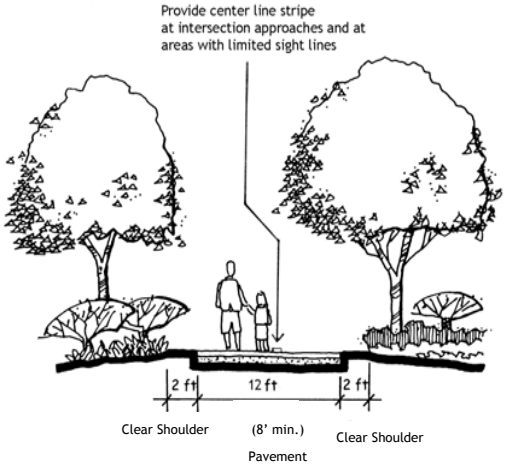
Surf to Turf

Terwilliger Blvd.

Willamette Crossing

Willamette Trolley Line

Tryon Creek Walking Path



Community Connector Pathways

Bryant Palisades Loop

Country Club Loop

Lake Loop

West Lake Grove Loop

South Parks Loop

Community Connector Pathways

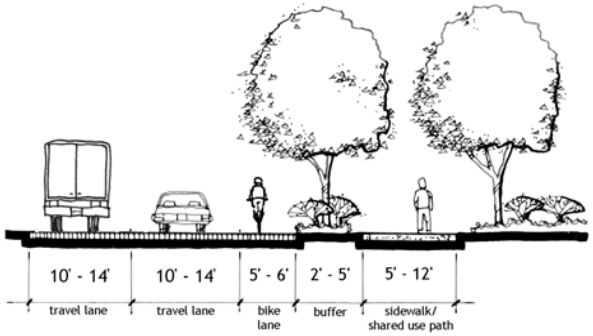
Iron Mountain Rd.

Kerr Parkway

Stafford Rd.

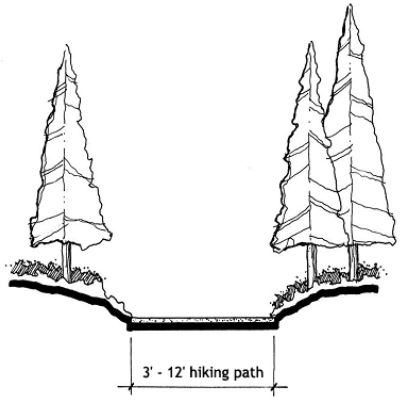
Bryant Rd.

Bonita Rd.



Local Trails:
Accessways, Park Circulation Trails

Neighborhood accessways *Local sidewalks* *Iron Mountain* *Luscher Farm* *Springbrook Park* *George Rogers Park*



Improvement Selection Criteria

With the goal of developing a high quality system of multi-purpose trails and pathways, improvements must not only meet the residents' expectations, but exceed them. There are essentially two types of improvements for the Lake Oswego network.

- **Develop new facilities**

  New facility provisions are needed for regional trails, community connector pathway corridors, local parks, and to connect residential and commercial areas if:

  - there are no existing facilities;
  - facilities currently only serve one user group but are intended to serve multiple user groups;
  - in parks, no ADA compliant facilities are available.

- **Upgrade existing facilities**

  Facilities will need to be upgraded if they currently support multiple uses but are not constructed to Federal and State standards, have obstructions, or are in poor condition.

Selection Criteria

There are three different categories of trails and pathways, thus three different sets of selection and ranking criteria. These criteria are based on those developed and used by the Transportation Advisory Board (TAB) to rank 10 pathway projects. The TAB-ranked pathway projects are shown in *Appendix A*. These projects -- primarily small scale and short term in nature – are incorporated into the broader trail and pathway projects in this Plan. The scoring system used for this Plan is also shown in *Appendix A*.

Depending on the type of trail, the criteria include:

Ease of Implementation: How difficult will it be to implement this project? This criteria takes into account topographical, political, and economic constraints.

User Generators: How many user generators does the project connect to within .25 - .5 miles of the project, such as schools, parks, employment and commercial districts, Town Centers, churches, etc.?

Connectivity: To what degree does this project fill in a missing gap in the trail and pathway system?

Hazard: To what degree does this project mitigate safety problems, such as speed, road width, and dangerous roadway crossings?

Population Served: Relative to other projects, does this serve special needs populations, like children and the elderly?

Equity: Have projects been evenly dispersed throughout the city? Is this project in an under-served area?

Project Priorities and Phasing

The projects in each category were ranked based on a weighted scoring system with the selection criteria described previously. Project scores were based on the information obtained from site visits and field work, City staff, and from the public. As a result, the projects have been grouped by trail classification (regional, community connector, and local) into Tier I, Tier II, and Tier III project priorities.[1]

Tier I projects are the top priority pathway and trail projects for short-term project implementation and are targeted for completion in the next five to 10 years.

Tier II projects are mid-term projects planned for implementation between 10 and 25 years. These projects comprise the bulk of the trails and pathways system.

Tier III projects are long-term projects recommended for implementation between the next 25 and 50 years from Plan adoption. These are projects that generally supplement the trail and pathway system or may provide potential pathways over a longer period of time as land uses and regional planning boundaries change.

The short, mid- and long-term schedule may change according to available funds, changing priorities, other roadway projects that coincide, new development and redevelopment opportunities, or other factors.

It should be noted that the purpose of this exercise is to understand the relative priority of the projects so that the City may apportion available funding to the highest priority projects. Medium and long-term projects also are important, and may be implemented at any point in time as part of a development or public works project. The ranked lists should be considered a "living document" and should be frequently reviewed to ensure they reflect current Lake Oswego priorities.

Staff did not rank the local access trails proposed to be developed next to roadways through future development projects. These are listed in Appendix B.

Table 2. Regional Trail Project Rankings

Tier I
Willamette Greenway
Willamette Shore Trolley
Surf to Turf (includes Willamette Crossing into Milwaukie)
Tier II
River to River
Terwilliger Boulevard

[1] Numerical ranking information is on file at the Lake Oswego Parks & Recreation Department.

Table 3. Community Connector Project Rankings

Tier I
Rosemont Rd.
Carman Dr.
South Parks Loop
Tier II
Country Club Loop
Kelok Road/Cardinal Road
Westside Connector Trail
Bryant/Palisades Loop
West Lake Grove Loop
Wembley Park Rd.
Tier III
Westside Connector Trail II
Kerr Parkway
Lake Loop
Westview Drive
Greentree Road
Knaus Road
Twin Fir Road
Douglas Way
Goodall Road
Lake Forest Blvd.
Lanewood St.
Treetop Lane

*Note that specific details, segments by street name, and costs estimates are included for each project in Tables 7-9.

Table 4. Park Trail and Pathway Rankings

Tier I
George Rogers Park
Cooks Butte
Bryant Woods/Canal Acres Trail System
Tier II
Springbrook Creek Trail
Iron Mountain/Country Club
Luscher Farm Trail System
Tryon Creek State Park Trail System
Sunnyslope Trail
Waluga Park Trail System
Tryon Creek South Trail
Tier III
Canal Trail
Marylhurst Trails
Canal Bridge
Mountain Park Trail System

Estimated Long-Term Costs

The candidate projects are recommended to be implemented over the next 50 years, or as funding is available. Some of the more expensive projects may take longer to implement.

The total implementation cost is estimated at $37 million. Approximately $14 million is for regional trails, $19 million for pathways on collector and arterial roadways, and $4.7 million for trails within parks. Costs are separated between trail and pathway facilities. A complete breakdown of costs for the publicly-funded trail and pathway projects is presented in Tables 7 though 9 on pages 45-48. Again, many trails and pathways will likely be implemented as part of property development projects over time. It is important to note that while many of the projects can be funded with Federal, State, and regional transportation, safety, and/or air quality grants, others are recreational in nature and must be funded by local or private sources.

It is important to note that many of the funding sources are highly competitive, and therefore it is impossible to determine exactly which projects will be funded by which funding sources. Timing of projects is also difficult to pinpoint exactly, due to dependence on competitive funding sources, timing of roadway and development projects, and the overall economy.

Maintenance guidelines are located in *Appendix D*. The following table summarizes maintenance costs for regional, community connector, and local access trails and pathways.

Table 5. Annual Maintenance Costs

Trail Type	Miles*	Cost/mile	Total
Regional Trails	13	$6,000**	$78,000
Community Connector	58	assumed as part of routine roadway maintenance	
Local Access			
Park Circulation	15	$800	$12,000
Sidewalks/Accessways	n/a	assumed as part of routine roadway maintenance	

* Approximate estimation. Actual trail miles will be determined after a detailed planning process and an engineering/survey analysis.

** Lower bound cost estimate based on Portland's Springwater Corridor Trail. Maintenance costs typically range from $6,000 - $10,000 per year.

Table 6. Funding Sources

Source	Description	Eligible Projects	Funding Cycle
Metro Transportation Improvement Program Funding	Federal transportation funds coordinated by Metro. Funds can be used for Preliminary Engineering, ROW acquisition and construction.	Regional, Community Connector projects along roadways with regional classifications (e.g. Boone's Ferry Rd)	2 Years
Recreational Trails Grants	Coordinated by Oregon State Parks. Funds can be used for ROW acquisition and construction.	Regional, Local	Annual
Land and Water Conservation Fund (LWCF)	Federal funds coordinated by Oregon State Parks. Funds can be used for ROW acquisition and construction.	Regional, Local	Annual
Measure 66 funds from Oregon State Lottery	Coordinated by Oregon State Parks. Funds can be used for ROW acquisition and construction.	Regional, Local	2 Years
Transportation Enhancements	Administered by Oregon Department of Transportation (ODOT). Must serve transportation need.	Regional, Community Connector	2 Years
Oregon Bike/Pedestrian Grants	Administered by ODOT's Bicycle and Pedestrian Program. Must be in public ROW.	Parts of the Regional Trails, Community Connectors	2 Years
System Development Charges (SDCs)	Fees on new construction allocated for parks, streets and public improvements. Where available, funds can be used for ROW acquisition and trail construction.	Community Connector, Local	Varies
Local/Regional bond measures approved by voters	Funds can be used for ROW acquisition, engineering, design and trail construction.	Regional, Community Connector, Local	Varies
Local Improvement Districts (LIDs)	Districts are typically created by local property owners, imposing a "new tax" to fund improvements. Funds can be used for ROW acquisition and construction.	Regional, Community Connector, Local	Varies
Tax Increment Financing/Urban Renewal Funds	Park of trail project must be located in an urban renewal district which meets certain economic criteria and is approved by a local governing body.	Community Connector, Local	Varies
Local Traffic Safety Commission	Funding for street crossings and signals.	Community Connector, Local	Varies

Implementation

To oversee implementation of the Plan, it is recommended that staff management and the **Parks and Recreation Board (PRAB)** take leadership roles, and devote at least two meetings annually to Plan evaluation, monitoring, and progress.

Development

Many of the trails shown on the **Conceptual Trails and Pathways Map**, particularly most local access trails located along roadways or intended as accessways, will be developed over time by Lake Oswego property owners, much like the sidewalk system has been developed. As part of the development review process, the City will be able to require, in some cases (see *Appendix C* for recommended code language), the property owner to construct the trail. In other cases, the City will work with the property owner to ensure the City can develop the trail itself in the future.

Public Funding Sources

There are a variety of potential funding sources including local, State, regional, and Federal funding programs that can be used to construct or augment the proposed trail and pathway improvements. Most of the these are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits. Local funding for these projects would typically come from the City of Lake Oswego and/or potential future bond or other local revenues.

Table 6 summarizes public funding sources for Lake Oswego trails and pathways. Some of these funds are restricted to the type of improvements that qualify for assistance. Typically State and Federal funds require trail and roadway improvements to comply with current Americans With Disabilities Act (ADA) Guidelines for accessibility.

Other Funding Opportunities

Volunteer programs may substantially reduce the cost of implementing some of the proposed trails and pathways. Additionally, volunteer programs can help reduce maintenance costs. Local schools or community groups may use the project as a project for the year, possibly working with a local designer or engineer. Work parties may be formed to help clear the right-of-way where needed. A local construction company may donate or discount services. Also, Lake Oswego's "Adopt A Pathway" program could be expanded to help construct and maintain more facilities. Other opportunities for implementation will appear over time, such as grants and private funds.

Table 7. Estimated Costs for Regional Trails

Trail Type ID	Trail Name and Segments	Trail miles Construction	On-street miles			Crossings				Other****	Preliminary Cost	Design & CM (15%)	Contingency (20%)	Estimate of Total Cost
			Widening	Stripe/sign bike lane	Signing only	Type 1	Type 1+	Type 2**	Type 3					
		$300,000 per mile *	$300,000 per mile	$25,000 per mile	$1,500 per mile	$5,000 per crossing	$15,000 per crossing	$10,000 per crossing	$200,000 per crossing					
Regional Trails														
R1	River-to-River	$876,000	$119,318			$10,000	$15,000		$200,000		$1,220,318	$183,048	$244,064	**$1,647,430**
R2	Surf to Turf	$1,392,045				$20,000	$30,000	$20,000			$1,462,045	$219,307	$292,409	**$1,973,761**
R3	Terwilliger Blvd		$437,500	$36,458					$100,000		$573,958	$86,094	$114,792	**$774,844**
R4	Willamette Crossing Trail									$4,200,000	$4,200,000	$630,000	$840,000	**$5,670,000**
R5	Willamette Shore Trolley Line***	$278,409				$10,000					$288,409	$43,261	$57,682	**$389,352**
R6	Willamette Greenway Trail	$159,091								$2,339,600	$2,498,691	$374,804	$499,738	**$3,373,233**
R7	Tryon Creek Walking Path	$35,795			$795			$10,000		$49,000	$95,591	$14,339	$19,118	**$129,048**
Total														**$13,957,667**

* actual cost will depend on ROW acquisition, drainage issues, surface selected

** includes signal modifications to add pedesrian actuation

*** includes only the trail segments within Lake Oswego city limits

**** special conditions that may include bridge construction, property acquisition, and sidewalk construction

Table 8. Estimated Costs for Community Connector Trails and Pathways

Roadway	Trail Name and Segments		Segment mileage	On-street miles				Crossings				Other****	Preliminary Cost	Design & CM (15%)	Contingency (20%)	Estimate of Total Cost
				Widening*	Sidewalk or Pathway**	Stripe/sign bike lanes	Signing only	Type 1	Type 1+	Type 2***	Type 3					
				$300,000 per mile	$184,800 per mile	$25,000 per mile	$1,500 per mile	$5,000 per crossing	$15,000 per crossing	$10,000 per crossing	$200,000 per crossing					
Community Connector Trails																
Segment	**From**	**To**														
CC1 Bryant/Palisades Loop																
Lakeview	Bryant Rd.	South Shore	0.99		$182,952		$1,485	$5,000					$189,437	$28,416	$37,887	$255,740
South Shore	Lakeview Blvd.	McVey/Stafford	2.52	$756,000	$465,696	$63,000						$200,000	$1,484,696	$222,704	$296,939	$2,004,340
Stafford Rd.	McVey Ave.	Overlook Dr.	0.93	$318,000		$23,250							$341,250	$51,188	$68,250	$460,688
Overlook Dr.	Stafford Rd.	Westview Rd.	1.06				$1,590						$1,590	$239	$318	$2,147
Royce Way	Westview Rd.	Bryant Rd.	0.46				$690						$690	$104	$138	$932
Bryant Rd.	Royce Way	Lakeview Blvd.	0.93			$23,250			$15,000				$38,250	$5,738	$7,650	$51,638
																$2,775,483
CC2 Country Club Loop																
Boones Ferry	Reese Rd.	Country Club	1.06	$159,091		$26,500							$185,591	$27,839	$37,118	$250,548
Country Club	Boones Ferry	Iron Mountain	1.46		$269,808						$200,000		$469,808	$70,471	$93,962	$634,241
Iron Mountain	Country Club	Lakeview Blvd.	1.79			$44,750							$44,750	$6,713	$8,950	$60,413
Upper Dr.	Lakeview Blvd.	Reese Rd.	0.66		$121,968								$121,968	$18,295	$24,394	$164,657
Reese Rd.	Upper Dr.	Boones Ferry	0.20		$24,500								$24,500	$3,675	$4,900	$33,075
																$1,142,933

Estimated Costs for Community Connector Trails and Pathways (continued)

Roadway	Trail Name and Segments		Segment mileage	On-street miles				Crossings				Other****	Preliminary Cost	Design & CM (15%)	Contingency (20%)	Estimate of Total Cost
				Widening* $300,000 per mile	Sidewalk or Pathway** $184,800 per mile	Stripe/sign bike lanes $25,000 per mile	Signing only $1,500 per mile	Type 1 $5,000 per crossing	Type 1+ $15,000 per crossing	Type 2*** $10,000 per crossing	Type 3 $100,000 per crossing					
Segment	**From**	**To**														
CC3 Lake Loop																
Upper Dr.	Bryant Rd.	Lakeview	0.99		$182,952		$1,485						$184,437	$27,666	$36,887	$248,990
Iron Mountain	Lakeview Blvd.	Chandler Rd.	1.59			$39,750		$5,000					$44,750	$6,713	$8,950	$60,413
Chandler Rd.	Iron Mountain	10th	0.16			$4,000		$5,000					$9,000	$1,350	$1,800	$12,150
A Avenue	10th	State St.	0.60			$15,000							$15,000	$2,250	$3,000	$20,250
State St.	A Ave.	McVey Ave.	0.56			$14,000							$14,000	$2,100	$2,800	$18,900
McVey Ave.	Hwy 43	South Shore	0.66		$121,968		$990						$122,958	$18,444	$24,592	$165,993
South Shore	McVey Ave.	Lakeview Blvd.	2.52	$756,000	$465,696	$63,000			$15,000				$1,299,696	$194,954	$259,939	$1,754,590
Lakeview	South Shore	Bryant Rd.	0.33		$182,952		$1,485	$5,000					$189,437	$28,416	$37,887	$255,740
Bryant Rd.	Lakeview Blvd.	Upper Dr.	0.16		$12,250	$4,000							$16,250	$2,438	$3,250	$21,938
																$2,558,963
CC4 Westside Connector Trail																
Boones Ferry	Portland	Bryant Rd.	2.65	$198,000	$121,968	$16,500							$336,468	$50,470	$67,294	$454,232
Bryant Rd.	Boones Ferry	Childs Rd.	1.46		$27,720	$36,500		$5,000					$69,220	$10,383	$13,844	$93,447
																$547,679
CC5 Westside Connector Trail II																
Lesser Rd.	Haines St.	Fosberg Rd.	0.46	$138,000	$85,008	$11,500		$5,000					$239,508	$35,926	$47,902	$323,336
Fosberg Rd.	Lesser Rd.	Carman Dr.	1.46		$92,400	$36,500		$5,000					$133,900	$20,085	$26,780	$180,765
Carman Dr.	Parkview Dr.	Quarry Rd.	0.27		$49,896	$6,750							$56,646	$8,497	$11,329	$76,472
Quarry Rd.	Carman Dr.	Boones Ferry	0.60	$150,000	$110,880	$15,000			$15,000				$290,880	$43,632	$58,176	$392,688
Bryant Rd.	Boones Ferry	Childs Rd.	1.46		$27,720	$36,500							$64,220	$9,633	$12,844	$86,697
																$1,059,958
CC6 South Parks Loop																
Jean Rd.	Pilkington Rd.	Bryant Rd.	0.53		$97,944	$13,250							$111,194	$16,679	$22,239	$150,112
Bryant Rd.	Jean Rd.	Royce Way	0.40		$73,920	$10,000			$15,000				$98,920	$14,838	$19,784	$133,542
Royce Way	Bryant Rd.	Westview Rd.	0.46				$690						$690	$104	$138	$932
Overlook Dr.	Westview Rd.	Stafford Rd.	1.06				$1,590						$1,590	$239	$318	$2,147
Stafford Rd.	Overlook Dr.	Childs Rd.	0.73	$219,000	$134,904	$18,250							$372,154	$55,823	$74,431	$502,408
Childs Rd.	Stafford Rd.	Pilkington Rd.	2.12	$636,000	$391,776	$53,000			$15,000		$100,000		$1,195,776	$179,366	$239,155	$1,614,298
Pilkington Rd.	Childs Rd.	Jean Rd.	0.73		$134,904	$18,250							$153,154	$22,973	$30,631	$206,758
																$2,610,195
CC7 West Lake Grove Loop																
Bangy Rd.	Bonita Rd.	Kruse Way	0.33										$0	$0	$0	$0
Kruse Way	Bangy Rd.	Kruse Oaks	0.16										$0	$0	$0	$0
Kruse Oaks	Kruse Way	Pamela St.	0.60				$900						$900	$135	$180	$1,215
Pamela St.	Kruse Oaks	Suncreek Dr.	0.20		$11,088		$300						$11,388	$1,708	$2,278	$15,374
Suncreek Dr.	Pamela St.	Fosberg Rd.	0.20				$300						$300	$45	$60	$405
Melrose St.	Fosberg Rd.	Fosberg Rd.	0.54			$13,500							$13,500	$2,025	$2,700	$18,225
Fosberg Rd.	Melrose St.	Carman Dr.	0.40		$73,920	$10,000		$5,000					$88,920	$13,338	$17,784	$120,042
Carman Dr.	Fosberg Rd.	Quarry Rd.	0.27		$49,896	$6,750							$56,646	$8,497	$11,329	$76,472
Quarry Rd.	Carman Dr.	Oakridge Dr.	0.50	$150,000	$110,880	$15,000			$15,000				$290,880	$43,632	$58,176	$392,688
Oakridge Dr.	Quarry Rd.	Waluga Dr.	0.23		$42,504		$345						$42,849	$6,427	$8,570	$57,846
Waluga Dr.	Oakridge Rd.	Carman Dr.	0.36		$46,200		$540						$46,740	$7,011	$9,348	$63,099
Bonita Rd.	Carman Dr.	Bangy Rd.	0.60	$180,000	$92,400	$15,000		$5,000					$292,400	$43,860	$58,480	$394,740
																$1,140,106
CC8 Rosemont Road																
	Stafford Rd.	West Linn	1.83	$549,000	$338,184	$45,750							$932,934	$139,940	$186,587	**$1,259,461**
CC9 Kerr Parkway																
	Boones Ferry	PCC	1.89		$138,600	$47,250							$185,850	$27,878	$37,170	**$250,898**

Estimated Costs for Community Connector Trails and Pathways (continued)

Roadway	Trail Name and Segments		Segment mileage	On-street miles				Crossings				Other****	Preliminary Cost	Design & CM (15%)	Contingency (20%)	Estimate of Total Cost
				Widening* $300,000 per mile	Sidewalk or Pathway** $184,800 per mile	Stripe/sign bike lanes $25,000 per mile	Signing only $1,500 per mile	Type 1 $5,000 per crossing	Type 1+ $15,000 per crossing	Type 2*** $10,000 per crossing	Type 3 $100,000 per crossing					
Segment	**From**	**To**														
CC10 Carman Drive																
	Kruse Way	I-5	1.19	$357,000	$219,912	$29,750							$606,662	$90,999	$121,332	**$818,994**
CC11 Knaus Road																
	Boones Ferry	Country Club	1.26		$232,848		$1,890						$234,738	$35,211	$46,948	**$316,896**
CC12 Wembley Park Road																
	Country Club	Twin Fir Rd.	1.04		$192,192		$1,560						$193,752	$29,063	$38,750	$261,565
	Twin Fir Rd.	Boones Ferry	0.23		$42,504		$345						$42,849	$6,427	$8,570	$57,846
																$319,411
CC13 Willamette Greenway to Luscher Farm																
Glenmorrie Dr.	Old River Rd.	Green Bluff Dr.	0.66		$121,968		$990						$122,958	$18,444	$24,592	$165,993
Green Bluff Dr.	Glenmorrie Dr.	Crestline Ct.	0.73		$134,904		$1,095						$135,999	$20,400	$27,200	$183,599
Crestline Ct.	Green Bluff Dr.	Skyland Dr.	0.13		$24,024		$195						$24,219	$3,633	$4,844	$32,696
Skyland Dr.	Crestline Ct.	Cornell St.	0.40		$73,920		$600						$74,520	$11,178	$14,904	$100,602
Bergis	Cornell St.	Stafford Rd.	0.60		$110,880		$900						$111,780	$16,767	$22,356	$150,903
																$633,793
CC14 Kelok Road/Cardinal Drive																
	South Shore	Bryant Rd.	0.68		$125,664		$1,020						$126,684	$19,003	$25,337	**$171,023**
CC15 Douglas Way																
	Quarry Rd.	Boones Ferry	0.27	$81,000	$49,896					$10,000			$140,896	$21,134	$28,179	**$190,210**
CC16 Lake Grove Avenue																
	Reese Rd.	Upper Dr.	0.40		$73,920		$600						$74,520	$11,178	$14,904	**$100,602**
CC17 Lanewood Street																
	Boones Ferry	Twin Fir Rd.	0.40		$73,920		$600						$74,520	$11,178	$14,904	**$100,602**
CC18 Twin Fir Road/Fir Ridge Road																
	Upper Dr.	Boones Ferry	0.73		$134,904		$1,095						$135,999	$20,400	$27,200	$183,599
	Twin Fir Rd.	Wembly Park	0.20		$36,960		$300						$37,260	$5,589	$7,452	$50,301
																$233,900
CC19 Goodall Road																
	Country Club	Boones Ferry	0.93		$171,864	$23,250							$195,114	$29,267	$39,023	**$263,404**
CC20 Highway 43																
	Portland	McVey Ave.	1.59	$477,000	$293,832	$39,750							$810,582	$121,587	$162,116	**$1,094,286**
CC21 Lake Forest Boulevard																
	Carman Dr.	Boones Ferry Rd.	0.66		$121,968		$990						$122,958	$18,444	$24,592	**$165,993**
CC22 Westview Drive																
	South Shore	Childs Rd.	1.46	$135,000	$55,440		$2,190	$5,000	$15,000				$212,630	$31,895	$42,526	**$287,051**
CC23 Greentree Road																
	Westview Rd.	South Shore	1.21		$92,400		$1,815						$94,215	$14,132	$18,843	**$127,190**
CC24 Treetop Lane																
	Greentree Rd.	Overlook Dr.	0.42		$77,616		$630						$78,246	$11,737	$15,649	**$105,632**
CC24 Meadows Road																
	Quarry Rd.	Bangy Rd.	0.93		$171,864	$23,250							$195,114	$29,267	$39,023	**$263,404**
Totals			58													**$18,652,815**

* actual cost will depend on ROW acquisition, drainage issues, surface selected

** includes upgrades and new sidewalk or pathway on one side of the street. Does not include special issues like excessive grades/topography, drainage, and ROW acquisition

*** includes signal modifications to add pedesrian actuation

**** special topographical constraints may need additional study

Table 9. Estimated Costs for Park Circulation Trails and Pathways

Trail Type ID	Trail Name and Segments	Trail miles Construction (unpaved) $132,000 per mile*	Trail miles Construction (paved) $300,000 per mile*	Crossings Type 1 $5,000 per crossing	Crossings Type 1+ $15,000 per crossing	Crossings Type 2 $10,000 per crossing	Crossings Type 3 $200,000 per crossing	Other**	Preliminary Cost	Design & CM (15%)	Contingency (20%)	Estimate of Total Cost
Park Trails												
PT1	**Canal Area**											
	Canal Acres	$25,000						$300,000	$325,000	$48,750	$65,000	$438,750
	River Run	$35,000							$35,000	$5,250	$7,000	$47,250
	Bryant Woods			$5,000					$5,000	$750	$1,000	$6,750
												$492,750
PT2	**Cooks Butte**	$4,773	$225,000					$50,000	$279,773	$41,966	$55,955	**$377,693**
PT3	**Luscher Farm**	$66,818	$600,000				$200,000		$866,818	$130,023	$173,364	**$1,170,205**
PT4	**Tryon Creek State Park**	$35,000							$35,000	$5,250	$7,000	**$47,250**
PT5	**Waluga Park**	$75,000			$15,000				$90,000	$13,500	$18,000	**$121,500**
PT6	**Iron Mountain**	$80,000	$225,000						$305,000	$45,750	$61,000	**$411,750**
PT7	**Sunnyslope Open Space**	$90,000			$15,000				$105,000	$15,750	$21,000	**$141,750**
PT8	**Bryant and Waluga Schools**	$105,000	$22,727						$127,727	$19,159	$25,545	**$172,432**
PT9	**Palisades and Lakeridge Loop**		$477,273						$477,273	$71,591	$95,455	**$644,318**
PT10	**George Rogers Park**	$22,500						$30,000	$52,500	$7,875	$10,500	**$70,875**
PT11	**Country Club Walking Trail**	$280,000							$280,000	$42,000	$56,000	**$378,000**
PT12	**Iron Mt. Creek Open Space**	$43,750					$200,000		$243,750	$36,563	$48,750	**$329,063**
PT13	**Woodmont Natural Park**	$7,500							$7,500	$1,125	$1,500	**$10,125**
PT14	**Southwood Park**	$17,500	$59,659						$77,159	$11,574	$15,432	**$104,165**
PT15	**Pennington Park**	$12,500							$12,500	$1,875	$2,500	**$16,875**
PT16	**Springbrook Creek Trail**	$105,000						$60,000	$165,000	$24,750	$33,000	**$222,750**
PT17	**Canal Trail**	$62,500							$62,500	$9,375	$12,500	**$84,375**
Totals												**$4,711,500**

* actual cost will depend on ROW acquisition, drainage issues, surface selected

** many trails will require environmental review and site specific planning and design

Other Recommendations and Action Items

To ensure the success of the Lake Oswego Trails and Pathways Master Plan, the following additional action items are recommended:

Water Way Trails

Lake Oswego has a number of navigable waterways that are adjacent to or run through the city limits, which are ideal for non-motorized aquatic recreation (i.e., canoeing and kayaking).

- Should the public obtain access to Oswego Lake, the City should develop a public waterway trail linking Millennium Park Plaza, the South Shore Natural Area, the Lake Grove Swim Park, and Oswego Canal.
- Launches for small non-motorized watercraft should be provided in parks and public spaces that are adjacent to the Willamette and Tualatin Rivers and Oswego Canal. Launches on Oswego Lake should be considered if the public is allowed access in the future.

Trailheads

Good access to the pathway and trail system is a key element to its future success. Trailheads (formalized parking areas) serve the local and regional population arriving to the pathway and trail system by car. As seen on the **Conceptual Trails and Pathways Map**, this Plan identifies a series of trailhead locations, all in conjunction with major parks. Trailheads provide essential access to the trail and pathway system and provide amenities like parking, restrooms, and signage for trail users. Additional trailhead siting will occur with further planning processes for individual projects.

Signage

- A comprehensive signage and directional system should be developed to inform and educate users about the trail and pathway system. This program should include a unique sign that delineates the Lake Oswego Pathway and Trail network theme. Opportunities for interpretive information could include the history of Lake Oswego and its early settlers; iron mining and processing; shipping; information about local flora and fauna; water quality; geologic formations; drainage and flow of water systems; bicycle and pedestrian safety and awareness; history of the Willamette River and native populations. Comprehensive and innovative signing systems make trail and pathway networks outstanding.

- Signs should also be created to warn either motorists of bicyclists and pedestrians or caution bicyclists and pedestrians of oncoming motor vehicles.
- Kiosks could be placed along some trails and at major trailheads, such as George Rogers Park and Springbrook Park, that include a map and other helpful information about the route, safety, and the city. A sample is provided in the *Design Guidelines* section of this Plan.

Education

- Explore educational opportunities. Numerous opportunities exist to use the trail system for educational materials about history, culture, science, and safety. The trail projects are more likely to attract foundation funding specific to education if education is specifically incorporated into project design.
- Establish bicycle and pedestrian safety programs that will teach bicycle safety to children, adults, and other groups that encounter bicyclists and pedestrians. A specific curriculum geared for each audience, along with a handbook or other literature, is recommended.
- Link to local youth participation programs, such as the Girl and Boy Scouts for educational opportunities, adopt-a-trail, trailside plantings, and other activities.

Comprehensive Plan and Community Development Code Language

To ensure successful implementation of this Plan, Lake Oswego's Comprehensive Plan should incorporate critical elements of this Plan, such as the goals and objectives and Conceptual Trails and Pathways Map. In addition, the Community Development Code should be revised to ensure that development projects incorporate relevant segments of the proposed pathway and trail network. Currently, Lake Oswego requires developers provide sidewalks, accessways, landscaping, and other elements as allowed by the code and the law. The recommended revised code language (see *Appendix C*) reflects the following changes:

- Defines the terms '*trails'* and '*pathways.*'.
- Requires developers to review the Conceptual Trails and Pathways Map to determine if a required trail, accessway, or path would apply to their project. The City may require a developer to implement a trail or accessway as part of their project if reasonable.

Currently, the code would apply only to developers going through a land-use application and review. City Council should consider expanding the applicability to individual property owners

expanding the footprint of their dwellings, such that they do not impede future City purchase of a trail easement.

Other Master Plan Processes

The following projects need to undergo Master Planning processes in order to identify the feasibility, cost, and funding availability of each project:

- Cooks Butte
- River to River Trail
- Willamette Trolley Line
- Surf to Turf
- Tryon Creek Walking Path
- Iron Mountain Natural Area
- Woodmont Natural Park

Safe Routes to School

Nationwide, communities are developing programs to improve the safety and ability of children to bicycle and walk to school. Federal money may be available in the future for projects that improve direct access to schools.

This Plan includes a trail or pathway connection to every school in Lake Oswego. Complementary to that would be the development of a local safe routes to school program. The toolbox of potential solutions includes:

- signal timing modifications
- curb extensions and median islands
- traffic calming
- markings and signage
- trails, sidewalks, bicycle lanes, and other facility improvements
- crosswalks
- crossing guard programs
- safe routes to school maps
- escorted bike and walk groups
- educational safety curriculums
- outreach programs to encourage safe driving.

Appendix A: Transportation Advisory Board Criteria and Project List

Transportation Advisory Board Pathway Program

Ranking Criteria

Tier 1	Must be in conformance with the City's Transportation System Plan. Must be included in City's Public Facilities Plan.	
Tier 2	Points based on each project; **maximum 100 points**	
	Proximity to school	15 points
	Other ped generator	20 points
	Connectivity	25 points
	Area Wide Benefit	10 points
	Equity	10 points
	Hazard	20 points
Tier 3	Neighborhood support: Is the majority of neighborhood response positive?	

Note: these rankings were developed separately from this Master Plan by the Transportation Advisory Board of Lake Oswego in 2002.

Project	From	To	Tier 1	Tier 2	Tier 3	Ranking
Upper Drive	Reese	Bryant	passed	95	passed	1
Lakeview Rd.	Bryant	Pilkington	passed	92	passed	2
Laurel St.	Hallinan	Cornell	passed	85	passed	3
Lake Grove Ave.	Upper Dr.	Reese Rd.	passed	95	passed	3
Greentree Rd.	Fernwood	Westview	passed	81	passed	5
10th St.	A Avenue	E Avenue	passed	80	passed	6
Treetop/Fernwood	Greentree	Overlook	passed	80	passed	6
G Ave.	4th Avenue	ACC	passed	70	passed	8
4th St.	E Avenue	F Avenue	passed	69	passed	9
Boca Ratan	Boca Ratan Dr.	Atwater Rd.	passed	67	passed	10

Lake Oswego Trails and Pathways Master Plan Project Ranking Criteria and Weighting

Regional Trails		**Community Connectors**		**Local Access Trails**	
Criteria	**Maximum Points**	**Criteria**	**Maximum Points**	**Criteria**	**Maximum Points**
Ease of Implementation	20	Ease of Implementation	20	Ease of Implementation	20
Potential Users	10	Potential Users	10	Population Served	15
Connectivity	25	Connectivity	25	Area benefit	10
Eliminates Hazards	20	Eliminates Hazards	20	Connectivity	25
		Equity	10	Eliminates Hazards	20
				Equity	10
Total Potential Points	**75**	**Total Potential Points**	**85**	**Total Potential Points**	**100**

Appendix B: Local Access Trails

Lake Oswego Trail Network: Local Access Trails

Trail Type ID	Trail Name and Segments		Trail Type ID	Trail Name and Segments		Trail Type ID	Trail Name and Segments		Trail Type ID	Trail Name and Segments	
Local Access Trails			Local Access Trails			Local Access Trails			Local Access Trails		
	From	To		From	To		From	To		From	To
LA1	**Poplar Way**		LA16	**Ridge Point Drive**		LA31	**Canal Bridge Trail**		LA46	**Lake Grove Access 01**	
	Glenmorrie	Old River		Stafford Rd.	Meadowlark		Albert Cir.	Canal Rd.		Upper Dr.	Lake Grove
LA2	**Chapin Way**		LA17	**Fernwood Drive**		LA32	**Kelok Road**		LA47	**Boones Way**	
	Glenmorrie	River to		Marjorie	Treetop		Bryant Rd.	Cardinal Dr.		Pennington	Lake Grove
LA3	**Glenmorrie Drive**		LA18	**Marjorie Avenue**		LA33	**Centerwood St./ Red**		LA48	**Cedar Way**	
	Bluff Dr.	Cherry Ln.		Fernwood	Cloverleaf		Indian Creek	Pilkington		Boones Way	Douglas Cir.
LA4	**Cherry Lane**		LA19	**Cloverleaf Road**		LA34	**SchalIt Way**		LA49	**Douglas Way**	
	Hallinan St.	Hwy. 43		Fernwood	Lakeridge		Jean Rd.	Lakeview		Lanewood	Iron Mt.
LA5	**Hallinan Street**		LA20	**Fernwood Drive**		LA35	**Hill Way**		LA50	**Lake Grove Access 02**	
	Cherry Ln.	Hemlock St.		Greentree	South Shore		Schalt Way	Wildwood		Lanewood	Lake Grove
LA6	**Laurel Street**		LA21	**Canyon Drive**		LA36	**Tualatin Street**		LA51	**Lake Grove Access 03**	
	Hallinan St.	Cornell Dr.		South Shore	Dellwood		Lakeview	Surf to Turf		Boones	Lake Grove
LA7	**O'Brien Street**		LA22	**Dellwood Dr.**		LA37	**Depot Street**		LA52	**Lake Grove Access 04**	
	Hallinan	Ash St.		Dellwood	Fernwood		Lakeview	Surf to Turf		Boones	Douglas Way
LA8	**Ash Street**		LA23	**Hillside Drive**		LA38	**Rebecca Lane**		LA53	**Collins Way**	
	O'Brien St.	Erickson		Fernwood	Palisades		Rosewood	Lower Dr.		Collins Way	Hallmark Dr.
LA9	**Maple Street**		LA24	**Palisades Crest Drive**		LA39	**Lindsay Court Trail**		LA54	**Galewood Street**	
	Cornell	Oswego		Hillside Dr.	Cooks Butte		Lindsay Ct.	Pilkington		Boones	Hallmark Dr.
LA10	**Erickson**		LA25	**Fernwood Circle**		LA40	**Waluga Drive Access**		LA55	**Oakridge Road**	
	Ash St.	Laurel St.		Dellwood	Fernwood		Boones	Surf to Turf		Inverurie Rd.	Quarry Rd.
LA11	**Hemlock Street**		LA26	**Barton Road**		LA41	**Sunset Drive**		LA56	**Inverurie Road**	
	Cornell	McVey Ave.		Riven Dell	Childs Rd.		Reese Rd.	Boones Fy.		Surf to Turf	Oakridge Rd.
LA12	**Lee Street**		LA27	**Mossy Brae Road and**		LA42	**Nola Ct. Open Space**		LA57	**Washginton Court**	
	Hemlock St.	Palisades		Stafford Rd.	River Run		Sunset Dr.	Easement 01		Roosevelt	Inverurie Rd.
LA13	**City Limits Trail**		LA28	**Tualatin River Access**		LA43	**Lake Grove Trail**		LA58	**P&W Open Space Trail**	
	Palisades	Bergis Rd.		Childs Rd.	Tualatin		Bryant Rd.	Reese Rd.		Frost Lane	Cortez Ct.
LA14	**Oak Street**		LA29	**Old Gate Road**		LA44	**Lake Grove Trail**		LA59	**Gassner Lane**	
	McVey Ave.	Palisades		Bryant Rd.	Oswego		Boones Fy.	Easement 01		P&W trail	Washington
LA15	**Luscher Farm Access**		LA30	**Oswego Canal Trail**		LA45	**Lake Grove Trail**		LA60	**Roosevelt Avenue**	
	River to	Luscher		Childs Rd.	Bryant Rd.		Upper Dr.	Surf to Turf		Washginton	Harrington

Local Access Trails, continued.

Trail Type ID	Trail Name and Segments		Trail Type ID	Trail Name and Segments		Trail Type ID	Trail Name and Segments	
Local Access Trails			Local Access Trails			Local Access Trails		
	From	To		From	To		From	To
LA61	**Burma Road**		LA76	**Bridge Court**		LA91	**Atwater Road**	
	Carman Dr.	Bangy Rd.		Country	Country		Knaus Rd.	Boca Ratan
LA62	**Kruse Creek Trail**		LA77	**Thoma Road**		LA92	**Sunningdale Road**	
	Meadows	Hunt Club		Knaus Rd.	LO High		Andrews Rd.	Tryon Creek
LA63	**Kruse Connectors 01**		LA78	**Sundeleaf Drive**		LA93	**10th Street**	
	Carman Dr.	Meadows		Country	Springbrook		A Ave.	G Ave.
LA64	**Kruse Connectors 02**		LA79	**Knaus Greenway Trail**		LA94	**F Ave. / G Ave.**	
	Kruse Creek	Meadows		Knaus Rd.	Country		10th St.	2nd St.
LA65	**Westlake Park Access**		LA80	**Country Commons**		LA95	**E Avenue**	
	Kruse Way	Westlake		Country	Goodall		10th St.	Hwy. 43
LA66	**Touchstone Reservoir**		LA81	**Leslie Lane Access Trail**		LA96	**B Avenue**	
	Melrose St.	Touchstone		Leslie Lane	Goodall		10th St.	8th St.
LA67	**Daniel Way**		LA82	**Knaus Road Access Trail**		LA97	**C Avenue**	
	Carman Dr.	Kruse Way		Knaus Rd.	Goodall		10th St.	Country
LA68	**Touchstone Drive**		LA83	**Knaus Access Trail**		LA98	**North Shore Road**	
	Botticelli	Carman Dr.		private street	Knaus		Cabana Ln.	State St.
LA69	**Carman Drive**		LA84	**Country Commons Trail**		LA99	**Lakewood Road**	
	Davis Lane	Boones		Knaus Rd.	Country		North Shore	Swim Park
LA70	**Glen Eagles Road**		LA85	**Timberline Drive**		LA100	**Eastside Road**	
	Wembly Pk	Prestwick		Knaus Rd.	Bonniebrae		Cooks Butte	Hilltop Rd.
LA71	**Glen Eagles Place**		LA86	**Old Road Easement**				
	Wembly Pk	Glen Eagles		Knaus Rd.	Tryon Creek			
LA72	**Prestwick Road**		LA87	**Country Commons Trail**				
	Glen Eagles	Crest Dr.		Timberline	Boca Ratan			
LA73	**Crest Drive**		LA88	**Briercliff Lane**				
	Prestwick	Ridgecrest		Bonniebrae	Tryon Creek			
LA74	**Uplands Drive**		LA89	**Boca Ratan Drive**				
	Ridgecrest	Wembly		Bonniebrae	Atwater Rd.			
LA75	**Fairway Road**		LA90	**Woodmont Creek Trail**				
	Iron Mt.	Iron Mt. Rd.		Woodmont	Tryon Creek			

Appendix C: Recommended Development Code Language

The language below is recommended to replace the relevant current code language articles:

Article 50.02 Definitions

Accessways: A strip of land intended for use by pedestrians and bicyclists that provides a direct route where the local street network does not provide a direct and obvious connection.

(New definition) Trail: Also called pathway and shared use path. Corridor provided for non-motorized users to facilitate recreation and/or transportation.

Article 50.56 Transit System

Section 50.56.010 Standards for Approval.

Transit-oriented features for a site within 1/4 mile of a transit street shall be provided to connect the development with:

i. The nearest adjacent transit street, or
ii. To adjacent pathways, trails, or sidewalks which lead to the nearest transit street.

Article 50.59 On-Site Circulation – Bikeways, Walkway, Accessways, and Trails

Section 50.59.005 Applicability

This standard is applicable to all minor and major development involving the construction of a new structure other than a detached single family dwelling, duplex, or accessory structure, and subdivision and planned developments. This standard is also applicable to modifications which increase the square footage of commercial, industrial, or institutional buildings by more than ten (10) percent. For the purposes of this section, an "existing building" is a building as it exists on (date of adoption of ordinance).

Section 50.59.010 Standards for Approval

1. Commercial, industrial and institutional developments of one acre or more shall provide a pedestrian circulation plan for the site.
    a. Pedestrian connections between the proposed development and existing development on adjacent properties other than connections via the street system shall be identified and implemented, where feasible.

2. Walkways shall connect at least one public entrance of each building accessible to the public to the nearest public walkway or other walkway leading to a public walkway. Walkways shall also connect to other areas of the site, such as parking lots and outdoor activity areas, to other building entrances, to adjacent streets and nearby transit stops.

3. Walkways shall meet accessibility standards of the Americans with Disabilities Act (ADA) standards as found in UBC Chapter 31. Walkways within the site, connections to the public sidewalk, and external connections off site shall provide convenient, accessible, and the most practical direct, barrier-free route design.

4. Portions of walkways shorter than 30 feet across driveways, parking lots or walkways crossing surfaces shared by fork lift or heavy truck traffic may use a painted crossing zone. Otherwise, walkways crossing driveways, parking areas, and loading areas shall be clearly identifiable through the use of a different paving material, raised elevation, or other similar method.

    a. Where walkways are adjacent to vehicle travel areas, they shall be separated by a raised curb, bollards, buttons, landscaping or other physical barrier. If a raised walkway is used, the ends of the raised portions shall be equipped with curb ramps.

5. Accessways for use by pedestrians and bicyclists shall be required when necessary to provide, where not otherwise provided by the existing right-of-way, safe, convenient and direct access for pedestrians and bicyclists to adjacent residential areas; transit stops; neighborhood activity centers, including schools, parks, shopping centers, and other commercial and industrial areas; or where shown on the Lake Oswego Pathways and Trails Master Plan (2003).

    a. Developments shall not be required to provide right-of-way for accessways off-site to meet this requirement. If right-of-way is otherwise available off-site, the developer may be required to improve an accessway off-site.

    b. Accessways are required between discontinuous public rights-of-way, where a new street is not feasible; through excessively long blocks; or wherever the lack of street connectivity creates inconvenient or out of direction travel patterns for local pedestrian or bicycle trips.

    c. Pedestrian and bicycle access shall be provided as follows for all development:

        - To provide direct access to nearby pedestrian/bicycle destinations and routes, all existing and proposed pathways and trails, and transit streets or transit facilities.

- To provide direct connection of cul-de-sacs and dead end streets to the nearest available street or pedestrian/bicycle destinations.
- To provide connections from local or cul-de-sac streets to collector or arterial streets.
- Provides neighborhood access to park and natural areas.

d. Spacing between full street or accessway connections shall be no more than 330' for residential and mixed-use development, and no more than 530' for commercial and industrial development.

e. An exception may be made when the Manager determines that construction of a accessway is not feasible due to physical or jurisdictional constraints. Such evidence may include, but is not limited to:

- Other Federal, State, or Local requirements prevent construction of a accessway;
- The nature of abutting existing development makes construction of a accessway impractical;
- The accessway would cross an area affected by a special purpose district overlay and the accessway is incompatible with the purposes of the special purpose district; and/or
- The accessway would cross topography where slopes exceed 30%.

Section 50.59.015 Standards for Construction.

1. The surfacing of walkways, bikeways and accessways shall consist of either two inches of asphaltic concrete over a minimum of four inches of compacted crushed rock, or of four inches of concrete, as determined by the City Manager. Depending on location, topography or presence of sensitive lands, other materials may be specifically approved by the City Manager.
2. Walkway surfacing shall be five feet in unobstructed width, unless specifically otherwise approved by the City Manager, and never less than four feet in unobstructed width.
3. Walkways without stairs shall have a maximum cross slope of two percent and a maximum slope of eight percent. If the existing grade exceeds an eight percent slope and the walkway construction requires an erosion control permit pursuant to LOC

52.02.040(1), and construction of stairs are impracticable, then the pathway may follow the existing grade.

4. Ramps for handicapped use are required on all walkways used by the public at all points where a path intersects a curb.
5. Walkways, bikeways and accessways must be constructed in such a way as to allow the surface drainage to sheet flow across them, and not flow along them longitudinally.
6. An accessway shall include at least a 15-foot wide right-of-way or easement and an 8-foot wide hard surface.
7. Accessways may meander around major trees or vegetation, considering the circumstances related to the property.
8. Bollards, buttons or landscaping shall be used to block motor vehicle access at locations where accessways abut streets.

Section 50.59.020 Trails/Pathways (NEW)

All applicants for a land use review on lands designated on the Lake Oswego Pathways and Trails Master Plan shall grant a public easement for the trail or pathway. The easement shall be granted as part of the review process and finalized prior to issuance of final building inspection approval. Trails shown adjacent to public rights-of-way may be constructed in the public right-of-way, subject to approval by the City Engineer. Trails and pathways shall meet the guidelines in the Lake Oswego Pathways and Trails Master Plan.

Section 50.59.025 Standards for Maintenance

Maintenance of walkways, bikeways, accessways, pathways, or trails shall be the responsibility of the owner or owners of the land abutting or through which the way passes. If the maintenance is proposed to be by an association or other entity, the maintenance agreement or by-laws, as the case may be, shall be subject to the review and approval by the City.

Section 50.59.030 Procedures

Applications shall include a scaled site plan containing sufficient dimensions and spot elevations to demonstrate compliance with this standard.

Section 50.59.035 Miscellaneous Information

None.

Appendix D: Maintenance Guidelines

The following table summarizes a recommended maintenance schedule for the Lake Oswego Trail and Pathway system. These guidelines address maintenance on the off-street portions of the trails. On-street portions should be maintained per the standards of the responsible jurisdiction.

Item	Frequency
Inspections	Seasonal - at both beginning and end of summer
Signage Replacement	1 - 3 years
Pavement Markings Replacement	1 - 3 years
Major damage response (fallen trees, washouts, flooding)	Schedule based on priorities
Pavement Sealing, Potholes	5 - 15 years
Introduced tree and shrub plantings, trimming	Every 1 -3 years
Culvert Inspection	Before winter and after major storms
Cleaning Ditches	As needed
Trash Disposal	Weekly during high use; twice monthly during low use
Lighting Luminaire Repair	Once a year
Pavement Sweeping/Blowing	As needed, before high use season. Weekly in fall.
Maintaining culvert inlets	Inspect before the onset of the wet season, then again in early fall
Shoulder plant trimming (weeds, trees, brambles)	Twice a year: middle of growing season and early fall
Waterbar maintenance (earthen trails)	Annually
Site furnishings, replace damaged components	As needed
Graffiti Removal	Weekly, as needed
Fencing Repair	Inspect monthly for holes and damage, repair immediately
Shrub/Tree Irrigation for introduced planting areas	Weekly during summer months until plants are established
Litter Pick-up	Weekly for high use; twice a month for low use