
BC Ferries' Application under Section 55 of the Coastal Ferry Act

BC Ferry Commission

July 2013

New Intermediate Class Vessels – Routes 9 and 17

Note: This report has been redacted such that information of a confidential and commercially sensitive nature is not included.



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1.0 Executive Summary

PricewaterhouseCoopers LLP (“PwC”) was engaged in May 2013 by the British Columbia Ferry Commission (the “Commission”) to review British Columbia Ferry Services Inc.’s (“BCFS”) Application (the “Application”) for the acquisition of new vessels submitted on May 22, 2013 in accordance with Section 55 of the *Coastal Ferry Act* (the “Act”).

We conclude that:

- Subject to confirmation of final cost, the major capital expenditure for three new Intermediate Class Ferries (“ICF”) is reasonable, prudent and consistent with the current Coastal Ferry Services Contract (“CFSC”) and the long-term capital plan established by BCFS;
- The selection between the diesel and liquefied natural gas (LNG) options based on the lowest net present cost (up to the maximum amount stipulated in the Application) is appropriate. The net present cost analysis needs to be re-assessed once capital and life-cycle costs have been updated through the procurement process and estimates for diesel and LNG fuel costs are updated; and
- BCFS has adequately responded to the questions posed in the Section 55 Application Guidelines.

We agree that the Queen of Nanaimo and the Queen of Burnaby, the current vessels being used on Route 9 and Route 17, respectively, are nearing the end of their useful lives and need to be replaced. Life-extending the vessels at this stage is uneconomical and carries undue risk.

The procurement of the replacement vessels represents an important procurement platform for a new generation of ICF vessels, as up to seven vessels in the next 15 years may be acquired under the same base design. The intent is to maintain the ownership of the design to allow for replication by one or more yards. Under the approach, the same hull size which can carry the equivalent of 85 automobiles (85 AEQ vessel) can also carry 125 AEQs or 145 AEQs with the addition of more vehicle decks.

The proposed deployment by BCFS of three new ICF vessels in terms of their capacity, operating characteristics and open deck design, is considered reasonable. We have confirmed with BCFS that its objective is to create design criteria such that there will be no increase in cancellations due to weather.

BCFS has conducted extensive business case analysis to support the acquisition of the three new vessels. The preferred option for the acquisition of two 145 AEQ vessels and one 125 AEQ vessel to serve the two routes is based on a life-cycle analysis (i.e. full life of the asset) expressed on a Net Present Value (“NPV”) basis which is considered good practice for assessing infrastructure options. The life-cycle costs of three smaller vessels compared to two larger “like-for-like” vessels are lower. In addition, the proposed strategy enables BCFS to acquire three vessels instead of two, which provides for extra service flexibility on the routes they can serve and amongst the fleet.

BCFS is planning to follow a number of well accepted practices in the governance of the project and in the procurement process that it has used in the successful acquisition of a number of new vessels since 2003. This includes running a robust international competition that is based on a design-build contract tied to a fixed delivery schedule.

While we have no major concerns, we have some minor concerns regarding the Application:

- The lack of response by BCFS in the Application to the public consultations in terms of any potential impact on the design of the vessels;
- The lack of response by BCFS in the Application to the public consultations in terms of the level of on-board amenities to be provided;
- The aggressive procurement timeline which creates a risk that the Queen of Burnaby and Queen of Nanaimo may need to remain in service beyond the in-service target dates for the replacement vessels; and
- There is the risk that the project costs may ultimately be higher than estimated, particularly as they relate to the LNG capability. The life-cycle analysis is influenced by capital costs, fuel consumption rates and fuel costs and should be confirmed once the competitive bids are received.

A summary analysis of BCFS's responses to the Section 55 Application Guidelines is shown below.

Summary of concerns with respect to BCFS' Responses to Section 55 Application Guidelines

Section 55 Category	# Section 55 questions	# Major concerns	# Minor concerns
Project Description	21	-	-
Timing and In-service Date	3	-	1
Does the Proposed Capital Expenditure Demonstrate Good Judgement, based on Wisdom, Experience and Good Sense?	8	-	2
Wise Use of Resources	6	-	-
Showing Due Consideration for the Future	7	-	-
Not Excessive	8	-	1
Demonstrating Good Value at a Fair, Moderate Price	8	-	-
Coastal Ferry Services Contract	1	-	-
Long-term Vision for Coastal Ferry Services in British Columbia	1	-	-

2.0 Background

In April 2003, the Province of British Columbia established the British Columbia Ferry Authority (the “Authority”), an independent corporation that holds the single issued voting share of BCFS.

BCFS as the operating subsidiary of the Authority provides coastal ferry services on the west coast of British Columbia. With 35 vessels travelling between 47 terminals, on 25 routes, BCFS is one of the largest ferry operators in the world, both in terms of fleet size and passengers carried. At the time, its fleet included a number of older vessels and BCFS has undertaken a process to upgrade its fleet.

A Coastal Ferry Services Contract exists between the Province and BCFS which defines service levels on each regulated route and the Commission sets price caps across the route groups every four years. Within its operating and regulatory framework, BCFS can adjust fares up to the price cap, and can access capital markets directly.

The Commission is a provincial regulatory agency operating under the Coastal Ferry Act with responsibilities for making regulatory decisions affecting ferry operators in the Province.

The *2012 Coastal Ferry Amendment Act* amended Section 55 of the Act to require BCFS to first obtain the Commissioner’s approval before incurring a major capital expenditure (Section 55 (2)). By Order 12-04, dated September 30, 2012, the Commissioner determined that for the purposes of Section 55 (2), a major capital expenditure includes:

“any capital expenditure which exceeds \$30 million, inclusive of component programs and interest during construction, and irrespective of the level of expenditure, any new vessel or terminal, and any vessel life extension which extends the life of the vessel by more than five years.”

On May 22, 2013 BCFS made its Application to the Commission under Section 55 of the Coastal Ferry Act. The Application for “New Intermediate Class Vessels – Routes 9 and 17” requests the following determination:

“That a capital expenditure for the New Intermediate Class Vessels – Routes 9 and 17 Project, including interest during construction (“IDC”), as well as supplemental Project costs, for a total expenditure of:

- \$<> million for diesel fuelled vessels; or
- \$<> million for liquefied natural gas (“LNG”) fuelled vessels is approved.”

According to the 2012 Amended Act, the Commission has 60 days to respond to the Application.

The Application is in four parts:

- Section 1. Introduction and Overview
- Section 2. Project Description
- Section 3. Analysis of Options
- Section 4. Procurement and Risk

The Application is also supported by a number of appendices containing supplementary information and technical reports. Also, on May 16, 2013 BCFS organized a presentation on the proposed Application for the benefit of representatives of the Commission and PwC.

It is noted in the Application that the legislative requirement to seek pre-approval of the proposed capital expenditure for the Project necessitates the submission of this Application prior to key design elements of this vessel replacement project being finalized. BCFS' intent is to pursue a design-build contract with a shipyard, which will be selected through a formal Request for Proposal ("RFP") process. To maintain credibility with the shipyards, the RFP process will be initiated only if and when this Application is approved by the Commissioner. With key design elements yet to be determined through the procurement process, there is a risk that certain assumptions BCFS has made in its Application may require subsequent amendment, with a commensurate change in the projected capital expenditures for the vessel replacements. Among the key design elements yet to be finalized are those respecting LNG. BCFS states that while its present intent is to acquire LNG fuelled vessels, further technical and financial analyses will be required before a final decision is made. These analyses very much depend on the responses to the RFP. BCFS notes that a subsequent application may be required as the procurement process for the Queen of Burnaby and Queen of Nanaimo replacement vessels proceeds.

3.0 Mandate

On May 22, 2013 the Commissioner received a formal Section 55 Application from BCFS relating to the proposed acquisition of three Intermediate Class Vessels. PwC was engaged in May 2013 by the Commission to review the Application by BCFS for the acquisition of the new vessels. Our review was conducted in accordance with Section 55 of the Coastal Ferry Act.

Section 55 of the Act requires that BCFS demonstrates to the Commission that major capital projects be:

- a. Reasonable;
- b. Prudent; and
- c. Consistent with:
 - i. The current Coastal Ferry Services Contract,
 - ii. Any long-term capital plan established by the ferry operator.

PwC was asked to review the information provided by BCFS, and, using the Section 55 Application Guidelines (see Appendix A) and our professional expertise, provide an unambiguous expert opinion on each of the above.

Subcontractors

PwC sub-contracted two technical advisors with expertise in specific areas. These technical advisors reviewed the Application and had access to all the supplemental information and appropriate BCFS staff. They each reviewed this with a particular focus, as outlined below.

Opus International Consultants

Opus International Consultants, transportation consultants, focussed on the review of traffic forecasts and demand modelling and optimisation studies of fleet configurations and scheduling conducted on the two routes.

3GA Marine

3GA Marine, Marine Architects, focussed on the naval architecture and vessel performance related issues including:

- The suitability of the open deck concept with relevance to the prevailing environmental conditions;
- The principal particulars of the proposed vessel for size (capacity) and performance (fuel type and consumption); and
- The capital cost estimates of vessel disposal refit alternatives and acquisition.

Scope

The scope of our engagement included:

- Review of Section 55 of the Coastal Ferry Act and the Section 55 Application Guidelines ;
- Review of the Coastal Ferry Services Contract;
- Attendance at the May 16 BCFS presentation explaining the proposed Application;

- Detailed review of the Application;
- Assessment of supplementary information including current capital plans of BCFS, inspection reports by engineering consultants, cost benchmarks supplied by external cost consultants, reports, presentations and financial information provided by BCFS and summary of responses to BCFS' Request For Expressions Of Interest;
- Development of written questions for BCFS and review of the responses to BCFS and review of answers and additional materials provided by BCFS to satisfy the consultants;
- Meetings with the BCFS VP of Engineering to discuss issues and design criteria;
- Correspondence and conference calls with the Director of Fleet Operations and BCFS Director of Strategic Planning concerning questions on the Simon Fraser University and Urban Futures reports;
- Review of traffic trends from other ferry operators and examination of trends in land based passenger travel during the past decade;
- Discussions with representatives of the Commission;
- Providing a report incorporating PwC's comments with those of the sub-consultants; and
- Debrief a draft version of this report with the Commissioner.

Notice to Readers

This report is issued by PwC for the exclusive use of the Commission in connection with its assessment of the Section 55 Application by BCFS for the replacement of the Queen of Nanaimo and the Queen of Burnaby. This report has been redacted such that information of a confidential and commercially sensitive nature is not included.

Our work did not constitute an audit conducted in accordance with generally accepted auditing standards, an examination of internal controls nor attestation nor review services in accordance with the standards established by the Canadian Institute of Chartered Accountants. Accordingly, we do not express an opinion nor any other form of assurance on the financial or other information, or operating internal controls, of the Project.

PwC did not examine, compile or apply agreed upon procedures to satisfy the requirements of Canadian Institute of Chartered Accountants to the financial information used in this report and we therefore are unable to express assurances on such information except where expressly stated in the report to form part of the scope of our work.

Further this report does not constitute an opinion as to legal matters, including the interpretation of the Coastal Ferry Act or any other similar matters. The economic impact of the various procurement options is also outside the scope of PwC's work.

Our work is based primarily on the information and assumptions listed in the body of this report. While we read information from various sources we did not perform checking or verification procedures except where expressly stated in the report to form part of the scope of our work. Our work and commentary is subject to assumptions, which may change, with the benefit of further detailed information. We make no representation regarding the sufficiency of our work and had we been asked to perform additional work, additional matters may have come to our attention that would have been reported to the Commission.

Some of the documents and figures we reviewed were produced by third parties. We did not corroborate or verify these documents and figures with these parties. It is outside the scope of our review to evaluate the methodology used to conduct independent studies; therefore, we have accepted the information as presented, including conclusions. We did review the credentials of external consultants that BCFS management relied upon and that we were unfamiliar with.

Additionally, it is important to interpret the results of the analysis presented in this report as representing a level of detail and precision commensurate with the stage of the procurement of the replacement vessels. Further analysis may be required as more and better quality information becomes available.

The outputs of the report are intended to provide the Commission with information to assist in informing their decision making process pertaining to the Application. The reader agrees that PwC, its partners, employees or agents, neither we nor accept any duty or responsibility to it, whether in contract or in tort (including without limitation, negligence and breach of statutory duty), and shall not be liable in respect of any loss, damage or expense of whatsoever nature is caused by any use the reader may choose to make of this report, or which is otherwise consequent upon the gaining of access to the report by the reader.

Our report, including schedules and appendices, must be considered in its entirety by the reader. Selecting and relying on specific portions of the analyses, or factors considered by us, in isolation may be misleading.

4.0 Approach

Our comments and conclusions are based on the formal written Application and the responses to our supplemental information requests provided by BCFS management and staff.

In reaching our conclusion about the Section 55 Application, our approach to the assessment has been to:

- Provide commentary on:
 - the rationale and scope of the project;
 - the options analysed; and
 - the procurement process and its associated risks
- Pose a number of clarification questions based on the Application
- Request additional analysis of BCFS
- Provide summary comments on:
 - each of the main categories under which Section 55 Application Guidelines are grouped; and
 - any major and minor concerns with the responses to each question.

Concern could stem from issues ranging from analytical approaches and procurement processes to issues of lack of clarity and adequate documentation.

Major concerns are defined as significant issues that have direct bearing on the overall conclusion about the Section 55 Application. They can relate to inadequate responses to the Section 55 Application Guidelines or to the overall conclusion about the reasonableness of the request. Minor concerns are less significant in terms of their impact on the overall conclusion but still warrant comment. Each concern could be considered as an area for further review or clarification with BCFS.

5.0 Project Description

5.1 Condition of Vessels

The Queen of Nanaimo and the Queen of Burnaby are assets that are 50 years old and nearing the end of their useful lives. Both vessels serve minor routes that cross the Strait of Georgia.

Vessel	Year built	Year to be retired	Routes served
Queen of Nanaimo	1964	Fiscal 2017	9 (Southern Gulf Islands)
Queen of Burnaby	1965	Fiscal 2017	17 (Comox-Powell River)

Source: BCFS Section 55 Application

We reviewed the asset management plans for the two vessels and confirmed the vessels are scheduled to be retired in the near future. The Queen Nanaimo had a \$17.2 million refit in 2006 to enable the vessel to continue in service until fiscal 2017. The Queen of Burnaby had a \$7.8 million refit in 2012 to allow the vessel to continue until fiscal 2016.

The Application states the age of the vessels results in frequent breakdowns and cancellation and maintenance costs are high. Inspection reports conducted by independent and qualified external consultants have confirmed a number of problems with the current vessels.

Vessel condition assessment surveys were conducted by ABS Consulting in March 2013 on the Queen of Nanaimo and the Queen of Burnaby. While the vessels are considered safe, the surveys identified a number of issues with each vessel that reflect their age, which are outlined in BCFS' Application. ABS Consulting's analysis confirmed that the Queen of Burnaby and the Queen of Nanaimo are approaching the end of their operating lives.

Much of the equipment for both vessels is long out of production and thus very difficult and expensive to support. Parts need to be replicated or re-engineered at a great expense due to the "one-off" production requirement, with a timeframe that is usually excessive for vessels that must maintain regular operations. This poses significant risk to fleet availability and service continuity.

Both vessels have high levels of asbestos and lead paint. The asbestos and lead paint abatement is expensive and the cost of any minor repair often greatly exceeds the cost of the specific maintenance activity.

The number of mechanical issues resulting in service cancellations in the last three years is as follows:

- Queen of Burnaby – 92 incidents, 38 cancellations; and
- Queen of Nanaimo – 60 incidents, 72 cancellations.

The rationale for replacing the vessels has increased with higher fuel prices. In fiscal 2013, fuel represented approximately 32% of the total direct operating costs of the vessels being replaced. In fiscal 2004, fuel represented approximately 16% of the total direct operating cost of the same vessels.

While the vessels operate safely and in compliance with regulatory requirements, it is evident that the service reliability of the vessels is progressively decreasing despite significant capital and maintenance expenditures. This is a strong indication that the vessels are near the end of their service lives.

5.2 Vessel Replacement Strategy

Corporately, BCFS has identified capital and operating cost efficiencies through a series build program, fleet standardization and right-sizing vessels for demand as fundamental objectives.

The procurement of the replacement vessels represents an important procurement platform for a new generation of intermediate class vessels, as up to seven vessels in the next 15 years will be acquired under the same base design. The intent is to maintain the ownership of the design to allow for replication by one or more yards. Under the approach, the same hull size for an 85 AEQ vessel can also carry 125 AEQs or 145 AEQs with the addition of more vehicle decks.

5.3 Comparison to Capital Plans

The vessel replacement strategy is supported by the BC Ferry Commission Regulatory Review which points to the desirability of standardization and interoperability of vessels and terminals, flexible deployment of equipment, and pursuit of more fuel efficient systems.

We reviewed the capital cost estimates and compared these to BCFS’ most recent Five Year Capital Plan approved by its Board of Directors as well as the capital costs used to set the Performance Term 3 price caps. The differences appear to be satisfactorily explained. Initially, the two vessels were to be replaced with like-for-like at the end of their useful lives. Based on its in-depth analysis, the company decided to replace the two like-for-like vessels with three smaller (and scalable vessels). The initial plan also did not include LNG powered vessels. Below is a table which shows a reconciliation of the capital costs presented in the 2014 Capital Plan which BCFS submitted to the Commission in March 2013 for the ICF vessels and those costs as presented in the Application.

Capital Plan reconciliation to Project Cost in Section 55 Application (\$m)

Costs	Diesel	LNG
Capital Costs		
2014 Five Year Capital Plan estimates for 3 ICF vessels		
LNG Additional Capital Cost		
Interest During Construction		
<i>Total Capital Costs</i>		
Operating Costs		
Training		
Crew Transition Costs		
<i>Total Operating Costs</i>		
Total project cost (including IDC and Incremental Operating Costs)		

Notes/Source:

1. This reconciliation and explanations in the notes below were included in the answers to questions from PwC and the Commission from July 4, 3013, question 4.
2. BCFS' practice is to apply interest during construction (IDC) in the first 2 years of the Capital Plan as its confidence in the total project costs is greatest during this period. For years 3-5 of the Five Year Capital Plan, IDC is assumed to be included in project costs. As the majority of IDC costs for this project would not be incurred until years 3 and beyond in the Capital Plan, this discrepancy was not accounted for in the initial project costing, but has been included in the total project costs for the purposes of this Section 55 Application.
3. Operating costs are not included in the Five Year Capital Plan as a result of new capitalization rules under International Financial Reporting Standards (IFRS). However these operating costs must be included in the total project costs in order to be included in the calculation to determine price caps. Omitting these operating costs from the price cap calculation would result in erosion of the company's equity base.

The comparison above indicates that the major capital expenditure for the three new ICF vessels is consistent with the long-term capital plan established by BCFS.

5.4 Consistency with Coastal Ferry Services Contract

The Commission is required to consider whether the proposed major capital expenditure is consistent with the Coastal Ferry Services Contract. Schedule A of the CFSC stipulates core service levels for each regulated route expressed as the number of round trips to be delivered per contract year, the minimum number of round trips per day and the minimum hours of operation that BC Ferries must operate. Another requirement is that the capacity provided on each designated ferry route will be sufficient to carry the previous year's traffic (Appendix 1 of Schedule "A" to CFSC).

BCFS submits that with the proposed three new ICF vessels BCFS complies with the current CFSC by being able to operate the core service levels as required under the CFSC. The traffic forecasts used in the analysis conducted by Simon Fraser University were based on current traffic levels. Based on the analysis in the Application the new vessels appear to provide sufficient capacity to carry the previous year's traffic, as required under the current CFSC.

6.0 Analysis of Options

6.1 Description of Options Analysis

BCFS conducted a Net Present Value analysis on a series of options. The analysis included all capital costs, operating and maintenance costs, and periodic life-cycle costs over a 40 year period. No revenues were included in this analysis.

Description of Options considered in Analysis

Option	Description	Vessel details
1	Life-extend Queen of Nanaimo and Queen of Burnaby for 10 years, then replace. Also acquire a 125 AEQ relief vessel in 2017 (same timeline for the relief vessel as the alternative options)	<ul style="list-style-type: none"> Life-extend Queen of Nanaimo for 10 years, then replace; Life-extend Queen of Burnaby for 10 years, then replace; and A 125 AEQ relief vessel
2	Replace with modified “like-for-like” vessels	<ul style="list-style-type: none"> A 145 AEQ vessel to replace Queen of Burnaby for Route 17, which is currently a 192 AEQ vessel, but which BCFS claim is effectively operational as 140 AEQ because of the way it is loaded; A 195 AEQ vessel to replace Queen of Nanaimo, which is currently a 192 AEQ vessel; and 125 AEQ relief vessel
3	Acquire three new Intermediate Class Ferries which are “standardized vessels” built on an 85 AEQ platform which would be fitted with gallery decks to increase capacity to 125 AEQ and additional hinged platform decks to increase capacity to 145 AEQ	<ul style="list-style-type: none"> A 145 AEQ vessel to replace the Queen of Burnaby for Route 17; A 145 AEQ to replace the Queen of Nanaimo for Route 9; and A 125 AEQ relief vessel
3(a)	Assumes the above vessel configuration with diesel fuelled vessels	
3(b)	Assumes the above vessel configuration with LNG fuelled vessels	

The NPV analysis used the following key assumptions made by BCFS:

- A discount rate of 7%;
- Inflation of 2% for all capital and operating costs;
- Assumes capital cost estimates based on purchase of new vessels at current fair market value as determined by STX Canada Marine (STXM), using their best pricing option and including all taxes and import duties. The benefits realised from building the ICF vessel in a series are assumed to be a reduction in price of 7% for the second ICF vessel and a further 4% for the third ICF vessel;
- No incremental berth or terminal upgrades required;
- Capital costs for LNG fuelled vessels assume dual fuel source;

- Capital and operating costs assume that the ICF vessels will be fuelled from LNG tanker trucks parked on the vessel car deck;
- Diesel fuelled ICF vessels are assumed to be 15% more efficient than the current vessels they would be replacing;
- Diesel fuelled 195 AEQ modified like-for-like replacement vessel for Route 9 expected to be 10% more fuel efficient than the Queen of Nanaimo;
- LNG fuelled vessels are assumed to use 10% more fuel on a diesel litre equivalent basis than the diesel fuelled equivalents;
- Delivered LNG costs have not yet been tested. The analysis uses a price for LNG which can be applied on a diesel litre equivalent basis. Both diesel and LNG prices are assumed to grow at 2% per annum, as per all other operating costs. Hence the initial price assumption for LNG is important as the difference between the diesel and LNG fuel is assumed to remain constant over time and the fuel costs (along with labour costs) have the greatest impact on overall operating costs;
- Assumes major overhaul events at 10 and 25 years after commission of equal value for either fuel system based on historical data;
- Assumes no tariff revenue differences in any of the options – the base NPV values are based on costs only;
- NPV is calculated over 40 years.

Based on the above assumptions, BCFS has calculated the NPV for the options as shown in the following table:

NPV summary from Options Analysis (\$m)

Option	Description	Project Cost	40 year NPV	
			Application ¹	Revised ²
1	Life-extend existing vessels for 10 years and replace commencing 2024		-596	-604
2	Modified like-for-like		-559	-566
3 (a)	Diesel fuelled (3 ICF)		-520	-526
3 (b)	LNG fuelled (3 ICF)		-497	-504

Notes/Source:

1. These NPV numbers were submitted in the final Application from BCFS
2. These NPV numbers were revised to include insurance costs for the new vessels in the NPV analysis and were included in the answers to questions from PwC and the Commission from June 5, 2013, question 6

6.2 Key Factors Influencing Options Analysis

The decision to replace the Queen of Burnaby and the Queen of Nanaimo are supported by an options analysis that includes replacement with an optimized vessel size that meets the objectives of the corporate vessel replacement strategy, independent demand forecasts and independent optimization studies.

The preferred options are based on the lowest NPV cost over the life of the assets. Option 3(b), involving the replacement of the Queen of Burnaby and the Queen of Nanaimo with 3 LNG fuelled ICF vessels is preferred by BCFS.

We reviewed the validity of a number of assumptions in the options analysis with a focus on the following:

- Open deck design
- Capital costs
- Fuel costs
- Fuel consumption
- Demand analysis
- Discount rate

We have commented on each of these below.

Open Deck Design Concept

BCFS' fleet already includes open deck ferries on minor routes which are invariably open bow type structures rather than the open deck envisaged for this project. These vessels are considered acceptable because they rarely encounter waves sufficient to break onto the car deck when in the prevailing sea conditions (although there are frequently spray conditions for the cars at the front of the deck).

BCFS' Application proposes an open deck vessel which does not have an open bow but is open from above with the vessel sides being high and the bow / ram opening to be closed at sea by a visor of sufficient height that waves will not break over the sides or bow.

From a naval architectural perspective, the advantage of an open deck is due to the reduction of steel weight and ship systems that are required for safety and operations in closed spaces.

From a regulatory perspective there is no difference between an open bow and an open deck as they both turn the space into an outside area. The main difference is that vessels with closed sides need to be fitted with drainage (scuppers or freeing ports) to allow any water to escape off the deck.

In a closed deck vessel, however, car decks require large fans and power. Fire fighting systems can be simpler on open decks since there are no sprinklers required and life saving equipment access can be addressed differently. An open vessel's advantage over closed deck in terms of capital cost also applies to performance and operational costs, since the vessel is lighter.

The approach adopted by BCFS to ensure the open versus closed deck aspect of the design is adequately addressed in the design-build phase of the project is to define environmental conditions in which the vessel is expected to operate in the Statement of Operational Requirements (SOR). This document describes the operational parameters for the service and is based on the in-house database of the prevailing conditions on the routes described. This is the same database that is used to manage the operations of the current vessels with respect to the weather windows of operations. Performance parameters are set in the Technical Statement of Requirements (TSOR). In this case these will deal with the probability of deck wetness and the natural frequency of motions. Sea conditions are described stochastically as a distribution

of wave heights and period. The motions of a ship can be modeled against known regular waves and the overall response to the distribution of sea conditions described in the stochastic model can then be simulated. This analysis gives a probability of an event happening. In this case “deck wetness” will be so modeled which is the probability of a wave exceeding the height of the deck or bulwarks.

As a means of validating its approach BCFS recently commissioned STXM to perform a similar analysis on the Island Sky hull shape in the Route 9 SOR waves. The Island Sky is an intermediate class vessel which has been operational in the BCFS fleet since 2008. Although it was designed to meet the requirements of a route exhibiting significantly lower wave profiles than the proposed ICF's will encounter (hence it is an open bow form) it does represent a modern design concept and is of a similar size and displacement and known performance. The analysis of Routes 9 and 17 notes that the wave encounter is predominately onto the side of the vessel and wave encounters onto the bow causing significant deck wetness are infrequent. To counter the resonant response to side encountered sea conditions, the TSOR will also describe natural motion frequencies to be significantly above encountered wave frequency (greater than 8 seconds).

It is acknowledged that none of these analyses and performance criteria can address the spray conditions caused by wind-blown breaking waves landing on the open deck. However, by meeting the deck wetness criteria the frequency of such events will be minimised. We were able to confirm with BCFS that it is its intention to incorporate design criteria such that there would be no more sailing cancellations due to weather as a result of the open deck vessel compared to a closed deck vessel.

Capital Costs

BCFS has developed a capital cost for the concept design of the ICF using values in a commissioned report written STXM. This work uses proprietary software which manipulates a database of known construction costs of similar ships. It uses a series of correction factors describing the difference in the principal characteristics of the candidate ship and the database ships and interpolates within the known data to derive an expected cost of the intended construction. The accuracy of the estimate is dependent on the amount and relevance of the “parent” ship data. Other considerations which create variances are the particularly volatile shipbuilding market as well as the maturity of the technology in various global regions.

This approach has been used to estimate the anticipated cost of construction of a set of BCFS candidate vessels in shipyards in Europe (where most of the baseline data comes from) and Canada (where there has only been one significant construction project of a similar ferry in recent times). There are no estimates for builds from Asia or Eastern Europe where in general ship building prices are lower but where there is virtually no LNG experience. It should be noted that the global shipbuilding market is in a very depressed state at this time and prices for conventional shipbuilding are at a decade low. The notable exception to that is in the USA where the construction of LNG powered vessels is at an all-time high (with commensurate pricing) due to vessel construction to support offshore exploration in the Gulf.

The Application takes the STXM derived build cost estimate and adds taxes, duty (25% for a build outside Canada), logistics costs (Project Management, delivery etc) and deducts an allowance for a series build of like ships. A contingency of 12.5% and a LNG premium are then added. The LNG premium represents the additional cost required to build the vessel with an LNG power plant. Published data sources suggest that the “uptick” for LNG is between 10% and 25% of the build price. BCFS acknowledges these references and uses a value suggested by STXM which is towards the lower end of the range. The STXM methodology takes the European and Canadian baseline data and modifies for the LNG premium. It should be noted that there is no real base line for Canadian LNG work and the European data comes from an expensive region for shipbuilding. This is however a prudent approach for the LNG cost, but may overestimate the price point for a diesel ship, thereby understating the price differential.

The BCFS analysis adds an additional 10% contingency to this LNG component of the overall pricing.

The capital cost estimates derived in the BCFS Application are reasonable and probably represent median values for both the LNG and conventional diesel vessels. However, as estimates in a planning process they may underestimate the price difference in the options because diesel powered vessels may be built in cheaper global regions and there is a risk that LNG premiums may be higher.

The capital cost assumptions BCFS used in its analysis assume no incremental berth or terminal upgrades are required. However, BCFS recognizes that there may be a requirement for terminal work such as dredging at the Little River terminal, depending upon the final design of the vessels. Hence the project costs may be greater than they have been currently modelled.

We requested BCFS conduct the following sensitivity tests on the capital costs and on exchange rates. The preferred option does not change based on the NPV analysis. These sensitivity tests are based on revised numbers for the 40 year NPV base case which differ from the original amounts in the Application, because they include insurance costs.

NPV sensitivity on capital cost of LNG vessels (\$m)

Case	Total Project Cost (incl. IDC)	40 year NPV	NPV advantage LNG v diesel
Replace with 3 ICF vessels – diesel base case		-526	-
Replace with 3 ICF vessels – LNG base case		-504	22
Capital cost of LNG propulsion -20%		-498	28
Capital cost of LNG propulsion -10%		-501	25
Capital cost of LNG propulsion +10%		-507	19
Capital cost of LNG propulsion +20%		-510	16

Source: BCFS answers to questions from PwC and the Commission from June 5, 2013, question 4

NPV sensitivity on exchange rate impact on capital cost of LNG vessels (\$m)

Case	Total Project Cost (incl. IDC)	40 year NPV	NPV advantage LNG v diesel
Replace with 3 ICF vessels – diesel base case		-526	-
Replace with 3 ICF vessels – LNG base case Exchange rate cost (35%)		-504	22
Capital cost impact of -10% exchange rate 3 ICF LNG fuelled vessels Exchange rate cost (25%)		-490	36
Capital cost impact of +10% exchange rate 3 ICF LNG fuelled vessels Exchange rate cost (45%)		-518	8

Source: BCFS answers to questions from PwC and the Commission from June 5, 2013, question 4

While all the above sensitivities show the LNG option is most favourable from an NPV point of view based on current capital cost estimates, we would suggest the NPV's be reviewed once more certainty has been gained through the procurement process.

Fuel Consumption and Fuel Costs

In estimating the life-cycle cost of the vessels over a 40 year period some assumptions have been made in the modelling to differentiate the operating costs for LNG versus diesel. These include:

- BCFS' fuel consumption improvement for a new vessel is assumed to be 15% of the amount currently used by the vessel on the route under consideration. 3GA Marine views this assumption as conservative given the improvement available in modern engines and newer hull designs. The existing ships are older technology, are larger, have enclosed decks, and are less manoeuvrable than the anticipated design (although the actual design of the new ships has not been finalized). Although this assumption of 15% is used consistently across the options reviewed, if it is too low, it will overemphasize the fuel component in the overall life-cycle cost analysis.
- The LNG ship will use 10% more fuel on a diesel litre equivalent basis than the diesel ship. This assumption can be considered a prudent way of including the penalty incurred by LNG engines that run at off peak powers for a significant amount of running time such as is experienced by BCFS vessels when at low power in the terminals. It also provides an allowance for the diesel that is used at the same time as LNG. In dual fuel engines diesel oil is used as the compression ignition medium to cause the combustion. While at higher powers this is in the region of only 1% of the total fuel energy, but at lower powers the relative percentage of diesel to gas consumed increases.

Other assumptions included in the analysis over time that have an implied effect on the LNG to diesel comparison include:

- The cost of both diesel and LNG is inflated at an equal rate. This is an over simplification of a very complex issue as the future prediction of the relative price of diesel and LNG is very uncertain. The marine fuel oil market is a large global market supplying about 300 million tons of fuel oil annually (and price developments generally follow those of crude oil). However the global natural gas market is not set up to supply LNG in small quantities to consumers such as ships. Therefore there are currently no functioning markets for this and no reference prices exist. There remains uncertainty around LNG pricing and therefore also around the difference between the costs of the different fuel types.
- The life-cycle maintenance costs for both the diesel and LNG power plants are assumed to be equal. A typical cost profile for ship maintenance over time has peaks in years where dry dockings and schedule maintenance and overhaul will occur. In the BCFS model there are significant peaks for this at around the 10 and 25 year marks when major equipment replacement and refits occur with the diesel and LNG options assumed to have exactly the same cost profile. While little may be known about LNG overhauls at this stage, 3GA believes that this assumption may underestimate the LNG life-cycle cost as LNG equipment may be more costly to maintain and replace than diesel. This is especially true in comparison to direct drive diesel power plant. In this Application, BCFS has used historical data on the current ship's maintenance and a constant inflation factor to model the new ship cost profile over time. 3GA believes BCFS' simplified modelling assumptions likely result in an underestimate of the life-cycle cost of LNG.

We have looked at industry sources to validate the pricing used by BCFS for diesel and LNG. The prices in CA\$ / L for diesel and LNG on a diesel litre equivalent basis based on current industry pricing are broadly in line with those BCFS has used.

Comparison of Fuel Prices used by BCFS versus Industry Sources

	Ultra low-sulfur diesel	LNG
British thermal unit (Btu) / US gallon ¹	129,488	
US\$ / US gallon ²	\$3.87	
US\$ / L	\$1.02	
CA\$ / L ³	\$1.04	
US\$ / Thousand cubic feet ⁴		\$13.87
US\$ / Million Btu ⁵	\$29.88	\$13.56
Industry price ratio (equivalent energy) ⁶	1.00x	0.45x
CA\$ / L using equivalent energy ratio ⁷	\$1.04	\$0.47
CA\$ / L used in BCFS model ⁸	\$0.95	\$0.45

Notes/Source:

- 1 Biomass Energy Data Book, 2011, Appendix A, using Lower Heating Value in Btu/gal
<http://cta.ornl.gov/bedb>
- 2 US Energy Information Administration, Retail price for US No 2. diesel Ultra low sulphur for week ending June 3, 2013
http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pets&s=emdpd2dxlopte_nus_dpg&f=w
- 3 Assumes US\$1.00 = CA\$1.02
- 4 US Energy Information Administration, Sweetgrass MT Liquefied Natural Gas Pipeline Exports to Canada, March 2013
http://www.eia.gov/dnav/ng/hist/ngm_epgo_png_yswgr-nca_dmcfm.htm
- 5 US Energy Information Administration, conversion from cubic feet to BTU
<http://www.eia.gov/tools/faqs/faq.cfm?id=45&t=8>
- 6 Calculates ratio of LNG cost to ultra low-sulfur diesel cost for equivalent energy produced
- 7 Uses constant ratio of \$ / Btu to convert LNG pricing to CA\$ per litre based on ultra low-sulfur diesel price per litre
- 8 Ratio of LNG cost to ultra low-sulfur diesel cost for equivalent energy produced - using BCFS model's assumptions

Other independent analysis appears to confirm the benefits of LNG over diesel on a cost basis, including a study conducted in early 2012 for Washington State Ferries based on pricing information provided by FortisBC, one of the possible suppliers of LNG gas to BCFS. The table below suggests a 60% fuel saving in 2015 that reduces to 52% in 2027.

FortisBC sells at regulated tariffs and it provided Washington State Ferries with its forecasted LNG pricing (based on the Sumas Natural Gas Index pricing indexed at the same rate as the Henry Hub Forecast, as the rate of increase is expected to be the same for both going forward). FortisBC also provided its liquefaction and production rates. Trucking was estimated at a ten-hour roundtrip at \$100 an hour. Forecast CPI was applied as an inflation factor to liquefaction, production and trucking.

The study also notes that FortisBC believes it will have sufficient capability to meet Washington State Ferries' initial demands and will have room to expand as regional demand grows in the future. The same is likely to apply to BCFS's needs.

LNG 16 year Price Forecast Pacific Northwest Supplier delivered for Washington State Ferries Use

Year	2015	2020	2025	2027
WSF ULSD Sept 2011 Forecast	\$3.57	\$3.78	\$3.90	\$4.03
Sumas Natural Gas Price Index Per Gigajoule	\$4.50	\$4.91	\$5.44	\$5.77
Conversion factors for Sumas Natural Gas Commodity to LNG Price				
Gas Gallon	\$0.39	\$0.42	\$0.47	\$0.50
Liquefaction	\$0.38	\$0.44	\$0.51	\$0.54
Trucking	\$0.11	\$0.13	\$0.15	\$0.15
Price per LNG Gallon	\$0.87	\$0.99	\$1.12	\$1.19
ULSD Equivalent Price with 1.7 G LNG = 1 G ULSD Adjustment	\$1.41	\$1.59	\$1.81	\$1.92
Savings per Gallon	\$2.16	\$2.19	\$2.09	\$2.11
Percent Savings	60%	58%	54%	52%

Notes/Source:

- 1 Based on discussions with FortisBC, assuming exchange rate of US\$1.00 = CA\$1.02
- 2 Source: Exhibit 13, Evaluating the Use of Liquefied Natural Gas in Washington State Ferries, Final Report, Prepared for Joint Transportation Committee, January 2012

While the LNG prices are broadly in line with industry the gap may narrow in the future. 3GA Marine felt that the price differential may currently be less than BCFS had modelled, so we asked BCFS to conduct sensitivities on this. The results in the table below show that even with the LNG fuel cost increasing by 30% compared to what BCFS had assumed, there would still be an NPV advantage of LNG versus diesel.

NPV sensitivity on LNG Fuel Cost (\$m)

Case	Total Project Cost (incl. IDC)	40 year NPV	NPV advantage LNG v diesel
Replace with 3 ICF vessels – diesel base case		-526	-
Replace with 3 ICF vessels – LNG base case		-504	23
LNG fuel cost +10%		-409	17
LNG fuel cost +20%		-515	12
LNG fuel cost +30%		-520	6

Source: BCFS answers to questions from PwC and the Commission from June 5, 2013, question 4

Subsequent to BCFS' submission of its Application on May 22, 2013, a decision was made by the British Columbia Utilities Commission ("BCUC") by Order G-88-13 to increase the delivery charge of LNG by FortisBC from the current rate of \$4.10 to \$6.50 per gigajoule. FortisBC had applied for a rate of \$4.25 per gigajoule, and that amount was assumed in the analysis in BCFS' Application. Since FortisBC would be a likely local supplier, this was reasonable in our view. However, the increase in delivery charge of LNG locally would negatively impact the NPV of the LNG options. BCFS provided the Commission with an updated financial analysis incorporating the LNG delivery price determined by the BCUC.

Updated Cost-Differential on LNG Fuel Cost (\$m)

Case	Increase in LNG price from that assumed in the Application	40 year NPV of Additional LNG Investment	Discounted Payback (years)	Simple Payback (years)
Replace with 3 ICF vessels – LNG base case from Application date 22 May, 2013 LNG price per diesel litre equivalent = \$0.455	0%	23	14	9.2
Replace with 3 ICF vessels – LNG price based on BCUC ruling LNG price per diesel litre equivalent = \$0.564	24%	10	21	12
Replace with 3 ICF vessels – LNG price based on no NPV advantage of LNG vs diesel LNG price per diesel litre equivalent = \$0.645	42%	0	NA	NA

Notes/Source:

- 1 Update of Table 3-2 on page 36 of the Application
- 2 Source: BCFS letter to Deputy BC Ferries Commissioner, July 12, 2013

NPV sensitivity on LNG Fuel Cost (\$m)

Case	Total Project Cost (incl. IDC)	40 year NPV	NPV advantage LNG v diesel
Replace with 3 ICF vessels – diesel base case		-526	-
Replace with 3 ICF vessels – LNG base case LNG price per diesel litre equivalent = \$0.455		-504	22
Replace with 3 ICF vessels – LNG price based on BCUC ruling LNG price per diesel litre equivalent = \$0.564		-519	7

Notes/Source:

- 1 Update of Table 3-3 on page 37 of the Application
- 2 Source: BCFS email to Deputy BC Ferries Commissioner, July 12, 2013

Based on the updated LNG pricing assumptions incorporating the LNG delivery cost for FortisBC determined by BCUC, the net present cost of the 3 ICF vessels is still lower if LNG powered than diesel

powered, assuming all else remains equal. However, the differential is much smaller with a benefit of LNG over diesel only being approximately \$7 million. If the LNG price per diesel litre equivalent went as high as \$0.645, there would be no NPV advantage of LNG versus diesel fuelled vessels according to BCFS' modelling.

We requested BCFS conduct sensitivity tests assessing the financial impact of greater diesel propulsion efficiency (than the 15% assumed in the base case relative to the current vessels) on the one hand and greater LNG fuel cost on the other. The LNG solution is favourable in all of the tests. As a result we are generally satisfied with the merits of the LNG solution over diesel from an operating cost point of view. Again, these base case NPV numbers differ from those submitted in BCFS' original Application, as they have been modified to include the insurance costs of the new vessels. However, the NPV analysis should be updated once the procurement process is completed to capture any changes in fuel costs.

NPV sensitivity on Diesel Propulsion Efficiency (\$m)

Option	Total Project Cost (incl. IDC)	40 year NPV		
		Base case (+15%)	+20%	+25%
Replace with 3 ICF vessels – diesel		-526	-520	-514
Replace with 3 ICF vessels – LNG		-504	-504	-504

Source: BCFS answers to questions from PwC and the Commission from June 5, 2013, question 4

LNG Supply Chain Issues

There are a number of issues yet to be finalized with respect to the implementation of an LNG power plant that are highlighted in the Application.

With vessel bunkering, it is understood that the intent is for BCFS to shuttle LNG fuel via trucks from local liquefaction plants. Delivery to the vessel will be made by parking the truck on the vehicle deck and loading directly into the onboard LNG tank. This method works easily with the open deck concept as, by regulation, all bunkering spaces must be suitably ventilated to the open deck where gas can freely escape if accidentally released. It requires however an overnight operation for bunkering and has no storage capability.

Alternatively, the ships and the terminals could be fitted with shore side fuel transfer facilities. This is a common approach in Europe where LNG storage tanks are sometimes located close to the terminals. The bunkering station on the ship is a separate space with open ventilation.

In pricing LNG as a fuel the additional costs over and above the commodity price for natural gas are liquefaction and transport. In the BCFS case there are locally based liquefaction plants. Consequently longer term stable supplies of LNG are available in the BCFS operational area.

Historically the objective of the liquefaction plants has not been to market LNG but rather to regulate the pipeline supply of gas to consumers, by buffer storing gas in its LNG state. The supply of LNG via truck to consumers is therefore somewhat of a by-product. Hence there may be unforeseen technical challenges with the LNG supply chain but there is likely to be sufficient time to address these. The potential additional costs associated with the LNG supply chain are excluded from the vessel costs and accordingly were outside the scope of our assessment.

Demand Analysis

BCFS commissioned Urban Futures to examine future demand for Routes 9 and 17 in separate studies. Urban Futures is an experienced demographic forecasting firm.

The Urban Futures forecasted rates of change are based on projected demographic changes and the forecasted rates of change were applied equally to passenger, passenger vehicle and commercial vehicle traffic. Although commercial vehicles represent only a small amount of the total traffic, no forecast of commercial traffic appears to have been completed. BCFS staff stated that in terms of total vehicles handled on Route 17 only 4.8% were commercial (approximately 10.8% on an AEQ basis). Commercial vehicle traffic is more prevalent on early morning crossings from the Comox area. In terms of local industry, the large paper mill in Powell River has its own barge handling facility where the majority of inputs and outputs are shipped. It was confirmed with BCFS that the percentage of commercial traffic on Route 9/9a is only 1.4% (3.5% on an AEQ basis).

While the forecasted demand does not appear unreasonable based on historical traffic patterns and forecasted population, the modelling was solely reliant on estimated future changes in total and specific (working age) cohorts. None of the following factors appears to have been considered - detailed trip purpose data, trends of reductions in trips per capita, price elasticity of demand pertaining to changes in ferry rates, travel disabilities for aging populations, alternative means of passenger travel (such as float plane service), and overall declining desires/needs for travel that reflect increasing use of social media and internet services.

Recent experience in most ferry services indicates a tendency toward decreased passenger and passenger vehicle travel demand. This phenomenon is not confined to North America as Western Europe and other portions of the developed world have also witnessed peak per capita automobile travel. A number of factors are at play. The table below cites some of the more prominent factors that are influencing the situation.

Factors affecting Future Vehicle Travel Demands

Factor	Impacts on Travel Demands
Demographics	Declines likely due to retirements/aging and smaller households
Income	Mixed impact. Higher travel from low to middle income range but little growth amongst upper middle to high income range
Geography	Declines with increasing urbanization
Operating Costs	Moderate declines due to rising fuel prices and road tolls
Travel Speeds	Neutral as travel speeds will be similar in the future
Transport Options	Declines due to improvements in alternative modes such as air
New Technologies	Declines due to increased tele-work, public transit information and user fees designed to improve demand management
Consumer Preferences	Declines due to preferences for alternative modes, urban living and walkable communities
Health Concerns	Increased demand for walking and cycling for both transport and recreation
Environmental Concerns	Some declines due to energy conservation and emission reduction programs
Freight Transport	Further growth concentrated in high volume corridors

Source: The Future Isn't What It Used To Be, Victoria Transport Policy Institute, 2012

In its Application BCFS used the Urban Futures demand growth rates to 2017 and compared to the vessel capacity. Based on the forecasts the capacity of the vessels appears to be adequate under the high and low growth scenarios for the two routes. This is shown in the table on the following page.

We requested the same high and low growth rates be applied to forecast passenger numbers out to 2027 and 2036. Based on this analysis, there appears to be adequate capacity to meet the low growth scenarios on the two routes out to 2036, especially when the two vessels are deployed on Route 9 in the peak and shoulder seasons. The high growth scenario on Route 9 suggests there may be inadequate capacity over time if only the 145 AEQ vessel is deployed. With the two vessels there appears to be adequate capacity. BCFS has suggested that capacity issues can be addressed through a number of factors including additional sailings, demand management, and adding a second deck to the 125 AEQ vessel.

A benefit of the new vessels is related to seasonal variations in demand and transition between peak and off-peak periods. With the current configuration, these “shoulder” periods are difficult to deal with effectively and usually result in either too little or too much capacity during the transition. With the ICF vessels it should be easier to develop shoulder period schedules to better meet service requirements at a more effective cost.

Capacity Analysis using Urban Futures Forecasts

% of times demand carried per sailing with 145 AEQ	Annual growth projections	2012 Current year	F2017 In service	F2027 10 years from in service	F2036 20 years from in service
Route 17					
Per annum high growth rate (Urban Futures)	1.22%	99%	98%	96%	92%
Per annum low growth rate (Urban Futures)	-0.16%	99%	99%	99%	99%
<i>1% of sailings is approximately</i>	29				
Route 9					
Off peak					
Per annum high growth rate (Urban Futures)	1.66%	97%	96%	93%	87%
Per annum low growth rate (Urban Futures)	-0.89%	97%	97%	98%	98%
<i>1% of sailings is approximately</i>	10				
Shoulder					
Operating 145 AEQ					
Per annum high growth rate (Urban Futures)	1.66%	87%	83%	74%	63%
Per annum low growth rate (Urban Futures)	-0.89%	87%	88%	90%	94%
Operating 145 AEQ and 125 AEQ					
Per annum high growth rate (Urban Futures)	1.66%	99%	99%	99%	95%
Per annum low growth rate (Urban Futures)	-0.89%	99%	99%	99%	99%
<i>1% of sailings is approximately</i>	4				
Peak					
Operating 145 AEQ					
Per annum high growth rate (Urban Futures)	1.66%	82%	76%	69%	63%
Per annum low growth rate (Urban Futures)	-0.89%	82%	84%	88%	94%
Operating 145 AEQ and 125 AEQ					
Per annum high growth rate (Urban Futures)	1.66%	99%	99%	99%	95%
Per annum low growth rate (Urban Futures)	-0.89%	99%	99%	99%	99%
<i>1% of sailings is approximately</i>	6				

Source: BCFS answers to questions from PwC and the Commission from June 5, 2013, question 1

Analysis of Fleet Configurations and Scheduling

BCFS commissioned Simon Fraser University (SFU) to conduct separate studies on vessel optimization for the two routes in question. The purpose of the studies was to evaluate the following:

For Routes 9 and 17:

- Whether it is possible to improve existing schedules given current fleet and port configuration

For Route 9:

- How the operating costs change if the Queen of Nanaimo vessel is replaced with two intermediate class vessels; and
- How the operating costs change if the Long Harbour demand is totally removed from the system and / or the Lyall Harbour demand is moved to the Village Bay Port (i.e. how does closing these ports affect level of service and daily operating cost?).

The Authors used a technique to compare efficiency called Pareto efficiency. This is where improvement can be measured between two observations by measuring their dominance over another observation. The two measures they elected to use are cost and level of service (delay).

BCFS set the variable parameters which were to be used:

- **Routes** – these are pre-determined and not optimized in this report;
- **Fleet Configuration** – There are 3 scenarios for Route 9: (1) The current fleet-Queen of Cumberland, Mayne Queen, Bowen Queen and Queen of Nanaimo; (2) Current fleet with a replacement of the Queen of Nanaimo with two ICF's; and (3) Current fleet without Bowen Queen. For Route 17 the vessel scenarios are as follows: (1) Right sized like-for-like replacements of existing fleet; (2) Replacement of existing fleet with two medium sized vessels of 85 AEQ; (3) Similar to 1 except the 145 AEQ vessel is replaced by an 125 AEQ vessel;
- **Port Configuration** – There are 4 Scenarios for Route 9: (1) All existing 7 ports; (2) All existing ports excepting Long Harbour; All existing ports excepting Lyall Harbour on Saturna Island; and (4) All existing ports except Long Harbour and Lyall Harbour; and
- **Demand** – This is based on past ticket sales, smoothed to create a demand model.

Costs are known and applied to the vessels as required, including overtime hours. SFU used current ticket sales to create their demand mode rather than any forecast passenger numbers. The SFU analysis was utilized to scope both vessel configuration and scheduling options.

For Route 9, the SFU analysis concluded that existing schedules can be significantly improved in terms of operating cost without reducing the level of service (defined as delay time). Further, it was concluded that replacement of the Queen of Nanaimo with two ICF's could reduce total operating costs while maintain the current level of service. Additional operating cost reductions could be achieved by removing either Long Harbour or Lyall Harbour or both.

For Route 17, the SFU analysis concluded that improved passenger satisfaction and reduced operating costs could be achieved by vessel option 1 - replacement with right sized like-for-like vessels. Additional operating cost savings could be achieved using option 3 but with some service level penalty. Option 2 produced inferior outcomes.

Additional sensitivity analysis was requested of BCFS and SFU. Since the SFU analysis was based on existing traffic levels and a specific weighting of travel time, a determination of whether the analysis would vary with traffic level or time value changes. The additional analysis showed there was no sensitivity to either traffic level changes or time value changes.

The information created by SFU was used in conjunction with the Urban Futures study on demographics as well as knowledge and experience of the staff at BCFS. As indicated in Tables 2-1 and 2-2 of the Application, traffic levels based on Urban Futures forecasts for both 2017 and 2027 were tested to determine the percentage of times all traffic will be handled on individual sailings. The vessel configurations for the two routes indicate adequate capacity in the short to medium term. As indicated with the additional sensitivity, the flexible intermediate vessels proposed should make it easier to adapt to changing demographics/demand within the ferry network. Increasing sailings and adding or removing vessels from routes becomes easier.

Discount Rate

Prior to the BC Ferry Commission Regulatory Review and the subsequent amendments to the Coastal Ferry Act which eliminated the regulated rate of return on equity, BCFS had regulated ROE of approximately 13%. Its weighted debt costs were approximately 6%. Based on its target capital structure, the company’s Weighted Average Cost of Capital (WACC) can be estimated as follows:

Target equity of 12.5% x 13% ROE =	1.625
Debt of 87.5% of total x 6.0% =	<u>5.250</u>
WACC	6.875
	Rounded 7.0 %

The Company’s WACC can be used as an appropriate discount rate. The 7% used by BCFS appears reasonable. Sensitivity was performed on the discount rate by reducing it to 6% on the basis that interest rates have fallen. This comparison is shown below. The lower discount rate favours the LNG option even more.

NPV Summary of Options at varying Discount Rates (\$m)

Option	@7%	@6%
1: Life-extend existing vessels for 10 years and replace commencing 2024	-596	-660
2: “Modified like-for-like”	-558	-616
3(a): Diesel fuelled (3 ICF)	-520	-576
3(b): LNG fuelled (3 ICF)	-497	-545

6.3 Ancillary services

BCFS has estimated the minimum safe crewing requirements for the ICF vessels which are its preferred option. These are:

- “A” licence – 15 crew for up to 585 passengers (600 total)
- “B” licence – 12 crew for up to 438 passengers (450 total)

A “B” licence leaves one crew member available to provide basic catering/retail service (level 1), whereas an “A” licence allows sufficient crew to provide a full cafeteria level service (level 4). BCFS analysed these two options (and two other interim levels, each requiring progressively more crew) by route, taking into account:

- Revenues, based on current passenger traffic on each route and per passenger spends from vessels with similar service offerings;
- Associated cost of goods sold;
- Incremental labour costs, allowing for times when an “A” licence would be required;
 - Route 9 requires an “A” licence on approx 40% of sailings, while Route 17 seldom requires and “A” licence
- Incremental amortization and debt service.

BCFS has not provided a preferred cafeteria service for any of the three vessels in the application. Rather, an analysis has been provided that determines the impact of the various ancillary services.

Annual Contribution to fares for Various Levels of Ancillary Services by Route

Annual contribution to fares	Level 1	Level 2	Level 3	Level 4
Route 9 vessels	\$131k	\$325k	\$310k	\$350k
Route 17 vessel	\$105k	\$48k	(\$30k)	(\$121k)
Combined (standardized)	\$236k	\$373k	\$280k	\$229k

Source: BCFS presentation to public, Intermediate Class Ferry (ICF) New Build Program, available on BCFS website

The conclusions drawn from the above results were that level 4 service on Route 9 and level 1 service on Route 17 each make the largest contribution towards fares. If all vessels are to be fully standardized, then level 2 for both routes makes the largest contribution. Note current ancillary services on both routes 9 and 17 are the equivalent of level 4.

BCFS sought public input on the ancillary services, providing the public with the above table and stating that the difference in contribution from level 1 to level 4 would require an offsetting annual ~2.3% fare increase. Public comments have been collated and analysed, and a description follows. The approach being taken by BCFS is to require that each of the three ICF vessels be designed with the capability to equip as level 4, such that a decision can be made on a case by case basis. The incremental capital costs associated with outfitting from a level 1 to a level 4 are relatively minor. As a result, this is not a major concern.

6.4 Issues Raised in Public Comments

Feedback received by BCFS

BCFS conducted public information sessions regarding the replacement of the Queen of Burnaby and the Queen of Nanaimo to inform the residents and customers of the two routes currently serviced by these vessels. Two hour sessions were held including a one hour of story board viewing, followed by a one hour Question and Answer period.

The following information sessions were held for users of Routes 9 and 17:

- Southern Gulf islands: Galiano, Saturna, Pender, Mayne, Saltspring, Richmond (April 22-30, 2013)
- Northern Sunshine Coast: Courtney, Powell River, Texada (May 1-2, 2013)

At these information sessions, public input was invited. Emails were collected from the public and submitted by BCFS to the Commission as part of its Application. No analyses or summaries of this public feedback were included in the Application.

A total of 44 emails were received from the public including from the ferry advisory committees of the relevant areas. Some emails raised more than one issue and each issue raised has been included in the table below, such that there are a total of 109 comments. The email responses have been categorised based on frequency of similar themes. A table which details the main comments, concerns and suggestions from each public email is included in Appendix E. Below is a summary of the number of responses by category and by route.

Summary of Issues Raised in Public Comments to BCFS

	Open deck	Amenities	Capacity	Reliability	Scheduling	Reservations	Pet area	Fares	Other
Route 9	2	11	9	1	10	4	3	8	11
Route 17	13	4	5	8	2	1	1	7	9
Total	15	15	14	9	12	5	4	15	20

The types of comments vary significantly by route, and a short description of general feedback by route is included below.

Route 9

The most frequent Route 9 comments were around amenities, scheduling, capacity and fares, with amenities being the focus.

- **Amenities:** preference for level 4 food service and reduced level of retail, suggestions for seating configurations and pet areas
- **Scheduling:** a variety of suggestions are made about minimising transfers and improving connections
- **Capacity:** main concerns are number of seats for passengers, so suggestions are mainly around enabling a reservation system for walk-on passengers or providing greater overall passenger capacity
- **Fares:** most comments relating to fares suggest fares are too high or increases ought to be kept to a minimum (i.e. food service level should be determined by most favourable impact on fares)

Route 17

There are more concerns around the open deck concept from users of Route 17, with this ranking well above all other categories in terms of number of comments. Most concerns around reliability stem from the open deck concept. Other areas of concern are around fares, capacity and amenities.

- **Open deck:** salt damage to vehicles, reduced reliability of service due to greater number of expected cancellations
- **Fares:** there are a similar number of comments around fares as for Route 9, also around fares being too high or minimising increases

- **Capacity:** some concerns that the proposed boat is too small
- **Amenities:** there were fewer comments regarding food service on this route, and no consistency in responses

To give context to comments around open deck suitability and concerns regarding weather cancellations for Route 17 we note that from information provided by the Commission that for the year ended March 2013, Route 17 had the highest number of cancelled sailings of any BCFS route. 2.33% of the required round trips were cancelled. For Route 9, only 0.12% of the required round trips were cancelled.

Of the 34 Route 17 trips cancelled in fiscal 2013, 27 of these were due to weather conditions, 3 were due to regulatory issues, and 4 were due to mechanical failure. 27 weather cancellations represent the second highest number of cancellations due to weather on a route, behind Route 23 (Campbell River to Quadra Island).

On Route 9, there was only 1 day when a return trip was missed. On Route 17 there were a total of 21 days with round trips missed in fiscal 2013, with the longest delay of 3 days with no round trips made.

BCFS has yet to articulate how the results of the public consultations are to impact on vessel design and amenities.

7.0 Procurement Options

7.1 Acquire Used Vessels

Used vessels were considered. However, they were rejected because they cannot meet a number of fleet objectives.

Some of the same challenges exist with leasing of new vessels which are not built to suit. As a result, only new vessels built to suit were considered.

7.2 Procurement Process for New Vessels

A committee comprised of senior management has been formed to oversee the procurement of new vessels.

A Request for Expressions of Interest ("RFEOI") for the design and construction of the three proposed ICF vessels was issued to 24 leading shipyards. These are described in Appendix D. A total of 16 shipyards expressed interest and indicated their ability to meet the in-service timeframe of fiscal 2017-18 for the 3 ICF vessels.

As described in section 4.3 of the Application, the next stage in the procurement process for the intermediate class vessels was intended to be the issuance of a combined Request for Qualifications ("RFQ") and Request for Proposals ("RFP") to the respondents of the RFEOI.

BCFS proposed a combined RFQ/RFP with the expectation that combining these two phases would be more efficient and expedite the overall timeline of the potential project. The Company has considered this matter further and now believes that there is no major time/schedule benefit to be gained from combining these phases and has thus decided to pursue a more traditional two step procurement process.

The first step would be the issuance of a Request for Pre-Qualifications ("RFPQ") to the respondents of the RFEOI. Through the RFPQ process, BCFS will determine which shipyards are capable of meeting BCFS' standards in terms of such things as qualifications, experience, and financial and technical capacity. Responses to the RFPQ will be evaluated and a short-list of shipyards will be selected for invitation to participate in a subsequent RFP process.

Pursuing this two-staged process is expected to provide benefits in terms of ensuring that the right shipyards are invited to participate in the RFP, in addition to providing BCFS with information at the RFPQ stage which will be of value as the Company proceeds in its further planning of the project and in the shaping of its RFP documentation.

Requirements will be for a design-build contract with BCFS maintaining the intellectual property (IP) for the design.

A Steering Committee will evaluate the bids and make a recommendation to BCFS' Executive Management Committee for decision. The final is contract subject to approval by the Board.

Due to the aggressiveness of the procurement timetable there is risk that the new vessels may need to remain in-service longer than anticipated. Any delay in the construction of the first replacement vessel may lead to delay in the construction of the following vessels. BCFS suggest that extending the time each vessel remains in-service will increase the likelihood of a service disruption, and that the potential consequences of any such disruption become much more significant the longer these vessels remain in-service. Additionally, any operating cost savings will not come into effect until the new vessels are in-service.

Since the summer is the busiest season it is the least desirable time to bring a new vessel into service because of the risks associated with a new vessel. If the replacement for the Queen of Burnaby, which is scheduled to be in-service in April 2016, is not ready by this date, it is likely that it will not be put into service on Route 17 until the fall. Hence, a two month delay in the delivery date may lead to a six month delay in the in-service date, and the necessity to have the Queen of Burnaby remain in-service during this time.

The project timeline is summarized in the following table.

Procurement process timeline summary

Time	Action
March 2013	RFEOI issued / responses received Vessel design principles finalised
End of June 2013	SOR and TSOR finalised
End of June to Mid-July 2013	RFPQ issued
End of August 2013	RFPQ responses received; evaluations commence
October 2013	RFP to shortlisted shipyards issued
November – December 2013	RFP responses received, evaluated & preferred shipyard selected Letter of intent with preferred shipyard executed BCFS Board of Directors' decision on contract award
January 2014	Award of shipyard contract

Source: Email from BCFS to Commission on June 18, 2013

7.3 Risk Identification and Mitigation

BCFS has identified a number of risk areas and mitigation strategies. These are summarized in the following table.

Identified Risks and Mitigation Strategies

Risk	Identified mitigation
Financial risks	
Affordability	Affordability based on financing plan and selection of lowest NPV option
Financing	Based on existing borrowing plan
Price escalation	Contingency has been built into the pricing. A supplemental application to the Commission on scope changes may be necessary in the event build costs are higher than estimated
Currency	Forward currency exchange contracts will be in place to hedge against currency exchange risk
Design risks	
Vessel design	BCFS will seek design rights for new vessels
LNG	Further technical and financial analyses will be required before a final decision is made
Timeline risks	BCFS has received confirmation from shipyards worldwide through an RFEOI that the proposed in service timeframe for the ICF vessels can be met
Construction & Delivery risks	
Project management	BCFS intends to enter into a Design-Build contract. Once the final shipyard is selected through the RFP process, a shipyard specific project management strategy will be developed
Cost escalation	Intent is to seek fixed price proposals from shipyards
Performance risk	Sea trials will be part of the construction phase
Insurance	The RFP responses will identify insurance terms proposed by the shipyard for the vessels during construction and delivery
Delivery	Delivery options specified by shipyards will be assessed
Operational & deployment risks	
Defects	Traditional warranties will form part of the overall shipyard contract
Training	A training program will be developed to ensure appropriate training is provided

BCFS has suggested pursuing a design-build contract with a fixed schedule. The intent is to request more detailed qualifications from the 16 shipyards which have shown interest in the project and select a short list of yards that would prepare pricing proposals based on compliance with the TSOR and SOR. We are generally comfortable with the process which is similar to what BCFS followed with the acquisition of the Super “C” vessels.

There are also a number of unresolved technical issues with the local supply of LNG for the two routes. As a result there may be unforeseen supply chain costs, however, these are expected to be minor.

8.0 Conclusions

We conclude that:

- Subject to confirmation of final cost, the major capital expenditure for three new Intermediate Class Ferries is reasonable, prudent and consistent with the current Coastal Ferry Services Contract and the long-term capital plan established by BCFS;
- The selection between the diesel and liquefied natural gas (LNG) options based on the lowest net present cost (up to the maximum amount stipulated in the Application) is appropriate. The net present cost analysis needs to be re-assessed once capital and life-cycle costs have been updated through the procurement process and estimates for diesel and LNG fuel costs are updated; and
- BCFS has adequately responded to the questions posed in the Section 55 Application Guidelines.

We agree that the Queen of Nanaimo and the Queen of Burnaby, the current vessels being used on Route 9 and Route 17, respectively, are nearing the end of their useful lives and need to be replaced. Life-extending the vessels at this stage is uneconomical and carries undue risk.

The procurement of the replacement vessels represents an important procurement platform for a new generation of intermediate class vessels, as up to seven vessels in the next 15 years will be acquired under the same base design. The intent is to maintain the ownership of the design to allow for replication by one or more yards. Under the approach, the same hull size for an 85 AEQ vessel can also carry 125 AEQs or 145 AEQs with the addition of more vehicle decks.

The proposed deployment by BCFS of three new Intermediate Class Vessels in terms of their capacity, operating characteristics and open deck design, is considered reasonable.

BCFS has conducted extensive business case analysis to support the acquisition of the three new vessels. The preferred option for the acquisition of two 145 AEQ vessels and one 125 AEQ vessel to serve the two routes is based on a life-cycle analysis expressed on a NPV basis which is considered good practice for assessing infrastructure options. The life-cycle costs of three smaller vessels compared to two larger “like-for-like” vessels are lower. In addition, the proposed strategy enables BCFS to acquire three vessels instead of two, which provides for extra service flexibility on the routes they can serve and amongst the fleet.

BCFS are planning to follow a number of well accepted practices in the governance of the project and in the procurement process that it has used in the successful acquisition of a number of new vessels since 2003. This includes running a robust international competition that is based on a design-build contract tied to a fixed delivery schedule.

While we have no major concerns, we have several minor concerns regarding the Application:

- The lack of response by BCFS in the Application to the public consultations in terms of any potential impact on the design of the vessels;
- The lack of response by BCFS in the Application to the public consultations in terms of the level of on-board amenities to be provided;

- The aggressive procurement timeline which creates a risk that the Queen of Burnaby and Queen of Nanaimo may need to remain in service beyond the in-service target dates for the replacement vessels; and
- There is the risk that the project costs may ultimately be higher than estimated, particularly as they relate to the LNG capability. The life-cycle analysis is influenced by capital costs, fuel consumption rates and fuel costs and should be confirmed once the competitive bids are received.

There is the risk that the capital costs may ultimately be higher than estimated, particularly as they relate to the LNG capability. The life-cycle analysis is influenced by capital costs, fuel consumption rates and fuel costs and should be confirmed once the competitive bids are received. A life-cycle cost analysis comparing LNG to diesel solutions could also examine the relative environmental impacts of these options. While clearly the LNG solution even as a dual fuel ship will have significant benefits in terms of its carbon footprint and health impact benefits, these considerations are outside of the scope of our work.

Appendix A: Compliance with Section 55 Application Guidelines

Section 55 Category	# Section 55 questions	# Major concerns	# Minor concerns
Project Description	21	-	-
Timing and In-service Date	3	-	1
Does the Proposed Capital Expenditure Demonstrate Good Judgement, based on Wisdom, Experience and Good Sense?	8	-	2
Wise Use of Resources	6	-	-
Showing Due Consideration for the Future	7	-	-
Not Excessive	8	-	1
Demonstrating Good Value at a Fair, Moderate Price	8	-	-
Coastal Ferry Services Contract	1	-	-
Long Term Vision for Coastal Ferry Services in British Columbia	1	-	-

Project Description	Major concern	Minor concern
a) Describe the proposal for the capital expenditure and provide a comparison to the capital currently in use, in terms, for example, of size, capacity and staff and/or crew requirements.	-	-
b) In the case of a new vessel, has an independent marine surveyor provided a condition assessment of the current vessel and is that assessment factored into the business case supporting the requested capital expenditure?	-	-
c) Is there a regulatory driver for the proposed capital expenditure?	-	-
d) Provide information on the operating costs of the vessel, terminal, information technology or other capital asset to be replaced and/or to be upgraded, covering the most recent three year period, including the current year.	-	-
e) Compare the annual maintenance costs of the existing capital asset with those expected for the replacement and explain any significant variances.	-	-
f) Have there been service disruptions due to inadequacy of the existing capital asset?	-	-
g) If age of the existing capital asset is a factor, what is the estimate of future costs of continuing its use?	-	-
h) Have there been complaints from the public, or other stakeholders about the existing capital asset?	-	-
i) Provide an estimate of the total capital costs associated with the proposed investment.	-	-
j) How was the cost estimate derived? Entirely with BC Ferries' staff or was there an external review?	-	-
k) In the case of a new vessel was the international ship broking industry contacted to determine if there are existing vessels available for purchase that may, with adaptation, be appropriate?	-	-
l) Provide an estimate of the incremental capital costs to provide "ancillary services," including catering and retail concessions, and provide estimates of the incremental operating costs to provide the ancillary services and the incremental revenue expected to be generated from those services.	-	-

m) In the case of a new vessel, demonstrate on a lifecycle cost or present value basis that the decision to build a new vessel versus the cost of acquiring a second-hand vessel, if applicable, is a net benefit. Include sensitivity analysis in case of cost overruns.	-	-
n) Does the proposal include significant features that are innovative or untried?	-	-
o) Is there an allowance in the estimate for inflation from the date of acceptance of a proposal to the completion date (escalation clause)?	-	-
p) Are financing costs included in the cost estimate between first payment to the supplier and the in-service date?	-	-
q) Compare the operating costs of the existing capital asset with those expected for the replacement, to include, in the case of vessels, fuel costs, crew costs and depreciation.	-	-
r) Does BC Ferries intend to capitalize any of its own internal costs with respect to the capital expenditure?	-	-
s) Identify any parts of the capital expenditure that are to be provided by BC Ferries or its subsidiaries.	-	-
t) In the case of vessels, if tenders are to be sought from foreign shipbuilders, what is the applicability of custom tariffs on importation of the vessels?	-	-
u) In the case of vessels, will BC Ferries require the contracting shipyard to bear the design and construction risk?	-	-

Timing and In-service Date	Major concern	Minor concern
a) For new or replacement vessels what is the expected in-service or deployment date and how was it derived?	-	-
b) Were potential builders, for example shipyards, contacted to determine if the proposed date is reasonable?	-	-
c) What are the consequences of a delay in the in-service or deployment date?	-	√

Does the Proposed Capital Expenditure Demonstrate Good Judgement, based on Wisdom, Experience and Good Sense	Major concern	Minor concern
i) Why is the proposed capital expenditure required now, and what are the consequences of any delay?	-	-
ii) How has this capital expenditure project been prioritized relative to other capital expenditure projects within the long term capital plan?	-	-
iii) What sources of expertise and experience have been relied upon in deciding to proceed with this capital expenditure?	-	-
iv) Provide detail on completed and/or planned consultations, in particular with the provincial government or other stakeholders.	-	√
v) In the case of new vessels, has BC Ferries considered any alternative to building and owning the new vessels?	-	-
vi) Will a new or replacement vessel require any modifications to any terminals? If so, at what additional cost?	-	-
vii) What are the procurement cost risks and how will they be mitigated?	-	√
viii) What are the consequences or the alternatives if the application is rejected?	-	-

Wise Use of Resources	Major concern	Minor concern
i) Can an existing vessel be reassigned instead?	-	-
ii) For shorter routes, were non-vessel options considered, such as a fixed link?	-	-
iii) Were non-vehicle vessels (e.g. passenger only ferries, barges, other) or a mix of vessel types considered?	-	-
iv) Has a used vessel option been considered?	-	-
v) How does the vessel align with the concept of standardization of the fleet?	-	-
vi) Would investments in technology, such as an expanded reservation system, better IT systems or a yield management program allow for a smaller sized vessel?	-	-

Showing Due Consideration for the Future	Major concern	Minor concern
i) How does the proposed new vessel contribute to overall fleet flexibility?	-	-
ii) What new technologies or innovations will be incorporated, and why are they considered necessary?	-	-
iii) Will there be provision for a conversion to an alternative to marine diesel engines, such as LNG?	-	-
iv) Is dual fuel capability planned and if so provide the rationale?	-	-
v) Will the new or replacement vessel be appropriate if the ratio of vehicle to foot passenger traffic changes in future?	-	-
vi) Is vessel capacity sufficient to meet current and projected future demand?	-	-
vii) What is the estimated impact of the proposed capital expenditure on future price caps assuming no change in non-passenger related revenues?	-	-

Not Excessive	Major concern	Minor concern
i) What passenger amenities will be provided, and why are they considered appropriate for the intended use of this vessel?	-	√
ii) Do any of the proposed passenger amenities require crewing levels to be higher than what is required by Transport Canada regulations?	-	-
iii) Is the vessel the right size and how has the capacity requirement been determined?	-	-
iv) Describe the objectives of BC Ferries' design standards for passenger accommodations for vessels of similar size and scope. Will the passenger accommodations for the replacement vessel deviate from these standards? If so, what is the rationale for the deviation and what impact, if any, will it have on the capital and operating costs of the vessel?	-	-
v) Will the application of logos or other BC Ferries' brand images to the vessel be consistent with BC Ferries' current practice for similar vessels. If not, how will it differ and what will be the effect on capital costs?	-	-
vi) What would have to be sacrificed to reduce total costs by 10%, and by 20%?	-	-
vii) Does vessel design or expected operating speed have any impact on labour costs?	-	-
viii) Are engines sized for efficient operations, fuel consumption and ability to recover schedule?	-	-

Demonstrating Good Value at a Fair, Moderate Price	Major concern	Minor concern
i) For new vessels what alternatives were considered? Provide the rationale (cost or otherwise) for why the alternatives were not accepted.	-	-
ii) Has the business case been built on a full life cycle costing basis?	-	-
iii) How fuel efficient will the new vessels(s) be?	-	-
iv) Will the new or replacement vessel have any impact on efficient use of labour?	-	-
v) Are the operating costs reasonable?	-	-
vi) How do the operating costs compare with the vessel being replaced?	-	-
vii) Is there any expected impact on revenue?	-	-
viii) Will crew training and certification activities be in excess of that required to meet regulatory requirements? If so, explain the rationale for this approach and whether it will result in incremental operating costs.	-	-

Coastal Ferry Services Contract	Major concern	Minor concern
i) Is the proposed capital expenditure consistent with the current Coastal Ferry Services Contract?	-	-

Long Term Vision for Coastal Ferry Services in British Columbia	Major concern	Minor concern
i) How does the proposed expenditure support the government approved long term vision for the future of coastal ferry services?	-	-

The following appendices have been removed as they include information of a confidential and commercially sensitive nature:

Appendix B: Questions to BCFS and its Responses (May 21, 2013)

Appendix C: Questions to BCFS and its Responses (June 5, 2013)

Appendix D: Questions to BCFS and its Responses (July 4, 2013)

Appendix E: Summary of Responses from Shipyards to Request for Expressions of Interest

***Appendix F: Public Comments
regarding Proposed New Vessels***

Public comments to BCFS in response to public consultation document

Route 9								Route 17												
	Open deck	Amenities	Capacity	Reliability	Scheduling	Reservations	Pet area	Fares	Other		Open deck	Amenities	Capacity	Reliability	Scheduling	Reservations	Pets	Fares	Other	
1										1			1	1						
2		1					1	1												
3										1			1							
4										1		1								
5										1										
6		1																		
7		1		1														1		
8			1		1	1														
9																				1
10																				
11					1															
12			1																	
13		1	1		1				1											
14										1	1		1	1					1	
15		1						1												
16	1	1	1		1															
17			1			1														
18																			1	1
19		1	1			1														1
20		1			1														1	1
21																				1
22														1						
23			1																	1
24					1															1
25		1	1		1	1														1
26																				1
27																				1
28																				1
29					1														1	1
30																				1
31										1										1
32										1	1		1							1
33										1	1	1	1						1	1
34																	1			
35																				1
36										1			1						1	1
37										1					1					
38										1		1	1							
39		1																		
40							1	1	1											
41	1																			
42		1	1																	
43			1		1															
44										1		1	1							
Total #	2	11	9	1	10	4	3	8	11	13	4	5	8	2	1	1	7	9		

Concerns / comments / suggestions

Damage to cars - people will sue BCFS, 85 AEQ too small
 Pet area (more comfortable seats), covered area in winter, reservation system to show space available, connections via Victoria to Saturna & Pender do not line up (from Vancouver), loading suggestions, lower fares for island residents, food service level should be determined by best impact on fares
 Poor weather concerns, necessity of service for medical appointments
 Poor weather concerns
 Vehicle corrosion
 Full cafeteria on weekends in summer worthwhile
 No gift shop required
 Walk on passengers should be able to make reservations
 Hull design
 as per 9, same concerns from same respondent
 Connection via Victoria
 Booking system for foot passengers, 145 AEQ = ok, but suggest greater # passengers
 Keep food service as is, schedule changes made do not help Gulf Island businesses
 Schedule timing should be changed, too expensive, fresh cooked meals preferred, separate seating for school groups
 Suitable dog area requested
 Prefers "modified like-for-like", level 4 menu, level 2 retail, minimize Village Bay transfers
 Foot passengers access to reservations
 Spend \$ on safety, not carpets and furniture
 Seating configuration, reservations of foot traffic, improve bus connection
 Suggest transfer from Salt spring via Nanaimo to mainland, fares should dictate food level
 New ferries to be less noisy in port
 Berth at Powell River instead of Comox
 Suggest different size vessels (Route 9 195 AEQ, Relief vessel 100AEQ) addresses other routes, highlights LNG drawbacks
 Poor connections to Vancouver, inconvenient from Salt spring
 Foot passengers access to reservations, level 4 food service
 Waste of money holding public consultation meetings
 Believes only BC shipyards should build the new vessels
 Believes only BC shipyards should build the new vessels
 Remove Route 9, suggests improving other connections instead
 Tsawwassen terminal berthing comment
 Salt water damage
 Level 2 food adequate especially if it saves money, safety in bad weather - fewer cancellations, LNG if cheaper, build boat wherever cheapest
 Level 4 food service suggested but with no fare increase, free wifi, debit transactions, asbestos concerns, pro LNG for cheaper operating costs
 Suggests dog area with shelter, place to tie up and separate dogs who do not get on with each other
 Capex unnecessary, fares are too high
 Cruise ship unnecessary
 Reservation system required, no salt spray, reliability important due to medical appointments
 Concern over spray reducing reliability
 Appropriate provisioning for pets (heating & comfortable seating for owners), seating configuration, wifi, pro LNG
 Berth at Powell River instead of Comox, double berth at Powell River
 Salt water spray on cars
 Level 4 cafeteria, level 3 retail ok, shoulder season capacity concerns, prefer 800 passengers for Nanaimo replacement
 Suggest large ship Tsawwassen to Mayne, smaller vessel hub and spoke service thereafter
 Open deck concerns about reliability of service, dependence on ferry for medical appointments

Summary of frequency of public comments to BCFS by category in response to BCFS' public consultation document

By number

Responses to BCFS

	Open deck	Amenities	Capacity	Reliability	Scheduling	Reservations	Pet area	Fares	Other	
Route 9	2	11	9	1	10	4	3	8	11	
Route 17	13	4	5	8	2	1	1	7	9	
Total #	15	15	14	9	12	5	4	15	20	109

By percentage

Responses to BCFS

	Open deck	Amenities	Capacity	Reliability	Scheduling	Reservations	Pet area	Fares	Other	
Route 9	2%	10%	8%	1%	9%	4%	3%	7%	10%	
Route 17	12%	4%	5%	7%	2%	1%	1%	6%	8%	
Total #	14%	14%	13%	8%	11%	5%	4%	14%	18%	