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Section 1: Introduction

1.1 Purpose and Scope This report is intended to clearly define the site analysis, data collection and public input completed in the DNV Spirit Trail design process to date. This report introduces eight evaluation criteria and uses them to evaluate the opportunities and constraints of several potential route alignment options. Also documented is a set of desirable physical characteristics for the DNV Spirit Trail. This report incorporates the information gathered from several workshops that included municipal staff and members of several local advisory committees. The findings of this report will help set the groundwork for future consultation, route selection and trail design.

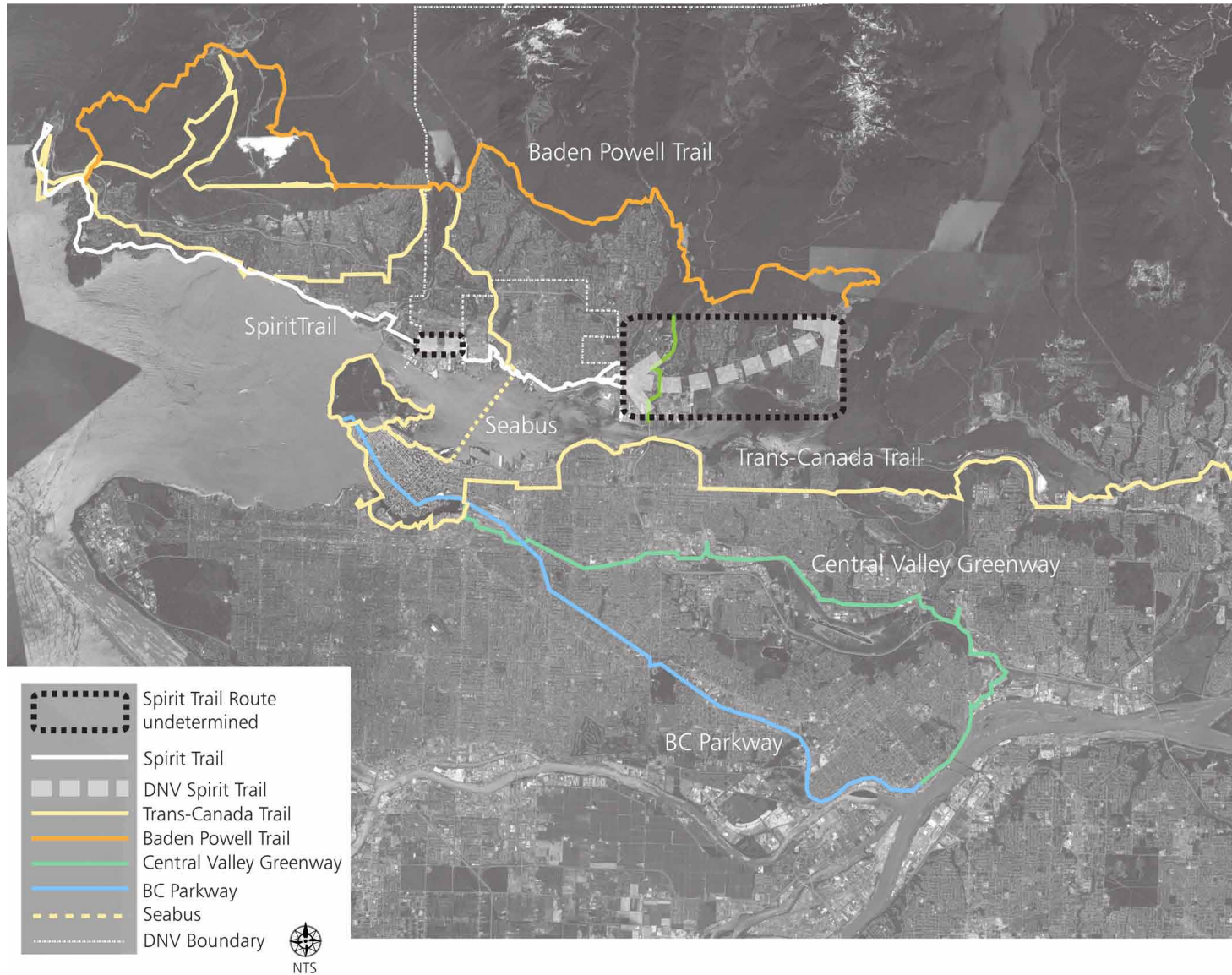
1.2 Background Early in 2007, the North Shore municipalities (District of North Vancouver, City of North Vancouver, and District of West Vancouver), the North Shore Spirit of BC Committee, and other organizations collaborated on a proposal for a waterfront-oriented trail that would connect Horseshoe Bay to Deep Cove. This proposal was successful in securing \$4 million of LocalMotion funding from the provincial government and the North Shore Spirit Trail became a 2010 Legacies Now project. Since that time, the Squamish First Nation has also joined the Spirit Trail team, partnering on the implementation of the project.

The Spirit of BC Committee is a community-based group of volunteers that formed with the goal of leveraging the funding for the 2010 Olympic Games to bring economic and social benefits to residents of the North Shore. One of the priorities of the North Shore Spirit of BC Committee is to initiate and advocate the development of a multi-use trail running east-west across the North Shore.

The North Shore Spirit Trail is envisioned as a 35 km long, accessible, low-lying, waterfront-oriented greenway that will link Horseshoe Bay and Deep Cove. The trail will function as both a recreation and transportation amenity for walkers, cyclists, in-line skaters and people with wheeled mobility aids. It will provide an important means of movement for people of all ages, abilities and fitness levels and improve connections between neighbourhoods, parks, trails, businesses, recreation services, and transportation hubs. The Spirit Trail is intended to be a joint initiative of the North Shore Municipalities, Provincial Government, First Nations and other organizations.

1.2 Regional Context

The Spirit Trail would create another major corridor within the existing regional trail network which currently includes the Baden Powell Trail, Trans-Canada Trail, the Central Valley Greenway, and the BC Parkway. The planned alignment of the Spirit Trail through the District of West Vancouver and City of North Vancouver is shown in white. The alignment of the Spirit Trail through the District of North Vancouver is represented with a dashed grey arrow to imply an intended connection to Deep Cove.



Section 2: Desirable Qualities

2.1 District of North Vancouver Spirit Trail Intent

The District of North Vancouver has numerous trails for advanced-level mountain biking. Cycling commuters utilize the District's existing infrastructure of on-street bike routes for direct transportation between destinations. A gap that currently exists in the system is in the provision of accessible trails for entry-level cyclists, in-line skaters, and people with wheeled mobility aides, including wheelchairs, walkers, and strollers. The District of North Vancouver's portion of the Spirit Trail should aim to fill this gap and continue the trail being established by neighbouring North Shore Municipalities across the central and eastern portions of the North Shore, to serve people of all ages, abilities and fitness levels.

2.2 Desirable Physical Characteristics

In order to support an intuitive, accessible, and safe trail that flows from one end of the North Shore to the other, the DNV Spirit Trail design guidelines were drawn from the rationale and design standards adopted by the District of West Vancouver and the City of North Vancouver for their portions of the Spirit Trail. The following pages provide a summary of the goals and design standards established by the other North Shore Municipalities and identify the recommended design intent and desirable physical characteristics for the District of North Vancouver Spirit Trail.

These desirable physical and accessibility characteristics apply both to the retrofit of existing trails and the design of new sections of the Spirit Trail in the District. New trail sections should be designed to these desirable physical characteristics. Existing sections would likely remain as they are currently and, when upgraded in the future, may be altered to more closely match the desired characteristics.

Summary of District of West Vancouver and City of North Vancouver

Goals:

The West Vancouver approach is primarily focused on on-street bicycle use, whereas the City of North Vancouver's Spirit Trail plan covers a wider array of recreational and environmental goals. Both municipalities acknowledge the importance of user experience and accessibility for all users.

Physical Standards:

The other North Shore municipalities have similar standards to each other for on-street bike lanes (minimum 1.5m width) and paved, shared off-street trails (minimum 4.0m width). Both municipalities recommend the trail be a hard surface, but not necessarily asphalt, and gently sloping to be accessible for as many users as possible. Lighting is appropriate along street sections for safety, but may be avoided in parks or areas where lighting would cause safety concerns.

Summary of TAC Bikeway Geometry Guidelines

The TAC Geometric Design Guide for Canadian Roads (1999) is the primary design guide for District roads. The design of roads is also guided by Master Municipal Construction Documents (MMCD) and the District's Development Servicing Bylaw.

The TAC geometric guidelines for bikeways are similar to the Spirit Trail design standards adopted by DWV and CNV, but do not include standards for inline skates, wheelchairs, grade-separated crossings, or setbacks in environmentally sensitive areas. The smoothness of the bicycle lane surface is noted as one of the most important factors in cyclist's choice of routes.

2.2 Desirable Physical Characteristics (cont.)

Streets and Street Rights of Way:

Along a street or railway.
Fewer resting points.

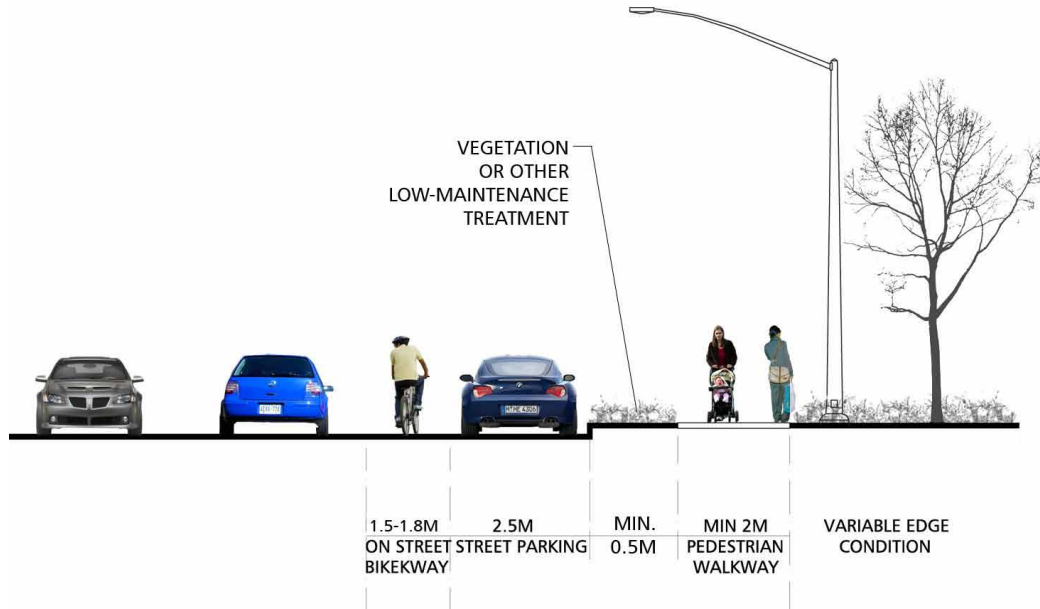
On street trail (commercial and residential areas):

1.5m bikeway (one way, both sides of street)

2.5m parking (optional),

minimum 0.5m vegetation or other low-maintenance treatment,

minimum 2.0m wide pedestrian walkway.

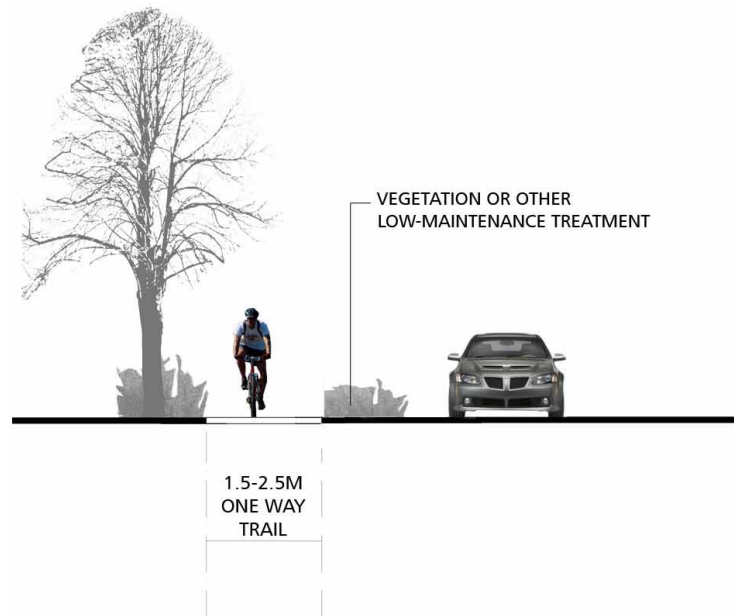


Paved Shoulder (on roads without curbs or gutters):

1.5-2.5m wide trail depending on speed of traffic (one way, both sides of street),

minimum 1.0m vegetation or other low-maintenance treatment

parking prohibited on shoulder.



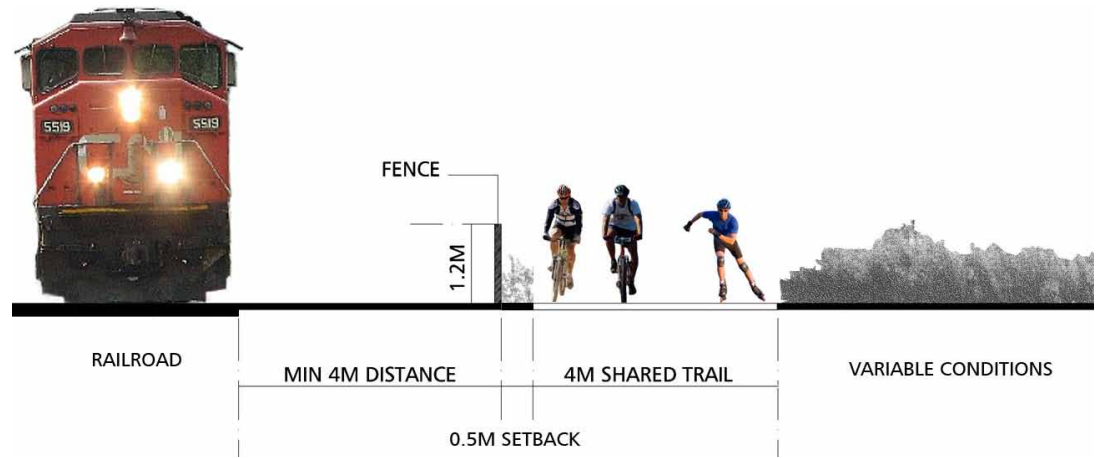
Shared trail adjacent to the railway:

minimum 4.0m distance from tracks,

1.2m high fence,

0.5m wide setback,

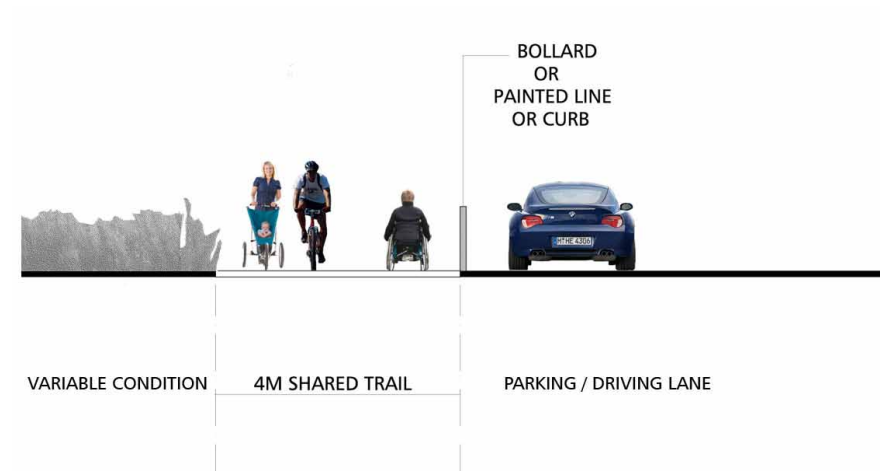
4.0m wide shared trail.



Trail through Right of Way behind businesses:

4.0m wide shared trail,

bollard, painted line, or curb.

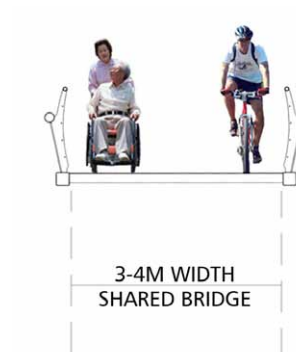


Pedestrian / Bicycle Bridge Crossing (shared bridge over creek and / or ravine):

Major crossing: 3.0-4.0m wide

Crossing in greenbelt: 1.2-3.0m wide

If narrower than 2.5m, provide alternative bypass for bikes.



2.2 Desirable Physical Characteristics (cont.)

Parks and Natural Parkland Areas:

Located in natural areas. Provide access to these natural areas to all users while maintaining or enhancing the natural character.

Where the width of trail is less than 3.0m, an alternative route for bicycles should also be provided.

Shared trail through parks and natural parkland areas:

- 2.0-4.0m wide trail,
- 4.0m wide trail is desirable,
- if less than 3.0m wide, ensure alternative route for bikes,
- minimum 0.5m wide shoulder to break line of slope,
- minimum 1.0m setback to objects > 150mm in height



Parallel to Creek:

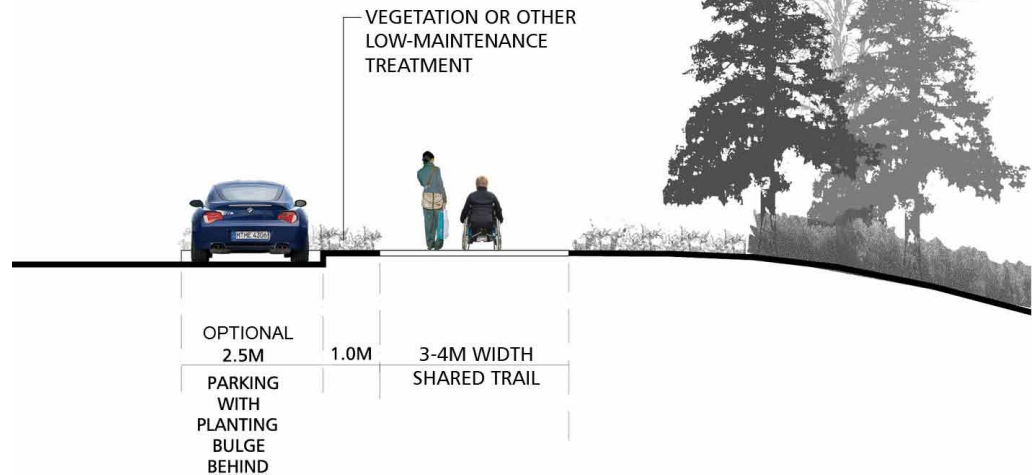
- max. 4.0m wide shared trail,
- 5.0m-15m riparian zone as per riparian protection bylaw



Off-street grade separated trail:

3.0m wide shared trail,

minimum 1.0m setback from curb containing vegetation or other low-maintenance treatment.

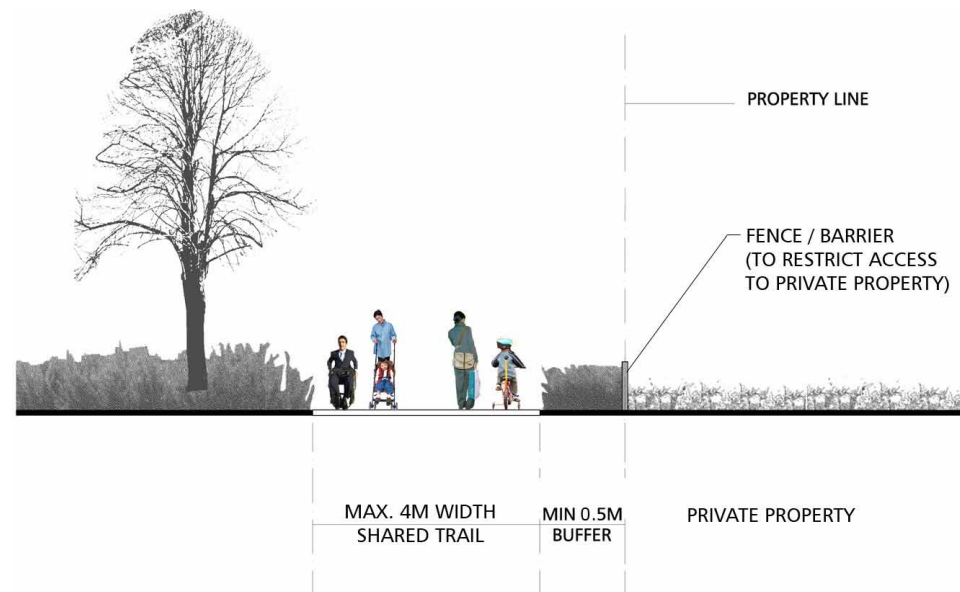


Areas adjacent to residential property:

fence along property line,

preferred minimum 0.5m setback from fence,

max. 4.0m wide shared trail



2.2 Desirable Physical Characteristics (cont.)

- Grades**
- Preferred: 4% or less, flatter around areas with high concentrations of people using wheeled mobility devices and/or the physically challenged
 - Exception: maximum 8% longitudinal slope for short distances with rest areas provided as required
 - Special circumstances: up to 15% only when absolutely necessary and for minimal distances
 - Minimum 2% and maximum 4% cross-slope

- Surface**
- Generally hard surfaced to accommodate all users and for the effective, safe and comfortable use of bicycles
 - Paving may include asphalt, concrete, pavers, or crushed granite on compacted road base

- Illumination**
- Streets and Street Rights of Way: existing on-street lighting, lighting at arterial and collector intersections
 - Parks and Natural Parkland Areas: generally no lighting
 - Site specific - may be used to connect important spaces
 - Lighting may be on timers, i.e. only on during winter commutes
 - Discouraged at low heights due to potential for vandalism

2.3 Route Evaluation / Selection Criteria

In order to evaluate potential trail alignments, eight criteria were considered desirable and were used to analyze trail sections and stimulate discussion about opportunities and constraints of each. These criteria are proposed to be used to inform the selection of the best route alignment for the District of North Vancouver Spirit Trail. The analysis diagrams for several of the criteria are included in Section 3 of this report.

Accessible Grades and Geometry

The Spirit Trail should be as accessible as possible for the widest variety of users. Generally the flattest route is preferable. For user comfort and safety, the trail should also be designed to meet the desired geometry for width, setbacks, traffic separation and direction of flow.

Compatibility with Relevant Plans

The Spirit Trail route should draw from previous planning work undertaken by the District of North Vancouver in consultation with neighbours and communities in the District and enhance existing movement lines desired by local residents. The alignment of the Spirit Trail should also consider the findings of reference documentation including the North Vancouver Bicycle Masterplan and local area plans.

Connectivity with Bike and Pedestrian Routes and Transit Nodes

Route selection should compliment existing transit and recreational trail systems to contribute to a high quality pedestrian and bicycle network. The Spirit Trail should provide a lower-elevation trail accessible to entry-level cyclists, in-line skaters, people using wheeled mobility aides and walkers of all ability levels. The District of North Vancouver sections should connect with the portions of the Spirit Trail being developed by the other North Shore municipalities, and improve the connection between West Vancouver and the City of North Vancouver.

Cost

Getting the largest return on investment in both the short and long term is important. The amount of new vs. existing trail required as well as the quantity and complexity of new intersections and grade-separated crossings have an effect on cost. To keep down costs associated with land purchasing, the alignment should use and/or modify existing infrastructure and follow public rights of way, utility corridors and parks, where possible. Financial grant opportunities should also be considered in the establishment of route alignment and design characteristics.

Experience

Route selection should consider user comfort throughout various conditions of light, weather, and traffic, and by consulting the bicycle compatibility index (a measure of bicycle-friendliness based on road geometry and traffic volume and speed). Where possible, the trail should provide opportunities for users to connect with nature and enjoy views of the water. The journey along the trail should include a variety of different experiences and settings, a good proximity to the waterfront, and opportunities to experience fun.

2.3 Route Evaluation / Selection Criteria (cont.)

Minimize Impact to Wildlife and Natural Systems

The design and construction of the Spirit Trail should seek to offset short-term environmental impacts with long-term environmental benefits. Providing a wider variety of attractive and accessible alternatives to automobile transport through improved local and regional connections is one way the Spirit Trail can help the environment. The trail should tread lightly on the land by aligning itself along existing street rights of way and existing trails through parks and parkland areas. Where the trail runs through natural parkland areas and sensitive ecological areas, the trail's physical characteristics may be modified to balance accessibility and usability with protection of habitat and ecological integrity.

Proximity to Amenities / Destinations

To encourage use of the trail as both a recreation and mobility route, the Spirit Trail should provide connections amongst neighbourhoods and local destinations and provide access to desirable amenities for trail users. Local destinations may include schools, community and recreation centres, parks, sports facilities and residential neighbourhoods. Route selection should consider existing user-appropriate amenities along the trail that would provide desirable services to users, such as shopping centres, services, transportation hubs, and cycling amenities, including biking stores, testing / practice tracks, and accessory trails.

Safety

Trail users safety (actual or perceived) can be increased through separation of the trail from motorized vehicular traffic. Trail separation also provides a better experience for pedestrians and those using non-motorized wheeled mobility aides. Safety should be a priority at vehicular intersections. The trail design should aim to minimize potential conflicts between different user types by providing good visibility and sufficient width to pass. Safety can also be increased with more eyes on the trail. Route selection should consider maximizing use (the more people using the trail, the more passive surveillance the trail receives) and visibility of the trail from the surroundings (intersecting trails, businesses, residential, adjacent vehicular / pedestrian traffic).

Section 3: Route Analysis

3.1 Alignments Considered

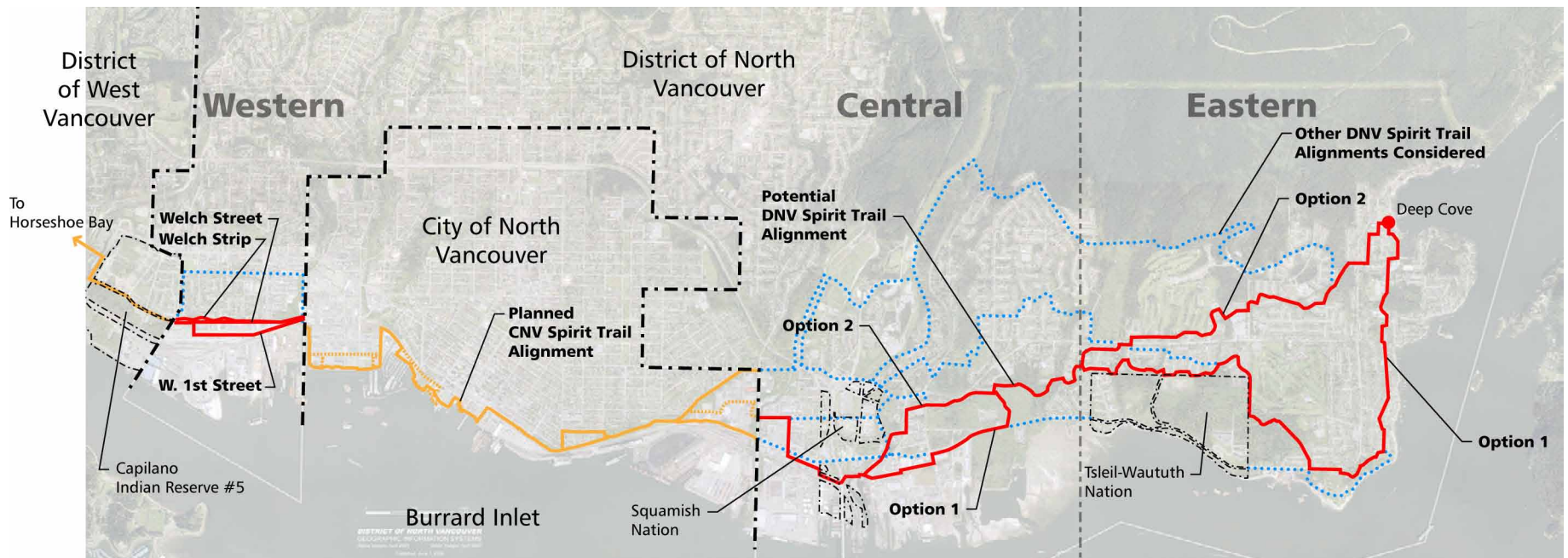
The District of North Vancouver Spirit Trail is intended to fill the gaps in the system and create a contiguous connection between West Vancouver, the City of North Vancouver and Deep Cove. The process of determining the optimal route alignment began by considering all possible options that could potentially connect with the planned Spirit Trail sections in neighbouring municipalities. The District of North Vancouver's existing street and trail network, land ownership, and varied terrain reduced the viable Spirit Trail alignments to two options in both the east and west of the District.

In this section, each option is evaluated using the criteria identified in section 2.3. Several of the criteria are also illustrated in analysis diagrams for each alignment option. Section 3.2 includes the evaluation of the western options and section 3.3 documents the central and eastern options.

The diagram below illustrates the proposed Spirit Trail alignment through the neighbouring municipalities (yellow). The red lines indicate potential route alignment options through the District of North Vancouver and other alignments considered (blue dots). These alignments may be revised as the planning process proceeds.

Legend

- Possible Trail Alignment
- ⋯ Other Alignment Initially Considered
- Other Municipalities' Spirit Trail Alignments



Section 3: Route Analysis

3.2 Western Alignment Options

There are 3 potential alignments for the DNV Spirit Trail sections between those planned by the District of West Vancouver and City of North Vancouver (See diagram on the right).

The alignment selected may also include a crossing of West 1st St at the CNV boundary.

Note: The alignment of DWV's route is subject to confirmation.

Option 1 - Welch Strip:

would be primarily off-street through the existing linear park, likely following the pattern of curving paths that currently exist in the Welch Strip. A short on-street section would be required to cross the intersections at Pemberton Ave and Lloyd Ave.

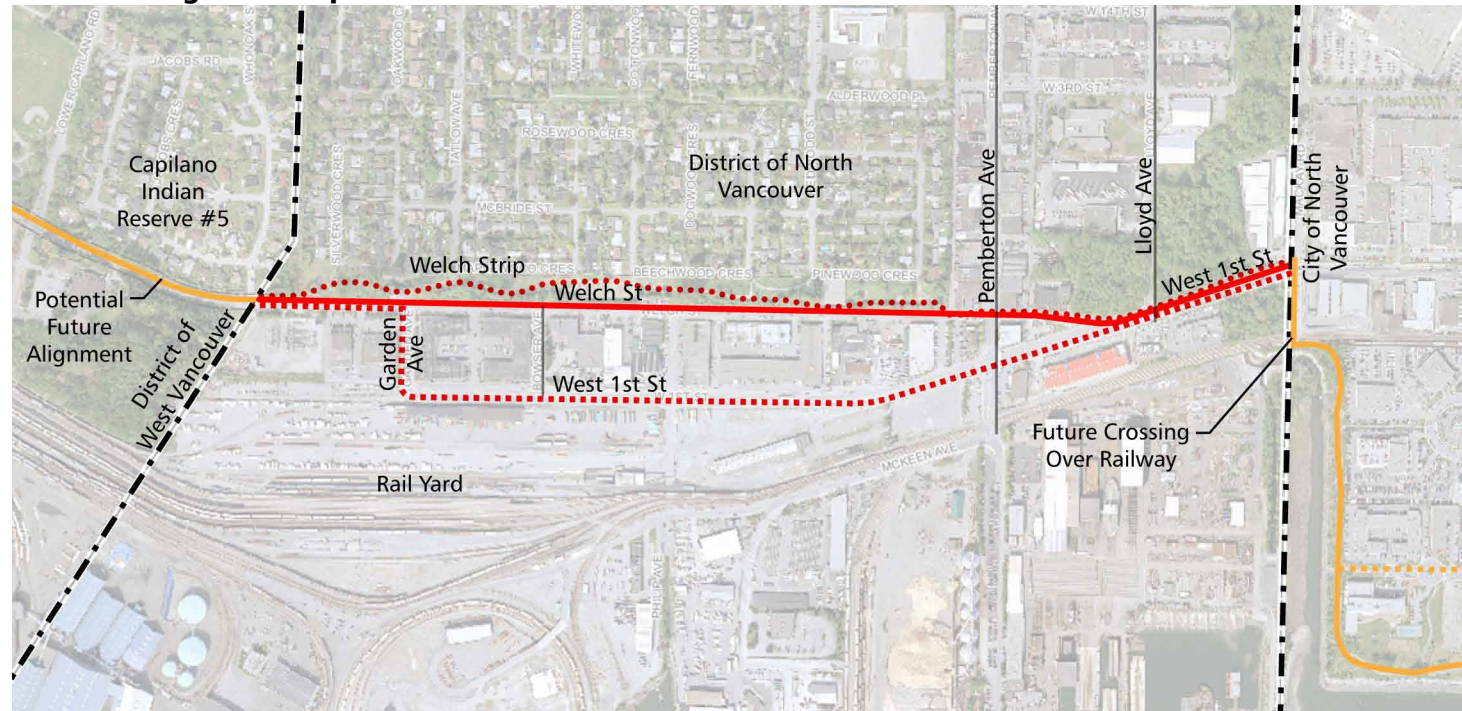
Option 2 - West 1st Street:

would follow the street and be a faster route for cyclists. This route is already established as a bikeway.

Option 3 - Welch Street:

would run along the north side of Welch Street adjacent to the park and provide the most direct connection between DWV and CNV for cyclists and pedestrians. A shared route would likely use the Welch Street right of way and potentially utilize a portion of the south edge of the Welch Strip. This option may also require the removal of vehicular parking along Welch St.

Western Alignment Options



Legend

- Possible Trail Alignment
- Other Municipalities' Spirit Trail Alignments



3.2.1 Criteria Matrix

The route evaluation / selection criteria are a means of evaluating and comparing potential route alignment options. The matrix below assigns a rating between 1 (least successful) and 5 (most successful) for each of the criteria for each alignment option. The number of shaded boxes indicates the score for each criteria. A total score is noted for each zone. A higher total score correlates with a more successful option using the evaluation criteria.

Evaluation Criteria	Welch Strip Rating					West 1st Street Rating					Welch Street Rating				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Accessible Grades and Geometry	■	■	■	■	□	■	■	■	■	■	■	■	■	■	■
Compatibility with Relevant Plans	■	■	■	□	□	■	■	■	□	□	■	■	■	■	□
Connectivity with Bike and Pedestrian Routes and Transit Nodes	■	■	■	■	■	■	■	■	■	□	■	■	■	■	□
Cost	■	■	■	■	□	■	■	■	■	■	■	■	■	■	□
Experience	■	■	■	■	□	■	■	□	□	□	■	■	■	□	□
Minimize Impact to Wildlife and Natural Systems	■	■	■	■	□	■	■	■	■	■	■	■	■	■	■
Proximity to Amenities / Destinations	■	■	■	■	□	■	■	□	□	□	■	■	■	■	□
Safety	■	■	■	■	□	■	■	□	□	□	■	■	■	■	□
	Score Option 1					Score Option 2					Score Option 2				
	32					28					33				

Evaluation summary

Using the route evaluation / selection criteria, both Option 1 (Welch Strip) and Option 3 (Welch Street) ranked similarly and would likely be more successful potential alignments for the Spirit Trail than an alignment along Option 2 (West 1st Street).

3.2.2 Accessible Grades and Geometry

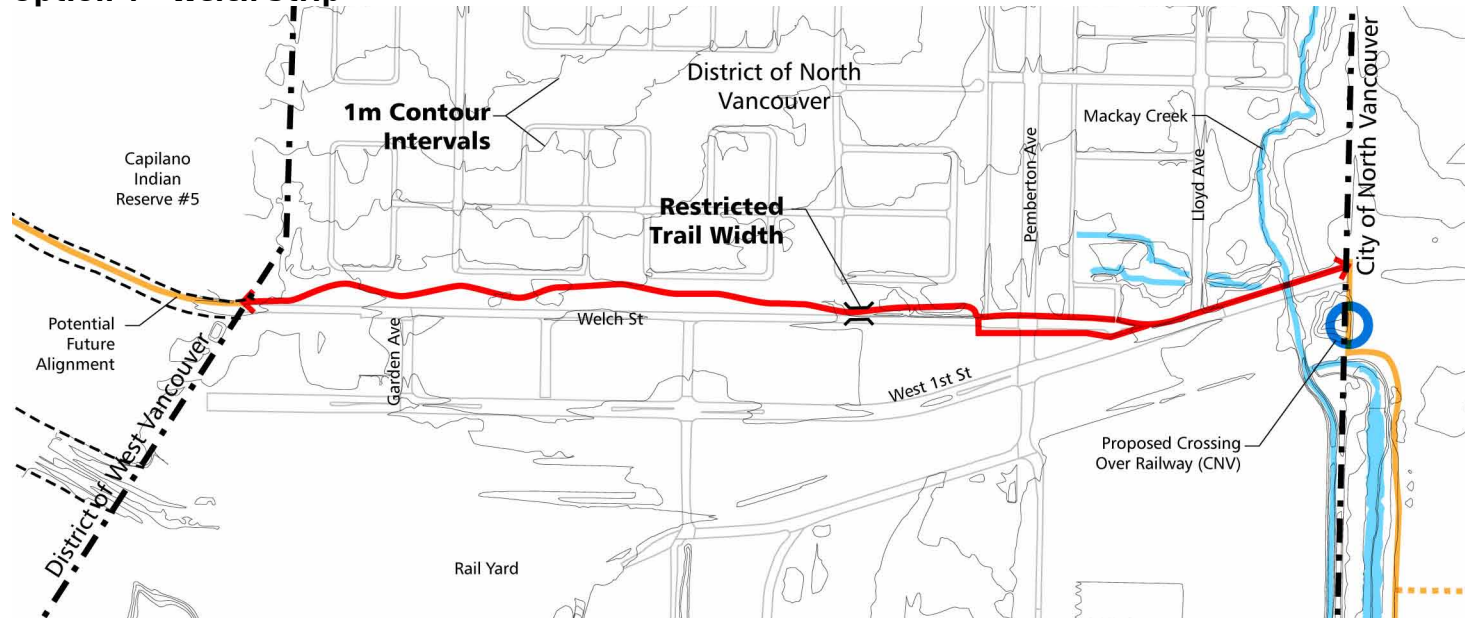
All alignments benefit from existing gentle grades, providing excellent opportunities for accessibility.

The Welch Strip has an existing paved (crushed gravel) trail system suitable for biking, walking and the use of wheeled mobility aides. Some of the tight corners would require upgrading to provide gentler curves for biking and the existing trail may be too narrow where it runs adjacent to the tennis courts in Welch Strip.

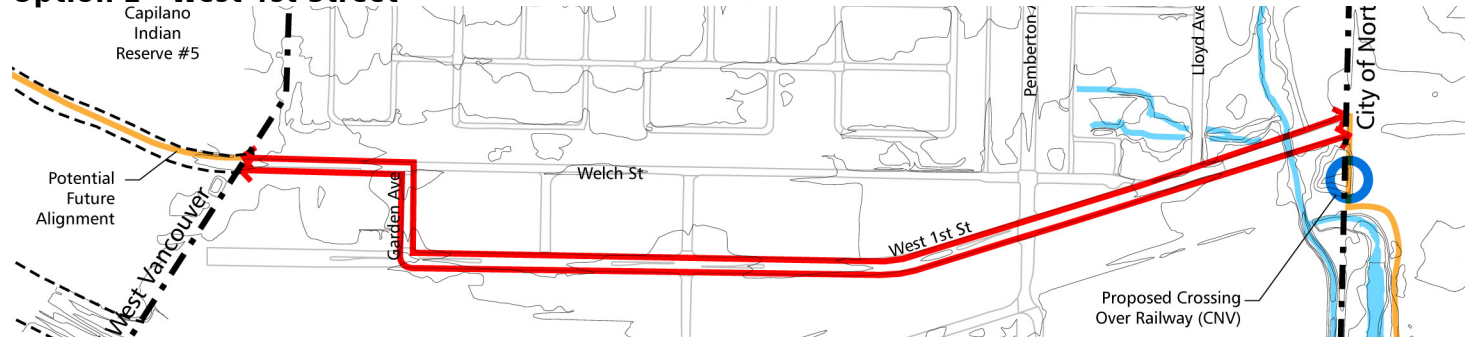
Most of the DNV section of West 1st Street has a wide paved right of way that would likely accommodate bike lanes on both sides with minimal modification. It is currently designated and used as a commuter bikeway.

A third option along Welch Street would be level, but may potentially have restricted trail width just west of Pemberton Ave. where grades adjacent to the north side of the street are steep.

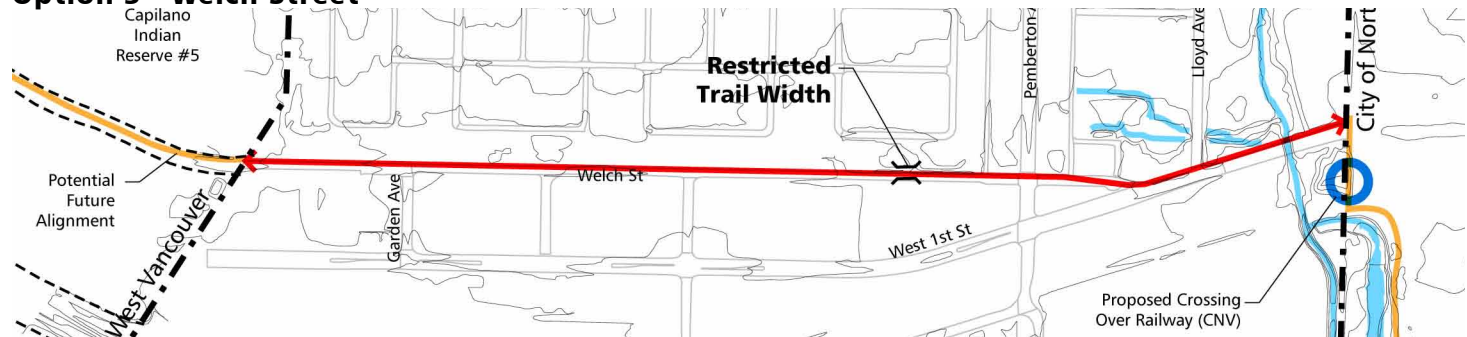
Option 1 - Welch Strip



Option 2 - West 1st Street



Option 3 - Welch Street



Legend

- Possible Trail Alignment
- Slopes over 8%
- Trail widths < 3m

3.2.3 Connectivity to Existing Bike and Pedestrian Routes

An existing commuter bikeway along West 1st Street and north along Tatlow Ave via Garden Ave provides a connection to the City of North Vancouver and to West Vancouver. The Welch Strip is currently a popular pedestrian trail for the residents of the Norgate community. The Spirit Trail would improve pedestrian and cycling connections to Park Royal Mall and Ambleside Park via Bridge Street and to Kings Mill Walk in the City of North Vancouver via a new pedestrian crossing over the railway at Mackay Creek (planned CNV Spirit Trail project).

A Spirit Trail alignment through the Welch Strip would be most appropriate for recreational trail users and would provide a transition between the residential neighbourhood and commuter routes. A West 1st St alignment, as shown in Option 2, would be most attractive to commuter cyclists and would include upgrading the demarcation of the existing bikeway. A trail alignment along Welch Street (Opt 3) would create the most direct east-west connection and provide access to existing bikeways and trails.

Legend

- Possible Trail Alignment
- Existing Bikeways
- Existing Trails

Option 1 - Welch Strip



Option 2 - West 1st Street



Option 3 - Welch Street



3.2.4 Cost Effective

Welch Strip is a popular pedestrian route and West 1st Street is an established pedestrian and cycling route.

The Welch Strip features a hard-packed crushed gravel trail that is suitable for walking and cycling and could be upgraded to the desirable physical characteristics to improve accessibility for all. Alignment of the Spirit Trail through Welch Strip may require realignment of short sections of the existing trail to provide gentler curves for cyclists, inline skaters and people using wheeled mobility aids. New and upgraded pedestrian crossings and a new section of shared trail along West 1st Street would also be required.

As most of the West 1st St alignment is already a bikeway, minimal upgrades are required, and would likely include clearer demarcation of the Spirit Trail along the existing rights of way.

Along Welch Street, the driving lanes could be narrowed to accommodate a new trail within the street's right of way. If widening of the street is required, the costs would be higher than other options. Option 3 would also require regrading of the existing berm and relocation of several trees.

Legend

- Higher Cost
- Medium Cost
- Minimal Cost
- New Crossing Required

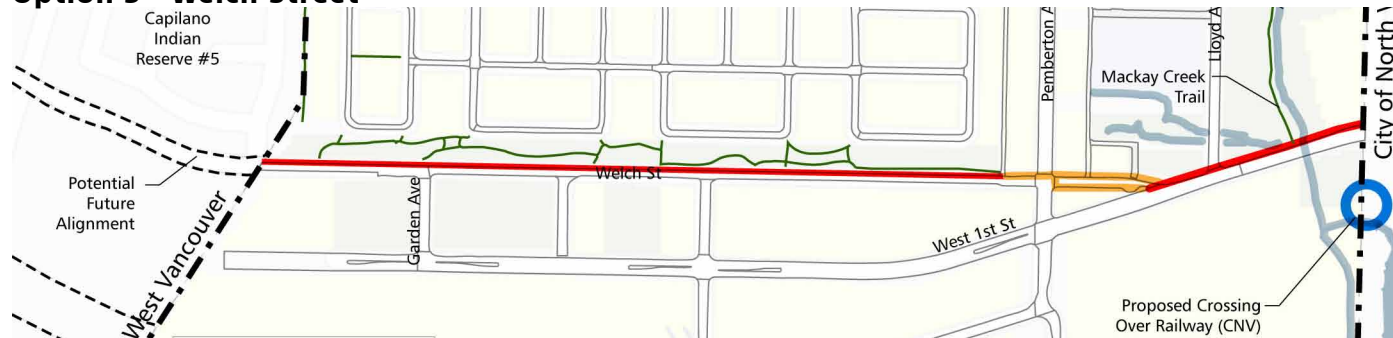
Option 1 - Welch Strip



Option 2 - West 1st Street



Option 3 - Welch Street



3.2.5 Experience and Safety

Separation of pedestrians and cyclists from vehicular traffic increases safety. Fewer at-grade crossings (intersections) reduce potential conflicts between trail users and vehicular traffic. Separation of commuter cyclists and low-speed cyclists may be desirable. All options will require improvements to sidewalks or the creation of a multi-purpose path.

The Welch Strip provides a trail experience separate from vehicular traffic in a park setting facing a residential neighbourhood. The eastern portion of this alignment would include moving through a short street section in a light industrial and commercial setting and a short section of a shared trail along the edge of Mackay Park.

A Spirit Trail alignment as shown in Option 2 would provide a continuous on-street experience through an active industrial area. The wide rights of way allow for faster speeds of commuter cyclists, but offer pedestrians little relief from the noise of traffic and weather conditions.

A Welch Street alignment (Option 3) could run adjacent to the street and be separated from vehicular traffic.

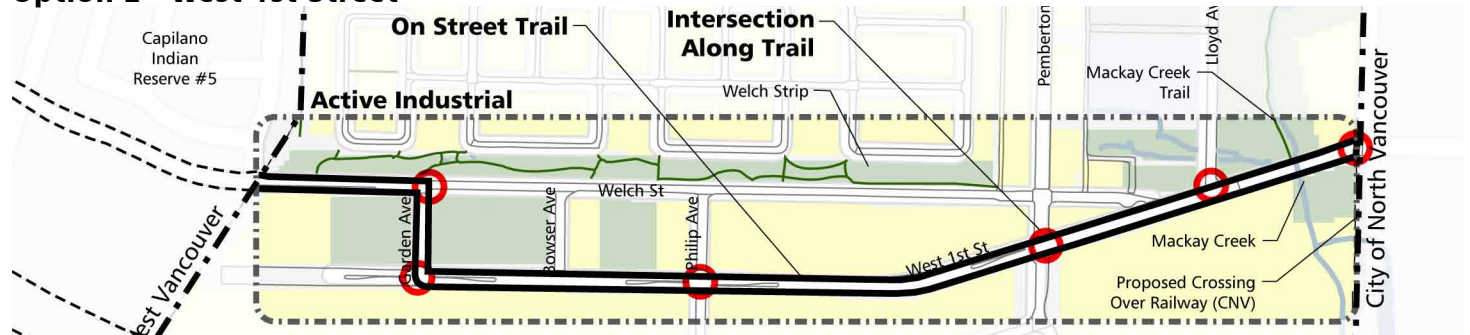
Legend

- On-street and R.O.W.
- Off-street and Parkland
- At-grade crossings

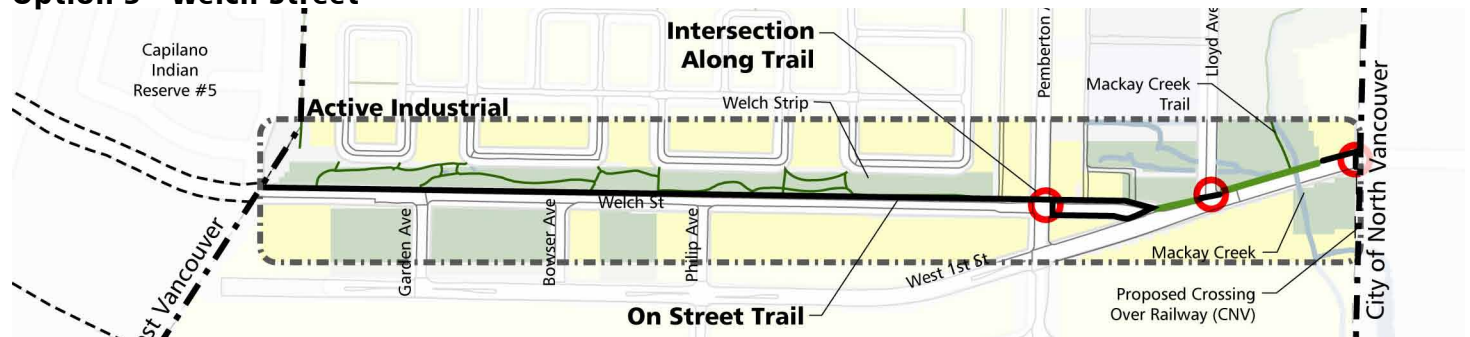
Option 1 - Welch Strip



Option 2 - West 1st Street



Option 3 - Welch Street



3.2.6 Proximity to Existing Amenities and Destinations

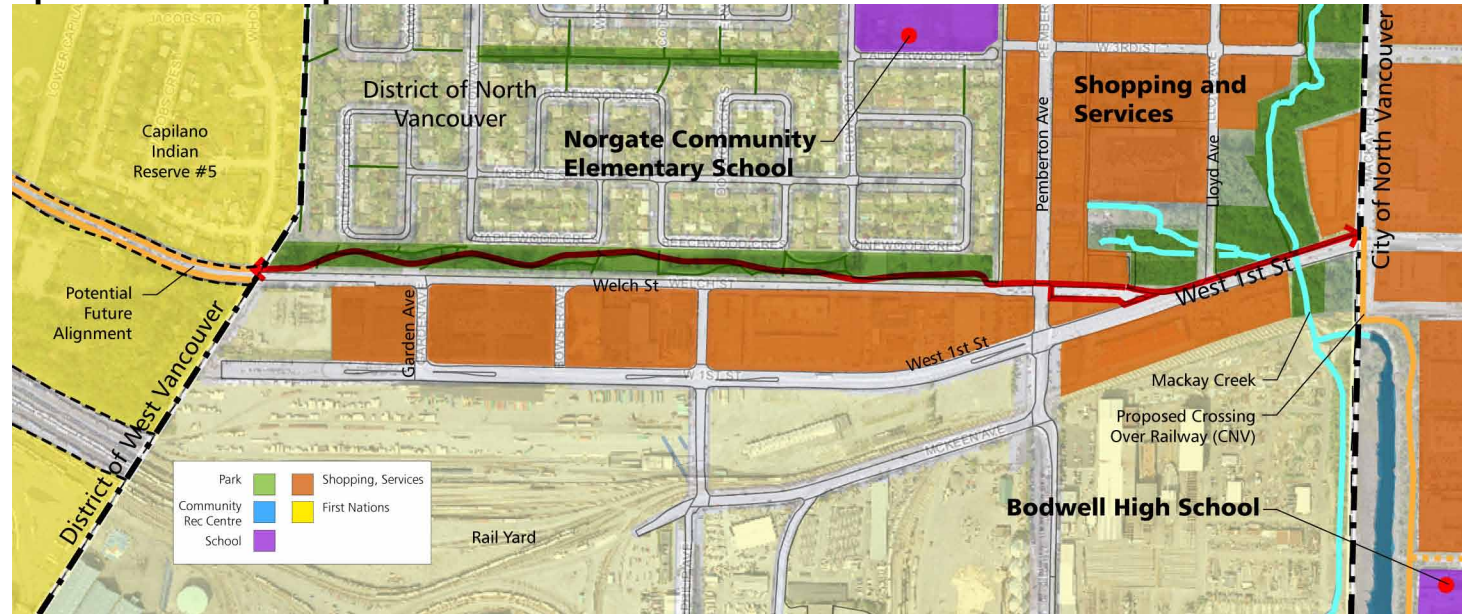
The majority of commercial and industrial businesses in this area are intended for access by automobile. Few existing services in this area would be considered of interest to the local Spirit Trail user. Local destinations of interest would likely be the residential neighbourhoods, schools and parks. Pedestrians and cyclists may also use the Spirit Trail to access destinations in neighbouring municipalities, e.g. Park Royal Mall, Ambleside Park, etc.

Option 1 would be a more attractive alignment for locals looking to connect with nearby destinations and amenities.

Option 2 would be more attractive for bicycle commuters who wish to quickly bypass this neighbourhood on their way to regional destinations. Option 2 would provide few amenities or destinations for pedestrians.

Option 3 would provide the most direct east-west connection and have a close relationship to both the Welch Strip, local trails, and the active industrial & commercial activities.

Option 1 - Welch Strip



Option 2 - West 1st Street



Option 3 - Welch Street



Legend

- Possible Trail Alignment
- Destination

3.3 Central / Eastern Alignment Options

Narrowing down the alignment options to two began by exploring multiple potential routes through the south-eastern part of the District of North Vancouver.

The Spirit Trail is intended to be a low-level, waterfront-oriented, accessible trail. Therefore, grades and proximity to the shore play a big part in the decision of where the trail will be aligned. Since the trail starts in Deep Cove, near sea level, the farther inland the trail travels, the more grades oppose accessibility of the route.

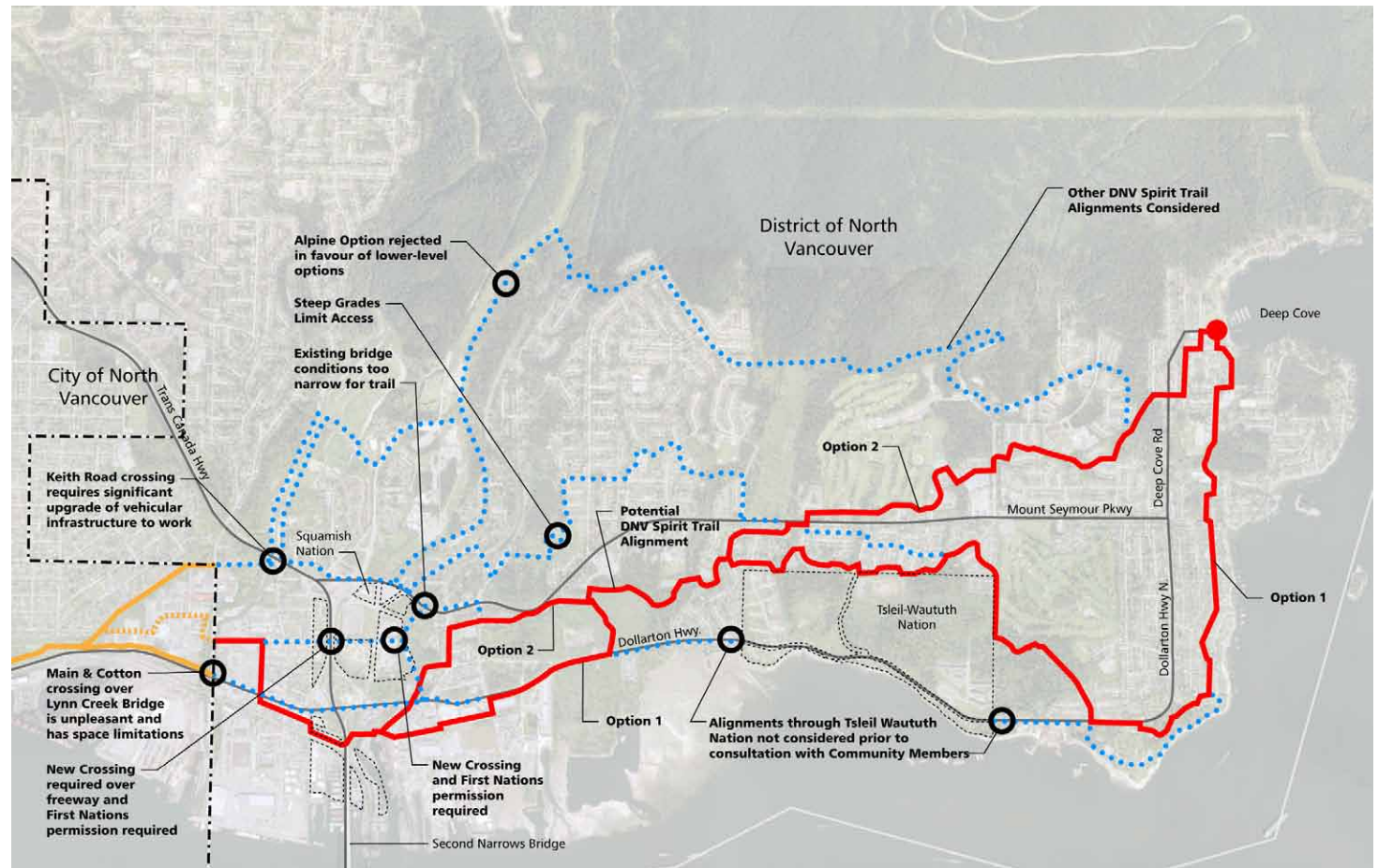
The two options selected for discussion:

1. are the lowest level options;
2. are considered prior to consultation with the Squamish and Tsleil-Waututh Nations;
3. provide the most interesting and pleasant journey through the industrial lands and under the Second Narrows Bridge;
4. have good proximity to existing amenities and destinations throughout south-east DNV.

Legend

- Possible Trail Alignment
- ⋯ Other Alignment Considered
- CNV Spirit Trail Alignment

Central / Eastern Alignment Options (2009)

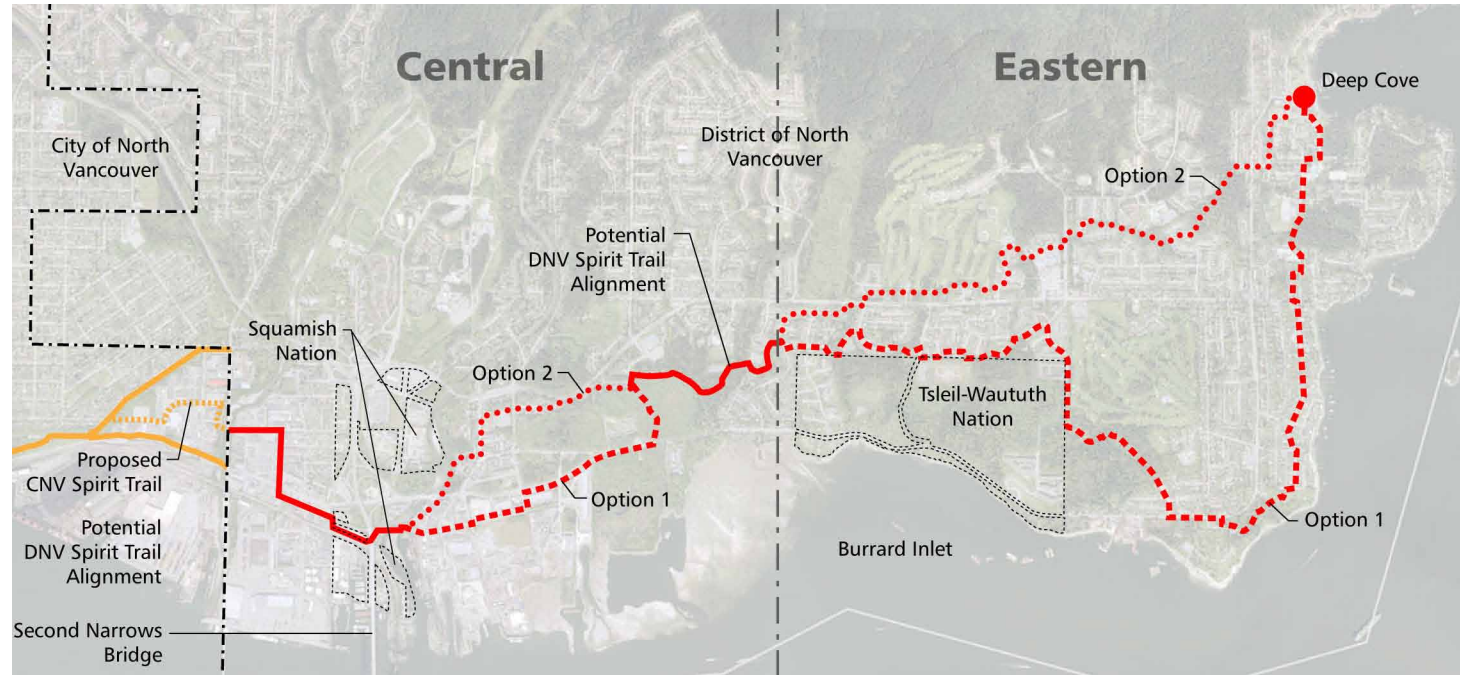


3.3 Central / Eastern Alignment Options

The trail alignment options are divided into 2 zones, Central and Eastern (as indicated in the diagram to the right). Each zone is evaluated separately and a total score is noted for each zone.

The matrices on page 23 assign a rating between 1 (least successful) and 5 (most successful) for each of the criteria for each alignment option. The number of shaded boxes indicates the score for each criteria. A higher total score correlates with a more successful option using the evaluation criteria (refer to pages 11 & 12 for detailed descriptions of criteria).

Central / Eastern Alignment Options (2009)





3.3.1 Criteria Matrix

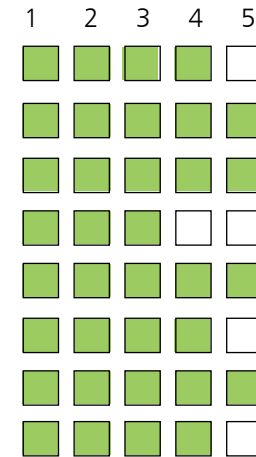
The route evaluation / selection criteria are a means of evaluating and comparing potential route alignment options. The matrix below assigns a rating between 1 (least successful) and 5 (most successful) for each of the criteria for each alignment option. The number of shaded boxes indicates the score for each criteria. A total score is noted for each zone. A higher total score correlates with a more successful option using the evaluation criteria.

Central (2009)

Evaluation Criteria

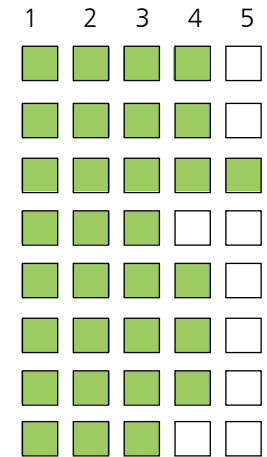
- Accessible Grades and Geometry
- Compatibility with Existing Plans
- Connectivity to Existing Bike and Pedestrian Routes
- Cost Effective
- Experience
- Minimize Impact to Wildlife and Natural Systems
- Proximity to Amenities/Destinations
- Safety

Option 1 Rating



Score Option 1 35

Option 2 Rating



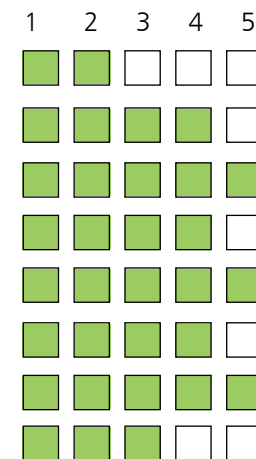
Score Option 2 31

Eastern (2009)

Evaluation Criteria

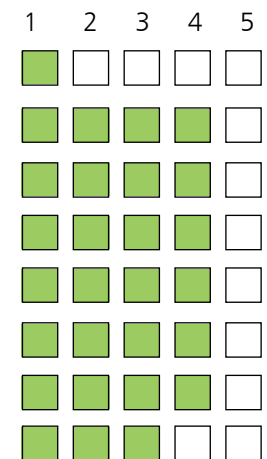
- Accessible Grades and Geometry
- Compatibility with Existing Plans
- Connectivity to Existing Bike and Pedestrian Routes
- Cost Effective
- Experience
- Minimize Impact to Wildlife and Natural Systems
- Proximity to Amenities/Destinations
- Safety

Option 1 Rating



Score Option 1 32

Option 2 Rating



Score Option 2 28

Total Score Option 1 67

Total Score Option 2 59

Evaluation Summary (2009)

The alignment proposed in Option 1 scored higher than in Option 2 for both the Central and Eastern sections of the trail using the route evaluation / selection criteria.

3.3 Central / Eastern Alignment Options (cont.)

3.3.2 Accessible Grades and Geometry

Creating a low-lying, waterfront-oriented, accessible trail running east-west across the District of North Vancouver is limited by the existing development patterns and many steep slopes.

The maximum acceptable slope for an accessible ramp is 8% over a short distance. The preferred slope would be a maximum of 4-5%.

The diagrams at the right show two potential alignments and highlight grade issues in orange. Areas highlighted in orange are in excess of 8%. Most are in the range of 10-14% with several sections in excess of 15% in Option 2 between Deep Cove and Parkgate.

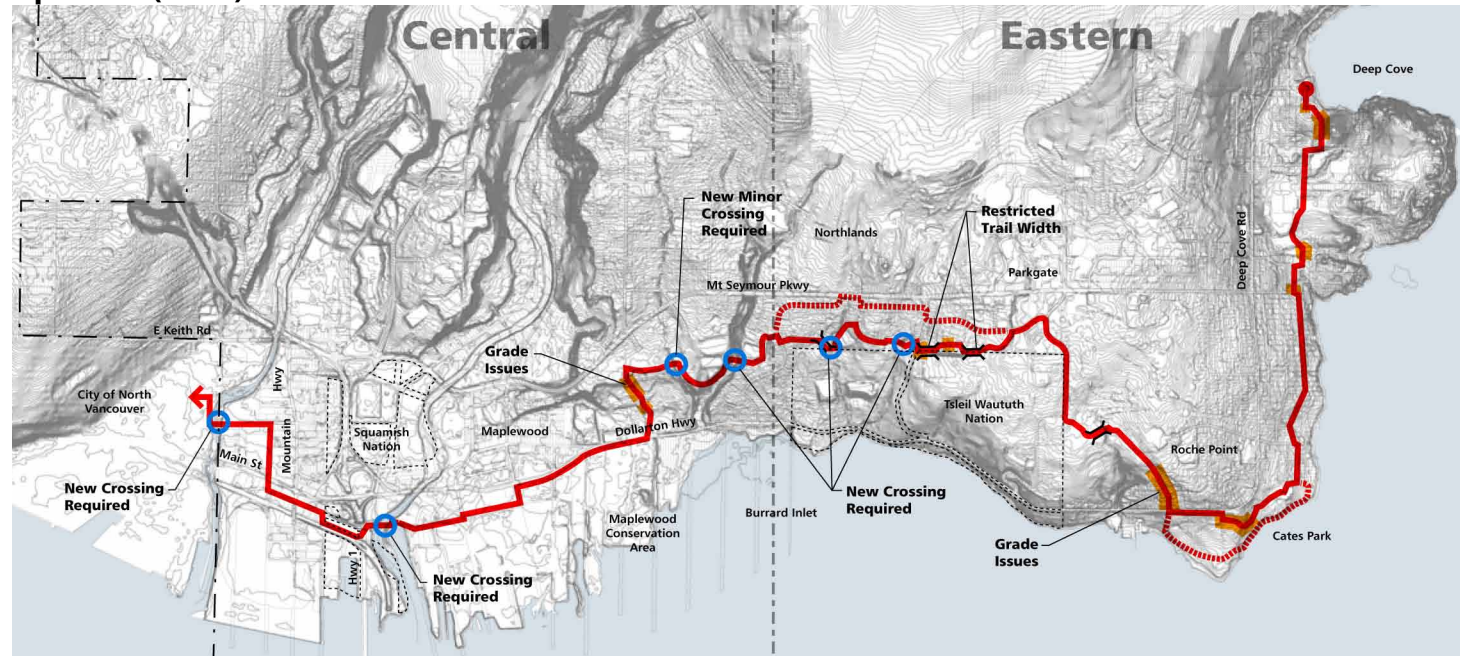
The diagrams also indicate narrow right of ways where the trail width would be restricted.

The requirement for new crossings are shown where creeks, rivers, and ravines inhibit trail development across existing grade conditions and further detailed studies are required.

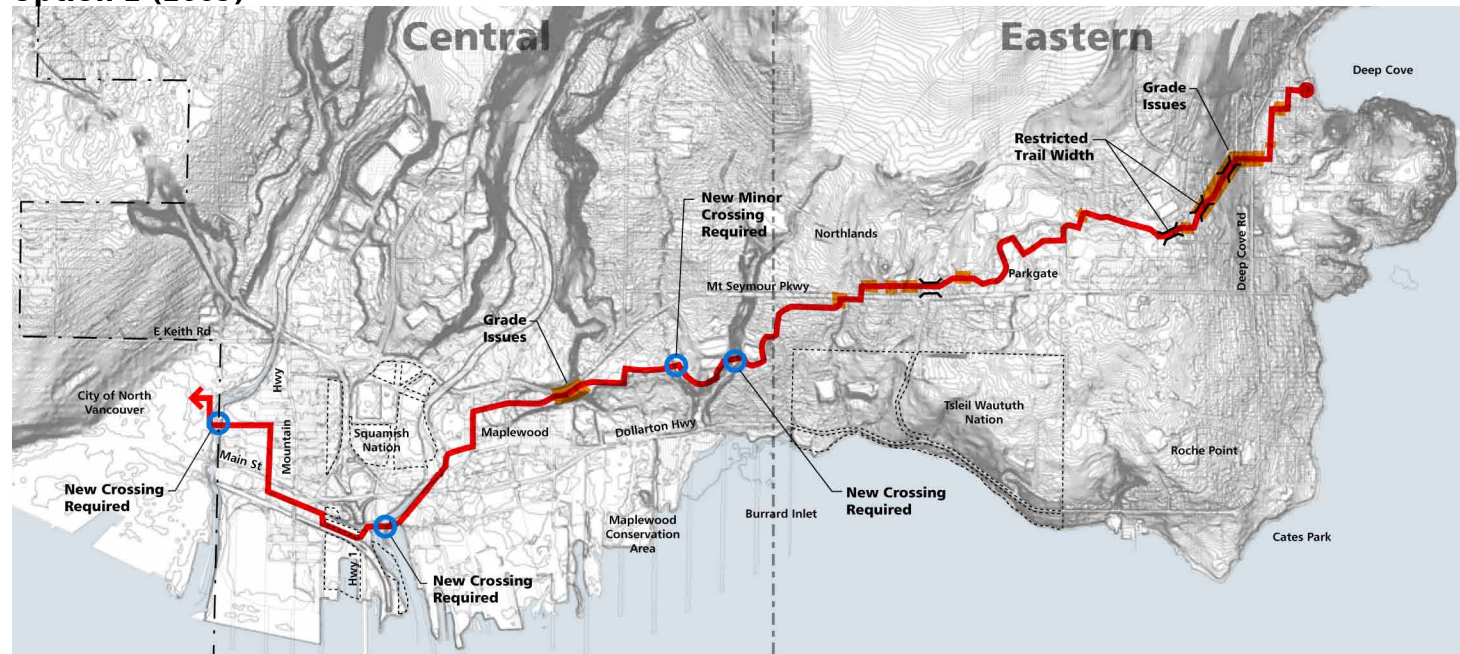
Legend

- Possible Trail Alignment
- Slopes over 8%
- ⌘ Trail widths < 3m

Option 1 (2009)



Option 2 (2009)



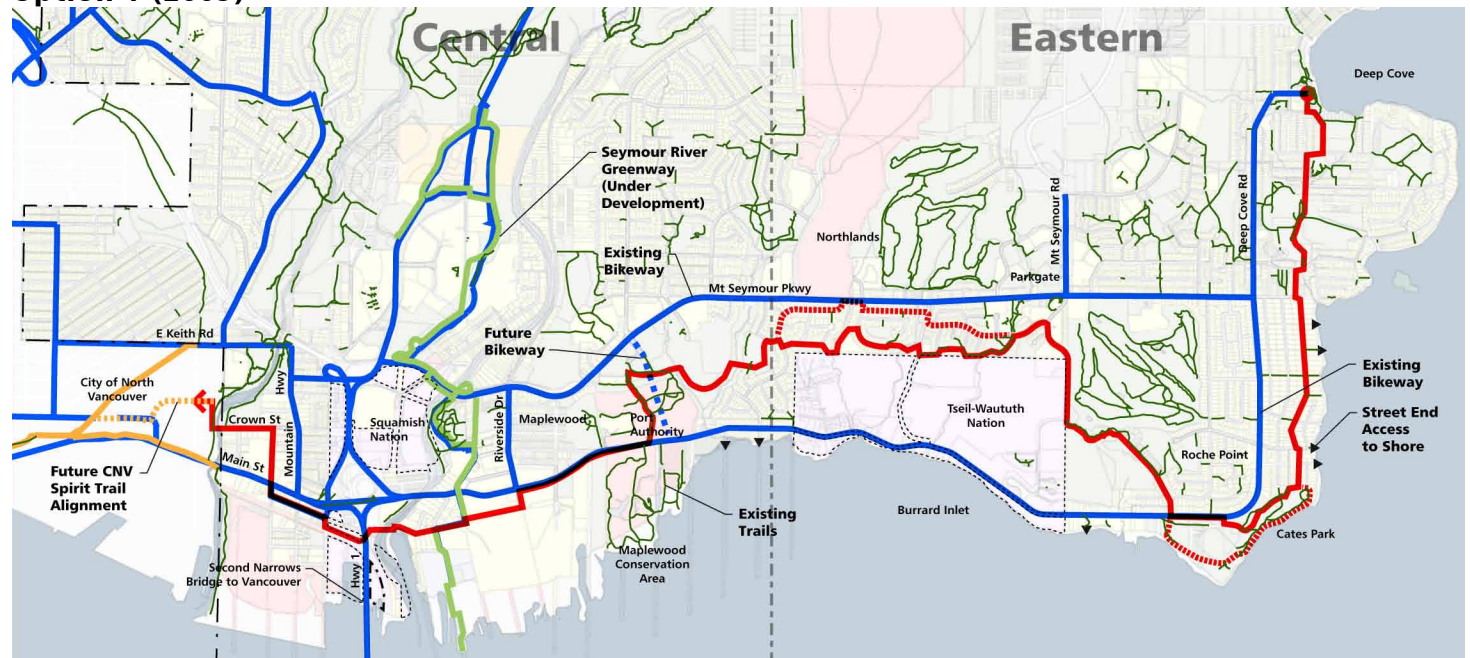
3.3.3 Connectivity to Existing Bike and Pedestrian Routes

The Spirit Trail should function to enhance the existing and planned bike and pedestrian network by developing better connections between bikeways, trails and neighbourhoods.

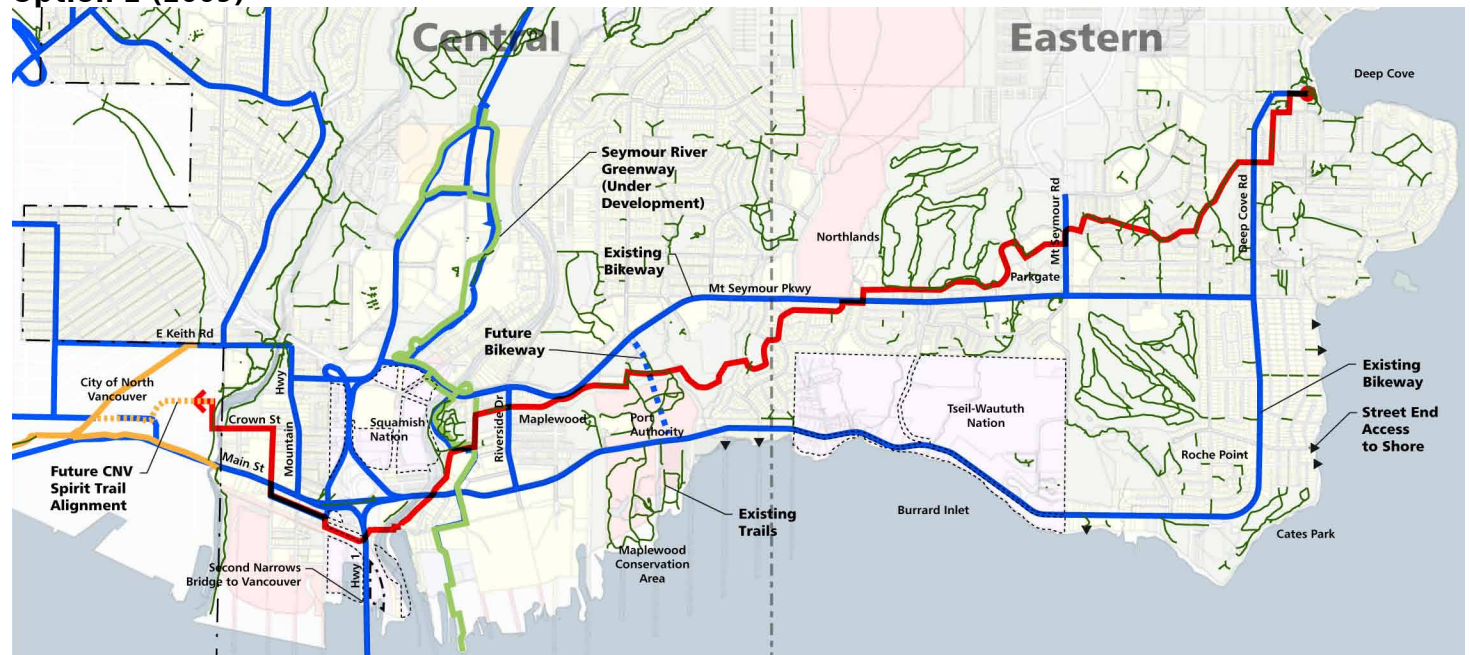
These diagrams overlay the two route options (red) on existing bikeways (blue), the proposed Seymour River Greenway (green), and potential alignment options for the CNV Spirit Trail (orange).

Existing pedestrian trails are shown in dark green. Existing and proposed connections to the shore via street ends are shown as triangles.

Option 1 (2009)



Option 2 (2009)



Legend

- Possible Trail Alignment
- Existing Bikeways
- Existing Trails

3.3.4 Cost Effective

Many factors can affect the relative cost and feasibility of trail options. Land ownership, grade-separated crossings, new intersections, and the amount and degree of new trail building required.

Where possible, the trail options are aligned along public Right of Ways and in DNV parks. The diagrams at the right show land ownership in the background.

A section of Option 1 is shown going through Port Authority Land in the diagram. The potential use of Port Land has not yet been determined.

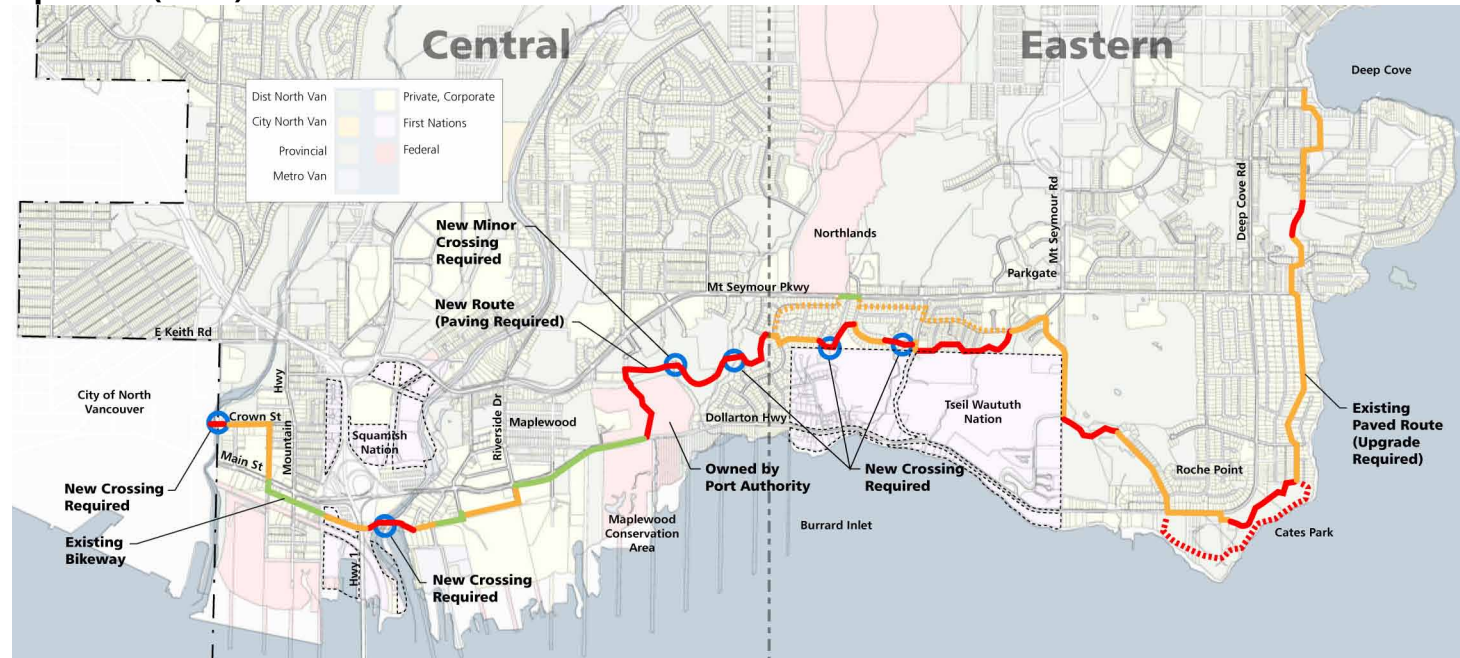
New grade separated bike and pedestrian crossings are indicated with a blue circle. The scale of these crossings is to be determined.

Portions of the trail that are already equipped as bikeways/ greenways are shown in green. The yellow sections are those which are paved and will require modifications to designate them as part of the trail. The red sections are unpaved or unbuilt trails that will require the most work to upgrade them to meet the desirable Spirit Trail characteristics.

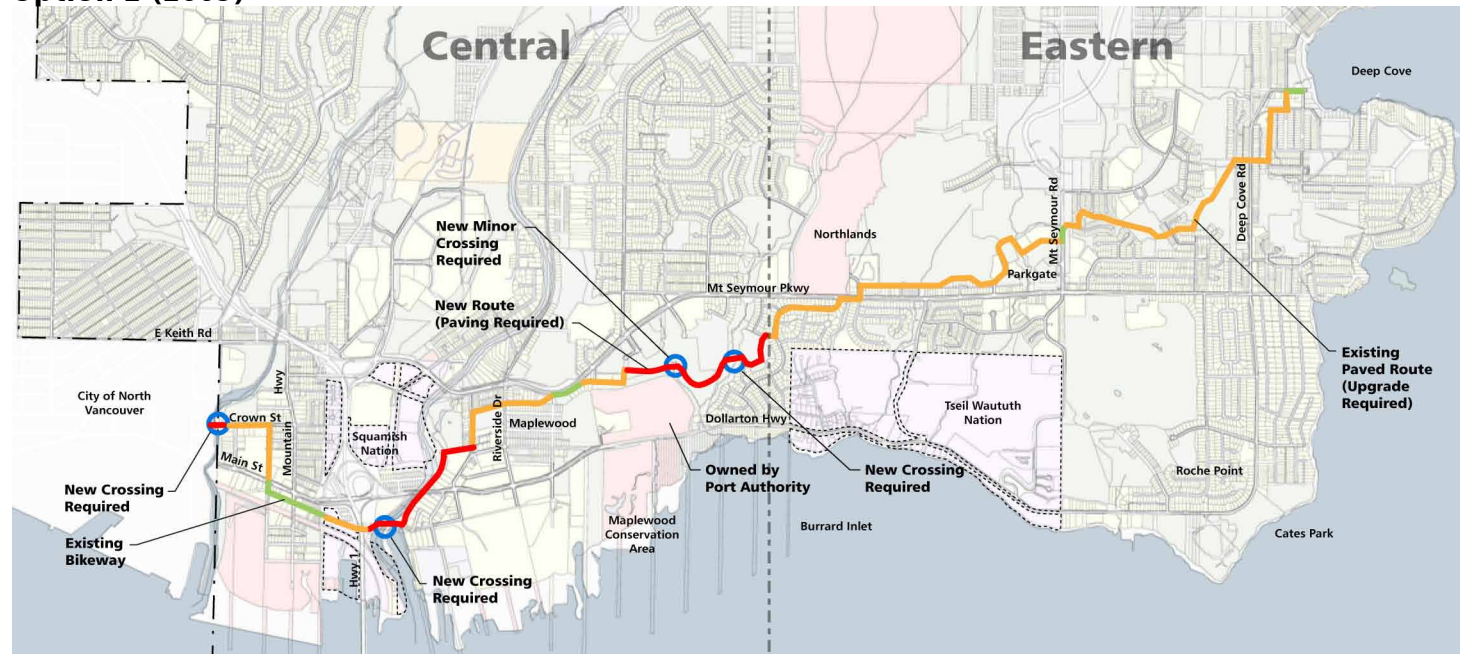
Legend

- Higher Cost
- Medium Cost
- Minimal Cost
- New Crossing Required

Option 1 (2009)



Option 2 (2009)



3.3.5 Experience and Safety

There are many qualitative factors that contribute to an individual's experience along the Spirit Trail. The ability to create a low-lying, waterfront-oriented trail in the District of North Vancouver is limited by numerous factors, including grade issues, land ownership, and development patterns that currently exist. What the District does offer is a wide variety of settings to experience along the journey to and from Deep Cove. These include the active waterfront and industrial/commercial area, the peaceful conservation area and wooded parkland, and the varied character of different residential neighbourhoods.

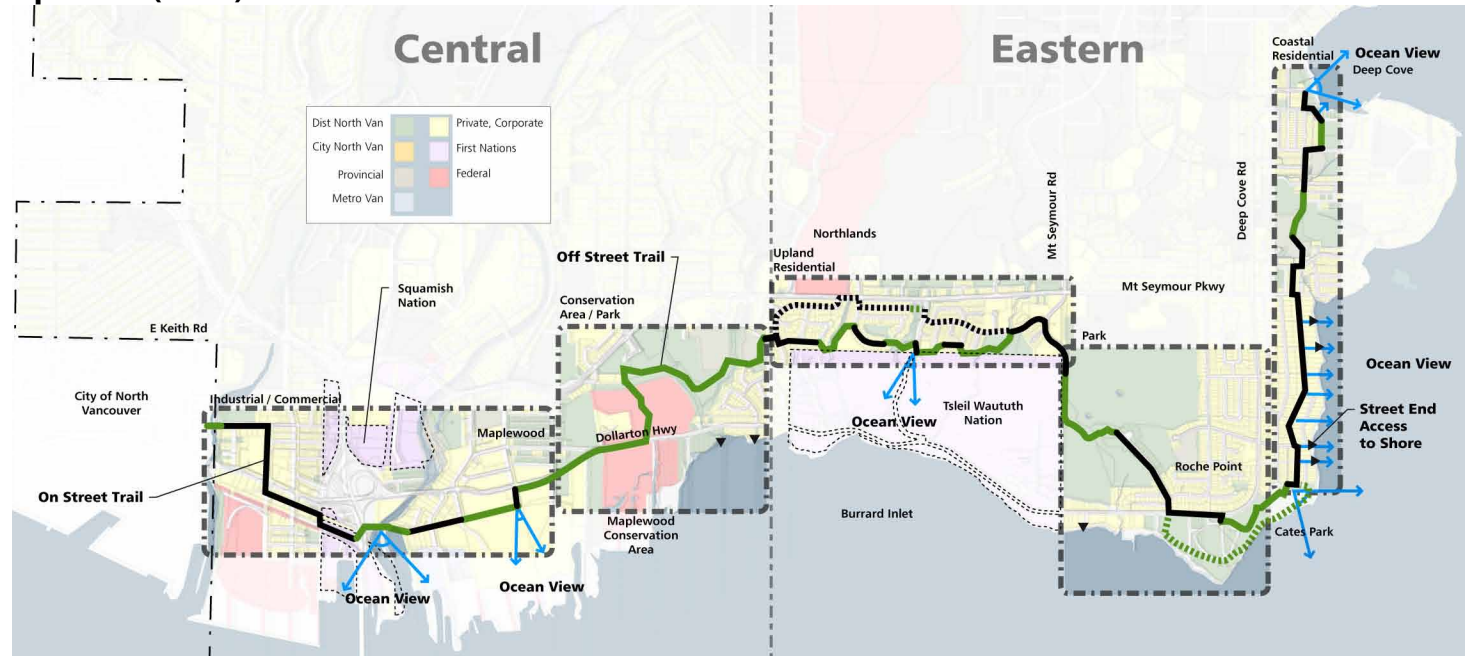
The diagrams highlight some general character zones along each route option. It is desirable to have a good diversity of experiential zones along the trail. Views of the Inlet are shown with blue arrows and shoreline access points are shown with black triangles.

The Spirit Trail will traverse the North Shore both on- and off-street. Segregating trail users from vehicular traffic is a factor that can increase safety for trail users. The diagrams represent on-street portions of the trail in black and off-street in green.

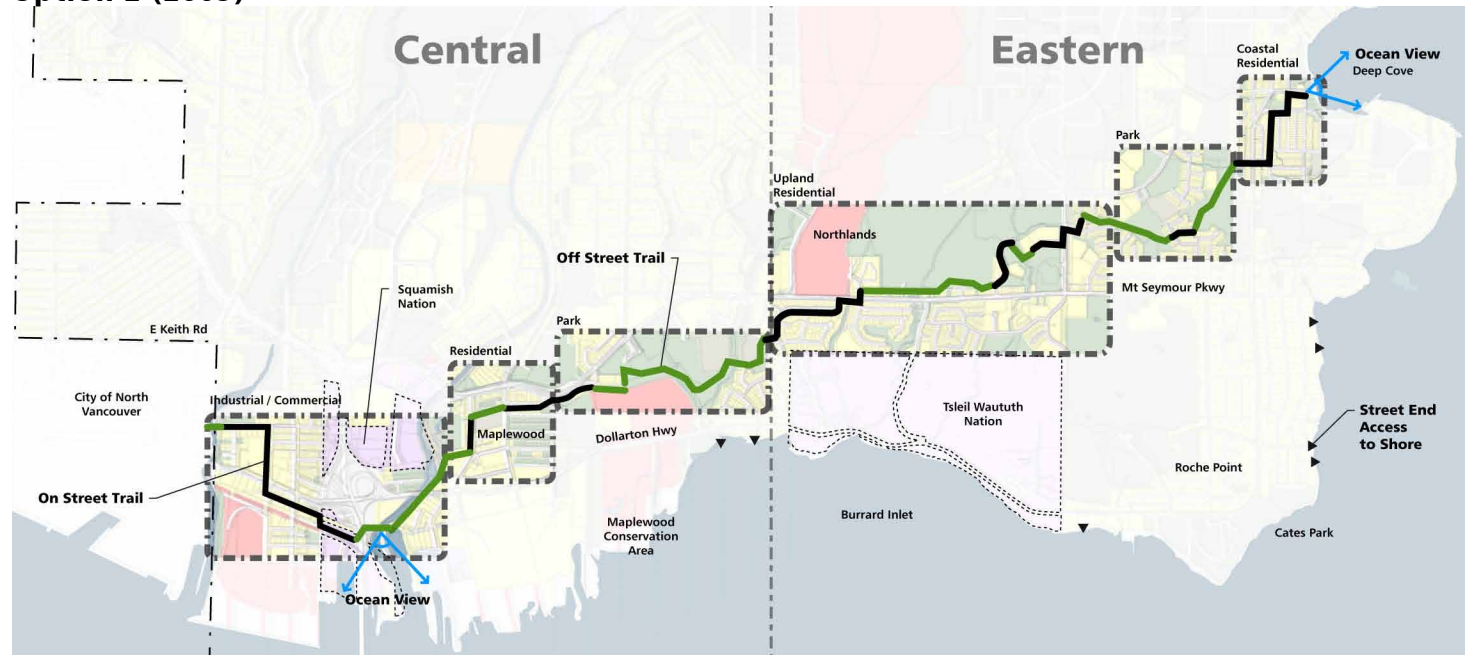
Legend

- On-street and R.O.W.
- Off-street and Parkland
- Views of Waterfront

Option 1 (2009)



Option 2 (2009)



3.3.6 Proximity to Existing Amenities and Destinations

An important part of the journey is having a destination worth the trip. The DNV Spirit Trail could function to link up neighbourhoods and schools, home and work, locally and throughout the broader region.

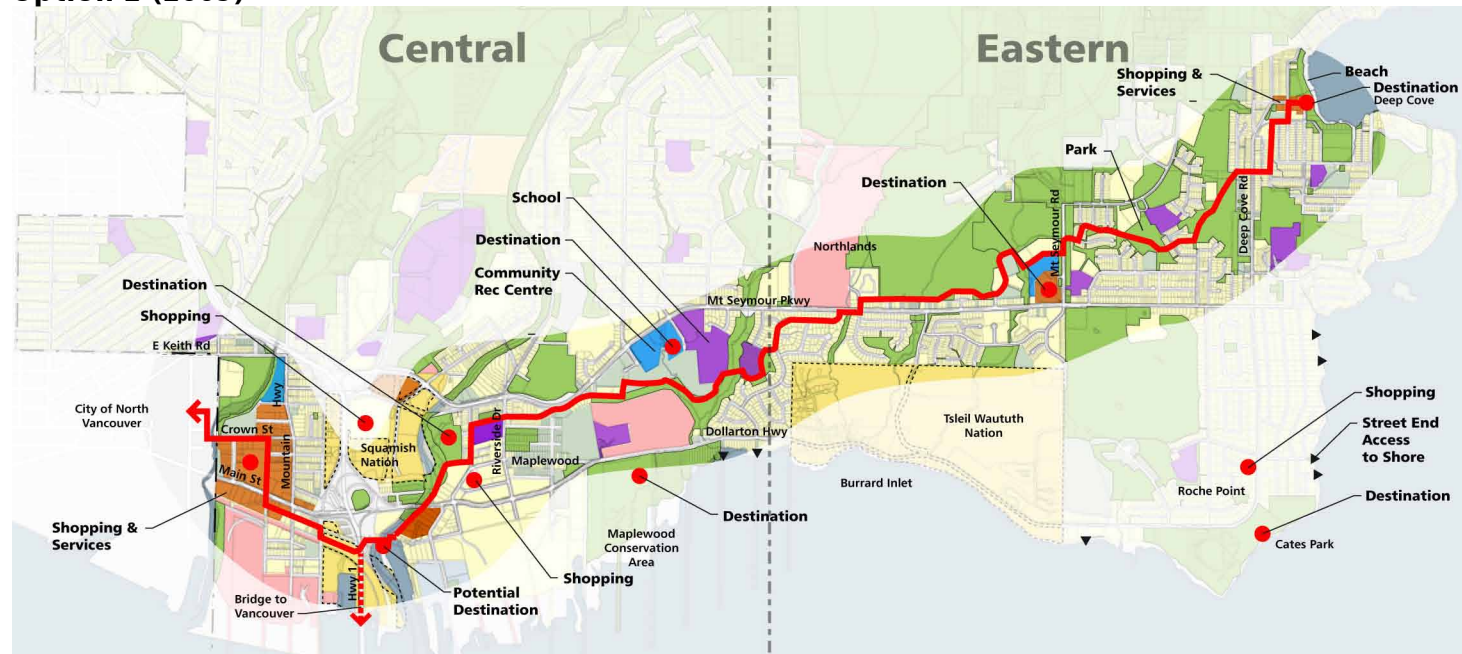
Destinations along the trail are indicated with red dots. Amenities include parks (green), community recreation centres (blue), schools (purple), commercial areas (orange), and First Nations (yellow).

Street end shore access is indicated with black triangles.

Option 1 (2009)



Option 2 (2009)



- Legend**
- Possible Trail Alignment
 - Destination
 - ▶ Waterfront Access Point

3.4 Central Alignment Options Revisited

In early 2013, the North Vancouver District Council endorsed revisiting the alignment options for the central section of the DNV Spirit Trail. Several planning projects underway in 2013, including proposed expansion of bridge crossings over Lynn Creek and community planning studies that propose increased density in the area, create opportunities to reconsider the future alignment of the Spirit Trail.

In addition to the two potential alignment options endorsed by council in 2009, two more alignment options are under consideration within the central section. The four preliminary route alignment options (see page 31) were presented to a working group on June 26, 2013 for discussion and feedback.

Based on the feedback, all four alignment options were refined and then analyzed using the criteria from previous route alignment studies.

The matrix on the following page assigns a rating between 1 (least successful) and 5 (most successful) for each of the criteria for each alignment option. The number of shaded boxes indicates the score for each criteria. A total score is noted for each zone. A higher total score correlates with a more successful option using the evaluation criteria.



2013 UPDATE

3.4.1 Criteria Matrix

Central

Evaluation Criteria

Ratings

**Option 1
Harbour Front**

**Option 2
Community Connection**

**Option 3
Direct Link**

**Option 4
Seymour Parkway**

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5

Accessible Grades and Geometry



Compatibility with Relevant Plans



Connectivity with bike and pedestrian routes and transit nodes



Cost



Experience



Minimize Impact to Wildlife and Natural Systems



Proximity to Amenities / Destinations



Safety



Score Option 1 25

Score Option 2 28

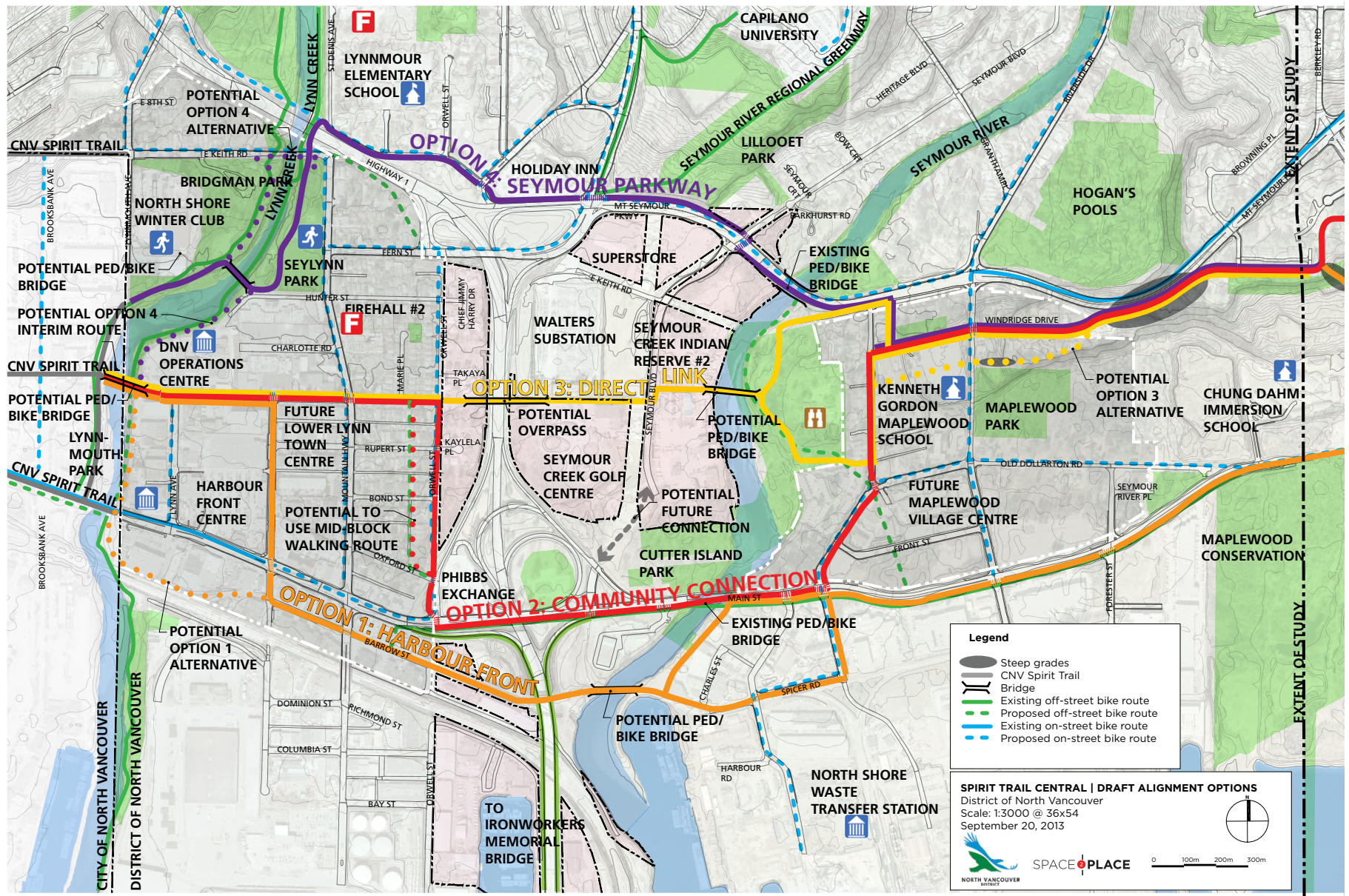
Score Option 3 30

Score Option 4 31

Evaluation Summary

The alignment proposed in Options 3 and 4 scored higher than Options 1 and 2 for the Central section of the trail using the route evaluation / selection criteria.

Central Route Alignment Options 1 to 4 (2013)





2013 UPDATE

3.4.2 Accessible Grades and Geometry

All of the options can be constructed relatively flat and accessible throughout, with the exception of a steep section near the east end of the central section.

Due to limited clearances and existing topography, a steep section along Windridge Dr. will be difficult to avoid. Option 1 circumvents Windridge Dr. and proposes a new route along the potential extension of Berkley Road, which may also be challenging to achieve grades of less than 8% everywhere.

Option 1 Harbour Front



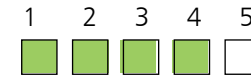
Steep sections at the Berkley Rd extension. Potential to reduce grades when designing the alignment through this section.

Option 2 Community Connection



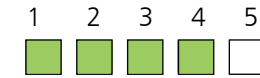
Steep section along Windridge Dr. Limited clearance available to lengthen trail sufficiently to reduce slope to under 8%.

Option 3 Direct Link



Steep section along Windridge Dr. Limited clearance available to lengthen trail sufficiently to reduce slope to under 8%. Potential alternative south of Windridge Dr. along sewer Right of Way also has grade challenges.

Option 4 Seymour Parkway



Steep section along Windridge Dr. Limited clearance available to lengthen trail sufficiently to reduce slope to under 8%.

3.4.3 Compatibility with Relevant Plans

All of the options support the realization of existing plans and are compatible with plans currently under development.

Option 2 scored marginally higher than the others as it is the only Spirit Trail route option to be the linkage between the Lower Lynn Village Centre, Phibbs Exchange and Maplewood Village Centre.

Option 1 Harbour Front



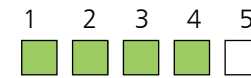
The most waterfront-oriented option. Potential connectivity with future Metro Vancouver park beside transfer station. Requires acquisition of railway Right of Way along Barrow and Spicer corridor and the purchase of the existing railway bridge. An alignment along Seymour River potentially requires portions of Charles St properties. Passes near proposed Lower Lynn Town Centre but not proposed Maplewood Village Centre.

Option 2 Community Connection



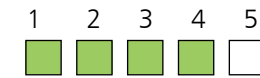
Passes through proposed Lower Lynn Town Centre, beside Phibbs Exchange and through Maplewood Village Centre.

Option 3 Direct Link



In Lower Lynn Plans. Requires negotiations with Squamish Nation to integrate with future plans between Highway 1 and Seymour River. Creates a direct connection between Lower Lynn Town Centre and Maplewood Village Centre via Seymour Creek Golf Centre. A bold approach that could potentially be an important pedestrian/cycling corridor linking three centres in this area.

Option 4 Seymour Parkway



Requires a new pedestrian bridge between Bridgman and Seylenn Parks and the multi-use trail on the recently widened Mt. Seymour Parkway bridge. Potential alternative to stay on west side of Lynn Creek to Keith Rd. Bypasses proposed Lower Lynn Town Centre and proposed Maplewood Village Centre.



2013 UPDATE

3.4.4 Connectivity with bike and pedestrian routes and transit nodes

All of the options have good connectivity with existing and proposed bike and pedestrian routes.

Options 2 and 3 have the best connectivity with the most routes.

Option 1 Harbour Front



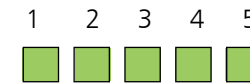
Ties in with existing and proposed on street bike routes. Utilizes existing route along Dollarton Hwy. Connection with Seymour River Greenway.

Option 2 Community Connection



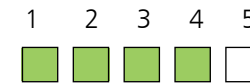
Ties in with existing bike routes along Main St, Second Narrows Bridge, through Lower Lynn Town Centre and Maplewood Village Centre and Phibbs Exchange. Connection with Seymour River Greenway.

Option 3 Direct Link



Utilizes proposed bike routes and creates a direct link between them over Highway 1 and Seymour River. Connection with Seymour River Greenway.

Option 4 Seymour Parkway



Ties in with and upgrades the existing north-south greenways at Lynn Creek and Seymour River (assuming a parallel trail is not required). Utilizes several existing routes with upgrades to meet Spirit Trail standards. Connection with Seymour River Greenway.

3.4.5 Experience

Experience was qualified by comparing the length of each option with the characteristics that contribute to a quality experience with the characteristics that detract from a good experience. Qualities that contribute to a positive experience are scenic areas (i.e. park, water views). Qualities that detract from a positive experience are areas that are noisy and/or have high traffic.

Options 3 and 4 scored the highest (an acceptable balance of positive and negative experiences). Option 2 scored the lowest (the negative experiences far outweigh the positive).

Option 1 Harbour Front

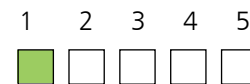


Length in scenic area: 24%

Length in noisy area: 52%

Ratio of scenic to noisy: 1:2

Option 2 Community Connection



Length in scenic area: 5%

Length in noisy area: 38%

Ratio of scenic to noisy: 1:8

Option 3 Direct Link



Length in scenic area: 22%

Length in noisy area: 23%

Ratio of scenic to noisy: 1:1

Option 4 Seymour Parkway



Length in scenic area: 25%

Length in noisy area: 33%

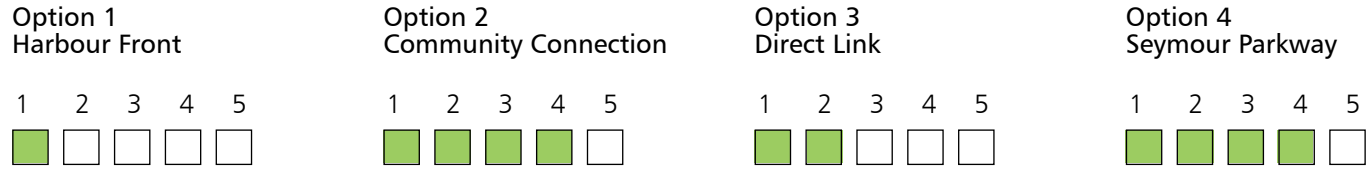
Ratio of scenic to noisy: 1:1.3



2013 UPDATE

3.4.6 Cost

A preliminary, high-level cost estimate was prepared for each option to compare the investment that each option might require to construct.



	Option 1 Harbour Front	Option 2 Community Connection	Option 3 Direct Link	Option 4 Seymour Parkway
Bridge/Overpass Subtotal	\$1,800,000	\$1,800,000	\$6,000,000	\$840,000
Trail Subtotal	\$3,330,000	\$2,610,000	\$2,710,000	\$3,240,000
Land cost subtotal	\$6,840,000	\$0	\$0	\$150,000
TOTAL (including fees and contingency, based on construction subtotal)	\$14,020,000	\$6,170,000	\$12,200,000	\$5,860,000

Option 1 has the lowest construction cost per metre. However, the cost for this option is increased significantly due to the need to acquire land from private land owners (railway company and portions of the properties between Spicer Rd. and Main St. along the east bank of the Seymour River). Costs exclude the land required for the Spirit Trail north of the Dollarton Highway through federal crown land (Port Metro Vancouver) as it is assumed that this section of multi-use trail would be developed along with a future extension of Berkley Rd.

Option 3 requires the most bridge/overpass infrastructure of any option.

Options 2 and 4 are the least expensive options.



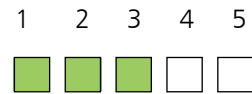
2013 UPDATE

3.4.7 Minimize Impact to Wildlife and Natural Systems

The construction of all of the options will create some temporary disturbance to wildlife and natural systems. The short term impact will be mitigated and native planting will be used along the trail to restore/enhance habitat. The long term environmental benefits of the trail include supporting active transportation as an alternative to automobiles.

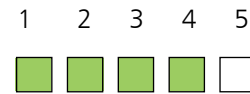
Option 2 has the least impact as it uses existing road and rail rights of way almost exclusively.

Option 1 Harbour Front



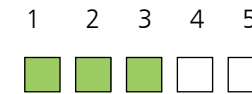
Uses existing road and rail rights of way. Clearing required for Berkley Road extension.

Option 2 Community Connection



Uses existing road and rail rights of way. Minimal clearing required by Kenneth Gordon Maplewood School.

Option 3 Direct Link



Selective clearing and grading near Maplewood Farm (widen existing trail alignments). Clearing required for bridge approaches. Minimal clearing required by Kenneth Gordon Maplewood School.

Option 4 Seymour Parkway



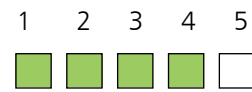
Clearing and grading along existing Lynn Creek trails (assuming a parallel trail is not required), for bridge between parks, along the south side of Keith Road between St. Denis Ave. and Old Lillooet Rd. and along Mount Seymour Parkway. Minimal clearing required by Kenneth Gordon Maplewood School.

3.4.8 Proximity to Amenities / Destinations

All of the options connect with a variety of amenities and destinations, such as parks, community resources, residential neighbourhoods, and commercial activities.

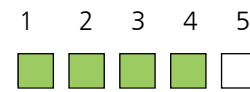
Option 3 scored slightly higher than the others due to its direction connection between the proposed Lower Lynn Town Centre and Maplewood Village Centre.

Option 1 Harbour Front



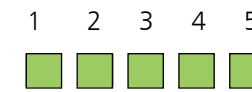
Lynnmouth Park, Lower Lynn Town Centre (planned), Harbour Front Centre, businesses along Main St. and Dollarton Hwy., Phibbs Exchange, Narrows Pub on Spicer Rd., Maplewood Conservation Area.

Option 2 Community Connection



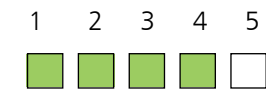
Lynnmouth Park, Lower Lynn Town Centre (planned), businesses along Main St., Phibbs Exchange, Maplewood Farm, Maplewood Village Centre (planned), Kenneth Gordon Maplewood School, Maplewood Park.

Option 3 Direct Link



Lynnmouth Park, Lower Lynn Town Centre (planned), Seymour Creek Golf Centre, Heritage Park, Maplewood Farm, Maplewood Village Centre (planned), Kenneth Gordon Maplewood School, Maplewood Park

Option 4 Seymour Parkway



Lynnmouth Park, Bridgman Park, North Shore Winter Club, Seylynn Park, Lynnmour Elementary School, Holiday Inn, Heritage Park, Maplewood Farm, Maplewood Village Centre (planned), Kenneth Gordon Maplewood School, Maplewood Park

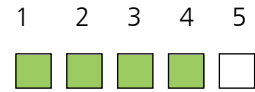


2013 UPDATE

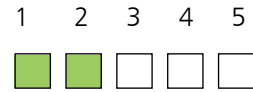
3.4.9 Safety

A high-level evaluation of safety of each option compared the percentage of on-street to off-street trail and also the number of street crossings at busy streets (connector/arterials) and at local streets.

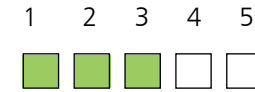
**Option 1
Harbour Front**



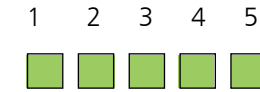
**Option 2
Community Connection**



**Option 3
Direct Link**



**Option 4
Seymour Parkway**



Off-street trail	77% (highest percentage)	47%	62%	77% (highest percentage)
On-street trail	23%	53% (highest percentage)	38%	23%
Number of busy street crossings	10 (most)	10 (most)	6	5 (fewest)
Number of local road crossings	3	3	5	4

Options 4 scored highest based having among the greatest percentage of off-street trail and the fewest crossings at busy streets and fewest crossings overall.

Option 2 scored the lowest for having more on-street trail than off street trail and also having among the most crossings at busy intersections of any option.

Section 4: Conclusion

Findings (2009)

The Spirit Trail is a 2010 Legacies Now project intended to benefit the local North Shore communities. Workshops were held in the summer and fall of 2008 to gain initial input on criteria used to evaluate different route alignment options. Two potential options were presented to promote discussion and gather feedback on some possible alignments.

Workshop attendees expressed a slight preference for Option 1 for the central and eastern alignments, which would create better local connections and more opportunities to view and access the waterfront. Option 1 was seen as providing a more diverse, fun and interesting experience. Workshop participants expressed support for the Spirit Trail to be primarily a family-oriented trail with some infrastructure accommodating bicycle commuters as well.

The western alignment along Welch Street scored higher overall due to a better user experience and more direct connections for people connecting between the District of West Vancouver and City of North Vancouver. One neighbour expressed concern about the Welch alignment, not wanting increased foot, bike, and skate traffic in the neighbourhood. When each of the central / eastern trail alignment options were evaluated using the eight criteria, Option 1 resulted in a higher score.

Recommendations (2009)

Existing trail segments along the preferred Spirit Trail alignment within wooded areas may be “grandfathered” into the Spirit Trail. This means that existing trail sections can be included as part of the Trail without yet meeting the desired characteristics (i.e. width, accessibility, etc.). These trail sections may be upgraded to meet the desired physical characteristics at such a time that there is sufficient support and funding to do so.

1. The Spirit Trail should focus on improving local connections to destinations (home, school, shopping) and build regional connections over time.
2. The Spirit Trail should bridge existing gaps first and then upgrade existing and undeveloped sections of the trail as required.
3. The Spirit Trail should prioritize improved connections between Lions Gate Bridge and Second Narrows Bridge, where demand is greatest for designated bike and pedestrian routes, and then progress eastward.
4. The Spirit Trail’s desirable physical characteristics should be a maximum 4 metre wide shared off-street trail. Where the trail is less than 2.5 metres wide, an alternative route could be provided for cyclists.
5. The Spirit Trail should be designed to maximize accessibility and be attractive and comfortable for use by entry-level cyclists, people using wheeled mobility aides (wheelchairs, walkers, and strollers), children, seniors, recreational inline skaters and joggers.

Next Steps (2009)

The District of North Vancouver is planning to initiate public consultation early in the process to identify a preferred alignment for the DNV section of the Spirit Trail. The District is expected to use the content of this report during public consultation with specific communities along the proposed alignment options. DNV’s public consultation for Spirit Trail is intended to promote community engagement in the process, gather input about how the trail can provide the greatest benefits for the community, and get a good sense of the public’s preferred trail alignment.

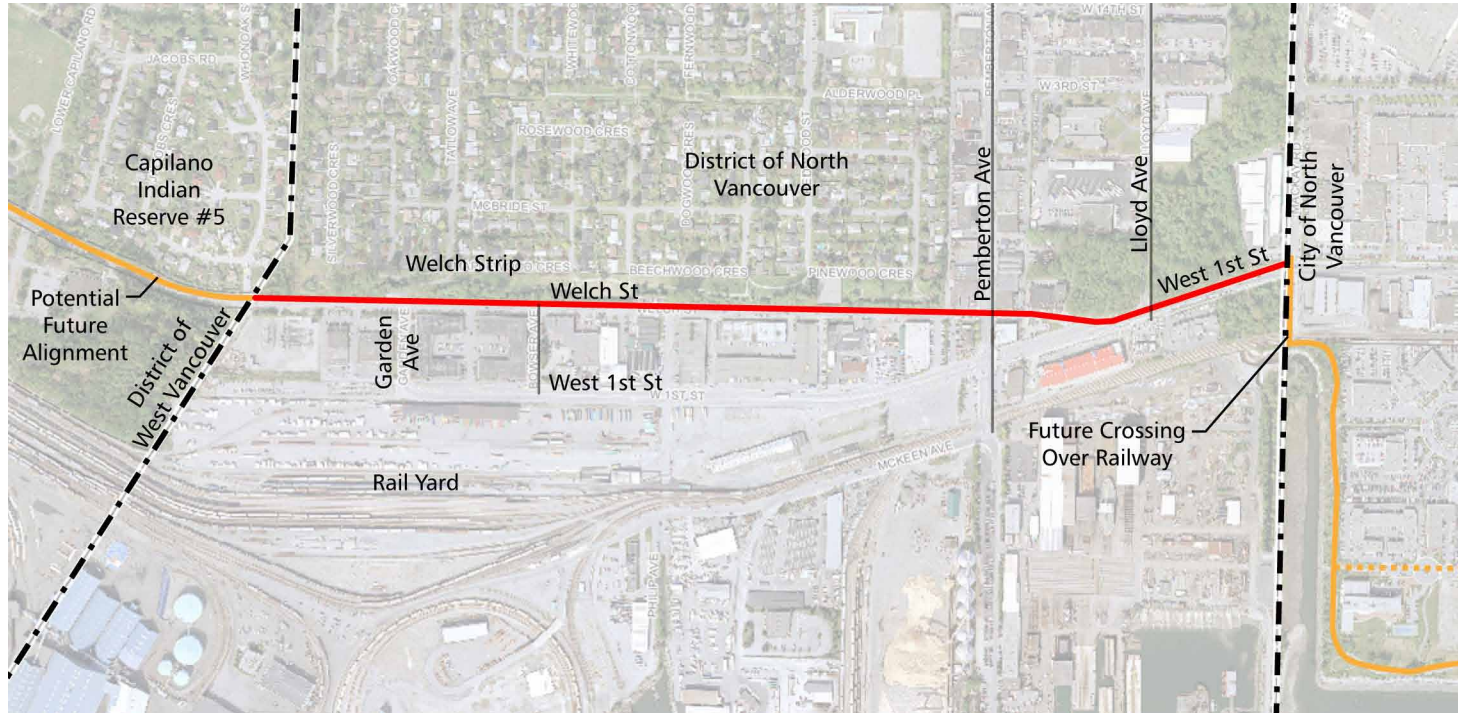
Section 4: Conclusion (cont.)

Three public workshops, 1 for each section of the Spirit Trail, were held during the fall of 2008.

The preferred alignment is shown in the diagrams to the right.

See appendix 3 for feedback received during the public workshops.

Preferred Western Alignment (2009)

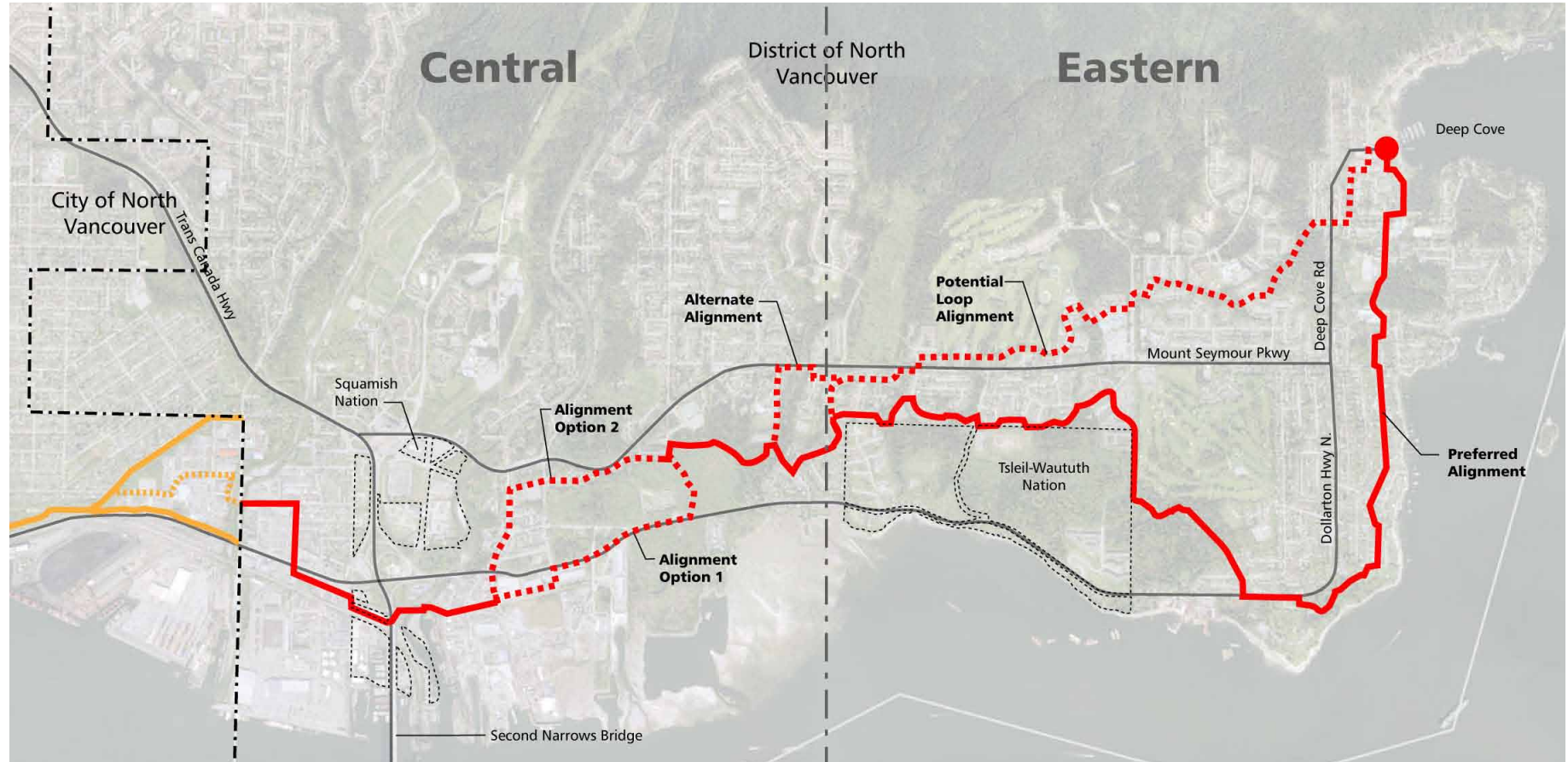


The feedback received at the public workshop on September 30th, 2008 indicated that there is a preference for the Spirit Trail to be aligned along Welch Street and connect to West 1st Street between Pemberton and Lloyd Avenues. Feedback included a desire to provide a direct paved route for bicycles and fast moving pedestrians along Welch Street while preserving Welch Strip for local pedestrian use.

Legend

- Preferred Trail Alignment
- - - - Potential Connection
- Destination

Preferred Central and Eastern Alignments (2009)



The feedback received at the public workshop on November 25th, 2008 indicated no clear preference between Options 1 and 2 through the central section.

The feedback received at the public workshop on December 3rd, 2008 indicated that there is a preference for the Spirit Trail's eastern alignment to be south of the Seymour Parkway, connecting down to the Dollarton Highway and Cates Park, and then northward to Deep Cove. This alignment was seen as providing the greatest number of new linkages between neighbourhoods and to local and regional attractions while also providing a better experience of the District's relationship to the waterfront.

Minimizing environmental impact was expressed as an important consideration for trail alignments through parkland and forested areas. Feedback also indicated support for using the Option 2 alignment (north of the Seymour Parkway through Norgate) to eventually develop a loop trail.

2013 UPDATE
**Section 4: Conclusion
(cont.)**
**Recommendations -
Central Alignment
(2013)**

Through revisiting the central section of the Spirit Trail and taking into consideration additional options and other planning initiatives currently underway, some new conclusions and recommendations have been identified.

Of the four options evaluated, Option 4 (Seymour Parkway) is recommended in the near term as it scores highest overall, excelling in the areas of cost, connectivity, experience, proximity and safety.

Option 3 (Direct Link) would require a greater investment in bridge/overpass infrastructure, but would also provide for excellent connectivity between the proposed Lower Lynn Town Centre and Maplewood Village Centres, with grade-separated crossings over the freeway, and the best overall experience for Spirit Trail users. Option 3 should be pursued as the longer term (ultimate) Spirit Trail alignment to provide a direct link between future growth centres.

Whether or not they become the designated Spirit Trail, all routes are feasible as potential future greenways that would enhance connectivity within the active transportation network. Therefore, most or all of the routes should be retained in long term plans for the area. For example, even if it is not the Spirit Trail, part or all of Option 2 could still be developed as an important pedestrian and cycling route that improves access to:

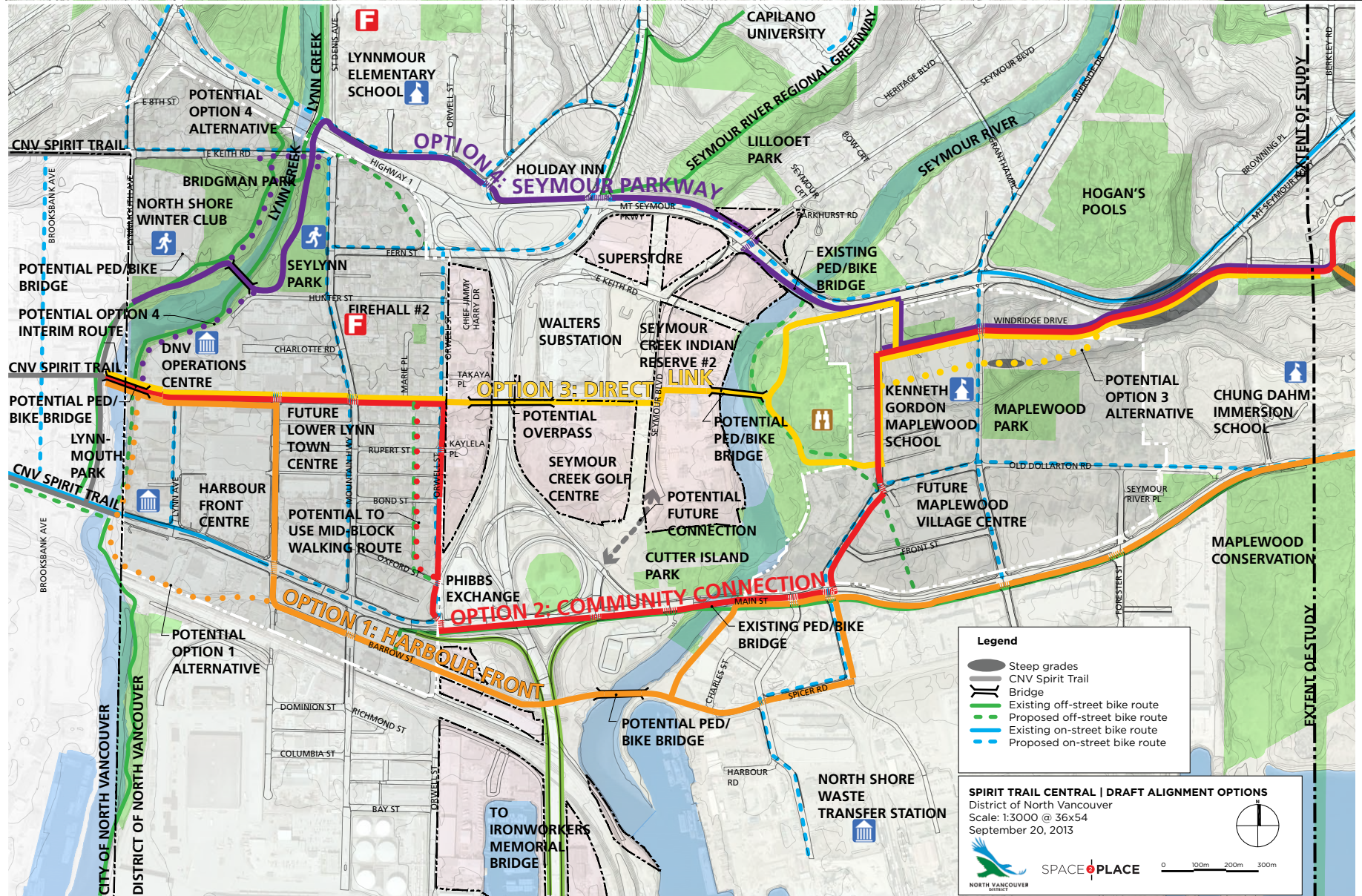
- expanded multi-use lanes on the Ironworkers Memorial Bridge,
- Phibbs Exchange,
- future growth centres, and;
- the North Shore's existing and future pedestrian and cycling routes.

With all of the options explored at this stage, it is important to maintain flexibility to allow for potential modifications to these alignments that may be become necessary through further development of the plans for the growth centres, bridge projects and the Seylenn/Bridgman Park Conceptual Park Plan.

Regardless of the alignment selected as the Spirit Trail, a potential bridge at Crown Street would create an important new link between the City and District of North Vancouver and allow the development of any of the pedestrian and cycling route options.

2013 UPDATE

Central Route Alignment Options 1 to 4 (2013)



2013 UPDATE

Appendices

A.1 Technical Summary of Existing Standards

Established Spirit Trail Goals

District of West Vancouver

Trail Core Values from the Spirit Trail Working Group Final Report (2009):

- Multi-use
Encouraging all ages, all abilities and all modes of self-propelled transport, including wheeled mobility aids
- Safety
Instilling a sense of security and well-being
- Connectivity
Building a continuous recreational and transportation link from Horseshoe Bay to North Vancouver
- Sustainability
Promoting a healthy lifestyle and reducing our carbon footprint
- Community
Creating a vibrant backbone through the community and fostering a sense of civic pride

Summary:

The West Vancouver approach is primarily focused on establishing a safe active transportation corridor, whereas the City of North Vancouver's Spirit Trail plan also covers a wider array of recreational and environmental goals.

Both municipalities acknowledge the importance of user experience and accessibility for all users.

City of North Vancouver

The trail should:

- Be waterfront oriented.
The alignment of the trail will be along the waterfront or with a waterfront view as much as possible.
- Form a linear park.
Connect existing park and public spaces by a linear greenway with park-like amenities.
- Be accessible to all.
This includes walkers, cyclists, in-line skaters, and those with wheeled mobility aids.
- Have a unique identity.
Users of the trail should always know when they are on the trail. The character of the trail should be a point of civic pride.
- Act as an ecological corridor.
Wherever possible the trail should act as an ecological corridor connecting wildlife habitats and showcasing innovative green infrastructure.
- Be separated from traffic.
Wherever possible the Spirit Trail should be separated from vehicular traffic. In addition, where space permits cyclists and pedestrians should also be separated from each other to increase safety.

A.1 Technical Summary of Existing Standards (cont.)

Established Spirit Trail Design Standards

District of West Vancouver

Street

- **Shared Bicycle Routes:** make use of collector roads and local streets with low traffic.
- **Marked wide travel lanes:** 4.3 metres (not including gutter), add 2.4 metres for parking lane.
- **Bicycle Lanes:** marked with a white line, 1.5-1.8 metres wide, continuous between intersections, painted with symbol.
- **Paved Shoulder:** on roads without curbs or gutters, one way travel, parking prohibited, 1.5-2.0 metres wide.

Off-Street Greenways and Pathways

- **Width:** minimum 4.0 metres, 3.0 for low-use paths, 2.4 metres over short spans where physical constraints are present.
- **Shoulders:** min 0.5 adjacent to multi-use pathways.
- Designed for 2-way travel, separated pathways should be avoided.
- Centre lines only used on horizontal curves with limited sight distances.
- Provide an adjacent soft-surfaced trail minimum 1.0 metres wide for runners, etc.

Summary:

The other North Shore municipalities have similar standards to each other for on-street bike lanes (minimum 1.5m width) and paved, shared off-street trails (minimum 4.0m width).

City of North Vancouver

Street

- Along a street or railway. For direct travel between destinations. Fewer resting points.
- On street trail: 1.5m bikeway, 2.5m parking, 1.8m street trees or 0.5m vegetation, minimum 2.0m pedestrian walkway.
 - Shared trail adjacent to the railway: min 4.0m setback, 1.2m fence, 4.0m shared trail.
 - Trail adjacent to the railway in restricted corridors: min 4.0m setback, 1.2m fence, minimum 3.0m shared trail, min 2.0m buffer.
 - Trail through Right of Way behind mall: 4.0m shared trail, bollard or painted line or curb.

Park

- Located in natural areas. Provide access to these natural areas to all users while maintaining or enhancing the natural character.
- **Shared trail through parks / natural areas:** 4.0m trail
 - **Off-street grade separated trail:** 3.0m shared trail with room for expansion to 4.0m, minimum 1.0m setback from curb.
 - **Pedestrian trail through ravine:** 2.0m pedestrian walkway, 0.5m setback from slopes.
 - **Areas where access to private property must be restricted:** post and rail fence along property line.
 - **Parallel to Creek:** 4.0m shared trail, minimum 5.0m riparian zone.

Urban

- Near the city centre and directly adjacent to the waterfront. Highest degree of design detail.
- **Adjacent to amenities:** 4.0m shared trail.
 - **Waterfront trail with adjacent open space:** 4.0m shared trail.
 - **Separated waterfront trail adjacent to open space:** 4.0m pedestrian walkway, 3.0m bikeway, 1.5m to breakline
 - **Trail between future buildings:** 3.0m bikeway, 2m setback from buildings.

Established Spirit Trail Design Standards

District of West Vancouver

Surface

- Generally hard surfaced to accommodate all users.

Alignment

- Pathway alignments based on speeds of 35 km/h (level ground) and 50 km/h on grades >4%.
- Centrelines required where minimum sight distances are not possible at horizontal curves.
- Where horizontal curves are less than min radius, pathway should be widened by 1.0m through curve.

Grades

- Max. grades on hard-surfaced pathway 3% for sustained sections, 5% for sections 30m or less, 10% for sections 15m or less.
- No part should exceed 15% grade.

Clearances

- 1.0m to object >150mm high.
- 0.5m to top of slope.
- 0.5m to railing, wall, barrier.
- 0.5m to curb of road <50 km/h.
- 0.75m to parked vehicles.
- 1.0m to road >60 km/h.
- 2.0m to road >70 km/h.
- 3.0m to road without curb <60 km/h.
- 7.0m to road without curb >70 km/h.
- 2.5m vertical to tree branches.
- 3.0m vertical to structures >2.0m in length.

Illumination

- Generally not necessary nor desirable.
- Lighting is essential at intersections, underpasses, and where night security is an issue.

Other considerations

- If stairs are required, provide a ramp on both sides.

City of North Vancouver

Surface

- Hard surfaced to accommodate all users.

Grades

- Max. grade 8%.

Illumination (unconfirmed)

- Street: existing on-street lighting, lighting at arterial and collector intersections.
- Park: no lighting.
- Urban: lit, Dark-Sky compliant, energy efficient, overhead for facial recognition.

Summary:

Both municipalities recommend the trail be a hard surface, but not necessarily asphalt, and gently sloping to be accessible for as many users as possible.

Lighting is appropriate along street sections for safety, but should be avoided in parks or areas where lighting would cause safety concerns.

A.1 Technical Summary of Existing Standards (cont.)

Established Bikeway Standards

TAC Geometric Design Guide for Canadian Roads (1999)

Bike Path Lane Width

- Two-way, exclusive: 2.5 - 3.5m
- Two-way, shared with pedestrians: 3.0 - 4.0m
- One-way, exclusive: 1.5 - 2.0m
- One-way, shared with pedestrians: 2.0 - 3.0m
- One-way, with 2.4 metre wide parking bays: 4.0m
- Paved shoulders: no standard for road without curbs. Edge justification is recommended.

Note: Minimum standards only to be used when:

- bicycle traffic expected to be low.
- pedestrian use expected to be occasional.
- there are good alignments and frequent and collision-free passing opportunities.
- maintenance vehicles that damage pavement not expected.

Surface

- Smooth (hard) surface is desirable for bicycles to be used effectively, comfortably and safely.

Summary:

The TAC geometric design guidelines for bikeways are similar to the Spirit Trail design standards adopted by DWV and CNV, but do not include standards for inline skates, wheelchairs, grade-separated crossings, or setbacks in environmentally sensitive areas.

The smoothness of the bicycle lane surface is noted as one of the most important factors in cyclist's choice of routes.

Grades

- Maximum 5% generally
- Where slopes > 5% are necessary, keep lengths short and provide flat (3%) area every 100 metres for rest.
- Maximum. cross-slope: concrete: 1.5-2.0%, asphalt: 2.0-4.0%, gravel, crushed stone, earth: 2.0-4.0%

Clearance

- 0.6 metres to lateral obstruction (signs, light poles, trees, and curbing > 150mm in height)
- minimum 2.5 metres vertical clearance to overhead structures (3.6 metres preferred)
- minimum 3.6 metres vertical clearance to overhanging foliage

Illumination

- Lighting is most important at intersections.
- Lighting may be needed to illuminate bikeway facility signage or warning signs.
- Lighting is preferred where a path parallels a street.

A.2 Stakeholder Workshops

Phase 1 included 2 stakeholder workshops held by the District of North Vancouver. The purpose of the workshops was to clarify the intent of the Spirit Trail, receive feedback on the route evaluation criteria, gain an understanding of some of the opportunities and constraints associated with two route options, and select one preferred alignment.

The planning of the Spirit Trail would go to the public for consultation after alignment issues had been addressed and the intent was clarified.

Summary of Input from Spirit Trail Workshop 1

The first workshop, held on June 19, 2008, included DNV Staff, North Shore Spirit of BC Committee, invited stakeholders, and the Consultants. The workshop was attended by 19 participants and 3 consultants.

Little feedback was received regarding the preferred alignment along the Welch Strip / West 1st St corridor between the District of West Vancouver and City of North Vancouver.

There was general support for a new bike and pedestrian crossing over Lynn Creek at Crown Street.

There was support for a routing that crosses the mouth of the Seymour River adjacent to the railway at the spit. This is seen as a desirable way to bring people close to the active waterfront in this area.

There was general support for the routing of both options where they overlapped behind the ice sports centre, Ron Andrews Rec Centre, Windsor Secondary, and Plymouth Elementary as these are seen as important amenities to connect with each other and surrounding neighbourhoods, and the trails that exist are relatively flat and scenic.

Due to the existing terrain and patterns of development in the District, the ability to create a trail to Deep Cove that meets desirable accessibility standards throughout, is not feasible. There was support at the workshop to maximize the length of the trail that is accessible, with particular focus on providing accessibility in areas that have higher populations of seniors (near the Ice Arena and Parkgate).

Until discussions occur with the Tsleil-Watuth Nation, a low-level, waterfront oriented alignment along the Dollarton Highway between Maplewood Conservation Area and Cates Park will not be considered. Of the two options presented, Option 1 was preferred as it has fewer and less extreme slopes than Option 2.

Most of the groups preferred the trail alignment shown in Option 1, citing important factors as being its connection to the Maplewood conservation area, better potential to connect with the Burrard lands in the future, more opportunities for views of the Ocean and waterfront access, more destinations including access to Cates Park. Option 1 was preferred for the creation of new connections between neighbourhoods, both by the proposed crossings and by developing trails that are currently limited in their access.

Option 2 was seen as doing a good job of connecting schools and shopping, but missed key destinations including Cates Park and the Maplewood Conservation Area. Its routing by Maplewood Farm was not seen as an asset, but would be acceptable in the short term until a route could be built by the conservation area. Option 2 was seen as less expensive to build as it uses more existing paved streets and trails and requires fewer new crossings, but the experience for users of the trail and improvement to the District's trail network would also be less significant than in Option 1.

Workshop participants noted that a portion of Option 1 was shown as being routed through Port Lands, and a portion of Option 2 was shown as being routed through private commercial property, which would likely require negotiations, delays in implementation, or re-routing.

A.2 Stakeholder Workshops (cont.)

Summary of Input from Spirit Trail Workshop 2

The second workshop, held on June 25, 2008 included the Joint Bicycle Advisory Committee (JBAC), Park and Natural Environment Committee (PNEAC), Transportation Planning Advisory Committee (TPAC), District of North Vancouver Staff, and the Consultants. The workshop was attended by 14 participants and 2 consultants.

Much discussion occurred about the intent of the DNV Spirit Trail and who it would be for. Many ideas were shared, however no consensus was reached as to how the trail would accommodate as many users as possible, balancing accessibility and local linkages with the needs of commuters for safer regional routes.

Staff from the City of North Vancouver explained that the cycling world has a wide spectrum, including people who want to ride, but don't want to mix with traffic. It was explained that The City of North Vancouver's Spirit Trail was designed as a hybrid recreation and transportation route.

Some participants said that the trail should be designed for commuters, some said it should be designed for slow traffic and pedestrians only, and some said it should be designed in such a way that everyone can use it.

Although the trail may not be everything to everyone, there was some support for the trail accommodating different users at different points along the trail. The trail could be designed so that commuters would use the trail in some sections and other times they would opt to take a more direct route. Some parts of the trail would provide low-speed, meandering paths attractive to people travelling between local destinations. Each part of the trail would respond to its local context and fill the gaps that currently exist.

Safety of trail users was a major concern, particularly regarding potential conflicts between fast and slow moving users. The separation of walkers and cyclists may be desirable in some circumstances. The City of North Vancouver is planning straighter routes for commuters that run parallel to meandering walking paths.

To minimize disturbance of natural areas, DNV has purposefully made its paths narrow and avoided wetlands.

It was acknowledged that there are some environmental impacts on the small scale, but taking action on the issues of global warming and peak oil require consideration of the environmental impacts at a large scale and over a long time. It was said that municipalities need to encourage people to get out of their cars for the environmental benefits. It was suggested that many of the trips on the Spirit Trail might be local trips (i.e. between home and school or home and Parkgate).

Governments at all levels are interested in supporting initiatives that reduce greenhouse gas emissions, including alternative transportation for commuters, both long and short trips. It was noted that the provincial government wants to see municipalities take action.

A.3 Public Workshops

Three public workshops were held throughout the fall of 2008, one for each section of the trail.

The purpose of the workshops was to clarify the intent of the Spirit Trail, receive feedback on the route evaluation criteria, gain an understanding of some of the opportunities and constraints associated with each potential route option, and select one preferred alignment.

Summary of Input from Spirit Trail Workshop: Western Section - September 30, 2008

Three options for the western section of the DNV Spirit Trail were presented and discussed at this workshop, attended by approximately 65 people.

Most attendees supported the vision of a Spirit Trail, supporting facilities for walking and biking. A few comments were received expressing opposition to development of the Trail, with one resident not wanting 'increased foot/bike/skaters in my neighbourhood'.

During the workshop discussions, the group expressed a preference for a route alignment along Welch Street (Option 3). This route scored slightly higher in the evaluation overall due to a better user experience and more direct connections for people connecting between the District of West Vancouver and City of North Vancouver. The written comment sheets submitted, however, indicated virtually equal support among the three options.

Several workshop attendees also expressed a preference for separating the higher speed trail users, such as adult cyclists, from the slower users such as pedestrians and children. This could be done by permitting pedestrians or other slow moving trail users to use the path in the Welch Strip Park, yet proving an alternate route for higher speed users.

Summary of Input from Spirit Trail Workshop: Central Section - November 25, 2008

Two options for the central section of the DNV Spirit Trail were presented and discussed at this workshop, attended by approximately 21 people.

Both options were identified as potentially workable by attendees who identified pros and cons for each. There was not a strong preference either way.

Questions were raised regarding financing from other levels of government and the possibility of using memorial benches along the trail. An attendee from the Wild Bird Trust expressed concern about routing the Spirit Trail along Dollarton, citing the potential for loss of trees adjacent to Maplewood Conservation area and cyclists riding on trails in the conservation area. Attendees noted that an alternative to the bridge crossing by Windsor School might be required due to the size of the ravine and cost of a new bridge.

A.3 Public Workshops (cont.)

Summary of Input from Spirit Trail Workshop: Eastern Section - December 3, 2008

Two options for the eastern section of the DNV Spirit Trail were presented and discussed at this workshop, attended by approximately 21 people.

There was more support for the alignment shown in Option 1, which is lower and more waterfront-oriented than Option 2, particularly in the long term and for the benefits it would provide for local residents. Attendees identified the value in connecting and enhancing existing trails. There was also a strong level of support behind an idea to eventually create a loop that would utilize both Options 1 and 2.

Attendees supported improving access to the waterfront. Several attendees indicated that a seawall between Cates Park and Deep Cove would be desirable. Many attendees indicated that Beachview Road would be an excellent alignment and were curious about what the treatment of Beachview might look like. There was also desire expressed to see a safe connection to the 2nd Narrows Bridge, which is currently seen as dangerous.

There were some comments expressing a desire to involve the T'sleil Waututh Nation. There was a suggestion that the desirable trail criteria include collaboration and community support.

Concern was expressed by some about the width of trails as well as paving of trails, particularly for trails that are routed through Roche Point and Cates Park. Participants identified potential width constraints along the area immediately north of the T'sleil Waututh Nation. Some of the existing trail bridges are narrower than the desirable trail characteristics, but may be replaced over time. Attendees identified steep sections along both potential routes including Plymouth Drive, Roche Place, and a new trail along a Berkley Road alignment.

2013 UPDATE**A.3 Public Workshops
(cont.)****Summary of Input from Spirit Trail Workshop: Central Section - June 26, 2013**

A total of 4 options were presented and discussed at this workshop, attended by approximately 12 people. Workshop participants organized themselves into two groups for most of the workshop and then regrouped to share their findings.

Participants were asked to reflect on what makes a good experience along the Spirit Trail (based on the sections already constructed). Respondents preferred off-street routes (separated from traffic) as they are perceived to be safer and more enjoyable, appreciated scenery and water views, liked when the trail has good proximity to destinations, amenities and places to rest, and value that the trail accommodates a wide range of user groups.

In response to a question about what lessons can be learned from earlier constructed sections, participants noted that a wider trail is better (i.e. 3 metres is too narrow), compatibility of different users could be improved through education on trail etiquette and/or separation of bikes and pedestrians where space allows, quality construction is important to ensure pavement stays smooth over time, and that the Spirit Trail should predominantly be a scenic route and therefore need not be the most direct.

Group 1 preferred Option 1 in the near term for the waterfront experience, the idea of repurposing the railway corridor for the trail, making use of the existing greenway along Dollarton Highway, and its proximity to shops and to the Second Narrows Bridge. Option 1 could be enhanced by creating a connection with Phibbs Exchange.

Group 2 preferred Option 4 in the near term, considering 'riverfront' as being waterfront, recognizing that this route is scenic and that it could be further enhanced with linkages to future greenway connections along Orwell Street and Keith Road.

Both groups agreed that Option 3 is the most desirable alignment in the long term, recognizing the direct connection it would provide between growth centres. They also agreed that a desirable pedestrian and cycling network includes a variety of route options and loops to serve the widest range of users.



