

Special Commission

SkyTrain Extension Review

Final Report

May, 1999

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INTERIM REPORT

DECEMBER, 1998

SPECIAL
COMMISSION
SKYTRAIN
REVIEW



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(source: Special Commission compilation)

Appendix #2: RTPO Evaluation Criteria

(source: RTPO)

Appendix #3: Special Commission Web Site

(source: Special Commission)

Appendix #4: Special Commission Public Information Source Points and Contact Numbers

(source: Special Commission)

Appendix #5: Comments and Submissions Received by the Special Commission

in 1998 (source: Special Commission compilation from public sources)

Appendix #6: Conclusions and Recommendations from the Ombudsman *Skytrain Report: Public Report No. 8, 1987*

(source: Provincial Ombudsman)

Appendix #7: RTPO Open House and Neighbourhood Consultation Program Schedule to end of 1998

(source: RTPO)

Appendix #8: Special Commission News Releases

(source: Special Commission)

Appendix #9: *GVRD Livable Region Strategic Plan*

(source: GVRD)

Appendix #10: List of Special Commission Skytrain Project Registry Documents

to end of 1998 (source: Special Commission compilation from multiple agency and public sources)

MAPS ACCOMPANYING INTERIM REPORT

Map A: Regional Overview (source: Special Commission GIS)

Map B: Rapid Transit Project Office Preferred Alignment
(source: Special Commission GIS)

Map C: Community Legacy Opportunities – Suggested Concepts
(source: Special Commission GIS)

INTRODUCTION

In June of 1998 the BC Government announced that the Skytrain would be extended along the Broadway-Lougheed-Coquitlam-New Westminster corridor (referred to in this report as the “accelerated project”). The Special Commissioner was appointed by the Province on September 17, 1998 to conduct an environmental review of this project. The Special Commission office was set up, staffed, and in operation by the end of September.

The Special Commission Skytrain Review Interim Report is a summary of the accelerated project planning process completed to December, 1998. The Skytrain Review involves a wide variety of stakeholders from governments and their agencies to individual members of the public. Release of the report at this time is intended to inform planning discussions by providing participating agencies and the public with an update on the planning process to date, and reporting on key issues the Special Commission has identified from the information currently available to it. The Interim Report will serve as a discussion framework for open Technical Forums and Public Meetings that the Special Commission will hold in early 1999.

The Special Commission is dedicated to help resolve issues and to maximize opportunities using an environmental review approach tailored for an urban setting. In order to add the greatest possible value to the accelerated project, the Special Commission is relying on all stakeholders to provide it with information, ideas and perspectives that will contribute to a positive process and a lasting legacy that benefits the entire community.

The Special Commission Skytrain Review Interim Report is a summary of the accelerated project planning process completed to December, 1998.

The Interim Report will serve as a discussion framework for open Technical Forums and Public Meetings that the Special Commission will hold in early 1999.

1.0 PURPOSE OF THE INTERIM REPORT

This report serves three key purposes for the public:

1. It provides a preliminary summary and comment on the work of the Rapid Transit Project Office (RTPO) to date;
2. It completes and reports on the Special Commission's review of the RTPO's approach to route alignment and station location design; and
3. It provides a discussion framework for open Technical Forums and Public Meetings on potential project impacts, benefits and mitigation which the Special Commission will conduct early in 1999.

1.1 ORGANIZATION OF INTERIM REPORT

The main body of the Interim Report is organized into four sections:

- Special Commission Overview;
- The Skytrain Project;
- Route Alignment Review; and
- Project Impacts, Benefits and Mitigation.

The *Special Commission Overview* section of this report introduces the Special Commission, defines its scope and purpose, and describes how it is fulfilling its mandate. The particular nature of an urban infrastructure project is provided. The approach, process and products of the Special Commission Skytrain Review are outlined, activities to date are described and planned next steps are presented.

The *Skytrain Project* section provides background on the work that preceded the accelerated project, including a synopsis of the major planning processes and documents that identified rapid transit needs and corridors in the region. The history of the accelerated project itself, from the decision to proceed, to the scope of the project, the mandate of the Rapid Transit Project Office (RTPO), and the overall approach to the project is documented. The roles and responsibilities of key participants in the accelerated project, which further clarifies the context and accountabilities of the Special Commission, are outlined. This section also identifies possible future plans and rapid transit corridors for which the Special Commission's work on the current accelerated project may provide insights and planning direction.

The *Route Alignment Review* section describes the RTPO's program for the design of route alignment and station locations for the accelerated project. The technical and public processes of the RTPO and the criteria being used by the company to develop their preferred route alignment and station locations are reviewed, and both system-

wide and location specific issues are identified based on information provided to the Special Commission to date. Summary and conclusions are provided on public process for remaining stages of the project and on what issues should be addressed. The Special Commission's review of route alignment is fundamentally a process audit, concerned primarily with how public input is solicited and considered, decisions are reached and issues are resolved. It does not review the substance of these decisions or recommend specific resolutions.

The *Project Impacts, Benefits and Mitigation* section outlines sources of information and input used in the initial review contained in this Interim Report, and provides a preliminary report on system-wide and location specific issues that have been identified. Each issue relating to project impacts, benefits and mitigation is described, a preliminary analysis is given, and next steps are identified. Preliminary comments are given on potential project impacts, benefits and possible mitigation issues for the purpose of providing direction to ongoing planning and consultation processes. The Special Commission has, in addition, compiled and put forward concepts for a Skytrain Community Legacy Program including a conceptual map illustrating some possibilities for positive community benefits.

The Appendices and Maps accompanying the Interim Report provide easy reference to support documentation and source material. This report is the first of several reports that the Special Commission will release. Future reports will be phased to reflect milestones in the work of the Special Commission. Each report will contribute to the whole of the Special Commission Skytrain Review, which will be concluded in March 1999.

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SPECIAL COMMISSION OVERVIEW

2.0 SPECIAL COMMISSION ROLES AND RESPONSIBILITIES

2.1 BACKGROUND

Provision of expanded rapid transit rail service is a cornerstone to implementing the vision of a sustainable region set out in the Greater Vancouver Regional District (GVRD) growth management strategy, the *Livable Region Strategic Plan* (see Appendix #9). The decision by the provincial government to move ahead on an accelerated project to extend Skytrain service in the Lower Mainland along the Broadway-Lougheed-Coquitlam-New Westminster corridor was taken to help realize that vision.

The need for regional rapid transit to help shape growth and protect the environment and quality of life in Greater Vancouver is recognized in the *Livable Region Strategic Plan*, and widely acknowledged by the public. Such an urban infrastructure project must be designed, built and operated in a manner that fulfills the long-term vision for the region. The Special Commission was appointed to help reach this goal.

There are other possible rapid transit corridors which will receive attention in the future that could connect with Skytrain. One possibility is for an east-west link as far as the University of British Columbia, and another is a south-north link from Richmond to the Vancouver Airport and to downtown Vancouver. There is also a preliminary study being done on a possible future Skytrain extension to Coquitlam Centre. None of these possible future rapid transit projects, however, are dealt with in this report, which addresses only the accelerated project.

While there are other possible rapid transit corridors which will receive attention in the future, none of these are dealt with in this report, which addresses only the accelerated project.

The role of the Special Commission Skytrain Review is clearly defined by these terms of reference in the context of the decisions already made regarding technology and accelerated timeline.

2.2 TERMS OF REFERENCE

In appointing the Special Commissioner the provincial Cabinet framed a mandate for the Skytrain Review. The terms of reference provide direction on the task to be accomplished while leaving flexibility for the Special Commissioner to design the best possible process to consider issues and complete the review in a timely manner. These terms of reference, dated September 16, 1998, are:

Terms of Reference

The provincial government has made a decision to use ALRT (Skytrain) technology and appointed a Special Commission that will focus on the following:

The Commission is to:

1. Review environmental issues related to construction and operation of the proposed Skytrain project.
2. Design and implement a public consultation process to receive input in order to carry out this assignment.
3. Monitor and receive input from the RTPO neighbourhood consultation process in order to provide advice and recommendations on Skytrain routes and related environmental impacts.
4. Develop recommendations for preventing and mitigating any environmental impacts.
5. Work with the Canadian Environmental Assessment Agency to develop and maintain a cooperative and harmonized review with federal agencies.
6. Ensure the review process is open, transparent, neutral and comprehensive.
7. Ensure that all relevant information is readily accessible within the Greater Vancouver Regional District.
8. Prepare an interim report to Cabinet summarizing the public input, and making specific recommendations with respect to the Skytrain project by December 1998.
9. Provide ongoing independent follow-up and monitoring throughout the design phase of the project.

In conducting the review process:

- the Special Commission will have dedicated staffing resources assigned from the British Columbia Environmental Assessment Office; and
- the Special Commissioner and staff from the EA Office will have the full cooperation of, and access to information from, all relevant provincial ministries, authorities and agencies.

The role of the Special Commission Skytrain Review is clearly defined by these terms of reference in the context of the decisions already made regarding technology and accelerated timeline. Within the parameters of these basic decisions, the mandate provides a broad scope for reviewing and shaping public process, facilitating

stakeholder involvement and cooperation, and making recommendations on a comprehensive range of environmental issues, including urban as well as biophysical environmental concerns.

This mandate allows the Special Commission to not only make recommendations for prevention and mitigation of environmental impacts, but also to identify new opportunities presented by the accelerated project and to recommend positive urban environmental improvements that will result in a legacy for the community.

An important part of the role of the Special Commissioner is to exercise judgement in determining the approach that will best fulfill the Special Commission's terms of reference within the given timeframe.

2.3 SPECIAL COMMISSION APPROACH

2.3.1 Roles and Relationships

The Special Commission is an independent, neutral body which makes recommendations to Cabinet and the public. Its job is to help ensure that environmental and community issues and concerns are appropriately considered in the planning, design, construction and operation of the accelerated project.

The primary task of the Special Commission is to review the work of the project proponent — the Rapid Transit Project Office (RTPO) — and make recommendations that assist in avoiding, minimizing or mitigating environmental impacts of the project. The Special Commission will review and advise on the RTPO's work in identifying and addressing major environmental issues such as biophysical environment, crime and safety, noise and vibration, visual impacts and aesthetics, and station integration and connectivity with the community and its transportation system.

While the Special Commission also has a role in helping to ensure adequate public process — including review of the RTPO's Neighbourhood Consultation Program regarding route alignment and station locations, which commenced prior to the creation of the Special Commission — it is not the Special Commission's intention to duplicate this process or make alternative recommendations on route alignment and station locations. In this aspect of its role, the Special Commission's purpose is to evaluate the success of the RTPO's process in meeting principles and criteria for public consultation, resolving issues and serving the intent of the *Livable Region Strategic Plan*.

In relationship to the RTPO, The Special Commission is acting as an advisor, monitor and evaluator in matters of project planning, design and processes being developed by the RTPO. The Special Commission and the RTPO are separate,

The Special Commission's job is to help ensure that environmental and community issues and concerns are appropriately considered in the planning, design, construction and operation of the accelerated project.

The Special Commission and the Rapid Transit Project Office are separate, independent entities with very different mandates, roles and responsibilities.

independent entities with very different mandates, roles and responsibilities. It is important that the relationship and distinctions between the two bodies are understood, particularly since both will be producing materials regarding the project for distribution. It is important that authorship of these documents be clear to the public.

The Special Commission and the RTPO want to ensure an effective working relationship while respecting each other's independence and respective mandates. To accomplish this, the RTPO and the Special Commission developed a working agreement that outlines how the offices will work together to help ensure the accelerated project is designed, reviewed and built in a manner that addresses public expectations of efficiency, timeliness and minimization of environmental impacts.

The Special Commission also has an important role in direct public and stakeholder consultation regarding potential accelerated project impacts, benefits and mitigation. In this role, the Special Commission is acting as a facilitator of public process by disseminating information, compiling public input, and reporting on public perspectives, concerns and ideas. The Special Commission's conclusions and recommendations will reflect both technical analysis and public feedback.

An important part of the Special Commission's public facilitation role is to encourage and support community efforts to realize positive benefits from the accelerated project. To accomplish this, the Special Commission is acting as a focal point for public ideas and perspectives that could contribute to a Skytrain Community Legacy Program.

Finally, the Special Commission acts in the role of inter-agency coordinator to help ensure efficient information sharing and cooperation in assessment processes among the many government agencies with an interest in the accelerated project. Numerous federal, provincial, regional and local government agencies have legal authority and responsibilities for reviewing specific aspects of major construction projects. The Special Commission process does not replace the statutory roles of other agencies but rather helps facilitate and address their information and process needs by establishing collaborative working relationships, including sharing of technical expertise and other resources.

2.3.2 Working Approach

In conducting its processes and developing its reports, conclusions and recommendations the Special Commission is taking an approach that:

- Is focused on broad, system-wide issues;
- Is open, proactive, positive and forward looking;
- Has the flexibility to identify and resolve issues of relevance;

- Respects private rights and entitlements while addressing the public interest;
- Facilitates solution finding;
- Promotes coordinated processes and information flow; and
- Maintains an independent and neutral review process.

The Special Commission is unique as a government appointed review entity that will provide its reports simultaneously directly to the provincial Cabinet and to the general public.

2.3.3 Special Commission Accountability

The Special Commissioner prepares reports for Cabinet which are public documents. The Environmental Assessment Office provides the Special Commissioner with technical and administrative support. The Special Commission is unique as a government appointed review entity that will provide its reports simultaneously directly to the provincial Cabinet and to the general public. This will serve both the neutrality and the transparency of the Special Commission's process. In addition to formal reporting, the Special Commission will continue to provide information briefings to stakeholder groups, Council and staff of local governments, members of the Inter-Governmental Advisory Committee (IAC), local media, MLAs and MPs.

2.3.4 Context of Review

One of the primary characteristics of the accelerated project is that it is being developed within an urban area following extensive planning and public involvement over the previous decade. This process identified, through numerous studies and significant public participation, specific regional transportation corridors and concluded that rapid transit was required as a cornerstone of the *Livable Region Strategic Plan*. The selected corridors necessarily pass through an already developed urban environment where people live and work.

This circumstance means that some urban environmental impacts are inevitable, but it also demands that those affected must be involved in seeking solutions and making trade-offs designed to prevent or mitigate potential impacts. A significant public process must be provided in an environmental review of an urban infrastructure development like the accelerated project. The Special Commission's review is focused on people processes as much as on technical assessment.

Although altered by human settlement, the urban biophysical environment contains natural features that are significant particularly because of their scarcity. Urban residents live, for the most part, in a built environment and have fewer opportunities to enjoy nature in their daily lives. Areas that provide green space and wildlife habitats are therefore important both to urban biodiversity, and to people's quality of life and their appreciation of natural values. At the neighbourhood level, these

An urban area is more than a physical space filled by people and buildings. It is a living community with a history, governance system, culture and plans for the future. The review of the accelerated project must consider this much broader context.

features are of special concern. While there may be fewer natural features in an urban landscape requiring protection or mitigation, there also may be opportunities to create new green space or other improvements that enhance the biophysical environment to the benefit of the community.

In addition, an urban area is more than a physical space filled by people and buildings. It is a living community with a history, governance system, culture and plans for the future. The review of the accelerated project must also consider this much broader context to ensure a balance of both regional and neighbourhood perspectives while respecting private rights and entitlements. Furthermore, the urban context of the accelerated project means that a large number of government agencies have a mandated interest in the project, creating a complex web of jurisdictions, roles and responsibilities. The Special Commission is coordinating the Skytrain Review process with these agencies.

Recognition of the value of rapid transit to the future of Greater Vancouver is embedded in the *Livable Region Strategic Plan* and is a matter of broad public consensus. Acting on opportunities to effectively manage growth and meet other objectives of the *Livable Region Strategic Plan* is an urgent priority. The efficiency and timeliness of the Special Commission's review process will be important to meet the schedule of the accelerated project.

The dynamics of the process and the accelerated project schedule dictate that the Special Commission Skytrain Review be an iterative rather than a linear process. Not all stages of the process will move forward at the same time for all segments of the accelerated project, and resolution of issues may create changes and adjustments throughout the course of project development. While the Special Commission's processes will be as anticipatory as possible, and opportunities for fine-tuning will naturally diminish as the accelerated project progresses, it should be expected that some parts of the project planning may move ahead before all issues can be fully resolved.

3.0 SPECIAL COMMISSION PROCESS

3.1 AREAS OF FOCUS

To carry out its terms of reference the Special Commission has identified the following key areas of focus:

Impacts of the Project on the Biophysical Environment

The Special Commission will review potential major impacts of the accelerated

project on the biophysical environment that have been identified, and the RTPO's proposed measures to prevent, minimize or mitigate negative impacts or enhance benefits.

Impacts of the Project on the Urban Environment

A major urban public infrastructure project has potential impacts on people, their communities and the urban built environment. The Special Commission will review potential major impacts of the accelerated project on the urban environment that have been identified — including crime and safety issues, noise and vibration issues, visual impacts and aesthetics issues and station integration — and the RTPO's proposed measures to prevent, minimize or mitigate negative impacts or enhance benefits.

Approach Used for Route Alignment and Station Location Design

The RTPO is responsible to undertake public consultation for selection of route alignment and station locations. The Special Commission's task is to audit this process and to review the RTPO's overall approach to route alignment and station location design. The overall objective is to help ensure that the work of the RTPO is undertaken in a professional manner and results in a design program that identifies and addresses the concerns and issues of community, government and public stakeholders.

Project Monitoring and Issue Resolution

The Special Commission is responsible to provide ongoing and independent follow-up and monitoring through the design phase of the accelerated project. The Special Commission will monitor and contribute to the RTPO's processes of identifying project impacts and issues, and measures to address impacts and resolve issues.

Identification of Opportunities for Skytrain Community Legacy

The Special Commission will focus on the realization of community benefits through creation of a Skytrain Community Legacy Program as an integral part of the processes of public and stakeholder consultation, inter-agency coordination, issues identification, review of impacts and mitigation, and ongoing project monitoring.

3.2 PROCESS FOR REVIEWING IMPACTS, BENEFITS AND MITIGATION

There are several parts to the Special Commission's process. The primary information to be reviewed by the Special Commission is provided by the RTPO in the form of plans and designs, reports and technical studies. The Special Commission also solicits and compiles information, feedback and expert opinion from other stakeholders and sources, including federal, provincial, regional and local governments and agencies, the public, and independent sources. This includes review by the Inter-Governmental

Recognition of the value of rapid transit to the future of Greater Vancouver is embedded in the Livable Region Strategic Plan and is a matter of broad public consensus. Acting on opportunities to effectively manage growth and meet other objectives of the Livable Region Strategic Plan is an urgent priority.

Five key issue categories — biophysical environment, crime and safety, noise and vibration, visual impacts and aesthetics, and station integration — will be used as a framework for reviewing both system-wide and location specific issues.

Advisory Council (IAC) described in section 3.5.1.

Information, once collected, is then made widely available and provides a focus for additional feedback from stakeholders, public discussion, and Special Commission consultations or further study. This includes formal public consultation through the Special Commission's Public Meetings described in section 3.4.3, and expert technical review through the Special Commission's Technical Forums described in section 3.2.3. Where beneficial, the Special Commission takes existing information and reformats or summarizes this information to make it more accessible and easier to interpret. Examples include sections of this Interim Report, and maps produced by the Special Commission through its Geographic Information System (GIS) described in section 3.2.4.

The results of this information review process are analyzed by the Special Commission for the purposes of issue identification and issue resolution, and form the basis for Special Commission reports, conclusions and recommendations.

3.2.1 Key Issue Categories

Based on the information received to date by the Special Commission, including documents provided by the RTPO, information gathered in direct consultations with stakeholders, and public input, the key environmental issue categories listed below have emerged. For purposes of organizing information and developing reports, conclusions and recommendations, the Special Commission will use these categories as a framework for reviewing both system-wide and location specific issues. Issues that do not strictly fall within these categories will not, however, be ignored, but will for convenience be captured under the most appropriate heading:

- *Biophysical Environment*, which will include issues relating to the natural environment such as streams and fish habitat, vegetation and bird habitat;
- *Crime and Safety*, which will deal with public safety and security;
- *Noise and Vibration*, which includes impacts related to both construction and operation;
- *Visual Impacts and Aesthetics*, which will address issues related to the cityscape; and
- *Station Integration*, which will cover those issues related to *connectivity*, or the efficient movement of people, and the manner in which a station fits within the local neighbourhood and community.

Some of these categories capture primarily *systemic* issues, others involve unique, *location specific* concerns, and some include system-wide, *recurrent*, site specific issues. The information to be reviewed in some categories, for example biophysical environment, is largely technical in nature and comes from RTPO reports, technical studies

and other expert sources. In other categories, such as visual impacts and aesthetics, much of the information to be reviewed comes from public input. In categories such as station integration, there is a large body of information to review from both types of source.

3.2.2 Legacy Opportunities

The accelerated project presents significant opportunities for associated benefits that could be realized by both the communities that the line serves, and the neighbourhoods along the Skytrain corridor. Some of these benefits may result from enhancements required as part of impact mitigation measures, but others may be beyond the scope of the accelerated project and more appropriately the responsibility of governments or local community groups. The Special Commission will work with communities to identify and evaluate opportunities for a Skytrain Community Legacy Program as part of its Skytrain Review.

The Special Commission will also act as a facilitator to encourage identification and proposal of positive community programs and projects which enhance the linkage between Skytrain, neighbourhoods and communities. Ideas, perspectives and proposals for consideration are being received through the Special Commission's public processes. The Special Commission has already heard from numerous individuals and organizations suggesting legacy initiatives related to greenways, urban habitat enhancement, and pedestrian and cycle commuting enhancements.

The Special Commission has developed for public review a proposed approach, criteria and components for a Skytrain Community Legacy Program, and has made a very preliminary identification of opportunities, all of which are outlined in section 17.0 of this report. To help ensure that benefits do accrue to communities that go beyond mitigation of impacts, the Special Commission will report its conclusions and recommendations on Skytrain Community Legacy in March, 1999.

3.2.3 Technical Forums

A series of issue-specific Technical Forums will be held by the Special Commission in early 1999 to focus on the key topic areas which have been identified as a result of technical and public input to date (see key issue categories in section 3.2.1). Technical Forums will be conducted on biophysical environment issues, crime and safety issues, noise and vibration issues, and station integration issues. Issues relating to visual impacts and aesthetics will be discussed throughout these four Technical Forums rather than be the subject of a separate forum.

The Special Commission will work with communities to identify and evaluate opportunities for a Skytrain Community Legacy Program as part of its Skytrain Review.

The objective of the Special Commission's Technical Forums will be to review the technical studies of the RTPO, to obtain expert opinion and hear public comment on specific issue areas, and to focus on proposed mitigation and design solutions.

The objective of the forums will be to review the technical studies of the RTPO, to obtain expert opinion and hear public comment on these specific issue areas, and to focus on proposed mitigation and design solutions. In the forums, the Special Commission, assisted where required by independent experts, will consult directly with representatives from the RTPO to gain clarification on completed studies and reports. The specialists will provide expert advice on the accelerated project. Members of the public are welcome to observe the forums and provide comments on the specific issue topics. The information resulting from the forums will be summarized for discussion at the Special Commission's open Public Meetings (see section 3.4.3) which will follow the Technical Forums.

Dates, locations and times of Technical Forums and Public Meetings will be advertised locally, and will be available through all Special Commission information source points listed in section 3.4.1.

3.2.4 Geographic Information System

The Special Commission has developed a significant information tool to assist its review of project impacts, benefits and mitigation. With the Geographic Information System (GIS), the Special Commission can generate project maps which superimpose basic accelerated project data showing route alignment and station locations onto mapping obtained from other government sources including the GVRD, BC Transit and local governments. Thus, the Special Commission is able to generate consolidated visual representations of the accelerated project service area, which show how the accelerated project geographically relates to such things as current zoning and land use designations, existing bus routes, green space and parks, schools, and heritage sites in the GVRD.¹ This Special Commission product will be made available to regional and local governments as an ongoing planning tool.

3.2.5 Evaluation Criteria

The Special Commission has adopted or adapted evaluation criteria for reviewing project impacts, benefits and mitigation from a variety of recognized sources.

Overarching principles of the Special Commission Skytrain Review are:

- Learn from past experiences in developing Skytrain;
- Ensure equitable distribution of benefits and impacts;

¹ A complete listing of the types of data incorporated in the GIS system can be seen in Appendix #1. The GIS system will be used as a primary tool to assemble data for analysis.

- Complement the *Livable Region Strategic Plan* in supporting:
 - the protection of the Greater Vancouver Green Zone,
 - the development of complete communities, and
 - the realization of a compact metropolitan region;
- Subscribe to Official Community Plans, as appropriate; and
- Respect local governments’ right to make decisions.

The Special Commission is using a broad frame of reference to assess environmental impacts of the accelerated project, considering both biophysical and urban environmental issues. The Skytrain Review is taking into consideration evaluation criteria developed by the Environmental Assessment Office and other bodies; recommendations by the provincial Ombudsman regarding the first Skytrain project in 1986, which are contained in the *Ombudsman Skytrain Report: Public Report No. 8, November 1987* (see Appendix #6) and the RTPO’s own criteria for design of route alignment and station locations, reproduced in full in Appendix #2 and summarized below:

The Special Commission is using a broad frame of reference to assess environmental impacts of the accelerated project, considering both biophysical and urban environmental issues.

SUMMARY OF RTPO DRAFT EVALUATION CRITERIA
(for Route Alignment and Station Location Process)

CRITERIA	ISSUE
1. Preserving Community Values and Quality of Life	Privacy View obstruction Over-shadowing Noise and vibration Community mobility Increasing traffic activity
2. Environmental	Business and residential Vegetation/wildlife Aquatic Archaeological and heritage sites
3. Managing Future Growth	Existing land uses Future land uses
4. Making Sure the System is Buildable	Utilities Soil conditions Schedule
5. Making Sure the System is Affordable and Timely	Construction costs Operating costs Risk
6. Increasing Access to Transit and Promoting Transit Use	Access to the system Service area population Geometry Travel time

“I strongly support the decision to use Skytrain technology on the proposed transit lines.”

— Written submission to the Special Commission

“While I am for increasing the provision of rapid transit, I am opposed to the current plan.”

— Written submission to the Special Commission

3.3 PROCESS FOR REVIEWING ROUTE ALIGNMENT AND STATION LOCATION APPROACH

3.3.1 Monitoring Public Consultation

In late summer 1998, the RTPO initiated a multi-faceted, iterative consultation program to help ensure that all public potentially affected by or interested in the accelerated project had the necessary information to formulate informed opinions and provide meaningful input.² The RTPO’s Neighbourhood Consultation Program is based on the following stated principles of design:

- The need to offer broad public access to information, input and involvement in the project;
- Open, honest and direct communications must be followed to facilitate meaningful information exchange;
- Expectations, roles and opportunities for public input and participation must be clearly defined;
- Appropriate venues and mechanisms for timely and effective public input must be provided;
- Public input will be acknowledged and incorporated into project plans and decisionmaking; and
- The public will be continually updated on ongoing decisions and their outcome.

The Special Commission has monitored all RTPO Neighbourhood Consultation Program open houses since mid-September, 1998, and has reviewed the RTPO’s open house reports. The purpose of monitoring is to review the thoroughness and success of the RTPO’s public process in achieving the stated principles and objectives, and to gain insights into the project and public perspective.

The Special Commission is tracking the issues identified by the RTPO in consultations with the public and other stakeholders. Where possible, the Special Commission provides comment and advice to the RTPO on the effectiveness of the RTPO public consultation process, improvements that can be made to the process and possible measures to resolve issues.

Monitoring will continue until a final preferred route alignment and station location design has been proposed, the RTPO has issued all associated reports, and a final route alignment and station location design has been completed by the RTPO.

² For a schedule of RTPO Neighbourhood Consultation Program open houses held to date, see Appendix #7.

Any related issues identified in future will be reported on in the Special Commission's Key Environmental Issues Reports.

3.3.2 Evaluation Criteria

The Special Commission used a variety of criteria in assessing the RTPO Neighbourhood Consultation Program for identifying preferred route alignment and station locations. The following were considered:

Public Notification

- Were adequate measures taken for notifying the public?
- Did the process encourage the involvement of all stakeholders?

Program Design

- Were the purpose and objectives of the public involvement process clearly presented?
- Was the public involvement process open and transparent?
- Did all participants understand the public involvement process structure and timing?
- Were lessons from previous experiences applied?
- Did the process foster creativity?
- Was the process adaptable to participants' needs? Did it suit the objectives of all participants?
- Did participants and presenters have a similar perception of what was being discussed, and did the process allow for the development of a clear understanding of the impacts of the accelerated project?
- Were conflicts addressed at the appropriate time in the process and was conflict resolution successful?
- Did the process adequately involve elected representatives?

Resourcing the Process

- Was the process sufficiently staffed and were presenters adequately prepared?
- Were there adequate resources (financial, staff, community) to achieve the stated objectives?

Effective Communication

- Were all communications for the public involvement process effective and inclusive, and were all necessary issues covered?
- Were participants adequately provided with timely, concise, understandable information in an appropriate medium or format?
- Did the process adequately address situations where participants have different levels of information?

“The longer we fight over the type of transportation needed, the longer we fight over the environmental impacts, the longer we fight over the route, the more we’ll end up in gridlock traffic without such a system.”

— Written submission to the Special Commission

The Special Commission recognizes that input from a well-informed public is necessary in a review process that is thorough, open, transparent, neutral, comprehensive, and informed by a public perspective.

- Was the public adequately advised on the consequences of specific actions or alternative solutions?

Feedback and Closure

- Were the stated objectives of the public involvement process successfully achieved?
- Were issues seen to be resolved fairly and objectively?
- Did participants feel their involvement was worthwhile?
- Was feedback provided to the public in a timely manner?
- Was the general public interest well-served in the process?
- Did the process contribute to the development of long-term relationships among participants and with the RTPO?

3.4 PROCESS FOR FACILITATING PUBLIC INVOLVEMENT IN THE SKYTRAIN REVIEW

Major goals for public participation in the Special Commission's review process are to:

- Ensure an open and accountable review process;
- Provide notification and information to the public at an early stage in the planning of the project;
- Ensure public input into the identification and resolution of concerns and issues about the project and their potential impacts; and
- Ensure that local information, knowledge and concerns contribute to both project design and decisionmaking processes.

3.4.1 Disseminating Information

The Special Commission wants to ensure that the public has access to relevant information and opportunities for input to the review process. The Special Commission recognizes that input from a well-informed public is necessary in a review process that is thorough, open, transparent, neutral, comprehensive, and informed by a public perspective.

To give the public access to information, the Special Commission makes the information it receives available through a variety of channels. This information includes the documentation submitted to the Special Commission by the RTPO; comments received from federal, provincial, regional and local governments; written comments from stakeholder groups and members of the public; and existing public documents that provide context for the accelerated project and the

review. This information is being made available through:

- A Special Commission web site, described in Appendix #3, where the public can view project reports and comments that are submitted to the Special Commission;
- Information viewing sites in 10 public library branches along the accelerated project corridor where the public can examine all the information submitted to the Special Commission;
- A continually updated Skytrain Project Registry³ which records and contains all completed RTPO accelerated project reports, public submissions, and other information;
- A Special Commission storefront office in East Vancouver at Commercial and Broadway where all information available is accessible for viewing by the public;
- Additional information access sites in the GVRD, including temporary offices in New Westminster and Burnaby, replaced by local municipal halls in 1999;
- Information packages available in local government offices; and
- A local public information telephone line to respond to requests for information.

All relevant contact numbers, addresses and locations are listed in Appendix #4.

3.4.2 Receiving Public Input

To create opportunities for public input into the review process, the Special Commission has established:

- A mailing address and an e-mail address for the public to send their comments or questions to the Special Commission;
- A drop-off point at the Special Commission Skytrain Review office in Vancouver for the public to submit written comments or questions;
- A web site “bulletin board” for the public to share their perspectives and ideas; and
- Dedicated local telephone and fax lines to receive feedback.

All relevant contact numbers and addresses are listed in Appendix #4.

3.4.3 Special Commission Public Meetings

Through monitoring the RTPO public open houses, the Special Commission has developed a good understanding of public issues and concerns — including the desire for open, town hall style public meetings — which has assisted in the design of

To give the public access to information and create opportunities for public input into the review process, the Special Commission makes the information it receives available through a variety of channels, and invites public comment by mail, e-mail, fax or phone.

³ A complete listing of all Special Commission Skytrain Registry documents to date can be found in Appendix #10.

The Special Commission will hold open Public Meetings early in 1999 to help identify and address both system-wide and location specific accelerated project impacts, benefits and mitigation.

the Special Commission's own public consultations. In addition, the Coalition for Skytrain Review, which represents the interests of a variety of regional environmental and transportation groups, the RTPO and other stakeholders have provided valuable perspectives. All of these have informed the Special Commission's planning for its own separate public consultation process in early 1999, which will focus on project impact, benefit and mitigation issues.

The Special Commission will hold a series of Technical Forums (see section 3.2.3), followed by Public Meetings in early 1999. These meetings will allow the public to discuss and provide broad comments on the work done to date by the RTPO in identifying and addressing both system-wide and location specific impacts, benefits and mitigation. Key objectives are to identify all potential impacts, find the best solutions for avoiding, minimizing or mitigating these, and look for opportunities to integrate the accelerated project positively within the community to best advantage.

Dates, locations and times of Technical Forums and Public Meetings will be advertised locally, and will be available through all Special Commission information source points listed in section 3.4.1.

In addition, the Special Commission is continuing to consult with stakeholders, including the local governments and the Coalition for Skytrain Review. The Special Commission will use this information to develop commentary, conclusions and recommendations on the work done by the RTPO to identify and address environmental impacts of the accelerated project.

3.4.4 Consultation with First Nations

The Special Commission is monitoring the RTPO's consultation process with First Nations, focused primarily on potential cultural and heritage impacts of the accelerated project. The RTPO has contracted with Visions First Nations Planning Group (Visions) to develop and implement a First Nations consultation strategy which is to be completed in March, 1999. To date, Visions has gathered and reviewed background information, identified and contacted the First Nations who have, or may have, interests in the accelerated project, and arranged follow up consultations. The First Nations include the Katzie, Kwayhquitlum, Musqueam, New Westminster, Squamish, Sto:lo, Tsawwassen, and Tsleil-Waututh (Burrard) bands. The Special Commission is advised that a number of initial meetings have been held with several First Nations.

In addition, an archaeological impact assessment will be conducted under the authority of a *Heritage Conservation Act* permit. The application for permit has been sent to First Nations for comment. It is anticipated that First Nations representatives will be directly involved in the impact assessment.

3.5 PROCESS FOR INTER-AGENCY COORDINATION

One of the Special Commission's roles is to promote inter-agency cooperation and coordination. The Special Commission will make best efforts to ensure that the issues are reviewed by agencies with the relevant mandate and expertise.

3.5.1 Inter-Governmental Advisory Committee

The Special Commission established the Inter-Governmental Advisory Committee (IAC) to facilitate cooperation and information exchange between federal, provincial and regional government agencies. The IAC reviews information provided to the Special Commission by the RTPO and provides technical analysis and strategic advice on matters such as the scope of the concerns, issue identification and resolution, and public consultation. Federal representatives keep other IAC members informed of the progress of the *Canadian Environmental Assessment Act* review.

The IAC helps ensure that information received from the RTPO is effectively shared among government stakeholders. This reduces the need for duplication of reporting by the RTPO. The objective is to allow government agencies and departments to maintain a broad, well-informed perspective on accelerated project issues and events. Where additional reporting specific to the needs of one agency is required, this can be quickly identified.

Local municipalities, while not members of the IAC, are in direct discussion with the RTPO on issues affecting local jurisdictions. The Special Commission will not re-assess agreements reached between local municipalities and the RTPO on route alignment and station locations, however the Special Commission continues to keep municipal officials informed and receive their input.

The IAC membership consists of:

Federal

- Canadian Environmental Assessment Agency
- Department of Fisheries and Oceans
- Canadian Coast Guard
- Environment Canada
- Health Canada

Provincial

- Special Commission (Committee Chair)
- Ministry of Environment, Lands and Parks
- Ministry of Municipal Affairs and Housing

The Special Commission has established the Inter-Governmental Advisory Committee to facilitate cooperation and information exchange between federal, provincial and regional government agencies, and to provide technical analysis and strategic advice.

Once potential impacts and mitigation measures have been identified, there remains the need to set in place a way to monitor the progress of the accelerated project through construction and operation to help ensure that commitments are effectively carried out.

- Ministry of Small Business, Tourism and Culture
- Ministry of Transportation and Highways
- BC Assets and Land Corporation
- Simon Fraser Health Region
- BC Transportation Financing Authority

Regional

- Greater Vancouver Regional District
- Greater Vancouver Transportation Authority
- BC Transit

3.6 PROCESS FOR PROJECT MONITORING AND ISSUE RESOLUTION

While the RTPO has direct responsibility for identification and resolution or mitigation of impacts and issues, the Special Commission contributes to this process by offering opportunities for discussion and problem solving through Technical Forums, Public Meetings, and the IAC. In addition, the Special Commission updates the RTPO with public, stakeholder and government feedback at regular bi-monthly meetings to help ensure issues are brought forward and addressed at the earliest possible stage of the project.

Once potential impacts and acceptable measures to address negative impacts have been identified, there remains the need to set in place a way to monitor and evaluate the progress of the accelerated project through construction and operation to help ensure that commitments made during project development are effectively carried out.

3.7 PROCESS FOR REPORTING

The Special Commission will release a series of reports and supporting documentation over the course of its work. This body of work is intended to be taken collectively and each report will add to — rather than replace — the preceding reports.

Report products to be issued by the Special Commission will include:

1. *Special Commission Reports*, which will be core documents pursuant to the Special Commission's mandate, and will incorporate information, conclusions and recommendations. Special Commission reports planned include this Interim Report, and a series of Key Environmental Issues Reports and a Report on Skytrain Community Legacy in February and March, 1999.

2. *Reference Materials*, such as: a compilation of comments and submissions received by the Special Commission; a list of Special Commission Skytrain Project Registry documents; Special Commission public information source points and contact numbers; Special Commission news releases; and other important documentation. Reference materials will be issued as Appendices and updated as required. In addition, maps produced through the Special Commission's GIS system will be issued.

Reports on the five key environmental issues, and on the Skytrain Community Legacy Program, will be produced after the Technical Forums and Public Meetings, and a thorough review of all input received by the Special Commission.

3.7.1 Key Environmental Issues Reports

In the Interim Report, the Special Commission summarizes the RTPO's work by identifying key environmental issues categories and providing an initial scoping of both system-wide issues and location specific issues. This initial description of key environmental issues reflects the priority being placed on these areas by the Special Commission.

Reports on the five key environmental issue categories will be produced after the Technical Forums and Public Meetings, and a thorough review of all input received by the Special Commission:

Key Environmental Issue Report on Biophysical Environment

This report will cover both system-wide issues and location specific issues relating to the natural environment, including green space, vegetation, riparian habitats, wildlife habitats, and air quality. In addition, archaeological issues will be addressed in this report. The report will summarize the work of the RTPO in identifying and addressing issues, as well as the Special Commission's evaluation and advice on any further work that may be required on prevention, reduction and mitigation of accelerated project impacts by the RTPO. The Special Commission's conclusions and recommendations on biophysical environment impacts, benefits and mitigation will be provided.

Key Environmental Issue Report on Crime and Safety

This report will cover both system-wide issues and, more particularly, location specific issues relating to public safety and security, including public perceptions of crime issues, and avoidance of risks to public safety through station location and design approaches. The report will summarize the work of the RTPO in identifying and addressing issues, as well as the Special Commission's evaluation and advice on any further work that may be required on prevention, reduction and mitigation of accelerated project impacts by the RTPO. The Special Commission's conclusions and recommendations on crime and safety impacts, benefits and mitigation will be provided.

The Special Commission's review of station integration includes issues relating to connectivity, or the efficient movement of people, and the manner in which stations fit within local neighbourhoods and communities.

Key Environmental Issue Report on Noise and Vibration

This report will cover both system-wide issues and, more particularly, location specific issues relating to noise and vibration associated with accelerated project construction and Skytrain operation. The report will summarize the work of the RTPO in identifying and addressing issues, as well as the Special Commission's evaluation and advice on any further work that may be required on prevention, reduction and mitigation of accelerated project impacts by the RTPO. The Special Commission's conclusions and recommendations on noise and vibration impacts, benefits and mitigation will be provided.

Key Environmental Issue Report on Visual Impacts and Aesthetics

This report will cover both system-wide issues and, more particularly, location specific issues relating to visual impacts and aesthetics of the accelerated project within the cityscape. The report will summarize the work of the RTPO in identifying and addressing issues, as well as the Special Commission's evaluation and advice on any further work that may be required on prevention, reduction and mitigation of accelerated project impacts by the RTPO. The Special Commission's conclusions and recommendations on visual and aesthetic impacts, benefits and mitigation will be provided.

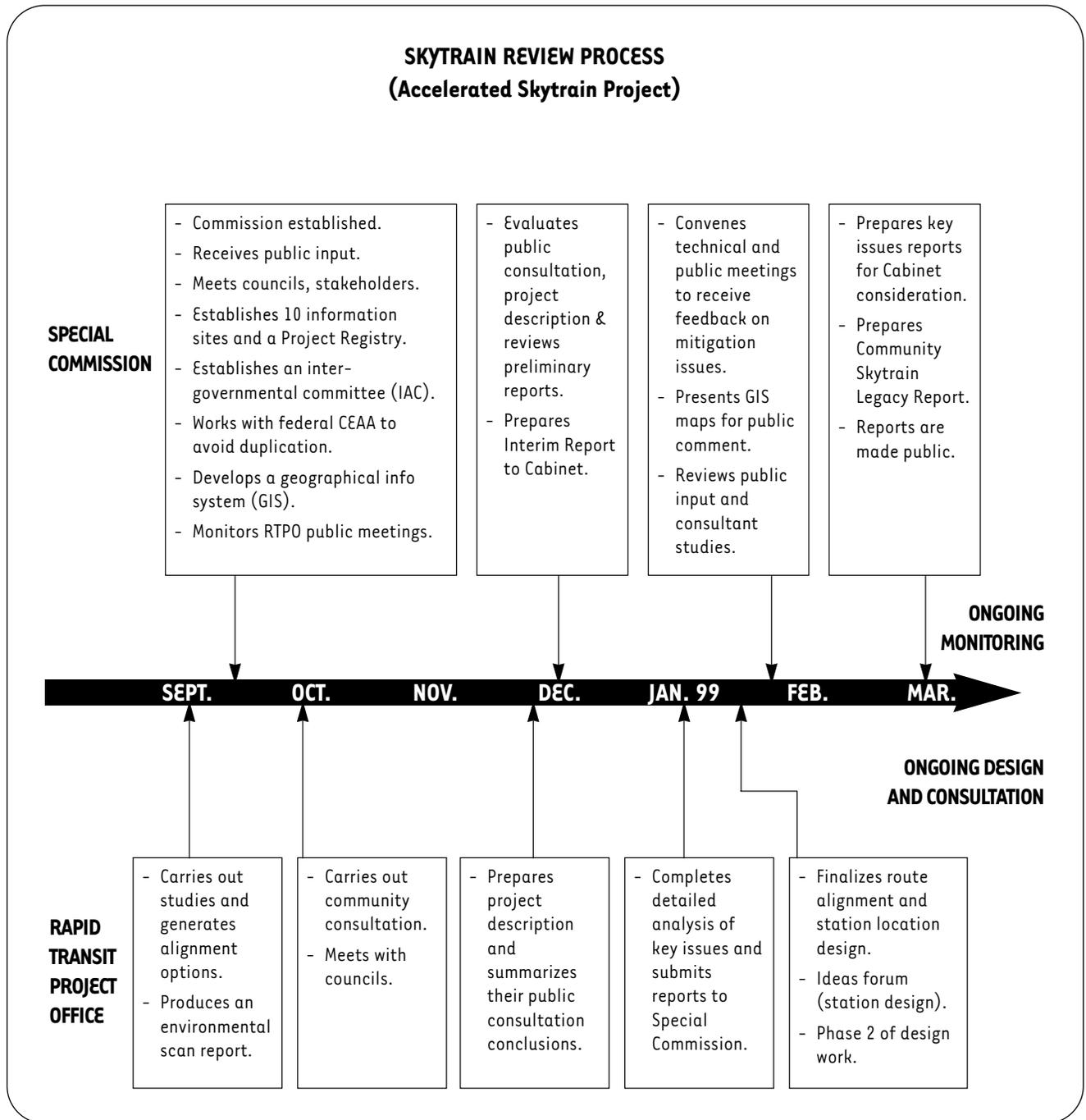
Key Environmental Issue Report on Station Integration

This report will cover both system-wide issues and location specific issues relating to *connectivity*, or the efficient movement of people, and the manner in which stations fit within local neighbourhoods and communities. This report will focus on topics such as integration of regional transit hubs which connect the accelerated project to other Skytrain lines and transit infrastructure such as bus lines, to other transportation modes, and to potential future public transit. It will also address issues related to such community concerns as traffic patterns, system access, park-and-ride facilities, and neighbourhood disruption. Finally, it will look at growth management and growth shaping issues associated with transportation infrastructure development, as contained in the *Livable Region Strategic Plan* for Greater Vancouver. The report will summarize the work of the RTPO in identifying and addressing issues, as well as the Special Commission's evaluation and advice on any further work that may be required on prevention, reduction and mitigation of accelerated project impacts by the RTPO. The Special Commission's conclusions and recommendations on station integration impacts, benefits and mitigation will be provided.

In addition, a sixth report will be issued in March, 1999 by the Special Commission on approaches and projects which could contribute to a Skytrain Community Legacy Program.

4.0 SPECIAL COMMISSION WORKPLAN AND TIMELINE

The workplan and timeline of the Special Commission is summarized in the chart below:



Special Commission milestones to date include establishment of the IAC, the Skytrain Project Registry, an information distribution and public feedback network, and the GIS mapping system, among others.

4.1 MAJOR ACTIVITIES TO DATE

The first priorities for the Special Commission were to meet regularly with the RTPO, key government agencies and stakeholder groups; develop an understanding of the accelerated project; identify what assessment information was required from the RTPO; and gather and distribute project information through a variety of channels.

The Special Commission also monitored the Phase 1 Neighbourhood Consultation Program open houses held by RTPO, and began preparing for the Special Commission's Technical Forums and Public Meetings in January.

Key milestones include: establishment of the Inter-Governmental Advisory Committee (IAC); initiation of the Skytrain Project Registry and a distribution network for project information; launch of the Special Commission web site; development of the Geographic Information System (GIS) mapping capability; and substantial completion of the Special Commission's review of the RTPO's approach to route alignment and station location design.⁴

4.2 NEXT STEPS

The Special Commission is continuing to receive, review and disseminate project information from the RTPO and other sources as described in section 3.0. The Special Commission's priorities in the weeks ahead will be ongoing monitoring; preparing for and conducting the Technical Forums described in sections 3.2.3 and Public Meetings described in section 3.4.3; compiling and analyzing information to prepare the Key Environmental Issues Reports discussed in section 3.7.1; and developing conclusions and recommendations. The Special Commission will also begin to identify and evaluate opportunities for Skytrain Community Legacy discussed in section 17.0.

⁴ To review public announcements to date from the Special Commission, see Appendix #8: Special Commission News Releases.

THE SKYTRAIN PROJECT

5.0 PLANNING FOR GROWTH AND PUBLIC TRANSIT IN GREATER VANCOUVER

5.1 BACKGROUND AND HISTORY

The GVRD has filed with the Special Commission a report entitled *Light Rapid Transit: The Cornerstone of the Livable Region Strategic Plan's Growth Management Strategy* (November 1998). Section 5.1 of the Interim Report is based on excerpts from the GVRD report, and represents the GVRD's perspective.

In the late 1980s, the GVRD Board became concerned about the impact of rapid growth in the region and initiated a research and consultative process which led to a policy document entitled *Creating Our Future*. This policy was adopted by the GVRD Board in July, 1990 and reviewed and re-adopted in 1992 and 1996.

Creating Our Future contains the following vision statement:

Greater Vancouver can become the first urban region in the world to combine in one place the things to which humanity aspires on a global basis: a place where human activities enhance rather than degrade the natural environment, where the quality of the built environment approaches that of the natural setting, where the diversity of origins and religions is a source of social strength rather than strife, where people control the destiny of their community, and where the basics of food, shelter, security and useful activity are accessible to all.

This vision became the foundation for the first effort to produce a growth management

The accelerated project is being developed following extensive planning and public involvement over the previous decade. Recognition of the value of rapid transit to the future of Greater Vancouver is embedded in the Livable Region Strategic Plan.

“The discussions on LRT or equivalent approaches have been going on for too many years between various levels of government. I applaud the provincial government taking the lead in getting the project rolling quickly.”

— Written submission to the Special Commission

“Although I don’t necessarily agree with anything this government does, the proposal for the Skytrain is a necessity.”

— Written submission to the Special Commission

and transportation plan jointly with the involvement of the implementing agencies (the municipalities and the provincial government) and resulted in the *Livable Region Strategic Plan* (see Appendix #9) and the *Transport 2021* Long Range and Medium Range Plans.

In January, 1996 the GVRD Board, with the formal support of all 20 municipalities, adopted the *Livable Region Strategic Plan*, incorporating by reference the policies of *Transport 2021*. In February, 1996 the Minister of Municipal Affairs approved an order under the *Growth Strategies Act* recognizing the *Livable Region Strategic Plan* as a regional growth strategy.

There are four main components of the *Livable Region Strategic Plan*:

- *Protect the Green Zone* by working with municipalities to set aside areas of productive agricultural land, working forests, watershed areas, environmentally sensitive areas and regional open spaces, thereby defining the area local governments can use for building cities and towns;
- *Build Complete Communities* rather than “bedroom suburbs” or “executive downtowns” by providing opportunities to work, shop, learn or play within easy reach of home;
- *Achieve a Compact Metropolitan Region* by accommodating about 70 per cent of the next million people in the existing built-up urban area comprising Vancouver, Burnaby, New Westminister, the Northeast Sector and North Surrey-North Delta; and
- *Increase Transportation Choice* by giving priority to walking, cycling, transit, goods movement and then the private auto.

As the *Livable Region Strategic Plan/Transport 2021* policies moved towards adoption, the Province and the GVRD began to search for a way to build and finance the top-priority Broadway-Lougheed-Coquitlam-New Westminister rapid transit project.

The results of this process were contained in the Province’s two policy documents, *Going Places: Transportation for British Columbians* and *In Transit: People Moving People*, issued in September, 1995. They proposed conventional light rail technology and the completion of the Broadway to Coquitlam Centre portion of a light rail transit (LRT)⁵ system by 2005, with a link to New Westminister by 2008, subject to the development of cooperative planning and financial arrangements with local government.

The *Livable Region Strategic Plan* focus on automobile restraint is supported by the *Air Quality Management Plan* adopted by the GVRD Board of Directors in December, 1994. The GVRD *Air Quality Management Plan* predicts declining air quality in the

⁵ Light rail transit (LRT) systems can be at grade (often on existing roadways) or on grade separated guideways (above the road or in a tunnel), but all involve a fixed rail line. They are driver operated and powered by overhead electric wires. Automated Light Rail Transit (ALRT) systems — such as Skytrain — are computer driven, largely grade separated, and must be on dedicated right-of-way.

period beyond the year 2000 unless trends of increasing automobile use in the region are not countered with more sustainable transportation options such as public transit.

Rapid transit in the Coquitlam-New Westminster, Broadway-Lougheed and Vancouver-Richmond corridors is a cornerstone of the GVRD growth management strategy because it:

- Provides an alternative to the private automobile for travel in corridors where this can be justified;
- Supports densification in transit corridors to advance the concepts of complete communities, a more compact metropolitan area and reduced pressure on the green zone;
- Provides incentive to municipalities, neighbourhoods and the private sector to support growth concentration by providing means of transportation that will reduce the congestion associated with growth; and
- Connects urban and suburban business centres, strengthening their role as focal points for employment, education, shopping, entertainment and residential development.

5.2 THE SKYTRAIN DECISION

On June 24, 1998, the provincial government announced its intention to accelerate design, construction and operation of rapid transit in response to public demands for immediate action to relieve congestion and improve transportation. The previous schedule called for new rapid transit lines to be in service between Vancouver and Coquitlam by 2005, and New Westminster and Coquitlam by 2008. The announcement established a committed project and budget for a new line between Columbia Station in New Westminster and Lougheed Town Centre/Mall to be in service by the fall of 2000, and between Lougheed Town Centre/Mall and Broadway or Vancouver Community College by 2001. The Province also announced its decision to use Skytrain technology, rather than conventional light rail technology.

A number of public submissions to the Special Commission have identified some issues which are outside the Special Commission's terms of reference. In particular, concern has been expressed with regard to the project "givens" — that is, the technology and timing — embedded in the provincial government's Skytrain decision. These submissions can be found in Appendix #5 which is a compilation of all comments and submissions received by the Special Commission.

"I am writing to you to express my deep concern over the Skytrain extension project. I am not writing to comment on any of the issues that your commission is seeking public input on, but on the very basis of the Skytrain project itself."

— Written submission to the Special Commission

The Rapid Transit Project Office (RTPO), a company wholly owned by the Province, is charged with fulfilling the obligations of the Province in rapid transit implementation.

6.0 THE ACCELERATED SKYTRAIN PROJECT

The following information regarding the accelerated project was provided by the Rapid Transit Project Office (RTPO) in a formal *Project Description*, which was delivered to the Special Commission on December 3, 1998.

6.1 THE RAPID TRANSIT PROJECT OFFICE (RTPO)

The Rapid Transit Project Office (RTPO) was established by the provincial government in late 1997. The company, incorporated under the name Rapid Transit Project 2000 Ltd., is wholly owned by the Province, and is charged with fulfilling the obligations of the Province in rapid transit implementation. This includes negotiating financial agreements and contracts, concluding environmental agreements and determining the terms and conditions under which provincial assets will be assigned for operations. The RTPO will ensure that all agreements and commitments for environmental mitigation, compensation and monitoring will become contractual conditions for the entity assigned to operate the new system. The Province retains ownership of the assets of the existing Skytrain system and will remain either the owner or majority owner of the new Skytrain assets.

Responsibilities of the RTPO include:

- Overall management of the project environmental planning and assessment;
- Meeting regulatory requirements;
- Communication;
- Public consultation;
- Negotiating necessary agreements with Bombardier and other contractors;
- Obtaining resources necessary to the successful completion of all segments of the project;
- Strategic planning; and
- Financial control.

A five-person Board of Directors is comprised of the President and CEO of BC Transit, the Chair of BC Transit, the President of the BC Transportation Financing Authority, an MLA from the GVRD, and the RTPO Director.

The RTPO is required to submit capital budget estimates for planning and construction to Treasury Board for review. Treasury Board is the major financial policy committee of the provincial Cabinet, and is chaired by the Minister of Finance. Treasury Board in turn makes recommendations on financial matters to Cabinet, which is the final authority in matters relating to the accelerated project.

6.2 ACCELERATED PROJECT DESCRIPTION

6.2.1 Parameters of Accelerated Project

The intent of a *Project Description* is to provide, in one document, an overview of the project that enables reviewers to define the project and its footprint, identify the entity responsible to carry out the project, and understand the timetable for project development and for additional reporting. In the case of the federal government, the information in the *Project Description* forms the basis to determine whether the project will be subject to review under the *Canadian Environmental Assessment Act* (see section 7.1.1). A *Project Description* does not, however, provide a comprehensive assessment of the impacts of the project.

The Skytrain decision described in section 5.2 identified the parameters of the accelerated project. The subject of the Special Commission Skytrain Review is the design, construction and operations of the defined accelerated project, which includes the line to be built between Vancouver Community College Station in Vancouver and Columbia Station in New Westminster.

Specifically, the RTPO's preferred route alignment for the accelerated project runs underground from Vancouver Community College to the Broadway Station, follows the Burlington Northern Rail Line through the Grandview Cut and eastward to Gilmore where it shifts north and continues east along Lougheed Highway to Lougheed Mall, follows North Road and the TransCanada Highway to the Brunette Interchange and down Columbia Street to the Columbia Station in New Westminster (see Map A: Regional Overview, and Map B: Rapid Transit Project Office Preferred Alignment).

In addition to the defined rapid transit corridor for the accelerated project, the use of Skytrain technology and the project schedule are "given" parameters of the project.

6.2.2 Description of Accelerated Project Construction and Operation

The RTPO's *Project Description* also includes a description of accelerated project construction and operation. The RTPO defines the construction of the accelerated project as the construction of the stations, guideway (the concrete structure that supports the Skytrain tracks when elevated) and ancillary facilities. This includes activities involved in constructing the primary and ancillary works of the accelerated project and any

The "givens" of the accelerated project are the use of Skytrain technology, the schedule, and the accelerated project corridor from Vancouver Community College Station in Vancouver to Columbia Station in New Westminster.

The complete Project Description is available to the public through the Skytrain Project Registry and on the Special Commission's web site.

associated works, storage and staging areas. Examples of construction activities are:

- Tunneling for the guideways and ventilation shafts and stations;
- Construction of guideways using pre-cast and poured concrete;
- Station construction;
- Installation of pilings for areas of poor soil foundation conditions;
- Steel fabrication and installation;
- Equipment installation and commissioning;
- Soil excavation and removal for piers for elevated sections of the guideways, at-grade guideways, and stations, as well as underground sections;
- Installation of electrical equipment for supply and transmission;
- Demolition and replacement of bridge structures in the Grandview Cut;
- Demolition of existing infrastructure or building to accommodate elements of the project; and
- Commissioning and decommissioning of construction works and storage yards.

Operational activities and actions will occur upon completion of the construction phase of the project. The operational activities will include:

- Passenger traffic and activities at stations;
- The passage of trains;
- Maintenance of the rolling stock at an existing facility;
- Operational control of the trains from an existing facility;
- Maintenance of the stations and power supply facilities;
- Maintenance of the trackage and guideway structures; and
- Emergency repairs.

The complete *Project Description* has been made available to the public through the Skytrain Project Registry and is also available on the Special Commission's web site.

6.3 FUTURE PLANS AND RAPID TRANSIT CORRIDORS

The *Livable Region Strategic Plan*, and the *Intermediate Capacity Transit System (ICTS) Studies* completed by BC Transit in 1995, refer to three basic rapid transit corridors and an extension to north Surrey. The three basic corridors described in the ICTS are the Broadway-Lougheed corridor, the New Westminster-Coquitlam corridor and the Vancouver-Richmond corridor. The Broadway-Lougheed corridor and New Westminster-Coquitlam corridor described in the ICTS study and the *Livable Region Strategic Plan* are partially included in the accelerated project. The differences are that

the accelerated project terminates at Vancouver Community College (VCC) while the original terminus proposed for the Broadway-Lougheed corridor was at Arbutus Street. The New Westminster-Coquitlam corridor described in the ICTS study is, in the accelerated project, a line from New Westminster to Lougheed Town Centre/Mall rather than to Coquitlam Centre.

Any previously identified corridors that have not been included in the accelerated project as defined in the *Project Description* are considered to be conceptual at this time. The RTPO has indicated that feasibility studies of possible future additions to the system continue. In particular, studies to determine feasibility, acceptability, cost, implementation options and financing strategies are in progress for another line between Lougheed Town Centre/Mall and Coquitlam Centre as well as for a line west of Vancouver Community College. The RTPO notes in its *Project Description* that these projects have yet to be confirmed. Their scope and nature remains undefined and no budget commitments or formal agreements to proceed have been concluded between the Province and the GVTA for these future additions.

The Special Commission has received many comments with regard to further expansion of rapid transit. These can be viewed in Appendix #5. In particular, the issue of the extension to Coquitlam Centre has been raised. Some have sought support for an acceleration of this work and scheduling.

While these issues are not addressed in the Special Commission Skytrain Review of the accelerated project, the Special Commission wishes to make the following observations:

Extension of rapid transit to Coquitlam Centre, as discussed above, is consistent with the *Livable Region Strategic Plan*. It is desirable that the Lougheed Town Centre/Mall Station in the accelerated project be designed to enable a possible future rapid transit link to Coquitlam Centre. Technical issues and the lack of clear community support for a particular route corridor still must be addressed, however, and municipal officials need time to resolve outstanding route corridor alternatives before any acceleration of this project could be considered.

Elsewhere, in Vancouver, integration issues which require further study are the Broadway corridor west from VCC, and the north-south corridor from Vancouver to Richmond. Any work on these should be undertaken with the system-wide context in mind.

“The Skytrain has been in existence for 12 years and is an excellent form of transit. This city is in traffic gridlock. Get the Broadway extension started now! Get on the Richmond extension ASAP.”

— Submission to the Special Commission Vancouver office

The review involves a large number of public agencies at every level who are accountable for certain activities within their respective mandates.

7.0 SKYTRAIN ROLES AND RESPONSIBILITIES

7.1 KEY PARTICIPANTS AND ACCOUNTABILITIES

The Special Commission's role in the accelerated project and its working relationship with the Rapid Transit Project Office (RTPO) are described in section 2.0. The role of the RTPO is detailed in section 6.1. The review involves a large number of public agencies at every level who are accountable for certain activities within their respective mandates, as well as other stakeholders who have an interest in the accelerated project and are providing input to the process.

Federal, provincial and regional government authorities share an interest in an environmental review of the accelerated project. For federal departments, the review must meet the legislated requirements of the *Canadian Environmental Assessment Act*. Provincial review of the project is in accordance with the terms of reference established for the Special Commission. On a regional level, the project is under review by the GVRD and the GVTA.

In addition to the Special Commission and the RTPO, key participants are:

7.1.1 Federal Government

The *Canadian Environmental Assessment Act (CEAA)* applies to projects for which the federal government holds specific decisionmaking authority. The *CEAA* sets out the responsibilities and procedures for the environmental assessment of projects involving the federal government. It establishes a clear and balanced federal environmental assessment process that helps federal responsible authorities (RAs) determine the environmental effects of projects before irrevocable decisions are made. An environmental assessment is required under the *CEAA* if a federal authority⁶ exercises one or more of the following duties, powers or functions in relation to a project:

- Proposes the project;
- Contributes any form of financial assistance to the project;
- Sells, leases or otherwise transfers control or administration of federal land to enable the project to be carried out; or
- Exercises a regulatory duty in relation to the project, such as issuing a permit or licence or granting an approval, that is listed in the Law List Regulation.

⁶ A federal authority is defined as a federal Minister of the Crown, an agency or body of the federal government that is accountable to Parliament through a federal Minister of the Crown for the conduct of its affairs, or a federal department. A federal authority that has specified decisionmaking responsibility relating to a project is responsible for ensuring an assessment is carried out in compliance with the *CEAA*, and is referred to as the Responsible Authority (RA).

The Canadian Coast Guard of the Department of Fisheries and Oceans (DFO) has determined that the accelerated project requires a permit under section 5(1) of the *Navigable Waters Protection Act (NWPA)* for the section of the route alignment that will cross the Brunette River. The Habitat Management Division of DFO predicts that authorizations under section 35(2) of the federal *Fisheries Act* will be required for the construction works adjacent to the Fraser River in New Westminster and for the bridge crossings at Stoney Creek and the Brunette River. The *Canadian Environmental Assessment Act* requires that DFO complete a screening level environmental assessment before a permit to cross the Brunette River or authorizations under Section 35(2) of the *Fisheries Act* are issued to the RTPO.

A screening level environmental assessment is a self-directed assessment in which the RA retains the greatest degree of management and flexibility over the scope and pace of the environmental assessment process. Screenings vary in time, length, and depth of analysis, depending on the circumstances of the proposed project, the existing environment, and the likely environmental effects.

7.1.2 Provincial Government

The provincial government's decision to initiate the accelerated project in June, 1998, and the Province's creation of the RTPO to design and construct the project, pre-dated provincial appointment of the Special Commission.

In the course of the Special Commission Skytrain Review, the provincial Cabinet will receive reports and recommendations issued by the Special Commission simultaneously with their public release. In addition, various provincial ministries which have regulatory or planning responsibilities are involved in the review through the IAC. The terms of reference for the Special Commission state that the Special Commission "will have the full cooperation of, and access to information from, all relevant provincial ministries, authorities and agencies."

7.1.3 Regional Government

The Greater Vancouver Regional District (GVRD), has responsibility for broad regional planning, including the region's growth strategy. The GVRD's policies for growth management and transportation are contained or referenced in the *Livable Region Strategic Plan*. Rapid transit in the Coquitlam-New Westminster, Broadway-Lougheed, and Vancouver-Richmond corridors is considered key to the GVRD growth management strategy.

"[For too many years] there seems to have been too much bickering between municipalities and foot dragging at all levels."

— Written submission to the Special Commission

Through the RTPO's Neighbourhood Consultation Program, and the Special Commission's Technical Forums and Public Meetings, the public have a role in providing direct input and participating in discussions which will inform the design process and the Special Commission's review.

The Greater Vancouver Transit Authority (GVTA), created by legislation in 1998 pursuant to agreements between the GVRD and the provincial government regarding regional transportation, will take over management and operation of the regional transportation system in the GVRD in April, 1999. It advises GVRD member municipalities on transportation issues relating to the regional growth strategy, official community plans, and major development proposals affecting the transportation service region.

The Special Commission is advised that the Province and GVTA have underway a negotiation which the parties intend will result in an agreement on the accelerated project, including such issues as cost sharing, and a possible memorandum of understanding on how to integrate the regional transit systems and complete a review of major design elements, by the end of January.

7.1.4 Local Government

Municipalities along the Skytrain corridor are responsible for municipal infrastructure affected or required by the accelerated project, and are approving authorities in such matters as zoning and permits associated with construction within their jurisdiction. Local governments also have strong interests, on behalf of their communities and constituents, in route alignment and station location, in environmental impacts and mitigation, and in potential community benefits resulting from the accelerated project.

7.1.5 Other Stakeholders

Through the RTPO's Neighbourhood Consultation Program, and the Special Commission's Technical Forums and Public Meetings, stakeholders and the public have a role in providing direct input and participating in discussions which will inform the design process and the Special Commission's review. A variety of other ways the public can access information and provide feedback are described in section 3.4 and in Appendix #4.

ROUTE ALIGNMENT REVIEW

8.0 PURPOSE OF ROUTE ALIGNMENT REVIEW

This Interim Report presents the Special Commission's primary review of the RTPO's approach to route alignment and station location design.

The purpose of this process audit is to provide an in-progress assessment of the RTPO's preferred route alignment and station locations along the Broadway-Lougheed-Coquitlam-New Westminster accelerated project corridor, as well as the processes used by the RTPO for public consultation and route alignment and station location design. The Special Commission's comments at this time are not intended to interfere with discussions which are taking place between the RTPO, affected municipalities and the GVTA, or with resolutions emerging from these consultations.

The Special Commission will continue to monitor the RTPO's process until the final route alignment and station location design has been decided, however the Special Commission does not anticipate the need to issue any additional reports specifically on this subject.

To view visual representations of the subject matter reviewed in this section, refer to Map A: Regional Overview, and Map B: Rapid Transit Project Office Preferred Alignment, both prepared by the Special Commission using its GIS system.

This review examines the RTPO's Neighbourhood Consultation Program activities to date and provides advice for improving future consultation design and implementation. This assessment focuses largely on the open house sessions, since they have been the primary mechanism for soliciting direct public input to the route alignment and station location selection process. The RTPO process has also included neighbourhood

The purpose of this process audit is to provide an in-progress assessment of the RTPO's preferred route alignment and station locations along the accelerated project corridor, as well as the processes used by the RTPO for public consultation.

The RTPO's Neighbourhood Consultation Program includes four phases, each focused on key decisionmaking points throughout the planning, design and construction stages of the accelerated project.

workshops and opinion surveys, as well as the presentation of a complex array of information to the public for feedback. In preparing this assessment, the Special Commission also sought to identify alignment specific impacts, benefits, and issues for resolution as the basis for generating specific conclusions and advice.

Outstanding environmental issues and potential impacts of the final design which were identified during the route alignment and station location design process, and which require mitigation, will be addressed in the Special Commissions Key Environmental Issues Reports to be issued early in 1999.

9.0 RTPO ALIGNMENT AND STATION LOCATION PROGRAM

9.1 OVERVIEW OF RTPO'S NEIGHBOURHOOD CONSULTATION PROGRAM

The RTPO's Neighbourhood Consultation Program, launched in the late summer of 1998, was designed to build awareness, provide information, identify key issues, encourage participation, examine route alignment and station location options, receive input and collaborate on route alignment and station location selection and design, and receive input regarding construction scheduling and mitigation plans. The primary format for public consultation to date has been open house sessions.

The Neighbourhood Consultation Program includes four unique phases, each focused on key decisionmaking points throughout the planning, design and construction stages of the accelerated project. In addition to public consultation, the program design includes reporting to the respective municipal councils for the purpose of tracking progress and soliciting feedback and endorsement to proceed. The four phases of the Neighbourhood Consultation Program are:

- Phase 1* Alignment and station locations
- Phase 2* Station program (i.e., what goes in and around stations)
- Phase 3* Station design and guideway/alignment treatments
- Phase 4* Construction planning and mitigation

During the first phase of the Neighbourhood Consultation Program the RTPO sought to identify and incorporate neighbourhood issues and preferences in the evaluation of route alignment options. Design considerations included route alignment location within the designated rapid transit corridor, elevated vs. grade level design, station location, and other issues with environmental impact implications. Stated assumptions of the route alignment and station location selection process were the

Skytrain technology, the rapid transit corridor (Broadway-Lougheed-Coquitlam-New Westminster), the budget (\$1.2 billion), and the construction schedule⁷

Tools for notifying the public of meetings and soliciting public input in this phase included:

- Advertising in community and regional newspapers;
- Mail drops with informational newsletters;
- Questionnaires;
- Public information displays;
- Open houses;
- Workshops;
- Meetings with stakeholders (including residents groups); and
- Door-to-door and telephone interviews.

The RTPO's strategy for ongoing communication about issue resolution and project decisions includes monthly project updates, quarterly community newsletters, fact sheets/information bulletins, announcements in community newspapers, and an interactive web site.

To manage a community-based Neighbourhood Consultation Program of this magnitude, the route alignment for the accelerated project was subdivided into segments based on municipal and local community boundaries. These are:

- Segment 1* Vancouver – VCC to Boundary
- Segment 2* Burnaby – Boundary to Delta
- Segment 3* Burnaby – Delta to Lake City
- Segment 4* Burnaby – Lake City to Bell
- Segment 5* Burnaby –Lougheed Mall
- Segment 6* Coquitlam – Lougheed Mall to Braid
- Segment 7* New Westminster – Braid to Columbia Station

The RTPO's process for evaluating route alignment and station location options has considered public input on issues, as well as a broad range of evaluation criteria for each option. The RTPO has presented criteria and assessments of options for review and comment, together with visual depictions of various alternatives. The intended outcome of this process is selection of preferred options which represent the optimal route alignment and station locations.

The RTPO's process for evaluating route alignment and station location options has considered public input on issues, as well as a broad range of evaluation criteria — many derived directly from past experience — for each option.

⁷ Lougheed Town Centre/Mall to Columbia Station operational by 2000; VCC to Lougheed Town Centre/Mall operational by 2001

To date, Phase 1 of the Neighbourhood Consultation Program has been implemented to various stages of completion in segments throughout the rapid transit corridor, with a total of 12 open houses held for the accelerated project.

The RTPO's evaluation criteria (summarized in section 3.2.5 and presented in full as Appendix #2) consider a number of factors including potential for complementing future growth in the community, increasing access to transit and promoting transit use, preserving community values and quality of life, providing a transit system that is affordable and timely, and ensuring the system is "buildable". Many of the criteria are derived directly from past experience and, in particular, the work of the provincial Ombudsman in a November, 1987 review of the first Skytrain construction in the GVRD. Conclusions and recommendations of the *Ombudsman Skytrain Report: Public Report No. 8* are contained in Appendix #6.

To date, Phase 1 of the Neighbourhood Consultation Program has been implemented to various stages of completion in segments throughout the rapid transit corridor for the accelerated project. The RTPO reports that a total of 12 open houses were held for the accelerated project between September 8 and December 10, 1998. These were held on weekday evenings at a number of locations in the vicinity of the proposed route alignment. Public input to the process (involving more than 3,000 open house participants) reportedly resulted in 85 route alignment changes and 31 station location modifications. The schedule of Phase 1 open houses, as well as the Neighbourhood Consultation Program timeline, is contained in Appendix #7.

9.2 RTPO PREFERRED ROUTE ALIGNMENT

The GVRD's *Livable Region Strategic Plan* clearly identifies rapid transit as a critical component to future growth management in the region. The Broadway-Lougheed-Coquitlam-New Westminster corridor was identified as a transit priority through a series of growth management, community, and transportation planning initiatives, and was agreed to by all affected municipalities. The route alignment options proposed by the RTPO have in large part adhered to the prescribed rapid transit corridor along the accelerated project route. Variations have occurred only where it has been practical to avoid conflict with residential areas, for example in the Grandview Cut area of Segment 1. Variations — particularly those related to station locations — should be validated by regional planning authorities to ensure that they are consistent with overall land use and growth management strategies, and transit system connectivity (see sections 5.1 and 6.3).

The route alignment and station location selection process — including technical studies and consultations with the public and local governments — is ongoing for most of the rapid transit corridor. Detailed route alignment options have been presented for the entire accelerated project corridor, and the RTPO plans to seek local government endorsement of the various preferred route alignments on a segment-by-

segment basis before finalizing the overall route alignment and station location design. Although the RTPO has developed a complete preferred route alignment and station location design, final presentations have not yet been made to municipal councils. In general terms, sections 9.2.1 – 9.2.7 describe the preferred alignment options as reported by the RTPO. It is this route alignment design which the Special Commission is using as a basis for its analysis.

9.2.1 Segment 1 – Vancouver (VCC to Boundary)

An underground system beneath Broadway is proposed for the route alignment between Vancouver Community College (VCC) and the Grandview Cut. The line is proposed to start at Glen Drive and run beneath the Broadway right-of-way until just west of Commercial Drive, where it would move beneath the properties on the north side of Broadway. It would then run parallel with Broadway to pass beneath Commercial Drive and the existing north entrance to the Broadway Station before turning southeast into the Grandview Cut.

The proposed station at VCC is underground and designed to be integrated with the college on the north side of Broadway. A portal entrance is proposed for the south side of Broadway. During station construction, the dead end of Keith Drive would be used as an equipment and supply marshalling area.

A new station interface is proposed for the area around the north entrance of the existing Broadway Station. The new station component would be underground, constructed by cut-and-cover methods after demolition of the existing north entrance and adjacent structures. The modified Broadway Station needs to be planned to facilitate seamless passenger transfers between the two Skytrain lines.

The preferred route alignment curves southeast into the Grandview Cut on the north side of Broadway. It would cross from the south side to the north side of, and parallel to, the Burlington Northern Railway (BNR) tracks from Broadway for approximately one kilometre. The existing wood trestle bridges at Lakewood Drive and Nanaimo Street would be demolished and replaced.

West of Slocan Street, the preferred route alignment rises on elevated structure and continues on elevated structure along the north side of the BNR tracks to cross above Slocan Street, Renfrew Street and Rupert Street. East of Rupert Street, the guideway would change from elevated to at-grade structure to pass beneath the TransCanada Highway along the north part of the BNR right-of-way.

Three stations have been proposed west of Commercial Drive. Nanaimo Station would be depressed within the Grandview Cut on the north side. Elevated stations are proposed at Renfrew Street and Rupert Street.

A new station interface is proposed for the area around the north entrance of the existing Broadway Station and needs to be planned to facilitate seamless passenger transfers between the two Skytrain lines.

Brentwood Station would provide a transportation hub for the Brentwood Town Centre, with several options still being considered.

9.2.2 Segment 2 – Burnaby (Boundary to Delta)

The preferred route alignment east of Boundary Road is elevated and continues along the BNR railway line until it turns north along the east or west boulevard of Gilmore Avenue northward to Lougheed Highway. There are options for a potential station location either at Boundary Road or on Gilmore Avenue. A preferred station will be identified as a result of ongoing property negotiations and results of the RTPO's station design program, which will include a comparative assessment of the merits of each location, including an assessment of connectivity with other transit infrastructure — such as bus lines — at each location.

East of Gilmore Avenue, the preferred route alignment is elevated on the south side of Lougheed Highway to a point between Madison Avenue and just west of Rosser Avenue. The elevated route alignment would continue to either the north or south side of the Lougheed Highway right-of-way to connect with a station serving Brentwood Town Centre/Mall and the Brentwood bus loop. The preferred route alignment will be subject to ongoing property negotiations.

Brentwood Station would be elevated and would provide a transportation hub for the Brentwood Town Centre. Several options are still being considered for the Brentwood Station.

9.2.3. Segment 3 – Burnaby (Delta to Lake City)

From the Brentwood Station, the elevated guideway would continue eastward along the south side of Lougheed Highway. An elevated station at Holdom Avenue is proposed and precise siting will be subject to property negotiations. East of Holdom Avenue, the preferred route alignment moves southward over the Kensington interchange and continues along the south side of Lougheed Highway between the roadway and the adjacent Canadian National Railway (CNR) tracks.

East of the Kensington overpass, the preferred route alignment continues on the south side of Lougheed Highway, rising to the Sperling Station at the southeast corner of Sperling Street and Lougheed Highway. At Bainbridge Street the preferred elevated alignment moves to the median and then shifts to the north side of Lougheed Highway after the route alignment crosses Eagle Creek and approaches Lake City Way. There may be a possible future station at Lake City Way.

9.2.4 Segment 4 – Burnaby (Lake City to Bell)

The preferred route alignment would be elevated along the north side of Lougheed Highway. East of a proposed station at Production Way, the route alignment would

remain elevated as it continues along the north side of Lougheed Highway, crossing Stoney Creek close to the highway. East of Stoney Creek, the guideway would either return to the median and be elevated until approximately Austin Street, or remain on the north side to accommodate a station at Bell Street. The final route alignment will be determined in part by the results of a detailed analysis of the station potential at Bell Street, which will include visual analyses and tree surveys to determine whether screening vegetation would be affected.

9.2.5 Segment 5 – Burnaby (Lougheed Mall)

Several alternative route alignment configurations have been developed for a station at Lougheed Town Centre/Mall. The route alignment in the vicinity of Lougheed Town Centre/Mall remains under consideration subject to technical evaluation.

9.2.6 Segment 6 – Coquitlam (Lougheed Mall to Braid)

From Lougheed Town Centre/Mall, the preferred route alignment to New Westminster via southwest Coquitlam would be an elevated guideway heading south along the west side of North Road and turning east across North Road at the intersection of North Road and the TransCanada Highway. Once on the south side of the TransCanada Highway, the route alignment would begin to descend to grade. It would run parallel to the TransCanada Highway and elevates to cross the BNR, the railway yard access road, and the Brunette River. South of Braid Street, the elevated route alignment would cross Brunette Avenue and continue south to Sapperton Station.

There are no stations planned for this segment of the route alignment. The preferred route alignment provides for a future elevated Braid Station west of Brunette Avenue subject to municipal and community consultation and decision.

9.2.7 Segment 7 – New Westminster (Braid to Columbia Station)

South of the Brunette Avenue-Braid Street intersection, the preferred route alignment consists of an elevated guideway that runs southwest between the BNR and CP rail lines. Sapperton Station would be located in the vicinity of Brunette Avenue and Keary Street to provide access to the Sapperton area as well as for commuters to both the Royal Columbian Hospital and the Labatt's brewery.

Immediately north of the Fraser River Railway Bridge, the preferred route alignment would cross the existing railway tracks and run adjacent to the Fraser River. The elevated route alignment would travel along the rail right-of-way parallel to Columbia

Several route alignment configurations have been developed for a station at Lougheed Town Centre/Mall, and remain under consideration subject to technical evaluation.

The open house format was appropriate for this consultation process, however the segmented approach presented challenges in addressing issues relating to the interfaces between segments, and did not provide a regional context for understanding the potential impacts of localized design modifications.

Street East between the Fraser River and the BNR and CP rail tracks. The preferred guideway height remains to be determined.

Just south of the Columbia Street-Front Street intersection, the route alignment would rise to cross Front Street and the existing rail trestle and enter the embankment at the foot of McBride Avenue and Columbia Street on the east side of Columbia. A flattened underground route alignment would allow for a possible future Woodland Station at McBride Avenue. The route alignment would continue underground to Elliot Street where it would connect with the existing Skytrain line northeast of the existing Columbia Station. The route alignment between Elliot Street and McBride Boulevard would generally be in a cut-and-cover tunnel, except for a short length that would be at-grade or depressed as it transitions into the Columbia Station.

10.0 SPECIAL COMMISSION REVIEW OF ROUTE ALIGNMENT

10.1 REVIEW OF ROUTE ALIGNMENT AND STATION LOCATION PROCESS

The public consultation process being conducted by RTPO, with its tight timetable for soliciting public input, is one of the most demanding undertaken in British Columbia in recent years. The primary format for public involvement in Phase 1 of the Neighbourhood Consultation program — the open house — was conducive to conveying detailed information in an informal setting and to accommodating the varied schedules of the local resident target audience. It provided opportunities for soliciting feedback and for addressing the specific concerns of individuals in a non-confrontational atmosphere. It was generally well-suited to addressing the concerns and interests of individuals directly impacted by decisions, although its effectiveness in doing so was reduced when an open house was attended by unexpectedly large numbers of participants, as occurred early in the process.

The open house format was appropriate for this consultation process in view of the fact that there has been, in recent years, considerable public debate throughout the affected communities on the selection of the prescribed corridor for rapid transit. A number of people have expressed concerns that the open house format did not provide an opportunity for open discussion of broader issues, including the underlying rationale for the accelerated project, however it was not actually a responsibility of the RTPO to provide a forum for this discussion.

The open house communication methods focused on hand-outs, questionnaires and display materials, supported by staff and consultants with expertise in the design of the respective segments. The division of the accelerated project corridor into seven segments

— each with a dedicated consultation and technical design team — was a logical approach to managing a project of this magnitude. In addition, the segmentation of the corridor by municipal and community boundaries facilitated constructive and focused discussions with municipal planning staff. At the same time, the segmented approach has presented challenges in addressing issues relating to the interfaces between segments. A well-coordinated approach was required to ensure that all open houses were attended by resource people capable of responding to questions related to adjacent segments.

The open house focus on specific concerns of individuals did not, however, lend itself well to a systematic public examination of issues. Neither did it provide a regional context for understanding the potential impacts of localized design modifications on the regional transit system as a whole, or on regional growth management strategies. Finally, this approach did not provide an effective means to resolve issues where the community has not yet reached internal consensus on preferred rapid transit corridor selection.

10.1.1 Public Notification and Promotion of Public Involvement

The process for notifying the public of the Phase 1 open houses was well-coordinated, with advertisements being placed in local and regional papers well in advance. In addition, invitation letters were prepared for many communities and distributed to residents of areas most directly impacted by the proposed route alignment. As a result, open houses were generally well attended and there has been a relatively high response rate to questionnaires.

Despite these best efforts, the RTPO did not successfully generate interest in attending open houses in some parts of the communities potentially impacted by the proposed options for route alignment and station location. For example, the Segment 6 open houses were attended mostly by residents of southwest Coquitlam/lower Lougheed, but were not well attended by residents of the Maillardville community. Similarly, some of the open houses in Vancouver and Burnaby were relatively poorly attended. As a result, the potential exists for the emergence of significant unstated and unresolved concerns once the final route alignment and station location design is announced and project construction begins.

The RTPO has attempted to prevent this problem by going door-to-door with a survey and accelerated project information along the New Westminster to Lougheed Town Centre/Mall corridor, and has plans for a similar effort elsewhere. However, it is possible that lack of sufficient public involvement in some decisions (e.g., removal of stations from original options presented) could result in the emergence of issues of

Open houses were generally well attended, but despite best efforts the RTPO did not successfully generate interest in some parts of the communities potentially impacted, which could result in the emergence of issues of public concern after construction has begun and/or the project is operational.

The public effectively endorsed the set of evaluation criteria, and these were used effectively by the RTPO to develop and evaluate initial options for route alignment and station locations. However, these criteria appear not to have been used consistently

public concern after construction has begun and/or the project is operational. Possible examples include traffic congestion in New Westminster during construction, and lack of a station in Maillardville.

10.1.2 Program Design

At the beginning of the Neighbourhood Consultation Program, a number of parameters (so-called “givens”) of the project design were presented in the information displays — namely the Skytrain technology, the rapid transit corridor (Broadway-Lougheed-Coquitlam-New Westminster), the budget, and the construction schedule. As the consultations progressed, many of the issues arising from these parameters became limiting factors of certain route alignment and station location options. As a result, the RTPO had to remind the public of these accelerated project “givens” and provide justification for their establishment. The accelerated project and the RTPO would have greatly benefited from a clearer statement by the provincial government on the decisions made at the outset of the consultation process rather than during the course of the work.

At the first open house in each segment, a clear and comprehensive set of route alignment evaluation criteria was presented to the public for comment and review (see Appendix #2). These criteria were, to a large extent, derived from previous experiences in rapid transit planning, design, practice and review. For example, the recommendations regarding the operation of elevated guideways through residential areas contained in the Ombudsman’s November 1987 *Skytrain Report* are reflected in evaluation criteria regarding the preservation of community values and quality of life (e.g., overshadowing, noise and vibration, privacy). The process was made more effective by giving the public an opportunity to comment on and add to the criteria. This benefit would have been greater if the public had also been able to easily perceive how the RTPO’s criteria and design options reflected lessons learned from past experience, in particular, the conclusions and recommendations found in the Ombudsman’s report.

Based on questionnaires and public comments received at the first round of open houses, the public effectively endorsed the set of evaluation criteria. These criteria were used effectively by the RTPO to develop and evaluate initial options for route alignment and station locations. However, these criteria appear not to have been used consistently throughout the Neighbourhood Consultation Program, and were not presented at some of the open houses. During the later public open houses, it was implied — and in some cases directly stated — that the guiding criteria were primarily cost, “buildability”, and public sentiment regarding the proposed options. As a result, the factors determining preferred route alignment and station location design

have often been unclear to the public, and there has been confusion about exactly how to effectively influence decisions. A follow-up communication to all participants and individuals potentially affected, which presents the preferred route alignment and station locations and shows how input was received and used, would greatly assist people to understand and support the results.

For some members of the general public and stakeholders, a controversial aspect of the public process has been the RTPO's reliance on the open house format for public meetings. The RTPO has shown flexibility in providing a process that evolves in an iterative fashion in response to the input and needs of process participants. In some communities, for example, the open house format was modified to provide a more focused workshop-style event. However, despite requests by a range of public interests — including certain organized community groups and residents' associations — the RTPO did not formally complement the open house format with town hall type meetings, which would have allowed direct comments and questions from the public in an open public forum.

The RTPO has, however, participated in a number of town hall type meetings organized by various residents' associations. The absence of this style of public meetings as an element of this first phase of the Neighbourhood Consultation Program has continued as a common criticism from certain residents who are dissatisfied with the results, and who believe the process failed to respond to public expectations. Public consultation through open houses and workshops needs to be supplemented in the next phase of the Neighbourhood Consultation Program, building on the contacts established in Phase 1 to consult in a more collaborative format.

The segment-by-segment approach in open houses focused on resolving individual concerns. Unfortunately, it appears that the approach also allowed competition among community interests, the perception of deferring public accountability, and the potential undermining of regional transportation and growth management planning initiatives. The segment-by-segment approach tended to be most responsive to highly vocal or organized constituencies, at the expense of satisfying publicly endorsed evaluation criteria. In the future phases of the RTPO's Neighbourhood Consultation Program, these concerns need to be dealt with, particularly in communities that have not had full public debate to resolve the larger issues. Local governments also need to be given a stronger role in resolving these issues. The segment-by-segment open house process conducted by RTPO does not, by itself, provide an effective mechanism for resolving issues among neighbourhoods, and could actually make it far more difficult for the RTPO to generate broad public support for final design solutions.

The absence of town hall type public meetings as an element of this first phase of the Neighbourhood Consultation Program has continued as a common criticism from certain residents who are dissatisfied with the results.

“We have repeatedly asked for an open forum, town hall meeting, but so far have been refused.”

— Written submission to the Special Commission

“I have the schedule for the information sessions held in various communities, however I have heard these meetings are often overcrowded and it is difficult to have questions answered.”

— Written submission to the Special Commission

10.1.3 Resourcing the Process

Each open house has been well staffed by professional public consultation and technical design consultants as well as by RTPO representatives. The roles of all staff in attendance have been clearly identified, although some public participants have reported confusion about the roles of the various presenters and have experienced difficulty in locating a suitable respondent to their particular question at the open houses.

The RTPO has made considerable effort to adapt their open houses to better meet public needs, and to ensure that consultants with suitable areas of expertise (crime and safety, noise and vibration, etc.) have been present at all public events. The high level of expertise of the technical staff has been apparent, as all presenters have been exceptional in their abilities to effectively convey complex information and to solicit and record feedback from the public. The synthesis of this information by the professional staff and their ability to listen, learn, and respond to public input has been reflected during the post-open house debriefing sessions.

The open houses have, in most cases, been attended by representatives of local governments. However, local government involvement in the RTPO’s Neighbourhood Consultation Program has been inconsistent and seemed to vary depending on the respective municipal planning staff. Some municipal officials have complained about lack of advance notification from the RTPO about route alignment and station location options that were to be changed, added or deleted from upcoming open houses within their constituencies. Most recently, the project’s accelerated schedule and unavailability of information from the detailed studies now underway have placed pressure on the RTPO’s working relationships with municipal officials. In addition, larger project issues outside the public consultation process have caused some municipal elected officials to express their frustration about the project schedule, and uncertainty about their role in influencing the route alignment and station location selection process.

10.1.4 Communication Strategies

Display panels containing maps of proposed route alignment and station location options have been a key element of the first phase of the Neighbourhood Consultation Process. While some graphics were initially too small for many participants to see and interpret, these have continuously improved and, at the latest open houses, have received much positive comment. Although public understanding of complex issues was generally facilitated by the clarity of graphics throughout the process, a multi-media approach that included videos, 3D images, and models of the proposed route alignments would have made presentations easier to comprehend,

particularly for technically complex segments such as New Westminster. Although less well-coordinated initially, a more cohesive presentation theme has evolved in each segment, as the segment teams have become more familiar with local issues and learned how to best communicate with the residents of their segment.

Poor communication of some critical route alignment information, however, has generated significant problems, loss of trust, and cynicism in the communities. For example, in New Westminster, the requirement for a 6- to 12-foot high protection wall running adjacent to the existing railway line, while depicted in some graphical presentations, was not well understood until after the third open house. Subsequent design options included provisions for mitigating associated visual impacts.

The pressure of tight timeframes clearly had some impact during the public consultation process. Although well-coordinated and organized during the initial sessions in each segment, subsequent sessions in some segments showed signs of difficulties in meeting tight open house deadlines. Some participants expressed concern about not receiving consistent responses to technical questions. “Just-in-time” delivery of display panels, and some presenters’ unfamiliarity with the range of material presented, was indicative of later open houses in some segments, as were comments from local government officials about late receipt of information.

10.1.5 Feedback and Closure

Key elements of a successful public process include not only receiving public input, but also following up with feedback to let the public know how their input is having a positive influence. Although written summaries of the information provided and input gathered during the open houses have been compiled by the RTPO — and recently made available through the Special Commission’s information network and by the RTPO — public release of these documents has not been timely. This follow-up information is well prepared and very useful in demonstrating that the teams have listened and responded to public input. The fact that this information has not been easily available to open house participants may have resulted in diminished public trust and increased concern that public input was not being heard and considered, despite evidence to the contrary.

In the absence of clear communication and demonstration of how evaluation criteria and public input has been used in decisionmaking, the mechanism for influencing route alignment and station location selection remains uncertain to some of the public. It is most important, at the end of the Phase 1 consultation process, for the RTPO to communicate the preferred route alignment recommendations directly back to those involved, as well as to indicate how public and stakeholder input has been

It is most important, at the end of the Phase 1 consultation process, for the RTPO to communicate the preferred route alignment recommendations directly back to those involved, as well as to indicate how public and stakeholder input has been used to formulate these preferences.

The open houses and related surveys have demonstrated a very high level of public support for and acceptance of the accelerated project as a whole, but there are many issues raised that the RTPO and other agencies need to deal with during implementation.

used to formulate these preferences. Inadequate follow-up to the open house process in each segment could result in a serious lack of clarity and certainty in the public mind, leading to difficulties for the RTPO in justifying preferred route alignments and station locations. More importantly, lack of clear communication could result in the future emergence of latent public concerns, as it remains unclear whether communities completely understand the full range of system-wide issues and implications of the accelerated project.

10.2 REVIEW OF SYSTEM-WIDE ROUTE ALIGNMENT AND STATION LOCATION ISSUES

The Special Commission's focus is primarily, but not exclusively, on system-wide issues. They may be *systemic* issues that must be assessed in relation to the total project, or they may be *recurrent* issues that are identified, either by RTPO investigations or through public consultation, along several segments of the route alignment. These issues are captured under the five key environmental issues categories described in section 3.2.1.

The open houses and related surveys have demonstrated a very high level of public support for and acceptance of the accelerated project as a whole. Nonetheless, there have been many issues raised that the RTPO and other agencies need to deal with during implementation. These are summarized below and are supported by more detailed documentation available in the Skytrain Project Registry and on the Special Commission web site.

Many of the issues raised during RTPO's public consultations and in written submissions to the Special Commission are system-wide in scope or systemic in nature. These publicly identified issues need to be considered when planning mitigation solutions for each segment of the route alignment. These issues are being tracked by the Special Commission and will be examined as part of its ongoing review of project impacts, benefits and mitigation (see sections 12.0-16.0). The Special Commission will provide conclusions and recommendations regarding prevention, minimization and mitigation of impacts in future reports.

Safety and security has emerged as a system-wide issue of paramount concern, especially with respect to potential impacts in and around proposed and existing Skytrain stations. Concerns are related — but not limited — to the creation of unsafe environments in the vicinity of schools (including pre-schools, elementary, secondary and post-secondary schools) and in residential areas. There are also concerns about the personal safety of commuters in the stations and adjacent areas.

Identified systemic or system-wide issues, which will also be considered as part of the ongoing environmental review, include:

Biophysical Environment Issues

- Potential biophysical environmental impacts such as affects on wildlife habitat.

Crime and Safety Issues

- Potential creation of unsafe environments in neighbourhoods.

Noise and Vibration Issues

- Potential impacts of system noise and vibration during construction or operation.

Visual Impacts and Aesthetics Issues

- Potential loss of privacy and views.

Station Integration Issues

- Connectivity with public transit and other transportation modes;
- Regional growth shaping implications associated with proposed station locations;
- Traffic congestion and problems associated with on-street parking;
- Pedestrian and cyclist access and connections;
- Integration of proposed stations with existing neighbourhoods;
- Capacity of the system to accommodate traffic during commuter rush hour and other times of high-volume ridership; and
- Potential impacts of construction on traffic congestion and neighbourhoods.

Furthermore, concerns have been expressed regarding the clear application of route alignment and station location evaluation criteria, particularly:

- Ridership criteria; and
- Project economic criteria, including the respective capital and operating costs of route alignment and station location options under consideration.

10.3 REVIEW OF LOCATION SPECIFIC ROUTE ALIGNMENT AND STATION LOCATION ISSUES

10.3.1 Segment 1 – Vancouver

Vancouver Community College to Grandview Cut

The Special Commission has been advised that neighbourhood consultation regarding route alignment and station locations in this segment is to be completed in early 1999. There has been no preferred route alignment and station location design for

Safety and security has emerged as a system-wide issue of paramount concern, especially with respect to potential impacts in and around proposed and existing Skytrain stations.

“I live around the Broadway Skytrain station and my concern is how the new bigger station will impact on the community... if this is going to be the “hub” of the Skytrain, where will you build the station? There’s not much room left around here.”

— Submission to the Special Commission’s Vancouver office

“How are you going to deal with the increased traffic between Broadway and downtown? The trains are already full by Nanaimo.”

— Submission to the Special Commission’s Vancouver office

this segment of the corridor presented to Vancouver City Council.

In addition to the broad issues noted in section 10.2, primary public issues include:

- Remediation of problems identified in the present Broadway Skytrain Station, and future potential capacity problems associated with transfers from the Broadway Station to west-bound buses and the downtown-bound Skytrain during peak travel periods. The Special Commission provides observations on this issue in section 11.3.1;
- Consideration is needed of future rapid transit and other transportation linkages in the design at the Broadway Station;
- Functionality of the VCC Station and its relationship to the Broadway Station; and
- Potential impacts on the Grandview Cut, a green space in a neighbourhood in the heart of the city.

Broadway Station to Boundary Road

The Special Commission has been advised that neighbourhood consultation regarding route alignment and station locations in this segment is to be completed in early 1999. There has been no preferred route alignment and station location design for this segment of the corridor presented to Vancouver City Council.

In addition to the broad issues noted in section 10.2, primary public issues include:

- The need for and desirability of a station at Nanaimo Street (especially given the proximity of the existing Nanaimo Skytrain Station);
- RTPO open house results report considerable support for stations at both Renfrew Street and Rupert Street, but little local public support for a station at Boundary Road;
- Requirement for resolution of a station on Boundary or adjacent in the context of land use and transit system connectivity; and
- Particular concerns regarding crime and safety in and around Vancouver Technical Secondary School.

10.3.2 Segments 2-5 – Burnaby

Boundary Road to Brentwood Town Centre/Mall

The Special Commission has been advised that neighbourhood consultation regarding route alignment and station locations in this segment is to be completed in early 1999. The RTPO has completed development of a preferred route alignment, except in the immediate vicinity of Brentwood Town Centre/Mall where discussions continue with adjoining landowners and businesses potentially impacted. No formal presentation of preferred route alignment and station location design has been made to Burnaby City Council.

Based on public input to the RTPO's open houses, there appears to be general public support for the proposed Gilmore Station over the Boundary Road option and for the route alignment associated with this station location. A preference for the route alignment on the south side of Lougheed Highway east of the Brentwood Town Centre/Mall has been reported from RTPO open houses. At Brentwood Town Centre/Mall, it is most important that the station be located, designed and built to tie in effectively with the rest of the regional transit system, and for easy pedestrian access throughout.

For this segment of the proposed route alignment, there are no other apparent location specific issues in addition to system-wide areas of concern listed in section 10.2.

Brentwood Town Centre/Mall to the Kensington Overpass

The Special Commission has been advised that neighbourhood consultation regarding route alignment and station locations in this segment is to be completed in early 1999. The RTPO has completed development of a preferred route alignment and station location design, which has not yet been formally presented to Burnaby City Council. Issues regarding Brentwood Town Centre/Mall Station have not been resolved. The Special Commission provides observations on this issue in Section 11.3.2. This is a key interchange point for transit and the station has great potential to shape local land use.

In addition to the broad issues noted in section 10.2, primary public issues include:

- Although the fly-over guideway option is further from residential properties, it will be visible in the south view as it climbs over the Kensington overpass.

Kensington/Sperling to Gaglardi

The Special Commission has been advised that neighbourhood consultation regarding route alignment and station locations in this segment is to be completed in early 1999. The RTPO has completed development of a preferred route alignment and station location design, which has not yet been formally presented to Burnaby City Council. At Sperling Station, local land use and property development opportunities appear to be high, requiring close coordination with Burnaby planning processes.

In addition to the broad issues noted in section 10.2, primary public issues include:

- Concerns regarding noise, vibration, and visual impacts precipitated strong local support for a tunneled route alignment from just east of Sperling Avenue to Lake City Way, and from Bell Avenue to Austin Road;
- Crime and safety concerns regarding the proximity of proposed stations at Lake City Way and Production Way to schools and residential neighbourhoods;
- Accommodation of wildlife crossings between Burnaby Mountain and Burnaby

“My main concern about any Skytrain extension is security at the stations.”

— Written submission to the Special Commission

“I agree with environmentally friendly forms of rapid transportation. However, I feel that the plan to build two Skytrain routes to Lougheed Mall... is a waste of taxpayers’ money.”

— Written submission to the Special Commission

Lake by elevated or underground route alignments between Bainbridge Avenue and Lougheed Town Centre/Mall;

- Potential impacts on the ecology of Stoney Creek;
- Impacts of noise and vibration on bird populations and other wildlife habitat; and
- Cumulative effects of local developments on watersheds, habitats, residents’ access, privacy, etc.

Gagardi to Lougheed Town Centre/Mall

The Special Commission has been advised that neighbourhood consultation regarding route alignment and station locations in this segment is to be completed in early 1999. The RTPO has completed development of a preferred route alignment and station location design, which has not yet been formally presented to Burnaby City Council. The functionality of Lougheed Town Centre/Mall as a transit hub is of great importance. The Special Commission provides observations on this issue in section 11.3.2.

In addition to the broad issues noted in section 10.2, primary public issues include:

- There is both support for and opposition to a route alignment along the north side of Lougheed Highway, with residents of Timberlea Towers in support of a route alignment along the median and concerned about the potential loss of trees, which currently provide a noise and visual buffer of Lougheed Highway, if the route alignment on the north side were selected;
- Local opposition to a Bell Station based on its proximity to Lougheed Town Centre/Mall;
- Crime and safety issues in the vicinity of the Bell Station, which is close to a local park, a high school, and a creek/ravine/wooded area;
- Support for a station at Lougheed Town Centre/Mall which has sufficient and convenient parking facilities (park-and-ride), and accommodates a community police presence to address concerns regarding crime and safety;
- Potential impacts on large populations of birds that have been observed to fly through the Bell corridor; and
- Stormwater management at stations, locations of stations near environmentally sensitive areas, and noise and vibration impacts on wildlife habitat, particularly nesting birds.

10.3.3 Segment 6 – Coquitlam

Lougheed Town Centre/Mall to Brunette Interchange

Neighbourhood consultation regarding route alignment and station locations in this segment is complete. The RTPO has completed development of a preferred route

alignment design, which has not yet been formally presented to Coquitlam City Council. There are no stations planned for this segment of the route alignment. The recommended route alignment provides for a future elevated Braid Station west of Brunette Avenue subject to City and community consultation and decision.

The deletion of the originally planned stations in this segment has significant implications for future urban development, transportation and transit planning in southeast Coquitlam. The Special Commission provides observations on resolving this issue in section 11.3.3.

In addition to the broad issues noted in section 10.2, primary public issues include:

- Potential loss of green space and trees, and the need for protection of aquatic and forested areas including Brunette River fisheries and Hume Park.

10.3.4 Segment 7 – New Westminster

Brunette Interchange to New Westminster

Neighbourhood consultation regarding route alignment and station locations in this segment is complete. The RTPO has completed development of a preferred route alignment and station location design, which will be formally presented to New Westminster City Council in January, 1999.

Following four RTPO open houses and two community organized public meetings, the Special Commission provides the following commentary:

- The technical work and professionalism of the RTPO team has been outstanding. It is unfortunate that apparent oversights in presentation (e.g., protection wall requirement) and perceived misunderstanding of public expectations (e.g., tunnel option feasibility during Open House #2) may have undermined the public's perceptions of the team's credibility.
- The alignment evaluation criteria were initially well presented and accepted by participants of Open House #1. During subsequent open houses, little or no reference was made to the complete evaluation criteria; instead the key criteria emerged as cost, construction impacts and "buildability". The absence of clear, comprehensive and well communicated rationale for selecting one alignment option over another has caused public concern and criticism of the process.
- The information displays on site-specific issues have continuously improved and culminated with an exceptional presentation on view impacts and route alignment option implications at Open House #4.
- The urban design and consultation teams' hard work, active listening and response to concerns have resulted in a creative preferred option for the route alignment at

"I am a Coquitlam resident living in the southwest section of the city. I am disappointed that there will not be a station somewhere in this vicinity and wonder why [they] even bothered to hold meetings for residents in this area. However, I believe it is essential to get on with the project."

— Written submission to the Special Commission

“I don’t mind doing my share for the overall transportation plan for the Lower Mainland, but [regarding Columbia Street in New Westminster] enough is enough!”

— Written submission to the Special Commission

Woodlands. This avoids any impact on Woodlands (a regionally important property) as well as adjoining residences.

- The process has led to positive resolution of most residents’ concerns in the areas around the Fraserview neighbourhood. While extensive visual impact analyses have effectively lessened the concerns of many Fraserview residents, for some people they have exacerbated concerns that significant visual and noise impact issues remain outstanding. The Special Commission offers observations in section 11.3.4 on resolution of this issue.

The original conceptual route alignment proposal had included a station at Braid Street. There have been significant community concerns expressed about this station. In particular, there was concern that such a station location would — by design or unintentionally — become a park-and-ride facility, thereby further exacerbating existing high traffic and road congestion problems. The anticipated construction of the proposed United Boulevard Connector (and its potential to significantly increase traffic flow from Coquitlam), combined with the rejection of a station option at Maillardville (Segment 6) have further intensified these concerns.

Despite neighbourhood concerns about traffic congestion and park-and-ride facilities, this larger area does need to be served by rapid transit, and a station is warranted at Braid Street. The Special Commission offers observations on resolving this issue in section 11.3.4.

In addition to the above, and the broad issues noted in section 10.2, primary public issues for the entire segment include:

- Visual impacts;
- Noise and traffic impacts;
- A specific primary concern, in front of Fraserview, remains regarding the visual impacts of both the proposed guideway and the required protection wall adjacent to the existing railway line;
- Coordination of the Skytrain route alignment selection with planning and design of the proposed United Boulevard Connector near Brunette Avenue and Braid Street, including the concern of local Sapperton residents about the potential height (and resulting visual impacts) of an elevated structure in their area;
- Potential loss of heritage trees in Queens Park; and
- Potential impacts on Fraser River riparian habitat.

11.0 SUMMARY AND CONCLUSIONS ON ROUTE ALIGNMENT APPROACH

11.1 ON THE CONSULTATION PROCESS

Notwithstanding a number of specific public issues and concerns, the implementation of Phase 1 of the Neighbourhood Consultation Program has generally been professional and responsive to the needs of individuals potentially affected. It appears to have produced acceptable results given the tight timeframes, the complexity of the material presented, and the broad range of emerging public interests and concerns. The open houses were, for the most part, well adapted to the needs of the public and of impacted individuals in particular. As a result, there appears to be agreement on most major items.

At the same time, based on the observations of the Special Commission, some particular future actions are required to deal with concerns raised. These include:

- The RTPO needs now to follow up with clear communication back to those who participated in the open houses and other types of public consultation, demonstrating how their input was used in preparing the final preferred route alignment and station location design.
- The provincial government should raise the level of public understanding about the accelerated project as part of an overall statement of rationale concerning the project “givens” (i.e., technology choice and timetable).
- Future public consultation processes need to provide the public and stakeholders with timely, concise, comprehensive and understandable information and feedback following consultation activities. This will assist in avoiding miscommunications or omissions that could create unsustainable expectations or lead to future surprises for affected communities, as well help promote positive relationships among all participants.
- To ensure regional perspectives are fully incorporated, the GVTA, as well as municipalities, should be formally involved in future consultations.
- The potential exists for the emergence of significant unstated and unresolved public concerns once the final route alignment and station location design is announced and project construction begins. To proactively deal with these concerns, and to facilitate more effective communication within communities in the vicinity of the preferred route alignment during both the design and construction phases, the RTPO should conclude its door-to-door surveys and consultations and complete the Phase 1 open house program.
- In the next stage of its consultation process and construction program, the RTPO should expedite plans for storefront offices. These offices should be established in

Notwithstanding a number of specific public issues and concerns, the implementation of Phase 1 of the Neighbourhood Consultation Program has generally been professional and responsive to the needs of individuals potentially affected.

Overall, the RTPO's preferred route alignment and station location design for the accelerated project appears to be generally acceptable to the public, provided that appropriate measures are taken for mitigation of public concerns such as crime and safety, noise and vibration, and visual impacts.

coordination with municipal planning departments. The storefront offices should have map and document viewing rooms, and regular hours to help ensure effective access to information regarding the project as a whole, as well as anticipated community impacts (and planned mitigation measures), during project construction and operation.

11.2 ON THE ROUTE ALIGNMENT AND STATION LOCATION DESIGN PROCESS

The results to date of the RTPO's route alignment and station location design follow a logical progression that is balanced and supported by broad public input. The preferred route alignment and station location options proposed by RTPO have, in large part, adhered to the prescribed rapid transit corridor for the accelerated project route which was identified through previous community and regional planning initiatives. Variations exist only where it has been necessary to avoid conflict with residential areas (e.g., the Grandview Cut), or in response to community concerns.

Wherever practical, the RTPO has effectively considered public input in the development of a preferred route alignment and station location design. Overall, the RTPO's preferred route alignment and station location design for the accelerated project appears to be generally acceptable to the public, provided that appropriate measures are taken for mitigation of public concerns such as crime and safety, noise and vibration and visual impacts. The preferred alignment and station location design also requires validation by regional planning authorities. Presentation by the RTPO of their preferred alignment and station location design in a comprehensive report back to participants and affected individuals — showing how their input influenced route alignment and station location decisions — would assist in achieving closure of the first phase of the Neighbourhood Consultation Program.

11.3 MAJOR LOCATION SPECIFIC ISSUES FOR CONSIDERATION AND RESOLUTION

11.3.1 Segment 1 – Vancouver

Broadway Station-VCC Station

Consideration is needed of future rapid transit and other transportation linkages in the design at the Broadway Station. In addition, there remain public concerns about the ability of the Skytrain system itself to accommodate passengers transferring from one line to the other line at this station during the commuter hour. Consideration of future rapid links from the VCC Station west should also be a factor in the design phase.

11.3.2 Segments 2-5 – Burnaby

Brentwood Town Centre/Mall Station

Issues regarding Brentwood Town Centre/Mall Station have not been resolved. This is a key interchange point for transit and the station has great potential to shape local land use. At Brentwood Town Centre/Mall, it is most important that the station be located, designed and built to tie in effectively with the rest of the regional transit system, and for easy pedestrian access throughout.

Lougheed Town Centre/Mall Station

The functionality of Lougheed Town Centre/Mall as a transit hub is critical to the success of Skytrain as a regional transit system and to transportation strategies for the entire region. Its design must produce a transition that is logical, accessible, and seamless. The final station design needs to work for both the current line and for a possible future link to Coquitlam Centre without expensive retro-fitting, in order to preserve the feasibility and affordability of a future northeast extension for Skytrain to meet regional and community planning goals.

11.3.3 Segment 6 – Coquitlam

Lougheed Town Centre/Mall to Brunette Interchange

The original route alignment proposal had included stations to serve the south Coquitlam and Maillardville areas, designed to serve growth management objectives in this area. As a result of concerns about costs, public resistance and low ridership projections, the RTPO's preferred route alignment shows no stations on this section. This omission has significant implications for future urban development, transportation and transit planning in southeast Coquitlam. In particular, transit connections to the Lougheed Station and the (future) Braid Station will require close attention. Flexible transit options which will attract and serve transit ridership from the surrounding areas need to be actively pursued as an alternative to possible pressure for increased vehicle parking at either station location, since the latter can only be expected to result in greater traffic and congestion around the two stations.

11.3.4 Segment 7 – New Westminster

Brunette Interchange to New Westminster

A station is warranted to serve the communities around Braid Street. This would be consistent with the intent of the *Livable Region Strategic Plan* for growth shaping in this area, provided such access to rapid transit does not have the effect of promoting

In the Vancouver segment, consideration is needed of future rapid transit and other transportation linkages in the design at the Broadway Station. In the Burnaby segments, the transit hubs at Brentwood Town Centre/Mall and Lougheed Town Centre/Mall must be designed and built to tie in effectively with the rest of the regional transit system.

A station is warranted to serve the communities around Braid Street. This would be consistent with the intent of the Livable Region Strategic Plan for growth shaping in this area.

The prescribed Columbia Street corridor represents the only logical route alignment to extend Skytrain – as recognized in all community and regional plans.

growth beyond the Fraser River. However, in order to address local concerns, traffic congestion issues need to be dealt with as part of planning and development of a future station at Braid Street. Despite neighbourhood concerns about traffic congestion and park-and-ride facilities, this larger area does also need to be served by rapid transit. In particular, transit planning for the Maillardville and southwest Coquitlam area should, concurrent with station design for Braid, examine effective flexible options to satisfactorily serve these areas. Both Braid and Lougheed stations are logical focal points for area residents interfacing with the Skytrain system. This work would appear to be an early priority and opportunity for GVTA focus and coordination with RTPO.

In an effort to assist decisionmaking, the Special Commission has prepared the following observations regarding the proposed route alignment at Fraserview:

- The prescribed Columbia Street corridor represents the only logical route alignment to extend Skytrain — as recognized in all community and regional plans.
- The question of how that route alignment should be located and built requires consideration of the full range of current and future values and uses in this corridor.
- The question of acceptable impact on the Fraserview development must be considered in the context of both the public interest and the property rights of individuals.

The question of values and uses — current and future — appears to have three parts:

1. This is, and will remain, one of the key transportation and utility corridors for the entire region. Future options for each use must be protected to the extent possible. In this context the best option for Skytrain route alignment is on the river side. Other options pose considerable present and future problems for the other transportation uses, are more expensive (now and in the future), and would result in traffic problems during construction.
2. The second key value of this area is its natural and heritage amenities. In particular, it provides views of a nationally significant river with both historic and natural values. These views are valuable for all regional residents and travellers. At this time there is, however, little physical access to the Fraser River at this location. The Official Community Plan and GVRD green space program propose improvements, but there are no immediate prospects for improved pedestrian and bicycle access along the riverfront. An optimal route alignment would include provisions for expediting improvements to public access, while a poorly located route alignment could eliminate this legacy opportunity entirely.

Some have argued that any alignment along the Fraser River would unacceptably impact the heritage and amenity values for the community. This is difficult to

assess in the context of this particular segment, which is already heavily impacted by transportation facilities. At the very least, any final route alignment and design should consider and protect the opportunity for provision of an attractive and safe greenway which is easily accessible for all community residents.

3. The third consideration is that of adjacent residential impacts. Noise, vibration and visual impact concerns have been identified as having potential to negatively impact property and resale values. Some residents suggest that the only acceptable option is a tunnel adjacent to Fraserview. However, it appears that this route alignment would conflict with other present and future uses, is technically problematic and, most important, is a questionable use of funds since other mitigation approaches would cost less.

Considering the matter of noise and vibration, the riverside route alignment is some distance from the closest residences. This equals or exceeds the buffer for many residential areas impacted by the accelerated project. The results of studies of ambient and projected noise along this busy corridor must be considered. The Special Commission will review the RTPO's *Noise Issues Report*, received December 21, 1998, and any other technical information or necessary mitigation plans for noise abatement to help ensure the impact on these residences can be minimized in the event that this does become the preferred route alignment. The results of vibration studies will also be considered for this segment of the alignment.

Considering visual values is more problematic. Loss of a visual amenity is not usually a compensation consideration in property development. Owners often lose some of their original views when surrounding lands are developed — as has already happened in this area with existing development. Undoubtedly the accelerated project will have some impacts on the views and therefore potentially the property values enjoyed by some. The RTPO must consider to what extent compensation may be owed and whether this is mitigated by other private gains and by the greater public interest.

Experience with existing sections of the line seems to show that over time the impact on views is offset by the amenity value that Skytrain brings to the individual property and the community. Where this is not so (due to very direct physical impacts) direct mitigation and even acquisition has been pursued. However, the latter approach does not appear to be warranted here given the potential for mitigation and other positive benefits to property interests.

The key consideration, therefore, is how best to offset and mitigate the visual impacts on a limited number of properties, while also serving the greater public interest.

Two route alignment options along the Fraser River are under consideration. If the

The Columbia Street corridor is and will remain one of the key transportation and utility corridors for the entire region. A key value of this area is its natural and heritage amenities. Another consideration for the accelerated project is that of adjacent residential impacts.

In finalizing the station locations and remaining route alignment issues, priority should be given to addressing potential growth management issues, and to station integration and connectivity issues.

lower route alignment for the accelerated project can be developed while also ensuring safe and effective access and views for the entire community, including the travelling public, then this should become the preferred option. If, however, the general interest cannot be ensured by this lower route alignment, then the higher elevation should be selected.

In either case the following actions need to be considered for this segment if the riverside location is chosen:

- Immediate construction of a greenway along that portion of river frontage from Woodlands to Sapperton stations, to mitigate and compensate the entire community for loss of future options in this corridor;
- Construction of safe and easy pedestrian and bike access at either end and in the centre of this segment to serve all residents, but particularly the Woodlands and Fraserview areas; and
- Provision for landscaping and other treatments to break up or otherwise ameliorate the physical impacts of the elevated guideway on individual properties.

11.4 NEXT STEPS OF WORK FOR THE RTPO

In finalizing the station locations and remaining route alignment issues, priority should be given to addressing potential growth management issues. These issues must be carefully examined to ensure that the preferred route alignment and station location design serves the growth management intent of the GVRD *Livable Region Strategic Plan*. Preferred options should be presented to regional planning authorities to help ensure they are consistent with, and contribute to, the effectiveness of the overall transportation system both in terms of connectivity and growth shaping.

Priority should be given to addressing station integration and connectivity issues, particularly at the crucial transportation hubs (i.e., the Broadway-VCC segment, Brentwood Town Centre/Mall, and Lougheed Town Centre/Mall). Both current and potential future linkages must be considered at these locations. In particular, there needs to be consideration given to the accelerated project's ability to accommodate the transfer of commuters from one line to the other line at the Broadway Station interchange.

The Special Commission encourages municipal governments to assume an active and visible role, particularly in terms of finalizing station locations since this will greatly influence land use.

Protocols between the RTPO and affected municipalities to formalize working relationships should be concluded before the accelerated project moves into major construction in the respective municipalities. The RTPO and the GVTA need to formalize their relationship and to conclude their negotiations in early 1999.

System-wide areas of concern have been identified by the public and will be the focus of further investigation and specific recommendations by the Special Commission. These include:

- *Biophysical environment* — especially related to impacts on creeks and rivers and including creation of net environmental benefits of the accelerated project;
- *Noise impacts* — what and where, and possible mitigation;
- *Crime and safety* — the most significant concern, especially with respect to the location of stations near schools; and
- *Connectivity with other transit modes* — including form and function of transit hubs at Broadway, Brentwood, and Lougheed stations.

These issues are examined further in the next section of this Interim Report.

“I request that the Skytrain extension be completed to serve the majority and stop catering to the special interest groups that spring up in every neighbourhood. Public transit must be routed so that it can be accessed by as many existing and future residential areas as possible.”

— Written submission to the Special Commission

“One must admit that the Skytrain extension from Columbia Station to Lougheed Mall along a route that was on the original planning books of 1983, when Skytrain was first conceived, is a good option for this section of the right-of-way.”

— Written submission to the Special Commission

PROJECT IMPACTS BENEFITS AND MITIGATION

12.0 PURPOSE OF INTERIM REVIEW OF PROJECT IMPACTS, BENEFITS AND MITIGATION

The following review is a work-in-progress, and is presented at this time for the primary purpose of identifying and organizing issues. The intent of the preliminary reviews of system-wide and location specific issues given in sections 14.0 and 15.0 of this Interim Report is to provide a framework for the Special Commission's Technical Forums and Public Meetings scheduled for early 1999. These sections of the report create a basis for public review, discussion and submissions.

The Special Commission invites public comment on the comprehensiveness of the key issues identified below, and any proposed mitigation measures. Providing information in this preliminary form for public examination and comment allows a public perspective to be considered at the appropriate point in the planning and study phase of the project.

Recognizing that these issues are still under review and measures to address potential impacts are still in the planning stage, however, the reporting format used by the Special Commission in these sections is as follows:

- For system-wide environmental issues, key categories are identified and discussed in general terms; and
- For location specific environmental issues in all categories, each is identified by segment, the RTPO's preliminary analysis is provided, and next steps are suggested.

“The fact that the Province has chosen Skytrain technology and has decided to go ahead with its construction with no input from the public... and no environmental or social impact assessment is simply unacceptable.”

— Written submission to the Special Commission

This interim review is primarily based on information contained in documents and technical studies received by the Special Commission to date from the RTPO. Input from the public and other sources regarding project impacts, benefits and mitigation is continually being received, considered and added to the review process.

To view visual representations of the subject matter reviewed in this section, refer to Map A: Regional Overview, and Map B: Rapid Transit Project Office Preferred Alignment, both prepared by the Special Commission using its GIS system.

Input from the public and other sources regarding project impacts, benefits and mitigation is continually being received, considered and added to the Special Commission's review process. A discussion of the Special Commission's process for reviewing project impacts, benefits and mitigation is given in section 3.2. Future Special Commission reports on the key environmental issues presented below will reflect the full range of input and information received from all sources, including the Technical Forums and Public Meetings, and will include conclusions and recommendations.

13.0 INFORMATION BASIS FOR PRELIMINARY ISSUE IDENTIFICATION

This interim review is primarily based on information contained in documents and technical studies received by the Special Commission to date from the RTPO, particularly in section 15.0, which deals with location specific issues.

13.1 INFORMATION AND REPORTS RECEIVED TO DATE FROM THE RTPO

The RTPO reported in the *Project Description* for the accelerated project (see section 6.2) that detailed technical analysis, including environmental assessments on route alignment and station location options for all segments, commenced in late July with the appointment of Planning and Urban Design (PUD) teams.

Environmental planning and assessment investigations and analyses by the RTPO have accompanied and informed the processes of route alignment and station location planning and preliminary engineering. To direct input to the segment PUD teams, potential biophysical and urban environment impacts with recommendations on avoidance and/or mitigation have been documented in various overview technical reports prepared by the RTPO.

Summary Report: Environmental Assessment (*RTPO, August, 1998*)

The *Summary Report*, received by the Special Commission on October 8, 1998, gave a general overview description of alternative and initially preferred routes alignment and station locations as of August, 1998, and associated control, maintenance and storage facilities based on that route alignment and station location design. The report was intended to identify the range, extent and significance of potential impacts resulting from activities associated with construction and operations of the accelerated project.

The *Summary Report* stated that it served the following purposes:

- Focusing the opportunities and constraints to project form, scale, and design;
- Enabling the responsible avoidance and/or mitigation of potential environmental impacts associated with the project; and
- Providing adequate information to regulatory authorities to demonstrate a logical, focused and responsible approach to identifying and managing environmental impacts associated with the project.

This report summarized the general and specific potential effects of the accelerated project, including both system-wide and location specific potential impacts that may result from project construction and operations. This report also summarized potential avoidance, mitigative and management measures to be incorporated in project development and design planning.

The findings of the *Summary Report*, as prepared by the RTPO's consultant, indicated that there are no unusual or grave environmental issues and/or impacts associated with the accelerated project. The RTPO concluded that biophysical and urban environmental issues identified for each of the accelerated project segments could be adequately and appropriately avoided and/or mitigated.

The Special Commission will comment on findings when a detailed impact assessment study is available from the RTPO and is reviewed by government and the public.

Update Report: Environmental Assessment (*RTPO, October, 1998*)

An RTPO *Update Report* was received by the Special Commission on October 14, 1998. The purpose of this report was similar to the purpose for the *Summary Report* but the *Update Report* addressed the changes in route alignment and station location design that had taken place since August, 1998. The *Update Report* also concluded that biophysical and urban environmental issues identified for each of the accelerated project segments could be adequately and appropriately avoided and/or mitigated.

The Special Commission will comment on findings when a detailed impact assessment study is available from the RTPO and is reviewed by government and the public.

Environmental Management Analysis Compendium (*RTPO, October, 1998*)

The *Environmental Management Analysis Compendium*, received by the Special Commission on October 26, 1998, provided a series of expanded analyses focusing on specific issues and outlining potential biophysical and urban environmental impacts.

The RTPO's Summary Report and Update Report summarized the general and specific potential effects of the accelerated project that may result from construction and operations. The Environmental Management Analysis Compendium provided a series of expanded analyses focusing on specific issues.

The Project Description (see section 6.2) describes the accelerated project in more detail than previous reporting.

The *Compendium* also identifies a series of additional reporting that will be provided. This includes reports on:

- Noise and vibration impacts and mitigation measures (*Noise Issues Report* received by the Special Commission December 21, 1998);
- Safety and security issues and mitigation measures;
- Project impacts on vegetation in the Grandview Cut and mitigation measures;
- Stream crossing impacts and mitigation plans;
- Tree inventory and mitigation measures;
- Archaeological impacts and mitigation measures;
- Environmental study of woodlands area;
- Construction management plans;
- Spill and hazardous materials management plans;
- Contaminated sites assessment; and
- Electro-magnetic fields.

Project Description (*RTPO, December, 1998*)

The *Project Description* (see section 6.2), received by the Special Commission on December 3, 1998, describes the project in more detail than previous reporting by the RTPO. It sets the context and parameters for the accelerated project, describes the role of the RTPO to carry out the project, provides a route alignment and station location design summary based on information available as of November, 1998, summarizes the project budget and presents a general overview of issues identified.

Archaeological Overview Assessment (*Arcas Consulting Archaeologists, February, 1998*)

An *Archaeological Overview Assessment* was conducted in February, 1998 (Arcas Consulting Archaeologists Ltd. 1998). This *Overview Assessment* studied the proposed LRT corridor that pre-dated the Skytrain decision in June, 1998. The assessment included a literature review, consultations with individuals with local knowledge, topographical and biophysical reviews, archaeological site potential modeling and field reconnaissance.

An archaeological site potential model was developed based on: topographical and biophysical characteristics of the area; current understanding of traditional and earlier settlement and resource use of the study area by First Nations peoples; present knowledge of historical settlement and development of the development sites; and locations of recorded archaeological sites. One of two archaeological site potential values was assigned to the land within the corridor examined:

- High potential — lands that exhibit topographic and biophysical characteristics that are highly supportive of past activities that would have left archaeological evidence; and

- Low potential — lands that exhibit few characteristics supportive of such activities.

The *Overview Assessment* indicates that several recorded sites are located in the vicinity of the proposed accelerated project and present definite archaeological concerns for the accelerated project in areas noted as having high archaeological site potential.

The study area included the majority of the current accelerated project preferred route alignment. Any gaps in current reporting will be addressed through a more detailed archaeological impact assessment that will report on all relevant areas of archaeological potential, including the areas where the route alignment runs near the Brunette and Fraser rivers.

Noise Issues Report (RTPO, December 11, 1998)

A technical study on noise issues has been prepared by the RTPO and was received by the Special Commission on December 21, 1998. The Special Commission had not had an opportunity to study this *Noise Issues Report* as of the date of this Interim Report, but will review this information through a Technical Forum in early 1999, and through comments received from IAC members and at the Special Commission's upcoming Public Meetings.

The Special Commission's focus is primarily, but not exclusively, on system-wide issues. They may be systemic issues that must be assessed in relation to the total project, or they may be recurrent issues along several segments of the route alignment.

14.0 SPECIAL COMMISSION PRELIMINARY REVIEW OF SYSTEM-WIDE KEY ENVIRONMENTAL ISSUES

The Special Commission's focus is primarily, but not exclusively, on system-wide issues. They may be *systemic* issues that must be assessed in relation to the total project, or they may be *recurrent* issues that are identified, either by RTPO investigations or through public consultation, along several segments of the route alignment.

For example, the connectivity of the accelerated project with other transit infrastructure and transportation modes is an issue that needs to be considered in terms of the entire accelerated project. This would include consideration of station locations over the entire project, connections with the existing Skytrain line at Broadway, Lougheed and Columbia Stations, and bus route adjustments required to integrate bus service with the accelerated project.

There are also local issues that are repeatedly identified along many segments of the route alignment. For example, the public input received at RTPO open houses indicates that in every segment of the accelerated project there are public concerns about potential project impacts on crime and safety in local communities. Crime and safety is therefore an issue to be considered in an overall context as well as on a location specific basis. The decision to characterize a particular recurring local impact as a

“In the Lower Mainland, protection of the environment is really about protecting the creeks and rivers. This can easily be accomplished by Skytrain. The long-term environmental impact of continued one-person-per-car commuting is far greater than any impact from Skytrain.”
— Written submission to the Special Commission

system-wide issue has been made for convenience of issue organization. Local issues that do not fit into the key categories identified are addressed under the heading of “Other Issues” in the Special Commission’s review of location specific environmental issues.

14.1 BIOPHYSICAL ENVIRONMENT

Impacts to the biophysical environment have been identified by the RTPO on a segment-by-segment basis. The Special Commission has identified several potential impacts that are system-wide issues. These include the potential impacts of project construction near streams and rivers, and the potential loss or alteration of green space, vegetation and natural habitats.

Possible affects of improved rapid transit on the regional airshed and air quality have been identified as a potential accelerated project issue in public comments. Any net reduction in private automobile use is thought to be linked to the degree of improvement that can be expected to regional air quality. It would follow that any improvement to regional air quality resulting from the accelerated project would depend on how many commuters opt to leave their cars at home and use the new Skytrain instead, and what potential exists for some people who currently use public transit to return to private automobile use if the accelerated project successfully reduces traffic congestion.

These types of potential changes in the regional airshed may be difficult to predict and measure, and the broader issue of regional air quality cannot be fully addressed in the context of the Special Commission Skytrain Review. Instead, the Special Commission will endeavor to identify agencies or other forums where this issue can be discussed, and will also receive and report on public and government comment on this issue in a future key environmental issue report on biophysical impacts, benefits and mitigation.

The potential effect of the accelerated project on air quality at the local level will be considered by the Special Commission. Of particular interest are changes that the accelerated project may have on patterns of local transportation use, especially in the vicinity of new stations (e.g., new or altered bus routes, bus interchanges at new stations and major parking facilities), and the effect — either positive or negative — that these changes may have on local air quality.

The Special Commission will report further on the issue of accelerated project impacts on local air quality when additional information is available from the RTPO on station locations, station design and any changes to existing bus routes required to connect bus routes to the new stations.

14.2 CRIME AND SAFETY

The RTPO reports regarding their Neighbourhood Consultation Program have all identified a public perception that the accelerated project could lead to increased crime in local communities. Some people are concerned that the accelerated project will make neighbourhoods more accessible to individuals who could be engaged in illegal activities. Personal security at stations is also a public concern. More discussion of this issue can be found in sections 10.2 and 10.3.

Additional reporting is expected from the RTPO on the issue public safety. The RTPO will also continue to examine these issues in Phase 2 of its Neighbourhood Consultation Program during its consultations on station design. The Special Commission will report in detail on this issue following further technical review and public consultation.

14.3 NOISE AND VIBRATION

This issue has been identified by the public through the RTPO's Neighbourhood Consultation Program. Noise impacts also became a significant public concern when the original Skytrain was constructed in the 1980s, leading eventually to a review of this and other issues by the Office of the Ombudsman in 1987. More discussion of this issue can be found in sections 10.2 and 10.3.

Additional reporting and assessment on the noise and vibration impacts of the accelerated project has been done by the RTPO in its *Noise Issues Report*, which was provided to the Special Commission in late December. The Special Commission will report in detail on this issue following further technical review and public consultation.

14.4 VISUAL IMPACTS AND AESTHETICS

This issue has been identified by the public through the RTPO's Neighbourhood Consultation Program. Visual impacts such as loss of viewsapes and loss of privacy became a significant public concern when the original Skytrain line was constructed in the 1980s, leading eventually to a review of this and other issues by the Office of the Ombudsman in 1987. More discussion of this issue can be found in sections 10.2 and 10.3.

Additional reporting and assessment on the visual impacts of the accelerated project is being completed by the RTPO and will be provided to the Special Commission. The Special Commission will report in detail on this issue following further technical review and public consultation.

“Please make sure that the stations are wide open. Also, for those who are close enough to walk, have safe, secure walkways.”

— Written submission to the Special Commission

“In rushing this project through, the government is setting the standards lower — not higher — in regards to many quality of life issues such as noise pollution and acceptable total traffic levels.”

— Written submission to the Special Commission

Two aspects of implementation are of concern to the Special Commission: connectivity to the regional transit system, and integration into surrounding land use and community plans. The Special Commission will be looking for assistance from the GVTA and GVRD to assemble information on the connectivity issue.

14.5 STATION INTEGRATION

The term “station integration” is used in Special Commission reports to encompass such issues as connectivity with existing or potential future transit infrastructure and other transportation modes, local and regional land use considerations, related growth management issues, and physical integration of the accelerated project into neighbourhoods.

The location and the design of Skytrain stations will play a significant role in determining whether the accelerated project can deliver the environmental and land use benefits anticipated in the GVRD *Livable Region Strategic Plan*. The region needs stations which are well designed and centrally located. Since the location of stations has been largely resolved with a few exceptions (e.g., Boundary/Gilmore, Brentwood Town Centre/Mall, Bell, Lougheed Town Centre/Mall), attention now shifts to the issues of design implementation and land use.

Two aspects of implementation are of concern to the Special Commission:

- Connectivity to the regional transit system; and
- Integration into surrounding land use and community plans.

The accelerated project has the potential to impact current transit infrastructure, given the need to connect and integrate the route alignment and station location design with the existing transportation system. The Special Commission will report further on the issue of the connectivity of the accelerated project to current transit infrastructure, as well as on land use and growth management issues. The information to be gathered for this review will be largely collected from sources other than the RTPO because this information does not reside with the RTPO. The Special Commission will be looking for assistance from Inter-Governmental Advisory Committee (IAC) members, in particular the GVTA and GVRD, to assemble information on this issue. Information on ridership is also required to assess issues related to connectivity of the accelerated project. The Special Commission will follow up with the RTPO and other sources to gather additional data on ridership.

Two stations are proposed that will connect the accelerated project to the existing Skytrain line. These major transfer points will be at Broadway Station and Columbia Station. These stations will need to accommodate a large number of passengers who will either transfer to another Skytrain or disembark from Skytrain and continue their journey by other forms of transportation. These stations will also be receiving passengers who arrive via other transportation and intend to board the Skytrain. The challenge will be to enable a large number of people to move through these stations, especially during peak hours.

The Special Commission will examine the RTPO plans for integration of stations in more detail once additional information is provided by RTPO. This issue will also be discussed in Public Meetings planned by the Special Commission for early in 1999. The Special Commission will report in detail on this issue following further technical review and public consultation.

The design of stations also has substantial implications for land use and ridership. The RTPO plans to begin Phase 2 of its Neighbourhood Consultation Program (Station Program) in early 1999. The Special Commission will monitor these consultations. In particular, the Special Commission wishes to ensure that system-wide design standards are flexible enough to accommodate local community values and perspectives, and to help ensure and encourage development guidelines for adjoining areas which are effective in promoting appropriate development of these areas. The Special Commission will work proactively with local governments on this topic.

Issues relating to each accelerated project route alignment segment are summarized and the RTPO's preliminary analysis are presented here. The Special Commission then sets out the next steps in the review of the issues.

15.0 SPECIAL COMMISSION PRELIMINARY REVIEW OF LOCATION SPECIFIC ENVIRONMENTAL ISSUES

For many issues which were also identified in the RTPO's Phase 1 Neighbourhood Consultation Program on route alignment and station location design, the RTPO has provided the Special Commission with overview level technical reporting on the potential impacts of the accelerated project. This portion of the Interim Report is based on information from RTPO's documents described in section 13.1, specifically: *Summary Report: Environmental Assessment (August, 1998)*, *Update Report: Environmental Assessment (October, 1998)*, *Environmental Management Analysis Compendium (October, 1998)* and *Project Description (December, 1998)*. Location specific issues are presented here for the purpose of preliminary identification, and much work remains to review all the information required to develop conclusions and recommendations.

In this section, the issues relating to each accelerated project route alignment segment are summarized and the RTPO's preliminary analysis is presented. The Special Commission then sets out the next steps in the review of the issue. For purposes of the Special Commission's location specific review, the onus is on the RTPO to provide a suitable description of the characteristics of the affected area (e.g., the Grandview Cut, Stoney Creek), to report on the magnitude of the impact, and to detail the measures proposed to prevent or mitigate the effect. The Special Commission, through discussion with IAC members and through public and stakeholder consultation, will then evaluate this reporting.

Each location specific issue is placed in one of the five key issues categories described in section 3.2.1 and used to capture system-wide issues.

Each location specific issue is placed in one of the five key issues categories described in section 3.2.1 and used to capture system-wide issues. In the *Summary Report: Environmental Assessment, Update Report: Environmental Assessment* and *Environmental Management Analysis Compendium*, the RTPO mainly identified potential issues related to impacts on the biophysical environment, noise and vibration impacts, and visual impacts and aesthetics. Identification of location specific issues related to crime and safety and to station integration has, to date, primarily occurred through the RTPO's Neighbourhood Consultation Program and other public feedback. These issues are described in detail in section 10.3 and are not re-stated in section 15.0, although they will be considered in future reports, conclusions and recommendations of the Special Commission. The RTPO is finalizing additional reports that will assist the Special Commission to examine all issues in more detail. Once received, these reports will also be made available to the public.

One issue that is not easily placed in one of the five key issue categories is the potential impact of the accelerated project on archaeological sites. The *Overview Archaeological Assessment* conducted by Arcas Consulting Archaeologists Ltd. in February, 1998 indicates that several recorded sites are located in the vicinity of the preferred accelerated project route alignment and present definite archaeological concerns for the project in areas noted as having high archaeological site potential. Additional reporting will be provided by the RTPO on the potential impacts to archaeological resources.

15.1 SEGMENT 1 – VANCOUVER (VCC TO BOUNDARY)

15.1.1 Biophysical Environment Issues

The reporting on impacts for the segment of the accelerated project route alignment west of Broadway and Commercial to Vancouver Community College (VCC) is preliminary because the exact route alignment is not yet finalized. The Special Commission notes that additional public consultations will be undertaken by the RTPO in Segment 1.

Cedar Cottage Park

Small stands of maturing trees exist as part of landscaping near the portal at Cedar Cottage Park. These stands are probably used to a limited extent by a small number and variety of songbirds. The siting and construction of the south portal to the station at VCC has the potential to impact vegetation at Cedar Cottage Park.

Preliminary RTPO Analysis

A north side portal to the accelerated project would avoid these trees. Trees to be removed or damaged during construction can be replanted. Compliance with City of Vancouver guidelines for tree removal in parks is required.

Next Steps

The RTPO will provide route alignment mapping for this segment and the Special Commission will consider whether any critical habitat is affected. Compliance with applicable by-laws for tree removal is also assumed.

Grandview Cut

The preferred route alignment curves southeast into the Grandview Cut on the north side of Broadway from the end of the new station platform at Commercial Drive. A right-of-way has been left for the future construction of a second railroad track by Burlington Northern Railway (BNR) in addition to the two Skytrain guideways.

For approximately one kilometre from Broadway, the preferred route alignment will run parallel to the north side of the BNR tracks. This section would be constructed on an essentially at-grade structure generally at the same elevation as the existing railroad. Due to the depressed nature of the Grandview Cut, the guideway would not be visible. The existing wood trestle bridges in the Grandview Cut at Lakewood Drive and Nanaimo Street would have to be demolished and replaced with new bridges. These bridges have been slated for future replacement in several years, as were the Woodland and Commercial Drive structures.

The Grandview Cut is a deep, man-made ravine (excavated about 1915) that has deciduous cover along the steep banks, which provides habitat for songbirds. The entire length of the Grandview Cut was created for, and subsequently developed for, transportation (railway and utility lines). The right-of-way adjacent to the rail ballast is primarily grasses and weeds, giving way to trees and shrubs as the sides of the Grandview Cut increase in slope. The remaining area along the steep slopes of the Grandview Cut is maturing deciduous forest habitat. Common tree species occurring here include red alder, cottonwood, bigleaf maple, and cherry. Maturing to mature deciduous trees are common. The Grandview Cut has been designated by Vancouver City Council as a greenway and is also included in the regional Green Zone mapping by the GVRD.

Preliminary RTPO Analysis

The *Environmental Management Analysis Compendium* reported that up to a 10m width would have to be cleared for the accelerated project operation with an additional 5m width cleared for construction. The net disturbed area will be up to 10m for the

The Grandview Cut is a deep, man-made ravine (excavated about 1915), that has deciduous cover along the steep banks, which provides habitat for songbirds. It has been designated by Vancouver City Council as a greenway.

The net effect of construction of the accelerated project through the Grandview Cut would be to reduce the vegetation approximately 20 per cent. Frequent Skytrain traffic has potential to impact nesting songbirds.

guideway (long term impact) and possibly up to approximately 5m for vegetation control. Were the route alignment situated on the south side of the BNR tracks it could result in a total width of 15m of disturbance on the south-side wall of the Grandview Cut during construction. At Victoria Drive, for example, this would leave about 13m of vegetation width on the south side of the south-side wall. At other sections, the amount remaining could vary between 10m and 15m, depending on design and position of the BNR-Santa Fe rail lines.

The net effect of construction of the accelerated project through the Grandview Cut would be to reduce the vegetation within the Grandview Cut by approximately 20 per cent. In addition, disturbance effects would be significant, firstly, due to construction activities and secondly, due to the frequency of Skytrain traffic as compared to the present level of rail traffic (BNR-Santa Fe, CN Rail, Via Rail, Amtrak, and Rocky Mountaineer traffic). Frequent Skytrain traffic has potential to impact nesting songbirds at various locations within the Grandview Cut.

The project also has the potential to impact drainage in the Grandview Cut. If the line follows the south side of the Grandview Cut, it may disturb north-facing vegetation and surface runoff. The City of Vancouver's storm water master planning includes an option to utilize the Grandview Cut for routing storm water drainage from Trout Lake and directing this toward the west. At present, shallow surface drainage ditches are located in the Grandview Cut. These likely drain by surface to the west into the City of Vancouver stormwater drainage system through the majority of the Grandview Cut, and into the Still Creek drainage from approximately Templeton Drive eastward along the Grandview Cut.

Next Steps

The RTPO notes that detailed construction design engineering, including guideway siting and placement of spans and footings, is being conducted in order to minimize environmental impacts in the Grandview Cut. In addition, a detailed environmental evaluation is in progress. Additional reporting is being provided by the RTPO on the potential impacts of the accelerated project on the Grandview Cut. This will include a determination of ecological implications and significance of vegetative loss and associated wildlife disturbance in the Grandview Cut. The RTPO will also consider what mitigation or enhancement measures may be possible to minimize or compensate for impacts.

The *Environmental Management Analysis Compendium* reports that the study information to be compiled on the Grandview Cut includes:

- A vegetation species list;
- A listing of birds and other wildlife utilizing the Grandview Cut, by season;

- Identification of any special status species that may occur in the Grandview Cut (i.e., Conservation Data Centre Red or Blue list);
- A refined impact analysis; and
- Preparation of a mitigation/compensation plan (including possible sites for compensation work and associated costs).

The Special Commission will consider findings and predictions when additional information on the route alignment and supporting environmental studies are available for review. The impacts of the accelerated project on green spaces, such as the Grandview Cut, will be a discussion issue in the Special Commission's Public Meetings early in 1999. The potential impact of the accelerated project on the Grandview Cut is of significant concern to local stakeholder groups.

Vegetation East of Grandview Cut

Accelerated project activities that could impact vegetation in this segment include construction work requiring removal of vegetation along the BNR-Santa Fe rail line from Slocan Street eastward to Boundary Road. A minimal amount of vegetation exists along this section of the route alignment. Wildlife use is expected to be limited to a small number and variety of songbird species.

Preliminary RTPPO Analysis

The RTPPO predicts that the impacts of this segment of the route alignment on vegetation will be minimal. Replanting of shrubs and/or trees along the route alignment is predicted to be effective to mitigate for disturbance to existing vegetation.

Next Steps

The Special Commission will consider findings and predictions when additional information on the route alignment and supporting environmental studies are available for review.

Still Creek

Along the BNR line east of the Grandview Cut, the accelerated project route alignment will follow a drainage ditch in the upper Still Creek system. The ditches and uppermost runoff to the Still Creek system along this segment do not contain fish, but do provide water and nutrients on a seasonal basis to fish-bearing waters downstream. They would be classified in the recently developed Classification System for Lower Mainland Region Watercourses (Envirowest, 1995) as either B (Yellow), or C (Green), indicating no fish and either some habitat value (B), or no habitat value (C). They are still classified as fish habitat and subject to protection through the federal *Fisheries Act* and the federal/provincial land development guidelines.

The impacts of the accelerated project on green spaces, such as Grandview Cut, will be a discussion issue at the Special Commission's Public Meetings early in 1999.

"There should be no concerns about ecology [in the VCC-Broadway segment] because it's going along an existing rail bed. The pollution caused by cars in traffic jams is far more damaging than Skytrain could ever be."

— Submission to the Special Commission's Vancouver office

The RTPO predicts that no significant loss of riparian habitat around Still Creek would result from the location, construction and operation of the accelerated project.

Where the route alignment would parallel the ditch and runoff area leading to upper Still Creek, it would be elevated on vertical supports with relatively insignificant footprint sizes and be located on the north side of the BNR right-of-way, thus avoiding the upper Still Creek drainages on the south side of the BNR right-of-way. The siting and design for the placement of support structures would also allow for clear-spanning of the ditch and any adjacent vegetation. The line would become at-grade as it approaches the TransCanada Highway to pass under the highway structures.

There is some potential for sediment-laden runoff from disturbed ground and/or soil stock piles to reach fish-bearing watercourses, particularly during storm events. Sediment control would be implemented.

Preliminary RTPO Analysis

The RTPO predicts that any permanent loss of vegetation at particular locations for support footprints or along the at-grade portions would be more than offset by re-vegetation during site reclamation. The RTPO predicts that no significant loss of riparian habitat would result from the location, construction and operation of the accelerated project in this segment of the route alignment.

The RTPO also predicts that potential for erosion and sediment transport during construction activities for the accelerated project can be addressed through proper use of sediment control equipment and techniques, and that no significant sedimentation would occur to watercourses along this section of the route alignment.

Next Steps

Additional reporting and assessment is being prepared by the RTPO and will be provided to the Special Commission. The Special Commission will report in detail on this issue following further technical review and public consultation.

15.1.2 Noise and Vibration Issues

Glen Drive to TransCanada Highway

The RTPO reports in the *Environmental Management Analysis Compendium* that although the accelerated project would be located in the Grandview Cut, the abutting residences along the right-of-way may be impacted by noise, vibration and visual impacts.

Potential disruption (noise and visual impacts) may occur to residential areas along South Grandview Highway, east of Slocan Street where the guideway would be elevated. Furthermore, there is limited intervening industrial development present to block or screen the guideway from residential areas. Approximately 20 houses are located in the general vicinity. The guideway would be situated approximately 200 metres or more from the nearest residential unit south of South Grandview Highway.

Preliminary RTPO Analysis

The RTPO predicts that the elevated guideway would be situated approximately 200m or more from the nearest residential unit in this area. Noise associated with Skytrain operations would be minimized through the use of design measures. Prior to detailed study, noise and vibration levels associated with the Skytrain operations were predicted to be close to present ambient conditions.

Next Steps

Detailed reporting on the issue of noise impacts has recently been provided by the RTPO in its *Noise Issues Report* (December, 1998). This includes measurement of existing noise/vibration levels and forecast of anticipated noise/vibration levels. The findings of the report will be input to route alignment evaluation work and assist to identify any design measures that may mitigate residual noise impacts.

The Special Commission will review the RTPO *Noise Issues Report*, and will report in detail on this issue following further technical review and public consultation.

Noise and vibration levels associated with Skytrain operations in this segment have been predicted by the RTPO to be close to present ambient conditions.

15.1.3 Station Integration Issues

Vancouver Community College Area

The RTPO reports that an underground system beneath Broadway is preferred for the route alignment between Vancouver Community College (VCC) and the Grandview Cut. The line is proposed to start at Glen Drive and run beneath the Broadway right-of-way until just west of Commercial Drive, where it would move beneath the properties on the north side of Broadway. It would then run parallel with Broadway to pass beneath Commercial Drive and the existing north entrance to the Broadway Station, before turning southeast into the Grandview Cut.

This section would be constructed using conventional mining construction techniques for the tunnel, and cut and cover for the stations. Using the conventional tunneling method, excavation would commence from the Grandview Cut and proceed west with spoils being evacuated from the east portal via the Grandview Cut. This technique would minimize construction disruption, including the need for relocation of utilities and disruption to traffic.

At VCC, the station would be underground and designed to integrate an entrance into the college on the north side of Broadway, possibly on the east side of the college building where Keith Drive dead ends. On the south side of Broadway, a small portal entrance is proposed, possibly at the west edge of Cedar Cottage Park. Construction of the station could take advantage of the sharp topographic drop on the north side of Broadway at Keith Drive by using the area at the street dead end as a construction area.

“The Broadway Station definitely needs a more people-friendly atmosphere. A sunny open people place would be a tremendous boost and enhancement for the neighbourhood.”

— Submission to the Special Commission Vancouver office

“The Broadway Station... should be integrated into and enhance the functioning of the neighbourhood — culture, history, the green space of the ravine, local businesses, local social services, performance arts, visual arts.”

— Submission to the Special Commission Vancouver office

Preliminary RTPO Analysis

The assessment done to date by the RTPO indicates that the primary impacts to be assessed in this downtown area are:

- Construction impacts from tunneling and removal of excavated materials;
- The siting and construction of the underground station at VCC. This has the potential to disrupt VCC college classes and activities; and
- Impacts to any surrounding residential areas from noise and dust during construction.

The RTPO reports that consultation and coordination with VCC on design development is required to help ensure optimal integration with the college of the entrance and the access to the Skytrain system. Siting of a station and its integration with VCC offers positive opportunities for the net benefit of improved access and egress to and from the campus, improved transit access for students and staff at VCC, and reduced parking demand at the college.

Next Steps

Further public consultation is planned by the RTPO for Segment 1 of the route alignment. The Special Commission will audit this process.

Broadway Station

At the Broadway Station, the north entrance and lands surrounding the entrance would be secured for construction of the new station interface. The existing entrance to Broadway Station at this location would be removed and replaced by a new entrance integrated with a new station platform situated either underground or open air within the Grandview Cut. This is intended to facilitate seamless passenger transfers between the two Skytrain lines. The properties around the existing entrance would be bought and demolished for the station construction, and there is an opportunity for an integrated development on this site.

Preliminary Analysis

The Special Commission views Broadway Station as a key connection and transfer point with the new Skytrain line, which needs careful study and design.

Next Steps

Further public consultation is planned by the RTPO for Segment 1 of the route alignment. The Special Commission will examine the RTPO plans for integration of stations in detail once additional information is provided by RTPO, and will report on this issue following further technical review and public consultation.

15.2 SEGMENT 2 – BURNABY (BOUNDARY TO DELTA)

15.2.1 Biophysical Environment Issues

Lougheed Highway

The RTPO reports in the *Environmental Management Analysis Compendium* that a number of trees are located in a narrow band along Lougheed Highway. These trees are reported to have limited value for wildlife, notably as perching sites for songbirds.

Preliminary RTPO Analysis

The RTPO predicts that the impacts of this section of the route alignment on trees will be insignificant. Any trees that are removed for construction can be re-planted. The RTPO notes that the City of Burnaby by-law #10482 may also apply to removal of trees.

Next Steps

The Special Commission will consider findings and predictions when additional information on the route alignment and supporting environmental studies are available, and will report on this issue following further technical review and public consultation.

Still Creek and Chubb Creek

The RTPO reports in the *Environmental Management Analysis Compendium* that accelerated project activity has the potential to impact aquatic resources around Still Creek and its tributaries. Still Creek and Chubb Creek are classified as relatively high-value (Red Zone, Class A) salmonid-bearing streams according to the recently completed Classification System for Lower Mainland Region Watercourses (Envirowest, 1995). Still Creek supports coho salmon, as well as cutthroat trout and other species. The streams are locally important and have been the subject of environmental studies and fisheries enhancement work.

The creeks are also recognized as Environmentally Sensitive Areas (ESAs) and as integral parts of the City of Burnaby's Green Zone (Official Community Plan, June, 1998). The City calls for improving the quality of urban runoff with zero net increase in volumes. The City also has sediment control guidelines similar to those in the federal/provincial Land Development Guidelines for the Protection of Aquatic Life (Chilibeck et al., 1992), and alternate stormwater management approaches.

Preliminary RTPO Analysis

The RTPO predicts that both Still and Chubb creeks and their associated riparian zones are sufficiently narrow in width to enable clear-spanning of the creek systems. Properly constructed clear-span structures generally produce no significant adverse

Still Creek and Chubb Creek are classified as relatively high-value (Red Zone, Class A) salmonid-bearing streams. The streams are locally important and have been the subject of environmental studies and fisheries enhancement work.

The RTPO predicts that both Still and Chubb creeks and their associated riparian zones are sufficiently narrow in width to enable clear-spanning of the creek systems. Properly constructed clear-span structures generally produce no significant adverse effects on fishery resources.

effects on fishery resources. The RTPO predicts that any adverse effects on fishery resources and disturbance to riparian areas during construction can be avoided.

Next Steps

Ongoing specific environmental study commissioned by the RTPO is underway to evaluate the specific siting, design and construction measures to be undertaken at Still and Chubb creeks. This involves site analyses by experienced fisheries and/or wildlife biologists to document the existing resources at the site and to develop site-specific impact avoidance and mitigation techniques to help ensure no net adverse impacts to Chubb and Still creeks.

The Special Commission will review the RTPO reports on project impacts once available, and will report on this issue following further technical review and public consultation.

15.2.2 Noise and Vibration Issues

Bridge Studios

The proposed route alignment is situated in proximity to Bridge Studios, which abuts the BNR right-of-way.

Preliminary RTPO Analysis

Due to filming requirements and associated restrictions from a noise/vibration perspective, business disruption is a significant issue to Bridge Studios. Prior to detailed study, the RTPO predicted that, during operation of the Skytrain, Bridge Studios may experience impacts such as noise and vibration.

Next Steps

Detailed reporting on the issue of noise impacts has recently been provided by the RTPO in its *Noise Issues Report* (December, 1998). This includes measurement of existing noise/vibration levels and forecast of anticipated noise/vibration levels. The findings of the report will be input to route alignment evaluation work and assist to identify any design measures that may mitigate residual noise impacts.

The Special Commission will review the RTPO *Noise Issues Report*, and will report in detail on this issue following further technical review and public consultation.

15.2.3 Station Integration Issues

Brentwood Town Centre/Mall

The RTPO reports in the *Environmental Management Analysis Compendium* that integration of the station at Brentwood Town Centre/Mall with the major bus interchange

and with existing and planned development are part of design for the Skytrain station in this area.

Brentwood Station may either be depressed or elevated and would provide connections to the various buses that converge at either the existing or a new bus loop. Relocation of this loop may be a part of this station design depending on its precise location.

The City of Burnaby Official Community Plan (June, 1998) documents include some policies pertaining to the location of this station. Specifically, it is stated in the transportation section of the framework for the Brentwood Town Centre Development Plan, adopted by Council on March 13, 1995, that the establishment of rapid transit generally along the Lougheed Highway corridor has been determined as a priority by the City.

The Plan states that the redevelopment of the Brentwood Town Centre is based on the premise that a rapid transit line will be established along the Lougheed Highway corridor and will be a major catalyst for development; that potential rapid transit stations in the vicinity of the Willingdon Avenue intersection along Lougheed Highway should be given consideration in the determination of the development plan; and that rapid transit should be fully integrated into the Brentwood Town Centre.

Preliminary RTPO Analysis

The RTPO states that the proposed station at Brentwood Town Centre/Mall supports community plan policies regarding a station in this location. This station could be grade separated at the Lougheed-Willingdon intersection, as specified in the Brentwood Town Centre Development Plan. The station designs, elevated or depressed, are being considered in the RTPO's station design process, as envisioned in the Plan. The RTPO is working with the municipal planning department on the design configuration of the station to help ensure that the station is integrated with planned development/redevelopment in the Brentwood Town Centre/Mall area, and that disruption effects are minimized.

Construction activities may also have potentially disruptive impacts on Brentwood Mall. Improved access to the existing and future development in the Town Centre due to the presence of the accelerated project would be positive factors.

Next Steps

The Special Commission has been advised that neighbourhood consultation regarding route alignment and station locations in this segment is to be completed in early 1999. The RTPO has completed development of a preferred route alignment and station location design, which has not yet been formally presented to Burnaby City Council. Issues regarding Brentwood Station have not been resolved. This is a key

*City of Burnaby
Official Community
Plan documents state
that the redevelopment
of the Brentwood
Town Centre is based
on the premise that a
rapid transit line
will be established
along the Lougheed
Highway corridor
and will be a
major catalyst
for development.*

Beecher Creek is recognized as an Environmentally Sensitive Area (ESA) and is an integral part of the City of Burnaby's Green Zone (Official Community Plan, June, 1998).

interchange point for transit and the station has great potential to shape local land use. The Special Commission will monitor the next round of consultations in the RTPO's Neighbourhood Consultation Program, and will also consider Brentwood Station in relation to system connectivity.

15.3 SEGMENT 3 – BURNABY (DELTA TO LAKE CITY)

15.3.1 Biophysical Environment Issues

Beecher Creek

The route alignment along the south side of Lougheed Highway would cross Beecher Creek, a north-side tributary of Still Creek. The RTPO reports in the *Environmental Management Analysis Compendium* that accelerated project activity has the potential to impact aquatic resources during construction of the route alignment across Beecher Creek. The route alignment along the south side of Lougheed Highway would cross Beecher Creek.

Beecher Creek is classified, using the recently completed Classification System for Lower Mainland Region Watercourses (Envirowest, 1995), as a relatively high-value (Red Zone, Class A) salmonid-bearing stream. Lower Still Creek and Beecher Creek support coho salmon, as well as cutthroat trout and other species. This stream is locally important and has been the subject of environmental studies and fisheries enhancement work.

Beecher Creek is recognized as an Environmentally Sensitive Area (ESA) and is an integral part of the City of Burnaby's Green Zone (Official Community Plan, June, 1998). The City calls for improving the quality of urban runoff with zero net increase in volumes. The City also has sediment control guidelines similar to those in the federal/ provincial Land Development Guidelines for the Protection of Aquatic Life (Chilibeck et al., 1992), and alternate stormwater management approaches.

Preliminary RTPO Analysis

Where the route alignment crosses Beecher Creek, it would be elevated along the south side of Lougheed Highway. The vegetation along the highway at this point is characterized by large cottonwoods and other mature deciduous vegetation. The location of the guideway along the south side of the highway would necessitate some tree and understory vegetation removal at the toe of the slope at the base of the highway right-of-way. Guideway support column footing structures may also require the removal of a small amount of vegetation. The creek itself would be clear-spanned. There is some potential for erosion and sediment transport during construction activities for the accelerated project.

Next Steps

Ongoing specific environmental assessments commissioned by the RTPO are underway to study the specific siting, design and construction measures to be undertaken at Beecher Creek. This involves site analyses by experienced fisheries and/or wildlife biologists to document the existing resources at the site and to develop site-specific impact avoidance and mitigation techniques to help ensure no net adverse impact to Beecher Creek and environs. The Special Commission will review the RTPO reports on project impacts once available, and will report on this issue following further technical review and public consultation.

Bellwood to Lake City

A number of trees are located in a narrow band along Lougheed Highway between Bellwood and Kensington Avenue. These trees have some value for wildlife, notably as perching sites for songbirds. Removal of these trees may be necessary as part of siting and construction of the guideway.

There is also deciduous woodland west of Phillips Avenue that links with a band of trees located along the south side of Lougheed Highway to Charles Rummel Park at the eastern end of this segment. A small stand of trees is situated west of Sperling Avenue on the south side of the highway. There is also a vegetated strip along the north side of Lougheed Highway either side of Phillips Avenue.

Preliminary RTPO Analysis

These treed areas, particularly the larger stands, have value for wildlife, notably as perching sites for songbirds and as aesthetic screening. Removal of some trees may be necessary along the south side of Lougheed Highway, west of Sperling Avenue, on both sides of the highway either side of Phillips Avenue, and east of Lozelles Avenue before the line traverses to the north side of Lougheed Highway.

Depending on the final route alignment configuration, the RTPO predicts that there may be a requirement to widen the right-of-way in the vicinity of the treed area west of Phillips Avenue and the treed area west of Sperling Avenue. This may involve the removal of some trees and understory vegetation in these locations. The RTPO anticipates that in the vicinity of Charles Rummel Park there would be no widening of the highway right-of-way and thus no encroachment on the vegetation in the park.

The RTPO predicts that the removal of trees along Lougheed Highway would have no significant impact, and that any trees removed during construction can be replanted. The City of Burnaby by-law #10482 may also apply to removal of trees.

Guideway support column footing structures around Beecher Creek may require the removal of a small amount of vegetation. The creek itself would be clear-spanned, and there is some potential for erosion and sediment transport during construction.

Eagle Creek is a Class A (Red) salmonid-bearing watercourse, and is an integral part of the City of Burnaby's Green Zone (Official Community Plan, June, 1998).

Next Steps

If the route alignment involves widening the right-of-way to encroach into any of these treed areas, then a detailed assessment of potential impacts to these sites should be conducted. This assessment should include an inventory of trees that may have to be removed, a listing of wildlife species that utilize the area by season, and preparation of a mitigation plan, including re-planting of vegetation. The Special Commission will review the RTPO studies, findings, predictions and any measures proposed to avoid or mitigate impacts, and will report on this issue following further technical review and public consultation.

Eagle Creek

East of the Kensington overpass, the guideway would remain on the south side of Lougheed Highway and rise over Sperling Avenue. The guideway would remain on the south side of Lougheed Highway until it reaches Bainbridge Avenue, where it would then transition to the median. After Lougheed Highway crosses Eagle Creek the guideway would shift to the north side of the highway at Lake City Way.

Eagle Creek is a tributary to Burnaby Lake. It is a Class A (Red) salmonid-bearing watercourse according to the recently completed Classification System for Lower Mainland Region Watercourses (Envirowest, 1995). A concrete fishway was recently completed to allow coho salmon access to above Lougheed Highway.

Eagle Creek is also recognized as an Environmentally Sensitive Area (ESA) and is an integral part of the City of Burnaby's Green Zone (Official Community Plan, June, 1998). The City calls for improving the quality of urban runoff with zero net increase in volumes. The City also has sediment control guidelines similar to those in the federal/ provincial Land Development Guidelines for the Protection of Aquatic Life (Chilibeck et al., 1992), and alternate stormwater management approaches.

Preliminary RTPO Analysis

The RTPO reports in the *Environmental Management Analysis Compendium* that the proposed crossing at Eagle Creek would not adversely impact the stream because siting and design factors would mitigate against any direct contact with fisheries sensitive zones. The crossing of Eagle Creek would be an elevated guideway in the median of Lougheed Highway. This would allow for essentially a clear-span of the creek with footings for the columns placed to avoid any effect to the creek itself. There would be no requirement to widen the right-of-way.

No direct alteration of habitat nor encroachment into adjacent riparian areas is predicted and it is anticipated that there would be no loss of riparian habitat as a result of the location, construction and operation of the accelerated project in this segment

of the route alignment. The RTPO predicts that no net loss of fish production would occur as a result of the proposed crossing structure and anticipates that sediment control would be effective in preventing sedimentation of watercourses.

Next Steps

Ongoing specific environmental assessments commissioned by the RTPO are underway to evaluate the specific siting, design and construction measures to be undertaken at Eagle Creek. This includes a focused fisheries habitat evaluation of immediate and downstream proximity to the site(s) and an ecological analysis of riparian and adjacent landward vegetation and associated wildlife habitats and species.

The Special Commission will review additional RTPO reports on project impacts once available, and will report on this issue following further technical review and public consultation.

The RTPO reports that the proposed crossing at Eagle Creek would not adversely impact the stream, because siting and design factors would mitigate against any direct contact with fisheries sensitive zones, and that no net loss of fish production would occur.

15.3.2 Noise and Vibration Issues

Holdom to Kensington

The RTPO reports in the *Environmental Management Analysis Compendium* that siting of the route alignment on the north side of Lougheed Highway may create noise impacts during project operations for residential areas to the north of Lougheed Highway between Holdom Avenue and Kensington Avenue. East of Holdom Avenue, the guideway would swing slightly to the south to pass over the Kensington interchange. Through this section, the guideway would run along the south side of Lougheed Highway between the roadway and the adjacent Canadian National Railway (CNR) tracks.

Preliminary RTPO Analysis

Prior to detailed study, the RTPO predicted that siting the route alignment on the south side of Lougheed Highway may minimize potential impacts. Impacts were not predicted to be significant given the ambient noise levels in this corridor.

Next Steps

Detailed reporting on the issue of noise impacts has recently been provided by the RTPO in its *Noise Issues Report* (December, 1998). This includes measurement of existing noise/vibration levels and forecast of anticipated noise/vibration levels. The findings of the report will be input to route alignment evaluation work and assist to identify any design measures that may mitigate residual noise impacts.

The Special Commission will review the RTPO *Noise Issues Report*, and will report in detail on this issue following further technical review and public consultation.

Residential uses about the Lougheed Highway right-of-way on the north and, to a lesser extent, on the south side of the highway through this segment to Lake City Way. The RTPO reports that concerns about the ability to buffer residential development from nuisance impacts will depend to some extent on the vertical alignment chosen.

Kensington to Lake City Way

East of the Kensington overpass, the guideway would remain on the south side of Lougheed Highway and rise over Sperling Avenue. The guideway would remain on the south side of Lougheed Highway until approximately Bainbridge Avenue, where it would transition to the median. After Lougheed Highway crosses Eagle Creek, the guideway would shift to the north side of the highway at Lake City Way.

Preliminary RTPO Analysis

The RTPO reports in the *Environmental Management Analysis Compendium* that residential uses about the Lougheed Highway right-of-way on the north and, to a lesser extent, on the south side of the highway through this segment to Lake City Way. Residential areas about the route alignment east of Bainbridge Avenue, southeast to Lake City Way on the north side, and from Phillips Avenue to Lozelles Avenue on the south side.

The RTPO reports that concerns about the ability to buffer residential development between Bainbridge Avenue and Lake City Way from nuisance impacts will depend to some extent on the vertical alignment chosen and the results of follow-up noise and visual impact assessments. Landscaping or buffer wall treatments will be considered to address potential impacts associated with either an at-grade shoulder or median alignment as well as an elevated median alignment.

Next Steps

Detailed reporting on the issue of noise impacts has recently been provided by the RTPO in its *Noise Issues Report* (December, 1998). This includes measurement of existing noise/vibration levels and forecast of anticipated noise/vibration levels. The findings of the report will be input to route alignment evaluation work and assist to identify any design measures that may mitigate residual noise impacts.

The Special Commission will review the RTPO *Noise Issues Report*, and will report in detail on this issue following further technical review and public consultation.

15.4 SEGMENT 4 – BURNABY (LAKE CITY TO BELL)

15.4.1 Biophysical Environment Issues

Lake City to Bell

Removal of trees along the north side of Lougheed Highway around Gaglardi Way and between Gaglardi Way and Lougheed Town Centre/Mall may be required during the siting and construction of the guideway. Removal of trees adjacent to Bell Towers is an issue of public concern for the residents of the high-rise units.

Preliminary RTPO Analysis

The *Environmental Management Analysis Compendium* describes a narrow band of trees along the south side of Lougheed Highway between the residential area and the roadway. Removal of habitat in the east end of Charles Rummel Park (south side of Lougheed Highway) is not predicted because the route alignment would be on the north side of the highway. The Lougheed Highway right-of-way would not be widened in this location.

A number of trees on the north side of Lougheed Highway between Gaglardi Way and Bell Avenue have value for wildlife as perching sites for songbirds. A narrow band of landscaped vegetation, including trees, is located along both sides of the highway and the adjacent high-rise residential developments west of Lougheed Town Centre/Mall.

The RTPO predicts that detailed design of the route alignment will minimize the removal of trees. Any trees that have to be removed for construction can be replanted with native species to provide food and cover for wildlife. The City of Burnaby by-law #10482 may also apply to removal of trees.

Next Steps

The Special Commission will consider findings and predictions when additional information on the route alignment and supporting environmental studies are available, and will report on this issue following further technical review and public consultation.

Stoney Creek

After crossing Gaglardi Way east of Stoney Creek, the guideway would either return to the median and be elevated until approximately Austin Road or remain on the north side to possibly allow for a station at Bell Street that is favoured by the City of Burnaby. If sited in the centre of Lougheed Highway, it would be necessary to create a median to accommodate the guideway columns, which would also necessitate either reduced lane widths or roadway widening. Resolution of whether the route alignment is placed in the centre of Lougheed Highway or along its north side is subject to detailed analysis of the station potential at Bell Street, as well as visual analysis and tree surveys to determine whether screening vegetation would be affected.

Stoney Creek is a salmonid-bearing tributary to the Brunette River. There is another unnamed creek in the immediate vicinity and there are also underground (culverted) watercourses in this area. These include Silver Creek, which is open just above Lougheed Highway and just below the BNR tracks, but is otherwise fully contained in the underground stormdrain system. Silver Creek does not directly support fish.

Stoney Creek contains coho salmon and cutthroat trout within the proposed crossing area, and has several recently completed concrete fishways to enhance fish production.

The RTPO predicts that detailed design of the route alignment in the areas along the north and south sides of Lougheed Highway in the segment will minimize the removal of trees.

Stoney Creek contains coho salmon and cutthroat trout within the proposed crossing area, and has several recently completed concrete fishways to enhance fish production.

It is a Class A watercourse with considerable local interest. In the current context, Stoney Creek is considered to be a high value fisheries resource.

Stoney Creek has also been recognized as a key natural resource by the City of Burnaby, and is included in the City's Green Zone as an Environmentally Sensitive Area (ESA) "to support wildlife habitat, improve biodiversity and provide recreational and educational opportunities" (City of Burnaby, 1997). The City also has sediment control guidelines similar to those in the federal/provincial Land Development Guidelines for the Protection of Aquatic Life (Chilibeck et al., 1992), and stormwater management approaches for construction projects within the City.

Preliminary RTPO Analysis

The RTPO predicts in the *Environmental Management Analysis Compendium* that the siting and construction of the route alignment across Stoney Creek has the potential to impact aquatic resources.

The RTPO notes that a clear-span structure would likely be used to cross Stoney Creek and the majority of the creek riparian zone. Construction is not predicted to interfere with the existing fishways. A detailed ecological resource analysis of the areas of Stoney Creek in proximity to the Lougheed Highway was prepared in 1998 by the Stoney Creek Enhancement Society. Detailed construction design engineering, including guideway siting and placement of spans and footings, is being conducted in order to minimize environmental impacts at this location.

Next Steps

The potential for impacts on Stoney Creek depends on the final location of the route alignment. Any disturbance to Stoney Creek as a result of the construction or operation of the accelerated project may require an authorization under section 35(2) of the federal *Fisheries Act*. This will be determined from detailed impact assessment information to be provided to the Special Commission and to the Department of Fisheries and Oceans. Measures to control the potential erosion and sediment transport during construction activities will be required for review.

The RTPO has initiated site investigations by fish and/or wildlife experts to document the existing conditions at the site, assess the crossing location and design, and develop site-specific measures to protect the environmental resources in the area. A detailed environmental evaluation is in progress and includes a focused fisheries habitat evaluation of immediate and downstream proximity to the site(s), as well as an ecological analysis of riparian and adjacent landward vegetation and associated wildlife habitats and species.

The Special Commission will review additional RTPO reports on project impacts once available, and will report on this issue following further technical review and public consultation.

15.4.2 Noise and Vibration Issues

Lake City to Bell

Siting, construction and operation of the accelerated project along this segment may cause nuisance impacts to abutting residential areas from a noise and vibration perspective. From Lake City Way to Gaglardi Way, the route alignment would follow the north side of Lougheed Highway. Residential areas are situated to the south.

Preliminary RTPO Analysis

Prior to detailed study, the RTPO predicted that a route alignment on the north side of the road between Lake City Way and Gaglardi Way would maximize the distance from the residential development to the south and minimize potential nuisance effects. Mature trees would also buffer some of the accelerated project from Lougheed Highway west of Gaglardi Way. The general location of the residential areas is at a lower elevation than the highway and is set back from the highway. The RTPO predicted that noise should not be a concern.

Next Steps

Detailed reporting on the issue of noise impacts has recently been provided by the RTPO in its *Noise Issues Report* (December, 1998). This includes measurement of existing noise/vibration levels and forecast of anticipated noise/vibration levels. The findings of the report will be input to route alignment evaluation work and assist to identify any design measures that may mitigate residual noise impacts.

The Special Commission will review the RTPO *Noise Issues Report*, and will report in detail on this issue following further technical review and public consultation.

15.4.3 Visual Impacts and Aesthetics Issues

Gaglardi Way to Bell

East of Gaglardi Way to Lougheed Town Centre/Mall, medium- to high-density residential units exist. With a narrow highway right-of-way and the existing road geometrics, the guideway must be elevated in the median to minimize encroachment on either side of the highway and thus avoid elimination of high tree screening. This elevated guideway may result in some visual impacts to residential areas.

The RTPO notes that a clear-span structure would likely be used to cross Stoney Creek and the majority of the creek riparian zone. Construction is not predicted to interfere with existing fishways. Any disturbance To Stoney Creek as a result of construction or operation may require an authorization under section 35(2) of the federal Fisheries Act.

Siting and construction of the route alignment across Stoney Creek has the potential to impact archaeological sites. The Special Commission will report on this issue once an archaeological impact assessment has been completed.

Preliminary RTPO Analysis

The RTPO reports that the elevated system may cause visual disruption along the accelerated project corridor and considers that this is somewhat mitigated through existing vegetation and buffers along the corridor. The RTPO also reports that visual impacts would be mitigated to the extent possible by providing perimeter landscaping where appropriate, introducing boulevard strip landscape, and planting vines and shrubs along existing or proposed noise barriers.

Next Steps

Once the route alignment is finalized, the Special Commission can determine whether this issue requires further review.

15.4.4 Other Issues

Stoney Creek Area Impacts on Archaeological Sites

Siting and construction of the route alignment across Stoney Creek has the potential to impact archaeological sites (i.e., possible undiscovered sites) either from direct project actions (e.g., land altering developments) or indirect project actions (e.g., increased use of a location containing archaeological remains).

Preliminary RTPO Analysis

The area around Stoney Creek was identified in the *Archeological Overview Assessment* (Arcas, 1998) as an area with high potential for archaeological sites. An archaeological site (DhRr30) is located near the confluence of Stoney Creek and the Brunette River.

Next Steps

The Special Commission will report on this issue once an archaeological impact assessment has been completed in accordance with the permit conditions set by the provincial Archaeology Branch.

15.5 SEGMENT 5 – BURNABY (LOUGHEED MALL)

Several route alignment configurations have been developed for a station at either Lougheed Mall or Lougheed Town Centre. The route alignment in the vicinity of Lougheed Mall remains under consideration and subject to further technical evaluation. It will be possible to identify and review the impacts of the accelerated project in Segment 5 once the station location has been determined.

The station at Lougheed Town Centre/Mall is potentially a key interchange point for transit and the station has great potential to shape local land use. The Special Commission will monitor the next round of consultations in the RTPO's

Neighbourhood Consultation Program, and will also consider Lougheed Town Centre/Mall station in relation to system connectivity.

15.6 SEGMENT 6 – COQUITLAM (LOUGHEED MALL TO BRAID)

15.6.1 Biophysical Environment Issues

Brunette River Crossing

After extensive evaluation of more than a dozen options, the RTPO reports that the preferred route alignment is proposed to travel south, elevated along the west side of North Road where it would begin its transition to cross over the TransCanada Highway to the south side. The route alignment would parallel the highway as it proceeds east to Brunette Avenue. In this segment, the guideway would cross over the Brunette River but would clear-span both the river and its riparian areas.

The mainstem of the Brunette River has important coho and chum spawning grounds above North Road and chinook rearing in the lower river. The Brunette River is included as an Environmentally Sensitive Area (ESA) for the Cities of Burnaby and New Westminster and is included in the GVRD Green Zone. The City of Burnaby also has sediment control and stormwater management guidelines for construction projects within the City.

The unnamed creeks along this segment of the preferred accelerated project route alignment do not contain fish north of the TransCanada Highway, but are still considered fish habitat under the federal *Fisheries Act*, as they provide food and nutrients to fish downstream (including possible fish presence in the same creeks near their confluences with the Brunette River).

Adjacent upland vegetation within the designated riparian zone varies in type, density and quality, and provides shading to aquatic habitat, cover for wildlife that utilizes the Brunette River (e.g., ducks, grebes, great blue heron and small to medium sized mammals), and perching sites for songbirds and raptors.

Preliminary RTPO Analysis

The RTPO predicts in the *Environmental Management Analysis Compendium* that the crossing of the Brunette River can be designed to minimize intrusion into the riparian habitat zone by clear-spanning the river and its banks and by locating tower footings in a manner which minimizes adjacent vegetative intrusion.

Potential for erosion and sediment transport during construction activities for the accelerated project would be addressed through proper use of sediment control equipment and techniques. Implementation of these techniques would help ensure no

The mainstem of the Brunette River has important coho and chum spawning grounds above North Road and chinook rearing in the lower river.

A permit for the crossing of the Brunette River is required under the Navigable Waters Protection Act, and an authorization may also be required under section 35(2) of the federal Fisheries Act.

significant sedimentation will occur to watercourses along this section of the route alignment.

Next Steps

The Canadian Coast Guard has advised the Special Commission and the RTPO that a permit for the crossing of the Brunette River is required under the *Navigable Waters Protection Act*. Department of Fisheries and Oceans has also advised that an authorization may also be required under section 35(2) of the federal *Fisheries Act*. This will be determined when more information is available on the specific design and location of the crossing.

Detailed construction design engineering, including guideway siting and placement of spans and footings, is being conducted in order to minimize environmental impacts at this location. The RTPO will consider the optimal design and mitigation for siting and construction of the guideway at this location. This will include a detailed fisheries habitat evaluation of immediate adjacent foreshore areas and detailed vegetation and associated wildlife habitats and species analysis.

The Special Commission will review the RTPO reports on project impacts once available, and will report on this issue following further technical review and public consultation.

15.6.2 Noise and Vibration Issues

Lougheed Town Centre/Mall to Braid

The RTPO reported in the *Environmental Management Analysis Compendium* that the operation of the accelerated project could potentially result in increased noise and vibration impacts, depending on the final route alignment. However, when the *Environmental Management Analysis Compendium* was prepared, the route alignment options for this segment included a route through Maillardville and this may no longer be applicable. Additional route alignment mapping is required from the RTPO to determine whether there is any potential for noise impacts to residents of the area.

Preliminary RTPO Analysis

Prior to detailed study, the RTPO predicted that noise and vibration levels associated with the operation of the Skytrain are not likely to be perceptible above prevailing ambient conditions.

Next Steps

Detailed reporting on the issue of noise impacts has recently been provided by the RTPO in its *Noise Issues Report* (December, 1998). This includes measurement of existing noise/vibration levels and forecast of anticipated noise/vibration levels. The

findings of the report will be input to route alignment evaluation work and assist to identify any design measures that may mitigate residual noise impacts.

The Special Commission will review the RTPO *Noise Issues Report*, and will report in detail on this issue following further technical review and public consultation.

Since the route alignment has changed and moved to the south side of the TransCanada Highway, noise and vibration impacts to residents in this area may no longer be an issue.

15.6.3 Visual Impacts and Aesthetics Issues

Coquitlam

The operation of the Skytrain could potentially result in increased noise and visual impacts depending on the final choice of route alignment.

Preliminary RTPO Analysis

Prior to detailed study, the RTPO predicted that noise and vibration levels associated with the operation of the Skytrain are not likely to be perceptible above prevailing ambient conditions. The recently completed *Noise Issues Report* will verify noise/vibration impacts and identify mitigation, if required.

This may not be an issue if the preferred route alignment now runs parallel to North Road to south of the TransCanada Highway before shifting towards New Westminster.

15.6.4 Other Issues

Brunette River Crossing Impacts on Archaeological Sites

Siting and construction of the route alignment near or adjacent to the Brunette River has the potential to impact archaeological sites (i.e., possible undiscovered sites) either from direct project actions (e.g., land altering developments) or indirect project actions (e.g., increased use of a location containing archaeological remains).

It has been recommended by the RTPO consultant (Arcas) that an “Archaeological Procedures for Construction” manual be created that gives a clear indication of what the contractor must be aware of and do if archaeological resources are encountered during construction.

Next Steps

The Special Commission will report on this issue once an archaeological impact assessment has been completed in accordance with the permit conditions set by the provincial Archaeology Branch.

Siting and construction of the route alignment near or adjacent to the Brunette River has the potential to impact archaeological sites. It has been recommended by the RTPO consultant that an “Archaeological Procedures for Construction” manual be created.

The riparian areas along the lower Brunette and Fraser Rivers in the vicinity of the preferred accelerated project route alignment include high, medium and low value habitat in different locations. Where the alignment is adjacent to the Fraser River foreshore, the FREMP habitat coding is primarily yellow.

15.7 SEGMENT 7 – NEW WESTMINSTER (BRAID TO COLUMBIA STATION)

15.7.1 Biophysical Environment Issues

Fraser River

After crossing the Brunette River and Brunette Avenue, the route alignment would run southwest between the BNR and CP rail lines. From Fraserview to Woodlands the route alignment would be elevated and travel along the rail right-of-way parallel to Columbia Street east between the Fraser River and the BNR and CP rail tracks. The preferred guideway height remains to be determined. The route alignment would then enter the embankment at the foot of McBride Avenue and Columbia Street on the east side of Columbia and continue in tunnel to Elliot Street before connecting to Columbia Street.

Preliminary RTPO Analysis

The *Environmental Management Analysis Compendium* records that the riparian areas along the lower Brunette and Fraser rivers in the vicinity of the preferred accelerated project route alignment include high, medium and low value habitat in different locations for wildlife and/or aquatic life in those areas. Riparian vegetation provides cover, shade and food (plant and insect) for fish in adjacent watercourses and is important to environmental integrity of aquatic systems.

The Fraser River Estuary Management Program (FREMP) has mapped the relative productivity and diversity of riparian areas in the Fraser Estuary and classified them as either:

- Red Coded: high productivity and diversity;
- Yellow Coded: moderate productivity and diversity; or
- Green Coded: low productivity and diversity.

Where the route alignment is adjacent to the Fraser River foreshore, the FREMP habitat coding is primarily yellow. With respect to the other water courses, the Brunette River is Class A, salmonid-bearing, while Glen Creek is Class B, with no fish, but providing water and nutrients for fish downstream, according to the recently completed Classification System for Lower Mainland Region Watercourses (Envirowest, 1995). The Official Community Plan for the City of New Westminster recognizes the foreshore and riparian upland along the Fraser River as an Environmentally Sensitive Area (ESA).

This segment of the route alignment will be of considerable interest to the Department of Fisheries and Oceans and construction adjacent to the Fraser River will likely require an authorization under the federal *Fisheries Act*.

Next Steps

The RTPO will complete detailed construction design engineering including guideway siting and placement of spans and footings in order to minimize environmental impacts at this location. A detailed environmental evaluation is also in progress and includes a detailed fisheries habitat evaluation of immediate adjacent foreshore areas and detailed vegetation and associated wildlife habitats and species analysis.

The Special Commission will review the RTPO reports on project impacts once available, and will report on this issue following further technical review and public consultation.

15.7.2 Visual Impacts and Aesthetics Issues

Fraserview/Woodlands

The *Environmental Management Analysis Compendium* reported that the accelerated project has the potential to impact views of the Fraser River for residents on the west side of Columbia Street between Cumberland and McBride Avenue. RTPO Neighbourhood Consultation Program open houses held to date in New Westminster have confirmed that this is an issue. Local residents are concerned about the visual impacts of the proposed guideway and of a crashwall that may be required if the guideway runs adjacent to the Fraser River and parallels the existing railway line. The Special Commission notes that work continues at the RTPO to finalize the vertical and horizontal alignment for this section of guideway.

Next Steps

The Special Commission will monitor the route alignment finalization process and review the result with New Westminster City Council. The Special Commission has provided comments in section 11.3.4 on accelerated project impacts on views and public access along the Fraser River. The Special Commission will review additional technical reports once available, and will report on this issue following further technical review and public consultation.

15.7.3 Station Integration Issues

Columbia Station

The Special Commission will examine the RTPO plans for integration of stations in more detail once additional information is provided by RTPO. This issue will also be discussed in Public Meetings planned by the Special Commission for early in 1999. The Special Commission will report in detail on this issue following further technical review and public consultation.

This segment of the route alignment will be of considerable interest to the DFO, and construction adjacent to the Fraser River will likely require an authorization under the federal Fisheries Act.

“There is very little habitat of any real significant value that would be damaged by Skytrain, in my opinion.”

— Written submission to the Special Commission

There are now several studies underway or completed through which the RTPO will provide additional and detailed reporting on the potential environmental impacts of the accelerated project.

15.7.4 Other Issues

Impacts on Archaeological Sites in the Area of the Brunette River and Fraser River

Siting and construction of the route alignment in New Westminster has the potential to impact archaeological sites (i.e., possible undiscovered sites) either from direct project actions (e.g., land altering developments) or indirect project actions (e.g., increased use of a location containing archaeological remains).

Next Steps

The RTPO will commission an archaeological impact assessment and/or site reconnaissance along the portion of the route alignment near or adjacent to the Brunette River.

The RTPO also plans to provide archaeological monitoring for all land-altering developments in New Westminster along the Fraser River waterfront, within the historic district between Columbia Street and the waterfront, from McBride Street to Eighth Street. Also, an “Archaeological Procedures for Construction” manual will be created that gives a clear indication of what the contractor must be aware of and do if archaeological resources are encountered during construction.

The Special Commission will report on this issue once an archaeological impact assessment has been completed in accordance with the permit conditions set by the provincial Archaeology Branch.

16.0 SUMMARY COMMENTS AND OBSERVATIONS

16.1 SYSTEM-WIDE KEY ENVIRONMENTAL ISSUES

Biophysical Environmental Issues

The Rapid Transit Project Office has completed an overview environmental analysis that identifies broad system-wide and location specific issues for the accelerated Broadway-Lougheed-Coquitlam-New Westminster corridor.

There are now several studies underway or completed through which the RTPO will provide additional and detailed reporting on the potential environmental impacts of the accelerated project. This includes studies of the locations where the route alignment crosses streams and rivers, and study of the potential impacts of the project on vegetation in the Grandview Cut as well as on other green spaces along the route alignment.

The Special Commission will use the additional reporting from the RTPO as reference material for the Special Commission’s Technical Forums and Public Meetings that are planned for early 1999. This information will also form the basis upon which

the Special Commission, working with members of the IAC, will undertake a more detailed technical review of the potential impacts of the accelerated project.

The Special Commission will provide conclusions and recommendations on the RTPO's proposed mitigation measures in future reports on key environmental issues.

Crime and Safety Issues

This is a key issue of concern to the public. The RTPO has identified public safety as an issue and has taken steps to prepare further detailed study and to propose design solutions that respond to safety and security concerns, both of which will be available in January, 1999.

The Special Commission confirms this approach, and will work closely with RTPO to help ensure that public concerns have been fully considered as the detailed station planning gets underway. In particular, the Special Commission will review the public safety study and discuss this topic at a Technical Forum and at Public Meetings in early 1999. Subsequently, the Special Commission will work with RTPO to help ensure that it prepares the necessary recommendations on standards and approaches to deal effectively with this issue.

Noise and Vibration Issues

This is another key issue of concern to the public. The RTPO has identified this issue and has undertaken further detailed study in its recent *Noise Issues Report* of December, 1998. The RTPO will propose design solutions that respond to noise and vibration concerns, which will be available in January, 1999.

The Special Commission confirms this approach, and will work closely with RTPO to help ensure that the public concerns have been fully considered as the final station design process gets underway. In particular, the Special Commission will review the RTPO's *Noise Issues Report* and discuss this topic at a Technical Forum and at Public Meetings in early 1999. Subsequently, the Special Commission will work with RTPO to help ensure that it prepares the necessary recommendations on standards and approaches to deal effectively with this issue.

Visual Impacts and Aesthetics Issues

The accelerated project is a significant new intrusion into the urban landscape, and this has been a subject of public concern in New Westminster and Burnaby. The RTPO began an extensive review of visual impacts in the latter stages of Phase 1 of its Neighbourhood Consultation Program open houses. In addition to considering issues raised in the open houses, the RTPO commissioned a technical study on visual impacts to assess the affects of the accelerated project.

"I live beside the existing Skytrain tracks. They built a massive retaining wall at the end of my street and said the wall would be hidden by vines, etc. To this day they have never planted a single plant of any description. I can see no reason for asking the public for input when you have no intention of keeping promises."

— Written submission to the Special Commission

“Station[s] should be integrated in a multi-use, community-based approach to increase the vitality and quality of life of neighbourhood residents and also transit users.”

— Submission to the Special Commission Vancouver office

The public have identified the Broadway, Lougheed and Braid stations as being of most concern with regard to how they will function in coordination with the rest of the transportation system and integrate within the community.

Depending on the selection of a preferred route alignment option, the Special Commission will review the final mitigation and landscape plans for all segments of the route alignment, including New Westminster, to help ensure that adequate plans are in place and implemented.

Station Integration Issues

This is a key system-wide issue which is of broad concern, but is particularly focused on the key transportation and transit hubs. The public have identified the Broadway, Lougheed and Braid stations as being of most concern with regard to how they will function in coordination with the rest of the transportation system and integrate within the community.

The RTPO has proposed a series of station design meetings and community consultations in Phase 2 of its Neighbourhood Consultation Program beginning in January, 1999. The Special Commission will work proactively with the RTPO on the design and delivery of these consultations. In particular, the Special Commission will work to help ensure that public concerns are recognized and will propose that a set of system-wide design principles and standards be developed by the RTPO. The Special Commission will work with the RTPO to help ensure that it deals effectively with this issue.

The Special Commission will also work with regional and local governments and, in particular, the GVTA as it assumes overall responsibility for transit and major transportation linkages around these stations, to help ensure that public concerns are understood and properly addressed.

Early in 1999, the Special Commission will convene Technical Forums and Public Meetings whose results will be considered in the development of future Special Commission reports on this matter.

16.2 LOCATION SPECIFIC ENVIRONMENTAL ISSUES

In each segment, a number of location specific issues have been identified by RTPO studies and through public comment at the RTPO's Phase 1 Neighbourhood Consultation Program open houses (see sections 10.3 and 11.3). These location specific concerns will be confirmed through the Technical Forums and Public Meetings in early 1999, as will the intended detailed mitigation plans from the RTPO.

17.0 PRELIMINARY IDENTIFICATION OF SKYTRAIN COMMUNITY LEGACY OPPORTUNITIES

The GVRD's *Livable Region Strategic Plan* provides the vision for the preservation of urban green space by encouraging the emergence of attractive, well serviced, new and compact urban centres. However, continual active progress is required to make this vision emerge as a reality. Rapid transit was identified as an essential agent of the *Livable Region Strategic Plan*.

The provincial decision to move ahead with the accelerated project could contribute greatly to the long-term goals of the *Livable Region Strategic Plan*. This is a significant investment in the future which serves the entire region by providing today a key part of the future transportation infrastructure that will help direct and shape population growth patterns and commercial development well into the next century. There is much work still to be done to ensure that this investment benefits the region to the extent intended.

In earlier sections of the Interim Report, the Special Commission focused on the approach to route alignment and station location design, and on biophysical and urban impacts, benefits and mitigation for the accelerated project. These will help ensure that the direct delivery of the accelerated project protects and enhances both the natural environment and the environment in which people live and work. As noted in sections 2.0 and 3.0, this work of the Special Commission continues through the intense public consultation processes in early 1999 and will result in reports on major conclusions and recommendations by the end of March, 1999.

In the following section, the focus turns to considering how the benefits of the accelerated project for individual communities might be enhanced and increased through a creative program which continues well beyond the construction of the line itself.

17.1 A SKYTRAIN COMMUNITY LEGACY PROGRAM

Helping to deliver positive community benefits goes beyond mitigation of impacts and will likely go beyond the normal responsibilities of even a large infrastructure development project. But this extension of Skytrain is more than just a development project. It is a major provincial and regional infrastructure initiative that runs through many communities. As such, there is an opportunity to use the accelerated project as the catalyst for realizing some community benefits that might not otherwise come about at this time.

The Special Commission is proposing work on a Skytrain Community Legacy Program which would establish and fund a delivery mechanism within each urban

The accelerated project could contribute greatly to the long-term green space goals of the Livable Region Strategic Plan. The focus here turns to considering how the benefits of the accelerated project for individual communities might be enhanced and increased through a creative program which continues well beyond the construction of the line itself.

A Skytrain Community Legacy Program would establish and fund a delivery mechanism in each urban community — oriented, in particular, to enhanced pedestrian and bicycle routes within and between the communities.

community to promote long-term, positive environmental benefits from the new Skytrain extension. The Skytrain Community Legacy Program would be oriented, in particular, to enhanced pedestrian and bicycle routes within and between communities, and this would be in addition to the environmental mitigation program for accelerated project construction.

The Special Commission has already heard directly and indirectly from a number of GVRD residents who are looking for ways in which the accelerated project can enhance their community well beyond mitigating any potential negative impacts. In particular, a recurrent theme in various meetings and submissions has been how this new transit system could actually encourage the use of alternative forms of transportation like cycling, as well as provide new pedestrian connections. This involves considering aspects of station design and transit system operations which might facilitate such alternative transportation patterns, and which can be directly accommodated within the accelerated project itself.

There are, however, potential programs and projects which would not necessarily be part of the accelerated project itself, but for which the Skytrain extension is, at the very least, a positive support. Such projects could enhance the role of Skytrain in the community while improving environmental values, increasing ridership on the system and providing alternative transport.

The following sections outline a possible approach to developing a Skytrain Community Legacy Program related to the accelerated project. Presenting these concepts now is meant to provide the communities along the accelerated project corridor with a catalyst and focal point, to build on previous and ongoing efforts in community planning and action towards enhancing green space, alternative transportation options and environmental values. The Special Commission will work with communities in the coming months to help develop these concepts further in order to make recommendations to the provincial Cabinet in March, 1999.

17.2 PROPOSED PROGRAM PRINCIPLES

1. The Skytrain Community Legacy Program will encourage positive community environmental programs and projects which enhance the linkage between Skytrain and the community.
2. The Skytrain Community Legacy Program is an enhancement program and does not substitute for the basic environmental mitigation work required as a result of accelerated project construction.

3. The Skytrain Community Legacy Program must build on community plans and help to deliver the objectives of the GVRD's *Livable Region Strategic Plan* and future transportation plans.
4. The Skytrain Community Legacy Program is an urban green space and transportation initiative to encourage proactive community projects which protect and enhance urban green space; encourage residents to use vehicles less; and encourage urban design and development which enhances those values.

17.3 POTENTIAL PROGRAM COMPONENTS

Examples of the sorts of things that might be done include:

- An urban greenways program which links Skytrain to key areas within the community and encourages linkages between communities;
- An urban habitat enhancement program that encourages the provision of natural or reclaimed wildlife, bird and fish habitats along trails and greenways associated with Skytrain; and
- A “Skytrain in the Community” program which encourages various community projects in association with Skytrain.

17.4 URBAN/COMMUTER GREENWAY

The Special Commission is proposing that the concept of an urban community trail system be developed for the new accelerated project route alignment. The new Skytrain line will link centres, often utilizing a new right-of-way which did not exist before and which is more direct than existing alternatives. In particular, where the route alignment is elevated, its surface level right-of-way may be valuable for other transportation modes. It provides an effective opportunity to encourage both commuter and leisure bicycle and pedestrian traffic on a safe, separate and dedicated route.

The concept of an urban/commuter greenway is not new. It is instructive to consider the experience from the existing Skytrain corridor and the building of a community urban trail system along that right-of-way. The Molson trail system runs almost the entire length of the existing Skytrain line. This was built as a result of a considerable community outreach program after the first Skytrain project was in place, which offers many useful lessons. In many places the trail is very effectively and attractively integrated into the community — such as south of the present Nanaimo Station, or in the vicinity of Royal Oak — and is clearly well used in certain locations. However, because the route is discontinuous in places, crosses numerous busy roads, and was built after

Presenting this possible approach is meant as a catalyst to build on previous and ongoing efforts in community planning for enhanced green space, alternative transportation and environmental values.

The Special Commission is proposing that the concept of an urban community trail system be developed for the new accelerated project route alignment. The Molson trail system, which was built after the existing Skytrain was in place, offers many useful lessons.

The concept described here is provided to start the process of dialogue with and among the neighbourhoods and communities through which the accelerated project will run.

the rest of the infrastructure (e.g., after road curbing had been constructed), it is inconvenient in other places, uncomfortable and potentially dangerous for any more than local casual use. Yet even with these limitations, it does provide an attractive connective corridor and the landscaping has, in places, helped to offset some of the more forbidding visual impacts of the elevated segments of the existing Skytrain line.

The sections below outline some potential aspects of an urban/commuter greenway project that could be developed as part of the process to construct the new accelerated project. These concepts have, for the most part, been gleaned from comments and recommendations made by the public to date, but also from a Special Commission review of the *Livable Region Strategic Plan*, Official Community Plans and associated planning documents.

17.4.1 Potential Opportunities for a New Urban/Commuter Greenway

In order to show the real opportunities that exist for a community greenway as a result of the accelerated project, the Special Commission has utilized its GIS mapping system to illustrate some features and possible options for such a greenway. The concept described below, along with Map C, Community Legacy Opportunities, in the Maps section are provided to start the process of dialogue with and among the neighbourhoods and communities through which the accelerated project will run. Section 17.6 indicates the next steps for taking these concepts forward.

As Map C illustrates, conceptually there are a number of exciting opportunities that the new route could support to the long-term benefit of the community. For example:

- In New Westminster, the community has long wished to secure public access to and along the Fraser River waterfront. This historically significant, visually interesting corridor is now potentially available along an extended section of the accelerated project.
- Further along there is potential to link into and expand access to the future parks and greenways along the Brunette River.
- In Burnaby, pedestrian and bike connections to Burnaby Lake Park and recreation complex might be enhanced.
- The pedestrian access to Lougheed Town Centre/Mall from the north and east might be improved using the example of existing access from the south and west; this could be emulated at other locations where the line will enter other community centres.
- In East Vancouver, green space linkages such as through the Grandview Cut and other areas might be beneficial to the community.

17.5 PROPOSED ORGANIZATION AND FUNDING

The following are proposed for further discussions:

- Funds contributed by all levels of government;
- A Skytrain Community Legacy Fund to receive grants and donations;
- Community led advisory groups; and
- A central (to the five municipalities) body responsible for standards and coordinating works.

These aspects of the Skytrain Community Legacy Program require additional consultation with the public even before preliminary proposals can be raised by the Special Commission. Throughout the coming detailed design phase of the accelerated project, there will likely arise opportunities and ideas that the community can discuss in the context of a “Skytrain in the Community” concept. The Special Commission will provide support and a focal point for this discussion as the interest and need arises in the coming months.

17.6 NEXT STEPS FOR A SKYTRAIN COMMUNITY LEGACY PROGRAM

In the coming months the Special Commission will complete the following actions to develop the Skytrain Community Legacy Program further, in close cooperation with community groups, local government and transit officials:

- Collect and incorporate into the GIS system additional information on green space, recreation and alternative transportation;
- Arrange meetings to seek advice from groups and individuals who were active in the development of the Molson trail system;
- Establish a small working group of local citizens and government staff to provide advice;
- Work with local councils and municipal staff to ensure consistency of approach and ensure efforts are not duplicated;
- Establish a series of meetings or informal task groups to develop the concepts further; and
- Draft the proposal for a Skytrain Community Legacy Program to make conclusive recommendations to Cabinet and the public by March, 1999.

“I think that you should give more information on the positive aspects that Skytrain has to offer.”

— Written submission to the Special Commission

“Currently I don’t use transit as the number of busses and transfers make it much faster for me to drive. The proposed Skytrain project may change that.”

— Written submission to the Special Commission

MOVING FORWARD

The demanding schedule and complexities of the accelerated project create equal demands on the Special Commission in fulfilling its mandate to conduct an “open, transparent, neutral and comprehensive” review process. To accomplish this, the Special Commission must be ever mindful of the priorities and perspectives of all stakeholders in the accelerated project, and make best efforts to meet their expectations.

The priorities for the Special Commission in the coming weeks and months will include:

- Continuing to receive, review and disseminate project information from the RTPO and other sources;
- Ongoing monitoring;
- Preparing for and conducting the Technical Forums and Public Meetings in early 1999;
- Compiling and analyzing information to prepare the Key Environmental Issues Reports;
- Developing conclusions and recommendations; and
- Identifying and evaluating opportunities for the Skytrain Community Legacy Program.

The Special Commission will look to all stakeholders for their contribution to the successful completion of this process.

The Special Commission will look to all stakeholders for their contribution to the successful completion of this review process.

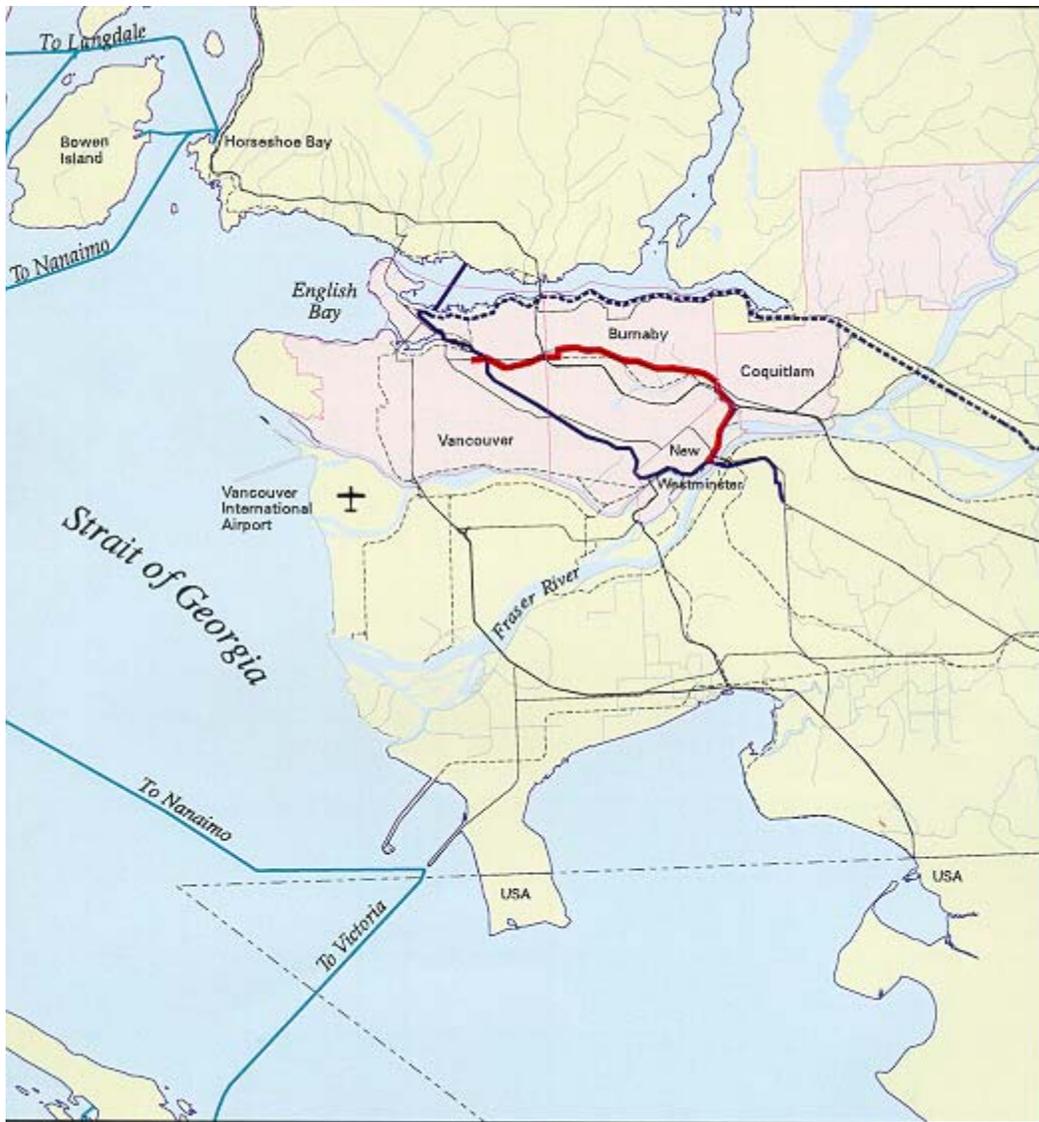
Special Commission

SkyTrain Extension Review

Final Report

May, 1999

**Map A: Regional Overview (source:
Special Commission GIS)**



	Rapid Transit Project Office Preferred Route Alignment Accelerated Project		Existing Skytrain and Sea Bus		Municipalities within Preferred Alignment		Railways
	West Coast Express		Major Highways		Ferry Routes		

December 21, 1998
 Land Use Coordination Office
 Albers Equal Area Conic NAD83

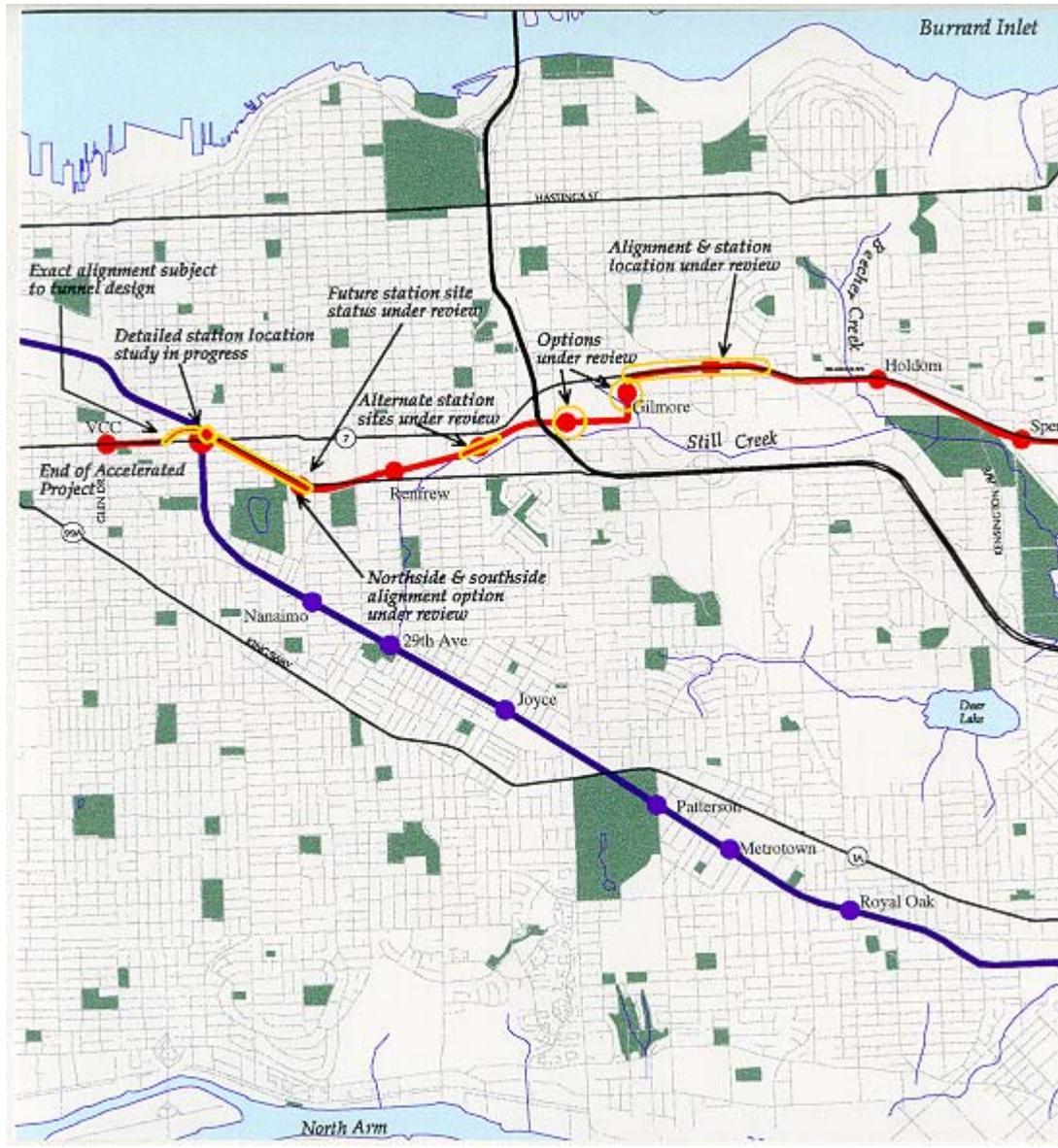
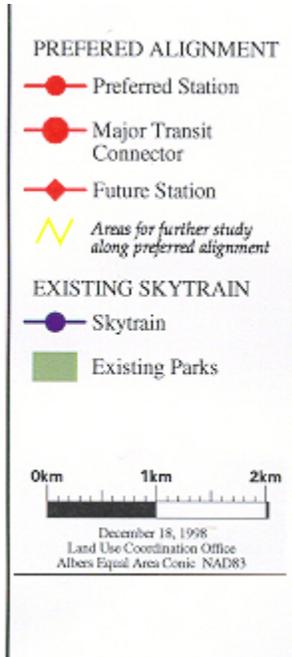
Special Commission

SkyTrain Extension Review

Final Report

May, 1999

**Map B: Rapid Transit Project Office
Preferred Alignment (December 18, 1998;
source: Special Commission GIS)**



Special Commission

SkyTrain Extension Review

Final Report

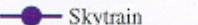
May, 1999

**Map C: Community Legacy
Opportunities – Suggested Concepts
(source: Special Commission GIS)**

**RAPID TRANSIT
PROJECT OFFICE
PREFERRED ALIGNMENT**

-  Preferred Station
-  Major Transit Connector
-  Future Station

EXISTING SKYTRAIN

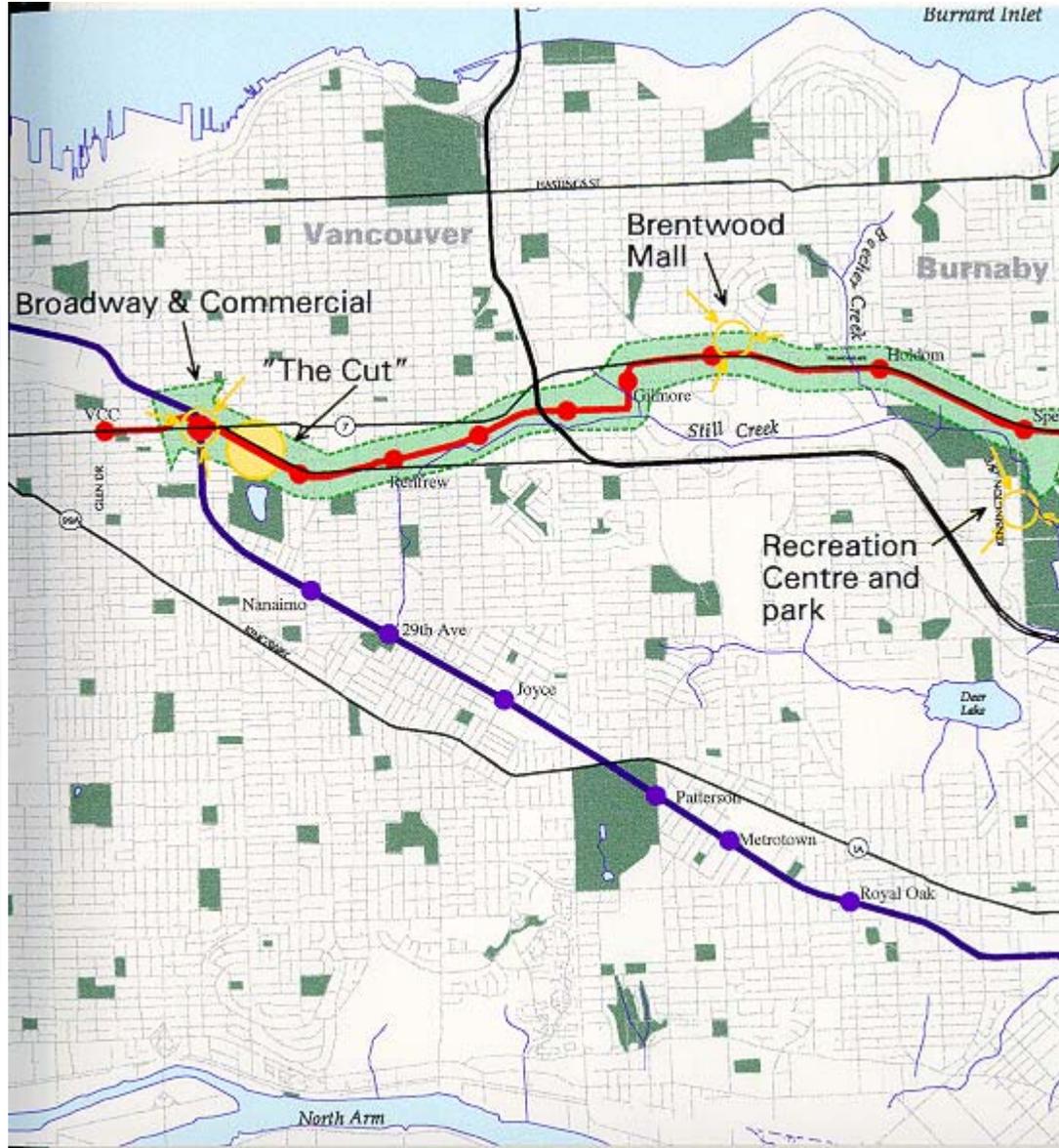
-  Skytrain
-  Existing Parks

OPPORTUNITIES

-  Travel Focus
-  Viewscapes
-  Environmental Issue/ Opportunity
-  Potential Legacy Opportunities within this area



December 18, 1998
Land Use Coordination Office
Alberta Equal Area Conic NAD83



SUMMARY
OF FINAL
REPORTING

MAY, 1999

SPECIAL
COMMISSION
SKYTRAIN
REVIEW



SUMMARY OF FINAL REPORTING

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1. BACKGROUND

THE SPECIAL COMMISSION PROCESS

In June, 1998, the provincial government announced an accelerated program to extend the SkyTrain system in the Broadway-Lougheed-New Westminster corridor based on regional study and planning, which had identified rapid transit in this corridor as a key to managing anticipated population growth. Environment, Lands and Parks Minister Cathy McGregor appointed an independent Special Commission in September, 1998, to review the SkyTrain extension project's environmental and planning issues and impacts, and facilitate good public processes and inter-agency coordination.

The Special Commission's job included:

- Reviewing environmental issues relating to building and operating the proposed SkyTrain extension and making recommendations to prevent or mitigate adverse impacts;
- Monitoring project consultations and receiving direct input in order to formulate recommendations and advice on a SkyTrain route and design which accommodate community and regional concerns, system efficiency and connectivity to other transit modes;
- Ensuring the adequacy of consultation with the public, local government, First Nations and other key stakeholders; and
- Providing ongoing monitoring and advice throughout the design phase of the project.

To fulfill this mandate, the Special Commission monitored the Rapid Transit Project Office's public process to determine route alignment and station location and design, and reviewed impacts on the biophysical environment and urban environment. The Special Commission also helped to coordinate the work of a variety of

federal, provincial and regional government agencies through an Inter-Governmental Advisory Committee—including helping to facilitate the project screening under a *Canadian Environmental Assessment Act* review.

As well as reviewing plans, designs, reports and technical studies provided by the Project Office, the Special Commission also solicited and compiled information, feedback and expert opinion from other stakeholders and sources including the public, agencies of all levels of government, and independent experts. The Special Commission also explored opportunities to create a lasting community legacy for neighbourhoods along the route.

INTERIM REPORT

In early January, 1999, the Special Commission released an *Interim Report* that provided a preliminary summary and comment on the route alignment consultation process of the Rapid Transit Project Office and a summary of key issues raised by the public.

Alignment Consultation Process

The Special Commission noted that Project Office public consultation was generally well resourced and planned. However, the Special Commission noted the need for public feedback to provide closure to alignment discussions and to allow for discussion of system-wide issues. The proposed route and station siting processes were deemed to be generally acceptable, provided appropriate mitigation is developed for the concerns and issues that were raised. The Special Commission identified a need for effective Project Office liaison and communication with affected communities near the proposed route on design, impact and mitigation issues, and noted that priority should be given to resolving plans for the three main interconnection points with other modes of transit at Broadway/Commercial, Brentwood Mall and Lougheed Mall.

Key Issues for Further Review

The *Interim Report* also outlined the key system-wide and location-specific issues identified by the public, stakeholders and government agencies that require resolution. The system-wide issues included:

Crime and Safety—public safety and security, especially near schools;

Biophysical Environment—issues relating to the natural environment, such as streams and fish habitat, vegetation and bird habitat;

Noise and Vibration—including impacts of construction and operation near residential areas and noise-sensitive businesses;

Visual Impacts and Aesthetics—including the cityscape, community values and the potential loss of privacy and views, especially along the Fraser River; and

Station Integration and Connectivity—issues related to connectivity, particularly at key points along the route such as Brentwood Mall, Lougheed Mall and Broadway/Commercial, as well as the efficient movement of people and the manner in which a station fits within the local neighbourhood and community.

Steps to Complete Final Reporting

In February, 1999, the Special Commission held open Technical Workshops on biophysical, noise and vibration, and connectivity issues to explore ways of resolving these issues. Summaries of the biophysical and noise and vibration Technical Workshops were later provided at two days of Public Meetings in mid-February. The Special Commission has solicited further input from independent experts and used this advice along with input from government agencies and the Public Meetings and Technical Workshops to prepare a series of key issue reports which complete the Special Commission's assessment of the accelerated portion of the SkyTrain extension project. These include:

- *Public Consultation Report;*
- *Biophysical Issues Report;*
- *Noise and Vibration Report;*
- *Station and Guideway Design Report;* and
- *Connectivity and Operational Issues Report.*

These reports, summarized in the following pages, are available in full on the Special Commission's web site at: <http://www.skytrainreview.gov.bc.ca>

Consultation with First Nations

The Special Commission has been monitoring the Rapid Transit Project Office's discussions with First Nations whose traditional territory is on or in the vicinity of the SkyTrain extension project route, including the Katzie, Kwayhquitlum, Musqueam, New Westminster, Squamish, Sto:lo, Tsawwassen, Snuneymuxw, and Tsleil-Waututh (Burrard) First Nations. The Project Office is consulting with these First Nations to identify their interests and address potential adverse project impacts, which may include cultural and heritage impacts.

The Project Office has provided the First Nations with project information and has met with those First Nations who expressed an interest in the project. The Katzie, Snuneymuxw, Yale, Squamish First Nations indicated no interest or did not comment to the Project Office. To date, First Nations have raised the following general types of concerns:

Kwaybquitlum—interested in consultations for the second phase of the project, economic opportunities and archaeology;

Musqueam—interested in participating in archaeological work (if funded by the Project Office) and in further consultations related to traditional use information;

New Westminster—interested in economic opportunities and consultations related to traditional use information;

Tsawwassen—interested in economic opportunities, archaeology studies and consultations related to traditional use information; and

Tsleil-Waututh—interested in participating in archaeological work (if funded by the Project Office), economic opportunities and further consultations.

These concerns and interests generally stem from recent court decisions regarding aboriginal interests and from unresolved land claims. However, the lands along the SkyTrain extension route are already either disturbed or developed, or are held in fee simple, which has a bearing on determining the significance of project impacts on First Nations. No potential adverse impacts have been identified in the Project Office's discussions with First Nations. No archaeological remains have been found, however the Project Office will monitor a few sites, where the route crosses the Brunette River and along the Fraser River, that may have moderate to high archaeological potential during the initial stages of construction.

The Project Office is continuing discussions with First Nations on access to economic opportunities and the consultation process itself. The Special Commission is satisfied that the Project Office has started a process in which First Nations will continue to have the opportunity to identify any potential adverse impacts that the project may have on their interests.

2. HIGHLIGHTS OF PUBLIC CONSULTATION REPORT

The Special Commission undertook direct public consultation in order to:

- Help ensure an open and accountable review process;
- Provide information to the public at an early stage of the project planning and design;
- Help ensure public input to the identification and resolution of concerns and issues about the project and its potential impacts; and
- Help ensure that local information, knowledge and concerns contribute to both project design and decisionmaking processes.

The Special Commission provided a wide variety of opportunities for the public to access information, contribute ideas and voice concerns:

- Mailing and e-mail addresses to receive written submissions;
- Ten document viewing sites in public libraries near the new route;
- A public Special Commission SkyTrain Project Registry of relevant documents and input;
- Store-front offices in the project area;
- Local phone lines;
- A web site with project review information and a “bulletin board” for exchange of ideas;
- Opportunity to observe Technical Workshops (February 2 and 3, 1999); and
- Opportunity to participate in Public Meetings (February 16 and 17, 1999).

OVERVIEW OF PUBLIC CONCERNS AND SUGGESTIONS

The Special Commission received a wide range of input—general and specific, inside and outside the mandate, critical and constructive. Significant public concerns and suggestions within the Special Commission’s mandate included:

- Station design concerns, including crime and safety, noise and visual impacts, traffic patterns and future development—particularly relating to elevated guideways and stations near residential areas and schools;
- Noise during construction, operation and maintenance of SkyTrain lines and stations;
- Potential for loss of trees and green space, and impacts on fish habitat and other environmentally sensitive areas;
- The connectivity of the SkyTrain system with other modes of transportation, including bus, car, bicycle, and pedestrian traffic;
- Legacy opportunities—including a multi-use pathway along the length of the guideway and a greenway along the Fraser River at Fraserview/Sapperton; and
- The adequacy of the Project Office public consultation process.

Many other public concerns and suggestions expressed concerned issues beyond the mandate of the Special Commission. These have also been summarized and are being provided to the provincial Cabinet. The main significant concerns included:

- That the decisionmaking process leading to the June, 1998 SkyTrain announcement (i.e., choice of technology and accelerated project schedule) did not include public review or adequate justification for the change from previous regional transportation planning;
- That anticipated environmental benefits associated with major public transportation projects (e.g., growth shaping, reduced traffic, air quality improvements, etc.) may not be realized;
- That the accelerated SkyTrain extension project (New Westminster to Vancouver Community College via Lougheed Mall) represents only a portion of the full *T-Line* prescribed to achieve GVRD growth management objectives, and that the complete *T-Line* may not be built;
- That the “fast track” project timeline would result in poor planning, inadequate consultation, budget overruns, community and environmental impacts, and engineering problems;
- The adequacy of the project rationale, and the potential erosion of local bus service and future rapid transit expansion into areas where demand was seen as higher and

more urgent—particularly the perception that project and operational costs would negatively impact the rest of the Lower Mainland transit system;

- The limited mandate of the Special Commission; and
- The desire of Coquitlam and Port Moody residents to be given the opportunity for open forums (i.e., town hall meetings) to provide input and express concerns now about future expansion plans.

3. HIGHLIGHTS OF BIOPHYSICAL ISSUES REPORT

BIOPHYSICAL ISSUES REPORT

The Special Commission's *Interim Report* identified the key environmental issue categories and scoped issues into either system-wide or site-specific issues. The *Biophysical Issues Report* examines the Project Office's assessment of the potential project impacts, and their plans and approaches to mitigating or compensating for these impacts. The report benefits from advice received from many sources including the Inter-Governmental Advisory Committee, and the participants in a two-day Technical Workshop on the potential biophysical impacts in early February, 1999.

SUMMARY OF PUBLIC ISSUES

The public has raised concerns that the proposed route alignment will diminish green space and impact environmentally sensitive areas—particularly at the Grandview Cut, stream crossings along the Lougheed corridor, the Brunette River, and Fraserview/Sapperton Reach. These areas are, for the most part, the same ones in which regulatory agencies are interested.

Rapid Transit Project Office's *Environmental Assessment Report*

This Special Commission report is based primarily on information contained in the Project Office's *Canadian Environmental Assessment Act* application which consolidated much information from earlier reports, and documented potential impacts within a 10m wide right-of-way along the 21-kilometer SkyTrain extension route. Impacts on soils, vegetation and wildlife habitat have been identified at Cedar Cottage Park,

Grandview Cut area, Lougheed Highway (trees), Stoney Creek, the area around rail rights-of-way in New Westminster, and the area around the planned New Westminster SkyTrain tunnel. Impacts on fish and fish habitat, water quality and stream riparian zones have been examined where the guideway crosses creeks/streams and where it runs adjacent to the Fraser River in New Westminster.

Design-Build Approach

Most potential biophysical impacts are associated with construction of the project. The Project Office has completed the preliminary engineering design and established site-specific environmental design criteria (e.g., span lengths and column locations) to guide the Design-Build Contractor in environmentally sensitive areas. Potential biophysical environmental impacts have been identified based on preliminary designs, and on experience with the existing SkyTrain. The Special Commission notes that the extent of these impacts and the mitigation or compensation required can be confirmed when more detailed design information is available for review by regulatory agencies.

The Project Office has made a variety of commitments to actions, investigations and documentation in the design-build contracting process to promote sound environmental practices and to meet federal environmental assessment requirements. The Special Commission notes that some revisions to those commitments will be required as more project detail is available and upon completion of the *Canadian Environmental Assessment Act* review.

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAM

The Project Office has developed a Construction Environmental Management Program to ensure that project construction and any required mitigation measures comply with all applicable federal and provincial legislative and regulatory requirements, local government by-laws, as well as with well-accepted construction environmental management practices. The program requires contractors to control actions and discharges to the surrounding air, water and land, and to deal appropriately with heritage objects or archaeological sites.

The Special Commission suggests independent, professional monitoring during the construction phase of the project, reporting directly to regulatory agencies as well as to the Project Office. The Project Office should meet with concerned government agencies to work out the details for this process.

DESIGN/CONSTRUCTION PHASE IMPACTS

Station Impacts—The only current stations where vegetation may be lost are at Rupert and Sapperton.

Road Works—Where the guideway is located in the highway median of the Lougheed Highway, it may be necessary to widen the highway by up to 2m on either side, which could disturb additional vegetation. The loss of trees also concerns residents in the Bell Avenue area. Additional road works may be required for acceleration and deceleration lanes near Lougheed Highway stations to accommodate passenger drop-offs.

Relocation of Utilities—The Project Office will have to relocate existing utilities at the Brunette River crossing and the Grandview Cut. Where technically feasible, it is recommended that the line be encased in a conduit affixed to the guideway or buried to avoid the need for disturbing more vegetation.

Ancillary Facilities—No major impacts have been identified from ancillary facilities such as power substations, control and storage facilities but this needs to be confirmed when more project design detail is available. Moving the existing Brentwood Mall bus loop could require changes to the local road network.

Opportunities for Coordination—To address federal government requirements, the Special Commission suggests the Project Office and the GVRD coordinate plans so that a proposed sewer line extension and greenway in New Westminster could be installed during construction of the SkyTrain guideway at Sapperton Reach.

Geotechnical Issues—The Project Office plans to conduct the necessary detailed geotechnical studies during the detailed design. The Special Commission notes that early availability of geotechnical information at sites of significant public concern such as the Grandview Cut, Stoney Creek and the Fraser River foreshore would have facilitated better consideration of alignment and construction options.

Seismic Information—The Special Commission obtained information from BC Hydro which indicates that some segments of the SkyTrain route are in areas of high earthquake liquefaction potential. The Project Office is incorporating this information into their engineering design specifications.

Contaminated Sites—The Special Commission and several regulatory agencies note that contaminated site information supplied to date is not specific and implies that contaminated soil issues will be dealt with when/if they are encountered. The Special

Commission agrees with federal agencies that this is an unresolved environmental issue and advises the Project Office to address this information gap.

ONGOING IMPACTS

Air Quality—In its *Environmental Assessment Report*, the Project Office discusses the likely effects of the project on regional air quality, on greenhouse gas emissions and on local air quality effects near bus transfer locations. Environment Canada has concerns about greenhouse gas impacts from cement production. The Special Commission notes that more data on projected ridership would strengthen and clarify long-term air-quality benefit projections. The Special Commission also agrees with the measures proposed by the Project Office to mitigate local air quality at bus interchanges such as shutting off bus engines during waiting times, encouraging taxis and private vehicles to do the same, and installing proper ventilation systems for covered bus parking/unloading areas

Guideway Maintenance—Regular tree and weed trimming is needed to prevent vegetation growth near the guideway from interfering with SkyTrain operations. This loss of vegetation should be included in calculations of project impacts compensation.

Other potential maintenance issues, which should be addressed by proper design, monitoring or system management, include:

- Potential contamination of surface water from improper guideway drainage;
- Erosion from run-off due to improper drainage or re-vegetation management; and
- Water contamination from (ethylene glycol) de-icing procedures.

SITE-SPECIFIC IMPACTS

The Special Commission has reviewed the *Environmental Assessment Report* and site-specific reports, and notes that issue areas have been adequately identified.

Grandview Cut—Based on the Project Office’s assessment and on comments from government agencies, loss of vegetation and potential impact to birds is the primary biophysical impact issue of concern. The design-build approach means the final number of trees that will be lost is not yet known. Further geotechnical data needs to be provided. The Special Commission supports the selection of the north-side elevated guideway alignment which minimizes visual and noise disturbance to adjacent properties, and recommends integrating relocated transmission lines into the guideway right-of-way to minimize tree and vegetation removal and the need for ongoing vegetation management.

The Special Commission endorses the mitigation strategy outlined in the Project Office's December, 1998 Grandview Cut study, and encourages the office to work with appropriate municipal provincial and federal agencies to develop a comprehensive landscape management plan, including mitigation and enhancement approaches. The Special Commission also supports the hiring of a qualified wildlife biologist to work with the landscaper to ensure planting appropriate species.

Chubb, Beecher, and Eagle Creeks—While these creeks are classed as environmentally sensitive and have relatively high fish habitat value, the project impacts determined from current designs of guideway stream crossings can be mitigated or compensated. Detailed designs and agreements with regulatory agencies will be required to confirm requirements for mitigation and compensation (if any).

Stoney Creek—The Special Commission and Department of Fisheries and Oceans consider this to be one of the critical sites and encourage the Project Office to work with community groups and all levels of government to minimize the impacts to the creek, and to coordinate compensation plans with other projects/developments in the area. More geotechnical details are required, including an assessment of slope stability.

Brunette River—The primary concern here is the impact to riparian vegetation and the productive capacity of fish habitat. The location of the railway tracks, a corridor for a fibre optic cable and a sewer line restrict the location of support columns, and the proposed guideway design includes footings within 30m of the river bank. However, environmental impacts can be minimized and the Special Commission endorses current design proposals. Detailed plans are now required to determine the mitigation and compensation.

Fraser River—Protection of fish habitat/water quality is a key concern of regulatory agencies where the new line runs along the Fraser River from Brunette Avenue to Front Street. More detailed information is needed to properly identify mitigation and compensation requirements.

Canadian Environmental Assessment Review

The SkyTrain extension project is reviewable under the *Canadian Environmental Assessment Act*, and the Special Commission has been working with the federal Department of Fisheries and Oceans and other federal agencies to coordinate both reviews and share information. Based on review of the Project Office's *Environmental Assessment Report* (March 15, 1999), federal agencies have indicated that more information will be required, including:

- More detail on overall potential construction and operating impacts;

- Site-specific details on project impacts, mitigation and compensation plans at stream crossings and along the Fraser River;
- Identification of contaminated sites which may be impacted by construction along the route;
- A more thorough analysis of cumulative effects;
- More analysis of potential impacts from accidents and malfunctions; and
- Responses to specific comments of federal agencies on the Project Office's *Environmental Assessment Report*.

SPECIAL COMMISSION CONCLUSIONS AND RECOMMENDATIONS

The Rapid Transit Project Office has identified the range of potential impacts that could result from construction and operation of the SkyTrain project and, in general terms, has set out a series of measures that could be implemented to mitigate and compensate for these impacts. The main issues of concern are loss of trees and vegetation along the route, disturbance of rivers/streams and streamside riparian zones, and potential impacts on water quality and fish habitat. The specific mitigation and compensation that will be required will be determined when more detailed design information is available for review.

The following is a summary of the Special Commission's key recommendations:

- In the Grandview Cut, every effort should be made to compensate and mitigate for the loss of trees and other vegetation, and integrate the power lines in the new guideway;
- At Stoney Creek, adjacent slope stability must be assessed to prevent future erosion and preserve water quality and fish habitat;
- At Sapperton Reach, the Project Office and the GVRD should coordinate the installation of the new sewer line with the construction of the SkyTrain guideway;
- Measures proposed by the Project Office to mitigate local air quality at bus loops should be adopted, such as shutting off bus engines and installing proper ventilation systems for covered bus parking/unloading areas;
- In response to public and review agency concerns, an independent, professional Environmental Monitor should be employed during construction to ensure environmental and noise guidelines are properly observed; and
- The completed list of the Project Office's construction phase commitments, responsibilities and assurances should be made available to all municipal authorities, key stakeholder groups and the public.

4. HIGHLIGHTS OF NOISE AND VIBRATION REPORT

The Special Commission has undertaken a full review of the Rapid Transit Project Office's work on noise and vibration issues, and has considered stakeholder input and public concerns. The Project Office expects noise impacts associated with the SkyTrain extension to arise primarily from the operation of railcars along the guideway, and measures to mitigate these impacts will be part of their project planning and design process. The Project Office has committed to reviewing final designs of the guideway, the stations, and proposed ancillary facilities to ensure that noise mitigation is included where warranted.

The Special Commission's *Noise and Vibration Report*, which is based substantially on advice from Wakefield Acoustics, reviews the Project Office's work on noise and vibration issues associated with project design, project construction and project operation, and the adequacy of proposed mitigation measures. The report considers the noise level of the SkyTrain itself, and the amount that this noise level raises the ambient (existing) noise level in a community. It also considers the annoyance potential of individual noise "events" and of the frequency of such events. In residential areas, Canada Mortgage and Housing Corporation (CMHC) notes that annoyance increases sharply when noises exceed 55 decibels.

PUBLIC CONCERNS ABOUT NOISE AND VIBRATION

In 1986, when the first SkyTrain began, noise from train cars and track maintenance led to major public concerns. The Office of the Ombudsman reviewed several issues including noise, and reported that noise impacts often exceeded the manufacturer's

stated maximum level of 74 decibels at a distance of 15 meters. The report also noted that SkyTrain had managed to lower noise levels through improved rail and car maintenance and reduced speed of the trains. The Project Office has promised to incorporate the lessons learned from past experience, including measures to limit the amount of noise from the project during the construction and operation phases. It is also relevant to note that the first SkyTrain guideway was routed through quiet residential neighbourhoods, while the new SkyTrain extension follows more highly developed transportation corridors with higher existing ambient noise levels.

Nevertheless, in view of the past negative experience for many residents during the start-up of the first SkyTrain, there is considerable public concern about potential noise impacts from the construction and operation of the new project. Most concerns have been expressed by residents in the Lougheed Mall and Fraserview areas about noise associated with stations, operations, maintenance, construction and tunnels. Specific public concerns include:

- Lougheed Mall area residents were concerned about potential noise impacts of a Bell Station (since deleted from the plan) and of the variation in pitch during acceleration and deceleration of the trains in the Lougheed Mall area. High-rise residents feared that removing mature trees on the north side of Lougheed Highway would result in loss of their aesthetic and noise buffer value.
- Concerns were expressed about the noise from the increased number of diesel buses that would idle and travel near the Lougheed Station and the Broadway/Commercial Station.
- Concerns were expressed by Burquitlam residents near Clarke Road that road widening to accommodate any future extension of the SkyTrain to Coquitlam would almost double the traffic noise.
- Fraserview residents were concerned that additional SkyTrain noise on top of the already high noise levels from truck and train traffic will greatly reduce the quality of life in their neighbourhood and their property value.
- In the Grandview Cut area, residents were concerned about noise disturbance during the evening and early morning hours, when traffic levels and thus background noise are low, and they sought assurance that the mitigation recommended in the BKL Consultants' report would be implemented.
- Concerns were raised about early morning noise from track maintenance grinding machines.
- Concerns were expressed about noise impacts on schools and that the fast-track plans would mean 24-hour construction.

REVIEW OF PROJECT OFFICE REPORTS

The Special Commission has reviewed two noise and vibration reports prepared for the Rapid Transit Project Office and their *Environmental Assessment Report* of March 15, 1999, and obtained further clarification during a Technical Workshop on noise and vibration issues in February, and from Health Canada.

RAPID TRANSIT PROJECT: PHASE I NOISE ISSUES REPORT

This report, prepared by BKL Consultants Ltd. of North Vancouver, describes the potential noise and vibration impacts of SkyTrain operations on sensitive land uses—principally residential—bordering the SkyTrain extension corridor, and identified mitigation measures where appropriate. Construction noise was not addressed in any depth.

Two measures were used to assess the existing noise environment—a 24-hour equivalent sound level (as recommended by the Ombudsman’s 1987 *SkyTrain Report*) which provides the average daily community noise exposure, and a measure of near-maximum noise levels that would be created during such common noise events as the passing of noisy trucks, sirens and aircraft. The projected noise exposures associated with SkyTrain operations were based on the existing SkyTrain system. Tests conducted by the manufacturer on the new MKII cars in Kuala Lumpur indicate that pass-by levels could be several decibels lower than the existing MKI cars.

The report indicates that no “severe” noise impacts were projected from SkyTrain operations. “Significant” impacts were projected at Horne Street in Burnaby and East 12th Avenue in Vancouver (along the Grandview Cut), and mitigation in the form of guideway noise barriers was recommended in both locations. “Modest” noise impacts were identified at six locations, however mitigation measures such as guideway noise barriers and station-generated noise control were recommended at only two of these locations—Salish Court and Holdom Street in Burnaby. Some professional judgement was used to determine where mitigation may be necessary, and the Special Commission suggests that it would instill a greater level of confidence in the procedure if the rationale behind BKL’s determinations was described in an addendum to their report.

The report notes that tunnels tend not to increase the noise levels created by SkyTrain. However, if problems were identified at any tunnel location, they could be mitigated by installing acoustic lining in short sections of tunnel. The Special Commission agrees that tunnel noises can be mitigated and notes that any potential noise impacts of tunnel ventilation systems should also be addressed.

While overall train noise levels are little changed when accelerating and decelerating in the vicinity of stations, the tonal character makes the noise more noticeable. The report notes that high motor vehicle traffic in the vicinity of stations will mask this noise. However, the Special Commission notes that late evening and night-time traffic would provide less continuous masking noise. The report also suggests ways to contain potentially problematic noise from the public address/paging system and door signals within the confines of the platform at Holdom Street in Burnaby, and Kaslo Street in Vancouver. The Special Commission suggests consideration be given to similar measures at Renfrew Station.

Park-and-ride systems and bus loops would also generate some noise impacts. Park-and-rides are not likely to be an issue, but the BKL report suggests measures in the design of bus loops to mitigate the noise of buses entering, idling and leaving the loops. The Special Commission notes that re-routing some buses could also reduce noise impacts on the surrounding community.

Vibration levels measured by BKL at locations near at-grade, elevated and depressed sections of the existing SkyTrain near Vaness Street in Vancouver were all well below the threshold for any adverse human reaction of any kind established by the US National Research Council, Academy of Sciences, Committee on Hearing Bioacoustics and Biomechanics in 1977. BKL also noted that, since the opening of the existing SkyTrain, there had never been an issue raised around SkyTrain-induced vibration and it was therefore not expected to be a significant concern on the new route.

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAM, *ACCELERATED RAPID TRANSIT PROJECT 2000 LTD. PHASE 1 - NEW WESTMINSTER TO VANCOUVER COMMUNITY COLLEGE*

This report specifies the Construction Environmental Management Program to be followed by all contractors during the construction of the accelerated project. It stipulates that contractors must follow all relevant federal, provincial and municipal regulations, obtain all required licences and permits and provide for ongoing environmental monitoring and supervision. The report specifies that the contractor shall:

- Act reasonably to minimize noise by maintaining noise control equipment on construction machinery, and comply with municipal by-law standards on noise levels;
- Comply with noise level regulations and guidelines established by the Workers Compensation Board;
- Comply with, or negotiate, restrictions on hours of work set by the municipalities in which the contract is being constructed; and

- Be responsible for applying for and procuring any permits to operate machinery at noise levels which exceed those established by municipal by-laws, and/or for undertaking operations outside normal working hours.

The report also states that should the Environmental Monitor observe contraventions of the Construction Environmental Management Plan, such as excessive noise, the Project Office may direct the contractor to immediately suspend all construction operations until appropriate steps have been taken to ensure that such incidents are not repeated. The Special Commission endorses the approach outlined in the report.

The noise control by-laws of most GVRD municipalities limit construction activities in or adjacent to residential areas to certain hours (typically from 7:30 am to 8:00 pm on weekdays and from 10:00 am to 8:00 pm on Saturdays), unless a specific exemption has been obtained. These by-laws also limit continuous noise emissions from construction activities to 85 decibels at the nearest “point of reception” near residences, or at a distance of 15.2m from the noise source, whichever is greater.

The report notes that, as with other major projects, there are only limited means of controlling noise associated with SkyTrain guideway and station construction. In areas where pile driving is required, noise levels at a distance of 15m could substantially exceed the 85 decibel limit adjacent to residential areas. Special noise control measures, such as partial or total enclosures of driver and pile, may be required.

Vibration from general construction activities is not likely to be of concern. However soil compaction and pile driving could produce perceptible vibration in adjacent residences, particularly in poor soils. The Simon Fraser Health Region has commented that vibration from pile driving in the vicinity of the Royal Columbia Hospital or near other sensitive facilities may be of concern. The only practical means of mitigating vibration would be to use a different method of compaction/piling, or to reduce the rate at which energy is fed into the ground, which would almost certainly extend the duration of the work. The Special Commission suggests that the Project Office consult with the staff of the Royal Columbia Hospital to determine if monitoring for potential impacts to hospital equipment should be included in the construction monitoring program.

Other Noise Issues

- Noise impacts of realigning major traffic arteries to accommodate SkyTrain construction;
- Intense squealing noise from train wheels in tight curves;
- Track switch noise in noise-sensitive locations;
- Potential sleep disturbance from routine rail grinding;

- Already significant noise from the high volume of truck and car traffic along Columbia Avenue in the Fraserview area; and
- Potential noise problems at Bridge Studios.

SPECIAL COMMISSION CONCLUSIONS AND RECOMMENDATIONS

The alignment of the SkyTrain extension project has been generally well located to minimize potential community noise impacts. However, noise levels are already higher than considered desirable in some residential areas. The BKL report has predicted that changes in the 24-hour average noise levels due to direct SkyTrain operations would generally be less than 1 decibel. Mitigation is recommended where noise levels are projected to increase by more than 1.5 decibels.

The Special Commission recommends that the Project Office should undertake the following analysis:

- A final detailed guideway noise assessment and mitigation plan should be done, based on the finalized SkyTrain alignment, traffic volumes and the confirmed noise output of the MKII cars and track switches.
- Approaches to controlling noise from stations and bus loops should be detailed and their anticipated effectiveness described as part of the final station designs.
- Potential for wheel squeal on tight curves should be determined and the mitigation approach detailed—particularly in the vicinity of Lougheed Highway.
- Required realignment of major roadways should be defined and noise mitigation measures described where warranted.
- An approach to the control of day-time construction noise should be provided.
- An assessment of the potential for night construction work, a strategy for minimizing resulting noise impacts, and public notice of these plans should be provided.
- An assessment of potential requirements for pile driving noise control measures and monitoring pile driving impacts in the vicinity of Royal Columbia Hospital are needed.

The Special Commission also recommends that the Project Office should:

- Follow through on stated commitments to keep local residents well informed on construction-related noise issues, both in advance of and during construction;
- Work with the Greater Vancouver Transportation Authority to assess and discuss mitigation requirements of potential noise impacts from new or altered bus loops, and

discuss how regular guideway maintenance can be accomplished within established noise impact guidelines;

- Review areas expected to experience “modest” noise impacts to ensure this assessment remains valid based on the final design;
- Consider making use of natural features at property lines along their right-of-way to reduce noise impacts;
- Work with relevant provincial agencies to investigate opportunities for homeowners to make noise-reducing home improvements under existing programs in areas slated for noise mitigation; and
- Consider additional noise mitigation in already noisy areas such as Columbia Street and Brunette Avenue.

And, the Special Commission recommends that the City of New Westminster, the Greater Vancouver Transportation Authority and the provincial government explore traffic noise reduction strategies in the Fraserview area.

5. HIGHLIGHTS OF STATION AND GUIDEWAY DESIGN REPORT

The Special Commission's December, 1998 *Interim Report* identified crime and safety, visual impacts and aesthetics, and neighbourhood integration as key issues relating to station and guideway design. This assessment was based on information the Special Commission had received from the Rapid Transit Project Office, direct consultations with stakeholders, and public input. Additional public consultation revealed that bicycle access was also an important station design issue.

The Special Commission's *Station and Guideway Design Report* assesses how well the Project Office's station and guideway design information and processes respond to the critical concerns of the public and to the Project Office's own stated principles of process and design. Special Commission staff were assisted in the preparation of this report by consultants Barry Downs AIBC (architect) and Harold Neufeldt BCSLA (landscape architect). Public comments from submissions to the Special Commission, as well as to the Project Office, were reviewed and incorporated. Valuable information and perspectives were also provided by senior staff of municipalities, neighbourhood and community policing representatives, and experts in public rail transit and criminology.

PUBLIC CONCERNS ABOUT STATION DESIGN

Key station and guideway design concerns raised by the public included:

- Crime and security;
- The importance of community consultation;

- Transit workers and local municipalities should be consulted;
- Community plans for policing, zoning, traffic patterns and future development must be developed carefully in the vicinity of stations; and
- The accelerated schedule is not providing enough time for local residents, neighbourhood groups and municipalities to be properly involved in station design.

PROJECT OFFICE REPORTS AND INITIATIVES ON STATION DESIGN

The Project Office committed to an open and accessible public consultation process on station design, and to the following design principles:

- SkyTrain stations will be designed to integrate well with, and complement the character of neighbourhoods through creative design and art work;
- SkyTrain stations will provide space for community amenities and services as well as retail and other business opportunities;
- Residents and communities will play a major role in designing the stations they want in their neighbourhoods;
- Stations will be designed to provide a welcoming focal point for the community; and
- Stations should be one of the safest places in the community, and principles of CPTED (*Crime Prevention Through Environmental Design*) will be fully incorporated in station and guideway design.

The Special Commission notes that these commitments indicate a clear understanding of the public's concerns around station design. If they are followed through, planning and design for stations should meet neighbourhood and community needs.

Project Office Study: *Security, Safety and Rapid Transit*

This study, prepared for the Project Office by Security Resource Group Inc.(SRG), provides a comprehensive analysis of the growth of overall crime trends in the Greater Vancouver region, how urban development has affected these trends, and the influence of transit and general public mobility on urban development and crime. The study offers recommendations and guidelines to alleviate public safety concerns during station design and SkyTrain operations. The study introduces the concept and principles of *Crime Prevention Through Environmental Design* (CPTED) and recommends that these principles and techniques be applied to the design of new stations and to surrounding neighbourhoods.

SRG recommends further examination and study of the following issues:

- Consistent statistical data collection methods by different police departments;
- A time-series analysis of crime before and after a SkyTrain station is built;
- Fare collection or payment methods and fare compliance including a cost/benefit analysis;
- Cost/benefit analysis of additional uniformed personnel at stations and on SkyTrain cars;
- Cost/benefit analysis of security monitoring of the closed circuit television systems; and,
- A special study on jurisdictional issues affecting the enforcement of provincial and federal laws on or around the SkyTrain system.

Project Office Initiatives on Safety and Security

In March, 1999, the Project Office committed to implementing CPTED principles, and announced a program in partnership with the Greater Vancouver Transportation Authority, local municipalities and their police departments to address personal safety and security issues related to the new SkyTrain line.

Project Office *Station Design Resource Book*

This book is a compendium of policy and design information assembled for use in the Project Office's station design process. It includes a summary of the design philosophy or approach and basic principles or standards for station design including the CPTED principles.

PROJECT OFFICE STATION DESIGN PROCESS

The Project Office has begun to implement a four-stage public process for station design in each municipality. The four stages include the following events:

1. Open house to report back on the preferred alignment and station locations and to introduce Ideas Forum concepts;
2. Open house and workshop to gather public input on design concerns;
3. Open house and workshop to present initial design and gather input; and
4. Open house for presentation of proposed station design by architect.

The Special Commission notes that the Project Office has not effectively reported back to the public involved in its earlier consultations and encourages the Project Office to provide the public with a clear and explicit written explanation of how decisions were made on route alignment and station location to bring proper closure to this phase of the design process, as recommended in the Special Commission's *Interim Report*.

SPECIAL COMMISSION CONCLUSIONS AND RECOMMENDATIONS

Crime and Security

The Special Commission supports the Project Office's announced commitments, which recognize that security and safety should be the number one priority in SkyTrain station design and operations. The Special Commission also endorses the SRG report and encourages the Project Office to undertake the further recommended crime and security studies, and to immediately employ specialists in *Crime Prevention Through Environmental Design* (CPTED) to help ensure these principles are properly implemented.

Station Design Resource Book

The Special Commission notes that the Project Office *Station Design Resource Book* provides useful information and is a good starting point for public involvement in the station design process. The following is a summary of the Special Commission's recommendations for enhancing the *Station Design Resource Book*, which should be used as a check list for the design of each new station, with particular emphasis on CPTED:

- Planning for all stations should maximize the safety and comfort of day and night commuters by: incorporating alternative access/escape routes; doing security planning that includes town centre parking areas at Brentwood and Lougheed town centres; and providing weather-protected transfer areas and barrier-free access except where safety and security take precedence.
- Neighbourhood integration should be enhanced by: landscaping, art and furniture that complements local neighbourhoods; including associated development in station architects' terms of reference; incorporating wide ramps that accommodate complementary activities such as retail carts and rest areas at key connecting points such as Brentwood, Sapperton and Broadway/Commercial; identifying current and future property "envelopes" required for stations and connecting zones; accommodating bicycles in stations and trains; and being energy efficient and sensitive to local ecosystems.
- Planning for all stations should accommodate future integration of security offices, entry control mechanisms (turnstiles), upgraded lighting and other security measures.
- The intrusiveness of guideways should be minimized by considering alternatives to bulky pillars and doing landscape restoration in impacted guideway right of ways.

Design Process

The Special Commission endorses the Project Office's general approach to the station and guideway design process. The following is a summary of recommendations for enhancing the process:

- The Project Office should ensure that the design process allows sufficient input from the public to design stations that are consistent with the positive concepts presented in their station design Ideas Forums and *Station Design Resource Book*.
- The Project Office and municipalities should work more closely to negotiate an appropriate schedule for planning and approvals. The Project Office's station design process should build on local municipal planning processes, and municipalities should, in turn, provide some flexibility in their development approval processes to help achieve efficiencies in the SkyTrain design and construction.
- The Greater Vancouver Transportation Authority should play a strong role to ensure that both the Project Office and municipal objectives are fairly balanced in designing stations and guideways.
- The open house/workshop format for the station design process should be augmented where necessary by additional interactive mini-planning workshops that also look at ancillary development and the surrounding community.
- The Project Office should communicate to the public and local governments clearly and in a timely manner about the details of the station design process, and in the provision of relevant design information and policy.
- The Project Office should open store-front offices along the route to assist in early resolution of issues and show that the Project Office is connected to and concerned about the communities where stations will be located.
- The Project Office should ensure that there is sufficient time in their station design process to benefit from additional community planning and from recommended studies on crime, safety and security.

6. HIGHLIGHTS OF CONNECTIVITY AND OPERATIONAL ISSUES REPORT

The Special Commission's *Interim Report* identified connectivity as an important component of an efficient and effective system design. An isolated system or a poorly conceived operating plan could result in a failure to generate ridership and environmental benefits normally expected of a major capital investment in public transportation such as SkyTrain. The Special Commission's *Connectivity and Operational Issues Report* reviews the Rapid Transit Project Office's connectivity and operations planning process, identifies issues to be resolved, and provides advice on possible changes to the process or product that could mitigate negative impacts. The report is based substantially on analysis and advice from the Special Commission's independent consultants, Sypher:Mueller International Inc.

The Rapid Transit Project Office is responsible for the design and construction of the SkyTrain line and the associated stations. The Greater Vancouver Transportation Authority will be responsible for the design and operation of local bus services that connect with the SkyTrain line and utilize the bus loops. The Project Office and the Greater Vancouver Transportation Authority are negotiating responsibility for the construction of the bus loops at the stations.

The original concept of the rapid transit expansion—which this SkyTrain extension project only partly fulfills—includes a branch from Lougheed Town Centre to Coquitlam Town Centre. The complete *T-Line* was the heart of the GVRD *Livable Region Strategic Plan*, and remains key to achieving regional growth objectives, and broad environmental objectives such as improving Lower Mainland air quality. There should therefore be a strong commitment to complete the *T-Line* in future to meet these objectives.

Since the release of the Special Commission's *Interim Report*, there has been considerable debate about the best route to complete the *T-Line*. At public meetings, strong representation was made for reconsidering the proposed route to Port Moody. However, the GVRD has confirmed the route, and planning should now proceed immediately with local governments to address the issues and concerns associated with this route.

Numerous agencies, environmental groups and the public have raised connectivity and other operational issues during the Special Commission review process—including two days of Public Meetings hosted by the Special Commission on February 15 and 16, 1999, and a connectivity Technical Workshop on February 19, 1999.

SKYTRAIN-TO-BUS CONNECTIVITY

Achieving the ridership and growth-shaping objectives of the SkyTrain extension will require effective connections with the bus system and other transportation modes. The Greater Vancouver Transportation Authority has provided the Project Office with their preliminary analysis and plan for extensive tie-ins with the bus service as part of a full-scale review of transit routes and schedules across the entire region. Local municipalities must also be involved to facilitate bus connectivity if station access requires changes to local streets and traffic patterns. On major routes, the Greater Vancouver Transportation Authority and/or the Ministry of Transportation and Highways may also have access issues to resolve with the Project Office. In particular, proposed stations along busy traffic corridors such as Lougheed Highway must safely accommodate the transfer of commuters between transportation modes.

The major bus-to-SkyTrain and bus-to-bus connection points identified by the Greater Vancouver Transportation Authority are found at the following locations:

Broadway/Commercial Station—The functionality of this station has been a key public concern. The Greater Vancouver Transportation Authority does not anticipate using the new Vancouver City College Station as a new connection point for buses along Broadway since the Broadway/Commercial Station one kilometer away is better able to handle the connecting bus traffic. The Project Office concept plan accommodates this use of the Broadway/Commercial Station, and indicates that the pedestrian paths linking the bus stops and the Broadway platforms should improve bus access and should be able to handle the projected passenger flows. A direct pedestrian connection to North Grandview Highway (across the Grandview Cut) may be necessary to link the station with bus stops along the highway.

Brentwood Town Centre Station—This station will require a major transit exchange with provision for approximately 10 to 12 bus bays to accommodate upgraded bus service. Accommodating future mall expansion and providing the street infrastructure for additional connecting bus traffic will be challenges. However, moving the station away from Brentwood Mall could have a negative impact on ridership and the attractiveness of transit.

Lougheed Town Centre Station—Lougheed will be a major connection point between buses and SkyTrain, requiring a minimum of 15 bus bays. The size, location and final design for this station have not been determined. The construction of a new exchange is an opportunity to improve and facilitate bus-to-bus as well as bus-to-SkyTrain pedestrian movements, and help improve ridership.

Braid Street Station—The inclusion of a station at Braid Street is still being considered. The Greater Vancouver Transportation Authority has noted that, “a station at Braid would allow for the most efficient connection to regional bus services from the growing Northeast sector...the nearest alternative stations would either impose a significant travel (time) penalty on passengers, or uneconomic duplication of services.”

The Project Office has initiated a functional planning study of the Braid Street Station area to determine the feasibility of a station and the functional requirements.

New Westminster Station—This will remain the major transfer point serving central New Westminster. Current planning anticipates that trains from Lougheed will be through-routed to New Westminster Station (continuing on to Waterfront Station).

Key Issues

- Coordinating transfers;
- Maintaining levels of local service;
- Enhancing pedestrian and cycle connections; and
- Stimulating new ridership.

SKYTRAIN-TO-SKYTRAIN CONNECTIVITY

Passengers may make connections between SkyTrain services at the following stations:

Columbia Station—The number of Columbia Station passengers likely to transfer between the line to Lougheed Town Centre and the line to King George Station is within the station’s current capacity. Current planning calls for passengers on the new line from Lougheed Mall to disembark at Columbia and change platforms to board a train to King George Station and Waterfront Station.

Lougheed Town Centre Station—There are a number of complex issues to resolve at this station. The Project Office is preparing a preliminary design of a station configuration that will serve several different functions as the SkyTrain system grows. In the first phase, this station will serve as the terminal for the line to New Westminster. There are two options in the second phase. The first would involve sending trains between Vancouver Community College and Waterfront stations via New Westminster that would not require transfers at Lougheed. The second option is to operate two separate services—one between Lougheed and Waterfront stations via New Westminster, and the other between Lougheed and Vancouver Community College stations. This option would require transfers for a limited number of passengers at Lougheed Station. In the final phase of development, with the completion of the *T-Line* to Coquitlam and Port Moody, there will be more SkyTrain-to-SkyTrain transferring activity at Lougheed Station.

Broadway/Commercial Station—The Project Office preliminary design accommodates the functional evolution of this key station as the line is extended westward. In the first phase, the line is planned to terminate one station west of the Broadway/Commercial Station at Vancouver Community College. All passengers on the new line destined for downtown Vancouver will be required to transfer to the existing SkyTrain line. As the new line is extended westward to an eventual terminal at Granville or Arbutus, the volume of downtown-bound passengers transferring from the new line to the old line will decline. However, this will be offset by an increase in transfers from the old line to the new westbound SkyTrain.

CONNECTIVITY OF SKYTRAIN TO OTHER TRANSIT MODES

The new SkyTrain line provides an opportunity to enhance connections with interurban bus services as well as with the public bus network, and it may be possible to develop a joint-use facility at Braid Street for SkyTrain, local and regional transit buses, Greyhound, and other scheduled Fraser Valley bus operators (e.g., City Link).

To enhance connectivity with the regional road system, Braid Street has been discussed as a potential site for a park-and-ride lot in order to intercept traffic from the TransCanada Highway. However, the Special Commission observes that this may not be the best location for a park-and-ride like the one in Surrey on the existing line, due to the already considerable traffic congestion in the immediate area, and the major delays already often encountered crossing the Port Mann Bridge.

The Project Office, the Greater Vancouver Transportation Authority and municipalities should work together to avoid safety problems associated with informal park-

and-ride and passenger drop-off activity in areas around new stations—particularly along Lougheed Highway where current road design will not accommodate an increase in pedestrian traffic or passenger drop-off activity.

The Project Office and the Greater Vancouver Transportation Authority should jointly address the issues of facilitating pedestrian and cyclist connections in the station design process, and of taking bicycles on board SkyTrain cars.

OPERATIONAL ISSUES

SkyTrain Cars

When the new SkyTrain extension opens, the entire system will operate with 60 new MKII cars, which are longer and wider than the existing cars, and which are expected to incorporate many new mechanical and electrical design improvements. However, the preliminary design specifications for these new cars currently contemplate having 40 per cent fewer seats and fewer cars in base-service trains, which will reduce the seating capacity per train significantly. In recent years, SkyTrain has succeeded in building off-peak ridership. However, because more passengers during these periods would be forced to stand, this growth may be difficult to sustain. Increasing the number of cars per train, or simply adding more seats to some or all of the MKII cars, would mitigate the problem.

A disadvantage of the existing MKI cars is the inability of passengers to circulate from one car to the next, which would enhance personal safety and security, and allow passengers to spread out to ease overcrowding. The new MKII cars will permit inter-circulation between two paired cars, but not between the two pairs of a four-car train. Three-car trains with fully open circulation would be preferable.

SkyTrain Stations

The Project Office anticipates narrower platforms at low-traffic stations. The Greater Vancouver Transportation Authority has noted that future neighbourhood redevelopment may result in significantly increased SkyTrain traffic at some stations, and centre platform stations are extremely difficult to expand (widen) if traffic volumes increase dramatically.

Six proposed or alternative stations included in the original plans for the new line have been eliminated or changed to future stations on the basis of input from the public and local government planners: Braid Street, Boundary, Woodlands, Bell, Lake City and Grandview. Of these, only Braid Street is required now to provide efficient and effective connectivity with other transit modes. The proposed Bell Station was located to serve a large high-density residential development and could free up additional capacity on the local bus network if area residents were encouraged to board the SkyTrain directly at Bell. However, local concerns about crime, safety and noise must be resolved.

There are a number of concerns about the design and operating plan for a Lougheed Mall Station as its function evolves over time. The Special Commission encourages the Project Office to consider feasible alternatives to ensure adequate capacity and scheduling flexibility of both the trains and operating plan.

SPECIAL COMMISSION CONCLUSIONS AND RECOMMENDATIONS

The Project Office is working with other agencies to identify and resolve connectivity issues. Significant progress has been made, and more work must be done during the detailed station design process. The Special Commission has identified significant issues requiring further work at Broadway/Commercial, Vancouver Community College, Lougheed Mall and Braid.

The Special Commission recommends that the Project Office do the following to ensure effective connectivity and operational planning:

- Work with the Greater Vancouver Transportation Authority to conclude agreements on bus-to-SkyTrain connectivity issues prior to final station design, with input from other stakeholders such as local municipalities and the Ministry of Transportation and Highways;
- Work with the Greater Vancouver Transportation Authority, the City of New Westminster and the Ministry of Transportation and Highways to quickly resolve the issue of a potential Braid Street Station to allow for planning bus-SkyTrain integration prior to finalizing other station designs;
- Work with the Greater Vancouver Transportation Authority on other policy issues that will impact connectivity with other transportation modes, including pedestrians, cyclists and parking facilities;
- Work with the Greater Vancouver Transportation Authority to jointly review the need for including the Vancouver Community College Station as presently conceived, as part of the SkyTrain expansion;
- Re-examine its operations plan with the Greater Vancouver Transportation Authority to avoid a decrease in the seating availability during the off-peak periods;
- Review its design concept of the new Broadway/Commercial Station to avoid potential congestion of commuters passing through the station; and
- Consider alternative configurations for Lougheed Town Centre Station to increase operational flexibility.
- The Special Commission also recommends that the provincial government reconfirm its commitment to extending the new line to Coquitlam Town Centre in the future.

8. SUMMARY AND ACTIONS

Overall, the Special Commission notes progress on identification and mitigation planning for relevant issues. However, much work remains to be done, and the Project Office should increasingly work with local government, the Greater Vancouver Transportation Authority and other stakeholders to find ways to ensure resolution of the remaining issues.

BIOPHYSICAL ENVIRONMENT ISSUES

The Project Office has identified the key issues and continues work on strategies to avoid, mitigate or compensate adverse project impacts. One issue of particular importance is potential impacts at stream/river crossings and along the Fraser River. Work is now required on the specifics of these mitigation and compensation approaches, and to resolve issues required to complete project screening under the *Canadian Environmental Assessment Act*. The Special Commission's recommendations include:

- The completed list of the Project Office's construction phase commitments, responsibilities and assurances should be made available to all regulatory agencies, municipal authorities, key stakeholder groups and the public.
- During construction, the Project Office should employ professional, independent Environmental Monitors to respond to public and regulatory agency concerns about accountability.
- Environmental compensation in the Grandview Cut should be carefully planned with input from agencies at all levels of government.

- Where the Project Office has to relocate existing utilities, it should try to incorporate them into the guideway right-of-way to reduce vegetation disturbance if this is technically feasible.

NOISE AND VIBRATION ISSUES

The Project Office report identifies relevant issues and proposes effective measures to mitigate noise and vibration problems during the construction and operation of the SkyTrain extension. Some issues require further action. The Project Office should undertake the following analysis during the detailed design phase:

- A final assessment of locations requiring guideway noise mitigation should be undertaken based on the finalized SkyTrain alignment, traffic volumes and the confirmed noise output of the MKII cars. Appropriate mitigation measures should be defined.
- Approaches to controlling noise from stations and bus loops should be detailed and their anticipated effectiveness described.
- Potential for wheel squeal on tight curves should be determined and the mitigation approach detailed.
- Required realignment of major roadways should be defined and noise mitigation measures described where warranted.
- An approach to the control of day-time construction noise should be provided.
- An assessment the potential for night construction work and a strategy for minimizing resulting noise impacts should be provided.

The Special Commission recommends that, during the construction phase, the Environmental Monitor for biophysical issues should also monitor noise and vibration issues. Municipal governments have the authority to enforce their local noise by-laws.

STATION AND GUIDEWAY DESIGN ISSUES

The Project Office has produced a good report on crime and security—a key design issue—and announced appropriate safety and security initiatives. They have also produced a *Station Design Resource Book* to guide implementation of public safety and other effective community integration principles during the design process. The Special Commission encourages the Project Office to:

- Employ CPTED (*Crime Prevention Through Environmental Design*) specialists to ensure CPTED principles are properly implemented;
- Follow through on its announced safety and security initiative commitments;

- Undertake the further crime and security studies recommended by its consultant, SRG;
- Make recommended adjustments to its *Station Design Resource Book*;
- Work with municipalities to ensure an effective public process; and
- Make use of Official Community Plans, as well as numerous additional studies and supporting documents provided by municipalities, to help ensure that the final design for each station is consistent with neighbourhood and community planning, design and development.

If these key steps are taken, and the Greater Vancouver Transportation Authority plays a role in ensuring that both Project Office and municipality objectives are fairly balanced, there should be a successful outcome of the station and guideway design process.

CONNECTIVITY AND OPERATIONAL ISSUES

The Project Office is making progress on the identification and resolution of issues relating to connectivity with the existing SkyTrain line, as well as with regional bus and road systems. Some important issues still require further work, and it is crucial for the Project Office to maintain effective working relationships with the Greater Vancouver Transportation Authority, local governments and the Ministry of Transportation and Highways to resolve them. In order to meet environmental and regional growth-shaping objectives, government should commit to future completion of the *T-Line* to Coquitlam and Port Moody.

The key next steps required to ensure good connectivity include:

- Making decisions on stations at Braid Street and Vancouver Community College;
- Resolving critical design issues at Broadway/Commercial and Lougheed Mall;
- Resolving outstanding issues relating to facilitating pedestrian and cyclist connections, and to addressing traffic flow and safety concerns around passenger drop-offs at stations near busy roads; and
- Reconsidering the configurations of the new MKII SkyTrain cars and train capacities in order to maintain and build ridership.

SUMMATION

The Special Commission concludes that the potential environmental impacts of the SkyTrain extension project have been adequately identified and the Special Commission's final reporting has identified processes for the Rapid Transit Project Office to resolve or

mitigate them at the detailed design stage. If this work is completed satisfactorily, the project will meet federal and provincial standards.

The Project Office faces a tremendous challenge to complete the complex technical work involved in designing and building the new SkyTrain extension on a very tight timetable, and the Special Commission notes public concern about whether the timetable is achievable. The Project Office has made progress in recognizing and dealing with public concerns about crime and security, noise, station design and connectivity issues. But while there is substantial public support for expansion of rapid transit, some apprehension remains—particularly about whether community interests are being given due consideration and whether environmental commitments will be followed through.

The project is now entering a very challenging phase during which openness and responsiveness to concerns of the public, and of the federal and municipal governments, will be crucial. The Special Commission recognizes the daunting task faced by the Project Office. An improved spirit of partnership among all parties is now needed to deliver this project. This will be fostered by greater openness and timely availability of information. The Special Commission urges the provincial government and the Project Office to develop and publicize a work plan that ensures openness and responsiveness to public concerns.

The participation of local governments is critical. The Special Commission urges all local governments to re-commit, with the Province, to developing an effective new SkyTrain service. Done properly, this project should greatly enhance the future of Greater Vancouver, but there is also a risk of losing this growth management opportunity by poor project delivery. The Special Commission also recommends adoption of a Community Legacy Program that will provide lasting community benefits and enhance neighbourhoods along the new SkyTrain route.

With this final reporting, the Special Commission has completed its assignment. Biophysical environment issues will be resolved through detailed design and permitting processes. Monitoring the Project Office's performance can best be accomplished by provincial and federal agencies and local governments. Since many of the issues of public concern extend beyond environmental issues, the final recommendation of the Special Commission is that the Province designate a small multi-agency team, led by a senior official, to work with the Project Office and others to enhance openness and partnerships, and ensure successful delivery of the finished product.

To facilitate public scrutiny of the ongoing SkyTrain extension development process, the Special Commission web site, which includes all relevant reports and process information, will be maintained until construction of the new line is completed.

STATION &
GUIDEWAY
DESIGN

REPORT

MAY, 1999

SPECIAL
COMMISSION
SKYTRAIN
REVIEW



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APPENDICES ACCOMPANYING STATION & GUIDEWAY DESIGN REPORT

- Design Appendix #1: Summary of SRG Study: *Security, Safety and Rapid Transit***
- Design Appendix #2: RTPD News Release, Backgrounder and Information Sheets**
- Design Appendix #3: Documents received from City of Burnaby and City of Vancouver**
- Design Appendix #4: Planning Issues and Opportunities**

INTRODUCTION

This report reviews the products and processes of the Rapid Transit Project 2000 Ltd. Office (RTPO) on station and guideway design for the accelerated SkyTrain extension project, up to April 7, 1999. The report describes these products and processes and provides the Special Commission's assessment of how well they respond to the critical concerns of the public identified in the Special Commission's *Interim Report* and in subsequent public review. The assessment also evaluates these products and processes against the broad principles of process and design to which the RTPO has committed. The report includes specific conclusions and recommendations that flow from this review.

The Terms of Reference of the Special Commission in conducting the SkyTrain Review requires the Special Commission to “review environmental issues related to construction and operation of the proposed SkyTrain project,” and “provide ongoing independent follow-up and monitoring throughout the design phase of the project”. This report focuses on the “urban environment” and addresses specifically three areas of station and guideway design:

1. Crime, security and safety;
2. Visual impacts; and
3. Neighbourhood integration of SkyTrain stations and surroundings.

These aspects of the urban environment are generally not covered by federal government approvals processes. These issues are, nonetheless, of high importance to the communities near the SkyTrain extension project. These issues are also central to the Special Commission's mandate as set out in its Terms of Reference. Accordingly, the Special Commission has produced this report to offer assistance to the RTPO, local governments and the public involved in the process of designing SkyTrain stations and guideways.

1.0 METHODOLOGY

The Special Commission retained consultants Barry Downs AIBC (architect) and Harold Neufeldt BCSLA (landscape architect) to provide critical expertise in assisting Special Commission staff to develop the content of this report. Public comments from submissions to the Special Commission as well as to the RTPO were reviewed and incorporated. Valuable information and perspectives were also received in meetings with the senior staff of municipalities and with neighbourhood and community policing representatives. In addition, experts in the fields of public rail transit and in criminology were consulted.

In preparation for reviewing RTPO materials and providing advice on station and guideway design, Special Commission staff and consultants undertook the following research:

1. Conducted site reviews of all existing stations and proposed new stations identified for the accelerated SkyTrain project;
2. Undertook an extensive literature review of *Crime Prevention Through Environmental Design* (CPTED) principles and approaches;
3. Met with planning staff from the cities of New Westminster, Burnaby and Vancouver;
4. Met with community policing representatives in New Westminster and Vancouver;
5. Held discussions with criminology expert Dr. Patricia Brantingham.

The Special Commission extends its appreciation to Dr. Patricia Brantingham, Professor of Criminology, Simon Fraser University in Burnaby.

SUMMARY

OF PUBLIC CONCERNS ABOUT STATION AND GUIDEWAY DESIGN

The material in this section is an overview of the public comments and concerns specific to station and guideway design as given to the Special Commission at public meetings and in written submissions.

With respect to the process of designing SkyTrain stations, the following are examples of key concerns raised by the public:

- Community plans for policing, zoning, traffic patterns and future development in the vicinity of stations must be developed carefully;
- Community consultation is of great importance;
- Transit workers and local municipalities should be consulted; and
- The accelerated schedule does not provide an appropriate period of time for local residents, neighbourhood groups and municipalities to be properly involved in designing stations that will meet their needs.

2.0 KEY AREAS OF CONCERN

Public comments on the actual design of stations fell primarily into four categories:

1. Crime and security;
2. Health and safety;

3. Bicycles; and
4. Visual impacts.

The following four sections provide examples of the types of concerns and suggestions raised by the public.

2.1 CRIME AND SECURITY

- Residents are worried that new stations or expansion of old stations in their neighbourhoods will lead to a decline in the quality of life in their area.
- Whether crime around stations is real or perceived, people felt the end result is the same: some residents are reluctant to ride SkyTrain.
- Above all, there was considerable perception that crime could be introduced into school neighbourhoods as a result of SkyTrain.
- The physical presence of Transit Police and SkyTrain staff was repeatedly mentioned as one of the most effective means of preventing crime and improving actual and perceived safety on SkyTrains and at stations.
- Other security measures such as camera coverage, lighting, phone boxes, community policing, and locating stations in busy areas were also suggested.

2.2 HEALTH AND SAFETY

- Increased vehicle and bus traffic near stations and decreased visibility due to guideway pillars were a concern, particularly where many children cross streets.
- People said consideration should be given to worker and user health and safety issues such as earthquake and emergency preparedness and incorporation of ergonomic principles.
- It was pointed out that elevators at the current SkyTrain stations are four inches too small for ambulance stretchers.
- It was suggested that staffing and scheduling changes should be made to improve safety and emergency preparedness.

2.3 BICYCLES

- The suggestion that the transit authority should change its policy and allow bicycles on SkyTrains was made.
- Incorporation of bicycle commuter facilities in stations was called for.

- The installation of hooks for bikes in SkyTrain cars was suggested.
- SkyTrain workers support bicycles on SkyTrain and have made suggestions for keeping bikes secure.

2.4 VISUAL IMPACTS

- Loss of views and loss of privacy, particularly along the Fraserview and Lougheed sections of the proposed SkyTrain route, were a serious concern.
- Fraserview residents believe that construction of SkyTrain along the waterfront will ruin their views of the river and destroy public amenities of the area.
- Residents in the vicinity of Lougheed Mall were concerned about the loss of trees planted between the buildings and Lougheed Highway.
- Tree planting was not seen as adequate mitigation for the loss of views.
- Loss of privacy and disturbance by passing SkyTrains is an important issue to residents.

Please see the Special Commission's *Public Consultation Report* for additional details on input received from the public through submissions, questionnaires, letters and presentations to the Special Commission at Public Meetings held in February, 1999.

INFORMATION AND MATERIALS FROM RTPO ON APPROACH TO DESIGN

The following sections briefly set out information, principles and commitments that the RTPO has confirmed in recognition of public interest in its station design process, including the public consultation process it is conducting to assist in station design.

3.0 RTPO CONSULTATION PRINCIPLES AND STATION DESIGN COMMITMENTS

3.1 RTPO CONSULTATION PRINCIPLES

The RTPO confirmed in its March, 1999 *Environmental Assessment Report* that the station design consultation process will be governed by the following principles quoted from Section 8-2 of the RTPO report:

1. The need to offer broad public access to information, input and involvement in the project;
2. Open, honest and direct communications must be followed to facilitate meaningful information exchange;
3. Expectations, roles and opportunities for public input and participation must be clearly defined;

4. Appropriate venues and mechanisms for timely and effective public input must be provided;
5. Public input will be acknowledged and incorporated into project plans and decisionmaking; and
6. The public will be continually updated on ongoing decisions and their outcomes.

3.2 RTPO STATION DESIGN COMMITMENTS

The RTPO has made commitments to the public and affected municipalities through public statements, documents, announcements and interviews since September, 1998. These commitments may be paraphrased as follows:

1. SkyTrain stations will be designed to integrate well with, and complement the character of, neighbourhoods through creative design and art work.
2. SkyTrain stations will provide space for community amenities and services as well as retail and other business opportunities.
3. Residents and communities will have a major role to play in designing the stations they want in their neighbourhoods.
4. Stations will be designed to provide a welcoming focal point for the community.
5. Stations should be one of the safest places in the community and principles of CPTED (*Crime Prevention Through Environmental Design*) will be fully incorporated in station and guideway design.

4.0 RTPO STUDY: **SECURITY, SAFETY AND RAPID TRANSIT**

The RTPO study, *Security, Safety and Rapid Transit*, is a cross-jurisdictional review of safety and security prepared for the RTPO by Security Resource Group Inc. (SRG). The study is comprehensive and introduces and supports a number of recommendations and guidelines for station design and SkyTrain operations. The *Security, Safety and Rapid Transit* study represents a summary of SRG's findings and a recommended course of action to address specific concerns. The study provides a comprehensive analysis of the growth of overall crime trends in the Greater Vancouver region, urban development which has affected those trends, and the influence of transit and general public mobility on urban development and crime.

4.1 STUDY RECOMMENDATIONS

The SRG study provides numerous recommendations for specific actions as well as cooperative initiatives related to:

- Community involvement;
- Station design;
- Staffing of the SkyTrain system;
- Security techniques; and
- Fare payment.

The study introduces the concept and principles of *Crime Prevention Through Environmental Design* (CPTED) and recommends that these principles and techniques be applied to the design of new stations and to surrounding neighbourhoods.

Further examination and study is recommended by SRG for a number of issues including:

- Consistent statistical data collection methods of different police departments;
- A time-series analysis of crime before and after a SkyTrain station is built;
- Fare collection or payment methods and fare compliance including a cost/benefit analysis;
- Cost/benefit analysis of additional uniformed personnel at stations and on SkyTrain cars;
- Cost/benefit analysis of security monitoring of the closed circuit television systems; and
- A special study on jurisdictional issues affecting the enforcement of provincial and federal laws on or around the SkyTrain system.

The *Executive Summary* of the SRG study is included in this report as Design Appendix #1.

5.0 RTPO NEWS RELEASE AND RELATED INITIATIVES ON SAFETY AND SECURITY

Following its receipt of the SRG study, *Security, Safety and Rapid Transit*, the RTPO issued a news release on March 29, 1999, announcing a program to address personal safety and security issues related to the new SkyTrain line. The news release indicated that the program is in partnership with the Greater Vancouver Transportation Authority (GVTA), local municipalities and their police departments.

5.1 SAFETY AND SECURITY PROGRAM

The SkyTrain safety and security program, as announced, is to have three main initiatives:

1. Station design;
2. System operation; and
3. Municipal and community.

A cornerstone of this program is the RTPO's firmly-stated commitment to make safety and security a priority and to implement CPTED principles in the design and construction of the new SkyTrain line.

Attached as Design Appendix #2 of this report are the following RTPO materials:

1. RTPO News Release: "Program to Address SkyTrain Personal Safety and Security", March 29, 1999;
2. RTPO Backgrounder: "Highlights of the Security, Safety and Rapid Transit Report", March 29, 1999;
3. RTPO Information Sheet: "Our Approach to Crime, Safety and Security";
4. RTPO Information Sheet: "Crime Prevention Through Environmental Design"; and
5. RTPO Bulletin: "Building a Safe, Secure SkyTrain System for Vancouver".

6.0 RTPO STATION DESIGN RESOURCE BOOK

The process of designing SkyTrain stations is now underway by the RTPO. Sections 9 and 10 in this report describe the process, and related advice from the Special Commission is provided in Sections 11 and 12. The RTPO's *Station Design Resource Book* was prepared especially for use by station design teams and the public during the station design process.

6.1 PURPOSE AND USE OF RESOURCE BOOK

The RTPO has developed the *Resource Book* as a compendium of policy and design information assembled for use in their station design process. The purpose of the *Resource Book* is to assist station architects, other project consultants and members of the public working on station designs. It contains the basic information necessary to begin station design.

The *Resource Book* includes an overview of the SkyTrain system technology, the alignment and the stations, a summary of the design philosophy or approach, and basic principles or standards for station design including the principles of *Crime*

Prevention Through Environmental Design (CPTED). The appendices include more detailed information including functional plans for each station. The *Resource Book* is, in effect, a “workbook”, and the RTPO indicates that the book will change as information on system-wide elements and policy are further developed by the RTPO.

The Special Commission reviewed the April 1, 1999 draft of the RTPO’s *Station Design Resource Book*. The RTPO subsequently provided a re-edited version on April 12, 1999 which may be viewed on the Special Commission’s web site at:

<http://www.skytrainreview.gov.bc.ca>

The Special Commission did not have time to review the April 12, 1999 draft, but assurances have been given by the RTPO that changes to the main content of the *Resource Book* were primarily in formatting and grammar.

6.2 REVIEW OF RTPO’S *RESOURCE BOOK*

Prior to the RTPO confirming its intent to develop a *Station Design Resource Book*, Special Commission staff and consultants developed a draft “station design checklist”. The draft checklist included general and specific principles of station design for four areas of SkyTrain station design:

1. The station place (platform and surround);
2. The interface with multi-modal transit (buses, cars, bicycles and pedestrians);
3. Related public zones; and
4. Surrounding neighbourhood area.

CPTED principles played a large role in forming this draft checklist which was then utilized by the Special Commission to review the RTPO’s *Station Design Resource Book*.

6.2.1 Planning Issues and Opportunities

Design Appendix #4 of the Special Commission’s *Station and Guideway Design Report*, “Planning Issues and Opportunities”, builds on the RTPO’s list of planning issues specific to each station as identified in the RTPO’s *Station Design Resource Book*. The “Planning Issues and Opportunities” list was developed by the Special Commission through its process of site review and discussions with staff from local municipalities. Its purpose is to bring additional planning issues and opportunities to the attention of the RTPO and the participants in each station design process. The Special Commission’s intent in providing this list of additional planning issues is to help ensure that they are considered as appropriate during station design, or in neighbourhood and community land use planning. The appropriate process and time for

addressing these planning issues needs to be determined by those closest to these issues, namely the local municipalities, the GVTA, the GVRD and the public working with the RTPO.

7.0 OTHER RTPO MATERIALS AND INFORMATION ON DESIGN

Detailed materials are being prepared by the RTPO for use by municipal and other engineers and the station design teams. Some of these materials cover technical requirements of station design and function to meet the guidelines, standards and regulations of a variety of regulatory authorities responsible for construction of capital infrastructure. Some of the materials will provide more information regarding the RTPO's system-wide policies and design for such aspects as retail space, bus interfaces and landscaping. Additional materials and information being prepared by the RTPO include:

1. *System-wide Design Manual*, intended to be a comprehensive document containing all of the detailed engineering, architectural and other design criteria information;
2. Building Code criteria;
3. Procurement information and criteria;
4. Standardized component elements;
5. Station-specific commuter movement and ridership analysis at key stations such as Broadway/Commercial;
6. Overall system design;
7. Evaluation of retail opportunities on a station-by-station basis;
8. Additional information and discussion with GVTA on the interface with buses; and
9. Possible system-wide specifications for landscaping.

Some of the materials listed above are either available or described in the appendices to the RTPO's *Station Design Resource Book*.

INFORMATION AND MATERIALS FROM MUNICIPALITIES ON STATION DESIGN

Special Commission staff and consultants discussed station and guideway design with the staff of the cities of New Westminster, Burnaby and Vancouver. These discussions assisted greatly with the Special Commission's review of RTPO materials, and provided local perspective on system-wide design issues and knowledgeable insight on station-specific planning issues. Each of the municipalities shared their current Official Community Plans as well as numerous additional studies and supporting documents. These materials will be useful to the SkyTrain station design teams and participants to inform design and help ensure that the final design for each station is consistent with neighbourhood and community planning, design and development.

Design Appendix #3 of this report lists the information provided by the cities of Burnaby and Vancouver that went beyond the cities' respective Official Community Plans.

8.0 DESIGN CONSIDERATIONS RAISED BY MUNICIPALITIES

The Special Commission has carefully reviewed materials submitted by municipalities, and made special note of points for consideration in the design of stations which would enhance the comprehensiveness of the RTPO's *Resource Book*. The following points have been paraphrased from the City of Vancouver document, *Principles and Aspirations for Station Precincts*. These points are highlighted here, as they do not appear to be covered in the RTPO's *Station Design Resource Book*. It is suggested that

the following points be provided to design teams in addition to the *Resource Book*:

1. Protect and recognize cultural, heritage and archaeological resources in station precincts;
2. Small-scale station architectural elements can aid in neighbourhood fit; and
3. SkyTrain infrastructure (such as substations) should be sensitively incorporated with station place or in neighbourhood settings.

For the most part, materials and ideas submitted by municipalities confirmed the existing content of the RTPO's *Station Design Resource Book*. These materials are a useful supplement to the *Resource Book* as they provide the station design teams with a higher level of local detail, and a local perspective.

The "Follow-up and Monitoring" section of this report contains specific recommendations from the Special Commission on the involvement of local governments in the design process.

RTPO STATION DESIGN PROCESS

9.0 IDEAS FORUM PRESENTATION

The RTPO's formal station design process for SkyTrain was preceded by development of an "Ideas Forum". The Ideas Forum is a series of information boards and four different station models that convey ideas about station design that were developed with four architectural firms and three landscape firms. Security consultants and a graphic design group also contributed to the materials. The Ideas Forum presentation illustrates concepts of how new SkyTrain stations can be designed to complement and integrate well with the character of neighbourhoods along the route. All of the presentation boards used for the Ideas Forums can be viewed on the RTPO's web site: <http://www.rapidtransit.bc.ca>

10.0 FOUR-STAGE PUBLIC PROCESS

The RTPO has indicated that it is proceeding with a four-stage public process for station design in each municipality. The four stages include:

1. *Design Forum #1*—Open House to report back on the preferred alignment and station location and to introduce Ideas Forum concepts.
2. *Design Forum #2*—Open-House and Workshop to gather public input on design concerns.

3. *Design Forum #3*—Open House and Workshop to present initial design and gather input.
4. *Design Forum #4*—Open House for presentation of proposed station design by architects.

The RTPO's intent for Design Forum #1 was to communicate back to the public the status of the RTPO preferred route alignment and station locations and also to introduce the next phase of the RTPO's work—station design—through presentation of concepts from the Ideas Forum. During this period the RTPO presented their SkyTrain station Ideas Forum at several locations, including Design Forum #1 events in New Westminster and at the Lougheed Mall.

The basic format for these four stages have been described by the RTPO as follows:

Design Forum #1—similar to recent alignment Open Houses undertaken by the Rapid Transit Project. The station architects are to be in attendance at the event for information. Weeknight, 4:00 pm – 8:00 pm.

Design Forum #2, Design Workshop #1—The first part of the day is to include a presentation by the station architect regarding station and context design issues and ideas as part of a morning Open House. In the afternoon, a station-specific design workshop with a public consultation facilitator will take place Saturday, 9:00 am – 5:00 pm.

Design Forum #3, Design Workshop #2—The station architect is to present a more developed station design based on discussions from first workshop and public input as part of a morning Open House. The design workshop process occurs in the same format as the previous one. Saturday, 9:00 am – 5:00 pm.

Design Forum #4—The station architect is to make a presentation of the station concepts as part of this event which will be in Open House format. Weeknight, 4:00 pm – 8:00 pm.

10.1 DESIGN FORUM OPEN HOUSES TO DATE

As of April 7, 1999, the RTPO held a total of seven major open houses representing partial implementation of the Design Forum #1 and #2 stages of their station design process:

- February 10 and 11 – City of Vancouver;
- February 23 – City of New Westminster;
- March 3 and 8 – City of Burnaby; and
- March 30 and 31 – City of Vancouver.

CONCLUSIONS AND RECOMMENDATIONS

The following sections provide conclusions and recommendations for the purpose of assisting the RTPO, communities and the public involved in SkyTrain station and guideway design. In all cases, these conclusions and recommendations are consistent with the RTPO's own stated principles and commitments, and are meant to add value to the RTPO's design process.

11.0 SPECIAL COMMISSION CONCLUSIONS

11.1 CONCLUSIONS ON RTPO CONSULTATION PRINCIPLES AND STATION DESIGN COMMITMENTS

These RTPO commitments are appropriate. They indicate a clear understanding of the public's concerns around station design, and have created a high level of expectation on the part of the public and municipal governments.

If these commitments are followed through, the RTPO has an opportunity in the coming months to establish and deliver a high standard of planning and design for stations that meet the identified neighbourhood and community needs.

11.2 CONCLUSIONS ON RTPO STUDY: *SECURITY, SAFETY AND RAPID TRANSIT*

The RTPO study, *Security, Safety and Rapid Transit* is comprehensive and well-documented. It addresses many of the concerns raised by the public and reported on by the Special

Commission in its *Interim Report* and in its *Public Consultation Report*. After extensive review of the report and its findings, the Special Commission endorses the conclusions, solutions, recommendations and future studies proposed in the RTPO's study, *Security, Safety and Rapid Transit*.

11.3 CONCLUSIONS ON RTPO NEWS RELEASE AND RELATED INITIATIVES ON SAFETY AND SECURITY

The Special Commission endorses the RTPO's intent to develop strategies and partnerships to address crime, security and safety in a manner that extends beyond the normal mandate of a development project. The RTPO has appropriately recognized crime, safety and security as the number one concern of the public with respect to the SkyTrain system and has taken progressive steps to address these public concerns.

If commitments made to date are followed through, there should be considerable progress made in creating a SkyTrain system that is safe—and perceived by the public to be safe—both during the day and at night.

11.4 CONCLUSIONS ON RTPO *STATION DESIGN RESOURCE BOOK*

The RTPO's *Station Design Resource Book* provides a useful information package and a good starting point for public involvement in the station design process. The *Resource Book* addresses many of the issues raised by the public about station design as well as the generic design and planning principles outlined in the materials received from municipalities (see “Information and Materials from Municipalities on Station Design” section and related Design Appendix #3). The *Resource Book* also provides further detail, suggestions and direction for building unique stations that meet local community needs while serving the regional transit system effectively. The *Resource Book* does a good job of furthering the concepts presented in the RTPO's Ideas Forum (see Sections 9 and 10, and conclusions and recommendations in this and the following sections).

The “Station Design Approach” and the “Station Design Principles” sections of the *Resource Book* indicate a well-conceived vision and direction for station design that should result in well-designed stations that meet community aspirations and regional transit needs—if followed through during the design process. These sections appear to be consistent with comments from the public and the general principles of design to which the RTPO committed during earlier public consultation processes (see Section 3 of this report). The *Resource Book* provides appropriate information on basic CPTED principles and techniques.

11.5 CONCLUSIONS ON RTPO IDEAS FORUM

The RTPO's Station Ideas Forum provides valuable and informative illustrations of what could be possible in station design. Many concepts for contributing to livable communities and quality of life were presented, and appear to address concerns raised previously by the public. This has appropriately responded to public expectations that stations will be designed to ensure that crime, security and safety concerns—as well as visual impacts and integration with communities—are addressed.

The RTPO should ensure that the design process allows sufficient input from the public to design stations that are consistent with the concepts presented in the Ideas Forums and further recognized by the RTPO *Station Design Resource Book*.

11.6 CONCLUSIONS ON RTPO OPEN HOUSES

The RTPO's Open Houses to April 7, 1999 have done a good job of meeting one of their two intended objectives. The Open Houses which have been staged have effectively introduced the concepts from the Ideas Forum. However, the RTPO's second objective—that of reporting back on their route alignment and station location process—is incomplete.

In its *Interim Report*, the Special Commission recommended that the RTPO communicate its preferred route alignment directly back to those involved in their Neighbourhood Consultation Program, as well as indicate how public and stakeholder input had been used to formulate these preferences. This has not been done effectively. The resulting lack of closure on route alignment and station locations continues to be a community concern, and is causing problems with the next stage of the RTPO's design process (station design). For example, in New Westminster, lack of information about the RTPO's decisionmaking rationale has contributed to a poor working relationship between the RTPO, the municipality and some of the public.

11.7 CONCLUSIONS ON RTPO STATION DESIGN PROCESS

Overall, if augmented by the recommendations below, the RTPO's station design process appears comprehensive and appropriate. In implementing the process, the RTPO must be sensitive to public and local government concerns about both the need for RTPO responsiveness to input, and its accountability for design decisions. Station and guideway design is at a critical stage. Design of stations, as well as their construction in an efficient manner, requires strong participation of—and cooperation with—

local governments, as well as input from the public. A spirit of partnership is needed to ensure that stations meet both regional transit needs and the needs of the communities within which the SkyTrain stations and guideways are to be located.

12.0 SPECIAL COMMISSION RECOMMENDATIONS

12.1 RECOMMENDATIONS ON RTPO CONSULTATION PRINCIPLES AND STATION DESIGN COMMITMENTS

The Special Commission encourages the RTPO to continue to follow through on its announced commitments on consultation and design, particularly those which recognize that security and safety should be the number one priority in SkyTrain station design and operations.

12.2 RECOMMENDATIONS ON RTPO STUDY: *SECURITY, SAFETY AND RAPID TRANSIT*

The Special Commission encourages the RTPO to continue to work with other organizations to undertake the further crime and security studies recommended by SRG.

12.3 RECOMMENDATIONS ON RTPO NEWS RELEASE AND RELATED INITIATIVES ON SAFETY AND SECURITY

The Special Commission encourages the RTPO to continue to work with other organizations to implement its announced program to address personal safety and security issues related to the new accelerated SkyTrain project. The Special Commission also recommends that the RTPO immediately employ CPTED specialists to augment work done thus far and to help ensure CPTED principles are properly implemented in station design and SkyTrain operations, as well as in neighbouring communities.

12.4 RECOMMENDATIONS ON RTPO *STATION DESIGN RESOURCE BOOK*

The RTPO's *Station Design Resource Book* should now—with the incorporation of the recommendations below—be considered as the general checklist for SkyTrain station design.

The Special Commission suggests the following specific additions:

1. All stations should be planned and designed to easily accommodate the future integration of security offices.

2. All stations should be planned now to accommodate—or at least not preclude—future implementation of active entry controls and fare compliance mechanisms (e.g., turnstiles).
3. All stations should have alternate means of access and escape.
4. All stations should be designed for maximum safety and security for day-time and night-time commuters.
5. Design of electrical and other systems should allow flexibility for future upgrading of lighting and security measures as these are developed or implemented.
6. The safety and security implications of using non-see-through black glass or advertising that covers windows on SkyTrain cars should be reviewed.
7. Safety and security issues at town centre parking lots (e.g., Brentwood and Lougheed) should be considered in a SkyTrain master security plan and during the design of these stations.
8. The RTPO should consider incorporating some visual benefits such as art components into required security fencing.
9. Designs should provide for barrier-free environments except where security and safety take precedence.
10. Partnerships should be created to help ensure a safe neighbourhood environment in empty lots near SkyTrain stations.
11. Property envelopes for SkyTrain stations and related transit interchange zones should be identified now to meet current and future needs (i.e., 50-year planned lifespan of stations).
12. Stations and surrounding areas should be planned and designed in the broader context of the future capacity needs for each station.
13. Integration with “associated development” should be included in the planning Terms of Reference for station architects.
14. Long station ramps (e.g., Brentwood, Sapperton and Broadway/Commercial stations) should be wide enough to accommodate mobile carts for retail, resting places, and a public thoroughfare.
15. The RTPO direction to architects that system-wide furniture will be utilized in all stations should not preclude the use of furniture inside or outside of stations that is more consistent with furniture used in the surrounding neighbourhoods.
16. The RTPO Station Art Program should involve extensive community participation.
17. System-wide standards and specification for landscaping should encourage station-specific landscaping that is consistent with neighbourhood standards or enhances the integration or landmark potential of stations.

18. Stations should be designed to provide for weather-protected connections (immediate or future) to bus transfer points or waiting areas.
19. Station designs should be sensitive to natural resources and local ecosystems, should be energy efficient, and should accommodate recycling programs or technologies.
20. All stations should be designed to safely accommodate commuters on bicycles approaching and accessing SkyTrain stations, as well as boarding SkyTrain cars.
21. Retail outlets at or near stations should relate to human and neighbourhood scale.
22. Landscape restoration should be undertaken in impacted guideway rights-of-way.
23. Alternatives to bulky guideway pillars should be designed or mitigative devices such as vaults, banners and lighting should be incorporated in the design (e.g., the approach at the existing Surrey Central Station and the Seattle Sound transit system's use of smaller twin pillars).

12.5 RECOMMENDATIONS ON RTPO IDEAS FORUM

The Special Commission recommends that the RTPO continue its progressive work illustrated by the Ideas Forum concepts, and ensure that these concepts are incorporated into final station designs.

12.6 RECOMMENDATIONS ON OTHER RTPO MATERIALS AND INFORMATION RELATED TO DESIGN

Additional RTPO station design related materials (prepared after April 7, 1999) have not been reviewed by the Special Commission. However, it is critical that the public and other participants in the station design process have access to these materials as they are developed. It is recommended that the RTPO provide such access to ensure an open and inclusive design process.

12.7 RECOMMENDATIONS ON MATERIALS AND INFORMATION FROM MUNICIPALITIES

Materials related to community planning and station design developed by New Westminster, Burnaby and Vancouver should be utilized by the SkyTrain station design teams and participants to inform design and help ensure that the final design for each station is consistent with neighbourhood and community planning, design and development.

12.8 RECOMMENDATIONS ON RTPO OPEN HOUSES

As per the Special Commission's *Interim Report*, the RTPO should provide the public with a clear and explicit explanation of the decision processes that lead to the RTPO's selection of each preferred station location and segments of its preferred route alignment. This should take the form of a simple written explanation. Where decision matrices and multiple accounts analysis or other tools were utilized, complete versions of these should be provided to the public and local governments involved. This feedback should bring closure to the alignment and station location phase of design.

12.9 RECOMMENDATIONS ON RTPO STATION DESIGN PROCESS

The RTPO should work closely with each municipality to negotiate an appropriate schedule for planning and approvals as is done for other major developments in municipalities. The RTPO station design process should build on local municipal planning processes. Municipalities should in turn provide some flexibility in their development approval processes to help achieve efficiencies in the design and construction of the SkyTrain guideway and stations. The GVTA should play a strong role to ensure that both the RTPO and municipal objectives are fairly balanced in designing stations and guideways.

The CPTED specialists (recommended above) should provide ongoing advice on overall system design as well as act as a resource for each station design team and for the Crime and Safety Review Committee that the RTPO has indicated it will form as part of the program for addressing personal safety issues on the SkyTrain system.

The open house/workshop format for the RTPO station design process should be augmented where appropriate by additional interactive mini-planning workshops that address not only the immediate SkyTrain station place but also ancillary development and the surrounding neighbourhood and community.

The RTPO should communicate to the public and local governments clearly and in a timely manner about the details of the station design process, including the provision of relevant design information and policy. The process also requires sufficient time to deal effectively with any issues raised.

The RTPO should—as recommended in the Special Commission's *Interim Report*—open Storefront Offices. These offices should provide:

- A meeting place for detailed community station design work;
- An information pick-up point;

- Full, detailed displays of alignment and station location; and
- Design information plus construction schedule and details.

These Storefront Offices would function through both the design and construction phases. They would assist in early resolution of issues and show that the RTPO is connected to and concerned about the communities and neighbourhoods where stations will be located.

DESIGN APPENDIX 1

SUMMARY
OF SRG STUDY:
*SECURITY,
SAFETY AND
RAPID TRANSIT*

DESIGN APPENDIX 2

RTPO NEWS RELEASE,
BACKGROUND AND
INFORMATION SHEETS

DESIGN APPENDIX 3

DOCUMENTS RECEIVED
FROM CITY OF BURNABY
AND CITY OF VANCOUVER

DESIGN
APPENDIX 4

PLANNING ISSUES
AND OPPORTUNITIES

CONNECTIVITY
& OPERATIONAL
ISSUES

REPORT

MAY, 1999

SPECIAL
COMMISSION
SKYTRAIN
REVIEW



CONNECTIVITY AND OPERATIONAL ISSUES

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INTRODUCTION

1.0 BACKGROUND

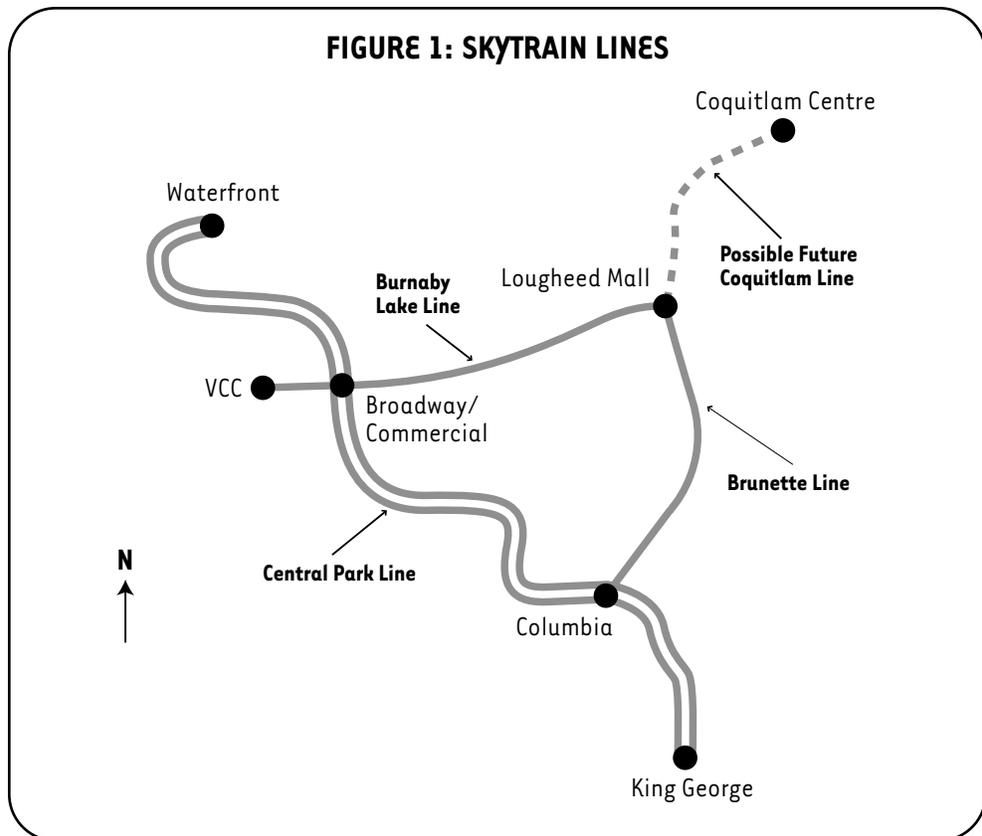
The Special Commission's *Interim Report* identified *connectivity*—the ability of the system to facilitate the transfer of passengers between modes and areas—as an important component of an efficient and effective system design. An isolated system would not generate the growth management, ridership and environmental benefits expected of a major capital investment in public transportation such as SkyTrain. Operational plans also affect functionality, capacity, and reliability of the system. Inefficient or ineffective operations could impact ridership, diminish anticipated environmental benefits and impede the desired shaping of growth in the Greater Vancouver Regional District (GVRD). Numerous agencies, environmental groups and the public have raised connectivity and operational issues during the review process.

The Terms of Reference of the Special Commission SkyTrain Review requires the Commission to “review environmental issues related to the construction and operation of the proposed SkyTrain project”. Decisions on the selection of the SkyTrain technology, and on an accelerated design and construction schedule, had already been made prior to the appointment of the Special Commissioner and were, therefore, not part of the review and assessment.

The rapid transit corridor under review (“the accelerated project”) is that contained in Rapid Transit Project 2000's (RTPO) *Project Description* (November 30, 1998) and *Preferred Alignment Report* (December 17, 1998), and more recently in their *Environmental Assessment Report* (March, 1999) and *Preferred Alignment Report*,

Version 2 (March 12, 1999). The route corridor is a 20.5 kilometer line, including approximately 7.5 kilometers along existing rail right-of-ways, 9 kilometers along the Lougheed Highway and 2 kilometers within tunnel. The general corridor is from VCC to Lougheed Town Centre Station via the Grandview Cut, Gilmour Avenue and the Lougheed Highway (Burnaby Lake Line), and from Lougheed Town Centre Station to Columbia Station in New Westminster via North Road, the TransCanada Highway, and Columbia Street (Brunette Line), shown in Figure 1 below.

Although this *Connectivity and Operational Issues Report* makes reference to potential future expansion of the SkyTrain system both west of Vancouver Community College and to the Northeast sector, with emphasis on the importance of designing the accelerated project to accommodate such extensions, the timing and nature of system expansion beyond the accelerated project remains the subject of future decision processes. The Special Commission has focused its review of connectivity and operational issues on the effectiveness of the accelerated project in moving people and connecting to other transit services and transportation modes.



The accelerated project under review contains only a portion of the rapid transit corridor described in the GVRD's *Livable Region Strategic Plan* and regional growth manage-

ment objectives. The complete “*T-Line*” is defined as the accelerated project plus a suburban branch connecting Lougheed and Coquitlam Regional Town Centres (Coquitlam Line). The *T-Line* would provide connectivity between communities and regional town centres, as well as contribute to the realization of GVRD growth-shaping objectives.

This report is based substantially on analysis and advice of Sypher:Mueller International Inc., consultants to the Special Commission. Although every effort has been made to use the most current information available, it is understood that the project planning and design processes are ongoing. New and updated information has been released by the RTPO since the completion of this analysis, which is based on information received by the Special Commission up to March 31, 1999. The purpose of the report is to review the ongoing connectivity and operations planning processes of the proponent (the RTPO), to identify issues that may arise, and to provide advice and suggestions for possible changes to the process or product that could mitigate negative impacts, as appropriate.

REVIEW OF RAPID TRANSIT PROJECT 2000 (RTPO) PRODUCT

2.0 PUBLIC CONCERNS

The Special Commission's Interim Report identified a number of key issues areas for further study and review, including station integration and linkages with the rest of the transportation system (i.e., connectivity). There were several mechanisms and opportunities for the public to provide input to the review process, including written submissions, local phone lines, an interactive web site, technical workshops, and public meetings. A complete reporting of public input is contained in the Special Commission SkyTrain Review's *Public Consultation Report*.

Public issues, concerns, and suggestions regarding connectivity included:

SkyTrain-to Bus Connection Points

- There was concern about the ability of New Westminster to handle the increased bus and car traffic. It was suggested that the Brunette Line start at New Westminster Station rather than at Columbia since New Westminster Station already has a large bus loop and is generally better equipped for such an expansion.
- The potential redundancy of a station at Bell was cited, given its proximity to both Production Way and Lougheed Town Centre Stations.
- There was an expressed need for a station at Gaglardi Way to serve the industrial, residential, school and university traffic.
- There was concern that the Broadway and Commercial area was becoming a regional transportation hub, with the associated bus and car traffic.

SkyTrain-to-SkyTrain Connectivity

- The potential impact (i.e., penalty) of multiple transfers on transit system ridership was pointed out.
- The opinion that the accelerated project does not make sense was expressed, since connections to densely populated areas are not included and much of the alignment parallels or duplicates the existing SkyTrain line.

SkyTrain Connectivity to Other Transportation Modes

- Improved cyclist access to SkyTrain stations and accommodation of bicycles aboard SkyTrain cars were suggested.
- Improvements to the current cycling facilities in the Brentwood Mall to Slocan Street areas and the Columbia/North Road/Brunette Avenue areas were wanted.
- The need to ensure that the Lougheed Highway's bicycle lane remains intact, even if a pathway is developed as part of the SkyTrain line, was cited.
- Improved pedestrian access to the Columbia Station along Columbia Street (e.g., by constructing a pedestrian overpass from a Fraser River walkway) was suggested.
- A preference to locate a station at Bainbridge Avenue (rather than at Sperling) along the Burnaby Lake Line was expressed, to attract walk-on riders from high-density residential neighbourhoods.
- The need for more park-and-rides in the SkyTrain system was cited, to encourage drivers to get out of their cars.
- Traffic congestion at park-and-ride areas was a concern.
- The issue of parking in residential areas near SkyTrain stations was raised.
- The importance of consulting Burquitlam area residents when designing Lougheed Station was emphasized, since increased traffic and parking would affect their neighbourhood.

SkyTrain Operations

- The apparent lack of need for the transit capacity provided by the proposed SkyTrain extension technology was noted.
- There was concern about the apparent redundancy of the proposed Burnaby Lake Line with the existing SkyTrain line, resulting in a limited number of new riders.
- Concerns were expressed that the accelerated project would not connect major destination points.
- The unavailability of ridership projections for public review was an issue.

- Potential privatization of the SkyTrain system caused concern.

Other Key Issues

- There was concern that SkyTrain stations (and associated development) would contribute to crime and security issues and would reduce livability (especially in communities with predominantly elderly populations such as Bell).
- Potential noise and vibration impacts of guideways and stations on residential areas were a concern (see *Noise and Vibration Issues Report*).
- Potential negative effects of stations on communities were cited.
- There was a desire to encourage multi-use planning (commercial/residential/recreational) in the vicinity of proposed stations.
- The opinion was expressed that decisionmaking processes were not considering residents' input.
- There was a desire that municipal governments and formal community advisory groups should play an active role in station location decisions because of the influence that SkyTrain can have on land use.
- Apparent disregard of the 1987 recommendations of the BC Ombudsman was cited as an issue.

Significant Concerns beyond the Special Commission Mandate

- There was a concern about the phasing of the accelerated project and subsequent future extensions, and their fit into plans for the full *T-Line*.
- Potential future SkyTrain extensions connecting the accelerated project with Port Moody and Coquitlam to the east and UBC to the west were issues.
- Absence of a firm commitment to extend the system to Coquitlam Centre caused concern.
- Some suggested an alternate corridor to Coquitlam Town Centre via the Lougheed Highway, while others expressed concerns regarding Lougheed Highway as an alternative route given potential impacts on Riverview and other neighbouring communities.
- The suggestion was made to focus on improving the existing bus system rather than on expanding SkyTrain.
- A caution was given regarding the potential for the cost of SkyTrain expansion to jeopardize existing bus system operations.
- There was an expressed need to conduct further studies examining how expansion of the bus system (instead of expanding SkyTrain) could more affordably get people out of their cars.

- The suggestion to examine the effectiveness of an improved bus system and of light rapid transit (LRT) was made.
- There were concerns regarding the fact that ridership on the current SkyTrain line has not increased with the growing population densities along the existing corridor.
- There was doubt about the ability of SkyTrain to ensure a reduction of cars and trucks on the roads.

3.0 CONNECTIVITY

Connectivity is a function of both infrastructure and operation. The RTPO is responsible for the design and construction of the accelerated project and the associated stations. The Greater Vancouver Transportation Authority (GVTA) will be responsible for the design and operation of local bus services that connect with the SkyTrain line and will utilize the bus loops which will be integrated into the SkyTrain design. The RTPO and GVTA are negotiating the responsibility for the construction of the bus loops at the stations. Annual GVTA planning and budget processes will determine the level of bus service provided.

3.1 SKYTRAIN-TO-BUS CONNECTIVITY

The RTPO is now beginning the process for the detailed design of the accelerated project stations and bus loops. A parallel process is underway at the GVTA to plan for service revisions to integrate the local and regional bus routes with the SkyTrain line. A GVTA discussion paper entitled *Phase I SkyTrain Extension Bus Integration* (March, 1999) contains proposed changes to the bus routes, including estimates of the bus traffic at each station. This information has been provided to the RTPO.

The role of the RTPO is to ensure that the accelerated project has sufficient capacity to efficiently and effectively meet the demand from connecting bus passengers, and to provide the infrastructure to facilitate connectivity. The RTPO process for station design has not yet advanced far enough to assess the ability of the infrastructure to handle bus-to-SkyTrain pedestrian movements. This connectivity and operational issue assessment provides input for this ongoing design process.

The transit plans being developed by the GVTA indicate that they will use the SkyTrain stations for bus-to-bus connections as well as connections between buses and SkyTrain. Local municipalities may also become involved in facilitating bus connectivity if station access requires changes to local streets and traffic patterns. On major routes,

the agency with jurisdictional authority (the GVTA and/or the Ministry of Highways and Transportation) may have to resolve local access issues.

In addition to its transit planning work on connectivity with the SkyTrain line, the GVTA is also embarking on a full-scale review of transit routes and schedules across the entire region. Work is scheduled to get underway on seven separate local transit planning studies that will examine routes, schedules, ridership and demand. This process will serve the intent of the GVTA to substantially improve bus service throughout most of the region. The GVTA *Phase I SkyTrain Extension Bus Integration Discussion Paper* (March, 1999) states that “[SkyTrain] station design will need to recognize that simply accommodating present demand for bus service will be inadequate in the future. The intention of the GVTA is to increase bus service levels to make transit more attractive.”

The RTPO and the GVTA must continue to work closely to ensure the design of the stations facilitates efficient and effective connections with other modes of transportation, as well as meets the operational requirements of the SkyTrain system. The RTPO and GVTA are continuing their negotiations to ensure that all necessary bus and pedestrian facilities will be provided at, or connect to, the accelerated project SkyTrain stations.

3.2 KEY SKYTRAIN-TO-BUS CONNECTION POINTS

The GVTA has provided the RTPO with their preliminary estimate of bus bay requirements at each SkyTrain station. The major bus-to-SkyTrain and bus-to-bus connection points identified by the GVTA are located at:

- Broadway/Commercial Station;
- Brentwood Station;
- Lougheed Station; and
- Braid Station.

Although Columbia Station is the terminus of the new line, current operational planning anticipates that trains from Lougheed will be through-routed to New Westminister Station (continuing on to Waterfront Station). Therefore, bus-to-SkyTrain connectivity will not be an issue at Columbia Station. New Westminister Station will remain the major transfer point serving central New Westminister.

Other stations such as Production, Sperling and Holdom may require smaller off-street facilities. The remaining stations do not require off-street facilities for bus-to-SkyTrain transfers.

Broadway/Commercial and Vancouver Community College (VCC) Stations

The functionality of the proposed Broadway/Commercial Station has been a key public concern. The initial concept plan for the Broadway/Commercial Station indicates that the proposed station and street configuration will in fact provide improvements to the existing station environment and function, and be able to accommodate the connecting bus traffic. The concept plan also indicates that the pedestrian paths linking the bus stops and the SkyTrain platforms will be of sufficient size to accommodate the projected traffic flows. A direct pedestrian connection to North Grandview Highway (across the Grandview Cut) may be necessary to link the station with bus stops along the highway.

Vancouver Community College (VCC) Station is located immediately west of the Broadway/Commercial interchange station. It offers an alternative transfer location between the new SkyTrain line and the Broadway and B-Line buses. The GVTA has pointed out several problems with having two major transfer points serving the same passenger movements, less than one kilometer apart. BC Transit and GVTA staff does not support short-turning Broadway or B-Line buses at VCC. The GVTA concludes, “the saving in bus operation cost [from short-turning buses at VCC] given the proximity of the two stations is not likely to be significant. The construction of a new trolley overhead loop and terminal facilities [at VCC] would be unlikely to be offset by any savings in the number of vehicles required.” The GVTA do not consider VCC to be viable as a terminus station unless it is part of an extension of the line west to the Central Broadway Business District.

The RTPO appears to concur with these conclusions regarding SkyTrain-to-bus connectivity and has indicated that Broadway/Commercial Station will be designed to accommodate all passenger transfers between SkyTrain and the buses operating along Broadway. The section of line between Broadway/Commercial and VCC Stations is planned to be in a tunnel, terminating in an underground station at VCC. A short extension west of Broadway/Commercial Station is required to accommodate a tail track and crossover. However, the volume of bus traffic on Broadway (9 and 99) is not determined by the VCC-generated passenger load. Moreover, the peak-time frequency of buses along Broadway rivals that of SkyTrain. Given these factors and that Central Park Line SkyTrain passengers must transfer anyways (to either SkyTrain or bus) to reach VCC, there is no apparent advantage or system connectivity requirement for this planned section.

Brentwood Town Centre Station

Brentwood Station will require a major transit exchange with provisions for approximately

10 to 12 bus bays. This is an increase from the current requirement, and reflects an upgrading of the local bus service connections. The specific location of the station and bus exchange has not been pinpointed. The selection of the SkyTrain station site could have significant impacts on bus and pedestrian movements, and needs to be considered in the context of town centre expansion. The intersection of Lougheed and Willingdon is one of the busiest in the GVRD. The reconfiguration of the bus exchange away from the existing location could require significant changes to the local road network in order to accommodate the turning movements of the buses. Similarly, locating the station away from the current local focus (Brentwood Mall) could have a negative impact on ridership and the attractiveness of transit.

Lougheed Town Centre Station

The size, location and final design for the Lougheed Station are in progress. Lougheed Station will be a major connection point between buses and SkyTrain. The GVTA projects that a minimum of 15 bus bays will be required at the exchange. The construction of a new exchange has the potential to improve and facilitate bus-to-bus as well as bus-to-SkyTrain pedestrian movements, and to help increase ridership.

Braid Station

The RTPO's preferred route alignment includes a possible future station at Braid Street in New Westminster. The RTPO has initiated a functional planning study of the Braid Station area to take into account all transportation and community considerations in determining the feasibility of a Braid Station and its functional requirements. The location of a station at Braid and Brunette would significantly enhance the overall efficiency and effectiveness of the transit system, and particularly the SkyTrain-to-bus connectivity. The decision to include a station at Braid is still being considered.

The GVTA has noted that “a station at Braid would allow for the most efficient connection to regional bus services from the growing northeast sector.” The GVTA also states “... passengers would have the least out-of-the-way travel under this option (with a Braid Station) ... the nearest alternative stations would either impose a significant travel (time) penalty on passengers, or uneconomic duplication of services.”

If omitted, the absence of a station at Braid would have a serious negative impact on the connectivity of the accelerated project with the bus network. This would result in poor service to the northeast sector, decreased ridership because of longer travel times for connecting passengers and/or potentially more hours of bus operation. Nevertheless, public concerns regarding a Braid Station—including concerns around park-and-ride facilities and the potential exacerbation of traffic and road congestion

problems—must be considered in the RTPO functionality study and the final design process if a Braid Station does go ahead.

Other Stations

No designs or layouts were available yet for any of the other stations identified by the GVTA as requiring off street bus loops. The RTPO has not yet identified the passenger amenities to be provided at any of the stations. The GVTA has provided an initial bus integration plan based on the RTPO's preferred alignment. The RTPO will now need to integrate this proposed bus integration plan into the station designs.

General Comments on SkyTrain-to-Bus Connectivity

One of the essential beneficial characteristics of the SkyTrain technology is the ability of the system to operate economically on relatively short headways at all times of the day and during weekends. The operations plan for the accelerated project has not been finalized, and indeed it can be changed at any time after the line becomes operational. However, based on current SkyTrain operating practices, it may be assumed that the opportunity exists for good schedule connectivity of bus-to-SkyTrain transfers.

In contrast, many new light rail systems, including operations such as Edmonton, Calgary and Portland, off-peak headways can be as long as 15 minutes. Such a schedule facilitates connections with local buses, but reduces the overall attractiveness of transit. Long headways also make scheduling of the bus system more complex and difficult when a bus route must serve more than one timed transfer focal point (transit exchange).

The realignment of bus routes to connect to the new SkyTrain stations will involve some changes to many local routes. In some areas there will be a substantial reduction in bus traffic as routes are shortened and passengers transfer to SkyTrain. However, no residents or businesses will lose bus service entirely, and all areas will maintain service to the levels outlined in the GVTA service standards policy. Some of the areas with the greatest substitution to SkyTrain from bus service are anticipated to be along Lougheed Highway and Columbia Street. There may also be some local impacts where buses are re-routed to gain access to stations. These bus route changes are the responsibility of the GVTA and not the RTPO. However, RTPO decisions on the location of station bus loops or access routes could impact transit routing choices, as well as the efficiency of bus-to-SkyTrain connections.

In some areas, the construction of the accelerated project may offer the opportunity to improve pedestrian and cycle connections within or between communities. Although plans for such connections cannot be assessed at this time because the station design process has just begun, it is hoped that final designs will incorporate

grade-separated crossings that will enhance the connectivity of pedestrian and cycle routes. These crossing facilities should be designed so that they are open to all users and not just SkyTrain passengers. This is particularly critical along busy main arteries such as Columbia Avenue and the Lougheed Highway, where opportunities for safe crossings are limited and the safety of pedestrian and cyclist traffic is at issue.

Opportunities for incorporating multiple-use overpasses into station design and elsewhere along the transit corridor need to be pursued with municipalities as part of the community enhancement projects within the proposed SkyTrain Community Legacy (see *SkyTrain Community Legacy Report*).

Neither the RTPO nor the GVTA have released ridership forecasts for the Burnaby Lake Line. It is therefore not yet possible to assess or evaluate how well the proposed connectivity measures will match existing demand or stimulate new ridership. The RTPO has hired a consulting firm to develop a ridership model that can assist in determining the types of changes that may encourage automobile commuters to switch to SkyTrain or other types of transit. The model is not yet finalized, however it promises to provide some useful insights into commuting mode choice among automobile drivers. At this point, the model cannot predict ridership for a specific route or service, however planned enhancements may increase the utility of the computer program for ridership forecasting.

3.3 SKYTRAIN-TO-SKYTRAIN CONNECTIVITY

In designing the accelerated project, the responsibility for facilitating SkyTrain-to-SkyTrain connections rests largely with the RTPO. Passengers will be making connections between SkyTrain services at:

- Columbia Station;
- Lougheed Town Centre Station; and
- Broadway/Commercial Station.

Columbia Station

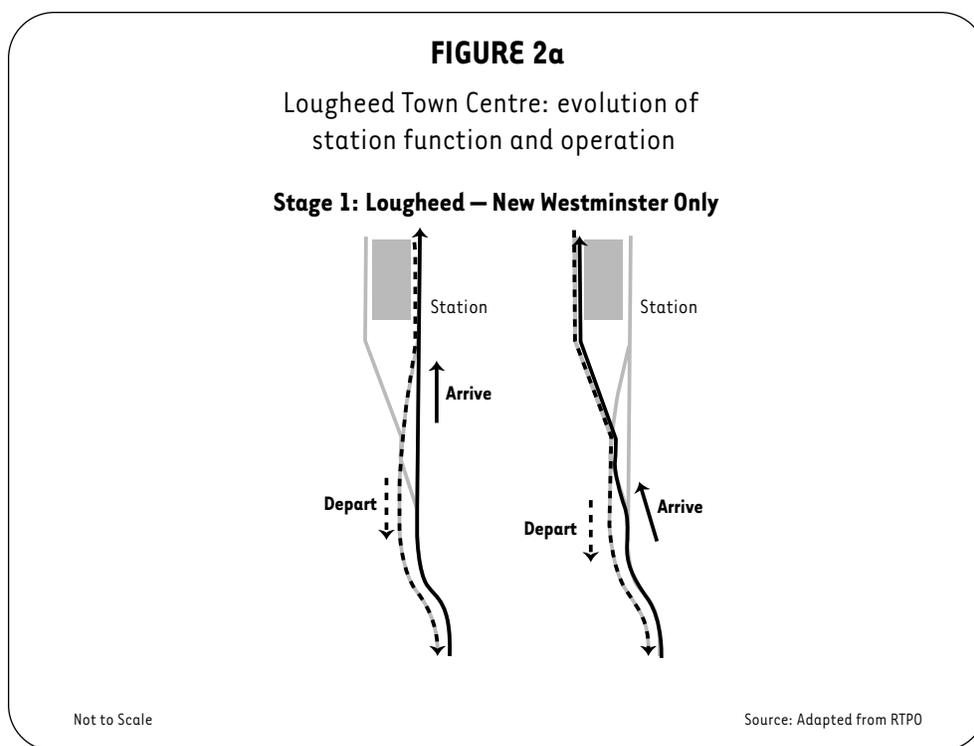
SkyTrain passengers at Columbia Station will be transferring between the line to Lougheed Town Centre and the line to King George Station. The current operational concept calls for the trains from Lougheed Mall to run through to Waterfront Station via Columbia Station over the existing SkyTrain line. Passengers on the Brunette Line would be required to disembark at Columbia Station and change platforms in order to board a train to King George Station. The trains to and from King George Station would also run through to Waterfront Station.

The transfer movement at Columbia is anticipated by the RTPO and GVTA to be quite low, and well within the capacity of the existing station.

Lougheed Town Centre Station

Lougheed Station will serve several different functions as the SkyTrain system evolves. The three stages of development and potential operation at Lougheed Station are illustrated in Figure 2. These stages (based on the RTPO's preliminary operating plan) are contingent upon the following planned and future extensions of the SkyTrain system:

- Stage 1 – Brunette Line (Columbia Station to Lougheed Town Centre Station);
- Stage 2 – Burnaby Lake Line (VCC to Lougheed Town Centre Station); and
- Stage 3 – Possible future Coquitlam Line (Lougheed Town Centre Station to Coquitlam Town Centre).



In the first stage, Lougheed Station will serve as the terminal for the line to New Westminster and there will be no SkyTrain-to-SkyTrain connections.

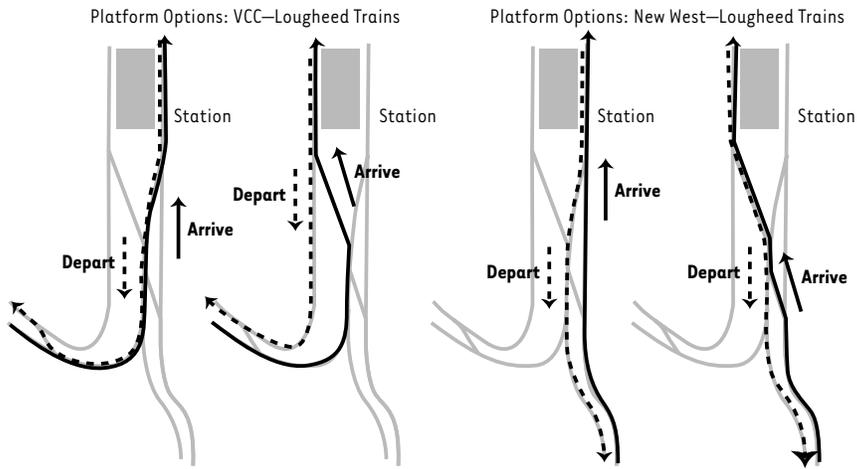
In the second stage, there are two options. The first option involves through-routing of trains between VCC and Waterfront, via New Westminster, and would not require any SkyTrain-to-SkyTrain transfers at Lougheed. The second option involves the system operating as two separate services:

1. Lougheed to Waterfront via New Westminster; and
2. Lougheed to VCC.

FIGURE 2b

Lougheed Town Centre: evolution of station function and operation

Stage 2: Service to New Westminster and VCC



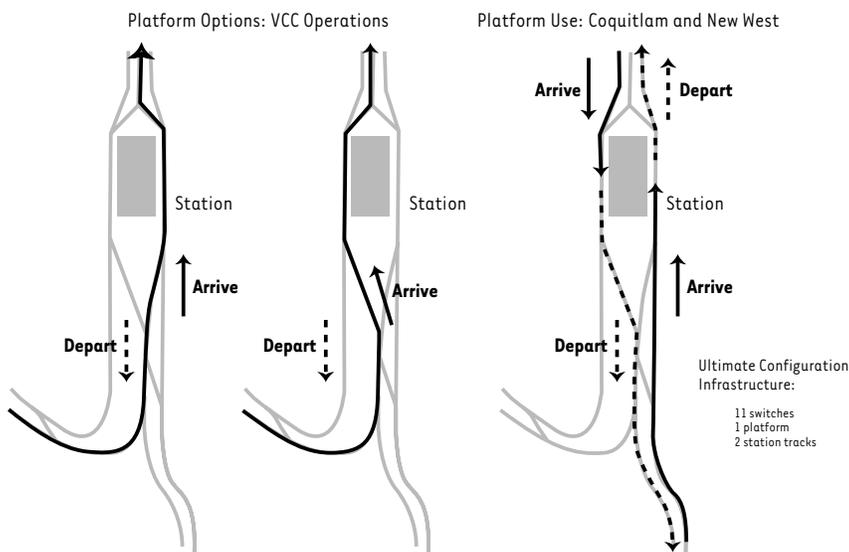
Not to Scale

Source: Adapted from RTPD

FIGURE 2c

Lougheed Town Centre: evolution of station function and operation

Stage 3: Service to New Westminster, VCC and Coquitlam



Not to Scale

Source: Adapted from RTPD

Under this scenario, transfers would be required at Lougheed for a limited number of passengers. The number of transferring passengers would be impacted by the decision for or against a Braid Station. If a Braid Station is not built with a major bus exchange, and buses are instead diverted to Lougheed Station, there will be more bus-to-SkyTrain transferring at Lougheed. If Braid Station is developed (with Lougheed acting as the regional transit hub), or if the buses are sent to New Westminster Station, there will be more SkyTrain-to-SkyTrain activity, and less bus-to-SkyTrain transferring at Lougheed.

The third stage of station functionality would involve the completion of the *T-Line* consisting of the Brunette Line, the Burnaby Lake Line, and a future Coquitlam Line. This would result in more SkyTrain-to-SkyTrain transferring activity at Lougheed Town Centre Station.

The design process for Lougheed Station has just begun and neither drawings nor ridership forecasts are available. Consequently, it is not possible to comment on the ability of the station to handle the volume of passengers that will result from the different connectivity patterns over the life of the station. Since it is not generally feasible to expand the capacity (width) of a central platform station after the rail line becomes operational, the use of a single centre-platform design (as indicated in early RTPPO concepts) will require careful planning to ensure that platform and egress routes can accommodate boarding and alighting passenger volumes for two lines, as well as the transfer volumes for all phases/options. This means the station must be designed and built for the peak load conditions (i.e., to accommodate the full *T-Line*), although those conditions may not develop until future extensions are realized. The concept of having all transfer movements take place on a single, central platform makes the service very convenient for passengers. However, the flexibility and potential capacity of the entire SkyTrain system could be constrained by the configuration and functional requirements of Lougheed Station.

Broadway/Commercial Station

Broadway/Commercial Station will be the most important station for SkyTrain-to-SkyTrain connections. Its functionality has been identified as a concern in numerous public comments. The function of this station will evolve as potential future westward expansion of the system occurs. For the accelerated project, the line is planned to terminate one station west of the Broadway/Commercial Station at VCC. All passengers on the Burnaby Lake Line destined for downtown Vancouver will be required to transfer to the existing Central Park SkyTrain Line. If the Burnaby Lake Line were to be extended westward to an eventual terminal at Granville or Arbutus, the volume of transfers from the Burnaby Lake Line to the Central Park Line would decline.

However, these numbers would be offset by an increase in transfers from the Central Park Line to the westbound SkyTrain.

The design of the Broadway/Commercial Station has just begun. The following comments are provided to assist the design process. One of the challenges of this two-level platform is providing for the vertical circulation between the underground Burnaby Lake Line station, and the elevated Central Park Line station. In addition there must also be pedestrian links to the bus stops on Broadway, Commercial Drive, and possibly across the Grandview Cut to the North Grandview Highway. The pedestrian movements at this station are complex, and further modeling will be required to ensure that all pedestrian flows are accommodated during all phases of development.

The initial concept for the Broadway/Commercial Station provides dual escalators from the underground platform level to street level, and a second flight of dual escalators from the surface to the platform of the Central Park Line. The RTPO has stated that when the line terminates at VCC, the dual escalators will operate in the up direction. Each one of the units will have a capacity of 100 passengers per minute, or 200 passengers per minute per dual installation. The Burnaby Lake Line is expected to have a peak headway of 6 minutes 40 seconds. The maximum capacity of the line will average 300 passengers per train. The vertical circulation system will be able to clear this volume in about 1.5 minutes. If a single escalator were operating it would take about three minutes to clear the platform.

Prior to any extension of the line beyond VCC, all of the escalators in the link between the two SkyTrain lines are planned to be operating only in the up direction. Therefore any passengers transferring from the Central Park Line to the Burnaby Lake Line will be required to descend the 16 meters between platforms entirely by stairs, or to use the elevator. The 16-meter vertical distance is equivalent to a four-and-a-half-story building. This will be a deterrent to using the system, and place heavy demand on the elevator.

The RTPO anticipates that future westward extension of the Burnaby Lake Line to Central Broadway would result in a reduction in transfers to and from the Broadway buses. This would permit one of each of the dual escalators to permanently operate in the *down* direction.

It should also be noted that the platform on the existing Central Park Line station will be utilized as both a waiting area and a pedestrian circulation area. Many major rail transit transfer stations are designed to include a mezzanine for pedestrian circulation, reserving the platform area for passengers waiting for their train. The design of such stations facilitates clearing the platform area of passengers quickly. Such a mezzanine would expedite passenger movements within the Broadway/Commercial Station and avoid

congestion. Although the platforms at the current Broadway/Commercial Station are the widest on the system, their width is reduced at several points due to exit stairways and escalators. These *pinchpoints* will exacerbate the congestion, as passengers disembarking from SkyTrain cars with doors that open into those areas may not be able to move towards the transfer exit at the north end of the platform. Further modeling may be necessary to identify any redesign or operational changes that might be necessary for the existing station platforms as input to the ongoing station design process.

3.4 SKYTRAIN CONNECTIVITY TO OTHER TRANSPORTATION MODES

Connections to Other Rail and Bus Lines

In addition to connectivity with the transit bus network and other SkyTrain lines, there is also an opportunity to enhance connections between SkyTrain and interurban buses at a possible Braid Station. Greyhound Lines provides scheduled coach service from their terminal on Braid Street to points in the interior of British Columbia, the rest of Canada, and to the US.

The potential may exist for developing a joint-use facility combining a terminal for passenger rail (e.g., Amtrak), Greyhound, local and regional GVTA buses, and SkyTrain at a Braid Station. Other scheduled coach service operators (e.g., City Link) between New Westminster and points in the Fraser Valley, such as Abbotsford and Abbotsford Airport, could also use such a terminal.

Parking Issues and Connections with Roads

Connectivity with the regional road system is also an important issue. The existing Surrey extension of the Central Park Line includes a large park-and-ride lot east of the Fraser River. The proposed Braid Station has been discussed as a potential site for a park-and-ride lot in order to intercept traffic from the TransCanada Highway. The proximity of the proposed Braid Station to the TransCanada Highway is often cited as a rationale for development of such a park-and-ride lot. However, there is considerable community concern that must be respected about such an option due to existing traffic congestion.

Moreover, Braid Station may not be the best location for intercepting cars from the TransCanada Highway due to the traffic congestion in the immediate area, and the major delays that are often encountered crossing the Port Mann Bridge. In largely built-up urban areas, park-and-rides compete with the local bus service as a method of bringing passengers to rail lines. Since all of the areas feeding SkyTrain are planned to have good feeder bus service, there may not be a strong argument for large, public or private park-and-ride facilities.

Informal park-and-ride (i.e., on-street parking), and kiss-and-drop (i.e., drop-off/pick-up of passengers) will likely be issues in the areas surrounding most of the SkyTrain stations on the Burnaby Lake Line, as well as in the vicinity of a future Braid Station. In the design process, RTPO should address this issue with the GVTA and the municipalities. It may be possible to resolve these issues, in part, through design and orientation of stations and access points, and by the provision of some off-street amenities (e.g., waiting shelters, benches, information boards, telephones, security lighting, litter cans, etc.).

The location of stations along Lougheed Highway creates some special safety concerns related to connectivity. Lougheed Highway is a four or six lane urban expressway that was not designed either for pedestrian circulation or the drop-off and pick-up of pedestrians. Locating Skytrain stations along this route will stimulate pedestrian activity on this corridor, however the current road design, the levels of lighting and the functionality of the traffic signals cannot safely accommodate such activity. In addition, the stations will generate some kiss-and-ride traffic which will increase weaving movements of vehicles and may require acceleration and de-acceleration lanes. These are connectivity issues that should be addressed during the station design process involving communities, local governments, and the GVTA.

Connections for Pedestrians and Cyclists

Ease of pedestrian and cyclist connections will depend largely on station design. At this point station designs have not been released for review, and it is therefore not possible to provide specific comments on pedestrian and cyclist connectivity and the availability of connections for non-passenger movements. The RTPO and GVTA should jointly address the issue of taking bicycles on board SkyTrain cars. This issue has important safety and capacity issues that would impact many aspects of station design, system operation and fare policy.

4.0 OPERATIONS

4.1 SKYTRAIN VEHICLES

When the accelerated project opens, the SkyTrain system will operate with 60 new MKII cars. The new MKII cars are longer and wider than the existing cars, and are expected to incorporate many new mechanical and electrical design improvements.

From a passenger seating point of view, the new cars could represent a decline in the level of service being provided. The existing cars are typically operated in trains consisting

of two married-pairs (a total of four cars). The new cars are to operate in trains of one married-pair (a total of two cars). Figure 3 compares the key passenger service characteristics of the existing four-car MKI and the proposed two-car MKII trainsets. The RTPO has proposed that the MKII cars be used to provide base service, and that MKI cars be used for supplementary peak period services. Figure 3 shows that a two-car MKII trainset will have 56 fewer seats (-40 per cent) than the existing four-car MKI trainset.

FIGURE 3: COMPARISON OF TYPICAL MKI AND MKII TRAINSETS

CHARACTERISTIC	MKI	MKII
Number of cars in typical trainsets	4	2
Total length per trainset	49.1	32.8
Number of seats per trainsets	140	84
Typical seating + standing capacity	328	256
Maximum seating + standing capacity	424	342
Number of doors per side	8	6
Total width of all door openings	9.8m	9.6m

Source: Rapid Transit Project 2000, Environmental Assessment Report (March 1999)

FIGURE 4: COMPARISON OF SEAT AVAILABILITY

MIDDAY DAY SERVICE – EXISTING LINE POST – ACCELERATED PROJECT ¹	HEADWAY IN MINUTES	TRAINS PER HOUR	SEATS PER TRAIN	1 HOUR SEAT AVAILABILITY	TOTAL 1 HOUR SEATING & STANDEE CAPACITY
Proposed Headway 2-Car MKII Trains	3	20	84	1,680	5,120
Current Headways 4-Car MKI Trains	4–5	12–15	140	1,680– 2,100	3,936– 4,920

1. i.e., upon completion and operation of the Brunette and Burnaby Lake Lines.

The growth of ridership in the off-peak period has been one of SkyTrain’s greatest successes. The new MKII cars with fewer seats will impact on the appeal of mid-day transit. Figure 4 compares the headways and seating availability today with the situation that would result if the current RTPO plan were to be implemented when the accelerated project (Brunette and Burnaby Lake Lines) is operational.

Data contained in BC Transit's SkyTrain *Five-Year Plan* (May, 1998) demonstrates that during the mid-day period at the existing Patterson Station, the average number of passengers per hour is 2,060 northbound, and 1,680 southbound. Based on the current four-car MKI trainsets, and four-minute headways, there is a sufficient number of seats to accommodate all passengers. Depending on headways, replacing the MKI cars with MKII cars would result in up to 420 fewer passenger seats per hour (20 per cent of the total passengers). This would occur even though the headways are improved from a train every four minutes today to a train every three minutes under the proposed operating plan. Currently, during low ridership months, headways on the Central Park Line are reduced to five minutes. A five-minute headway with the MKI cars provides the same number of seats per hour as the MKII cars with three-minute headways. Decreasing the base period headways from 4 minutes to 3 minutes is not a significant enhancement for base period users. Most SkyTrain passengers must transfer to or from a transit bus in order to complete their journey, and most buses in suburban areas have base period headways greater than 15 minutes. Waiting one minute less on the SkyTrain platform for a train may simply mean waiting one minute longer at the bus stop. As a consequence the increased capital and operating costs associated with running MKII cars with three-minute headways may not be the most effective or efficient means of increasing base period seating capacity.

The proposed headways and MKII cars are able to match the current total base period capacity and provide a slight increase in capacity to handle new traffic stimulated by the extension to Lougheed Station. However the plan to run two-car MKII trains and the loss of seating does represent a decline in the level of service compared to the base period today. Continuing to operate the base service with four-car MKI trains would avoid this problem. Creating permanently married units consisting of three MKII vehicles, coupling together two pairs of MKII cars, or simply adding more seats to some or all of the MKII cars would also resolve this problem. Although it would be preferable to operate three-car married units over four-car MKII trains, the RTPO has advised the Special Commission that the middle (type C) cars necessary to implement three-car units are not part of the planned MKII fleet.

The existing MKI cars do not provide for the circulation of passengers between cars. This is a serious disadvantage with the existing four-car MKI configuration. The ability in the MKII to circulate between cars of a married pair enhances personal safety and security and allows passengers to spread out to ease overcrowding. The circulation of passengers within married pairs or units of the MKII is a significant benefit of the new trains. However, if capacity problems require the MKII cars to be coupled as four or five car trains the intercirculation benefits will be lost. In fact, with four or five car

trains even SkyTrain security and employees will not be able to circulate between the additional cars except when the train is stopped.

The proposed operating plan for SkyTrain relies heavily on adjusting headways to respond to changes in demand. With automated trains, it is easier and less costly to dispatch (or retrieve) additional trains rather than to manually shunt vehicles and add (or remove) cars to each trainset. Reduced headways means improved customer service. However, with the restriction imposed by the configuration at Lougheed Town Centre, it may be difficult to precisely match headways and demand. In addition the BC Rapid Transit Company currently undertakes guideway preventative maintenance and inspections during the midday period; five-minute headways are used to facilitate this work. The proposed operations plan includes midday headways as short as every three minutes on some sections. If these short headways eliminate the possibility of conducting the guideway inspections during the midday periods, the work may have to be rescheduled for late nights and early mornings.

4.2 SKYTRAIN STATIONS

Public information distributed by the RTPO indicated that some stations with low levels of anticipated traffic would have relatively narrow station platforms (compared to those at busy interchange stations such as Broadway and Lougheed). The GVTA has also noted that there are several stations that may initially have little activity, but may be focal points for future population growth and urban redevelopment activity. While the convenience of centre-platform stations is attractive to passengers, they are extremely difficult to expand (widen) if traffic volumes increase dramatically. The station designs for the low volume stations cannot be evaluated as they are not yet available for review, however care should be taken to ensure that platform widths are adequate in areas where there is potential for future redevelopment.

A total of six stations or station options included in the original plans for the new line have been eliminated or deferred to future SkyTrain expansion projects. These stations are:

- Braid (under review);
- Boundary (eliminated—service to be provided by Gilmore Station);
- Woodlands (designated as potential future station);
- Bell (status uncertain pending ongoing negotiations);
- Lake City (designated as potential future station); and
- Grandview (designated as potential future station).

Of these, only Braid Station is required to provide efficient and effective connectivity

of the accelerated project with other transit modes. A station at Bell would be ideally located to serve the existing (and future) large population of high-density development residents within the station catchment area. Encouraging existing and future residents of the area to board the SkyTrain directly at Bell, rather than riding a bus the short distance to Lougheed Station, would free up additional capacity on the local bus network. However, there are significant local concerns about neighbourhood impacts (e.g., noise, crime and safety, loss of trees, etc.) that must be considered and resolved first.

4.3 OPERATIONS PLAN AND LOUGHEED STATION

A complete operation plan has not been presented to the Special Commission. However, an RTPO presentation indicated that the functionality of Lougheed Station would be critical to the operation of the new line. Figure 1 illustrates how the role of the Lougheed Station would change over time as the SkyTrain line is extended.

The operations plan for Lougheed Station shows that two separate SkyTrain lines will share a single, central platform. According to the RTPO operations concept, the ultimate configuration (Stage 3) would be operated with five-minute headways on the Brunette and possible future Coquitlam Lines, and headways of three minutes, 10 seconds would be operated along the Burnaby Lake Line from Vancouver to Lougheed Station. Ridership forecasts have not been provided to allow an assessment of the appropriateness of the headways and the capacity for the projected demand. However, it should be noted that the station utilization proposed for Lougheed is very intensive and will require precise scheduling and operations with coordinated headways on the two routes.

The northbound and southbound trains of a future Coquitlam Line would have to be carefully integrated with the schedule of the trains on the Burnaby Lake Line. Any delay on either line would impact the operation of the other line. The ability of SkyTrain to adjust headways on one line to resolve capacity problems will be constrained by the impact it will have on the time envelope available for trains on the other line. In fact the headways must be multiples of each other, such as five minutes (Coquitlam-New Westminster) and 2.5 minutes (VCC-Lougheed), or four minutes and two minutes. The operations plan offers intensive use of a two-track, single platform station. It appears to be feasible, but it limits the flexibility of headways on the entire SkyTrain system. This is because the operations plan also calls for the Coquitlam-New Westminster line and the King George-New Westminster line to offer a combined service between New Westminster and Waterfront. Consequently, the operation of the entire SkyTrain system will become dependent on the intermeshing of the two lines at Lougheed Station.

It is the central platform design of the Lougheed Station that creates this headway constraint with its attendant impact on the flexibility and potential capacity of the whole SkyTrain system. The RTPO has not specifically stated what the ultimate capacity per hour of the system will be with this station configuration. Notwithstanding the user-friendly aspect of a central platform, building such a constraint into a new station on a new rail line may not be optimal. Independent transportation planning experts have advised the Special Commission that other options are feasible and should be explored to ensure that long-term efficiency of the SkyTrain system is optimized.

CONCLUSIONS AND RECOMMENDATIONS

5.0 CONCLUSIONS

Overall, the Commission concludes that the RTPO has identified all key issues of connectivity. Many are resolved, and there is positive progress on solutions. The connectivity and operations planning are very much works-in-progress. Major steps are being taken in conjunction with other agencies (particularly the GVTA) to ensure that the RTPO is advised of the connectivity requirements at the SkyTrain stations. The GVTA is working towards redesigning the existing bus routes, and as part of its new mandate, it is planning major improvements to the regional bus system that will further enhance the connectivity of the entire transit system. The station at Braid—a key potential location for bus service—has not been settled and there are significant community concerns to be resolved.

Work is also progressing on connectivity issues between the existing and planned Skytrain lines. The station design process has just begun and the following is offered to inform the process:

- The current design concept for the Broadway/Commercial Station should improve bus connections. It also appears that connectivity between the SkyTrain line will be functional, however passengers transferring from the Central Park Line to the Burnaby Lake Line may be required to walk down the equivalent of four-and-a-half flights of stairs during phase one operations. The concept may also result in congested conditions on the Central Park Line platform due to the pinchpoints on the platform, and the location of the egress route to the Burnaby Lake Line and Broadway

buses. The situation appears to require further investigation, analysis and modeling.

- The VCC Station is not required for connectivity, and therefore the station and tunnel may not be required as part of the accelerated project.
- The current concept for the Lougheed Station provides convenient connectivity for passengers between the Burnaby Lake Line and the Brunette and possible future Coquitlam Lines. However, the concept is not compatible with the proposed operations plan and the planned headways for the new and existing SkyTrain lines. The flexibility and potential capacity of the entire SkyTrain system could be constrained by the configuration and functional requirements of a single station. The approach to the connectivity issues at Lougheed should be re-examined and alternative configurations considered.
- Connectivity with other modes of transportation will depend largely on the facilities being provided by the RTPO at the SkyTrain stations. No conclusions can be reached at this early stage in design. The issues of community integration are being addressed in a separate Special Commission key issue report on station and guideway design.

6.0 RECOMMENDATIONS

The Special Commission on SkyTrain Review recommends the following actions be taken to ensure that planning and design of the accelerated project result in success:

1. The RTPO and the GVTA should continue their work on bus-to-SkyTrain connectivity issues. The process should also include input from other stakeholders such as the local municipalities and the Ministry of Transportation and Highways (MOTH).
2. The RTPO, GVTA, City of New Westminster, neighbouring municipalities and MOTH should work quickly to complete the functional planning study to resolve the issue of Braid Station so that planning for the bus-to-SkyTrain integration can be completed in advance of the finalization of other station designs.
3. Informal park-and-ride and kiss-and-drop will likely be an issue in the areas surrounding most of the SkyTrain stations on the Burnaby Lake Line. The RTPO should address this issue with the GVTA and respective local governments to minimize impacts on the communities.
4. The RTPO and the GVTA should begin discussions on other policy issues that will impact connectivity with other modes of transportation, including pedestrians and cyclist issues, and parking facilities. In particular, consideration should be given to responsibility for grade-separated crossings to accommodate pedestrian and cyclist traffic along busy corridors such as Columbia Avenue and the Lougheed Highway.

This may be accomplished in conjunction with the community enhancement projects within the proposed SkyTrain Community Legacy.

5. The RTPO and the GVTA should jointly review the need for including the VCC Station and connectivity tunnel in the Burnaby Lake Line of the accelerated project.
6. The RTPO should re-examine the MKII vehicle seating and operations plan.
7. The RTPO should consider alternative configurations for Lougheed Station to increase scheduling and capacity flexibility and to improve incident management.
8. The RTPO should review their concept for the Broadway/Commercial Station to ensure that sufficient escalator capacity is provided to handle all two way flows at every phase of development of the SkyTrain system, and that access routes to all bus stop locations identified by the GVTA are accommodated.

CONNECTIVITY APPENDIX 1

GLOSSARY

CONNECTIVITY & OPERATIONAL ISSUES GLOSSARY

Burnaby Lake Line	The portion of the SkyTrain accelerated project between Lougheed Town Centre Station and Vancouver Community College.
Brunette Line	The portion of the SkyTrain accelerated project between Columbia Station (New Westminster) and Lougheed Town Centre Station.
Central Park Line	The existing SkyTrain line, from Waterfront Station to Columbia Station in New Westminster
connectivity	The ability of the system to facilitate the transfer of passengers between transportation modes, and areas.
Coquitlam Line	A possible future SkyTrain extension connecting Lougheed Town Centre Station to Coquitlam Town Centre. In combination with the Burnaby Lake and Brunette Lines of the accelerated project, this line would complete the <i>T-Line</i> prescribed in the GVRD <i>Livable Region Strategic Plan</i> .
headway	The time, usually expressed in minutes, between buses or trains operating on fixed schedules. Larger headways mean lower levels of service (more time between trains). Shorter headways provide better levels of service (less time between trains).
married-pair	Two rail cars permanently coupled to form a single unit. The MKI cars operate in permanent married-pairs, which means they can only operate with two, four, or six cars (or one, two, or three married-pairs). MKII cars also operated as married-pairs of two cars, expandable to married units of three, four or five cars.
shuttle-service	Service that terminates at station and then returns to its originating station
tail track	A section of track located beyond the last station at the end of the line. The track is used to store out-of-service trains or to facilitate the switching of a train from the inbound to the outbound track.
through-service	Service that enters the station, boards and discharges passengers, and then continues on towards its ultimate destination.

CONNECTIVITY APPENDIX 2

CONNECTIVITY WORKSHOP NOTES

CONNECTIVITY WORKSHOP NOTES

Special Commission – SkyTrain Review Connectivity Workshop

February 19, 1999, 12:00 – 4:30

Vancouver, BC

Full attendance and participation by:

- Rapid Transit Project Office (RTPO);
- Greater Vancouver Transportation Authority (GVTA);
- Greater Vancouver Regional District (GVRD);
- BC Rapid Transit Corporation Ltd.;
- Local government staff (Vancouver, New Westminister, Burnaby, Coquitlam)
- Ministry of Transportation and Highways (MOTH); and
- Special Commissioner (staff and consultants)

Negotiations between the GVTA and the Province (RTPO) regarding cost sharing are ongoing and may preclude discussions around specific system elements. The activities of the Special Commission are not designed to in any way undermine or impose on these negotiations.

Discussions

The RTPO indicated that the preferred alignment and station locations have largely been determined. A station design program is being implemented for the accelerated project alignment. Bus integration will be a primary input to this station design process.

The RTPO presented a conceptual system operations plan. Ridership estimates are based on 1995 data that are currently being refined, although more recent estimates are not anticipated to be substantially different. Market-based ridership analyses are also being developed based on the assumption that reduced crowding conditions will lead to increased market share.

Station operation planning is an ongoing process. The primary goal is to determine that the project, as proposed, will be a functional system. The RTPO indicated that the system is being designed to accommodate ridership levels consistent with 2021 projected buildout in Coquitlam and Surrey.

The RTPO presented their conceptual station operations for major interchange stations at Lougheed and at Broadway/Commercial Station, including the following:

- The proposed design for the Lougheed interchange will allow for flexibility in providing both “*through-service*” (New Westminister-Coquitlam) and “*shuttle-service*” (Burnaby-Lougheed).

- Broadway/Commercial Station will be an important transfer point. Although this will be a busy station, it is not anticipated to be a bottleneck in the system as long as movement can be accommodated within the station (a function of station design). The anticipated hourly passenger loads are considered manageable. Moreover, since the RTPO has acquired the complete triangle site at Broadway and Commercial, there are considerable opportunities for facilitating bus connections. Preliminary station concepts and broad principles for Broadway/Commercial Station were presented and discussed to demonstrate how peak-hour capacity and passenger flow levels can be accommodated.

The GVTA presented a proposed bus integration plan (discussion paper available) based on the RTPO's preferred alignment. Principles considered in preparing this initial plan were:

- No duplication of long distance services;
- Increased frequency of feeder services;
- New local services (Columbia/Lougheed);
- Continued local service (Burnaby); and
- System/stations must accommodate future growth.

The RTPO is also initiating a Braid Street Functional Planning Study to determine the extent that Braid Street may be suitable as a station site. The study will examine short and long term possibilities based on:

- Market demand;
- Functional requirements (bus loop, kiss-and-drop, roadway access improvements, etc.);
- Community impacts/benefits (including traffic and safety issues impacting residential areas);
- Site re-development potential; and
- Public transit ridership and system integration.

The planning process will involve consultation with the community, the City of New Westminster, and the GVTA.

Local government staff expressed strong desire that the system is fully integrated (between and among municipalities/transit modes) and that all stakeholders (neighbouring municipalities, communities, MOTH, etc.) be involved in future functional planning initiatives.

Specific suggestions for consideration in planning for efficiencies and improved connectivity of the transit system include:

- Consider opportunities to approach the private sector to operate park-and-ride facilities;
- Stations provide opportunities for grade-separated interchanges for SkyTrain and non-SkyTrain users; and
- Plan for Cape Horn Interchange/United Boulevard Extension to be built into the transit/ALRT planning, especially in association with Braid Street.

It was suggested that the fact that MKII SkyTrain cars have less seating and capacity (260 two-car trains) compared to that of MKI SkyTrain cars (280 four-car trains) may create some ridership issues.

Based on the information provided to date, the GVRD was not yet ready to comment on whether the system as proposed will match their original objectives for growth management.

Outcomes

It was agreed that GVTA-provincial negotiations must conclude before more detailed discussions around connectivity issues can proceed much further.

Processes and relationships are in place for implementing the following components for addressing connectivity issues:

- RTPO station design program;
- GVTA area planning; and
- Braid Street Functional Planning Study.

Municipalities need to follow up with the RTPO and GVTA in a coordinated manner to ensure issues with affect them both individually and collectively are addressed in these planning processes.

Based on the next steps outlined by workshop participants, the Special Commission has determined that sufficient and appropriate bi-lateral negotiation and consultation processes are in place. Also, on the basis of workshop discussions, the Special Commission has sufficient information and advice to comment on the connectivity issue.

Workshop participants agreed the session was a valuable discussion forum and that no further Special Commission-sponsored sessions would be required at this time.

The Special Commission will produce a key issue report on Connectivity and Operational Issues for release in April, 1999.

NOISE &
VIBRATION
ISSUES

REPORT

MAY, 1999

SPECIAL
COMMISSION
SKYTRAIN
REVIEW



NOISE & VIBRATION ISSUES REPORT

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Noise Appendix #1 Noise and Vibration—Potential Impacting Factors	

INTRODUCTION

The Special Commission's review of environmental issues related to the construction and operation of the proposed SkyTrain includes this report on the potential impacts of noise and vibration.

Detailed information on the potential noise and vibration impacts of the accelerated project was not available for review by the Special Commission at the time that the *Interim Report* was prepared and the Special Commission identified the issues of noise and vibration for further study and reporting.

1.0 BASIS OF REPORT

Since the Special Commission's *Interim Report*, the Rapid Transit Project Office (RTPO) has released two reports dealing with noise and vibration issues. The first is the *Rapid Transit Project: Phase I Noise Issues Report* (BKL Consultants, December, 1998), which assesses potential noise impacts and recommends various measures to address these impacts. The second is the Construction Environmental Management Program (RTPO, January 1999), which includes several performance standards for contractors regarding the control of noise during project construction. These two reports were the main source of technical information available for review by the public and by the members of the Inter-Governmental Advisory Committee (IAC).

These RTPO reports were later supplemented by a letter from the RTPO to Health Canada, dated March 3, 1999, responding to questions from Health Canada on *The Rapid Transit Project: Phase I Noise Issues Report*, and by information contained

in an application submitted by the RTPO on March 15, 1999 for approval under the *Canadian Environmental Assessment Act (CEAA)*.

The RTPO has noted that noise impacts associated with the accelerated SkyTrain project arise primarily from the operation of train cars along the guideway. Additional noise impacts arise from various other aspects of operations (e.g., stations) and design (e.g., alignment location and elevation, tunnels). These impacts are all considered by the RTPO to be mitigable through the implementation of design recommendations (see Noise Appendix #1) during the course of project planning and execution. While noise measurements were taken only at selected sites along the alignment, these sites are considered by the RTPO to be representative of conditions along the length of the whole alignment.

The RTPO has committed that potential measures for cost-effective noise mitigation through design will be considered in final design of all facilities. Final designs of the guideway, the stations, and proposed ancillary facilities will be reviewed to ensure that noise mitigation is required where warranted.

The Special Commission's noise and vibration issues report considers all three stages of project development: project design, project construction and project operation. Particular attention is given to the issues of noise impacts that may result from project operations and the adequacy of the measures proposed by the RTPO to mitigate these impacts. The Special Commission has been assisted by Wakefield Acoustics who conducted an independent technical review of the reports provided by the RTPO.

2.0 SOUND LEVEL BASICS¹

Sound is expressed in terms of its physical quantity or sound level and its perceived level or loudness. The physical quantity (sound level) is measured in decibels (dB). However, human hearing does not respond equally to sounds at different frequencies or pitches. Lower frequency sounds that are perceived to be equally as "loud" as higher-pitch sounds have, in fact, a much higher decibel level than these higher pitched sounds. To accommodate this variation in the sensitivity of human hearing to sounds at different frequencies, a weighting system is applied to sound level measurements. When the weighting is applied the resulting sound level measurements are said to be "A-weighted" and the decibel level is abbreviated dBA.

When sound energy doubles, the decibel value does not similarly double. It increases by only 3dB. In terms of human hearing, for the perceived loudness of a

¹ This section is based on information in *The Rapid Transit Project: Phase I Noise Issues Report* (BKL Consultants December 1998), Page 1.

sound to double requires an increase in sound levels of about 10dBA. The average listener starts to detect a change in sound levels once the level has increased or decreased by 3dBA and will detect a clearly noticeable change at 5dBA.

There are two factors that are pertinent to assessing the impact of the noise to be produced by the operation of the SkyTrain. The first is the noise level of the SkyTrain itself. The second is the amount that this noise level raises the ambient noise level—the existing background noise—in a particular area. A SkyTrain running on an open track would produce the same noise whether it was travelling through Vancouver or Coquitlam. The significant difference between the two locations—and a parameter of significance—would be the existing noise level exposure of the community in the absence of SkyTrain.

In an environment with high ambient noise levels, the noise from SkyTrain might not be a significant change from existing background levels. In an environment with lower ambient noise levels, the increase in noise as a result of SkyTrain might be significant.

Annoyance from noise results from a combination of three factors:

1. Sound pressure from a single event;
2. Frequency of those events; and
3. The ambient noise levels (the pre-existing levels of noise in the environment).

Because SkyTrain passes by frequently, a measurement which accounts for this frequency is a better indicator of the SkyTrain noise impact level than the sound pressure generated from a single event. A measure of noise over a 24-hour period, called the 24-hour equivalent sound level— or decibels (Leq)—is generally used to determine noise impact on residential areas. Canada Mortgage and Housing Corporation (CMHC) has adopted 55 dB(Leq) as the maximum outdoor noise level for its residential projects. Annoyance from noise sharply increases when 55 dB(Leq) is exceeded.

Sound from SkyTrain pass-bys diminishes with increasing distance from the SkyTrain guideway. Typically, levels drop by two to three dBA from 15 to 30 meters, and by an additional three to five dBA from 30 to 60 meters.

PUBLIC CONCERNS

3.0 PAST EXPERIENCE WITH SKYTRAIN

The history of the original SkyTrain line has some relevance to the current discussion of noise impacts. When the first SkyTrain began operation in 1986, noise from the operation of the train cars and the maintenance of the tracks led to major public concerns. The Office of the Ombudsman reviewed several issues associated with the original SkyTrain project, including the issue of noise, and reported its findings in November, 1987.

The BC Ombudsman's report found that SkyTrain was expected to have noise levels for single pass-bys at a distance of 15 meters of a maximum of 74 dB(A). Several noise impact studies of the original SkyTrain conducted in 1986 and 1987 found that the SkyTrain noise levels were well above the manufacturer's stated maximum of 74 dB(A).

The Ombudsman's 1987 report also noted that after the initial start-up period of SkyTrain, BC Transit had managed to lower noise emissions of the system through improved rail and car maintenance and reduced speed of the trains.

The RTPO has stated that the accelerated project will incorporate the lessons learned from past experience, including measures to limit the amount of noise from the project during the construction and operation phases. Consultants to the RTPO have suggested that information from Bombardier, the manufacturer of the MKII SkyTrain cars which will be used on the accelerated project line, suggests that these cars are about 5 dBA quieter than the MKI cars used on the original SkyTrain line. It is also relevant to note that the original SkyTrain guideway was routed through

quiet residential neighbourhoods in Burnaby and New Westminster, while the accelerated project alignment follows more highly-developed transportation corridors with higher existing ambient noise levels.

Nevertheless, in view of the negative experience for many residents during the start-up of the original SkyTrain in the 1980s, it is not surprising that public concern about potential noise impacts from the construction and operation of the accelerated SkyTrain project has been constant throughout the RTPO's consultation process and during the Special Commission's Technical Workshops and Public Meetings.

4.0 ISSUES RAISED BY THE PUBLIC

The public has raised several issues and concerns about the potential for noise impacts from the accelerated project.

- The majority of the concerns were raised by residents of the Lougheed Mall area in Burnaby and the Fraserview area in New Westminster. These concerns are focused on noise associated with stations, operations, maintenance, construction and tunnels.
- Many residents of the Lougheed Mall area were concerned about potential noise impacts of a possible station at Bell Avenue, as well as the variation in pitch during acceleration and deceleration of the trains in the Lougheed Mall area. They requested a high standard of noise and visual impact mitigation be employed.
- Residents of the high-rise buildings in the Lougheed Mall area believe they will experience noise impacts from SkyTrain passing through their neighbourhood. Fears were expressed that the mature trees on the north side of Lougheed Highway would be removed when SkyTrain is built, resulting in loss of their aesthetic and noise buffer value.
- There were concerns about the noise associated with the increased number of diesel buses that would idle and travel near the Lougheed Station and the Broadway/Commercial Station.
- Concerns were expressed by people who live in Burquitlam near Clarke Road that road widening to accommodate any future extension of the SkyTrain to Coquitlam would almost double the traffic noise, as traffic would be closer to the buildings.
- In Fraserview suggestions were made that, due to the existing high levels of truck and train traffic in the Fraserview area, government should explore ways to reduce noise levels rather than increasing noise by adding SkyTrain to the area. Several residents fear that additional noise from SkyTrain will greatly reduce the quality of life in their neighbourhood, as well as property values.

- There was concern about whether the mitigation recommended in the *Rapid Transit Project: Phase I Noise Issues Report* would be implemented or not, particularly in the Grandview Cut. Residents near the proposed route noted that noise would be an issue during the evening and early morning hours, when traffic levels—and thus background noise—are low.
- Public concerns were raised regarding the noise generated by the maintenance of the tracks by cars that grind the tracks.
- Comments on construction noise related to impacts on schools and to the fast-track plans for 24-hour construction.

SUMMARY

AND ANALYSIS OF RTPO REPORTS

This report provides an overview of reports released by the RTPO that related to noise and vibration impacts and mitigation. These are the *Rapid Transit Project: Phase I Noise Issues Report* (BKL Consultants December 1998), and the Construction Environmental Management Program (RTPO, January 1999). The following sections outline the RTPO reports' scope and objectives, process and methodology (where appropriate), and their relationship to the SkyTrain design-build process.

The RTPO reports were later supplemented by a letter from the RTPO to Health Canada and by information in an application submitted by the RTPO for an approval under the *Canadian Environmental Assessment Act (CEAA)*. The information contained in these supplementary documents is incorporated into this issues report.

The noise impacts study completed to date is based on preliminary design information for the accelerated project. The RTPO has noted in its CEAA application that the Design-Build Contractor—in the course of detailed design—may develop improvements and innovations to basic design parameters. The Special Commission established the IAC to facilitate cooperation and information exchange between federal, provincial and regional government agencies. Members of the Inter-Governmental Advisory Committee have advised the Special Commission that changes made to the route alignment or to station location as part of detailed design may have consequential impacts. If so, it would be necessary for the RTPO and its consultants to revisit their initial findings to determine if existing conclusions and mitigation measures remain valid. The Special Commission recommends—if it

becomes necessary for the RTPO to review and amend its initial findings—that this be done in consultation with the appropriate regulatory agencies and municipalities, and include a process for two-way communication with the public.

5.0 RAPID TRANSIT PROJECT: PHASE I NOISE ISSUES REPORT

5.1 SCOPE AND OBJECTIVES

The *Rapid Transit Project: Phase I Noise Issues Report* was prepared by BKL Consultants Ltd. of North Vancouver and was submitted to the Rapid Transit Project 2000 Ltd. (RTPO) on December 11, 1998. The investigation documented in this report may be considered a preliminary noise and vibration impact assessment of the accelerated SkyTrain project. Its scope was to describe the potential noise and vibration impacts of SkyTrain operations on sensitive land uses (principally residential) bordering the proposed corridor from the Columbia Station in New Westminster to Vancouver Community College in Vancouver, and to identify mitigation measures where appropriate. Construction noise was not addressed in any depth. The principal objectives of this study, therefore, were:

- To establish criteria for identifying significant SkyTrain noise impacts;
- To apply those criteria to rate-projected noise and/or vibration impacts from SkyTrain operations at representative locations along the corridor; and
- To recommend mitigation measures where projected noise and/or vibration impacts are predicted to be non-trivial and where mitigation would, at the preliminary design stage, appear to be feasible.

The BKL report is largely devoted to potential SkyTrain noise impacts and mitigation measures. The levels of vibration expected to result from normal SkyTrain operations were judged not to be of concern.

The Special Commission expects that during the detailed design phase—when the precise horizontal and vertical guideway alignments and station locations are known—the nature, locations and extent of mitigation measures would be finalized based on a more accurate prediction of resulting community noise exposures.

5.2 NOISE IMPACT ASSESSMENT APPROACH

Based on the contents of their report, BKL's noise impact assessment approach appears to have been as follows:

- Establish, through 24-hour continuous noise monitoring, existing community noise environments at 25 representative noise-sensitive locations (mostly residential) along the accelerated SkyTrain corridor;
- Select two descriptors of the existing noise environments felt to be most relevant to the assessment of the potential noise impacts of a commuter rail system such as SkyTrain. The first of these was the 24-hour equivalent sound level², or $L_{eq}(24)$, which provides a single-number measure of the average daily community noise exposure. The second was the L_{01} —that noise level exceeded for 1 per cent of the time (for example for 36 seconds out of an hour). The L_{01} is then representative of the near-maximum noise levels that would be created during such common noise events as the passing of noisy trucks or motorcycles, siren soundings, aircraft overflights, nearby dog barks, etc.
- Establish a five-point impact significance scale (Insignificant, Minimal, Modest, Significant, Severe), and rate impacts based on how much projected SkyTrain operation noise will increase overall $L_{eq}(24)$'s in the community, and by how much maximum SkyTrain pass-by noise levels will exceed existing L_{01} 's.
- Where projected noise impacts are rated as being Modest, Significant or Severe, mitigation measures may be recommended, with some professional judgement being applied in this regard, particularly in cases of Modest impacts. Modest impacts are considered to occur when SkyTrain noise would cause $L_{eq}(24)$'s to increase by from 2 to 5 dBA, or when maximum pass-by levels would exceed existing L_{01} 's by from 5 to 10 dBA during certain hours of the day and night. The BKL report (page 4) indicates that, subjectively, Modest Impacts will mean that “individuals out of doors and indoors will notice SkyTrain pass-bys and may, on occasion, be annoyed by the noise”.

² The Ombudsman *SkyTrain Report* (Public Report No. 8, 1987) identified the 24-hour equivalent sound level as an appropriate community noise descriptor for use in assessing SkyTrain noise impacts.

5.3 NOISE IMPACT ASSESSMENT METHODOLOGY

5.3.1 SkyTrain Noise Emissions

The projected SkyTrain noise exposures—both the $L_{eq}(24)$ contribution and the maximum pass-by noise levels—were based on noise measurements made by BKL on the existing SkyTrain system. While the existing system uses Bombardier’s MKI cars and the new system will employ the new, larger MKII cars, MKI noise levels were used in BKL’s noise predictions. On page 5, BKL states that tests conducted on MKII cars in Kuala Lumpur indicate that pass-by levels “could be several decibels lower than the MKI cars.” In this event, BKL’s noise impact analysis could be considered to be quite conservative. It is then of some interest to have these test results confirmed.

5.3.2 Prediction of $L_{eq}(24)$ ’s from SkyTrain Operations

While the methodology used to calculate the $L_{eq}(24)$ ’s to be expected from the new SkyTrain system was not described in detail in the BKL report, the consultant explained during the Special Commission’s Noise and Vibration Technical Workshop of February 3, 1999 that the typical $L_{eq}(24)$ of 57 dBA at 15m mentioned on page 7 of their report was based on measurements of the existing SkyTrain with 560 trains per day and four cars per train. This process would involve the measurement of the sound energy contributions of many individual SkyTrain pass-bys at a fixed distance to obtain “Single Event Levels” or SELs. The combined sound energies of all anticipated daily pass-bys would then be calculated and this total energy averaged over a time base of 24 hours. Implicit in this process are the assumptions that the new and existing SkyTrain systems will have the same numbers of trains per day and cars per train, as well as the same average speeds.

5.3.3 Assumed Rate of Attenuation of SkyTrain Noise with Distance from Guideway

Page 8 of the BKL report notes that maximum SkyTrain pass-by noise levels typically decrease by 2 to 3 dBA between 15m and 30m, by 3 to 5 dBA from 30m to 60m and by 6 dBA or more per doubling of distance beyond 60m. However, it was revealed at the Technical Workshop, that, to be conservative—and considering that at many locations along the route the nearest residences are roughly 30m from the proposed alignment—a distance attenuation rate of 3 dBA per doubling of distance (3 dBA/DD) was used throughout. This rate was then applied when calculating both

SkyTrain $L_{eq}(24)$'s—for which it is appropriate, particularly where residences are exposed to a very long section of alignment. This rate was also applied when calculating SkyTrain maximum pass-by noise levels—for which it is conservative beyond about 30m. For example, at a distance of 60m, the maximum pass-by level could be overestimated by up to 2 dBA, while at 90m the estimate could be 5 dBA or more too high.

5.3.4 Rating of Noise Impacts and Recommendation of Mitigation Measures

No “Severe” noise impacts were projected from SkyTrain operations, however “Significant” impacts were projected at two residential locations: Sites 10 and 24. At Site 10 on Horne Street in Burnaby, on the south side of Lougheed Highway and just west of Lougheed Mall, this level of impact was indicated by projected maximum SkyTrain pass-by noise levels. At Site 24, on East 12th Avenue in Vancouver along the Grandview Cut, “Significant” impact was indicated by both the SkyTrain’s pass-by levels and its effect on $L_{eq}(24)$'s. Mitigation in the form of guideway noise barriers was recommended in both locations.

“Modest” noise impacts were identified at six locations (Sites 11, 12, 13, 17, 18 and 25), with maximum SkyTrain pass-by levels responsible for this impact rating in all cases. Mitigation measures were, however, recommended at only two of these locations. At Site 11 (Salish Court in Burnaby), guideway noise barriers were recommended; however, at Site 17 (Holdom Street in Burnaby), proposed mitigation was limited to control of station-generated noise.

In discussions between BKL, Health Canada, DFO and the Special Commission prior to the Special Commission’s Technical Workshop, the BKL consultant indicated that in recommending locations for mitigation, some professional judgement had been applied based on just where the projected impacts—particularly those due to maximum SkyTrain pass-by levels—fell within the 5 dBA range of the “Modest” category. It appears that consideration was given to other factors such as the somewhat conservative approach taken to the prediction of SkyTrain noise exposures, the preliminary nature of the SkyTrain alignment, the location of the SkyTrain alignment relative both to the affected residences and to other major noise sources—in particular the Lougheed Highway. It would instill a greater level of confidence in the procedure if the rationale behind BKL’s selection of “Modest” impact areas for mitigation recommendation had been described in an addendum to their report.

5.3.5 SkyTrain Operation Vibration Impact Assessment

The criteria used for the onset of potential vibration impacts from SkyTrain operations was the “threshold for any adverse human reaction of any kind”, as established by the US National Research Council, Academy of Sciences, Committee on Hearing Bioacoustics and Biomechanics in 1977. Vibration levels measured by BKL at locations near at-grade, elevated and depressed sections of the existing SkyTrain near Vaness Street in Vancouver were all well below this threshold level. The BKL consultant also noted that, in his experience, since the opening of the existing SkyTrain, there had never been an issue raised around SkyTrain-induced vibration. Vibration is therefore not expected to be a significant concern on the new alignment.

5.3.6 Relationship to the Design-Build Process

In response to a question at the Technical Workshop, the BKL consultant offered the opinion that where mitigation measures were recommended, they would be installed when the guideway is completed or shortly afterwards. There is no need for guideway barriers to be installed before the system is running, and it is likely that—under a design-build contract—all mitigation measures of a similar nature would, as much as possible, be carried out in one continuous operation. This would likely occur after the guideway is essentially completed throughout the length of the project, or project subsection.

6.0 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAM, ACCELERATED RAPID TRANSIT PROJECT 2000 LTD. PHASE I—NEW WESTMINSTER TO VANCOUVER COMMUNITY COLLEGE

6.1 SCOPE AND OBJECTIVES

This report was submitted by Rapid Transit Project 2000 Ltd. in January, 1999 and partially revised in February, 1999 as part of the preparation of the RTPO’s application under the CEAA. It specifies the Construction Environmental Management Program which is to be followed by all contractors during the construction of the accelerated project. It stipulates that contractors must follow all relevant federal, provincial and municipal regulations, obtain all required licences and permits, and provide for ongoing environmental monitoring and supervision.

6.2 APPROACH AND METHODOLOGY

In the specific area of noise and vibration, Section 4.7 of the Construction Environmental Management Program specifies that:

- The Contractor shall act reasonably to minimize noise by maintaining noise control equipment on construction machinery, and complying with municipal by-law standards on noise levels established by the cities of New Westminster, Coquitlam, Burnaby and Vancouver;
- The Contractor shall comply with noise level regulations and guidelines established by the Workers Compensation Board;
- The Contractor shall comply with, or negotiate, restrictions on hours of work for the Site set by the city or cities in which the Contract is being constructed; and
- The Contractor will be responsible for applying for and procuring any permits to operate machinery at noise levels which exceed those established by municipal by-laws, and/or for undertaking operations outside normal working hours.

Section 5.6 of the Construction Environmental Management Program stipulates that should the Environmental Monitor³ observe contraventions of the environmental management plan—including, but not limited to, among other things, “excessive noise”—then “the Owner may direct the Contractor to immediately suspend all construction operations” and not to resume work until appropriate steps have been taken to “insure that such incidents are not repeated”.

The noise control by-laws of most Greater Vancouver Regional District (GVRD) municipalities limit construction activities in or adjacent to residential areas to certain hours (typically from 07:30 to 20:00 hours on weekdays and from 10:00 to 20:00 hours on Saturdays) unless a specific exemption has been obtained. Further, such by-laws typically limit continuous noise emissions from construction activities to 85 dBA at the nearest “point of reception” in or adjacent to residential premises, or at a distance of 15.2m from the noise source, whichever is greater.

³ The Environmental Monitors are the personnel to be retained by the Contractor to ensure that the Contractor's work is conducted in accord with the environmental construction specifications in the Construction Environmental Management Program, as well as with agency permits, guidelines, rules and regulations and/or RTPO policy. The RTPO has also hired an Environmental Inspector who will conduct on-site field inspections to ensure environmental compliance, and compliance with RTPO policies, and who will oversee the work of the Environmental Monitors. The issue of the lines of accountability for the Environmental Monitors is discussed in Section 10 of the Special Commission's *Biophysical Issues Report*.

MAIN ISSUES IDENTIFIED IN RTPO REPORTS AND TECHNICAL WORKSHOP

7.0 SKYTRAIN CONSTRUCTION NOISE AND VIBRATION

7.1 CONSTRUCTION NOISE AND ITS CONTROL

The BKL report touches only briefly on construction noise issues, stating that—as with other major projects—SkyTrain “guideway and station construction will produce noise and there are only limited means of noise control”. It was also noted that “scheduling and duration of construction will be developed in later phases of the design”, implying that, to a large degree, construction noise impacts must be controlled/limited through scheduling and hours-of-work restrictions.

The potential for construction noise impacts is greatly expanded if work must be extended into night-time hours, particularly in summer and early fall. The RTPO should indicate if it foresees the need to apply for exemptions to permit night-time construction work on this project and, if so, should be encouraged to provide as much notice as possible of any such plans and to do everything possible to mitigate impacts through careful selection of night-time work sites and equipment noise control measures.⁴

As stated in Section 6.2 above, limits may be placed on construction through municipal noise by-laws and, under the environmental management plan, best

⁴ Although it is not a noise impact, it was noted by the IAC that night-time construction may require special lighting—such as large flood lights—and if this were the case, the RTPO should advise the municipalities whether the impacts of special lighting could potentially disturb local residents.

available control measures must be used and construction may be stopped if noise emissions are considered, by the Environmental Monitor, to be excessive.

However, the construction will span municipal boundaries at locations along Boundary Road and North Road. It will be important at these boundary interfaces that there be consistency between municipalities as to the hours permitted for construction and the established procedures to deal with noise issues. A coordinated effort between the municipalities to set hours for construction and procedures for dealing with noise mitigation would be beneficial.

Given that the minimal setback distances from the SkyTrain alignment to the nearest residences are 30 to 40m, construction noise emissions complying with an 85 dBA by-law limit at 15m could still produce levels up to 75 to 79 dBA at such residences. In general, noise emissions from general construction activities would tend not to be this high on a continuous basis. In areas where pile driving is required, however, noise levels could substantially exceed the 85 dBA limit at 15m, depending on the types of pile driver and piles. In particular, if impact pile driving of steel piles should be necessary adjacent to residential areas, special noise control measures, such as partial or total enclosures of driver and pile, may be required.

7.2 CONSTRUCTION VIBRATION AND ITS CONTROL

Potential vibration impacts from SkyTrain construction activities were not addressed specifically in either report discussed above. However, the Construction Environmental Management Program was sufficiently inclusive in its definition of emissions from construction activities which could result in work stoppage to encompass vibration impacts.

The RTPO has since commented in its CEAA application that there is not expected to be any significant vibration impact from the Rapid Transit system. Measurements have been made along the existing SkyTrain guideway under conditions where the guideway is elevated, at grade, and depressed in a cut. Under all conditions, the vibrations from the SkyTrain pass-by were significantly below the threshold for any adverse reaction of any kind based on the US National Research Council, National Academy of Sciences, Committee on Hearing, Bioacoustics and Biomechanics (CHABA) guidelines.

The Simon Fraser Health Region has commented to the Special Commission that vibration from pile driving in the vicinity of the Royal Columbia Hospital or near other sensitive facilities may be of concern. As a precaution, the RTPO should meet with staff of the hospital to determine if monitoring the potential impacts to

equipment at the Royal Columbia Hospital should be included as part of the Construction Environmental Management Program.

In review of the reporting from the RTPO, it appears that—except possibly in areas of very poor (soft) soils—ground-borne vibration from general construction activities is not likely to be of concern. However, two foundation-related activities—vibratory soil compaction and pile driving—could produce perceptible vibration in adjacent residences, particularly if the poor soils which would precipitate the need for such activities should extend to the foundations of these residences. In the case of pile driving, the vibration may be of lesser concern than the noise, depending on the type of pile driver being used (i.e., vibratory or impact type). If such vibration should create a problem, the only practical means of mitigating its effects would be to use a different method of compaction/piling, or to reduce the rate at which energy is fed into the ground, which would almost certainly extend the duration of the work.

8.0 SKYTRAIN OPERATIONS NOISE

8.1 NORMAL SKYTRAIN OPERATION NOISE

While noise impacts from normal SkyTrain operations are projected not to be significant in most locations, at this preliminary design stage they have been considered sufficient in three locations to warrant recommendation of mitigation in the form of guideway noise barriers. During the detailed design phase, the physical extent of these mitigation works must be defined and the possibility must be considered that a more detailed impact assessment could identify other locations warranting mitigation.

8.2 TUNNEL NOISE EFFECTS

It was observed in the BKL report that tunnels do not so much tend to amplify or increase the noise levels created by SkyTrain (at least not at any distance from the portals), as to “telegraph” the approach of a train. It was noted that if it is problematic in any location, this effect could be mitigated through the acoustic lining of short sections of tunnel. Also flagged was the potential noise impacts of tunnel ventilation systems. The Special Commission agrees with the RTPO’s suggestion that any such impacts would be fully mitigable.

8.3 SKYTRAIN STATIONS

The BKL report noted that there is a tonal character to the noise from SkyTrain as it enters and exits stations. This noise comes from the linear motor that is used for both acceleration and primary braking. The tones increase in frequency in discrete steps as the motor frequency is stepped-up to move the train out of the station. Once the train has reached normal travel velocity the pronounced tones have significantly diminished. While overall train noise levels are little changed during acceleration and deceleration, the tonal character makes the noise more noticeable. The BKL report makes no specific recommendations for mitigating this noise, but notes that “the stations will be located in the vicinity of areas of high motor vehicle traffic which will mask this tonal noise”. While it is expected that this may be generally true to some extent, it will become less so during the late evening and night-time, as traffic becomes less dense and provides less continuous masking noise.

Another issue around stations is the noise from the public address/paging system and door signals. The BKL report indicated that “these sources would be examined and means determined to contain noise from these sources within the confines of the platform”. Options to be considered in controlling this type of noise are given on page 14 of the BKL report. The Special Commission recommends that details of how this is to be accomplished should be provided in the detailed design.

In predicting SkyTrain $L_{eq}(24)$'s near stations, BKL applied a 3 dBA correction to reflect the effects of train noise tonality and other station-related noises.

8.4 COLLATERAL NOISE EFFECTS

The term “collateral noise effects” was used in the BKL report to describe the potential noise impacts of park-and-ride systems and from bus loops. While details of park-and-ride systems will be developed during detailed design phases, these facilities were not considered to be significant sources of noise impact. This is because they serve mostly light vehicles and their use patterns tend to match those of surrounding road systems.

Bus loops, on the other hand, due to the higher noise levels and protracted usage patterns, were recognized as significant potential sources of noise impacts. It was stated that, where necessary, measures will be considered in the design of bus loops to mitigate the noise of buses entering, idling and leaving the loops. The Special Commission recommends that consideration should also be given to the routing of buses to and from the local road or highway system, so as to minimize noise impacts on the surrounding community.

9.0 OTHER ISSUES REQUIRING FURTHER INFORMATION/INVESTIGATION

9.1 ROAD ALIGNMENT CHANGES

The BKL report noted that significant noise impacts could occur if major traffic arteries were realigned to accommodate SkyTrain construction. Locations where such realignments may occur therefore need to be identified at the detailed design phase. Potential mitigation measures were not discussed in the BKL report, but the options would likely be limited to roadside noise barrier walls and/or the use of open-graded asphalt, or quiet pavement.

9.2 TRAIN NOISE IN CURVES

Wheel-rail interaction in tight curves can create an intense squealing noise. The Special Commission recommends that, if the SkyTrain alignment is to include any curves which are tight enough to cause such squealing, the locations should be identified. If such curves are in the vicinity of noise sensitive areas, the RTPO's approach to mitigating/avoiding wheel squeal (though track lubrication or other methods) should be described as soon as possible.

The primary opportunity to minimize the potential for noise from wheel-rail interaction in tight curves is at the design stage. To date, information has not been available on the potential for curves in the preferred alignment to generate wheel squeal that might affect the nearest residences. While this may be an issue that has been taken into consideration in project design, more information to confirm this is recommended by the Special Commission.

9.3 TRACK SWITCHES

The BKL report (page 7) discusses the potential noise impact of switches and indicates that, while switch noise is not much louder than normal wheel-rail noise, it is of a different character and as a result is more noticeable. Switch locations should therefore be defined, and any need for special guideway barriers past the switches locations identified.

9.4 RAIL GRINDING

Regular rail grinding is required approximately monthly to maintain a smooth ride and reduce SkyTrain vibration and noise. Page 5-137 of the RTPO's *CEAA* application states that rail grinding takes place in the night-time hours when the Rapid

Transit system is shut down. In the past, grinding was very significant, as the grinders used were very noisy during pass-bys. However, these have been replaced with new grinding technologies which are much quieter. The present grinder, a Pandrol Jackson 8 Stone Rotary Grinder, moves quite slowly so that it does take a significant amount of time to pass a given area. At present, the rail-grinding system, when grinding, moves at approximately 5 km/h, and when moving from area to area travels at normal train speeds. When grinding, the system has a pass-by noise level of 79 dBA at 15m, which is not significantly different in level to a regular SkyTrain pass-by.

However, since it moves more slowly, these noise events will be longer—about two to three minutes. Therefore, for residences 30 to 60m from the guideway, rail-grinding noise would still have some potential for sleep disturbance. In this way, its noise impact potential could be roughly compared to that of a street sweeper.

9.5 MAINTENANCE

The problems with noise from the operation of the original SkyTrain were partially alleviated when a more consistent program of rail grinding and wheel maintenance was implemented. A commitment to a regular and comprehensive program of track and car maintenance will help keep potential noise levels from the wheel-rail interactions to a minimum.

In its *CEAA* application the RTPO has committed to provide regular maintenance of the guideway to ensure that operating noise levels are within established guidelines. The Special Commission notes that future discussion between the RTPO and GVTA should clarify how this commitment will be implemented.

SUMMARY

OF IDENTIFIED MITIGATION MEASURES

The Rapid Transit Project: Phase I Noise Issues Report presented a number of recommendations on measures to mitigate noise impacts from the accelerated project. Many of these measures would be effective if they are implemented by the RTPO.

In its *CEAA* application, the RTPO has set out a number of commitments which it notes to be minimum commitments. These are discussed where applicable in the following sections.

10.0 SKYTRAIN OPERATION NOISE IMPACT MITIGATION

10.1 GUIDEWAY NOISE BARRIERS

The installation of sound-absorbing guideway noise barriers was recommended in the BKL report at certain locations along the corridor (Site 10 – Horne Street, Burnaby; Site 11 – Salish Court, Burnaby; and Site 24 – East 12th Avenue, Vancouver), with the possibility of additional mitigation locations being warranted near Site 24 in the Grandview Cut area.

The RTPO's *CEAA* application reconfirms that three locations along the route will require mitigation in the form of acoustical barriers:

1. Grandview Cut from Broadway/Commercial Station to Nanaimo;
2. Lougheed Highway in the vicinity of Holdom Station; and
3. Lougheed Highway from west of Bell to Government/Austin.

These barriers will be provided along both sides of the guideway in vicinity of BKL monitoring Sites 10 and 11. The barriers will extend from approximately one block west of Bell to the Government/Austin Street crossing.

In the vicinity of Site 24 on south side of Grandview Cut, barriers will be provided for both guideways in this location, rather than just the near guideway. Requirements for additional mitigation of noise along the Grandview Cut by provision of guideway noise barriers will be reviewed in detail in final design.

The *CEAA* application also notes that Bridge Studios has been identified as an area of acoustical concern and that studies are ongoing to determine whether there are requirements for mitigation measures. The Special Commission recommends that the findings of the study and any mitigation measures proposed by the RTPO be made available to the public as soon as possible.

In areas slated by the RTPO for noise mitigation, there may be opportunities for local property owners to undertake improvements to their residences that may enhance the RTPO's noise mitigation measures. The RTPO could explore whether home improvement programs—such as BC Hydro's Power Smart—include opportunities for residents to install double-glazing for windows to make residences more energy-efficient. Windows are always the prime conduit by which sound gets in to residences, and therefore double-glazing has the additional advantage of mitigating noise impacts.⁵ Information about these programs could be made available to residents in areas where noise impacts require mitigation.

10.2 STATION NOISE CONTROL

The need for control of the noises created inside SkyTrain stations was identified at two locations—Site 17 at Holdom Street in Burnaby, and Site 21 at Kaslo Street in Vancouver. The mitigation options available were stated to include enclosing platform areas with glazing, acoustically treating ceilings, and reducing openings at guideway ends.

In its *CEAA* application the RTPO notes that:

- Where warranted, measures will be considered in design to cost-effectively reduce noise egress from the Rapid Transit Project station platform activities. Options that will be considered include acoustically treating ceilings and reducing openings at the guideway ends.

⁵ The Ombudsman's report, noted that a rebate scheme has several advantages. The property owner feels compensated in the sense that he or she is enabled to counter some of the negative impact on the property and thereby improve it. The rebate satisfies the inadequacy of compensation in that it addresses the subjective nature of the impact and ensures the taxpayer that public money is spent on improving the livability of the property rather than merely financing the owner's move to another community. Improving the individual property means the neighbourhoods will improve rather than deteriorate. (SkyTrain Report, Public Report No. 8, November 1987)

- Rapid Transit Project 2000 Ltd. will provide for acoustical treatment to reduce noise at Holdom Station. Need for mitigation at other stations will be reviewed in final design, and will be based on station design and proximity to residences.
- Where it will not detract from their function, paging and bell signalling systems will be adjusted for minimum noise levels and strategically located to reduce noise egress to the community. Rapid Transit Project 2000 Ltd. will ensure that these measures are applied for Holdom and Renfrew stations, as recommended by BKL.
- Rapid Transit Project 2000 Ltd. will ensure that ancillary systems will have suitable noise control measures incorporated into their design to reduce noise to acceptable levels both within the stations and to the community.

While the RTPO has committed to provide acoustical treatment at Holdom Station, the same commitment has not been made for Renfrew Station. Similar measures for Renfrew Station should be considered if, after review of final station design, there is still the potential for noise impacts to local residences.

10.3 BUS LOOP NOISE CONTROL

The RTPO notes in its *CEAA* application that changes in noise levels due to bus operations have the potential for significant impacts. Internal combustion buses are significantly noisier than automobiles and the SkyTrain itself. Although, generally, more buses are used during rush hour, there are typically still significant number of buses entering, idling, and leaving the bus loops in the early hours of the morning and late hours of the evening.

Proposed physical changes to the bus transit system to improve tie-ins to the accelerated SkyTrain project are limited to modification of the existing major bus exchange facilities at Lougheed and Brentwood malls, and development of a new off-street bus loop in conjunction with the station at Production Way. The new bus loop at Production Way will be located in the interchange area at Gagliardi and Production.

The RTPO also notes that changes in noise impacts associated with these changes to the existing bus system, or changes in bus operations, have not, to date, been assessed in detail for the accelerated project. The RTPO has noted that noise mitigation may be considered by others in the design of bus looping facilities, where necessary.

The potential impacts of noise from bus loops will need to be assessed once sufficient information is available to confirm the location of any new bus facilities associated with the accelerated SkyTrain project. If there is a significant potential for increased noise impacts on local residents, this will need to be mitigated. The Special Commission considers that the RTPO should take the lead in completing this assessment, although

the funding for mitigation measures (if measures are needed) may be subject to discussions between the RTPO and the GVTA.

10.4 CONTROL OF NOISE FROM TUNNELS, VENTILATION AND TRANSFORMERS/RECTIFIERS

Noise from tunnel ventilation systems and transformer/rectifier stations used to power SkyTrain may create impacts, but these can be mitigated where necessary with standard noise control technology. Impacts due to “telegraphing” of SkyTrain noise from tunnel portals could be mitigated by acoustically lining the portal areas.

The RTPO has noted in its *CEAA* application that noise from untreated tunnel ventilation systems can be addressed through design of adequate acoustical measures if necessary. Tunnel ventilation systems will have suitable noise control measures incorporated into their design to reduce mechanical noise to comply with municipal noise by-laws.

With regard to the telegraphing of SkyTrain noise from tunnel portals, the RTPO has noted that impacts are not expected to be significant. Should tunnel telegraphing prove to become an issue, the RTPO will provide for an acoustical retrofit of the tunnel(s) to reduce noise. For example, application of 50mm-thick acoustical sound absorbing treatment to the interior of the tunnel walls and ceiling for up to 15m from the portals will be considered. This treatment could take the form of sprayed cellulose or cementitious product, or mechanically-fastened glass fibre boards behind protective cover. The Special Commission agrees that workable measures exist to mitigate the telegraphing of SkyTrain noise from tunnel portals and can be implemented by the RTPO where necessary.

11.0 SKYTRAIN CONSTRUCTION NOISE IMPACT MITIGATION

The BKL report did not address construction noise in any depth, but implied that while the scope for practical control was limited, the impacts could be alleviated through thoughtful scheduling and hours of work restrictions. The *Construction Environmental Management Plan* requires contractors to employ the best available noise control measures and establishes the Owner’s right to have work stopped if the environmental monitoring staff observes the creation of “excessive noise”. Also, municipal by-law limits on hours of work and maximum noise emissions will apply.

The RTPO has noted in its *CEAA* application that guideway and station construction will produce noise and there are only limited means of noise control. Clearing and construction of the guideway, including installation of footings, will cause noises of

concern to some residents. A good percentage of station construction noise relates to installation of ancillary services such as washrooms, elevators, ventilation, and electrical services, and these activities normally have minimal community noise impact. The RTPO notes that scheduling and duration of construction activities will be developed in later phases of the project design. The RTPO's contract specifications will specify that the Contractor adhere to municipal noise by-laws that regulate construction noise and hours of construction work, and this will need to be carefully monitored.

The RTPO has stated that it will also encourage and support communication with residents to keep them informed of construction-related noise issues. The Special Commission notes that keeping local residents well informed, both in advance of and during construction, is a particularly important measure. The details of how this will be done should be reviewed and discussed by affected municipalities, regulatory agencies and local stakeholders well in advance of project construction.

12.0 CEAA REVIEW

The *Canadian Environmental Assessment Act (CEAA)* applies to projects for which the federal government holds specific decisionmaking authority. The *CEAA* sets out the responsibilities and procedures for the environmental assessment of projects involving the federal government. It establishes a clear and balanced federal environmental assessment process that helps federal responsible authorities (RAs) determine the environmental effects of projects before irrevocable decisions are made.

An environmental assessment is required under the *CEAA* if a federal authority exercises one or more of the following duties, powers or functions in relation to a project:

- Proposes the project;
- Contributes any form of financial assistance to the project;
- Sells, leases or otherwise transfers control or administration of federal land to enable the project to be carried out; or
- Exercises a regulatory duty in relation to the project, such as issuing a permit or licence or granting an approval, that is listed in the Law List Regulation.

The Canadian Coast Guard of the Department of Fisheries and Oceans (DFO) has determined that the accelerated project requires a permit under section 5(1) of the *Navigable Waters Protection Act (NWPA)* for the section of the route alignment that will cross the Brunette River. The Habitat Management Division of DFO has also determined that an authorization under section 35(2) of the federal *Fisheries Act* will be required for the construction works adjacent to the Fraser River in New

Westminster, as well as for the bridge crossings of several creeks.

The *Canadian Environmental Assessment Act* requires that DFO complete a screening level environmental assessment before a permit to cross the Brunette River or an authorization under Section 35(2) of the *Fisheries Act* are issued to the RTPO.

A screening level environmental assessment is a self-directed assessment in which the RA retains the greatest degree of management and flexibility over the scope and pace of the environmental assessment process. Screenings vary in time, length and depth of analysis, depending on the circumstances of the proposed project, the existing environment, and the likely environmental effects.

The RTPO filed its *CEAA* application with DFO on March 15, 1999. Copies of the *CEAA* application were distributed by the Special Commission to members of the Inter-Governmental Advisory Committee (IAC), were filed on the SkyTrain Project Registry and satellite registries, and the text of the application was also posted on the Special Commission's SkyTrain Project web site.

For the purposes of the Special Commission SkyTrain Review, the IAC members were given four weeks to review the *CEAA* application and provide written comments to the Special Commission. In support of the Special Commission's process, federal departments have provided timely feedback to the Special Commission and to the RTPO on the status of the *CEAA* review.

Various federal departments have noted in their comments to the Special Commission that, for some issues, more project information is needed from the RTPO before the *CEAA* review can be completed. The Special Commission and DFO had previously agreed that if the *CEAA* application was incomplete, DFO would identify the additional project detail required by federal authorities in order to complete the *CEAA* review, and these information requirements would be included in the Special Commission's *Biophysical Issues* and *Noise and Vibration Issues* reports. Based on advice from DFO, the issues that remain outstanding with regard to noise impacts and need to be addressed as part of the *CEAA* review are:

1. The potential for wheel squeal on curves should be determined and the approach to mitigation detailed.
2. The potential impacts of noise from new bus loops will need to be assessed. Planned approaches to controlling noise emissions from bus loops should be detailed and their anticipated effectiveness described.
3. At sections of the Loughheed highway (or at any other locations) where road widening will occur, the RTPO should indicate the worst-case change in dBA at buildings along these sections. Noise mitigation measures should be described if

projected noise impacts warrant mitigation.

4. Areas identified in the application as having minimal or modest potential for impact (*Environmental Assessment Report* – Table 5.4-3) should be reviewed to ensure that recommendations remain valid based on final design.
5. Locations identified by BKL as warranting guideway mitigation should be verified based on the finalized Skytrain alignment, traffic volumes, confirmed noise output of the MKII cars and confirmed noise output of track switches.

Some of this information may not be required in advance of the completion of the review as long as the RTPO commits to provide this information as part of its follow-up. The RTPO should consult with DFO for further guidance on the timing for provision of this information.

CONCLUSIONS AND RECOMMENDATIONS

13.0 CONCLUSIONS

Unlike portions of the existing SkyTrain route, the alignment of the accelerated SkyTrain project has been well-located, in terms of minimizing its potential for community noise impacts, by generally following existing major road and rail transportation corridors. It is generally true that introducing a significant new source of noise will create less impact where ambient noise levels are higher than where they are lower, particularly where the temporal patterns of the new noise source match those of the existing noise environment reasonably well.

However, where noise exposures are already higher than considered desirable for residential land use—the CMHC sets this threshold at $L_{eq}(24)$ 55 dBA—the amount by which these overall noise exposures can be further increased without causing significant additional impacts decreases in proportion to the increasing level of pre-project noise.

The majority of residential locations along the new SkyTrain alignment are currently exposed to noise in the $L_{eq}(24)$ 60 to 72 dBA range. Therefore, under various transportation noise impact assessment procedures⁶, significant, mitigable noise impacts would occur where project-related increases in $L_{eq}(24)$ or Day-Night

⁶ BC Ministry of Transportation & Highways Revised Noise Policy of 1993 and US Department of Transportation's Transit Noise and Variant Impact Assessment procedure of 1995.

Average Noise Level ⁷, or L_{dn} , are predicted to be only 2 to 4 dBA. The BKL report has somewhat conservatively predicted that changes in these 24-hour average noise levels due to direct SkyTrain operations would generally be less than 1 dBA. Where projected changes have been more than 1.5 dBA, mitigation has been recommended, based principally on projected maximum SkyTrain pass-by levels.

The greatest potential for noise impacts from the new SkyTrain route is likely to be associated with the isolated noise events of individual train pass-by and their potential for creating disturbance, particularly during the late evening, night-time and very early morning when residents are trying to get to sleep or stay asleep. The BKL report used an impact indicator based on how much the maximum SkyTrain pass-by noise levels would exceed the existing near maximum noise levels in the community as represented by the L_{01} (noise level exceed 1 per cent of the time). The report argued that if the pass-by levels did not exceed existing L_{01} 's during key night-time hours by more than 5 to 10 dBA, the potential for impact is minimal.

While this procedure evaluates the capacity of SkyTrain noise levels to cause sleep disturbance, it does not quantify this effect. The likelihood of waking or shifts to lighter sleep stages relates not only to the maximum level and duration of intrusive noise events, but also to the total numbers of such noise events during the night. It has been suggested to the Special Commission that a quantitative analysis of the potential for sleep disturbance—when final designs are available—would help determine whether any additional guideway noise barriers are needed to address this issue.

The RTPO's study of potential noise impacts has found that the noise impacts to the residents of the Fraserview area are not likely to be significant in relation to the already existing ambient levels. With regard to this finding, the Special Commission is concerned that the existing high levels are already a disruption for local residents and that the primary source of this noise is the high volume of truck and light vehicle traffic along Columbia Avenue between Braid and McBride. The Special Commission encourages the City of New Westminster, GVTA and the provincial government to examine strategies that would reduce these high noise levels.

⁷ The Day-Night Average Noise Level, or L_{dn} is similar to the $L_{eq}(24)$ except that it applies a 10 dBA correction to noise levels occurring during the night-time hours. However, due to the relatively high night-time traffic noise levels along the new SkyTrain corridor, projected noise impacts are very similar whether the L_{dn} metric or the $L_{eq}(24)$ is used.

14.0 RECOMMENDATIONS

1. Locations identified by BKL as warranting guideway mitigation should be verified based on the finalized Skytrain alignment, traffic volumes, confirmed noise output of the MKII cars and confirmed noise output of track switches.
2. The potential for wheel squeal on curves should be determined and the approach to mitigation detailed.
3. The potential impacts of noise from new bus loops will need to be assessed. Planned approaches to controlling noise emissions from bus loops should be detailed and their anticipated effectiveness described.
4. On the Lougheed Highway—or at any other locations—where road widening will occur, the RTPO should review its earlier studies to determine if the predicted worst-case change in dBA at buildings along these sections remain valid or whether any additional noise mitigation measures will be required at these locations. The results should be communicated to Health Canada.
5. The RTPO or the RTPO's Contractor should provide the municipalities with the details of the specific measures that will be taken to ensure compliance with municipal noise by-laws during project construction.
6. The RTPO should indicate to the municipalities and to the public if the RTPO foresees the need to apply for exemptions to permit night-time construction work on this project. If so, the RTPO should provide as much notice as possible of any such plans and should mitigate impacts through careful selection of the locations for night-time work and through equipment noise control measures.
7. Where construction will span municipal boundaries there should be consistency between municipalities as to the hours permitted for construction and the established procedures to deal with noise issues that may arise. A coordinated effort between the municipalities to set hours for construction and procedures for dealing with noise mitigation would be beneficial.
8. If impact pile driving of steel piles is necessary adjacent to residential areas, special noise control measures, such as partial or total enclosures of driver and pile, may be necessary to keep noise levels within the limits set by municipal by-laws. The RTPO should plan for this contingency.
9. If impact pile driving is necessary in the vicinity of the Royal Columbia Hospital, the RTPO should meet with staff of the hospital to determine if monitoring the potential impacts to equipment at Hospital should be included as part of the construction monitoring program.

10. The rationale behind BKL's selection of "Modest" impact areas for mitigation recommendation should be provided to Health Canada. This should include a description of the measurement procedure and prediction methodology used in projecting SkyTrain noise exposures at 15 m and at larger distances.
11. The RTPO's plans to communicate with residents to keep them informed of construction-related noise issues should be reviewed and discussed by effected municipalities, regulatory agencies and local stakeholders well in advance of project construction. The RTPO should also explore the possibility of creating a standing group of interested municipalities, regulatory agencies and stakeholders that could serve to disseminate information, facilitate two-way communication and assist with issue resolution.
12. As presented in the CEAA application the RTPO should ensure that areas identified in the application as having minimal or modest potential for impact (Table 5.4-3) are reviewed to ensure that recommendations remain valid based on final design.
13. As presented in the CEAA application the RTPO should take advantage of all opportunities to make use of natural features on the edge of the right-of-way, or at the property line of affected properties to reduce noise impact. Dedicated noise barriers (berms, barrier fences, retaining walls) should be considered during the detailed design stage where warranted.
14. The existing volumes of truck and light vehicle traffic along Columbia Avenue between Braid and McBride are a substantial source of noise for local residents. The Special Commission encourages the City of New Westminster, GVTA and the provincial government to examine strategies that would reduce these high noise levels.
15. In areas slated for noise impact mitigation measures, the RTPO—in cooperation with relevant provincial agencies—should investigate opportunities to promote programs for local property owners to undertake improvements to their residences where these improvements would help mitigate noise impacts.
16. If the RTPO amends its initial findings—based on final project design information—these amendments should be discussed with the appropriate regulatory agencies and municipalities and made available to the public.

NOISE APPENDIX 1

NOISE AND VIBRATION – POTENTIAL IMPACTING FACTORS

The RTPO has identified factors that may result in noise and vibration impacts at the design, construction and operation stages (including maintenance) of the accelerated project. These are presented in more detail in Section 5.4 of the RTPO's *Environmental Assessment Report*. They are summarized in this Appendix to the *Special Commission's Noise and Vibration Issues Report* to assist DFO with the preparation of a federal screening report.

The RTPO has also developed Prescribed Environmental Design Measures and Criteria in response to the potential noise and vibration impacts of the project. These are also described in Section 5.4 of the *Environmental Assessment Report* and will be subject to further review as part of the CEEA review process once more design detail is available for the project.

The RTPO notes that there are two broad factors that are applicable to assessing the impact of the insertion of a noise-producing source into a community. The first is the noise level that the source produces when compared to an absolute criterion, and the second is the amount that the source raises the ambient level in the community.

Within these two broad categories, specific potential impacting factors identified and addressed for the accelerated SkyTrain project are:

Design

- Alignment location in relation to distance of guideway from existing uses that may be impacted by noise;
- Alignment location in relation to ambient noise levels;
- Changes in location or operation of other noise-producing sources (e.g., road alignment changes) to accommodate the accelerated project route alignment;
- Railcar features—type and design specifications as they affect levels of noise generated;
- Guideway design features as they affect noise attenuation/modification, including at-grade or elevated guideway and noise-mitigating measures;
- Tunnel design features, including potential for “telegraphing”, and design for noise mitigation; and
- Station location and design features, including design for noise mitigation.

Construction

- Type and noise levels of construction equipment and methods and proximity to existing uses; and
- Construction schedule and hours of operation.

Operation

- Guideway maintenance, including rail grinding methods;
- Railcar operations parameters; and
- Station operations parameters, where applicable.

BIOPHYSICAL
ISSUES

REPORT

MAY, 1999

SPECIAL
COMMISSION
SKYTRAIN
REVIEW



BIOPHYSICAL ISSUES REPORT

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APPENDICES ACCOMPANYING BIOPHYSICAL REPORT

**Biophysical Appendix #1: Vegetation, Wildlife and Aquatic Habitat—
Potential Impacting Factors**

INTRODUCTION

In the *Interim Report* the Special Commission summarized the RTPO work completed as of December, 1998, identified the key environmental issue categories and scoped issues into either system-wide or site-specific issues. This *Biophysical Issues Report* examines the RTPO's assessment of the potential impacts of the accelerated project on the biophysical environment.

In the course of its work, the Special Commission has gathered advice and comment from many sources. Government agencies have provided comment and advice through the Inter-Governmental Advisory Committee (IAC) on a continuing basis.¹ On February 2nd and 3rd, 1999, the Special Commission conducted an intensive two-day Technical Workshop on the potential biophysical impacts of the accelerated project, which involved RTPO staff and consultants, government reviewers and key stakeholder groups. On February 15th and 16th, 1999, there were Public Meetings where stakeholder groups and members of the public made presentations on their issues of concern.

1.0 SPECIAL COMMISSION REVIEW AND CANADIAN ENVIRONMENTAL ASSESSMENT ACT REVIEW

The Special Commission reviewed the accelerated project under the Terms of Reference provided by Cabinet. The project is also subject to a federal review under the

¹ The Special Commission established the IAC to facilitate cooperation and information exchange between federal, provincial and regional government agencies. The IAC reviewed information provided to the Special Commission by the RTPO and offered technical analysis and strategic advice on matters such as the scope of the concerns, issue identification and resolution, and public consultation.

Canadian Environmental Assessment Act (CEAA) for which the Department of Fisheries and Oceans (DFO) is the lead responsible authority. The Special Commission and DFO have been working together to coordinate their reviews and share information.

In its *Interim Report* the Special Commission noted that a series of key issue reports would be prepared by the Special Commission at the end of March, 1999. In late February it was confirmed that the RTPO would file an application (an *Environmental Assessment Report*) for federal approval under the *CEAA* in early March. It was anticipated that the *CEAA* application would contain more detailed information than the RTPO had previously made available to the Special Commission.

To ensure that the Special Commission reports were current, and to continue the coordination of the provincial and federal review processes, the Special Commission extended the timelines for its issues reports, allowing an additional four weeks for review of the *CEAA* application by members of the Inter-Governmental Advisory Committee. This report is the product of that review and the commentary and advice provided to the Special Commission by the IAC.

The Special Commission and DFO had previously agreed that if the RTPO's *CEAA* application was incomplete, DFO would identify the additional project detail required by federal authorities in order to complete the *CEAA* review, and these information requirements would be included in the Special Commission's *Biophysical and Noise and Vibration Issues* reports.

The RTPO filed its *CEAA* application with DFO on March 15, 1999. After a four-week review of the application, federal review agencies have noted that, for some issues, more project information will be needed from the RTPO before the *CEAA* screening can be completed. These information requirements are presented in Section 12.0.

2.0 RTPO REPORTING

The *Environmental Assessment Report* is the most comprehensive piece of documentation provided by the RTPO. It consolidates much of the information contained in earlier reports and supporting environmental documentation and includes some new information not reported previously. The RTPO notes that the *Environmental Assessment Report* consolidates or supercedes information provided in earlier studies. The Special Commission has drawn heavily from the information in the *Environmental Assessment Report*.

In addition to the *Environmental Assessment Report*, the RTPO's environmental impact assessment is provided in several reports that have been submitted to the

Special Commission since the start of the review. The RTPO's reports are based on literature review, field visits and expert judgement, and were completed by reputable experts in the areas of fish, wildlife and vegetation.

In terms of impacts to the biophysical environment, the predominant feature of the accelerated project is the approximately 21km guideway. It has a right-of-way requirement of 7.6m with an additional 1m on each side for vegetation management to keep the train right-of-way clear of vegetation as an operational and safety requirement. For impact assessment purposes the total right-of-way width was defined by the RTPO as 10m.

The RTPO has identified several key components of the terrestrial environment, which are potentially impacted by the development of the SkyTrain project. These are soils, vegetation, wildlife and wildlife habitat. There are also key components of the aquatic environment that may be impacted by the accelerated project, including: fish and fish habitat in streams and rivers; water quality in streams or surface drainage, and groundwater flowing into streams; and stream riparian zones. Generally speaking, riparian habitat is the vegetation adjacent to a stream, river or lake. This area may extend anywhere from 5 to 50 meters from the edge of a water body. Habitat (trees, vegetation and wildlife) beyond this distance are usually referred to as terrestrial habitat.

In the context of the accelerated project, the potential for impacts to the aquatic environment has been an area for greater focus given the number of stream crossings along the route, as well as the crossing of the Brunette River and the section of alignment adjacent to the Fraser River in Sapperton. The potential for terrestrial impacts is most pronounced in the Grandview Cut.

The issue areas that have been reviewed by the RTPO and reported in the *Environmental Assessment Report* include:

Terrestrial Environment:

- Cedar Cottage Park;
- Grandview Cut;
- Vegetation east of Grandview Cut;
- Trees along Lougheed Highway;
- Vegetation between the CP and BNSF rights-of-way, New Westminster; and
- Vegetation in the vicinity of New Westminster tunnel and tunnel portal.

Aquatic Environment:

- Chubb Creek crossing;
- Beecher Creek crossing;

- Eagle Creek crossing;
- Stoney Creek crossing;
- Brunette River and tributary crossing; and
- Fraser River foreshore, New Westminster.

3.0 SUMMARY OF PUBLIC ISSUES

- In public comments on the potential biophysical effects of the accelerated project, the most common issue raised has been that the proposed route alignment will infringe on green space and environmentally sensitive areas. Areas of particular public concern that have been identified were the Grandview Cut, stream crossings along the Lougheed corridor (e.g., Chubb Creek, Beecher Creek, Eagle Creek and Stoney Creek), the Brunette River, and Fraserview/Sapperton Reach. Some suggestions have been made by members of the public that the route alignment should use existing corridors and be planned around green space and trees.
- Where there has been public concern about impacts at stream or river crossings, members of the public have recommended that caution be used in constructing works at or near stream crossings, Stoney Creek in particular, and along Fraser and Brunette Rivers. Slope stability along the Grandview Cut has also been cited by members of the public as potential problems during construction. There have been several references to the importance of proper monitoring and enforcement of environmental standards during project construction and the need for effective mechanisms to ensure action and follow-up in the event of non-compliance with standards by any of the project contractors.
- There have also been public calls for more detailed environmental impact assessments and a particular concern that it be demonstrated that the accelerated project will get people out of their cars. The issue of ridership has been of much concern to the Coalition for Skytrain Review and the Coalition has commented that more information on ridership is needed from the RTPO.
- These public issues and concerns are among the issues presented in this Special Commission report and are similar to some of the issues raised by government agencies. The Special Commission's complete report on public comments is available through the Environmental Assessment Office project registry and is also posted on the Special Commission's SkyTrain Review web site at: <http://www.skytrainreview.gov.bc.ca>

The Special Commission has also reported on the issues raised by the public in the Special Commission's Public Consultation Report.

ASSESSMENT OF IMPACTS FROM PROJECT DESIGN, CONSTRUCTION AND OPERATION

4.0 FACTORS WITH THE POTENTIAL TO IMPACT THE BIOPHYSICAL ENVIRONMENT

In the *Environmental Assessment Report* the RTPO has provided a good summation of the various types of factors that may result in impacts at the design, construction and operation stages (including maintenance) of the project. These are presented in the report in relation to vegetation, surface water quality, groundwater quality and aquatic habitat. The list of factors are described at length in Sections 5.2 and 5.3 of the RTPO's *Environmental Assessment Report* and are summarized in Biophysical Appendix #1 of this *Biophysical Issues Report*.

5.0 DISCUSSION OF PROJECT DESIGN ISSUES

5.1 ROUTE SELECTION

Field work for the RTPO's site-specific environmental assessment studies was done in November and early December, 1998². The findings from these studies formed part of the process for review of several route alignment options and the development of

² Previous field work was also done to develop the RTPO's *Environmental Management Analysis Compendium* (October 1998) and the *Update Report* (October 1998)

the preferred alignment as presented in the *Preferred Alignment Report* submitted to the Special Commission in January, 1999.

To select the preferred alignment the RTPO combined these analyses with input from municipal councils, staff and the public. Evaluation criteria were developed by the RTPO to address social, environmental, customer service, cost and construction feasibility issues. The evaluation criteria were developed in particular to address concerns raised in the *Ombudsman SkyTrain Report: Public Report No. 8*, November 1987:³ and were presented to the public at RTPO open houses as part of its Neighbourhood Consultation Program, along with an explanation of their objectives and how the criteria could be quantitatively or qualitatively measured. Public input on the comprehensiveness of the list of criteria, as well as fairness and objectivity of measurement, was invited by the RTPO.

5.2 DESIGN-BUILD PROCESS

The RTPO has chosen a design-build process for the construction of the guideway of the accelerated project. This is a competitive bidding process where contractors or consortiums are invited to prepare project designs based on sets of general and specific project specifications guidelines and design criteria issued by a proponent. The bids are then reviewed and evaluated by the proponent to identify a preferred bid that meets the project criteria. The RTPO notes that it has adopted this approach for the guideway because it:

- Allows innovation in development of designs; and
- Permits the constructors to fully participate in the design to ensure that construction feasibility issues, including impact avoidance, are properly considered in the selection of guideway elements.

The RTPO notes in its *Environmental Assessment Report* that preliminary engineering design has been carried out to provide a base for the detailed design work to be undertaken by the Design/Build Contractors. In addition, site specific environmental design criteria (span lengths and column locations) have been defined by the project engineers and environmental specialists, as required, to guide the Design/Build Contractors in environmentally sensitive areas. These design criteria have been incorporated in the RTPO's impact assessments.

³ The Ombudsman's 1987 report on the original SkyTrain project focused on five key issues—privacy, view and shadowing, excessive noise, property values and community perception. The first three factors have been addressed in the evaluation criteria and preferred alignment and station location selection.

The RTPO also notes that design alternatives will be limited to the horizontal and vertical alignment and station locations already established. The Design-Build Contractor will receive, and be required to meet, general and specific environmental parameters from the RTPO. This will include strict limitations on column placement and work zone in environmentally sensitive areas, and construction environmental management requirements. The RTPO has stated that the accelerated project details that are apt to affect the biophysical environment (i.e., basic dimensions and characteristics of the guideway elements and stations, and the construction and operation of the SkyTrain project) are well known, based on experience with the existing SkyTrain facility.

If the Design-Build Contractor develops improvements and innovations to basic design parameters used by the RTPO these changes would be required by the RTPO to equal or better the environmental design and performance standards defined in its *Environmental Assessment Report* and committed to the RTPO. The Design-Build Contractor would be responsible for providing the required information needed to obtain any necessary approvals for any such changes from the pertinent environmental review and regulatory bodies.⁴

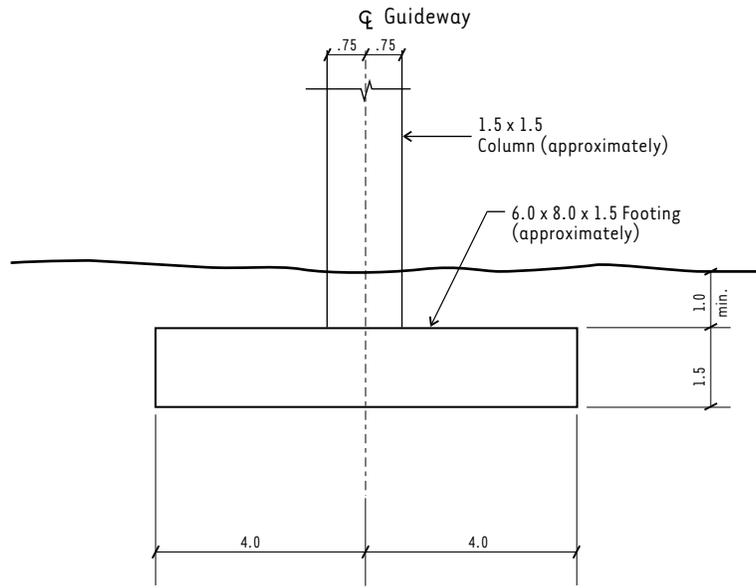
One challenge for regulatory agencies in assessing the accelerated project's impacts to the biophysical environment is that the level of project detail needed to quantify and confirm the disturbance to terrestrial and riparian habitat—in particular at stream crossings, along the Fraser River and in the Grandview Cut—is not yet available. Another difficulty with a design-build approach from an environmental assessment perspective is that it may limit the ability of regulatory agencies to confirm that impacts to the environment are minimized before a proponent makes major contractual commitments.⁵

For example, the centreline of the route alignment has been defined and the preliminary design drawings have identified the expected locations of the guideway columns at stream crossings and along the Fraser River. What remains to be determined are the actual dimensions of the footings for these columns. There are two basic designs for column footings. Spread footings are used where stable sub-surface materials are near the surface. Spread footings would have a concrete foundation 6m x 8m x 1.5m, constructed about 1m below the ground surface (see Figure 1). Pile cap footings are used where the stable subsurface material is located further below the surface, such as on the Brunette River and Fraser River foreshores. In pile cap footings, a matrix of pipe piles are driven down to the hard stratum and then capped by a concrete pad 6m x 8m x 1.5m. The depth of the

⁴ While the design-build process does leave room for development of project designs that exceed the environmental design and performance standards defined by the RTPO, it is unclear if there is an incentive for this to occur.

⁵ CEEA legislation requires the Responsible Federal Authority (DFO) to ensure that an environmental assessment of the project is conducted as early as is practicable in the planning stages of the project and before irrevocable decisions are made.

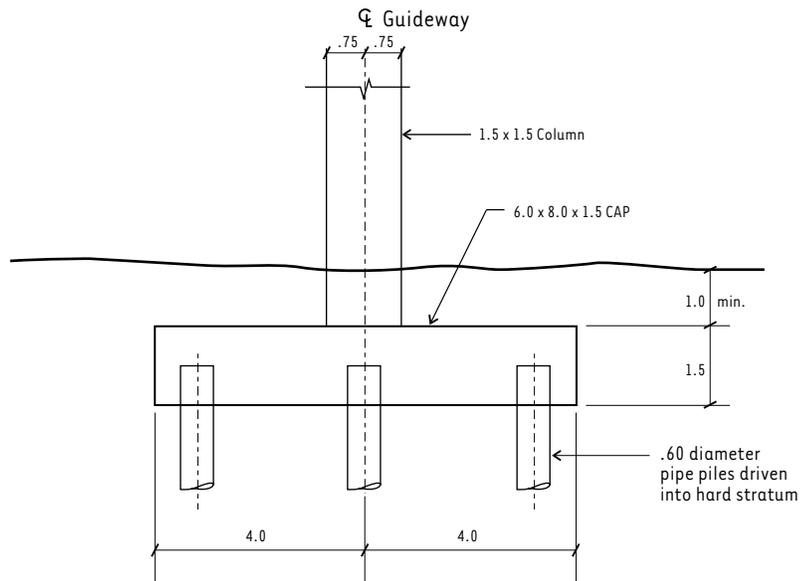
FIGURE 1: SPREAD FOOTING TYPICAL GUIDEWAY FOUNDATIONS



These are typical maximum dimensions (in meters) but could be larger in some cases.

All Dimensions Approximate
(Source: Rapid Transit Project 2000)

FIGURE 2: EXCAVATION TYPICAL GUIDEWAY FOUNDATIONS



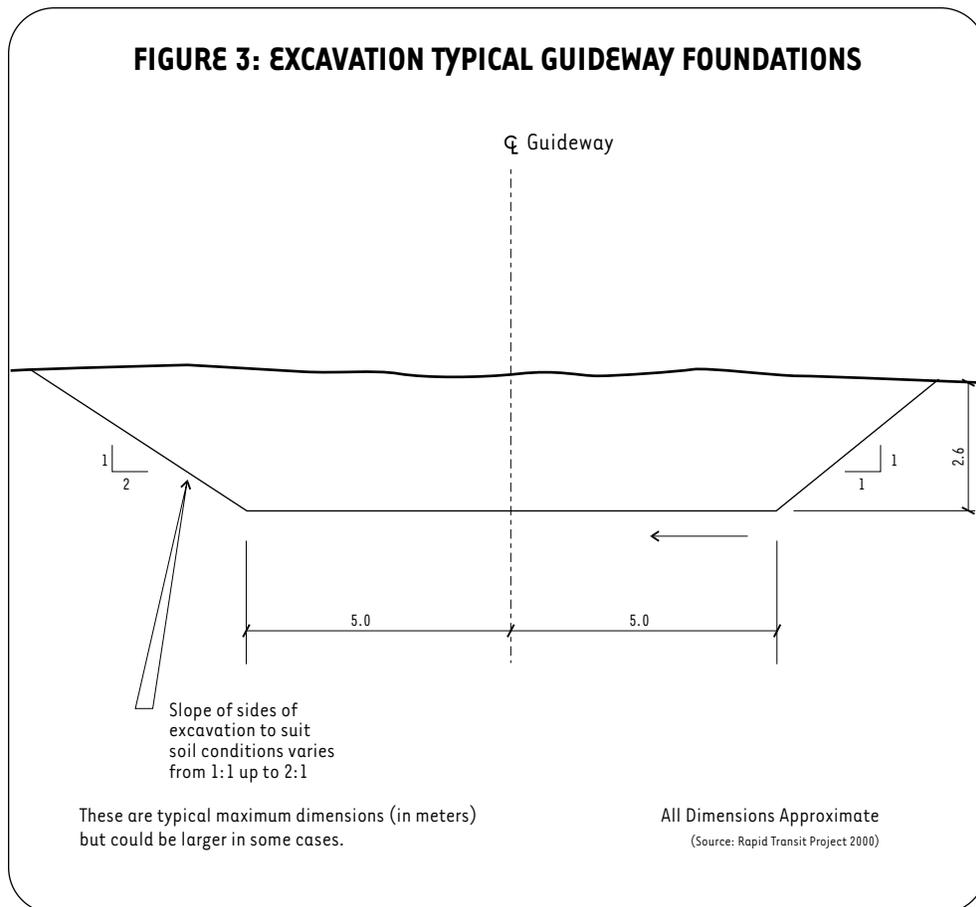
These are typical maximum dimensions (in meters) but could be larger in some cases.

All Dimensions Approximate
(Source: Rapid Transit Project 2000)

pad can vary from flush with ground surfaces to 1m deep, depending on site conditions (see Figure 2).

The RTPO notes that the size of excavations for column footings can vary depending on the soils and the corresponding steepness of the side slope of the excavation that can be tolerated (see Figure 3). It is therefore difficult to know at the preliminary design stage what the dimensions of the excavations for footings will be in environmentally sensitive areas such as the Fraser River foreshore or Stoney Creek. Given that requirements for mitigation or compensation are linked to the degree of surface disturbance from project construction, the issue of required mitigation or compensation—unless a very conservative approach is taken—is difficult to resolve prior to review of detailed design drawings.

On a general level, the potential impacts to the biophysical environment of the accelerated project have been identified although the full extent of these impacts remain unconfirmed until the detailed design information for certain locations is available for review by regulatory agencies. In locations where mitigation and/or compensation is required, review agencies have determined that the full extent of



the mitigation and compensation needs can be confirmed with more detailed design information.

5.3 STATION LOCATIONS

The RTPO in its *Environmental Assessment Report* has reported on the various planned and future stations and the potential for impacts to the biophysical environment from these stations.

A total of 11 new stations will be constructed at the time of transit line construction. Provision has been made to add another four stations in the future, as required to meet passenger demand. Of the current or future stations, four of these are identified by the RTPO as having the potential for impacts at the time that the stations are constructed:

1. *Grandview Station* (Future): Elevated side platform station near crest of Grandview Cut west of Nanaimo Street. May require clearing in the Grandview Cut in the future.
2. *Rupert Station* (Current Project): Side platform station east of Rupert Street, in industrial area north of the BNSF tracks. Some loss of marginal shrub vegetation.
3. *Sapperton Station* (Current Project): Elevated centre platform station between CP and BNSF tracks with access from Keary Street across Brunette to the Royal Columbian Hospital. Impacts on vegetation along drainage ditch in this area.
4. *Woodlands Station* (Future): Impact assessment for tunnel and transit line construction in this area includes biophysical impacts that would be associated with future construction of a Woodlands Station.

Another future station that may have a potential for environmental impacts, and is not identified as such in the *Environmental Assessment Report*, is a possible future station at Braid. It has been noted in the Special Commission's *Connectivity and Operational Issues Report* that a station at Braid would significantly enhance the overall efficiency and effectiveness of the transit system, and particularly SkyTrain-to-bus connectivity. There are potentially water quality and local air quality impacts from park-and-ride facilities that may be included in a future station at Braid, and from the potential for traffic congestion in the area of the station. The Special Commission recommends that the RTPO include a future Braid Station in the list of possible future stations with the potential for environmental impacts.

The Special Commission has noted in its *Connectivity and Operational Issues Report* that the locations of stations along Lougheed Highway create some special safety concerns related to connectivity. The safety concerns can be addressed, but this may require acceleration and deceleration lanes approaching stations to accommodate vehicles

stopping to drop passengers off at these stations. Were this measure adopted by the RTPO, the potential for biophysical impacts would need to be assessed.

5.4 ROAD WORKS

At this stage of project development, it has been difficult to identify the extent of any required alterations to existing roadways to accommodate the new guideway where the guideway follows the centreline of the highway. For example, if road widening is needed along the Lougheed Highway near existing streams, trees or green space, this could potentially have impacts to the biophysical environment which have not been identified in the existing environmental assessments.

In a letter to DFO (April 9, 1999), the RTPO has committed that the only place the accelerated project design may require road widening is where the guideway is located in the highway median of the Lougheed Highway. At these locations it may be necessary to widen the highway by up to 2m on either side. The only stream crossing where the guideway is located in the highway median is Eagle Creek, and the RTPO notes that at this location the culvert that the creek passes through is under the highway and will not have to be widened. Road widening will be limited at this section by including a narrower shoulder lane.

The *Environmental Assessment Report* elaborates that the road widening will require some roadside vegetation to be cleared in the vicinity of the stream crossing, but that the culvert will not have to be replaced. It is expected that the fill slope at the culvert will be steepened from a current slope of approximately 2:1 to a slope of 1.5:1. By steepening the fill slope over the culvert, the RTPO anticipates that the toe of the fill slope will only have to be moved a short distance closer to the creek, if at all. This would ensure that the widening minimizes the reduction in the amount of riparian habitat. The Special Commission considers that these design measures are adequate to minimize impacts to Eagle Creek from road widening, as long as they are adhered to—or improved upon—prior to the start of construction at this location.

The other location where there has been public concern about the impact of road widening on existing trees is the Bell Avenue area. Residents of the high-rise towers on Salish Court and Timberlea have been concerned that the accelerated project will require the removal of a band of trees between their high-rises and Lougheed Highway. This is perceived by the residents not only to be an unwelcome loss of existing vegetation, but also to have a negative impact on the existing aesthetics, because the loss of trees would make the traffic on Lougheed Highway and the guideway more visible. The RTPO has noted that the centreline

option with no station at Bell is, from an environmental perspective, the preferred alignment because it results in the least impact to trees on both sides of the highway and offers greater opportunity for mitigation by replanting and enhancing tree screens.⁶

5.5 RELOCATION OF UTILITIES

There is the potential for impacts to riparian areas, trees or greenspace if the relocation of existing utilities (e.g., hydro lines) is required and additional right-of-way must be cleared to adjust an existing utility corridor. Two locations where the RTPO has already identified the need to relocate utilities are at the Brunette River crossing and in the Grandview Cut. Done properly, the relocation of hydro lines at the Brunette River crossing will only require the destruction of a small area of riparian habitat for the pole footing, which can be compensated for at the site. There is more concern with the relocation of the utility line on the north side of the Grandview Cut. In this case, it is recommended that the line be encased in a conduit affixed to the guideway or buried, to avoid the need for clearing of a new corridor for the utility poles and consequential loss of vegetation.

5.6 ANCILLARY FACILITIES

5.6.1 Bus Interchanges and Park-and-Ride Facilities

There are no park-and-ride facilities for this project as currently planned. Interface with bus transit services will primarily involve existing street transfer points, although there will also be minor off-road bus connection points near Holdom, Sperling, and Production Way. There are modifications to two large existing bus loops that will be required at Brentwood and Lougheed malls. The RTPO predicts that modifications to these facilities will occur within the existing developed area of these malls and, as such, no incremental biophysical impacts are anticipated.⁷ However, the Special Commission notes that the reconfiguration of the bus exchange at Brentwood Mall away from the existing location could require changes to the local road network in order to accommodate the turning movements of buses.⁸

⁶ The Special Commission acknowledges that the City of Burnaby has a keen interest in the construction of a station at Bell Avenue. The extent to which a centre-alignment with a station at Bell would require the removal of trees has not been reported by the RTPO.

⁷ The main potential impact from new bus interchanges is noise, and this is discussed in the Special Commission's *Noise and Vibration Issues Report*.

⁸ SkyTrain-to-bus connectivity is discussed in the Special Commission's *Connectivity and Operational Issues Report*.

5.6.2 Power Substations

There is considerable flexibility in locating power substations within station facilities or in appropriate locations within, or even across the street from, the guideway right-of-way. With the exception of one substation which may be located in the Grandview Cut in conjunction with the modifications to the Broadway/Commercial Station, no substations will be located in the vicinity of identified, biophysically sensitive areas. At all substation locations, including the one at Commercial, no significant incremental biophysical impacts, which would be additional to those already identified for guideway and station development, are anticipated by the RTPO.

5.6.3 Control, Maintenance and Storage Facilities

The maintenance facilities for the existing SkyTrain will be expanded to include new storage tracks and a new maintenance building to service the MKII cars. All development will take place on the existing Skytrain Operations and Maintenance Centre site. No additional clearing or site preparation is required. The existing maintenance site was originally reclaimed from an old dump area which was stabilized and prepared with compacted gravel at the time of initial facility development. Additional storage tracks and the new maintenance building will be constructed within the existing prepared site.

The expanded maintenance facilities may include an improved automatic car washing facility with on-site capabilities for complete treatment of wash water prior to discharge to the municipal sanitary sewage system. As part of the new development, all waste and materials storage and handling facilities will be centralized for improved efficiency and management. No incremental biophysical impacts are anticipated with expansion of this facility.

5.7 RELATED PROJECTS

The RTPO reports that a number of projects will be carried out in conjunction with construction of the accelerated project. The majority of these (e.g., utility relocations) will result in localized temporary effects in already developed and modified areas. Two projects will involve incremental effects in sensitive areas:

5.7.1 Upgrading Nanaimo Street Bridge

This bridge will be widened by about 5m during the construction of the accelerated SkyTrain project, increasing the area of impact of this facility on the Grandview Cut.

The Lakewood Bridge will also be upgraded, but the area of impact in the Grandview Cut will not be significantly increased in relation to the impact of SkyTrain project construction itself.

5.7.2 New Transmission Structure at the Brunette River Crossing

Installation of a new transmission structure on the existing BC Hydro transmission line at the Brunette River crossing will be needed. In order to obtain sufficient clearance in relation to the accelerated project, the structure will require a 1200mm diameter concrete caisson located on the south side of the river, about 25-30m upstream of the alignment and about 5m from the top of bank.

The Special Commission notes that the RTPO will need to confirm that these are the only existing utilities that may need relocation as a result of the project. The RTPO is advised to confirm with municipal authorities that all utilities which could be impacted by the project, in particular any underground utilities, have been identified.

6.0 GEOTECHNICAL ISSUES

Among the issues raised by members of the public and government reviewers is the possibility that there are some sensitive terrain sites along the route alignment—in particular the Grandview Cut, Stoney Creek and the Fraser River foreshore—and the potential for impacts from construction.

Early availability of information to the Special Commission on the geotechnical conditions at these sites could have facilitated assessment of alignment and construction options.

The geotechnical information provided to date by the RTPO has been limited.⁹ The geotechnical studies that have been done provide the basis for the preliminary engineering (Golder Associates, 1999; Knight Piesold Ltd et al, 1999; Klohn Crippen, 1998). The RTPO has stated that detailed geotechnical studies will be conducted commensurate with detailed design as part of the design-build process.

There may be some sensitive terrain sites along the route alignment which could affect how the accelerated project is designed and constructed in these areas. For example, the slopes of the Grandview Cut can be prone to sloughing, so it may be necessary—either during project construction or project operations—to build retaining walls to maintain slope stability. These retaining walls would have environmental impacts, in

⁹ Geotechnical information was provided to DFO on March 24, 1999 consisting of study information on stream crossings compiled in December, 1998 and study data for the Sapperton area compiled in February, 1999.

addition to the impacts of the guideway and pillars. More detailed geotechnical information is needed as part of the assessment of the potential impacts of the project on the Grandview Cut (an area of steep slopes with active slumping), and the Stoney Creek crossing (a fish stream in an area of varied terrain types, some with steep slopes).

In the case of the section of tunnel in New Westminster, the RTPO has stated that in the detailed design phase of the project the RTPO and/or the Contractor will conduct site-specific investigations, including hydrogeological and geotechnical evaluations. Based on site-specific data, the measures required for design, construction and operation for groundwater management slope stabilization, and for drainage and erosion control to prevent or mitigate impacts during construction and operation, will be identified.

There has been limited information provided by the RTPO on seismic issues. The *Environmental Assessment Report* notes that the project will be designed for a 1 in 475 year earthquake. Information obtained from BC Hydro by the Special Commission provides a regional perspective of the liquefaction potential for the Lower Mainland (BC Hydro *Report H2474*). This report identifies and maps the distribution of liquefaction potential for different material types. Based on this report, some segments of the SkyTrain route traverse areas that have high liquefaction potential. Information on project design for areas of high liquefaction should be part of the RTPO's additional reporting on geotechnical issues.

7.0 PROJECT CONSTRUCTION ISSUES

The majority of the potential impacts to the biophysical environment are associated with the construction phase of the accelerated project. To assess and address these potential impacts, the RTPO conducted a series of site-specific studies that were incorporated with additional information on the project in the *Environmental Assessment Report*.

These include studies of contaminated sites, and site-specific studies of the Grandview Cut, stream crossings along the alignment, the Brunette River crossings, and the Fraser River foreshore. One general commitment of the RTPO is that there will be no clearing of riparian vegetation for materials storage, construction laydown, or sedimentation ponds.

Accordingly a key focus of the RTPO's impact assessment for the aquatic environment as related to the accelerated SkyTrain project is the riparian zone.

7.1 CONTAMINATED SITES

The RTPO's *Environmental Management Analysis Compendium* included an overview section on potentially contaminated soils and groundwater. It was reported that contaminants associated with both historic and current land uses have the potential to impact the soils and groundwater at their site of origin as well as adjacent sites

Potential for environmental contamination was classified from low to high and, in general, according to category of land use. Land uses predicted to pose the highest potential for environmental contamination include industrial facilities, as well as gaso-line service stations and auto dealerships due to the presence of underground fuel storage tanks. Commercial and light industrial land uses were seen as having moderate potential for environmental contamination. Land uses least likely to pose concern for environmental contamination to the SkyTrain corridor were included undeveloped/park lands, institutions and residences.

The potential to encounter significant environmental liabilities related to soil and/or groundwater contamination along the length of the proposed route was examined in more detail on behalf of the RTPO and reported in the document *The Preliminary Environmental Evaluation for Rapid Transit Project 2000, Glen Drive. Vancouver to Columbia Street, New Westminster* (Golder Associates, January 21, 1999).¹⁰ The intent of the study was to identify and evaluate the potential to encounter significant environmental liabilities related to soil and/or groundwater contamination along the length of the proposed route, and to aid in alignment selection, property acquisition strategies and negotiations and in the preparation of cost estimates.

The RTPO notes in the *Environmental Assessment Report* that more refined assessments of the potential for soil and groundwater contamination will be conducted as route selection is finalized, as engineering design is refined, and as further information is required for property acquisition.

The RTPO states that on the basis of the findings of the Golder report, most of the area traversed by the accelerated project has low risk potential for environmental contamination. A high potential for environmental contamination exists at several locations along the route, however, from soils and groundwater on land to be incorporated into the accelerated project right-of-way. The RTPO recommends site investigations for all sites where moderate-to-high contaminant levels exist, or could migrate from upslope areas. Remedial measures to ensure that no contaminants reach water-courses along the route are to be instituted before the properties are used for the

¹⁰ A copy of this document was not provided to the Special Commission although in the Environmental Assessment Report the RTPO states that the study is available on request from the RTPO.

accelerated SkyTrain project. Site investigations will be conducted in accordance with the provincial standards (*Waste Management Amendment Act, 1993*) for assessments of contaminated sites. Site remediation and disposal of contaminated materials will be implemented where necessary. Professional consultants and/or contractors with the necessary qualifications and experience will be retained for this work.

It has been noted by several regulatory agencies, and is also noted by the Special Commission, that the information supplied to date is not specific and implies that issues arising from contaminated soils will be dealt with when and if they are encountered. This approach may give rise to future difficulties, given the complexity of some problems of this nature and the time needed to resolve them.

DFO has commented that provincial contaminated sites legislation will apply to construction on municipal, provincial or fee-simple lands, and the federal government would take the lead in setting criteria for contamination issues on federal lands. Resolution of these issues can be both costly and time-consuming, and may involve both up-front remediation requirements as well as long-term management of any residual contaminants. Construction on contaminated lands, regardless of ownership, could give rise to *Fisheries Act* section 36 issues relating to groundwater and storm drainage.

The Special Commission agrees with DFO that, in the absence of information on whether or not the right-of-way crosses any potentially contaminated lands and on the ownership of any such lands, the subject of contaminated sites is an unresolved environmental issue at this time. The Special Commission advises the RTPO to address this information gap prior to the start of project construction.

7.2 EVALUATION OF THE METHODOLOGY FOR THE SITE-SPECIFIC REPORTS

In assessing the potential site-specific impacts of project construction on terrestrial and aquatic resources, the *Environmental Assessment Report* draws heavily on information previously submitted to the Special Commission including information from the following reports:

- Environmental Assessment of Brunette River Crossing (December, 1998)
- Environmental Assessment of Stoney Creek Crossing (December, 1998)
- Environmental Assessment of Beecher Creek Crossing (December, 1998)
- Environmental Assessment of Eagle Creek Crossing (December, 1998)
- Environmental Assessment of Chubb Creek Crossing (December, 1998)
- Environmental Impact Assessment - Sky Train Segment 7 – Sapperton Reach, Fraser River Alignment Option (December, 1998)

- Potential Impacts and Mitigation Strategy: Vegetation, Fish and Wildlife Along the Grandview Cut (version 2.0)

The Special Commission's review of these site-specific reports considered the level of inclusiveness (i.e., identification of all key issues and concerns) and the level of detail (i.e., provision of sufficient information in support of study conclusions) used in the analysis.

The following general observations, on the *Environmental Assessment Report* draw on previous review of the site-specific studies and from comments provided by IAC members.

7.2.1 Level of Detail Regarding Impacts to Fish Habitat

There is a need for more specific information on the amount of fish habitat that will be impacted at stream crossings during construction and operation of the project to determine the feasibility or effectiveness of mitigation measures that have been suggested in the *Environmental Assessment Report*. This will require detailed site-specific information regarding mitigation measures to eliminate the impact or compensate for the loss of productivity in the riparian areas at each of the stream crossings and along the Fraser River foreshore.

7.2.2 Justification of Impacts to Existing Greenbelts and Wildlife Corridors

The primary impact to the terrestrial environment which is of concern for the SkyTrain project is the loss of trees for the clearing of the right-of-way. Loss of trees and other potential impacts to the biophysical environment were predominately assessed assuming current conditions as a baseline. This approach is mentioned in the *Environmental Assessment Report*:

Habitat can be evaluated in terms of capability or suitability. Habitat *capability* may be defined as an area's potential, regardless of its present state, to support a given species under optimal conditions. An area's habitat *suitability* is related to the actual condition of the habitats, and current ability to support wildlife. Impact assessment and mitigation planning for the upland areas of the accelerated project have focused on habitat suitability rather than habitat capability for reasons discussed below.

The wildlife habitats, and consequently the wildlife communities, of Greater Vancouver are radically different than they were prior to urbanization. Most remaining forest habitat consists of small, fragmented patches of shrubs and immature trees. An abundance of "edge" habitat, a dearth of "interior forest" habitat, and an abundance of non-native plant species characterize these patches.

Interpreting the potential impacts of the accelerated SkyTrain project in the context of a “natural” baseline environment is therefore neither possible nor relevant. Changes to the wildlife community typically associated with undisturbed ecosystems in the Coastal Western Hemlock Zone have proceeded so far in the urbanized portions of the GVRD, that a “new” wildlife community now occurs there. Because of these changes, the impact assessment for the accelerated project focuses on the current suitability of wildlife habitats, which are identified and interpreted as either significant or insignificant for wildlife in both local and regional contexts. (*Environmental Assessment Report*, Chapter 5-21).

It is the Special Commission’s view that, in general, it would be beneficial to try and improve the biophysical environment over time rather than set objectives to maintain current conditions at a degraded state. This is especially true for an urban environment where there has been a continual reduction in the amount of green space over time and where there is much public interest in recovering the productive capacity of urban streams.

In an urban environment, where population densities are high and where adapted plant and wildlife communities exist, smaller habitat fragments may have greater importance. The value of remaining green space, streams and habitat, and the importance of particular urban-based ecological issues, are not fully captured by a conventional environmental assessment methodology. As noted by the provincial Ministry of Environment, Lands and Parks (MELP), a young successional forest in an urban setting, such as the Grandview Cut, is a very high-value habitat. Its habitat value must not be assessed by standards adapted to Crown forest lands or pristine environments.

7.2.3 Justification of Riparian Setbacks¹¹

In the site-specific studies, a benchmark of 15m was used as the minimum distance for riparian setbacks. While this may be a proposed minimum distance, effort should be made to achieve setbacks of greater than 15m wherever possible. DFO has noted that the clearing of trees or loss of vegetation within 15m of the streams will require compensation. The 15m benchmark is not referenced in the *Environmental Assessment Report* or in the Construction Environmental Management Program (Appendix 1 of the *Environmental Assessment Report*) so it is unclear whether this benchmark still applies. Every effort should be made to achieve setbacks of greater than 15m.

¹¹ Generally speaking, riparian habitat is the vegetation adjacent to a stream, river or lake. This area may extend anywhere from 5 – 30m from the edge of a water body. Habitat (trees, vegetation and wildlife) beyond this distance are usually referred to as terrestrial habitat.

The RTPO has noted in the *Environmental Assessment Report* that setbacks for the columns from the stream channels have been defined by the project biologists and engineers with the objective of minimizing impacts to the riparian zone in the context of site specific conditions. These design specifications have been provided to the Design/Build Contractors and they are the basis for the assessment of impacts and prescription of mitigation and compensation measures.

7.2.4 Sedimentation

Input from the Special Commission's Technical Workshops and from the IAC revealed that sedimentation is a key concern for urban watersheds, and in particular for the Stoney Creek watershed. Not all best management practices, as recommended in the location assessment studies, have proved effective for urban watersheds.

There were also some concerns expressed at the Special Commission's Technical Workshops that sediment control ponds may not always be effective, one concern being that above-average rainfall—unless the settling ponds are sized carefully—can lead to overflows and the release of sediment into streams and rivers.¹²

The RTPO's Construction Environmental Management Program states that the RTPO will require the Contractor to prepare a Stormwater Drainage and Sediment Control Plan, for review by the RTPO prior to the start of construction. The plan will detail how discharges from the Site and related work areas (including access roads, excavations, soil fill areas) will be managed to comply with the provisions of the *Land Development Guidelines for the Protection of Aquatic Habitat* (DFO and MELP, 1993) and the intent of the Federal *Fisheries Act*, and Policies. The Contractor shall be responsible for regular monitoring, maintenance and repairs to improve components of the stormwater drainage and Sediment Control System as necessary to ensure they are working effectively to control discharges from the Site (section 4.2.9).

The Special Commission notes that regulatory agencies are very concerned that the Stormwater Drainage and Sediment Control Plan also be made available to them for their review and approval. The appropriate limits to sedimentation levels, and measures for sediment control, will need to be developed by the RTPO in consultation with DFO and MELP.

¹² The suitability of settling ponds is questioned in a written submission to the Special Commission from the Simon Fraser Health Region (March 5, 1999).

8.0 SITE SPECIFIC ISSUES AND ANALYSIS

This section reviews the potential impacts of project construction at locations that have been identified by the RTPO as issue areas. The Special Commission is of the view that the RTPO has effectively identified the various sites along the route alignment that could be classified as issue areas. This section draws from information the RTPO's *Environmental Assessment Report* and reviews this information in the context of the comments received from government agencies, and in the context of issues raised at the Technical Workshops.

8.1 GENERAL LOSS OF VEGETATION AND TREES

The *Environmental Assessment Report* identifies several areas along the route alignment where there will be loss of trees and vegetation to accommodate construction of the guideway and columns. The specific locations that have emerged as being of the most concern during the Special Commission SkyTrain Review are the Grandview Cut, the various stream crossings, the Brunette River crossing and the Sapperton Reach area. These areas are discussed in detail in this report.

There are also other areas along the route alignment where there will be loss of trees and vegetation. These include:

- Cedar Cottage Park;
- Vegetation east of Grandview Cut;
- Trees along Lougheed Highway;
- Vegetation between CP and Burlington Northern Santa Fe rights-of-way;
- New Westminster; and
- Vegetation in New Westminster Tunnel and tunnel portal area.

The RTPO notes that, should any trees be removed or damaged during construction, suitable trees will be replanted in compliance with municipal guidelines. The RTPO also proposes to evaluate opportunities at various locations to enhance vegetation. Excluding the Grandview Cut, sites where clearing will be required are assessed by the RTPO as small localized areas, often in marginal remnant vegetation within highly-developed areas. The RTPO notes that proposed re-vegetation plans will replace vegetation in areas disturbed by construction—in general with vegetative communities which are improved, relative to existing vegetation, and which have enhanced value for wildlife habitat.

The Special Commission agrees with this objective and, given the urban context for the accelerated project and the value of existing vegetation, supports the intent of the RTPO to enhance the existing habitat rather than merely replace the trees and vegetation lost during project construction. The plans should be developed in consultation with the appropriate government authorities.

8.2 IMPACTS TO THE GRANDVIEW CUT

The proposed route alignment is along the north side of the Grandview Cut, elevated for most of its length with some possible at-grade sections (see Figure 4). The RTPO predicts that the Grandview Cut is the only location which will sustain significant long-term alteration of vegetation from permanent structures (e.g., guideway columns, at-grade sections, stations) or from long-term vegetation management requirements during the operations phase of the accelerated project.¹³

The RTPO studies have not identified any exceptional trees or rare plant species or communities (as listed by the BC Conservation Data Centre) in the Grandview Cut, and there is no concern with respect to rare or endangered vegetation species or habitats on the slopes of the Grandview Cut.

The ditches in the Grandview Cut that parallel the rail bed and the low-lying, moist areas adjacent to the ditches provide habitat for several aquatic plant species and those that prefer or tolerate moist-to-wet sites. It is conceivable that provincially-listed rare plant species might be found in these areas, though there are no records of such occurrences. Water flowing in ditches is unusual in east Vancouver, because former natural surface streams have been eliminated.

The RTPO has noted that those wildlife species that make appreciable use of the Grandview Cut are undoubtedly able to tolerate the high degree of human activities that occur locally (i.e., vehicular and pedestrian traffic along the nearby streets and activities associated with operating and maintaining the railroad and its infrastructure).¹⁴

Sticklebacks have been observed in one of the ditches during an RTPO field study. It is likely that these fish were flushed from storm drain outlets into the Grandview Cut during a recent rainstorm event. The ephemeral nature of the ditch habitat likely precludes spawning for this species. No other fish were observed during the investigation, and other sections of the ditches likely provided similar, ephemeral habitat.

¹³ The Special Commission notes that there is also a length of trees in the area of Stoney Creek that will sustain long-term alteration based on the current design of the project – see Section 8.3.4.

¹⁴ Wu and Flannery (1996) report finding coyote scat in the Grandview Cut. However, although coyotes may occur there occasionally, it is highly improbable that the Grandview Cut supports a local population of this species.

TABLE 1: AREA (HA) OF HABITAT TYPES MAPPED ALONG THE GRANDVIEW CUT BETWEEN WOODLAND DRIVE AND SLOCAN STREET

HABITAT	AREA (HA)
Trees	5.607
North side	2.627
South side	2.980
Shrub/Forb	3.569
North side	2.051
South side	1.517
Bridges	0.935
Railroad Bed	0.845
SkyTrain Tracks	0.076
Total	11.031

(Source: Environmental Assessment Report)

TABLE 2: AREA (HA) OF EACH HABITAT TYPE AFFECTED BY THE FOUR ALIGNMENT OPTIONS STRUCTURES NEAR BROADWAY

OPTION	RIGHT-OF-WAY RADIUS ¹ (m)	TREES	SHRUB/ FORB	BRIDGE	RAILROAD BED	SKYTRAIN TRACKS ²	TOTAL
North Side:	3.8	0.542	0.478	0.119	0.008	0.013	1.159
Elevated	4.8	0.680	0.598	0.150	0.020	0.016	1.464
North Side:	3.8	0.452	0.523	0.119	0.038	0.010	1.142
At Grade	4.8	0.580	0.642	0.151	0.059	0.012	1.443
South Side:	3.8	0.583	0.408	0.121	0.032	0.010	1.154
Elevated	4.8	0.736	0.514	0.153	0.043	0.012	1.458
South Side:	3.8	0.611	0.367	0.121	0.027	0.010	1.136
At Grade	4.8	0.774	0.456	0.153	0.036	0.012	1.431

1. Two right-of-way widths are considered for each of the four alignment options. A radius of 3.8m corresponds to a 7.6m guideway width, and a radius of 4.8m corresponds to a total alignment right-of-way width of 9.6m.

2. "SkyTrain Tracks" refers to existing tracks

(Source: Environmental Assessment Report)

Based on the RTPO's assessment, and on comments received from government agencies, the primary biophysical impact of concern from project construction in the Grandview Cut is the loss of vegetation and the potential impact to birds. The RTPO has assembled data on the area of habitat in the Grandview Cut that would potentially be affected by the various alignment options that were considered (see Tables below).

From that data, the RTPO notes that the "North-Side Elevated" option involves the second smallest net loss of treed vegetation. Overall, trees probably provide the greatest value as wildlife habitat in the Grandview Cut, and reductions of impacts on trees will reduce habitat impacts. The alignment on the north side of the Grandview Cut requires less tree removal, since there is an existing tree-free corridor for the electrical utility line.

The RTPO notes that the proposed guideway alignment for the north-side elevated option does not constitute a barrier to the movements of terrestrial animals across the Grandview Cut. Based on comparative net loss of treed vegetation and potential barriers to animal movement, the RTPO has selected the north-side elevated option as the most desirable option from the perspective of potential impacts to terrestrial habitat. The RTPO also considers a north side alignment to minimize visual and noise concerns for adjacent properties, to support the preferred Nanaimo Station location, and to maintain the most flexibility for City planning and engineering initiatives. The Special Commission supports the selection of the north-side elevated option.

In view of the potential impacts to the Grandview Cut, the Special Commission also recommends that the alignment in the Grandview Cut be integrated with the transmission line right-of-way. This should help eliminate the need for much of the vegetation removal, as well as the need for ongoing vegetation management, and should reduce the accelerated project's impacts to migratory birds in this area.

The *Environmental Assessment Report* states that since construction is by design-build, many aspects of the design and construction process are not final. Final impacts, including locations and numbers of trees that will be lost or disturbed, will be identified more specifically by the Design-Build Contractor, and submitted for RTPO approval.

In its discussion of the design-build process the RTPO noted that if the Design/Builder develops improvements and innovations these changes would be required by the RTPO to equal or better the environmental design and performance standards defined in its *Environmental Assessment Report*. It was unclear to the Special Commission whether, in the case of the Grandview Cut, this condition applies and, when final designs are available, whether the actual vegetation losses in Grandview Cut would be equal to or less than the calculations presented in Table 2 for the north-side elevated option.

While impacts to the Grandview Cut may not have any significant impact to regional wildlife values, the Grandview Cut is locally very important for wildlife, especially with respect to the rarity and degree of urban forest removal in Burrard Peninsula. It is important that all efforts be made to ensure localized satellites of habitat are maintained, compensated for and/or enhanced.

The Special Commission also supports the recommendation from Environment Canada that every effort be made to compensate and mitigate for the impact of the project along the Grandview Cut. This area has been the subject of considerable public interest in the past, and the removal of vegetation—while unlikely to produce regionally significant effects—will have a local negative impact on migratory birds. All of the recommendations outlined in the *Potential Impact and Mitigation Strategy for the Rapid Transit Project (Accelerated Phase): Vegetation, Fish, and Wildlife along the Grandview Cut* report (December 15, 1998) should be optimized.

The Special Commission supports the proposal by MELP that the RTPO recruit a qualified wildlife biologist to work with the landscaper to ensure plantings represent natural vegetative communities to the extent possible within the urban landscape.

The Special Commission also recommends that development of mitigation and enhancement options be done in consultation with government agencies such as MELP and Environment Canada, and the City of Vancouver, and that a comprehensive landscape management plan for the Grandview Cut be prepared. A proposed compensation plan should be developed by the Design-Build Contractor and submitted to government agencies for review.

8.3 STREAM CROSSINGS

The assessments conducted by the RTPO for project impacts at stream crossings are presented in the following sections. One issue common to impacts at stream crossings, the Brunette River crossing and the Sapperton Reach is that there be no net loss of fish habitat as a result of the accelerated project. The Special Commission notes that to determine that there is no net loss of habitat, more detailed design and construction information will be required to identify the specific areas of impact and identify the compensation areas. This information should be accompanied by a habitat balance sheet that shows the habitat potentially impacted and proposed compensation areas. The habitat balance should be positively weighted to the compensatory area.

8.3.1 Impacts to Chubb Creek

Chubb Creek, a tributary of Still Creek, is located in Segment 2 of the accelerated

project and is classified as a relatively high-value salmonid-bearing stream (see Figure 5). The creek is also designated as an Environmentally Sensitive Area by the City of Burnaby Official Community Plan. Present developments in the vicinity of the crossing include:

- Parking lots and paved streets;
- A steel-tower power line;
- Other raised and buried utility lines;
- Dumping of solid waste and fill; and
- Nearby commercial and industrial developments.

A narrow strip of riparian vegetation, mostly 3m in height, exists in the vicinity of the proposed SkyTrain location.

In this area, the route alignment parallels Gilmore Avenue. On the east side the elevated guideway crosses the creek using a 35m span. Support columns are located approximately 12m away from the edge of the creek. The footings will be located within what is currently private land that is cleared of vegetation.

The RTPO predicts that Chubb Creek provides few constraints to the location of the guideway, but notes that other factors do provide some constraints to the design, including the proposed station located north of the creek crossing and the curve in the alignment that is required to the south. The guideway will cross the Chubb Creek at a point where the existing riparian vegetation is confined to a narrow strip. Current design layout indicates the footings immediately to the south and north of Chubb Creek will be more than 10m from the edge of the creek channel, and outside the existing riparian vegetation. The additional area required to construct the footings will also be situated away from the riparian vegetation. Access for both footings can be made through existing cleared areas. Accordingly, the RTPO predicts that there will be no clearing required for construction of the guideway at Chubb Creek, nor will there be any requirements for vegetation management in the right-of-way.

The Special Commission notes that the predictions of the RTPO are based on the current design for the accelerated project. If there are changes at the detailed design stage, measures to mitigate and/or compensate for impacts at Chubb Creek may be required.

8.3.2 Impacts to Beecher Creek

Beecher Creek is a salmonid-bearing tributary of Still Creek and is classified as a relatively high-value stream (see Figure 6). The creek is also designated as an Environmentally

Sensitive Area by the City of Burnaby Official Community Plan. Present developments in the vicinity of the crossing include:

- Lougheed Highway;
- Railway;
- Kensington overpass; and
- Nearby residential and commercial developments.

The guideway will be elevated at the crossing and will be located just south of the Lougheed Highway. The RTPO reports that a 35m span will be used which will require that one of the support columns be placed within riparian habitat adjacent to the creek channel. The footing locations will be approximately 5m south of the edge of the Lougheed Highway.

Beecher Creek has been classified as a relatively high-value salmonid-bearing stream. The creek is incorporated in the GVRD designated Green Zone and is recognized by the City of Burnaby as an Environmentally Sensitive Area under the City's Official Community Plan.

The RTPO, in its current design of the guideway, has attempted to minimize impacts through location of support columns and footings. The general alignment at this point must be located approximately 5m south of the edge of the highway to avoid a buried 230 kV transmission line. The location of the western footing will be outside the established riparian vegetation with the closest edge of the footing located approximately 6m from the creek edge.

The eastern footing will be constructed 17.5m from the creek channel within existing riparian vegetation. The area of excavation for the footing will be approximately 10m x 12m (120 m²). The access for constructing this footing is likely to be from the Lougheed Highway and will require clearing an additional 10m x 5m (50 m²) of roadside vegetation. The total area to be cleared for construction will be 170m².

The RTPO has identified the long-term impact at this site due to the proximity of the support columns to Beecher Creek and the future capability of that land to support riparian vegetation. Several trees within 10m of the creek will be lost on west side as part of the clearing required for the the guideway.¹³ There will also be ongoing vegetation management under and adjacent to the guideway once it is built. This management will limit the overall height of trees that may subsequently grow in the area

It is the prediction of the RTPO that construction impacts can be mitigated

¹³ Information from DFO after a site visit to Beecher Creek with the RTPO on April 9, 1999.

through the proper handling of topsoil, establishing erosion control measures, collecting stormwater with elevated sediment levels for off-site treatment, and, as soon as construction is completed, reclamation and re-vegetation of the site.

The RTPO proposes to compensate for impacts at Beecher Creek through creation of similar habitat which could also involve the rehabilitation of degraded riparian habitat in the vicinity of the guideway crossing. The RTPO has committed that the specific sites for compensation will be identified and designed in consultation with appropriate provincial, federal, regional and municipal agencies and, where possible, the local stream stewardship groups.

The Special Commission agrees that the location of the guideway footings has taken into consideration the need to mitigate impacts at Beecher Creek. The residual impacts to the riparian areas associated with construction and operation can be compensated and the RTPO will need to reach agreement with the regulatory agencies on the extent of the compensation required, prior to the start of construction at this location.

8.3.3 Impacts to Eagle Creek

Eagle Creek flows into Burnaby Lake from several tributaries in Burnaby Mountain (see Figure 7). It is classified as a high-value salmonid-bearing stream (Class A) and is also designated as an Environmentally Sensitive Area by the City of Burnaby Official Community Plan. Present developments in the vicinity of the crossing include:

- Lougheed Highway;
- Railway; and
- Nearby residential and commercial developments.

The RTPO notes that the guideway will be elevated and located in the median of the Lougheed Highway at the point where the alignment crosses Eagle Creek. At this site the location of the footings and support columns will not have a direct impact on the riparian area of the creek. To accommodate the footings along the median, the highway will have to be widened up to approximately 2m on either side. This is predicted not to require widening of the culvert which passes Eagle Creek under the highway or to extend the existing footprint of the road.

There will be modification to vegetation immediately adjacent to the highway in order to accommodate the highway widening. The amount of vegetation lost to road widening has not been quantified at this time. In its assessment of the impacts to Eagle Creek the RTPO notes that since this is a design-build section of the accelerated project, final design is not available to confirm whether compensation for vegetation loss will be required.

The Special Commission considers the selection of a centreline alignment as an appropriate measure to help mitigate the impacts of the project at Eagle Creek. An appropriate compensation plan, if required, will need to be worked out in consultation with regulatory agencies, prior to the start of construction at this location.

8.3.4 Stoney Creek Crossing: SkyTrain Segment 4 (Lake City to Bell)

Stoney Creek is located just east of Gaglardi Way in the section of alignment between Production Way to Austin Avenue (see Figure 8). When determining the preferred alignment for this section the RTPO considered the need to clear-span Stoney Creek. It also considered the need to minimize visual and noise impacts on adjacent residential properties, to minimize tree loss and to maximize distance between Lougheed Highway and residences.

Stoney Creek is a salmonid-bearing tributary to the Brunette River and is classified as a high-value stream (Class A). The creek is also designated as an Environmentally Sensitive Area by the City of Burnaby Official Community Plan. Development in the vicinity of the crossing include:

- Lougheed Highway;
- An active railway;
- BC Hydro right-of-way;
- A school;
- Nearby residential development; and
- A proposed sewer line.

The Special Commission considers Stoney Creek to be one of the critical sites impacted by the guideway and is concerned that best efforts must be undertaken by the RTPO to minimize the impacts to the creek, and to provide sufficient compensation for any residual impacts. This concern is shared by DFO and MELP.

The RTPO notes that the environmental effect of building the guideway over Stoney Creek and along the north side of the Lougheed Highway includes the construction impacts of clearing areas for access and clearing the area for the footings. Current design layout indicates that there will be one footing immediately west of Stoney Creek that will be within the flood plain of the creek. Two or three footings to the east of the crossing where the creek parallels the Lougheed Highway will be located within riparian habitat adjacent to the creek. The third footing to the east will be

located near the top of a slope, at which point the footing will be approximately 30m from the creek channel. This third footing will be located in a wetland area that will require mitigation to avoid erosion and run-off.¹⁶

In the *Environmental Assessment Report* it is predicted that removal of riparian vegetation will be associated with the construction of the three footings immediately east of the stream crossing. The footing west of the crossing will be located in an unvegetated area that appears to be part of an access route that parallels the BNSF rail line. No vegetation will have to be cleared to gain access or to construct the western footing. The access to the three eastern footings will likely be from the Lougheed Highway, which will require up to a 10m x 10m clearing downslope with placement of sufficient fill material to build a stable platform to work from. The footings will require the excavation of a 12m x 10m x 3m deep hole. The total clearing to access and construct each footing would be approximately 220m² for a total disturbance of 660m² for the three column footings.

It is predicted that the ongoing vegetation management along guideway right-of-way will limit the ultimate height of the trees along the fill immediately north of and under the guideway to approximately 10m to 13m high. The band of tall mature and maturing trees that now exists between the creek and the top of the fill slope will either be reduced to an area 6m or 7m wide next to the creek, or removed completely if wind throw is deemed to be a risk¹⁷. The RTPO predicts that the main effect of the loss of the larger trees will be a reduction in the amount of large organic debris that can enter the creek and provide complexity to the fish habitat.

The RTPO suggests that compensation for the construction and operation of the guideway at this location can be achieved by planting suitable areas with appropriate native vegetation within the vicinity of the stream crossing. DFO has noted that this may not be possible because available space for compensation is extremely limited in the vicinity of the crossing.

In order to complete the compensation plan and finalize the required permits and authorizations to construct around Stoney Creek, the RTPO proposes to work closely with DFO, MELP, stream stewardship groups, the City of Burnaby, GVRD and Burlington Northern Santa Fe to ensure that effective and appropriate compensation plans are developed.

As part of the information to completed the *CEAA* review, the RTPO will need to produce mitigation and compensation plans for review and approval by DFO.

¹⁶ Information from DFO after a site visit to Stoney Creek with the RTPO on April 9, 1999.

¹⁷ Information from DFO after a site visit to Stoney Creek with the RTPO on April 9, 1999.

Currently the RTPO has not proposed an adequate compensation plan for the potential impacts to fish habitat associated with the Stoney Creek crossing. DFO believes that the development of an acceptable habitat compensation plan at the Stoney Creek site will be difficult, as a sewer line, an urban trail, and high school development may affect the feasibility of any proposed compensation for the crossing at this location. DFO has also noted that the replanting of vegetation lost to clearing is defined as mitigation. Compensatory planting will have to occur in areas not directly impacted by clearing or project construction.

There is not much detail in the RTPO assessment of the Stoney Creek crossing regarding the geotechnical properties of the terrain in the area. This information will be gathered when more geotechnical study is done by the Design-Build Contractor. The stability of the slopes in the areas adjacent to Stoney Creek will need to be assessed to ensure that any potential impacts for erosion as a result of the project are fully addressed at the detailed design stage.

8.3.5 Impacts to the Brunette River

In Segment 6 the alignment crosses the Brunette River just to the west of an existing railway trestle in an area between the TransCanada Highway and Brunette Avenue (see Figure 9). The RTPO notes correctly that the primary concern at this location is the impact to the riparian vegetation adjacent to the river and an unnamed tributary, and the associated productive capacity of the fisheries habitat. The river and its riparian zone provide a wildlife movement corridor between Burnaby Lake Regional Park and the Fraser River. The Brunette River has been classified as an Environmentally Sensitive Area by the cities of Burnaby and New Westminster, and is included in a GVRD Green Zone.

The general area of the proposed crossing has seen considerable development with an existing railway trestle, a wooden bridge for an access road, and a major concrete bridge for Brunette Avenue all located within 150m downstream. There is also a power line that crosses and parallels the Brunette River at this location. The power line and railway lines require regular vegetation control which precludes the establishment of large trees along the north side of the river. There are also various underground sewer pipes in the area and a buried fibre optic cable that runs next to the unnamed tributary.

The design specifications for the guideway call for a special structure with a span of 60m supported by two columns. The support columns will require footings to be constructed within the riparian vegetation associated with this section of the Brunette River.

Access through the riparian zone will also be required in order to construct the footings and to place the guideway on the columns. The footings will be pile-supported.

The *Environmental Assessment Report* notes that, in the design specification for the Brunette River crossing, the RTPO has attempted to minimize the environmental effects of the crossing. The location of the railway tracks, a corridor for a fibre optic cable and a GVS & DD sewer line restrict the location of support columns. To place support columns a full 30m away from the river channel would require an 80m span, and the footing and support column on the north side of the river would be on the railway tracks. The selected span width of 60m provides a set-back from the river of approximately 17m on the north side and 28m on the south side to minimize the effect on the riparian habitat.

The construction impacts associated with the span of the guideway that crosses the Brunette River will involve building access to each footing and clearing the area for the construction of the footing. The RTPO predicts that the total area of disturbed riparian vegetation (within 30m of the river) is approximately 300m². Following construction, the access road on the south side of the river and the area of the column footings will be reclaimed and re-vegetated.

The RTPO predicts that the amount of riparian habitat permanently taken out of production will comprise the area of the two support columns. The permanent loss will be limited to 2.25m² per column or 4.5m² in total, out of the total area of 300m² that will be cleared for construction. The vegetation management associated with the guideway will not alter the existing riparian shrub habitat or the overall existing function of the riparian habitat around the Brunette River.

There is also a small tributary that enters the Brunette River approximately 90m downstream of the guideway crossing. The guideway crosses the tributary over an existing culvert and then runs through an area that has previously been cleared of trees. The construction of the guideway will require that some trees along the north side of the tributary be removed, and ongoing vegetation control will be required.

The footing location next to the small tributary takes advantage of the 25m culvert located 150m upstream of the Brunette River, as it provides access across the creek for constructing the footing on the north side without impacting the creek or clearing vegetation. The alignment of the guideway parallel to the tributary, 15m to the north, takes advantage of an existing access road that parallels the TransCanada Highway and reduces the need to clear vegetation for access.

The RTPO reports in the *Environmental Assessment Report* that the alignment and height of the guideway requires that there be ongoing vegetation management for the section of the guideway that parallels this watercourse. The larger trees east

of the tributary that flows from the culvert under the TransCanada Highway will have to be removed to accommodate the guideway. This amounts to approximately 20 larger trees along a 150m section of the guideway. However, the RTPO predicts that the impact on the unnamed tributary as a result of the removal of these trees is also likely to be minimal, given their horizontal and vertical distance from the channel. The RTPO notes that the primary importance of riparian function for this watercourse is to provide shade, overhanging cover, and nutrient inputs, and this function is provided primarily by the thicket of shrubs immediately adjacent the tributary channel.

The Special Commission considers that the decision presented in the *Environmental Assessment Report* on the location for the crossing of the Brunette River has been made with a view to minimizing impacts to the river and is an improvement over the site location that was initially proposed. The Special Commission endorses the decisions of the RTPO to construct a bridge with a 60m span in view of the technical issues and costs associated with an 80m span at the same location. The impacts to the Brunette River area have been generally identified and it is now the responsibility of the RTPO to develop a precise description of the quantity of vegetation impacted and the exact amount and forms of compensation to be applied as a result of these impacts.

8.3.6 Impacts to the Fraser River Foreshore

The accelerated project alignment in Segment 7 extends south of Braid Street to follow the railway tracks and Brunette Avenue, as well as the lowermost sub-reach of the Brunette River from about Sherbrooke Street to the confluence with the Fraser River. The route alignment then proceeds along Columbia Street adjacent to the Fraser River from approximately Brunette Avenue to Front Street. The specific alignment for this route is along the abandoned Burlington Northern Santa Fe Rail line (BNSF) fronting Sapperton Reach, Fraser River, in New Westminster (see Figure 10).

The shoreline is composed of two landscape elements: riparian and foreshore areas. The riparian area is defined as that portion of the shoreline above normal high water that is notably affected by riverine processes. The foreshore area is defined as that portion of the river bottom between normal high water and normal low water. These water levels are a function of both riverine and tidal processes.

The Fraser River and associated estuary support a significant salmon population. One section of shoreline adjacent to the proposed alignment is classified as moderately-productive habitat by the Fraser River Estuary Management Program (FREMP). FREMP is a multi-agency cooperative agreement managed by representatives from:

- Environment Canada;
- Department of Fisheries and Oceans;
- Ministry of Environment, Lands and Parks;
- North Fraser Harbour Commission; Fraser River Harbour Commission; and
- Greater Vancouver Regional District.

FREMP facilitates coordinated project review for activity and development proposals within the estuary. Its authority is founded upon the mandates of the individual agencies participating in the program. To guide activities and development within the estuary, FREMP has classified the overall fish and wildlife habitat value of shoreline within the estuary, specifying requirements for prospective activities and development. Specific shoreline segments are colour-coded to denote their fish and wildlife habitat value. Moderately productive areas (including part of the shoreline slated for guideway construction) are colour-coded yellow, meaning the activity or development must demonstrate mitigation to the greatest extent practical. Unmitigable impacts must be compensated for through the construction of habitats that replace the functional capacity of impacted habitats.

The RTPO reports that additional clearing of vegetation will not be required for construction of access roads. The roads to be used for haul purposes are existing municipal and provincial roadways, and are already paved. Delivery of some materials by barge, with transfer to shore by crane, is also an option. The use of heavy machinery will be a major construction activity on the project site. Tracked excavators will prepare the site for implementation of concrete works. Steel piles will be driven by large pile drivers. The piles will be filled with concrete and the concrete columns formed and poured in-place. Guideways will be transported to the site by truck or rail, and large cranes will lift the guideways in place upon the columns. Site preparation for use of the equipment will not incur additional impacts on the riparian vegetation.

A key concern with respect to the effects of project construction on fish habitat is the protection of water quality. Potential impacts to water quality include:

- The discharge of sediment laden waters into Sapperton Reach;
- The discharge of concrete wash water and solids into Sapperton Reach; and
- Accidental spills of oils or fuels from construction equipment into the riparian environment.

Construction in this area will include an upgrade of bank revetment along portions of the shoreline. The majority of the existing revetment does not comply with engineering design standards. Existing revetment material consists of boulder, rip rap and

demolition material (e.g., broken concrete and asphalt). The upgrade of bank revetment will include rip rap placed according to the engineering design standards. The proposed revetment design accommodates riparian benches capable of sustaining native plant assemblages.

The RTPO has noted that as a result of the construction of accelerated SkyTrain project along the Fraser River, the anticipated worst-case scenario would be a loss of approximately 2750m² of riparian vegetation and approximately 2850m² of unvegetated intertidal foreshore. At the same time, the project design would allow for the creation of at least 4000m² of riparian woodland and 1500m² of foreshore marsh.

In review of the information from the RTPO on the potential impacts of construction on the Sapperton Reach, regulatory agencies have noted that the level of detail is insufficient to fully quantify the impacts or to fully quantify the compensation that will be required to mitigate impacts. Consequently, DFO and MELP have expressed concern that more detail is needed about the RTPO's plans for habitat compensation. DFO will require further detail on the habitat compensation proposed, which should include a plan view of the proposed riparian vegetation and intertidal marsh to be created as habitat compensation on the Fraser River.

DFO has also noted that riparian vegetation (e.g., cottonwoods) exists between the proposed route alignment and the mouth of the Brunette River. From review of the *Environmental Assessment Report*, it is not clear if this riparian vegetation will need to be removed or trimmed during or after construction of the SkyTrain project and, if this vegetation needs to be removed, whether this loss is included in RTPO's calculations of the total area of riparian vegetation impacted by the project along the Fraser River foreshore.

One related project that is not discussed by the RTPO in the *Environmental Assessment Report* is a proposed sewer line extension in New Westminster at Sapperton Reach in the same general area as the guideway. The GVRD plans also include provision for a greenway adjacent to the sewer line and these plans for the greenway may also be impacted by the SkyTrain project.

In a letter to the DFO (April 9, 1999) the RTPO notes that the design of the accelerated project will not preclude future projects by other jurisdictions, and that the RTPO design contemplates and provides allowances such that these projects can occur in the future. This is a reference to a proposed greenway development and to the future construction of a GVS & DD sewer line.

Options for the location of the future sewer line will be affected by the SkyTrain project if the only feasible location for the sewer line is on the river side of the guideway. This area will be the site of compensation works required of the RTPO by DFO

to address the disturbance to fish habitat created by project construction in the Sapperton Reach. Once installed, the compensation works should not be disturbed, and it would not be acceptable to DFO to have these compensation works re-excavated as part of sewer line construction.

The RTPO has stated to DFO that the guideway design will allow for installation of the sewer line on the landward side of the guideway (between the guideway and the existing railway line), and the RTPO has committed to undertake further discussion with the GVRD to confirm this information. The Special Commission's view is that, to recognize federal concerns, the RTPO and the GVRD should coordinate the installation of the sewer line with the construction of the guideway. If this is not possible, then assurance that the sewer line can be constructed at a later date without disturbance to compensation works required by DFO will be needed.

9.0 PROJECT OPERATIONS AND MAINTENANCE

Although the largest number of impacts will occur during project construction, there will be some ongoing impacts resulting from the operation of the SkyTrain project. These include potential impacts to air quality, impacts from electric and magnetic fields, and impacts from guideway maintenance.

9.1 AIR QUALITY

Improvement to air quality is one of the four components of the GVRD's *Livable Region Strategic Plan* which seeks to:

- *Protect the Green Zone* by working with municipalities to set aside areas of productive agricultural land, working forests, watershed areas, environmentally sensitive areas and regional open spaces, thereby defining the area local governments can use for building cities and towns;
- *Build Complete Communities* rather than “bedroom suburbs” or “executive downtowns” by providing opportunities to work, shop, learn or play within easy reach of home;
- *Achieve a Compact Metropolitan Region* by accommodating about 70 per cent of the next million residents in the existing built-up urban area comprising Vancouver, Burnaby, New Westminster, the Northeast sector and North Surrey-North Delta; and
- *Increase Transportation Choice* by giving priority to walking, cycling, transit, goods movement, and then the private auto.

The fourth component of the plan is consistent with the GVRD's *Air Quality Management Plan* which predicts declining air quality in the period beyond the year 2000 unless trends of increasing automobile use in the region are not countered with more sustainable transportation options such as public transit.

In the *Environmental Assessment Report* the RTPO included discussion and analysis of the likely effects of the accelerated project on regional air quality in the Lower Fraser Valley, on greenhouse gas emissions, and on local air quality effects near bus transfer locations.

The RTPO's comments with respect to impacts to regional air quality include the observation that:

One purpose of the Rapid Transit Project is to provide an alternate to passenger car use and to provide an alternate to bus use along arterial corridors (where buses can be delayed by other traffic). To the extent that the proposed Rapid Transit Project is used as an alternate to motor vehicle use, emissions will be reduced. (*Environmental Assessment Report*, 5-142)

The Special Commission notes that potential benefits to air quality in the Lower Fraser Valley depend in part on the degree to which SkyTrain becomes an effective alternative to the use of motor vehicles. Measuring this is a complex exercise and there are many variables involved. Some general predictions on the degree to which the accelerated project can attract ridership, presumably drawing people to rapid transit as an alternative to the use of the automobile, can be made on the basis of modelling data.

As noted in the Special Commission's *Connectivity and Operational Issues Report*, the RTPO has hired a consulting firm to develop a ridership model that can assist in determining the types of changes that may encourage automobile commuters to switch to SkyTrain or other types of transit. While the model is not yet finalized, it promises to provide some useful insights into commuting mode choice among automobile drivers.

In the *Environmental Assessment Report* the RTPO has outlined its approach for determining potential air quality effects. This will include emission projections from the EMME/2 model for two time periods (2006 and 2021), with and without the accelerated SkyTrain project, to show the difference in the expected emission rates for the criteria air contaminants.¹⁸ The Special Commission advises the RTPO to indicate to federal authorities when this modelling information will be available.

The Special Commission notes that information provided by the RTPO on bus interchanges required for the accelerated project identifies the need for new bus loops at Brentwood Mall and Lougheed Mall. For the purposes of the Special Commission review, further study information from the RTPO on this issue is not required, given the RTPO's intention to address this issue during detailed design.

In the *Environmental Assessment Report* a brief evaluation of local and likely air quality effects near park and ride or bus transfer locations resulting from the accelerated project is provided. The RTPO predicts that any minor increase in air emissions locally would be offset by more regional decreases in emissions. The RTPO also proposes that, during detailed design, attention be given to mitigate impacts from bus connections. Measures such as shutting off bus engines during waiting times, signs for taxis and private vehicles to take similar action, and proper configuration of ventilation systems for covered bus parking/unloading areas to vent exhaust away from air intakes to adjacent buildings will be considered. The Special Commission recommends that these measures be undertaken by the RTPO or delegated to the appropriate authority by mutual agreement.

¹⁸ The GVRD has also developed a transportation demand model (EMME/2) to predict the effect of long-term growth on regional transportation patterns with, for example, a SkyTrain system. EMME/2 can be used to forecast transit demand, travel times for various forms of transportation and changes in vehicle kilometers travelled.

One issue beyond the scope of the Special Commission review is the degree to which the accelerated SkyTrain project will affect future levels of greenhouse gases (GHG). In written comments to the Special Commission, Environment Canada documented several concerns with regard to the *Environmental Assessment Report*. One comment was that the *Environmental Assessment Report* lacks an analysis of the potential contribution to GHG's from the production of cement needed for use in the construction of the guideway.

9.2 ELECTRIC AND MAGNETIC FIELDS

In the *Project Description* filed with the Special Commission by the RTPO in December, 1998, the RTPO committed that an Analysis of Electric and Magnetic Fields would be done as one of the specific Environmental Design Assessments. It was completed by the RTPO to support specific environmental issues identified in the *Environmental Management Analysis Compendium* and for incorporation into site-specific design, construction and operational plans.¹⁹ For this reason it is recorded in this *Biophysical Issues Report*, although it was not a specific information request of the Special Commission.

Section 5.8 of the *Environmental Assessment Report* provides an analysis of the potential for impacts from electric and magnetic fields as a result of the operation of the SkyTrain system. The RTPO drew its information for this analysis from the document *Electric and Magnetic Fields From the Phase 1: Accelerated SkyTrain System, Preliminary Study* (January 18, 1999) prepared by Paul S. Wong, P.Eng. for the RTPO.

The study concluded that the electric fields from the accelerated project are not likely to be significant when compared to those generated by common distribution lines found in residential areas. The study also concluded that magnetic fields beyond a small distance from the guideway will likely be similar to those generated by the existing SkyTrain system if the magnetic fields external to the MKI and MKII train cars have similar characteristics.

Based on the findings of the study, the RTPO has concluded that the accelerated project is not anticipated to have any significant adverse impacts in terms of effects of electric and magnetic fields, and that the frequencies and levels of both electric and magnetic fields produced in the course of project operations do not require mitigative measures. The RTPO has concluded from the study information that frequencies and levels of both electric and magnetic fields produced in the course of SkyTrain operations are such that they pose no undue risk of impact to humans, animals or plants beyond those normally encountered in daily life in an urban area.

¹⁹ Appendix C, Rapid Transit Project 2000 Project Description, November 30, 19

Health Canada reviewed this study as part of its review of the *CEAA* application and provided comments to the Special Commission. Health Canada has advised the RTPO to carry out further electric field and magnetic field measurements from the existing SkyTrain system and magnetic field measurements from a MKII car. Health Canada's advice is based on the three recommendations for follow-up that were included in the actual study. These were that the following measurements be carried out to verify the assumptions used in the study:

- Carry out some electric field measurements from the existing SkyTrain system;
- Carry out further magnetic field measurements from the existing SkyTrain system using instruments that can respond to all frequencies from 0 to 3,000 Hz; and
- Carry out some magnetic field measurements from a rapid transit system or a test track using the MKII vehicles.

9.3 IMPACTS FROM GUIDEWAY MAINTENANCE

The RTPO notes that the most common aspect of project operations or maintenance with potential impacts to the biophysical environment is ongoing vegetation management (i.e., tree trimming and vegetation management) required to prevent vegetation adjacent to the guideway from interfering with SkyTrain operations. The main concern with this activity is that the potential loss of vegetation as a result of operations management should be included in the RTPO's calculations of the compensation measures required to address the impacts of the project.

The RTPO notes that other potential impacts to the biophysical environment during project maintenance or operations include contamination of surface waters from improper guideway drainage, and erosion from run-off due to improper drainage or re-vegetation management. The main concern for contamination from run-off from the guideway concerns the use of ethylene glycol for de-icing and its associated potential for contamination of surface waters. The RTPO notes that de-icing is required for the safe operation of the SkyTrain system. De-icing procedures include three principal components:

1. De-icing of the third rail for the safe operation of trains' power collection system.
The third rail is de-iced by an automatic train-mounted applicator;
2. Train de-icing. Trains are de-iced by an automatic system installed at the two underground stations, Columbia and Waterfront; and
3. Door de-icing. Additional de-icing is sometimes required for the proper operation of train doors. In this case, de-icing fluid is applied to train doors manually.

The RTPO reports that the amount of glycol (de-icing fluid) applied to trains during a typical winter is small, varying from years in which no de-icing is required to a maximum of approximately 1350 litres in a relatively severe winter. This amount is applied over the approximately 29-kilometer total distance of the guideway. There is no recycling or collection system in place, nor is such a system presently intended, given the relatively small amount of glycol typically applied. The RTPO also notes that the drainage design for the guideway will ensure discharge is away from surface drainages by either discharge to sewer or providing for infiltration to ground, and will more than adequately handle any residual glycol on the guideway given the very small amounts involved. DFO has noted that drainage of ethylene glycol into watercourses is potentially a concern and could adversely affect water quality and result in damage to fish and fish habitat. The Special Commission considers that appropriate design and operations standards can address DFO's concern and the RTPO is advised to discuss this issue further with DFO.

10.0 ENVIRONMENTAL MANAGEMENT AND PROJECT MONITORING

10.1 COMMITMENTS, ASSURANCES AND RESPONSIBILITIES

The RTPO has made a variety of commitments to actions, investigations and documentation in an effort to assure that the accelerated project is planned, designed, and constructed in keeping with sound environmental practices. These are presented in the *Environmental Assessment Report* (Chapter 9) as a consolidated tabular summary of all commitments, responsibilities and assurances given by RTPO that take precedence over, and supersede, all previously documented commitments, responsibilities and assurances.

The RTPO notes that these commitments, responsibilities and assurances incorporate, to the extent possible, the findings of relevant RTPO investigations and studies, and the resulting modifications to the design of the project to mitigate potential effects identified. The information will be used to prepare the contractual requirements for construction contracts to be issued for the accelerated SkyTrain project.

For the various commitments, responsibilities and assurances listed in the tables in Section 9 of the *Environmental Assessment Report*, the RTPO has identified:

- The party responsible for its implementation;
- The party responsible for overseeing its implementation and completion;

- The particular period, aspect, plan or other context of the project to which the particular commitment, responsibility or assurance applies;
- The approximate implementation period (activity period);
- Whether agency submissions are required; and
- The date when submissions are required.

The Special Commission finds that this tabular information is useful and provides a good summary of the various responsibilities of the RTPO and its Design-Build Contractor, and a consolidated list of the various measures that are proposed by the RTPO to mitigate the impacts of the accelerated project on the biophysical environment.

Given that the RTPO's environmental impact assessment of the accelerated project is based primarily on preliminary engineering designs and specified environmental design criteria, the mitigation measures identified in the tables by the RTPO are mostly generic. While likely to be effective, these measures will need to be more precisely specified when more detailed project design information is available for review and comment by regulatory agencies and upon completion of the *CEAA* review. This applies especially for sites such as Stoney Creek, the Brunette River, the Fraser River foreshore and the Grandview Cut.

However, the Special Commission recommends that, once the *CEAA* review is completed, the final table of the RTPO's commitments, responsibilities and assurances be made available to all municipal authorities, key stakeholder groups and to the public, and provided for public access on the RTPO's web site.

10.2 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAM

The Construction Environmental Management Program (CEMP) is a key part of the RTPO's environmental management strategy and is particularly relevant to the RTPO's commitments, responsibilities and assurances. The RTPO notes that its Construction Environmental Management Program has been developed to ensure that project construction and any required mitigation measures comply with all applicable federal and provincial legislative and regulatory requirements, and local government by-laws, as well as with best-accepted construction environmental management practices. Through its CEMP, the RTPO will require its contractors to control actions and discharges to the atmosphere, bodies of water, and land areas which may harm fish or wildlife and their habitats, or which may affect heritage objects or archaeological sites.

The CEMP has been revised several times during the Special Commission SkyTrain Review. An initial version was provided for review in January, 1999. This version was distributed by the Special Commission for agency and public comment and was also reviewed at the Special Commission's Technical Workshop. There were many suggestions and recommendations on ways to improve the CEMP that were offered by agencies or stakeholders at the Technical Workshop or in written comments. A revised CEMP was issued by the RTPO as part of its application for an approval under *CEAA*.

The Special Commission notes that some observations that had general acceptance at the Technical Workshop, or were provided in comments from agencies, are not reflected in the most recent revision to the CEMP. It is not mandatory that the RTPO incorporate observations from the Technical Workshop into a revision of the CEMP, except where required by regulatory authorities as a condition of any approvals, permits or licences. However, several observations from the Technical Workshop are restated here and are also specific recommendations of the Special Commission.

10.2.1 Monitoring and Independence

The degree to which the RTPO can demonstrate that it has met its commitments, responsibilities and assurances depends in large part on the quality of its project management and project monitoring. Regulatory agencies have been concerned that reporting and accountability during project construction and operation be comprehensive, reliable and effective.

The Environmental Monitors are the qualified personnel to be retained by the Contractor to ensure that the Contractor's work is conducted in accord with the environmental construction specifications in the Construction Environmental Management Program, as well as with agency permits, guidelines, rules and regulations and/or RTPO policy. The RTPO has also hired an Environmental Inspector who will conduct on-site field inspections to ensure environmental compliance, and compliance with RTPO policies, and who will oversee the work of the Environmental Monitors.

One issue is the degree of autonomy available to the Environmental Monitors who will be responsible to monitor construction sites. The RTPO proposes that the Environmental Monitors report either directly to the RTPO, or indirectly through the Design-Build Contractor. The RTPO has incorporated a suggestion from the Technical Workshop into section 3.9 of the *Environmental Construction Specifications* and has provided some latitude for the Environmental Monitor to halt construction if an activity is leading to, or has the potential to lead to, environmental damage. This is

one of the key responsibilities of an Environmental Monitor.

Regulatory agencies often require that there be a “third party” approach for monitoring in environmentally sensitive areas. This means that the Environment Monitor reports directly to regulatory agencies as well as to the proponent. This offers greater assurance to agencies that the Environmental Monitor will be able to respond to issues during project construction, and that the contractors are aware that failure to comply with the advice of the Environmental Monitor will be reported directly to regulatory authorities.

The Special Commission recommends that a “third party” model be implemented for the monitoring of the full construction phase of the accelerated project. DFO may require this for works near sites for which authorizations are issued under the *Fisheries Act*. However, this “third party” model could also be used to monitor and respond to other potential issues (e.g., noise impacts, impacts in the Grandview Cut), and could offer better direct lines of communication with municipal governments during the construction phase.

10.2.2 Qualifications and Duties of Environmental Monitors

It is important that Environmental Monitors be suitably qualified to undertake the responsibilities they are assigned. The need for qualified Monitors is noted in the CEMP, but there are no provisions for regulatory agencies to review these qualifications and/or the duty descriptions before the Monitors are recruited. The Special Commission recommends that this issue be further discussed between the RTPO the relevant federal, provincial and municipal government agencies.

10.2.3 Agency Review of Management Plans

The contractor is responsible to develop various impact management plans. The Special Commission recommends that the RTPO or the Design-Build Contractor, when developing various impact management plans, offer government agencies an opportunity to review the plan if a government agency requests this.

10.2.4 Sedimentation

Project construction has the potential to lead to sedimentation of local streams, in particular the sensitive sites identified earlier in this *Biophysical Issues Report*. The CEMP contains several clauses that set performance standards for the Design-Build Contractor. Clause 4.2.2 of the CEMP notes that care should be exercised by the contractor during all phases of the work to minimize sedimentation of waterways, ditches

and storm sewers in the vicinity of the site, and to eliminate the release of raw concrete, concrete leachate and any other debris or deleterious substances and to prevent it from entering any watercourse. The Special Commission notes that the ideal is to manage construction so that no sediment is introduced into waterways.

10.2.5 Linkages with Municipalities

The CEMP makes reference to compliance with local by-laws, but does not prescribe any measures for ensuring effective linkages between the Design-Build Contractor, the RTPO and municipal authorities. The Special Commission recommends that prior to the start of construction in each municipality, the RTPO, contractor and effected municipality discuss ways to achieve these linkages. This is essential for issues such as tree clearing and vegetation management that may be influenced by municipal by-laws.

11.0 ARCHAEOLOGICAL ISSUES

In the Interim Report, the Special Commission noted that siting and construction of the route alignment in New Westminster has the potential to impact archaeological sites (i.e., possible undiscovered sites) either from direct project actions (e.g., land-altering developments) or indirect project actions (e.g., increased use of a location containing archaeological remains). At the time, the RTPO had submitted an *Archaeological Overview Assessment* for the accelerated project and was planning to carry out a more detailed *Archaeological Impact Assessment (AIA)*. The AIA was completed in April, 1999 and reviewed by the Ministry of Small Business, Tourism and Culture. The following observations on archaeological issues are based on comments provided by the Ministry.

The Ministry is satisfied that likely effects on archaeological sites that may arise from the core parts of this project have been identified as best as possible, given the improvements to much of the land, and unresolved land tenure and project details that prevailed during the assessment. The potential for significant impacts to archaeological sites that are buried or otherwise inaccessible beneath pavement or other obstacles is generally considered to be low. If such deposits exist, their integrity, and hence their archaeological significance, is likely to be seriously compromised. The Ministry is satisfied that the proposed monitoring program makes adequate provision for the identification and mitigation of any impacts to buried deposits that may exist, including significant deposits.

The Ministry also cited several recommendations from the *ALA* report, including:

1. Full-time archaeological monitoring should be undertaken for the initial stages of construction in the following locations:
 - Coquitlam (Lougheed Mall) – New Westminster: the Brunette River crossing from the TransCanada Highway to the industrial rail spur south of the river; and
 - New Westminster: the Fraser River waterfront from Columbia Street/Cumberland Street to Columbia Street/Front Street.
2. On-call archaeological monitoring should be undertaken for the initial stages of construction in the following locations:
 - New Westminster: from Brunette River crossing to Brunette Avenue/Columbia Street intersection; and
 - New Westminster: from Columbia Street/Front Street to Albert Crescent.
3. If the route is significantly altered, additional impact assessment fieldwork is required for previously-unsurveyed lands with high or moderate archaeological potential.
4. The RTPO should promptly inform representatives of each First Nations community about the particulars of any unanticipated archaeological discoveries.

The Special Commission recommends that the RTPO provide written commitment to the Ministry that the RTPO will comply with these and the other recommendations in the *AIA* report.

The Ministry is also concerned that the Archaeological Monitor have the authority necessary to suspend construction or related development activities where they are found to be in conflict with a previously unidentified archaeological site, in order that appropriate mitigative decisions can be taken and implemented. Such decisions would be determined in part by the Archaeology Branch in consultation with the RTPO and their archaeological consultant, and in accordance with procedures for such discussions laid out in Heritage Permit application(s). The Special Commission supports this recommendation and notes that the RTPO will need to consult with regulatory agencies to clearly delineate and coordinate the various roles and authorities of the various project monitors.

Given the design-build process, there may be some modifications to the preferred route alignment as part of the final design, and this may have some impact on the specific siting of ancillary facilities. The RTPO should make provision for ancillary facilities to be assessed, monitored and, if necessary, mitigated. The Ministry has noted that the ancillary facilities known at this time can be included in the impact management planning and provided for in the Heritage Permit such that they are treated in a manner equivalent to the other aspects of the project.

Construction or installation of facilities which may occur in areas not assessed as part of the AIA, but do have archaeological potential, may need to be assessed under another Heritage Permit. The need for such assessment will be evaluated on a case-by-case basis. The RTPO should be aware that any direct or indirect effects to archaeological sites by the accelerated project must be identified and mitigated. These ancillary developments, whether built by RTPO or in direct association with the project (e.g., bus facilities), are to be included in the archaeological impact management planning.

12.0 CEAA REVIEW

The *Canadian Environmental Assessment Act (CEAA)* applies to projects for which the federal government holds specific decisionmaking authority. The *CEAA* sets out the responsibilities and procedures for the environmental assessment of projects involving the federal government. It establishes a clear and balanced federal environmental assessment process that helps federal responsible authorities (RAs) determine the environmental effects of projects before irrevocable decisions are made.

An environmental assessment is required under the *CEAA* if a federal authority exercises one or more of the following duties, powers or functions in relation to a project:

- Proposes the project;
- Contributes any form of financial assistance to the project;
- Sells, leases or otherwise transfers control or administration of federal land to enable the project to be carried out; or
- Exercises a regulatory duty in relation to the project, such as issuing a permit or licence or granting an approval, that is listed in the Law List Regulation.

The Canadian Coast Guard of the Department of Fisheries and Oceans (DFO) has determined that the accelerated project requires a permit under section 5(1) of the *Navigable Waters Protection Act (NWPA)* for the section of the route alignment that will cross the Brunette River. The Habitat Management Division of DFO has also determined that an authorization under section 35(2) of the federal *Fisheries Act* will be required for the construction works adjacent to the Fraser River in New Westminster, as well as for the bridge crossings of several creeks.

The *Canadian Environmental Assessment Act* requires that DFO complete a screening level environmental assessment before a permit to cross the Brunette River or an authorization under Section 35(2) of the *Fisheries Act* are issued to the RTPO.

A screening level environmental assessment is a self-directed assessment in which the RA retains the greatest degree of management and flexibility over the scope and

pace of the environmental assessment process. Screenings vary in time, length and depth of analysis, depending on the circumstances of the proposed project, the existing environment, and the likely environmental effects.

The RTPO filed its *CEAA* application with DFO on March 15, 1999. Copies of the *CEAA* application were distributed by the Special Commission to members of the Inter-Governmental Advisory Committee (IAC), were filed on the SkyTrain Project Registry and satellite registries, and the text of the application was also posted on the Special Commission's SkyTrain Project web site.

For the purposes of the Special Commission SkyTrain Review, the IAC members were given four weeks to review the *CEAA* application and provide written comments to the Special Commission. In support of the Special Commission's process, federal departments have provided timely feedback to the Special Commission and to the RTPO on the status of the *CEAA* review.

Various federal departments have noted in their comments to the Special Commission that, for some issues, more project information is needed from the RTPO before the *CEAA* review can be completed. The Special Commission and DFO had previously agreed that if the *CEAA* application was incomplete, DFO would identify the additional project detail required by federal authorities in order to complete the *CEAA* review, and these information requirements would be included in the Special Commission's *Biophysical Issues* and *Noise and Vibration Issues* reports. Based on advice from DFO, the issues that remain outstanding and need to be addressed include:

- Detailed site-specific information is required on project impacts at stream crossings and the Fraser River;
- Detailed site-specific mitigation plans are needed for each of the stream crossings, as well as for the works adjacent to the Fraser River;
- Detailed site-specific habitat compensation plans need to be provided for sites where it has been determined that the project will cause the harmful alteration, disruption or destruction of fish habitat. The RTPO will need to ensure that any compensation plans proposed have considered the implications of other projects planned at or near the site;
- Identification of contaminated sites along the route alignment and potential for site interaction with the construction of the accelerated project;
- A more thorough analysis of the cumulative effects of the project in relation to existing and future projects is required;
- More detail on the potential environmental impacts due to accidents and malfunctions and plans for dealing with them;

- More detail on the potential impacts of station construction and operation is required; and
- Responses from the RTPO to comments provided by federal departments on the RTPO's *Environmental Assessment Report*.

The issues identified to date are based on the information received to date from the RTPO. Additional comments on *CEAA* review issues may be pending once DFO receives more project detail from the RTPO.

CONCLUSIONS AND RECOMMENDATIONS

13.0 CONCLUSIONS

The RTPO has effectively identified the range of potential impacts that could result from construction and operation of the accelerated SkyTrain project and, in general terms, has set out a series of measures that—if fully implemented during the detailed design stage as well as during project construction and operation—should mitigate most impacts.

The potential impacts to the biophysical environment of primary concern are:

- Loss of trees and vegetation along the right-of-way for the route alignment;
- Disturbance of riparian habitat at stream and river crossings; and
- Potential impacts to water quality and fish habitat.

These impacts to terrestrial and aquatic resources from project construction and project operations can be addressed through appropriate construction management, mitigation and/or compensation measures. The sensitive sites along the alignment that are of primary concern are confirmed as being:

- The Grandview Cut;
- Beecher Creek;
- Stoney Creek;
- The Brunette River Crossing; and
- The Sapperton Reach.

The specific mitigation and compensation measures required prior to the start of construction at these locations will be determined by regulatory agencies when more detailed design information is available for their review. This information should be accompanied by a habitat balance sheet that shows the habitat potentially impacted and proposed compensation areas. The habitat balance should be positively weighted to the compensatory area.

Based on the preliminary design information and impact assessment presented in the *Environmental Assessment Report*, the RTPO's decisions on the locations of footings near Beecher Creek, Stoney Creek and at the Brunette River have taken into consideration the need to mitigate impacts at these crossings.

At Beecher Creek, the residual impacts to the riparian areas associated with construction and operation can be compensated and the RTPO will need to reach agreement with the regulatory agencies on the extent of the compensation required, prior to the start of construction at this location.

The selection of a centreline alignment is an appropriate measure to help mitigate the impacts of the project at Eagle Creek. An appropriate compensation plan, if required, will need to be worked out in consultation with regulatory agencies, prior to the start of construction at this location.

Stoney Creek is one of the most critical sites impacted by the guideway, and best efforts must be undertaken by the RTPO to minimize the impacts to the creek, to provide sufficient compensation for any residual impacts, and to ensure that actual construction is implemented to the satisfaction of regulatory agencies, including the City of Burnaby. At Eagle Creek, the choice of a centreline alignment along the Lougheed Highway should minimize the impacts to the creek, as long as any road widening is within the limits predicted in the *Environmental Assessment Report*. The choice of a centreline alignment near Bell Avenue will also help to minimize the loss of trees in the area.

The decision of the location for the crossing of the Brunette River is an improvement over the site location that was initially proposed. The Special Commission endorses the decision of the RTPO to construct a bridge with a 60m span in view of the technical issues and costs associated with an 80m span at the same location.

DFO has noted that drainage of ethylene glycol into watercourses is potentially a concern and could adversely affect water quality and result in damage to fish and fish habitat. The Special Commission considers that appropriate design and operations standards can address DFO's concern and the RTPO is advised to discuss this issue further with DFO.

The Special Commission notes that regulatory agencies are very concerned that the Stormwater Drainage and Sediment Control Plans be made available to them for their review and approval. The appropriate limits to sedimentation levels, and measures for sediment control, will need to be developed by the RTPO in consultation with DFO and MELP.

The Special Commission notes that potential benefits to air quality in the Lower Fraser Valley depend, in part, on the degree to which SkyTrain becomes an effective alternative to the use of motor vehicles. Modeling this is a complex exercise and there are many variables involved. The Special Commission advises the RTPO to indicate to federal authorities when additional modeling information will be available.

Information provided by the RTPO on bus interchanges required for the accelerated project identifies the need for new bus loops at Brentwood Mall and Lougheed Mall. For the purposes of the Special Commission review, further study information from the RTPO on the local impacts to air quality from these facilities is not required, given the RTPO's intention to address this issue during detailed design.

However, the reconfiguration of the bus exchange at Brentwood Mall away from the existing location could require changes to the local road network in order to accommodate the turning movements of buses.

14.0 RECOMMENDATIONS

14.1 GRANDVIEW CUT

Every effort should be made to compensate and mitigate for the impact of the accelerated project along the Grandview Cut. The Special Commission supports the selection of the north-side elevated option. The guideway in the Grandview Cut should be integrated with the transmission line right-of-way to help reduce the need for vegetation removal.

The RTPO should recruit a qualified wildlife biologist to work with the RTPO and the Design-Build Contractor's landscaper to ensure plantings represent natural vegetative communities to the extent possible within the urban landscape.

The recommendations outlined in the *Potential Impact and Mitigation Strategy for the Rapid Transit Project (Accelerated Phase): Vegetation, Fish, and Wildlife along the Grandview Cut* (December 15, 1998) report should be optimized.

Development of mitigation and enhancement options should be done in consultation with government agencies such as MELP, Environment Canada and the City of

Vancouver, and a comprehensive landscape management plan for the Grandview Cut should be prepared and integrated with local greenway initiatives and the SkyTrain Community Legacy Program.

14.2 STONEY CREEK

More detail on the geotechnical properties of the terrain and the stability of the slopes in the areas adjacent to Stoney Creek will need to be assessed, to ensure that any potential impacts for erosion as a result of the project are fully addressed at the detailed design stage. As part of the information to complete the *CEAA* review and obtain a *Fisheries Act* authorization for construction at Stoney Creek, the RTPO will also need to produce detailed mitigation and compensation plans for review and approval by DFO.

14.3 FRASER RIVER/SAPPERTON REACH

To recognize federal concerns, the RTPO and the GVRD should coordinate the installation of the sewer line with the construction of the guideway. If this is not possible, then assurance that the sewer line can be constructed at a later date without disturbance to compensation works required by DFO will be needed.

14.4 AIR QUALITY

The RTPO proposes that measures such as shutting off bus engines during waiting times, signs for taxis and private vehicles to take similar action, and proper configuration of ventilation systems for covered bus parking/unloading areas to vent exhaust away from air intakes to adjacent buildings will be considered. The Special Commission recommends that these measures be undertaken by the RTPO or delegated to the appropriate authority by mutual agreement.

The RTPO should indicate to federal authorities when emission projections from the EMME/2 model for two time periods (2006 and 2021), with and without the accelerated SkyTrain project, will be available.

14.5 GUIDEWAY MAINTENANCE

The loss of vegetation as a result of operations management should be included in the RTPO's calculations of the compensation measures required to address the impacts of the project.

14.6 CONSTRUCTION MONITORING

A “third party” model should be implemented for monitoring the construction phase of the accelerated project. The RTPO’s or the Design-Build Contractor’s Environmental Monitors should report directly to regulatory agencies as well as to the proponent. The RTPO should meet with concerned government agencies to work out the details for this process. The frequency for reporting to the RTPO and the regulatory agencies should be weekly or at other intervals where required by the regulatory agencies.

It is important the Environmental Monitors be suitably qualified to undertake the responsibilities they are assigned. Concerned government agencies should be given an opportunity to review the qualifications and/or the duty descriptions of the Environmental Monitors before the Monitors are recruited. The RTPO should also consult with regulatory agencies to clearly delineate and coordinate the various roles and authorities of the various project monitors.

The RTPO or the Design-Build Contractor, when developing impact management plans, should offer government agencies an opportunity to review the plans if government agencies request.

The Construction Environmental Management Program makes reference to compliance with local by-laws, but does not prescribe measures for ensuring effective linkages between the contractors, the RTPO and municipal authorities. Prior to the start of construction in each municipality, the RTPO, the Design-Build Contractor and the affected municipality should discuss ways to achieve these linkages.

14.7 GEOTECHNICAL

Information on project design for areas of high liquefaction should be part of the RTPO’s additional reporting on geotechnical issues.

14.8 CONTAMINATED SOILS

It has been noted that the information supplied to date is not specific, and implies that issues arising from contaminated soils will be dealt with when/if they are encountered. Prior to construction, the RTPO should provide more information to DFO on whether or not the right-of-way crosses any potentially contaminated lands and the ownership of any such lands.

14.9 PUBLIC INFORMATION

When completed, the final table of the RTPO's commitments, responsibilities and assurances should be made available to all municipal authorities, key stakeholder groups and to the public, and provided for public access on the RTPO's web site.

14.10 ARCHAEOLOGICAL IMPACTS

The RTPO should provide written commitment to comply with the recommendations of the Ministry of Small Business, Tourism and Culture as contained in the Ministry's letter to the Special Commission of April 29, 1999.

The Archaeological Monitor should have the authority necessary to suspend construction or related development activities where they are found to be in conflict with a previously unidentified archaeological site in order that appropriate mitigative decisions can be taken and implemented. Such decisions would be determined, in part, by the Archaeology Branch in consultation with the RTPO and their archaeological consultant, and in accordance with procedures for such discussions laid out in Heritage Permit application(s).

14.11 STATIONS

The RTPO should include Braid Station in the list of possible future stations with the potential for environmental impacts.

Stations along the Loughheed Highway may require acceleration and deceleration lanes to accommodate vehicles stopping to drop passengers off at these stations. If this measure is adopted by the RTPO, the potential for biophysical impacts will need to be assessed.

14.12 UTILITIES

The Special Commission notes that the RTPO will need to confirm that the utilities identified to date are the only existing utilities that may need relocation as a result of the project. The RTPO is advised to confirm with municipal authorities that all utilities which could be impacted by the project, in particular any underground utilities, have been identified.

BIOPHYSICAL APPENDIX 1

VEGETATION, WILDLIFE AND AQUATIC HABITAT— POTENTIAL IMPACTING FACTORS

The RTPO has identified factors that may result in impacts at the design, construction and operation stages (including maintenance) of the accelerated project. These are presented in more detail in Sections 5.2 and 5.3 of the RTPO's *Environmental Assessment Report*. They are summarized in this appendix to the Special Commission's *Biophysical Issues Report* to assist DFO with the preparation of a federal screening report.

The RTPO has also proposed a Planning and Mitigation Approach and developed Prescribed Environmental Design and Management measures in response to the potential impacts of the project on the biophysical environment. These are also described in Sections 5.2 and 5.3 of the *Environmental Assessment Report* and will be subject to further review as part of the CEAA review process once more design detail is available for the project.

Factors with the Potential to Impact Existing Vegetation

Project Design

- Location/siting of the alignment (including underground and above ground sections), and guideway elevations.
- Associated requirements for vegetation clearing for construction, and for vegetation management (trimming, brushing) during operation.

- Guideway span lengths and associated requirements for, and location of, guideway columns which will permanently displace vegetation.
- Design of guideway footings and support columns (footprint, depth) and associated requirements for vegetation clearing and excavation.
- Capability to restore vegetation in the footing area.
- Location and design of stations (elevated, at grade) and associated requirements for vegetation clearing and long term displacement of vegetation.
- Design and location of ancillary facilities (power substations, bus interchange facilities) and associated requirements for vegetation removal.
- Modifications to road surfaces (localized widening) to accommodate the project with potential for encroachment on vegetation.
- Site reclamation plans, including revegetation areas and species.

Project Construction

- Clearing and site preparation requirements (including potential requirement for fill, gravel placement) for temporary construction access roads.
- Clearing and excavation for construction of column footings.
- Clearing and excavation for station foundations.
- Cut-and-cover excavation for construction of underground sections of the line.
- Portal construction site for mined tunnel.
- On-site storage of excavated material (topsoil for reclamation, subsoils).
- Clearing and site preparation for crane pads (for placing guideway spans onto columns) in the vicinity of each column (could be localized widening of construction access road).
- Locations of on-site laydown and materials storage areas, with potential disturbance to vegetation.
- Drainage management facilities for construction and/or operation (ditches, sedimentation ponds, infiltration areas), with potential disturbance to vegetation.

Project Operation

- Vegetation management on the guideway right-of-way (trimming, brushing, maintenance of planted areas).
- Drainage management (to prevent erosion, contamination of surface drainages).

Factors with the Potential to Impact Wildlife

In addition to impacts on vegetation, the RTPO has also identified following potential impacting factors that could also affect wildlife.

Project Design

- Guideway elevation and associated impact on wildlife movement and access to habitat (potential to fragment habitat or create barriers to movement).
- Site reclamation and re-vegetation plans and potential changes to habitat capability and suitability.

Project Construction

- Potential wildlife disturbance effects related to timing of activities, such as clearing, in relation to life stage requirements (nesting, breeding, rearing etc.).

Project Operation

- Railcar and station operation with potential noise disturbance to wildlife.
- Vegetation management on the right-of-way, with potential for wildlife disturbance and impacts on the ability of sites to advance to later stages of ecological succession.
- Monitoring and care of planted areas affecting capacity to support wildlife.
- Potential for wildlife collision.

Surface Water Quality and Drainage Management Issues

The following are generic water quality issues that potentially apply to all aquatic environments affected by the project.

Project Construction

- Sedimentation of streams due to erosion and run-off from disturbed areas during construction.
- Potential for contamination of drainage water from curing of concrete for column footings.
- Potential for contamination of drainage water from spills of hazardous materials associated with operation and maintenance of construction equipment.

Project Operation

- Management of run-off from the guideway to prevent contamination of surface waters. The primary concern with respect to guideway drainage is the use of ethylene glycol for de-icing and potential for contamination of surface waters. The design of drainage facilities for the guideway will provide for appropriate management of drainage so as to prevent contamination from ethylene glycol.

Groundwater Quality Issues

Aspects of the accelerated SkyTrain project with the potential to interface with groundwater, and induce subsequent effects on surface water conditions, are construction of column footings and excavation of tunnels.

- Construction of column footings, including pile cap footings, may require dewatering during construction. Potential concerns include sediments and potential mobilization of contaminants in disturbed sub-surface soils.
- Tunnel construction will not directly affect stream crossings or the Fraser River foreshore, although drainage from dewatering during construction could ultimately reach surface waters.

Factors with the Potential to Impact the Aquatic Environment

The following are aspects of project design, construction and operation which have the potential to produce impacts on the aquatic ecosystem and wildlife habitat associated with riparian areas.

Project Design

- Location of the alignment and guideway elevation, with associated requirements for tree removal in riparian areas during construction, and vegetation management in riparian areas (trimming, brushing) during operation.
- Guideway span lengths and location of guideway columns which will permanently displace riparian vegetation.
- Design of column footings (footprint, depth), with associated requirements for vegetation clearing during construction, and capability to restore vegetation in the footing area.
- Design requirements for road widening to accommodate the project in the road median, with potential for encroachment on riparian vegetation.
- Site reclamation plans, including re-vegetation areas and species.

Project Construction

- Clearing and site preparation for temporary construction access roads in riparian areas.
- Clearing and excavation for construction of column footings (refer to cross-sections of footings, Environmental Assessment Report section 5.1.3 for dimensions of standards footings and associated excavations) in riparian areas.
- Clearing and site preparation of crane pads (for placing guideway spans onto columns) in the vicinity of each column in riparian areas (could be localized widening of construction access road).
- Potential contamination of drainage water from curing of concrete footings in open excavations.
- Potential for erosion and sedimentation in streams and rivers due to run-off from disturbed areas and soil stockpiles.

Project Operation

- Vegetation management on the guideway right-of-way (trimming, brushing) affecting riparian vegetation.
- Drainage management (to prevent erosion, contamination of streams and rivers).

Factors with Potential to Impact Wildlife Habitat in Riparian Zones

Project Design

- Guideway elevation and associated impacts on wildlife movement in riparian corridors (note that elevated crossings at all sites permit wildlife movement to the extent possible given existing barriers to movement, such as highway fill and culverts).
- Site reclamation and re-vegetation plans and suitability to support wildlife.

Project Construction

- Potential wildlife disturbance effects related to timing of activities, such as clearing, in relation to life stage requirements (nesting, breeding, rearing etc.).

Project Operation

- Potential noise disturbance to wildlife.
- Potential wildlife disturbance due to vegetation management on the right-of-way.
- Monitoring and care of planted areas affecting ultimate capacity to support wildlife habitat.
- Potential for wildlife collision.

PUBLIC
CONSULTATION
REPORT

MAY, 1999

SPECIAL
COMMISSION
SKYTRAIN
REVIEW



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APPENDICES ACCOMPANYING PUBLIC CONSULTATION REPORT

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- Public Consultation Appendix #7: Public Meeting Comment Form**

INTRODUCTION

1.0 PUBLIC PROCESS

The Special Commission's mandate requires that it design and implement a public consultation process to receive input in order to carry out a review of environmental issues related to construction and operation of the SkyTrain accelerated project.

Goals for public participation in the Special Commission SkyTrain Review are to:

- Ensure an open and accountable review process;
- Provide notification and information to the public at an early stage in the planning of the project;
- Ensure public input to the identification and resolution of concerns and issues about the project and their potential impacts; and
- Ensure that local information, knowledge and concerns contribute to both project design and decisionmaking processes.

To date, the Special Commission has provided a wide variety of opportunities for members of the public to participate:

- Mailing and e-mail addresses to receive written submissions;
- Ten public library viewing sites;
- SkyTrain Project Registry;
- Store-front offices in the project area;
- Local phone lines;
- A web site with project review information and a "bulletin board" for exchange of ideas;

- Observing Technical Workshops with open public question and answer sessions, February 2 and 3, 1999 (see Appendix #11: Summary of Proceedings in the Appendix Section of the Special Commission SkyTrain Review binder); and
- Attending and speaking at public meetings, February 16 and 17, 1999.

This public consultation report is based substantially on reporting of public comments by Praxis Pacific, consultants to the Special Commission. The purpose of this report is to document public issues raised during the Special Commission SkyTrain Review process and to report these issues to government. This report documents all public submissions received during the review process. In particular, it contains input received at public meetings following release of the Special Commission's *Interim Report* (January, 1999). Public issues raised through other modes of consultation are also documented and included in the issues tracking document (Public Consultation Appendix #1).

1.1 PUBLIC MEETINGS

Two public meetings were held on February 16 and 17, 1999 at the Executive Plaza Inn in Coquitlam, British Columbia. The objective of the public meetings was to help ensure that:

- The accelerated project and potential impacts have been identified and communicated to the public;
- Solutions for avoiding, minimizing or mitigating identified impacts are found; and
- Full advantage is taken of opportunities to enhance communities, the environment and the regional transit system.

Over the two days, 94 participants signed in and 44 people were registered to speak (total of 138 participants). There were approximately 25 ad hoc presentations during scheduled open comment periods. All public meeting participants were encouraged to fill in comment forms, resulting in the return of 39 completed forms (39/138 = 28 per cent response rate).

The public was notified of these meetings through paid advertisements in community newspapers and in the *Vancouver Sun* and *The Province* daily newspapers, through public service announcements, and in the *Buzzer* newsletter distributed by BC Transit (Public Consultation Appendix #2). The meetings were also promoted through newspaper and radio reports. Participants were invited to register in advance if they wished to speak and were given a five-minute time slot to make their presentation (Public Consultation Appendix #3).

The Special Commissioner chaired the public meetings and asked questions of clarification, as required. Patricia Howie of Praxis Pacific facilitated the sessions by keeping participants to their time and managing a series of open floor sessions (Public Consultation Appendix #4). The public meetings were recorded by a court reporter and full transcripts were prepared. These are available for viewing at the SkyTrain Project Registry and public viewing sites, as well as online at <http://www.skytrainreview.gov.bc.ca/>

An open house area was set up by the Special Commission in an adjoining section of the meeting room. Presentation materials included a series of maps used to assist in the project review, a computer demonstrating the Geographic Information System (GIS) being used to assist with project analysis, display boards summarizing the technical workshop input, and a variety of project reports and environment assessment materials (Public Consultation Appendix #5). The Rapid Transit Project Office (RTPO) also had display materials in the foyer (Public Consultation Appendix #6).

1.2 REPORT ORGANIZATION

This report on public consultation provides a summary of input provided by the public during the Special Commission's public meetings (February 16 and 17, 1999), through the comment forms circulated at the public meetings (Public Consultation Appendix #7), and through written submissions sent directly to the Special Commission by e-mail, fax or mail. Most of this information was available for analysis in electronic form. Qualitative data management software was used to assist in the sorting of comments. Comments made by the public during the February 2nd and 3rd Technical Workshops are captured in the Summary of Proceedings documents (Appendix #11 in the Appendix Section of the Special Commission SkyTrain Review binder).

This report broadly follows the key issue areas identified by the Special Commission in its *Interim Report*:

- *Biophysical Environment* includes issues relating to the natural environment such as streams and fish habitat, vegetation and bird habitat;
- *Noise and Vibration* includes impacts related to both construction and operations;
- *Connectivity and Operational Issues* considers the ability of the system to facilitate the transfer of passengers between transportation modes and areas (e.g., regional town centres);

- *Station and Guideway Design Issues* includes issues of crime, public safety and security, visual impacts and aesthetics, and the integration of stations into local neighbourhoods and communities; and
- *Legacy Opportunities*.

In addition, this report summarizes comments made regarding the decisionmaking process and topics outside the Special Commission's mandate and communicates these concerns to government. Such issues include:

- Project timing;
- Project justification; and
- Future expansion to the Northeast sector (Port Moody and Coquitlam).

Each section is divided into themes, each one beginning with a summary of the input provided by the public, followed by a series of direct quotes taken from the public meeting transcripts, the comment forms and written submissions. Quotes were chosen to represent the diversity of comments on each subject and to retain as much detail as possible in a summary report.

The public meeting transcripts, comment forms and written submissions are available in their entirety on the Special Commission's SkyTrain Project Registry.

PUBLIC CONSULTATION RESULTS

2.0 BIOPHYSICAL ENVIRONMENT

The most common biophysical environment issue raised was that the proposed route alignment would infringe on green space and environmentally sensitive areas. Areas of particular concern were the Grandview Cut, stream crossings along the Lougheed corridor (e.g., Chubb Creek, Beecher Creek, Eagle Creek and Stoney Creek), the Brunette River, and Fraserview/Sapperton Reach. It was suggested the route alignment should use existing corridors and be planned around green space and trees.

- “It makes little sense to destroy environmentally sensitive areas in order to construct an environmentally friendly transportation network. Existing corridors should be used wherever possible; sensitive areas and green spaces must be avoided.”
- “My biggest concern is the impact that SkyTrain will have on streams and green spaces along the proposed routes. The possibility of a station at Bell and Lougheed is alarming. We live in an urban environment and green space is precious...any loss is unacceptable.”
- “As there are many trees around our property, we have many different types of birds, Also a number of squirrels. SkyTrain going through this area would be taking a natural home away from Mother Nature.”
- “...and I strongly oppose any further developing on green space. The Lougheed Corridor must maintain its trees on the north side of Lougheed Highway.”
- “[I am concerned about] the large chestnut tree in New Westminster near the on-ramp to the Pattulo Bridge where you plan to cut and cover. The area around this tree cannot in any way be disturbed due to construction. The alignment should be

through the on-ramp road, not the small area in which this tree is surviving. A certified arborist with many years of experience—in consultation with New Westminster Parks—could assist the long life of this beautiful heritage tree.”

It was recommended that caution be used in constructing works at or near stream crossings, Stoney Creek in particular, and along Fraser and Brunette Rivers. Slope stability along the Grandview Cut and on Clark Street hill were noted as potential problems for construction.

- “Grandview Cut has surface stability problems. Construction through this area will have negative effects on wildlife.”
- “Don’t put SkyTrain down North Road and through Port Moody...the Clarke Street hill and hillsides around are not stable enough.”
- “When construction begins, especially by the Brunette River, which has encountered many problems over the years with spills, [we] will have more problems and it is a salmon run.”
- “[My] concern is impact on the Fraser River and shoreline from Woodlands area north to the junction of Brunette and Columbia in particular. This narrow strip of land needs to be protected for the use of residents, with concerns built in for environmental impact. Put the half kilometer in a tunnel continued from Woodlands.”
- “Firstly, the Stoney Creek must be protected from any possible damage due to construction and there must be no impact on this stream after completion.”
- “[My concerns are] impacts on Stoney Creek (long term) from SkyTrain and the associated development that will occur in the area; impacts on the Brunette River during construction; and impacts on the Fraser River shore.”

Finally, more detailed environmental impact assessments were requested. It was considered crucial that this project result in improved air quality by getting people out of their cars.

- “[I suggest] comprehensive environmental impact studies [to address these issues] along with a policy of no net loss of green spaces.”
- “It’s unacceptable to cut trees down for the sake of putting in SkyTrain. No proper, extensive environmental assessments [have been] done.”
- “More thorough study on environmental situations [needs to be done].”
- “[My concern is] air quality. Reduce cars on road...improve transit system...build SkyTrain!”
- “...we can’t afford to waste billions of dollars on a project that does not contribute substantially and cost-effectively to solving our problems with air quality and traffic congestion.”

3.0 NOISE AND VIBRATION

Concerns regarding potential noise and vibration were raised primarily by residents of the Lougheed Mall area in Burnaby and the Fraserview area in New Westminster. Their comments focused on noise associated with stations, operations, maintenance, construction and tunnels.

3.1 NOISE AROUND STATIONS

Many residents of the Lougheed Mall area urged decisionmakers to avoid placement of a station at Bell Avenue. If this station is built, residents asked that noise and other issues be addressed. They stressed that noise attenuation systems should be located in the station, at station entry and exit points, and on the guideway to keep noise from rising to the residential buildings. A request was made for compensation to residents in older nearby high-rises to provide for triple-glazed windows, which would alleviate the additional noise pollution.

Residents were concerned about the variation in pitch during acceleration and deceleration of the trains in the Lougheed Mall area. Although a tunnel beginning west of Bell Avenue was suggested as a preferred approach for reducing neighbourhood impacts, it was generally recognized that this may be prohibitively expensive. Residents requested a high standard of noise and visual impact mitigation be employed and wanted to be involved in discussions on noise abatement in the area.

There were concerns raised about the noise associated with the increased number of diesel buses that would idle and travel near the Lougheed Station and the Broadway/Commercial Station.

- "...noise and vibration in the immediate area will be significant, with acceleration and deceleration of SkyTrain. The variation in pitch will be much more annoying than the whine of the train, which at least is constant and easier to tune out noise."
- "...we are concerned about...noise as the train is leaving and entering the stations, as it is also an up-grade from the Bell Station up to Lougheed Mall."
- "...we believe the best thing that we really need is a good noise attenuation system located directly in the station, and also at the entrance and exitways and the guideways, to contain the noise and keep it downwards."
- "We also request compensation in the form of triple-glazed windows to alleviate the increased noise pollution that will be unbearable when added to the already ever-present din that filters up from the Lougheed Highway."
- "A station at Bell Avenue would have trains accelerating directly in front of our building. As this section of Lougheed Highway is lined with high-rise concrete

structures, this noise would be reflected and impact on all residents facing the Lougheed Highway.”

- “Timberlea Tower C residents favour a tunnel starting west of Bell Avenue as having the lowest impact on our neighbourhood...noise abatement will be required and we do expect to be involved in the decisions on the type of abatement that will be in place.”
- “By essentially terminating the line at Broadway and Commercial with a little spur line out to VCC, this intersection becomes the entire region’s central transportation hub. How many articulated diesel buses will be circling around and idling? How much more noise? How late at night will this noise be? I despair for my neighbourhood.”

3.2 OPERATIONAL NOISE

Concerns were expressed by people who live in Burquitlam near Clarke Road that road widening to accommodate SkyTrain would almost double the traffic noise as traffic would be closer to the buildings. There was concern raised that the assumptions of the noise study were based on out-of-date standards of the 1972 report of the US Department of Housing and Urban Development. There were also questions about the accuracy of the noise studies for the original SkyTrain and this proposed expansion.

A question was asked about the possibility of increased noise from the new, heavier MKII SkyTrain cars. Concerns were also expressed about whether the mitigation recommended in the noise consultant’s report would be implemented or not, particularly in the Grandview Cut. Residents near the proposed route noted that noise would be an issue during the evening and early morning hours, when traffic levels and thus background noise are low.

- “the HUD [US Department of Housing and Urban Development] does not have a good track record...even if you do take that report to be serious...so we’re basing our assumptions on the noise levels on an outdated and flawed report in its entirety.”
- “Noise levels promised by the original SkyTrain designers were exceeded considerably. Are the promised noise levels for the new construction going to be any more accurate?”
- “The report mentioned that the MKII cars are longer and the motors are larger...larger horsepower on these motors. How is that going to affect the sound?”
- “...in the evening and during the night we [Fraserview residents] have respite from that noise. The SkyTrain will be going by right into the early hours and starting in the early hours...we will now be bombarded with sound almost 24 hours a day.”

Residents of the high-rise buildings in the Lougheed Mall area believe they will experience noise impacts from SkyTrain passing through their neighbourhood. Fears were expressed that the mature trees on the north side of Lougheed Highway would be removed when SkyTrain is built, resulting in loss of their aesthetic and noise buffer value.

One resident of New Westminster was concerned about the effects of noise on her elderly neighbours from the frequency and the maintenance of SkyTrain. Another resident noted that noise from SkyTrain would make the Fraser riverfront area ineffective as a healing place for people. Suggestions were made that, due to the existing high levels of truck and train traffic in the Fraserview area, government should explore ways to reduce noise levels rather than increasing noise by adding SkyTrain to the area. Should noise be reduced and walkways improved, one person predicted a reduction in car use in the area. Several residents fear that additional noise from SkyTrain will greatly reduce the quality of life in their neighbourhood and their property value.

- “[We are] extremely concerned that if a station is put at Bell, the route will most probably come down the north side of the highway, and this alignment will certainly destroy many, if not all, of our mature trees. These trees...do double duty. They act as a noise buffer and they also give us visual beauty, which, when you are living in a concrete structure, is extremely hard to come by.”
- “Where I live [Fraserview]...I believe it’s about 6,000 trucks a day. It’s gone up a lot in the last year. We have 80 trains a day at least. And we’re going to get SkyTrain on top of it. Now, they say that the SkyTrain is going to just increase this a little bit, so it’s acceptable. But the point is that the noise level in that area is unacceptable to begin with...”
- “I live overlooking Columbia Street at Richmond. The noise of the SkyTrain probably isn’t going to drive me out of my head because I’m quite used to the trains. But next door to me, right beneath my patio, is a home for the aged.”
- “It’s a view area [Fraserview]. So, with the main reason for living here removed, the community character is going to change. And the extra noise energy from the SkyTrain is going to be added to the present noise of the traffic and the trains, and I believe the result is going to be mind-numbing.”

There were a number of suggestions about how to mitigate operational noise:

- “Reduced speeds in areas with elevated side walls...”
- “All noise mitigation factors [must] be implemented as suggested by the consultant.”
- “Do not place the route through residential areas or go underground in residential areas.”
- “I want the SkyTrain to be underground...proper design initially so it does not have to be fixed by an only-partially successful method later.”

- “...keep the mature trees intact to help lessen the noise.”
- “SkyTrain should follow major transportation corridors.”
- “Tunnel, trench and cover SkyTrain, or better still don’t have SkyTrain line along this route.”
- “Review what type of track, wheels, etc. we are currently using. There are many new advances since the 1986 opening of SkyTrain.”

3.3 MAINTENANCE NOISE

Public concerns were raised regarding the noise generated by the maintenance of the tracks by cars that grind the tracks. During the public meetings, the expertise was not on hand to respond to these concerns adequately. The Special Commission has subsequently provided all meeting participants with a written clarification of the potential impacts of regular (approximately monthly) night-time rail grinding required to maintain a smooth ride and reduce SkyTrain vibration and noise¹.

- “When I was in Surrey I lived six blocks away from where they were grinding and it was like it was in my backyard.”
- “What about the track clearing machines? They far exceed noise by trains...they should only be able to operate in certain areas that are in keeping with neighbourhood acceptance levels.”

3.4 CONSTRUCTION NOISE

Comments on construction noise related to impacts on schools and to the fast-track plans for 24-hour construction.

- “Glen Eagle Secondary School is right on the route. It’s very, very close to the road as it is. These students, their classrooms are right within meters of the road...we’re very concerned about the noise, not only during construction but also during ongoing...operation.”
- “I want it on the record that we vehemently oppose the 24-hour construction plans.”

¹ The rotary grinder moves at approximately 5 km/h and produces noise levels of 79dBA at 15 meters. An independent acoustics consultant has advised the Special Commission that the noise impact potential could be roughly compared to that of a street sweeper.

3.5 TUNNEL NOISE

The issue of noise from tunnels was raised, noting that a proactive approach to this issue should be taken to abate the noise.

- “Another concern is the tunneling. The report indicated the problem called telegraphing, which would mean that before that SkyTrain comes out of the tunnel you would hear it approaching...the exit of the tunnel. The report says tunnel telegraphing proved to be an issue...and absorption treatment could be applied if there’s a problem. Well, we’re saying there is a problem.”

3.6 VIBRATION

People who live in the Lougheed Mall area expressed concern that there would be vibration impacts to their buildings from SkyTrain.

- “We have concerns that the vibration from the SkyTrain will have an effect on the underground structure of the Timberlea complex. Ground sampling on behalf of SkyTrain was done along Lougheed Highway late last year. We would like to know if they do show any potential effects on the pool and underground parking structures.”

4.0 CONNECTIVITY AND OPERATIONAL ISSUES

Connectivity is how the SkyTrain links with the other systems such as roads, buses and bikeways. Public concerns regarding connectivity include:

- Cyclist and pedestrian access to SkyTrain;
- Connections with the bus system;
- Transit ridership;
- Integration with the communities near stations;
- Functioning and location of transportation hubs;
- Affects on the road transportation system;
- Growth shaping issues associated with future stations; and
- Connections with existing and future SkyTrain lines.

4.1 CYCLIST AND PEDESTRIAN ACCESS AND CONNECTIONS

Two people addressed the issue of accommodating bicycles in the SkyTrain system. They explained that surveys have found that more people would use transit and cycle if bicycles were permitted in the transit system.

One person stated that the SkyTrain presents an opportunity to improve the current cycling facilities in the Brentwood Mall to Slocan Street areas and the Columbia/North Road/Brunette Avenue areas. A request was made to ensure that the Lougheed Highway's bicycle lane remain, even if a pathway is developed as part of the SkyTrain line.

A Fraserview resident explained the danger of walking along Columbia Street to the Columbia Street Station. He noted that a walkway would not provide better access to a station for Fraserview residents unless a bridge were constructed over Columbia Street.

It was suggested that a station be located at Bainbridge Avenue (rather than at Sperling) along the Lougheed route in Burnaby in order to attract walk-on riders from the higher density neighbourhoods in that area.

- “Most major cities now permit bicycles on their transit system throughout the day. This increases the catchment area of the stations at both ends.”
- “We’d like to see covered racks for those who wish to lock their bike and go...we need coin-operated lockers as well as monthly rentals.”
- “So for most of the Lougheed Highway, it is a suitable bicycle route already and we’d like to keep it that way...Boundary Road on Lougheed Highway...is where the shoulders disappear and cyclists must share narrow curb lanes with high volumes of trucks, buses and cars. On the other side, Columbia Street, North Road and Brunette Avenue...are critical bottlenecks in the region’s cycling network. These corridors have been identified as future locations for green ways or cycle roads...but the SkyTrain opportunity is the first real opportunity to actually make the improvements...”
- “...for us to walk down to the Columbia Street Station it’s very, very dangerous...if you had a walkway and one could walk down to Columbia Street Station...we wouldn’t have any better access to SkyTrain [unless] a more appropriate walk over Columbia Street would...be constructed.”
- “...walking along the river with a huge wall and having a SkyTrain over top is not really a pleasant idea. We want a safe walkway along the Fraser River to bring New Westminster together. “

- “...you’ve got quite a large medium to high-density neighbourhood up there [Montecito area] and I think it’s in the interest of having a station closer and within walking distance of that area so you can get as much walk-on ridership as possible.”

4.2 CONNECTIONS WITH BUS SYSTEM

Many people believed the money earmarked for SkyTrain would be better spent by improving the bus system rather than expanding SkyTrain, and more specifically, some stated concerns that the high costs of SkyTrain operation and future expansion would jeopardize the existing bus system. Others said either that both SkyTrain and bus system expansion should be priorities, or bus expansion should come before SkyTrain. A request was made for studies on how expansion of the bus system could achieve goals such as getting people out of cars and greater affordability.

Some people stated that improving the bus system and adding Light Rapid Transit (LRT) would be more effective solutions to regional transportation issues. It was stated that buses provide more flexible transportation options and carry more riders than SkyTrain. One suggestion was to spend a fraction of the SkyTrain budget on roads, a bus lane and more buses. It was also noted that more buses would be in place today, between New Westminster and Lougheed Mall for example, if there were a real need for SkyTrain.

- “...we may end up with one bus every half hour...for the people that are trying to commute by bus we will have less bus public transit after SkyTrain than what we have now.”
- “...by expanding our bus system we’re going to achieve cost-effective transit...increasing ridership, getting people out of their cars, reducing congestion and pollution on our main highways.”
- “...frequent, inexpensive and convenient bus service is universally accepted as the most effective way to persuade drivers to abandon their cars in favour of public transit.”
- “...the provincial government is providing...some capital funding associated with this project, but they’re not providing funding to also improve the bus system...the buses are the backbone of the system...the buses have the ability to provide transportation options.”
- “...we’re concerned that it’s a lot of money spent on poorly designed system. This isn’t a matter of SkyTrain versus roads...but it could be a matter of SkyTrain...”

versus potential buses or rapid buses that could serve a much greater region and a much larger percentage of the region's ridership."

- "Did you know there wasn't one express bus between Columbia Station and the Lougheed Mall, not one? Now, if there was such a demand in this area, why don't they just put on express buses?"
- "Escalating costs will jeopardize upgrading and expanding the bus fleet which carries the majority of transit passengers."
- "We also recommend the GVRD's plans to increase the number of buses and trolley buses from the current 1,024 to 1,600 should be accelerated to keep pace with the schedule for the SkyTrain expansion. This is an important part of any strategy to increase ridership."
- "It is very important that the GVTA work with SkyTrain to make sure there are proper bus connections. On the existing SkyTrain, night bus connections are very poor."
- "Try to improve feeder routes from the adjoining community [Broadway between Production and Sperling] to SkyTrain. There is a transit stop northwest of Gaglardi. So it would be a natural connection to a Gaglardi Station. Most people are as close to Lougheed Mall as to Bell Station, or can use #133. This infrequent local bus would need upgrading to provide SkyTrain access."

4.3 RIDERSHIP

A number of people were concerned about a lack of need, or lack of ridership, for the proposed SkyTrain line. It was noted that the current ridership on bus routes that will become SkyTrain routes are too low to justify SkyTrain. It was also noted that ridership on the current SkyTrain line has not increased as population densities have increased along the existing corridor. Some were concerned that because the routes are parallel, some riders of the current system would only be shifted to the new system, attracting only a limited number of new riders. There was also concern that the new section would not be connecting major origins or destinations. People believe that ridership projections should be completed and made available for public review before the project goes ahead.

One person was concerned about the possibility of SkyTrain becoming a privately operated system. He expressed the need for continued provincial government involvement (i.e., subsidies) in SkyTrain in order to increase ridership levels. It was also recommended that the benefits of transit use and of SkyTrain be part of a communications strategy. One person pointed out that transfers cause people to avoid using transit, so fewer transfers to travel from major origins and destinations will increase ridership in the system.

- “SkyTrain is running at the same headways [capacity] that they were 10 years ago...the ridership hasn’t increased.”
- “We are concerned that the alignment is almost parallel to the existing SkyTrain system...and it’s not connecting major origins or destinations...as such, the ability to attract people from out of their cars or to attract new riders is limited...”
- “There hasn’t been enough neighbourhood consultation to figure out with the residents what will work best to provide...the most ridership, the most effective ridership and not to disturb the local residents.”
- “The present peak hour bus capacity...from Lougheed Mall to Broadway Station and from Lougheed Mall and environs to Columbia Street Station is about 1,000 and 1,200 persons per hour respectively...both far below the threshold that would justify a light metro such as SkyTrain.”
- “...we point out the crucial link between continued provincial involvement in the operations of SkyTrain and increasing ridership levels...All transit systems require a strong public policy framework to support increased ridership...declining ridership has shown to follow closely on decreased subsidies, increased fares and cuts in service.”
- “Has there been a ridership survey done? No. The ridership surveys that independent groups have done have indicated a very small amount of people would use that facility, to bring it from Coquitlam into New Westminster.”
- “The third thing is, buses need to be planned and supplied first so that there is the connectivity and there is the ridership on the buses.”
- “The RTPO knows that the line will actually carry relatively few people and that the vast majority of those people will be people who will be re-directed from existing transit services.”
- “To be successful, a transit system must take people from where they live to where they want to go in what they call a seamless journey. A seamless journey is a no-transfer one because you can lose upwards of 70 per cent of your ridership per transfer.”

4.4 INTEGRATING STATIONS WITH NEIGHBOURHOODS

A Fraserview area resident noted that it is difficult to commute by SkyTrain for people who live between or far from stations, because of the inadequacy of the bus system to carry people to and from the stations. Another person suggested that stations be located in areas where many people can walk to the station. Specifically, she suggested a station be located at Bainbridge and Lougheed to serve the community there. It was also suggested that there be a station at Gaglardi Way due to the industrial, residential, school and university use that would result.

It was suggested that buses to SkyTrain stations be free in order to encourage people to use the system. Some people feel that a station would not be required (or desired) at Bell Avenue, as there would be two stations nearby for use by area residents. People were also concerned about the deterioration of their communities. One person described the challenge of siting stations in communities because of community resistance to SkyTrain in their neighbourhoods, while buses in communities do not typically provoke opposition. Several people referred to the BC Ombudsman's 1987 Recommendations on SkyTrain, and were disappointed many of them appear to have been ignored. The areas around proposed stations were identified as ideal places to encourage multi-use planning (commercial, residential and recreational).

- “I tried to commute by SkyTrain when I moved to New Westminster...it was impossible because the bus system going one way is great but, because of the river going the other way, it's not so good. So at night...there'd be a bus every half hour, you'd have to walk at night down Columbia Street...it's dangerous. So even if you want to commute, it's very difficult to commute from our area.”
- “First, the people of New Westminster are going to lose a possible strip park...that would be constructed right down the city-owned shore and foreshore of the Fraser River that's dead in front of the Fraserview area right now. Second, the deterioration of the Fraserview community will start.”
- “...you've got quite a large medium to high-density neighbourhood up there [Montecito] and I think it's in the interest of having a station closer and within walking distance of that area so you can get as much walk-on ridership as possible. I think a lot of them would opt to walk to Bainbridge and Lougheed, but Sperling's too far, they wouldn't walk down there.”
- “I think there should be Lake City Station because of the industrial park.”
- “Why is only east of Austin (opposite the Lougheed Mall) considered for a station? Why not consider the west side, adjacent to mall, so no crossings of Austin are necessary? This area has been mostly vacant over the last 20 years. Several small businesses have been unsuccessful, so it is not a prime commercial location.”
- “...if we could take a free bus down to the SkyTrain I think you might encourage people to use it, and once they use it a bit, they might find it's not such a bad experience after all.”
- “...the ability to route the SkyTrain adjacent to major origin destinations and yet still have the buy-in from the local residents...because of the perceived negative impacts onto their community...I think it's almost a flaw of the technology which you don't get with buses because buses don't bring a lot of these negative impacts into the community.”

- “I would have thought that the 1987 recommendations of the BC Ombudsman would have been enough to have the above ground construction [within residential neighbourhoods] of the SkyTrain reconsidered.”
- “Incentives should be provided, including re-zoning, to encourage developers to become involved in more creative mixed-use proposals for residential and commercial development around those stations.”

4.5 BELL STATION

Many people who live near the proposed Bell Station on Lougheed Highway were opposed to the construction of a station at this location. Their concerns included potential redundancy of stations (given its proximity to both the Lougheed Mall and Production Way stations), crime and safety in this community of predominantly elderly residents, and potential noise and vibration impacts. These residents favoured a central alignment down Lougheed Highway that would distribute impacts evenly between high-rises on both sides of the highway. They were concerned that a station would require an alignment on the north side of the Lougheed Highway. A great deal of frustration was expressed that decisions appeared to have already been made before residents were consulted. They also asked why a station was not considered for Gaglardi.

- “The injection of a redundant station will result, as studies have shown, in an increase in the rates of stolen autos, assaults, and B&E’s.”
- “My understanding is that there will be a SkyTrain station with a bus loop at both Lougheed Mall and Production Way. We believe that these two stations will effectively cover ridership from Bell Avenue east to Lougheed Mall, and west to Production Way, making a station at Bell Avenue redundant...”
- “We strongly urge you to consider our views regarding noise, vibration, parking, time, cost, and above all crime, and elect to eliminate the Bell Station option.”
- “If one purpose of SkyTrain is to lessen travel time, would it not save time, not to mention wear and tear on the train, to eliminate a station? Besides, it would also save money.”
- “So we’re pretty well of the opinion now that it’s just talking that we’re doing...if the City of Burnaby wishes to have a station at Bell, they’re going to get a station at Bell no matter how it impacts the existing residents.”
- “A lot of us had wondered why they would not seriously look at the idea of a Gaglardi Station...we had always looked at it as the best location for a station that would handle all the Simon Fraser traffic, Lake City, high school...”

4.6 BRAID STATION PARK-AND-RIDE

Concerns were expressed by Braid area residents not wanting a park-and-ride facility in this location. Their principal objection was that the area cannot accommodate any additional road traffic. It was suggested that a majority of the people using it would be coming from the north side of the highway and that it would make more sense to put a station and park-and-ride facility in South Coquitlam.

- “...as residents of that area [Braid], we’re very concerned about traffic congestion and secondly having a park-and-ride at Braid. And our concern is that if the outlying areas want SkyTrain service, then the outlying people should take SkyTrain through their back door and enjoy the service through Maillardville or lower Lougheed.”
- “Our concern is that Braid right now serves as kind of a real funnel at this time for everybody else in the Lower Mainland. We’d like to see the Braid Street Station go away because we will use Keary rather than Braid Street.”
- “We can’t understand why a major station has to be at Braid and at 6:00 at night you can’t get a car through there, let alone having to bring a SkyTrain and all the park-and-ride around it.”
- “... there’s one thing I’d like to bring up today and that is the small community of New Westminster is being asked to absorb a large part of the SkyTrain, especially the proposed park-and-ride at Braid and Brunette.”
- “Also, the city doesn’t want a park-and-ride on the south side of the freeway. This is mainly for drivers coming from the north side of the freeway. That would be silly. Put the park-and-ride on the north side. Why bring the extra needless traffic into New Westminster?”

4.7 MAJOR TRANSFER POINTS

One person was concerned about Broadway and Commercial area becoming a regional transportation hub, and the associated bus and car traffic in the area. A Burquitlam area resident said that it is important to consult area residents when placement and design of the Lougheed Station is undertaken, as the increase in traffic and parking would affect the neighbourhood.

One person proposed the provision of small pollution-free vehicles for people to drive to their destination when they arrive at major bus or SkyTrain terminals.

- “By essentially terminating the line at Broadway and Commercial with a little spur line out to VCC, this intersection becomes the entire region’s central transportation hub...”
- “...in regards to the Lougheed placement, we feel it’s very important for the City

of Coquitlam and area residents to be consulted when they do the placement and the design of the Lougheed Station. This station will greatly impact the Coquitlam and the Burquitlam area because...we are just right across the street.”

4.8 NEW WESTMINSTER VS. COLUMBIA STATION

One person expressed concerns about the ability of New Westminster to handle the increased bus and car traffic when it becomes a more major transfer point, and wondered why the new line is proposed to start at Columbia rather than at New Westminster Station. It was noted that New Westminster Station already has a large bus loop, whereas at Columbia Station, there is little room to construct a bus loop. There was also concern that there is not enough room to expand Columbia Station to accommodate two lines, and that New Westminster Station is far better equipped for such an expansion.

- “There’s going to be more bus traffic coming along that corridor, and is there the room at Columbia Station to handle this?”
- “...the people that are making the decisions are considering starting this project at Columbia Station instead of New Westminster Station...I do not believe that the traffic patterns around in downtown New Westminster can adequately cope with the increased traffic, the increased bus traffic that this is going to create...in my view to start this project at New Westminster Station makes much more sense. There is an existing bus loop there.”
- “New Westminster Station, there is also a third track at New Westminster and there is not at Columbia.”

4.9 ROAD/AUTOMOBILE CONNECTIVITY

There were several suggestions regarding park-and-rides. One suggestion was that there be more park-and-rides in the SkyTrain system to encourage drivers to get out of their cars. Some people suggested locations for park-and-rides, including at Lougheed Station and King Edward (on a Lougheed Highway to Coquitlam Centre route). Others were concerned about traffic congestion at park-and-ride areas, in particular at a possible future Braid Station. Further consultation and study on the affect of park-and-rides on mixed-use developments around stations was requested.

Concerns were expressed regarding parking in residential areas near SkyTrain stations. It was suggested that station placement take into consideration community concerns about traffic and transportation issues.

- “...to encourage use I would like to suggest that park-and-rides be more prominent, there be more of them than there are now. If I have to take a bus, wait, then take the SkyTrain, wait, then catch another bus I’m likely just to stay in my car and keep on going. But if I could go to a park-and-ride I think that would encourage me to use some kind of rapid transit more than I do...”
- “There will be increased traffic in the area [Lougheed Station] and we see major parking problems if there is not a park-and-ride at that location.”
- “I would suggest that the SkyTrain run along Lougheed Highway out to Coquitlam Centre, and that a park-and-ride be put in at King Edward.”
- “Park-and-ride lots can encourage drivers to use SkyTrain, especially in less densely populated areas of the region, but these facilities can also undermine mixed-use development around stations. Further consultation and study of this important question should be undertaken, and local governments should use their zoning powers and land ownership to support a preference for mixed residential and commercial development around stations.”
- “Limited residential parking will be greatly affected along Bell Avenue, Hunter Street and Keswick Avenue. Does this mean parking permits and/or parking meters, or just a park-and-ride?”

Some people favoured Light Rapid Transit (LRT) to SkyTrain. Reference was made to an LRT in Hong Kong which does not disrupt road traffic and runs at more frequent intervals than proposed for SkyTrain.

- “In Tuen Mun, Hong Kong, the LRT carries 25,000 persons per hour in the peak, two-car trains at 40-second headways, and there’s over 60 intersections with roads on that system. The debate that three and four-minute headways are going to disrupt traffic is just stuff and nonsense.”

Some people were concerned about the inability of SkyTrain to ensure a reduction of cars and trucks on the roads.

- “...if we do get a few cars off of the roads, what’s going to stop it from being replaced by trucks?”
- “...if you take a certain fraction of those cars off the road by giving them the SkyTrain service...there is already congestion there, and if that starts to ease as parking becomes slightly more available than before, then people who are already feeling these constraints will now take advantage of this let-up and use their cars that much more often.”

4.10 GROWTH SHAPING

Some people believe that rapid transit brings growth and development in the vicinity of stations. People stated that municipal governments and formal community advisory groups should play an active role in station location decisions because of the influence that SkyTrain can have on land use. One person noted that public housing and other facilities should be located near stations rather than focusing on private development. It was noted that development around SkyTrain determines (in part) the level and crime and livability of a neighbourhood. One person did not believe that growth follows SkyTrain, even though municipalities have tried to direct growth through the regional transit system.

- “We encourage the municipal governments to assume an active and visible role in the station location as this will influence land use in the area.”
- “...we’re extremely disappointed in that area [Joyce Street], as far as the development stages that have happened over there to date...”
- “Policies should be developed to support the construction of subsidized housing, public buildings, and other public facilities around stations rather than an exclusive focus on private business development. Incentives should be provided, including rezoning, to encourage developers to become involved in more creative mixed-use proposals for residential and commercial development around those SkyTrain stations.”
- “...what we see is tremendous growth...in Richmond. No transit there. They built SkyTrain out to Surrey, central Whalley. No growth there. Since SkyTrain has been built we’ve seen tremendous densification along the route, yet the ridership has stagnated for the past four or five years, or is even dropping. So what we see is a transit system that maybe has compelled municipalities to provide the zoning for densification.”
- “...certainly SkyTrain does bring people in but it’s the massive increase of road capacity that’s probably made Metrotown what it is today.”

4.11 CONNECTIONS WITH EXISTING AND FUTURE SKYTRAIN LINES

Potential future phases connecting the accelerated project with Port Moody and Coquitlam to the east and UBC to the west are outside the Special Commission’s Terms of Reference. However, these future expansions are relevant to the current accelerated project because it must provide for any necessary future connections/interchanges.

Many people indicated an interest in the planned future expansion of SkyTrain to Coquitlam and Port Moody. Some implications of future expansion to the current

project were noted. People urged the Special Commission, RTPO and municipalities to study a future extension to the Northeast sector (Coquitlam Town Centre) rather than just the accelerated project. People emphasized the importance of knowing the implications of future expansion of the SkyTrain system in order to properly design the accelerated project.

One person said that citizens should not count on the political commitment that the extension to Coquitlam Centre would be completed. Some people recommended a route along Lougheed Highway as the best option to extend SkyTrain to Coquitlam Centre area. It was noted that the Braid Station would be the most logical place from which to extend such a line. It was suggested that the community in Port Moody does not want SkyTrain there, and that the area could instead be better served by buses from Coquitlam Centre and/or Lougheed Mall. Furthermore, it was suggested that SkyTrain along the Lougheed would have fewer effects on the community and would be used by many of the commuters who currently drive that corridor. However, there were also explicit objections to Lougheed Highway as an alternative route given potential impacts on Riverview and other neighbouring communities.

One person stated that in order to be useful, the new SkyTrain needs to extend to Coquitlam to the east and to Granville or UBC to the west.

- “The government’s promise to extend the SkyTrain from Lougheed Mall to Coquitlam Centre...is an empty promise, and...should be considered an election promise, not a binding commitment.”
- “...we support the rapid transit but we support a complete line to Coquitlam Town Centre which we feel is absolutely necessary. We don’t see why there is a need for a parallel line to a line that already exists, that goes from New Westminster to downtown. It’s important to have rapid transit for Burquitlam, Port Moody and Coquitlam Town Centre where the growth will occur. And we urge the [Special] Commission and the Rapid Transit Office and all municipalities to...study the complete line, not just Phase 1.”
- “...a Lougheed Highway route, which links up with an existing line off the new Phase 1 of SkyTrain with potential two stops along the route, makes economic and environmental sense.”
- “...at Lougheed Mall you need to design what you’re going to do there on the second phase as you design that part of the route...nobody’s really sure what it looks like yet, partly because you have to know where you’re going to go next.”
- “You know the part of the line that’s being considered to be built as Phase 1 is unfortunately almost redundant because it’s paralleling a line that already exists.”

- “...the downtown area of Port Moody could be easily served by feeder buses going into Coquitlam Centre.”
- “In order to make this new SkyTrain line serve useful transit corridors, it would be necessary to extend it to Coquitlam on the east and to at least Granville on the west if not all the way to UBC, where some kind of rapid transit service is truly needed. But the government refuses to commit...”
- “...the citizens of Port Moody are at the point where they want nothing to do with SkyTrain. We’ll be very happy to have lots of buses. And if somebody wants to run a SkyTrain route to Lougheed Mall, we’ll go to Lougheed Mall. It’s a 10-minute bus ride. The difference is probably four minutes overall. The cost is half a billion dollars difference.”
- “...the people that are travelling on the Lougheed Highway in front of Riverview are usually driving back and forth, going to work and that, and they’re probably the ones that are polluting the atmosphere. I would think a SkyTrain in that area would be a lot better.”

Some people expressed concern about whether rapid transit from Vancouver Community College (VCC) to Granville-Arbutus would be built in the future. Some people said that the current phase being considered does not make sense, as the connections to densely populated areas are not included and much of the route alignment parallels or duplicates the existing SkyTrain line. It was suggested that the first phase connect New Westminster to Coquitlam Centre, and that the second phase connect Lougheed Mall to VCC or Granville-Arbutus.

- “...speaking of the VCC to Granville-Arbutus segment, the government has no serious plan as to whether and how it will complete rapid transit from VCC to Granville-Arbutus. This leaves the Lougheed Mall to VCC segment as an orphan segment before construction has even started.”
- “There has been vague talk of filling the gap between VCC and Granville-Arbutus with a rapid bus service, but this just illustrates that the plan to build SkyTrain from Lougheed Mall to VCC is illogical. Why would we have a high-capacity rapid transit line on the least dense portion of the corridor and a rapid bus service on the most dense portion of the corridor?...why would we have rapid transit going westward from Lougheed Mall, stopping short at VCC where passengers would then get off, transfer to a bus and complete their connection to a rapid transit line going north-south on the Granville-Arbutus corridor?”

Several people commented on issues related to how the accelerated project fits in with the full “*T-Line*” described in the GVRD *Livable Region Strategic Plan*. The current project constitutes only half of the complete corridor, much of it duplicating services provided by the existing line. It was suggested that rapid transit projects be designed so that each individual line is self-sufficient and functional regardless whether future expansion occurs. There were several concerns that the lines do not terminate at major destinations, and that the system would therefore not attract a sustainable level of ridership.

- “Phasing should be designed so that each phase makes sense on its own whether or not future phases are added. Yet, it is clear that the New Westminster-to-VCC route does not meet this simple test for what constitutes good phasing...The proponent’s only stated rationale for the project is based exclusively on studies of rapid transit on full corridors, that is, New West to Coquitlam and Broadway-Lougheed.”
- “...the SkyTrain extension project is not good rapid transit. Fundamentally it’s in the wrong place. The New West to Lougheed Mall segment is only half of the New West to Coquitlam corridor. The Lougheed Mall to VCC segment is only half of the Lougheed Mall to Arbutus corridor. The New West to VCC route merely duplicates the existing SkyTrain route.”
- “There is the problem and the disagreement with regard to phasing of segments. We have ended up with truncated *T-line* which is sort of half of an inverted L...which doesn’t really provide us with any sort of a...solution-based product...”
- “It doesn’t match any of the plans like Transport 2021 that were stated before which was supposed to be the full *T-Line*. It’s an incomplete transit corridor without the complete transit or bus connections in place yet, nor the ridership.”
- “This additional line will most likely preclude the construction of a truly integrated rapid transit system in Greater Vancouver...it is not a coherent line in itself.”
- “We’re concerned that Phase 1 seems to be ending on the downtown side in a place at a destination where not a lot of people will go, Vancouver Community College. I think that it is unfortunate that it is not being extended further down...”

5.0 STATION AND GUIDEWAY DESIGN

This section covers the broad topic of project design and provides a summary of public concerns and issues regarding specific station design details, including visual and aesthetic considerations, and crime and safety. Many people provided constructive suggestions on how station designs could be improved to mitigate crime, increase accessibility, and incorporate health and safety features.

5.1 STATION DESIGN

Discussions regarding station design occurred at two levels of detail. At one level, people emphasized the importance of community consultation in station design. They also suggested transit workers and local municipalities should be consulted.

Furthermore, they felt that community plans for policing, zoning, traffic patterns and future development must be developed carefully in the vicinity of stations to combat some of the problems experienced on the current line.

On a more detailed level, some specific suggestions were made for noise attenuation systems, wheelchair access, larger elevators and health and safety features. People were worried that small “mom and pop” stores and services would be replaced by chains (e.g., McDonalds) around future stations. Specific suggestions on how to diffuse crime in and around stations and how to design for cyclists are included in sections specific to these topics.

- “It’s a question of what’s going to happen two or three blocks radiating out from this hub. It has to do with what sorts of improvements to the streets are going to be made to facilitate the volume of pedestrian traffic. It has to do with what’s going to be done to mitigate against this basic problem of extreme high transients amid a place where people live.”
- “When you go into the station design and the location of the tracks and everything else, it has a major impact economically and socially on the community. And that’s something else that can’t be rushed.”
- “We encourage the municipal governments to assume an active and visible role in station location as this will influence land use in the area. Right now, access to North Road at the Lougheed area is closed to Burnaby, so any additional traffic, parking, etc., will not affect Burnaby at all. What’ll happen is that’ll all come across the street, end up in our municipality.”
- “Introduction of filthy diesel buses, elimination of street parking, property devaluation, destruction of green space and increased crime...no, SkyTrain will not increase my and my neighbours’ quality of life.”
- “You might make the bus stops a little wider so more people can get in there out of the rain, too.”
- “And I would hope that whatever system goes in, that consideration is given for the handicapped.”
- “Riders’ councils should be encouraged and those riders’ councils should be funded by the GVTA. Policies should be developed to support the construction of subsidized housing, public buildings and other public facilities around stations.”

- “An advisory group composed of the relevant unions should be struck by the GVTA with a mandate to provide input into future growth and expansion, health and safety issues, public safety and crime prevention, ergonomic design, fare retention, and the introduction of any new technology.”
- “I believe, where the community itself has got involved and made that station—not only structurally, but made it fit or suit its surroundings—I don’t see any particular reason why that wouldn’t be of benefit to SkyTrain itself.”

5.2 BICYCLES

Cyclists advocated incorporation of bicycle commuter facilities in stations. Suggestions included: secure lockers and racks, construction of ramps instead of stairs for short flights (two to three steps), and installation of hooks for bikes in SkyTrain cars. They advocated that the transit authority change its policy and allow bicycles on SkyTrains. SkyTrain workers support bicycles on SkyTrain and have made suggestions for keeping bikes secure.

- “In the GVRD bike survey final report February of 1993, 37 per cent of respondents said they would cycle more if they could take their bikes on the SkyTrain.”
- “For the most part the SkyTrains would be quite suitable as they are. Sometimes instead of two or three stairs, a little ramp would be easier.”
- “Apparently this involves the design of the station and cars to accommodate bicycles but also the policy of the transit authority.”

5.3 STATION DESIGN—HEALTH AND SAFETY

People urged that more consideration be given to worker and user health and safety issues such as earthquake and emergency preparedness, and incorporation of ergonomic principles. It was noted that elevators at the current SkyTrain stations are four inches too small for ambulance stretchers. Staffing and scheduling changes were also suggested to improve safety and emergency preparedness.

- “Right now the elevators are not large enough to handle a stretcher for emergency response, and as a result we have to carry stretchers down long flights of stairs.”
- “The health and safety of SkyTrain employees obviously overlaps substantially with the safety of passengers. Public confidence in the quality of service will increase if people feel safe when they’re riding SkyTrain as well as when they’re waiting for a train at the station.”

- “...our scheduling is very ineffective and very wasteful. We have four-hour shifts that do not allow the staff to be fully trained and to be kept up-to-speed on hands-on driving abilities, things like that.”

5.4 VISUAL AESTHETICS

Loss of views and loss of privacy were concerns shared by residents, particularly along the Fraserview and Lougheed sections of the accelerated project route. Fraserview residents believe that construction of SkyTrain along the waterfront will ruin their views of the river and destroy the public amenity of the area. Tree planting was not seen as adequate mitigation for the loss of views. Residents in the vicinity of Lougheed Mall were concerned about the loss of trees planted between the buildings and Lougheed Highway that would likely be removed with route alignment along the north side of the highway. With an elevated route, the first few floors of high-rise buildings and three-to-four-floor condominiums will be looking at or under the SkyTrain guideway. The resulting loss of privacy and regular disturbance of passing SkyTrains is an important issue to these residents.

- “Right now I look out, I have a wonderful view of the Fraser River. If I look out and I see SkyTrain in front of me...I mean, how do you make that better?”
- “SkyTrain is not going to increase my quality of life. Green space cultured by our building over 20 years is to be ripped apart. Not only the trees in front of our building but the adjacent small park targeted for the Bell Street Station will be eliminated. Concrete pillars and guideways will scar the landscape and become an unwanted focal point.”
- “Our trees...it’s taken 22 years to grow those trees, and I get a good feeling every time I look out...at them. They provide a visual barrier between us and the traffic, and to a certain degree they provide a bit of a sound barrier also. But in both ways it’s very good for us and we don’t want to lose one branch off one of those trees if we can possibly help it.”
- “Removal of these [trees] would cause an unacceptable increase in traffic impact on the suites directly facing the highway.”
- “SkyTrain in its concrete elevated structures at a height of approximately 25 feet will invade their privacy. Many of these residents [Eagle Ridge] live in townhomes and condominiums whose windows can be directly looked into by [SkyTrain] passengers.”
- “A lot of these units are right on the route. They’ll be looking out onto the route and riders will be looking into their homes.”

- “Now, they were told that eventually there might be light rapid transit or a light form of transit when we purchased our homes there...we are being faced with—every four minutes 20 hours a day—a SkyTrain running by on an elevated track.”
- “...the proposed new open concept of the station...we do have a problem with it because where the proposed station is adjacent to a residential complex...not only will riders be able to look directly into their homes, but anybody waiting for a train will also have that opportunity.”

In order to avoid negative impacts, some people suggested that SkyTrain should not be routed through residential areas. Where this is not possible construction of the line at grade, in a trench or tunnel was recommended.

- “I’m assured that the stations will be acceptable, but there is no way of hiding the eyesore of the overhead track route. This may be acceptable in a commercial area, but does nothing for a residential area.”
- “Elevated tracks cannot be beautified. The elevation permits passengers to look into residents’ windows. Consider tunneling more and possibly ground-level tracks.”

5.5 CRIME AND SAFETY

Crime is an important issue for residents along the length of the accelerated project route. Some residents requested the complete results of the RTPO crime and safety study. A resident of East Vancouver suggested that crime had increased around the Joyce Station and that expansion of SkyTrain at Broadway/Commercial would make it a major transportation hub with even more transients (potentially contributing to further negative community impacts). Furthermore it was pointed out that whether crime around stations is real or perceived, the end result is the same: residents are reluctant to ride SkyTrain.

- “If you perceive it to be crime, that’s how you treat it.”
- “In 1996 Jennifer Buckley did a study on this subject aptly named Public Transit and Crime. She indicates that three SkyTrain stations designated as residential—29th Street, Joyce, and Nanaimo—exhibited an unusually higher number of police calls which included prowling, harassment, stolen cars, breaking and entering. According to her report, nine stations in Vancouver accounted for 49 per cent of police calls.”
- “By far our biggest concern is crime. There seems to be a correlation between crime and SkyTrains.”

- “When you have a system which puts the stations and the guideway out of the surveillance of the ordinary person on the street including, I might add, passing police cars, you are building a situation where you are going to have some opportunity for crime.”
- “Commercial has already become one of the most dangerous and unpleasant places in the city...thousands of people daily moving in and out of a major transportation hub is a classical magnet for crime and blight. It’s the sort of place where a multitude of people pass through but nobody lingers. There are constant crowds, but nobody’s paying attention except the people who live nearby.”
- “Local police are being cut back every year. What is SkyTrain prepared to do about the increased neighbourhood crime a station brings? Nothing, I expect, just build a station and let the chips fall where they may.”
- “...diehard SkyTrain users ever since day one when the first SkyTrain started... have now stopped taking the SkyTrain because of (a) the lack of security, and (b) the perception of the lack of security...the criminal element that the SkyTrain brings and just the fact that there is nobody on the trains to police any potential problems.”

5.6 BELL STATION & CRIME

Residents near the proposed Bell Station fear that a station almost adjacent to the network of trails along Stoney Creek would make the area unsafe and ripe for increased crime. They were especially worried because an estimated 50 per cent of the population near Bell comprises elderly people. Residents added that since the City of Burnaby seems to be most in favour of the Bell Station, they should take some of the responsibility for combating crime.

- “Many of these trails are hidden, and this, along with the high school, provides the perfect opportunity for crime to develop. A station here would only give the criminal another getaway route, and in my opinion be inviting crime.”
- “...and we just hope that if a station is built at Bell, that the impact on the existing residents there, such as the noise, the safety issues and the security issues, are addressed such that it will allow us to still remain living in our homes that we wish to stay in...not to force us to move to let other people move in that are willing to put up with noise and other changes...”
- “Since the station would actually be on the outskirts of the Town Centre, right on the edge of the green space park areas that they’re talking about, some of us feel that a station would be more subject to crime...So we certainly feel that the city

should be taking responsibility in what they're doing as well as the SkyTrain and the station itself.”

- “...within a half a block you have a totally seniors’ building. The one thing they have been unable to cope with at ALRT stations has been the crime problem, and I think this would just be a terrible disaster for those people.”

5.7 CRIME AND SAFETY—SCHOOLS

Crime and safety around schools is another consideration for both guideway alignment and station location. Increased vehicle and bus traffic near stations and decreased visibility due to guideway pillars where many children cross streets were among the concerns expressed. Above all, there was considerable perception that crime could be introduced into school neighbourhoods as a result of SkyTrain.

- “There’s three schools directly on the route. Guildford Way is the pedestrian route used by these three schools. There’s approximately 3,000 children attending these three schools...we’re very concerned about the SkyTrain, what the SkyTrain will do to these schools and how it would affect our students.”
- “Concrete pillars make it very difficult for drivers coming down to see what’s happening...it’s rather like passing a set of lined up cars and so they don’t get good visual contact with what’s going on across the road, and neither do young children coming across.”
- “Now, this proposed station...it’s adjacent to the secondary school and it’s a short half-block from the middle school. We’re very concerned about this because of the opportunity [for crime]...of our safety from the drug dealing.”
- “A retired principal has told us of the problems that they had when the SkyTrain station went in about a block and a half from his school. He said they had dealing and recruiting prostitution, pimps, gang members came in, there was more theft and sale of stolen goods. There was just too much access for people involved in illicit trade.”
- “One of the problems with the SkyTrain as well is that there is no barrier to entry. Any of these children can get on. Any of these people that don’t really want to be attending these schools, or coming into the schools, have access to these stations as well.”
- “...all the police that we’ve talked to have strongly opposed any kind of station at all anywhere near a school and here we have three schools right on the route and those three schools are going to be within a half a block from the station.”

5.8 MITIGATION MEASURES

The physical presence of transit police and SkyTrain staff was repeatedly mentioned as one of the most effective means of preventing crime and improving actual and perceived safety on SkyTrains and at stations. Suggestions included increasing staff numbers overall and during certain times of the week, better and more efficient use of staff, and coordination between security and transit police. Other security measures such as camera coverage, lighting, phone boxes, community policing, and locating stations in busy areas were also suggested.

- “Crime prevention including fare evasion, theft, violence, vandalism, property damage, etc. should be met with more effective and efficient use of staff. For instance we [transit staff] should be coordinated better with the transit police, who are now a separate entity.”
- “[The population] is fully 50 per cent or better geriatric in the neighbourhood. And they generally have toddled over to the mall. They feel much safer going to the mall. It’s well-lighted and they’ve always felt good about that.”
- “I know a lot of people don’t want to go to, say, Edmonds Station. It’s kind of in a remote spot. They feel better about going to the mall where there’s lots of people. They feel safer there.”
- “It’s all very well to have people on the platforms, but travelling on SkyTrain...I see no transit police, no security personnel.”
- “...I would appreciate some more security presence for people who are handicapped or older. In many of the stations you can stand by yourself and there’s nobody there related to the system to give you any security in mind or physical ability.”
- “I also feel turnstiles should be installed in the new SkyTrain stations to cut down on fare evasion.”
- “There should be Community Police stations near every station.”
- “I suggest increased policing, increased lighting in the close areas. Also video cameras and phone boxes.”
- “The increase of crime is my main concern with the SkyTrain extension to the three areas [Vancouver, Coquitlam and New West]. There must be adequate SkyTrain personnel and security/police in all areas of the station to prevent loitering, crime, intimidation, etc.”
- “More security [should be] present at all times at the stations. I do not want to live [near] or visit a station like the New Westminster station where drugs and loitering are commonplace.”

6.0 LEGACY

Some people made suggestions for legacy opportunities that could be built through the construction of community greenways or multi-use pathways along the SkyTrain corridor. It was suggested the RTPO make provisions for a multi-use pathway in the overall design and that cyclists, pedestrians and in-line skaters be included in the design process of this pathway.

- “The legacy project calls for a path along the whole Lougheed corridor, and that would be good. It would save you from having to breathe the fumes, and there are cyclists who would prefer to use a path instead of using the shoulders on the highway.”
- “There are few opportunities in an urban society for linear green space to be developed, a place for joggers, walkers, for families to teach their children to cycle away from the noise pollution and danger of motorized vehicles. Vancouver Area Cycling Coalition sees this as an opportunity to develop such a greenway.”

Residents of Fraserview would like to see a greenway along the Fraser River and there is concern that construction of an elevated guideway will threaten plans to develop a linear park. People look forward to having safe access to the river, but suggested that the park would be much more pleasant if the SkyTrain were in a tunnel, rather than passing overhead. Several heritage features of this area were identified for incorporation into the linear park.

- “It’s really not compatible with concrete columns. Sure you can plant grass underneath the columns, but is this really the green space that City Council envisioned? This wouldn’t be a park. It’s not even a walkway.”
- “...to me, walking along the river with a huge wall and having a SkyTrain over top is not really a pleasant idea.”
- “A larger population will surely need all the recreational space we can provide. SkyTrain and a dressed-up greenway will not meet that need. They are incompatible.”
- “...this corridor has an exceptional history that should be protected. At East Columbia and Richmond Streets sits the site of the first survey marker of the Royal Engineers, from where the whole province was mapped out. The site of BC’s first Government House is across the street. These sites were chosen for their vantage point over that stretch of the river that is proposed to be eliminated by the SkyTrain alignment. We must protect this vantage view of our history.”
- “There’s a great big huge shed there right now that could possibly be used for arts and crafts shows, or it could be torn down, depending on what the City decided to use it

for. And of course the Hyack Air Building was the coal building for the prison, and there's a tunnel underneath there up into the gate-house. So that's a heritage building..."

7.0 DECISIONMAKING PROCESSES

There were a number of comments relating to decisionmaking since the June, 1998 announcement of the accelerated SkyTrain project. Concerns were expressed about the 1998 decision itself, the subsequent Rapid Transit Project Office (RTPO) public consultation process, and the procedure that might be used for awarding construction contracts. There was also discussion of the Special Commission, its role, and how it has been conducting its public review of the SkyTrain expansion.

7.1 JUNE, 1998 ANNOUNCEMENT

At the root of many concerns was disappointment that the provincial government announced the accelerated project, exempted the project from the BC *Environmental Assessment Act*, and then initiated public consultation activities to determine how—but not whether—the project should proceed. A number of presenters stated that these actions led them to conclude that the provincial government has ignored years of regional transportation planning and is not willing to listen to concerns about project “givens” such as the timing, corridors and technology.

- “We were quite alarmed last June by the sudden and unexpected announcement from the provincial government that we were going to be getting SkyTrain and not LRT...”
- “... the *Livable Region [Strategic] Plan* to Transport 2021, BC Transit’s 10-year plan and the five-year plan...all of those things were thrown out the window with the June 24th decision, and since then all that transit planning has gone behind closed doors.”
- “We’ve been told in every way but Sunday that the government will do what the government wants to do, that this is completely a government agenda situation. We can scream and we can yell as much as we want, but what’s going to happen is going to happen. Unacceptable, sorry.”
- “...and the provincial government was not elected on the mandate to accelerate SkyTrain, to borrow three billion dollars to build it. And it seems that something of this magnitude should—if they wanted to accelerate in this fashion—should maybe put it to referendum for the people to decide whether or not they want it.”

A number of people who are critical of the June, 1998 announcement prefaced their rationale by stating their strong support for public transit and, in some cases,

rapid transit. While they applauded the provincial government for making a commitment to public transit, they stated concerns about the decision to proceed with the accelerated project.

- “...this is a dilemma that we are facing where finally, after lobbying the government for years to improve transit, the government now is coming forward with a significant investment in public transit. And now we have to publicly not support this project.”
- “We support rapid transit, we recognize the need for it, but we don’t recognize the need for SkyTrain.”
- “I again reiterate that we do support the need for rapid transit of some type. With more cars per capita on the road in Vancouver than in Los Angeles, we’d better take a look quick. And I don’t mean rush into it, I mean look at it quickly.”
- “First of all, as was stated before, we support the rapid transit but we support a complete line to Coquitlam Town Centre, which we feel is absolutely necessary.”
- “We do support the development of alternate forms of transportation that will get people out of their cars but, like some of the other speakers have alluded to, we believe that research, sound planning, feasibility studies and genuine public consultation needs to precede any announcement about what kind of transit system we will get, when, and where it will be built. And this has not been the case with SkyTrain.”
- “We would commend the provincial government for...the support of public transit.”

7.2 RAPID TRANSIT PROJECT OFFICE PUBLIC PROCESS

A number of concerns were raised about the RTPO’s approach to public consultation. Some people were frustrated at the preliminary nature of the project information to date and they wanted an opportunity to participate in a detailed assessment. Some people have found that there is too much information to digest. Others were concerned about information gaps, such as details on costs, ridership and project justification. The neighbourhood-by-neighbourhood approach to route alignment selection was seen by some as divisive and an attempt to avoid looking at regional or overview issues. One person noted that there are inconsistencies in how public consultation is taking place in each municipality. A number of people suggested that the style of the public process has been more like public relations than public consultation and this has resulted in a one-way flow of information: from the RTPO to the public, but not the reverse.

- “I’m concerned about...the lack of the public consultation on each side of the line to ensure New Westminster isn’t picking up all the Coquitlam information.”
- “...treat the existing analyses and public process so far for what they are, a preliminary phase of a comprehensive process; open up the process to a full-scale discussion of the issues...”
- “The consultation between the public has been very poor, there’s been no financial information available, no background information available about capital or operating cost and where the funds are going to come from.”
- “...in some of the municipalities there is no process in place for public participation...and this varies among municipalities...the opportunity to respond.”
- “We believe that open houses are part of a large public relations agenda designed to sell the idea of SkyTrain or a particular route and discourage public input because of lack of confidence in the process overall.”
- “...they end up being not much more than a public relations group that goes around trying to reassure everybody that things are going to be okay. These sessions are more promotional than educational.”
- “As a community we’ve made ourselves clear right from the beginning. We were given the opportunity to select between three different routes. Without question, the choice was the underground red route. This was then pulled from beneath us...”

Some comments on the RTPO public process focused on difficulties with the open house format. People felt no one was listening to, recording or considering their viewpoints. Some were unsatisfied with the one-on-one style of discussion because they might get different answers depending on who they spoke with, and because there was no public record of the discussion. Concerns were expressed that the RTPO could not be held accountable for statements. Others commented that there was too much detailed information, and that overcrowding around the displays was a problem. Some were disappointed that senior officials from RTPO and local MLAs were not available.

- “...there were far too many one-on-one conversations and our experience was that we could get two different answers to the same question depending on who we spoke to.”
- “So the three meetings I went to really weren’t a real listening session...more the planners telling the people who were there what the plans were with a few stickies on the board.”
- “The process seemed to be one where there was a lot of information available. The ability for people to digest that information in the very tiny time that was given to them was negligible.”

- “They have open house meetings which, theoretically, are informative and, theoretically, are open...but in practice are not.”
- “...we were forced into attending public consultation after public consultation, which were no more than patronizing attempts to pacify the outcry and wear us down. On each occasion the senior officials of the RTPO and/or our own MLA were nowhere to be seen. Were they really interested in our opinions? We think not.”

Due to their dissatisfaction with the open house format, a number of people suggested a town hall format similar to one that was used in Port Moody on February 15, 1999.

- “I think the first thing that needs to be done is what we did last night [in Port Moody], and there needs to be a town hall forum...or even a combination of open houses and town hall, because, as I stated, there’s no written records of questions and answers given.”
- “...after repeated requests to the RTPO to have an open town hall forum, we’ve been told time and time again—even as late as last night—that they will not have a town hall forum, period.”

7.3 CONSTRUCTION BIDDING PROCESS

A submission from the Vancouver-New Westminster Building and Construction Trades Council urged that the RTPO/provincial government adopt a construction project agreement for the accelerated project. Such an agreement would set fair wage levels, and could also be used to ensure that principles of quality, safety training, equity hire and local hire are not compromised to cut costs to win contracts. According to the Council, a construction project agreement would set standards and assure contractors do high quality work, use quality materials and would result in contracts being completed on time and on budget.

- “Winners of ‘bid-shopped’ contracts often reduce their costs by paying workers less, installing sub-standard or unspecified materials, cheating on allowable apprenticeship ratios and engaging in other questionable practices such as resorting to the underground economy.”
- “These [leaky condo disaster, Save-On-Foods, Coquihalla Highway] construction fiascos all had one factor in common. Contractors who actually worked on the construction site were awarded work after having ‘bid-shopped’ the tender.”
- “Recent Highway Constructors Ltd. (HCL) agreements accomplished all these goals [fair wages, principles of quality, safety training, equity hire and local hire], and did it on time and on schedule.”

7.4 THE SPECIAL COMMISSION'S ROLE AND REVIEW PROCESS

Some people were critical of the Special Commission's mandate and questioned its independence in reviewing the project. People questioned whether politicians would listen to and follow the Special Commissioner's recommendations. One person suggested that the project be subject to a private sector audit to ensure independence.

- "...this is only a cynical exercise in minimal public relations. I do not envy you your task, and I only hope that some attention will be brought to the serious concerns raised by this project."
- "A Special Commission employed by the government is a farce. It has no teeth. It has to give back to the government what it wants to hear."
- "I personally believe that this whole process is nothing more than an exercise in futility. However, this is not meant to reflect on you or to be taken as personal criticism of your credibility. I personally believe that your intentions are honourable."
- "I would just [like] to know, is the government in any way obligated? I know they're receiving this information...but are they obligated to follow any of your recommendations?"
- "I don't believe that you, the Special Commissioner, has a mandate to make a decision regarding this public process. You are the messenger, and I don't believe that you or anybody else can convince this Premier to have a change of mind."
- "...to me, we've got the government auditing the government project...my point is...that maybe the government shouldn't be involved at all...like, maybe they should have hired a public company, Price Waterhouse, totally objective."

There were also comments about the Special Commission's public review process. One person was concerned that a scheduled Technical Workshop on the connectivity issue would be a closed session and suggested that some form of public involvement be incorporated. This individual was also concerned that the Special Commission did not respond adequately in its *Interim Report* to his previous written submissions, and complained about difficulties in accessing project information under the *Freedom of Information Act*. One person could not find advertisements for the public meetings in his local papers. Some people questioned the independence of the Special Commission and suggested that the technical workshops held by the Special Commission were of a general nature and that more detailed studies and discussions were required.

- "Why should it be that the transit implications, the connectivity issues regarding this project, are being discussed in a closed door session by a process which was supposed to be open and transparent...?"

- “I did attend the...Technical Workshop, and I have to agree with the person who stood up...and said, “This is not a Technical Workshop, this is an opportunity to discuss the possibilities of impact on the environment”. So there has never been enough specific information made available as to the specific proposals...”
- “How is it that the Commission’s report advocates one and only one alignment along the Fraser River which happens to be the same as the RTPO’s preferred alignment? How is it that the Special Commission’s report advocates constructing a station at Braid Street when the...consultation process showed clear and strong opposition to the RTPO’s original plans to construct a station at this location?”
- “I presented you with at least four detailed written submissions in the October, November, December period...and in fact your *Interim Report* totally ignores everything thing we’ve said including the things which ought to be, even by your definition, in your Terms of Reference.”

8.0 PROJECT TIMING

Underlying many criticisms of the SkyTrain accelerated project was concern about the fast-track schedule. These people stated there seemed little need for such a rush. The most common concerns were that the fast-track schedule would result in poor planning, bad decisionmaking, engineering problems, negative environmental impacts, cost overruns and, in the end, a product that does not meet the needs of the Lower Mainland as well as it might if the project were built and planned at a slower pace.

- “...the fast-track schedule is the single biggest and most easily solved problem with the SkyTrain extension project.”
- “We think that, inevitably, fast-tracking will result in a poor decisionmaking. People will be forced to make decisions in the absence of critical information, it will waste money...”
- “Our number one concern is the speed of the process...rapid transit projects require careful coordination of community and transit needs, and some worldwide examples involved as much as 10 years of planning and consultation before they ever started building a line.”
- “No proper environmental assessments were done because of the speedball express this project is on. There will be numerous, older trees that are slated to be cut down to put this SkyTrain through. It cuts through parks in Coquitlam and Port Moody that are environmentally sensitive...it seems the environment is a minor issue, and one of very little importance when it comes to this project.”

- “Slow down the whole process. Get some basic questions answered first. Let the independent specialists put in their reports. Take the politics out of rapid transit. It just does not have to be SkyTrain.”
- “Don’t build SkyTrain [in] ESAs. Slow down the fast-tracking so that proper planning will occur. There was such a lack of information at the Technical Workshop that it was almost a joke.”

While people agreed that there is a need for rapid transit, they did not understand the rush. Already, as a result of the accelerated schedule, it was felt there was not enough time for proper consultation or adequate coordination of community plans around stations. Some speculated the fast-track SkyTrain could run into the same problems as the fast ferry project.

- “The impact on neighbourhoods, urban streams, air quality and the Grandview Cut is being swept aside by the fast-track process.”
- “We’re going to have this system for a long time and we need to do it right. We need rapid transit but we need it done properly.”
- “The fast-track that this project is on precludes any serious planning to deal with the multiplication of these and other problems. I despair for my neighbourhood [Broadway/Commercial area].”
- “There’s a fast track-on, which makes us skip over the large-scale issues and rush past the community issues. I feel the solution is to slow down the fast track.”
- “I see many analogies between what happened with the fast ferries and what’s happening with SkyTrain. We’re going to see significant cost overruns and significant engineering issues that are going to be dealt with on the fly and with poor planning.”
- “Please ask Cabinet to slow this project down to ensure we do it right for both now and the future. Fast-tracking anything always results in mistakes, and we cannot afford any more.”

9.0 PROJECT JUSTIFICATION

Public comments regarding project justification generally fell into the following categories: routing, technology, and budget. The overall message was that improvements to the transit system are both wanted and needed, and people are happy that the government is ready to make a large investment in public transit, but they want to be sure that the money spent buys the best system possible.

- “...people who want rapid transit want good rapid transit, rapid transit that will work in terms of moving people, getting people out of their cars and promoting densification in appropriate areas.”
- “...everybody is thrilled that there is money spent on rapid transit, but we’re concerned that it’s a lot of money spent on a poorly designed system. This isn’t a matter of SkyTrain versus roads, for example, but it could be a matter of SkyTrain—the money spent on SkyTrain—versus potential buses or rapid buses that could serve a much greater region and a much larger percentage of the region’s ridership.”

Some people questioned whether SkyTrain technology is the best technology to meet the Lower Mainland’s transit needs. Some suggested Light Rapid Transit (LRT) or more buses would be better alternatives. There were questions regarding the Province’s contract with Bombardier for the assembly of the MKII vehicles.

- “...if the people of Lower Mainland wanted to spend three billion dollars they would get a much more comprehensive system with LRT due to the fact that it does cost less and it could be much more far-reaching than what’s currently proposed.”
- “What LRT could do is start to be part of the process of reclaiming the existing roads’ space. The problem with congestion is not lack of roads. We just have too many private passenger vehicles.”
- “...a ground-based light [rail] transit or LRT system would be much cheaper to build, would re-allocate street space without increasing pavement, and would keep neighbourhoods livable by decreasing automobile traffic and not having elevated tracks. The savings could be spent on building the bus fleet.”
- “...buses are the backbone of the system. Now, buses may not be sexy. SkyTrain sure is sexy. But the buses are the backbone of the system. The buses are what carry the bulk of the public transit users.”
- “We need rail transit. We’re going to have gridlock in the automobile situation if we don’t get it. But SkyTrain is environmentally unfriendly and it’s a financial black hole which is going to drag down the entire system...”
- “For short-term political and economic gain—300 Bombardier jobs—we are being asked to give up the hope of ever having a real transit system in Greater Vancouver.”
- “They own SkyTrain...it’s not like a streetcar where you can go and hire a car from many companies around the world. SkyTrain is owned now by Bombardier. If you want to get cars or parts you have to go through Bombardier. This is a big cost.”

Some people said that the SkyTrain extension could not be justified with the RTPO's preferred route for the accelerated project, and questioned whether this is the best route alignment to serve the greatest number of commuters.

- “There has been vague talk of filling the gap between VCC and Granville-Arbutus with a rapid bus service, but this just illustrates that the plan to build SkyTrain from Lougheed Mall to VCC is illogical. Why have a high-capacity rapid transit line on the least dense portion of the corridor and a rapid bus service on the most dense portion of the corridor?”
- “...why are we putting the SkyTrain into the back end of New Westminster? We already have a SkyTrain route into New Westminster. Why are we running it through the back door?”
- “It makes no sense to go half-way on a corridor not knowing what the heck is going to happen on the other half. And that, in our submission, is an environmental issue because a lot of money is being put into this and there will be environmental costs. And if it doesn't get people out of their cars, we've blown the wad. We have no other chance to put a lot of money into rapid transit to actually improve air quality in this area.”
- “And if somebody wants to run a SkyTrain route to Lougheed Mall...it's a 10-minute bus ride. The difference is probably four minutes overall. The cost difference is half a billion dollars”

Many people expressed the view that construction should not start and billions of dollars spent before these issues of project justification are resolved and the project properly planned.

- “We have yet to see an in-depth environmental study, a responsible and realistic budget. A \$143.8 million contingency is not responsible.”
- “But to answer to the people directly, or to a coalition group in a public forum, they're just not here tonight, and I think that's quite unfair—that they're spending that kind of taxpayers' dollars without having to answer to the taxpayers directly—and I just find that real disturbing.”
- “As a result of trading buses and conventional light rail for SkyTrain, there will be more cars on already congested streets, more air pollution, more time lost to commuting, land lost to parking and money lost to insurance. This additional line will most likely preclude the construction of a truly integrated rapid transit system in Greater Vancouver. As pointed out by the Coalition for SkyTrain Review, the proposed line is really only half of a New West-to-Coquitlam corridor and half of the Lougheed-Broadway.”

- “...it’s not hard to understand why our provincial government decided to exempt this project from any type of serious environmental review. It obviously wouldn’t stand up to serious scrutiny.”

10.0 FUTURE EXPANSION TO COQUITLAM AND PORT MOODY

A number of residents of Port Moody and Coquitlam made presentations seeking a reassessment of the route options (including comparative studies and an open public process) that are under consideration for a future extension to the Northeast sector. Others suggested that the accelerated project makes no sense without the connection to Coquitlam. There was concern that the high cost of the accelerated project would preclude further expansion east and west, and that the fast-track process would have implications on future route considerations to Coquitlam and Port Moody.

- “The best route for the Lougheed Mall to Coquitlam Centre segment has not been determined even to an approximate extent. Whether rapid transit should go directly through Port Moody or along Lougheed Highway in Coquitlam is an open question. The comparative costs and benefits of each major route option have not been examined in any public written analysis...and yet the transportation benefits of the whole thing won’t be realized until at least one of the full corridors is completed.”
- “As important as the full corridor is, it’s clear that the correct alignment choices in Coquitlam are far from obvious. There are major engineering and cost questions that have to be answered, serious discussion about the shape of those communities.”
- “It [the RTPO] needs to look at re-phasing to Coquitlam Centre as Phase 1, and then down Lougheed into Vancouver and VCC later.”
- “...rather than spending \$1.5 billion to get a rapid transit line that covers the entire New West-to-Coquitlam corridor as well as the entire Broadway-to-Lougheed corridor we’re spending \$1.2 billion for a transit line from New Westminster to Vancouver City College which...more or less duplicates the existing SkyTrain line.”
- “In order to make this new SkyTrain line serve useful transit corridors, it would be necessary to extend it to Coquitlam on the east and to at least Granville on the west, if not all the way to UBC, where some kind of rapid transit service is truly needed.”
- “The government’s promise to extend the SkyTrain from Lougheed Mall to Coquitlam Centre, however sincere, is an empty promise, and it’s that promise that makes New West-to-Lougheed Mall have any transit rationality at all.”

10.1 ISSUES IN COQUITLAM

10.1.1 Guildford Route

There were some concerns regarding the proposed route on Guildford Way related to the potential impact on the schools, traffic, crime, visual impacts, privacy and noise in the area. There was opposition to stations at Landsdowne and Guildford. One recommendation was to move the future line to the Barnet Highway.

- “We are here today...stating our opposition to the line proposed on Guildford Way. Guildford Way is the pedestrian route used by...three schools...we’re very concerned about the SkyTrain, what the SkyTrain will do to these schools and how it would affect our students...”
- “TERRA has heard from residents who feel strongly that SkyTrain in its concrete elevated structures at a height of approximately 25 feet will invade their privacy.”
- “The Barnet Highway is a win-win situation.”

10.1.2 Lougheed Highway Route

A number of people were concerned about the route from Lougheed Mall to Coquitlam Centre. Many people favour the use of the Lougheed Highway, avoiding direct routing through Port Moody. Others objected to Lougheed Highway as an alternative route given potential impacts on Riverview and other neighbouring communities. People requested more studies and consultation associated with the route options.

Ideas for the Lougheed Highway routing were presented, including a possible bridge across the Fraser River to Guildford Town Centre in Surrey and a line from Coquitlam Centre ending at Newport Village in Port Moody. One person also noted that a Lougheed Highway to Newport Village route could connect with West Coast Express to offer a route directly to downtown Vancouver. It was also suggested that the Lougheed Highway line could attract more riders from Maple Ridge, Mary Hill area, Maillardville and Surrey.

- “The flat topography is ideal for train travel. With the route being an existing commuter corridor, the planners felt that the LRT would have a better chance of attracting those commuters to abandon their vehicles and ride the trains. This route would draw ridership from not only Coquitlam, Port Coquitlam and Port Moody, but also Maple Ridge and Surrey, thus making it a more viable route with revenue-generating potential.”

- “...the current route would cost a minimum of \$500 million and go as high as \$800 million. We propose the Lougheed Highway corridor route be adopted because the costs would be \$250 million without the unknown variables of tunnel construction. This \$250 million would provide guideways from Braid Street to Coquitlam Centre and then westward along Barnet Highway to Newport Village in Port Moody.”
- “If the government still wishes to spend an additional \$250 to \$500 million in this area for rapid transit, then it should construct a second crossing over the Fraser River alongside the Port Mann Bridge to bring SkyTrain to the Guildford Town Centre...the expansion into Guildford would alleviate a great deal of vehicular traffic over the Port Mann, and with a future connection to the existing King George Station at a cost of \$150 million, a true north-south *T-line* would be complete...”
- “...what happened to the process that closed down any consideration of the Lougheed corridor as part of the SkyTrain route?”
- “It’s not for me—in any way, shape or form—to make a decision one way or the other about that [using Lougheed corridor past Riverview to Coquitlam Centre]...people are saying they want to have a public discussion of the different options...but I have a lot of family to worry for, and I certainly think we should try and keep what green space we have...”

10.2 ISSUES IN PORT MOODY

Many people who live in Port Moody expressed their dissatisfaction with the process to date and their aversion to having SkyTrain in their city. The Lougheed Highway route to Coquitlam Centre was generally preferred with a possible connection to Newport Village from Coquitlam Centre. People cited costs, lack of future growth opportunities, and lack of ridership as factors in their opposition to the currently proposed connection from Lougheed Mall to Port Moody.

- “...do not bring that train into our city...the cost weighed against the benefit doesn’t add up. The amount of disruption that it would cause within our city, the unknowns that it will bring in the form of crime and pressure to increase density will completely change the complexion of the city of Port Moody.”
- “It [Lougheed Highway] was a route that was looked at five years ago. It would be less expensive, less disruptive. It is on grade so it’ll be way easier to construct. It avoids ploughing through the middle of Port Moody and it will encourage growth and yield the same benefits of getting these cars off the road.”

- “...the citizens of Port Moody are at the point where they want nothing to do with SkyTrain. We’ll be very happy to have lots of buses. And if somebody wants to run a SkyTrain route to Lougheed Mall, we’ll go to Lougheed Mall. It’s a 10-minute bus ride.”
- “...there is one proposed station in downtown Port Moody in an area that’s literally three blocks wide between the water and the bluff. There just isn’t a lot of space to put the kind of people that you expect to put around a SkyTrain station.”
- “We don’t think that Port Moody can really support the rapid transit corridor going through there. Port Moody is already well served by the West Coast Express and by having a major highway through it.”
- “...the downtown area of Port Moody could be easily served by feeder buses going into Coquitlam Centre. It’s essentially about a two minute drive...”
- “From Coquitlam’s bus and train link the line could continue back towards Port Moody giving all communities a versatile link. A connection at the eastern end of the city would create less of an environmental impact to our small city, preserve some of our valuable land and save our residents from expropriation...”
- “Why does Port Moody, as a bedroom community, need another transportation outlet out of it? It already has the West Coast Express, it already has BC Transit, it has the Barnet HOV lanes.”

OVERVIEW OF PUBLIC CONCERNS

The Special Commission received a wide range of input—general and specific, inside and outside the mandate, critical and constructive. As much detail as possible has been retained throughout this report. This final section provides an overview of significant public concerns that were conveyed to the Special Commissioner.

11.0 SIGNIFICANT CONCERNS WHICH ARE WITHIN THE SPECIAL COMMISSION'S MANDATE

- There were concerns regarding the potential loss of trees and green space, as well as potential impacts on fish habitat and other environmentally sensitive areas.
- Residents near proposed route alignments and stations in certain locations (e.g., Bell-Lougheed and Fraserview) had significant concerns about noise, including noise during construction, operation and maintenance of SkyTrain routes and stations. They wanted assurances that these concerns will be addressed.
- Key factors to be considered in design efforts include crime and safety, noise and visual impacts, traffic patterns and future development. Elevated guideways through, and stations near, residential areas and schools were a significant focus of concern.
- Suggestions for legacy opportunities included a multi-use pathway along the length of the guideway and a greenway along the Fraser River at Fraserview/Sapperton.
- There were concerns regarding adequacy of the RTPO public consultation process.
- There were concerns regarding the limited mandate of the Special Commission and the absence of a comprehensive environmental assessment process.

12.0 SIGNIFICANT CONCERNS WHICH ARE BEYOND THE SPECIAL COMMISSION'S MANDATE

A number of presentations and written submissions shared these themes:

- That the decisionmaking process leading to the June, 1998 SkyTrain announcement (i.e., choice of technology and accelerated project schedule) did not consider public interest and years of regional transportation planning.
- Concern regarding the current and future demand for the accelerated project. Suggestions were made to encourage ridership through enhanced access for pedestrians, cyclists, cars and buses.
- That the accelerated SkyTrain extension project (New Westminster to VCC via Lougheed Mall) represents only a portion of the full *T-Line* prescribed to achieve GVRD growth management objectives and which is generally supported. There is concern that no firm commitment is in place for the subsequent completion of the full *T-Line*.
- That the anticipated environmental benefits associated with major public transportation projects (e.g., reduced traffic, air quality improvements, etc.) would not be realized.
- Slowing down the project timeline—or fast-track—was advocated as the single greatest opportunity to avoid or mitigate budget overruns, community and environmental impacts, and engineering problems.
- Potential erosion of local bus service and future rapid transit expansions. Of particular concern was the possibility that project and operational costs would negatively impact the rest of the Lower Mainland transit system.
- Residents of Coquitlam and Port Moody wanted their concerns about future expansion considered now and they wanted it done in an open way (e.g., town hall meetings).

PUBLIC
CONSULTATION
APPENDIX 1

ISSUES TRACKING
DOCUMENT

PUBLIC
CONSULTATION
APPENDIX 2

SPECIAL COMMISSION
SKYTRAIN REVIEW
PUBLIC CONSULTATION
ADVERTISEMENTS/
ADVERTISING
PUBLICATION SCHEDULE

PUBLIC
CONSULTATION
APPENDIX 3

PUBLIC MEETING AGENDA

PUBLIC
CONSULTATION
APPENDIX 4

SPECIAL COMMISSION
SKYTRAIN REVIEW
PROCEDURES FOR
PUBLIC MEETINGS
FEBRUARY 16 AND 17

PUBLIC
CONSULTATION
APPENDIX 5

SPECIAL COMMISSION'S
PUBLIC MEETING
OPEN HOUSE
DISPLAY MATERIAL

PUBLIC
CONSULTATION
APPENDIX 6

RTPO'S PUBLIC MEETING
OPEN HOUSE
DISPLAY MATERIAL

PUBLIC
CONSULTATION
APPENDIX 7

PUBLIC MEETING
COMMENT FORM

SKYTRAIN
COMMUNITY
LEGACY

REPORT

MAY, 1999

SPECIAL
COMMISSION
SKYTRAIN
REVIEW



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INTRODUCTION

1.0 A SKYTRAIN COMMUNITY LEGACY

The Special Commission SkyTrain Review is recommending the development of a SkyTrain Community Legacy Program to be implemented in conjunction with the accelerated SkyTrain extension project. Community input contributed to the initial concept for a community enhancement program as discussed in the Special Commission's *Interim Report*. This has been further developed by the Special Commission with staff support from a parks expert. This report proposes that government endorse the principle of a SkyTrain Community Legacy Program that promotes positive, creative, community benefits that can become a long-term legacy of the rapid transit project. Work to develop this report was greatly assisted by the time and effort contributed by regional and municipal government staff and representatives from local community groups.

1.1 BACKGROUND

In June, 1998 the BC Government announced that the SkyTrain would be extended along the Broadway-Lougheed-Coquitlam-New Westminster corridor. The Rapid Transit Project Office (RTPO) was given the responsibility for the overall project planning, design and construction of the new rapid transit line.

The Special Commissioner was appointed by the Province on September 17, 1998 to conduct an environmental review of the project. Throughout the review process, the Special Commission has been working with community and stakeholder groups,

as well as affected government agencies, to review the RTPO's studies that identify potential environmental project impacts and methods of avoiding, minimizing or mitigating these impacts.

Building on the GVRD's *Livable Region Strategic Plan*, a SkyTrain Community Legacy Program offers an opportunity to increase the benefits of the accelerated project through the development of a legacy which will continue well beyond the construction of the rapid transit line. The Special Commission sees opportunities for the accelerated SkyTrain project to be a catalyst for realizing some associated community benefits that might not otherwise come about at this time.

Supporting the GVRD and member city plans, the SkyTrain Community Legacy proposal focuses on two key components:

1. The establishment of a regional greenway to enhance and complement the SkyTrain guideway where practical, and the development of adjacent and parallel routes where, because of alignment characteristics or the availability of better alternatives, it is not practical to establish the greenway in conjunction with the guideway.
2. The support of SkyTrain-related community enhancement initiatives within the affected neighbourhoods, which will improve the quality of life in the region.

1.2 GREENWAYS—AN INTRODUCTION

Greenway corridors in urban settings provide connections between open spaces and natural areas. They provide opportunities for urban recreation, create alternative ways to move through the city, act as wildlife corridors, and generally enhance the quality of community and city life. The urban landscape contains natural features that have special value due to their ecological or cultural significance, particularly because of their scarcity. In general, urban residents have fewer opportunities to enjoy nature in their daily lives and therefore areas that provide green space and wildlife habitats are important to people's quality of life and their appreciation of natural values. The SkyTrain expansion passes through or around a number of regionally significant green spaces. The creation of a network of greenways linking these natural areas can provide both community enhancements and ecological improvements to the region.

1.2.1 Existing SkyTrain Greenway

During the construction of the existing SkyTrain in the mid-1980s, it became evident that there was a desire to enhance the rapid transit corridor, both in its appearance and its functional role in the affected communities. In response, the BC Parkway was

developed from the Stewardson Way in New Westminster to Science World in Vancouver. A substantial portion of the corridor has been enhanced through landscaping, which has helped to offset the visual impacts of the guideway.

The BC Parkway contributes to the region's overall greenway initiative by providing pedestrian and cyclist facilities linking the communities along the SkyTrain line. It includes trail infrastructure under and along the guideway as well as facilities adjacent to the SkyTrain corridor in local parks, such as Trout Lake Park and Central Park. The greenway also includes over 30 plazas and mini-parks along the corridor, which are designed as rest stops, viewpoints and meeting places for Parkway users.

Over 75 corporations, government agencies, political parties, neighbourhood associations, and societies, as well as hundreds of individuals contributed over \$4 million to construct the BC Parkway. The \$450,000 annual maintenance cost for the BC Parkway is part of SkyTrain operations budget. The cities of New Westminster and Surrey also contribute to the maintenance of the BC Parkway by servicing small segments of the corridor within their municipalities. Further maintenance is provided by a number of the neighbourhood organizations that participate every year in greenway clean-up initiatives through community adoption projects.

Local residents and municipal government agencies recognize the BC Parkway as a positive attribute of the community. In many places, the greenway is very effectively and attractively integrated into the community—south of the present Nanaimo Station and in the vicinity of Royal Oak being good examples. Many sections are well used by people in the local communities.

However, because the BC Parkway was planned and developed after the design of the original SkyTrain line, its pathways are discontinuous in places and require users to cross many busy roads. Local residents and government agency staff have emphasized the need to apply the lessons learned from the BC Parkway experience.

1.2.2 Greenway Planning in Greater Vancouver

The Greater Vancouver Regional District (GVRD) and its member municipalities are both individually and collectively involved in greenway planning initiatives, which are currently at various stages of conceptualization and implementation. Greenway planning in the region also involves participation by local landowners and residents as well as community, recreation and conservation organizations.

In 1996 the GVRD developed the *Livable Region Strategic Plan*, which identified growth management objectives for the Lower Mainland. The four main goals of this plan are to:

1. Protect the green zone;
2. Build complete communities;
3. Achieve a compact metropolitan region; and
4. Increase transportation choice.

In support of its *Livable Region Strategic Plan*, the GVRD created a *Draft Greater Vancouver Regional Greenway Vision* in 1998, which envisions a network of greenways within the region linking the major parks and outdoor recreation sites. The *Greenway Vision* identifies networks of recreational and environmental natural corridors.

The recreational vision builds on the initiatives of the member municipalities to create a regional network of trails and greenways that will enhance access to recreational opportunities. It incorporates existing trail networks within the region, and seeks to create new trails that will enhance linkages between the municipal networks. The environmental vision focuses on regionally significant greenway corridors that support the functions of the natural systems within the urban environment. These include both large and small natural areas within the green zone that would benefit from habitat enhancement projects. The vision is intended to foster coordination between the municipal trail networks.

The SkyTrain extension project offers the opportunity to accomplish some of the regional goals of greenway development by facilitating the implementation of both local and regional government greenway planning initiatives and helping with coordination.

1.3 POTENTIAL COMMUNITY ENHANCEMENTS

In addition to contributing to a regional greenway system, the work to develop the SkyTrain Community Legacy proposal also considered other innovative community and neighbourhood enhancement initiatives to integrate the SkyTrain extension project positively into the surrounding communities.

The Special Commission is proposing that a SkyTrain Community Legacy Program help deliver some community benefits beyond the required mitigation associated with the construction of the SkyTrain project. For example, neighbourhood aesthetics could be improved by removing overhead utility lines adjacent to the corridor and relocating them in conduits attached to the SkyTrain guideway. Community enhancements could also assist in maintaining pedestrian and cyclist access to the

corridor for both transit and greenway users through the provision of overpasses and underpasses and, as well, could provide interpretive facilities along the transit corridor.

A SkyTrain Community Legacy Program could also help improve neighbourhood quality of life by supporting projects which enhance the aesthetics of the streetscape along the corridor. Planting curbside trees and improving sidewalks are methods of enhancing the pedestrian environment as well as visually improving the existing streetscape.

1.4 PROGRAM CONSULTATIONS

Since the release of its December, 1998 *Interim Report*, the Special Commission has consulted with regional and municipal greenway planners to help develop this SkyTrain Community Legacy proposal. Municipal staff have identified greenway planning issues and potential projects that would help deliver a regional greenway system.

Representatives from regional conservation and advocacy groups have also been given the opportunity to provide input to the SkyTrain Community Legacy proposal. Community groups, such as the Vancouver Area Cycling Coalition and the British Columbia Institute of Technology Burnaby Lake System Project are important sources of local information and are in a position to advise on the development of a SkyTrain Community Legacy Program. Members from these organizations have met with staff from the Special Commission to discuss greenway planning issues and have provided input on potential greenway and community improvement projects.

However, transportation and environmental conservation organizations involved in the Coalition for SkyTrain Review have chosen not to participate in the development of a SkyTrain Community Legacy Program at this time due to their broader concerns about the SkyTrain extension project.

During public meetings in February, 1999, the Special Commission also heard suggestions from local residents about how a SkyTrain Community Legacy Program could benefit their communities. Construction of a continuous greenway along the SkyTrain corridor was supported by participants, particularly by residents of the Fraserview neighbourhood in New Westminster, who are in favour of developing a riverfront park in their community and enhancing public access to the Fraser River foreshore. Residents suggested that the overall design of the accelerated project should accommodate plans for a multi-use pathway.

The Rapid Transit Project Office (RTPO), while noting that guideway and community enhancements were not incorporated into its budget estimates, has provided information, ideas, experience and concepts.

COMMUNITY OPPORTUNITIES

2.0 LEGACY PLANNING ISSUES IN GREATER VANCOUVER

The Special Commission initially met with staff from regional and city governments and community groups to discuss the level of support for a SkyTrain Community Legacy Program. While each city is at a different stage in the greenway planning process, there is extensive work and dedication being devoted to greenway planning in these Lower Mainland communities. Regional and city staff have identified some specific issues affecting greenway planning in each city. Many of the issues are common throughout the regional network, while others are unique to specific segments of the proposed SkyTrain corridor.

2.1 GREATER VANCOUVER REGIONAL DISTRICT

Staff from the Greater Vancouver Regional District involved in greenway planning note that the objectives of a SkyTrain Community Legacy Program would support the goals of their *Draft Greater Vancouver Regional Greenway Vision*. The GVRD envisions an integrated network of pathways in which the urban commuter and recreational greenway along the SkyTrain corridor would be a key regional component, linking communities within and between the municipalities.

Of particular concern to the GVRD is the need to create connections between the SkyTrain corridor and the surrounding communities to the north and south of the new line. The GVRD suggests that pedestrian and cyclist connections (e.g., overpasses and underpasses) be provided at key points along the greenway to facilitate movement

across the new line. These connections would not only enhance public access to the transit system from the surrounding communities, but would also enable integration of the new greenway to existing cyclist routes, urban trails and recreational pathways. GVRD staff propose that some of the stations facilitate cyclist and pedestrian connectivity by providing the structural link across the major roads.

Another key issue for the GVRD is the need to design stations to function as staging areas to the entire community, by incorporating community meeting places (e.g., plazas) and cyclist facilities (e.g., secure lockers) into the structural design of the stations. It was suggested that SkyTrain stations should be landscaped to provide a physical and visual connection to the adjacent greenway system. In cases where the greenway is located directly under or adjacent to the SkyTrain guideway, the guideway should be landscaped and vegetated as much as possible.

Finally, the GVRD notes that greenways should be aligned to provide access to parks and other destinations, such as community centres, recreation facilities and local interest sites.

The GVRD identified projects that would support regional greenway planning priorities, as well as areas of overlap between this work and regional parks and infrastructure planning and construction (including the Greater Vancouver Sewerage and Drainage District). For example, the SkyTrain extension alignment along the Fraser River foreshore in New Westminster parallels a portion of the GVRD's proposed Burnaby Mountain-Brunette River-Westminster Quay Greenway. The New Westminster portion of the GVRD's pilot project could be complemented by accelerated development of proposed facilities, including a planned waterfront park at the mouth of the Brunette River and a boardwalk along the Fraser River to the New Westminster Quay. The GVRD proposes that a SkyTrain Community Legacy Program help deliver this portion of their pilot project, as well as the segments of the proposed regional greenway which follow the Brunette River corridor through New Westminster, Coquitlam and Burnaby. It will be important to design this section of the greenway to incorporate an appropriate setback from the foreshore for fish habitat protection.

The GVRD recognizes community legacy opportunities in support of regional greenway planning beyond their proposed pilot project. The GVRD supports the development of a greenway along the Lougheed Highway corridor where the SkyTrain alignment follows adjacent to the north or the south side. As well, the GVRD encourages establishment of a continuous trail along the Still Creek corridor. Both the cities of Vancouver and Burnaby have identified this corridor as a key inter-municipal connection and recreational and commuter route linking the False Creek seawall—and hence downtown Vancouver—to Burnaby Lake Regional Park. Proposals to develop a

Still Creek greenway are also supported by the BCIT Burnaby Lake System Project and the Brunette Basin Stormwater Task Force. GVRD staff have also suggested consideration be given to providing improved greenway access to Burnaby Lake Regional Park along Sperling and Laurel Streets, and along Piper Avenue from Production Way.

The GVRD also supports Vancouver's plans to establish a pedestrian greenway along the Grandview Cut. Many of the projects identified by the GVRD are also endorsed by the member municipalities who are jointly working towards cost sharing options to see further development of these project.

2.2 CITY OF VANCOUVER

Vancouver is currently working on a greenways plan which envisions the development of a continuous pedestrian and cyclist pathway through the city. Much of their proposed Central Valley Trail greenway corridor follows along the new SkyTrain route and therefore there is an opportunity to coordinate the two projects through a SkyTrain Community Legacy Program. However, Vancouver has noted that the preferred SkyTrain alignment has reduced the opportunity to develop the Grandview Cut as a greenway corridor. Therefore, Vancouver has proposed that two parallel greenway routes could be provided along this segment of the corridor. The primary greenway link would occur to the north of the Grandview Cut, along the Grandview Highway North right-of-way. A smaller scale greenway, in the form of a pedestrian footpath and nature trail, could be developed along the south side of the Grandview Cut (on the opposite side from the SkyTrain line), near the top of the embankment.

East of the Grandview Cut, there is an opportunity to enhance Vancouver's greenway plan through a SkyTrain Community Legacy Program by helping the city acquire a continuous right-of-way along the rapid transit corridor to Boundary Road.

Vancouver has also proposed two habitat restoration projects along the accelerated project corridor. The Grandview Cut is a unique green space within Vancouver that would benefit from revegetation and habitat restoration projects. As well, Vancouver has proposed restoration of Still Creek and development of a recreational pathway along the corridor. There is clearly a need to integrate Vancouver's and Burnaby's greenway plans as they relate to the restoration of the Still Creek corridor.

Vancouver also commented on the need to design the new Broadway/Commercial Station to enhance linkages to the greenway corridors through the Grandview Cut by providing pedestrian and cyclist access to and from the station.

2.3 CITY OF BURNABY

Burnaby has recognized that a SkyTrain Community Legacy Program would provide a means of achieving and accelerating greenway development generally along the new SkyTrain corridor. For the most part, the SkyTrain route through Burnaby follows the Lougheed Highway corridor, with some sections of the alignment traveling along the northern or southern sides of the right-of-way, and other portions running along the centreline median. Because the SkyTrain both bisects and traverses the highway at various points, there is only limited opportunity to create a continuous greenway under the guideway. Therefore, it has been suggested that—in addition to enhancement opportunities along the guideway where practical—alternative, continuous routes through Burnaby could be established within more natural settings as part of the greenway system.

Burnaby supports the establishment of pedestrian trails designed for recreational use in conjunction with habitat enhancement projects along the Still Creek corridor. Burnaby promotes legacy projects focused on restoring and enhancing the natural habitat and providing appropriate recreational opportunities along Still Creek, and encourages the development of partnerships with the City of Vancouver and local community groups to realize these objectives.

Because the Lougheed Highway corridor does not offer a cyclist-friendly environment, a parallel bikeway and pathway along the BNSF rail right-of-way could also be established as a more direct and level route through Burnaby for use by commuter cyclists.

Burnaby has also identified bikeway and pathway projects that would enhance the SkyTrain guideway and allow for the development of an associated greenway both under and parallel to the guideway, where practical. As well, Burnaby has identified key locations along the alignment where pedestrian and cyclist connections across Lougheed Highway and surrounding transportation infrastructure could be provided to enhance community access to both the greenway and the SkyTrain system.

An important role of a SkyTrain Community Legacy Program could be to encourage community enhancement projects focused on the visual aesthetics of the SkyTrain guideway and corridor, such as utility bundling.

2.4 CITY OF COQUITLAM

Although the accelerated phase of the SkyTrain extension project only travels through a small corner of Coquitlam, there are transportation issues related to the design of a greenway system that are of concern to the City staff. For example, a key concern—also recognized by the GVRD—is the need for access across the major transportation routes in the area, which currently act as barriers to the flow of pedestrians and cyclists. The SkyTrain guideway will be crossing both the Lougheed Highway and the TransCanada Highway as it travels through Burnaby and Coquitlam into New Westminister. It will be critical to provide pedestrian and cyclist links in these areas to ensure the SkyTrain system and the greenway are accessible to the local residents. Coquitlam has identified key community enhancement projects that could promote the establishment of north-south connections between the greenway and the surrounding communities, including overpasses at North Road and Austin Road.

Coquitlam sees limited value in creating a greenway situated in close proximity to the traffic and noise of the major transportation infrastructure in this portion of the city. Like Burnaby, Coquitlam favours locating a greenway away from the SkyTrain guideway as it enters into New Westminister. The preferred location would be along the Brunette River corridor, provided that access points are established to link the greenway into the community. In particular, Coquitlam has emphasized the need to provide a physical linkage between the Brunette River greenway and the Lower Lougheed neighbourhood to the north.

Coquitlam has indicated that a Community Legacy Program could play a key role in enhancing the environmental and recreational values of the Brunette River through the creation of a greenway along the natural corridor. Other community enhancement projects, including streetscape improvements and traffic calming, would be coordinated in conjunction with Burnaby and New Westminister to enhance connections between the three communities.

2.5 CITY OF NEW WESTMINSTER

New Westminister is encouraging the development of a regional greenway system and has noted in its Official Community Plan that there is strong community support for the creation of trails and multi-use pathways. Construction of the SkyTrain extension is set to begin first in New Westminister, connecting the Columbia Street Station with Lougheed Mall. Therefore, coordination between the SkyTrain project and greenway planning should be an early priority.

New Westminster has been planning for the development of a waterfront park along the Fraser River foreshore. With the preferred SkyTrain alignment running parallel to the river, some residents are concerned that the opportunity to develop a community green space at this location has been compromised. However, the Special Commission believes an elevated SkyTrain guideway may still be compatible with the plans to develop a community greenway and linear park along the foreshore.

New Westminster has also identified the need to establish pedestrian and cyclist access points across the city's busy transportation infrastructure to connect the communities to the greenway and the waterfront linear park.

New Westminster has identified properties that could be acquired to contribute to the proposed Fraser River greenway system and, like both Burnaby and Coquitlam, has proposed that the focus be on the eastern portion of the corridor, away from the guideway, along the Brunette River.

New Westminster has also proposed community enhancements to improve the infrastructure along the Columbia Street corridor and to celebrate the strong historical transportation, industrial and institutional roles of the surrounding community through the development of interpretive facilities. A Legacy Program could help enhance access to cultural features along the new SkyTrain alignment, such as the historical buildings associated with the old BC Penitentiary site.

2.6 COMMUNITY GROUPS

The Vancouver Area Cycling Coalition (VACC) strongly supports the development of infrastructure to encourage urban commuter and recreational cycling, and favours the construction of a linear park and bicycle path along the SkyTrain corridor. In addition to suggested enhancements of the existing BC Parkway, the VACC supports the establishment of a well-designed urban greenway along this new route to add to the cycling opportunities in the Greater Vancouver area.

The VACC has suggested the early adoption of a Community Legacy Program to ensure that greenway planning is coordinated with the design of the SkyTrain system. In particular, key connections along the greenway route would be needed to maintain the pathway's continuity and to provide access to public transit.

The VACC has expressed the view that it is essential the new station structures be designed to provide pedestrian and cyclist access to and from the proposed greenway, with the provision of overpasses, pathway links and greenway staging areas around the

SkyTrain stations¹. The group has also proposed that stations be equipped with secure locker facilities for bicycles and that cyclists be allowed to take bicycles on the SkyTrain.

The Special Commission also met with members from local stream stewardship groups concerned with the urban waterways in Burnaby to discuss the potential of partnering Community Legacy greenway opportunities with existing rehabilitation initiatives. The objectives of both the BCIT Burnaby Lake System Project and the Brunette Basin Stormwater Task Force call for the development of a greenway along the Still Creek and Brunette River corridor in conjunction with rehabilitation projects. There are concerns about the potential impact of increased public access to the Brunette River and therefore, any greenway development along the corridor would have to avoid and protect sensitive habitat areas.

¹ Issues associated with station design have been included in the Special Commission's Report entitled *Station and Guideway Design Report*

COMMUNITY LEGACY PROGRAM A PROPOSAL

3.0 POTENTIAL BENEFITS OF A COMMUNITY LEGACY PROGRAM

By coordinating existing provincial, regional and local government planning initiatives, a SkyTrain Community Legacy Program would be able to accelerate the development of an integrated greenway network for the region and help promote related community enhancements.

In an urban area, access to green space has historically been provided through the establishment of dedicated parks. Yet the effect of development and urban growth is the increasing isolation of these parks as islands of green space, hemmed in by the built environment. A greenway system can help re-establish linkages between fragmented natural areas, while creating new green spaces and enhancing community access.

The establishment of an integrated network of greenway corridors can provide a variety of community benefits that contribute to the overall character and livability of a city. A system of pedestrian trails and bikeways traversing the urban landscape offer people important visual and physical connections to nature. By providing opportunities for recreation and outdoor activities, as well as encouraging healthy alternatives to traveling by car, greenways can play an important role in shaping communities. Greenways can also provide a local focus for neighbourhood improvement efforts that foster a sense of community pride. A SkyTrain Community Legacy Program that focuses on the establishment of a greenway system in the GVRD and promotes local enhancement projects offers an opportunity to shape the Lower Mainland's urban

landscape for the enjoyment of present and future generations. The proposal developed by the Special Commission in conjunction with local government agencies, community groups and residents offers a true nature and community legacy to accompany the SkyTrain extension project.

The GVRD's *Livable Region Strategic Plan* envisions the development of viable communities set within the context of a compact and sustainable region. Key to realizing this vision is the delivery of increased transportation options within and between the Lower Mainland communities. The provision of expanded rapid transit service within the region is intended to help accomplish the goals of the *Livable Region Strategic Plan* by densifying development while protecting other areas of the region's natural environment and enhancing community access and connection to efficient forms of transportation.

Along with these project benefits, rapid transit is intended to also spur development along the transit corridor and shape the growth of the communities linked by the system. These communities' character and quality of life would be further enhanced by integrating a system of linked natural areas within the very core of the urban environment. Weaving a series of greenways along and adjacent to the new SkyTrain guideway will thus not only create an aesthetically pleasing transit corridor, but will also establish natural public spaces in adjacent neighbourhoods.

An integrated rapid transit system is an important element in a sustainable urban landscape. A network of greenways threaded through the communities in the GVRD complements the transportation system and adds value by strengthening the urban fabric itself. A SkyTrain Community Legacy Program could assist in the development of a more sustainable urban region by building upon the fundamental social and environmental benefits of rapid transit and delivering local community facilities in conjunction with the SkyTrain extension project.

There is a unique opportunity available at this time to coordinate greenway planning with the design and construction of the new rapid transit line. While land is being assembled for the accelerated SkyTrain project, coordinated initiatives to acquire linear rights-of-way and provide pathways and bikeways would allow for effective coordination of regional greenway planning with the rapid transit project. The establishment of a SkyTrain Community Legacy Program could assist in the delivery of a continuous greenway corridor linking the communities along the new SkyTrain line. A Legacy Program would provide a focal point for coordination of the local community planning with the provincial SkyTrain project, placing emphasis on the synergy between rapid transit and community greenways in a sustainable and livable region.

With a SkyTrain Community Legacy Program, the provincial government could

also help develop new partnerships to assist in achieving the goals of the *Livable Region Strategic Plan* and could broaden the benefits of the rapid transit project within the affected communities. Promotion of legacy opportunities in association with the accelerated SkyTrain project may strengthen community support and awareness of the long-term benefits of expanding rapid transit service within the region, and help integrate the accelerated project into the communities.

The provision of dedicated funding in support of a SkyTrain Community Legacy Program could enable greenway projects and related community enhancements to be realized sooner than without the accelerated SkyTrain project.

Overall, a SkyTrain Community Legacy Program would:

- Establish a regional greenway following along and adjacent to the new SkyTrain line, creating a number of community trail loops;
- Improve the aesthetic appearance of the SkyTrain guideway and corridor through landscaping and guideway enhancement projects;
- Provide direct links from the new SkyTrain stations and corridor to the surrounding communities, integrating the project into the region's natural and cultural setting;
- Support opportunities for habitat restoration and enhancement within the region's green zone along and adjacent to the proposed SkyTrain route;
- Promote alternative transportation options, encouraging both commuter and recreational use; and
- Create additional green space in the region.

3.1 FUNDING

A SkyTrain Community Legacy Program can assist in delivering many of the region's *Livable Region Strategic Plan* goals. There are a considerable number of funding sources that have similar objectives and are currently contributing towards those goals.

In transportation and greenway recreation development, both the British Columbia Transportation Financing Authority (BCTFA) and the Greater Vancouver Transportation Authority (GVTA) contribute to programs to enhance cycling and pedestrian access. In addition, the cities of Burnaby, Vancouver, New Westminster and Coquitlam and the Greater Vancouver Regional District (GVRD) all have urban trail systems designed, in part, to encourage non-vehicle use.

The four cities and the GVRD contribute to the establishment of greenways, parks and natural areas through municipal and regional programs. Government and non-government organizations, such as the BCIT Burnaby Lake System Project and

the Brunette Basin Stormwater Task Force, make significant financial and in-kind contributions to habitat restoration, recreation development and community participation within the SkyTrain Community Legacy area.

Finally, the municipal governments and the GVRD contribute directly to other related community enhancements such as traffic calming, drainage and aesthetic improvements including utility bundling and landscaping through their respective annual maintenance and improvement programs.

3.2 FUTURE FUNDING

In total, several million dollars are already spent each year within the area serviced by the SkyTrain extension on projects that are compatible with a SkyTrain Community Legacy Program, creating considerable opportunity for cost-sharing.

In addition to the existing funding sources, there is a significant potential to enter into new partnerships similar to those forged in the development of the BC Parkway. To realize these partnerships, it will be important to identify some core funding—a provincial contribution—to attract and encourage the financial and in-kind participation of the private sector, individuals and government and non-government organizations.

3.3 APPLICATION OF A SKYTRAIN COMMUNITY LEGACY PROGRAM

A brief overview of potential projects is provided to illustrate the types of activities that could be sponsored by a SkyTrain Community Legacy Program to help deliver a regional greenway system and associated community enhancements. Map E, Community Legacy Proposals, provides an illustrative summary concept, locating the proposed projects in relation to the SkyTrain extension corridor.

The categories of projects include:

- Land Acquisitions and Transfers;
- Guideway Enhancements; and
- Community Enhancements.

While many projects are dependent upon using existing city or region owned land, the implementation of the SkyTrain Community Legacy proposal would require that some land be acquired for development of the greenway. Acquisition projects may be in support of the greenway corridor itself, by acquiring a linear right-of-way for trail and bikeway development, or may be for compatible conservation and recreation purposes, by transferring lands for additions to regional or municipal parks.

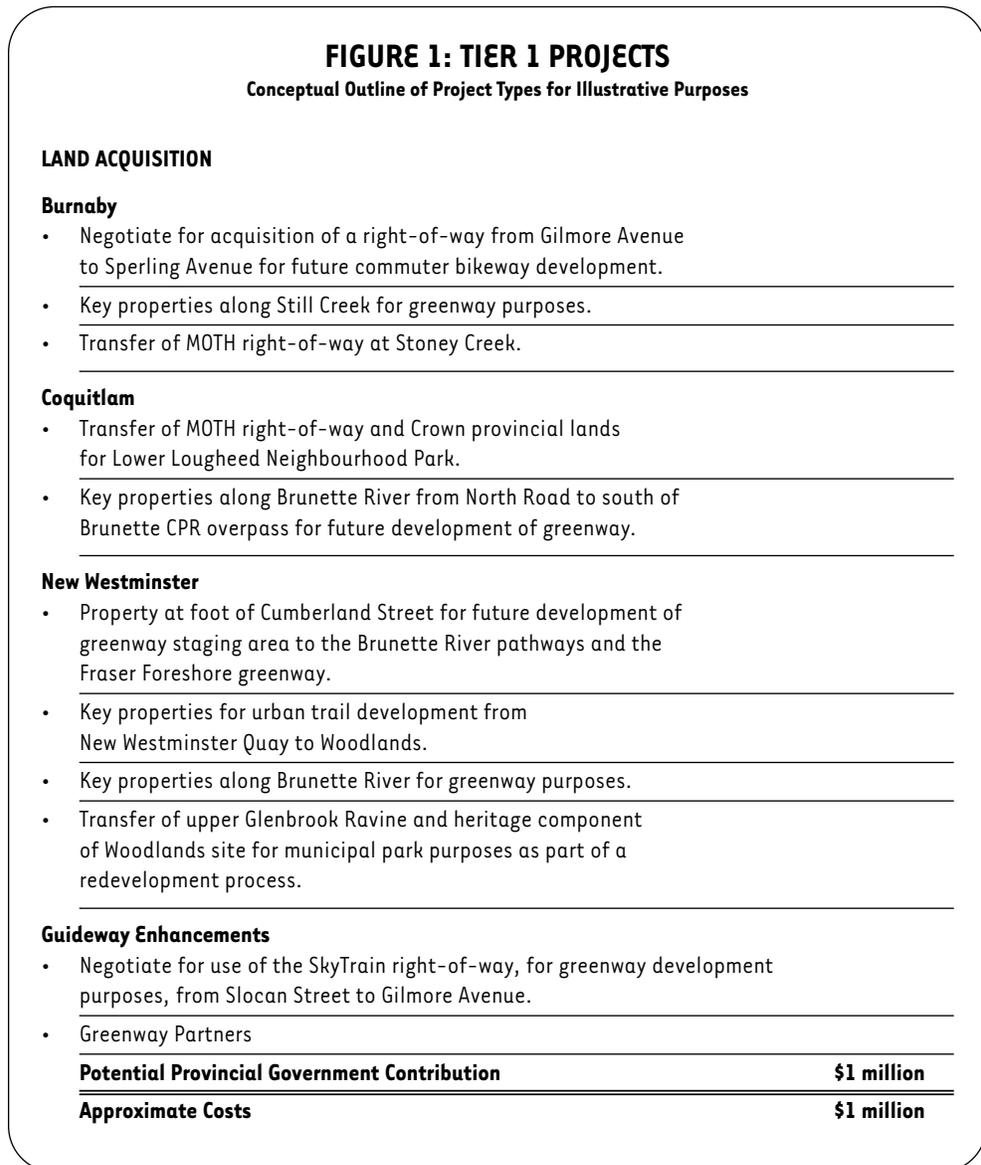
Projects in the guideway enhancement category focus on the provision of facilities and infrastructure required along and adjacent to the guideway, including the construction of pedestrian and cyclist pathways and the installation of required signage and lighting. Projects may also be in support of the development of park amenities and neighbourhood plazas along the greenway corridor.

Community enhancement projects help integrate the accelerated project into the surrounding communities by improving the existing community facilities and services generally adjacent to the SkyTrain corridor, and creating opportunities for community involvement in local enhancement projects. Community enhancement projects also include the development of greenway facilities in conjunction with habitat restoration projects away from the SkyTrain guideway along sensitive stream corridors.

The above categories have provided a structure for identifying potential projects within each of the municipalities, and have assisted in the development of tiers for a SkyTrain Community Legacy Program. With the clear understanding that this is entirely separate from the rapid transit project and that funding was not included within the accelerated rapid transit project budget for greenway and community enhancement projects, the Special Commission has developed a series of suggested Community Legacy concepts for the provincial government to consider. The proposed Community Legacy is presented for consideration as three tiers representing a range of development phases for the legacy. Building on each other, the three tiers offer a phased approach to the adoption of a Community Legacy Program. The projects and costs identified are entirely illustrative at this time— additional work, such as detailed planning, consultation and costing, is required to further the concepts presented here. Review by federal and provincial agencies would be part of this process.

3.3.1 Tier 1 Projects

Tier 1 identifies projects that would begin the process of land acquisition for future greenway or neighbourhood park development along or adjacent to the guideway. A Greenway Partners Fund to encourage associated community improvement projects is also included.



3.3.2 Tier 2 Projects

Tier 2 identifies a number of guideway and community enhancement projects that build on the initial land acquisition projects identified in Tier 1. These projects focus on bikeway and pathway development under or adjacent to the guideway and propose

the construction of key overpasses to facilitate safe connections to the developments. In addition, the RTPO would be encouraged to expand its utility bundling program to include improvements for aesthetic purposes. At the Tier 2 level, provincial funds could contribute to the delivery of important overpass connections along the corridor which help to maintain the continuity of the proposed regional greenway.

FIGURE 2: TIER 2 PROJECTS

Conceptual Outline of Project Types for Illustrative Purposes

GUIDEWAY ENHANCEMENTS

Burnaby

- Bike/pathway development under guideway from Boundary Road to Gilmore Avenue, Sumas Street to Bainbridge Avenue and Eagle Creek (Charles Rummel Park) to Stoney Creek (Eastlake Park).
- Overpass at Boundary Road.

New Westminster

- Bike/pathway development under guideway from Patullo Bridge to Cumberland Street.

Vancouver

- Bike/pathway development adjacent to guideway along North Grandview Highway from Commercial Drive to Victoria Drive and from Lakewood Drive to Slocan Street.
- Bike/pathway development under the guideway from Slocan Street to Boundary Road.
- Overpasses at Slocan Street, Renfrew Street, Rupert Street.
- Underpasses at Commercial Drive, Victoria Drive and Nanaimo Street.

Regional

- Utility bundling along the SkyTrain corridor in conjunction with RTPO's construction plans (from Commercial Drive to Boundary Road in Vancouver; from Beta Avenue to Holdom Avenue and from Bainbridge Avenue to North Road in Burnaby; and from Patullo Bridge to Cumberland Street in New Westminster).

COMMUNITY ENHANCEMENTS

Burnaby

- Bike/pathway development from North Road to Cariboo Road.

Coquitlam

- Bike/pathway development from CPR tracks to North Road.

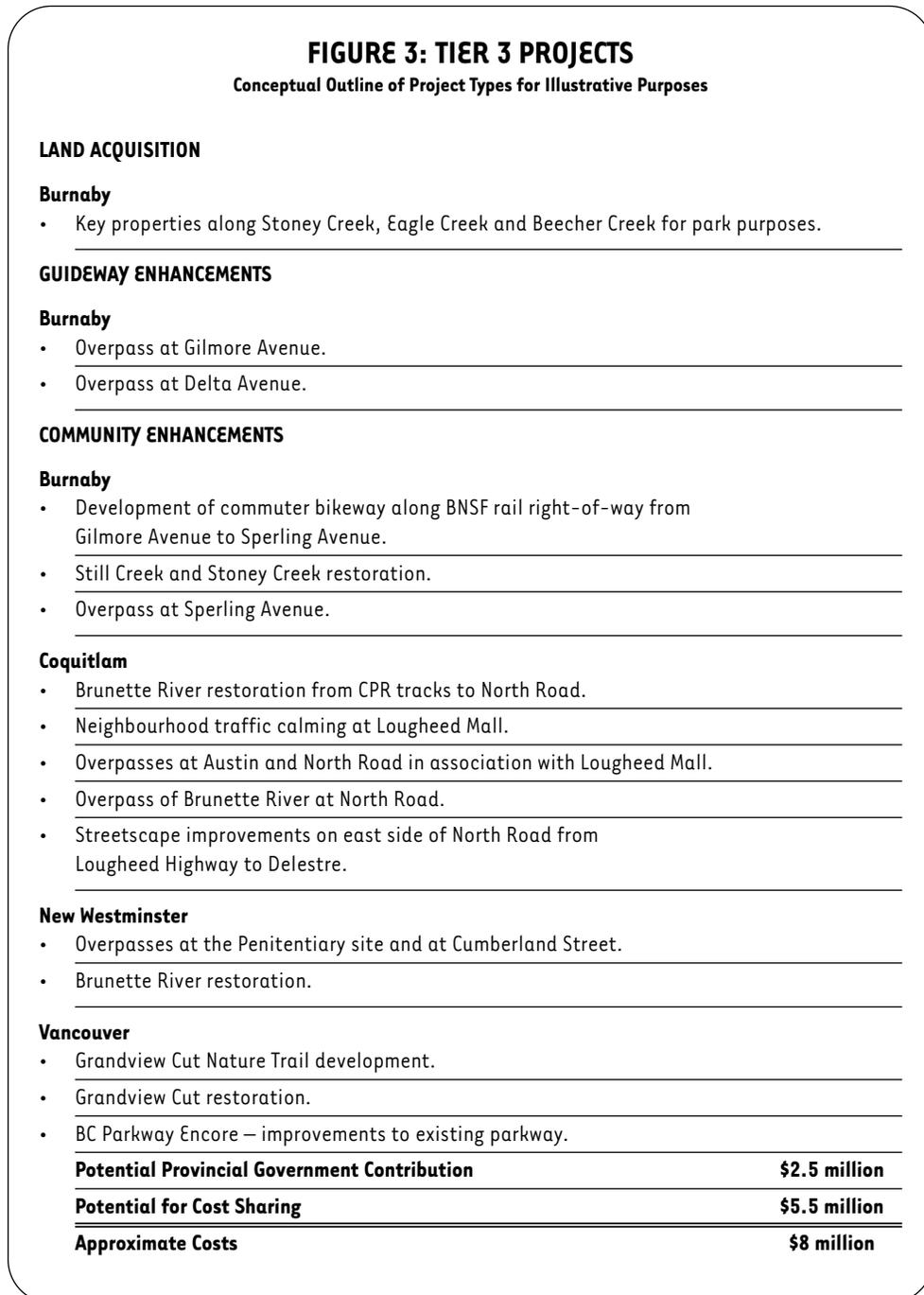
New Westminster

- Bike/pathway development along Brunette River from Cumberland Street to CPR tracks.
- Traffic calming on Columbia Street through installation of no post median and landscaping.

Potential Provincial Government Contribution	\$1-1.5 million
Potential for Cost Sharing	\$7-8 million
Approximate Costs	\$8-9.5 million

3.3.3 Tier 3 Projects

Tier 3 projects would see the construction of additional overpasses to facilitate safe connections and community enhancements such as streetscape improvements and improvements to the existing BC Parkway. Tier 3 also provides funds dedicated to habitat restoration projects to occur in conjunction with greenway development. Provincial government investment at the Tier 3 level would fund the construction of overpasses and the restoration of natural habitat.



3.4 SKYTRAIN COMMUNITY LEGACY FUND

Local governments have planned and proposed a number of greenway related initiatives. Over the next 30 to 40 years, a combination of annual funding by participants along with community redevelopment—a significant amount spurred on by the construction of the accelerated project—will see many of the projects identified in the above sections completed, even without the establishment of a SkyTrain Community Legacy Fund.

However, an opportunity exists, in a new, separate and coordinated program, to accelerate the delivery of these Community Legacy projects. The establishment of a SkyTrain Community Legacy Fund would accomplish that early delivery.

The proposed fund would reflect the level of support that the provincial government wishes to give to a SkyTrain Community Legacy Program. The fund could be completely provided by the provincial government, or the government could contribute seed money for cost-sharing partnerships with others. This initiative will also require a specific management structure—the Community Legacy Program.

3.5 COMMUNITY LEGACY ADVISORY COMMITTEE

If the provincial government decides to fund the program to the Tier 2 or Tier 3 level, the Special Commission proposes the establishment of a Community Legacy Advisory Committee which could assist in the planning and implementation of the program. Reporting to the Community Legacy Program, the committee could consist of members from local and regional interest groups, including the Vancouver Natural History Society, the BCIT Burnaby Lake System Project, the Brunette Basin Stormwater Task Force, the Outdoor Recreation Council and the Vancouver Area Cycling Coalition.

3.6 PROGRAM RELATIONSHIP TO THE RTPO'S PLANNING, DESIGN AND CONSTRUCTION

This program is not part of the accelerated SkyTrain extension project, however, if adopted, it would be beneficial to coordinate some legacy projects with the RTPO process to ensure design and financial efficiencies. In particular, legacy opportunities that include land acquisition and projects that are directly associated with guideway design and construction could be achieved in conjunction with the RTPO's process.

For those community enhancement opportunities not directly associated with the guideway, such as habitat restoration, bike and pathway developments along Still Creek and the Brunette River, and improvements to the existing BC Parkway, implementation can occur in association with the RTPO process.

CONCLUSIONS

4.0 SUMMARY

The extension of rapid transit within the GVRD has been proposed to shape urban growth patterns, to contribute to environmental protection, and to enhance the quality of life in the region. The accelerated project should be designed, built and operated in a manner that fulfills the long-term vision for the region. The Special Commission is proposing that government consider a Community Legacy Program that would help deliver the goals of the *Livable Region Strategic Plan* by:

- Encouraging the establishment of greenway corridors linking fragmented parks and the regional green zone to help maintain the viability of these small parcels;
- Providing opportunities for immediate access to parks and natural areas within local neighbourhoods to enhance the recreational opportunities close to home;
- Improving the aesthetic appearance of the SkyTrain guideway and corridor through landscaping and guideway enhancement projects;
- Integrating the rapid transit project into the surrounding communities by placing an emphasis on community-based initiatives which reflect the region's natural and cultural setting;
- Enhancing the visual and physical connections to green spaces within the urban region; and
- Promoting alternative modes of transportation by providing the required infrastructure to encourage active participation in recreational and commuter use of greenway corridors.

The accelerated SkyTrain extension project provides an excellent catalyst to similarly accelerate related guideway and enhancement projects along and adjacent to the new rapid transit line to further a regional greenway system and to build and strengthen working partnerships in the communities.

In an effort to realize these goals, and given the considerable interest and potential for cost sharing, the Special Commission has worked with all municipalities and public interests to identify and give initial costings to a number of projects at three different tiers that offer a phased approach to a SkyTrain Community Legacy Program.

4.1 TIER 1

Focusing on land acquisition and community involvement, this first phase requires coordination with the RTPO for right-of-way acquisition, transfer of provincial lands with significant conservation value and establishment of a partnership fund to encourage community initiatives along the guideway.

The overall cost of the program at the Tier 1 level is estimated at \$1 million.

4.2 TIER 2

Building upon Tier 1, the Tier 2 phase focuses on bikeway and pathway development, the construction of key overpasses and subsequent guideway enhancements. The estimated costs of Tier 2 projects would require a provincial government contribution of approximately \$1-1.5 million for the delivery of these connections and would also propose the development of cost-sharing partnerships to fund an additional \$7-8 million in greenway development initiatives. The provincial government would contribute to part of this additional sum based upon a cost-sharing formula. The estimated \$8-9.5 million of financial investment, including the provincial contribution, in Tier 2 of the program would be spread out over a three to five year period.

4.3 TIER 3

Tier 3 projects would complete a SkyTrain Community Legacy Program by building upon the greenway and community enhancement projects achieved in the previous two tiers. The final tier would fund the acquisition of properties for recreation and conservation purposes, the construction of additional overpasses to facilitate safe connections and community enhancements such as habitat restoration, streetscape improvements and improvements to the existing BC Parkway. In addition to the

funds required for projects at the Tier 2 level, the completion of Tier 3 projects would require a provincial government contribution of \$2.5 million for the construction of key overpasses and the completion of proposed habitat restoration projects. Cost-sharing partnerships would fund an additional \$5.5 million. The total approximate funding for a Tier 3 project of \$8 million would also be spread out.

4.4 FUTURE ROLE OF SKYTRAIN COMMUNITY LEGACY PROGRAM

The Special Commission has developed a conceptual proposal for a SkyTrain Community Legacy Program which could help in the delivery of positive community benefits within each of the municipalities along the new SkyTrain line. The proposal identifies examples of a series of projects that would significantly enhance the quality of life within the affected communities at an estimated cost of approximately \$17-18.5 million, including both provincial and partnership contributions.

There is an opportunity to realize the combined community and ecological benefits of a SkyTrain Community Legacy Program over a period of years, implementing the program to the Tier 3 level as funding is made available. If the provincial government accepts the SkyTrain Community Legacy proposal in principle, the Special Commission would propose the following steps:

1. Develop a specific program proposal and seek local government endorsement.
2. Further develop cost-sharing options by seeking commitments from partners on a community- and project-specific basis;
3. Prepare, for presentation to Treasury Board, a detailed program and budget outlining cost-sharing options for an integrated SkyTrain Community Legacy Program; and
4. Develop potential management structures for the implementation of the Legacy Program as a separate program with an advisory structure drawn from the communities.

