TO: CITY MANAGER 2003 April 23

FROM: DIRECTOR PLANNING AND BUILDING Our File: 88000-20

SUBJECT: **RICHMOND-AIRPORT-VANCOUVER RAPID TRANSIT PROJECT (RAVP)/ NORTHEAST SECTOR RAPID TRANSIT ALTERNATIVES**

PURPOSE: To provide background material and formulate a position in response to Council's request for a staff report on shifting regional transportation priorities.

RECOMMENDATIONS:

1. **THAT** Council request the TransLink Board to undertake a full review of the long term potential impact the RAVP may have on its operating budget and on the regional bus system prior to approving the procurement phase of the RAVP.

2. **THAT** Council request the GVRD and TransLink Boards to:

   a) Hold to the long standing regional priority of completing the construction of the "T"-Line, specifically the remaining Port Moody-Coquitlam (PMC) Line to Coquitlam Centre, prior to approving the bid procurement phase of the Richmond-Airport-Vancouver Rapid Transit Project (RAVP);

   b) Reactivate the GVTA Governance Task Force in order that recommendations can be brought forward to improve coordination between the goals of the GVRD and specific strategic actions of TransLink; and

   c) Renew their commitment to the *Livable Region Strategic Plan* and its cornerstone objectives (protection of the green zone, building complete communities, achieving a compact metropolitan region, and increasing transportation choice) and ensure that major regional transportation decisions be made in the context of and to further the objectives of the *LRSP*.

3. **THAT** copies of this report be forwarded to all other municipal Councils within the GVRD, the TransLink Board of Directors, the GVRD Board of Directors, all Members of the Legislative Assembly within Greater Vancouver, all Members of Parliament within Greater Vancouver, Johnny Carline - CAO and Commissioner of the GVRD, Pat Jacobsen - CEO of TransLink, and Jane Bird - Project Director, RAVP.

REPORT

1.0 BACKGROUND

On 2002 February 27, TransLink officially released over 20 technical reports resulting from 10 months of project team work undertaken from 2002 April to 2003 January as part of the *Project Definition* phase of the Richmond-Airport-Vancouver Rapid Transit Line Project (RAVP). The release of these technical reports signalled the launch of a compressed public consultation program undertaken in the month of 2003 March. It is anticipated that the RAVP project team will be presenting the results of this public consultation program and seeking approval from the TransLink Board to proceed to the procurement phase of the RAVP at a special meeting being targeted for 2003 May 23. It is anticipated that the TransLink Board will be requested to authorize the project team to proceed with the selection of a preferred private sector company and eventual award of the design-build-finance-operate-maintain contract for the RAVP.

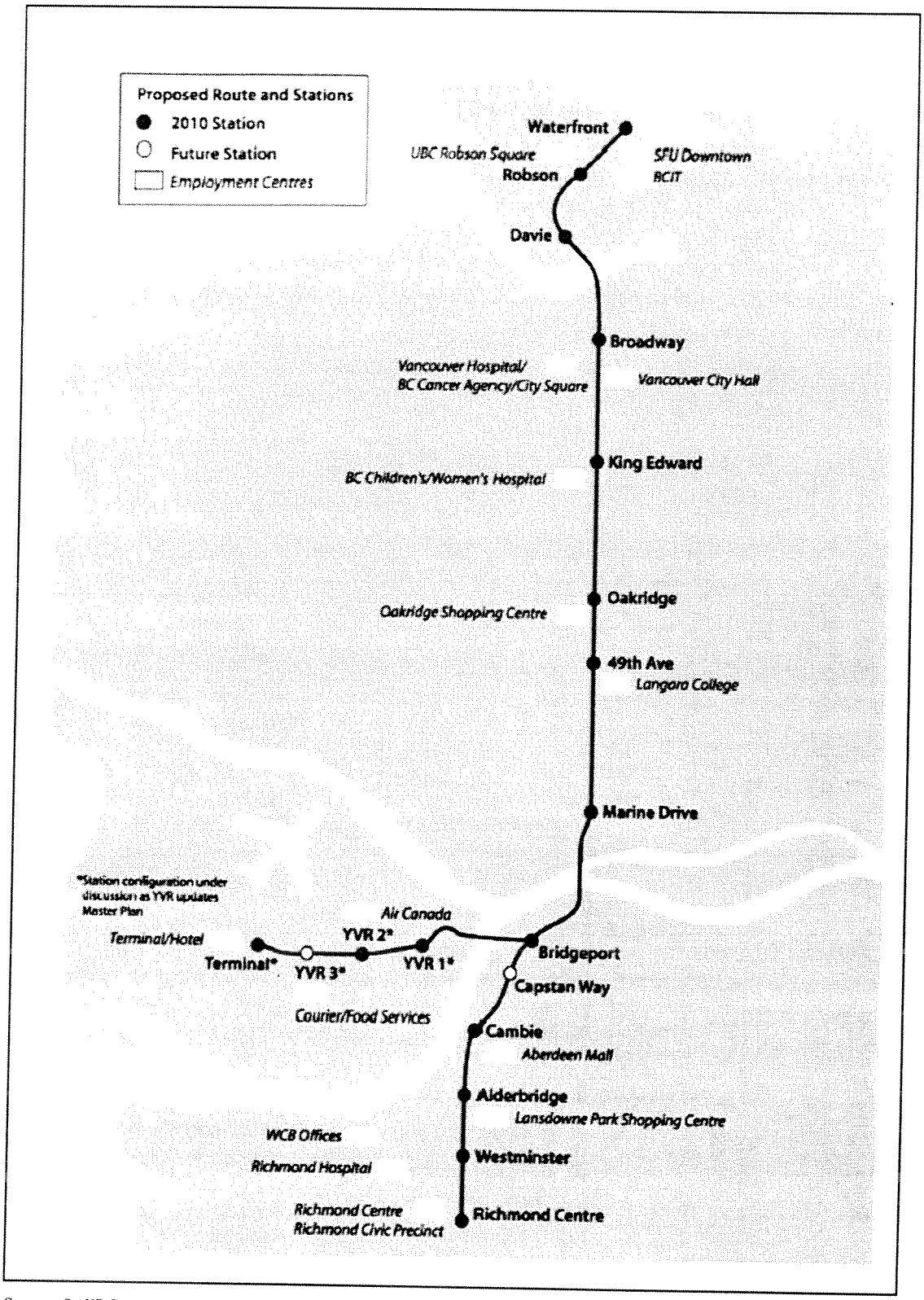
The purpose of this report is to present a critique of the technical reports released for the RAVP, outline the key risks associated with the project as we understand them, and highlight the potential consequences of these risks both in terms of potential impact to TransLink as well as how they may potentially impact the *Liveable Region Strategic Plan (LRSP)*. It should be noted that the analysis contained within this report relies heavily on the facts and figures presented within the compendium of technical material released by the RAVP project. It should be noted that this material excluded the full *Report on Financial Feasibility* prepared by Price Waterhouse Coopers which was not released to the City or the public: but did include only the Executive Summary portion of this report which was available for public review. The intent of this report is to provide comments to the TransLink Board prior to their 2003 May 23 meeting.

2.0 RICHMOND-AIRPORT-VANCOUVER RAPID TRANSIT PROJECT (RAVP)

It is important to note that the project review undertaken for RAVP was not a comparison within a family of different regional projects, but rather a project specific review undertaken in isolation in response to specific criteria as defined by the project team. Therefore, the material produced in support of the RAVP remains silent on the potential *LRSP* implications.

2.1 RAVP Project Description

As shown in **Figure 1**, the RAVP would connect the existing Waterfront Station in the north to Richmond Centre in the south (14.3 km), and the existing YVR Airport terminal to the west (14.9 km). It would follow No. 3 Road in Richmond, Grant McConachie Way on Sea Island, Cambie Street to False Creek, and Davie and Granville Streets in downtown Vancouver.



Source: RAVP Project Definition Report

Figure 1

As an output of the Project Definition Phase, **two rail configurations** have been identified. The Fully Grade Separate option (FGS) would be fully separated from the street (bored tunnel from Waterfront Station to 37th Avenue, cut and cover from 37th Avenue to 49th Avenue, and elevated from 49th Avenue to both Richmond Centre and the domestic terminal at YVR). The Partially Grade Separated option (PGS) would be the same as the previous option with surface sections introduced from Waterfront Station to Nelson Street, 49th Avenue to Marine Drive, and Bridgeport Road to Richmond Centre.

It is proposed that the RAVP will be procured under a **design, build, finance, operate and maintain** (DBFOM) private partnership agreement with a 35 year term. As such, no specific rail technology (eg. SkyTrain) has been selected. Rather, the private companies bidding will be invited to submit solutions that satisfy defined performance criteria (travel time, frequency, reliability, capacity) to a defined number of stations along a specific given alignment. Travel time targets for the two rail configurations are shown in **Figure 2**. The operating plan will be left to the private company which in turn, will be determining whether or not a transfer will be required to reach the airport terminal from the main line (Waterfront to Richmond Centre). It should be noted that the Millennium Line was constructed under a design-build (DB) contract but was turned over to TransLink to operate once the system was constructed.

Figure 2
Performance Criteria - Travel Times

	Waterfront Station to:	
	Richmond Centre (minutes)	Airport Terminal (minutes)
Existing 98-B Line Rapid Bus	42-58	n/a
Rail Options		
Partially Grade Separated (PGS)	32	28
Fully Grade Separated (FGS)	30	25

Capital cost for the selected rail options would be between $1.5 and $1.7 billion, with cost-sharing for the project (totalling $1.75 billion) being suggested as follows:

- $450 million (26%) from Federal government
- $400 million (23%) "order of magnitude" from the private sector

- $300 million (17%) from the Provincial government
- $300 million (17%) from the Airport Authority
- $300 million (17%) from TransLink

Both the cost-sharing and the design-build-finance-operate-maintain (DBFOM) approach proposed for the RAVP contrasts with earlier transit projects constructed in the Greater Vancouver region.[1] The primary difference for the approach being proposed for the RAVP is that the private sector operator will need to recover capital cost, profit and risk from the revenue it receives from TransLink for operating the system.

Operating costs have been estimated to be $25 million annually in 2010 for the FGS option and between $29 million and $34 million annually for the PGS option.

2.2 Risk Review of Ridership Assumptions

Although a range of ridership options were developed for the RAVP project, two specific options were presented in the *RAVP Project Definition Report* (one for the FGS option and one for the PGS option). These two options both excluded a western extension of the Millennium Line to Granville, excluded a potential "premium" service to the airport, and excluded cruise ship passengers. As a result, about 95% of the RAVP ridership is forecast to be local ridership (including airport employees) and only about 5% is forecast to be air passengers. RAVP project staff have indicated that about ***58% of RAVP ridership is estimated to be existing transit riders*** and about 42% is estimated to be from new transit riders (5% air passengers and 37% other sources).

The risk involved in the ridership estimates is an important consideration in determining how robust the revenue stream will be. The revenue stream, in turn, is used to support the anticipated significant private sector capital cost contribution ($400 million) required under the current proposed business plan for the RAVP. A description of the methodology used in assessing the risk inherent in the ridership estimates and the final ranking for each aspect (terms of reference, bench marking, "airport" passenger model, "local" passenger model, and peer review) is provided in **Attachment "A"**.

Based on this assessment, the following key risks associated with the assumptions used as inputs to the ridership forecasts by the RAVP *Ridership and Revenue Consultants* have been identified.

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[1] Both the Expo and the Millennium lines were funded by the Province and, as noted previously, the Millennium Line was constructed using a design-build approach.

2.2.1 Assumptions Potentially Affecting Both Air and Non-air Passengers

As the following assumptions affect both air and non-air passengers, they potentially impact all (100%) of RAVP's forecast ridership.

- ***First boarding revenue assignment rates***[2] used for the RAVP are significantly higher than rates observed on the Expo Line (110% to 141% higher). This seems unlikely given that the Expo Line has a considerable number of high density land uses within walking distance clustered along its length (eg. downtown New Westminster, Metrotown, and Collingwood village), while the proposed RAVP Line would travel large stretches without similar significant destinations.

- ***Initial ridership and revenue*** for 2010 have not been discounted to allow for a gradual build up of ridership that usually occurs following a system start. The RAVP Ridership and Revenue Consultants note that if initial revenues were "ramped-up" based on recent experience on other rapid transit systems, then initial boardings could decrease by 13% to 33%.

2.2.2 Assumptions Potentially Affecting Non-air Passengers Only

As the following assumptions affect non-air passengers only, and their potential impact is limited to 95% of RAVP's forecast ridership.

- ***Value customers place on their time*** is also very sensitive input to the model with 20% swings in the value of time resulting in 20% to 28% swings in "local" boardings (i.e. if the travel time target of 30 minutes from Waterfront Station to Richmond Centre for the FGS option can not be achieved within the budget made available, then the ridership/revenue estimate assumed is too high).

- ***End to end travel (running) times,*** when subjected to sensitivity analysis, show that 20% swings in travel time would result in 15% swings in "local" boardings.

- ***A 1,150 space Park and Ride*** is assumed at Bridgeport which results in 850 to 1,000 daily trips and using the RAVP annual conversion factor, this equates to about 0.3 million trips per year or about 1.0% of

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[2] First boarding assignment assumes that revenue is earned by the part of the transit system where the rider boards first. The higher rates assumed for the RAVP infer that more riders will enter the RAVP at stations directly (i.e. fewer will transfer from the bus) than do now on the Expo Line.

RAVP ridership. Should the Park and Ride itself not be built or Park and Ride demand not be as strong as expected, then this could have a significant impact on RAVP's forecast ridership.

- ***Conversion factors*** have been used to convert model outputs (A.M. peak hour and mid-day period) to annual estimates. These factors are very sensitive, with changes of less than 1% resulting in changes of 100,000 to 225,000 annual trips, or 0.3% to 0.7% changes in RAVP ridership.

2.2.3 Assumptions Potentially Affecting Air Passengers Only

As the following assumptions affect air passengers only, their potential impact is limited to 5% of RAVP's forecast ridership.

- ***Airport air passenger forecasts*** used assume a strong rebound in air travel in 2002/2003 followed by a period of sustained growth, while some airline analysts are taking a much more conservative view that there will be declining air travel for the medium-term.

- ***Seasonal variation in air passenger volumes*** is referenced, but not accounted for in any of the ridership forecasts.

- ***Ratio of air passengers transferring to other flights*** was assumed to be 28%, while the Vancouver International Airport Authority (VIAA) Airport Improvement Fee data indicates a transfer rate that could be as high as 35%.[3]

Moreover, the *Ridership and Revenue Consultants* (Halcrow/TSi) state that:

"Demand and revenue forecasts are based on numerous assumptions and predictions about future economic, planning and travel behaviour developments. Any variations in these assumptions may concern any number of factors, ..."

Any of these assumptions taken in isolation may seem reasonable, however, the collective impact of aggressive ridership assumptions could be significant given that TransLink will be responsible for any gaps between projected ridership and actual revenue.

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[3] The more air passengers that transfer, the less air passengers there are to potentially use RAVP.

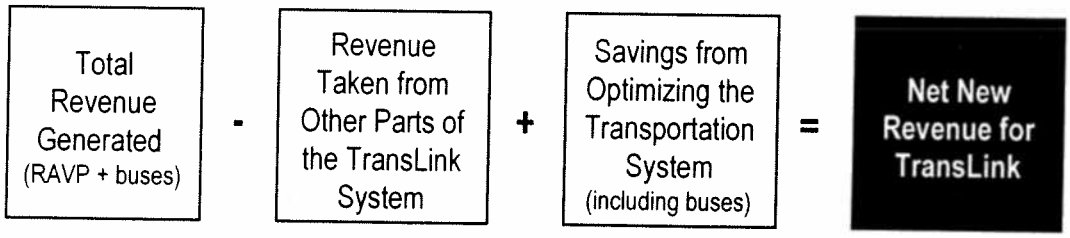
2.3 Financial Analysis

The *Report on Financial Feasibility*, prepared by Price Waterhouse Coopers for the RAVP relies heavily on the ridership estimates and the associated fare revenue estimates described above. In general terms, about 90% of the RAVP fare revenue is generated by local ridership (including airport employees) and about 10% is generated by air passengers. Only the *Executive Summary* of this report was released to the City and the public as, *"... information and financial analysis that the (partnering) Agencies wish to remain confidential in order to preserve their negotiating position."*. Full disclosure should be a requirement to allow any interested party the opportunity to review and comprehend all parameters associated with the RAVP including the proposed participation of the private sector.

In the absence of full disclosure of their analysis, this section is the City of Burnaby's best effort at estimating the overall impact to TransLink's annual operating budget.

The *Executive Summary* indicates that the additional net revenue generated by the RAVP in 2013 would be $40 million for the FGS option and $31 million for the PGS option (allowing for revenues to "ramp-up" to mature levels three years following the systems starting operation in 2010). The additional funds generated for each option were estimated using the formula outlined in **Figure 3**.

Figure 3
Price Waterhouse Coopers'
Method for Calculating Net New RAVP Revenue

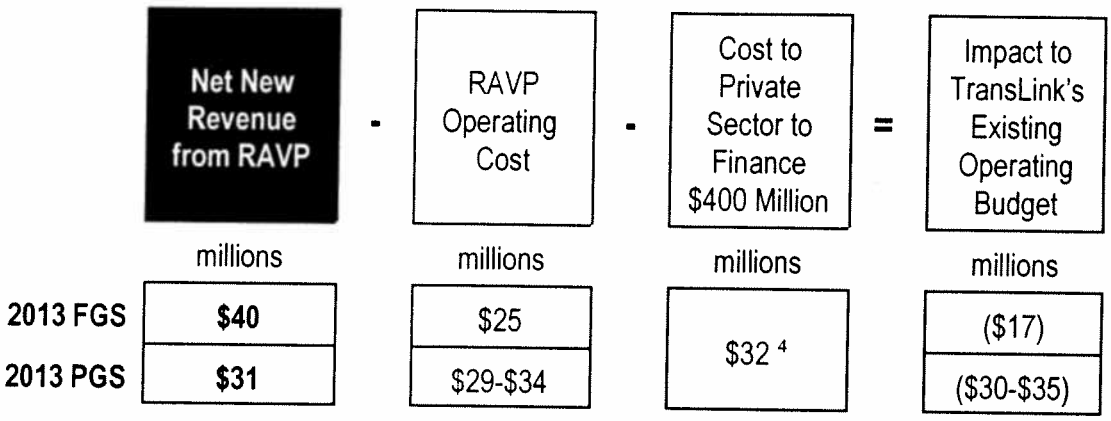


However, what is not clearly identified in the *Report on Financial Feasibility* is that the system operating costs and the cost of financing the private sectors' $400 million capital cost contribution both have to be covered by this net new revenue to avoid impacting TransLink's existing revenue. The top half of **Figure 4** shows the calculation for determining the impact on TransLink's existing operating budget.

The bottom half of **Figure 4** shows an estimate of the impact on TransLink's annual operating budget if both of these costs (RAVP operating cost and the cost of financing the private sectors' $400 million capital cost contribution) are subtracted from the net new revenue stated.

As shown in **Figure 4**, the $40 million in total new revenue forecast by Price Waterhouse Coopers (including some revenue gain derived from the bus system as a result of increased overall system ridership) would be enough to cover either the estimated annual RAVP operating costs ($25 million) or the annual cost of financing the $400 million capital cost contribution requested from the private sector ($32 million). The projected net new revenue would not be sufficient to cover both costs.

Figure 4
City of Burnaby
Method for Calculating the
Overall Impact to TransLink's Operating Budget
(Annual Revenue - Operating Costs)



It should also be noted that TransLink would be responsible for financing its capital cost contribution to the RAVP ($300 million), which could amount to an additional $21 million annually, assuming it is financed through the Municipal Finance Authority (MFA) with semi-annual interest and principal payments for a 35 year term at a preferred MFA borrowing rate of 6.20%.

Moreover, Price Waterhouse Coopers notes that the scope for private sector efficiencies is probably less than international experience would suggest, *"... because the Project Team has already worked to optimize capital costs."*

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4 Annual cost of repaying a $400 million bond issued over 35 year term (as suggested by Price Waterhouse Coopers) calculated at a rate of 7.58% with monthly payments being made on both interest and principal (as detailed on page B2 on ***Appendix "B" attached***).

2.4 RAVP Conclusion

The ridership models, although extremely sophisticated, are dependent on a complex series of data inputs and assumptions. A detailed assessment of the assumptions included in all stages of the development of the ridership estimates (including the *Ridership and Revenue Consultant's* terms of reference as defined by the RAVP Project Team) indicates that there are a number of areas where these assumptions could have a significant effect on the ridership estimates.

Moreover, the ridership estimates form the basis of the revenue projections for the RAVP. When the resulting total annual revenue for TransLink calculated by the *Financial Feasibility Consultant* ($40 million) is compared with the annual operating costs estimated for the RAVP ($25-$34 million) and the annual cost of serving the $400 million capital cost contribution required from the private sector ($32 million), only one, not both of these two costs can be covered from the total new revenue generated by the RAVP.

3.0 LIVABLE REGION STRATEGIC PLAN (LRSP)

As indicated previously, the work undertaken for the RAVP was not a comparative review against other regional rapid transit projects. How then does this recent work on the RAVP relate to the *LRSP*, the completion of the "T"-Line to Coquitlam Centre or other transit studies undertaken previously?

The *LRSP* provides a comprehensive framework for making land use and transportation decisions in the region until 2021. It resulted from a four-year consultation process involving the public, governmental and non-governmental agencies, and the 21 municipalities and one electoral area that constitute the GVRD. In 1996, the *LRSP* was adopted by the GVRD Board and deemed to be a regional growth strategy by the Province.

The *LRSP* is based on four fundamental strategies:

- Protect the Green Zone
- Build Complete Communities
- Achieve a Compact Metropolitan Region
- Increase Transportation Choice

The *LRSP* recognizes that these four strategies are inter-related and mutually supportive. Indeed, it notes that it is the, *"inter-dependency and consistency between the strategies which binds them together as a growth management framework."*[5]

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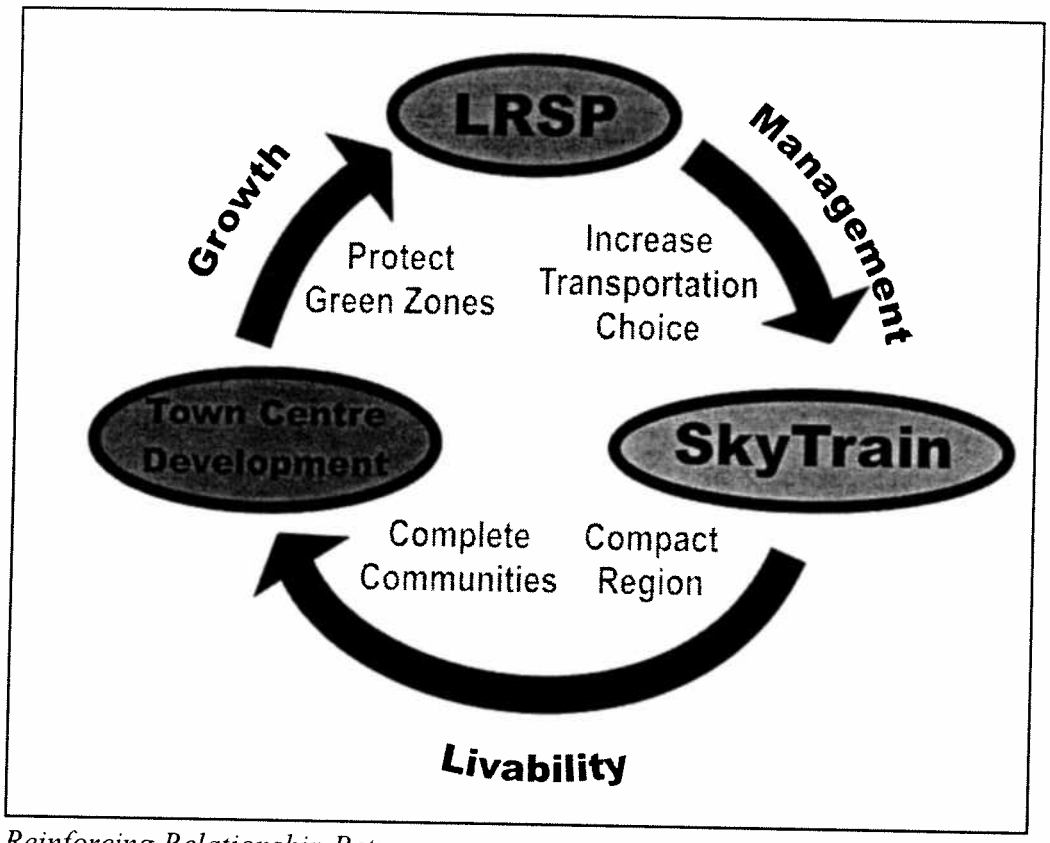
[5] GVRD. *Livable Region Strategic Plan*. December 1999, page 9.

Figure 5 provides an illustration of the inter-dependence of various elements of the *LRSP*. It shows how the availability of rapid transit or SkyTrain (Increased Transportation Choice) fosters development in town centres which, in turn, helps to protect the Green Zone while supporting the Complete Community and Compact Metropolitan Region strategies of the plan. **Figure 5** also depicts the *LRSP*'s aims of managing growth in order to maintain regional livability and protect the environment.



Reinforcing Relationship Between
Rapid Transit and the Objectives of the LRSP

Figure 5

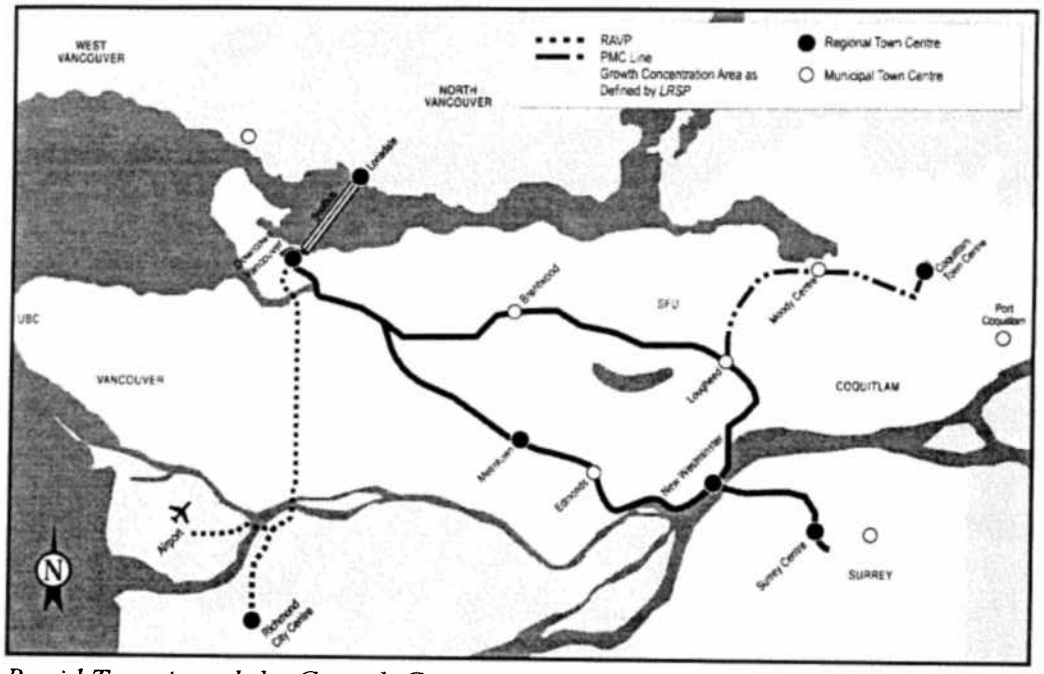
The *LRSP* is highly regarded internationally for its overall vision, and for the collaborative nature of its preparation and implementation. Also, while challenges have been faced in meeting some of its objectives (e.g., attracting office employment to some of the more suburban town centre areas), the plan has provided an important framework for growth and development in the region

Burnaby's town centre areas are a testament to the importance of persisting with the *LRSP* vision. Metrotown, for example, has grown into a vibrant regional town centre, with significant residential, commercial (and to a lesser extent) office development, supported by

various recreational and community amenities. The introduction of SkyTrain, coupled with the patience and long term vision of successive Burnaby Councils (in accordance with City and Regional plans), have been essential to Metrotown's success.

3.1 Land Use and Transportation

Figure 6 shows the relationship of the RAVP and "T"-Line to the area of the region identified for growth in the *LRSP*. Clearly, Richmond is outside while the Northeast Sector is inside the Growth Concentration Area as defined by the *LRSP*.



Rapid Transit and the Growth Concentration Area **Figure 6**

Failure to complete the "T"-Line with the PMC Line extension to Coquitlam Town Centre would undermine the objectives of the *LRSP*. Without rapid transit, "interim" lower density development may proceed in the Northeast Sector because there may not be enough transportation capacity to meet the travel requirements of higher density land use. Once these "interim" land uses are in place, redevelopment could be decades away resulting in limited perceived demand for a rapid transit line. The opportunity to shape growth could be significantly diminished and the objectives of the *LRSP* could be compromised.

3.2 GVRD's Requirement for Regional Context Statements (1996)

As part of the implementation of the GVRD's *LRSP,* the GVRD worked with all the various municipalities within the region to link their existing Official Community Plans (OCP's) to the *LRSP.* Regional Context Statements were prepared by each of the regions' municipalities and they were used as the mechanisms to entrench aspects of the *LRSP* in each communities' OCP. This effort infused the concept of intensified land use supported by rapid transit into each of the respective municipal OCP's. This area of intensified land use was defined as the *"Growth Concentration Area"* by the *LRSP.*

Under requirements of the *Local Government Act*, by year end, GVRD municipalities will need to either reaffirm their commitment to their existing regional context statements, or submit amended versions. In the absence of clear direction from the GVRD, one municipality has even questioned whether municipalities, in preparing regional context statements, should be choosing amongst elements of the *LRSP* that they support and those they may wish to ignore.

3.3 Sustainable Region Initiative (2001)

In 2001 July, the GVRD initiated a review of the *LRSP* and *Air Quality Management Plan,* adopting social, economic, and environmental sustainability as the review's "fundamental objective." At the time, the GVRD also launched the *Sustainable Region Initiative (SRI): "a framework, vision, and action plan for Greater Vancouver based on the concept of sustainability that embraces economic prosperity, community well-being, and environmental integrity."*[6] Moreover, it has been roughly five years since Burnaby and other municipalities in the region updated their OCPs. There is a need for a contemporary regional framework - which does not appear to be done because of the *SRI* priority. We do know, however, that it would be premature for us to launch a major review of our OCP until the status of the *LRSP* is confirmed. We can only assume that other regional municipalities will reach a similar conclusion. Until these uncertainties are resolved, a policy vacuum will exist for planning in the region.

The strategies contained in the *LRSP* are inter-related and mutually supportive. Also, they require patience, commitment, and persistence to be realized. Enhancements can definitely be made to the *LRSP* (e.g., incorporating a sustainability perspective, more explicitly addressing social and economic concerns). That said, it would be premature and counter-productive to suggest that the fundamental strategies of the *LRSP* be overhauled.

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[6] GVRD Website: www.gvrd.bc.ca/sustainability

3.4 Millennium Line (2002)

The Millennium SkyTrain Line opened for service on Saturday, August 31, 2002 with the introduction of nine (9) new stations in Vancouver and Burnaby. With this one event, the operating length of SkyTrain in the region, effectively, almost doubled overnight. Two days later on Monday, September 2, 2002, the integration of bus service with the new Millennium Line occurred in Burnaby, New Westminster and the Tri-Cities (Port Moody, Coquitlam, and Port Coquitlam) to provide convenient connections with the new SkyTrain stations. This bus service change was the largest restructuring of bus routes to occur in the region since Phase 1 of the Expo line opened in 1986.

However, the "T"-Line is only now half built - without the PMC Line to Coquitlam Centre, the effectiveness of the Millennium Line will be significantly undermined. To use the Expo Line as an example, Metrotown Station has grown from the seventh busiest station on the line to the busiest. The creation of the regional town centre at Metrotown, and the ridership it generates, would not likely have occurred if the construction of the Expo Line stopped at Metrotown Station and did not connect to New Westminster or Surrey beyond.

Time has shown that Coquitlam Centre has had difficulty in attracting office development in the absence of a rapid transit connection to the rest of the region. Moreover, the implication for the Lougheed Town Centre is just as significant. Will it be at the nexus of three rapid transit lines or will it be the bus terminal along a sub-regional SkyTrain loop?

3.5 Brentwood Town Centre - Post Millennium Line Announcement

The Millennium SkyTrain Line opened for service less than seven months ago. Despite this short time span, the new Millennium Line has had a significant impact on land use development in the Brentwoood Town Centre area. **Figure 7** shows the rate at which the Brentwood Town Centre development has exploded since the Province's announcement of the Millennium SkyTrain Line in June of 1998. Since 1998 alone, the Brentwood Town Centre has contributed [7] over 2,000 residential units and over 1.8 million square feet of office/retail space to the goals of the *LRSP*. To put this latter statistic in perspective, the original threshold for "regional town centre" status within the *LRSP* was considered one million square feet of commercial space.

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[7] Constructed, is under construction or is in the rezoning process.

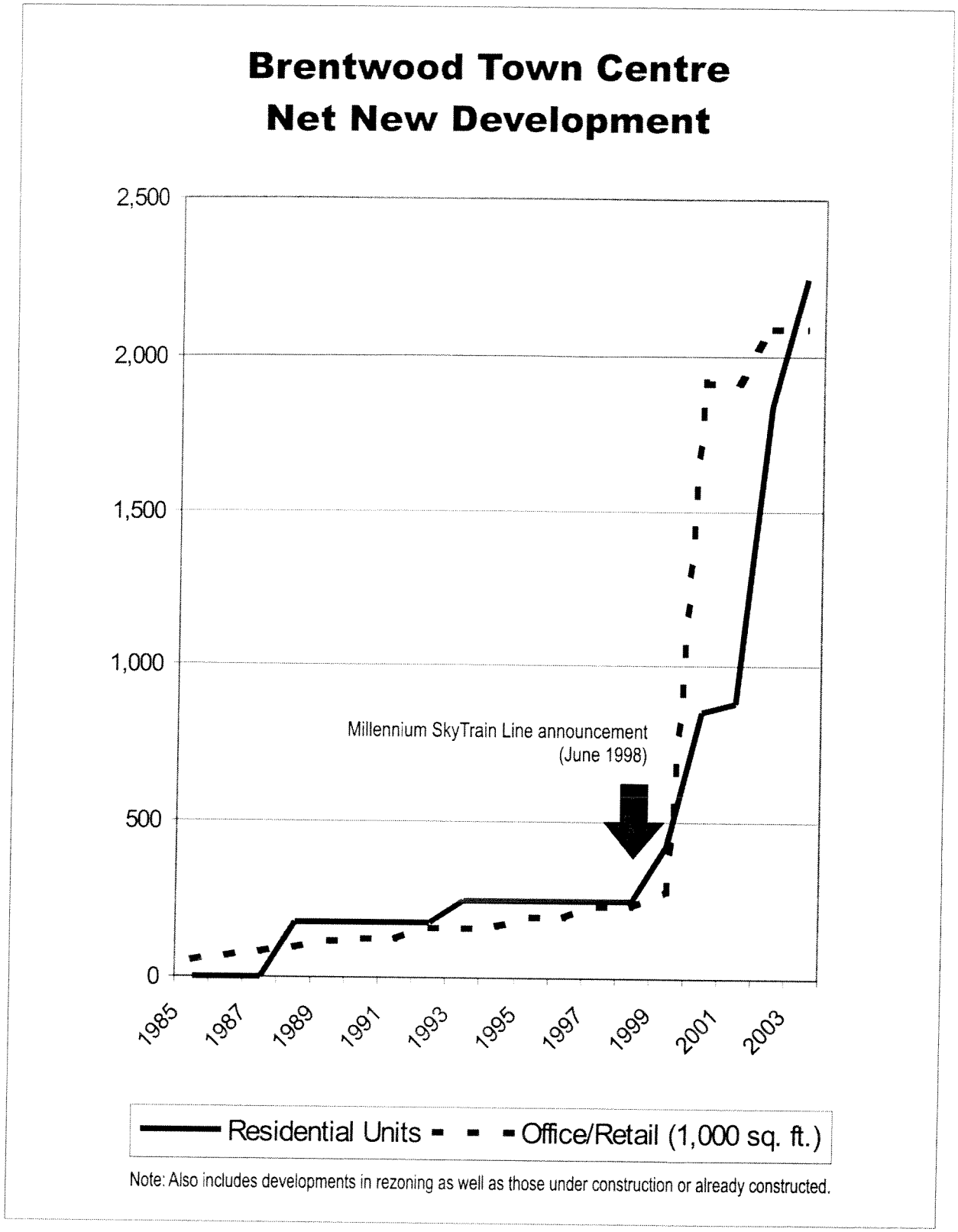
Brentwood Town Centre
Net New Development
2,500
2,000
1,500
1,000
500
0
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
Millennium SkyTrain Line announcement
(June 1998)
Residential Units
Office/Retail (1,000 sq. ft.)
Note: Also includes developments in rezoning as well as those under construction or already constructed.

Figure 7

3.6 *LRSP* Conclusion

The *LRSP* provides a regional framework for making land use and transportation decisions. Fundamental to the *LRSP* is the concept of intensified land use being supported by rapid transit. This concept of rapid transit supporting intensified land use was infused in each affected communities Official Community Plan (OCP) using a *Regional Context Statement*. Although bus transit offers the opportunity to serve ridership more cost-effectively than rapid transit, only rapid transit offers the land use "shaping" benefits fundamental to the success of the *LRSP*. The basic rational for building rapid transit is to "shape" land use. Recent experience in the Brentwood Town Centre area demonstrates the dramatic impact the construction of the Millennium SkyTrain Line has had on local land use development patterns. However, without the completion of the "T"-Line with the PMC Line to Coquitlam Centre the broader objectives of the *LRSP* could be undermined.

4.0 OTHER RELATED TRANSPORTATION ISSUES

4.1 Impact to the Bus System

Price Waterhouse Coopers' calculation of $40 million in *"new revenue for TransLink"* depends on *"revenue/savings (realized) from optimizing the transportation system"*. A portion of this appears to be revenue drawn from the bus system. ***Appendix "B" attached*** indicates that there is a significant amount of unaccounted for revenue/savings (about $2 million with the PGS option[8] and about $8 million for with the FGS option). Even if $1 million is assumed to be from other sources of savings (e.g. deferred operational costs), this could result in $1 to $7 million in future bus system revenues being targeted within the $40 million in *"total new revenue for TransLink"*.

Any reallocation of bus system fare revenue would have to occur during a period when the *Project Definition Report* assumes bus system service levels have increased by 20% within Vancouver and Richmond. The inferred assumption would appear to be that TransLink will cover these additional bus system operating costs, while being able to divert the incremental increase in fare revenue gained in the bus system from the introduction of the RAVP to the project itself.

Moreover, there is the larger revenue/cost shortfall of $17 to $35 million identified in **Figure 4,** plus the $21 million annually to service TransLink's $300 million capital cost contribution for a total shortfall of $38 to $56 million, both of which

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[8] See column 'D' on page B1 or ***Appendix "B", attached***.

TransLink could also ultimately be responsible for. As witnessed in TransLink's financial crisis of 2001, when there is a revenue/cost shortfall, service cuts to the bus system are likely to follow. As a point of reference, the bus service cuts undertaken from June to December of 2001 resulted in a $5 million dollar reduction ($10 million on an annual basis) in transit service (or about a 4% reduction in regional bus service).

4.2 Multiple Account Evaluation (MAE) of Rapid Transit Options in Greater Vancouver (1995)

Appendix C, attached provides an overview of other policy and transit studies undertaken over the past two decades, in addition to the LRSP, to highlight key technical and policy decisions related to determining regional priorities between the two remaining proposed rapid transit lines (RAVP and the Northeast Sector or PMC Line).

The *MAE of Rapid Transit Options in Greater Vancouver* was a milestone study which was undertaken in 1985 to compare a range of rapid transit options for three major corridors in Greater Vancouver: Broadway-Lougheed, Coquitlam-New Westminster and Richmond-Vancouver. **Figure 8** outlines the results of the key comparisons undertaken as part of the multiple account evaluation of the three rapid transit corridors. The intent was to assist decision-makers in selecting among a range of rapid transit options by providing a consistent assessment of how each performs in achieving key regional policy objectives.

As shown in **Figure 8,** the trade-off between the RAVP (Richmond-Vancouver) and the Port Moody-Coquitlam Line (Coquitlam-New Westminster) is primarily one of ridership ("serving") versus land use benefit ("shaping"). This study concluded that because of low/medium value in contributing to regional land-use goals and high net financial and social costs, investment in ***Richmond-Vancouver Line does not appear to be warranted in the medium term.*** Moreover, the ***Coquitlam-New Westminster Line has an advantage over Richmond-Vancouver in terms of supporting regional land-use goals.***

Figure 8
Comparison Between Corridors
Assessments relative to other corridors

	Broadway-Lougheed Enhanced LRT/ALRT	Coquitlam-New Westminster Enhanced LRT/ALRT	Richmond-Vancouver Cambie ALRT
Contribution to Regional Land-use Goals	**Medium to Medium/High**	**Medium/High to High**	**Low/Medium**
Transit Ridership 2006 Boardings	**High** [9]	**Low/Medium**	**Medium/High**
Cost-Effectiveness Cost / Boarding	**High $3.26-$3.89**	**Low $5.39-$5.60**	**Low $5.54**
Net Social Costs (present value)	**$274-$484 million**	**$424-$547 million**	**$447 million**

4.3 Formation of GVTA/TransLink (1998)

In 1998, Provincial legislation established the Greater Vancouver Transportation Authority (GVTA) known as TransLink. TransLink is responsible for planning, financing and operating a regional transportation system that moves people and goods efficiently, supports the *LRSP*, air quality objectives and economic development of the Greater Vancouver Regional District (GVRD).

The fundamental purpose behind the formation of the GVTA was to:

(1) Ensure that transportation decisions which affected the region were made at the regional level.

(2) Effectively ***link transportation decision making to the LRSP***.

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[9] Dependent on the extension to Coquitlam Centre if this projection is to be fully realised.

(3) Form a robust governance system which would allow timely decisions to be made for the effective management of both broad policy questions and more specific operational issues.

(4) Continue to involve the Province, albeit in a minor way.

This new arrangement, at its core, was intended to strengthen the relationship between land use and transportation entrenched in the *LRSP*.

4.4 Recent Events

The following recent events have had the collective effect of shifting the GVRD from an active role of "shaping" land use with strategic transportation projects to a passive role of "serving" land use with transportation projects. The risk is that the four cornerstone objectives of the *LRSP* (protecting the green zone, building complete communities, increasing transportation choice and achieving a compact region) may be compromised. The implementation of the infrastructure by TransLink now appears to be a determining policy for the GVRD.

- **TransLink's *Strategic Transportation Plan* (2000)** diluted the transportation program required to meet the *Transport 2021* targets into a half-measure called the "mid-point" scenario in line with TransLink's financial capacity in year 2000.

- **TransLink's Financial Crisis (2001)** caused TransLink to abandon the reduced transportation program outlined in the *Strategic Transportation Plan.*

- **Richmond-Airport-Vancouver Project (2002)** was launched by TransLink to investigate "partnership" funding opportunities with other agencies and the private sector with the question being posed, *"Should the RAVP be constructed before or after 2010?"*

- **2010 Winter Olympic Bid Book (2002)** was submitted and provides an opportunity for TransLink to leverage the Federal government for RAVP capital funding on the assumption it would be in place for the 2010 Olympics, if the Olympics were awarded to Vancouver.

- **Northeast Sector Rapid Transit Alternatives Study (2002)** was initiated by TransLink to examine a range of lower cost alternatives to SkyTrain which could potentially offer a transit connection to Coquitlam Centre via either the northwest corridor (North Road/Clarke Road/Barnet Highway) or the southeast corridor (Lougheed Highway/Trans Canada Highway/CP Rail right-of-way). No comparative review of the merits of the Northeast Sector or

Richmond-Vancouver extensions have been included in this review nor has the Northeast Sector alternatives been assessed for their potential implications on the *LRSP*.

- **TransLink's new Long Range Transportation Plan (2003)** will need to be completed and adopted by the end of 2003. TransLink officials have noted shortcomings with the *LRSP* (e.g., its lack of an explicit social or economic component). They have also suggested that the GVRD may need to "look in the mirror" and examine some of the fundamental assumptions underlying the Regional plan (e.g., how and where the region will grow, the success of town centres, and the commitment to meeting road priorities).[10] Therefore, while being required to support the *LRSP* policies, TransLink officials are raising serious questions about their organization's commitment to the *LRSP*.

4.5 RAVP Analysis on Timing

There is no doubt that both the RAVP and the PMC Line are both worthy projects and, if implemented over time, should both contribute to the success of the *LRSP*. The question of timing is however a strategic one: *"Which line would best meet the objectives of the LRSP by proceeding first?"*

It should be noted that the RAVP team's own analysis on the question of whether or not the RAVP should be constructed earlier or later than 2010 concluded that ***there was no clear benefit to constructing the RAVP Line prior to 2010.*** [11]

4.6 Comparison of Capital Costs

Figure 9 provides a summary of the capital costs and cost sharing agreements assumed for both the RAVP project and PMC Line.

Assuming a maximum Federal contribution of one third ($240 million)[12] to the PMC Line could be achieved, the adjusted residual capital cost of the PMC Line to TransLink would be $410 million or $110 million more than the contribution expected for the RAVP. This wouldn't involve private sector participation and the need to bleed off revenue to pay for the contribution made.

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10 TransLink. *Long Range Transportation Plan Context Paper*. February 2003, page 34.

11 *"The quantitative measures reviewed - costs and benefits - associated with construction of the line do not provide a clear answer on timing (pre or post 2010) within the limits of the analysis."*

12 This is consistent with the formula used for the RAVP (two-thirds by local partners and one-third by Canada).

Figure 9
Comparison of Capital Cost Estimates and Cost-Sharing

	Richmond/ Airport/ Vancouver Rapid Transit Project (RAVP)		Port Moody-Coquitlam (PMC) SkyTrain Line	
Capital Costs	$1.5-$1.7 billion		$0.7 billion	
Cost Sharing (millions)				
Federal Government	$450	26%	-	-
Private Sector	$400	23%	-	-
Provincial Government	$300	17%	$80	11%
Airport Authority (VIAA)	$300	17%	-	-
TransLink	$300	17%	$650	89%

It should also be noted that RTP 2000 Limited had reserved $25 million of the Municipal Integration Fund (MIF) for the PMC Line to Coquitlam Centre. MIF was established to allow for the integration of the rapid transit line including sidewalks, station plazas, bus loops, and passenger pick-up and drop-off facilities.

4.7 Transportation Issues Conclusion

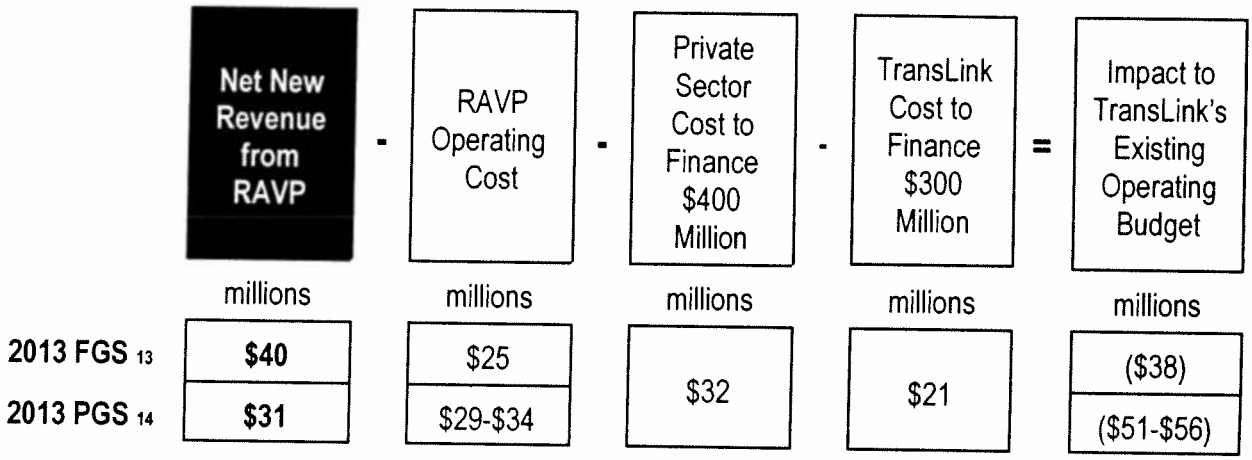
The RAVP Line may have a significant impact to the bus system given a total estimated annual revenue shortfall of $38 to $56 predicted when annual RAVP operating cost and annual financing costs for the private sector and TransLink ($400 million and $300 million respectively) are accounted for. To balance this shortfall bus service cuts in the range of four to six times the value of those undertaken in 2001 ($10 million on an annual basis) would be required. Moreover, the "T"-Line has been the regions long standing priority and may come with less risk and impact to the bus system that the RAVP Line as currently proposed, it remains uncompleted. The GVTA (TransLink) was formed to strengthen the relationship between land use and transportation and yet recent events have shown there has been a disconnect between the objectives of the *LRSP* and strategic transportation decisions.

5.0 CONCLUSION

Both the RAVP and the PMC Line are worthy projects. Over the past twenty years, however, the PMC Line to Coquitlam Centre in association with the now completed Millennium Line has consistently been referred to as the regional priority as part of the "T"-Line. The Greater Vancouver region now faces a pivotal decision that will either "shape" or "serve" land use patterns.

In the absence of full disclosure of the financial analysis undertaken for the RAVP (on the basis of preserving their negotiating position with private sector bidders), our own analysis summarized in **Section 2** of this report and in **Figure 10** indicates that the impact on TransLink's annual operating budget could be significant. This assessment indicates that **the impact to TransLink could be in the range of $40 to $60 million annually** as estimated by the City of Burnaby.

Figure 10
City of Burnaby Calculation of the
Overall Impact to TransLink's Operating Budget
(Annual Revenue - Operating Costs)



13 Fully Grade Separated Option

14 Partially Grade Separated Option

The RAVP Line has projected $40 million of "new TransLink revenue" in year 2013. From this revenue TransLink would have to cover the following costs (as shown in **Figure 10** above):

- the annual operating cost of the RAVP Line ($25 million estimated by RAVP);
- the annual cost to the private sector financing a $400 million capital cost contribution ($32 million estimated by the City of Burnaby using the assumptions outlined by RAVP); and
- the annual cost to TransLink to service their $300 million capital cost contribution ($21 million estimated by the City of Burnaby).

The RAVP as currently proposed is dependent on a significant capital cost contribution from the private sector ($400 million). Although the Project Team for the RAVP has determined that net new revenues to TransLink will amount to $40 million, this amount is only enough to cover either the operating costs of the RAVP ($25-$34 million) or the debt servicing costs for the private sector capital cost contribution of $400 million ($32 million), but not both.

TransLink would also be responsible for financing its capital cost contribution to the RAVP ($300 million), which could amount to an additional $21 million annually if financed under similar assumptions as the private sector contribution.

This funding burden could be staggering, when surrounded by the expectation that bus service will be increasing in the Vancouver and Richmond service areas by 20%.

This financial analysis is by no means meant to be definitive, but rather to highlight our concern that a further consideration of the full impact to TransLink's operating budget should be undertaken by the TransLink Board prior to the RAVP project being approved for procurement.

Moreover, the series of recent events highlighted in **Section 4** of this report indicate that TransLink appears to be determining regional priorities in isolation from the *LRSP* and the GVRD Board. ***This policy disconnect is particularly alarming given that one of the most significant strategic transportation projects in the region's history, the "T"-Line, has not yet been completed.***

Our hope is that the recommendations put forward in this report will serve as a warning to the both the TransLink Board and the GVRD Board to carefully consider the full implications of releasing the RAVP prior to the PMC Line as the last phase of the "T"-Line. Moreover, we are also hopeful that this consideration will serve as a catalyst for a renewed sense of commitment to the *LRSP* and its cornerstone objectives (protection of the green

zone, building complete communities, achieving a compact metropolitan region, and increasing transportation choice).

J.S. Belhouse, Director
PLANNING AND BUILDING

Attachments (3)

cc: Director Finance
Director Engineering

Appendix A
Ridership and Revenue Risk Assessment

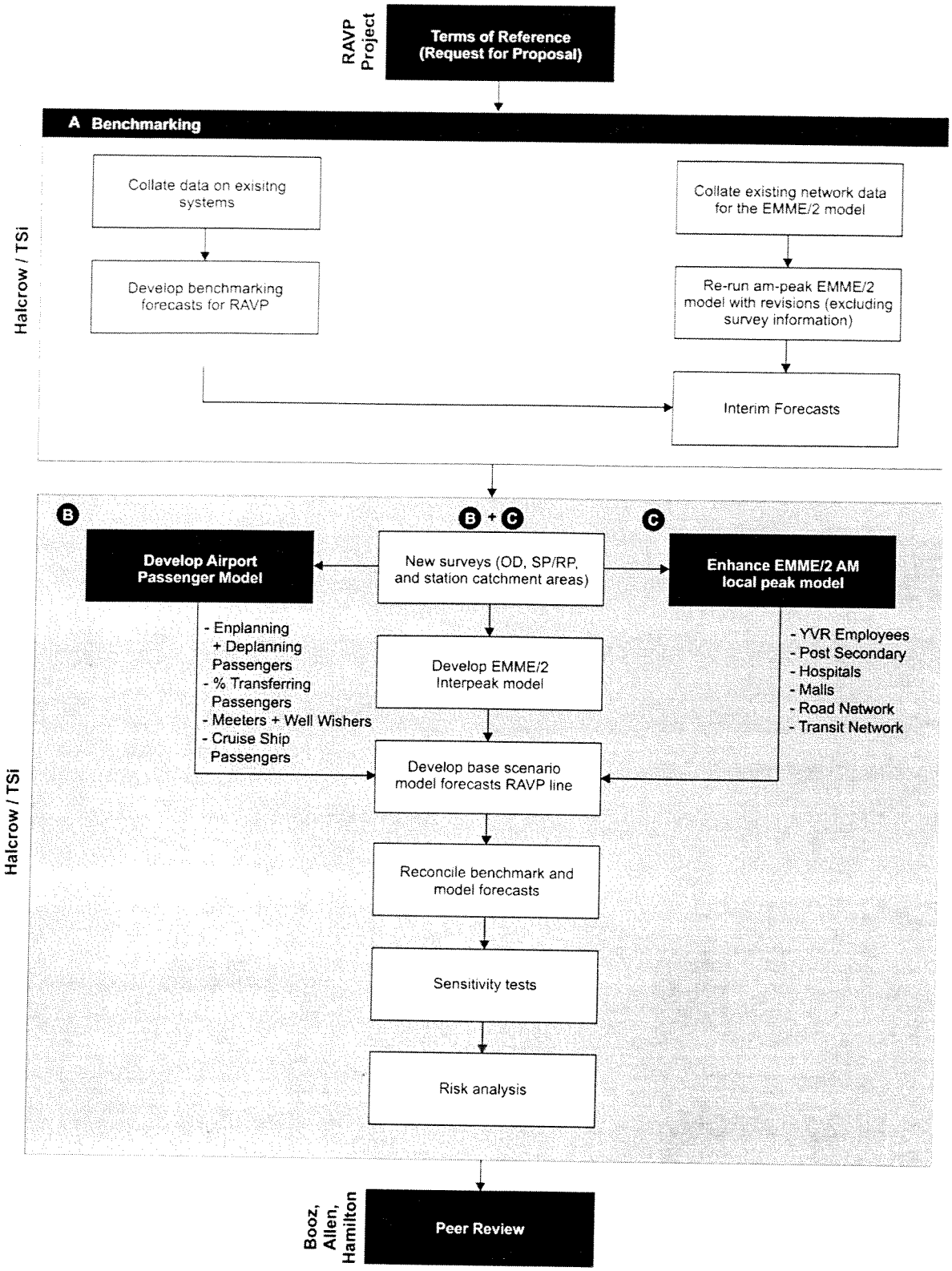
The City of Burnaby undertook an assessment of the ridership and revenue forecasts developed for the Richmond-Airport-Vancouver Rapid Transit Project (RAVP). This assessment included a review of a series of technical reports for each of the following steps of the ridership and revenue process outlined in **Figure A1** *(on the next page).*

- *Request for Proposal (RFP)* issued by the RAVP Project Team (2002 June). It should be noted that the RFP limits the scope of the Ridership and Revenue Consultant's assignment to the RAVP, as opposed to a system-wide assessment of alternative projects.

- *Executive Summary* and *Final Report* developed by Halcrow/TSi (2003 January)
  - A) Benchmarking
  - B) "Airport" Passenger Model
  - C) "Local" Passenger Model

- *Peer Review* undertaken by Booz, Allen, Hamilton (2003 February)

We have prepared **Figure A2** ***(attached)***, a set of summary sheets (one for each of the five process steps noted above). For each step of the process used, we have noted key assumptions made by either the Project Team or the Ridership and Revenue Consultant; indicated the market of riders affected (airport, local or all); indicated the percentage of the RAVP revenue affected; commented on the potential risk involved in each assumption; ranked all of the assumptions according to degree of risk (low, medium or high); and then sorted the assumptions from highest risk to lowest risk.



RAVP Ridership and Revenue Process

Figure A1
City of Burnaby

Risk Item	Riders Affected	% of Total Estimated RAVP Revenue Affected (FGS Option)	Risk	Comments
TERMS OF REFERENCE				
First board revenue assignment	All	100%	High	First board revenue assignment assumed for RAVP[1] could significantly impact TransLink's net revenue. Assumed first boarding rates are significantly higher for RAVP than rates from Expo Line (110%-141% higher) [2] while the nominal rate per board[15] is only 10% less (as RAVP only travels through two zones). [3] 58% of the RAVP ridership would be current transit riders, 42% new transit riders (5% air passengers and 37% other).
Running time	Local	90%	High	Running time of 23 minutes (20 minutes for "premium" service) Waterfront to YVR for Fully Grade Separated (25 minutes for partial grade-separated), [4] [5] was provided by project team based on assumed performance criteria for technology Sensitivity analysis shows that 20% swings in travel time would result in 15% swings in "local" boardings [6]
Commercially optimized fares [7]	Airport	10%	High	Consultant was requested to review a "premium" service as a method of increasing revenue.

15 Nominal rate per board is the value assigned to each passenger boarding the system. It is lower than a single fare to compensate for multiple-boarding made on a single trip and to allow for concession fares and monthly passes.

Risk Item	Riders Affected	% of Total Estimated RAVP Revenue Affected (FGS Option)	Risk	Comments
TERMS OF REFERENCE, continued				
Ramp up analysis (how quickly ridership on the RAVP reaches anticipated "mature" volumes).	All	100%	High	Sensitivity analysis shows that different assumptions would result in 13%-33% decrease in initial boardings. [8] Although considered, 2010 ridership as shown has not been discounted for "ramp-up" effect.
Value of time assumptions	Local	90%	High	Sensitivity analysis shows that a 20% swing in the value of time would result in 20%-28% swings in "local" boardings. [9]
"Investment Grade Ridership and Revenue Forecast" [10]	All	100%	Medium- High	Term used but the expected accuracy of the deliverables is not clearly defined.
Scope of assignment[11]	All	100%	Medium- High	Scope of the assignment is broad. Prioritization of effort left to Ridership and Revenue Consultant
Schedule	All	100%	Medium	Aggressive seven (7) month schedule[12] complicated by extensive data collection requirements. Prioritization of effort left to Ridership and Revenue Consultant
Alignment and broad station locations	All	100%	Low	Provided to Ridership and Revenue Consultant [13]
Land use	All	100%	Low	GVRD (Growth Management Strategy) land use assumptions boosted. Employment increased in Richmond/Airport area from 150,000 (GMS) to 175,000 [14] (25,000 jobs or 16%) as existing employment has already exceeded the future levels assumed in the GMS land use scenario.

Risk Item	Riders Affected	% of Total Estimated RAVP Revenue Affected (FGS Option)	Risk	Comments
"A" - BENCH MARKING				
Population	Local	90%	Medium	RAVP has 80% of the population per hectare of the Expo line (37 versus 46 people per hectare). [15]
Employment				RAVP has 147% of the employment per hectare of the Expo line (31 versus 21 employees per hectare).[16]
Car Ownership				RAVP has 115% of the car ownership per household of the Expo line (1.36 versus 1.18 household care ownership per hectare). [17]
The Ridership and Revenue Consultant assumed that higher employment will offset lower population and higher car ownership.				
Rail mode split	Airport	10%	Medium	Current rail mode splits in Europe (6%-43%) vary significantly from US locales (2%-14%) [18] Ridership and Revenue Consultant has assumed that Vancouver is in between European and U.S. examples (9-12%).
Passengers with a downtown Vancouver destination	Airport	10%	Medium	YVR has a high proportion (35%) of passengers with a downtown origin/destination [19] Applying this analysis, the Ridership and Revenue Consultant estimated mode share is 20-28%.
Percentage of jobs in the CBD	Local	90%	Low	Percentage of jobs in Central Business District (CBD) is lower in Vancouver than other Canadian cities cited (13% versus 23% for Calgary and 18% for Edmonton). [20] Employment in Richmond has the potential to generate two-way work trips to off-set the lower concentration of jobs in the CBD.
Is airport central to the region?	Airport	10%	Low	Vancouver scores "low" on isolation index (centrality to region). [21] Ridership and Revenue Consultant predicts a rail mode of 5-7% using this factor.

Risk Item	Riders Affected	% of Total Estimated RAVP Revenue Affected (FGS Option)	Risk	Comments
"B" - AIRPORT PASSENGER MODEL				
Air passenger forecasts	Airport	10%	High	Vancouver International Airport Authority (VIAA) passenger forecasts assume a 4.7% average rate of growth from 2002 to 2010, with a short period of negative growth in 2001/2002, followed by a strong rebound of 7% between 2002/2003, gradually tapering off to a more modest level of growth at about 3.6% per annum by 2009/2010. The prediction of a strong rebound of air passenger growth of 7% in 2002/2003 appears unlikely, given recent domestic and international events (e.g. SARS, war in Iraq). Moreover, some airline industry analysts are taking a much more conservative view that there will be a period of continued decline for the medium-term future.[22]
Seasonal variation in YVR volumes [23]	Airport	10%	High	Does not appear to be addressed in application of annual ridership factors.
Ratio of transferring air passengers	Airport	10%	High	Ratio of transferring air passengers was assumed to be 28%.[24] VIAA Airport Improvement Fee data indicates that the transfer rate could be as high as 35%. [25] This translates into a potential range of uncertainty on the airport passenger forecasts of -7% to +14% on this issue alone. [26]
Travel surveys	Airport	10%	Medium	Seven (7) travel surveys undertaken in September and October of 2002.[27] September and October are past the main tourist season.
Walk time from baggage collection to the RAVP platform	Airport	10%	Medium	Walk time from baggage collection to the RAVP platform assumed to be five (5) minutes [28]

Risk Item	Riders Affected	% of Total Estimated RAVP Revenue Affected (FGS Option)	Risk	Comments
"B" - AIRPORT PASSENGER MODEL, continued				
RAVP operating hours	Airport	10%	Medium	RAVP operating hours assumed the same as all airline operating hours.[29] Early morning operating hours prior to the first flights will be essential to attracting airport work trips. Moreover, good bus service frequencies on off-peak travel times will also be required in other parts of the region to make trips convenient for airport workers.
Fare evasion/fraud	Airport	10%	Low	Fare evasion/fraud assumed to be 4% of air passenger revenue.

Risk Item	Riders Affected	% of Total Estimated RAVP Revenue Affected (FGS Option)	Risk	Comments
"C" - LOCAL RIDERSHIP MODEL				
Park and Ride	Local	90%	Medium	1,150 space Park and Ride assumed at BridgePort with a $2 per day charge. [30] Results in 850-1,000 RAVP daily riders. [31] Using their conversion factors, this could equate to 0.3 million riders per annum or 1.0% of total forecast "local" ridership in 2010.
A.M. peak hour ridership to combined (A.M. and P.M.) peak period ridership factor	Local	90%	Medium	A.M. peak hour to combined (A.M. and P.M.) peak period factor of 5.0 used.[32] Each 0.1 increase in this factor results in 225,000 trips per annum or a 0.7 % change in "local" ridership in 2010.
A.M. peak hour ridership to mid-ridership conversion factor	Local	90%	Medium	A factor of 12.4 used for converting A.M. peak hour to mid-day. Each 0.1 increase in this factor results in 225,000 trips per annum or a 0.7 % change in "local" ridership in 2010.
Daily ridership to annual ridership conversion factor.	Local	90%	Medium	A factor of 310 was used to expand daily ridership to annual.[33] Each 1 day change in this factor results in 100,000 trips per annum or a 0.3 % change in "local" ridership in 2010.
Cost of driving	Local	90%	Low	Cost of driving assumed to be $0.125 per km [34]
Parking charges	Local	90%	Low	1996 parking charges increased by 10% for inflation [35]
Transit fares	Local	90%	Low	April 2002 zone fares for transit system (one-zone = $2, two-zones = $3, and three-zones = $4) [36]
Induced trips	Local	90%	Low	No allowance has been made for "induced" trips or trips which are now not being made. [37]

Risk Item	Riders Affected	% of Total Estimated RAVP Revenue Affected (FGS Option)	Risk	Comments
BOTH "B" and "C"				
Full versus partial grade seperation	All	100%	Medium	Full versus Partial Grade Separation of the RAVP (23 minutes and 25 minutes respectively).[38] Model is sensitive to travel time change (each minute change results in 1.5 million trips per annum or a 4.5% change in overall ridership).
Real revenue growth	All	100%	Medium	Assumed to be 1.6% prior to 2021 and 1.5% after 2021.[39]
Future road network	All	100%	Low	Current thinking from various levels of government.[40]
Future feeder bus network	All	100%	Low	Future feeder bus network assumptions (including service integration with the Millennium Line) [41] and bus fleet size [42] A.M. run times from the model were slightly higher than actual scheduled run times.[43]
Operating frequencies for West Coast Express (WCE) and SeaBus	All	100%	Low	Provided by TransLink [44]
PEER REVIEW				
Letter of 2003 February 25 from Booz, Allen, Hamilton	All	100%	Medium	Analysis restricted to "top of desk" review - no audit of models undertaken.

1. Page 120, "RAVP Final Report on Ridership and Revenues", Halcrow/TSi, January 2003

2. Page 120, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

3. Page 121, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

4. Page 7, Appendix 1, "RAVP Ridership and Revenues RFP", RAVP Team, June 2002

5. Page 59, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

6. Page 125, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

7. Page 6, Appendix 1, "RAVP Ridership and Revenues RFP", RAVP Team, June 2002

8. Page 125, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

9. Page 125, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

10. Page 6, "RAVP Ridership and Revenues RFP", RAVP Team, June 2002

11. Page 8, "RAVP Ridership and Revenues RFP", RAVP Team, June 2002

12. Page 16, "RAVP Ridership and Revenues RFP", RAVP Team, June 2002

13. Page 6, "RAVP Ridership and Revenues RFP", RAVP Team, June 2002

14. Page 2, Appendix 1, "RAVP Ridership and Revenues RFP", RAVP Team, June 2002

15. Page 17, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

16. Page 17, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

17. Page 17, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

18. Page 28, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

19. Page 39, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

20. Page 25, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

21. Page 34, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

22. Page 10 and 144, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

23. Page 5, Appendix 1, "RAVP Ridership and Revenues RFP", RAVP Team, June 2002

24. Page 47, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

25. Page 145, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

26. Page 145, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

27. Page 12, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

28. Page 59, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

29. Page 60, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

30. Page 111, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

31. Page 111, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

32. Page 119, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

33. Page 119, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

34. Page 80, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

35. Page 81, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

36. Page 81, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

37. Page 136, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

38. Page 59, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

39. Page 130, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

40. Page 6, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

41. Page 84, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

42. Page 6, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

43. Page 84, "RAVP Final Report on Riderhip and Revenues", Halcrow/TSi, January 2003

44. Page 6, "RAVP Final Report on Ridership and Revenues", Halcrow/TSi, January 2003

Appendix B
Review of Financial Analysis

Estimated Impact to the Bus System Operating Revenue

City of Burnaby
2003 April 23

Estimate of Bus System Revenue Within Price Waterhouse Coopers "New TransLink Revenue"

	2010 Revenue	2013 Revenue	2013 New Revenue to TransLink			
	Total Revenue Generated by RAVP	Total Revenue Generated by RAVP	New Revenue Generated by RAVP	New Revenue/Savings from Other Area (including Bus)	Savings From Optimizing Transportation Network	New Revenue Generated by RAVP for TransLink
	A (millions)	B = A x 1.05 [2] (millions)	C = B x 58% [3] (millions)	D = F-E-C [4]	E (millions)	F (millions)
Full Grade Separation (FGS)	$32.7 [1]	$34.3 100%	$19.9 58%	$7.9	$12.2 [5]	$40.0 [6]
Partial Grade Separation (PGS)	$27.5 [1]	$28.9 100%	$16.7 58%	$2.1	$12.2 [5]	$31.0 [6]
			calculated values			

Notes:

1 Page 54, *Project Definition Report*, RAV Rapid Transit Project

2 Page 133, *RAV Final Report on Ridership and Revenue*, Halcrow/TSi

3 Stated by RAVP project staff (although Page 129, *RAVP Final Report on Ridership and Revenue*, Halcrow/Tsi stated 75% to 77% of RAVP ridership from current passengers)

4 Page 4, *Report on Financial Feasibility*, Price Waterhouse Coopers

5 Page 61, *Project Definition Report*, RAV Rapid Transit Project Office prorated as shown on Page B3 of Appendix "B"

6 Page 5, *Report on Financial Feasibility*, Price Waterhouse Coopers

Calculation of Cost of Financing $400 million (Private Sector)

City of Burnaby
2003 April 10

Details

Amount:	$400,000,000	
Interest Rate:	7.58%	*Estimated rate for 34/35 year term for the private sector with DBRS A-high rating*
Term:	35 Years	

Principal and Interest

The following estimates are based on assumption that both principal and interest payments are made on a periodic basis.

Estimated Payment (interest & principal)

Monthly	$2,686,407	Principal & Interest
Semi-Annual	$16,371,136	Principal & Interest
Annual	$33,362,738	Principal & Interest

Estimated Annual Payment (interest & principal)

Monthly	$32,236,880
Semi-Annual	$32,742,272
Annual	$33,362,738

Interest Only

Based on assumption that only interest payments are made on a periodic basis and the principal is paid at the end of the term.

Estimated Payment (interest only)

Monthly	$2,487,666	Interest Only
Semi-Annual	$15,160,000	Interest Only
Annual	$30,894,564	Interest Only

Estimated Annual Payment (interest only)		Total Capital Amortized Annually	Total Annual Payment
Monthly	$29,851,997	$11,428,571	$41,280,568
Semi-Annual	$30,320,000	$11,428,571	$41,748,571
Annual	$30,894,564	$11,428,571	$42,323,135

Year	Difference [1]	Prorated Amounts
2010	($9,972,000.00)	($9,972,000.00)
2011		($10,708,363.64)
2012		($11,444,727.27)
2013		($12,181,090.91)
2014		($12,917,454.55)
2015		($13,653,818.18)
2016		($14,390,181.82)
2017		($15,126,545.45)
2018		($15,862,909.09)
2019		($16,599,272.73)
2020		($17,335,636.36)
2021	($18,072,000.00)	($18,072,000.00)

($8,100,000.00) / 11 = ($736,363.64)

Notes:

1 *The amounts shown in the "difference" column appear on page 61 of the Project Definition Report*

Appendix C
Policy and Transit Study Overview

The City of Burnaby conducted a review of previous policy and transit studies undertaken over the previous two decades to highlight key technical and policy decisions as they relate to determining regional priorities between the two remaining proposed rapid transit lines (RAVP and the Northeast Sector or PMC Line).

1. ALRT (SkyTrain) to Surrey and Coquitlam (1983):

- The Construction of Phase 1 of the Expo SkyTrain line resulted in 21.4 kilometres of SkyTrain with 15 stations extending from the SeaBus terminal at Waterfront Station to the redeveloping downtown of New Westminster.

- ***Future extension Coquitlam (via the area which would later be called the Lougheed Town Centre area) was viewed as a priority*** to assist in the development of the suburban centres.

2. ALRT (SkyTrain) to Surrey and Coquitlam Report

Following the review of three corridors (North Road, Extension of the North Road, and Lougheed Highway), this study concluded that the ***preferred alignment for a SkyTrain extension to Coquitlam was via north road.***

3. Review of Northeast Sector Transit Initiatives (2002)

This study examined ten potential transit initiatives to serve the Northeast Sector, including a further extension of SkyTrain from Lougheed Mall to Coquitlam Centre, via North Road and Port Moody.

4. Regional Intermediate Capacity Transit System Studies (1993)

This study provided additional information which helped to narrow the wide variation in the quality of data provided in previous studies in order that priorities could be set for a staged development of rapid transit in the Lower Mainland. This study was based on the understanding that ***it was not possible to finance the construction of all three rapid transit (ICTS) lines at once.***

5. Regional Intermediate Capacity Transit System Studies (1994)

Since one of the goals of *Transport 2021* was to provide Intermediate Capacity Transit Systems (ICTS) connections between town centres, ***the extension to Coquitlam Town Centre via the Lougheed Highway was included in the analysis.***

6. Multiple Account Evaluation of Rapid Transit Options in Greater Vancouver (1995)

- The purpose of this evaluation was to compare a range of rapid transit options for three major corridors in Greater Vancouver: Broadway-Lougheed, Coquitlam-New Westminster and Richmond-Vancouver.

- The intent is to assist decision-makers in selecting among a range of options by providing a consistent assessment of how each performs in achieving key policy objectives.

- **Figure C1** outlines the results of the key comparisons undertaken as part of the multiple account evaluation of the three rapid transit corridors.

Figure C1
Comparison Between Corridors
Assessments relative to other corridors

	Broadway-Lougheed Enhanced LRT/ALRT	**Coquitlam-New Westminster** Enhanced LRT/ALRT	**Richmond-Vancouver** Cambie ALRT
Contribution to Regional Land-use Goals	**Medium to Medium/High**	**Medium/High to High**	**Low/Medium**
Transit Ridership 2006 Boardings	**High** [16]	**Low/Medium**	**Medium/High**
Cost-Effectiveness Cost / Boarding Net Social Costs (PV)	**High** $3.26 to $3.89 $274 to $484 million	**Low** $5.39 to $5.60 $424 to $547 million	**Low** $5.54 $447 million

- Because of low/medium value in contributing to regional land-use goals and high net financial and social costs, investment in ***Richmond-Vancouver ICTS does not appear to be warranted in the medium term.***

- ***Coquitlam-New Westminster has an advantage over Richmond-Vancouver in terms of supporting regional land-use goals.***

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[16] Dependent on the extension to Coquitlam Centre if this projection is to be fully realised.

7. BC Transit's 10 Year Development Plan (1995)

The *Ten-Year Plan* put forward a number of specific transportation system improvements to support the GVRD's regional development vision presented in the *Livable Region Strategic Plan* and its transportation component, *Transport 2021.*

Rapid Transit:

- *development of a* ***light rail transit (LRT) system in the Broadway-Lougheed-Coquitlam corridor by 2005***

This plan was dependent upon continued implementation of the GVRD's growth management strategy and *Transport 2021.*

8. TransAction 2002 (1997)

Trans Action 2002 was BC Transit's five-year transportation plan for 1998-2003. While it aimed to support the implementation of the Region's plan, it became clear that the existing funding and governance arrangements are limiting factor. Transit capital expenditures are required to fall within the Provincial Government's Debt Management Plan. As a consequence, *TransAction 2002*, while setting out in the right direction, ***falls short in meeting the modal share targets set by Transport 2021 and adopted by the Livable Region Strategic Plan***. [17]

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[17] The gap between what can be delivered under Provincial constraints through *TransAction 2002* and what is required to meet the region's targets is in the order of $380 million in capital expenditures over the five year period.