BRITISH COLUMBIA
FERRY COMMISSION

ORDER
NUMBER: 05-01

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IN THE MATTER OF
Statute of British Columbia Bill 18 – 2003, The Coastal Ferry Act and
Determination of the Calculation and Comparison of Average Ferry Fares and Price Caps

BEFORE: Martin Crilly, Commissioner on February 9, 2005

O R D E R

WHEREAS:

A. Section 38 (2) of the Act requires the commissioner to determine quarterly, for each route group, whether the **average fare charged by a ferry operator** is within a **price cap**;
B. section 39 states that, for the first performance term, each route group's **price cap** is equal to its average fare at April l, 2003; and that the cap will increase each November 1 by 2.8% (for the major route group) or 4.4% (for all other route groups);
C. in the event that an operator's average fare is not within the cap over any four consecutive quarters, section 48 indicates the actions required of the operator to bring about **compliance by the operator**;
D. to implement the above sections of the Act requires a **detailed determination** of how average fares and price caps will be calculated, compared and reported; and
E. such a determination requires interpretations of the meaning of terms and of the Act's intent;

NOW THEREFORE the Commissioner orders as follows:

Ferry operators should (a) **calculate and compare** average fares and price caps quarterly, for each route group, in a manner consistent with the attached **Determination** and (b) **provide** the comparison to the Commissioner within 60 days of the end of each quarter in a format indicated in the Determination.

DATED in Comox, in the Province of British Columbia, this ninth day of February 2004

BY ORDER

M L Crilly

Martin Crilly
British Columbia Ferries Commissioner

Determination

of Procedure for Calculation and Comparison of Average Ferry Fares and Price Caps

Martin Crilly
BC Ferries Commissioner
February 2005

CONTENTS

1 Introduction

Purpose of this Document

Under the Coastal Ferry Act, the Commissioner is to regulate ferry fares using an approach known as price cap regulation.

The Act states that the Commissioner is to:

- 38(a).... review the quarterly reports and annual reports of the ferry operator ... to determine whether...the weighted average of the tariffs charged in relation to the core ferry services applicable to each route group serviced by the ferry operator is within the price cap established for that route group.

The price cap for the first performance term is the average of the tariffs payable as at April 1, 2003 and the cap is, on each November 1, to increase (i) by 2.8% for the major route group, (ii) by 4.4% for all other groups.

The commissioner intends that *ferry operators will be responsible for collecting data, measuring their own average fare levels and comparing them with price caps, subject to audit and inspection by the Commission, using methods and formats specified by the Commission*.

The purpose of this document, therefore, is to detail the methods and formats which a ferry operator should use to calculate, compare and report average ferry fares and price caps. The use of these methods and formats will permit:

- **the commissioner** to determine whether or not the ferry operator is in compliance with the Act, and whether enforcement actions are called for;
- **ferry customers** to know whether they are being charged fares within the legal limits; and
- **ferry operators** to evaluate alternative service offerings and associated tariffs in order to make maximum use of their pricing freedoms.

This *Determination* was written by the Commissioner after discussions with BC Ferries management in 2003 and 2004. It draws heavily on background material developed with the assistance of InterVISTAS Consulting Inc. and with technical input and commentary from BC Ferry Services Inc.

Outline of this document

The Determination begins by reviewing the relevant clauses in the Act, and defines terms used. It identifies certain complications due to unavailability and aggregation of source data.

In section 2 the document goes on to examine and review key principles and interpretations of the Act.

It then lays out, in a technical section 3, a 9-step method for calculating average ferry fares and price caps by route group, with calculations using illustrative data.

Section 4 explains how to determine if the ferry operator is on- or off-side, i.e. whether the actual average fares are within the price caps.

Section 5 then indicates a format for publishing the comparison between average fares and price caps.

Terms Defined

Terms used in this document have the following meanings:

"Operator" means any ferry operator regulated by the BC Ferry Commission, as defined by the Act. British Columbia Ferry Services Inc (BC Ferries) is presently the only ferry operator regulated by the Commission.

The "**tariff**" for a route comprises a list of "fares". A typical tariff contains 20 to 60 fares, giving different dollar charges for marine transport of different types of traffic. Typically, fares for a type of traffic change by day of week (weekend vs. midweek) and time of year (high, low and shoulder season).

A "**fare**" is the price charged to move one "**unit**", typically a vehicle or a passenger of a specific traffic "**type**" (of which there are some 14, see box at left) on a **route**.

Note that on some routes, a two-way fare is charged which covers a return trip, though traffic units are stated in terms of one-way trips. For some traffic types, e.g. commercial trucks and buses, the appropriate unit may be vehicle length (in feet) where the fare is expressed as a per-foot charge.

A "**yield**" over a period of time (e.g. a quarter-year) is an average "dollars per unit" figure computed for a group of traffic types. For instance, a passenger yield for a given quarter is computed by taking the revenue in that quarter from passengers of all types (i.e. adults and children, whether at peak, off-peak, mid-week or weekend fares) and dividing by the total number of units carried (e.g. total number of all those passengers travelling in the quarter). Mathematically, the resulting yield is identical to a weighted average fare for the group of traffic types where the basis of weighting is the units carried of each type.

BC Ferries Traffic Types for a typical route

- driver/ passenger,
- child, ages 5-11
- under-height[1] vehicle under 20 ft[2] long,
- overheight vehicle (including light trucks and campers up to 20 ft long)
- bus per foot length
- motor cycle
- motor cycle group rate
- motor cycle with sidecar and/or trailer
- as above (group rate)
- kayak, canoe
- bicycle
- truck over 5500kg GVW (per foot charge), up to 9 ft wide
- prepaid books of tickets (e.g. 10) for each of adult, car, motorcycle
- assured loading tickets (car and driver) books of 10

[1] i.e. 7 feet high or under

[2] with extra per-foot charges in excess of 20 feet

A Coastal Ferry Services Contract (CFSC) was signed by the Province of B.C. and BC Ferries on April 1 2003. It designates 25 ferry routes to be regulated by the Commission, divided into seven **route groups**. Some groups contain only one route (e.g. Route 3 - Langdale-Horseshoe Bay). The group with the largest number of routes is the "minor" route group with 16 routes.

Data Limitations

At time of writing, BC Ferries records onboard the number of units carried of each traffic type, i.e. the number of passengers, kayaks, motor cycles with sidecar, etc, for any given sailing. This is not the case for BC Ferries revenue, which is aggregated at the tollbooth into fewer categories. After discussions with the company, it was decided to group revenues into only four categories:

- passengers
- cars
- buses and
- trucks.

For instance, revenue from adults and children, whether at full fare or in discounted prepaid ticket books, fall into the **passenger** category. Bicycle and motorcycle revenue fall into the **car** revenue category. Light truck and camper revenues are also classed as **car** revenues.

The revenues in these four categories cannot readily be disaggregated into traffic types. Accordingly, average fares are not calculated for each of the 14 traffic types. Instead, the average fare can only be computed for each of the **four**[3] **revenue categories**. BC Ferries may elect to approach the Commission for authorization to increase the number of revenue categories used in the calculation of weighted average fares, as and when its data collection system supports greater disaggregation. The Commission will then specify how the resulting new measurement of average fare levels should be married to, or reconciled with, the old measurement using fewer categories.

Allocation and Unbundling Issues

The Commission is tasked to regulate only marine transportation charges (ferry fares) for each route group. Therefore, any package pricing which bundles a ferry fare with another fare in another route group, or with a non-regulated service (e.g. accommodation) creates complications for measuring fares.

The tariff structure already includes some combined fares which cover two different outputs, e.g.:

[3] The background work for this document suggests that it may be in BC Ferries' interest to invest in the company's data collection system. A larger number of revenue categories, each with its own market behaviour, would refine both the measurement system not only from the viewpoint of the Commission, but also improve BC Ferries' ability to make maximum use of the pricing freedoms under the price cap regulation system.

- assured loading tickets combine car and driver
- the circle trip package combines three route groups
- the 4- and 7-day SailPass offering covers journeys made in four groups.

Further, there may be a trend towards offering a package price for marine transport plus ancillary services and products (e.g. sail + car rental, sail + dinner, or sail + reservation + meal + berth + tour) as BC Ferries partners with other suppliers.

Today in practice, the "unbundling" corrections needed for satisfactorily accurate measurement of average fares appear to be minor. Prorating a package price between ferry-fare and other components should, for the time being, be done in proportion to the published "rack rate" for individual components.

As the tariff and service structures become more complex, certain additional unbundling and other rules may be needed—unless the impact on the price level can be shown to be negligible.

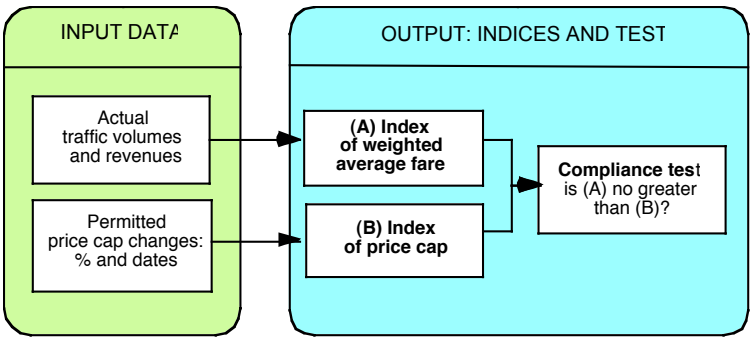
It will be the responsibility of BC Ferries to make explicit its unbundling rules for offerings which combine travel on different route groups and/or ferry travel with ancillary products and services. It will also be the company's responsibility to apply the unbundling rules consistently across traffic types, across routes, and over time.

2 Key Determinations

The diagram below summarizes the approach for measuring and comparing average fares and price caps. It combines actual traffic volumes and revenues to generate an index of average fares actually paid by ferry users, computed at the end of each quarter year. This is compared with an index of the price cap, derived from the permitted percentage changes set by the Act and by the Commission, also computed quarterly. If the former index does not exceed the latter, the ferry operator is in compliance[4].

This section 2 discusses several issues in the computation and makes key determinations for the principles to be used in computing and comparing the indices. Key determinations are shown *in italics*.

A more technical Section 3 following gives details of the intermediate calculations.



Actual quarterly revenues and quarterly traffic are to be used

The fares that users actually pay, not those in the published tariff, should be measured for price cap regulation.

A ferry operator may publish a "rack rate" tariff for its services, but these are not necessarily the charges that each user actually pays. The

[4] There is a grace period in the Act whereby the average of the actual tariffs can exceed the cap for 4 consecutive quarters without consequence to the ferry operator, but if the excess continues into a fifth quarter such that the average of the second, third fourth and fifth quarters exceeds the cap, then the Commissioner can make an order (e.g. to reduce prices). The application of this provision is discussed in Section 4.

operator may offer special discounts or apply premiums to the published tariff. Accordingly, the actual revenue earned by a route is generally not equal to the traffic units multiplied by the published rate.

*The **actual ferry fare** for a traffic type on a specific route* (in a specific period of time) *is computed by taking the **actual revenues** divided by **actual traffic units** carried in that period*. As discussed in section 1, this produces a dollars-per-unit-carried measure (commonly called the **yield**) of that type of traffic on that route during that period

Since the Act calls for quarterly reporting*, yields should be calculated each fiscal quarter*. The values will be attached to the end of each quarter.

General Discussion of Weighting

The Act implies that (in a given quarter) there should be a single measure of the average fare in that route group. *Since there are currently seven route groups defined in the Coastal Ferry Services Contract, there will be seven such fare measures* (in each quarter). There will also be seven price caps to compare them with.

There are different yields for different traffic types within a route, and a route group may contain several routes. Therefore, to produce a single measure per route group, a method is needed to combine yield figures together.

This implies a weighting scheme to produce an overall average yield.

Consistent with regulatory practice elsewhere *when averaging yields, or growth rates in yields, as appropriate, across traffic types and across routes within a route group*, *yields or growth rates will be revenue-weighted*.

Seasonality to be addressed through four-quarter moving totals

Ferry traffic is highly seasonal, with summer volumes typically 2.5 times winter traffic volumes.

Traffic mix and fares also vary by season. BC Ferries' major routes (group 1) and the Sunshine Coast (group 2) currently have three tariff seasons (peak, shoulder, low) and other route groups have two (peak and low). On major routes, there is a weekend/weekday fare differential. While sailing frequencies/capacities are adjusted somewhat to the seasons, vessel utilization is substantially lower in the off-peak season.

The price cap regulatory system should accommodate seasonality. There is no intent to penalize operators for higher /lower seasonal fares and market conditions. The approach should:

- encourage seasonal pricing and efficient responses to the seasonally changing market; and
- not restrain the operator from adjusting the seasonal structure of its tariff (e.g. adjusting effective dates of seasonal pricing).

Four-quarter moving averages and moving totals will be used to help deal with seasonality.

Index of weighted average fare to be calculated: starting date

As a measure of ferry fares in a route group, *an index of yield (to be called the average fare index) will be computed*. There was no increase in

fares in calendar 2003, so that a clear four-quarter period without the complication of a tariff increase in those quarters is available.

Price cap also weighted

The Act says the price cap is the "average of the tariffs payable as at April, 2003". It is taken that:

- the Act does not intend taking the published tariff in effect at April 1 2003 for traffic carried on April 1 (comprising a dozen or more fares for each route group) and taking a simple average.
- the relevant base fares are those published in the tariff in effect in April 2003, which is the Tariff in a BC Ferry Corporation publication dated December 2002, with the exception of the Northern Routes whose fares are published one year in advance of others.
- the Act intends that the price cap be produced from a "weighted average within a route group", as the Act refers elsewhere to weighting: to compute the price cap unweighted would make comparisons with weighted measures meaningless.

Index of Price Cap to be calculated

Price cap regulation requires actual fare levels to be compared with price caps; and since the former is calculated as an index as determined above, the latter must be also. Accordingly, *the price cap for each route group will be expressed as an index*.

In the first performance term, the price cap is to be set initially at the level of actual fares when the Coastal Ferry Act came into effect. *This will be defined to have a value of 100.*

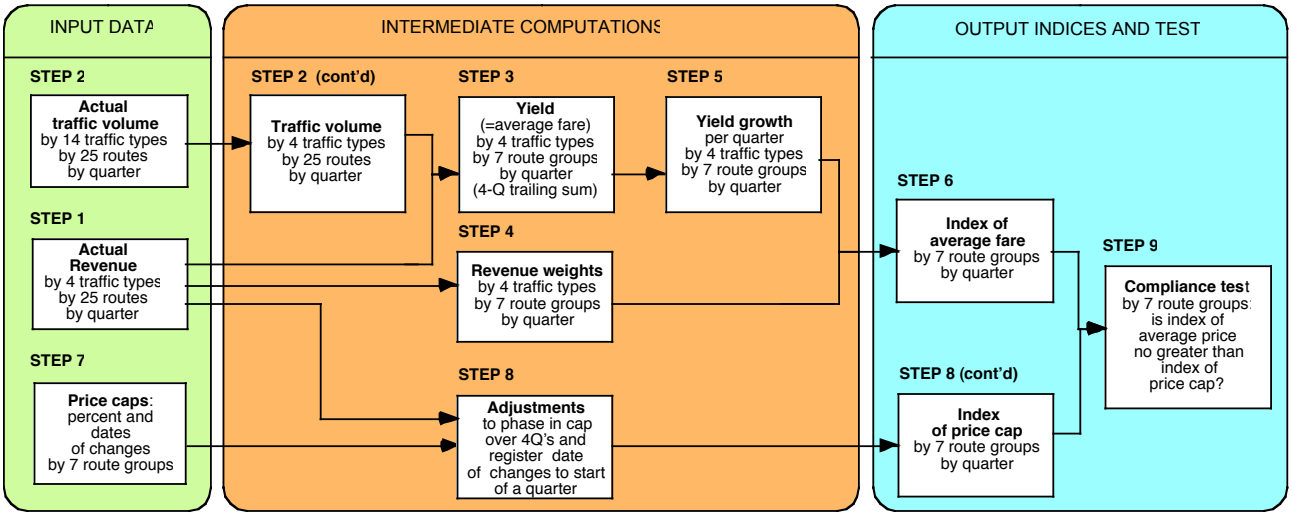
Note that two technical adjustments, detailed in section 3 following, are required in order to recognize that:

- yields are calculated as a 4-quarter moving average, so *the changes in the price cap must be phased in over four quarters* for a valid comparison; and
- the Act states that the price cap will increase by a specified percentage each November 1 in the first performance term. This is part way through a calendar quarter. *An adjustment is needed to properly register the price cap increase applicable at the measuring point, which is the end of each quarter*.

3 Nine-Step Calculation

This section provides a detailed prescription for the steps required to test whether fares are compliant with the Act.

The flow chart below provides an overview of the method. The step numbers on each box key to the spreadsheets at the end of this section.



From BC Ferries data collection system, obtain tollbooth revenue by 4 traffic types for each of 25 routes by quarter. Unbundle fares that are joint among route groups, and packages that combine ferry fares and ancillary services and products, making unbundling rules explicit. For each traffic type, add revenues for each route within a given route group. Compute 4-quarter trailing revenue totals by 4 traffic types, for every quarter. Do this for the seven route groups.

A problem concerning the initial quarters of data

An initialization problem occurs in the early quarters of the period of interest. The first quarter for which a 4-quarter total is needed is FY2003/4 Q1, the first quarter under the new legislation. Normally this would mean using source data for the four quarters leading up to and including it, i.e. quarters FY2002/3 Q2 though FY2003/4 Q1. A difficulty arises because a general fare increase occurred in December 2002 in the middle of this 4-quarter period. The legislation intends that the fares after this increase, not

before, are the base from which price measurement begins. Yet the 4-quarter trailing revenue would capture the pre-December 2002 increase data in the 4-quarter totals for FY2003/4 Q1, and Q2.

The solution is to replace calendar 2002 quarterly data with data from the corresponding quarters in 2003 for the purposes of calculating the initial 4-quarter totals. Since there was no fare increase in calendar 2003, this provides a base consistent with the Act's intent and is unaffected by the lower fares pre-December 2002[5]. The process applies both to revenue data and traffic volume data, and is illustrated in the TABLE A below.

					FY2003/4			
	Base Q1	**Base Q2**	**Base Q3**	FY'03 Q4	FY'04 Q1	FY'04 Q2	FY'04 Q3	FY'04 Q4
					First Performance Period --->			
step 1: Actual Revenue by traffic type								
Route group actual revenues by quarter ($000)								
passengers	$ 1,979	$ 2,856	$ 1,689	$ 1,575	$ 1,979	$ 2,856	$ 1,689	$ 1,605
cars	$ 2,942	$ 4,263	$ 2,401	$ 2,166	$ 2,942	$ 4,263	$ 2,401	$ 2,201
buses	$ 26	$ 31	$ 12	$ 17	$ 26	$ 31	$ 12	$ 17
trucks	$ 623	$ 641	$ 540	$ 517	$ 623	$ 641	$ 540	$ 533
total revenue	$ 5,569	$ 7,791	$ 4,641	$ 4,275	$ 5,569	$ 7,791	$ 4,641	$ 4,357
4 quarter trailing revenue				$ 22,277	$ 2[illegible]	$ 2[illegible]	$ 2[illegible]	$ 22,358
four quarter trailing revenues by traffic type ($000)								
passengers				$ [illegible]	$ [illegible]	$ [illegible]	$ 8,099	$ 8,129
cars				$ 11,772	$ 11,772	$ 11,772	$ 11,772	$ 11,807
buses				$ 85	$ 85	$ 85	$ 85	$ 86
trucks				$ 2,321	$ 2,321	$ 2,321	$ 2,321	$ 2,337
step 2: Actual Traffic Volumes Traffic for quarter by type by quarter (000 units)								
passengers	627	881	543	493	627	881	543	485
cars	255	334	231	211	255	334	231	207
buses	1	1	0	1	1	1	0	7
trucks	10	10	8	8	10	10	8	8
Traffic volumes, four quarter trailing totals (000 units)								
passengers				2,545	[illegible]	[illegible]	[illegible]	2,536
cars				1,031	[illegible]	[illegible]	[illegible]	1,027
buses				[illegible]	[illegible]	[illegible]	3	9
trucks				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Step 2 Actual Traffic Volumes

From BC Ferries data collection system, obtain traffic units by quarter for 4 traffic types, by 25 routes. Add traffic units for each traffic type for each route group. Compute 4-quarter trailing volume totals within a given route group, by 4 traffic types, for every quarter. Do this for the seven route groups.

[5] Except for Route 12 Brentwood Bay-Mill Bay. This route shuts down sporadically for vessel re-fits, producing wide annual and seasonal swings—including for the base data set above for all other routes, making the above base data unsuitable. See Appendix A to this Determination for a resolution.

Adopt the same alternative as for Step 1 for the initial 4-quarter totals by replacing calendar 2002 quarterly data with that from the corresponding quarters in 2003.

Step 3 Yields by traffic type

Divide the 4-quarter total revenue data from Step 1 by the corresponding traffic volume data in Step 2. This produces the trailing 4-quarter yield (=average fare) by 4 traffic types by 7 route groups, for every quarter. See TABLE B and C following for annotated spreadsheets on this and remaining steps.

Step 4 Revenue Weights for Price Index

Weights to combine yield data for the four traffic types will be needed to produce a price index combining all traffic types in a later Step 7 (they will also be needed in a special adjustment in a later Step 8). The weighting is by revenue share of each traffic type. For each route group, for each quarter, produce a revenue share for each of the 4 traffic types, using the 4-quarter trailing revenue total from step 1.

Step 5 Growth rates of individual yields

Computing the price index requires percentage growth rates for the yield of each traffic type to be computed before they are combined using the weights from the previous step. To obtain the yield (4-Q trailing) growth of each traffic type, compute the "this-quarter-to-preceding-quarter" ratio of the yield data from Step 3. To put it another way, individual yield growth rates are computed as ratios of this quarter's four-quarter-trailing-sum with last quarter's four-quarter-trailing-sum.

Step 6 Direct Price Index

This step weights and adds the growth ratios of Step 5. Take the initial value of the price index at quarter 4 of FY02/03 as 100. This, by definition, is the value of the index at the start of the first day of the Coastal Ferry Act.

To compute the value of the price index at the end of the next quarter, add to the last value of the index the weighted growth ratio. The weighted growth ratio is the result of adding the four individual growth ratios from Step 5, each first multiplied by their revenue weight from Step 4.

Step 6a Quantity Index

An index of the total amount of traffic carried (called a quantity index) is not required for price cap regulation in the first performance period. However, it is expected to be a useful measure for use during the price cap review to be undertaken by the Commission in the years 2006-2008. It can be conveniently computed and recorded here.

The quantity index is constructed by dividing total revenues by the yield index. This produces a large value because the price index is set at 100 in its base quarter. Accordingly, the quantity index is re-based at 100 in the base quarter.

Step 7 Price cap changes and timing

At this step, the price cap changes for each route group, expressed in percentage changes, along with their effective dates, are recorded. These changes are either specified in the Coastal Ferry Act, or ordered by the Commissioner.

A complication arises when the effective date does not coincide with the end of a quarter. In fact, this occurs with the legislated maximum increases of 2.8% (major route group) or 4.4% (others) in the first performance term, which are scheduled for November 1 of each year. In this step, the effective

TABLE B	Calendar 2003				Calendar 2004				2005
Using Sample Input Data		FY2003/4				FY2004/5			
	FY'03 Q4	FY'04 Q1	FY'04 Q2	FY'04 Q3	FY'04 Q4	FY'05 Q1	FY'05 Q2	FY'05 Q3	FY'05 Q4
		First Performance Period --->							
step 1: Actual Revenue by traffic type									
Route group actual revenues by quarter ($000)									
passengers	$ 1,575	$ 1,979	$ 2,856	$ 1,689	$ 1,605	$ 2,076	$ 2,878	$ 1,834	$ 1,663
cars	$ 2,166	$ 2,942	$ 4,263	$ 2,401	$ 2,201	$ 3,285	$ 4,470	$ 2,700	$ 2,357
buses	$ 17	$ 26	$ 31	$ 12	$ 17	$ 29	$ 35	$ 13	$ 18
trucks	$ 517	$ 623	$ 641	$ 540	$ 533	$ 685	$ 664	$ 631	$ 570
total revenue	$ 4,275	$ 5,569	$ 7,791	$ 4,641	$ 4,357	$ 6,075	$ 8,048	$ 5,178	$ 4,607
4 quarter trailing revenue	$ 22,277	$ 22,277	$ 22,277	$ 22,277	$ 22,358	$ 22,864	$ 23,121	$23,658	$ 23,909
four quarter trailing revenues by traffic type ($000)									
passengers	$ 8,099	$ 8,099	$ 8,099	$ 8,099	$ 8,129	$ 8,226	$ 8,248	$ 8,393	$ 8,451
cars	$ 11,772	$ 11,772	$ 11,772	$ 11,772	$ 11,807	$ 12,150	$ 12,357	$12,656	$ 12,812
buses	$ 85	$ 85	$ 85	$ 85	$ 86	$ 88	$ 93	$ 94	$ 95
trucks	$ 2,321	$ 2,321	$ 2,321	$ 2,321	$ 2,337	$ 2,400	$ 2,423	$ 2,514	$ 2,550
step 2: Actual Traffic Volumes Traffic for quarter by type by quarter (000 units)									
passengers	493	627	881	543	485	642	869	566	490
cars	211	255	334	231	207	271	334	242	210
buses	0.553	0.781	0.886	0.459	0.696	0.808	0.920	0.566	0.550
trucks	8.160	9.614	9.713	7.945	7.644	9.809	9.841	9.015	8.209
Traffic volumes, four quarter trailing totals (000 units)									
passengers	2,545	2,545	2,545	2,545	2,536	2,551	2,538	2,561	2,567
cars	1,031	1,031	1,031	1,031	1,027	1,043	1,043	1,054	1,057
buses	2.68	2.68	2.68	2.68	2.82	2.85	2.88	2.99	2.84
trucks	35.43	35.43	35.43	35.43	34.92	35.11	35.24	36.31	36.87
step 3: Yields by traffic type method: 4 quarter revenue divided by 4 quarter traffic									
passengers	$ 3.18	$ 3.18	$ 3.18	$ 3.18	$ 3.21	$ 3.22	$ 3.25	$ 3.28	$ 3.29
cars	$ 11.42	$ 11.42	$ 11.42	$ 11.42	$ 11.50	$ 11.65	$ 11.85	$ 12.01	$ 12.12
buses	$ 31.73	$ 31.73	$ 31.73	$ 31.73	$ 30.34	$ 30.91	$ 32.24	$ 31.55	$ 33.37
trucks	$ 65.51	$ 65.51	$ 65.51	$ 65.51	$ 66.93	$ 68.35	$ 68.75	$ 69.25	$ 69.17
step 4: Revenue Weights for Price Index method: current 4 quarter revenue (Paasche)									
Weights for use in creating price index									
passengers	0.364	0.364	0.364	0.364	0.364	0.360	0.357	0.355	0.353
cars	0.528	0.528	0.528	0.528	0.528	0.531	0.534	0.535	0.536
buses	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
trucks	0.104	0.104	0.104	0.104	0.105	0.105	0.105	0.106	0.107
sum	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
step 5: Growth rates of individual yields method: trailing 4 quarter growth ratios									
passengers		0.0000	0.000	0.0000	0.0071	0.006	0.008	0.009	0.005
cars		0.0000	0.000	0.000	0.006	0.013	0.017	0.013	0.009
buses		0.0000	0.000	0.000	-0.044	0.019	0.043	-0.021	0.058
trucks		0.0000	0.000	0.000	0.022	0.021	0.006	0.007	-0.001
step 6: Direct Index of Yield method: weighted 4Q trailing growth rates									
Average fare index	**100.00**	**100.00**	**100.00**	**100.00**	**100.81**	**101.96**	**103.27**	**104.38**	**105.08**
step 6A: Quantity Index method: revenue divided by price this is not required for price cap compliance: it is provided to show what happens to aggregate output									
revenue based quantity index	22,277	22,277	22,277	22,277	22,178	22,424	22,388	22,666	22,752
Quantity Index	100.00	100.000	100.000	100.000	99.557	100.66	100.50	101.75	102.13
step 7: Price cap percentage changes and dates as given in the Act or ordered by the Commssion									
allowed increase in quarter	**0**			0.044				0.044	
increase relevant to this Q	0	0	0	0.044	0.044	0.044	0.044	0.044	0.044
effective date of increase				Nov 1 2003				Nov 1 2004	
portion of quarter's revenue after this date				0.618				0.618	
step 8: Price cap quarterly phase-in based on quarterly revenues									
price cap increase?		No	No	Yes	No	No	No	Yes	No
quarterly revenue weight	0.19	0.25	0.35	0.21	0.19	0.25	0.35	0.21	0.19
portion of rev wt to be applied this quarter		0.25	0.35	0.13	0.19	0.25	0.35	0.13	0.19
current lift factor		1.000	1.000	1.006	1.008	1.011	1.015	1.006	1.008
residual from last year?		No	No	No	No	No	No	Yes	No
resid. portion of rev wt to add to 1		0.000	0.000	0.000	0.000	0.000	0.000	0.082	0.000
residual lift factor		1.000	1.000	1.000	1.000	1.000	1.000	1.004	1.000
net lift factor		1.000	1.000	1.006	1.008	1.011	1.015	1.009	1.008
Price cap index value	**100.00**	**100.00**	**100.00**	**100.56**	**101.39**	**102.48**	**104.03**	**104.98**	**105.86**
step 9: Compliance test									
Avg. Fare index from above	100.00	100.00	100.00	100.00	100.81	101.96	103.27	104.38	105.08
Price Cap index from above	100.00	100.00	100.00	100.56	101.39	102.48	104.03	104.98	105.86
Cumulative Price Cap Gap		0.0	0.0	0.6	0.6	0.5	0.8	0.6	0.8

	A		L
2	*TABLE C*		
3			
4			FY'05 Q3
6			
8	***step 1: Actual Revenue by traffic type***		
9	*Route group actual revenues by quarter ($000)*		
10		passengers	1834.16739904229
11		cars	2699.9837980079
12		buses	13.112466316391
13		trucks	631.170429912938
14		total revenue	=SUM(L10:L13)
15		4 quarter trailing revenue	=SUM(I14:L14)
18	*four quarter trailing revenues by traffic type ($000)*		
19		passengers	=SUM(I10:L10)
20		cars	=SUM(I11:L11)
21		buses	=SUM(I12:L12)
22		trucks	=SUM(I13:L13)
24	***step 2: Actual Traffic Volumes*** Traffic for quarter by type by quarter (000 units)		
26		passengers	565.616411078084
27		cars	242.168930286459
28		buses	0.565736349634525
29		trucks	9.014527215818
30	*Traffic volumes, four quarter trailing totals (000 units)*		
31		passengers	=SUM(I26:L26)
32		cars	=SUM(I27:L27)
33		buses	=SUM(I28:L28)
34		trucks	=SUM(I29:L29)
36	***step 3: Yields by traffic type*** method: 4 quarter revenue divided by 4 quarter traffic		
38		passengers	=L19/L31
39		cars	=L20/L32
40		buses	=L21/L33
41		trucks	=L22/L34
43	***step 4: Revenue Weights for Price Index*** method: current 4 quarter revenue (Paasche)		
44	***Weights for use in creating price index***		
46		passengers	=L19/L$15
47		cars	=L20/L$15
48		buses	=L21/L$15
49		trucks	=L22/L$15
50		*sum*	*=SUM(L46:L49)*
52	***step 5: Growth rates of individual yields*** method: trailing 4 quarter growth ratios		
53			
54		passengers	=(L38/K38)-1
55		cars	=(L39/K39)-1
56		buses	=(L40/K40)-1
57		trucks	=(L41/K41)-1
59	***step 6: Direct Index of Yield*** method: weighted 4Q trailing growth rates		
61		***Average fare index***	=K61*(1 + (L54*L46) + (L55*L47) +(L56*L48) +(L57*L49))
63	***step 6A: Quantity Index*** method: revenue divided by price this is not required for price cap compliance: it is provided to show what happens to aggregate output		
67	revenue based quantity index		=E61*SUM(I14:L14)/L61
68		Quantity Index	=K68*(L67/K67)
70	***step 7: Price cap percentage changes and dates*** as given in the Act or ordered by the Commssion		
71		allowed increase in quarter	0.044
72		increase relevant to this Q	=IF(ISBLANK(L71),K72,L71)
73		effective date of increase	Nov 1 2004
74	portion of quarter's revenue after this date		0.618
76	***step 8: Price cap quarterly phase-in based on quarterly revenues***		
77		price cap increase?	=IF(ISNUMBER(L74),"Yes","No")
78		quarterly revenue weight	=H14/SUM($F14:$I14)
79	portion of rev wt to be applied this quarter		=L78*IF(ISNUMBER(L74),L74,1)
83		current lift factor	=(1+L72)^L79
84		residual from last year?	=IF(ISNUMBER(H74),"Yes","No")
85	resid. portion of rev wt to add to 1		=IF(L84="Yes",1-SUM(H79:K79),0)
86		residual lift factor	=(1+H71)^L85
87		net lift factor	=L86*L83
89		***Price cap index value***	***=K89*L87***
94	***step 9: Compliance test***		
95		Avg. Fare index from above	=L61
96		Price Cap index from above	=L89
97	Cumulative Price Cap Gap		=L96-L95

date of the price cap change is recorded. For the quarter in which this occurs, the portion of revenue for that quarter which occurs after the price cap increase is also recorded as new input data. In the sample spreadsheet, it is the November and December share of Q3 revenue for that year, being 0.618. This **portion** will be used in the next step, which adjusts for the fact that the price cap increase did not coincide with the end of a quarter.

Step 8 Price Cap Quarterly Phase-In

The *price cap index is defined as having a value of 100 on April 1, 2003*, (i.e. end of FY 03 Q4) when the Act came into effect. It is then increased quarterly by multiplying by a quarterly-computed **lift factor**.

For comparability, the price cap index at any quarter, like the index of actual fares, must phase in a step increase in the source data (be it yield or cap) over four quarters. This is done in the method for calculating lift factors.

The quarterly phase-in uses the compounding principle. If the price cap is to increase from 100 to say 104.4 over one year, the annual **lift factor** would be 1.044. If this is to be broken into equal quarterly increments, the quarterly lift factor would be 1.044 raised to the fractional power of 0.25. Note that the product of four such quarterly lift factors is 1.044, since 0.25 + 0.25 + 0.25 + 0.25 = 1

However, because the revenues for the quarters are not equal, a **seasonal adjustment** to the phase-in is required. Instead of an equal power of 0.25 applied to the annual lift factor, a more representative result for the quarterly factors is achieved by applying a different power for each quarter (with the powers still adding to 1) each quarter. The approach is to use the revenue share of that quarter in the previous year, meaning a higher proportion of the price cap is phased in for quarters with higher revenue. Again, because the sum of the shares is 1, so is the sum of the exponents. That means that over the year the annual factor is still (in the example) 1.044.

The first line in Step 8 flags whether there is a price cap increase in the particular quarter. The second line computes the **quarter's revenue share within the fiscal year** (using data from Step 1) as an input to the seasonal adjustment of the phase-in.

A **current lift factor** is computed by taking the annual lift factor and applying the quarterly exponent (seasonally adjusted by the revenue shares).

In a quarter where the price cap has increased part way through the quarter (e.g. November 1) the solution is to take only a portion of the (mid-quarter) price cap increase in the current quarter. The **portion** is the same one already recorded in step 7, being the revenue share of November and December as a fraction of the October-December quarter of that year.

Having taken only a portion of a quarterly lift requires the rest of it - the residual - to be taken a year later. If this was not done, the lift factor would not capture the full annual amount (November 1 to the next November 1 in this example) intended by the price cap increase. Accordingly a **residual**

lift factor must be computed to capture (in this example) the October portion in the fourth quarter of the following year.

The current lift factor multiplied by the residual lift factor then produces a **net lift factor**. The price cap index at a quarter is computed by multiplying the last quarter's index value by this quarter's net lift factor, starting, as earlier mentioned, with a price cap index value of 100 at April 1, 2003.

Step 9 Compliance test

The compliance test compares the average fare index from Step 6 to the price cap index of Step 8. If the latter is greater than the former, the ferry operator is in compliance.

4 Offside Determination

Section 48(2) of the Act provides a test as to whether a ferry operator has exceeded the price cap, stating that:

- 48 (1) ... if the average of the tariffs charged in relation to a route group exceeds the price cap for that route group, the commissioner may, subject to subsection (2), order the ferry operator to comply with those requirements...

and it provides a grace period for compliance as follows:

- 48 (2) If the average of the tariffs charged by a ferry operator in relation to a route group over any 4 consecutive quarters exceeds the price cap for that route group, the commissioner must not make an order under subsection (1) in relation to that price cap requirement unless, by the end of the quarter following the 4 consecutive quarters in which the price cap was exceeded, the average of the tariffs charged in relation to the route group over that quarter and the previous 3 quarters exceeds the price cap for that route group.

The test as described in the Act uses an average over four quarters, indicating that the legislature did not want to penalize an operator for seasonal variations which might result in exceeding the cap for a short period. The test uses four quarters of data.

The test also implicitly recognizes that if the ferry operator exceeded the price cap over a four quarter period, it should be given time to adjust. This is reasonable since variations in traffic mix, the effects of rounding tariff changes to the nearest quarter dollar, etc., make it difficult for the operator to know in advance whether it will exceed the cap. If the operator has exceeded the cap for the average of four quarters, it has one additional quarter in which it can rectify the situation. The test is applied a second time, using data for the fifth quarter (along with data for quarters 2 through 4, for a total of four quarters). If the test in the fifth quarter finds the operator continues to exceed the price cap, then the commissioner may make an order under the provisions of section 48(1). This order is one which requires the operator to comply with the price cap. This order may require 'prompt' compliance, or at the discretion of the Commissioner, allow the operator a period of time to achieve compliance.

The Specific Test in This Determination

The specific formulation of the price cap test the Commissioner intends to use, as laid out in the Determination, is one that is computed quarterly, as required by the Act. This test computes the average price charged by the

operator using four quarters of data. This means that it is using four quarters of data, as required by the Act.

What is meant by average?

There is a subtle issue regarding the term *average*. The specific formulation of the test used by the Commissioner takes an *annual average* by using a four-quarter trailing sum. Section 48(2) refers to an average over four quarters. One interpretation is that the legislature intended to compute the average price for each quarter, and then take the simple average of the four quarterly averages. Mathematically, this could be different from the annual average in the Commissioner's specific test. However, if a weighted average of the four quarters were used, it would essentially be the same as an annual average. The legal issue then becomes whether when using the term 'average' the legislature intended 'weighted average' or 'simple average'. The Act does use 'weighted average' in places (e.g., 38(2)(ii)) suggesting that 'average' was intended for a different meaning. On the other hand, the legislature gave the Commissioner some discretionary powers (e.g., 48(1)).

It seems that the drafting of the legislation did not consider subtleties such as the above, and provided the Commissioner with some discretion. It is the Commissioner's view that 'annual average' test is reasonable and most consistent with economic theory.[6] If an operator is found to have exceeded the price cap by a very small amount, less than or equal to the difference from the 'simple average of four quarters', the Commissioner can view that the operator is in reasonable compliance.

Route 40 - a unique case

Route 40 is unique in that there are no operations on this route in two quarters of every year. This raises two issues. The first is how the price cap index should be computed. The specific formulation of the price cap test will freeze the price cap in the two quarters when there are no operations. In the quarters with operations, the price cap index is increased based on the share of revenue of that quarter in the annual total revenue. There is no penalty to the ferry operator in this approach, nor does it create an advantage. It does result in a graph of the price cap index which looks like a step function rather than smooth, but that is also the nature of actual operations on this route.

The second issue arises in interpreting the provisions of Section 48(1), which effectively provides the company one quarter in which to rectify a case where average tariffs exceed the price cap. The Act might be interpreted strictly as requiring the company to make a correction in the following calendar quarter, something that may be impossible as there are no operations. An alternative interpretation favoured by the Commissioner is to allow the company the next quarter with operations in which to make corrections, which is allowed in the discretionary provisions of Section 48(2).

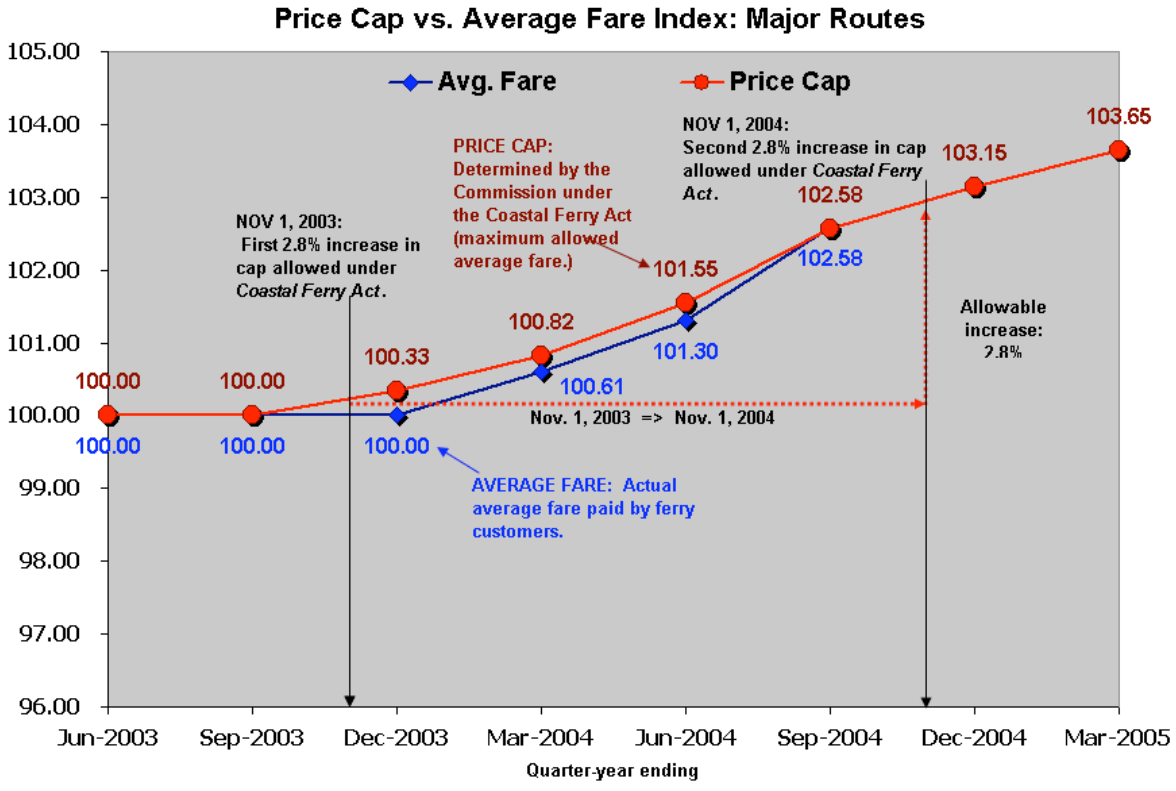
[6] The problem with simple average of four quarters, is that it gives higher weight to the prices paid by traffic units in the off peak quarters. Price indexes generally do not give higher weights to unit prices paid in some months than in other months.

5 Reporting Format

The ferry operator should report the price cap index and the average fare index quarterly, for each route group, quarterly, within 60 days of the end of the quarter, in both numerical table and graphical format.

The numerical table should contain, for each route group, the values of the price cap index and the average fare index, by quarter, starting with the quarter that began on April 1, 2003.

The graph should have a horizontal axis of time and a vertical axis of index value. With one graph for each route group, the graph should trace the history of the price cap index and the average fare index for a minimum of eight quarters.



Appendix: Route 12

Route 12 sees sporadic service. Only the current vessel, MV Mill Bay, can be used for technical reasons. When this ship is unavailable due to refit, the route suspends operation. Because the refits are not regular, varying from year to year, there are problems in defining a "normal" year for base year data. A base year is required to start the computation of 4-quarter moving totals for traffic and revenues, needed in the methodology for computing actual average fare indices.

After analysis of options by BC Ferries, the most practicable solution was selected. Since the ship did not go into refit in FY2003, the data from that year will be used. However, since there was a general fare increase of 3.8% in December 2002, prior to the start of price cap regulation, the revenue for the first three quarters of FY should be computed as if the 3.8% fare increase had occurred April 1, 2002.

This is illustrated in TABLE D overleaf.

TABLE D - Route 12

Using dummy data	FY'03 Q1	FY'03 Q3	FY'03 Q3	Base Q1	Base Q2	Base Q3	FY'03 Q4	FY'04 Q1	FY'04 Q2	FY'04 Q3	FY'04 Q4
							Calendar 2003				
								FY2003/4			
								First Performance Period --->			
step 1: Actual Revenue by traffic type											
Route group actual revenues by quarter ($000)											
passengers	$ 40	$ 100	$ 60	$ 42	$ 104	$ 62	$ 70	$ 45	$ 100	$ 50	$ 65
cars	$ 80	$ 225	$ 120	$ 83	$ 234	$ 125	$ 100	$ 80	$ 220	$ 130	$ 105
buses	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
trucks	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
total revenue	$ 120	$ 325	$ 180	$ 125	$ 337	$ 187	$ 170	$ 125	$ 320	$ 180	$ 170
4 quarter trailing revenue							$ 819	$ 819	$ 802	$ 795	$ 795
four quarter trailing revenues by traffic type ($000)											
passengers							$ 278	$ 281	$ 277	$ 265	$ 260
cars							$ 541	$ 538	$ 525	$ 530	$ 535
buses							$ -	$ -	$ -	$ -	$ -
trucks							$ -	$ -	$ -	$ -	$ -
step 2: Actual Traffic Volumes Traffic for quarter by type by quarter (000 units)											
passengers	20	50	30	20	50	30	25	22	48	28	23
cars	10	20	15	10	20	15	14	12	18	17	15
buses	-	-	-	-	-	-	-	-	-	-	-
trucks	-	-	-	-	-	-	-	-	-	-	-
Traffic volumes, four quarter trailing totals (000 units)											
passengers							125	127	125	123	121
cars							59	61	59	61	62
buses							-	-	-	-	-
trucks							-	-	-	-	-

Revenues grossed up to reflect December 2002 increase of 3.8%