

the

mountain valley express

CHILLIWACK → WHISTLER

60 minutes



the mountain valley express

A vision to connect the Fraser Valley, Metro Vancouver, and the Sea-to-Sky Corridor with fast, reliable express rail.



capacity for up to
15,300
passengers per hour

that's equivalent to 6 lanes of highway

Up to **80%** faster than driving between whistler & chilliwack



would attract
97,000
trips everyday taking 20% of drivers off our roads



30-70% cheaper than highways for same demand



support
460K-1M
jobs over 30 years

create
\$49-61B
in transport benefits over 30 years



CHILLIWACK —

ABBOTSFORD —

LANGLEY —

SURREY —

VANCOUVER —

VANCOUVER NORTH —

HORSESHOE BAY —

SQUAMISH —

WHISTLER —

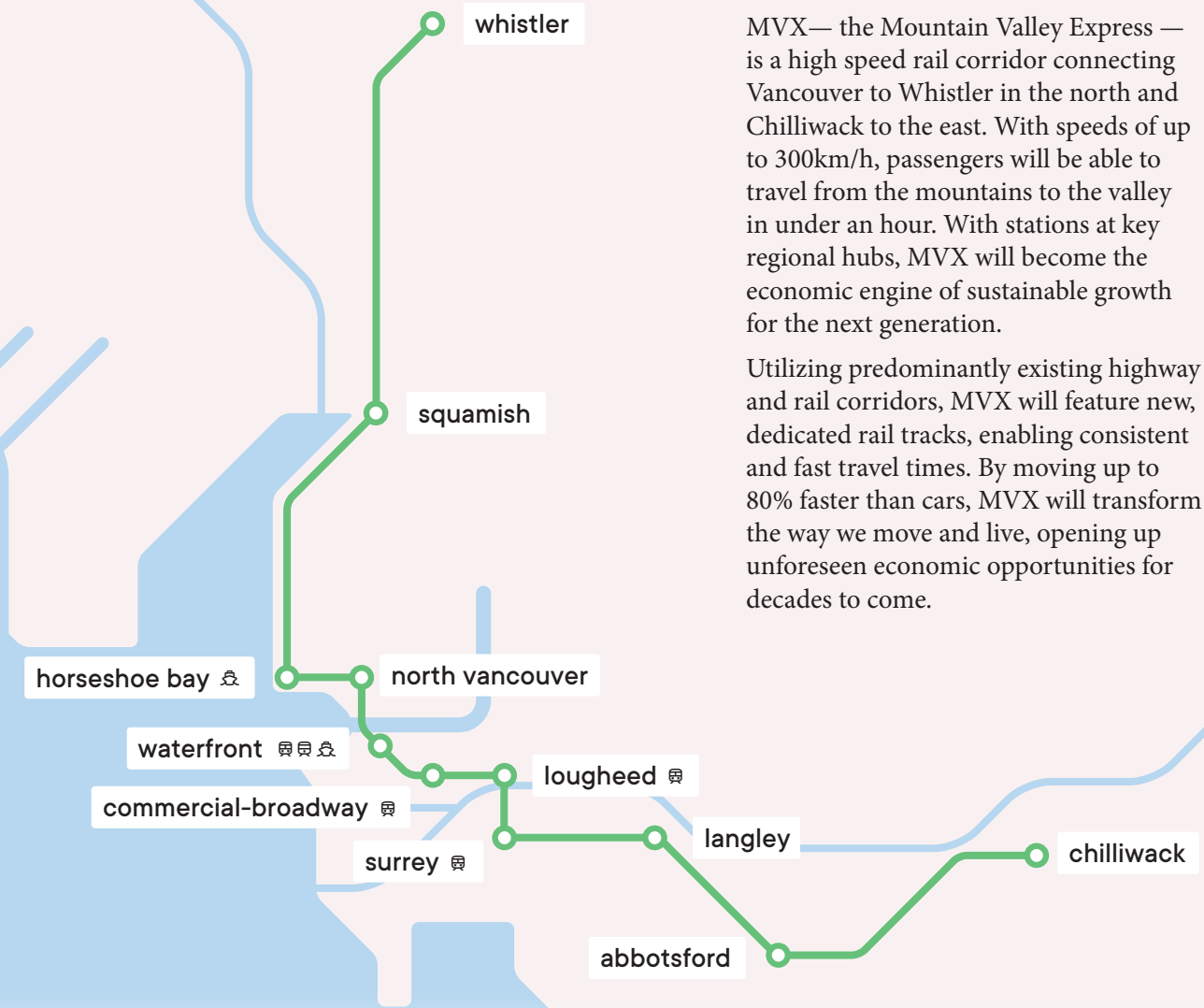
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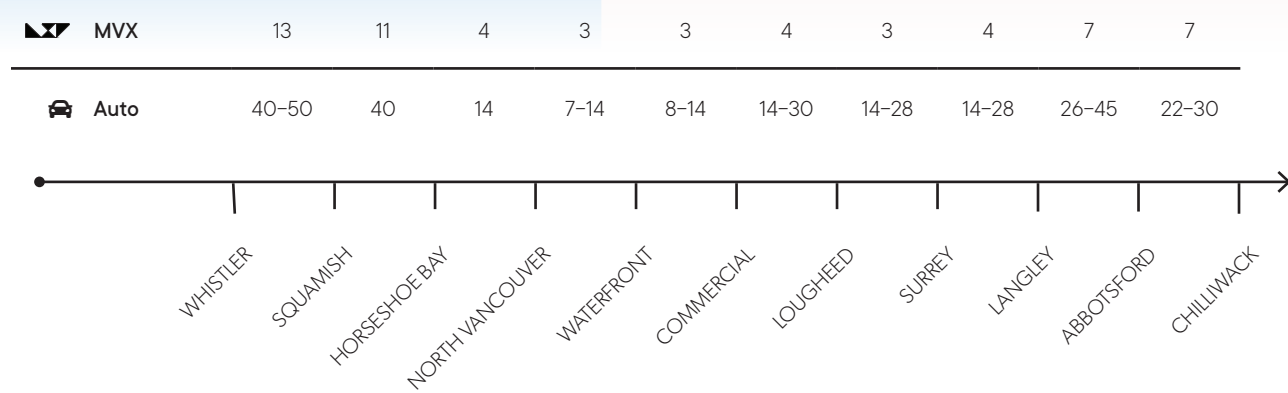
Proposal

MVX— the Mountain Valley Express — is a high speed rail corridor connecting Vancouver to Whistler in the north and Chilliwack to the east. With speeds of up to 300km/h, passengers will be able to travel from the mountains to the valley in under an hour. With stations at key regional hubs, MVX will become the economic engine of sustainable growth for the next generation.

Utilizing predominantly existing highway and rail corridors, MVX will feature new, dedicated rail tracks, enabling consistent and fast travel times. By moving up to 80% faster than cars, MVX will transform the way we move and live, opening up unforeseen economic opportunities for decades to come.



TRAVEL TIMES IN MINUTES



Background

British Columbia is at a turning point in its history. The COVID-19 pandemic has exacerbated the inequities in our society and fragilities in our economy. With the largest job loss recorded since World War II, and a disproportionate risk being placed on essential workers in our communities, how we respond to this moment will define a generation.

While the recovery from COVID-19 remains top-of-mind, there is an even larger crisis looming. Climate change requires us to rethink how we live, work, and play. We cannot continue the status quo - we must build back better. This requires bold investments in resilient, equitable, and sustainable infrastructure.

We can no longer continue investing billions in public funds towards highways, which fuel rising congestion, greenhouse gas emissions, and expensive sprawl that eat away our farmland and forests. We can, and we must, do things differently.

British Columbia, Oregon, and Washington State are currently investigating building a high-speed rail corridor that would connect Portland, Seattle, and Metro Vancouver. This project is being planned because it will foster strong economic growth along the West Coast. High-speed rail is a proven, zero-emissions transportation alternative that has revitalized communities and created powerful economic megaregions across Europe and Asia.





To support economic recovery and prosperity for people right here in Metro Vancouver, we must ensure that our local communities can access opportunities without a car. We need to connect the South Coast from Whistler to Chilliwack with high-speed rail. We need the Mountain Valley Express.

The Mountain Valley Express would move 97,000 trips per day, taking 20% of all drivers off our congested highways. Building high-speed rail would support up to one million good jobs for British Columbians and reduce travel times by 80% compared to driving. It would also support our province's goal of reducing greenhouse gas emissions by 60 per cent by 2040.

The Mountain Valley Express would connect people with more employment opportunities, at a scale not seen in generations. It would contribute to a more affordable and equitable region.

From the Kettle Valley Railway, to hydro-electric power projects, to the Coquihalla Highway; British Columbians have always been willing to make bold investments for our future.

It is time to build the Mountain Valley Express.





Benefits

AFFORDABILITY

The unaffordable cost of housing in regional centres has driven many families far from where they work and play, where rent is lower and home ownership is more achievable. However, without reasonable alternatives to driving, many families are forced to commute by car. Our region is polycentric, and connecting these centres with MVX is an obvious regional mobility evolution.

With travel times up to 80% faster than driving, MVX will replace unreliable car commutes with comfortable, fast connections from the suburbs to the city in record time. With MVX, it will be as fast to travel into Downtown Vancouver from Chilliwack as taking the bus from Marpole. This time-space transformation will create significant opportunities to expand housing options in communities with greater land availability and lower land costs, improving housing affordability for thousands of families. And by commuting with MVX, many households will be able to reduce driving or even sell their vehicle, producing additional savings.

AN ECONOMIC ENGINE

High speed rail has a proven track record of creating significant economic value. By compressing space

and time between communities, new opportunities for innovation, employment, education, and exchange are created. And with MVX stations located at major destinations and urban centres, economic opportunity will be spurred across the South Coast region. With additional public and private investment to co-locate post-secondary campuses, start-up incubators, and co-working spaces on MVX, stations will become the innovative employment hubs of tomorrow.

LOCAL EXPRESS TRANSIT

With a limited-stop, express rail corridor through the heart of Metro Vancouver, the MVX can also serve as an express transit service for local trips. An existing 35 minute SkyTrain trip from Waterfront to Lougheed will be replaced by an 7 minute trip on the MVX. This will dramatically improve access between Downtown Vancouver and suburban destinations, creating new economic and social opportunities. MVX will help relieve growing pressure on the SkyTrain Expo Line, which currently acts as the primary east-west transit corridor in the region. It will also help provide redundancy to the regional transit network, essential during extreme weather events, power outages, and periodic SkyTrain closures.



RESORTS AND OUTDOORS

Anchored by Whistler Blackcomb, one of the world's most renowned ski resorts, the Sea to Sky has seen incredible economic growth and tourism demand since the 2010 Olympics. However, this has also brought unprecedented highway congestion, creating unreliable travel times and unanticipated pressures on natural areas. Continued sustainable development is only possible with the alternative, fast transportation connection enabled by MVX. Just 31 minutes to Whistler from Downtown Vancouver, MVX will vastly improve access for both international visitors and urban daytrippers. MVX will also connect to Squamish, reducing parking pressures to popular sights such as Shannon Falls, the Chief, and the Sea to Sky Gondola. And with the planned Garibaldi at Squamish resort, significant new demand on the area will be managed thanks to a quick 18 minute trip on MVX from Downtown.

Similar to the Sea to Sky, the Fraser Valley has a bounty of natural destinations, whose access is currently limited by a heavily congested and unreliable highway. With MVX, a trip to Chilliwack will be just 28 minutes from Downtown Vancouver. Nearby attractions include Harrison Hot Springs, Cultus Lake, Chilliwack Lake and Bridal Falls. MVX will enable more locals and visitors to experience these beautiful destinations, spurring additional economic activity.

INTERNATIONAL CONNECTIONS

Just as the Canada Line transformed access to and from YVR, MVX will build upon that success by extending the reach of this popular transit line. With a transfer at Waterfront station, a tourist could travel from YVR to Whistler or Chilliwack in just under an hour. This connection will also be extremely beneficial to locals, dramatically reducing car-free travel times from the suburbs to the airport.

With a station at Horseshoe Bay, MVX will transform access to Vancouver Island, enabling trips to the BC Ferries terminal of 35 minutes or less. With the rise in car free trips on BC Ferries, MVX will support an increase in more walk-on trips, which are more environmentally-friendly and less costly to service for the ferry corporation.

By creating a high-speed rail corridor through the South Coast region, MVX will lay the foundation for a future planned connection to Seattle and Portland. With initial plans calling for the BC terminus in Surrey, BC, the Cascadia HSR project will be able to connect to the MVX tracks and continue onto Downtown Vancouver. This will help drive additional demand along the Cascadia HSR, as studies have shown that direct downtown connections are more popular than alternate suburban locations.



Costs

Based on capital projections for the Vancouver-Seattle-Portland High Speed Rail, MVX is projected to cost between \$7-16 billion. This capital cost assumes the MVX is designed to operate at speeds between 200-300km/h with 11 stations. A future business case, along with routing options and associated construction costs, can provide greater certainty on capital costs.

Without MVX, there will be increased pressures to expand and upgrade both Highways 1 and 99. Based on the cost of a current project adding HOV lanes on Hwy 1 to 264 St, it would cost \$1 billion to add one additional lane through to Chilliwack. Similarly, when the Sea to Sky Highway was upgraded in 2009 for \$600 million, the Ministry of Transportation anticipated future enhancements to be required starting in 2020 due to increasing congestion. With MVX, costs to expand both these highways could be deferred and used to construct the rail line.

With the BC Government committed to continuing to raise the carbon tax over time, it is recommended that new revenues be used to fund a portion of MVX. As transportation emissions are the dominant source of carbon pollution, constructing MVX can make a substantial dent in our emissions targets and provide a desirable alternative to driving. With each annual \$5/tonne increase in the carbon tax raising roughly \$250 million per year, continued increases could fund a significant portion of the project.

As one of the largest urban economies in Canada, and the potential to showcase MVX as one of the first high speed rail projects in North America, there is a clear justification for federal contributions. MVX's transformational impact on emissions reductions, improved affordability for families, and fueling the innovative economy of tomorrow align seamlessly with the federal government's priorities. The federal government invested \$1.2 billion through the new Canada Infrastructure Bank into Montreal's planned REM regional rail network. It is also studying VIA Rail's High Frequency Rail proposal for central Canada, where an investment of \$4-6 billion is expected to fund that plan, as well as a proposed rail connection between Calgary and Banff.

There is also significant long-term revenue potential in land value capture around MVX stations. Rail stations in Asia are mixed-use complexes featuring retail, office, and housing. These complexes are developed and owned by the rail company, producing revenues which subsidize operations. This model has been followed in recent years by YVR with the construction of the MacArthur Glen Outlet on Sea Island. Land value capture was recently introduced in Metro Vancouver as part of the Mayors' Ten-Year Vision funding program, which introduced a regional Development Cost Charge on new developments. This tool enables TransLink to garner a portion of the value created with transit expansion as new services support and spur demand for new development nearby.

Case Studies



SOUTH FLORIDA

Brightline, a privately-owned and operated rail service, re-started passenger operations on an upgraded, existing railway between West Palm Beach and Miami in 2018. Construction took three years at a cost of \$1.75 billion USD. To achieve profitability, the owner developed mixed-use retail, office, and housing complexes at the three new stations. A \$1.75 Billion USD extension to Orlando will feature new tracks with speeds up to 200km/h, allowing a traveler to complete the trip 30 to 60 minutes faster than by driving.



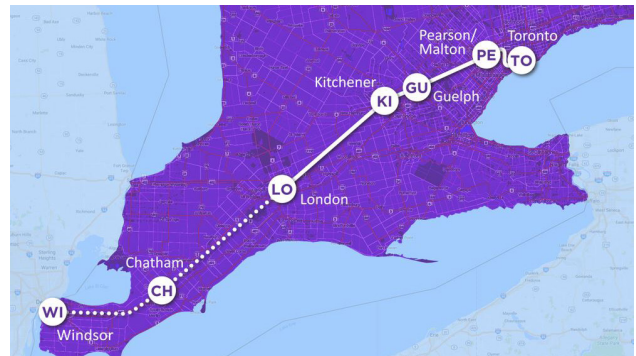
LAS VEGAS-SOUTHERN CALIFORNIA HIGH SPEED RAIL

Brightline is constructing a 300km long high speed rail along the Interstate 5 corridor, connecting Victorville, CA with Las Vegas. Traveling up to 240km/h, the trip will take between 75-90 minutes, about half the time as driving. Although built and operated privately, the \$4.8 billion USD project required a \$3.2 billion USD state bond to start construction. The project is under construction and begins operation in 2023. Future plans call for an extension directly to Los Angeles.



BEIJING-ZHANGJIAKOU HIGH SPEED RAILWAY

To support transportation between these two host cities for the 2022 Beijing Winter Olympics, China constructed a high speed railway. With 10 stations over 173km, including a stop at the Great Wall of China, the railway features the longest tunnel on the Chinese rail network, spanning 12km. The new railway shortened travel time from over 3 hours to around 45 minutes, traveling speeds up to 350km/h. The new line was built in 4 years for a cost of 23.6 Yuan or CAD \$4.4 Billion.



SOUTHERN ONTARIO HSR

The former Liberal Government of Ontario had initiated work on the development of a high speed rail corridor connecting Toronto to London, with a future phase to Windsor. With a total trip time of an hour and a half, the route would cut travel time in half compared to driving. Traveling speeds up to 250km/h using a mixture of existing and new corridors, the \$20 billion CAD project was put on hold for review following the election of the Progressive Conservatives.

Questions & Answers

WHY NOT IMPROVE TRANSIT WITH BUSES FIRST?

BC Transit introduced the Fraser Valley Express in 2015, connecting Langley to Abbotsford and Chilliwack for the first time with public bus service. With growing ridership, BC Transit introduced Sunday and holiday service in 2017, and doubled weekend service in 2018. The route is being extended to connect directly to Lougheed Station in 2021. With 19,300 riders per month (232,000 per year), the service has proven that there is demand for inter-regional transit in the Fraser Valley.

However, the service's reliability is currently hindered by congestion. As there are no bus or HOV lanes on Highway 1 east of 202 Street, the service remains stuck in traffic for many hours of the day, delaying trips and reducing the service's attractiveness.

BC Transit is exploring introducing bus service connecting Squamish to Vancouver in the coming years, but has not committed to a timeframe or negotiated an operating agreement with the Sea to Sky municipalities. That service will also face similar congestion issues that plague the Fraser Valley Express on Highway 1.

HOW IS THIS DIFFERENT THAN THE WEST COAST EXPRESS?

The West Coast Express is a limited, rush-hour only commuter train service that connects Mission to Downtown Vancouver. Although the West Coast Express was introduced in 1995, the service has seen

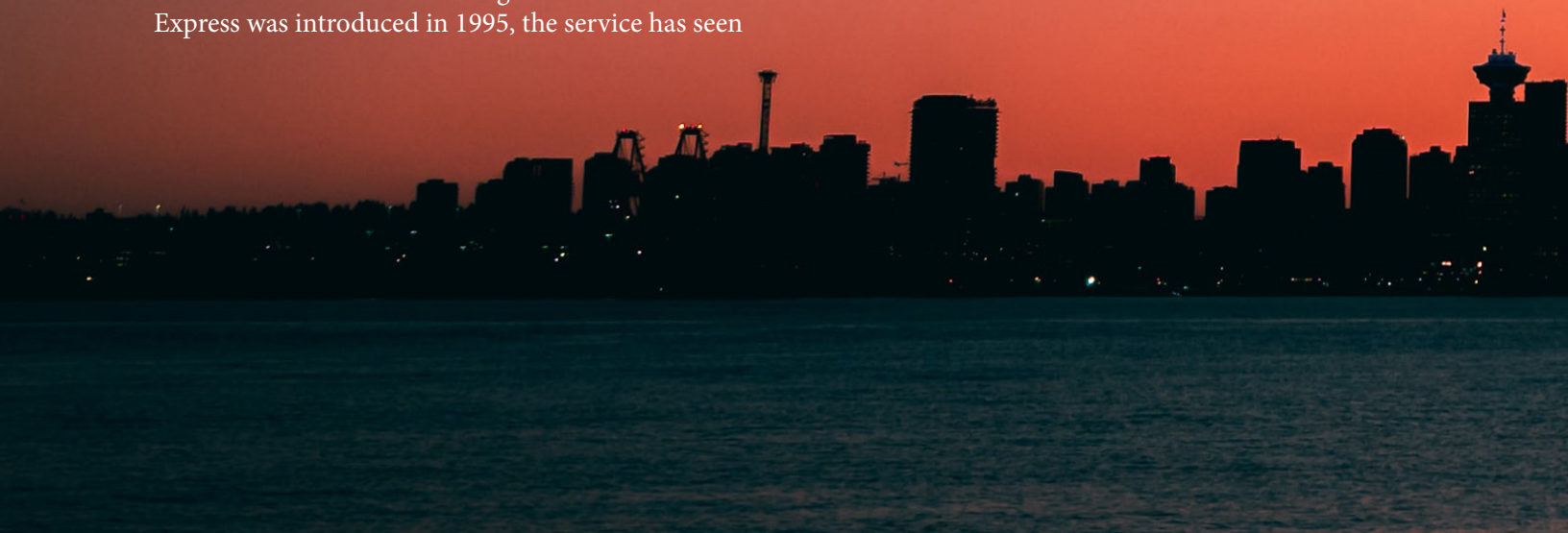
few upgrades through the years due to the challenges of negotiating additional track time with CP Rail.

MVX includes new, dedicated tracks specifically for the express passenger service which allows it to have high frequencies and high speeds. The significant travel time reductions obtained with the new, dedicated tracks fuels the high benefits of the project.

Negotiating additional shared track time on existing railways in the region may be feasible, but these services will not have the same travel time savings as MVX and could negatively impact freight movement.

CAN WE AFFORD THIS?

The MVX would be BC's most significant major project, with a budget comparable to the Site C dam currently under construction. Although the capital costs are significant, they are comparable to the costs allocated to other transportation mega projects in the Lower Mainland, such as the \$3.5 billion for the 6km Broadway subway extension or the \$2.5 billion allocated to the Port Mann Bridge/Highway 1 expansion. With the most significant travel time savings of any transportation project built in recent history, the economic returns for MVX will be felt for a generation.



Next Steps

This proposal is a proof of concept. It strives to imagine a future where the South Coast region is connected by passenger rail. Based on our analysis, a system like MVX is not only feasible, but could be critical for future sustainable growth of our region and of the province.

Bearing in mind that MVX will connect three regions and could be a significant catalyst for provincial growth, we ask that the province take the lead and commission a feasibility analysis for a passenger rail system in the South Coast. The feasibility analysis should evaluate multiple system options, examining alternative routes, speeds, and station locations. It should include a cost-benefit

analysis, considering travel time savings, emissions reductions, direct and indirect economic benefits, development opportunities and land value capture, and health benefits. The analysis should consider work recently completed with the Burrard Inlet Rapid Transit Study, as well as the Transport 2050 Regional Transportation Strategy under development.

Based on the findings of the feasibility analysis, a more accurate assessment of the benefits and realities of a passenger rail system will become clear and should guide public discussion and future decisions about the project.



Methodology & Assumptions

The vision for MVX is based on, and leverages, recently completed technical and economic studies for similar high speed rail and related transportation infrastructure. The general methodology and assumptions used are noted below.

CAPITAL COSTS

The capital cost for MVX is based on figures used in the Seattle USHR Feasibility Study.

While the general route of the MVX follows existing highway and railway corridors, this analysis compared several realistic alternatives in specific sections, such as between Carvolth and Lougheed. Differences included route and grade separation. These options were compared to provide a capital cost range.

One major station at Waterfront and nine minor stations were added to the cost. A contingency of 30% was then added to the sub-total to produce the \$7-16 billion CAD high-level cost

Infrastructure	Price (per unit)
At grade rail	\$13 - \$28M per kilometer
Elevated rail	\$105 - \$170M per kilometer
Tunneled rail	\$195M per kilometer
Major station	\$413M
Minor station	\$55M
Total cost	\$5.5B to \$12.5B
Total cost (30% contingency)	\$7B to \$16B

MVX RIDERSHIP

As this vision does not include a robust transportation modeling exercise, the ridership is based on an extrapolation of current highway usage along the entire corridor.

To determine current highway use, August 2019 traffic volumes were taken from Ministry of Transportation and Infrastructure counters. Each counter identified was a large gateway into or out of each respective sub-area of the larger region. Both the Lions Gate and Second Narrows were counted - as the MVX travels through Downtown, capturing some of the local traffic that uses the Lions Gate, but also travels further west to the Sea to Sky corridor, capturing some of the longer distance traffic that currently travels on Hwy 1 and the Second Narrows.

Based on the mode share estimates in the Seattle USHR Business Case, it was assumed that MVX would capture a total of 20% of current corridor traffic. It does not consider future growth along the corridor.

Sub-area	MoTI Counter ID	Traffic Volume (Aug 2019)	20%
Sea to Sky	P9901NS	28,916	5,700
Lions Gate	P151NS	64,542	12,900
Second Narrows	P152EW	133,186	26,600
Port Mann	P1600EW	169,403	33,800
Fraser Valley	P174EW	91,021	18,200
Totals		487,068	97,200

ECONOMIC BENEFITS

The economic benefits were quantified based on assumptions of economic value from the Ontario HSR Business Case. These values were then applied to the cost and ridership estimates for MVX.

Travel Time Savings is calculated on the 97,200 trips shifted to MVX. Based on typical trips between sub-areas (Chilliwack to Abbotsford or Surrey to Vancouver), average travel times savings with MVX range from 11 to 61 mins. The time savings are multiplied by the base value. This calculation does not consider the cumulative travel time savings of trips along the entire corridor from end-to-end as they would be less typical, although would provide significantly higher benefits compared to driving.

Congestion Savings is quantified based on trips during peak periods. This is assumed as 3 hours of morning travel and 3 hours of evening travel. Based on the Ontario HSR Business Case Report, this peak period travel equates to 40% of total daily volumes. From the 97,200 trips that are assumed to shift to MVX, 40% - or 38,800 trips - is used as the basis of this calculation. Those trips are assumed to have traveled 49 km per day, based on the average 18,000 km per year.

Auto User Cost Savings, Safety, and Emissions are all based on the 20% of current corridor trips shifting to MVX. Those 97,200 trips are assumed to travel 49 km per day, based on the average 18,000 km per year. The sub-total is multiplied by 365 days to determine the annual value and then by 30 years to determine the project's lifecycle benefits.

	Base	Annual Value	30-year Value
Travel Time Savings	\$16.13/hr	\$103 - \$577M	\$3 - \$17B
Auto User Cost Savings	\$0.63/km	\$1.1B	\$33B
Congestion Savings (peak)*	\$0.30/km*	\$209M	\$6.2B
Safety	\$0.08/km	\$139M	\$4.1B
Emissions	\$0.01/km	\$17.4M	\$524M
Totals		\$1.5 - \$2B	\$47 - \$61B

*peak = 6 hours or 40% total daily volume or 38,880 trips

OTHER CAPITAL & OPERATING ASSUMPTIONS

Input	Details	Source
Jobs Supported	66,600 jobs/\$1 billion CAD	APTA Economic Impact of Public Transit
MVX Passenger Capacity	7,560 passengers per hour per direction	California Equivalent Capacity Report
Highway Expansion Capital Costs (\$ CAD million)	\$32.5/km in urban areas \$6.5/km in rural areas	California Equivalent Capacity Report



References & Sources

BACKGROUND

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Stats Canada: Canadian Economic Dashboard and COVID-19

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Government of British Columbia: Climate Planning and Action

<https://www2.gov.bc.ca/gov/content/environment/climate-change/planning-and-action>

METHODOLOGY

Seattle UHSR Feasibility Study

https://wsdot.wa.gov/publications/fulltext/LegReports/17-19/UltraHighSpeedGroundTransportation_FINAL.pdf

Seattle USHR Business Case

<https://wsdot.wa.gov/sites/default/files/2019/07/12/Ultra-High-Speed-Ground-Transportation-Study-Business-Case-Analysis-Full-Report-with-Appendices-2019.pdf>

Ontario HSR Business Case

<http://www.mto.gov.on.ca/english/publications/pdfs/preliminary-business-case-hsr.pdf>

California HSR Equivalent Capacity Report

https://hsr.ca.gov/docs/about/business_plans/2020_Business_Plan_2019_Equivalent_Capacity_Analysis_Report.pdf

MoTI Traffic Data Program

<http://www.th.gov.bc.ca/trafficdata/>

APTA Economic Impact of Public Transit

<https://www.apta.com/wp-content/uploads/APTA-Economic-Impact-Public-Transit-2020.pdf>

