BRITISH COLUMBIA | Gateway Program

Improving Roads and Bridges for people, goods and transit throughout Greater Vancouver

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Transit Priority
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Park & Ride

Program Definition Report
January 31, 2006

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1. INTRODUCTION

Greater Vancouver has seen tremendous change over the past decade. Significant population and economic growth combined with changing regional travel patterns and expanding trade has placed considerable strain on our transportation system. Congestion on regional roads and highways is increasing, with growing impacts to residents, communities, the environment and the economy.

High levels of congestion lead to unreliable travel times for vehicles and transit, as well as uncertain operating conditions that increase driver stress and contribute to a growing number of vehicle collisions. Congested roads make incident management more difficult and increase the use of community streets as drivers attempt to avoid queues and delays on major routes. Transportation is now the top concern for Lower Mainland residents[1].

The business community is also concerned. The BC Trucking Association estimates that goods movers are stopped or slowed in Lower Mainland traffic 75% of the time, and approximates the current cost of congestion to goods movers at approximately $500 million per year. Transport Canada estimates the economic impact of congestion on all traffic in the region is up to $1.5 billion per year[2], with the rising costs of delivering goods and services eventually passed on to consumers.

Over the next 25 years, Greater Vancouver's population is expected to grow by about 900,000 residents (more than the population of New Brunswick). Without action, congestion will get worse, quality of life will suffer and economic opportunities will be foregone. Investment in transportation is required to improve the region's livability and its competitiveness as a trading centre and a place to do business.

Addressing this situation requires a comprehensive and integrated response that addresses the need for both goods and people movement. Significant investments are required in transit services, roads and facilities to accommodate other modes of transport.

The Province and other levels of government have committed substantial resources to developing comprehensive plans for measures such as expanding the region's rapid transit system and cycling networks. However, such investments can only address some of the needs. Significant investment in roads and the highway system is also required.

This report focuses on addressing congestion in three priority corridors that fall under the Gateway Program, which is part of a broader strategy called "Opening up B.C.":

1. Along the south shore of the Fraser River – referred to as the South Fraser Perimeter Road;
2. Along the north shore of the Fraser River – referred to as the North Fraser Perimeter Road; and,
3. The Highway 1 corridor from Vancouver to Langley, including the Port Mann Bridge.

These corridors are not only major commuter routes; they are also major goods movement corridors. Congestion on these routes, particularly the Highway 1 and North Fraser Perimeter Road corridors, has become much worse than anticipated 10 years ago (when the Livable Region Strategic Plan [LRSP] was adopted), and traffic volumes are projected to continue increasing. Improvements to the North Fraser corridor are also required to realize the full potential benefits of the Golden Ears Bridge.

Along the south shore of the Fraser River, commercial traffic has grown significantly. A new continuous route is required to accommodate this traffic as well as to facilitate planned port expansion and other economic growth.

This report is organized into four major parts as follows:

Part 1: Problem Definition discusses the problem of congestion, where and why this congestion is occurring, and implications for future growth. It provides the reader with an understanding of key trends, which help in determining appropriate solutions.

Part 2: Responding to the Problem describes the comprehensive and integrated response proposed to improve transportation in Greater Vancouver, and presents pre-design concepts for proposed improvements under the Gateway Program.

Part 3: Benefit-Cost Analysis outlines the preliminary analysis of Program benefits and costs.

Part 4: Moving Ahead describes key activities over the next 18 months to move the Gateway Program forward, including continued work with local governments, public consultation, First Nations consultation and Environmental Assessment review.

PART 1: PROBLEM DEFINITION

2. THE CAUSES AND EFFECTS OF CURRENT CONGESTION

Over the past decade, the LRSP and its associated transportation components, including Transport 2021, have guided transportation investment in Greater Vancouver. The primary goals of the LRSP are to maintain regional livability and protect the environment in the face of anticipated growth. This is to be accomplished by:

- Concentrating population and employment growth in the Growth Concentration Area and in regional town centers;
- Protecting green spaces between and within town centers; and
- Increasing transportation choice (transit, car-pooling and cycling) and discouraging single-occupant vehicle use, while maintaining mobility for goods movement.

The intent is to encourage people to live close to where they work, increase the share of trips taken with transit, in high occupancy vehicles (HOV), on bicycles or by walking, and decrease the share of trips taken in private automobiles. The intent was also to discourage lengthy commuter trips and leave existing road space available to serve goods movement trips. The LRSP acknowledged that if the economic impact of congestion increased beyond what was envisioned, the plan would require revision.

In reality, dispersed employment growth, changing social trends and increasing trade have caused Greater Vancouver's growth to evolve differently than anticipated by the LRSP. As a result, the region's transportation network shows increasing strain from rising traffic volumes and congestion on major roads and bridges.

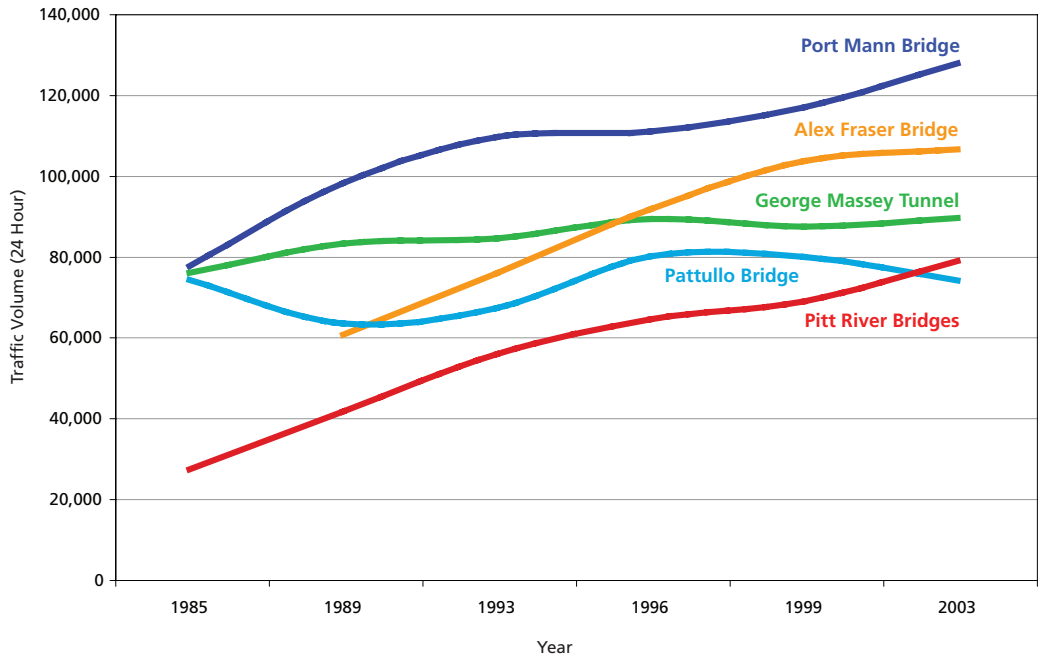
The balance of this chapter provides insights into the nature of these trends to help characterize the transportation challenges now facing our region.

2.1 INCREASING VEHICLE VOLUMES

Increasing traffic volumes can be seen on almost all of the region's major roads but most notably at water crossings. Since 1985, the highest rates of growth in traffic over the Fraser and Pitt Rivers have been over the Port Mann (connecting Coquitlam and Surrey), Pitt River (connecting Pitt Meadows and Port Coquitlam) and Alex Fraser (connecting New Westminster and Delta) bridges, as shown in Figure 1.

The Port Mann Bridge has the highest daily traffic volumes per lane among all major water crossings in Greater Vancouver. Built as a 4-lane bridge in 1964 when the population of Greater Vancouver was 800,000 (and now 5 lanes), the Port Mann Bridge carries approximately 127,000 vehicles per day, a 65% increase since

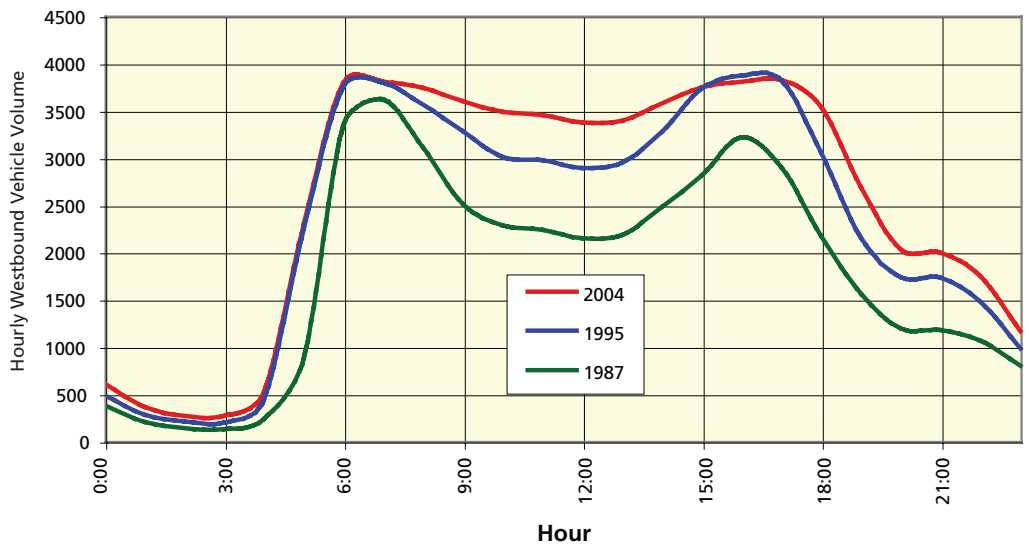
Figure 1: Growth in Traffic Volumes Crossing the Fraser and Pitt Rivers (1985 - 2003)[3]



1985 when daily traffic numbered 77,000 vehicles. Daily Port Mann Bridge traffic volumes are 20% higher than the 6-lane Alex Fraser Bridge and 43% higher than the 4-lane Massey Tunnel (even with its reversible lane operations). Daily traffic on the Port Mann Bridge is 20% higher than San Francisco's Golden Gate Bridge, despite having fewer lanes.[4]

The Port Mann Bridge is now congested for 13 hours a day (between 6 a.m. and 7 p.m.).[5] On average, it now takes almost three times as long to travel from 200th Street to the Port Mann Bridge in the peak period as during free-flow conditions. During extremely congested driving conditions when there are vehicle stalls or crashes, it can take over two hours to travel the 29 km stretch between 200th Street in Langley and Willingdon Avenue in Burnaby, with up to an hour and a half spent queuing for the Port Mann Bridge.

Figure 2: Average Weekday Hourly Traffic Volumes on the Port Mann Bridge[6]



With growing demand for travel over an increasingly congested crossing, the "peak" period is now spreading into the midday, as illustrated in Figure 2.

It is estimated that, if current trends continue, the bridge will reach full capacity in the westbound direction between 6 a.m. and 7 p.m. by 2009.[7] This means that the congestion currently experienced in the morning and evening peaks will be experienced all day.

The Pitt River swing bridges are also heavily congested during peak travel periods. The daily traffic volume over the bridges has nearly tripled from 27,000 to 78,000 between 1985 and 2003, and is expected to reach 88,000 by 2007. In addition, traffic volumes in the already congested off-peak direction are expected to increase by 20-30% following completion of the Golden Ears Bridge by TransLink. This will have a small positive impact on the Port Mann Bridge. Complications related to the opening and closing of the swing bridges, while infrequent, can also cause significant congestion and travel delays for both marine and vehicle traffic.

As a new structure, substantial traffic growth was anticipated over the Alex Fraser Bridge when it opened in 1986. This additional capacity has helped to relieve congestion and limit traffic growth at the George Massey Tunnel and Pattullo Bridge.

While congestion at water crossings is an obvious example of traffic bottlenecks, delays are also felt on many of the region's municipal arterial roads, and increasingly along community streets. This is particularly the case in areas that have seen significant growth in freight-related commercial activity.

For example, the largest concentration of industrial and international trade-related facilities in Greater Vancouver is along the Fraser River in Delta and Surrey. Freight-related commercial activity from areas such as the Deltaport container terminal, Fraser Surrey Docks and CN Intermodal yard is growing strongly, despite the lack

of a suitable transportation route, leading to increasing truck traffic on residential streets and key community connectors such as River Road.

2.2 POPULATION AND EMPLOYMENT GROWTH

Greater Vancouver has seen significant population and employment growth in the past 10 years. However, because Statistics Canada changed the way in which it records employment census data beginning in 1996, relevant population and employment comparisons can only be made for the last five years (1996 to 2001).

Between 1996 and 2001, Greater Vancouver's population grew by about 8.7%, from 1.9 million to 2.1 million. During the same five-year period, total employment grew by 8.6% and the employed labour force[8] by 9.5%.

Figure 3 illustrates the growth in employment and employed labour force by municipality over the past 5 years. Employed labour rather than population is a better indicator of where workers are living. This provides a better benchmark for comparison with where they are working and illustrates changes in commuting patterns.

For example, Vancouver accounted for approximately 21,000 or 24% of the growth in labour force across the region, but less than 5,000 or 4.9% of new jobs, whereas Richmond accounted for 10% of the growth in labour force and 17% of new jobs.

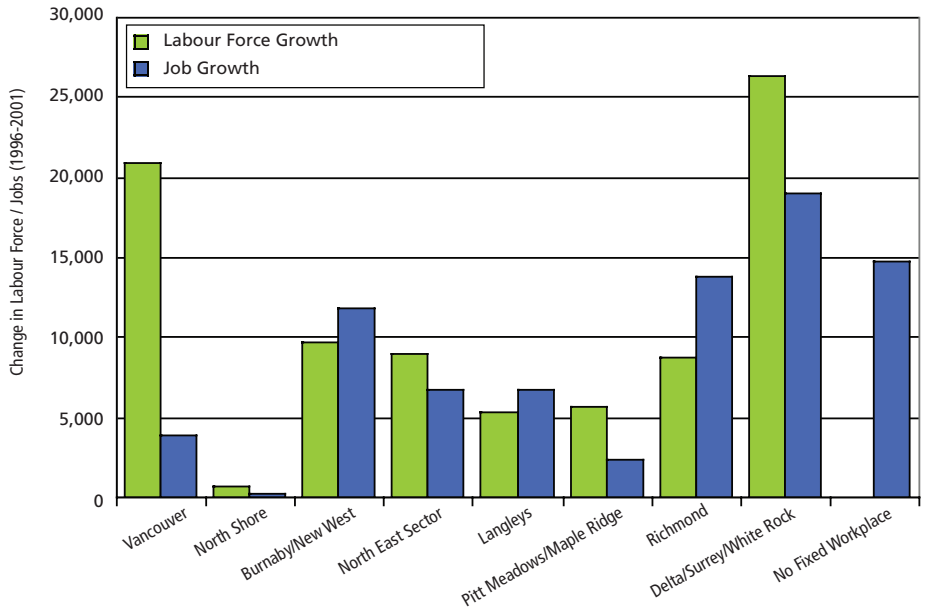
In comparing labour force and employment growth numbers, it is clear that in some municipalities, notably Vancouver, Surrey, Delta, Pitt Meadows, Maple Ridge and White Rock, labour force grew much more than employment. In other municipalities, such as Richmond, the Langleys, Burnaby and New Westminster, employment grew more than labour force. It is also clear that employment with no fixed workplace is growing rapidly.

2.2.1 Growth in Industrial and Office Parks

While overall employment is generally growing as anticipated in regional plans, the location of employment growth and nature of trips being made by the growing population are somewhat different than expected. This is in part due to significant growth in "business park" development over the past 10 years.

Office-based employment comprised approximately 35% of regional employment in 2001. The LRSP anticipated that growth in office-based employment would primarily occur in urban and/or regional town centres, efficiently served by transit. However, in the last 10 years, only 7% of new office jobs have been based in regional town centers while almost 50% have gone into suburban office parks,[10] located primarily in Burnaby, New Westminster and Richmond.

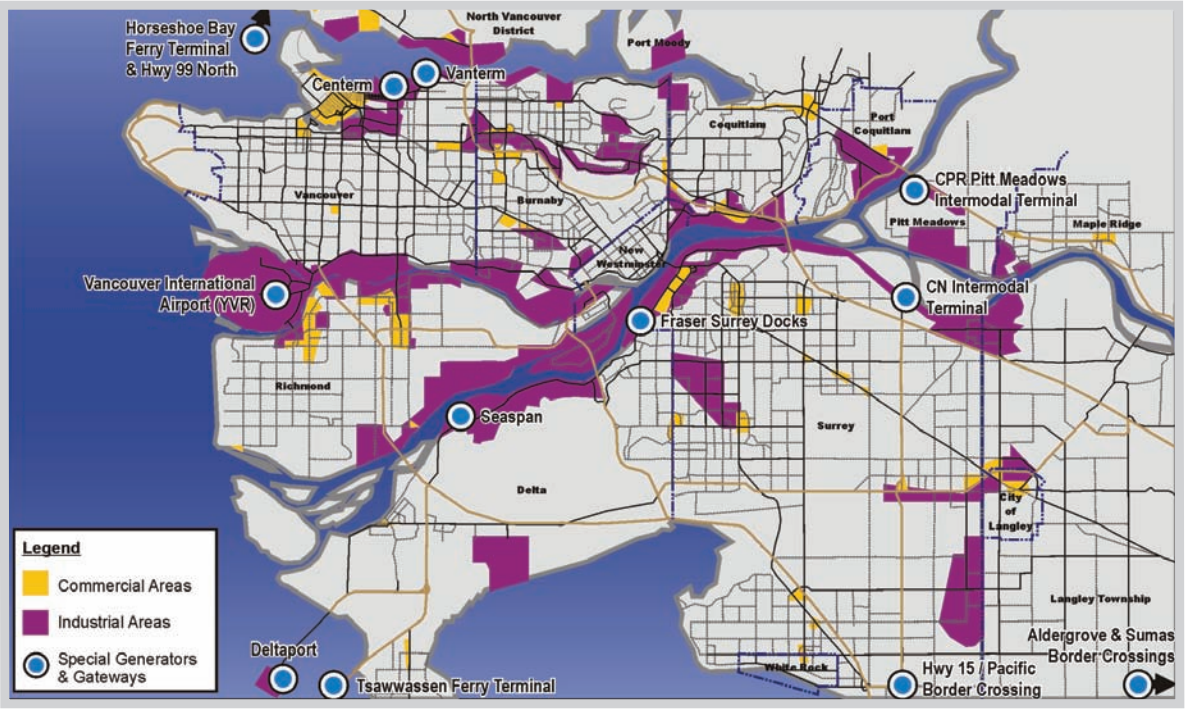
Figure 3: Change in Labour Force and Jobs[9] by Sub-Area (1996-2001)



While still only representing 16% of the total regional office market, employment in business parks grew by 240% (24,000 workers) between 1991 and 2001 – the fastest of all floor-space types. Projections indicate that this trend will continue, with business park employment in the region anticipated to increase by another 46,000 workers by 2021, representing a 135% increase for the 20-year period (2001 to 2021).[11]

Commercial and industrial areas in Greater Vancouver as well as the major transportation gateways and important generators of truck traffic such as ports, airports and intermodal yards (see Figure 4) are also key employment generators. Industrial areas are primarily clustered along the Fraser River, with growing importance along the south and eastern shores in Delta, Surrey and Langley as residential development encroaches in the north and western areas such as Vancouver. Commercial areas are scattered throughout the region. These are highlighted in Figure 4.

Figure 4: Major Commercial and Industrial Areas in Greater Vancouver[12]



While some commercial office parks are located along existing transit routes, they tend not to be well served by transit due to low density of development and more remote locations. For tenants, the lower cost of office space and larger square footage in business parks is often of greater importance than transit access. High-rise, multi-tenant buildings found in town centres cost up to 40% more per square foot than low-rise business park locations.[13]

Industrial areas and facilities, also highlighted in Figure 4, accounted for approximately 41% of regional employment in 2001. While industrial development was well distributed within the region, it was led by south of the Fraser communities of Delta (22%) and Langley (24%).[14]

Many of these employment locations are even more challenging in terms of the provision of high quality transit service than the office parks of Burnaby, New Westminster and Richmond. They often see less frequent transit service and require multiple transfers. For example, the 35 km trip from Coquitlam Town Centre to the Tilbury Industrial area of Delta takes more than two hours and three transfers by transit during the business day, but less than 50 minutes by car.

Future projections indicate that growth in industrial areas will be dominated by Surrey and Delta, due to inventory limitations in other areas from encroaching residential development.

2.2.2 New Commuting Patterns

With continued growth in the size of the employed labour force and employment outside of the traditional core of Vancouver, new commuting patterns are emerging. Greater Vancouver no longer exhibits the predominant "suburb-to-downtown" commuting

pattern of many other major metropolitan centres. Instead, as implied in Figure 5, commuting patterns are becoming increasingly dispersed.

Commuting within and between GVRD municipalities other than Vancouver has increased substantially. Also, while commuting from other GVRD municipalities to Vancouver was essentially unchanged between 1996 and 2001, commuting from Vancouver to other GVRD municipalities increased. In fact the growth in Vancouver residents working in other Greater Vancouver municipalities exceeded the growth in other GVRD residents working in Vancouver by a factor of 9 to 1.

The resulting demand in travel is now much more complex and people are increasingly travelling from everywhere to everywhere.

Figure 6 *(next page)* summarizes travel patterns for City of Vancouver residents. Figure 7 *(next page)* summarizes the same information for the Township and City of Langley (the Langleys).

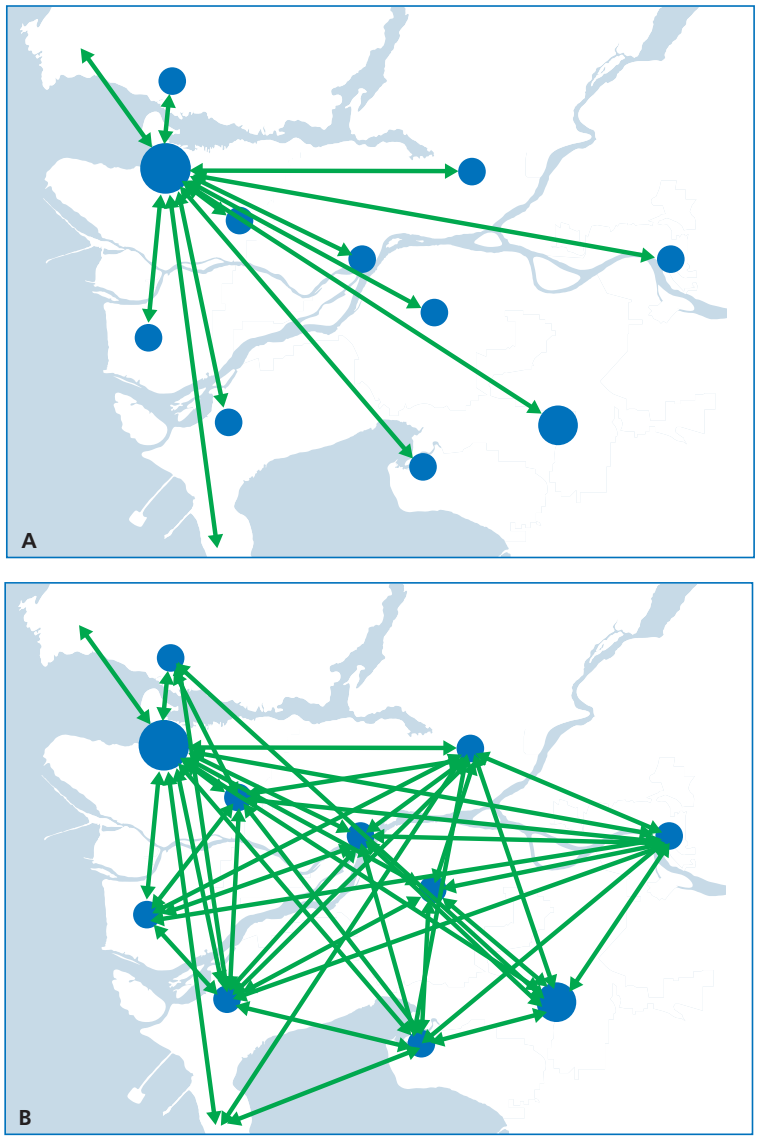
As can be seen in Figure 7, transit is not a significant factor in work travel for many Langley residents, reflecting the relatively less developed transit network in Langley, as well as the lack of transit service in the Port Mann and Highway 1 corridor.

Travel patterns for other municipalities are included in Appendix A.

Considered together, these figures illustrate the important travel demand trends emerging in Greater Vancouver:

- Across Greater Vancouver, a growing number of people live and work in different municipalities;
- Long commutes are relatively small portions of the observed travel volumes; and
- For trips to and within less densely populated areas, automobiles continue to capture a higher share of trips. These trips are difficult and expensive to serve by transit.

Figure 5: Change in Greater Vancouver Commuting Patterns (illustrative purposes only)



Change in Nature of Trips - *There has been in a shift in the traditional suburb to downtown travel pattern (A),to more complex travel patterns (B) as a result of increasing population and dispersed locations for job creation.*

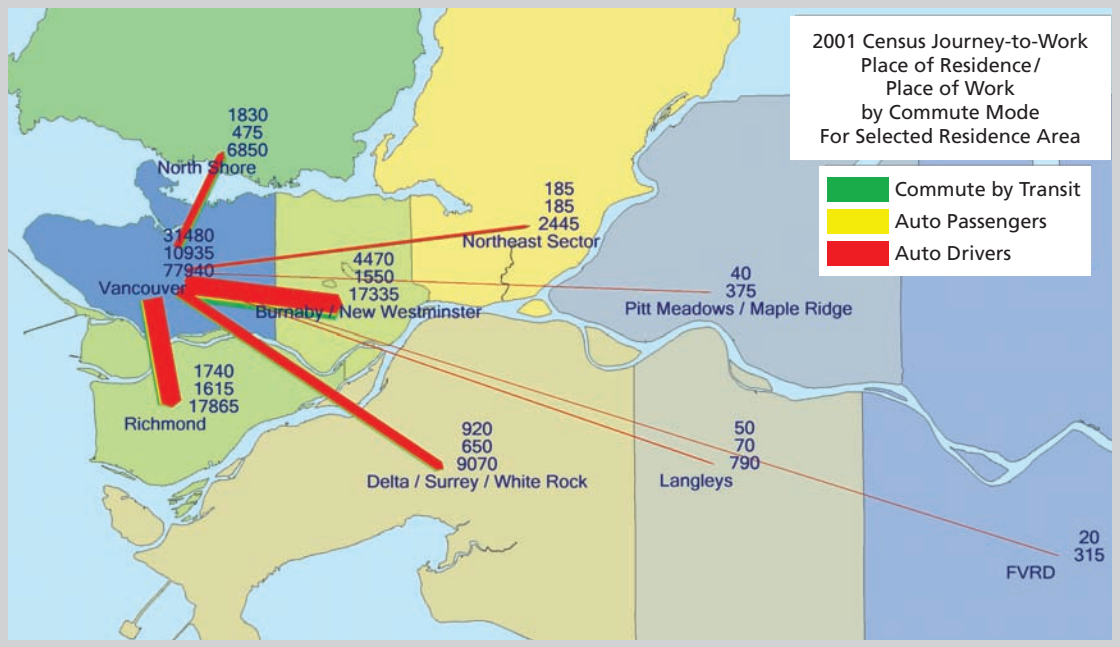


Figure 6: Vancouver Commuting Patterns (2001)

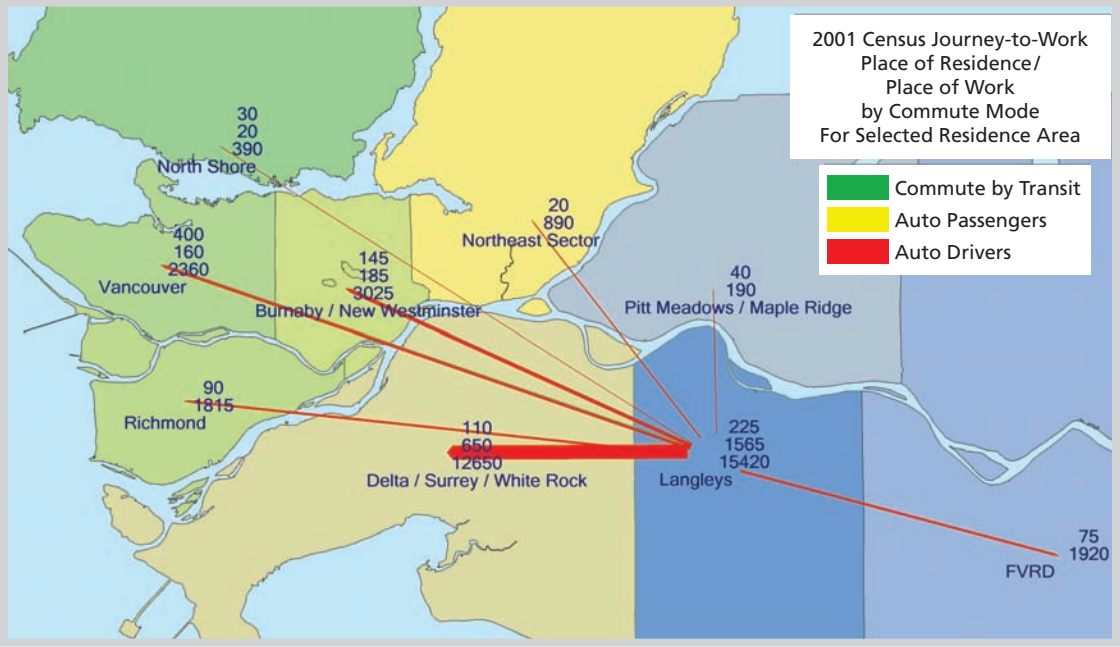


Figure 7: The Langleys Commuting Patterns (2001)

The combination of increased population and employment with more dispersed commuting patterns has contributed to an increase in road congestion.

2.3 EXPANDING TRADE AND TOURISM

The emergence of China as an increasingly important player in the international marketplace, exponential growth in containerized goods movement and the impact that these trends will have on the Lower Mainland were not anticipated when the LRSP was developed. This growth in international trade through Greater Vancouver has contributed significantly to recent improvements in the British Columbia economy.

The transportation sector is vital to trade. In British Columbia, transportation accounts for 114,000 jobs (5.6% of total employment)[15] and contributes over 10% or $8.1 billion to provincial GDP.[16] A large portion of this transportation activity is linked to the ports, airports and intermodal facilities in Greater Vancouver known collectively as "gateways" *(see Figure 4, page 6)*.

As Canada's main Pacific gateway, Greater Vancouver has been a primary beneficiary of the growth in Asia-Pacific trade. The gateway facilities now account for 75,000 jobs and $10 billion in business output annually in Greater Vancouver alone.[17] Vancouver's gateways also support 6,500 jobs and $250 million of the GDP of the provincial economies of Alberta, Saskatchewan and Manitoba.[18]

The recent growth in gateway-related employment has not only contributed to the growth in commuter traffic, it has also been a significant contributor to growth in commercial traffic.

Emerging as a strategic North American transportation gateway for international trade with the Asia-Pacific region, Greater Vancouver has become Canada's highest volume container shipping location, with over 1.6 million twenty-foot equivalent units (TEUs) handled in 2004, transporting goods from all over the world.[19] The Port of Vancouver is 30 hours closer to Shanghai

than the Port of Los Angeles; therefore, a container arriving at Vancouver can be unloaded and shipped by train to Chicago before a similar container has arrived in Los Angeles.

In addition, the Fraser River Port Authority is the fourth busiest auto port in North America, with 445,000 vehicles received in 2003. Contributing to the expansion of trade with China, Japan and Korea is the increasing demand for Canadian raw materials including minerals and forest products.

The Port of Vancouver has seen a 56% growth in trade with China alone in the past year.[20] Trade with Asia now accounts for 35% of British Columbia's trade, 55% of cargo movements and 95% of container movements through the Port of Vancouver.[21]

Containerized freight movement by rail remains most feasible for containers going to destinations well beyond Greater Vancouver, while trucks are the most feasible option for local and regional transportation. The strong growth of containerized freight volumes has also led to corresponding strong growth in container freight facilities providing related transportation services (packaging and repackaging, warehousing, logistics, supply chain management, etc.). These factors have led to significant growth in container truck volumes. In the past five years, truck traffic from key generators *(ref. Figure 4, page 6)* in the region has grown by approximately 20%.

The growth in trade has come not just from overseas. Increasing Canada-US trade in B.C., now $23.9 billion annually[22], has resulted in the Pacific Highway Border Crossing becoming Canada's fourth busiest.

Economic growth has also come from increased tourism. The Greater Vancouver region attracts more tourists than any other part of British Columbia.

Home to Canada's largest cruise ship facility, Vancouver's Canada Place and Ballantyne Cruise Terminals attract close to 1 million passengers annually.[23] While forecast growth in cruise passenger travel is moderate, the cruise industry is an important seasonal employment generator. The cruise industry generates 4,500 direct jobs, $177 million in wages and $508 million in economic output annually to the region.[24]

The Vancouver International Airport is the second largest international passenger gateway on the West Coast of North America, with some 15.7 million passengers annually,[25] anticipated to grow to 21 million by 2010.[26]

This strong economic growth resulting from increases in trade and tourism through Greater Vancouver's gateways has resulted in more traffic on our roads, connecting to local, national and international destinations. This growth is expected to continue.

2.4 LIMITED INVESTMENT IN TRANSPORTATION INFRASTRUCTURE AND TRANSPORTATION DEMAND MANAGEMENT DURING THE 1990s

The LRSP envisioned substantial investment in transportation infrastructure by 2006. Proposed initiatives included significant investments in transit facilities and services, limited investments in roads, and transportation demand management (TDM) measures such as tolls on all crossings onto the Burrard Peninsula, to provide a disincentive for long-distance commuting as well as to finance proposed transit improvements. The LRSP also identified areas where new roadways were required, including the South Fraser Perimeter Road, to serve goods movement needs.

Since the adoption of the LRSP, the Province built the Millennium Line, and with other partners is investing in the Canada Line (Richmond-Airport-Vancouver Rapid Transit Project) and Coquitlam Light Rail Transit Line. TransLink has expanded bus service and the Province and municipalities have built significant components of the HOV network and are expanding the cycling network.

However, some key components of the regional transportation strategy have not been implemented. Most notably, key demand management measures such as tolling water crossings have not been implemented; the investment in transit, although substantial, has not met projected targets; and there has been no significant increase in major road capacity since the completion of the Alex Fraser Bridge in 1986.

Despite slower than projected progress in transportation investment, Greater Vancouver has seen a significant increase in transit use compared with other North American cities. In 2003, TransLink analyzed trends in ridership for eight Canadian cities for the period 1990-2000. During this period, with the exception of Greater Vancouver, Calgary, and to a limited extent Edmonton, all Canadian cities saw significant declines in overall transit ridership[27] over this period. In fact, Vancouver saw in excess of a 20% increase in ridership. However, during this same period, vehicle use also increased, and transit's share of trips in the morning peak period has remained at about 10% since 1993.

2.5 OTHER FACTORS AFFECTING DEMAND FOR TRANSPORTATION

Other social and demographic trends that are influencing how and when people travel include the following:

Changes in the Nature and Tenure of Work. In recent years, the nature of work has continued to change, with more people telecommuting, becoming self-employed and working part-time.[28] In 2001, just over 10% of people employed in the GVRD had no fixed workplace.[29] Technologies such as cell phones have facilitated mobile offices, and just-in-time manufacturing has created mini-warehouses throughout the region. As a result, people and goods are more mobile and work-related trip-demand is increasing at all times of the day.

People are also changing jobs more frequently than they have in the past. Although changing jobs often results in a change in employment location, people are less inclined to change the location of their residence in response. A recent study by Urban Futures highlights the way in which personal choices such as these are often at odds with regional planning assumptions: "If a person is not certain where they will work in five years, they will not give place of work much importance in deciding where to establish a home."[30]

Increasing Number of Multiple-commute Households. A combination of continued growth in two primary income earners as well as more live-at-home adult children is creating multiple daily commute destinations from individual residences.[31] Between 1996 and 2001, growth in the number of adult children living at home has been highest in the 20 to 29 age group, with 40% of adult children aged 20 to 29 now living with their parents, up substantially from 29% in 1981.[32]

Increasing Number of School-commuting Trips. Almost half of trips to elementary and high school in the GVRD in the morning peak period are made by auto.[33] Growing safety concerns for children have increased the amount of travel to school that is done in private automobiles.

Increasing Number of "Mid-day" Trips. As the region's population has started to reach retirement age in larger numbers, their transportation needs have changed. This trend is seen in travel patterns, with a greater demand for "off-peak" travel contributing to a significant growth in trips made during the midday period. Between 1999 and 2004, the number of people in the 60-64 age group increased by over 25%,[34] compared to total population growth of 6%.

2.6 SUMMARY OF KEY IMPACTS

The demographic and economic trends described above have created a significantly different transportation situation than envisioned 10 years ago. Growth in inter-municipal travel and other trips is causing increasingly complex travel patterns in our region that are difficult to serve with our existing transit system (or with cycling or car-pooling).

Transit demand in outer municipalities is primarily served by bus due to their lower population densities, while rapid transit is most appropriate for travel between high-density areas. Connections between outer municipalities require multiple transfers and increased travel time. These connections are less frequent, difficult to schedule and expensive to serve. Demand for transit on the Port Mann Bridge cannot be satisfied despite it being one of the busiest commuter corridors in the region. While the Port Mann Bridge is unable to facilitate any reliable transit service due to congestion, other significant commuter water crossings such as Lions Gate and Oak Street Bridges see a transit share of between 10 and 15%.[35]

As a result, more and more vehicles are squeezing onto a static road network. In the past five years, the number of registered vehicles in the GVRD grew by 12.5% (143,400). This growth is greater than population growth during the same time period, and represents an increase of approximately 3.25 vehicles every hour.

Key impacts of growth in congestion include:

- An increase of 30% in average vehicle trip times, although average trip length has remained constant over the past 10 years;
- An increase in the cost of congestion up to $1.5 billion annually; and
- Road users experiencing increasingly fluctuating service levels and longer and more unpredictable travel times – one major incident can cause gridlock in the entire system.

Significant investment in the transportation network is required not only to address these needs but to also accommodate future growth, as described in Chapter 3.

3. THE FUTURE WITHOUT ACTION

3.1 EFFECTS OF FUTURE POPULATION AND EMPLOYMENT GROWTH

The GVRD estimates that the population of Greater Vancouver will increase from the current 2.1 million to 3.0 million by 2031. Most of this growth is expected to take place in the southern and eastern sections of the region. Over 50% of forecast population growth is anticipated to take place in the Northeast Sector (Coquitlam, Port Coquitlam, Port Moody, Anmore and Belcarra) and Surrey/Delta, and only 24% in Vancouver, Burnaby and New Westminster.

Employment in Greater Vancouver is expected to increase by about 500,000 jobs by 2031. This includes strong employment growth in Surrey and Delta.

While transit, cycling, and walking will contribute significantly to travel in the region, using GVRD population and employment targets and assuming currently planned transit and road improvements are in place, the majority of commuting trips will continue to be by private vehicle. It is projected that there will be another 82,000 to 115,000 vehicle trips to accommodate on the road network in the morning peak hour by 2031[36] *(see Figure 8)*. By comparison, the Port Mann Bridge currently carries approximately 127,000 vehicles in an entire 24-hour day.

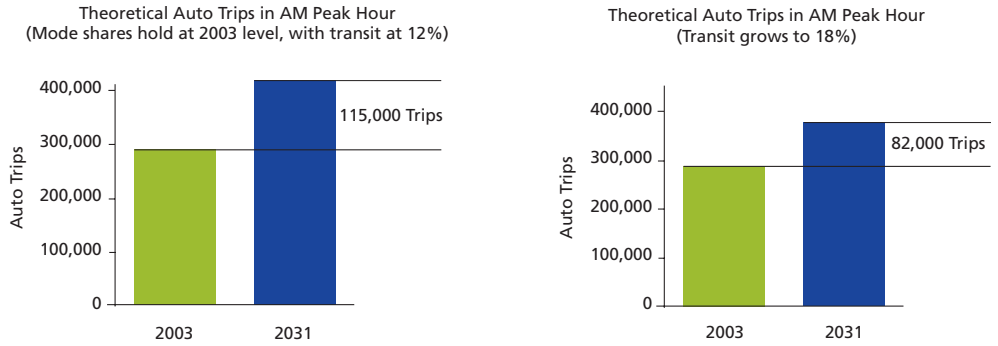
Without additional investment in both transit and road transportation infrastructure, the result will be increasing congestion, longer travel times on Greater Vancouver's already-congested roads and transit lines, and continued deterioration in safety, reliability and quality of life.

For example, Figure 9 *(next page)* provides a simple illustration of what could happen if population continues to grow according to projections and there are no improvements to the Port Mann Bridge.

Currently, the bridge is congested approximately 13 hours per day. The average morning peak period queue to access the Port Mann Bridge westbound is approximately 5 km long, extending as far as 176th Street. By 2011, analysis indicates the average queue could extend 12 km to 200th Street, and by 2021 it could extend 17 km to 216th Street.

This loss of mobility will compromise the region's ability to take advantage of significant economic development opportunities, negatively impact the region's competiveness and reduce safety. Regional and inter-regional traffic will spill onto local streets. Congested conditions result in collision rates at least double that of free-flowing conditions and congestion-related idling contributes significantly to the region's greenhouse gas emissions.

Figure 8: Projected Auto Trips in Morning Peak Hour on Greater Vancouver Road Network (2031)



3.2 IMPLICATIONS FOR OPPORTUNITIES TO EXPAND TRADE GATEWAYS

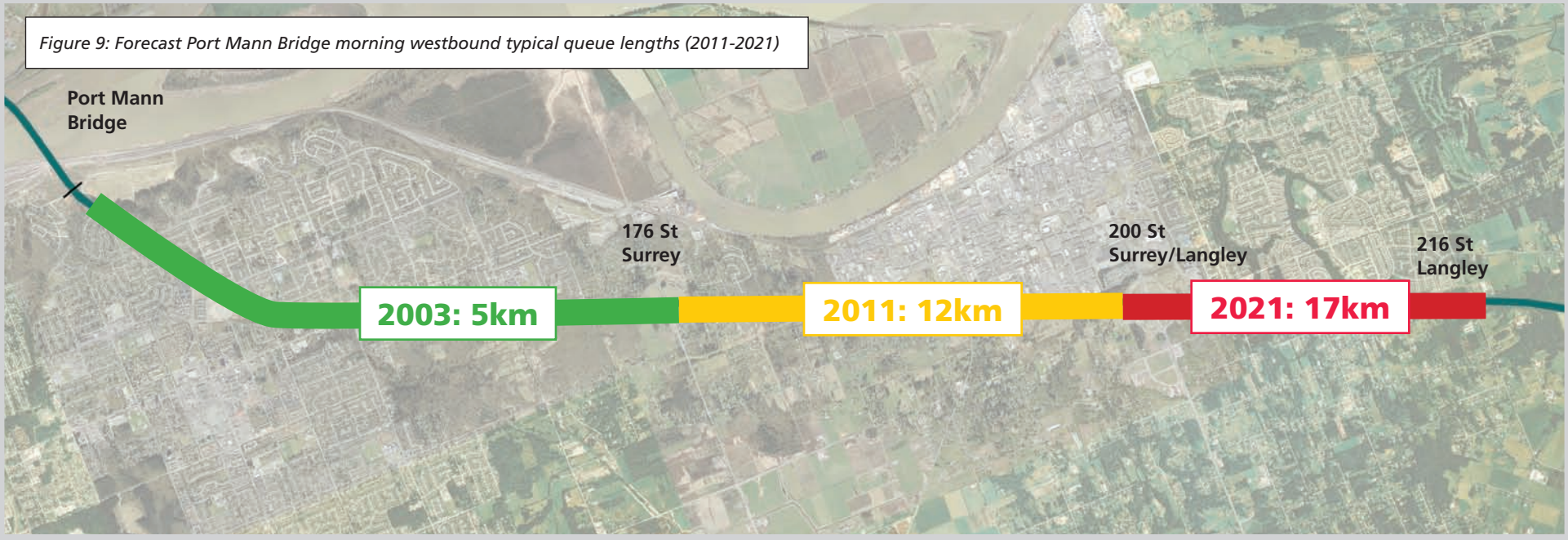
The continued growth of Asia-Pacific trade presents British Columbia and Canada with significant economic development opportunities. The most significant arises from expanding container traffic, which on the west coast of North America is projected to increase 300% by 2020. The Province of British Columbia has adopted a Ports Strategy with an objective to expand British Columbia's market share of Asia-Pacific container traffic from 9% to 17% by 2020. This would result in British Columbia container traffic increasing from 1.8 million TEUs to 8.8 million TEUs by 2020. This would create more than 50,000 new jobs and contribute over $3 billion annually to Canadian GDP by 2020. Each percentage point in container market capture in 2020 is worth approximately $250 million a year in GDP and 4,000 jobs.[37]

Approximately 50% of containerized goods are currently transported to and from Greater Vancouver's terminals by truck; the other 50% move by rail.[38] Figure 10 *(next page)* illustrates the projected growth in truck volumes associated with the forecast growth in international trade.

A significant portion of this growth is in light trucks, serving growing commercial markets that are spin-off businesses from increasing international trade, such as warehousing and distribution centres for containerized goods as well as equipment repair facilities.

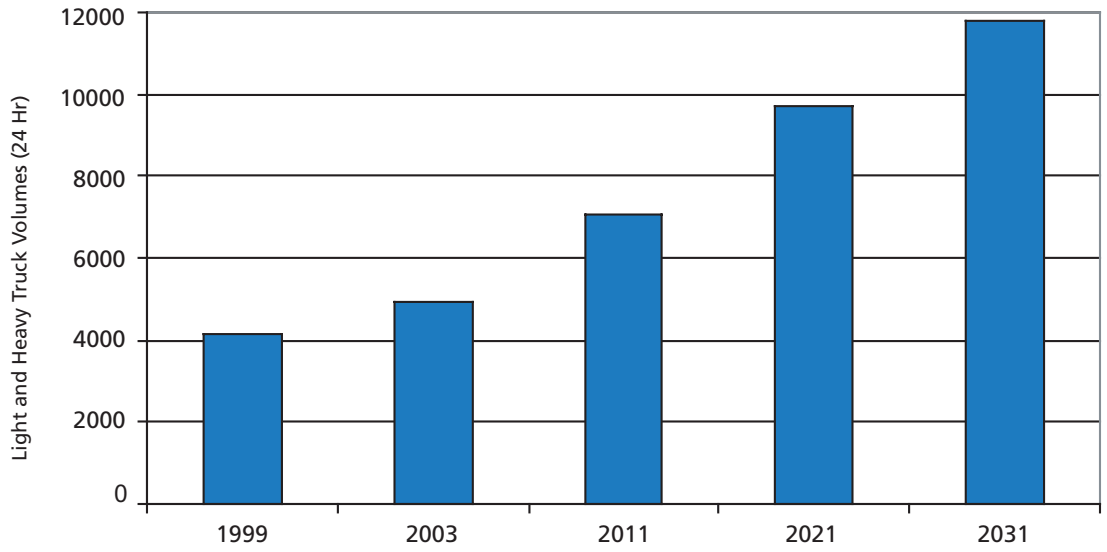
Other West Coast centres, such as Los Angeles, San Francisco and Seattle, compete directly with Vancouver for port business. As a result, British Columbia will face strong competition in achieving its Port Strategy goals.

Figure 9: Forecast Port Mann Bridge morning westbound typical queue lengths (2011-2021)



U.S. jurisdictions are acting to support their gateways by providing improved transportation links to highway networks and rail depots. If Greater Vancouver is to maintain its competitive advantage as a trade gateway, and British Columbia is to achieve the goals of the Ports Strategy, we need to do the same. A key consideration will be road access to and between ports and other gateway facilities.

Figure 10: Forecast Gateway Truck Volume, 1999-2031



PART 2: RESPONDING TO THE PROBLEM

4. A COMPREHENSIVE AND INTEGRATED RESPONSE IS REQUIRED

Coordinated transportation infrastructure and service improvements are needed throughout the region to address current and future transportation needs and to realize potential economic development opportunities from increasing trade.

Required improvements include:

- Expansion of the transit system;
- Additional transit service;
- Expansion of the HOV network;
- Expansion of cycling networks;
- Construction and improvement of key roads, particularly facilities that improve connections to trade gateways (ports, border crossings, rail-truck intermodal yards, national highways) and relieve congestion on major trade routes; and
- Expansion of port facilities.

The provincial government and other agencies already have initiatives underway to provide these needed improvements.

The Gateway Program was established as part of a broader response by the Province of British Columbia to relieve congestion and improve mobility for all modes of transportation. Its focus is on key commuter and goods movement routes that are heavily congested.

Figure 11 *(next page)* summarizes key transit and road investment projects planned or in progress.

4.1 CURRENT INITIATIVES

Canada and the Province have several cost-shared initiatives underway to improve goods movement in the region, including the Border Infrastructure Program (BIP)[39] and Strategic Highway Improvement Projects (SHIP), with specific emphasis on improving Canada-U.S. border trade connections.[40] These initiatives will improve key sections of the region's road network resulting in better links between border crossings, ports, container facilities, industrial parks, airports and railways.

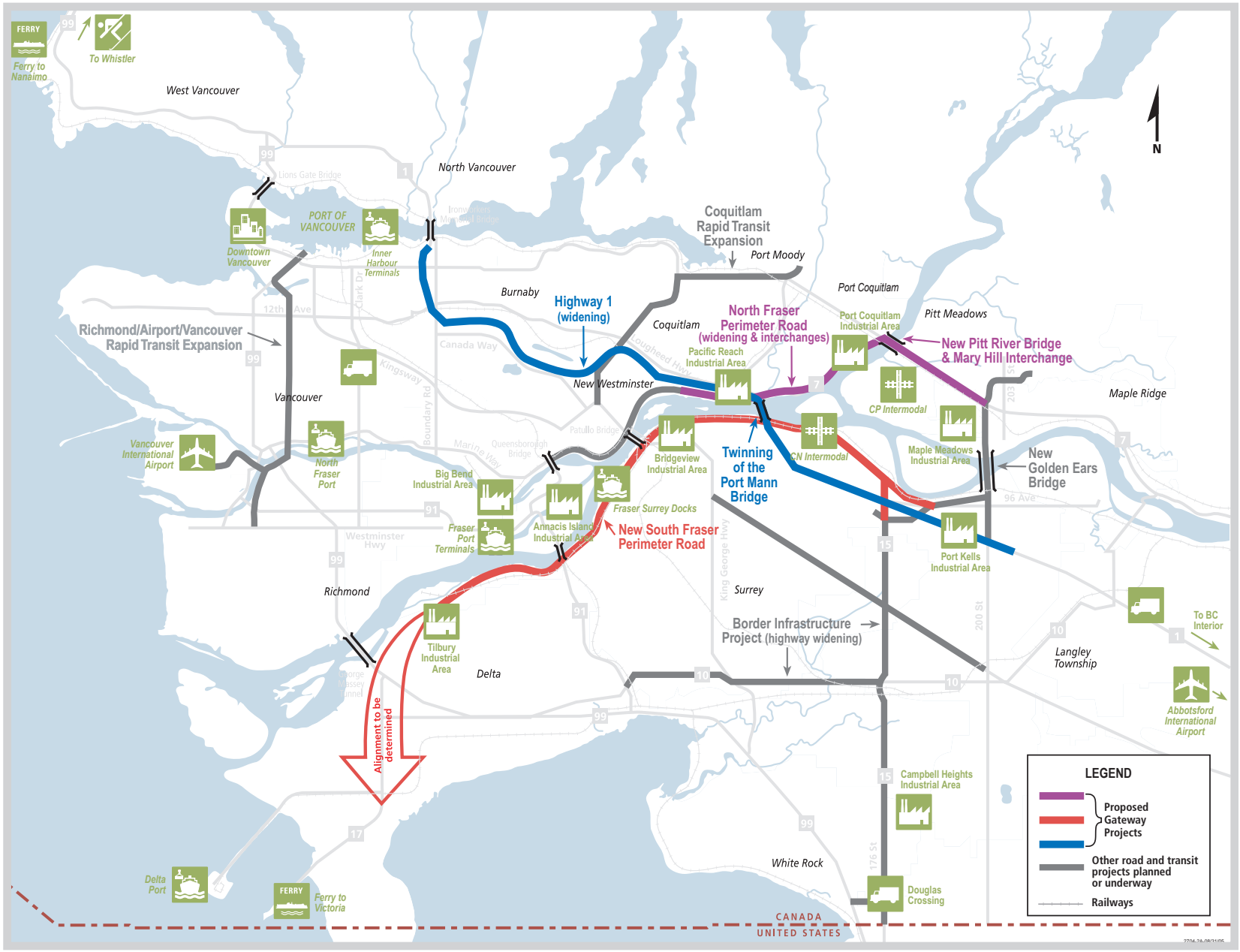
The Province, Canada, TransLink and other partners are investing in the Richmond-Airport-Vancouver Rapid Transit (Canada Line) and Coquitlam Light Rail Transit (Evergreen Line). TransLink, under its Three-Year Plan and 10-Year Outlook, also has significant plans to increase bus and SeaBus service and expand the successful U-Pass program.[41]

In addition, TransLink is expanding key components of the region's major road network, and providing for the Golden Ears Bridge connection between Surrey/Langley and Maple Ridge/Pitt Meadows.

Municipalities, with support from the Province and TransLink, are implementing significant investments in cycling network, upgrading safety and connecting key routes.

Under the Pacific Gateway Initiative, Canada and the Province are anticipating supporting infrastructure development to maximize Asia-Pacific trade opportunities, and to strengthen British Columbia's position as a world cruise destination.

Figure 11: Gateway Program: Part of an Integrated Solution



4.2 THE ROLE OF THE GATEWAY PROGRAM

Even with all of these improvements, Greater Vancouver will still require significant additional investment to relieve congestion and create a robust transportation system to service a growing economy and population base. In 2003, the provincial government, through the Ministry of Transportation, established the Gateway Program to complement other regional road and transit improvements already underway or planned. Three priority corridors were identified for consideration:

- A new east-west corridor along the south shore of the Fraser River;
- An improved east-west corridor along the north shore of the Fraser River; and
- The existing Highway 1 corridor from Vancouver to Langley.

Measures to restore mobility to the Highway 1 corridor were determined to be necessary as the corridor is the most significant commuter and goods movement route in the Lower Mainland. This route suffers from the worst congestion of all major routes and is experiencing the most rapid growth in traffic.

Measures to improve east-west mobility on both sides of the Fraser River were also determined to be a priority. These corridors contain key port, intermodal facilities and industrial areas, and are vital to achieving the goals of British Columbia's Port Strategy.

Currently, east-west routes adjacent to the Fraser River are heavily congested city streets and do not provide direct, continuous connections to and between growing port areas and the other key gateway facilities. Traffic in these areas is presently served by a patchwork of portions of provincial highways, local arterials and collectors that provide partial, fragmented, discontinuous, and inappropriate routes for goods movement.

The Gateway Program is intended to be part of an integrated solution to address the needs of our growing region, as shown in Figure 11 *(previous page)*. Improvements in these priority corridors would also integrate with and expand the benefits from other initiatives such as the Border Infrastructure Program as well as TransLink improvements to the Major Road Network, including the new Golden Ears Bridge.

Improvements in these corridors will also facilitate expansion of transit services, the HOV network and cycling networks.

5. STRATEGIC CONSIDERATIONS

As part of the development of the Gateway Program to date, consideration has been given to a number of strategic alternatives for dealing with congestion in the Highway 1 corridor and at crossings of the Fraser River. These alternatives and the results of their analyses are summarized below.

Installing a rapid transit line along the Highway 1 corridor between Vancouver and the Fraser Valley. A review of transit opportunities in the Highway 1 corridor was commissioned by the Gateway Program. The report concluded that the Highway 1 corridor is not well located relative to regional town centres, and therefore, is not the right location for high capacity rail transit service relative to future transit demands based on existing and expected development.

The report further concluded that better transit service on existing routes could significantly increase transit usage (this increase could be served by 20 buses per hour) and that the initial focus for the development of transit service in the corridor should be on providing fast, easy access to the existing rapid transit system for both buses and cars.

For possible longer term implementation, the report indicated that consideration should be given to protecting opportunities for passenger rail operations. The pre-design concept for the twinned Port Mann Bridge described in Chapter 7 will accommodate potential future light rail rapid transit.

Widening/Replacement of the Pattullo Bridge. The aging Pattullo Bridge currently provides the closest alternative to the Port Mann Bridge for crossing the Fraser River. Because of this, the Gateway Program considered the appropriateness of improvements to this crossing as an alternative to twinning the Port Mann Bridge. For example, improvements to the Pattullo Bridge such as widening to provide a six lane cross-section would increase the capacity of the structure from approximately 3,500 vehicles per hour to approximately 5,700 vehicles per hour in either the westbound or eastbound directions. The ability of the supporting road network on either side of the bridge to accommodate the demand will ultimately dictate the traffic volume that can be accommodated across the improved bridge structure. To accommodate the new demand associated with this increase in capacity across the bridge – upwards of 2,200 vehicles per hour in the peak direction – improvements to the supporting regional and municipal roadway network would be required, such as the construction of the Stormont-McBride Connector and widening of the main connection elements including McBride Boulevard.

Due to severe constraints posed by urban development on either side of the existing Pattullo Bridge, it was determined that supporting road capacity improvements at this location could not be realized in the near term and would therefore not provide the large measure of congestion relief that is needed.

George Massey Tunnel Expansion. Consideration was given to widening the George Massey Tunnel in conjunction with development of the South Fraser Perimeter Road.

To capture sufficient benefits, twinning the tunnel would also require improvements to other crossings over the North Arm of the Fraser River, such as the Oak Street or Knight Street bridges, or a new crossing to serve projected commuting patterns associated with employment growth in central Burnaby.

While upgrades to the George Massey Tunnel remain part of the Ministry of Transportation's longer term plans, widening of the Port Mann Bridge and development of the South Fraser Perimeter Road would provide greater overall benefit to the region.

Tolling the Port Mann Bridge without investment in new bridge capacity. In keeping with demand management measures proposed as part of the LRSP, the Gateway Program analyzed the effect of tolling the existing Port Mann Bridge as a means to address congestion at the bridge. Analysis has indicated that in an urban environment such as Greater Vancouver, tolling the Port Mann Bridge (which has the highest daily volume of traffic of any bridge across the Fraser River) *without any new capacity* would result in seriously overloading untolled alternative routes such as the Pattullo Bridge.

It also is estimated that the existing demand for westbound travel over the Port Mann Bridge in the AM peak hour is 5,000 vehicles; however, the capacity of the bridge is only about 3,600 vehicles per hour. As such, upwards of 1,400 vehicles/hour over the AM peak period would need to be diverted from the Port Mann Bridge to achieve the same user benefits as the proposed Port Mann Bridge twinning.

The Pattullo Bridge is the next closest river crossing to the Port Mann Bridge. An additional 1,400 vehicle/hour demand at the Pattullo Bridge would exacerbate existing congestion at that east bridgehead to the extent that queues would potentially extend an additional two to three kilometres on both King George Highway and Scott Road. Subsequent diversion of traffic demand from the Pattullo Bridge to the Alex Fraser Bridge and again from the Alex Fraser Bridge to the George Massey Tunnel would therefore be expected, since all of these crossings fall short in meeting the traffic demand during the AM peak period. Associated transit service required to shift people to alternate modes would be difficult to provide because transit vehicles would be caught in the same congestion at the bridge crossings.

To effect the diversion at the Port Mann Bridge, tolls in the range of $5 to $8 per trip would be needed. For daily commuters using the Port Mann Bridge, the toll would amount to payments ranging from $2,000 to $3,500 per year.

Due to the negative system-wide impacts and significant financial burden on existing bridge users, just tolling the existing bridge as a strategy for dealing with congestion at the bridge is not recommended. It is also inconsistent with Provincial policy, which requires that tolling be applied only for major projects that result in significant increases in capacity.

Applying system-wide tolling without investment in new bridge capacity. The LRSP contemplated the use of system-wide tolling as a travel demand management measure for maintaining mobility at water crossings. Further, TransLink has identified the concept as one that may need to be studied over a longer term. System-wide tolling in the context of the LRSP generally includes tolling of all bridges connecting to the Burrard Peninsula, including the Lions Gate, Ironworkers Memorial, Pitt River, Port Mann, Pattullo, Alex Fraser, Knight Street, Oak Street and Arthur Laing bridges as well as the George Massey Tunnel.

System-wide tolling of existing bridges would mitigate the diversion of traffic from a tolled Port Mann Bridge, as described above. However, in order to achieve traffic flow conditions on the Port Mann Bridge comparable to the pre-design concept described in Chapter 7, individuals require adequate opportunities to use alternative modes. The feasibility of such alternatives is questionable and they are not contemplated within TransLink's 10-Year Plan. As such, imposition of a system-wide congestion toll could have a significant detrimental impact on the region's economic development.

6. DEVELOPMENT OF THE GATEWAY PROGRAM

As a result of the strategic considerations outlined in Chapter 5, the focus of the Gateway Program has remained on the noted three priority corridors. In developing the reference concepts described in Chapter 7, careful attention was given to ensuring the proposed improvements are compatible with adjacent road systems and how these systems are likely to evolve over the next 7 to 10 years. This consideration established boundaries for the scope of the Gateway Program improvements that could be contemplated over the same period.

6.1 PLANNING APPROACH FOR PRIORITY CORRIDORS

With the Gateway Program priority corridors identified, the Ministry of Transportation adopted a comprehensive planning approach for each corridor. This process is outlined in Figure 12. Stakeholder consultation including dialogue with staff at TransLink, the GVRD and area municipalities has been ongoing throughout this process.

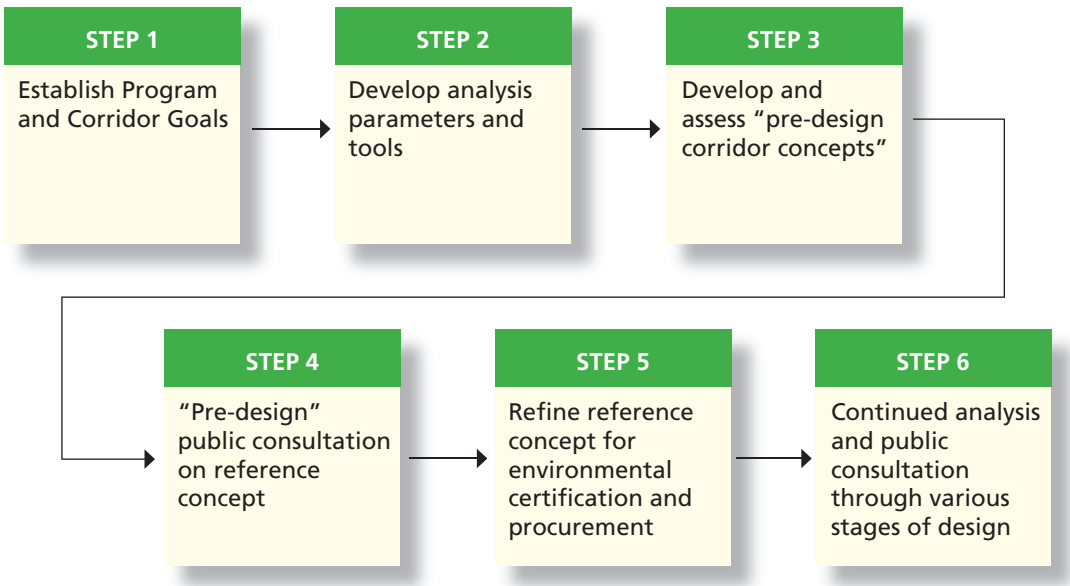
The remainder of this chapter outlines the results of steps 1 to 3 at a program level. Chapter 7 provides more detailed results of steps 3 to 5 for each corridor as appropriate. The planning work for each corridor is at different stages and will move forward on different schedules.

6.2 PROGRAM AND CORRIDOR GOALS

Based on the analysis outlined in Chapters 2 and 3, the following goals were established for the Gateway Program:

- Address congestion;
- Improve the movement of people and goods in and through the region (through to 2031);
- Improve access to key economic gateways through improved links between ports, industrial areas, railways, airports and border crossings;
- Improve safety and reliability;
- Improve the region's road network;
- Improve quality of life in communities by keeping regional traffic on regional roads instead of local streets and restoring municipal streets as community connectors;
- Reduce vehicle emissions by reducing congestion-related idling;
- Facilitate better connections to buses and SkyTrain, cycling and pedestrian networks; and
- Reduce travel times along and across the Fraser River during peak periods.

Figure 12: Gateway Program Development Process



6.3 ANALYTICAL PARAMETERS AND TOOLS

As a precursor to developing and assessing "pre-design concepts" for the Gateway Program, it was important to establish the parameters and assumptions upon which the technical analysis would be based. It was also necessary to develop analytical tools. These are described below.

6.3.1 Population and Employment Projections

The GVRD, in consultation with municipalities, is responsible for developing population and employment projections for the Greater Vancouver region. These projections are used by municipal and regional planners to develop appropriate infrastructure and programs to serve the forecast growth.

Forecasts maintained by the GVRD are known as the "Growth Management Scenario" (GMS). GMS is updated regularly by the GVRD, with GMS 4 being the most recent and GMS 5 under development. GMS 4 provides forecasts through to the year 2021.

The Gateway Program commissioned recognized experts Urban Futures Inc. to extend the GVRD's population and employment projections out to the year 2031.[42] Base case population and employment projections are outlined in Figure 13.

6.3.2 Travel Patterns and Trends

The Gateway Program commissioned an extensive data collection program to better understand the nature of travel demand today, and to calibrate transportation planning models used to forecast future travel demand. A key element of this data collection program was the 2004 Trip Diary Survey,[43] which was conducted jointly with TransLink and is referenced extensively in previous chapters. 4,800 households were included in the survey. In addition to this extensive research, the Gateway Program also conducted a range of origin-destination, travel time and speed-flow surveys, as well as detailed vehicle volume and occupancy counts along the priority corridors. The results were compiled and shared with area municipalities and TransLink.[44]

Figure 13: Greater Vancouver Population/Employment Projections (2001-2031)

Municipality	Population					Employment				
	2001	2011	2021	2031	('01-'31) % chg	2001	2011	2021	2031	('01-'31) % chg
North East Sector	195,640	245,970	323,620	386,470	98%	65,780	90,280	122,410	151,450	130%
Burnaby/N Westminster	255,520	287,530	346,360	379,840	49%	158,700	178,070	205,670	219,480	38%
Langley(s)	114,420	143,340	188,100	209,270	83%	55,790	71,380	95,770	105,590	89%
Pitt Mdws / Maple Ridge	80,540	91,400	112,870	125,170	55%	24,860	30,390	37,960	44,760	80%
North Shore	178,040	181,800	195,350	211,330	19%	74,000	82,320	89,020	94,110	27%
Richmond	170,220	180,530	207,230	230,820	36%	122,030	155,320	172,880	185,690	52%
Delta/Surrey/ White Rock	479,150	540,120	653,070	759,380	58%	180,390	212,320	265,700	307,120	70%
Vancouver / UBC	572,510	593,490	632,060	702,850	23%	379,000	425,500	451,810	466,330	23%
Electoral Area C	4,080	3,300	3,470	3,750	-8%	1,080	1,130	1,300	1,370	27%

6.3.3 Model Development and Calibration

The Regional Transportation Model was originally developed in the 1980s and is maintained primarily by TransLink. It is the traffic forecasting tool used by planners in developing long term transportation plans and determining the effects of new transportation infrastructure. The model was updated using the travel data collected by the Gateway Program and TransLink and includes the planned infrastructure improvements.[45]

Enhancements to the model were developed to project traffic flows in the afternoon peak hours, not just in the morning peak hours, and to provide more detailed traffic information. The enhanced model allowed for the testing of design concepts. A separate model was developed to forecast revenues under various tolling options.

Operational micro-simulation models were also developed for specific projects to assess queuing (line-ups), lane-changing and other operating characteristics at a finer level.

Data collection and model development and calibration required an extensive work program, which took place from 2003 to early 2005. It has provided significant improvement in the information and tools available to transportation planners throughout the region. These tools have enabled development of a better understanding of the problems and the implications of potential solutions in each corridor.

6.3.4 Potential Mode Priority and Congestion Reduction Options

In developing a pre-design concept for each corridor, consideration was given to all modes of transportation including transit, HOV and cycling. The Gateway Program also conducted a review of recent experiences and practices in transportation demand management measures with a view to identifying a range of such congestion reduction measures that could be appropriate for each of the corridors.

To determine the appropriateness of these measures, a number of initial studies were undertaken. The results of these studies are contained in companion reports available under separate cover. A summary of each study follows. Detailed options for each of the Gateway corridors are described in Chapter 7.

Transit.[46] Potential opportunities to facilitate and enhance transit services on the Highway 1 corridor were identified. These include new bus service, future expansion of light rail transit, transit queue jumpers or other transit priority measures.

Further details on potential transit measures are outlined in Chapter 7. The Gateway Program will continue to liaise with TransLink to explore various opportunities to support regional plans for transit.

Cycling.[47] The Gateway Program developed a draft cycling plan overview that outlines how cyclists could be accommodated within the Gateway Program corridors. Cycling deficiencies and potential improvements were identified with input from the TransLink Bicycle Advisory Group, municipalities, GVRD Regional Parks Department, Better Environmentally Sound Transportation (BEST) and the Vancouver Area Cycling Coalition, and used in the development of the draft plan, which provides for significant improvements in the cycling network across the region.

The plan provides for an estimated $50 million of pedestrian and cycling facilities improvements within the three corridors in accordance with Ministry of Transportation policy. It also includes up to $10 million to fund additional off-corridor projects that will improve the overall effectiveness of the regional cycling network. This funding will be provided on a cost-shared basis with municipalities.

Further details on potential cycling measures for each corridor are contained in the Draft Cycling Plan as well as in Chapter 7 of this report.

Lane Allocation.[48] Lane allocation refers to the practice of implementing operational strategies and design features that support the designation or allocation of traffic lanes for the use of specific vehicle types or user groups, providing them with superior service during congested periods. Two strategies, HOV lanes and ramp metering, are currently in use in Greater Vancouver.

The Gateway Program lane allocation study investigated several operational strategies and design features that could support the designation or allocation of lanes for the exclusive use of specific user groups. Potential strategies and design features included priority for transit and/or HOVs, site-specific features to support and facilitate efficient goods movement, and queue jumpers that provide priority access for specific vehicles such as transit or HOVs while regulating (through traffic signals or ramp meters) access by other vehicles to optimize efficiency of through-traffic along the corridor.

For the Highway 1 corridor, several strategies and design features were deemed applicable. These include HOV lanes along the corridor, ramp metering to manage traffic demand with priority access to the corridor for HOVs and new access ramps and improved interchange geometry to enhance accessibility and efficiency for goods movement.

The Gateway Program also considered the use of High Occupancy Tolled (HOT) lanes as a possible lane allocation strategy for Highway 1. In a number of other jurisdictions, under-utilized HOV lanes have been converted to HOT lanes, whereby single occupancy motorists are offered the opportunity to pay for access to the HOV lanes, thereby also realizing a travel time advantage over the more congested general purpose lanes. This concept is not considered suitable for the Highway 1 corridor as the present HOV system is relatively well utilized and the addition of significant tolled traffic to the HOV lanes would quickly erode the advantages afforded HOVs by the present arrangement.

To support the Gateway Program's goal of facilitating the movement of goods, consideration has been given to lane allocation strategies which would give advantage to commercial vehicles using Gateway Program roads and bridges, particularly on the Highway 1 corridor. Strategies that have been examined include dedicated roadways or lanes for commercial vehicles, shared use of HOV lanes by commercial vehicles, and site-specific features designed to give advantage to commercial vehicles (typically queue jumper/bypass lanes or geometric improvements at heavy truck traffic locations). While each of these strategies has the potential for application in specific circumstances, it is apparent that a single strategy will not be suitable in every situation. In the coming months, the Gateway Program is committed to working with goods movers to identify the locations, strategies, and specific features that will provide a sustained and cost-effective advantage to the movement of goods within the project corridors.

For the North Fraser Perimeter Road, retention and extension of the westbound peak period HOV lane on the Lougheed Highway segment in Pitt Meadows is under consideration, in addition to the inclusion of ramp metering to manage traffic demand at future interchanges along the overall corridor. For the South Fraser Perimeter Road, applicable design features focused on enhancing accessibility through new connections to industrial areas and other major goods movement corridors.

Road Pricing. Road Pricing can be used as a congestion reduction measure as well as a means of generating revenues to defray the cost of infrastructure. Tolling is one example of road pricing and British Columbia has

a long history of tolling. In addition to the Coquihalla Highway, TransLink's new Golden Ears Bridge will be tolled, and in the past the Lions Gate, Iron Workers Memorial, Pattullo and Oak Street bridges and the George Massey Tunnel were all tolled.

Tolling could be structured to encourage road users to take alternative routes, to choose alternative destinations, to travel at alternate times, to use alternate modes (e.g., transit or carpooling) or to not make some trips. This reduces current congestion and/or the build-up in traffic volume in the tolled corridor.

Based on the results of analysis commissioned by the Gateway Program and application of the provincial tolling guidelines[49], it was concluded that consideration should be given to using tolling on the Port Mann/Highway 1 corridor as a congestion reduction measure and as a means of defraying the cost of improvements. In combination with HOV lanes, transit and commercial vehicle priority access to highway on-ramps, and commercial priority lanes, tolling could potentially be an option to further reduce congestion and limit growth in traffic on the highway and Port Mann crossing.

Tolling of the Pitt River Bridge and Mary Hill Bypass is not being considered, given that TransLink's Golden Ears Bridge will be tolled. The provincial tolling guidelines require the availability of a viable untolled alternative. Highway 7 and the Pitt River Bridge will be the only viable untolled alternative route for travel between Pitt Meadows/Maple Ridge and other parts of Greater Vancouver. In addition, traffic forecasts indicate that the proposed capacity improvements for the Pitt River Bridge are sufficient to serve forecast travel demand through to 2031 without the need for additional transportation demand management measures.

Tolling of the South Fraser Perimeter Road is not recommended as traffic analysis has indicated that tolling would divert a significant portion of traffic, including trucks, to the local road network in Surrey and Delta. This would take away from one of the primary benefits of this route. Further, the number of potential access and egress points would render tolling difficult and expensive (relative to the revenues that could be produced) to administer and enforce. In addition, should tolling of the Port Mann/Highway 1 corridor occur, the SFPR would be part of a viable untolled alternative route.

As discussed above, system tolling and/or tolling the Port Mann Bridge without improvements were not considered viable options.

7. PRE-DESIGN CONCEPTS

Using the goals, analytical parameters and tools established for the Gateway Program, and initial studies considering potential mode and transportation demand management options, a pre-design reference concept was developed for each corridor. Each pre-design concept represents the initial proposal of the Program Team based on the compendium of technical analysis and municipal consultation to date.

For each corridor, the following pre-design elements are described:

- Features to accommodate alternate modes;
- Proposed physical characteristics; and,
- Congestion reduction/demand management measures under consideration.

The purpose of the pre-design concepts is to provide a reference point for undertaking pre-design public consultation.

Through the pre-design public consultation process, feedback within technical and financial constraints will be considered and a report describing the public input that has been received will be prepared. Subsequent to decisions on scope and timing, the preferred concepts will be submitted for Environmental Assessment review. The concepts will continue to be refined as a result of community input, further technical and financial analysis and environmental assessment review.

A description of the Gateway program's comprehensive public consultation process is contained in Section 10.1 of this report.

7.1 PORT MANN/HIGHWAY 1 CORRIDOR

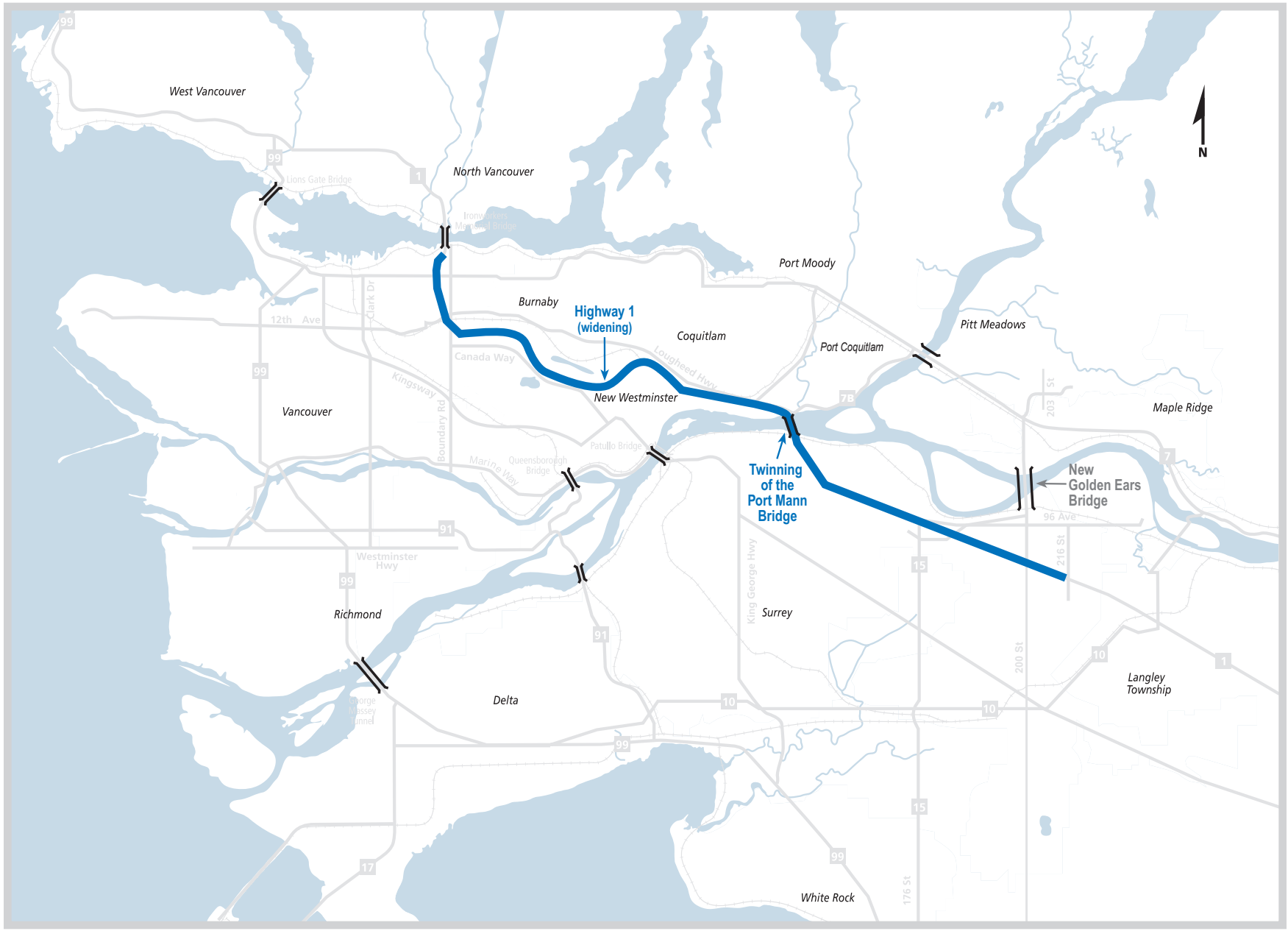
Various components of the Highway 1 corridor have been studied, with each study indicating the need to provide significant improvements to accommodate forecast 2021 traffic levels.[50] These studies also strongly recommend addressing safety along the highway, including insufficient merge lengths, extensive off-ramp queues that back up onto the highway, and undesirable lane changing at on- and off-ramps.

The following goals have been established for the Port Mann/Highway 1 Project:

- Reduce travel times for trips along the corridor and increase their predictability;
- Reduce congestion at entry and exit points to Highway 1;
- Reduce travel times for trips across the corridor and improve connections within and between communities;
- Improve access to and egress from the corridor for goods movement;
- Facilitate the introduction of transit service along the corridor and the improvement of transit service across the corridor;
- Expand HOV, cycling and pedestrian networks along or in the vicinity of the corridor; and,
- Improve safety for vehicle operators and passengers, cyclists, and pedestrians.

Figure 14 provides an overview of the project's proposed geographic scope. More detailed drawings are contained in Appendix B.

Figure 14: Extent of Port Mann/Highway 1 Project



7.1.1 Features to Accommodate Alternate Modes

The Gateway Program is working with TransLink and municipalities to identify areas where alternatives to the automobile (such as transit, car-pooling services and cycling) could be improved. In this regard, the pre-design concept for the Port Mann/Highway 1 Project includes the following features:

Expansion of Highway 1 HOV Lanes:

Consistent with provincial and regional plans, the pre-design concept calls for extending the westbound HOV lane from its current starting point just west of the Cape Horn interchange in Coquitlam across the Port Mann Bridge to 200th Street, and extension of the existing eastbound HOV lane from its current terminus just west of 152nd Street to 200th Street.

Cycling and Pedestrian Infrastructure:

Cycling on Highway 1 is prohibited due to safety concerns associated with cyclists crossing the on- and off-ramps carrying freeway traffic volumes. This restriction will remain; however, the pre-design concept calls for significant cycling improvements along the Highway 1 corridor in three key areas:

- Provision for cyclists and pedestrians to cross the Fraser River via a two-way shared-use path on one side of the new Port Mann Bridge structure (barrier separated from traffic), with connections to regional and/or municipal cycling routes on either side of the bridge;
- Accommodation of cyclists and pedestrians across Highway 1 at all interchanges and overpasses; and,
- Additional (cost-share basis with municipalities) off-corridor improvements yet to be determined to cycling networks to help make cycling a more viable alternative to driving.

See also **Gateway Program Draft Cycling Plan,** a companion document to this report (available under separate cover).

Transit Priority Measures:

Congestion at the Port Mann Bridge is currently a significant barrier to transit use. With queues to access Highway 1 spilling onto the local street network, reliable bus service is impossible for most of the day. TransLink has indicated a desire to run this service, provided that a reliable schedule can be maintained. The current pre-design concept will facilitate the introduction of bus service through transit queue-jumpers and extended HOV lanes (see Section 7.1.3).

In preliminary discussions with TransLink, several opportunities for other transit priority measures have been identified along the corridor. These include:

- Park and Ride lots at key interchanges in Surrey and Langley to enhance ridership for transit services being considered for this segment of the corridor; and
- Priority bus access to the highway corridor from the various Park and Ride lots.

The pre-design concept also proposes the construction of bridge foundations that will accommodate future light rail transit expansion across the twinned Port Mann Bridge.

For more information, a companion report, **Overview of Future Transit Needs,** is available under separate cover.

7.1.2 Physical Characteristics*

The proposed Port Mann/Highway 1 project includes widening of the highway, twinning the Port Mann Bridge, upgrading interchanges and improving access and safety on Highway 1 from the McGill interchange in Vancouver to 216th Street in Langley, a distance of approximately 37 kilometres. It is anticipated that due to insufficient width and/or vertical clearance, a majority of the structures that cross over the highway will be replaced as part of the project.

**Note: Prior to broad public consultation regarding access and interchange improvements, further technical liaison is required with municipalities.*

McGill Street to Grandview Highway (Vancouver): ***Two new lanes (one in each direction) and interchange improvements***

This section of Highway 1 currently consists of four lanes (two in each direction). The current pre-design concept calls for one additional lane in each direction, for a total of six lanes. All proposed widening is within the existing highway right-of-way, primarily within the existing centre median. The Cassiar Tunnel as well as most of the overpass structures were originally designed to accommodate this width and as a result do not require reconstruction.

New highway lanes through Cassiar Tunnel would function primarily as dedicated entry and exit lanes between Hastings and McGill. This would reduce congestion and weaving (lane-changing) westbound through the Cassiar Tunnel as well as reducing slow-downs and back-ups on the municipal streets that result from eastbound traffic merging onto Highway 1.

McGill Street Interchange:

The McGill Street Interchange connects Highway 1 to Commissioner Street, the primary access road for Port of Vancouver facilities located on the south shore of Burrard Inlet, including Vanterm and Centerm. Opportunities to consider truck priority movements at this interchange are being analysed as part of this project.

Hastings, First Avenue and Boundary Road Interchanges:

The pre-design concept calls for localized operational and safety improvements, with no property acquisition or changes to municipal streets.

Concerns have been raised regarding the potential of the Port Mann/Highway 1 Project to increase traffic using First Avenue, which provides a route to the downtown core of Vancouver. Traffic modelling results to date indicate that improvements to Highway 1 will not substantially change forecast traffic volumes on this route. For example, with or without the Gateway Program, westbound peak period traffic volumes on First Avenue are expected to increase by less than 5%. Therefore, the pre-design concept envisions mainly operational and safety improvements without reconstructing this interchange.

Grandview Highway Interchange:

Currently, traffic entering Highway 1 eastbound via the Grandview Highway on-ramp mixes with traffic exiting Highway 1 eastbound to Willingdon Avenue. The mixing of these two high-volume traffic streams over a short distance results in a weaving pattern that slows all traffic, including through-traffic on Highway 1. The pre-design concept calls for separation of these two traffic movements and eliminating the weave through construction of a new overpass.

The pre-design concept also calls for improvements to the Highway 1 westbound to Grandview Highway off-ramp to address safety concerns.

Grandview Highway to Douglas Street Overpass (Burnaby): ***Interchange improvements and new Highway 1 overpass***

Currently, the Grandview Interchange is a transition point where Highway 1 changes from four lanes to six lanes (three in each direction). This six-lane segment extends east to the Cape Horn Interchange in Coquitlam. Two of these lanes (one in each direction) are designated as HOV lanes, restricted to vehicles with two or more persons. This area of Highway 1 sees some of the highest traffic volumes, with complex traffic operations due to the close spacing of several interchanges and resulting interaction of the on- and off-ramps.

The pre-design concept calls for maintaining the existing six lanes, including the HOV lanes, between the Grandview Interchange and the Douglas Street Overpass (located between Willingdon and Sprott Street Interchanges) for highway through-traffic.

Barrier separated auxilliary lanes are being considered to have high volume merging take place away from through-traffic, thus avoiding traffic slowdowns and associated safety concerns that currently exist on the highway on/off-ramps. These improvements can be done within the existing highway right-of-way.

Willingdon Interchange/Wayburne Overpass:
The Willingdon Interchange is a key connection point between Burnaby and Highway 1. Currently, a large volume of through-traffic mixes with vehicles entering the highway via the interchange on-ramps. Traffic volumes exiting the highway are also high, which frequently results in large queues forming on highway off-ramps extending to the highway itself. Drivers on Highway 1 must reduce their speed or change lanes to adjust for slower moving merge traffic and exiting vehicles. This results in a high number of accidents at this interchange. The addition of barrier separated auxilliary lanes in this location will see these merge points occur at reduced speeds, away from highway through lanes.

The pre-design concept also provides for a new, dedicated overpass across Highway 1 at Wayburne Drive for local north-south traffic, leaving Willingdon as the primary access point for traffic bound for Highway 1 as well as the north-south route. Transit and HOV priority measures would remain on Willingdon and, with the replacement of the existing Willingdon structure, HOV and transit can be extended over the highway to connect with existing transit priority routes on either side.

Ramp safety improvements are also proposed to reduce weaving for traffic exiting Highway 1 eastbound at Willingdon to Canada Way eastbound.

Douglas Street Overpass to North Road (Burnaby):
Two new lanes (one in each direction) and interchange improvements
Between the Douglas Street Overpass and North Road, the existing Highway 1 has a six-lane configuration with two dedicated as HOV lanes. The pre-design concept calls for two additional lanes (one in each direction) for a total of eight lanes.

Sprott Street and Kensington Avenue Interchanges:
The Sprott Street and Kensington Avenue Interchanges work together to provide all-direction access to Highway 1. The pre-design concept calls for replacement of both interchanges with increased cross-highway capacity for Sprott Street. In addition, localized operational and safety improvements such as eliminating undesirable weaving and merging conditions between Canada Way and the Kensington Avenue ramps will be addressed.

Gaglardi Way Interchange and Cariboo Road Overpass:
The pre-design concept calls for replacement of both overpasses, as well as some reconfiguration of the ramps at the Gaglardi Way Interchange to improve safety and operations.

North Road to Cape Horn (Coquitlam): ***Two new lanes (one in each direction) and interchange improvements***
The pre-design concept calls for one additional through lane in each direction for a total of eight lanes. Opportunities are being explored for maintaining the westbound climbing lane for trucks entering the highway at the Brunette Interchange.

Brunette Avenue Interchange:
Currently there are safety concerns at the westbound Highway 1 off-ramp to southbound Brunette, resulting from heavy truck queues that often extend onto the highway. The pre-design concept contemplates improvements to the Brunette Avenue interchange. However, due to the complexity of numerous connecting municipal streets, including the Brunette Avenue/Blue Mountain Street/Lougheed Highway intersections, as well as geographic constraints in the area, the development of improvements requires further consultation with municipalities, particularly the City of Coquitlam.

King Edward Street:

Currently, King Edward Street provides the primary road connection between Coquitlam and the Pacific Reach commercial and industrial area, crossing under the highway as a three-lane road. It also traverses a multi-track, at-grade rail crossing, which creates traffic gridlock in this area when trains pass through. The City of Coquitlam has identified an improved highway crossing at this location as a municipal priority.

The pre-design concept includes an option for a dedicated crossing over the highway and railway to eliminate this conflict.

Figure 15: Pre-design concept for twinned Port Mann Bridge

Cape Horn Interchange:

The Cape Horn Interchange sees the confluence of numerous major roads and highways, many of which did not exist when the interchange was constructed. As a result, the interchange accommodates numerous trip patterns at traffic volumes that are far in excess of what the interchange was designed for. In addition, much of the area surrounding the interchange, in particular Pacific Reach, has become a significant business and employment area.

The pre-design concept calls for major reconstruction of the interchange to better integrate the network of roads in the Cape Horn area. Of particular note is the need to provide high-volume connections to Lougheed Highway for traffic travelling between the Tri-cities and Surrey. Improved connections between the Mary Hill Bypass and Highway 1 are also proposed. Finally, major reconstruction of the existing interchange provides an opportunity for better direct access from Highway 1 to the Pacific Reach business area.

The Port Mann Bridge (Coquitlam – Surrey):

New four-lane bridge for eastbound traffic

Traffic analysis conducted by the Gateway Program indicates the Port Mann Bridge is congested, and at or near capacity for most of the time between 6 a.m. to 7 p.m. daily. The bridge currently carries about 127,000 vehicles per day, including 10,000 trucks.

In addition to experiencing significant daily congestion, the existing bridge is more than 40 years old and in need of rehabilitation, including painting, roadway resurfacing, and seismic upgrading.

The pre-design concept includes construction of a new parallel bridge on the downstream or western side of the existing bridge. The downstream side was selected based on a review of numerous constraints in the area such as environmental, potential archaeological and roadway geometry impacts.

The pre-design concept for the twinned bridge is illustrated in Figure 15 *(previous page).* The new structure would accommodate four lanes of traffic eastbound. It would also be built to accommodate potential future light rail rapid transit.

The new structure's design will factor in the following marine community needs:

- River hydraulics and protection from potential silting or scouring;
- Protection of the main navigation channel for marine transportation;
- Protection of ancilliary channels that provide access to log boom areas; and
- Commercial and First Nations fishing interests.

152nd Street to 200th Street (Surrey/Langley):
Four new lanes (two in each direction), extension of HOV lanes and interchange improvements

The pre-design concept calls for two new lanes in each direction for a total of eight lanes including one in each direction designated for HOV traffic. Most of this work will be within the existing highway median. The interchanges at 152nd, 160th and 176th Streets serve not only Highway 1 traffic but also local traffic needs. All of the overpasses at these interchanges were constructed in the 1960s and are proposed to be replaced to meet horizontal requirements and vertical clearance standards. Pre-design concepts for each interchange are described below.

152nd Street Interchange:

The 152nd Street corridor is a major feeder route from North Surrey to Highway 1. Traffic analysis indicates that a high volume of this traffic crosses the Port Mann Bridge to access the Tri-Cities. Current year traffic modelling indicates 52% of all morning peak-hour traffic entering Highway 1 westbound at 152nd Street exits at the Cape Horn Interchange.

The pre-design concept calls for replacement of the existing overpass and extending/reconfiguring the westbound on ramp to better accommodate the short-distance travel demand between Surrey and Coquitlam.

160th Street Interchange:

Congestion at this interchange often results in significant traffic queuing on local streets, creating gridlock on the overpass resulting in long delays for local traffic. Backups on the eastbound off-ramp can also extend onto the highway itself, causing safety concerns. The interchange is also in close proximity to the truck weigh scale on Highway 1.

The pre-design concept calls for significant reconstruction of the interchange, replacing structures and reconfiguring ramps to meet the new and more diverse travel patterns that have developed. Increased cross-highway capacity and better separation from highway traffic will provide a good connection between Fraser Heights and the rest of Surrey. Although significant changes are planned at this interchange, all work is expected to be contained within the existing right-of-way.

176th Street Interchange:

The existing 176th Street Interchange currently connects Highway 1 to Highway 15 and the Pacific Border crossing to the south along with local streets to the north. It also serves as the primary western access point from Highway 1 to the Port Kells industrial area, and can experience congestion at peak travel times.

In the future, this interchange will become a much more significant and important access point with new connections to the South Fraser Perimeter Road as well as the Golden Ears Bridge.

The pre-design concept calls for significant redesign and reconstruction of the interchange to address forecast changes in travel patterns and provide for connections to new road networks created by the South Fraser Perimeter Road and Golden Ears Bridge. Improvements

will include replacement of the overpass to meet new clearance standards and increase cross-highway capacity. All on/off ramps will be reconfigured and reconstructed. As part of the interchange work, widening on 176th Street will be required between Barnston Drive East and 96th Avenue, to provide efficient connections to the South Fraser Perimeter Road and the Golden Ears Bridge.

Although significant changes are contemplated at this interchange, most can be contained within the current right of way.

192nd Street Partial Interchange (west facing ramps):
Currently 192nd Street north of Highway 1 connects to Harvie Road south of the highway via a dedicated overpass (no connections to the highway). 192nd Street serves the Port Kells industrial area, whereas south of Highway 1, the area is generally rural.

As a means to partially address the significant travel pattern changes expected for the nearby 176th Street and Port Kells areas, the pre-design concept calls for construction of a Highway 1 westbound on-ramp and Highway 1 eastbound off-ramp at 192nd Street. The ramps would be configured to provide access to the industrial area, while limiting access to rural areas to the south.

Canada and British Columbia, under the Strategic Highway Infrastructure Program, are cost-sharing the construction of these ramps. Work is scheduled to be completed in 2006.

200th Street – 216th Street (Langley) : *Transition to six lanes at 200th Street, then back to four lanes (two in each direction) at a new 216th Street Interchange*
The pre-design concept calls for the transition from eight lanes to six lanes at the 200th Street interchange and transition from six lanes to the current four lanes at 216th Street. An additional westbound truck climbing lane from Glover Road to approximately 208th Street is being considered. Interchange improvements are described below.

200th Street Interchange:
A new 200th Street interchange was completed in 2004. No changes are contemplated at this location, apart from possible minor modifications to existing on/off ramps to accommodate highway widening.

216th Street Interchange:
Currently there is no interchange at 216th Street, which is centrally located between the two existing Langley interchanges at 200th and 232nd Streets.

Traffic analysis conducted by the Gateway Program indicates that, with development plans for this area and increasing traffic volumes to and from the east, a full-movement interchange will be required within the 2031 time horizon. In addition to serving planned growth in this area, the interchange would also provide some relief to the busy 200th and 232nd Street interchanges.

The pre-design concept proposes a new interchange providing full movements (i.e., all directions of travel can access to and from the highway).

Intelligent Transportation Systems
The pre-design concept includes the implementation of Intelligent Transportation Systems (ITS) for the Port Mann/Highway 1 corridor. ITS measures contemplated include:

- Dynamic message signs;
- Closed-circuit cameras; and,
- Vehicle detectors.

Introduction of ITS technology will provide for early detection of traffic incidents, effective emergency response and efficient removal of vehicles and debris. Other benefits include improved safety through more efficient traffic management and a reduction in collisions, resulting in improved trip reliability and user satisfaction.

7.1.3 Additional Congestion Reduction Measures

In addition to extension of HOV lanes and other measures to accommodate alternative modes described in Section 7.1.1, other transportation demand management measures are being considered for the Highway 1 corridor.

Queue Jumper Lanes or Dedicated Ramps:

Queue jumpers provide priority access at interchanges for specified users such as commercial vehicles or HOV, allowing them to enter the freeway more quickly than other users. Dedicated ramps are ramps restricted to specific types of users, such as commercial vehicles or HOVs, usually at certain times of the day such as peak traffic periods. This restricted use allows these users priority access to the highway.

Transit/HOV queue jumpers at 152nd Street and/or 160th Street on-ramps to westbound Highway 1 are proposed as part of the initial works. In the longer term, westbound queue jumpers at on-ramps between 216th Street in Langley and First Avenue in Vancouver, and eastbound queue jumpers at on-ramps between First Avenue and Brunette Avenue may prove to be beneficial. For commercial vehicles, facilities may be desireable at the following locations:

- Commercial-vehicle-only ramps connecting United Boulevard with Highway 1 eastbound;
- Commercial-vehicle-only access to 192nd Street ramps;
- Commercial vehicle priority at McGill Street.

Tolling and other Congestion Reduction Measures:

The Ministry of Transportation will be conducting the first of three stages of public consultation in February, March and April, 2006 regarding proposed improvements to the Port Mann/Highway 1 project. This first stage of consultation, the pre-design stage, will specifically consult on congestion-reduction measures such as HOV lanes, transit and commercial vehicle priority access to highway on-ramps, and a proposed toll on the Port Mann Bridge. The public will be asked to consider the pros, cons and trade-offs of measures that limit growth in traffic such as tolls and HOV lanes. The public will have clear choices regarding the acceptability of tolling and other congestion-reduction measures.

The pre-design concept considers tolling on the Port Mann/Highway 1 improvements as a potential option to reduce congestion, limit growth in traffic demand and generate revenue to pay for the improvements. Tolling could potentially be an option in combination with HOV priority lanes, transit and commercial vehicle priority access to highway on-ramps, and commercial priority lanes. These measures are being considered in various combinations to reduce congestion and limit growth in traffic on the highway and Port Mann crossing.

If the improved highway is not effectively managed through tolls and/or other congestion-reduction measures, analysis shows that it would reach current levels of congestion 5 to 10 years after project completion. Additionally, without these measures, the level of congestion in the corridor would make it difficult to offer improved transit services along the route.

A potential toll on the Port Mann Bridge could be in the order of $2.50 (2005$) each way for private vehicles. The rate for trucks could, if implemented, be higher, and the rate for motorcycles could be lower. The potential Port Mann Bridge toll would be generally consistent with tolls proposed for the Golden Ears Bridge.

This proposed tolling option on the Port Mann Bridge, combined with improved transit service, HOV lanes, transit and commercial vehicle priority access to highway on-ramps, and/or commercial priority lanes, would keep bridge congestion below current levels until 2031 or beyond.

Other tolling measures that could be considered include:

- Reduced toll rates for HOVs to encourage HOV use and improve mobility;
- Variable toll rates for peak and off-peak periods to encourage those users who have flexibility to travel in less busy times; and,
- A possible free period overnight.

If the proposed tolling and congestion-reduction measures were implemented, the benefits to users of the expanded bridge and improved highway would include vehicle operating cost savings and time savings. For example, a daily commuter traveling from Vancouver to Langley could expect to realize $0.50-1.50 in vehicle operating cost savings and approximately $5.00 in travel time savings in each direction.

Electronic tolling similar to the tolling technology contemplated for the Golden Ears Bridge could be used. An electronic system maximizes efficiency of traffic flow and minimizes driver inconvenience as vehicles are not required to slow down or stop to pay the toll.

Following consultation, if tolls were introduced on the Port Mann Bridge, it would affect traffic on the Pattullo and Alex Fraser bridges. Some users of the Port Mann Bridge would choose to use these crossings instead of paying a toll. Traffic modeling indicates that the volume of traffic in 2021 would not be appreciably different on the Pattullo and Alex Fraser bridges than it would be if the Gateway Program was not built. However, with respect to the Pattullo Bridge, the Ministry of Transportation would work with TransLink to contribute funding for safety and reliability improvements, as required.

7.1.4 Environmental Assessment

Due to its length, the Port Mann/Highway 1 Project is subject to a harmonized federal/provincial environmental review process. Following public consultation, and subsequent pre-design concept refinements, the Project Team will prepare an Environmental Assessment application for the project. The application and supporting studies will be submitted to the B.C. Environmental Assessment Office for review. Potential environmental and socio-community impacts will be identified along with proposed mitigation and compensation measures. Through the review, additional opportunities for public input will be provided, wherein additional issues may be identified and addressed in accordance with Environmental Assessment Review procedures.

Fieldwork required to support analysis for the environmental assessment application is continuing. It is anticipated that the project would enter the environmental review process in late 2006, following pre-design community consultation. For more information on the Environmental Assessment Review Process, please see Section 12.

7.2 SOUTH FRASER PERIMETER ROAD

Currently, there is no corridor that serves east-west travel demand for port, industrial and regional users along the south side of the Fraser River. Opportunities for port expansion, resulting from significant growth in Asia-Pacific trade, and increasing industrial development in Surrey and Delta, reinforces the need for a South Fraser Perimeter Road (SFPR).

The SFPR has long been part of provincial, regional and municipal transportation plans. With connections to Highways 1, 15, 91, 99 and 17, and the future Golden Ears Bridge, the SFPR will take a significant step towards improving the region's road network.

The SFPR will link primary gateway facilities such as Deltaport, Fraser Surrey Docks, CN Intermodal yard, Canada/U.S. border crossings and the Tsawwassen ferry terminal to Vancouver Island. It would also serve the growing industrial centres in Delta, Surrey and Langley. The route would also benefit tourists accessing borders, Vancouver Island and the BC Interior.

The following goals have been established for the South Fraser Perimeter Road Project:

- Improve access to major trade gateways such as Deltaport, Fraser Surrey Docks, CN Intermodal yard, Canada/U.S. border crossings, and the Tsawwassen ferry terminal to Vancouver Island;
- Provide a better connection between Highways 1, 15, 91, 99 and 17, and between the bridges and the George Massey Tunnel that cross the Fraser River;
- Improve access to numerous industrial areas along the south side of the Fraser River;
- Reduce east-west travel times, particularly for heavy trucks, on the south side of the Fraser River;
- Restore municipal roads as community connectors by reducing truck and other traffic on municipal road networks; and,
- Improve safety.

7.2.1 Physical Characteristics

The pre-design concept for the SFPR calls for a four-lane divided roadway primarily on the south shore of the Fraser River through Delta and Surrey.

Figure 16 *(next page)* provides an overview of the project's proposed geographic scope. More detailed drawings are contained in Appendix C.

By 2031, it is envisioned that SFPR will be a totally grade-separated expressway with interchanges at all access points. However, based on the results of traffic modelling, the pre-design concept for "opening day" includes a combination of intersections and interchanges as described below.

Highway 17 to Highway 99 (two options):

Option 1: Relocated Highway 17 – North Option begins on Highway 17 at the Deltaport Way Interchange, with the addition of a northbound truck lane to the existing Highway 17 configuration. The truck lane continues for approximately three kilometers north of Deltaport Way where the South Fraser Perimeter Road would diverge and follow an easterly direction through vacant farmland to where it would pass over 64th Street, south of Ladner, in order to maintain local connectivity and farm access. The new road would connect to Highway 17 at a new interchange that would provide free-flow movement on/off SFPR for regional and heavy commercial traffic while maintaining on/off connections for local traffic to the existing Highway 17.

Beyond 64th Street the route would continue east and then turn north adjacent to the BC Rail Port Subdivision rail line. The road would pass over Ladner Trunk Road and connect via a new interchange to Highway 99 near the Vancouver Land Fill. This will be a full movement interchange except for Highway 99 southbound to SFPR eastbound. This movement was not provided due to the low traffic demand. An alternative connection for this movement is provided via Highway 91.

Option 2: Relocated Highway 17 – South Option begins at the Deltaport Way Interchange and parallels the BC Rail Port Subdivision rail line. The existing Deltaport Way Interchange would be modified to provide free-flow movements on/off SFPR for regional and heavy commercial traffic while maintaining on/off connections for local traffic to existing Highway 17. 64th Street would pass over the new road and the rail line, as would 36th Avenue, to maintain local connectivity and farm access. Continuing northward parallel to the rail line, the new road would turn east south of Ladner Trunk Road then north again towards Highway 99.

Figure 16: Extent of South Fraser Perimeter Road Project

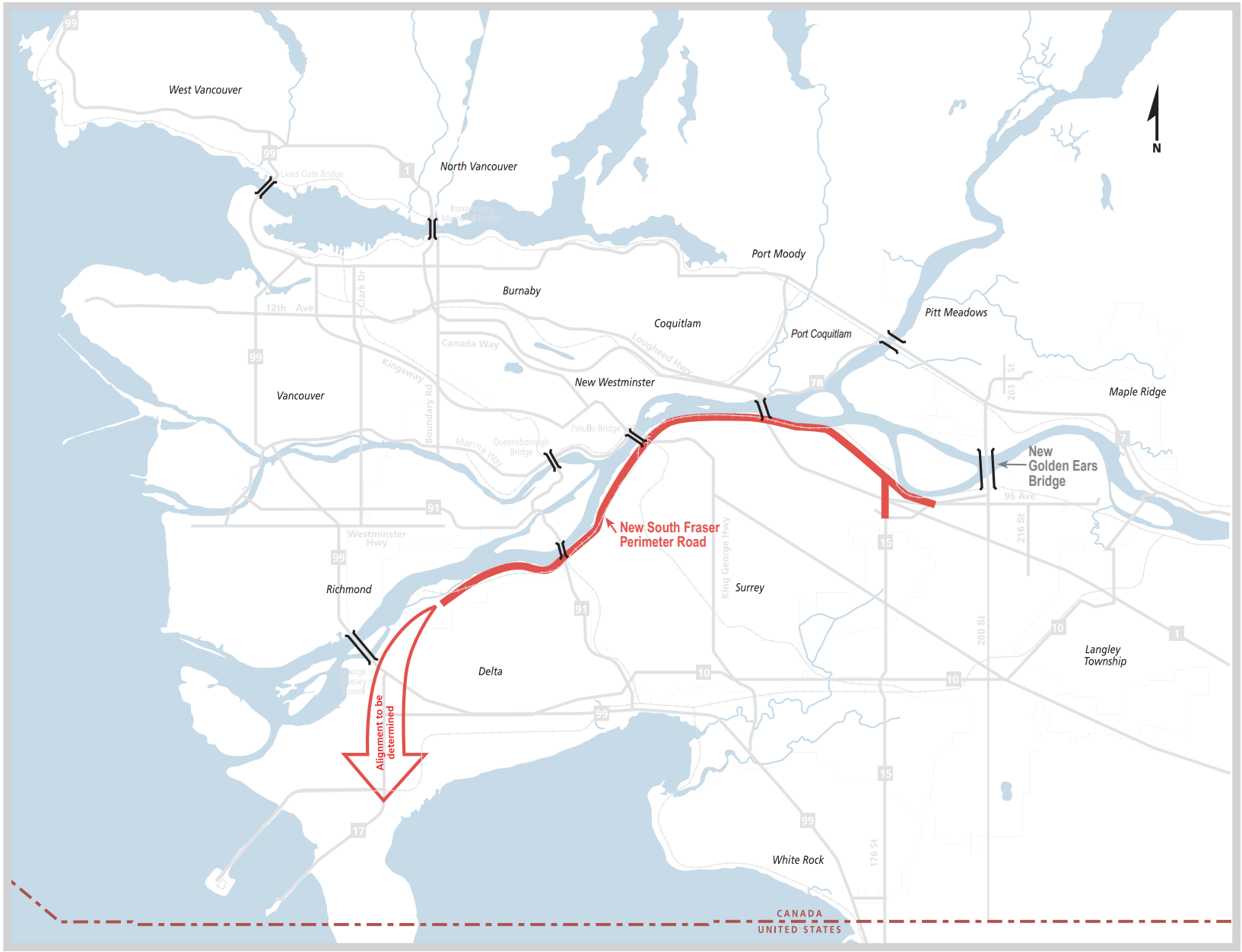


Figure 17: Southwest Delta Alignment Options

1 *Relocated Highway 17 (North)*

2 *Relocated Highway 17 (South)*

The road would pass over Ladner Trunk Road and connect to Highway 99 as per the North Option. Figure 17 *(previous page)* outlines the general alignment of the two alternatives.

After connecting to Highway 99, SFPR continues north adjacent to 72nd Street and Burns Bog towards the Tilbury and Sunbury industrial areas. Intersections at 72nd and 80th Streets would provide access to the Tilbury and Sunbury industrial areas as well as local farms. The 80th Street intersection would also provide emergency access to Burns Bog.

Public consultation on three alignment options for the southwest Delta segment of the SFPR was held in January and February of 2005. Approximately 1,650 people participated in the consultation process, and 753 feedback forms were received. Those who participated generally supported the SFPR and 78.5% of those filling out feedback forms preferred the Relocated Highway 17 – South Option. This was followed by 12.2% support for the Relocated Highway 17 – North Option and 9.3% for the Upgraded Highway 17 Option. A petition containing 509 signatures from residents of East Ladner opposing the North Option was also received. The consultation report is available on the project website at www.gatewayprogram.bc.ca.

Figure 18: Relocated Highway 17 North Option

Since the completion of pre-design consultation, the Gateway Program continued receiving input on the alignment options through the Community Relations Program. This input included a petition containing 431 signatures in favour of the North Option and against the Upgraded Highway 17 Option.

During consultation, groups and individuals also indicated an interest in potential adjustments to the alignment options such as:

- Further exploring 72nd Street as a refinement to the proposed Relocated Highway 17 options; and
- Adjusting the Relocated Highway 17 – North Option to reduce potential impacts on East Ladner.

More detailed analysis of potential agricultural impacts of the options was also suggested.

Following completion of additional analysis, the Upgraded Highway 17 Option was eliminated due to its higher costs, technical challenges and higher community impacts during and after construction. The two Relocated Highway 17 Options are being refined to reduce potential impacts and it is anticipated that both options will be put forward for further public consultation. Figure 18 illustrates the pre-design concept for the relocated Highway 17 (North) option, which provides a greater noise buffer between the SFPR and the East Ladner community.

The Program Team also evaluated a proposed truck-only route put forward by local residents Greg Hoover and Olav Naas. The authors' initial and revised proposals were reviewed and it was determined that the proposals did not meet the Project's goals.

Analysis determined that the proposed route addressed only about 10% of traffic, resulting in a minor mobility improvement for most people; longer travel times for trucks, particularly those with origins or destinations north of the Fraser River or to the Tilbury/Sunbury industrial areas; added traffic to other routes such as Highway 91; and did not reduce congestion on River Road west of Highway 91, offering little benefit to local industrial areas.

In support of their proposal, the authors raised some specific questions, namely agricultural land impacts and soil conditions related to the Gateway Program's Relocated Options and traffic analysis conducted on their truck route proposal.

While the Gateway Program's Relocated Options do affect agricultural lands, the Hoover & Naas option would have a similar impact if constructed as a two-lane facility and would exceed the Gateway options if protected for a four-lane corridor.

As to soil conditions, it is recognized that soft soils in this segment of the corridor will pose particular construction challenges. In addition to detailed geotechnical and hydrogeological evaluations, the Ministry of Transportation has conducted an independent review of field conditions and related engineering work. This review confirmed that the Gateway Program's analyses and construction assumptions are appropriate.

Traffic projections for the proposed truck route were modelled using the same forecasting tools employed for all segments of the corridor, and reflect the traffic volumes that could be expected, based on the characteristics of the route.

80th Street to Highway 91:

From 80th Street SFPR bears eastward parallel to the Fraser River. The pre-design concept calls for a new route along the southern edge of Delta industrial lands and north of the protected Burns Bog lands. The pre-design concept also calls for a new full movement interchange (Sunbury Interchange) to provide free flow access to and from SFPR and Highway 91, to connect to the local road network at River Road and Nordel Way and to serve the Sunbury Industrial area and Fraser Port lands. Figure 19 *(next page)* provides an artist's rendering of what a new Sunbury Interchange could look like. SFPR then turns northeast passing below the Alex Fraser Bridge and over the BNSF and CN rail lines.

Highway 91 to Tannery Road:

After passing over the rail lines, SFPR continues northeast near the base of the North Delta escarpment, in split-grade fashion (westbound lanes are separated from the eastbound lanes), on the south side of the BNSF rail line. A typical cross-section of the split-grade concept is illustrated in Figure 20 *(next page)*. Based on municipal and community input, no local access to the SFPR is contemplated through North Delta. Residents will use existing local roads to access SFPR at the new Sunbury or Tannery Road Interchanges.

Near Knudson Road, the split-grade configuration merges into a single grade cross-section on South Fraser Way. From Elevator Road, SFPR utilizes the existing South Fraser Way right-of-way to Tannery Road. The existing at-grade rail crossing at Elevator Road is replaced by an elevated structure linking Fraser Surrey Docks directly with the municipal road network and providing a connection to the SFPR through a new interchange at Tannery Road. The Elevator Road Overpass would also maintain access to the commercial fishery/recreational docks located on the south side of Alaska Way and allow heavy commercial traffic to pass over the BNSF and CN rail lines, thereby eliminating the associated traffic delays and congestion.

Figure 19: Sunbury Interchange

Figure 20: North Delta Split Grade

The Tannery Road Interchange will be a full movement interchange to serve the growing South Westminster industrial area and provide access to the local road network, including the King George Highway and the Patullo Bridge via Scott Road. The pre-design concept also calls for an overpass across the railway tracks between the developing industrial warehouse facilities south of SFPR and port and rail facilities to the north.

The SFPR then continues eastward, passing over Old Yale Road to maintain community access to parkland, industrial and residential properties in the South Westminster area.

Tannery Road to 130th Street/Bridgeview Drive:

From Old Yale Road, SFPR passes underneath the SkyTrain and Patullo Bridges and the Southern Rail trestle, and parallels the existing Industrial Road/116th Avenue alignment to the Bridgeview area. An intersection at Bridgeview Drive/130th Street provides access to CN Rail's fuel storage facility and industrial areas to the north and the local network to the south. The intersection also provides connections to the King George Highway via Bridgeview Drive.

130th Street/Bridgeview Drive to 176th Street Interchange and Golden Ears Bridge:

From 130th Street/Bridgeview Drive, SFPR continues east to an intersection at 136th Street, maintaining the cross-corridor connection to CN Rail's Thornton Yard and residential properties. From 136th Street, SFPR continues eastward following the south boundary of the CN Rail corridor along the Fraser River, passing underneath the Port Mann Bridge and along the bottom of the Fraser Heights escarpment. Due to the topographic constraints of the Fraser Heights escarpment, access to the SFPR is not provided between 136th Street and 176th Street.

Community and environmental agency input has assisted in the identification of the SFPR alignment below Fraser Heights. Significant residential growth in Fraser

Heights over the past five years means that previous alignment options developed for the SFPR were no longer viable. Working with the community and Fisheries and Oceans Canada and negotiating a purchase of approximately 67 hectares of land from CN Rail allowed an alignment along the bottom of the Fraser Heights escarpment to be developed. A substantial bridge is proposed for this section to mitigate the effects of the project through the environmentally sensitive wetlands.

Figure 21 *(right)* illustrates the alignment through Fraser Heights. This significantly reduces socio-community and fisheries impacts.

A new interchange at 176th Street and 104th Avenue connects the local road network, the CN Intermodal Yard and the Golden Ears Bridge project to the SFPR. From 104th Avenue the SFPR runs adjacent to 176th Street connecting with Highway 1 and Highway 15 to the south.

The pre-design concept calls for a non-signalized intersection at Barnston Drive and 176th Street, permitting free flow regional and heavy commercial traffic movement on the relatively steep slope of this section. The intersection will provide for right in/right out movements, as well as protected left movements for access to the local road network. East/west movements across SFPR at Barnston Drive would no longer be allowed. These movements would be accommodated via 176th Street and connections to the local road network. A pedestrian overpass is also proposed.

The 176th Street to 184th Street Golden Ears Connector, approximately two kilometres long and paralleling the CN Rail corridor, would connect SFPR from the intersection of 176th Street and 104th Avenue to the Golden Ears Bridge Project at approximately 184th Street. The pre-design concept calls for a 60km/h, urban arterial standard road with intersections at 177A, 179 and 182A Streets.

7.2.2 Features to Accommodate Alternate Modes

The Gateway Program is working with TransLink and the municipalities of Delta and Surrey to identify means through which to facilitate the use of alternatives to single occupancy vehicles on SFPR. As this corridor is primarily a goods movement corridor, and given projected traffic volumes to 2031, it was determined that priority lanes (e.g., HOV, truck only, transit) were not required as relative time savings would be minimal. However, the pre-design concept for the SFPR includes the following cycling, pedestrian and transit features.

Cycling and Pedestrian Infrastructure:

The pre-design concept calls for cyclists to be accommodated on roadway shoulders, with alternative cycling routes via parallel local road networks in the vicinity of major interchanges. This will reduce conflict between vehicles and cyclists where there are significant grades, high volumes of vehicles and/or multiple merge lanes.

Figure 21: SFPR Fraser Heights

Cross-corridor access for cyclists is proposed at all interchanges and overpasses.

Transit:
Transit will continue to primarily use the local road system. The Gateway Program will work with TransLink and municipalities to minimize any impacts that SFPR would have on transit routes, including providing appropriate transit access to River Road in North Delta and to the area north of SFPR in the Bridgeview area.

7.2.3 Additional Congestion Reduction Measures

Forecast volumes do not indicate that congestion will be a major consideration in the operation of the corridor through to 2031. As such, the pre-design concept for SFPR does not call for specific transportation demand management measures. In particular, no tolls are proposed for the South Fraser Perimeter Road, as discussed in Section 6.3.4. Analysis indicated that tolling would cause significant diversion and that it would be expensive to collect tolls due to the many entrance and exit points along the route. Also, as SFPR is primarily a goods movement route, there is less opportunity for demand management measures to shift traffic to alternate modes.

7.2.4 Environmental Assessment

Similar to the Port Mann/Highway 1 Project, the South Fraser Perimeter Road Project is subject to a harmonized federal/provincial environmental review process. The project is currently in the pre-application stage of environmental review, under the direction of the BC Environmental Assessment Office (BCEAO). Working groups comprised of representatives of provincial and federal environmental permitting agencies, municipalities, the GVRD and First Nations are assisting the Gateway Program Team in reviewing draft impact assessment reports and identifying potential mitigation measures.

Following public consultation, the Project Team will prepare an Environmental Assessment application for the project. For more information on the environmental assessment review process, please see Section 12.1.

7.3 NORTH FRASER PERIMETER ROAD

Substantial growth in employment in Burnaby, New Westminster and Coquitlam, as well as the increase in office park, industrial, and transportation-related development on the north shore of the Fraser River, has given rise to considerable growth in the demand for travel in an east-west direction along the north shore of the Fraser River.

The North Fraser Perimeter Road is a set of proposed improvements to existing roads to provide an efficient, continuous east-west route between the Queensborough Bridge in New Westminster and TransLink's new Golden Ears Bridge in Maple Ridge/Pitt Meadows. Proposed upgrades would improve safety and reliability along this key goods movement corridor and better serve growing communities in the northeast sector of Greater Vancouver. The North Fraser Perimeter Road has been the subject of several studies in recent years, with each study recommending the need for significant corridor improvements to meet forecast growth.[51]

Proposed North Fraser Perimeter Road improvements are being planned and delivered under three different programs:

- The Border Infrastructure Program (Queensborough – 6th Street) includes reconfiguration of the Highway 91A interchange at the north end of the Queensborough Bridge in New Westminster. Additional information on this project is available at http://www.bip.gov.bc.ca.
- TransLink's 3-Year Plan and 10-Year Outlook include improvements to Front and Columbia Streets in New Westminster as well as construction of a new United Boulevard Extension to replace the single lane bridge and existing connection to Braid Street, with a new connection to Brunette Avenue just to the south of Braid Street.

- The Gateway Program component stretches from King Edward Street in Coquitlam to Maple Meadows Way and is described below. Its purpose is to provide an efficient roadway along the north shore of the Fraser River from the Cape Horn Interchange to the new Golden Ears Bridge.

The following goals have been established for the Gateway Program component of the North Fraser Perimeter Road corridor:

- Reduce travel times for trips along the corridor and increase their predictability, particularly for heavy trucks;
- Improve access to the CP Intermodal facility, a major trade gateway;
- Improve access to the Port Coquitlam, Mary Hill and Pacific Reach commercial/industrial areas;
- Improve cycling and pedestrian facilities and connectivity to existing networks on either side of the Pitt River crossing;
- Support improved transit service;
- Reduce regional traffic on municipal road networks; and,
- Improve safety.

7.3.1 Physical Characteristics

Figure 22 *(next page)* provides an overview of the geographic scope of the Gateway Program component of the North Fraser Perimeter Road. The project includes the following proposed improvements. Further detail is contained in Appendix D.

7.3.1.1 Pitt River Bridge and Mary Hill Interchange Project

The existing Pitt River swing bridges on Highway 7 (connecting Pitt Meadows to Port Coquitlam) are heavily congested during peak travel periods. The volume of daily traffic over the bridges has increased from 27,000 to 78,000 vehicles between 1985 and 2003, and is expected to reach 88,000 by 2007.

With construction of TransLink's Golden Ears Bridge (scheduled for completion in 2009), the level of congestion at the bridges will worsen. Additional traffic from Coquitlam, Port Coquitlam, Port Moody and Burnaby will be using the bridges to travel to/from Langley and Surrey. The introduction of the Golden Ears Bridge is expected to increase peak hour traffic in the already strained single-lane direction of the counter-flow system by 20 – 30%, significantly exacerbating congestion and delays.

The Pitt River bridges were built in 1956 and 1978 and the swing mechanisms are 27 and 30 years old. These mechanisms experience breakdowns resulting in unexpected closures of the bridges and lengthy delays to the travelling public.

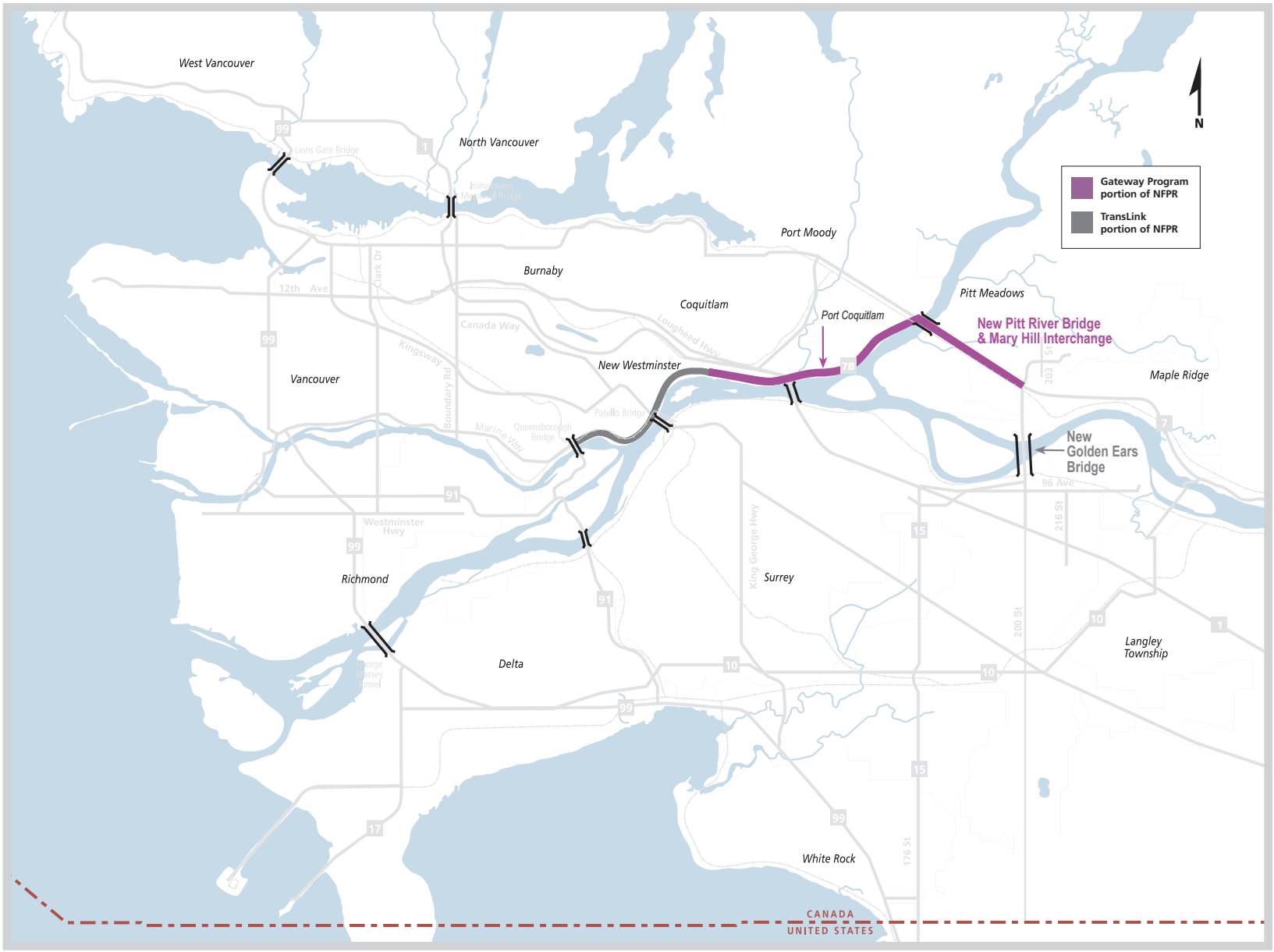
Construction of a new high-level bridge and a new interchange at the west end of the bridge, where the Lougheed Highway and Mary Hill Bypass meet, will significantly improve travel times and safety and reduce unexpected closures for all users, including goods movers, transit and cyclists. In addition, provision of an auxiliary east-bound truck lane on the bridge and modifications to the intersection at Lougheed Highway and Kennedy Road will serve to improve access to and from CP Rail's Pitt Meadows intermodal yard.

The congested Mary Hill Bypass/Lougheed Highway intersection, immediately to the west of the existing bridges, needs to be converted into an interchange to fully capture the operational benefits of the new bridge.

Pitt River Crossing:

The pre-design concept calls for a new high-level bridge with six through lanes, and auxiliary truck lane

Figure 22: Extent of North Fraser Perimeter Road Corridor



in the eastbound direction. This measure will minimize weave and merge movements for trucks ascending and descending the grades of the bridge without interfering with other traffic. On the eastern end, truck traffic bound for the CP Rail inter-modal yard needs to exit immediately after crossing the bridge, requiring trucks to slow down considerably to negotiate the exit.

The bridge foundation will also be designed to accommodate additional width in the future for potential light rail transit.

The height of the new bridge will provide up to 16 metres of clearance over a 100-metre-wide shipping channel in the Pitt River and will have bicycle and pedestrian facilities.

Lougheed Highway/Mary Hill Interchange:
The pre-design concept calls for an interchange with free-flow operations for the current major highway movements, improved local access via a new local road network and potential for upgrading and expansion in the future when the Fremont connector is constructed. This connector is anticipated to serve future development to the north and would tie into the proposed new Mary Hill Bypass/Lougheed Highway interchange. Figure 23 *(right)* illustrates the pre-design concept for the new bridge and interchange.

Pre-design consultation for the project was undertaken in May and June 2005. Approximately 500 people participated in small group meetings, open houses or through a web-based feedback form. A copy of the complete consultation summary report is available on the Gateway Program website at www.gatewayprogram.bc.ca.

Since consultation was completed, refinements to the interchange as well as cycling network improvements have been made, reflecting public input and value engineering. These include additional measures for eastbound cyclists on the south side of the new Pitt River Bridge and modifications to local connections between the Southeast and Northeast quadrants of the interchange.

7.3.1.2 Longer-Term Improvements

The remainder of the Gateway Program component of the NFPR is currently in the high-level planning stages and will require additional traffic modeling and dialogue with local and regional governments before pre-design concepts can be finalized. Based on preliminary analysis, the following improvements are contemplated.

United Boulevard (Coquitlam):
Only intersection improvements are contemplated in this section.

Figure 23: Pitt River Bridge and Lougheed / Mary Hill Interchange Pre-design concept

King Edward Street:
As described previously for the Port Mann/Highway 1 Project (Section 7.1.2), King Edward Street in Coquitlam is the primary access point to the busy and growing Pacific Reach/South Coquitlam commercial/industrial area along the United Boulevard section of the NFPR. The existing access is significantly restricted by the narrow Highway 1 underpass (3 lanes) and the at-grade crossing of the CP Rail Sapperton Yard.

The pre-design concept includes an option for a dedicated crossing over the highway and railway to eliminate this conflict.

Mary Hill Bypass:
Near the Port Mann Bridge, United Boulevard currently connects to the Mary Hill Bypass at a signalized intersection. The pre-design concept calls for this intersection to be upgraded to an interchange to improve access to the Mary Hill Bypass eastbound as well as Highway 1 westbound.

Preliminary traffic modeling suggests that the Mary Hill Bypass will continue to function efficiently through to 2031 with the existing four-lane configuration and intersection improvements or conversion of intersections to interchanges. However, in light of planned improvements to Highway 1 and the Cape Horn Interchange, the short section between the Cape Horn Interchange and Shaughnessy Street will likely require additional capacity in the medium term.

Shaughnessy Street Intersection:
Traffic forecasts suggest that the existing high volume of left-turn movements from Mary Hill Bypass eastbound to Shaughnessy Street northbound in the afternoon peak period will continue to grow; within the 2031 planning horizon of the Gateway Program, construction of a grade-separated interchange may be required.

Pre-design concepts for this interchange continue to be developed. However, options are significantly constrained by the proximity to Colony Farms Regional Park, heron nesting habitat, the Fraser River, and existing residential development. Further traffic modelling and discussions with the City of Port Coquitlam and environmental permitting agencies are required to complete this work.

Pitt River Road Intersection:
Future traffic growth suggests that an eventual grade-separated interchange will be necessary. Once again, the configuration of an interchange at this location is constrained by existing development and the proximity to the Fraser River. At present, the pre-design concept calls for an overpass structure with Pitt River Road passing over the Mary Hill Bypass and a directional ramp for eastbound to northbound traffic.

Broadway Street Intersection:
With completion of the Coast Meridian overpass project, Broadway will become a major access point to the Mary Hill Bypass for traffic from Coquitlam and Port Coquitlam. Traffic modelling suggests that a Broadway/Mary Hill Bypass interchange will be required late in the 2031 planning horizon. The pre-design concept calls for a tight-diamond interchange configuration.

Coast Meridian Road Intersection:
As discussed above, with the construction of the Coast Meridian Overpass, Broadway will become the primary access point to the Mary Hill Bypass. The pre-design concept calls for the existing Coast Meridian access point to be closed.

Kingsway Avenue Intersection:
Traffic modelling suggests that a Kingsway/Mary Hill Bypass interchange will be required late in the 2031 planning horizon. The current concept calls for a tight-diamond interchange configuration.

Lougheed Highway (Pitt Meadows)

Preliminary traffic modelling suggests that Lougheed Highway will function efficiently through to 2031 with a six-lane configuration. As such, in addition to intersection improvements or conversion of intersections to interchanges, the pre-design concept calls for extension of the westbound HOV lane from its current starting point west of Harris Road to where the Golden Ears Bridge to Lougheed Highway on-ramp enters, just west of Maple Meadows Way. Pre-design concepts are as follows:

Old Dewdney Trunk Road/Kennedy Road Intersection:
Because of the proximity to the CP Rail Intermodal yard, this intersection sees significant truck movements and is an important part of the freight network. It is anticipated that improvements will be required to the existing Old Dewdney Trunk Road/Kennedy Road intersection, with the likelihood of a fully grade-separated interchange in the longer term.

Harris Road Intersection:
Traffic forecasts suggest that a full movement, grade-separated interchange will be required at Harris Road within the 2031 planning horizon, with particular measures to address the large volumes of northbound to westbound left turns in the morning peak period. Interchange alternatives will be significantly constrained by the extensive development to the south of Highway 7.

Harris Road to Maple Meadows Way:
The pre-design concept calls for widening to a full six-lane cross-section. For the most part, this can be accommodated within the existing right-of-way.

7.3.2 Features to Accommodate Alternate Modes

HOV Lanes:
East of the Pitt River Bridge, a westbound HOV lane extends from just west of Harris Road to Kennedy Road. It primarily acts as a transit peak-period queue-jumper lane, sending buses to the front of the bridge queue where they merge with general traffic. Long term regional plans call for extension of HOV lanes along Lougheed Highway west of the bridge. HOV lanes are not contemplated along United Boulevard or the Mary Hill Bypass.

While technically challenging, the pre-design concept for the Pitt River Bridge allows for future extension of the existing westbound HOV lane. However, public feedback during pre-design consultation overwhelmingly supported configurations having all general purpose lanes, primarily due to the lack of supporting HOV networks east and west of the bridge.

Cycling and Pedestrian Infrastructure:
The initial pre-design concept for the Pitt River Bridge provided for a two-way shared-use path on the north side of the new Pitt River Bridge structure (barrier separated from traffic). Reflecting public input during pre-design consultation, the concept now also includes an eastbound cycling shoulder on the south side of the bridge to accommodate cyclists who are comfortable riding with traffic. The pre-design concept for the Mary Hill Bypass/Lougheed Highway Interchange accommodates all cyclist movements through a combination of dedicated cycling paths and roadway shoulders and/or parallel existing routes.

While pre-designs for other elements of the NFPR are still in development, it is planned that cyclists will be accommodated on the shoulders of the Mary Hill Bypass and Lougheed Highway consistent with current facilities, as well as across any new interchanges and overpasses.

Transit:
The Gateway Program is currently working with TransLink to identify appropriate transit priority measures. The new Pitt River Bridge foundations will be constructed to allow for future widening that could be used for light rail transit or other purposes.

7.3.3 Additional Congestion Reduction Measures

In the near term, specific additional congestion reduction measures are not contemplated. However, as the regional HOV network west of the bridge is expanded, ramp metering with HOV and transit priority facilities at access points and bridgeheads will be considered. Options for truck priority features near intermodal facilities are also being explored.

As previously discussed in Section 6.3.4, tolls are not being considered for the NFPR.

7.3.4 Environmental Assessment

The Gateway Program submitted a Canadian Environmental Assessment (CEAA) screening report on the Pitt River Bridge and Mary Hill Interchange Project for review by regulatory agencies in July 2005. Completion of the CEAA review is anticipated in early 2006.

The Project is expected to provide significant long-term benefits. The key findings of the screening are summarized below:

- Net increase in the amount of riparian habitat along the shores of the Pitt River due to removal of existing bridges and old roadway areas;
- Reduced shading of riparian and littoral habitats (i.e., shallows where light reaches the river bottom), as well as enhanced connectivity of the riparian corridor along both shorelines of the Pitt River;
- Improved management of stormwater and road run-off, thereby enhancing water quality and quantity management for both road drainage and fish habitat;
- Improved green space and recreation corridor connectivity along the Pitt River shorelines;
- Improved safety and reliability for all modes of transport;
- Improved navigation channel (better vertical and horizontal clearances and location); and,
- Enhanced habitat connectivity along the Pitt River foreshore.

For more information on the environmental assessment review process, please see Section 12.1.

8. PROGRAM BENEFITS

This section of the report provides a summary of the benefit-cost analysis undertaken to date of the pre-design concepts described in Chapter 7 of this report.

8.1. USER BENEFITS

The Gateway Program will provide road and bridge user benefits primarily in the form of travel time savings (avoided delays), reduced vehicle operating costs and improved safety.

8.1.1 Travel Time and Operating Cost Savings

To estimate the travel time savings and reduced vehicle operating costs, the Gateway Program engaged the international transportation consulting firm Steer Davies Gleave, supported by Vancouver-based transportation planning and economic consulting experts. The consultants used transportation models (see Section 6.3.3) to predict Gateway's impact on traffic patterns and overall travel times, on Gateway and other local roads. The analysis involved comparing travel time in the region today with the Gateway Program pre-design concept improvements.

The analysis indicates that the Gateway Program will result in travel time and operating cost savings at a present value of $8 billion, based on a real discount rate of 4.5%. Depending on their origin and destination, travellers could see time savings of between 5 and 30% over 2003.

Figure 24 presents travel times between representative origins and destinations today and with the Gateway Program. Illustrated in the table are the free flow travel time (theoretical travel time based on distance and speed limits), the average morning peak period travel time in 2003 and the forecast travel time for the same period in 2031 with the Gateway Program in place.

A high level summary of total annual travel time savings for different vehicle types is shown in Figure 25 *(next page).*

PART 3: BENEFIT-COST ANALYSIS

Figure 24: Comparison of Travel Times for Morning Peak Hour

	Travel time (minutes)		
Trip origin and destination	**Free Flow**	**2003**	**2031 with Gateway**
Langley City to Port of Vancouver (Centerm/Vanterm)	36	62	47
CP Rail Pitt Meadows Intermodal Yard to Vancouver International Airport	46	66	63
Surrey City Centre to Pacific Reach, Coquitlam	14	21	16
Pacific Reach, Coquitlam to Port of Vancouver Centerm/Vanterm	20	36	31
CN Rail Surrey Intermodal Yard to Tilbury Island, Delta	27	35	24

Figure 25: Annual Travel Time and Vehicle Operating Cost Savings with The Gateway Program (2005$)

	($ Million)	
	2021	2031
Cars	$474	$811
Light Trucks	$21	$34
Heavy Trucks	$36	$58
Total	$530	$903

8.1.2 Other User Benefits

Transit users will also experience significant travel time savings and improved transit services as a result of the Gateway Program.

Cyclists and pedestrians will benefit from improved service across the Port Mann Bridge, across Highway 1, along the North and South Fraser Perimeter Roads and on improved municipal cycling networks.

8.1.3 Safety Benefits

The Gateway Program will provide significant safety improvements along major transportation corridors and redirect regional traffic off local streets and onto regional routes. The safety benefits associated with the Gateway Program road and bridge improvements were evaluated by expert transportation safety consultants.[52] Analysis indicates that the Gateway Program will have a positive impact on network safety performance. With tolls on the Port Mann Bridge, the net impact would be in the range of 7-8% improvement, which is valued at approximately $60 million per year. Without tolls, the improvement would be in the range of 2-3%.

8.2 ECONOMIC BENEFITS

Construction of Gateway Program facilities will generate approximately 17,000 person-years of direct employment and will contribute $1.7 billion to British Columbia's gross domestic product.

Program facilities will provide long-term economic benefits by:

- Improving the competitiveness of Greater Vancouver ports and airports as conduits for the growing trade flows between Asia and North America;
- Improving the competitiveness of British Columbia and Canadian businesses moving goods to market through and within the region;
- Reducing the cost of goods and services for consumers; and,
- Increasing the productivity of workers by reducing the travel times of service providers in the region (i.e., tradespeople) and the number and extent of unanticipated delays.

These benefits, while difficult to quantify, are expected to be significant.

8.3 OTHER BENEFITS

Program facilities will provide long-term socio-community benefits by:

- Improving intra-municipal access by reducing highway queuing that currently spills onto municipal streets;
- Providing improved cross-highway connectivity within municipalities that span both sides of Highway 1;
- Maintaining local streets for local use by improving the efficiency of regional corridors; and,
- Improving air quality by reducing congestion-related idling vehicle emissions (see Section 9.2.3).

9 PROGRAM COSTS

9.1 PROGRAM COST ESTIMATES

The initial cost estimate of the pre-design concepts described in Chapter 7 is in the range of $3 billion. The Port Mann/Highway 1 Corridor is the largest component, followed by the South Fraser Perimeter Road and the North Fraser Perimeter Road. The current estimated cost breakdown is indicated in Figure 26 below. Capital cost estimates will be refined in response to scope changes resulting from public consultation, and the environmental assessment process.

Figure 26 — Initial Gateway Program Cost Estimates (2005$)

COMPONENTS	(billion)
Highway 1/Port Mann Corridor	$1.5
South Fraser Perimeter Road	0.8
North Fraser Perimeter Road	0.4
Program Contingency	0.3
	$3.0

Based on quantifiable benefits and costs, the Gateway Program has a strong business case, with a benefit to cost ratio of 3 to 1.

9.2 OTHER CONSIDERATIONS

In addition to financial costs, other potential impacts of the Gateway Program have been identified. These include the following:

9.2.1 Land Use

The Gateway Program conducted a literature review with respect to the relationship between road network expansion and changes in land use.[53] The review indicated that transportation accessibility is only one of many factors that can contribute to changes in land use. Factors such as land availability, land prices, access to utilities, crime rates and zoning can have equal or greater impacts on land use. Better access to transportation facilities can facilitate, but not initiate, changes in land use patterns.

In Greater Vancouver, municipalities, together with the GVRD, control land use. How land use will change in the future will primarily depend on the land use decisions taken by municipalities and the GVRD. It is not possible to determine the effect of the Gateway Program on land use without making assumptions on how other governmental agencies will alter their decisions on land use matters. As previously discussed in Section 6.3.1, planning for the Gateway Program is based on population and employment projections outlined in the GVRD's GMS 4 land use plan as well as individual municipalities' official community plans.

9.2.2 Agriculture

The South Fraser Perimeter Road traverses agricultural land in Delta. Depending on the final alignment option selected, the project could directly impact between 70 and 86 hectares of agricultural land, which would be required for road right-of-way. The project team has been working with the Delta Farmers' Institute and the Agricultural Land Commission to minimize agricultural impacts and explore opportunities for mitigation. These measures will be reflected in the environmental assessment application for the South Fraser Perimeter Road.

Other Gateway Program corridors are in more urban areas and no additional impacts to agricultural land are anticipated, with the exception of a small portion within the proposed 216th Interchange at Highway 1 and potentially within future new interchanges at Harris Road and Dewdney Trunk Road.

9.2.3 Vehicle Emissions

Congestion related to idling is one of the most significant contributors to reduced regional air quality. By freeing up traffic movement along arterial corridors, Gateway projects have the potential to alleviate some of these emissions. However, there is also the potential for increased roadway capacity to result in increased number of vehicles on the road, and therefore a reduction in air quality.

As part of the environmental impact analysis for the Gateway Program, a regional air quality impact assessment is being conducted.

The preliminary analysis indicates that, despite the increase in roadway capacity, implementation of the Gateway Program is predicted to have an insignificant effect (less than 0.1%) on the region's ambient air quality and minor net effect (0.7%) in greenhouse gases in the region. That is to say, implementation of the Gateway Program would result in 0.1% more vehicle emissions in 2021 than if the program did not proceed. This preliminary analysis is based on total traffic volumes only, in the absence of demand management measures. It is expected that combined with congestion reduction measures described in the pre-design concepts (Chapter 7), positive air quality benefits will result from reduced congestion-related idling in the Gateway Program corridors.

The Gateway Program will work to refine pre-design concepts and obtain environmental certification for the Pitt River Bridge and Mary Hill Interchange project, South Fraser Perimeter Road and the Port Mann/ Highway 1 project. Key to achieving these objectives will be:

- Working with municipalities, regulators and review agencies;
- Ongoing community relations;
- Consultation at key design stages; and,
- Facilitating review and comment on the studies undertaken as part of the environmental review process.

PART 4: MOVING AHEAD

10. PUBLIC CONSULTATION AND COMMUNITY RELATIONS

Budget provisions have been made by the provincial government to fund approximately 50% of the SFPR and Pitt River Bridge/Mary Hill Interchange projects.

In October 2005, the federal government announced up to $90 million in cost-shared funding for the Pitt River Bridge/Mary Hill Interchange Project. This commitment was part of a broader announcement of the Pacific Gateway Strategy to improve infrastructure, border services and links with the Asia-Pacific Region for the purpose of expanding trade and cultural ties.

Federal cost-sharing for the SFPR Project is also being pursued. The October 2005 federal announcement indicated that an additional $400 million was to be allocated to support additional Pacific Gateway Strategy initiatives.

The schedule for the Gateway Program contemplates phased construction of the various components. Construction of the Pitt River Bridge/Mary Hill Interchange is planned for completion by the opening of the new Golden Ears Bridge in 2009. As noted previously, the Golden Ears Bridge will increase traffic flows at the Pitt River Bridge such that additional capacity in the non-peak direction is needed. The additional capacity is required to fully take advantage of the potential benefits offered by the Golden Ears Bridge.

The schedule then anticipates construction of the SFPR by 2012, in advance of the Port Mann/Highway 1 improvements. The SFPR will provide a high quality link between Highway 1 and other Fraser River crossings as well as improving access to port and industrial areas along the river.

Construction of the Port Mann/Highway 1 improvements is contemplated by 2013.

The Gateway Program recognizes the importance of consultation and ongoing communication with interested parties and is committed to a comprehensive consultation program as well as an ongoing community relations program to ensure that community and public input is considered in the development of the Program.

10.1 CONSULTATION

Consultation with municipalities and the public is ongoing and has been underway for more than two years.

Public consultation takes place at three key design stages: pre-design, preliminary design and detailed design. Input will be considered with financial and technical information as projects proceed.

Pre-design consultation gathers community feedback on proposed concepts designed to meet congestion safety, movement and access goals. This stage is based on conceptual proposals for new or improved roads and bridges, lane use and other travel demand management measures, as well as consideration for alternate transportation such as transit and cycling.

Preliminary design consultation discusses more specific elements of the project such as refinements to key interchanges and access features, lane use and transportation demand management measures. This stage deals with specific rather than conceptual improvements. A key outcome is community feedback on preliminary designs for consideration by the project team and highway designers in developing detailed designs.

Detailed design consultation generally focuses on fewer but more detailed treatments, such as specific interchange and access features, aesthetic treatments such as lighting and landscaping, and discussion of mitigation measures where required. This stage also involves more financial and technical analysis to ensure designs are financially and technically feasible.

The preliminary schedule for the Gateway Program calls for pre-design consultation to be complete in 2006, followed by environmental assessment reviews and the procurement and construction phases as outlined in Figure 27 below.

10.1.1 Methodology

Consultation will take place via a series of small group meetings and open houses as well as through web-based consultation materials and feedback forms. Public and stakeholder notification will include:

- Local Governments
- Municipal Technical Liaison Committees
- First Responders (police, fire, ambulance)
- Neighbourhood Organizations
- Business Organizations
- Transportation Groups
- Sustainability Groups
- Tourism Organizations
- Members of the Public
- Other groups and organizations

Key aspects of the project being discussed will be presented through discussion guides, display boards and staff presentations. Input will be gathered through meeting notes, feedback forms, fax, e-mail, phone and correspondence. Community and stakeholder input received during each phase of consultation will be summarized in a Consultation Summary Report. These reports will be available for public review on www.gatewayprogram.bc.ca.

10.1.2 Current Consultation

In 2005, pre-design public consultation was undertaken in Delta regarding options to improve or relocate Highway 17 as part of the southwest segment of the South Fraser Perimeter Road (SFPR), and in Port Coquitlam, Pitt Meadows and Maple Ridge regarding improvements to the Pitt River Bridge and Mary Hill Bypass. The Consultation Summary Reports for both consultation processes are available on www.gatewayprogram.bc.ca.

Pre-design consultation on the 80th to Nordel segment of the SFPR is taking place in January 2006.

Pre-design consultation on the Port Mann/Highway 1 project and on the remainder of the SFPR alignment is being undertaken during 2006.

Figure 27: Gateway Program Development Preliminary Schedule

	PMH 1 PROJECT	SFPR PROJECT	PITT RIVER BRIDGE PROJECT
Pre-design Consultation	2006	2006	Complete
Environmental Assessment Review	2006 – 2007	2006	2006
Start of Procurement	2007	2006	2006
Design and Construction	2008 – 2013	2007 – 2012	2006 – 2009

Note: Dates are subject to change pending environmental certification and further technical and financial analysis. Prelminary design consultation and detailed design consultation will be conducted as the projects proceed.

10.2 COMMUNITY RELATIONS

The Gateway Program has an ongoing Community Relations Program to ensure that interested parties can provide input and have their questions answered on an ongoing basis. The Community Relations Program facilitates ongoing two-way communications with stakeholders and helps build understanding between the Program and interested and potentially affected individuals and groups. Activities undertaken as part of the Community Relations Program include preparation and distribution of Community Updates, Fact and Information Sheets, presentations to community groups and associations, responding to questions, and maintaining the Gateway Program website.

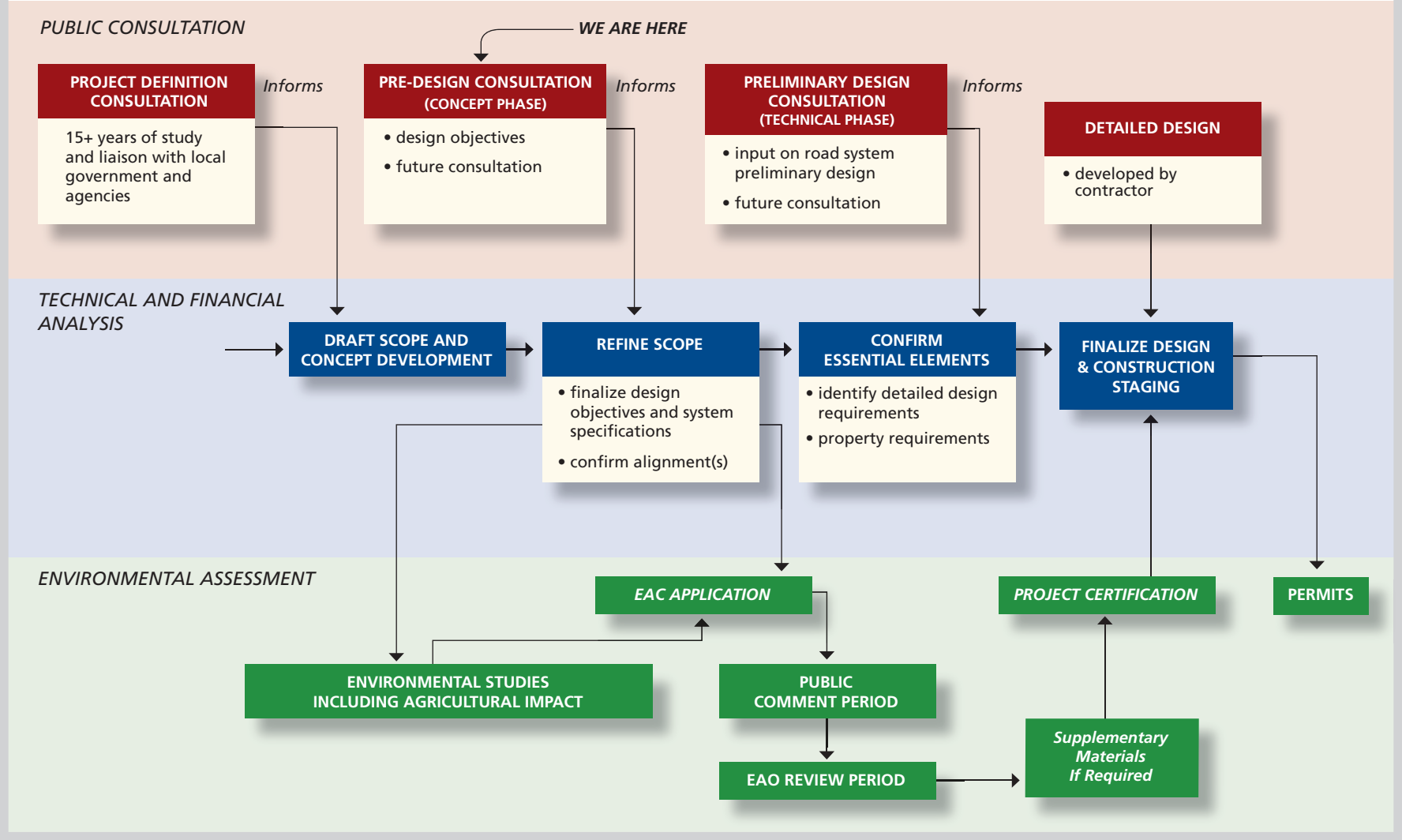
10.3 PUBLIC REVIEW DURING ENVIRONMENTAL ASSESSMENT

In addition to comprehensive consultation at the pre-design, preliminary design and detailed design stages, the Gateway Program will include public review periods associated with the environmental assessment of each project, as described in Chapter 12. Public reviews generally involve public notices and open houses to review socio-economic, noise, water and other studies that form the environmental assessment.

Following environmental assessment certification, formal public consultation (including community meetings, open houses and web-based consultation) will continue as each of the Gateway projects progress through the key design stages.

Figure 28 outlines the public consultation process and its relationship to design stages and environmental assessment.

Figure 28: Gateway Program – Relationship between Planning, Consultation and Environmental Assessment



11. FIRST NATIONS CONSULTATION

In accordance with legal and policy requirements, the Province will consider aboriginal interests in relation to the Gateway Program component corridors to ensure that First Nations issues and concerns are identified, and the Province's obligations towards First Nations are met.

Consultation with First Nations was initiated in the spring of 2003, and will continue throughout development of the Gateway Program. Project-based consultations have taken place with:

- Katzie First Nation
- Musqueam Indian Band
- Tsawwassen First Nation
- Sto:Lo Nation
- Kwikwetlem First Nation
- Kwantlen First Nation
- New Westminster Indian Band
- Semiahmoo First Nation

Since initiating consultation, the Gateway Program has continued to share project-related information and has provided an opportunity for these First Nations to participate in the environmental assessment (EA) process associated with the South Fraser Perimeter Road and Pitt River Bridge & Mary Hill Interchange projects. More focused information sharing and consultation has occurred with several of these First Nations based on their interest and willingness to engage in EA-related matters. This has included opportunities to participate in and/or review key EA study components (i.e., archaeology). More detailed Port Mann/Highway 1 consultations are scheduled to begin in early 2006.

The Gateway Program will undertake additional consultation initiatives with First Nations as efforts to further identify and resolve issues of potential concern continue, leading up to the filing of EA applications (see Section 12.1).

12. ENVIRONMENTAL ASSESSMENT REVIEW PROCESS

As agency, community and stakeholder feedback is received and technical analysis is completed, the notional scope for each project will be refined. The program team will then prepare the respective environmental assessment applications and work with review agencies, stakeholders and the public throughout the review process to obtain environmental assessment certification.

The Ministry of Transportation is committed to minimizing environmental impacts and is continuing to consult with key stakeholders in the process of conducting comprehensive environmental reviews.

12.1 ENVIRONMENTAL REVIEW

Environmental assessment for medium to large scale projects in British Columbia follows one of two processes. For projects that trigger the Reviewable Projects Regulation of the BC Environmental Assessment Act (BCEAA), a harmonized review is to be undertaken in accordance with the Canada-BC EA Cooperation Agreement (March 2004). For projects that trigger federal legislation only, such as the Fisheries Act or Navigable Waters Protection Act, an environmental review under the Canadian Environmental Assessment Act is required. For additional detail on the provincial and federal environmental review processes, refer to www.eao.gov.bc.ca and www.ceaa.gc.ca.

Just how a project is reviewed by regulatory agencies is dependent on the physical and geographic scope of a project as well as the natural and socio-community resources that are potentially affected. Due to their length, both the South Fraser Perimeter Road and the Port Mann/Highway 1 projects are subject to a harmonized federal/provincial environmental review process. The review process for the Pitt River Bridge and Mary Hill Interchange and North Fraser Perimeter Road, due to their smaller scale and non-contiguous scope, are subject to review under the Canadian Environmental Assessment Act (CEAA) only.

The Gateway Program Team will prepare environmental assessment applications for each project. These applications and supporting studies will be submitted to the relevant assessment office for review. Potential environmental and socio-community impacts will be identified, along with proposed mitigation and compensation measures. Subject areas to be addressed include:

- Aquatics and fisheries, including water quality;
- Vegetation and wildlife;
- Local and regional air quality;
- Socio-community;
- Agriculture;
- Noise;
- Archaeology;
- Contaminated sites; and
- Water resources (e.g., hydrogeology, hydrology, hydraulics).

Public consultation and First Nations involvement in the environmental assessment process is an important aspect of the review process, wherein additional issues may be identified and addressed by the Gateway Program in accordance with environmental assessment review procedures.

For each project, subject to completion of these steps to the acceptance of the environmental review agencies, a conditional approval will be issued, allowing the project to proceed with procurement. For South Fraser Perimeter Road and the Port Mann/Highway 1 projects,

Environmental Assessment Certificates (EACs) would be issued. For the North Fraser Perimeter Road and Pitt River Bridge & Mary Hill Interchange projects, a CEAA Conclusion would be issued. The EAC and CEAA Conclusion constitute approvals-in-principle for the design concepts presented, recognizing that approval to proceed to construction is issued only after environmental agencies have approved a final design as per their legislated mandate.

12.2 PROJECT ENVIRONMENTAL ASSESSMENT STATUS

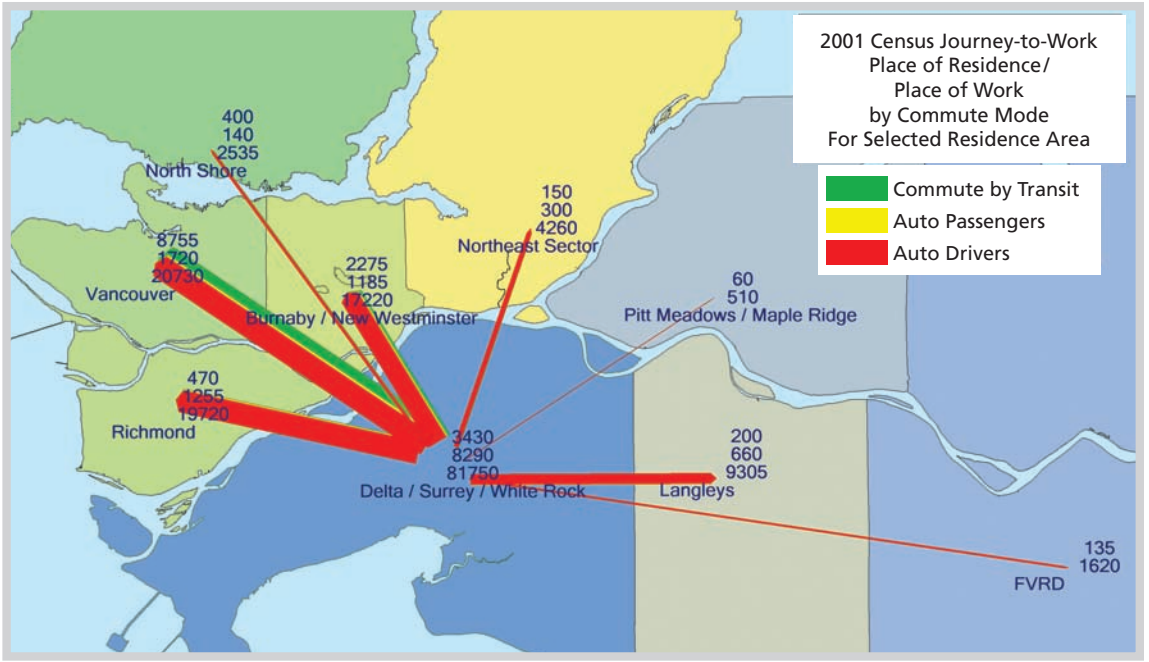
A federal CEAA review of the Pitt River Bridge and Mary Hill Interchange component of the North Fraser Perimeter Road is underway. A screening document has been submitted to the responsible federal agencies and to the Fraser River Estuary Management Program, which coordinates environmental reviews of projects within its mandated area.

The South Fraser Perimeter Road is currently in the pre-application stage of a harmonized federal-provincial review, coordinated by the BC Environmental Assessment Office. Working Groups are comprised of representatives of provincial and federal environmental permitting agencies, local municipalities, the GVRD and First Nations. The Working Groups are assisting the Gateway Program Team in providing technical review of draft impact assessment reports and ensuring that the assessments will meet regulatory approval requirements.

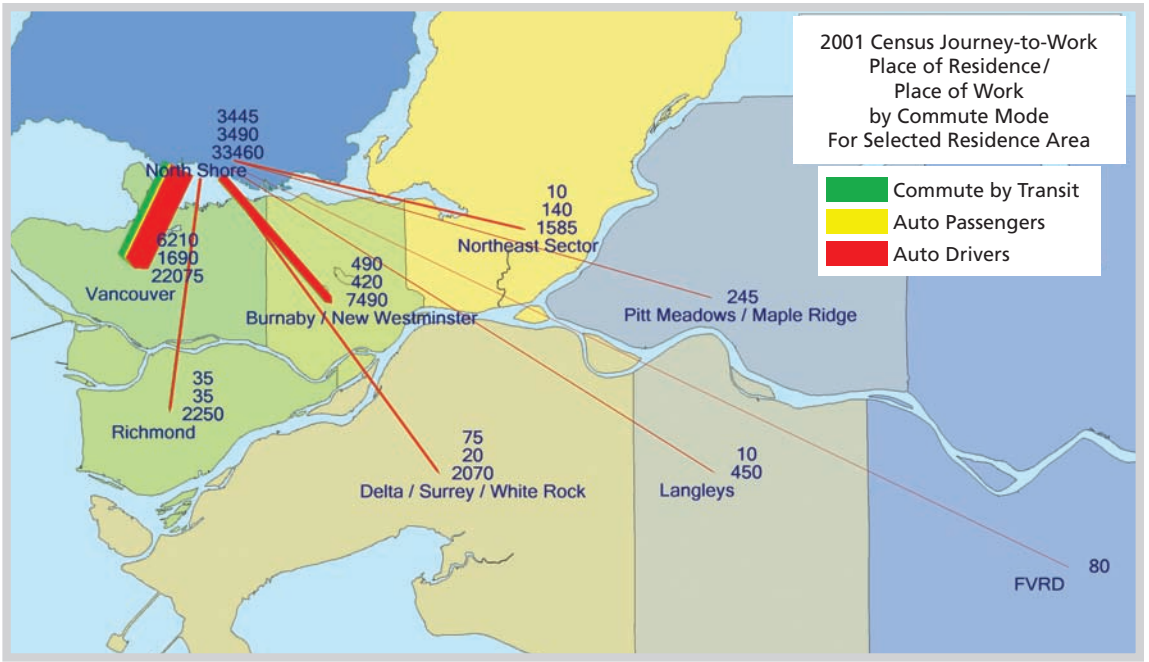
The Port Mann/Highway 1 project is anticipated to enter pre-application under BCEAA/CEAA in 2006. Preliminary environmental assessment work is currently underway. Input from the assessments will assist in refining project scope.

DELTA/SURREY/WHITE ROCK RESIDENTS' COMMUTING PATTERNS (2001)

Examples to illustrate representative distribution of place of employment for residents in various geographic locations within Greater Vancouver are presented and discussed in this appendix. The number of commuters bound for different destinations are listed in groups of three. The top number refers to the number of transit commuters, followed by vehicle passengers and vehicle drivers. The thickness and direction of the arrows corresponds to the volume and direction of travellers. Note that commuting patterns for residents of Vancouver and the Langleys are contained in Section 2.2 (page 8) of this report.

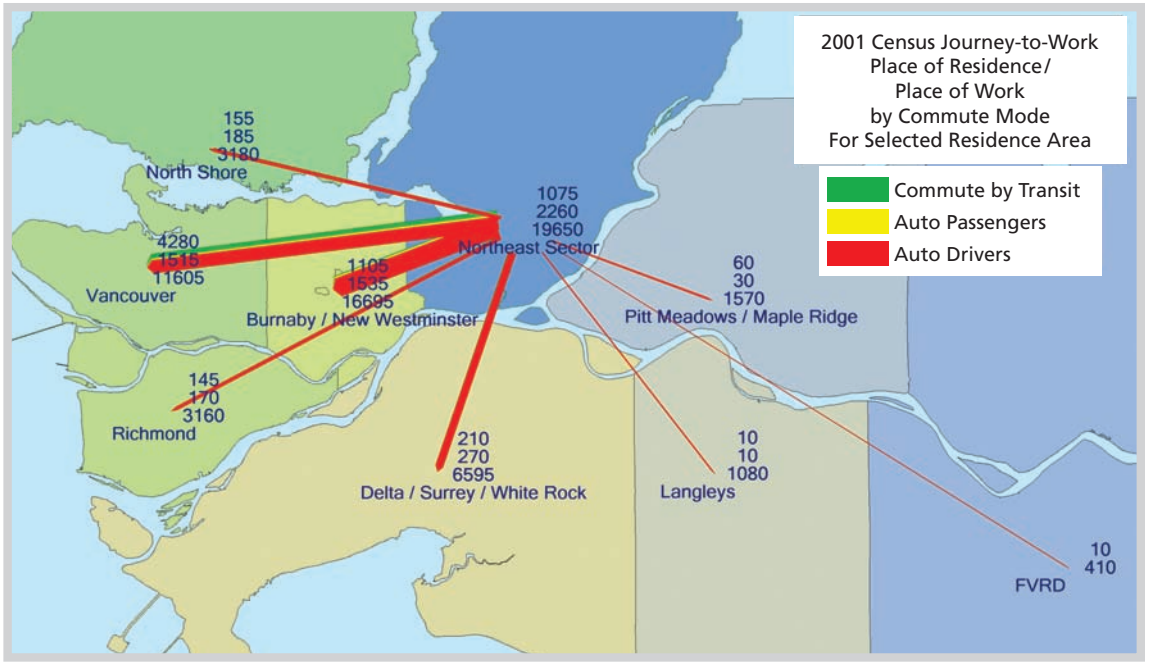


NORTH SHORE RESIDENTS' COMMUTING PATTERNS (2001)



NORTHEAST SECTOR* RESIDENTS' COMMUTING PATTERNS (2001)

*Includes Coquitlam, Port Coquitlam, Port Moody, Anmore and Belcarra.



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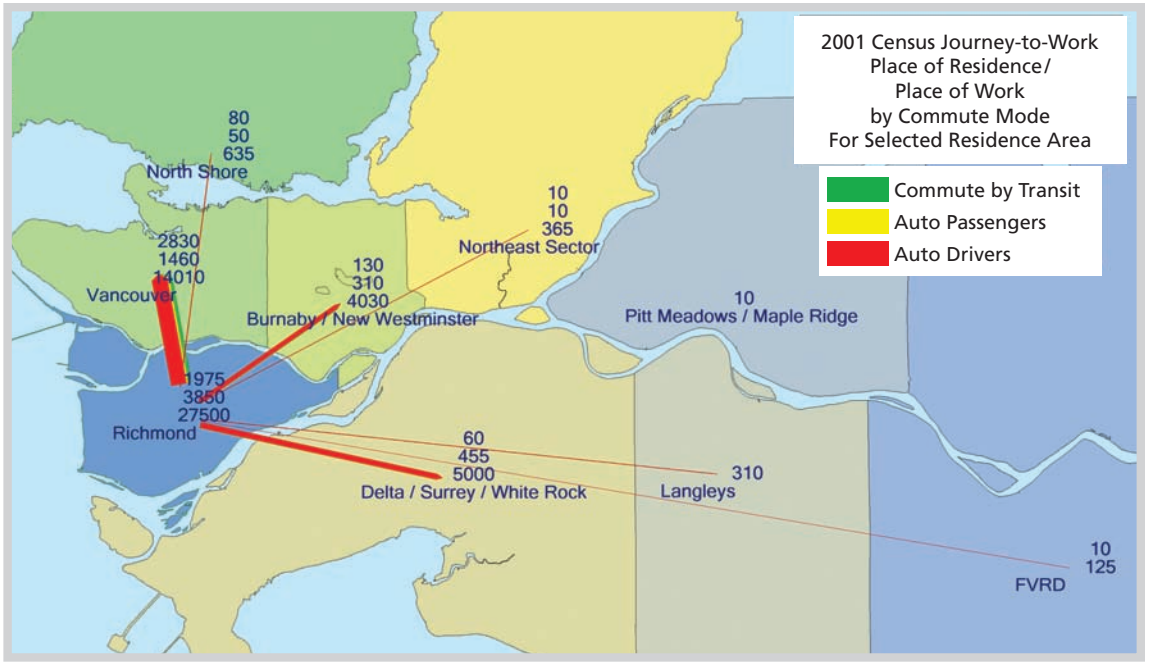
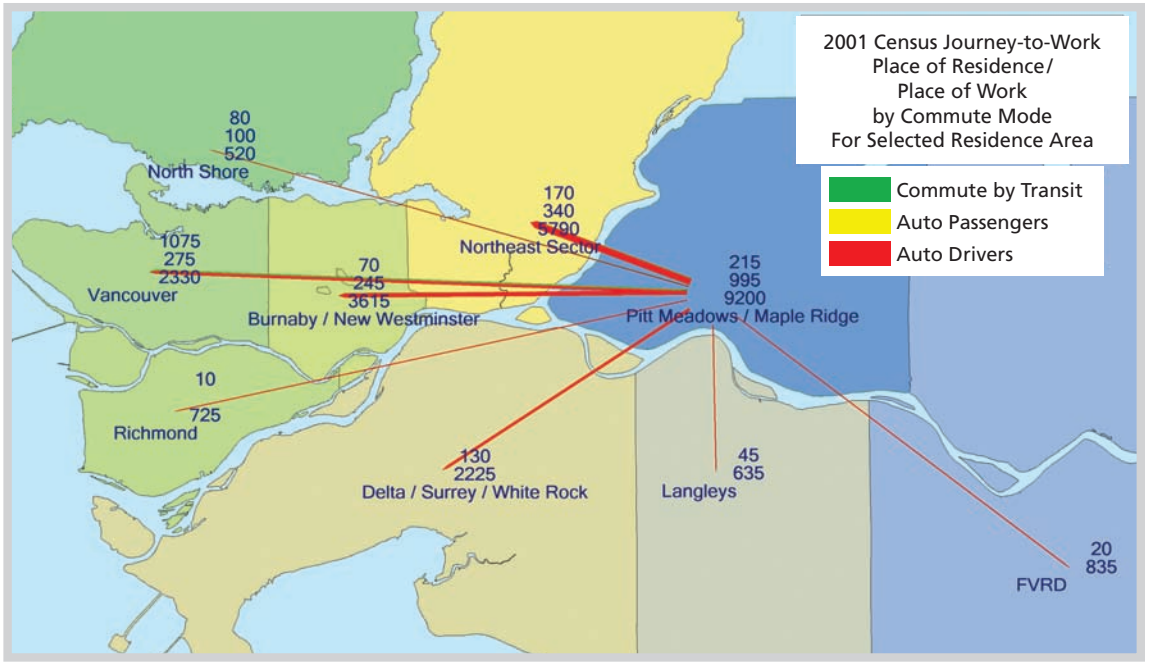
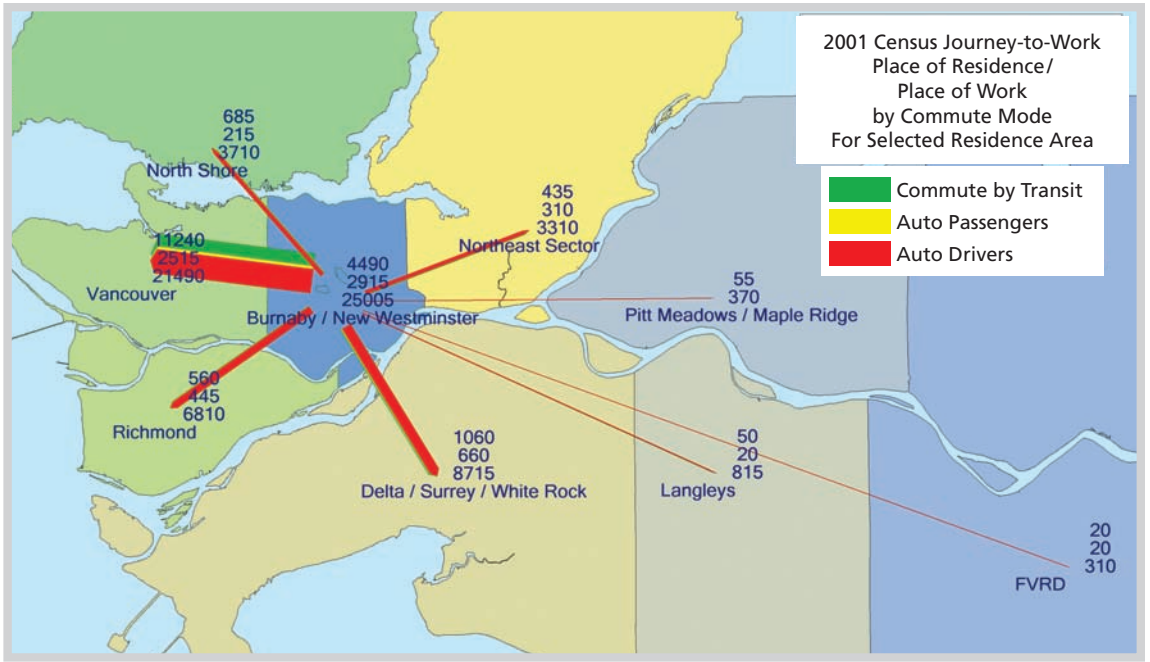


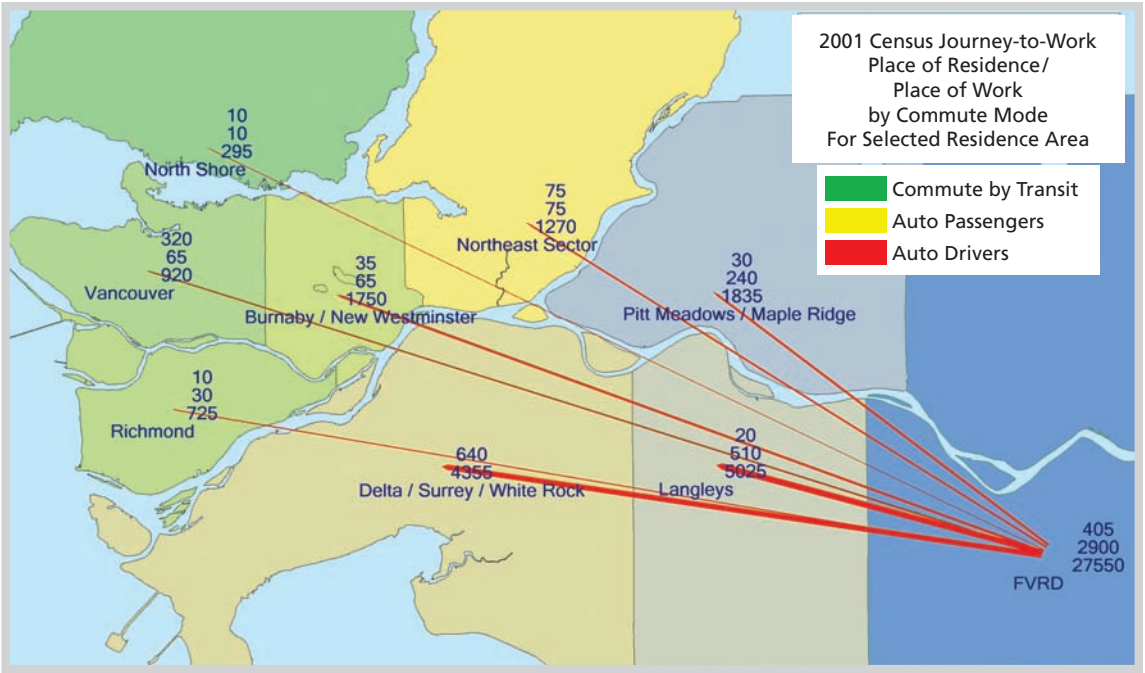
PITT MEADOWS AND MAPLE RIDGE RESIDENTS' COMMUTING PATTERNS (2001)



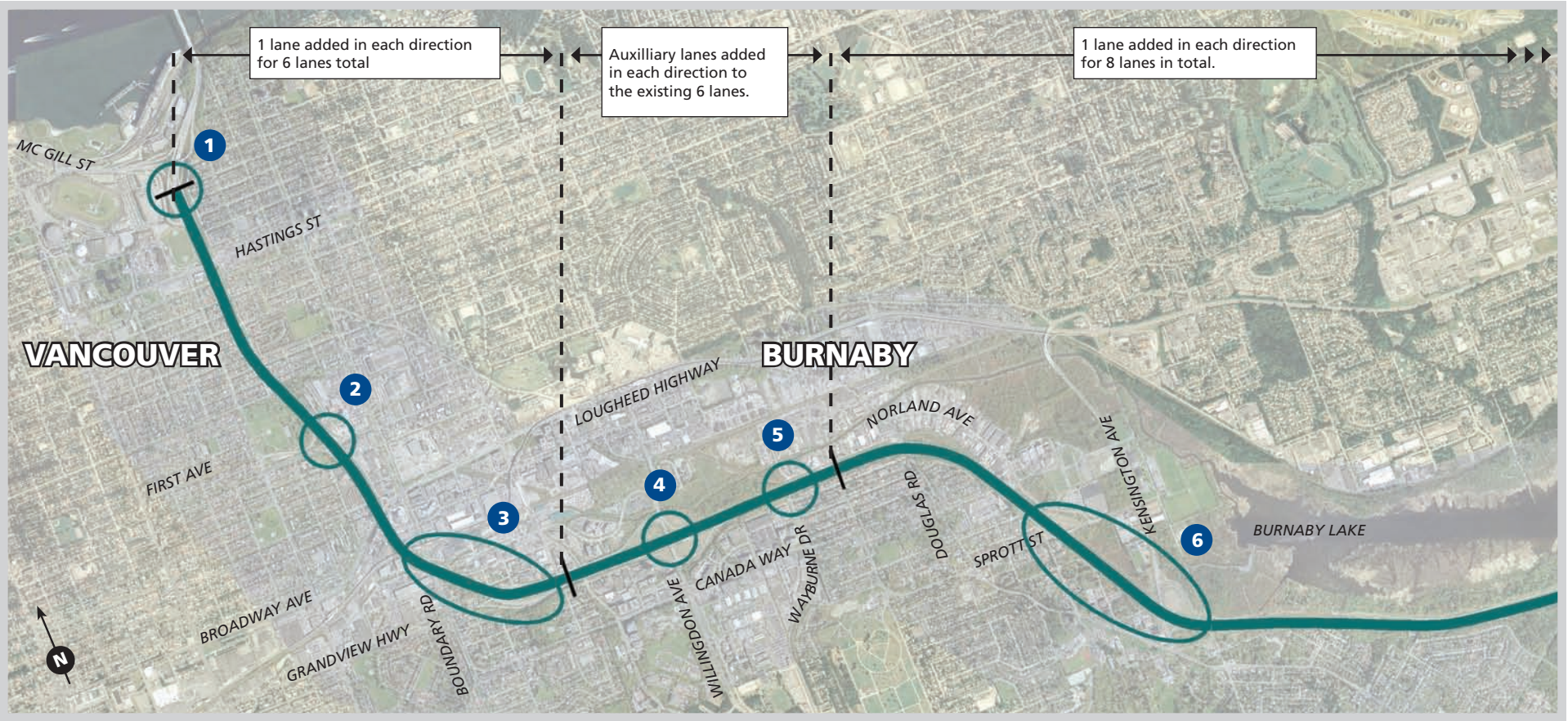
BURNABY AND NEW WESTMINSTER RESIDENTS' COMMUTING PATTERNS (2001)



FRASER VALLEY RESIDENTS' COMMUTING PATTERNS (2001)



HIGHWAY 1 IMPROVEMENTS: MCGILL STREET TO KENSINGTON AVENUE



1 McGill Street ramp modifications would:
- Enhance highway operation by improving traffic flow entering and exiting the highway
- Improve safety by eliminating the short merging distance for traffic entering the highway

2 First Avenue ramp modifications would:
- Improve safety on the highway by reducing traffic queues exiting the highway

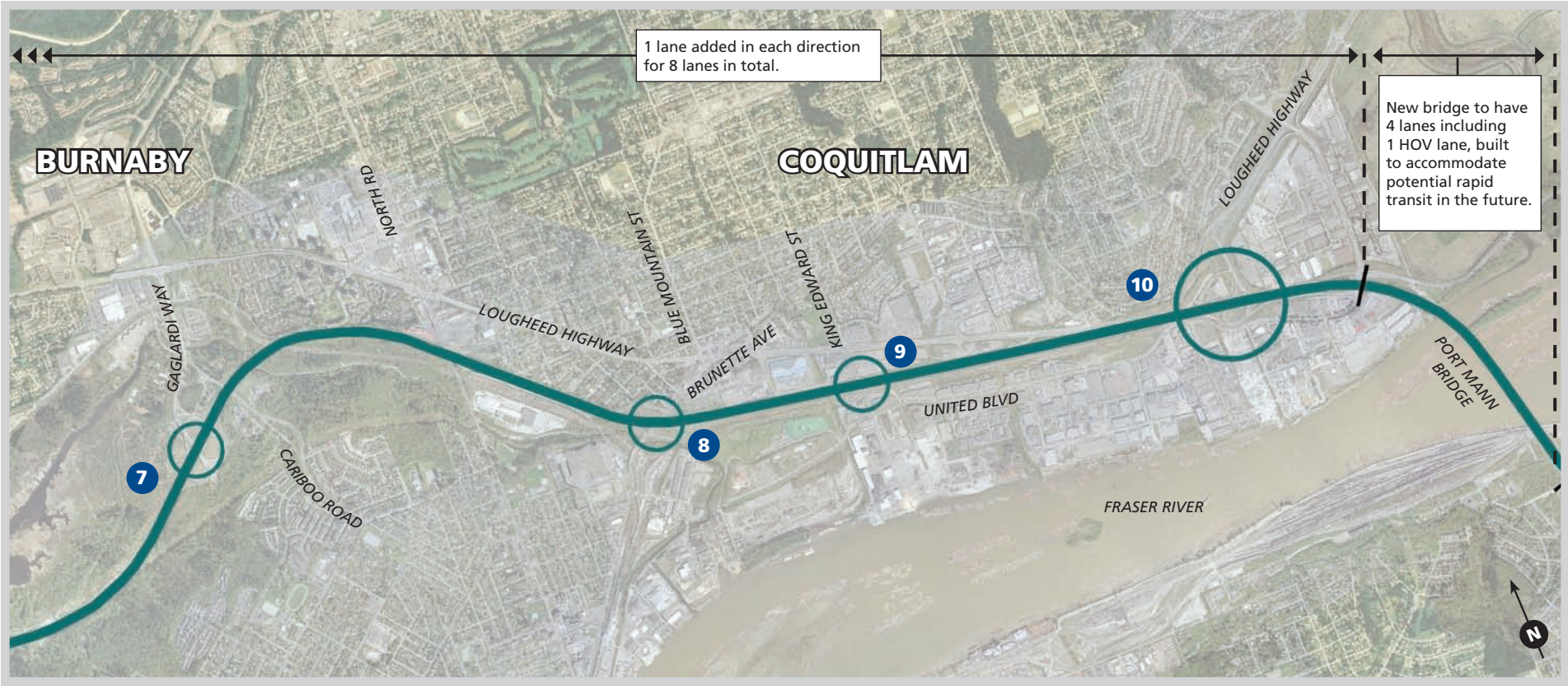
3 Extension of the Boundary Road on-ramp and reconstruction of Grandview Highway overpass would:
- Enhance highway operation by improving traffic flow entering the highway
- Improve safety on the highway and municipal roads by reducing conflict points

4 Reconstruction of the Willingdon Avenue interchange would:
- Enhance the operation of the interchange by improving access to and from the highway
- Improve connections across the highway
- Improve safety on the highway and municipal roads by reducing traffic weaving with auxilliary lanes and ramp improvements

5 Construction of a potential new overpass at Wayburne Drive would:
- Improve connections across the highway
- Assist the operation of the Willingdon Interchange by reducing traffic volumes
- Address current and future traffic in the Still Creek/Willingdon Area

6 Reconstruction of the overpass at Sprott Street and interchange at Kensington Avenue would:
- Improve the traffic flow entering the highway
- Improve connections across the highway
- Improve safety on the highway and municipal roads

HIGHWAY 1 IMPROVEMENTS: GAGLARDI WAY TO THE PORT MANN BRIDGE



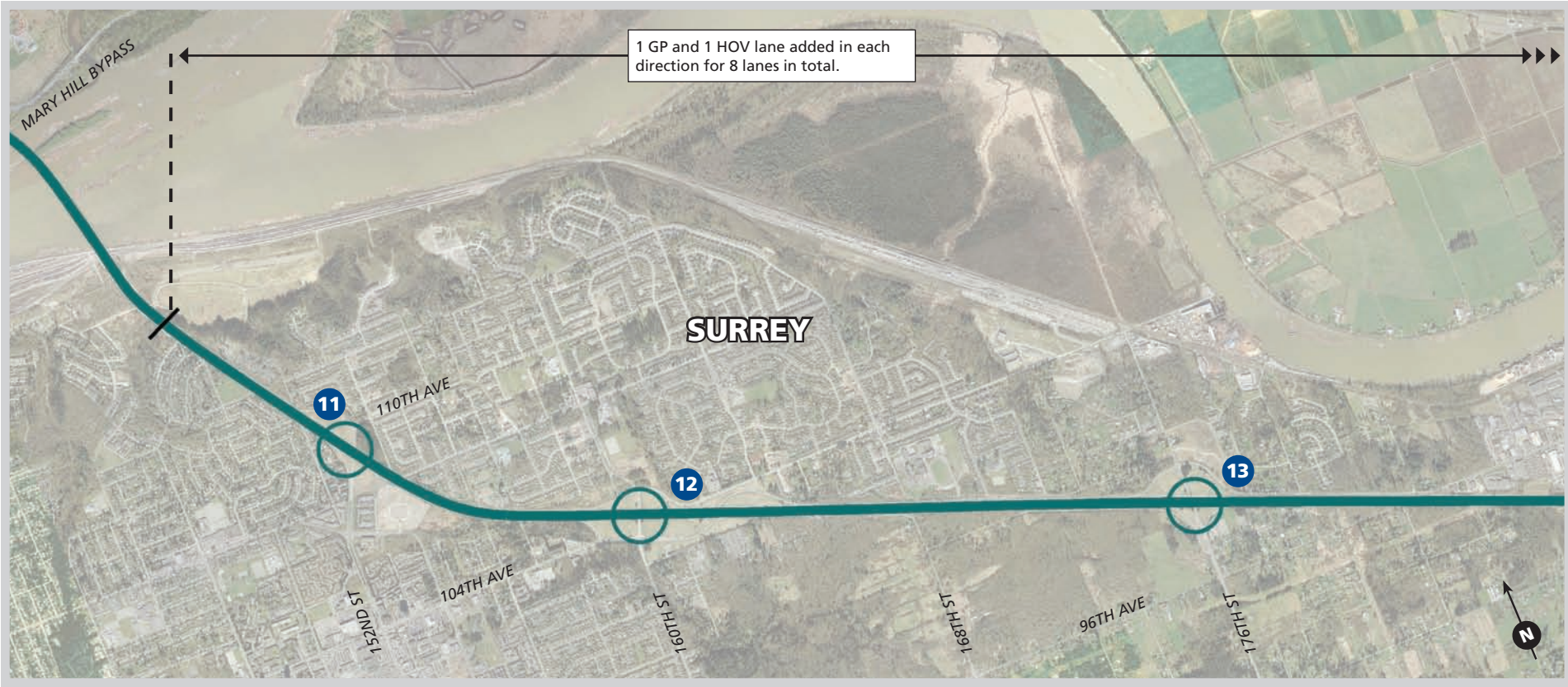
7 Reconstruction of the interchange at Gaglardi Way and the overpass at Cariboo Road would:
- Enhance the operation of the interchange by improving the traffic flow entering the highway
- Improve connections across the highway
- Improve safety on the highway by increasing the distance traffic has to enter and exit the highway

8 Reconstruction of the Brunette Avenue interchange would:
- Address current and future traffic
- Improve connections to and across the highway
- Enhance the operation of the interchange by improving traffic flow entering and exiting the highway
- Improve safety on the highway by reducing traffic queues exiting the highway

9 Construction of a potential new dedicated overpass at King Edward Street would:
- Improve safety on the highway by smoothing the highway and improving the sight lines
- Improve connections across the highway
- Remove an at-grade rail crossing on King Edward Street
- Address current and future traffic anticipated in the south Coquitlam and Pacific Reach area
- Assist the operation of the Brunette Interchange

10 Reconstruction of the Cape Horn Interchange and twinning of the Port Mann Bridge would:
- Enhance the operation of the highway and interchange by allowing free traffic flow between the major arterial roads
- Address current and future traffic
- Improve connections between the major arterial roads and the highway
- Improve connections between Surrey and the Tri-Cities
- Improve safety on the highway by improving directional signage and reducing traffic weaving

HIGHWAY 1 IMPROVEMENTS: PORT MANN BRIDGE TO 176TH STREET

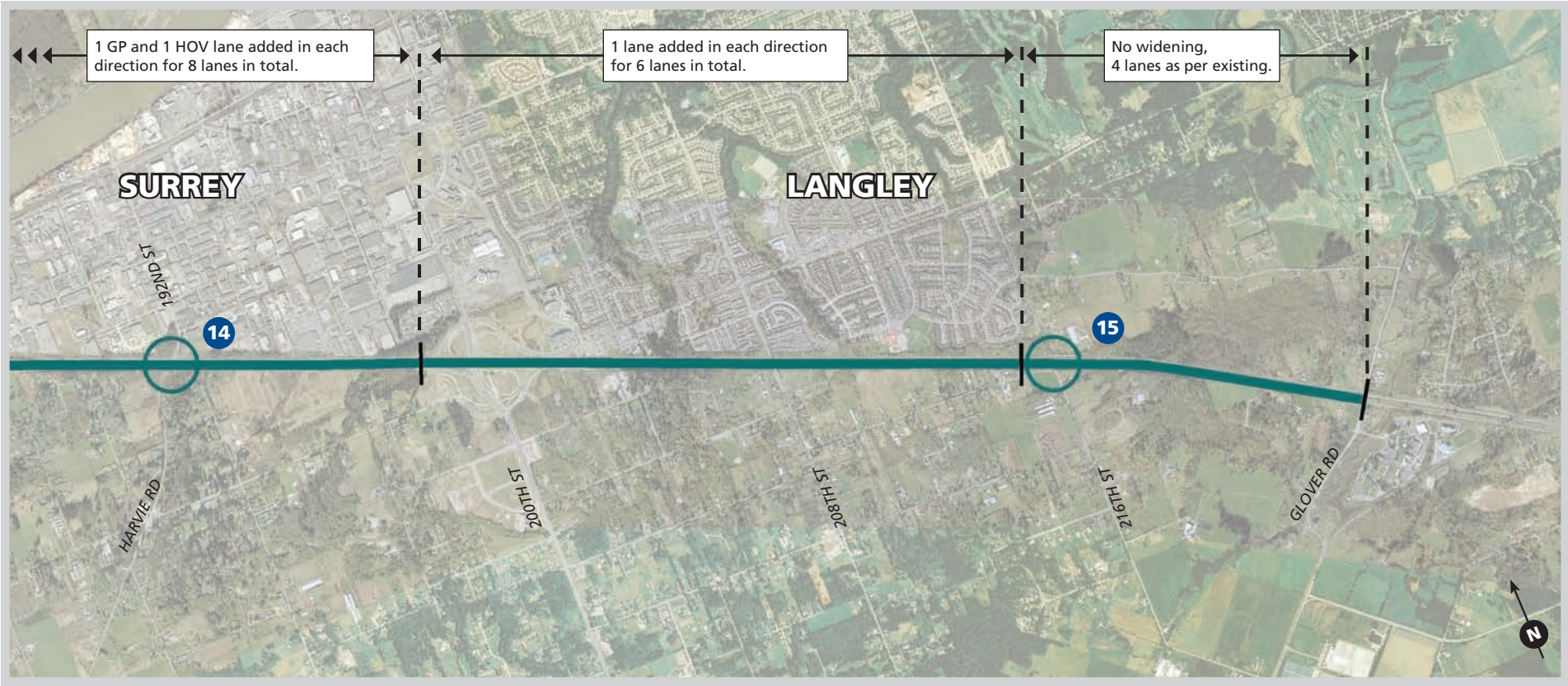


11 Reconstruction of the 152nd Street overpass would:
- Improve safety at the interchange
- Address the current and future traffic

12 Reconstruction of the 160th Street interchange would:
- Improve connections across the highway for the Fraser Heights community
- Address the current and future traffic
- Enhance the operation of the highway and municipal roads by improving access to and from the highway
- Improve safety by relocating the weigh-scales and improving adjacent intersections

13 Reconstruction of the 176th Street interchange would:
- Enhance the operation of the highway and interchange by improving access to and from the highway
- Address forecast changes in travel patterns due to the Golden Ears Bridge and South Fraser Perimeter Road projects
- Improve connectivity across the highway and to other major transport routes
- Improve safety on the highway and municipal road network

HIGHWAY 1 IMPROVEMENTS: 192ND STREET TO GLOVER ROAD



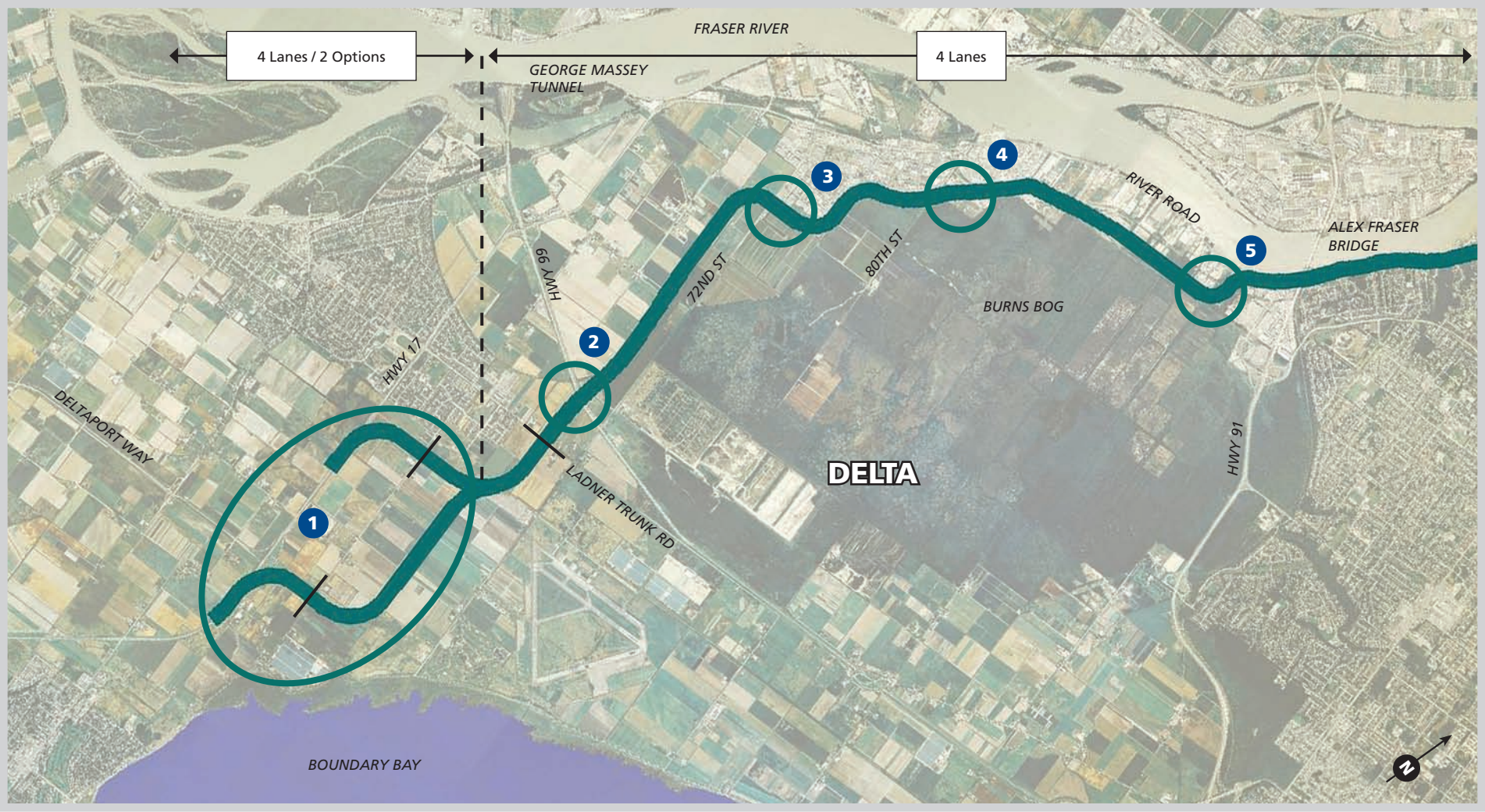
14 Construction of a proposed partial interchange at 192nd Street would:

- Address changing future travel patterns in the Port Kells Area
- Improve access to and from the highway for the Port Kells area
- Improve operation of the 176th Street and 200th Street interchanges
- Improve connectivity across the highway

15 Construction of a potential new interchange at 216th Street would:

- Address the changing travel patterns
- Assist the operation of the 200th Street interchange
- Improve connectivity across the highway
- Improve access to and from the highway

SOUTH FRASER PERIMETER ROAD IMPROVEMENTS: HIGHWAY 17 TO ALEX FRASER BRIDGE



1 Two relocated Highway 17 alignment Options in Southwest Delta.

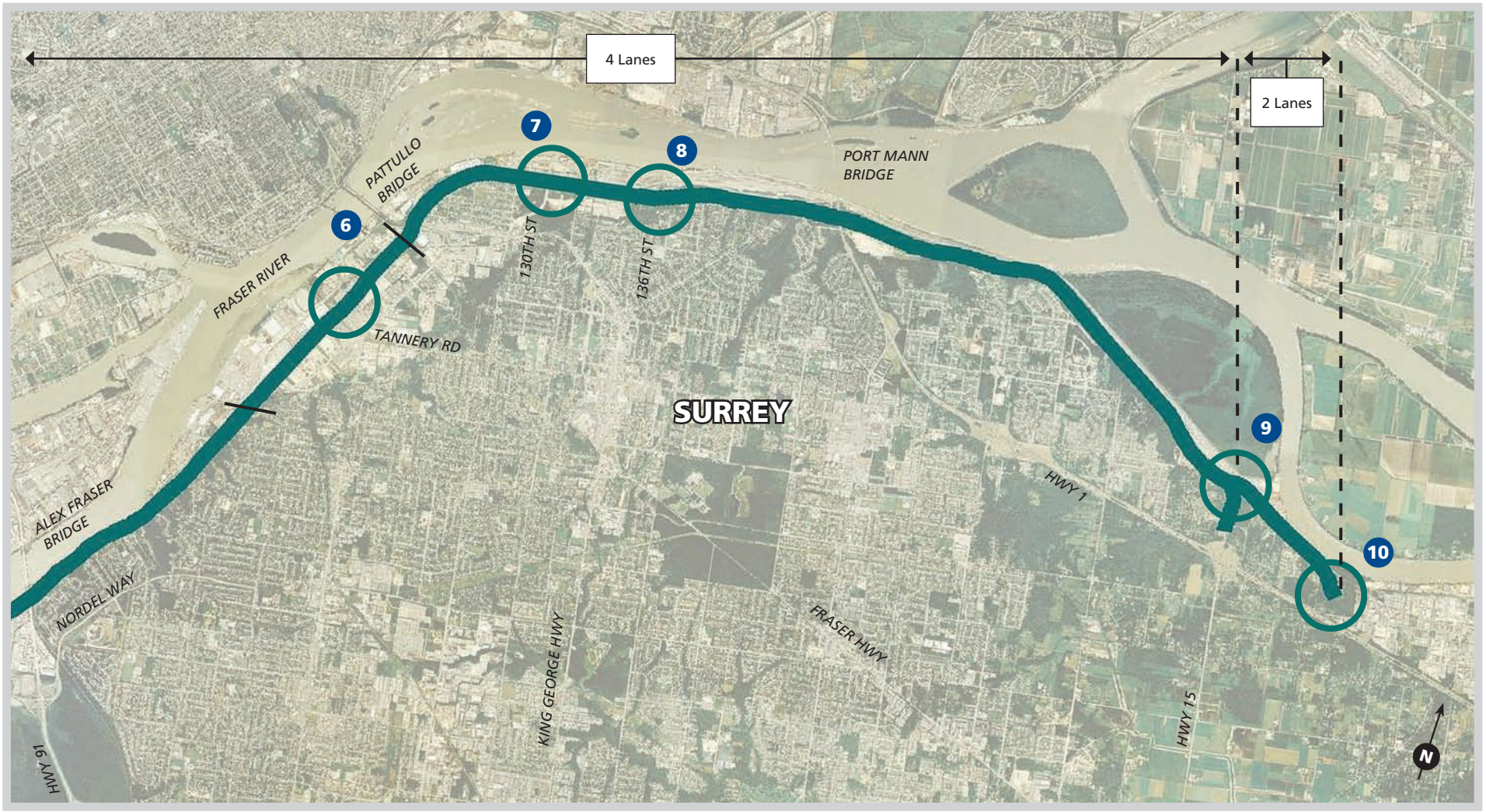
2 Highway 99/SFPR interchange provides connections between SFPR and Highway 99

3 Intersection at 72nd Street provides access to the Tilbury Industrial Park and to local farms

4 Intersection at 80th Street provides access to Sunbury industrial area and emergency access to 80th Street South of SFPR

5 Sunbury Interchange provides connections between SFPR, Highway 91 and River Road

SOUTH FRASER PERIMETER ROAD IMPROVEMENTS: ALEX FRASER BRIDGE TO 182A STREET



6 Tannery Road Interchange provides connections between Fraser-Surrey Docks, Scott Road and the King George Highway

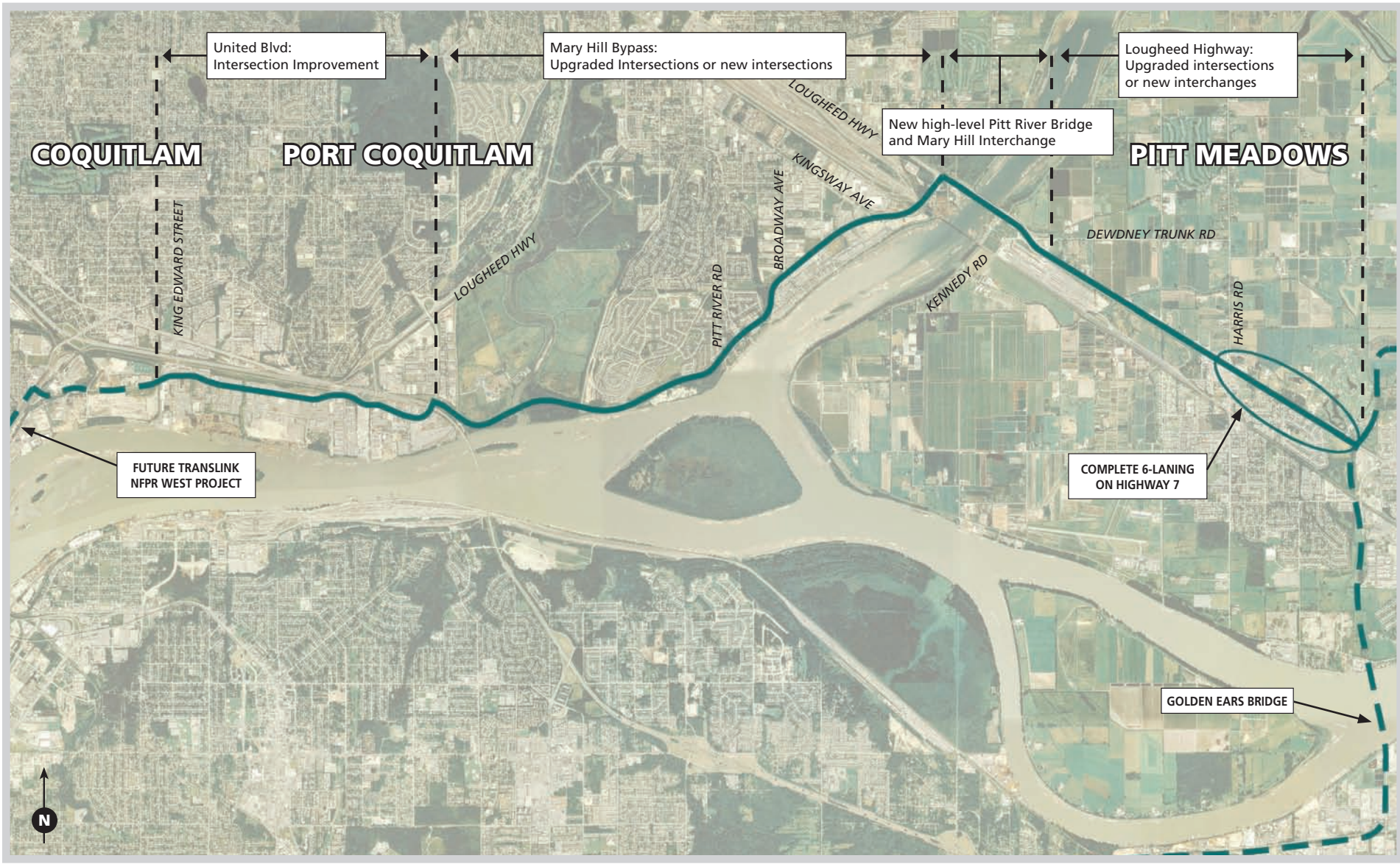
7 Intersection at 130th Street provides access to industrial and rail facilities north of SFPR and connections to Scott Road and the King George Highway south of SFPR

8 Intersection at 136th Street provides access to residences and the CN Rail Thornton Yard

9 Fraser Heights Interchange provides connections between SFPR, Highway 15, Highway 1, Golden Ears Bridge and the local road network

10 Intersection east of 182A Street provides access to Golden Ears Bridge and Port Kells.

NORTH FRASER PERIMETER ROAD IMPROVEMENTS



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