

Westshore Passenger Ferry Pre-Feasibility Study Overview

March 8, 2019

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Agenda

Opening Remarks

Mark Collins, President & CEO, BC Ferries

Study and Meeting Objectives

Jamie Marshall, VP, Business Development & Innovation, BC Ferries

Pre-feasibility Study Overview

Patrick Devlin, SNC Lavalin

Dan Gomez-Duran, Steer

Q&A

Next Steps

Jamie Marshall, BC Ferries



Opening Remarks

Mark Collins

President & CEO

BC Ferries



Study Objectives - Connecting Communities

To gather information on the viability of a marine solution to an increasingly challenging community transportation issue.



Meeting Objectives

Share pre-feasibility study outcomes and key findings

Facilitate discussion among stakeholders

Determine next steps for project

- › Full feasibility study?
- › Funding arrangements?
- › Process and leadership?



Westshore Express Passenger Ferry Service

Stakeholder Presentation – 8th March, 2019



SNC • LAVALIN

steer



Building what matters

Westshore Express Passenger Ferry Service

- › Study objectives
- › Proposed service and terminals
- › Design Vessels
- › Cost Estimates
- › Demand Forecast
- › Business Case
- › Key Findings
- › Questions



Background & Study Objectives



Background & Study Objectives

- › Well known current transportation issues for those commuting from the Westshore.
- › CRD forecasts 30% growth over next 20 years, half located in Westshore where population will increase by 88%.



Ferry Study Objectives:

- › Forecast potential passenger demand for the proposed ferry service;
- › Assess viability of the service: financial, social, environmental, user benefits and technical challenges; and
- › Identify key technical and financial issues for further analysis and study.



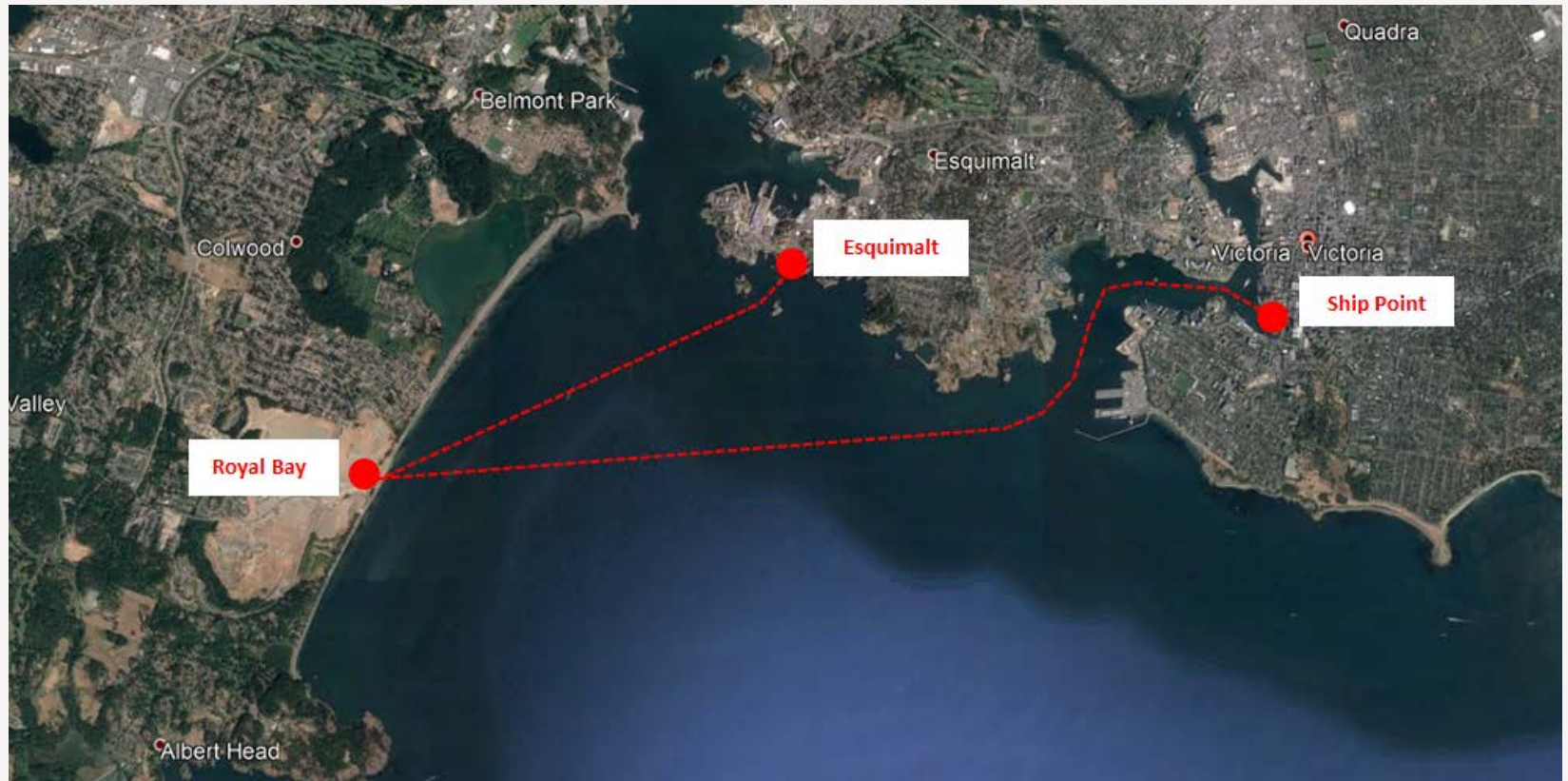
Proposed Service and Terminals



Proposed Service & Terminals

Reference Case

- › Royal Bay to Ship Point: ~30 min trip, departing every 20 min, 6am to 10pm
- › Royal Bay to Esquimalt: ~15 min trip, departing every hour, 6am to 9pm



Proposed Service & Terminals – Royal Bay

- › Old quarry site soon to be developed. Terminal would be a focal point for Royal Bay development (2,800 homes for 7,000 residents).
- › Shallow shoreline extending for some distance offshore.
- › Exposed to wind and waves from the southeast
- › Esquimalt Lagoon 900 m north is federally designated bird sanctuary, sand spit has had previous erosion issues



Proposed Service & Terminals – Royal Bay

Upland

- › Parking for 250 vehicles
- › Sheltered bike stands
- › Bus stops and turnaround
- › Covered waiting area with washrooms

Marine

- › 110 m long x 3m wide jetty
- › 35 m aluminum gangway
- › Concrete pontoons
- › 150 m rubble-mound breakwater

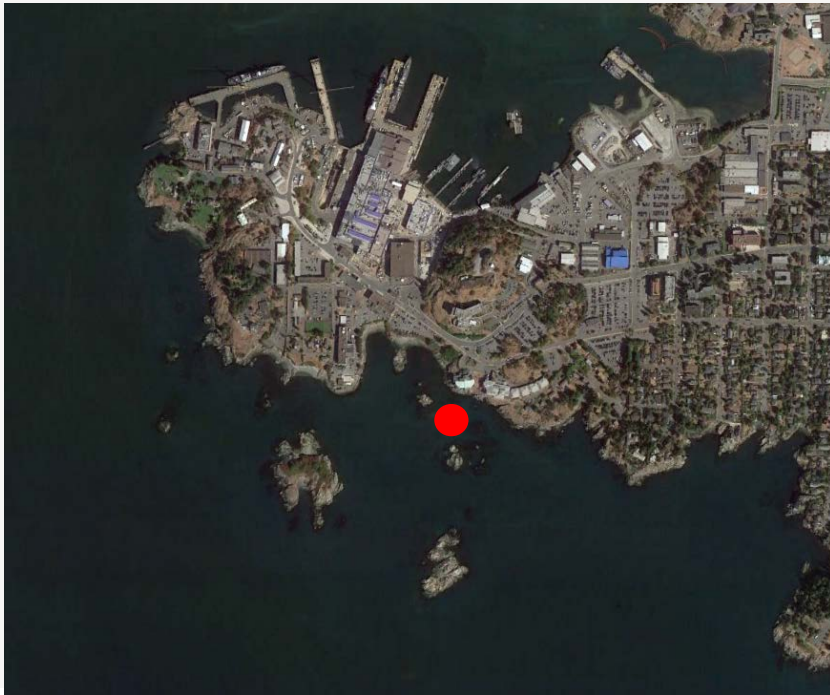
Exclusions

- › Waterfront promenade and landscaping



Proposed Service & Terminals – Esquimalt

- › Outside of Esquimalt Harbour due to the secure zone inside
- › At the current Pacific Fleet Club due to potential availability of this building
- › Exposed from the south, inside small rocky islands



Proposed Service & Terminals – Esquimalt

Upland

- › Utilise existing building for waiting area and washrooms
- › Sheltered bike stands
- › Existing public transit connections

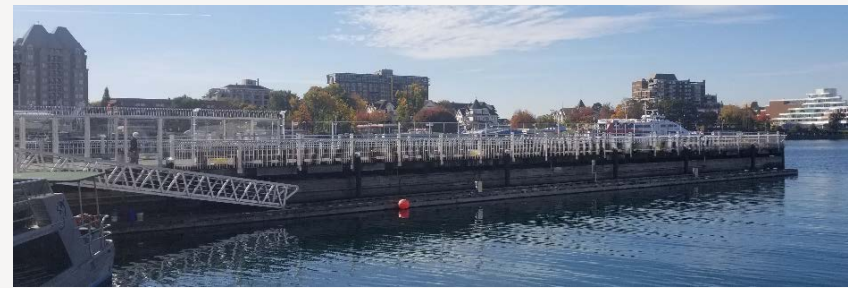
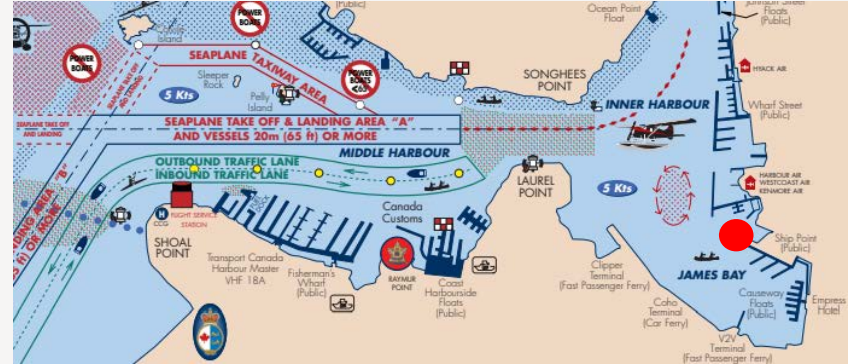
Marine

- › 75 m long x 3m wide jetty
- › 35 m aluminum gangway
- › Concrete pontoons
- › 100 m rubble-mound breakwater



Proposed Service & Terminals – Ship Point

- › Existing wharf currently used by similar size vessels
- › Harbour speed restrictions: 7 knots outer harbour, 5 knots inner harbour
- › Busiest location with many other users (Harbour Air, Clipper, Coho, V2V, Whale watching, water taxi, tourist, private and commercial vessels)



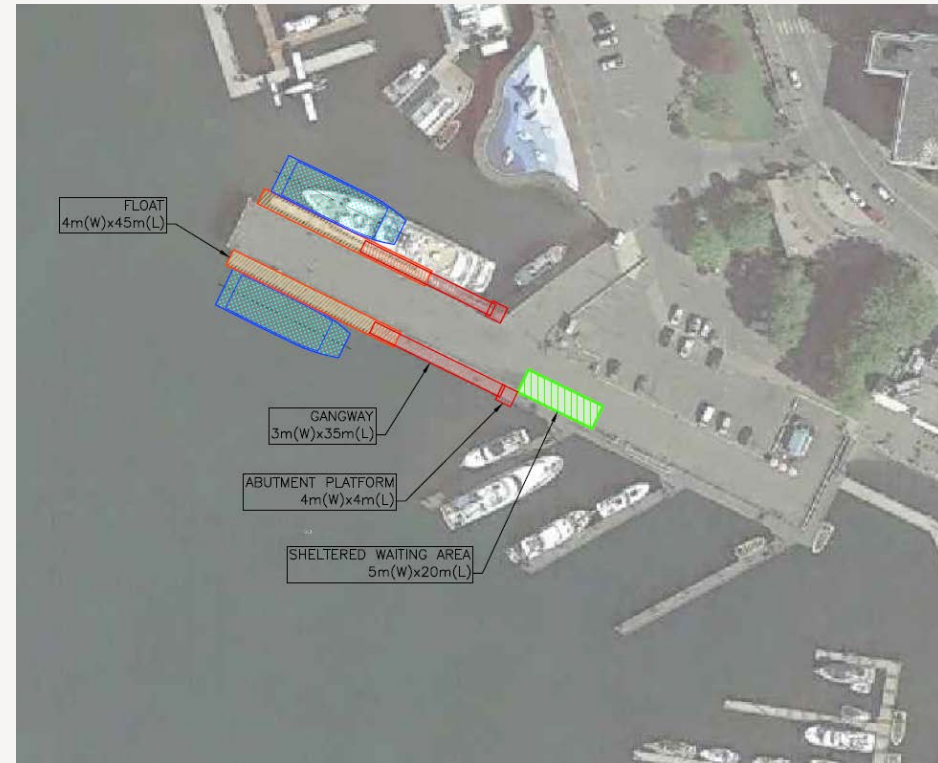
Proposed Service & Terminals – Ship Point

Upland

- › Covered shelter
- › Existing carpark and public transit connections

Marine

- › 35 m aluminum gangway
- › Existing timber floats replaced with concrete pontoons



Design Vessels

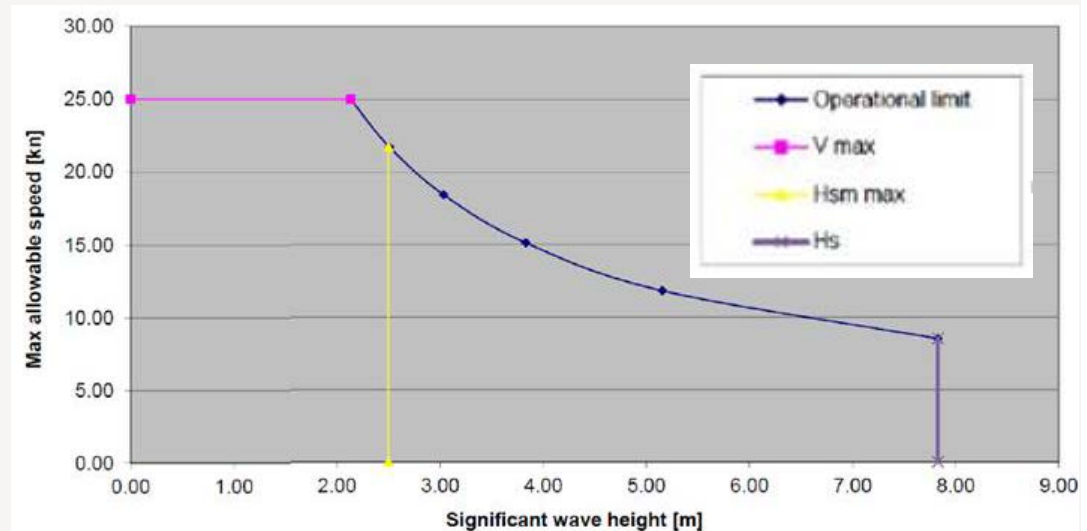


Design Vessels

- › Damen Fast ferry DFFe3209 selected as design vessel.
- › Can operate at 25 kts in over 2m waves
- › Low operational downtime for proposed route (estimated about one storm per year).



Key Vessel Statistics	
Length	32.3 m
Beam	9.9 m
Depth moulded	3.4 m
Draught (hull)	1.6 m
Draft (prop)	1.7 m
Passenger capacity	294 people
Maximum speed	25 knots

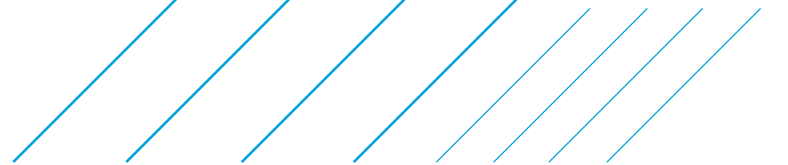


Design Vessels

- › Diesel engines
- › Alternative fuels:
 - › Fuel cell – Feasible but expensive and need a source of hydrogen.
 - › Electric – Current technology would not have sufficient capacity or charge time for high proposed speed with relatively short turnaround time.
 - › Natural Gas – Feasible but not currently available in this model, Damen gave indicative price for LNG. CNG may also be feasible.



Cost Estimates



Cost Estimates

Capital Costs

- › Terminals
- › Vessels - \$10.8M per vessel, five vessels for reference case

Terminal	Element	Estimated Cost	Total
Royal Bay			\$27,900,000
	Marine	\$15,200,000	
	Upland	\$12,700,000	
Esquimalt			\$10,000,000
	Marine	\$9,500,000	
	Upland	\$500,000	
Ship Point			\$3,700,000
	Marine	\$3,200,000	
	Upland	\$500,000	
Totals			\$41,600,000

Operational Costs

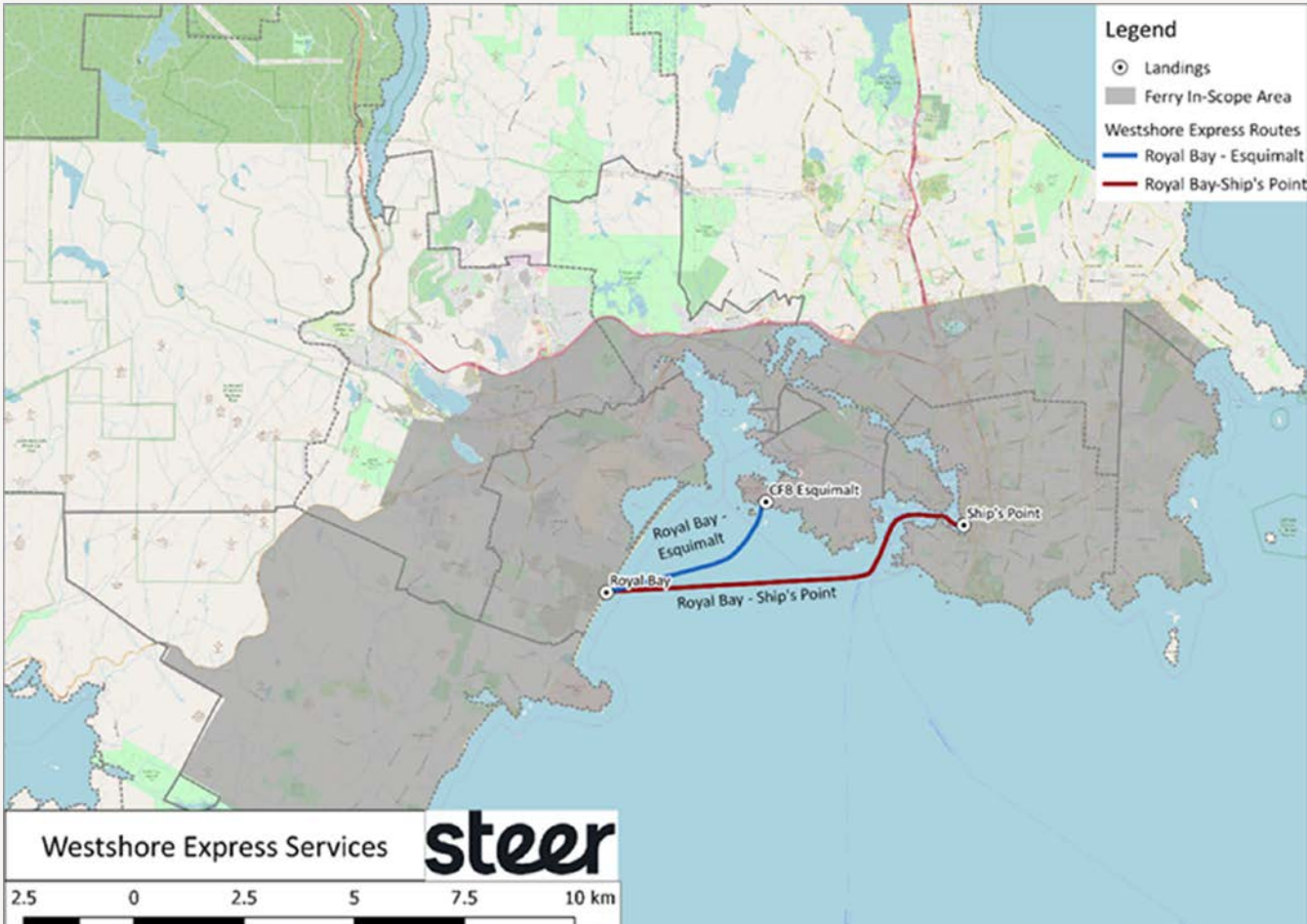
- › Staff – Four people per crew, three crew per vessel: \$7M /year
- › Fuel – \$3.2M /year for reference case
- › Typical allowances for vessel and infrastructure maintenance



Demand Forecasts



Study Area

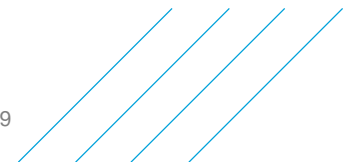


Existing Conditions

Potential Demand (2018)

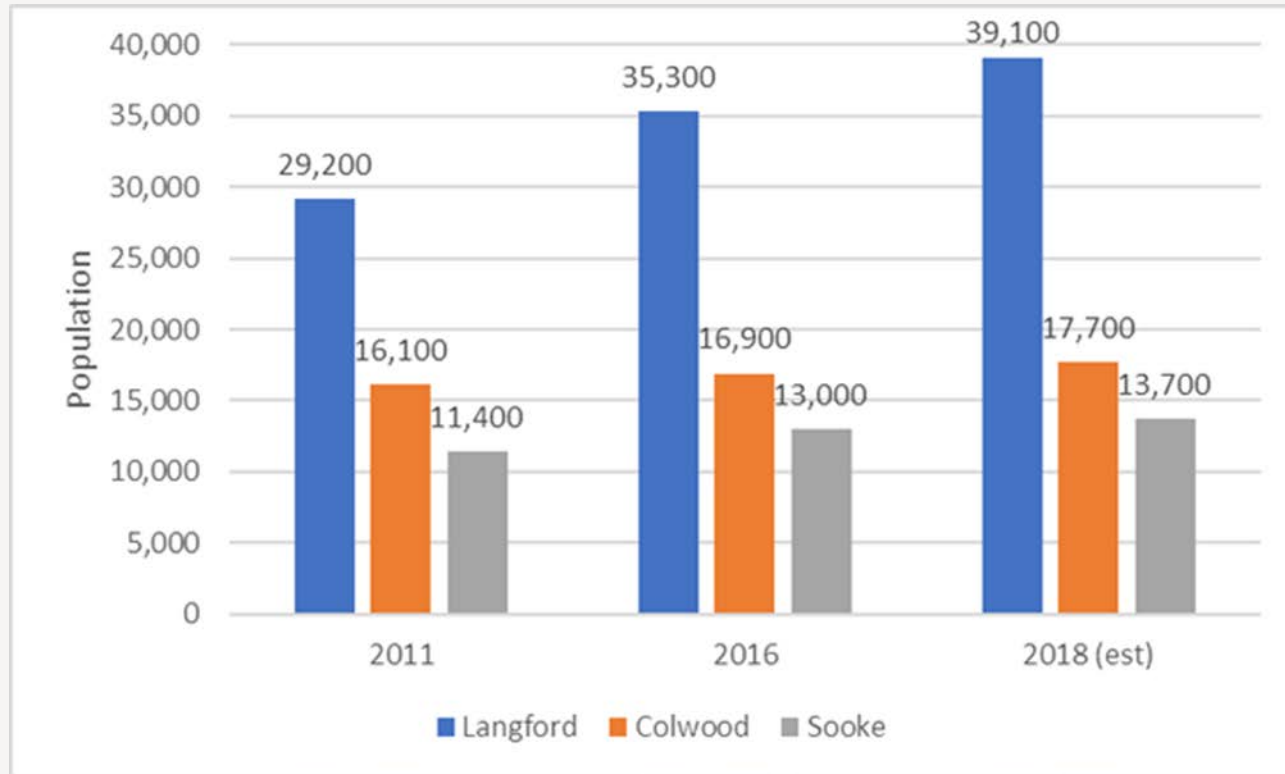
Mode	Regional Trips	Regional Mode Share	Ferry In-Scope Potential Trips	Ferry In-Scope Mode Share
AM Peak (7am-9am)				
Car	139,483	93%	7,609	89%
Bus	10,571	7%	903	11%
Total	150,054	100%	8,512	100%

- › Absolute maximum demand of 8,500
- › Higher transit mode share in Westshore than region as a whole



Existing Conditions

Population Growth



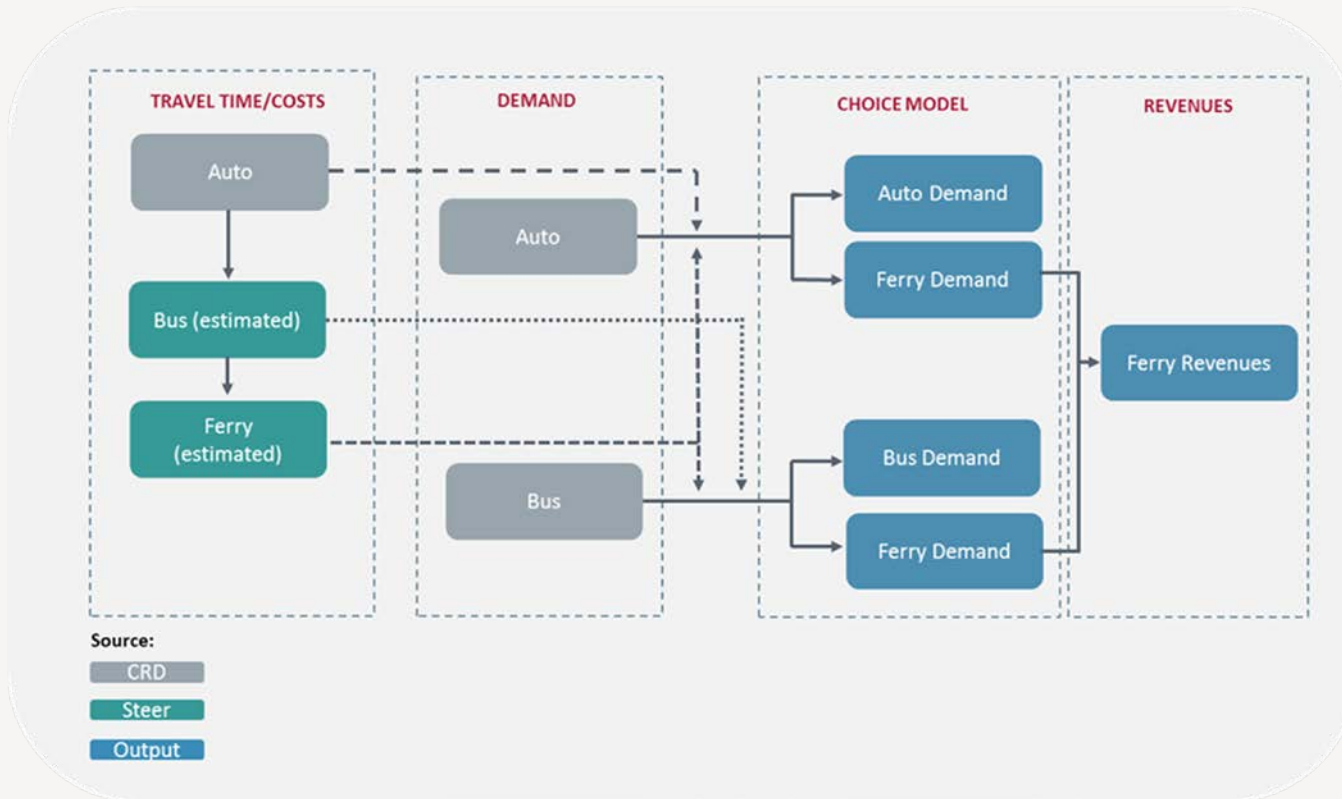
Existing Conditions

Transit Network

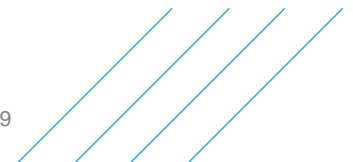


- › Discussions with BC Transit required to provide seamless access to Royal Bay and ferry terminal

Data Sources and Methodology

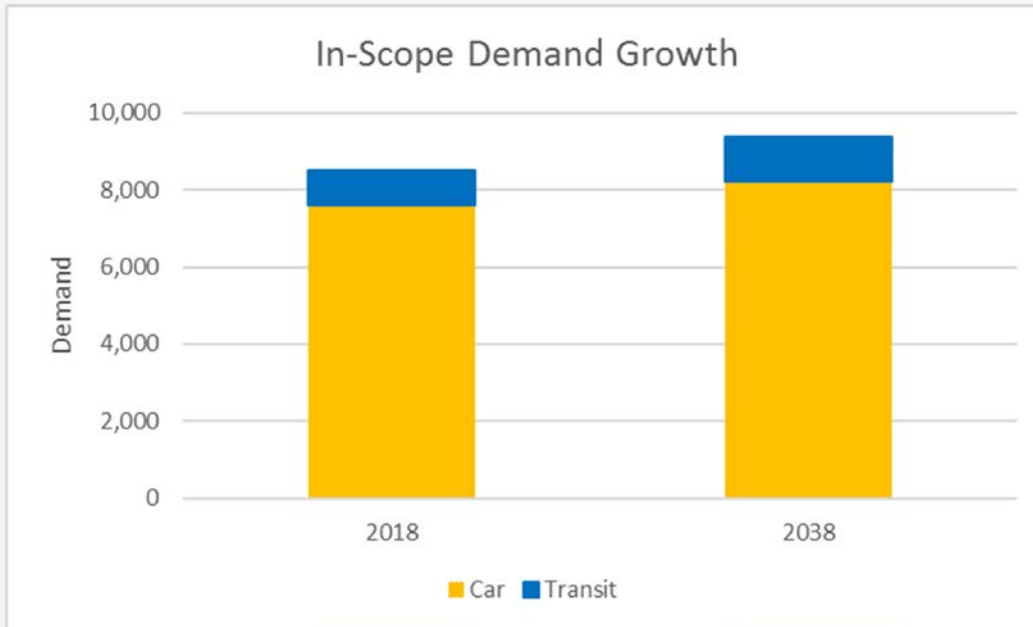


- › CRD Origin-Destination data and forecasting travel time model outputs
- › BC Transit and traffic flows for expansion from AM peak to daily and annual



Future Assumptions

Demand Growth



- › Based on CRD model and population/employment growth in region
- › Higher growth in transit but car remains the main mode of travel



Future Assumptions

Ferry Service

	Royal Bay – Ship’s Point	Royal Bay - Esquimalt	Unit
Distance	4.7	2.4	<i>nm</i>
	8.8	4.4	<i>km</i>
Travel Time (@ 20 knots)	29.5	12.4	<i>mins</i>
Travel Time (@ 25 knots)	27.6	11.0	<i>mins</i>
Travel Time (@ 30 knots)	26.4	10.2	<i>mins</i>
Travel Time (@ 35 knots)	25.5	9.5	<i>mins</i>
Capacity (per ship)	300	300	<i>people</i>
Frequency (Peak)	20	60	<i>mins</i>
Frequency (Off-Peak)	20	60	<i>mins</i>
Hourly Peak Capacity	900	300	<i>Passengers per hour per direction (pphpd)</i>
Hourly Off-Peak Capacity	900	300	<i>pphpd</i>



Future Assumptions

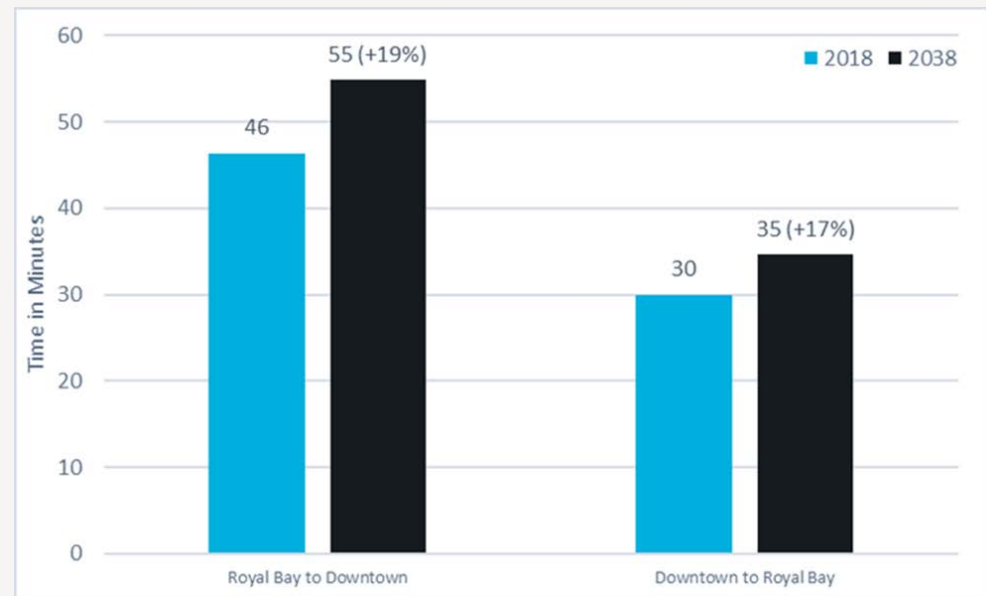
Travel 'Costs'

Auto

- › Travel times from CRD model
- › Vehicle operating costs (\$0.10/km)
- › Parking costs in downtown Victoria (\$2.75 per trip)

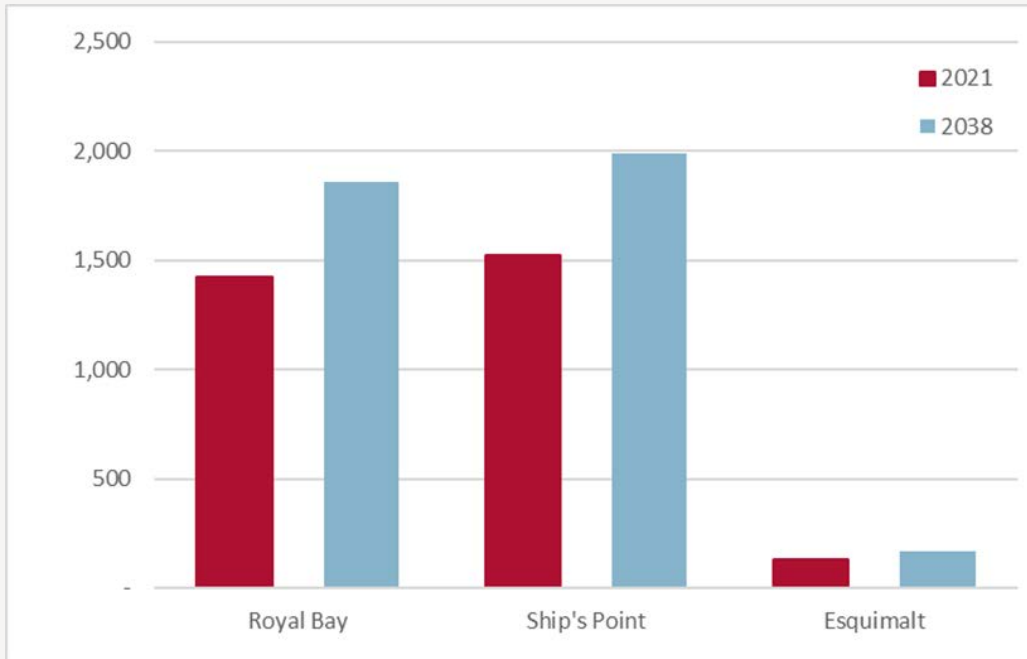
Transit

- › Estimation of travel times from auto times
- › Improvement in transit frequencies by 25%
- › Transfer penalty (4 mins)
- › \$2.50 per trip



Forecasts

Daily Boardings by Terminal

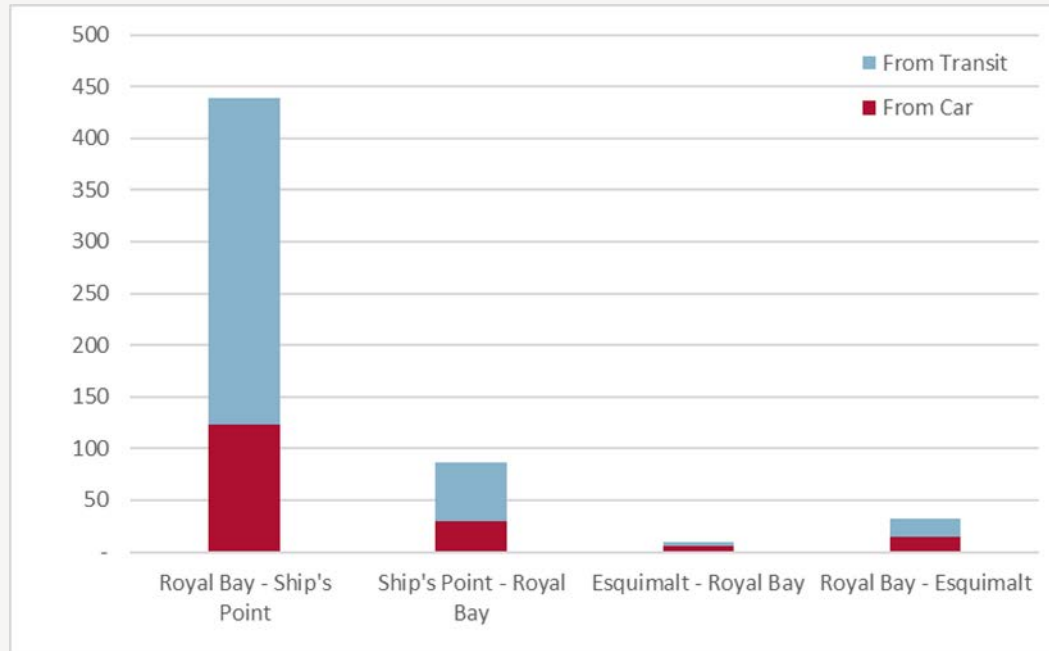


- › 3,100 passengers in 2021 increasing to 4,000 in 2038
- › Limited demand on Esquimalt route



Forecasts

AM Peak Boardings (2038)

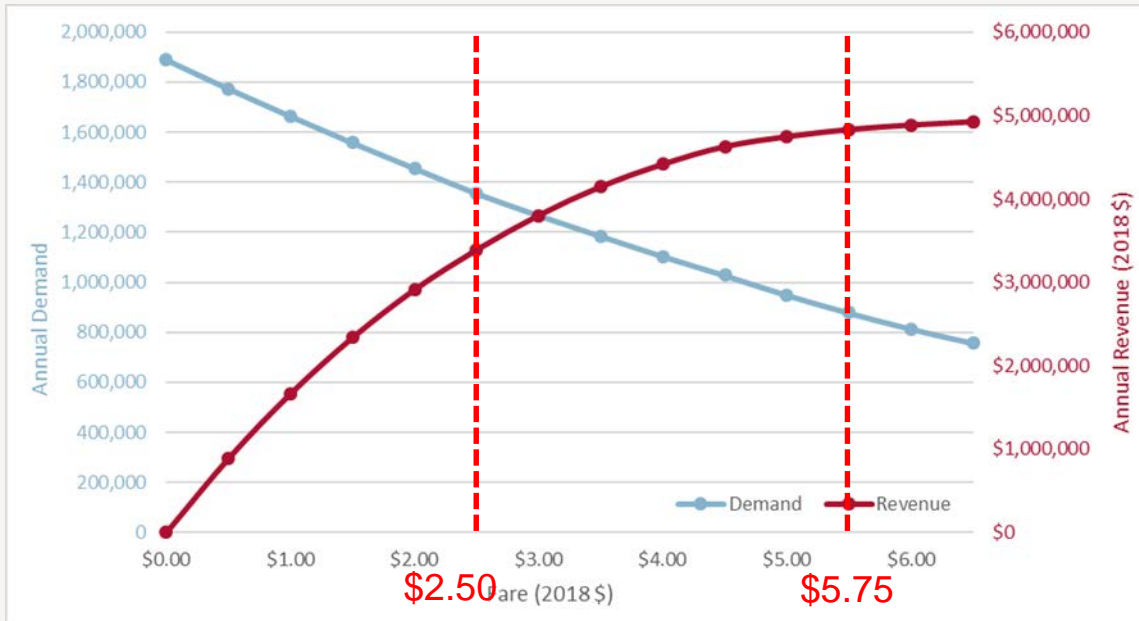


- › Majority of demand from transit users as ferry more competitive
- › Limited demand on Esquimalt route



Forecasts

Demand and Revenue Analysis (2038)



- › Revenue optimisation reduces demand considerably



Forecasts

Environmental Estimates

- › Assessment of impact of car reduction:
 - › Number of cars removed from road
 - › GHG emissions based on average trip length of 8.8 kilometres
- › Findings (2038)

Auto trips removed	Vehicle kms removed	GHG savings (tonnes)
415,000	3.65M	79

- › ‘Opposite’ results from financial evaluation i.e. higher fare price options will have lower environmental benefits (less demand) and vice versa



Forecasts

Sensitivity Tests

- › Variety of tests to review the impact of:
 - › Routes (Esquimalt and/or Ship Point)
 - › Frequencies
 - › Fares
 - › Service (peak or all day)
- › Findings
 - › Low ridership on Esquimalt route
 - › Higher fares can compensate for the lower demand
 - › Options with ferry fare integration with BC Transit (free transfers) show high demand but revenue sharing mechanism between BC Ferries and BC Transit would be required and increase in subsidy requirements



Forecasting Considerations

- › Bus network restructuring required with introduction of the ferry. This will require discussions with BC Transit.
- › Model forecasts and ferry demand estimates based on demand and travel times provided by CRD from the regional transport model - we have not been able to assess the accuracy of this information.
- › CRD model outputs cover the AM peak period. There is uncertainty around the potential ferry capture rate during the off-peak periods. To assess this more accurately an off-peak assessment would be required which would require additional information to be collected.
- › Mode constants are based on models developed in other jurisdictions. Stated Preference (SP) survey of potential ferry users in Victoria region would provide a more robust estimate.
- › Revenue maximizing fare results in considerably less demand on the ferry service and this could have policy and equity/affordability implications.



Business Case



Business Case – Inputs and Assumptions

- › Consideration over 40 year life,
- › Construction in 2020, in service by 2021 and operates until 2059
- › Direct financial benefits (revenue) only, no wider economic benefits assessed yet
- › Annual escalation 2%
- › Weighted Average Cost of Capital taken as 7%
- › Reference Case uses fare of \$2.50 equivalent to bus



Business Case – Results & Alternative Cases

- › Financial results for the Reference Case were poor.
- › Considered a number of alternative cases:
 - › Each route in isolation
 - › Alternative fuels
 - › Reduced vessel staffing
 - › Reduced vessels
 - › Reduced frequency and service hours
 - › Raising fare price
 - › Increasing vessel speeds



Business Case – Results & Alternative Cases

› Reference Case (Option 1A)

- › Both RB-SP and RB-ESQ service, 20 min intervals, full day (16hrs), 5 x diesel vessels, 4 people per crew, \$2.50 fare
- › Capital cost = **\$98M**
- › Cashflow = **-\$8.4M/yr**, NPV **-\$230M**

› Reduced Service Case (Option 2C)

- › RB-SP only, 40 minute intervals, 4hrs AM & 4hrs PM, 2 x LNG vessels, 2 people per crew, \$5.75 fare
- › Capital cost = **\$58M**
- › Cashflow = initially **-\$280k/yr** and breaking even in 2026, NPV **-\$50M**

› Reduced & Faster Case (Option 4)

- › RB-SP only, 30 min intervals, full day (16hrs), 2 x LNG vessels, 2 people per crew, \$5.75 fare
- › Capital cost = **\$58M**
- › Cashflow = initially **+\$170k/yr**, NPV **-\$31M**



Key Findings



Key Findings

- › All terminals considered technically feasible, breakwaters required at Royal Bay and Esquimalt
- › Sensitive sites to the north of Royal Bay site will need further investigation to assess environmental impacts.
- › Operational downtime due to weather would be within reasonable limits for a dependable service.
- › Expected ridership for Esquimalt route is quite low.
- › There is a balance between revenue raising from fares and ridership numbers, between \$2.50 to \$5.75
- › There are significant advantages to the financial business case from:
 - › *Using natural-gas-fueled vessels (requires further investigation).*
 - › *Increasing vessel speeds to achieve 60 min turnaround*
 - › *Operating vessels with reduced staff i.e. only two per vessel*



Questions?



*Our values are the essence of our company's identity.
They represent how we act, speak and behave together,
and how we engage with our clients and stakeholders.*

S~~A~~*F*~~E~~*T*~~Y~~

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We put safety at the heart of everything we do, to safeguard people, assets and the environment.

We do the right thing, no matter what, and are accountable for our actions.

We work together and embrace each other's unique contribution to deliver amazing results for all.

We redefine engineering by thinking boldly, proudly and differently.

