

SCHEDULE "F": LAKES DISTRICT REGIONAL PARK MASTERPLAN AND DEVELOPMENT GUIDELINES

The Lakes District

Regional Park Masterplan and Development Guidelines



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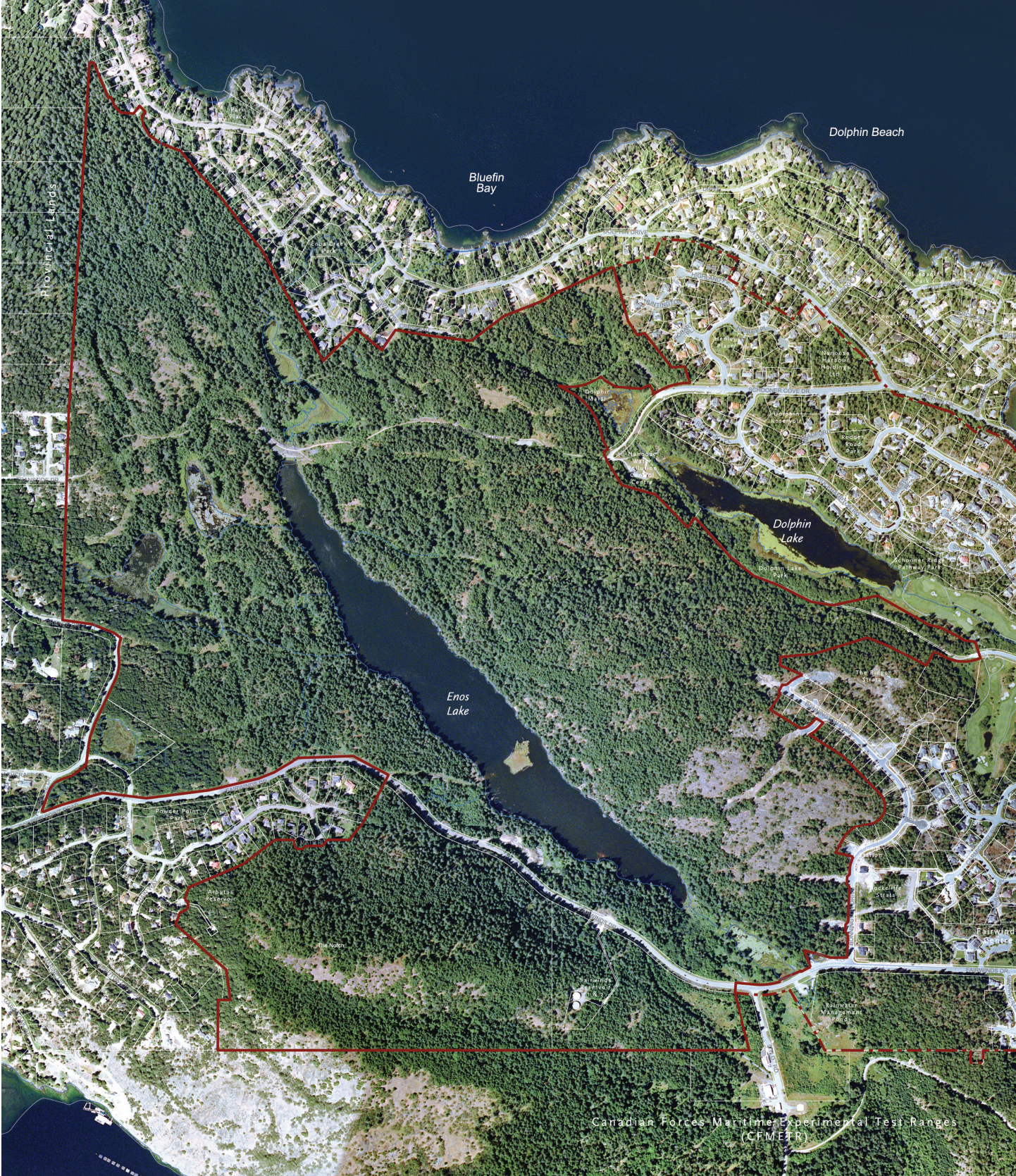


FIG. 1 Lakes District Neighbourhood Plan Area

1 THE LAKES DISTRICT NEIGHBOURHOOD

The Lakes District Neighbourhood Plan (OCP Amendment Bylaw No.1400.03) adopted by the Regional District of Nanaimo (RDN) in 2011, is predicated on sensitively accommodating planned development within the designated growth area through principles of sustainability and complete community design. The Neighbourhood Plan provides for the phased development of a sustainable neighbourhood containing a diversity of housing forms structured by a network of regionally significant parks and trails.

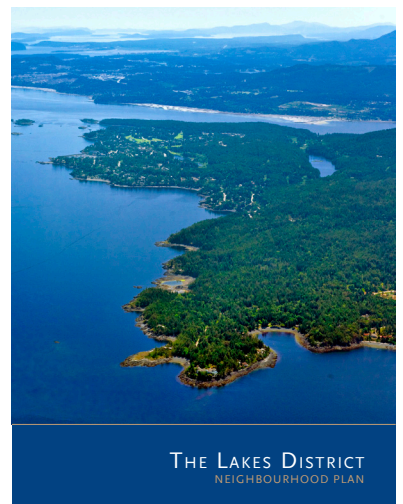
Central to the Lakes District is the public park system that will conserve the ecological integrity of natural ecosystems and provide both passive and active recreational opportunities.

The following Lakes District Regional Park Masterplan and Development Guidelines serves as a framework to implement the parks vision adopted in the Neighbourhood Plan, and will form part of the RDN Parks Management Plan.

The methods and technical information used are sourced from Best Management Practices, including precedents from the City of Nanaimo and the Resort Municipality of Whistler, as well as the following professional reporting:

- *The Lakes District Preliminary Geotechnical Terrain Assessment*, (Trow Associates, 2008);
- *Archaeological Overview Assessment: Lakes District & Schooner Cove Neighbourhood Plan Areas, Nanoose Bay, BC*, (IR Wilson Consultants, 2008);
- *The Lakes District Study Area; Fairwinds Development Detailed Biophysical Inventory*, (Cascadia Biological, 2009); and,
- *Fairwinds' The Lakes District and Schooner Cove Neighbourhood Plan; Environmental Impact Assessment*, (Pottinger Gaherty Environmental Consultants, 2010).

Specific design standards for each trail type are tailored with the goal of building a superior public recreational amenity and neighbourhood legacy within the Lakes District.



2 PARKS FOR CONSERVATION

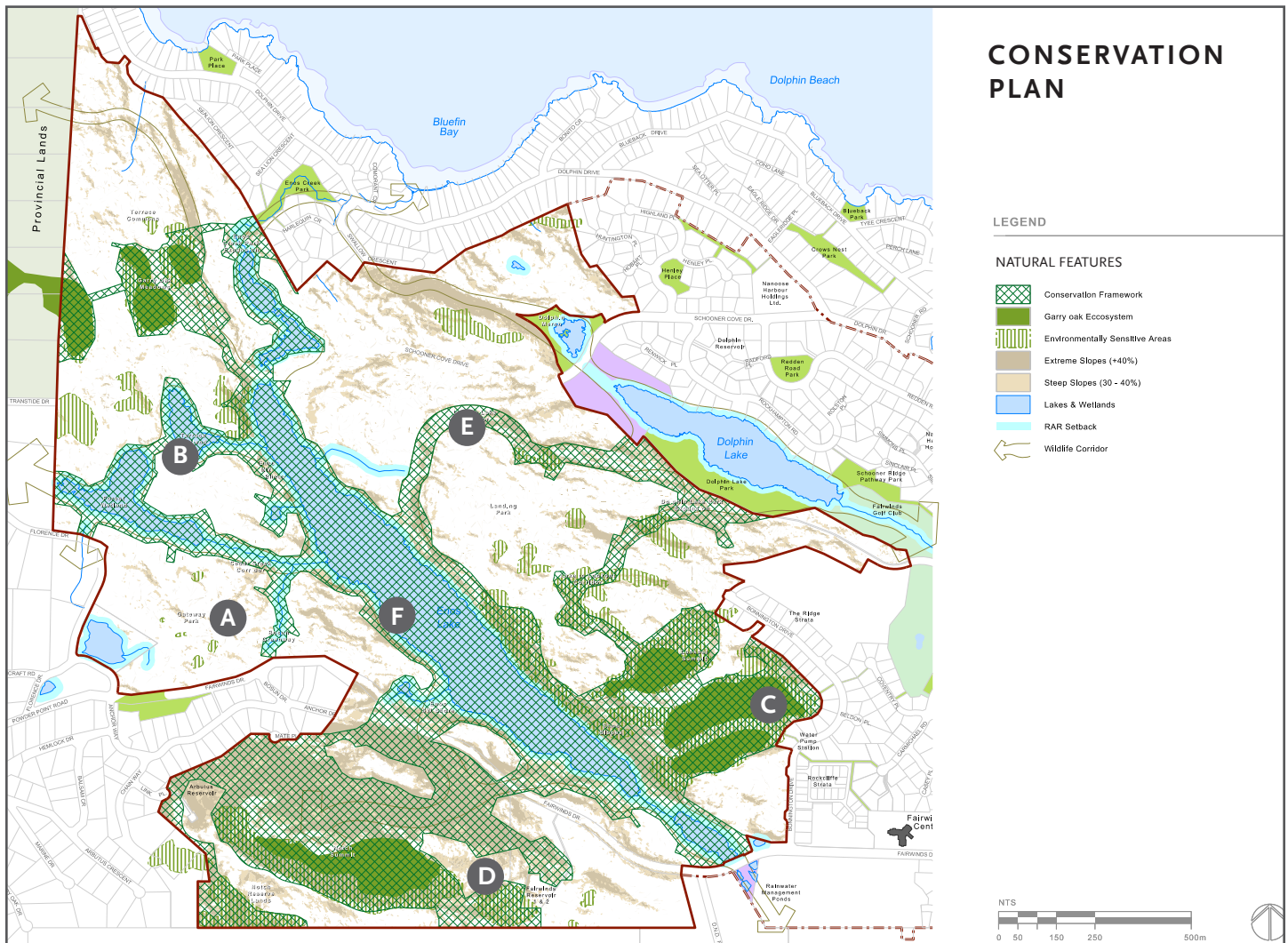


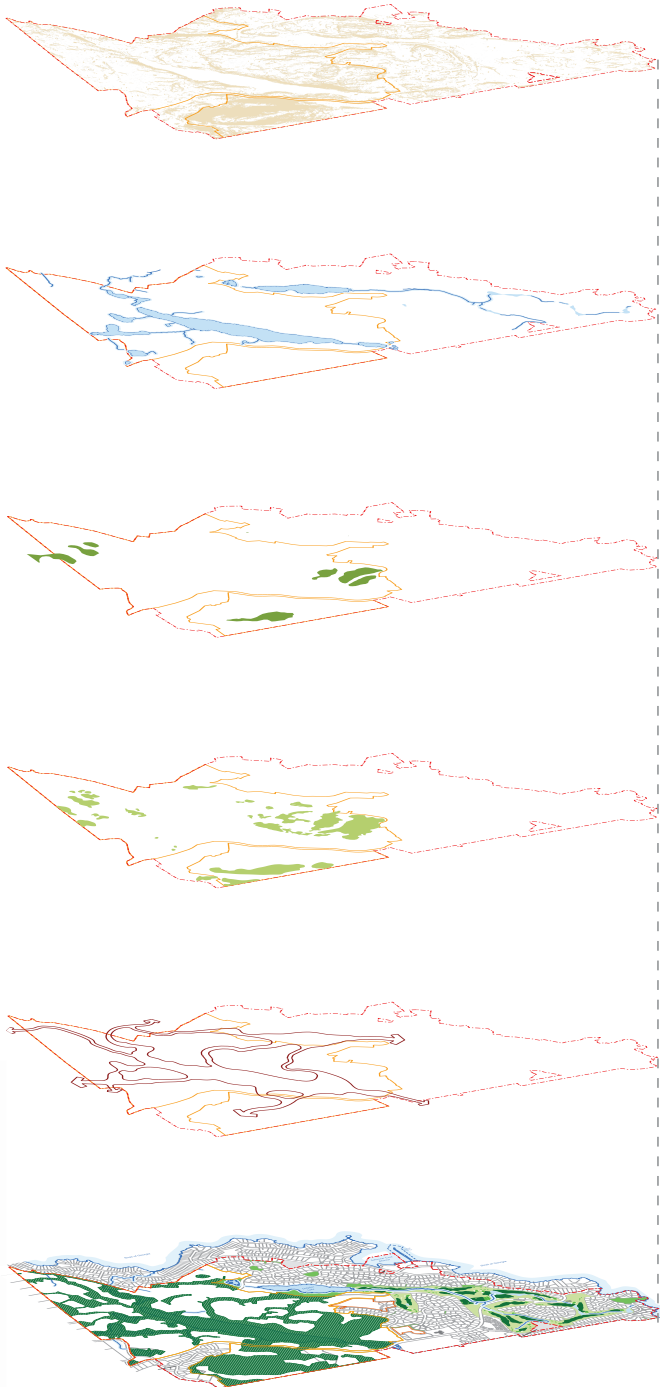
FIG. 2 Parks Conservation Plan

As a result of extensive ecological inventories and mapping, in combination with comprehensive public and stakeholder consultation, the Lakes District Parks Network is central to the design and intention of the Neighbourhood Plan: to create a more complete and sustainable community in balance with its environment.

The design of the Lakes District Neighbourhood Plan centred upon identification of conservation values and recreational features within the area, as illustrated in Figure 2. Set within the context of a designated growth area, ecosystem conservation was the most significant organizing structure for the Plan. The intent was to ensure the protection, in perpetuity, of the functional integrity of natural systems; the recreational opportunities associated with passive and active outdoor activities; and the natural features that define the area's landscape character.

Forming the "green heart" of the Lakes District, Enos Lake serves to link the neighbourhood's significant conservation lands - Terrace Wetlands, the Garry Oak Meadows, the Lookout and the Notch - into a sustaining landscape network able to protect its ecological integrity.

2.1 Planning for Conservation - Ensuring Ecological Integrity



A Steep Slopes & Rocky Outcrops

More than 20% of the lands have steep terrain, defined by slopes in excess of 30%, as shown in tan, to the left. While these areas limit potential for some types of development, they create unique opportunities for design and contribute to the natural landscape character and views.

B Water & Wetlands

With 8% of the Lakes District occupied by riparian areas, including lakes, streams and wetlands, the protection of these features creates an opportunity to maintain natural function as well as landscape character. Setbacks from waterbodies (“buffers”) follow Provincial Streamside Protection and Enhancement Areas requirements.

C Garry Oak Ecosystem

A series of sensitive Garry oak Ecosystem areas have been identified, comprising approximately 4% of the Lakes District. Through sensitive design and monitoring, 100% of these areas will be preserved and protected.

D Environmentally Sensitive Areas

Approximately 12% of the Lakes District is classified as Environmentally Sensitive Area (ESA). These areas are intended for conservation, with a focus on low impact recreational opportunities such as bird watching, hiking and environmental stewardship.

The conservation framework retains 85% of ESAs, with an additional ~5% identified for protection through private land covenants.

E Wildlife Corridors

Protecting wildlife movement and habitat, including blue and red listed species, through wildlife corridors is a Provincial and Regional goal. Wildlife corridors between 30-50 metres wide serve to maintain healthy habitat while linking to the recreation network.

F The Conservation Plan

The resulting conservation plan served as a framework in preparing the Neighbourhood Plan, ensuring the natural systems, recreational opportunities and landscape character of the Lakes District are protected in perpetuity as public park.

3 PARKS & TRAILS FOR RECREATION

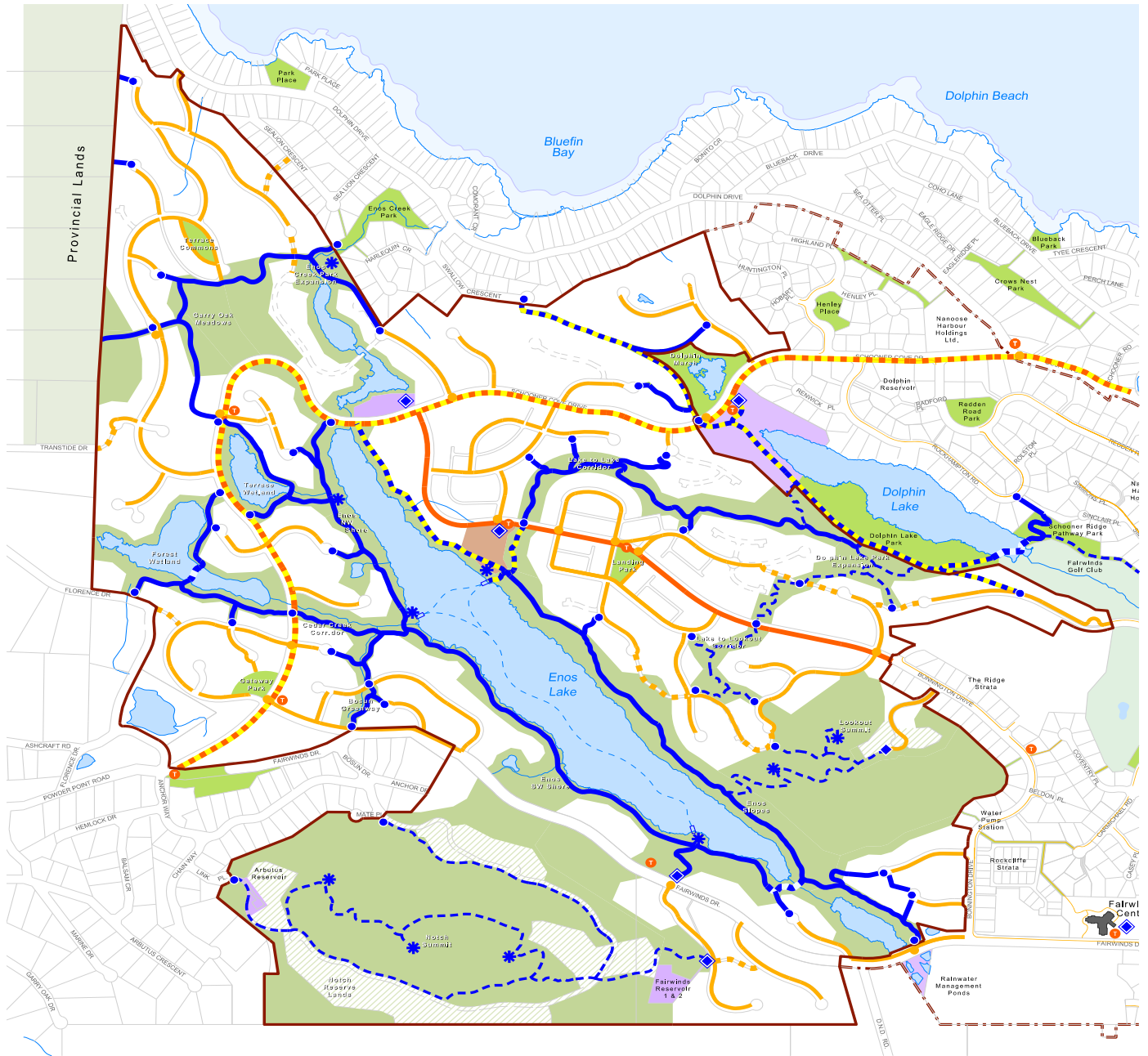


FIG. 3 Parks and Trail Plan

Trails & Features

	Trail Type I: Multi-Use (2.5-3.0m width)	2.17 km
	Trail Type II: Walking (1.5-2.25m width)	8.90 km
	Trail Type III: Hiking (0.75-1.0m width)	5.10 km
	Bridges + Boardwalk	0.24 km
	Enos Lake "Blue Way" and Docks	1.12 km
	Major Staging Area	
	Minor Staging Area	
	Trail access Point	
	Lookout	
	Dock	

Land Use

	Regional Park
	Community Park
	Development Reserve
	Neighbourhood Lands
	Lakehouse Centre
	Civic Infrastructure
	Public Road ROW

Sidewalks & Pathways

	Multi-Use Pathway (3.0m width)	3.26 km
	Collector Sidewalk (2.4m width)	1.34 km
	Emergency Connector Pathway (4.0m width)	1.00 km
	Local Sidewalk (1.8m width)	11.38 km
	Designated Street Crossing	
	Potential Transit Stop & Shelter	

Complimenting the conservation and recreation goals of the parks network is a robust trail network which provides for recreation, transportation and connectivity within the Lakes District. Designed to be a “pedestrian first” neighbourhood, the Plan prioritizes walking for recreation and transportation through two distinct, yet complimentary, networks: the neighbourhood system of sidewalks and pathways, along with a Parks system of forested trails and boardwalks. Each network has been planned to provide a range of opportunities to experience the landscape and a choice of routes to significant neighbourhood destinations. Together, these two pedestrian systems intentionally foster a healthier and more social lifestyle.

As the Lakes District neighbourhood is built, over 40% of the Plan area will remain dedicated as public park. The size and sequence of park phasing is secured through the Phased Development Agreement, in conjunction with rezoning of the Neighbourhood Plan area.

LAKES DISTRICT TRAIL NETWORK - trail types and network components

To limit environmental impact and new construction costs, trails will utilize existing routes where feasible. Where unofficial trails intrude into Environmentally Sensitive Areas, preferred routes will be designated and unofficial trails closed.



Parks Staging:

As the ‘front door’ to the regional park, staging areas are major trail access points which establish the identity and features of the trail system, and provide general orientation for park users. Staging areas include off-street parking, along with orientation signage and basic amenities. The trail network includes proposed Major and Minor Staging Areas, to be confirmed following implementation of the Integrated Management Plan.



Trail Accesses:

Trail Access Points are intended to provide access to the public park and trail network, and are linked to the network of sidewalks. To delineate private and public property, and to enhance trail user experience and safety, split rail fencing will be used where trail access points are adjacent residential properties. Removable post vehicle barriers and gates will be used to allow pedestrian movement while precluding non-EMS or park vehicle access on trails.



Trail Type I | Multi-use Trail:

The highest order pathway, Trail Type I is intended as a universally accessible multi-use trail located along level routes, constructed to withstand high usage demands. The multi-use trail is designed to accommodate a range of low-speed activities including walking, jogging and cycling, and is suitable for strollers and mobility impaired individuals.



Trail Type II | Walking Trail:

Narrower than the multi-use trail, Trail Type II is intended as a walking trail providing pedestrian-only access through moderately sloped terrain.



Trail Type III | Hiking Trail:

Where terrain is more challenging, and/or includes sensitive ecosystems, Trail Type III is intended for controlled pedestrian access. Trail widths are reduced to 0.75 – 1.0 metres to limit impact on hillsides and vegetation, and to enhance the hiking experience.



Boardwalk & Bridge Crossings:

In areas where designated trails cross wetland riparian areas or other sensitive ecosystems, boardwalk will be constructed to provide safe access. Boardwalk widths will match the adjacent trail designation standard. Bridge crossings will be constructed at significant creeks. Matching the width of the adjacent trail standard, bridge structures will be constructed of wood with expanded metal to provide tread in wet weather, and are equipped with railings on either side.

4 TRAIL CLASSIFICATIONS + DESIGN STANDARDS

4.1 Trail Hierarchy

The Lakes District parks system includes a hierarchy of three trail categories, in addition to pedestrian bridges and boardwalks. The trail hierarchy is outlined below and summarized in Fig. 4.

Each trail type is tailored to reflect the landscape terrain and its designated use:

Trail Type I | Multi-use trail (2.5 - 3.0m): The highest order pathway, Trail Type I is intended as a universally accessible multi-use trail located along level routes, constructed to withstand high usage demands. The multi-use trail is designed to accommodate a range of low-speed activities including walking, jogging and cycling, and is suitable for strollers and mobility impaired individuals.

Trail Type II | Walking trail (1.5 - 2.25m): Narrower than the multi-use trail, Trail Type II is intended as a walking trail providing pedestrian-only access through moderately sloped terrain.

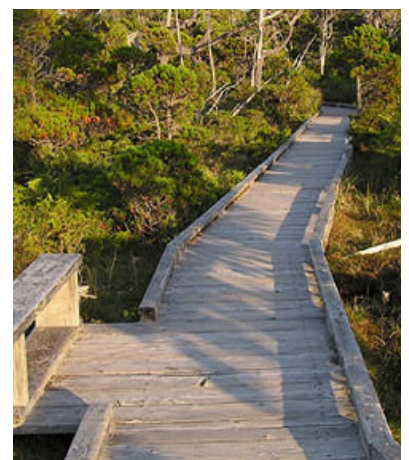
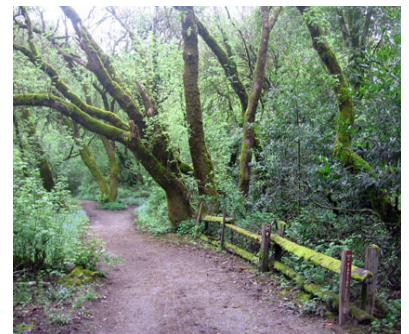
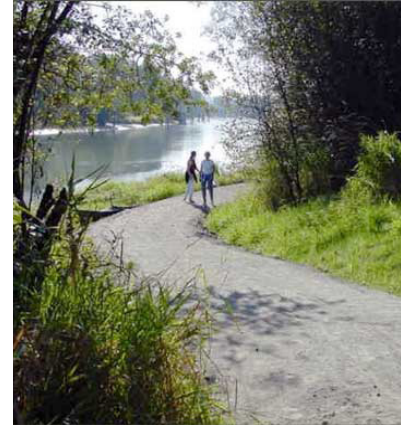
Trail Type III | Hiking trail (0.75 – 1.0m): Where terrain is more challenging, and/or includes sensitive ecosystems, Trail Type III is intended for controlled pedestrian access. Trail widths are reduced to limit impact on hillsides and vegetation, and to enhance the hiking experience.

Boardwalk: In areas where designated trails cross wetland riparian areas or other sensitive ecosystems, boardwalk will be constructed to provide safe access. Boardwalk widths will match the adjacent trail designation standard.

Trail widths will vary according to natural features: where topography is challenging or steep, trails may be narrower in locations; and in areas of gentle terrain or locations that provide views of the surrounding scenery, trails may be wider to accommodate additional programming.

Exact trail locations and boardwalk designs are to be determined in the field at the time of construction.

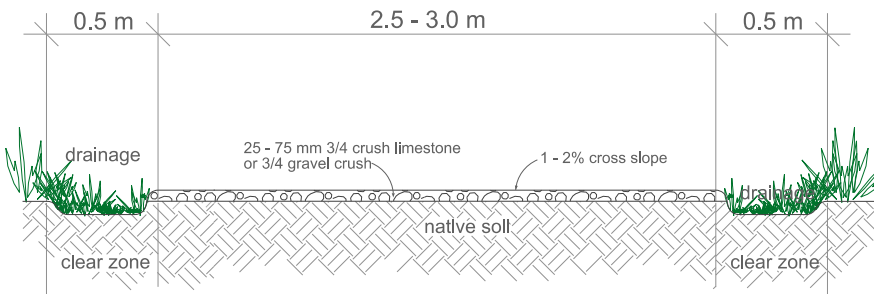
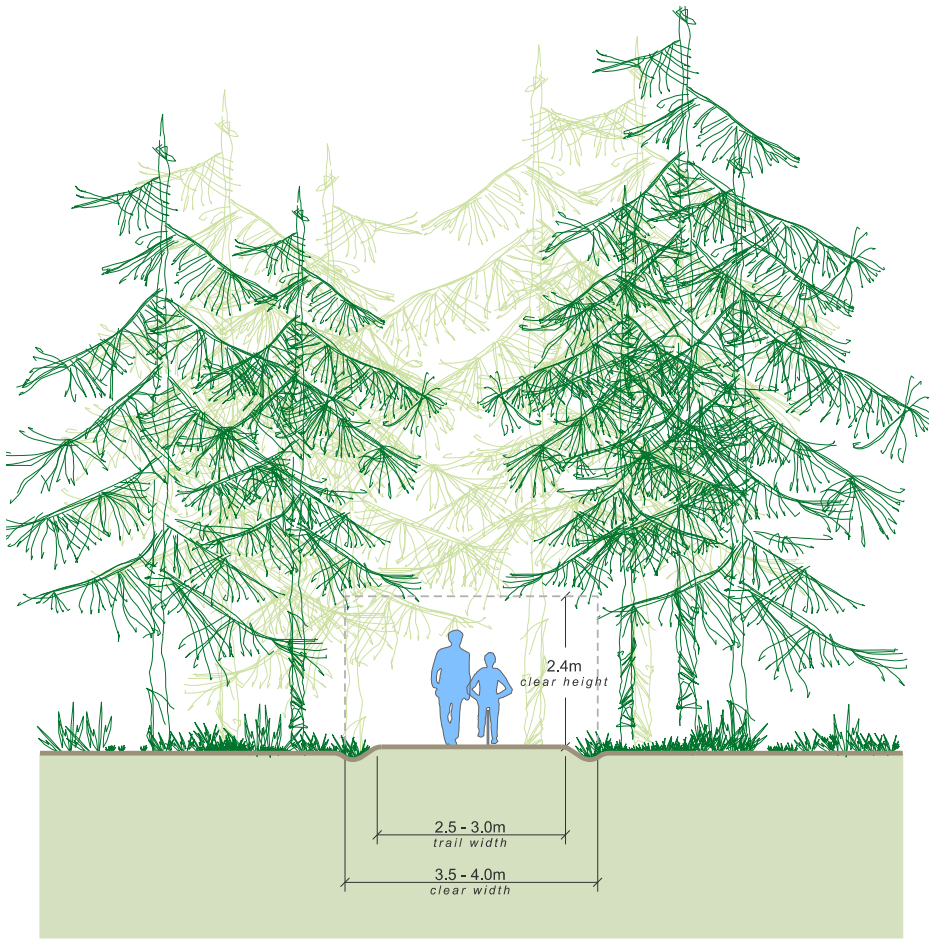
In order to be successful over the long-term and minimize maintenance, trails must be designed and built to specific standards. The following design and construction guidelines depict typical trail design; recognizing that flexibility in design will be necessary given the variability of the terrain.



	MULTI-USE TRAIL TYPE I	WALKING TRAIL TYPE II	HIKING TRAIL TYPE III	BOARDWALK
Purpose	<ul style="list-style-type: none"> • accommodates low-speed activities, suitable for strollers or mobility impaired individuals • connects residential & park uses 	<ul style="list-style-type: none"> • provides pedestrian access to mildly sloped terrain 	<ul style="list-style-type: none"> • provides wilderness experience and controlled pedestrian access where terrain is more challenging, and/or includes sensitive ecosystems 	<ul style="list-style-type: none"> • where trails cross riparian areas or sensitive vegetation / ecosystems • functions as an extension of the trail while protecting landscape
Level of Use	HIGH	MODERATE	MODERATE	HIGH - LOW
Type of Use	walking, jogging, cycling, strollers, wheelchairs	walking, jogging	hiking, walking, jogging	accommodate types of use associated with relevant trail
Location	<ul style="list-style-type: none"> • Schooner Cove Drive adjacent • residential & regional park areas 	<ul style="list-style-type: none"> • residential & regional park areas 	<ul style="list-style-type: none"> • regional park/wilderness areas 	<ul style="list-style-type: none"> • Enos Lake, Dolphin Lake & Forest Wetland • locations where extra measures required to protect sensitive vegetation / ecosystems
Width	2.5 - 3.0m	1.5 - 2.25m	0.75-1.0m	0.75-3.0m, as determined by trail width
Surface	<ul style="list-style-type: none"> • crushed limestone or gravel 	<ul style="list-style-type: none"> • native soil and crushed limestone or gravel 	<ul style="list-style-type: none"> • native soil and crushed limestone or gravel 	<ul style="list-style-type: none"> • wood decking and no slip grating, exact construction to be determined based on detailed design
Slope	<ul style="list-style-type: none"> • ideally 0-5% / maximum 10% grade and short pitches up to 12% 	<ul style="list-style-type: none"> • 10-30% slope • trail grade 0-10% sustained, with some short steep pitches 	<ul style="list-style-type: none"> • up to 30% slope • steeper trail grade 	n/a
Accessibility	<ul style="list-style-type: none"> • universal access where feasible 	<ul style="list-style-type: none"> • universal access where feasible (limited) 	<ul style="list-style-type: none"> • pedestrian only 	<ul style="list-style-type: none"> • consistent with through conditions
Trail Head Barriers	<ul style="list-style-type: none"> • bollards/gates to restrict vehicles 	<ul style="list-style-type: none"> • bollards/gates to restrict vehicles 	<ul style="list-style-type: none"> • bollards/gates to restrict vehicles 	n/a
Buffer	<ul style="list-style-type: none"> • landscape or distance buffers adjacent to residential lands • minimum 0.5m adjacent to Dolphin Drive 	<ul style="list-style-type: none"> • landscape or distance buffers adjacent to residential lands • minimum 0.5m adjacent to Dolphin Drive 	<ul style="list-style-type: none"> • landscape or distance buffers adjacent to residential lands 	n/a
Riparian/ESA	<ul style="list-style-type: none"> • minimize trail widths • use fencing to protect sensitive areas from people/pets • use boardwalks at Enos Lake & Dolphin Lake to protect riparian area 	<ul style="list-style-type: none"> • minimize trail widths • use fencing to protect sensitive areas from people/pets • use boardwalks at Forest Wetland to protect riparian area 	<ul style="list-style-type: none"> • minimize trail widths • use fencing to protect sensitive areas from people/pets • use narrow boardwalks to protect riparian areas 	n/a
Drainage	<ul style="list-style-type: none"> • 1-2% cross slope • minimum 20cm ditch on uphill side of trail, both sides if on flat terrain or culverts every 50-100m, or as determined 	<ul style="list-style-type: none"> • 1-2% cross slope • minimum 20cm ditch on uphill side of trail, both sides if on flat terrain or culverts every 100- 150m, or as determined 	<ul style="list-style-type: none"> • 2-4% cross slope • minimum 20cm ditch on uphill side of trail, both sides if on flat terrain 	n/a
Surfacing Depth	25mm - 75mm	25mm - 75mm	25mm - 75mm	n/a
Clearing Width	3.5m-4.0m (0.5m each side)	2.5 - 3.25m (0.5m each side)	1.75-2.0m (0.5m each side)	n/a
Vertical Clearance	2.4m	2.4m	2.4m	2.4m
Sight Lines	<ul style="list-style-type: none"> • minimum 20m • ideally 30m 	<ul style="list-style-type: none"> • provide safe sighting distance 	<ul style="list-style-type: none"> • provide safe sighting distance 	<ul style="list-style-type: none"> • provide safe sighting distance
Variations	<ul style="list-style-type: none"> • lookout or rest area approximately every 500m 	<ul style="list-style-type: none"> • lookout or rest area approximately every 500m 	<ul style="list-style-type: none"> • special lookouts at Notch Hill/ Enos Slopes Summit 	<ul style="list-style-type: none"> • boardwalks will be designed and engineered based on individual specifications
Associated Park Features	<ul style="list-style-type: none"> • outdoor furniture: benches, garbage receptacles • orientation information and educational signage 	<ul style="list-style-type: none"> • outdoor furniture: benches, garbage receptacles • orientation information and educational signage 	<ul style="list-style-type: none"> • orientation information and educational signage 	<ul style="list-style-type: none"> • orientation information and educational signage

FIG. 4 Trail Hierarchy Summary

4.2 Multi-Use Trail Standard

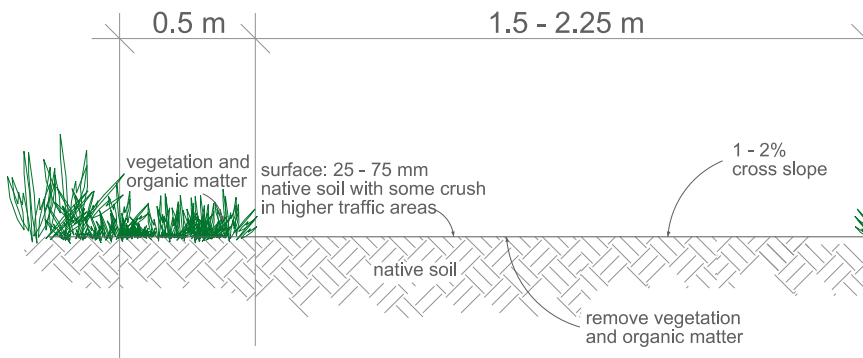
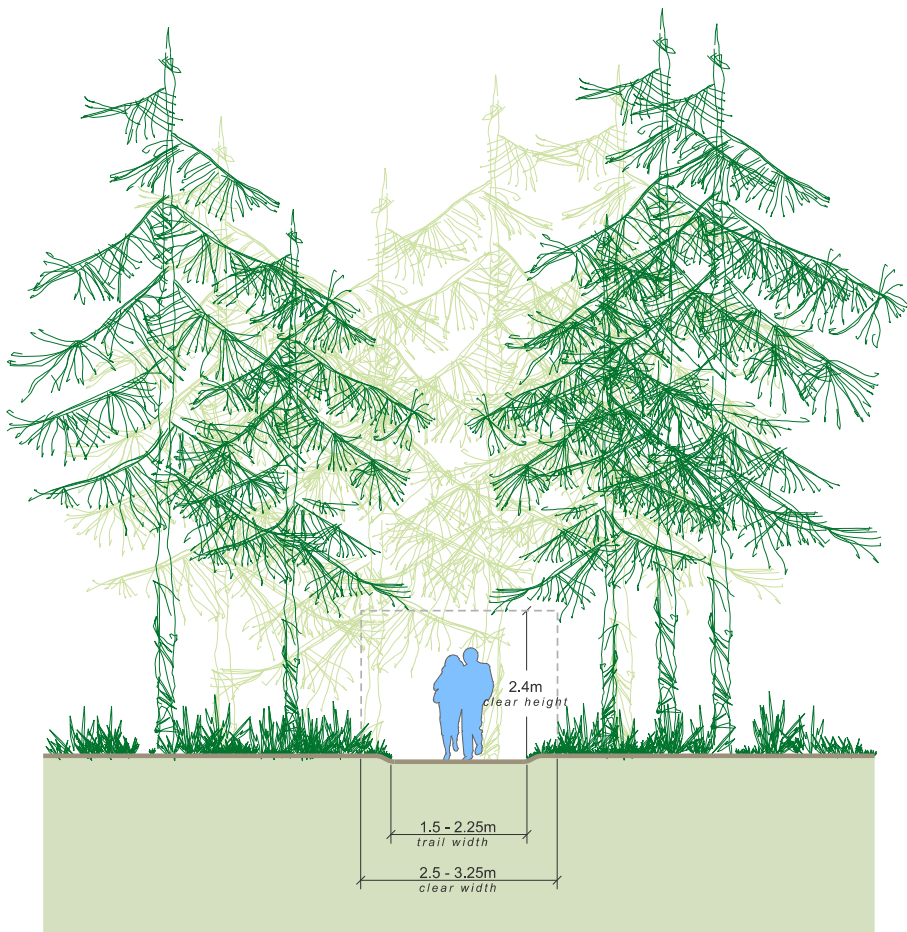


CONSTRUCTION NOTES

- Use excavator or trail cat, except in environmentally sensitive areas.
- Clearing and grubbing to native soil.

MULTI-USE TRAIL TYPE I	
Purpose	<ul style="list-style-type: none"> • accommodates low-speed activities, suitable for strollers, bikes or mobility impaired individuals • Connects residential & park uses
Level of Use	HIGH
Type of Use	walking, jogging, cycling, strollers, wheelchairs
Location	<ul style="list-style-type: none"> • Schooner Cove Drive adjacent • residential & regional park areas
Width	2.5 - 3.0m
Surface	• crushed limestone or gravel
Slope	• ideally 0-5% / maximum 10% grade and short pitches up to 12%
Access	• universal access where feasible
Trail Head Barriers	• bollards/gates to restrict vehicles
Buffer	<ul style="list-style-type: none"> • landscape or distance buffers adjacent to residential lands • minimum 0.5m adjacent to Dolphin Drive
Riparian/ESA	<ul style="list-style-type: none"> • minimize trail widths • use fencing to protect sensitive areas from people/pets • use boardwalks to at Enos Lake and Dolphin Lake to protect riparian areas
Drainage	<ul style="list-style-type: none"> • 1-2% cross slope • minimum 20cm ditch on uphill side of trail, both sides if on flat terrain or culverts every 50-100m
Surfacing Depth	• 25mm - 75mm
Clearing Width	• 3.5m-4.0m (0.5m each side)
Vertical Clearance	• 2.4m
Sight Lines	<ul style="list-style-type: none"> • minimum 20m • ideally 30m
Variations	• lookouts/rest areas approximately every 500m
Associated Park Features	<ul style="list-style-type: none"> • outdoor furniture: benches, garbage receptacles • orientation information and educational signage

4.3 Walking Trail Standard



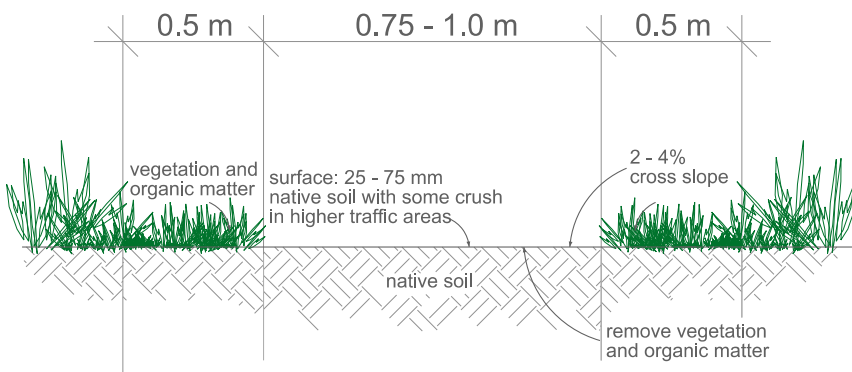
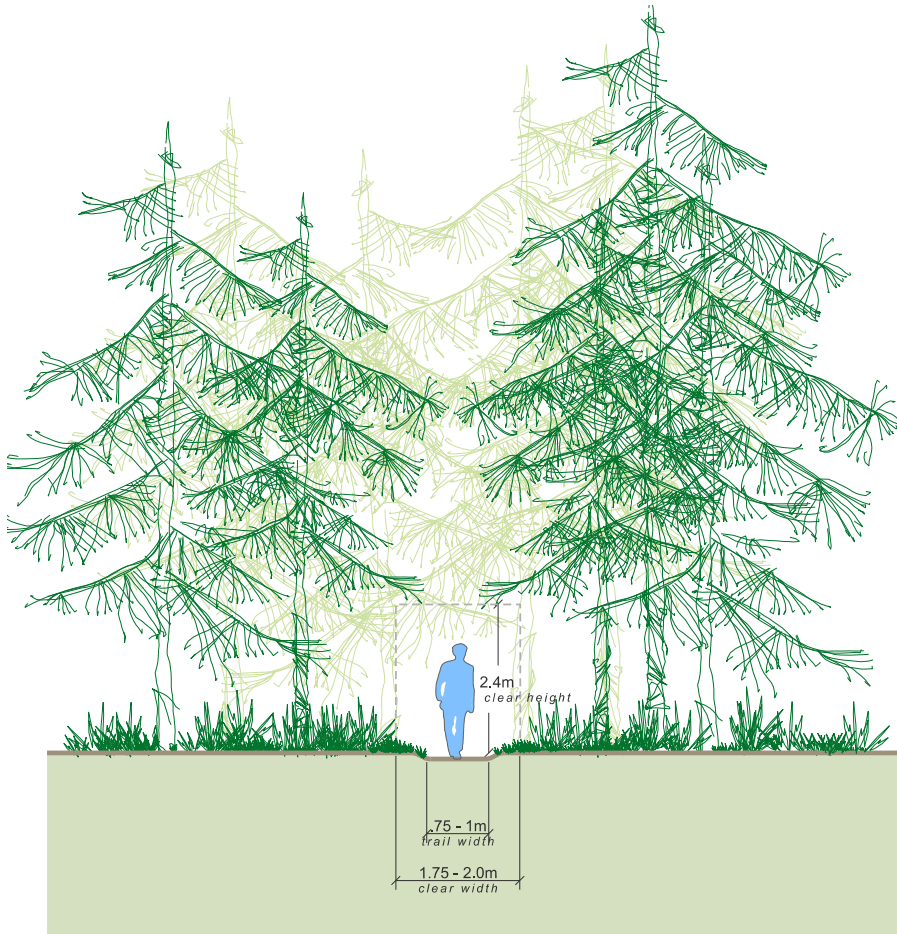
CONSTRUCTION NOTES

- Use excavator or trail cat, except in environmentally sensitive areas.
- Clearing and grubbing to native soil.
- 3/4 gravel or crush in high traffic areas to prevent erosion
- given variability of terrain and significant presence of bedrock, standard is flexible
- stairs may be required for steep sections

WALKING TRAIL TYPE II

Purpose	• provides pedestrian access to mildly sloped terrain
Level of Use	MODERATE
Type of Use	walking, jogging
Location	• residential & regional park areas
Width	1.5 - 2.25m
Surface	• native soil and crushed limestone or gravel
Slope	• 10-30% slope • trail grade 0-10% sustained, with some short steep pitches
Access	• universal access where feasible (limited)
Trail Head Barriers	• bollards/gates to restrict vehicles
Buffer	• landscape or distance buffers adjacent to residential lands • minimum 0.5m adjacent to Dolphin Drive
Riparian/ESA	• minimize trail widths • use fencing to protect sensitive areas from people/pets • use boardwalks at Forest Wetland to protect riparian area
Drainage	• 1-2% cross slope • minimum 20cm ditch on uphill side of trail, both sides if on flat terrain or culverts every 100- 150m
Surfacing Depth	• 25mm - 75mm
Clearing Width	• 2.5-3.25m (0.5m each side)
Vertical Clearance	• 2.4m
Sight Lines	• provide safe sighting distance
Variations	• lookouts/rest areas approximately every 500m
Associated Park Features	• outdoor furniture: benches, garbage receptacles • orientation information and educational signage

4.4 Hiking Trail Standard



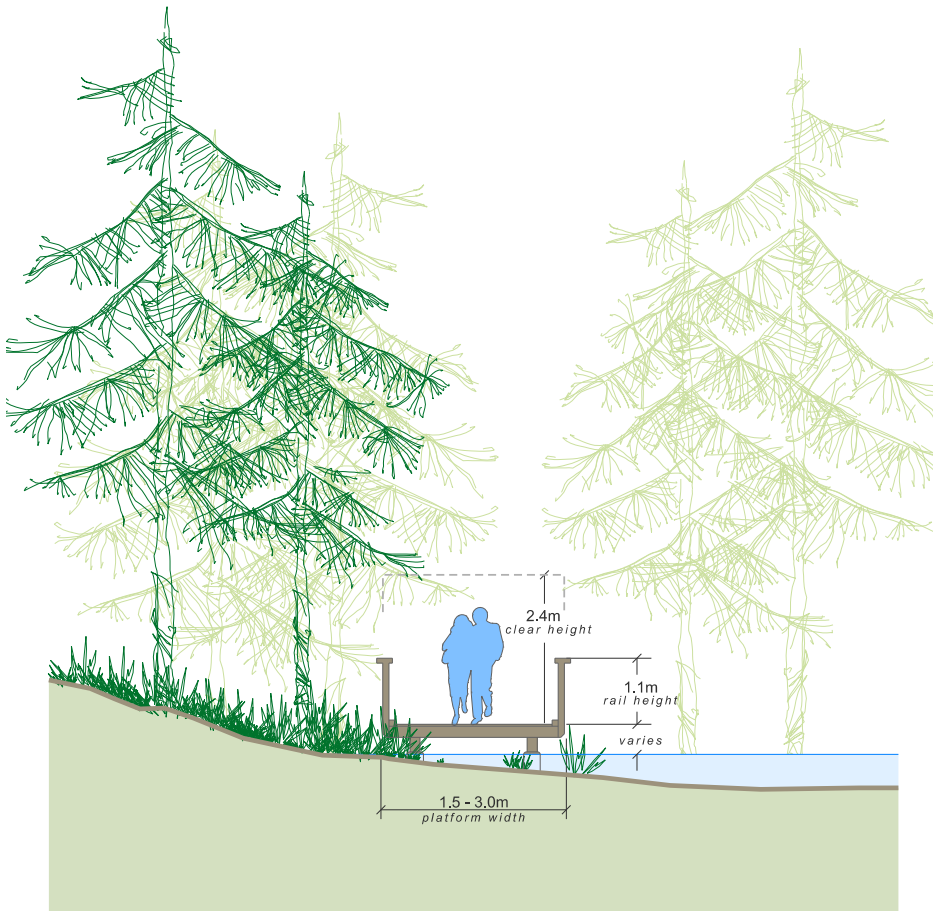
CONSTRUCTION NOTES

- Hand build to minimize impact to vegetation
- Clearing and grubbing to native soil
- 3/4 gravel or crush in high traffic areas to prevent erosion
- Use bark mulch to protect tree roots, as needed

HIKING TRAIL TYPE III

Purpose	<ul style="list-style-type: none"> • provides wilderness experience and controlled pedestrian access where terrain is more challenging, and/or includes sensitive ecosystems
Level of Use	MODERATE
Type of Use	hiking, walking, jogging
Location	• regional park/wilderness areas
Width	0.75 - 1.0m
Surface	• native soil and crushed limestone or gravel
Slope	<ul style="list-style-type: none"> • up to 30% slope • steeper trail grade
Access	• pedestrian only
Trail Head Barriers	• bollards/gates to restrict vehicles
Buffer	• landscape or distance buffers adjacent to residential lands
Riparian/ESA	<ul style="list-style-type: none"> • minimize trail widths • use fencing to protect sensitive areas from people/pets • use narrow boardwalks to protect riparian areas
Drainage	<ul style="list-style-type: none"> • 2-4% cross slope • minimum 20cm ditch on uphill side of trail, both sides if on flat terrain
Surfacing Depth	• 25mm - 75mm
Clearing Width	• 1.75 - 2.0m (0.5m each side)
Vertical Clearance	• 2.4m
Sight Lines	• provide safe sighting distance
Variations	• special lookouts at Notch Hill/ Enos Slopes Summit
Associated Park Features	• orientation information and educational signage

4.5 Boardwalk Standard



CONSTRUCTION NOTES

Boardwalks range from 0.75m to 3.0m wide, with a raised edge or railing where elevated more than 0.6m above ground. The deck is constructed of wood, but a half-metre section of expanded metal in the centre should be used to add extra tread.

Three types of boardwalk are proposed, as determined by level of use, terrain and environmental sensitivity:

- low, narrow boardwalk (no railing),
- slightly raised boardwalk (kick rail), and
- higher boardwalk (railing as required through BC Building Code).

Abutments are precast concrete or wood; however, and will be kept as small as possible and screened with riparian vegetation to ensure a minimal presence. Hand railings, if required, should be set to code, and posts should be spaced no further than 3m / 10 feet apart.

All construction in riparian areas must be completed during the fisheries window, in accordance with the Fairwinds' Lakes District and Schooner Cove Neighbourhood Plans and an Environmental Construction Management Plan, and with approval of Senior Government Agencies. Adequate silt measures must be utilized to ensure that no material is disturbed into the watercourse.

BOARDWALK	
Purpose	<ul style="list-style-type: none"> • where trails cross riparian areas or sensitive vegetation / ecosystems • functions as an extension of the trail while protecting landscape
Level of Use	HIGH - LOW
Type of Use	accommodates types of use associated with relevant trail
Location	<ul style="list-style-type: none"> • Enos Lake, Dolphin Lake & Forest Wetland • locations where extra measures required to protect sensitive vegetation / ecosystems
Width	0.75 - 3.0m, as determined by trail width
Surface	<ul style="list-style-type: none"> • wood decking with non-slip metal grate, exact construction to be determined based on detailed design
Slope	n/a
Access	<ul style="list-style-type: none"> • consistent with through conditions
Trail Head Barriers	n/a
Buffer	n/a
Riparian/ESA	n/a
Drainage	n/a
Surfacing Depth	n/a
Clearing Width	n/a
Vertical Clearance	• 2.4m
Sight Lines	<ul style="list-style-type: none"> • provide safe sighting distance
Variations	<ul style="list-style-type: none"> • boardwalks will be designed and engineered based on individual specifications
Associated Park Features	<ul style="list-style-type: none"> • orientation information and educational signage



5 PARK AND TRAIL ACCESS GUIDELINES

The following provides general guidelines for designing trail access, including Staging Areas and Trail Access Points, in addition to providing directions on universal access and public/private land interface. Implementation may require adjustment as a result of sensitive environmental areas, challenging terrain and user demand. Final design detail to be determined in the field prior to construction.



5.1 Staging Areas and Trail Access Points

Staging areas are major trail access points which serve to identify the trail system, orient and organize trail users. Major trail heads are equipped with parking areas for 10 - 15 vehicles, (as determined by topography, environmental sensitivity and user demand); entrance signs, interpretive or orientation signage; vehicle barriers; bike racks; and garbage receptacles. Major Staging Areas may include picnic facilities and washrooms.

Minor Staging Areas have parking for 4 - 6 vehicles, as determined by topography, environmental sensitivity and user demand. Other amenities include entrance signs, interpretive or orientation signage; vehicle barriers; and may include bike racks and garbage receptacles.

Designed to provide neighbourhood access to the trail system, Trail Access Points are equipped with wayfinding signage and vehicle barriers, along with split rail fencing where needed to delineate public trail from private property.



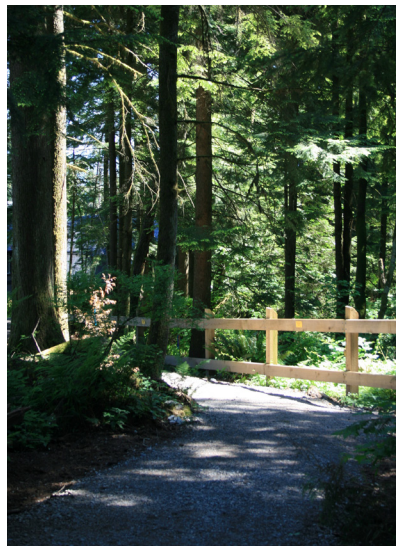
5.2 Trail Buffers

Most trails within the Lakes District are situated within parks, and will not require buffers or setbacks. Where sections of trail or trail access points are located within or adjacent to road right-of-ways, or adjacent to residential uses, buffers, permeable fencing such as a split rail, and / or landscaping will be used to separate public and private realms. Buffers for trails within the road right-of-way will be determined by MoTI. User experience, good sightlines and Crime Prevention Through Environmental Design (CPTED) Guidelines will be considered when constructing all trail types and access points.



Minimum buffers from road right-of-ways are listed in the table below:

Road Type	Minimum Buffer
Low volume (under 50km/h)	0.5m
Low volume with on-street parking	0.75m
Moderate volume (under 60km/h)	1.0m



5.3 Barriers

Bollards, removable post barriers, and gates are used to direct pedestrian movement and preclude vehicle access on trails. In universally accessible locations, such as access points for Multi-use Trails, trail barriers must allow for wheelchair access.

Where emergency or service vehicles, and parks equipment access is required, barriers or bollards must be removable. Bollards, or posts and sleeves are the most common removable barrier and, where required, be located at trail heads as required. Where removable barriers are not required, boulders may be used in the place of bollards.

Where used, barrier posts or bollards will be installed in odd numbers so that the centre post is positioned in the centre of the trail.

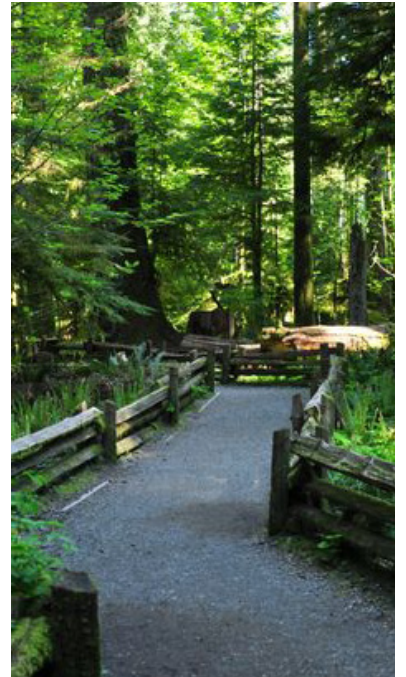
Baffle gates, rather than bollards, may be used on nature trails where bicycle or ATV use is prohibited.



5.4 Fences

Wood rail fences will be used for several purposes within the Lakes District Regional Park:

- Split rail fencing will be used at trail access points to delineate public park from private property.
- Low wood rail fences may be located at viewpoints to define access while maintaining views and aesthetics.
- Wood fences may be used along nature trails to define circulation and prohibit access to hazards and ESAs.
- Safety railings will be provided along trails adjacent to steep slopes and other known hazards. Safety railings must be at least 0.5m from the edge of the pathway and must be built according to the BC Building Code (commercial uses).



5.5 Universal Access

For Multi-use Trails where universal access is appropriate, the following standards must be applied in the design, construction and maintenance of trails to allow physical accessibility:

- Recommended maximum slopes should not exceed 5% for long distances. Landings should be provided if the slopes exceed these grades.
- Surfacing will be uniform with no obstructions or depressions.
- Trail heads and parking will provide universally accessible stalls.
- Signs, light standards, power poles, power boxes, mail boxes, and bus stops can all obstruct the flow of a wheelchair or stroller. Install structures with consideration of their visual and physical impacts.
- Curb cuts will be provided where trails cross roads, where required.
- Bollards, baffles and other barriers will be spaced in such a way that a wheelchair can pass.
- Select rest areas and seating will allow wheelchairs to pull off the trail.
- Best Management Practices for specific accessibility and bicycle design details apply.



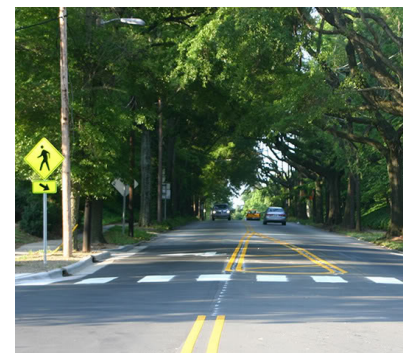
5.6 Trail Street Crossings

The locations where trails cross streets are a critical safety site for both trail users and vehicles. Several crossing treatments can be used to assist trail users in safely continuing on the trail and minimizing vehicle conflicts. Intersection design will be completed in conjunction with MoTI, and is subject to MoTI approval.

The following provides recommendations for trail crossings for the Lakes District, dependant on the trail type, street volumes, and street design. Each of the following crossing types is detailed in the City of Nanaimo Bicycle Facility Design Guidelines (2001). Signed crossings are common where trails intersect major streets with low traffic volumes. Signs and crosswalk markings may be used to indicate the crossing and improve safety.

Trail crossings will be located at intersections and mid-block sites. Where trails are located parallel to streets, crossings should occur at intersections or as close to as possible to maximize crossing visibility. Mid-block crossings will also be located to maximize visibility for approaching motorists with adequate signing and illumination (and possible median islands) to increase safety and visibility. The trail crossings should also occur at right angles to the roadway.

Trail intersections should be well marked for both trail users and vehicles. Signage should alert multi-use trail users to stop and dismount (if on bikes). As referenced in the Barrier and Fencing section of this document, post and sleeve vehicle barriers on multi-use trails at road intersections are recommended to be placed in odd numbers with the centre post in the centre of the trail.



6 TRAIL FEATURES + STRUCTURES

These following provides guidelines for trail features, such as rest areas and signage, as well as structures including boardwalks and bridges. Implementation may require adjustment as a result of sensitive environmental areas, challenging terrain and user demand. Final design detail to be determined in the field prior to construction.

6.1 Rest Areas and Lookouts

Rest areas and lookout points along trails provide opportunities for sitting, socializing and passive recreation such as wildlife and scenery viewing. Located at well used, easily accessible high points within the trail network, and highlighting the exceptional local scenery, lookout points may include benches, orientation signs, interpretive signage and / or garbage cans. A more rustic standard may apply at the Notch and the Lookout, which may only include rough benches tailored to the landscape and park experience.

The design of the lookouts or rest areas depends on the type of trail, and site specific conditions such as soils, slope, views, vegetation, interpretive opportunities and adjacent lands uses and features. Rest areas are placed at least 500m apart within the Multi-Use and Walking trails. Hiking trails have fewer rest areas and are built to a more rustic standard.

Bird and wildlife viewing structures may be incorporated into the trail design to allow visitors the opportunity to view wildlife with minimal disturbance to the animal. These structures will be made of wood in order to compliment the natural environment.



6.2 Trail Signage

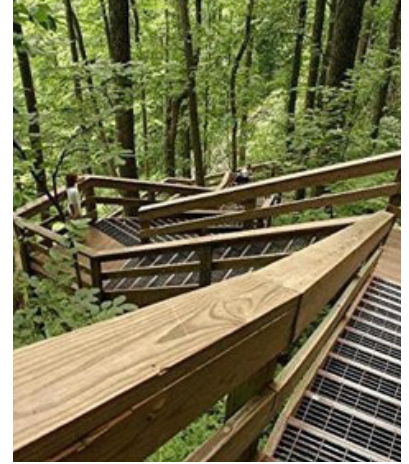
Trail signage is an important directional and character defining element of a trail. Sign types include:

- Entry signs displaying park name;
- Informational providing park and trail regulations;
- Kiosks with orientation maps;
- Directional and distance;
- Seasonal or warning; and
- Interpretive/Educational signs which celebrate the natural and cultural heritage of the Lakes District.

Interpretive signage will be considered in some areas to foster understanding of, and respect for, sensitive areas that need to be protected or to areas of particular interest. Educational signage can be used to reinforce why people and their pets should stay out of riparian areas and other ESAs.

The following standards apply to the placement of signs along trails:

- Kiosks with trail maps and park regulations will be located at all major trail head intersections. They will include the trail name and permitted uses; a map of the trail and specific “you are here” location; and the Regional District Parks logo and contact info.
- Trail name signs and direction/distance markers will be placed at major trail crossings and kilometer intervals.
- Interpretive signs will be located at some areas of natural or cultural interest, ESAs, and/or rest areas.
- Although most park regulations are posted at the kiosk, hazards along the trail, pedestrian crossings at intersections, bike speed limits and permitted trail user groups will be clarified through signage along the trail.
- 2.1m is optimal height for sign legibility (excluding trail markers). Sign placement will be obvious but not obtrusive. Signs will be consolidated as much as possible to avoid sign clutter along trails.



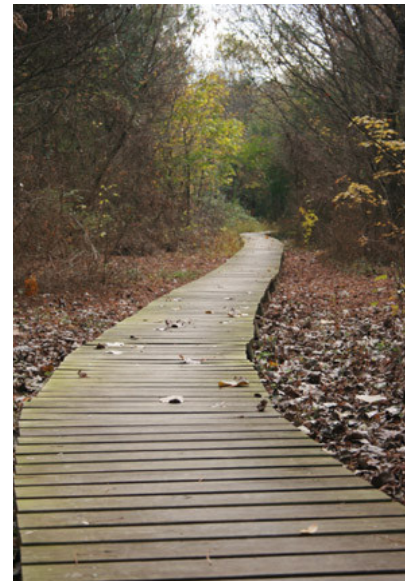
6.3 Bridges and Boardwalks

Bridges and boardwalks will be used throughout the trail network, not only to provide access but also to function as landmarks and viewing platforms, while adding to trail character. Boardwalks will also be required in order to discourage walking off the trail, particularly in environmentally sensitive areas. The design of structures depends on trail widths, size of riparian areas, environmentally sensitive areas, and expected load on the structure.



Bridge crossings are used along the Multi-use and Walking trails at significant creeks. They are up to 3.0m wide with a railing on either side. The bridge deck is wood and may include slip resistant materials, such as expanded metal to provide tread in wet weather.

Boardwalks are used where trails cross smaller watercourses, wetlands and sensitive vegetation. They are low in height and span shallow and slow moving water. Boardwalks range from 1.0m to 3.0m wide with a raised edge or railing when raised more than 0.6m above ground. The deck is wood with a half-meter section of expanded metal in the centre to add extra tread.



Bridges and boardwalks will be aligned along the path so that users do not have to make sharp turns at the end of the bridge. The intersection between the bridge and trail will also be clear to ensure user safety. Decking material will be rough cedar or treated lumber.

If used, observation decks will bow outward from the running boardwalk to create an outward focus. The direction of decking lumber relative to the running deck (even if on a 45 degree angle) can affect the perception and aesthetics of the observation deck. End decks are suitable to the end of spurs. Decks on both side areas are useful for viewing and can aid in traffic flow in busy sections. Decks on one side focus visitor attention and allow passing points for traffic. Decks will be sloped no more than 1:20.

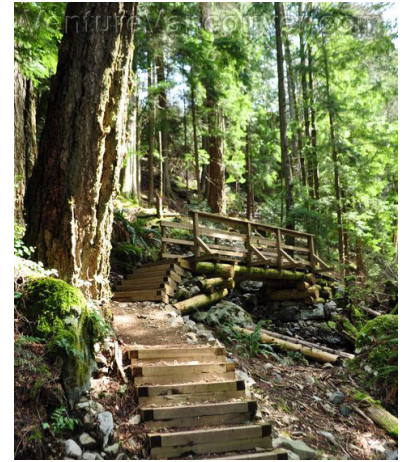
All construction in riparian areas must be completed during the fisheries window, in accordance with the *Fairwinds' Lakes District and Schooner Cove Neighbourhood Plans Environmental Impact Assessment* (Pottiger Gaherty Environmental Consultants Ltd 2010). Adequate silt measures must be utilized to ensure that no sediment enters the watercourse.

6.4 Stairs

Steps and staircases may be utilized for steep sections of trail. Step construction and material depends on the site's drainage, soil and rock substrate. Typically constructed from wood, the following standards apply.

- All steps will have a step tread ratio of 2:1 with optimal 150mm rise and 300mm run.
- Rise is very important and will be consistent, unless separated by landings.
- Landings will be provided on longer flights.
- Handrails will be provided on at least one side if the flight is long and steep, or either side if stairs are raised over 2 feet above the ground.

For specific wood stair construction details, refer to City of Nanaimo Beach Access Trail Design Guidelines. Engineered design may be required.



6.5 Docks

As a public amenity within the Lakes District Regional Park, public docks will be constructed for recreation and for access to Enos Lake. Docks will be publicly owned, but will allow for private licencees to operate boat rentals or other similar services to the benefit of park users.

Docks will range from 2.0 - 5.0m wide and up to 25m long, depending on location and user demand. Decking material will be rough cedar or treated lumber.

All construction in riparian areas must be completed during the fisheries window, in accordance with the *Fairwinds' Lakes District and Schooner Cove Neighbourhood Plans Environmental Impact Assessment* (Pottiger Gaherty Environmental Consultants Ltd 2010). Adequate silt measures must be utilized to ensure that no sediment enters the watercourse.

Additional guidelines for structures, below, apply.



6.6 Structures

The following guidelines should be followed for all boardwalk or bridge types:

- Lumber used in structures along trails will be pressure treated lumber or dimensional cedar.
- To reduce risk of leaching toxic preservatives, piles in saturated soils/ water will not be constructed of treated wood.
- When using cedar, walking surfaces will be rough sawn to reduce slipperiness when wet and metal-expanded grates should be used to prevent slipping.
- Railings will be set to code heights according to BC Building Code. Stair railings will be between 32"-36" and platforms will have bottom and mid rails.



7 TRAIL PLANNING + DEVELOPMENT

These following provides general directions for trail siting and alignment, as well as providing directions for landscape design, protection of vegetation and consideration for drainage. Implementation may require adjustment as a result of sensitive environmental areas, challenging terrain and user demand. Final design detail to be determined in the field prior to construction.



7.1 Trail Siting

Many factors influence the specific siting and placement of trails, including the type of trail, connections to existing trails and parks, existing site conditions, soil type, environmental sensitivity and biophysical conditions, hillside slopes, vegetation and drainage conditions. Trails may need to shift slightly from the proposed alignment in order to enable construction.

To limit environmental impact and reduce cost, trails will utilize existing routes where possible. Where unofficial trails intrude into Environmentally Sensitive Areas, preferred routes will be designated and unofficial trails will be closed or decommissioned.

Trails should be designed to compliment and respect the landscape. Natural features, such as rocks and logs, will be incorporated into the design to denote edges and trail direction, and also to provide visual interest. The resulting trail will appear to be directed by the landscape. Where possible, trails will be sited along the edges of wildlife corridors in order to preserve wildlife movement.



Steep or unstable slopes, as well as erodible soils, will be avoided. Retaining walls may be required to prevent side slopes from slumping onto trails, but will be avoided wherever possible by working with the terrain. Where particularly sensitive vegetation or riparian areas are encountered, trails will be either routed to avoid impact or boardwalks and bridges will be incorporated to traverse over the sensitive area.

7.2 Trail Turns

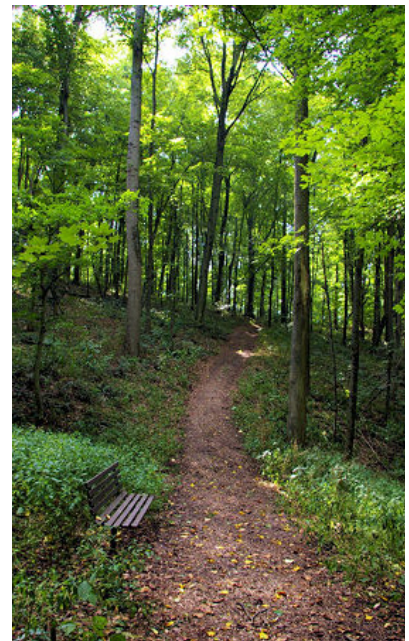
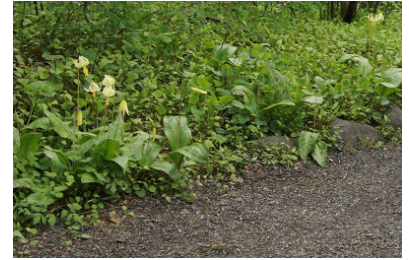
To ensure visibility, safety and adequate sight lines on the multi-use path, trail turns will be minimized. For walking and hiking trails, minor turns add an element of mystery to trails as one continues on to see what is around the corner. In some cases, hiking trails may require switchbacks due to topography; however, sharp turns will be avoided wherever possible. Adequate visibility must be ensured on all trails.



7.3 Landscaping

Natural and native planted vegetation along a trail enhances the aesthetics and character of a trail, and buffers the trail from adjacent land uses. Vegetation must be balanced with safe vertical and horizontal clearance requirements and sight lines so that trail users can see what is ahead and anticipate trail conditions. The landscape treatment and clearance width depends on the type of trail and surrounding area. The majority of trails within the Lakes District have existing natural vegetation that will be preserved wherever possible. However, where vegetation is planted, the following guidelines apply to all landscape treatments:

- Installation and maintenance practice must conform to BCLNA Standards and applicable Regional District of Nanaimo standards.
- No trees or shrubs shall be planted within the vertical or horizontal clearances as specified in these Guidelines.
- Plant masses will not be planted where they impede visibility along the trail.
- Native replanting will be required in natural areas for restoration and screening.
- Trail landscaping should utilize native or low maintenance / low water use plantings.
- Changes in drainage patterns will be minimized.
- To avoid damage to trail surfaces or bases, root barriers will be planted along the trail adjacent to the tree to prevent roots from growing under hard trail surfaces.
- Where trails are close to residential properties, plantings will be used for privacy screening, trail softening and enhanced aesthetics. However, tall and dense plantings will be avoided for safety and security reasons.

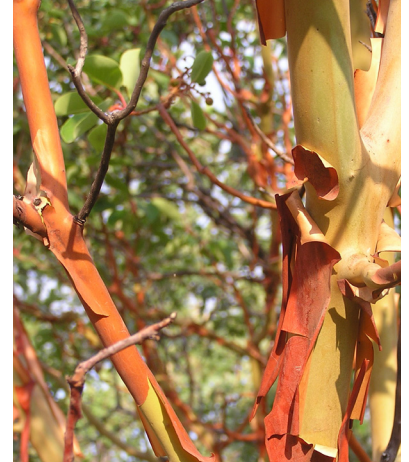


7.4 Trees and Vegetation Protection

Trees and vegetation add to the aesthetic and environmental value of recreational areas and surrounding trail system. Care will be taken to protect trees where they do not negatively impact the routing, safety and clearance of trails. The following guidelines help to preserve trees:

- Where feasible, trails should be routed around the drip line of highly significant trees.
- During trail construction, damage to trees or tree roots that are to be retained will be avoided.
- All roots below the surface will be removed in preparing the sub-grade.
- Root barriers may be used to protect both trees and trails.

For further direction on tree planting procedures, refer to City of Nanaimo Engineering Specifications and Standards Section 14.



7.5 Retaining Walls

Retaining walls will be used to prevent side slopes from slumping onto trails or boardwalks. Where possible, retaining walls will be avoided through trail siting and grading. Where walls must be installed, proper drainage and anchoring must be in place. Furthermore, any wall over 1.2m requires a railing. Mechanically Stabilized Earth (MSE) will be considered to eliminate the need for retaining walls.



7.6 Drainage

Drainage is a critical component of trail design, and if executed properly, lessens the impact to the environment while improving trail lifespan. Proper grading and site preparation enables water to flow across the trail, minimizing erosion.

The type of drainage utilized depends on the trail location and soil types, but will include swales or culverts. Where trails are situated on sloped hillsides, a shallow swale will be constructed on the uphill side of the trail. Where trails are situated on flat terrain, swales will be required on both sides of the trail.

Culverts will be considered where trails cross small ephemeral or intermittent watercourses, including raingarden, where bridges and raised walkways are not necessary or feasible. Where required, culverts will be regularly spaced on the trail to divert water. Based on slope angle, culvert spacing on multi-use trails will be between 100 and 150 metres, and on walking trails every 50 to 100m. Culverts are likely not required for hiking trails. In order to minimize water damage, trails will avoid slope fall lines.

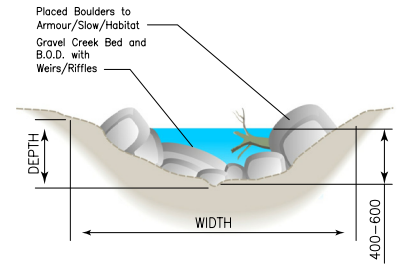


7.7 Rainwater Creeks

As a Best Management Practice in stormwater management, ephemeral rainwater creeks will be constructed within the Regional Park to convey stormwater run-off from development areas into Enos Lake, as directed by the The Lakes District and Schooner Cove Integrated Stormwater Management Plan.

Constructed of rocks and gravel, the small creeks follow natural contours, and feature pools and cascading sections to aerate run-off water. Over time, the creeks will mimic natural creeks and provide habitat.

Where Rainwater Creeks cross trails, culverts for drainage will be used to prevent damage to the trail (see Fig.5). For greater detail, see the cross section below, illustrated Rainwater Creek drainage across Trail Type I / Multi-use or Trail Type II / Walking Trails.



Rainwater Creek - Conceptual Cross Section (KWL)

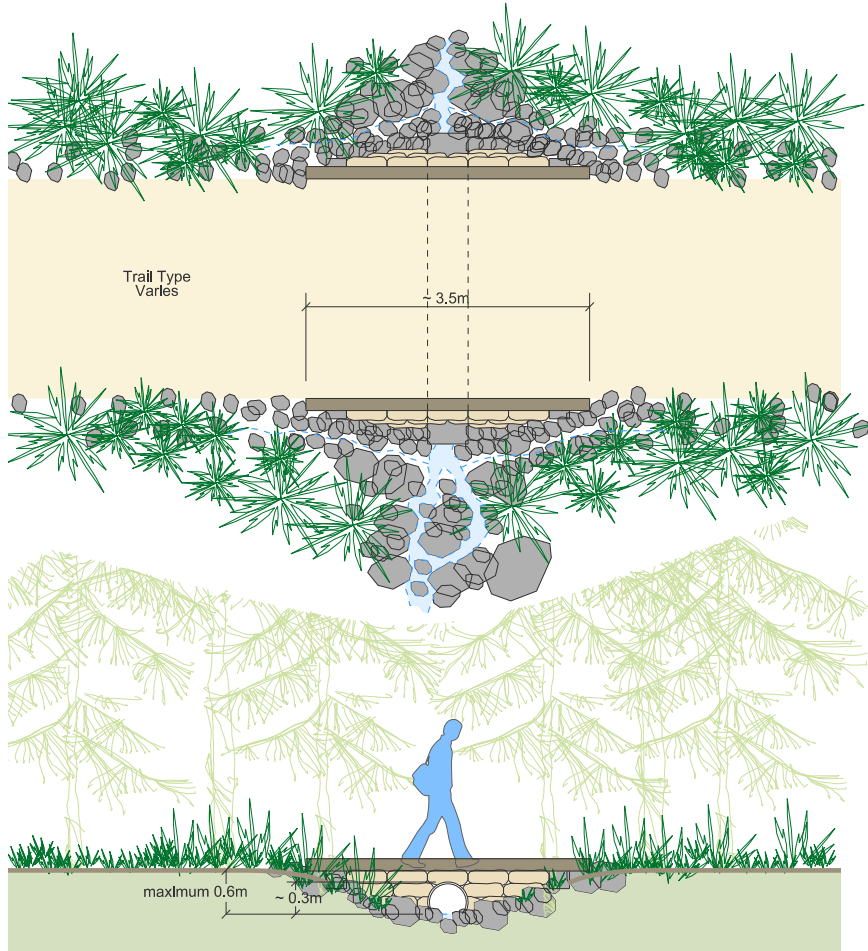
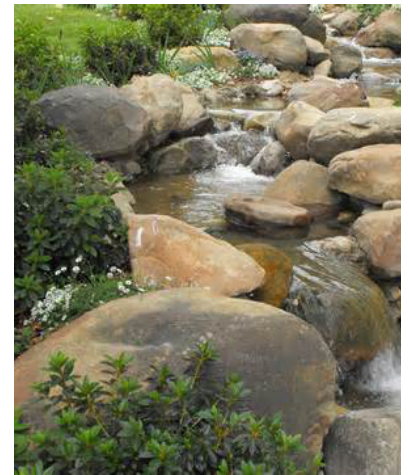


FIG. 5 Rainwater Creek Crossing Detail and Section

7.8 Joint Multi-use Trail and Sanitary Sewer SRW

To maximise efficiency in the sanitary sewer system and to minimize long-term infrastructure maintenance costs, a sanitary trunk main is proposed within the park, along the portion of the east side of Enos Lake.

For shared benefit, a portion of the Multi-use Trail is paired within the Sanitary Sewer Right-of-Way (SRW) for a length of 452m along the northeast of Enos Lake, connecting to Schooner Cove Drive. See figure 6, below, for sanitary sewer alignment within the Regional Park.

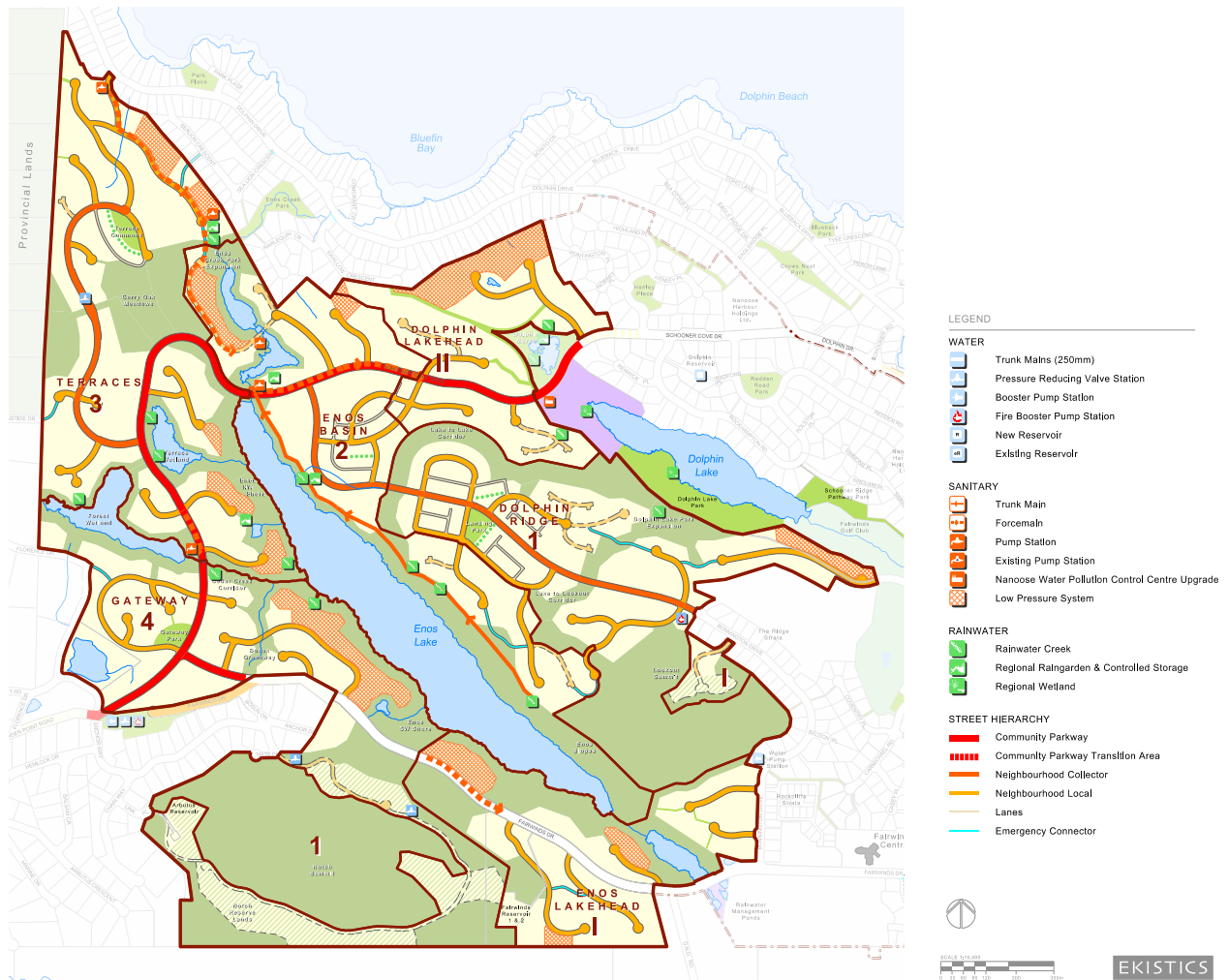


FIG. 6 Lakes District Infrastructure Plasing Plan

8 TRAIL CONSTRUCTION

These guidelines provide general directions for trail construction; it is recognized that implementation may require adjustment as a result of environment, landscape and user demand. Future detailed design will be completed at the construction stage.



8.1 Trail Surfacing

The material used for trail surfacing varies according to proposed use and level of traffic, and recommended material is listed in the Trail Standards for each type. Natural materials are encouraged in order to ensure permeability, reduce cost, complement the existing landscape and reduce the speed of traffic.



Trail surfacing is required for the Multi-use Trail. However, application of surface materials will be reduced or eliminated for Walking and Hiking trails, if the trail is located on well drained and coarse textured soil.

Bark mulch is used only under certain circumstances, and will be applied at a depth of approximately 10cm.

Surfacing for Staging Area parking will be gravel.



8.2 Clearing and Grubbing

Requirements for clearing and grubbing largely depend on the trail standard being implemented, the types of soil and vegetation present. Slope is not generally a significant factor unless slope exceeds a gradient of 50% and full bench cuts are required.

Trail dozers or excavators are generally designed to clear and grub trails that are 1.2m to 1.8m wide. Narrower trails may need to be hand built, especially in and around environmentally sensitive areas where removal of vegetation should be minimized. In locations where trails are planned on flat terrain, additional fill may be required.



8.3 Equipment

A variety of trail building machines are available which can reduce trail building costs. Trail dozers or excavators are suitable for constructing the Multi-use and Walking trails. Many machines have multiple attachments, including both blade and excavator arm, which can increase their versatility and eliminate the need for more than one piece of equipment. Operator experience is important to ensure that construction is safe, efficient and environmentally responsible.



