# Island Rail Corridor to an Active Transportation Trail

## Feasibility Report
## April 2023

Prepared For:

**Friends of Rail to Trail (FORT-VI)**

FRIENDS OF RAILS TO TRAILS VANCOUVER ISLAND

Prepared By:

**MJL Engineering Ltd.**

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# 1.0 EXECUTIVE SUMMARY

MJL Engineering Limited (MJL) and their sub-consultants Davies Transportation Consulting Inc. and Intrinsik Corp. were appointed by Friends of Rail to Trail, Vancouver Island (FORT- VI) to carry out a Feasibility Study for the potential conversion of Island Rail Corridor to an Active Transportation Trail. The Rail Corridor spans a total of 289 kilometers, partitioned into two separate subsections: the Victoria Subdivision (225 km/139.8 mi) between Victoria and Courtenay, with a short spur south of Nanaimo to Wellcox Yard and barge ramp on Nanaimo's waterfront, and the Port Alberni Subdivision (64 km/39.7 mi) between Parksville and Port Alberni. The Corridor intersects with the territories of fourteen First Nations and fourteen municipalities consisting of five regional districts, meaning that any further works may require consultation with local stakeholders.

## 1.1 Potential Economic Impacts

The economic effects of the proposed Island Corridor Trail were estimated via an analysis of comparable existing trails, such as the GAP Trail in Pennsylvania and the Central Otago Rail Trail in New Zealand. By utilizing divergence analysis of these existing trails, a reasonable evaluation of the expected economic implications of the proposed trail was achieved. This economic analysis was a prediction of the economic impact of the Island Corridor Trail, this is conducted in the absence of surveys of trail users and businesses adjacent to and in the vicinity of the proposed trail.

The economic impact estimates for the GAP Trail and Central Otago Rail Trail should be considered indicative of the potential financial value the proposed trail could accrue upon the establishment of a substantial base of frequent users and related businesses. Our analysis was based on the historic analysis of mature trails that have achieved a comparable level of patronage and commercial presence over a commensurate time period.

Based on an analysis of potential trail usage and representative tourism spending patterns in the Greater Victoria area, annual direct economic impacts could reach an estimated **$50 million**, with indirect and induced impacts estimated to add an additional **$45 million** in total each year, resulting in a total estimated economic impact of approximately **$95 million** annually.

## 1.2 Health Impact Assessment

The objective of the Rapid Health Impact Assessment (HIA) was to furnish FORT-VI with supplementary health and related information as a component of the Feasibility Study, while underscoring the potential health, social, and economic advantages of the proposed pathway.

The Island Rail Corridor was subjected to a Rapid Health Impact Assessment (HIA), which employed an evidence-based process to evaluate the potential human health implications of a potential conversion of the existing rail corridor to an active transportation trail. The HIA baseline health profiles considered the regional districts of Alberni-Clayoquot, Capital, Comox Valley, Cowichan Valley, and Nanaimo, encompassing the general study area. The Health Economic Assessment Tool (HEAT) for walking and cycling was utilized to estimate the benefit to the general study area if the

corridor were to be converted to an active transportation trail, encouraging local population to engage in walking and cycling.

Based on an estimation of the predicted frequency of utilization, it is conceivable that 0.04 premature deaths could be averted annually, resulting in a financial return of in excess of **$200,000** CAD per annum, should all individuals within the specified age range in the zone of investigation traverse the reformed Island Corridor Trail by walking or cycling a minimum of four times a year.

## 1.3 Cost Estimate

A Class D Cost Estimate was generated to ascertain the economic viability of the proposed Island Corridor Trail project. Utilizing commonly utilized labour, equipment and material rates on Vancouver Island, an approximation of the cost associated with the design and construction of the trail was computed. This estimate is intended to provide the Government of British Columbia with the requisite economic information to determine the feasibility of the project.

The cost estimates for civil works were generated for the two types of trail cross-sections; asphalt surfacing and gravel surfacing. It was hypothesized that asphalt surfacing would be applied to a quarter of the full trail length in the more urbanized regions.

The total expenditure necessary to execute the project, including engineering, bridge upgrades, at-grade crossing enhancements, rockfall mitigation and contingency, is estimated to be **$172,788,954**. This figure is derived from the base cost of **$101,231,163** for civil construction, augmented by bridge upgrades, at-grade crossing enhancements, and rockfall mitigation plus 10% for engineering costs and 15% for contingencies.

**Summary of Cost Estimates**

| | |
|---|---|
| Civil Construction Cost per Km | $349,073 |
| **Total Civil Construction Cost of the Trail** | **$101,231,163** |
| Raising Vertical Clearance for 2 Bridges | $10,000,000 |
| Railing & Decking of 50 Bridges | $13,000,000 |
| Falling Rock Mitigations | $2,000,000 |
| At Grade Crossing Improvements | $12,000,000 |
| **Total Construction Cost** | **$138,231,163** |
| Engineering (10%) | $13,823,116 |
| Contingency (15%) | $20,734,674 |
| **Total Project Cost** | **$172,788,954** |

## 1.4 Future Consideration

The future consideration for developing the proposed trail may be as follows:

- A comprehensive case study incorporating further data points from local sources and literature(s) is recommended in the implementation stages.
- Facilitate inter-jurisdictional dialogue to ensure stakeholder involvement in the Island Corridor Trail project, with a particular emphasis on local community and First Nation interests and objectives.
- Design a proposed Island Corridor Trail to accommodate the needs and abilities of most demographics, including children, youth, older adults, and individuals with ability challenges.
- Verify that the proposed Island Corridor Trail is integrated with the existing active transportation infrastructure(s) in the area.

# 2.0 INTRODUCTION

## 2.1 Study Purpose and Background

MJL Engineering Ltd, abetted by sub-consultants Davies Transportation Consulting Inc. and Intrinsik Corp., were tasked to lead a Feasibility Study for FRIENDS of Rail to Trail, Vancouver Island (FORT-VI) with regard to the potential adaptive reclamation of the existing Island Rail Corridor into an Active Transportation Trail where decommissioned rail routes are cleared for use as designated pathways. No consideration was given to removal and disposal of the rails and ties costs in feasibility study as per RFP. The alignment of the Island Rail Corridor is illustrated in **Figure 2-1**.

The total length of the corridor is 289 kilometers and consists of the following subdivisions:

- Victoria Subdivision a 225 km (139.8 mi) track between Victoria and Courtenay, with a short spur from just south of Nanaimo to Wellcox Yard and barge ramp on the Nanaimo waterfront.
- Port Alberni Subdivision a 64 km (39.7 mi) branch line from Parksville to Port Alberni.

It is our understanding that the Province of British Columbia is currently undertaking a comprehensive examination of the potential applications for the Island Rail Corridor, including enquiries into the viability of integrating an active transportation route. This feasibility study's findings shall be duly submitted to provincial authorities in order to influence their contribution into federal government-governed decisions concerning subsequent implementation and management plans pertaining to the trail corridor.

The Island Rail Corridor, formerly known as the Esquimalt & Nanaimo (E&N) Railway, is now under the oversight of a non-profit entity: The Island Corridor Foundation (ICF). Under contract with Southern Railway of British Columbia for operation of this railway line, the ICF has a Board made up of twelve directors. These directors are sourced from various constituents including five from local Regional Districts and five from locally involved First Nations governments while two additional members are chosen at large.

MJL Engineering Ltd. and subconsultants, conducted a review of the existing studies and reports compiled by BC Government and other external stakeholders, as well as those for analogous trails-such as The Great Allegheny Passage (GAP) trail in Pennsylvania, Okanagan Rail Trail in British Columbia, Veloroute des Bleuets Trail in Quebec, Confederation Trail in Prince Edward Island and Central Otago Rail Trail. The findings from these studies were incorporated into the extensive body of knowledge used to determine our findings.

## 2.2 Project Location and Study Area

An evaluation of the Island Rail Corridor, as captured in the Ministry of Transportation and Infrastructure's (MOTI) Condition Assessment Report, identifies fourteen First Nations Territories and fourteen municipalities comprising five regional districts located within. To ensure continued

progress is achievable along this Corridor, consultation must be initiated with relevant stakeholders identified therein; graphical representation provided in **Figure 2-2** below.

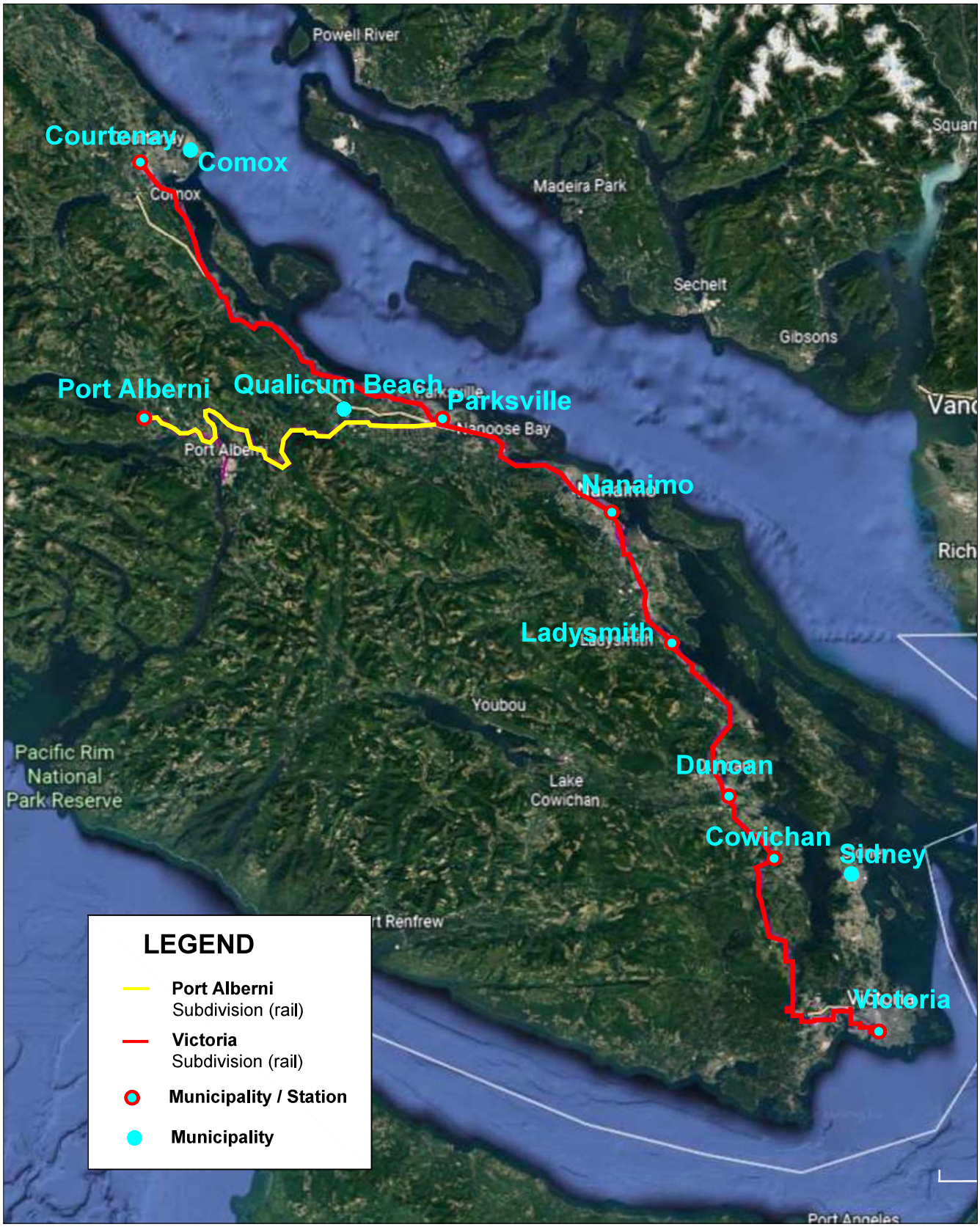



**Figure 2-1: Alignment of Island Rail Corridor**

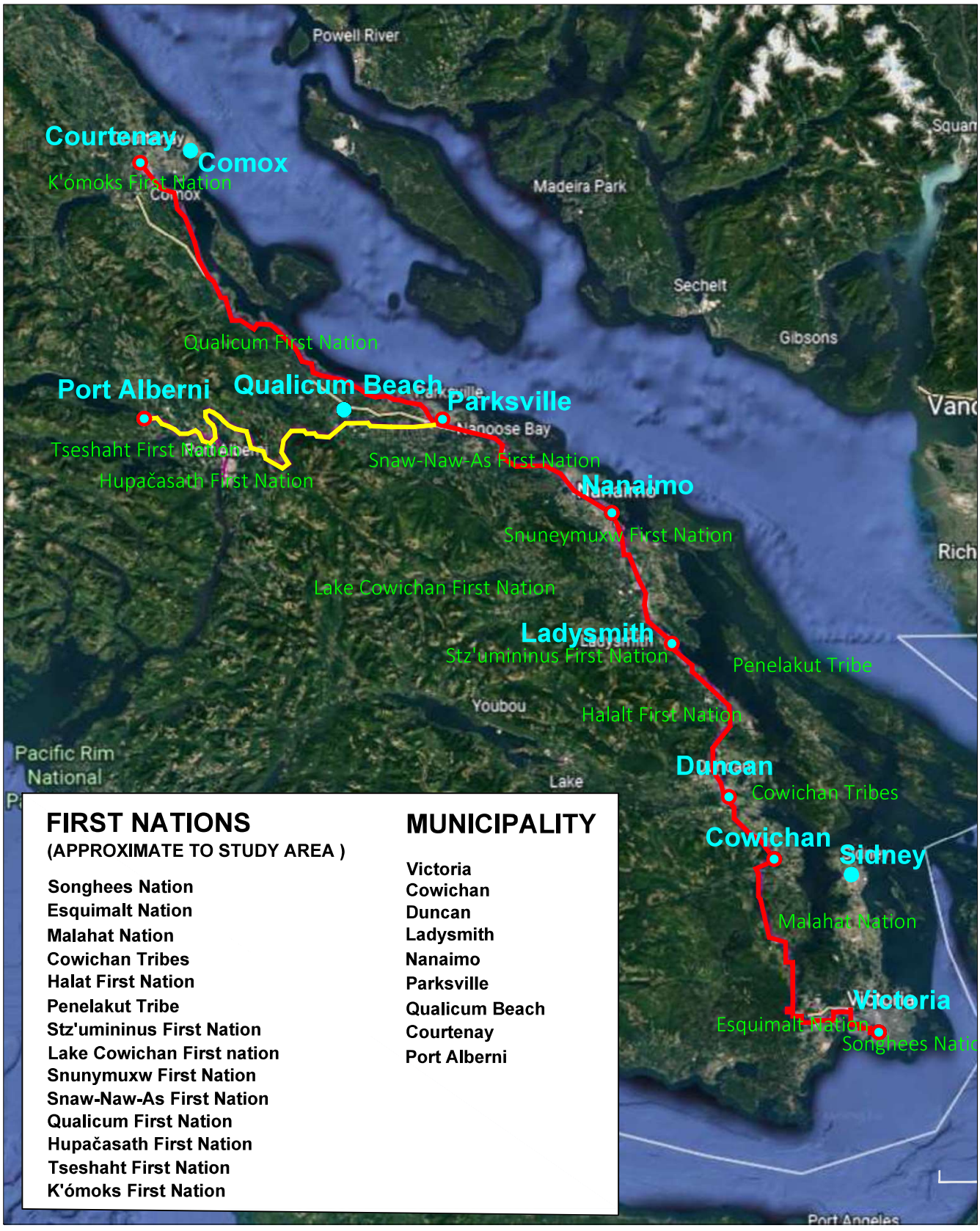



**Figure 2-2: First Nations & Municipalities Map**

**First Nations:**

- Esquimalt Nation
- Songhees Nation
- Malahat Nation
- Cowichan Tribes
- Lake Cowichan First Nation
- Halalt First Nation
- Stz'uminus First Nation
- Penelakut Tribe
- Snunymuxw First Nation
- Snaw-Naw-As First Nation
- Qualicum First Nation
- Hupačasath First Nation
- Tseshaht First Nation
- K'ómoks First Nation

**Stakeholders:**

- Island Corridor Foundation
- Southern Railway of Vancouver Island
- Federal Government
- Provincial Government
- 5 Regional Districts
  - Capital Regional District
  - Cowichan Valley Regional District
  - Regional District of Nanaimo
  - Comox Valley Regional District
  - Alberni-Clayoquot Regional District
- 14 Municipalities
- General Public
- Local Industry
- Technical Safety BC

The proposed Island Corridor Trail will traverse two major subdivisions in the form of the Victoria Subdivision (225 km) and Port Alberni Subdivision (64 km). An enriched population growth is expected in both regions, apart from Cowichan which lags behind provincial average population increase figures between 2016-2021. Both rural and urban routes make up these subdivisions and directly pass through First Nations Territories as well as regional districts and municipalities where businesses are mainly located.

The existing Island Rail Corridor will serve as the primary foundation for the proposed Trail's construction, providing necessary physical infrastructure (including grade, bridges etc.), as well as rights of way to facilitate its development.

The proposed Island Corridor Trail is expected to become a renowned destination for outdoor recreation and active transportation, with utilization by local users as well as foreign travelers.

## 2.3 Methodology

The methodological approach adopted to carry out the feasibility study was based on an investigative framework comprising analysis and evaluation techniques.

- Undertook process of data analysis from analogous trails and preceding research, such as Island Rail Corridor Condition Assessment Report.
- Calculated cost assessment for consulting and construction services required for transforming Island Rail Corridor into an active transportation trail utilizing the rail bed.

- Estimate economic impacts of the Island Corridor Trail.
- Figured out economic consequences of Island Corridor Trail speculation based on surveys already conducted with similar existing trails in provincial regions; in absence of as-is situation, these forecasts were extrapolated.
- Carried out HIA (Health Impact Analysis) to estimate effects an Island Corridor Trail would have on public health in prescribed area.

# 3.0 U.S. TRAIL EXAMPLE - GREAT ALLEGHENY PASSAGE (GAP) TRAIL

## 3.1 Background

The Great Allegheny Passage winds 240 km (150 miles) from Cumberland, Maryland, through tunnels in the Allegheny Mountains, across the Laurel Highlands, deep into the gorges of Ohiopyle State Park, into the region's historic Steel Valley to Pittsburgh's Festive Point State Park. Constructed between 1978 and 2013 and maintained by municipalities and local volunteers, the Great Allegheny Passage receives over a million visits annually, with tourists from all 50 states and over 35 countries.

The first major segment that would become the GAP was transferred from the Western Maryland Railway to the Western Pennsylvania Conservancy in 1978. This 26.75-mile section of abandoned railroad bisected the newly established Ohiopyle State Park, which had formally opened in 1971. Soon thereafter, a trail surface was constructed by park staff. For the next three-and-a-half decades, different sections of the GAP, developed by a web of owners, stakeholders, and volunteer groups, were added throughout the now 150-mile path between downtown Pittsburgh and Cumberland, Maryland including four former railroad tunnels, many bridges, and other physical infrastructure. A map of the GAP Trail is shown below.

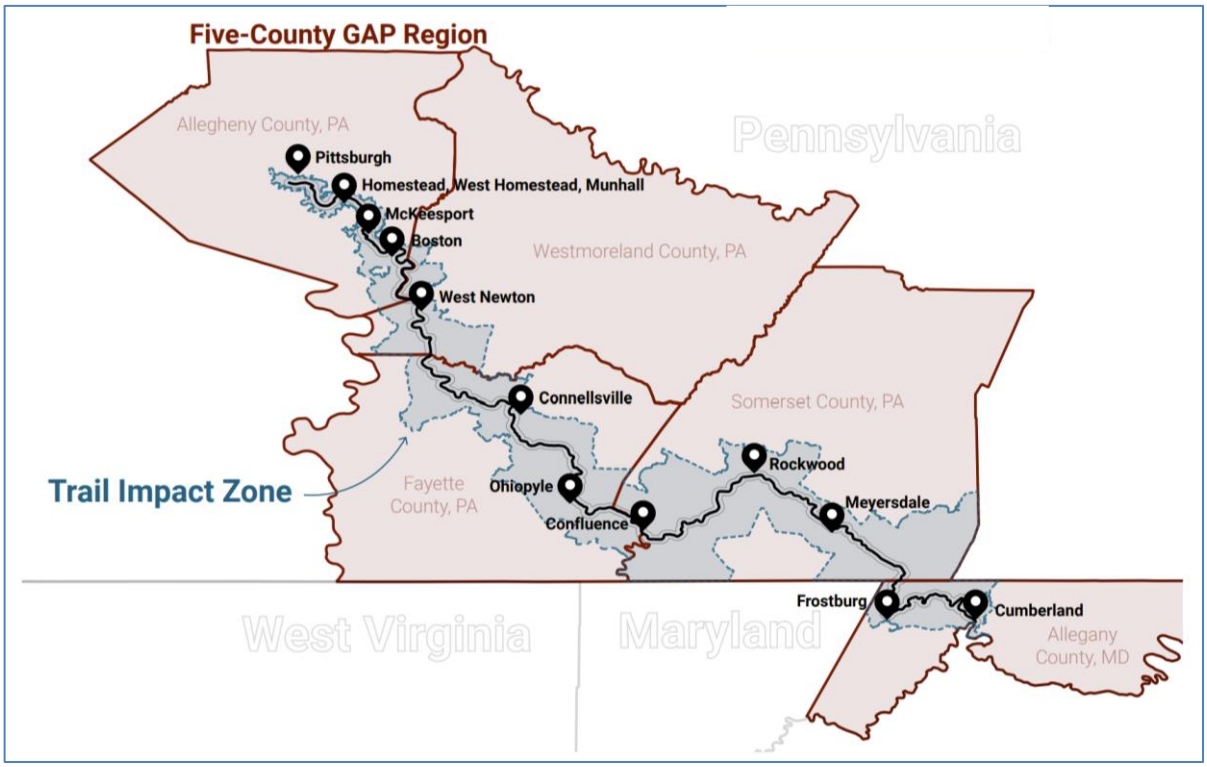



**Figure 3-1 - GAP Trail Map**

For purposes of economic impact analysis, the "Trail Impact Zone" was defined as the area proximate to the trail, where most direct trail user spending occurs. It is formed by aggregating Census Block Group geographies that are located either on the path of the GAP or within half-mile of the path. Census geographies were used because they enable incorporation of a variety of sources for analysis.

**Table 2.1** shows the population in the Trail Impact Zone and the total resident population by section of the GAP Trail.

**Table 3.1 - GAP Trail Impact Zone and Total Population**

| GAP Trail Impact Zone and Total Population 2019 | | |
|---|---|---|
| Gap Section | 2019 Trail Impact Zone Population | 2019 Resident Population |
| Pittsburgh & Allegheny County Pa | 119,670 | 1,221,744 |
| Pennsylvania's Laurel Highlands | 59,605 | 559,253 |
| Allegany County Md | 31,861 | 71,445 |
| Total | 211,136 | 1,852,442 |

Between 2016 and 2019 there were an average of approximately 1 million GAP visits each year. In 2019, the estimate of user visits was 990,000, and 7.6% of GAP user visits were estimated to be from overnight users, or through-riders. In 2020, GAP user visit counts shot up dramatically to almost 1.5 million visits. While these extremely high use rates appear to be an effect of Covid-19, it is likely that GAP user visits will continue to increase from pre-2020 levels in coming years, in keeping with long-term trends.

## 3.2 Economic Impact

An economic impact study of the GAP Trail was completed in 2021. The report was developed by Fourth Economy in partnership with the Great Allegheny Passage Conservancy (formerly the Allegheny Trail Alliance). Research was conducted between the fall of 2020 and the spring of 2021. The report was funded by the Hillman Foundation and the Katherine Mabis McKenna Foundation.

Data was gathered for the study through surveys of trail users and businesses in the Trail Impact Zone. Responses from the trail user surveys indicated that day users spent an average of US$90 per day. Restaurant was the highest spending category with 30.4% of total day user spending. Overnight users spent US$496 per trip. Indoor overnight accommodation was the highest spending category with 42.7% of total overnight user spending. These estimates were not used in the estimation of economic impacts but rather were based on business surveys.

The impact analysis was developed using a standard IMPLAN (input/output) model focused on the five core counties along the 150-mile trail: Allegheny, Westmoreland, Fayette, and Somerset counties in Pennsylvania and Allegany County in Maryland. Survey data provided by business owners and trail users estimated the scale and categories of spending by GAP tourists in the Trail Impact Zone. Participating businesses were asked to provide their total revenue for 2019 and

estimate the percentage of that revenue that came from GAP users. Revenue for each industry sector was estimated and factored based on location-specific user spending data from the trail user survey and GAP user counts. Characteristics of the GAP Trail businesses survey are highlighted below:

- 44 percent of businesses surveyed were founded primarily to serve GAP users.
- Most GAP businesses are small or mid-sized, with a median staff of 4 employees and median revenue of $100,000 annually.
- GAP businesses offer diverse amenities to both trail users and residents. More than 63% offer more than one key type of good or service.
- 35 percent of GAP businesses are seasonal. Others are open year-round. June – October are generally the busiest months.

The study estimated that the GAP generated US$121.2 million (CDN$162.1 million)[1] in economic impacts in 2019. GAP tourists spent nearly US$75 million (CDN$99.5) in direct impacts on GAP businesses. In turn, this spending produced nearly US$22 million (CDN$29.2 million) in indirect impacts among local businesses within the five counties that supply and support the core GAP businesses. All this activity from the direct and indirect impacts generated additional spillover impacts of nearly US $25 million (CDN$33.2 million) from the spending of the employees and owners of those businesses, which are referred to as induced impacts.

[1] Converted at the annual US$/CDN$ exchange rate of 1.3269 for 2019.

# 4.0 NEW ZEALAND TRAIL EXAMPLE - CENTRAL OTAGO RAIL TRAIL

## 4.1 Background

The Central Otago Rail Trail is a good example of the potential for a rail trail to increase tourism activity in a relatively remote region. It was among the first developed in New Zealand. It is located in Central Otago, a sparsely inhabited region of New Zealand's South Island. The Otago Central Rail Trail is a 152-kilometre, recreational trail that follows the former Otago Central railway line between Middlemarch and Clyde.

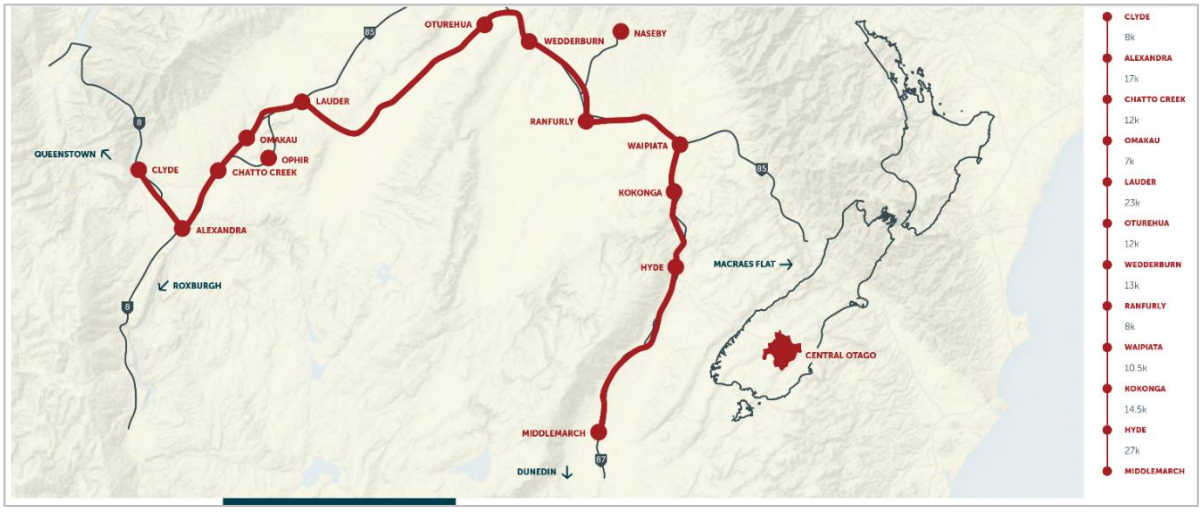



**Figure 4-1 - Central Otago Rail Trail2**

In 1993 the Department of Conservation (DOC) bought the corridor for a recreational reserve. The Otago Central Rail Trail Trust was formed in 1994 to partner the Department, helping raise funds to initially open the Trail. This included the removal of ballast, decking the bridges, improving culverts and adding handrails.

The Rail Trail officially opened fully in 2000 and the teamwork between the Trust and DOC has continued. DOC undertakes the maintenance, while the Trust upgrades the facilities and focuses on development and enhancements. The success of this innovative project inspired the government in 2010 to set up the New Zealand Cycle Trails and support the development of similar trails around the country.

The Central Otago Rail Trail extends from Middlemarch to Clyde, with ten locations enroute, some of which have a population too small to be included in a list of New Zealand towns (less than 1,000 residents). The largest center is Alexandria, with a population of just under 6,000 in 2018. The

[2] Central Otago Rail Trail https://www.otagocentralrailtrail.co.nz/

closest urban center is Dunedin, a city of approximately 100,000 people located 80 km from the start of the trail in Middlemarch.

## 4.2 Ngā Haerenga New Zealand Cycle Trails

The New Zealand Cycle Trail's genesis dates back to a government 'jobs summit' early in 2009. The idea was to build a network of world-class cycle trails that would not only provide a safe and sustainable way to explore New Zealand's special places, but also generate lasting economic, social and environmental benefits for surrounding communities.

The Otago Central Rail Trail was a major inspiration for the New Zealand Cycle Trail. The country's first major off-road cycle touring route, opened in 2000, it repurposed a disused railway as a multi-day trail passing through a series of out-of-the-way towns. Revitalising a quiet corner of the South Island, it had also become the second-largest income earner after farming.

With this success in mind, the government committed a NZ$50 million fund to create a continuous touring route running the length of the country. This funding was matched by an additional NZ$30 million from councils and local organizations, many operating at grass-root level. The Department of Conservation and other key stakeholders were also brought in to help plan the way forward.[3]

The New Zealand Cycle Trails network is made up of the:

- Great Rides: predominantly off-road trails. They showcase the best of New Zealand's landscapes, environment, culture and heritage. The Otago Central Railway became affiliated with the New Zealand Cycle Trails network as a Great Ride in 2012.
- Heartland Rides: Through the Network Expansion Project, a series of on-road cycle touring routes were added to the New Zealand Cycle Trails network. These are known as the Heartland and Connector Rides. The Heartland Rides are mostly on-road routes through scenic landscapes and small towns, and the Connector Rides link the Great Rides and Heartland Rides with urban centres, transport hubs and other key tourist attractions. Heartland and Connector Rides encourage cyclists to use scenic back-country roads where they can experience heartland New Zealand.
- Urban cycle trails: through its Urban Cycleway Programme, Waka Kotahi - the New Zealand Transport Agency has co-funded the building of a number of on-road and off-road cycleways. The cycleways make it easier and safer for cyclists to move through urban centres.
- Up to NZ$8 million is available annually for the maintenance, development and promotion of the New Zealand Cycle Trails.[4]

[3] The New Zealand Cycle Trail Story https://www.nzcycletrail.com/about/the-new-zealand-cycle-trail-story/

[4] Ngā Haerenga New Zealand Cycle Trails https://www.mbie.govt.nz/immigration-and-tourism/tourism/tourism-projects/nga-haerenga-the-new-zealand-cycle-trail/

## 4.3 Economic Impact Studies

**Otago Central Rail Trail Economic Impact and Trends Survey 2008**

In 2005, the Otago Central Rail Trail Charitable Trust developed a survey questionnaire to measure the economic impacts of the Rail Trail on businesses established in communities on the fringes of the trail. In 2008 the Trust repeated the effort to learn more about the successes and problems of businesses and communities affected by the Rail Trail, and administered a second survey to a similar sample in the same area, i.e. the Rail Trail's Middlemarch – Clyde corridor, including the greater Maniototo and Strath Taieri areas.

The survey administered in 2008 assessed the trends and economic impact of the Otago Central Rail Trail (OCRT)on businesses in the areas most affected by the OCRT and was based on the questionnaire used in 2005. However, in 2008 two different distribution methods were utilized: 1) online questionnaires were distributed to businesses with available email addresses and 2) hard-copy questionnaires were posted along with self-addressed, postage-paid return envelopes to businesses without known email addresses.

For the 2008 survey, the majority (68.8%) of respondents were Accommodation Providers, followed by 22% Food and Beverage, 14.7% Retail, 10.1% Tour Operators, 7.3% Transport Providers, and 3.7% representing other types of businesses, including a travel agency, post office, and service station. These results were similar to the 2005 survey results. Results also indicate that the sample comprised two main types of businesses: large businesses with a total turnover of more than NZ$250,000 (32.6%), and small businesses with a total turnover under NZ$10,000 (29.5%).

A total of 552 full-time and part-time staff were reported to be employed and a significant number of these employees are employed part-time, both during the summer and winter seasons. Most business staff earn between NZ$12.50 and NZ$20.00 per hour including 235 part-time staff employed during the summer compared with 147 part-time staff during the winter season.

February and March are the busiest months for businesses on the rail trail whereas June and July are the quietest. A significant percentage (22.6%) of businesses close for four or more weeks during the year and, most commonly, during the months of July and August. However, for 72.6% of the respondents, if there was demand during winter months businesses would operate without stopping.

Nearly one third of respondents (29.7%) reported that the OCRT was very important in their decision to buy or start their business. However, a significant number of respondents (19.8%) affirmed that the rail trail was not at all important in their decision to initiate their business. These results may be attributed to the sample of participants, which included several businesses that are not in fact related to, or greatly impacted by, the rail trail (e.g., big supermarket and petrol station

chains). Moreover, the results show that most of the respondents (46.2%) attribute only 0-20% of their turnover to OCRT users.[5]

**Ngā Haerenga The Great Rides of the New Zealand Cycle Trails: Some Benefits in Relation to Costs**

In 2016 the New Zealand Ministry of Ministry of Business, Innovation and Employment commissioned a cost benefit analysis of the New Zealand Cycle Trails.[6] The analysis was based upon data provided by the Ministry of Business, Innovation and Employment (MBIE) and NZ Statistics, findings from previous trail surveys and the opinions of NZ Cycle Trail experts. These sources were combined with findings from published research. The CBA is evaluative of one year, the year 2015 being when estimates of monthly trail visits based upon electronic counts were available for a suitable analysis.

Benefits were calculated separately for between domestic and international visitors. Domestic visits were further separated for commuters and non-commuters. This secondary separation was required because of the strong belief that non-commuters, composed mostly of tourists, would be prone to spending for food, accommodation and the like while on the trails, whereas commuters would not be prone to doing so. This belief was translated into a simplifying assumption: that only non-commuters would be doing any spending on the trails. Thus, for non-commuters, the main benefits would have been the consumer and producer surpluses arising from their spending, while for commuters, there would also have been benefits not related to such surpluses, such as health-related ones.

The total benefits for the year were estimated at around NZ$49.42 million, exceeding corresponding costs of around NZ$13.92 million and implying net benefits of NZ$35.5 million. An annual benefit of NZ$3.55 or a net benefit of NZ$2.55 was earned for every dollar spent on costs.[7] Note these estimates include only direct economic impacts, not indirect or induced impacts.

## 4.4 Economic Impact of the Otago Central Rail Trail

With the exception of the 2008 survey undertaken for the Central Otago Rail Trail Trust, there are no economic impact studies specific to the OTRC. However the network-wide studies conducted for the New Zealand Ministry of Business, Innovation and Employment contain data on the OTRC, and the findings of these studies can be applied to analysis of the OTRC economic impact. Estimates of trail use for various years are shown below.

[5] Otago Central Rail Trail Economic Impact and Trends Survey 2008 Carla Jellum and Arianne Reis 2009 p. 3-4.

[6] Ngā Haerenga The Great Rides of the New Zealand Cycle Trails: Some Benefits in Relation to Costs (2015 Cost Benefit Analysis) Antong Victorio for the Ministry of Business, Innovation and Employment August 5, 2016.

[7] Ibid. p. 2.

**Table 4.1 - Otago Central Rail Trail Visits**

| Otago Central Rail Trail Visits | | |
|---|---|---|
| **Year** | **Number of Visits** | **Source** |
| 2015 | 17,164 | Ngā Haerenga The Great Rides of the New Zealand Cycle Trails: Some Benefits in Relation to Costs |
| 2020 | 21,848 | 2021 Evaluation of the New Zealand Cycle Trails |
| 2021 | 25,722 | 2021 Evaluation of the New Zealand Cycle Trails |

The 2015 Cost Benefit Analysis estimated that 96% of the OCRT were visits by non-commuters and 4% were visits by commuters, suggesting that trail usage is driven primarily by tourism-related activities. International visitors were inferred as having an average share of use equal to 13.5% of all visits to the network as a whole.[8] Visits to the OCTR by international travelers were estimated at 4,541 visits in 2015.[9]

The final average spending by international visitors in 2015 was estimated at NZ$207.23 per visit per day. On this basis, international spending on the OCTR was estimated at NZ$1.25 million. Average spending on domestic visits was estimated at NZ$173.13 per visitor per day. Total domestic spending on OCTR visits was estimated at NZ$506,207 after accounting for displacement (i.e. shift in expenditures from other domestic purchases). [10]

The study estimated Consumer Surplus benefits, defined in context as dollar indications of satisfaction-related benefits to domestic visitors resulting from a positive difference between what they would have been willing to pay in relation to what they actually paid. Consumer Surplus benefits for the OCTR were estimated to range from NZ$132,869 to NZ$255,518 in 2015.[11]

The study estimated savings from reduced mortality rates from cycling activity. The estimate for OCTR users was an annual benefit of NZ$167,727 for non-commuters and NZ$3,130 for commuters.[12]

**Table 3.2** summarizes estimated OCTR benefits for categories where trail-specific estimates were provided. Total benefits were estimated at NZ$2.2 million (CDN$1.9 million).[13]

[8] 2015 Cost Benefit Analysis pp. 5-6.

[9] 2015 Cost Benefit Analysis p. 7.

[10] 2015 Cost Benefit Analysis p. 8.

[11] 2015 Cost Benefit Analysis p. 13

[12] 2015 Cost Benefit Analysis p. 18.

[13] Converted at the annual 2015 exchange rate of NZ$/CDN$ of .8712.

**Table 4.2 - Otago Central Rail Trail Economic Impacts 2015**[14]

| Otago Central Rail Trail Economic Impacts 2015 (NZ$) | | | | |
|---|---|---|---|---|
| | Non-Commuter | | | |
| | Domestic | International | Commuter | Total |
| Annual Visits | 11,939 | 4,541 | 684 | 17,164 |
| Total Revenue | $506,207 | $1,245,587 | | $1,751,794 |
| Consumer Surplu | $255,518 | | | $255,518 |
| Health Benefits | $167,727 | | $3,031 | $170,758 |
| Total | $929,452 | $1,245,587 | $3,031 | $2,178,070 |

## 5.0 CANADIAN TRAILS

The GAP and the New Zealand trail examples demonstrate the success of trails in local business development and economic impact. In Canada there are also many examples of successful trails built on abandoned rail corridors.

A considerable part of the Trans Canada Trail is composed of repurposed defunct rail lines donated to provincial governments by CP and CN rail and rebuilt as multi use trails. The main section runs along the southern areas of Canada connecting most of Canada's major cities and most populous areas.

### 5.1 Atlantic Canada

In Nova Scotia, almost every section of the Trans Canada Trail and other walking trails are abandoned railways. A small railway line from Musquodoboit Harbour (Musquodoboit Trailway) to Dartmouth is well used by community members and tourists. Another well used section is used from Halifax to New Germany to Yarmouth to Grand Pre.

There have been two recent economic impact studies done on trails in Atlantic Canada. The first was a study on the economic impact of the Confederation Trail on Prince Edward Island in 2012.[15] The Confederation Trail was built on a decommissioned rail line. The main trail is 273 km from west to east - Tignish to Elmira. Branch trails run through small towns and communities including the heart of Charlottetown.

[14] Excluding estimated Producer Surplus benefits.

[15] Economic Impact Study for the Atlantic Canada Trails Association ("Confederation Trail" Prepared for: Atlantic Canada Trails Association Prepared by: Gardner Pinfold November 16, 2012.

The second was a study on the economic impact of the Rum Runners Trail in Nova Scotia. The Rum Runners Trail (RRT) is a 119 km trail connecting two of the province's most visited locations – Halifax and Lunenburg.[16]

These studies used a combination of user counts and surveys to gather data:

- The number of trail users was estimated based on manual counts and data collected using infrared and metal detectors along selected segments of the trail.
- Data on trail users and visits was collected using a combination of onsite and mail-back surveys from users on selected segments of the trail.

For both trails, the data represented only a small portion of actual trail usage on specific segments of the trail. For the Confederation Trail, the sample consisted of 406 surveys representing 910 trail users. For the Rum Runners Trail, the sample consisted of 399 surveys representing 901 trail users. The estimated number of trail visits for each of the trails is shown below, based on the trail counts and survey results.

**Table 5.1 - Atlantic Trails – Sample Visits**

| Atlantic Canada Trails - Sample Visits | | | |
|---|---|---|---|
| | **Day trips** | **Overnight Visits** | **Total Visits** |
| Confederation Trail | 7,341 | 10,565 | 17,906 |
| Rum Runners Trail | 89,494 | 8,851 | 98,345 |

Economic impacts were estimated based on trail user spending estimates derived from the survey data.

**Table 5.2 - Atlantic Trails – Trail Expenditures**

| Trail Related Expenditures $ per person-visit | | |
|---|---|---|
| | **Confederation Trail** | **Rum Runners Trail** |
| Resident Cyclists | $7.08 | $10.82 |
| Resident Pedestrians | $19.05 | $6.60 |
| Visitor Cyclist | $138.11 | $780.45 |
| Visitor Pedestrians | $111.09 | $179.50 |

Comparative estimates of economic impacts for the two trails are shown below.

**Table 5.3 - Atlantic Trails – Estimated Economic Impacts**

| Estimated Economic Impacts (CDN $ Millions) |
|---|

[16] Economic Impact Study for the Rum Runners Trail ("Rum Runners Trail") Prepared for: Rum Runners Trail Committee Prepared by Gardner Pinfold December 2016.

| | Confederation Trail | Rum Runners Trail |
|---|---|---|
| Direct | $2.70 | $4.20 |
| Indirect | $0.30 | $1.50 |
| Induced | $1.10 | $1.10 |
| Total | $4.10 | $6.80 |

Note that these estimates are based on activity on only a portion of each trail.

## 5.2 Quebec

The 256 km Veloroute des Bleuets in Quebec makes a significant contribution to the Sagueny - Lac Saint Jean Economy both through the visitors it attracts and through the investments made. As a major tourist draw it broke a record in 2020 with 290,000 users on its network. The last economic impact study carried out by Veloroute managers in 2017, based on 2016 data, reported total benefits of $11.5 million 238,044 recorded user movements.[17]

## 5.3 British Columbia

In British Columbia the 50 km Okanagan Rail Trail is an example of local government, First Nations and volunteer cooperation to purchase and covert a disused railway to a rail trail. An economic impact study for the Rail Trail predicted 500,000 annual users after five years but that was achieved in the first year and likely significantly surpassed that number in 2020 as COVID-19 drove people outdoors.

Potential economic impacts of the Okanagan Rail Trail were estimated in a 2014 study.18 Trail usage forecasts were developed for six categories of users: Local Walking, Local Resident Cycling, Local Commuting, Regional Commuting, Visitor Subregional, and Visitor. Economic impacts were estimated only for the Visitors. The study estimated direct and indirect impacts of spending by visitors of CDN$ 7.5 million per year by the 15th year of operation.[19]

[17] Veloroute des Bleuets https://veloroutedesbleuets.com/en/about/

[18] Okanagan Rail Trail Impact Assessment Westcoast CED Consulting Ltd. (Vernon, BC) In conjunction with Lions Gate Consulting Inc. (Vancouver, BC) Peak Solutions Consulting Inc. (Kamloops, BC) May 15, 2014.

[19] Okanagan Rail Trail Impact Assessment p. vii.

## 6.0 POTENTIAL ECONOMIC IMPACTS OF THE ISLAND CORRIDOR TRAIL

As noted in the methodology section, economic impacts of public trails are typically estimated based on surveys of trail users and businesses along the trail. Since the Island Corridor Trail does not yet exist, estimates of economic impact are based on experience in jurisdictions with similar existing trails.

Our estimates are based on comparisons with the GAP Trail and Central Otago Rail Trail examples detailed above. It should be emphasized that these are mature trails which have been in operation long enough to build a substantial base of visitors, and for businesses to locate along the trail to serve these visitors. Consequently, our estimates of economic impacts for the Island Corridor Trail should be viewed as an indication of the potential economic impact the trail could have when it has reached a similar level of maturity.

### 6.1 Potential Trail Users

To estimate the potential number of trail users, we have followed the example of the Great Allegheny Gap economic impact study and defined a Trail Impact Zone. For this study, we estimated the population within the Trail Impact zone of the proposed Island Corridor Trail based on census dissemination blocks with centers within a buffer zone 1 km on either side of the trail. Maps for the Island Corridor Trail Impact Zones are shown below:

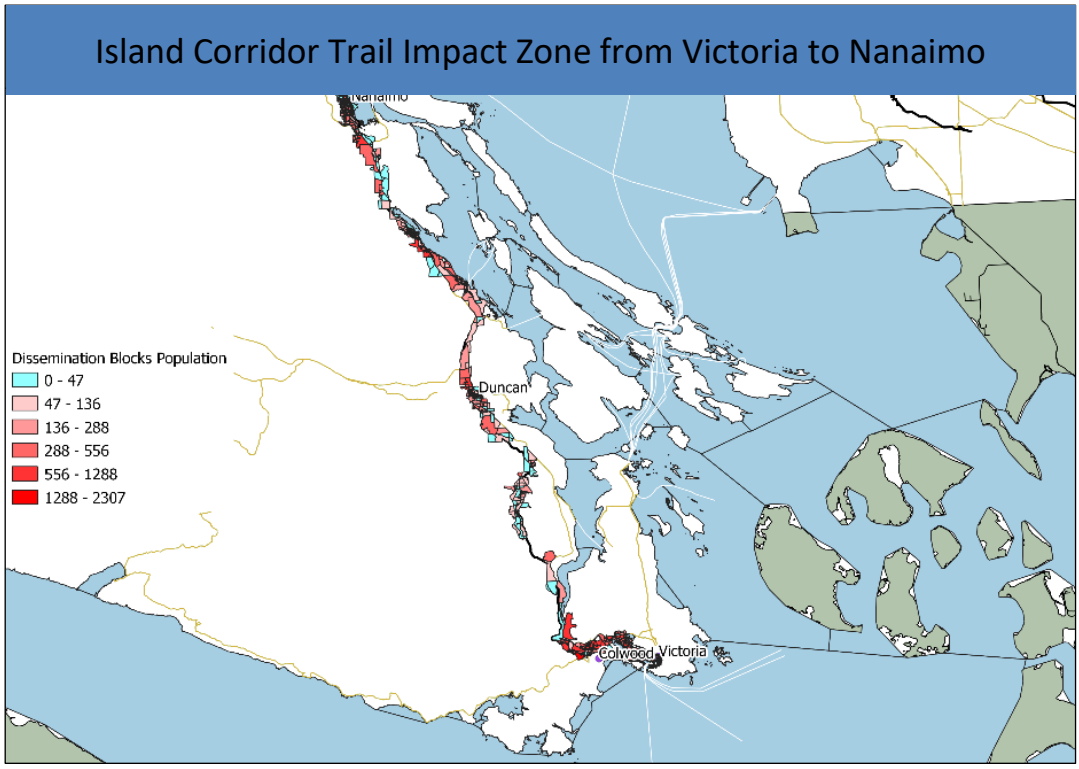



**Figure 6-1 - Island Corridor Trail Impact Zone Victoria to Nanaimo**

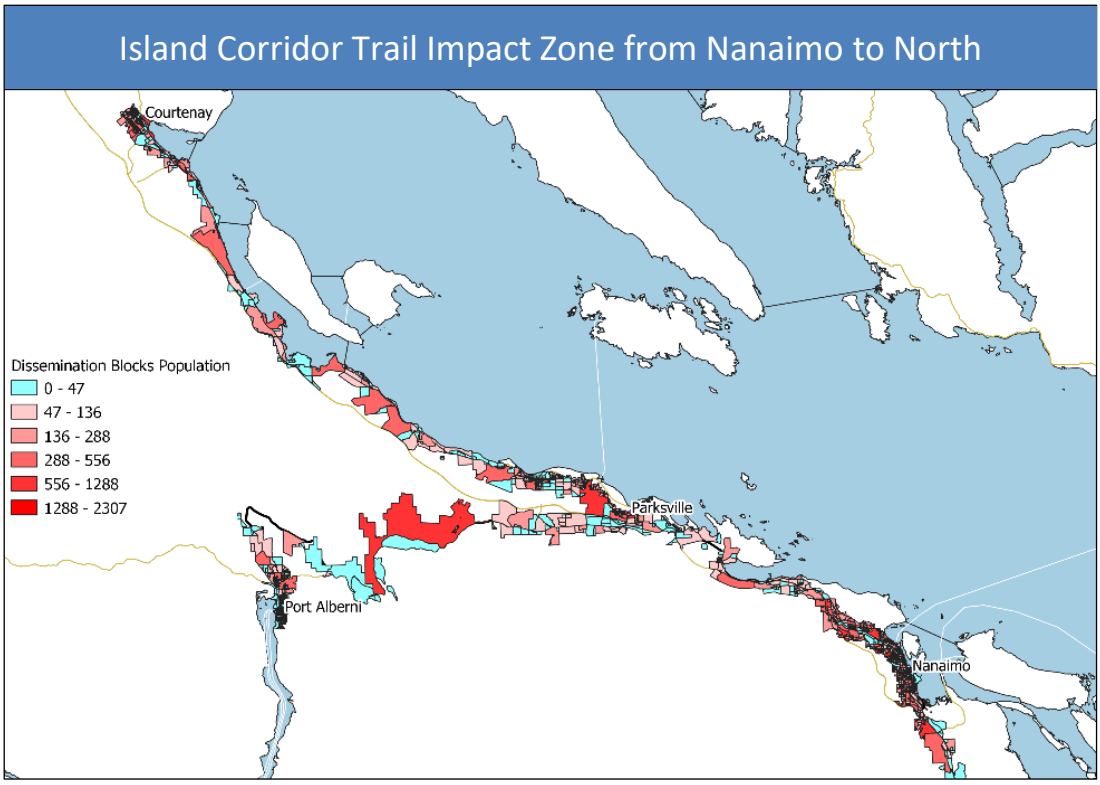



**Figure 6-2 - Island Corridor Trail Impact Zone Nanaimo and North**

We have developed an estimate of potential trail use for the Island Corridor Trail based on the ratio of trail use to Trail Impact Zone population and annual visits for the GAP Trail.

**Table 6.1 - Annual Visits – GAP Trail Actual and Island Corridor Trail Forecast**

| GAP and Island Corridor Trail Impact Zone Day Trips | | | | | |
|---|---|---|---|---|---|
| **Trail** | **2019 Trail Impact Zone Population** | **Day Trips per TIZ Population** | **Day trips** | **Overnight Visits** | **Total Visits** |
| GAP Trail | 211,136 | 4.3 | 914,760 | 75,240 | 990,000 |
| VI Trail | 210,340 | 4.3 | 911,311 | 74,956 | 986,268 |

We assumed that 18% of the day trip users (164,036 visits) were commuters, and the remaining 82% (747,275 visits) were non-commuters.

## 6.2 Economic Impact of the Island Corridor Trail

Typically, economic impacts are broken down into direct, indirect and induced impacts. For example, in the Economic Impact of Tourism in Greater Victoria, BC Final Report, the consultant (Intervistas) described tourism economic impacts as follows:[20]

- Direct Tourism Related Impacts – These are impacts directly associated with employment in tourism in Greater Victoria. This includes employment in all types of accommodation as well as related tourism-oriented services such as restaurants, attractions, tours and transportation.
- Indirect Economic Impacts – These are impacts associated with employment in industries that depend on tourism. For example, wholesalers that supply food to Greater Victoria area restaurants that serve visitors are considered to be providing indirect employment. Indirect employment is generated within industries that supply or provide services to support direct employment.
- Induced Economic Impacts – These impacts stem from expenditure by individuals employed either indirectly or directly. This is often referred to as the "household spending effect". For example, if a hotel employee expands or re-models his/her home using wages earned directly in the tourism industry, this would result in additional (induced) employment in the general economy. The home renovation project would support induced employment hours in the construction industry, the building materials industry, and so forth.

Our approach to estimating direct economic impacts is based on potential average trail visitor spending. The closest approximation we could find to potential visitor spending on the VI Trail was the data collected by Destination Greater Victoria 2019 Visitor Survey Report which found that average spending for visitors to Greater Victoria was CDN $237 per person per day in 2019.[21] We have assumed that the ratio of spending of international trips to domestic trips is the same as that reported in the GAP Trail Economic Impact Study, which results in an average domestic spending per trip for non-commuters of $43 per visit.

Based on these estimates, the potential direct economic impact of the Island Corridor Trail is shown below.

[20] Economic Impact of Tourism in Greater Victoria, BC Final Report by Intervistas for Destination Greater Victoria May 2018 p. 6.

[21] Destination Greater Victoria 2019 Annual Visitor Survey December 2019 p. 26.

**Table 6.2 - Potential Direct Economic Impact of Island Corridor Trail**

| GAP Trail Impact Zone and Total Population 2019 | | | |
|---|---|---|---|
| **Gap Section** | **2019 Trail Impact Zone Population** | **2019 Resident Population** | **2019 Visits** |
| Pittsburgh & Allegheny County PA | 119,670 | 1,221,744 | |
| Pennsylvania's Laurel Highlands | 59,605 | 559,253 | |
| Allegany County Md | 31,861 | 71,445 | |
| Total | 211,136 | 1,852,442 | 990,000 |

Indirect and induced impacts are typically calculated based on multipliers indicating a percentage of the direct spending for indirect and induced impacts. We have calculated the multipliers estimated in the Intervistas study for tourism spending in Victoria in 2018 as 0.50 for indirect impacts and 0.40 for induced impacts.[22]

Our estimates of the total potential economic impact of the Island Corridor Trail are shown below.

**Table 6.3 - Total Potential Economic Impact of the Island Corridor Trail**

| Total Potential Economic Impact of the Island Corridor Trail | |
|---|---|
| | CD$ Millions |
| Direct | $49.9 |
| Indirect | $24.9 |
| Induced | $20.0 |
| Total Economic Impact | $94.8 |

[22] Economic Impact of Tourism in Greater Victoria, BC Final Report P. 2.

# 7.0 GOVERNMENT POLICIES

## 7.1 Government of Canada

### Active Transportation Fund

Since 2015, the Government of Canada has invested in almost 650 km of active transportation trails, bike and pedestrian lanes, and recreational paths. Through the Investing in Canada Plan, the Government of Canada has provided over $236 million for more than 300 active transportation projects from coast to coast to coast, ranging from bicycle storage lockers to complete active transportation networks. In addition, hundreds more infrastructure projects funded by the Government of Canada have included components that promote active transportation.

In March 2021, the Government of Canada announced the Active Transportation Fund, the first dedicated fund supporting the expansion and enhancement of active transportation infrastructure across Canada. The new $400-million fund is part of an eight-year, $14.9-billion public transit investment outlined by Prime Minister Trudeau and Minister McKenna on February 10, 2021. It will support communities as they build vibrant neighbourhoods where people can safely live, work and play. The fund will also help Canadians living in rural communities and places currently without active transportation options to unlock the potential in their communities. The Active Transportation Fund will provide $400 million over five years to support a modal shift away from cars and toward active transportation. The Active Transportation Fund will invest in projects that build new and expanded networks of pathways, bike lanes, trails and pedestrian bridges, in addition to supporting active transportation planning and stakeholder engagement activities.[23]

There are two streams of projects eligible for funding under the Active Transportation Fund:

### A. Planning Projects

Planning projects involve the development or enhancement of formal active transportation strategic planning documents or stakeholder engagement. Eligible planning projects include:

- Research, including case studies, data collection initiatives, mapping of walkability and bikeability, community audits/assessments.
- Public and/or stakeholder engagement and outreach, education programs.
- Policy development, including drafting objectives/actions for inclusion in community land use and/or transportation plans.
- Feasibility studies, business cases, and detailed costing estimates relating to the design of a project or program.

[23] National Active Transportation Strategy 2021 – 2026 Infrastructure Canada 2021 https://www.infrastructure.gc.ca/alt-format/pdf/nats-snta/nats-strat-snta-en.pdf

- Projects which support the implementation of Canada's national active transportation strategy, such as events raising awareness and encouraging the adoption of active transportation.

**B. Capital Projects**

Capital projects involve new infrastructure construction, enhancement of existing infrastructure, and/or improvements to design and safety features that encourage increased active transportation. Eligible capital projects include:

- Building or enhancing infrastructure for active transportation, such as multi-use paths, sidewalks, footbridges, separated bicycle lanes, and connections to other roadways (this could include nature trails and other infrastructure which could support recreation, so long as this infrastructure can be demonstrated to reflect evaluation criteria).
- Enhancing active transportation infrastructure, including design considerations in which there may be no net gain in kilometres of infrastructure, but quality improvements that support greater usage.
- Building or enhancing design features and facilities that promote active transportation, such as storage facilities, lighting, greenery, shade, and benches.
- Building or enhancing safety features which promote active transportation, such as crosswalks, medians, speed bumps, and wayfinding signage.

## 7.2 British Columbia

**B.C. Active Transportation Infrastructure Grants Program**

The B.C. Active Transportation Infrastructure Grants Program provides cost-sharing opportunities for network planning grants and infrastructure grants. Funding from these grant programs supports the development of active transportation infrastructure for all ages and abilities. For example, infrastructure grants fund:

- Multi-use protected travel lanes.
- Pedestrian and cycling safety improvements.
- End-of-trip facilities and other amenities.
- Lighting and wayfinding.

The B.C. Active Transportation Infrastructure Grants Program provides guidance and cost-sharing for B.C. communities to make it easier and safer for people to walk, ride or roll using active transportation modes. There are separate conditions for planning and infrastructure projects.

For Active Transportation Network Planning Grants, the province cost-shares to a maximum of 50%, or $50,000 whichever is less. For Active Transportation Infrastructure Grants, the province cost-shares to a maximum of $500,000 per project.

Provincial cost-share portions are determined by the type and size of community applying for a grant. The percent of eligible funding provided through the program based on the applicant's community profile is shown below:

- Indigenous community or local government(s) working in partnership with an Indigenous community - 80%
- Population less than 15,000 - 70%
- Population between 15,000 to 25,000 - 60%
- Population over 25,000 - 50%

## 7.3 Capital Region District

The Capital Region District developed a Regional Pedestrian & Cycling Masterplan in 2011 which focused on engineering comfortable and accessible walkway and bikeway networks to increase the mode share of walking and cycling.[24] It included a comprehensive bikeway network that links the entire region.

The 17 km E & N Rail Trail project is the most recent addition to the 84 km Regional Trail system which includes the Galloping Goose (55 km) and the Lochside Trail (29 km). In 2007, funding was secured and engineering design commenced for the E & N Rail Trail. In 2009, construction started on Phase 1 of the trail which included 6.6 km of new trail within the E&N Rail Corridor. Phase I (45% of the complete trail) provided a 14.3 km contiguous route from Esquimalt Road in the City of Victoria to Jacklin Road in the City of Langford using newly constructed rail trail, sections of the Galloping Goose Regional Trail and cycling lanes and sections on municipal roadways. The report included a detailed map of the E & N Rail Trail Development Plan.[25]

**Figure 7-1 - E & N Rail Trail Victoria**

[24] Regional Pedestrian & Cycling MasterplanAlta Plannng and Design for the Capital Regional District March 2011.

[25] Regional Pedestrian & Cycling Masterplan p. 24.

The total cost of the project is estimated at $36 million dollars. This cycling and pedestrian trail is being constructed largely within the E&N rail corridor. The E&N Rail Trail-Humpback Connector is being built in phases over a number of years and will be 17 kilometers in length when complete. To date, 13 km of the trail is open for public use.

Work is currently under way on the section of the trail from Esquimalt Road to the Johnson Street bridge (Kimta E&N Connector). This section of trail will link the E&N Rail Trail to the Galloping Goose Regional Trail just west of the Johnson Street bridge, in the City of Victoria. The CRD will develop the trail section between Esquimalt Road and Catherine Street and the City of Victoria will construct the remainder. Construction began in 2022 and is expected to be complete in 2023. The CRD received a $1 million BC Active Transportation grant (2019) from the BC Ministry of Transportation & Infrastructure to assist in this project.

The overall trail project has been strongly supported by the federal government through the Regionally Significant Projects, Strategic Priorities Gas Tax funding ($14 million), and the Western Economic Diversification Fund ($1 million), and by the Province of BC through Bike BC ($2.7 million) and Local Motion funding ($275,000). The CRD has covered all costs that are not encompassed by grant funding.

The project includes safety improvements at the rail crossings which are required to meet Transport Canada's Canadian Railway-Roadway Grade Crossings Standards. It includes specific intersection safety upgrades (barriers, signals and pedestrian crossings) which must be put in as part of the trail construction process.

## 7.4 City of Nanaimo

Nanaimo's current cycling network is made up of two primary north-south off-street multiuse trails along the Inland Island Parkway and E&N Railway. The network also includes several other trails within the City's parks and along the Waterfront Pathway, and a number of signed on-street bicycle routes. The E&N is the spine of the network connecting many of Nanaimo's most important destinations with gentle, consistent grades.[26]

Master Plan proposed a medium-long term bicycle network consisting of a dense network of bicycle facilities throughout the City, particularly in areas with high cycling potential and within mobility hubs. The proposed network included several high-quality north-south multiuse pathways as mobility spines, focusing on enhancing the existing E&N Trail, Harbourfront Pathway, and Parkway Trail.

[26] Nanaimo Transportation Master Plan May 26, 2014, P. 49.

In 2016 the City completed an E&N Downtown South Alignment Study to identify a feasible alignment for future development of a trail along the E&N Corridor through south and downtown Nanaimo. [27]

Due to newer rail safety regulations and constraints within the Downtown, construction of the E&N Trail is anticipated to be significantly more challenging and costly than existing segments. To address these challenges, the study identified trail alignment, preliminary design and estimated cost for the trail from Franklyn to Seventh streets that balanced user comfort, viability, cost and met rail safety requirements. Findings from the study were presented to the Council at their June 20, 2016 meeting. Considering the strong influence, the presence of active rail had on the alignment selected and the upgrades required to construct the trail, Council received the Alignment Report but deferred construction until greater certainty about the future status of active rail is achieved.[28]

[27] E&N Rail Corridor Downtown South Alignment & Costing Study Summary – Final LANARC for the City of Nanaimo April 2016.

[28] "E&N Trail - Downtown South City of Nanaimo" https://www.nanaimo.ca/your-government/projects/e-n-trail---downtown-south

# 8.0 COST ESTIMATE

A Class D cost estimate for the construction and design of the proposed Island Corridor Trail project was generated. The cost estimate was determined using rates of labour, equipment and materials commonly used on Vancouver Island and was produced in the absence of a detailed design, where design parameters were assumed and the quantities and productions were based on the assumed parameters. Construction costs were calculated by multiplying the costs plus 20% margin per kilometer as expected to be priced by civil contractors across the total 290-kilometer trail length. Subsequent to this, additional costs for rock fall mitigations, at-grade crossing improvements, and bridge upgrades were added to the cost estimate. The purpose of this cost estimate is to provide the Government of British Columbia a budget to determine the feasibility of the project.

## 8.1 Methodology and Crew Build

Based on the assumed scope of work, the construction tender is to be divided into four categories: bridge upgrades, at-grade crossing improvements, rock fall protection, and civil construction. Fixed cost estimates have been assigned to the bridge upgrades, at-grade crossing improvements, and rock fall protection categories; however, a detailed cost breakdown was developed for the civil construction scope based on a per kilometer basis, as civil construction cost comprises the majority of the total project cost. A detailed construction methodology was formulated, and costs were then assigned to the various elements of the methodology. Once the costs were totaled, a 20% margin was added, 10% for overhead and 10% for profit.

## 8.2 Civil Construction

The cost estimate takes into consideration the construction of the trail path structure, which requires two trail construction crews (A and B). Additionally, a clearing and grubbing crew (C) was included to replace the topsoil with approved granular fill. An onsite transport crew (D) was assigned to move gravel and waste to and from the construction location and dump truck access. Tandem and Pup dump trucks were allocated for the transportation of gravel to the site, and waste to the dumpsites. Furthermore, the falling and paving scopes were assumed to be subcontracted by the civil contractor at assumed local rates.

The width of the proposed trail is 4.0 meters which is in accordance with the recommended guidelines for active transportation design in British Columbia. As per these guidelines, a desirable shared multi-use pathway width ranges from 3.0 to 4.0 meters, with a minimum constrained width of 2.7 meters.

An embankment slope ratio of 1:2 was assumed for the proposed trail. The British Columbia Active Transportation Design Guidelines recommend that the shoulder width be expanded to 1.5 meters or that safety rails be installed when the slope is steeper than 1:1 and the drop exceeds 0.3 meters, or when the slope is steeper than 2:1 and the drop exceeds 1.2 meters. While a wider shoulder or safety rail would be desirable to enhance safety measures, it may not be economically feasible to

implement these measures. The feasibility of incorporating such measures should be evaluated during the design phase. The cost for additional shoulder width or safety rail was not considered in civil construction estimate.

The development of this trail will include the installation of road crossings, signage, access barriers, trailheads, and destination locations, as well as measures to prevent erosion, address steep slopes, ensure drainage, and provide a support infrastructure.

## 8.3 Trail Surfacing

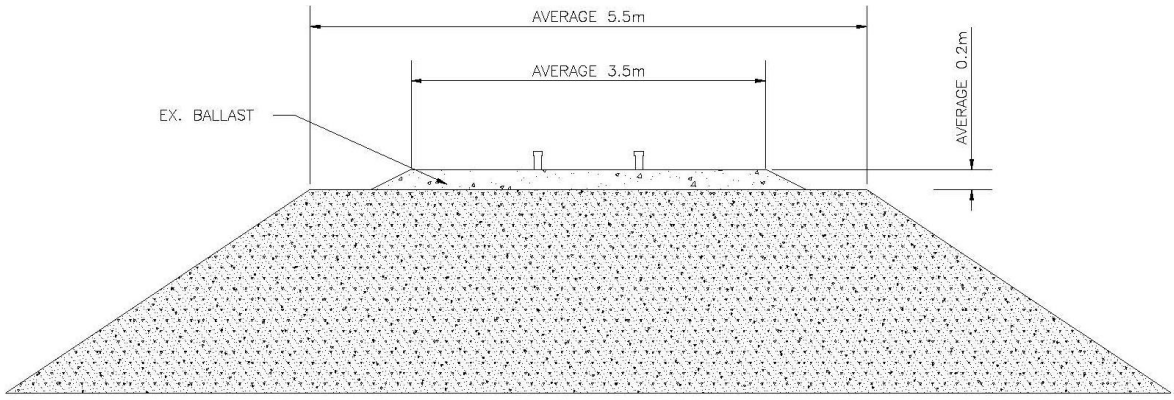
The primary surface of the proposed trail will be prepared with the compacted aggregate, however, asphalt paving will be provided along the sections passing through the settlements and municipalities. It was estimated that 25% of the trail will be paved with asphalt, while the remaining 75% of the trail will be composed of a compacted gravel surface.

The information shared about the Okanagan Rail Trail suggests that the existing rail structure on the trail has been found to be adequate as subgrade once it has been blended, graded, and compacted. However, if unsuitable materials are encountered during construction, it's crucial to seek geotechnical recommendations to ensure that the trail's stability and safety are not compromised. In areas where paving is not considered, it is recommended to add an additional 150mm thickness surface of high fines or 19mm crushed aggregate. This type of aggregate provides a good running and cycling surface for trail users.

Widening the width of the existing embankment in certain narrower sections may be necessary to accommodate the proposed 4.0-meter-wide trail with the appropriate side slopes. This critical step will ensure that the trail is safe, functional, and accessible to all users. Once the embankment has been widened to the required width, the subgrade will need to be graded and compacted to achieve an adequate structure and sufficient drainage. Finally, to provide a durable and suitable surface for running and cycling, a layer of 150mm thickness of high fines 19mm crushed aggregate can be placed, prepared, and compacted.

## 8.4 Typical Railway Track Cross Section

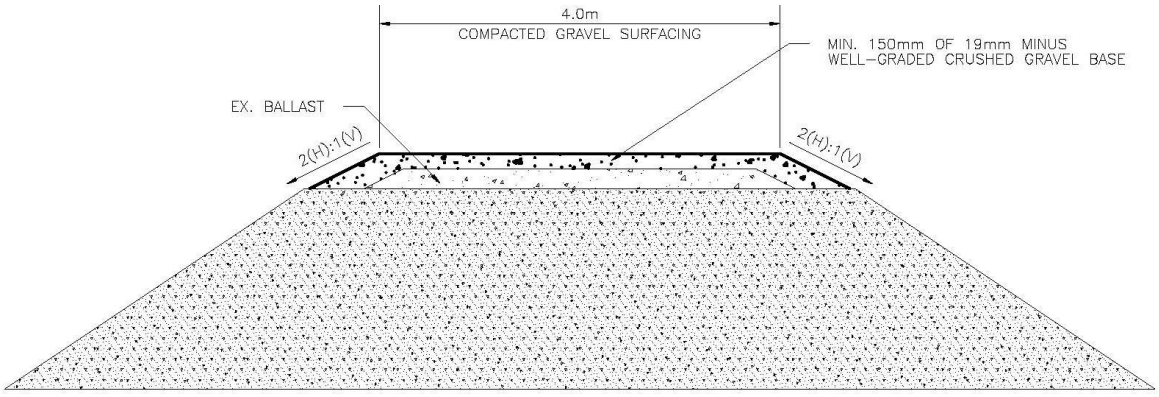
The original railway infrastructure included a rail base that was covered with a layer of ballast, approximately 200mm in thickness. Ballast refers to a homogenous material composed of large rocks, measuring approximately 50-75mm in size. As per information provided by FOTR-VI, the top of the railway embankment is 5.5 meter wide with ballast about 3.5 meter wide. The embankment side slope ratio is 1:1.5. The typical railway cross section is shown below.



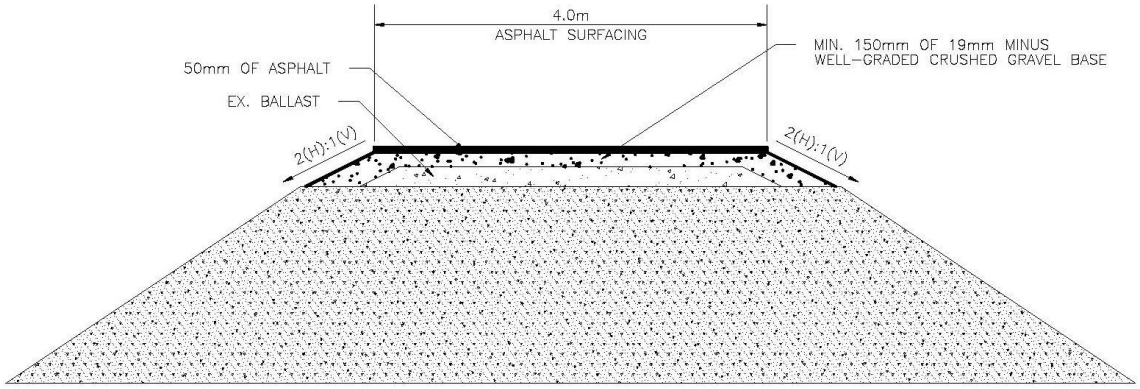

TYPICAL RAILWAY TRACK CROSS SECTION

## 8.5 Cross Sections of the Proposed Trail

The proposed trail will be constructed to a basic width of 4.0 meters, which may be narrowed to a range of 3.0-3.5 meters in areas where space is limited. The embankment slope ratio of 1:2 was assumed, and railing may be installed where drop is more than 1.2 meters. The proposed cross sections of the trail with asphalt surfacing and without asphalt surfacing are shown below:




PROPOSED CROSS SECTION WITHOUT ASPHALT




PROPOSED CROSS SECTION WITH ASPHALT

## 8.6 Bridges

**Vertical Clearance**

The Island Rail Corridor Condition Assessment Report (2020), which was prepared by the Ministry of Transportation and Infrastructure (MOTI), provides crucial insights into the condition of the railway bridges along the rail corridor. According to the report, several bridges that pass over roadways have lower vertical clearance than the MoTI standard of 5.0 meters required for new bridges.

Specifically, the Shawnigan Lake Road Bridge (mile 26.80) and Koksilah Road Bridge (mile 35.60) were found to have excessively low vertical clearances of 3.40 meters and 2.90 meters, respectively. These clearances fall significantly below the required standard, which raises concerns about the safety and accessibility of these bridges for both road and potential trail users.

Raising of these two bridges to a standard height was included in cost estimates. The cost for the pedestrian and cycling bridges was assumed to be $5.0 millions each. This cost was based on a recently designed pedestrian and cycling bridge along Galloping Goose trail which will cross Sooke Road near Ocean Boulevard in the City of Colwood.

**Bridge Decking**

There are 40 bridges between Langford and Courtenay but only 8 are ballasted. The other 32 brides are open decked and will require decking and rails. On the Port Alberni Spur, only 1 is ballasted among the 19 bridges. The other 18 bridges will require decking and rails. The average cost for decking and railing was assumed to be $260,000 for each bridge based on the decking and railing replacement cost at Charters Trestle Bridge on Galloping Goose Trail.

## 8.7 Rockfall

Proper management of rockfall is essential for ensuring the safety of pedestrians and cyclists using the proposed trail through mountainous areas. Rocks falling onto the trail pose a significant risk to their safety, and as such, it is imperative to implement rockfall mitigation measures. These typically include the use of rockfall meshes and rockfall detectors.

To address the issue of rockfall along high-risk areas, such as those found along the Island Rail Corridor, mitigation measures have been put in place. The 2009 Hatch Mott MacDonald Evaluation of the E&N Rail Corridor: Baseline Report identified several potential rockfall sites at Mile 15.6, 15.7, 16.2, and 16.3 on the Victoria Subdivision. The report noted the presence of active rock faces with freshly fallen material in the ditches and significant cracking between the blocks.

In light of these findings, an allocation of $2.0 million has been set aside for rockfall mitigation measures aimed at reducing public exposure to risk. This cost includes the installation of signage at each section. However, accurately estimating the cost of rock scaling, another possible mitigation measure, can be challenging. This is because each section may have varying access, competence of rock, and past maintenance measures. Therefore, further refinement of the estimated cost is necessary during the detailed design stage.

## 8.8 Grade Crossings

A level grade crossing is a type of crossing where a road or pathway intersects a trail. In the Island Rail Corridor, which covers both the Victoria and Port Alberni Subdivisions, there are a total of 236 at-grade crossings, including pedestrian crossings. These crossings are categorized as either passive crossings, which are non-signalized, or active level crossings, which are signalized. Upgrades to these crossings can range from doing nothing to installing pedestrian flashers or pedestrian controlled signals with advanced warning flashers.

Determining the appropriate treatment for each crossing can be achieved through the use of guidelines such as the Transportation Association of Canada (TAC) Pedestrian Crossing Control Guide and Bikeway Traffic Control Guidelines. Consistency in crossing treatments is also crucial to ensure that trail users and vehicles alike know what to expect at each crossing along the corridor. In general, trail users should have the right of way, and vehicles should be required to stop, although this may be reversed in cases where the crossing involves a highway or a busy roadway. As such, it is recommended that these crossings undergo technical review and updating using field surveys and the most current available traffic data, while also complying with jurisdictional standards during the detailed design process.

To cover the cost of grade crossing improvements along the proposed trail, an amount of $10.0 million has been allocated based on engineering judgement.

## 8.9 Assumptions

- The cost of converting the existing Island Rail Corridor to Island Corridor Trail was determined by calculating the cost per kilometer of the transition.
- The cross section of the trail is assumed to have a width of 4m and a 1:2 embankment slope ratio.
- A topsoil stripping and backfill depth of 0.5m is assumed to be present on both sides of the existing railway ballast.

- It is estimated that 25% of the trail is paved with asphalt, while the remaining 75% of the trail is composed of a gravel surface.
- As per the local estimates on Vancouver Island, the cost of asphalt paving is estimated to be $70.00 per square meter.
- The cost of Excavator and Dozer equipment were calculated by applying a twenty percent reduction (of included profit and overhead) to the Island Equipment Owners Association rates and adding a ten percent fuel surcharge.
- The cost of operation of Excavators and Dozers were estimated to reflect an Island Equipment Owners Association rate, factoring in a 20% reduction of incorporated profit and overhead, and a subsequent increase of 10% for fuel surcharge.
- The contractor's profit margin is anticipated to be 20% of the cost per kilometer.
- In order to ensure the minimum vertical clearance for two bridges and the safety of cyclists, an estimated budget of 10 million for elevation of 2 bridges and 2 million for rock fall mitigation was allocated. Further, an amount of 13 million was allotted for the decking and railing of 50 bridges and 12 million for the improvement of at-grade crossings.
- Engineering cost and contingency were estimated at 10% and 15% respectively of the total project cost.

Based on the assumptions that asphalt surfacing is provided along 25% of the total trail length, the civil construction cost of the entire trail amounts to approximately **$101,231,163**. With additional bridge upgrades, at-grade crossing improvements, and rockfall mitigations, raising the total construction cost to approximately **$138,231,163**. Furthermore, a 10% engineering/consulting cost and a 15% contingency increases the total budgetary value including all aspects of the project to a grand total of **$172,788,954**. A detailed cost breakdown is illustrated in **Table 8.1**.

**Table 8.1 – Breakdown of Trail Cost**

| S. No | Task | Unit | Quantity | Rate | Total |
|---|---|---|---|---|---|
| | | | | | |
| **1** | **Path Structure (Crew A)** | | | | |
| A | Class 1 Dozer/Grader A | Hours | 60 | $128 | $7,656 |
| B | 7 Tonne Roller A | Hours | 60 | $128 | $7,656 |
| C | Diesel Plate Compactor, Bare | Hours | 30 | $25 | $750 |
| D | Grades Person A | Hours | 60 | $56 | $3,360 |
| E | 19mm Minus | Tandem Load | 91 | $163 | $14,850 |
| | | | | | |
| **2** | **Path Structure (Crew B)** | | | | |
| A | Class 1 Dozer/Grader B | Hours | 60 | $128 | $7,656 |
| B | 7 Tonne Roller B | Hours | 60 | $128 | $7,656 |

| | | | | | |
|---|---|---|---|---|---|
| C | Diesel Plate Compactor, Bare | Hours | 30 | $25 | $750 |
| D | Grades Person B | Hours | 60 | $56 | $3,360 |
| E | 19mm Minus | Tandem Load | 91 | $163 | $14,850 |
| | | | | | |
| **3** | **Asphalt 50mm (25% of Total Length)** | | | | |
| A | Paving Subcontractor Task | Square Meter | 1000 | $70 | $70,000 |
| | | | | | |
| **2** | **Falling** | | | | |
| A | Falling Subcontractor Task | Lump sum | 1 | $10,000 | $10,000 |
| | | | | | |
| **3** | **Clearing and Grubbing (Crew C)** | | | | |
| A | Class 6 Excavator C | Hours | 15 | $135 | $2,020 |
| B | Dump Fees | Tandem Load | 15 | $175 | $2,625 |
| | | | | | |
| **4** | **Topsoil Stripping and Backfill (Crew C)** | | | | |
| A | Class 6 Excavator C | Hours | 45 | $135 | $6,059 |
| B | 7 Tonne Roller C | Hours | 45 | $128 | $5,742 |
| C | Dump Fees | Tandem Load | 93 | $50 | $4,654 |
| D | Approved Fill | Tandem Load | 93 | $163 | $15,125 |
| | | | | | |
| **5** | **Onsite Transport** | | | | |
| A | 25 Tonne Rock Truck | Hours | 60 | $163 | $9,768 |
| B | Class 6 Excavator D | Hours | 60 | $135 | $8,078 |
| C | 6 mm Poly Sheet | Each | 5 | $75 | $375 |
| | | | | | |
| **6** | **Offsite Haul and Import** | | | | |
| A | Tandem and Pup | Hours | 422 | $163 | $68,705 |
| | | | | | |
| **7** | **Miscellaneous** | | | | |
| A | Mob/Demob | Lump sum | 1 | $3,000 | $3,000 |
| B | Traffic Control | Lump sum | 1 | $1,000 | $1,000 |
| C | Erosion Control | Lump sum | 1 | $2,000 | $2,000 |
| D | Testing | Lump sum | 1 | $6,000 | $6,000 |
| E | Supervision | Hours | 60 | $120 | $7,200 |
| | | | | | |
| **8** | **Contractor Profit** | | | | |
| A | 20% Profit | Percent | | 20% | $58,179 |
| | | | | | |
| | **Civil Construction Cost per Km** | | | | **$349,073** |
| | **Total Civil Construction Cost of the Trail** | | | | **$101,231,163** |
| | Raising Vertical Clearance of Bridges | Each | 2 | $5,000,000 | $10,000,000 |
| | Railing & Decking of Bridges | Each | 50 | $260,000 | $13,000,000 |

| | | | | | |
|---|---|---|---|---|---|
| | Falling Rock Mitigations | | | | $2,000,000 |
| | At Grade Crossing Improvements | | | | $12,000,000 |
| | **Total Construction Cost** | | | | **$138,231,163** |
| | Engineering (10%) | | | | $13,823,116 |
| | Contingency (15%) | | | | $20,734,674 |
| | **Total Cost of Trail** | | | | **$172,788,954** |

## 8.10 Construction Economic Impacts

Total economic impacts of construction activities related to the Island Corridor Trail include direct, indirect, and induced impacts. The total cost estimates above represent the direct economic impacts. Indirect and induced impacts have been estimated using the most recent available multipliers from Statistics Canada (2019).[29] Estimated economic impacts are shown in **Table 8.2**.

**Table 8.2 – Island Corridor Trail Construction Economic Impacts**

| **Economic Impact – Island Corridor Trail Civil Construction** | | | |
|---|---|---|---|
| | **Total Cost CDN$ Millions** | **Multiplier** | **Economic Impact CDN$ Millions** |
| Direct Economic Impact | $101.2 | 1.00 | $101.2 |
| Indirect Economic Impact | $101.2 | 0.822 | $83.2 |
| Induced Economic Impact | $101.2 | 0.438 | $44.4 |
| **Total** | | | **$228.8** |
| | | | |
| **Economic Impact – Island Corridor Trail Civil Construction with Bridge Upgrades, Crossing Enhancements & Rockfall Mitigation** | | | |
| | **Total Cost CDN$ Millions** | **Multiplier** | **Economic Impact CDN$ Millions** |
| Direct Economic Impact | $172.8 | 1.00 | $172.8 |
| Indirect Economic Impact | $172.8 | 0.822 | $142.0 |
| Induced Economic Impact | $172.8 | 0.438 | $75.7 |
| **Total** | | | **$390.5** |

As shown in the above table, the indirect and induced economic impacts are expected to be $83.2 millions and $44.4 millions respectively for Civil Construction Cost Estimate and $142.0 millions and 75.7 millions respectively for the Total Project Cost Estimate.

[29] Multipliers for Transportation Engineering Construction Statistics Canada Input-output multipliers, detail level 1 2 3 Table: 36-10-0594-01 Released 2022-12-13.

## 9.0 RAPID HEALTH IMPACT ASSESSMENT

The purpose of this report is to provide an evidence-based Rapid Health Impact Assessment (HIA) of the proposed conversion of the existing rail corridor into an active transportation trail as part of the Feasibility Study of the project. The HIA was conducted within a week and is a desktop exercise utilizing available literature and information. The assessment is intended to emphasize the potential positive health, social and economic benefits of the proposed project.

The HIA evaluates the potential human health implications of the proposed project and its distribution within the community. The HIA highlights the importance of active transportation in developing and maintaining health in a population and provides an overview of the potential effects of the proposed project. The conclusion of the HIA is that the proposed project has the potential to yield positive health benefits for the community.

The following main tasks were included in the Rapid HIA:

- Providing a high-level Baseline Health/Community Profile for the study area.
- Conducting a high-level economic benefit assessment using the World Health Organization's Health Economic Assessment Tool (HEAT).
- Identifying opportunities/challenges; make recommendations.
- Documenting findings in Rapid HIA report.

The Health Impact Assessment (HIA) of an active transportation has identified a number of primary benefits associated with its implementation. These include improved mental and physical health, increased accessibility, reduction in air pollution, reductions in noise and congestion, and increased social cohesion. These findings suggest that active transport has the potential to provide multiple health and environmental benefits, which could lead to improved quality of life for individuals and communities.

A baseline health profile was conducted to provide contextual information regarding population and demographic, socioeconomic, housing, transportation, and health status characteristics of the general study area encompassing the regional districts of Alberni-Clayoquot, Capital, Comox Valley, Cowichan Valley, and Nanaimo. The baseline health profile is intended to provide insight as to how the proposed project may affect the individuals living in these communities.

The Health Economic Assessment Tool (HEAT) was used in this Rapid Health Impact Assessment (HIA) to estimate the potential economic benefit of converting the Island Rail Corridor into an Active Transportation Trail. The feasibility study was used to determine the potential frequency of usage for the converted corridor. The estimated economic benefit of this project was found to be greater than $200,000 CDN per year, resulting from the prevention of 0.04 premature deaths per year in the five regional districts. This finding suggests that the conversion of the Island Rail Corridor would provide a significant economic and social benefit to the local population.

The overall recommendations from the Rapid HIA are as follows:

- Enhancing active transportation infrastructure in Vancouver Island by converting the Island Rail Corridor into an Active Transportation Trail would not just enhance the physical and mental health and wellbeing of communities in the region, but also lead to economic benefits for the province in the short and long terms.
- Design the proposed Island Corridor Trail so most residents of the Regional District of Alberni-Clayoquot can benefit from engaging in active transportation.
- Engage with the local communities and First Nations along the proposed trail to ensure their feedback and concerns are taken into consideration, and a proposed Island Corridor Trail works in the interests of most communities/Nations.
- Design a proposed Island Corridor Trail to suit the needs and abilities of most demographics, including children, youth, older adults, and individuals with ability challenges.
- Ensure that a proposed Island Corridor Trail is designed and connected to other active transportation features in the vicinity.
- Ensure safety and security for women and others is considered in the planning and design of the active transportation trail.

A detailed Rapid Health Impact Assessment Report is included in **Appendix A** of this report.

# Appendix A

# Rapid Health Impact Assessment Report

# A Rapid Health Impact Assessment (HIA) for a Feasibility Study to Convert the Vancouver Island Rail Corridor to an Active Transportation Trail

## FINAL REPORT

PROJECT 401924

PREPARED FOR FRIENDS OF RAILS TO TRAILS – VANCOUVER ISLAND (FORT-VI)

Friends of Rails to Trails – Vancouver Island (FORT-VI)
#303 104 Esplanade, Nanaimo, BC V9R 0G6

January 18, 2023

SCIENCE INTEGRITY KNOWLEDGE

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# 1. Introduction

A growing body of research identifies that the way our communities and transportation systems are designed, built and operated can impact the health of residents. Transportation can have enormous positive health impacts, especially active transportation, which has tremendous health and social benefits. Well-connected and well-maintained active transportation trails are an accessible mode of transportation that enable individuals of all ages to travel safely and, at the same time, increase the social capital and cohesion within a community. Prioritizing safe active transport infrastructure not only encourages active transportation behaviour, leading to higher levels of physical activity and reducing the risk of obesity, but also promotes better social cohesion within a community. Mental health within a community is a function of a number things related to overall safety and security, availability of discretionary time, stress due to traffic congestion, and access to healthy food sources as well as means of affordable and accessible transportation. A vast body of literature exists demonstrating the significant positive physical and mental health impacts related to regular active transportation.

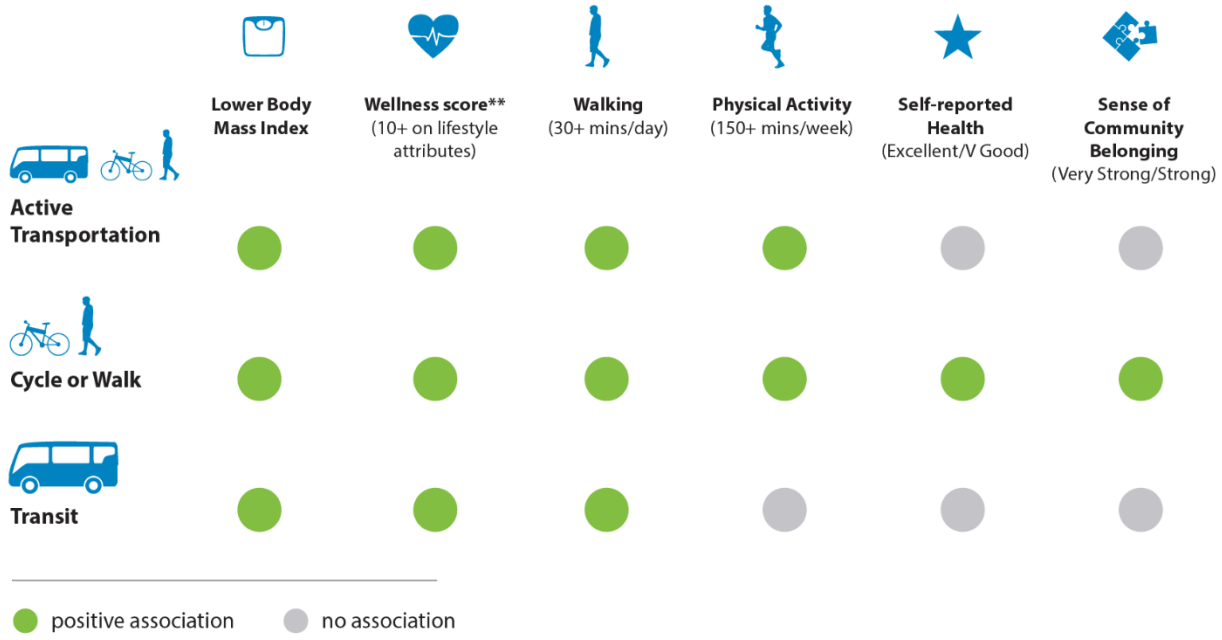


**Figure 1.** Self-Reported Health and Health Behaviour of Metro Vancouver Residents as Indicated in the 'My Health My Community Survey' conducted in 2013-2014.

***Note**: Controlled for: age, gender, income, education, ethnicity, chronic diseases, commute time, weekly physical activity, time in Canada, 5 minutes to transit stop.*
*** Lifestyles characterised by eating 5+ servings of fruits or vegetables a day, 30+ minutes of walking a day, 150+ minutes of moderate or vigorous physical activity a week, and not smoking.*

**Figure 1** above shows results from a self-reported health and health behaviour survey of Metro Vancouver residents. Residents positively associate cycling and walking with: a lower body mass index; overall wellness; achieving 30+ minutes of walking per day and 150+ minutes of physical activity per week; excellent or very good self-reported health; and very strong or strong sense of community belonging. Transportation, specifically active transportation, connects us to our communities, our place of work and our friends and family. The way transportation infrastructure is designed and the modes of

transportation that we have access to, especially active transportation, impact our lifestyle and our health.

Evidence shows that well-planned, connected and accessible active transportation systems influence our health by increasing our physical activity, improving air quality and reducing vehicle injuries, leading to overall better physical and mental health.

According to the British Columbia Centre for Disease Control (BCCDC), in 2015, the estimated annual economic burden from physical inactivity in the province was $983 million (CDN). About 45% of British Columbians are overweight or obese, and the rate of obesity in BC children has nearly tripled in the past 25 years. One of the main aims of BC's Active Transportation Strategy (2019)[1] is to reverse this trend by doubling the percentage of trips taken with active transportation by 2030, and making active transportation choices like walking and cycling more convenient and comfortable, so that physical activity becomes part of the daily rhythm of life. A study of the City of Vancouver's Comox-Helmcken Greenway Corridor's impacts on health found that survey participants near the greenway doubled their odds of achieving 20 minutes of moderate and vigorous physical activity daily (Frank et al., 2019).

Federally, the Active Transportation Fund[2] set up by the Government of Canada is expected to provide $400 million over five years to make travel by active transportation easier, safer, more convenient and more enjoyable. This funding is in support of Canada's first National Active Transportation Strategy (2021 – 2026)[3]. Both provincially in BC and more widely in Canada, there are policies and plans in place to boost active transportation within communities. Recently, in December 2022, Comox Valley Regional District received funding from the Active Transportation Fund (Infrastructure Canada, 2021) to begin construction of the Lazo Greenway in partnership with the Town of Comox. Funded by the federal government, the project is expected to add 2.5 km of gravel and asphalt pathway from Butchers Road to Sand Pines Road, install directional, informational, and cautionary signage, add pedestrian road crossings, and improve landscaping. Once built, the Greenway would also provide better connection within the region and ensure a safe route for active transportation.

## 1.1. Aims of the Rapid HIA

In keeping with BC's Active Transportation Strategy (2019), we have utilized a health and social lens when evaluating the potential positive health benefits of converting the Vancouver Island Rail Corridor to an active transportation trail. The overall aim of the Rapid HIA is to provide the Friends of Rails to Trails (FORT-VI) with additional health and related information as part of the Feasibility Study of converting the Vancouver Island Rail Corridor into an active transportation trail, and to emphasize the positive health, social and economic benefits of such a proposed project.

# 2. Approach and Methods

A Health Impact Assessment (HIA) is an evidence-based process that evaluates broad potential human health implications, both positive or negative, of a project or policy on community health and the

[1] Move Commute Connect: BC's Active Transportation Strategy (2019). Available: https://www2.gov.bc.ca/assets/gov/driving-and-transportation/funding-engagement-permits/grants-funding/cycling-infrastructure-funding/activetransportationstrategy_report_web.pdf

[2] National Active Transportation Fund. Available: https://www.infrastructure.gc.ca/trans/index-eng.html

[3] Infrastructure Canada, National Active Transportation Strategy 2021-2026. Available: https://www.infrastructure.gc.ca/alt-format/pdf/nats-snta/nats-strat-snta-en.pdf

distribution of those impacts within the community. It is a tool that can help communities, decision makers, and practitioners make choices that improve public health by enhancing community design that is geared towards the development of healthy communities. It allows a study team to establish a series of social determinants of health, in consultation with the community and key rightsholders / stakeholders, that can be assessed to determine whether a proposed scenario (e.g., converting Vancouver Island Rail Corridor into an active transportation trail) poses any health benefits or concerns to segments of the local population based on current and predicted future environmental conditions, and what recommendations may be useful to address these concerns and further enhance any potential positive impacts. HIAs serve as vehicle for the public and rightsholders / stakeholders to gain understanding about both the potential beneficial and non-beneficial health impacts of a project, allowing for a balanced overview of options moving forward.

## 2.1. HIA Framework

Depending on their scope and scale, HIAs can range from rapid desktop assessments that are conducted in a few days to a few weeks, to comprehensive HIAs that are large in scope and scale, involve the collection of primary data, extensive stakeholder and rightsholder engagement, and may take a few months to a couple of years. This Rapid HIA is a small part of the feasibility study for the conversion of the Vancouver Island Rail Corridor to an active transportation trail. It is mainly a desktop exercise using available literature and information and was undertaken in less than a week. As such, this Rapid HIA does not provide a detailed assessment of potential health impacts, but highlights some key issues and concerns, and also the overall benefits of well-planned active transportation infrastructure. **Figure 2** demonstrates the general HIA framework.

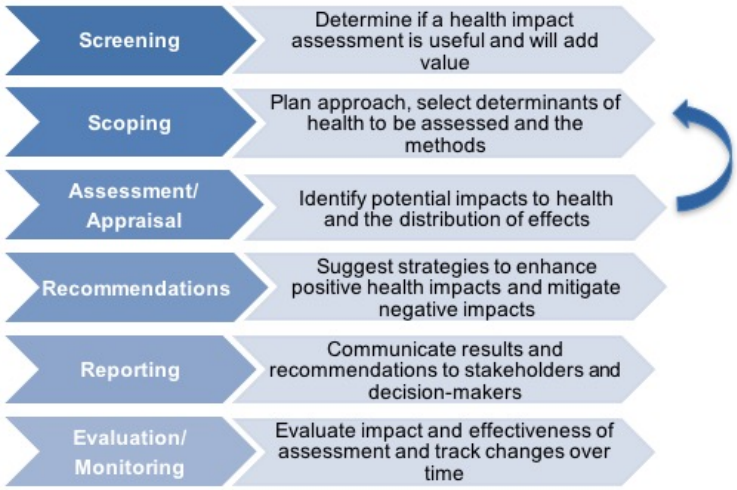


**Figure 2** General Steps of an HIA

## 2.2. Main Tasks of the Rapid HIA

In keeping with the aims of the Rapid HIA, the main tasks include:

- Review of relevant province of BC policies related to active transportation and other related documents
- High level Baseline Health/Community Profile for the study area

- Conduct a high-level economic benefit assessment using the Health Economic Assessment Tool (HEAT)
- Identify opportunities/challenges; make recommendations
- Document findings in Rapid HIA report

# 3. Scoping Step

The main focus of this Rapid HIA is to highlight the importance of active transportation in developing and maintaining health in a population. Active transport or non-motorized transport methods can include walking, cycling, and their variants which increase access and connection for communities. Active transport in communities has shown to improve quality of life of existing and new users through reducing disease burden, increasing mental health, and improving access and cohesion. Active transport not only provides benefits for individuals but can also have positive effects on the environment (Litman, 2022). Various benefits of active transportation, and infrastructure that encourages active transportation, are discussed below.

## 3.1. Mental & Physical Health

It has been shown through multiple studies that partaking in even small acts of physical activity, whether that be simply walking or biking, can have large effects on one's mental and physical health. Various diseases are shown to be related to inadequate levels of physical activity, such as heart disease, hypertension, stroke, depression, diabetes, osteoporosis, cancer, and dementia (Litman, 2022). Sinnett and others (2011) found that reductions in the rates of obesity, diabetes, blood pressure, cardiovascular disease, and cancer can be associated with increased levels of walking. When individuals are engaging in physical activity and promoting healthier lifestyles, it can result in a reduction of disease burden and thus an overall reduction in mortality rates (reviewed in Sinnette et al., 2011).

Not only does active transport increase physical health as it promotes physical activity, but it also greatly coincides with an increase in mental health. Simply put, walking and cycling are not only a mode of non-motorized transportation but provide enjoyment and entertainment (Litman, 2022). Physical recreation promotes increases in mental health as it provides a source of happiness and can lower stress levels, reducing anxiety and depression (Litman, 2022). Physical activity through active transportation has also been shown to improve self-worth and can have positive impacts on an individual's self-esteem (reviewed in Sinnett et al., 2011). Ma and Ye (2021) provide further confirmation with their study as they found that bikeable neighbourhoods are positively associated with life satisfaction and better mental health, and negatively associated with psychological distress.

## 3.2. Increased Accessibility

Not all community members have either the ability to operate a vehicle or have the means to afford a vehicle (i.e., non-drivers), which can considerably reduce accessibility in a community (Litman, 2022). To achieve equality in a community and promote independence and economic opportunity, it is crucial for non-drivers to have access to public transport but also the ability to successfully engage in active transport methods (e.g., walking and cycling). Litman (2022) showed that approximately 20 to 40% of individuals in a typical community may not be able to drive, and thus walking and cycling facilities greatly benefit non-drivers' ability to access their communities and fulfill their day-to-day needs. As active transportation facilities and areas increase one's connection to their community, they become

attractive and highly beneficial aspects of communities which are actively sought out and desired (Litman, 2022).

## 3.3. Air Pollution

As discussed, active transport has positive benefits on the mental and physical health of people but also shows benefits to the environment. Active transportation methods do not produce direct emissions and have low lifecycle greenhouse gas emissions (Reynolds et al., 2010). It has been suggested that communities which have active transport facilities and are considered walkable have reduced rates of vehicular use and thus lower pollutant emissions (Reynolds et al., 2010). Transport Canada (2006) states that promoting sustainable modes of transportation (i.e., walking, cycling, public transit) and reducing driving can have immediate and positive effects on air quality by reducing smog and particulate matter.

## 3.4. Traffic Noise and Congestion

Noise pollution has been shown to be a health risk in urban settings, and traffic congestion exacerbates such issues (Reynolds et al., 2010). Easily accessible and high functioning active transport facilities promote usage by community members, which can reduce the number of cars on roads, thus reducing congestion and traffic noise (Reynolds et al., 2010).

## 3.5. Social Cohesion

Social cohesion of communities can be improved due to walking and cycling facilities, as these are places where people naturally gather and interact with members of their community (Litman, 2022). Active transport facilities are locations where people stand, wait, and socialize which can improve non-drivers and disadvantaged individual's connection to those around them and their community (Litman, 2022). Being unable to access one's basic needs, including access to other people, due to the inability to operate a motor vehicle can make someone extremely isolated from their community resulting in a reduction of social cohesion.

# 4. Baseline Health Profile

## 4.1. Population and Demographics

Awareness involving the size of a population, in addition to how that population is changing over time is integral, as it can be one of the first indicators to consider when examining a population and their potential needs (Island Health, 2019). Population size and change can influence how communities develop over time and play a part in decisions regarding infrastructure and plans to meet the needs of future residents. This is especially true for location with smaller population sizes, where they can be more greatly affected by changes in population when compared to larger city centers (Island Health, 2019).

All the locations listed in Table 1, show positive increases in population change from the years 2016 to 2021 all of which are greater increases, except for Cowichan Valley, compared to British Columbia. Nanaimo (i.e., 9.4%) and Comox Valley (i.e., 8.9%) show the greatest population change compared to British Columbia (i.e., 7.6%). The locations in the Study Area, overall show positive increases in population changes from the years 2016 to 2021.

Figure 3 to Figure 7 illustrate the distribution of the populations of each location included in the Study area by both age and sex.

Table 1: 2021 Population and Population Change

| Location | 2021 Population | | | 2016 Population | Population Percent Change (2016 - 2021) |
|---|---|---|---|---|---|
| | Total | Male | Female | Total | |
| Alberni-Clayoquot | 33,520 | 16,645 | 16,875 | 30,981 | 8.2 |
| Capital | 415,455 | 200,970 | 214,485 | 383,360 | 8.4 |
| Comox Valley | 72,445 | 34,970 | 37,475 | 66,527 | 8.9 |
| Cowichan Valley | 89,015 | 43,585 | 45,430 | 83,739 | 6.3 |
| Nanaimo | 170,365 | 82,385 | 87,980 | 155,698 | 9.4 |
| **British Columbia** | **5,000,880** | **2,457,515** | **2,543,365** | **4,648,055** | **7.6** |

Source: Census Profile 2021 Census of Population

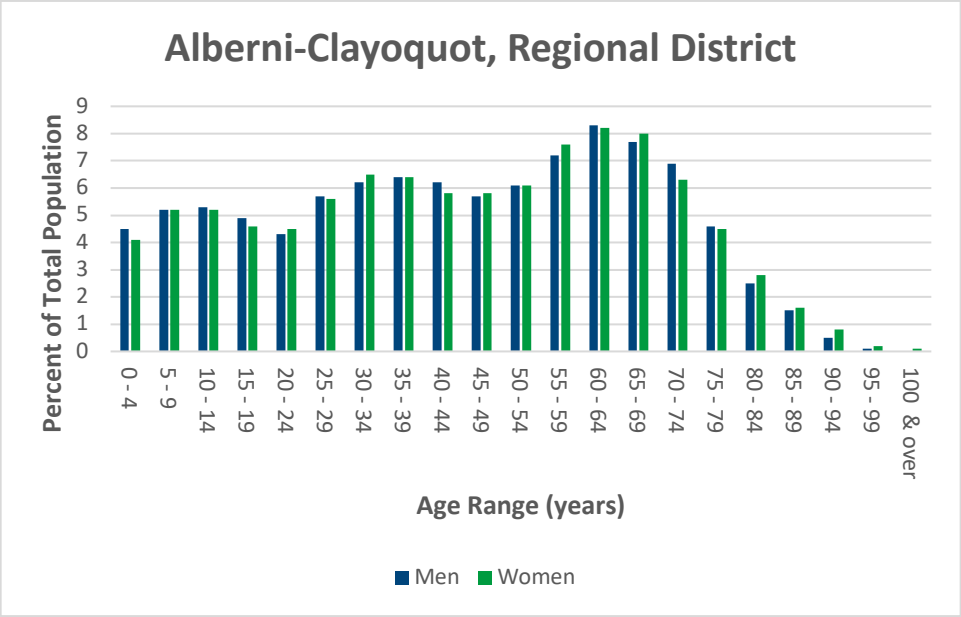


Figure 3 Population Demographics by Age and Sex – Alberni-Clayoquot Regional District

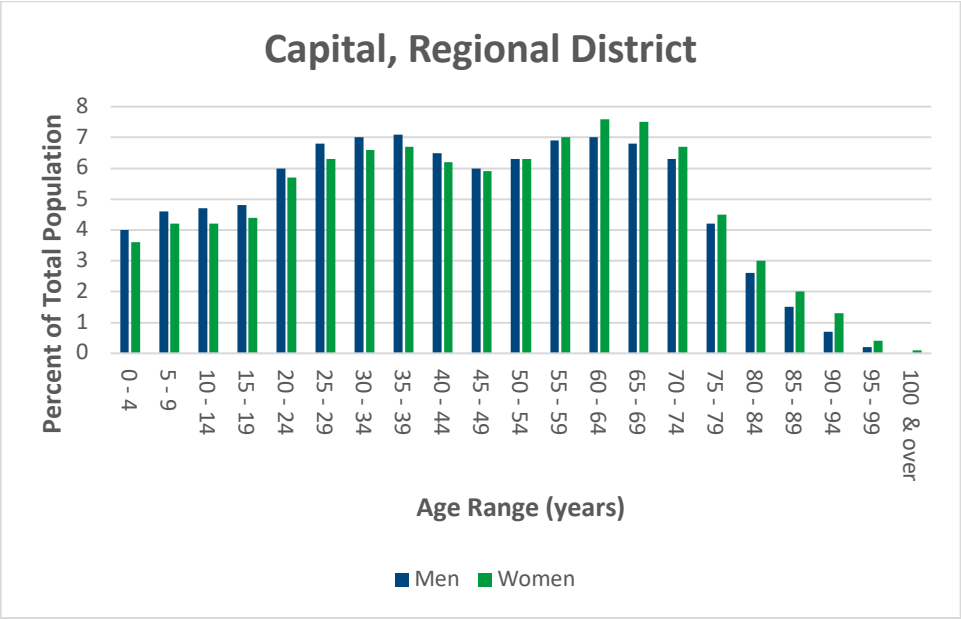


**Figure 4** Population Demographics by Age and Sex – Capital Regional district

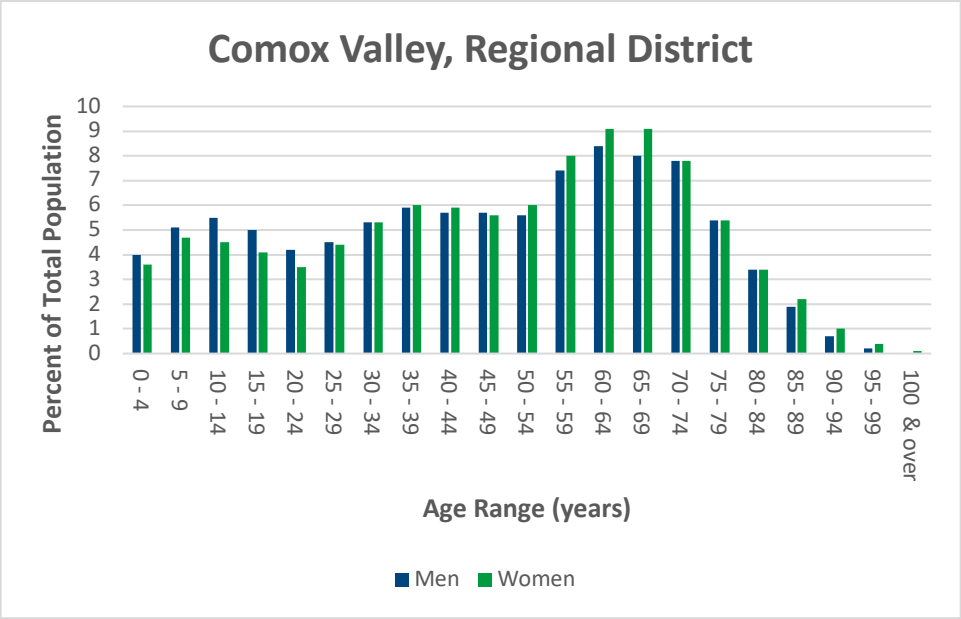


**Figure 5** Population Demographics by Age and Sex – Comox Valley Regional District

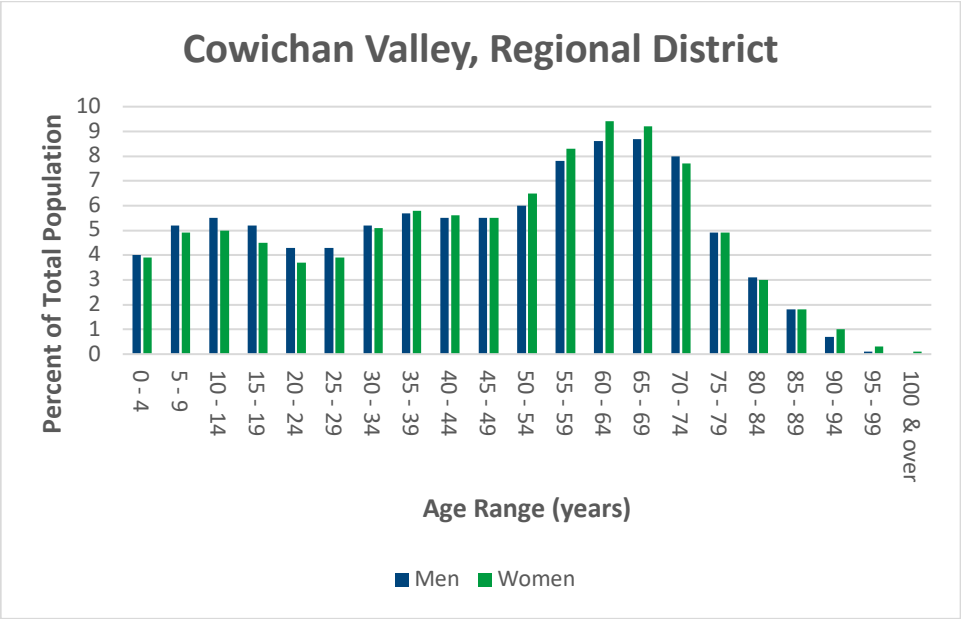


**Figure 6** Population Demographics by Age and Sex – Cowichan Valley Regional District

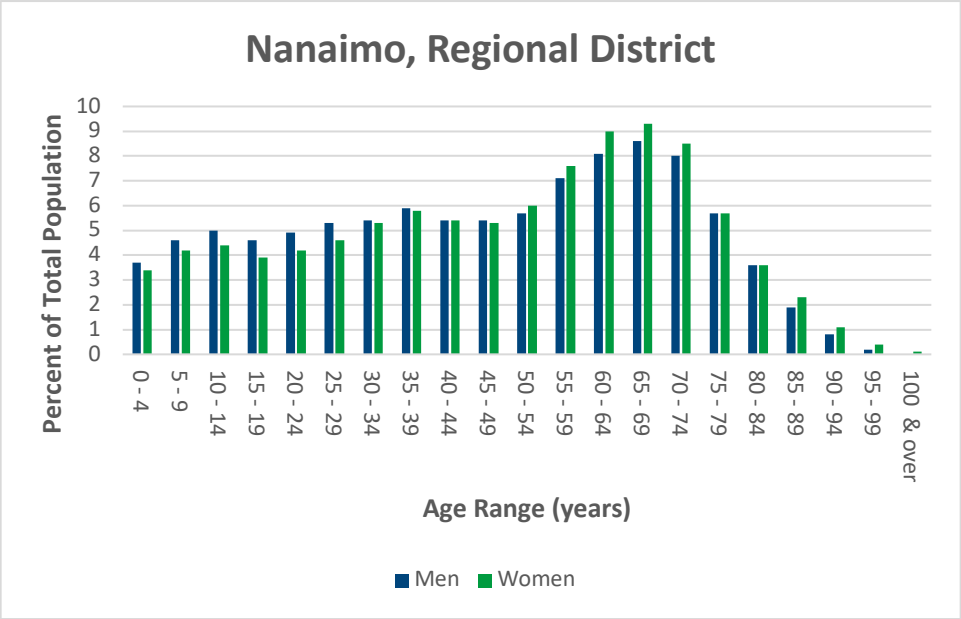


**Figure 7** Population Demographics by Age and Sex – Nanaimo Regional District

Table 2 shows the distribution of the populations of the areas included in the Study Area by broad age groups, in addition to the average age of the populations. Overall, compared to British Columbia (i.e., 43.1%) all locations in the Study Area show higher average ages. The locations that show the highest average age are Nanaimo (i.e., 48) and Comox Valley (i.e., 47.4), while the locations with the lowest

average age are Alberni-Clayoquot (i.e., 44.9) and Capital (i.e., 45.1). The age group that holds the greatest percentage of the population is ages 14 to 64 years old, for all locations.

Table 2: Population Distribution by Age

| Location | Distribution (%) of population by broad age groups | | | | Average age of the population |
|---|---|---|---|---|---|
| | 0 to 14 years | 15 to 64 years | 65 years and over | 85 years and over | |
| Alberni-Clayoquot | 14.8 | 61.1 | 24.1 | 2.4 | 44.9 |
| Capital | 12.6 | 63.4 | 24 | 3.2 | 45.1 |
| Comox Valley | 13.7 | 57.9 | 28.4 | 3.2 | 47.4 |
| Cowichan Valley | 14.2 | 58.1 | 27.6 | 2.9 | 47 |
| Nanaimo | 12.6 | 57.4 | 29.9 | 3.4 | 48 |
| **British Columbia** | **14.3** | **65.3** | **20.3** | **2.4** | **43.1** |

Source: Census Profile 2021 Census of Population

## 4.2. Socioeconomic

There are multiple factors that can contribute to impacting a community's wellbeing and health, including employment and income. A household's or individual's average income and employment status can greatly influence health, as it can directly impact access to food and shelter. Those in higher income groups tend to have better health outcomes as there are opportunities to bridge health inequalities, which is not the case for those in lower income groups (Island Health, 2019).

Table 3 shows status of the labor force for the locations in the Study Areas. Compared to the unemployment rate in British Columbia (i.e., 8.4), Alberni-Clayoquot (i.e., 9.6) is the only location which shows a higher rate of unemployment. The location with the lowest rate of unemployment is Capital (6.8).

Table 3: Status of Labour Force

| Location | Unemployment rate |
|---|---|
| Alberni-Clayoquot | 9.6 |
| Capital | 6.8 |
| Comox Valley | 8 |
| Cowichan Valley | 7.3 |
| Nanaimo | 8.4 |
| **British Columbia** | **8.4** |

Table 4 illustrates the prevalence of low income based on the low-income measures of locations included in the Study Area and British Columbia, in addition to how that prevalence is represented in difference age groups. Prevalence of low income which were the highest in the Study Area are Alberni-Clayoquot (i.e., 13.6%), and Nanaimo (i.e., 10.9), which are also greater than the overall prevalence of low income in British Columbia (i.e., 10.8%). The locations in the Study Area that show prevalence of low income below British Columbia are Capital (i.e., 9.1%), Comox Valley (i.e., 10.3%), and Cowichan Valley (i.e., 10.7%).

Table 4: Prevalence of Low Income

| Location | Low income and income inequality in 2020 (%) | | | | |
|---|---|---|---|---|---|
| | Prevalence of low income based on the Low-income measure, after tax | 0 to 17 years | 0 to 5 years | 18 to 64 years | 65 years and over |
| Alberni-Clayoquot | 13.6 | 17.8 | 17.2 | 11.9 | 14.7 |
| Capital | 9.1 | 9.5 | 9.5 | 8.5 | 10.5 |
| Comox Valley | 10.3 | 11.1 | 11.5 | 9.3 | 11.7 |
| Cowichan Valley | 10.7 | 13.1 | 13.7 | 9.4 | 11.7 |
| Nanaimo | 10.9 | 12.5 | 12.9 | 9.9 | 12 |
| **British Columbia** | **10.8** | **11.4** | **11.2** | **9.7** | **13.7** |

Source: Census Profile 2021 Census of Population

Table 5 illustrates the median income of families before and after taxes in the locations included in the Study Area in addition to British Columbia. The median total income before taxes in 2020 is the highest in Capital (i.e., $111,000), which is also greater than the median total income for British Columbia ($107,000). The remainder of the locations show median total incomes lower than British Columbia, the lowest being Alberni-Clayoquot (i.e., $87,000).

Table 5: Median Total Income of Families in 2020

| Location | Income of economic families in 2020 | |
|---|---|---|
| | Median total income of economic family in 2020 ($) | Median after-tax income of economic family in 2020 ($) |
| Alberni-Clayoquot | 87,000 | 79,000 |
| Capital | 111,000 | 97,000 |
| Comox Valley | 96,000 | 86,000 |
| Cowichan Valley | 97,000 | 87,000 |
| Nanaimo | 94,000 | 85,000 |
| **British Columbia** | 107,000 | 95,000 |

Source: Census Profile 2021 Census of Population

## 4.3. Housing

Housing and the condition of housing are both determinants of health, and can have impacts on an individual's health, as substandard living conditions can be related to poorer health (Island Health, 2019). When households must spend increased amounts of their total income on housing, they become unable to acquire other basic needs and resources which can result in decreased overall health (Island Health, 2019).

Table 6 provides insight into the conditions of dwellings that are occupied in the locations of the Study Area. Nanaimo (i.e., 5.19%), Capital (i.e., 5.36%), and Comox Valley (5.73%) show lower percentages of dwellings needing major repairs when compared to British Columbia (5.84%). Alberni-Clayoquot (i.e., 9.31%) and Cowichan Valley (i.e., 6.62%) show the highest percentages of dwellings requiring major repairs.

Table 6: Condition of Private Dwellings

| Location | Occupied private dwellings by dwelling condition - 25% sample data | | |
|---|---|---|---|
| | Total occupied private dwellings | Percent of dwellings needing regular maintenance and minor repairs (%) | Percent of dwellings needing major repairs (%) |
| Alberni-Clayoquot | 14,610 | 90.69 | 9.31 |
| Capital | 185,205 | 94.64 | 5.36 |
| Comox Valley | 31,945 | 94.26 | 5.73 |
| Cowichan Valley | 37,290 | 93.38 | 6.62 |
| Nanaimo | 75,275 | 94.81 | 5.19 |
| **British Columbia** | **2,041,835** | **94.16** | **5.84** |

Source: Census Profile 2021 Census of Population

Table 7 and Table 8 show housing affordability for both homeowner households and tenant households. Capital (17.4% & 40%) and Nanaimo (14.9% & 40.8%) show the highest percentages of households spending 30% or more of its income on shelter cost for both owners and tenants. For household owners all locations show percentages lower than the overall of British Columbia (i.e., 19.3%). While for tenants, only Cowichan Valley (i.e., 36.1%) and Alberni-Clayoquot (i.e., 35.7%) show percentages lower than British Columbia (i.e., 37.8%).

Table 7: Housing Affordability, of Household Owners

| Location | Owner households in non-farm, non-reserve private dwellings - 25% sample data | | | |
|---|---|---|---|---|
| | Total owners | % of owners with a mortgage | % of owners spending 30% or more of their income on shelter costs | % in core housing need |
| Alberni-Clayoquot | 9,940 | 54.5 | 13.4 | 6.3 |
| Capital | 114,220 | 55.9 | 17.4 | 6 |
| Comox Valley | 24,335 | 53 | 14.7 | 4.9 |
| Cowichan Valley | 28,630 | 53.8 | 14.3 | 4.2 |
| Nanaimo | 54,820 | 52.2 | 14.9 | 5.2 |
| **British Columbia** | **1,330,795** | **57.5** | **19.3** | **8.0** |

Source: Census Profile 2021 Census of Population

Table 8: Housing Affordability, Tenant Households

| Location | Tenant households in non-farm, non-reserve private dwellings - 25% sample data | | | |
|---|---|---|---|---|
| | Total tenant households | % of tenant households in subsidized housing | % of tenant households spending 30% or more of its income on shelter costs | % in core housing need |
| Alberni-Clayoquot | 3,910 | 13 | 35.7 | 27.3 |
| Capital | 67,965 | 10.9 | 40 | 24.2 |
| Comox Valley | 7,215 | 10.7 | 38.4 | 22.1 |
| Cowichan Valley | 7,190 | 9.9 | 36.1 | 22.2 |
| Nanaimo | 19,860 | 9.9 | 40.80 | 23.6 |
| **British Columbia** | **663,870** | **11** | **37.8** | **24.7** |

Source: Census Profile 2021 Census of Population

## 4.4. Transportation

The proportion of employed people utilizing walking, biking, or busing to access their workplaces is illustrated in Table 9. All locations in the Study Area, except for Greater Victoria (i.e., 36.3%) show lower percentages of employed people utilizing walking, bikes, and buses to access work when compared to the overall British Columbia (i.e., 22.4%). Cowichan Valley South (i.e., 8.2%) and Cowichan Valley North (i.e., 8.4) show the lowest proportion or people utilizing alternative methods to access work. As previously stated, Greater Victoria shows the highest percentage of employed people utilizing walking, bikes, and buses to access work, which is 13.9% higher than British Columbia (22.4%).

Table 9: Proportion of Employed Population Using Walking, Biking, or Busing as a Mode of Transportation to Work

| Transportation | Location | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Alberni - Clayoquot | Comox Valley | Cowichan Valley North | Cowichan Valley South | Cowichan Valley West | Greater Nanaimo | Greater Victoria | British Columbia |
| **Employed Population Aged 15 and Over Walking, Biking or Busing to Work (%)** | 12.1 | 11.6 | 8.4 | 8.2 | 9.8 | 11.6 | 36.3 | **22.4** |

Source: Island Health, Local Health Area Profiles 2018

Table 10 was obtained from a study in Vancouver Island which illustrates the perceived importance of trails on an individual's desired or actual lifestyle (Gagné, 2020). 90% of respondents to the survey indicated that trails are extremely or very important to their actual or desired lifestyle.

Table 10: Survey: Understanding the Importance of Trails to One's Lifestyle

| Answer Choices | Responses of Survey | |
|---|---|---|
| | Percent | Count |
| **Extremely important** | 60.45 | 458 |
| **Very important** | 30.29 | 229 |
| **Somewhat important** | 8.33 | 63 |
| **Not so important** | 0.79 | 6 |
| **Not at all important** | 0.13 | 1 |

Source: Table from Gagné (2020), n = 797 respondents, of which 688 were Vancouver Island residents.

In the same study conducted by Gagné (2020) of mainly Vancouver Island residents, majority of the respondents (about 86%) indicated that they would use a trail-developed section of the Vancouver Island Corridor (E&N Rail Corridor). The main uses for a proposed Vancouver Island Trail were identified as recreation (93% of respondents) and health and exercise (87%). Interestingly, and connecting to the point made below in relation to commuting (Section 4.4.1), a third of the respondents to this survey identified commuting as a use (Gagné, 2020). This finding points to an opportunity for a proposed Vancouver Island Trail as an important part in encouraging mode-shift to active transportation in the region, and in keeping with the active transportation policies provincially and federally.

### 4.4.1. Mode of Commuting

As seen in the chart below (Figure 8), the main mode of commuting in all five regional districts is via car, truck or van, i.e., driving (or being driven as passengers). Comparing Figure 8 to Figure 9, which represents the percentage of the population that commutes less than 15 mins, 15-29 mins, 30-44 mins, etc., we notice that the regional district of Alberni-Clayoquot has the most <15 mins commute (about 65%), but about 85% of the population drives to commute.

Four of these regional districts in Vancouver Island, with the exception of Capital Regional District, have a greater percentage of people driving to commute when compared the BC average. In fact, Capital Regional District has the biggest share of the population that commutes by walking or cycling to work (15.1%), which is also higher than the BC share (8.5%). It's been shown that more urban populations tend to use active transportation more than sub-urban and rural populations, but it's also known that introducing active transportation infrastructure in areas where people would benefit, can shift more of transport from non-active travel to active travel (Frank et al., 2019).

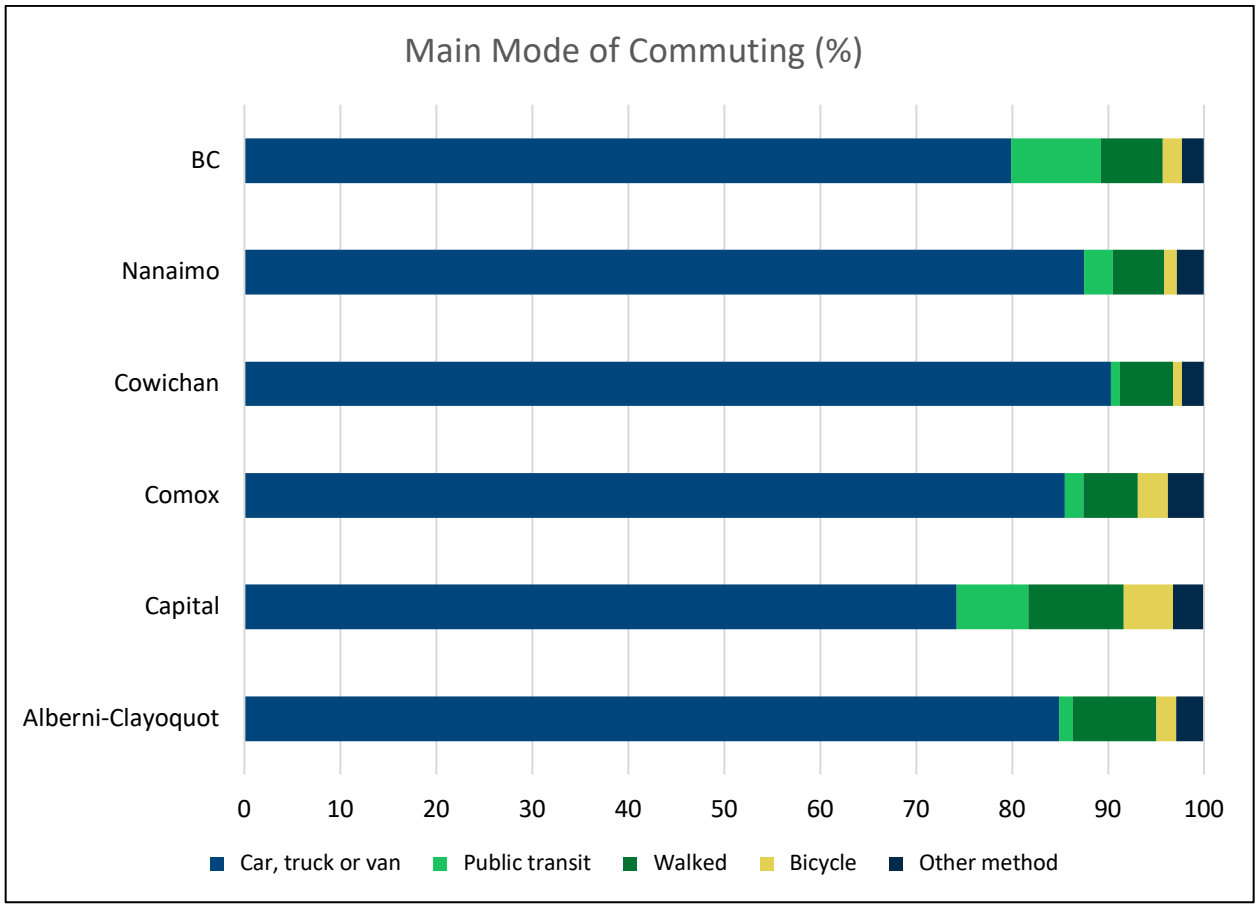


**Figure 8** Main Mode of Commuting (percent)

### 4.4.2. Commuting Time

From Figure 9 below, it is estimated that the majority of commuting trips in all regional districts are within 30 minutes. The most interesting observation is related to the percentage of commutes that are

less than 15 minutes, and comparing these to the corresponding statistics in Figure 8 above. For example, for Alberni-Clayoquot, although about 65% of all commuting trips are within 15 minutes long, this region relies heavily on driving; 85% of all commutes are via car, truck or van.

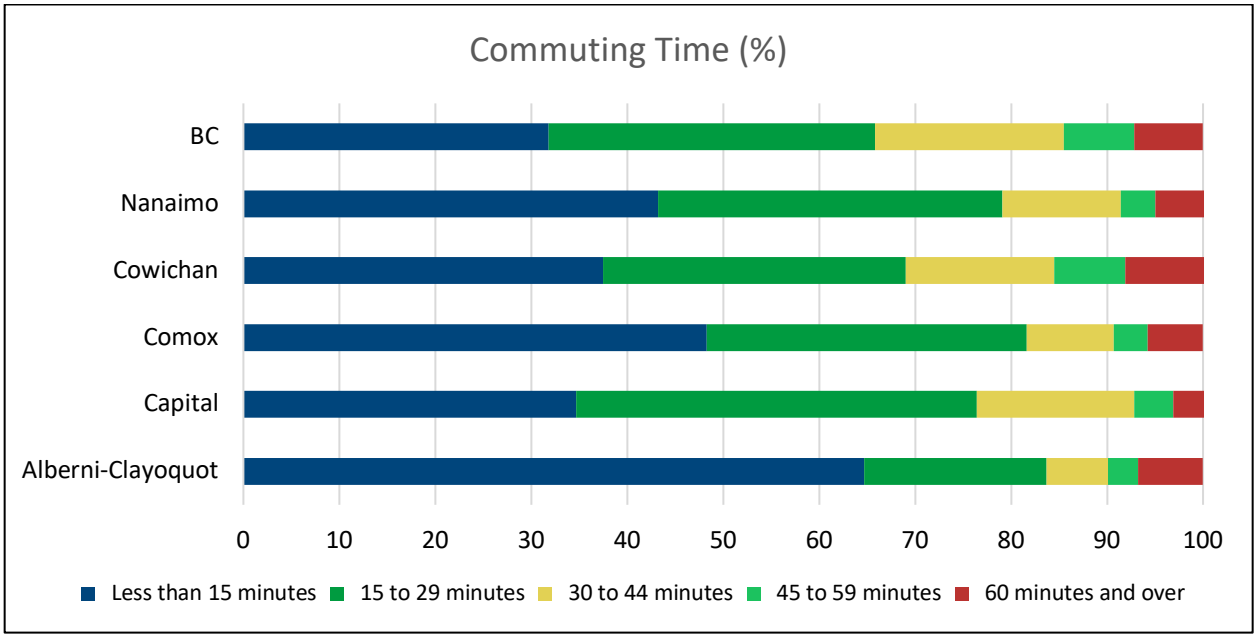


**Figure 9** Commuting Time (percent)

## 4.5. Health Status

Understanding the prevalence and rates of chronic diseases and health indicators in communities is important as managing conditions can result in influencing the genetics and lifestyle practices of communities. The prevalence of chronic diseases in communities can be related to shifts in death rates; for example, if chronic disease prevalence decreases, people live longer and mortality rates lower (Island Health, 2019). Chronic diseases can have large impacts on not only an individual's physical health but also their mental health, as the diseases can influence one's ability to complete daily activities and maintain relationships (Island Health, 2019).

Table 11 shows the prevalence rates of chronic illnesses and health indicators for the locations in the Study Area, in addition to British Columbia. The location in the Study Area that shows the highest prevalence for the most chronic illnesses is Alberni-Clayoquot which includes chronic kidney disease (i.e., 25.7), diabetes (i.e., 88.8), heart failure (i.e., 25.1), and hypertension (234.3) which are also higher than British Columbia (i.e., 23.2, 80.3, 19.4, & 224.7, respectively). The location that shows the lowest prevalence rates for the most chronic illnesses is Greater Victoria which includes asthma (i.e., 122.7), chronic obstructive pulmonary disease (i.e., 42.9), heart failure (i.e., 15.9), ischemic heart disease (i.e., 50.5), hypertension (i.e., 203), and osteoarthritis (i.e., 83.2), which are also all lower than British Columbia.

Table 11: Prevalence Rates of Chronic Illnesses and Health Indicators

| Prevalence (age standardized rate per 1,000) | Location | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Alberni - Clayoquot | Comox Valley | Cowichan Valley North | Cowichan Valley South | Cowichan Valley West | Greater Nanaimo | Greater Victoria | British Columbia |
| Alzheimer's Disease and Other Dementia | 21.8 | 18.9 | 18.3 | 20.6 | 17.5 | 23.7 | 24.5 | **20.3** |
| Asthma | 139.3 | 126.7 | 156.7 | 135.2 | 137.6 | 136 | 122.7 | **123.1** |
| Chronic Kidney Disease | 25.7 | 22.9 | 19.4 | 22.2 | 24.2 | 24.8 | 21.1 | **23.2** |
| Chronic Obstructive Pulmonary Disease | 63.6 | 49.6 | 66.4 | 90.2 | 102.2 | 54.4 | 42.9 | **51.1** |
| Diabetes | 88.8 | 60.3 | 69.8 | 70.6 | 73.8 | 73.2 | 67.2 | **80.3** |
| Heart Failure | 25.1 | 18.4 | 18.4 | 18.4 | 19.5 | 18.4 | 15.9 | **19.4** |
| Ischemic Heart Disease | 67.2 | 64.8 | 63.6 | 62 | 64.8 | 68.5 | 50.5 | **69.4** |
| Hypertension | 234.3 | 210.9 | 219 | 222.9 | 228.3 | 206.2 | 203 | **224.7** |
| Osteoarthritis | 104.7 | 83.2 | 104.3 | 100.3 | 111.1 | 90.3 | 83.2 | **84.9** |

Source: Island Health, Local Health Area Profiles 2018

Table 12 shows the prevalence rates of mental health related illnesses and diseases for the locations in the Study Area and British Columbia. All locations in the Study Area for both mood and anxiety disorders and depression show higher prevalence rates when compared to British Columbia as a whole (i.e., 301.9 & 246, respectively). Cowichan Valley West (i.e., 366.8) shows the highest prevalence rate for mood and anxiety disorders, while Alberni-Clayoquot (i.e., 303.3) shows the highest rate for depression. The highest prevalence rates of schizophrenia and delusional disorders occurs in Cowichan Valley West (i.e., 13.1) and Greater Victoria (16.9). The locations with the lowest prevalence of schizophrenia and delusional disorders are Cowichan Valley North (i.e., 6.9) and Comox Valley (i.e., 8.7), both of which are lower than British Columbia (i.e., 11).

Table 12: Prevalence Rates of Mental Health-Related Illnesses

| Prevalence (age standardized rate per 1,000) | Location | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Alberni - Clayoquot | Comox Valley | Cowichan Valley North | Cowichan Valley South | Cowichan Valley West | Greater Nanaimo | Greater Victoria | British Columbia |
| **Mood and Anxiety Disorders** | 352.6 | 338.2 | 350 | 362.5 | 366.8 | 335.1 | 347.6 | **301.9** |
| **Depression** | 303.3 | 282.7 | 296.3 | 293 | 294.5 | 258.6 | 285.1 | **246** |
| **Schizophrenia & Delusional Disorders** | 10.2 | 8.7 | 6.9 | 11.3 | 13.1 | 12.1 | 16.9 | **11** |

Source: Island Health, Local Health Area Profiles 2018

# 5. Results from the Health Economic Assessment Tool (HEAT)

The Health Economic Assessment Tool (HEAT)[4] for walking and cycling by the World Health Organization (WHO) estimates the value of reduction in mortality that may result from specific amounts of walking or cycling. The HEAT primarily answers the question of whether 'x' number of people regularly walking or cycling an amount of 'y', has potential health impacts on premature mortality as well as the economic value associated with these impacts (WHO, 2017). We used HEAT in this Rapid HIA to roughly estimate the benefit to the general study area if the Vancouver Island Rail Corridor was potentially converted to an active transportation trail thereby incentivizing the local population to routinely engage in walking and cycling. In a more in-depth assessment, the HEAT should be tailored more, however, since this is a Rapid HIA, we tended to use the default values in the model, and were also informed by the estimate of potential trail usage provided by MJL (MJL, 2023).

For this particular assessment, we estimated how many premature deaths would be prevented in the study area if everyone in the target age range walked and cycled in a converted Vancouver Island Active Transportation Corridor less than once per month. As mentioned above, we used the information provided by MJL that suggested that trail usage in the trail impact zone population would average at around four visits per person per year, which is approximately 0.01 trips per person per day. The HEAT uses ages 20 – 74 as the target range to estimate walking related impacts and ages 20 – 64 for cycling. **Appendix 1** provides the details of how the HEAT was used and the values that were entered. In order to be conservative and to account for variable weather, cycling time per day was adjusted by (negative) 20%. In order to conduct the assessment for most of the study area, HEAT was run five times for the five regional districts within the study area. Although these five regional districts do not comprise of the entire study area (for example, there are several First Nations in the study area), they serve as a representative population for the purposes of applying the HEAT to estimate economic benefits of engaging in walking and cycling.

Table 13: Results from the Health Economic Assessment Tool (HEAT)

| Location (Regional District) | Health Economic Assessment Tool (HEAT) General Results | | |
|---|---|---|---|
| | Total Population | Summary of impacts for mortality – premature deaths prevented per year[a] | Economic Value of Impacts (CDN) (per year)[b] |
| Alberni-Clayoquot | 23,740 | 0.0016 | $6,980.00 |
| Capital | 415,451 | 0.02 | $119,662.00 |
| Comox Valley | 72,445 | 0.0033 | $19,564.00 |
| Cowichan Valley | 89,013 | 0.0041 | $24,120.00 |
| Nanaimo | 170,367 | 0.0083 | $49,446.00 |
| **Total Study Area** | **771,016** | **0.04** | **$222,145.20** |

Source: Health Economic Assessment Tool (HEAT) v. 5.1.0.

[a] Premature deaths prevented per year. Example: For Alberni-Clayoquot, over the full assessment period of 10 years, 0.016 premature deaths would be prevented.

[b] Mortality is monetized using a Value of Statistical Life (VSL) of $4,429,000.00 (MER) (USD) per premature death. This is a standard value provided in the HEAT. The conversion rate of $1 USD = $1.34 CDN on January 17,2023 has been used to provide amounts in CDN $.

[4] Health Economic Assessment Tool (HEAT) for walking and cycling by WHO. Available: https://heatwalkingcycling.org/#homepage

As seen in Table 13 above, overall, within the five regional districts, by walking and cycling less than once per month per person per year, and averaging at about four trips per person per year, 0.04 premature deaths can be prevented per year, resulting in an economic benefit of more than $200,000 CDN annually. Again, it should be re-iterated here that as this is a Rapid HIA, the HEAT has been used mostly with the default settings (Appendix 1). For a more comprehensive HIA, further tailoring the settings and values used in the HEAT to allow for more nuanced and accurate results is highly recommended.

# 6. Opportunities and Challenges

Since this is a Rapid HIA, we have not conducted a detailed assessment of health impacts, but have tried to highlight some opportunities and challenges for a proposed Vancouver Island Trail.

There are potentially enormous health benefits to be gained from converting the Vancouver Island Rail Corridor into an active transportation trail that is user-friendly to all ages and all abilities. Given that the Vancouver Island Rail Corridor is over 280 km long, converting it into an active transportation trail would significantly enhance connectivity in the entire region, not just for leisure use, but also for commuting. As discussed in Section 4.4. above, a third of the respondents in a survey of mainly Vancouver Island residents identified commuting as a use of a proposed Vancouver Island Corridor Trail (Gagné, 2020). This finding points to an opportunity for a proposed Vancouver Island Trail as an important part in encouraging mode-shift to active transportation in the region, and in keeping with the active transportation policies provincially and federally.

In addition to the indirect economic benefits related to improved health and wellbeing (approximately $200,000 CDN annually; see Section 5), there are also direct economic benefits of a proposed Vancouver Island Trail (MJL, 2023). The economic assessment conducted as part of this feasibility study indicates that the direct economic benefit of a Vancouver Island Trail would be almost $50 million CDN annually, and overall, the economic impacts are estimated to be approximately $94 million CDN annually.

It is possible that for some of the commutes in the five regional districts that are under 15 minutes long, having a safe, connected Vancouver Island Trail could shift mode of transportation from a current driving-heavy pattern to more active modes, including walking and cycling. For example, in the Regional District of Alberni-Clayoquot, although a majority of the commuting trips are within 15 minutes, the reliance on driving for commuting purposes is heavy.

Regional District of Alberni-Clayoquot

It should be noted Alberni-Clayoquot has the poorest performance for most determinants of health, including socioeconomic (unemployment rate higher than BC and highest in the study area, lowest median total income of economic family within the study area), housing (highest percent of private dwellings in need of major repairs, highest percent of tenant households in core housing need), transportation (one of the highest car-dependent regions for commuting, but also with the highest percentage of short commutes), and overall health status (highest prevalence for diabetes, heart failure, hypertension, the highest prevalence rates for depression and among the highest prevalence rates for mood and anxiety disorders). Residents in this region would benefit from increased transportation, especially when it comes to mitigating health impacts related to diabetes and mental health concerns. Encouraging mode shift in this region for the shorter commutes (less than 15 minutes) from driving to walking and/or cycling may lead to higher level of health benefits, when compared to the other four regional districts in the study area, due to the current health disparities in Alberni-Clayoquot.

# 7. Recommendations

Ideally, for HIAs, Recommendations to enhance potential positive health impacts and mitigate potential negative health impacts should be made in consultation with Indigenous rightsholders and public stakeholders. However, since this is a Rapid HIA, the following high-level recommendations have been made based on the information gathered so far in this Rapid HIA, and on the information available in the feasibility study (MJL, 2023):

- Enhancing active transportation infrastructure in Vancouver Island by converting the Vancouver Island Rail Corridor into an active transportation trail would not just enhance the physical and mental health and wellbeing of communities in the region, but also lead to economic benefits for the province in the short and long terms.
- Organize the proposed Vancouver Island Trail so most residents of the Regional District of Alberni-Clayoquot can benefit from engaging in active transportation .
- Engage with the local communities and First Nations along the proposed trail to ensure their feedback and concerns are taken into consideration, and a proposed Vancouver Island Trail works in the interests of most communities/Nations.
- Design a proposed Vancouver Island Trail to suit the needs and abilities of most the demographic, including children, youth, older adults and individuals with ability challenges.
- Ensure that a proposed Vancouver Island Trail is designed and connected to other active transportation features in the vicinity.
- Ensuring safety and security for women and others is considered in the planning process.

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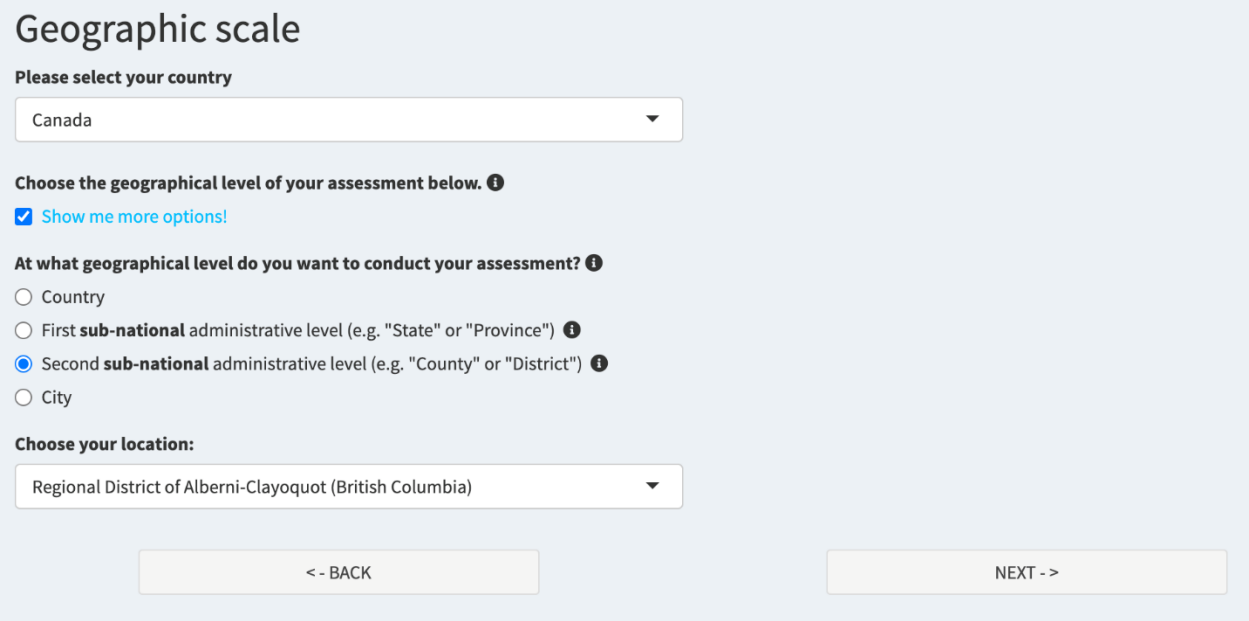
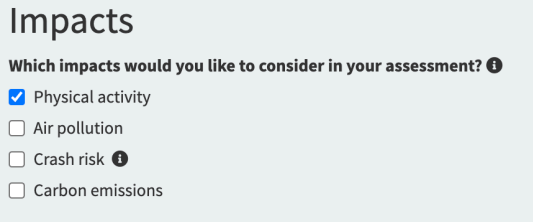
# Appendix 1: Health Economic Assessment Tool (HEAT) Settings

This appendix provides detailed information, including screenshots, on how the HEAT model was used in this Rapid HIA. The HEAT run for Regional District of Alberni-Clayoquot is shows as an example.

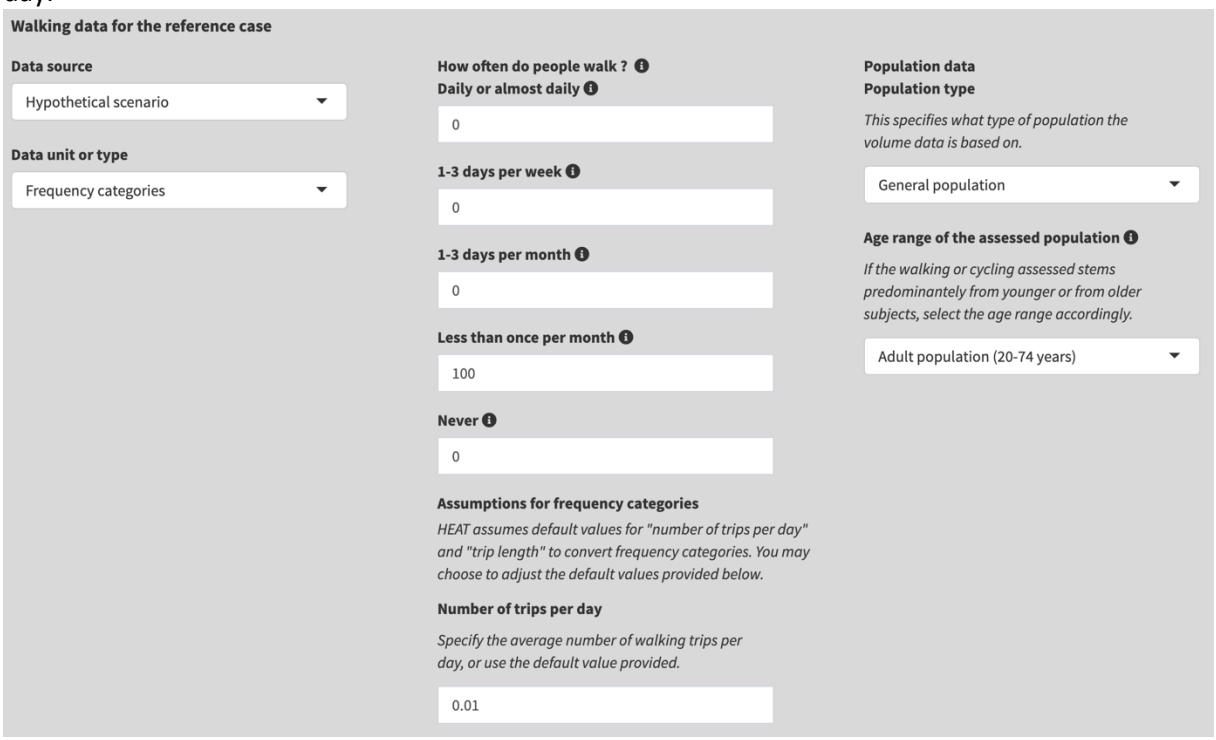
Step 1: Setting the geographic scale. For this Rapid HIA, the HEAT was run five times, once each for the five regional districts considered in the assessment.

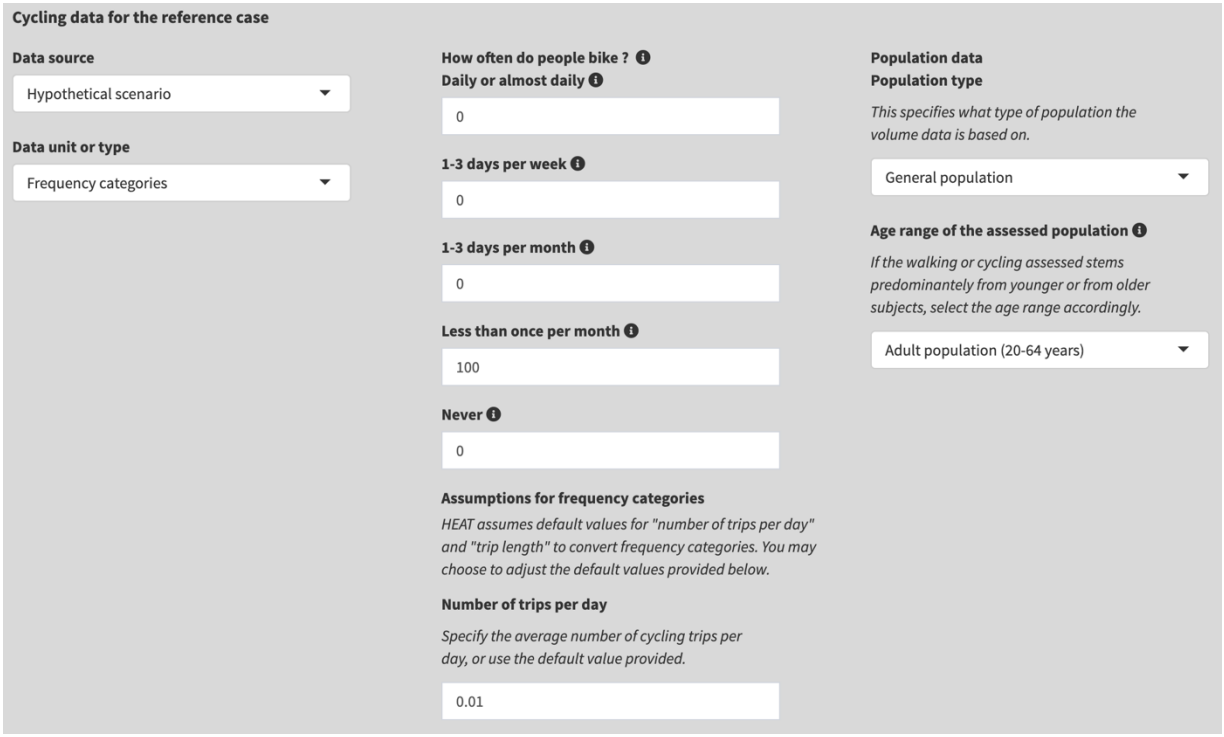



Step 2: Selecting the impacts to be considered in the assessment



Step 3: Active modes data input. Selected 100% of users using the trail for less than once per month, based on the estimate produced by MJL that average usage is approximately four visits per person per year from the Trail Impact Zone population (MJL, 2023), which equals roughly 0.01 trips per person per day.






Step 4: entering population statistics for each of the five regional districts (example for Alberni-Clayoquot RD shown here).

Population values used – Statistics Canada, 2021

| Location (Regional Districts) | Total population | Population 20-64 years | Population 20-74 years |
|---|---|---|---|
| Alberni-Clayoquot | 33,521 | 18,885 | 23,740 |
| Capital | 415,451 | 244,395 | 301,310 |
| Comox Valley | 72,445 | 38,650 | 50,535 |
| Cowichan Valley | 89,013 | 47,450 | 62,410 |
| Nanaimo | 170,367 | 90,570 | 119,940 |

**Total population size for your sub2 if available in HEAT background data (Data level: sub2; Data source: No data available)**

*Figure includes all ages*

33521

**Percent of total population within the age range you are assessing for in the (country-level data from United Nations, Population Division)**

71

**Population size used for your assessment of in the**

23740

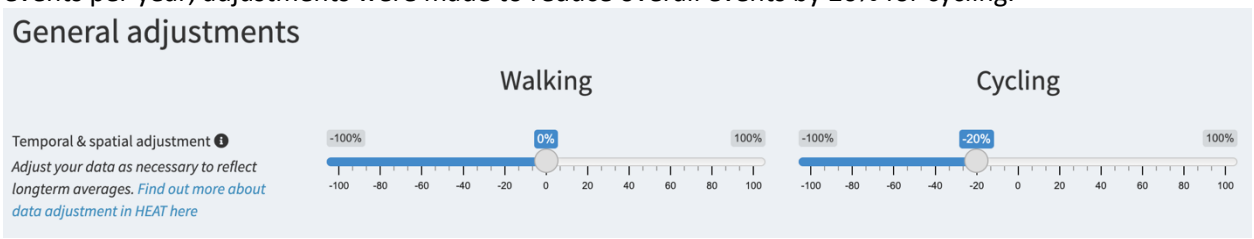
**Percent of total population within the age range you are assessing for in the (country-level data from United Nations, Population Division)**

56

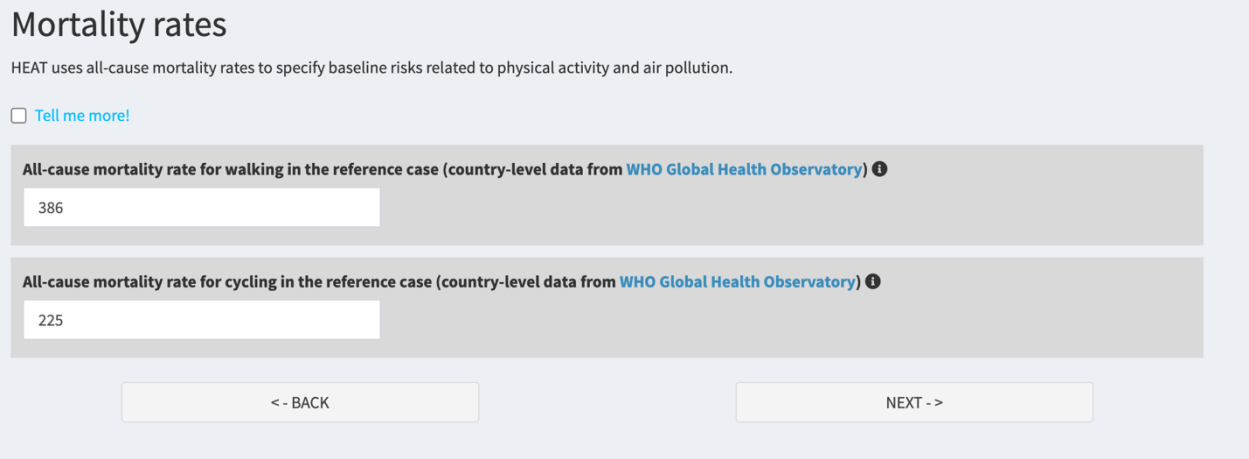
**Population size used for your assessment of in the**

18885

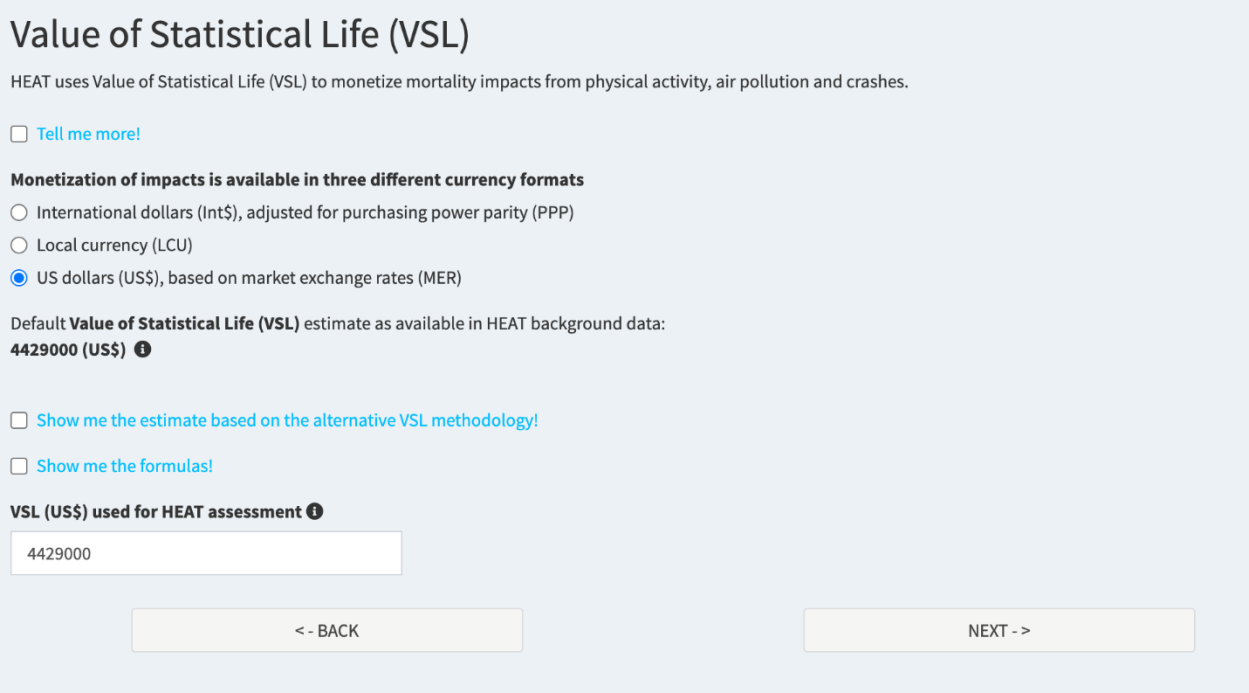
Step 5: Introduction to data adjustment. To be more conservative in estimating the number of cycling events per year, adjustments were made to reduce overall events by 20% for cycling.



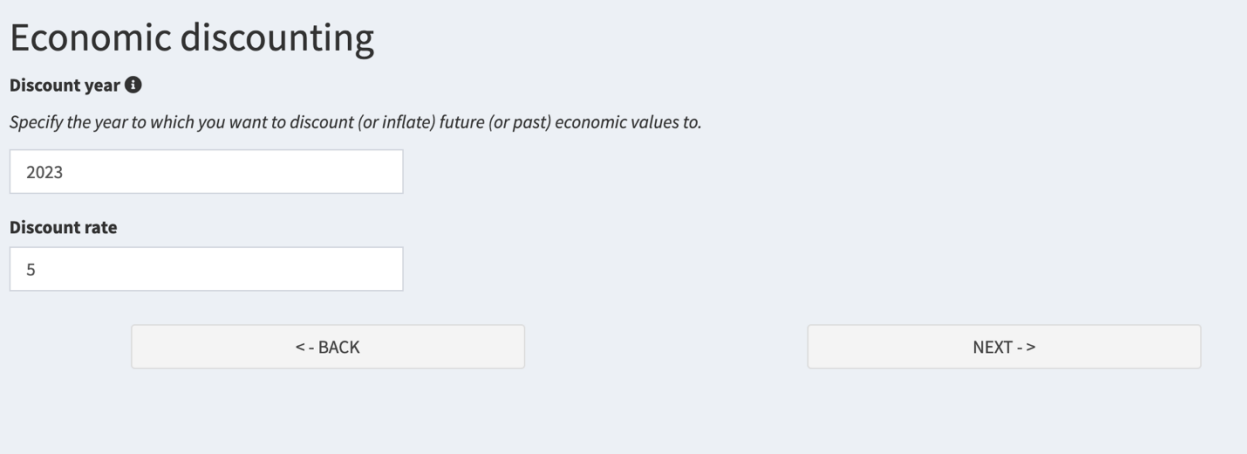
Step 6: Introduction to additional parameters – Mortality rates. All-cause mortality rates for Canada built into the HEAT were used.




Step 7: Identifying the Value of Statistical Life (VSL). The default value of statistical life (in USD) already entered in the HEAT was used. This was later converted to CDN dollars using the exchange rate on the day (conversion rate shown).



Step 8: Information related to Economic Discounting. The default information pre-entered in the model was used.




Step 9: Introduction to parameter review. Selecting default and background values for the assessment. The default values in the model were selected.

## Default and background values

The table below provides an overview of the **default values** used for your assessment. If you would like to use other values, you can edit column "Editable value".

| | Parameter description | Default value | Editable value | Unit | Parameter name |
|---|---|---|---|---|---|
| 1 | Average cycling speed | 14 | 14 | km/h | speed_bike |
| 2 | Average walking speed | 5.3 | 5.3 | km/h | speed_walk |

The table below shows the **background values** that the tool uses for your assessment. These cannot be modified.

| | Parameter description | Background value | Unit | Parameter name |
|---|---|---|---|---|
| 1 | Time needed to obtain full health impacts in single case assessment | 0.00 | years | builduptime_onecase |
| 2 | Relative risk for mortality and bike | 0.90 | ratio | RR_bike |
| 3 | Relative risk for mortality and walk | 0.89 | ratio | RR_walk |

Step 10: Introduction to results. The results were noted.
General results screen: Example – Regional District of Alberni-Clayoquot