6.3 COMMUNITY COHESION

Community Cohesion – Summary of Assessment

- The Project will generally enhance physical connectivity between New Westminster and Surrey by improving motorized transport of goods and people through and between the two communities. It will also provide a safer and more accessible Fraser River crossing for pedestrians and cyclists.
- The Project's Traffic Management Plan, including community consultation throughout Project construction, is expected to be able to safely mitigate the adverse effects of construction on roadways to maintain mobility, worker safety, and neighbourhood connectivity.
- Several neighbourhoods near the Project that may incur adverse effects during Project construction are also likely to include vulnerable population groups that may be less able to adapt to temporary changes in their environment.
- Mitigation of potential adverse social equity effects during construction will require ongoing consultation with the affected communities. Specific strategies to engage vulnerable population groups will form part of the Project communication and engagement plans.
- Potential Project-related effects on community cohesion can be effectively addressed by applying mitigation and Best Management Practices.
- No Project-related residual or cumulative effects on community cohesion are expected.

6.3.1 Context and Boundaries

Community cohesion refers to the quality and frequency of personal and social interactions within and between neighbourhoods and can add to a common vision and sense of belonging or sense of place within a community. Transportation infrastructure such as roads, sidewalks and bicycling paths can influence community cohesion by facilitating convenient and safe travel within neighbourhoods and encouraging people to interact with their neighbours and community (Litman 2017).

This section describes the context for assessment of Project-related effects on Community Cohesion including the rationale for selecting the VC subcomponents, the indicators of potential effects, and the spatial, temporal, administrative, and technical assessment boundaries.

6.3.1.1 Valued Component and Subcomponent Selection

The existing Pattullo Bridge was built in 1937 as the first major Fraser River motor-vehicle crossing in Metro Vancouver and a key link for the Pacific Highway south to the U.S. and the Trans-Canada Highway east. The Project is expected to provide long-term benefits by maintaining and improving this important link between growing urban population and employment areas, enhancing efficient movement of goods on the Major Roads Network, and facilitating increased pedestrian and cycling traffic.

The Project will improve several existing components of motor vehicle, pedestrian, and cycling transportation infrastructure within the Cities of New Westminster and Surrey and is expected to improve the transport of people and goods through and between the communities. While New Westminster is a more urban, pedestrian-scale community than Surrey, both cities are traversed by transportation arterials that contribute to regional connectivity but which can create barriers to local pedestrian and cycling connectivity.

The City of New Westminster has long been concerned about balancing regional transportation needs with neighbourhood livability, and the City of Surrey has a desire to reduce regional traffic using local streets. The Project has some potential to adversely affect physical connectivity within and between neighbourhoods and the communities of New Westminster and Surrey through changes in access and traffic patterns.

There is also potential for an imbalance between residents deriving benefits from the Project and those who may experience adverse effects. Benefits from transportation projects tend to be dispersed broadly throughout the region, while adverse effects may be highly localized. Specific components of the Project could potentially have localized adverse effects on specific neighbourhoods, and within those neighbourhoods vulnerable individuals or population groups may be less able to avoid or adapt to adverse effects. For the purpose of this assessment, vulnerable populations are defined as individuals, families, or population groups that may be less able to adapt to, or insulate themselves from, changes in their environment, and may be coping with acute and/or chronic challenges to everyday life. Examples include low-income families, single parent families, the homeless, the elderly, new immigrants and people living with physical or mental disability.

For the Community Cohesion VC, two subcomponents were selected, Neighbourhood Connectivity and Social Equity. **Table 6.3-1** summarizes the rationale for selecting each subcomponent.

Table 6.3-1 Subcomponents of the Community Cohesion VC

Subcomponent	Rationale for Selection
Neighbourhood connectivity	The proposed Project has potential to affect physical connectivity through changes in access and traffic patterns within and between neighbourhoods.
Social equity	Incidence of adverse Project effects may fall disproportionally on vulnerable populations.

Table 6.3-2 describes the indicators selected for each VC subcomponent.

Table 6.3-2 Indicators for Assessment of Potential Effects

Subcomponent	Indicators	Measurable Parameters
Neighbourhood connectivity	Physical connectivity within and between neighbourhoods, as well as between Surrey and New Westminster	Changes in physical barriers and safety related to transportation infrastructure (motorized and non-motorized); barriers could include changes in structural elements or traffic volumes
		Changes in traffic patterns (including traffic volumes for motorized, transit, and non-motorized traffic)
		Changes in motor vehicle access
		Changes in access for cycling and pedestrian traffic

Subcomponent	Indicators	Measurable Parameters
Social equity	Vulnerable populations likely to incur equity effects	Incidence of adverse Project effects on certain neighbourhoods and/or population groups through changes in noise, vibration, access, visual outlook or neighbourhood connectivity
		Occurrence of vulnerable populations in LSA neighbourhoods indicated by income levels and other socio-economic indicators of vulnerability

6.3.1.2 Regulatory Context

Communities and the transportation network surrounding the Project are regulated by several levels of government and government agencies:

- MoTI (BC Ministry of Transportation and Infrastructure) manages provincial highways, which in the LSA includes Highway 17 in Surrey.
- Municipalities including the City of New Westminster and City of Surrey have jurisdiction over the local road network. Each municipality establishes an Official Community Plan to direct and manage land uses within its boundaries under authority of the *Local Government Act*, and undertakes supporting transportation infrastructure planning, construction and maintenance.
- The Vancouver Fraser Port Authority (VFPA) manages federal lands and waters under its jurisdiction under authority of the *Canada Marine Act*.

There are several roads in the LSA that are designated Major Roads Network (MRN). Municipalities own and operate MRN roads, while costs of maintenance and upgrades are shared between the municipalities and TransLink on a lane-km basis. TransLink must approve the addition or removal of MRN designated roads and/or capacity changes.

As indicated in **Section 2.0 Environmental Assessment Process**, which includes a review of the Federal EA Process Regulatory Context (**Section 2.2.1**), the proposed Project is not a CEAA 2012 "designated project," and an environmental assessment as described in CEAA 2012 is not required. The Project includes physical works and activities on federal lands under VFPA jurisdiction, requires a Project and Environmental Review Permit from VFPA, and is required to meet applicable requirements of CEAA 2012, including an assessment of potential effects on Aboriginal peoples.

The Community Cohesion assessment in this section addresses potential Project effects that may particularly affect Aboriginal peoples residing in the LSA and RSA.

Potential cultural effects on Aboriginal Groups that may result from changes to community cohesion are considered in the assessment of use of lands and resources for traditional purposes and Aboriginal interests (**Section 11.0** and **Section 12.0**, respectively).

6.3.1.3 Assessment Boundaries

This section identifies the spatial, temporal, administrative, and technical study area boundaries that are applicable to the Community Cohesion VC, in a manner consistent with **Section 3.2 Assessment Boundaries**.

6.3.1.3.1 Spatial

The Local Study Area (LSA) boundary was selected to represent the spatial extent to which the Project is likely to interact with community cohesion through potential direct effects on:

- neighbourhood connectivity infrastructure such as roads, sidewalks, and paths from Project construction disturbance
- neighbourhood connectivity from Project operations affecting traffic patterns or Project structural elements presenting obstacles to connectivity
- social equity through Project construction noise, vibration, and access disturbance that may be experienced predominantly or disproportionately in LSA neighbourhoods that have a higher likelihood of including populations that are more vulnerable and/or less resilient to those effects
- social equity through Project operations effects resulting in changes in access, noise, or visual outlooks due to changes in bridge access/ exit ramps and traffic patterns

The Regional Study Area (RSA) boundary is intended to capture areas that may be subject to indirect adverse Project effects on community cohesion as well as potential cumulative adverse effects from other projects. The RSA boundary reflects the extent to which the Project could interact with neighbourhood connectivity and social equity through broader changes in traffic patterns.

Table 6.3-3 defines the spatial assessment boundaries for the Community Cohesion VC; these boundaries are shown in **Figures 6.3-A-1** and **6.3-A-2**.

Table 6.3-3 Spatial Boundaries for Assessment of Potential Effects on Community Cohesion

Spatial Boundary	Description of Assessment Area
Local Study Area (LSA)	Includes the extent of the Project Boundary and the surrounding neighbourhoods in accordance with the following Census Area boundaries: ▪ In New Westminster, the eastern part of Downtown New Westminster (Census Tract #207), part of the Queen's Park and Glenbrooke North neighbourhoods (Census Tract #208), and the Glenbrooke South and Victory Heights neighbourhoods (Census Tract #209). ▪ In Surrey, the Bridgeview neighbourhood and the South Westminster neighbourhood (Census Tract #192). ▪ These boundaries are intended to capture areas that may be subject to direct adverse Project effects on community cohesion.
Regional Study Area (RSA)	Defined as all areas within the Cities of Surrey and New Westminster. These boundaries are intended to capture areas that may experience indirect adverse effects from the proposed Project as well as potential cumulative adverse effects from other Projects.

6.3.1.3.2 Temporal

Project interactions with Community Cohesion by Project phase are shown in **Table 3.4-1** of **Section 3.0 Assessment Methodology**. As shown on that table, the Project has the potential to adversely affect community cohesion during Project construction and operations.

During the Project Construction Phase, all construction-related activities could interact directly with community cohesion because traffic patterns, access, and other related factors could be adversely affected by construction of new roads, interchange structures, and bridge structures, and by the demolition of existing roads and the existing Pattullo Bridge. During Construction, potential adverse effects on Social Equity may result from construction disturbance being experienced predominantly and disproportionately in LSA neighbourhoods with a higher incidence of populations that are more vulnerable and less resilient to those effects.

During the Project Operations Phase, the Project could adversely affect community cohesion through:

- changes in structural barriers and safety related to transportation infrastructure (e.g., changes in the location of access ramps, the road network, and the level and distribution of motor vehicle traffic)
- changes in safe access to community infrastructure, services, and leisure activities
- incidence of adverse Project effects on populations that may be more vulnerable and/or less able to adapt to changes in their environment

6.3.1.3.3 Administrative

The LSA boundaries are intended to capture areas that may be subject to direct adverse Project effects on community cohesion and within that context have been defined to follow the boundaries of several Statistics Canada Census Tracts in New Westminster and Surrey.

The RSA for Community Cohesion follows the administrative boundaries of the municipalities of Surrey and New Westminster.

6.3.1.3.4 Technical

Technical boundaries refer to the constraints imposed on an environmental assessment by limitations in the ability to predict the effects of a project, such as limitations in information, data analyses, and data interpretation. With regard to the Community Cohesion VC, some technical limitations were encountered in the ability to assess Project effects on motorized and non-motorized traffic patterns and physical barriers associated with transportation infrastructure; and the ability to assess the incidence of potential adverse Project effects on vulnerable populations. In particular, the following limitations were encountered:

- Traffic analysis was conducted in support of this Project; the forecasted traffic volumes presented in the **Appendix 18.1 Traffic Modelling Report** were used to assist with the assessment of effects related to changes in motor vehicle traffic patterns on physical connectivity between neighbourhoods and between Surrey and New Westminster. The traffic modelling relied on a set of assumptions regarding transportation investments, Metro Vancouver population growth, and employment growth that may differ from what actually happens in the future.
- Limited information is available to assess the extent to which population groups may be particularly vulnerable to adverse Project effects such as noise, vibration, changes to visual quality, and barriers to neighbourhood connectivity.

These data constraints did not limit the assessment of Community Cohesion as sufficient information was available to gauge the likelihood of adverse effects in an EA context.

6.3.2 Existing Conditions

This section describes existing conditions for each of the two subcomponents of the Community Cohesion VC, Neighbourhood Connectivity and Social Equity. This includes:

- a regional overview and historical activities
- key data sources and information
- a description of existing neighbourhood connectivity in and near the LSA
- a description of existing conditions for the Social Equity subcomponent

This section refers to individual neighbourhoods and planning areas in New Westminster and Surrey described in **Section 6.2 Land Use**; see **Figures 6.3-A-3, 6.3-A-4 a**nd **6.3-A-5** for the boundaries of the neighbourhoods, Census Tracts, and Dissemination Areas (DAs) that overlap the LSA.

6.3.2.1 Regional Overview and Historical Activities

The existing Pattullo Bridge and the proposed replacement bridge are located in an area of longstanding human occupation and use. Aboriginal peoples have lived at and accessed resources in the areas on each side of the Fraser River at the crossing for millennia, as evidenced by archaeological sites (refer to **Section 7.0 Heritage Resources**), oral histories and First Contact stories, and the presence of former reserves (i.e., Musqueam 1, Langley 8). Aboriginal Groups have emphasized their ancestral connections to and the continuing importance of the Fraser River for resource harvesting (particularly fishing) and other traditional purposes, including but not limited to its importance as a transportation route (refer to **Section 12.0 Aboriginal Consultation** for Group-specific details).

The earliest crossings of the Fraser River were by canoe, including a canoe ferry service operated by Kwantlen people. In 1904, ferry boat services between the north and south shores of the river were replaced by the New Westminster Railway Bridge (NWRB), which allowed people and other vehicles to travel on an upper deck above the train tracks. The existing Pattullo Bridge was built in 1937 to service the growing motor vehicle traffic between New Westminster and Surrey, and as a key link for the Pacific Highway south to the U.S. and the TransCanada Highway.

Over time, other Fraser River crossings were built to connect to new highways, but the Pattullo Bridge remained an important connection between the communities of Surrey and New Westminster. The current Regional Growth Strategy and the Official Community Plans of both communities reinforce the importance of the connection. (**Section 6.2 Land Use** describes local and regional land use plans and assesses the compatibility of the Project with those plans).

6.3.2.2 Data Sources and Reliability

Preparation of baseline information for Community Cohesion required desktop research and visits to the Project site. **Table 6.3-4** summarizes some of the key studies and data sources. **Appendix 18.11 Social**

and Economic Statistical Data provides more detailed information, including a list of references and tables of demographic and other socio-economic data in support of the assessment of Project effects on social and economic values considered in this Application.

Table 6.3-4 Summary of Relevant Studies Related to Community Cohesion

Study Name/Data Source	Study Relevance/Purpose
Canada Census and National Household Survey (NHS) (Statistics Canada 2016)	Provides Statistics Canada data on LSA, RSA, Metro Vancouver, and BC, including data on Aboriginal and total population, number of dwellings, household income, commuting patterns, and other demographic data; detailed summary tables are included in **Appendix 18.11**.
Parsons Traffic Analysis Report (January 2018) and the Environmental Assessment Input - Traffic Modelling Report prepared for the Project (**Appendix 18.1**)	Provides comparable modelled traffic estimates (using an EMME model) which were then expanded into AADT volumes for the Project and nearby road network for three scenarios: ▪ 2014 Baseline (this information was largely used for modelling validation purposes and as a starting point for estimating the demands in 2023 and 2030; note that the 2014 data assumes bridge tolls on the Port Mann and Golden Ear Bridges) ▪ 2023 and 2030 No-build Scenario (i.e., rehabilitated bridge that is reduced to three standard lanes, with a reversible centre lane) ▪ 2023 and 2030 Build Scenario (i.e., new four-lane bridge and improved road connections in City of Surrey and City of New Westminster)
TransLink results of the 2011 Metro Vancouver Regional Screenline Survey and Trip Diary Survey	Provides motorized and non-motorized traffic data for selected roads and bridges in Metro Vancouver based on several 24-hour counts and 16-hour surveys to help determine typical weekday traffic in April 2011; includes data on motor vehicle traffic, number of passengers per car (SOV and other), truck traffic by type, pedestrian and bicycle traffic.
Insurance Corporation of BC (ICBC)	Provides collision rates categorized by serious crashes, those resulting in injury or fatality, and those resulting in property damage only for all major Fraser River crossings, including the existing Pattullo Bridge and major Metro Vancouver traffic intersections, several in Surrey.
TransLink, and Metro Vancouver regional transportation and growth plans	Several transportation planning documents were reviewed: TransLink Regional Transportation Strategy (2013); 2011 TransLink cycling strategy (A Regional Cycling Strategy for Everyone); and Metro Vancouver's Regional Growth Strategy (RGS), first completed in 2011 and updated in 2014.
Transportation plans for New Westminster and Surrey	The 2014 New Westminster Master Transportation Plan by Urban Systems, and the 2008 Surrey Transportation Strategic Plan helped provide context for the assessment.
2013/2014 My Health My Community (Fraser Health Authority 2015)	Provides selected health, lifestyle, and socio-economic statistics based on an extensive survey of Metro Vancouver residents; survey results are available for the RSA (New Westminster and Surrey) and for several neighbourhoods overlapping the LSA, including Downtown New Westminster, Queen's Park, Whalley, and Surrey City Centre.
Social planning departments for New Westminster and Surrey	Both Surrey and New Westminster have social planning departments with extensive websites detailing action plans and progress reports directed toward vulnerable populations in their communities.

Study Name/Data Source	Study Relevance/Purpose
Site visits and reviews of satellite images and streetscape images to help determine existing land uses	Several site visits were made to neighbourhoods surrounding the Pattullo Bridge and proposed locations within the alignment of the Reference Concept. These informed development of LSA and RSA boundaries and helped in the assessment of potential Project effects on the existing motorized and non-motorized infrastructure. Reviews also included satellite images and streetscapes through services such as Google Earth as well as images and data provided by municipal, regional, and provincial GIS data services, and by TransLink/Parsons as part of this Project.

6.3.2.3 Current Conditions for Neighbourhood Connectivity Subcomponent

This section describes existing conditions for the neighbourhood connectivity subcomponent of the Community Cohesion VC.

This section frames the context within which the potential Project effects on neighbourhood connectivity will be assessed. Changes in physical connectivity are influenced by:

- factors affecting the demand for connectivity, including population, employment, location of public services/institutions, and community features
- factors facilitating or hindering physical connectivity, including the availability of infrastructure to support the existing motorized, transit, and non-motorized traffic; key attributes of the infrastructure that may act as physical barriers, such as traffic congestion, access, safety, number of traffic lanes, and traffic lights; and geographic barriers such as distances and grades

Within this context, motorized and non-motorized traffic patterns reflect connectivity levels resulting from the interplay of demand factors, supplied infrastructure, and geographic barriers.

6.3.2.3.1 Factors Affecting the Demand for Connectivity in the LSA and RSA

Factors likely to affect the demand for physical connectivity in and near the LSA include population growth, population density, employment growth, the location of major employers and institutions in and near the LSA, and the location of schools, community parks, and other amenities within the LSA.

Population Growth

Population growth leads to increased demand for motorized and non-motorized connectivity. The Land Use VC assessment (**Section 6.2**) provides an overview of the land use plans overlapping the LSA which inform understanding of future population patterns. These plans include the Metro Vancouver Regional Growth Strategy (Metro RGS 2040), which anticipates that the combined population increase for Surrey and New Westminster between 2011 and 2041 will represent 30% of the additional 1.1 million people expected for all of Metro Vancouver, compared to their 23% share of the region's population in 2011.

The significant population increases projected for Surrey and New Westminster to 2041 will have implications for the demand for RSA transportation infrastructure, including the Pattullo Bridge. In Surrey, 27% of the population growth is expected to be in Surrey City Centre, anticipated to reach 111,200 people by 2041, up from 28,400 in 2011.

Population Density

The Regional Growth Strategy (Metro RGS 2014) encourages population growth in town centres where it is easier to connect people with good quality transit, road and pedestrian facilities.

In 2016, based on Canada Census data the LSA in New Westminster had a population density of 4,360 people per km2, which was similar to the population density for all of New Westminster of 4,500 people per km2. Between 2011 and 2016, the population increased by 9% in the LSA in New Westminster.

The population density of the Surrey part of the LSA was only 425 people per km2, largely because the 10 km2 LSA area includes industrial lands lining the waterfront on both sides of the Pattullo Bridge and both sides of Highway 17. For the nearby Surrey City Centre, however, the population density was 4,700 people per km2, about the same as New Westminster. Between 2011 and 2016, the population increased by 1% in the LSA in Surrey and 17% in Surrey City Centre. Future development plans for the Scott Rd SkyTrain Station area could substantially increase the population density in the Surrey part of the LSA.

Employment Growth, Employment Centres, and Institutions in the LSA and RSA

Employment centres and large institutions create significant demand for transportation services. Employment and educational institutions also typically start and end at similar times of the day, contributing to peak hour traffic volumes and stretching infrastructure to capacity. Encouraging employment growth in areas that are supported by sufficient and sustainable transportation access is an important element of the Regional Growth Strategy (Metro RGS 2040).

Downtown New Westminster, the Surrey part of the LSA, and Surrey City Centre include regional employment clusters that are expected to continue to affect the demand for physical connectivity and commuting traffic patterns in and near the LSA and RSA:

- Employment in Downtown New Westminster is expected to grow from an estimated 7,250 jobs in 2011 to 11,000 jobs by 2031, a 50% increase over the 20-year period.
- South Westminster in Surrey is a vibrant industrial and commercial area that is expected to host almost 20,000 jobs if development proceeds in accordance with the neighbourhood concept plan for the area (while no expected time frame to full build-out is provided in the plan, this would represent a three-fold increase from an estimated 4,760 jobs in 2010).
- Employment in Surrey City Centre is expected to increase from 23,180 jobs in 2012 to 36,650 jobs by 2041, a 58% increase over 30 years.

These same neighbourhoods in and near the LSA and RSA include several large public institutions that are likely to continue to influence commuting traffic patterns within the LSA and between New Westminster and Surrey, and contribute to the demand for connectivity along the Pattullo Bridge corridor and associated approach routes:

- Douglas College on Royal Ave and 8th St in Downtown New Westminster has a student population of 10,000 full-time-equivalent students at its main New Westminster campus and the satellite Coquitlam campus. Based on the 2015 Immediate Fall Transition enrollment from Lower

Mainland School Districts, Douglas College students are drawn from Surrey (30%), New Westminster (8%), and other Lower Mainland communities such as Coquitlam (30%), Burnaby (12%), and Ridge-Meadows, Delta, and other municipalities (20% combined).

- Major health service facilities within the RSA boundaries that serve LSA and RSA residents and generate employment in both communities include:
    - Royal Columbian Hospital on East Columbia St in Sapperton, a large regional hospital serving the communities of New Westminster, Coquitlam, Port Moody, and Port Coquitlam
    - Surrey Memorial Hospital, the BC Cancer Agency, and the Jimmy Pattison Outpatient Care & Surgery Centre, which are located at or near the south end of Surrey City Centre
- The Simon Fraser University (SFU) campus on 102 Ave in Surrey City Centre (approximately 3 km from the Bridgeview LSA neighbourhood) serves approximately 7,500 students in its 30,000 m^2 building; SFU's expansion plans for Surrey City Centre include a new building providing approximately 14,400 m^2 over five floors.
- The main campus of Kwantlen Polytechnic University (KPU) on 72 Ave and King George Blvd in Surrey is approximately 10 km south of the Bridgeview LSA neighbourhood; KPU has approximately 20,000 students enrolled at its four campuses in Metro Vancouver, and a new satellite campus is planned for Surrey City Centre to serve approximately 1,600 students each year.
- Other major destination service institutions in Surrey City Centre include Surrey City Hall, the Surrey Public Library, and Revenue Canada. In New Westminster, these include City Hall, the Provincial Court House, and the Land Title and Survey Authority of BC in the Downtown neighbourhood, and the Justice Institute of BC on McBride Blvd in Victory Heights.

The locations of community amenities within LSA neighbourhoods influence the demand for connectivity and regional and local motorized and non-motorized traffic volumes. Such facilities within the LSA include:

- several large regional parks (e.g., Queen's Park, Westminster Pier Park, Brownsville Bar Park)
- smaller neighbourhood parks (e.g., Albert Crescent Park, Glenbrook Ravine Park, Bridgeview Park)
- seniors' residences (e.g., Queen's Park Care Centre residential care bed facility, Good Samaritan Canada Victoria Heights in Glenbrooke South, several others in Glenbrooke North)
- community recreation centres and recreation facilities (e.g., Canada Games Pool and Fitness Centre, Centennial Community Centre, and Bridgeview Community Centre)

Elementary and Secondary School Locations and Catchment Areas in the LSA and RSA

School locations and catchment areas also affect motorized and non-motorized traffic patterns and contribute to the demand for connectivity. Walking or cycling to school are often the preferred modes of transportation and maintaining safe non-motorized access near schools is an important element of neighbourhood connectivity. Several schools within the LSA have catchment areas that extend across major transportation corridors such as McBride Blvd and Royal Ave in New Westminster and King George Blvd in Surrey. These major arterial roads have major arterial roads have adjacent sidewalks and specific non-motorized facilities that enable safe crossing of non-motorized traffic.

In **New Westminster**, the École Qayqayt Elementary School on Merivale St south of Royal Ave in the Albert Crescent Precinct of Downtown New Westminster, is a K-5 school whose catchment area extends across McBride Blvd, including part of the Glenbrooke South neighbourhood between McBride Blvd and the Glenbrook Ravine Park, and between East Columbia St and Blackberry Dr. The school-recommended walking route to and from Glenbrooke South uses the Memorial Dr pedestrian/ bicycle overpass instead of the busy McBride Blvd intersections at Royal Ave East (two-way crosswalk) and East Columbia St. For students residing between East Royal Ave and Columbia St, however, using the pedestrian overpass adds approximately 500 m additional distance to the more direct one km route using the McBride Blvd/ Royal Ave East intersection, and includes a considerable uphill grade.

Three other schools in New Westminster also have catchment areas that overlap the LSA and extend across McBride Blvd (Fraser River Middle School, Glenbrook Middle School and New Westminster Secondary School). Students walking or cycling to these schools from east of McBride Blvd can cross McBride Blvd at either of the two pedestrian/bicycle overpasses near Memorial Dr or 7th Ave without incurring any noticeable detour.

In **Surrey**, Bridgeview Elementary School on 115A Ave near 128 St is a K-7 school with approximately 150 students. The school's catchment area overlaps the Surrey part of the LSA, including the Bridgeview neighbourhood and the area between King George Blvd and Old Yale Rd, and between 128 St and the riverfront. There are several major roads within the school's catchment that require specific crossing opportunities for non-motorized traffic including King George Blvd, Scott Rd/120 St, Bridgeview Dr, and Old Yale Rd. Within the school's catchment area, Bridgeview Elementary is easily accessible from neighbourhood streets in the mainly residential area north of King George Blvd and west of Bridgeview Dr. For students residing south of King George Blvd or east of Bridgeview Dr non-motorized access is provided by an overpass at 126 St, and there is a traffic light at Bridgeview Dr. and King George Blvd.

Two secondary schools located outside the LSA have catchment areas that overlap the LSA and extend on both sides of King George Blvd. Kwantlen Park Secondary School on 132 St near 104 Ave is the catchment secondary school for Bridgeview Elementary school students. The City Central Learning Centre at 109 Ave and 131A St is a secondary school of approximately 200 students and 20 staff designed to help adolescents and young adult students re-engage in the educational process and re-enter school at a grade 10, 11, or 12 level. Students residing in Bridgeview who walk or cycle to these schools would use the overpass at 126 St or the traffic light at Bridgeview Dr to cross King George Blvd.

The Surrey part of the LSA also includes other learning institutions that are privately owned or offer specific training programs:

- The main campus of Khalsa School, a private school at 10677-124 St, serves approximately 1,400 students in primary grades and 300 in Grades 8 to 12 (there are two other satellite campuses in Newton (Surrey) and in Mission). Khalsa School is approximately 1.2 km walking distance from the Scott Road SkyTrain Station and 2.3 km from the Bridgeview Community Centre via the 126A St pedestrian overpass across King George Blvd.

- CDI College is a for-profit, non-sectarian, career-oriented institute with a campus located on 124 St in the Transit-Oriented Urban Village district approximately 500 m from the Scott Road SkyTrain Station.
- Several training institutions for industrial trades, such as the Trowel Trades Training Association and Finishing Trades Institute of BC, are located in the Bridgeview Industrial area between the waterfront and Highway 17 along 116 Ave/Industrial Dr. Non-motorized traffic between these facilities and the Bridgeview residential area or Scott Rd SkyTrain Station is facilitated by the pedestrian/ bicycling overpass across Highway 17 at 112A Ave.

6.3.2.3.2 Connectivity Infrastructure: Bridges and Roads

Motor vehicle transportation infrastructure promotes connectivity within neighbourhoods and cohesion between communities by providing for the movement of goods and people. Some elements of transportation infrastructure can also create barriers to local motor vehicle traffic due to road congestion and access restrictions. Motor vehicle roads with multiple lanes of traffic can inhibit non-motorized traffic mobility unless accommodation is made by means of traffic lights and crosswalks at intersections, multi-use paths, and other non-motorized infrastructure facilities.

This section describes current traffic patterns, safety and other attributes of the existing Pattullo Bridge and major roads in the New Westminster and Surrey sections of the LSA.

Connectivity Infrastructure: Existing Pattullo Bridge

The existing Pattullo Bridge was built in 1937 to service the increasing amount of motor vehicle traffic between New Westminster and Surrey. Before that time, people and other vehicles travelled on the upper deck of the NWRB, which was built in 1904 and has remained in operation as a railway bridge ever since. Since 1937, four major crossings of the Fraser River have been added; starting downstream of the Pattullo Bridge, they include:

- the four-lane George Massey Tunnel (GMT), which opened in 1959 and for which planning is underway for a replacement crossing
- the six-lane Alex Fraser Bridge (which opened with four lanes in 1986) linking Delta with New Westminster via Annacis Island and the Queensborough Bridge built in 1960 (planning is underway to expand the Alex Fraser Bridge capacity to seven lanes)
- the ten-lane Port Mann Bridge, which opened in 2012, replacing the five-lane bridge built in 1964
- the six-lane Golden Ears Bridge, which opened in 2009 replacing the ferry service between Maple Ridge and Langley

Including the existing four-lane Pattullo Bridge, a total of 30 lanes of motor vehicle traffic cross the Fraser River in Metro Vancouver as of 2017. The TransLink Screenline Survey for the Metro Vancouver region reported that average weekday traffic for the Pattullo Bridge in 2011 was 67,500 vehicles, which represented 13% of the estimated 503,000 crossings over the Fraser River (based on a two-week automatic vehicle count).(TransLink 2013b)

Since 2011, motor vehicle traffic on the Pattullo Bridge has been affected by the following recent changes in road infrastructure:

- the Port Mann Bridge replacement project, which was completed in 2012
- bridge tolling on the Port Mann Bridge, which was partially introduced in November 2012 and completely implemented on February 28, 2013, before ending on September 1, 2017
- completion of Highway 17 in December 2013
- partial closures of the existing Pattullo Bridge for resurfacing in 2016, which reduced annual average traffic volumes for that year

In September 2017, the tolls on the Port Mann Bridge and the Golden Ears Bridge were removed. This affected regional traffic patterns in Metro Vancouver, including traffic on the Pattullo Bridge. As indicated in the Traffic Analysis Report (**Appendix 18.1**) and **Section 1.0 Project Overview**, the average daily traffic for 2017 was 70,000 motor vehicles but this included 9 months of higher traffic before tolls were removed on other bridges, and 3 months at daily traffic levels averaging approximately 60,000 motor vehicles after toll removals.

The Pattullo Bridge has narrow lane widths, no centre median, substandard geometry and a relatively narrow sidewalk on the west side of the bridge for non-motorized traffic. In the past two decades, several traffic safety initiatives have been implemented on the existing bridge including closely spaced, raised pavement markers to clearly delineate lane lines, better signage, and night-time centre lane closures.

Appendix 18.11 summarizes ICBC data on the number of accidents for the Pattullo Bridge, other Fraser River crossings and for the top ten crash intersections in the Lower Mainland. In 2013, the latest year for which ICBC data were readily available, the Pattullo Bridge had 155 crashes, including 60 serious accidents involving injury and/or fatality and 95 property damage only (PDO) accidents. As is reported by ICBC, the number of accidents and accident rates depend on a wide variety of contributing factors such as traffic volumes, speed, alcohol and drug impairments, distractions, high-risk behavior (e.g. following too close) and road conditions. (ICBC 2016)

Connectivity Infrastructure: New Westminster Road Network

The New Westminster Master Transportation Plan classifies roads within the City of New Westminster as follows:

- Provincial highways fall within the jurisdiction of MoTI and include Highway 91A, the Queensborough Bridge, Stewardson Way (west of 6th Ave), and Brunette Ave (north of Braid St), all outside the LSA.
- Major Roads (i.e. roads that are part of the Metro Vancouver MRN) in the LSA include Royal Ave, 10th Ave, McBride Blvd, and East Columbia St (between Brunette Ave and McBride Blvd); Major Roads in the RSA include Boyd St, Derwent Way, Stewardson Way, and Brunette Ave.

- City Arterials roads (i.e. roads that are intended for longer-distance local and regional mobility with daily traffic volume of 5,000 to 20,000 vehicles) in the LSA include Front St.

- City/ Neighbourhood Collector Roads (i.e roads that are intended to connect traffic from local roads to arterial and major roads, and place equal importance on traffic movement and access to properties with daily traffic volume of less than 8,000 daily vehicles with some exceedances) in the LSA include: Columbia St, Carnarvon St, Royal Ave and 8th Ave west of McBride Blvd; and East 10th Ave, East 8th Ave, East Columbia St north of the Brunette Ave intersection, and parts of East 6th Ave, Cumberland St and Richmond St.

- Local Roads (i.e. roads that provide a high level of access to individual properties typically with less than 1,000 daily vehicles) in the LSA include Agnes St, the north-south streets such as 1st St, 2nd St and 3rd St, and many others throughout the LSA/RSA.

The estimated Annual Average Daily Traffic (AADT) data presented in this report were determined by applying expansion factors to the EMME hourly volume outputs. The assumptions, methodology, and limitations of this data can be found in the Traffic Analysis Report (**Appendix 18.1**). This level of resolution is considered adequate to understand potential effects on Community Cohesion.

Table 6.3-5 provides a brief description of how the existing transportation infrastructure affects physical connectivity for motorized and non-motorized traffic within and between the New Westminster LSA neighbourhoods. While not necessarily indicative of recent traffic volumes or changes due to the removal of tolls on other bridges, the 2014 baseline AADT estimates are referenced in the table to help demonstrate general traffic flows in the surrounding areas.

Table 6.3-5 Key Attributes of New Westminster Transportation Infrastructure in and Near LSA

Major Streets	2014 Estimated AADT (1)	Motor Vehicle Transportation Infrastructure and Accommodation for Non-Motorized Traffic
Pattullo Bridge and access ramps	Approximately 74,500 daily vehicles on bridge (49% southbound and 51% northbound)	Motorists can currently access the Pattullo Bridge via i) southbound McBride Blvd, ii) the eastbound Royal Ave on-ramp, and iii) the westbound E. Columbia St on-ramp. Due to safety and traffic operational considerations, the westbound E. Columbia St on-ramp is closed to all traffic – except emergency vehicles – from 3-6 pm on weekdays. A single narrow sidewalk accommodates non-motorized traffic on the west side of the existing bridge, with access along the E. Columbia St on-ramp. Observed pedestrian and cyclist usage is generally low (based on approximately TransLink's 2011 Screenline survey, 8 pedestrians and 56 bicycles were observed within a 16-hour period on an April weekday, of which 52 bicycles were observed within the 9-hour peak period).
McBride Blvd	40,000 daily vehicles just south of Memorial Dr (two-way)	McBride Blvd is a north-south truck route that links 10th Ave to the Pattullo Bridge, with an exit to Royal Ave prior to the bridge. Northbound traffic from Pattullo Bridge continues onto McBride Blvd, with a loop-ramp exit to Royal Ave. Traffic can also turn onto East Columbia St. via southbound McBride Blvd.

Major Streets	2014 Estimated AADT (1)	Motor Vehicle Transportation Infrastructure and Accommodation for Non-Motorized Traffic
	1,400 daily vehicles on the one-way northbound segment north of Royal Ave 12,800 daily vehicles south of Royal Ave (consisting of 10,500 southbound vehicles and 2,300 northbound vehicles)	The New Westminster neighbourhoods of Victory Heights and Glenbrooke South are on the east side of McBride Blvd; and Glenbrooke North, Queen's Park, and Downtown New Westminster are on the west side. Existing signalized intersections along McBride Blvd include: ▪ McBride Blvd / E. Columbia St (pedestrian crossing on the west approach, and multi-use path crossing on the north approach) ▪ Royal Ave (pedestrian crossing on the south and east approaches) ▪ Memorial Dr (pedestrian crossing on the east approach) ▪ 6th Ave and 8th Ave (pedestrian crossings on all approaches) ▪ 10th Ave (pedestrian crossing on the east and south approaches) There are also two overpasses for bicycles and pedestrians, one just south of Memorial Dr and one at 7th Ave. Sidewalk is generally provided on the east side of McBride Blvd only, except south of Royal Ave where sidewalk is provided on both sides. A multi-use path on the east side of McBride Blvd provides a link to the Central Valley Greenway, the BC Parkway, and the Albert Crescent ramp sidewalk to the Pattullo Bridge.
Royal Ave	31,000 daily vehicles just east of 1st St 13,000 daily vehicles on the eastbound on-ramp to Pattullo Bridge	Royal Ave is an east–west truck route (time restricted) and connects Stewardson Way to McBride Blvd. An eastbound on-ramp is provided for vehicle access onto the Pattullo Bridge. ▪ East of McBride Blvd, Royal Ave becomes East Royal Ave, a collector road through Glenbrooke South. ▪ Downtown New Westminster is on the south side of Royal Ave west of 1st St, and the Queen's Park neighbourhood is on the north side of Royal Ave. Traffic lights at key intersections facilitate motor vehicle and non-motorized traffic crossing. ▪ Sidewalk is provided on the south side only between 1st St, Granville St and McBride Blvd; west of Granville St, a sidewalk is generally provided on both sides.
Columbia St (west of McBride Blvd)	13,500 daily vehicles west of the on-ramp to Pattullo Bridge	Within the LSA boundaries, Columbia St is the major historic east–west commercial and retail street as well as an important bicycle route through Downtown New Westminster. It is also a key transit destination due to the presence of the Columbia SkyTrain Station at 4th St, just outside the LSA, and the New Westminster SkyTrain Station at 8th St outside the LSA. A pedestrian-activated light at Elliott St and a traffic light at 4th St facilitate motor vehicle and non-motorized traffic crossings. As Columbia St is not a truck route, no direct connection is provided between eastbound Columbia St and the Pattullo Bridge.

Major Streets	2014 Estimated AADT (1)	Motor Vehicle Transportation Infrastructure and Accommodation for Non-Motorized Traffic
East Columbia St (east of McBride Blvd)	31,000 daily vehicles 40,000 daily vehicles east of Front St merge 4,800 daily vehicles on the Albert Crescent Park on-ramp to Pattullo Bridge.	Westbound traffic on East Columbia St can access the Pattullo Bridge via the Albert Crescent Park on-ramp west of McBride Blvd, except during the afternoon peak period closure. Within the LSA, East Columbia St divides the Glenbrooke South neighbourhood from the New Westminster industrial waterfront and Sapperton Landing Park east of the existing Pattullo Bridge. Immediately north of East Columbia St, a major escarpment and park provide a buffer between the Glenbrooke South residential areas and East Columbia St, the tracks and infrastructure related to the SkyTrain, and heavy rail tracks associated with NWRB and other railway operations. Pedestrian access to the waterfront (Sapperton Landing Park) is provided at the Cumberland St traffic light. Outside the LSA, East Columbia St between Cumberland and Braid St is a key north–south connector between New Westminster and the City of Coquitlam and is part of the municipal truck route network. Past Brunette Ave, East Columbia St is an important collector road for the Sapperton neighbourhood of New Westminster, providing access to commercial, institutional (Royal Columbian Hospital), and retail land uses.
Front St	8,000 vehicles west of Pattullo Bridge	Front St is an east-west arterial truck route, which, combined with the rail corridor on both sides of the street, acts as a barrier between Downtown New Westminster and the Fraser River waterfront. There are no pedestrian and cyclist facilities within the Front St right-of-way in the vicinity of the Pattullo Bridge.

Note 1: All AADTs are rounded; see **Appendix 18.1** for more detail.

Connectivity Infrastructure: Surrey Road Network

The City of Surrey's road network follows four broad road classifications:

- **Provincial highways and related infrastructure** fall within the jurisdiction of MoTI; examples include Highway 17 and Highway 1.
- **Major Arterial Roads** that are part of the Major Road Network and other Arterial Roads are the main arteries for vehicles through and within Surrey. They are primarily for through traffic, have restricted access, and are important routes for emergency services. Ultimately, Surrey's Arterial Roads are planned to have two lanes in each direction, bicycle lanes, sidewalks, streetlights, a landscaped median, and no parking. In the LSA, examples include: King George Blvd, Scott Rd/120 St south of King George Blvd, and Bridgeview Dr north of King George Blvd.
- **Collector Roads** are designated to allow traffic flow within larger neighbourhoods and town centres, provide connections between adjacent arterial roads, and serve as important routes for emergency services. Ultimately, they are planned to have two travel lanes, parking on at least one side of the road, bicycle lanes, and grass boulevards with streetlights and sidewalks. In the LSA, examples include: 110 Ave near the Scott Road SkyTrain Station, Timberland Rd in the South Westminster industrial area, 124 St, 114 Ave, and 112A Ave in the residential area of the Bridgeview neighbourhood, and 116 Ave/Industrial Rd north and west of Highway 17.

- **Local Roads** which are planned to allow two-way travel and ultimately have parking on at least one side of the road, sidewalks, and streetlights. In the LSA, examples include the streets within the Bridgeview residential and industrial neighbourhoods not previously identified.

Table 6.3-6 provides a brief description of how the existing transportation infrastructure affects physical connectivity for motorized and non-motorized traffic within and between the Surrey LSA neighbourhoods. While not necessarily indicative of recent traffic volume and changes due to the removal of tolls, the 2014 baseline estimated AADT is also referenced in the table to better help demonstrate the general commuting patterns in the surrounding areas.

Table 6.3-6 Key Attributes of Surrey Transportation Infrastructure in and near LSA

Major Streets	2014 Estimated AADT (1)	Motor Vehicle Transportation Infrastructure and Accommodation for Non-Motorized Traffic
Pattullo Bridge and access ramps	74,500 daily vehicles	Surrey access to the existing Pattullo Bridge is from either King George Blvd (22,100 daily vehicles or 58% of NB traffic) or from Scott Rd (16,000 daily vehicles or 42% of NB traffic) Southbound Pattullo Bridge traffic either continues onto King George Blvd (20,700 daily vehicles or 57% of SB traffic) or exits via the Scott Rd southbound exit lanes (15,700 daily vehicles or 43% of SB traffic) There are currently no direct connections between the Pattullo Bridge and Highway 17. For non-motorized traffic, the single narrow sidewalk on the west side of the Pattullo Bridge exits to 111 Ave and continues along the BC Parkway alignment.
King George Blvd	45,200 daily vehicles between 126A St and Bridgeview Dr/ 128 St	King George Blvd is part of the Major Road Network, truck route network, and the Surrey Dangerous Goods Routes linking the Pattullo Bridge with Surrey City Centre and South Surrey. Within the LSA, the Bridgeview neighbourhood is on the north side of King George Blvd, and South Westminster is on the south side. Several businesses within the LSA have immediate street access onto King George Blvd. Street intersections are limited to the Scott Rd entry and exit lanes, and the Bridgeview Dr/128 St traffic light/intersection. Within the LSA, there is no accommodation for non-motorized traffic on the south side of King George Blvd, until east of Bridgeview Dr; the north side of King George Blvd has a sidewalk for pedestrians that extends from the eastern boundary of the LSA to 124 St. Non-motorized access also includes a bicycle/pedestrian overpass at 126A St.

Major Streets	2014 Estimated AADT [1]	Motor Vehicle Transportation Infrastructure and Accommodation for Non-Motorized Traffic
North of King George Blvd		
Bridgeview Dr south of 128 St	14,000 daily vehicles	Bridgeview Dr is a north–south arterial road and a Surrey truck route that facilitates motor vehicle access to Highway 17 for eastbound traffic exiting the Pattullo Bridge (traffic destined to the southbound section of Highway 17 would likely exit at Scott Rd). A traffic light at Bridgeview Dr/128 St and King George Blvd facilitates access to and from Bridgeview Dr, particularly left turns onto Bridgeview Dr northbound. The traffic light and interchange at Bridgeview Dr and Highway 17 provide motor vehicle and non-motorized access to and from Highway 17 and connect the industrial area along the Surrey waterfront with the rest of Surrey.
124 St south of Highway 17	Less than 500 daily vehicles estimated	In the Bridgeview neighbourhood, 124 St is a collector road that provides access to the industrial properties on the west side of 124 St as well as right-in/right-out access to and from the Highway 17.
South of King George Blvd		
Scott Rd	35,000 daily vehicles between King George Blvd and Old Yale Rd 27,000 daily vehicles south of Old Yale Rd	Scott Rd is part of the Major Road Network and a major north–south transportation corridor and truck route in Surrey. Scott Road connects to Pattullo Bridge via King George Blvd. Scott Rd also provides access to the north Scott Road Station Park and Ride lot, as well as the Scott Road Station bus exchange. Within the LSA, three east–west streets cross Scott Rd: Old Yale Rd/108 Ave, Tannery Rd/104 Ave, and 110 Ave/111 Ave. Scott Rd has designated cycling paths on each side.
110 Ave	2,500 daily vehicles	110 Ave is parallel to King George Blvd and provides access to the south Scott Road Station Park and Ride lots. A bicycle lane along 111A Ave connects the Scott Road SkyTrain Station to the BC Parkway cycling path through either a series of crosswalks and parking areas, or a substantial detour along 110 Ave.
Old Yale Rd	3,300 daily vehicles west of Highway 17 and 8,700 daily vehicles east of Highway 17	Old Yale Rd is an east–west arterial road and is part of the Surrey truck route network. It provides access to/from Highway 17 at an existing signalized intersection, as well as access to the Surrey Fraser River waterfront. Old Yale Rd is a major link between Surrey City Centre and the riverfront, becoming 108 Ave east of 128 St. There is a multi-use path on the south side of Old Yale Rd between Scott Rd and the riverfront.
104 Ave/ Tannery Rd	10,700 daily vehicles between Scott Rd and Highway 17	Tannery Rd is an east–west arterial and a Surrey truck route. The Tannery Rd interchange at the intersection with Highway 17 facilitates motor vehicle traffic destined to and from the South Westminster waterfront industrial area and the VFPA Fraser Surrey Docks (FSD) terminal. (Access from Highway 17 to FSD through Elevator Rd, near the southern boundary of the LSA, was closed in February 2016 with the completion of a new route that connects Robson Rd and Timberland Rd from the Tannery Rd overpass.) 104 Ave and Tannery Rd are vehicle-oriented arterials connecting Surrey City Centre to South Westminster and do not provide for non-motorized traffic.

Major Streets	2014 Estimated AADT (1)	Motor Vehicle Transportation Infrastructure and Accommodation for Non-Motorized Traffic
Timberland Rd/Bridge Rd	Less than 1,000 daily vehicles estimated on Bridge Rd (one way) 2,400 daily vehicles near Tannery Rd	Timberland Rd is a collector road that services the industrial area along the Surrey waterfront in South Westminster; it runs parallel to Highway 17 from Old Yale Rd to the north, up to and past Tannery Rd to the south. Bridge Rd provides a one-way eastbound connection between the waterfront industrial areas north and south of the Pattullo Bridge.
Highway 17	17,000 daily vehicles south of Old Yale Rd 24,000 daily vehicles south of Tannery Rd	Highway 17 is a provincial highway with limited access points within the LSA, and is part of the Dangerous Goods Route network for Surrey. Within the LSA, access is facilitated by an interchange at Tannery Rd and a traffic signal at Old Yale Rd, Bridgeview Dr, and 136 St. There is also an existing at-grade road/rail crossing at the Southern Rail crossing. Other streets providing right-in/right-out access include Elevator Rd and 103 Ave in South Westminster and 124 St in Bridgeview. Highway has designated shoulder bicycle lanes in each direction.

Note 1: All AADTs were rounded; see **Appendix 18.1** for more detail.

6.3.2.3.3 Connectivity Infrastructure: Public Transit

Public transit promotes community mobility and neighbourhood connectivity through facilitating safe, comfortable and reliable local and regional travel to pedestrians, individuals with mobility challenges and enhancing regional cycling travel. TransLink operates the transit system within Metro Vancouver, including in New Westminster and Surrey.

The existing Pattullo Bridge is not a key public transit link, and the only scheduled bus route that uses the bridge is a night bus service connecting downtown Vancouver to the Surrey Central SkyTrain Station (Route N19 from downtown Vancouver starting at 1:39 am until 4:09 am on weekdays, 6:09 am on Saturdays, and until 7:09 am on Sundays). During night closures of the Pattullo Bridge for maintenance, the night bus service is rerouted to the Alex Fraser Bridge. The bridge is also used for buses travelling between Columbia St Station and Scott Road Station if there are disruptions to the SkyTrain system across the SkyTrain Bridge.

The New Westminster and Surrey public transit services in and near the LSA are largely based on rapid rail transit (SkyTrain), coordinated with bus service to local and regional destinations.

- New Westminster has been connected by SkyTrain rapid rail transit between the Vancouver Waterfront Station, Burnaby, and New Westminster since the Expo Line opened in January 1986. Expansions to the Expo Line in 1990 and 1994 included the new Columbia St SkyTrain Station in New Westminster and the extension of rapid transit to Surrey.

- The SkyTrain Bridge (located downstream of the Pattullo Bridge) has provided a public rapid transit connection between New Westminster and Surrey since March 1990, when the SkyTrain Expo Line was extended to the Scott Road SkyTrain Station in Surrey. This line was extended again in 1994 to include three additional stations in Surrey City Centre.
- The Millennium Line was opened in 2002, providing further connections in New Westminster at Sapperton Station and north Burnaby.

TransLink's Frequent Transit Network throughout Metro Vancouver is a network of corridors that provide transit service every 15 minutes or better throughout daytime hours starting at 6 am on weekdays, 7 am on Saturdays, and 8 am on Sundays, until 9 pm every day.

Bus service within the LSA in New Westminster includes:

- Routes on key east–west transit corridors such as Route 128 on 8th Ave and Route 155 on 6th Ave (Route 155 links the Braid SkyTrain Station, the Royal Columbian Hospital on East Columbia St and the 22nd Ave SkyTrain Station).
- Three local bus routes that service east–west routes including Royal Ave, Agnes St, and Columbia St, and north–south routes such as 2nd St in the Queen's Park neighbourhood and Francis Rd, Cumberland St, and Richmond St in Glenbrooke South:
    - local bus route C3 links Victoria Hill/Glenbrooke South to Quayside via East Royal Ave/Royal Ave and Agnes St
    - local route C4 services the Queen's Park and Downtown neighbourhoods
    - local route C9 links Glenbrooke South with the New Westminster SkyTrain Station and Lougheed SkyTrain Station in Burnaby via Columbia St/East Columbia St

In Surrey, the transit system relies on an extensive network of conventional buses and includes nine major bus loops (exchanges): at the Scott Road SkyTrain Station in the LSA, at the three Surrey City Centre SkyTrain Stations near the LSA, and at 5 other more regional centres (i.e. Guildford, Newton, Scottsdale (120 St [Scott Rd] and 72 Ave), South Surrey, and White Rock.) Bus services within Surrey that are part of TransLink's Frequent Transit Network include:

- a major north–south transportation corridor on Scott Rd that links the Scott Road SkyTrain Station in the LSA with the Newton exchange in Surrey and includes several bus routes such as the local 312, 319 and 391 routes and the regional 640 bus route to the exchange/bus loop in Ladner (outside the RSA)
- several routes along major arteries such as King George Blvd, 104 Ave, and Fraser Highway that link the Surrey Central exchange with other major bus loops/exchanges in Surrey and operate primarily outside the LSA

In the LSA, the bus route C7 links the Bridgeview neighbourhood with the Scott Rd SkyTrain Station and Surrey City Centre SkyTrain station.

The Scott Road SkyTrain Station, near Scott Rd and King George Blvd, is located within the LSA. It includes four security-patrolled Park and Ride lots, spaces for passenger pick-up and drop-off, and a bus exchange serving multiple bus routes including connecting routes to the Ladner Exchange and Newton Exchange. The two northern Park and Ride lots and the bus exchange are accessed from Scott Road, and the two southern Park and Ride lots are accessed from 110 Ave.

The other three SkyTrain stations in Surrey are in the City Centre:

- Gateway SkyTrain Station, at 108 Ave and University Dr, at the northern end of Surrey City Centre
- Surrey Central SkyTrain Station, at 10277 City Parkway (102 Ave and 135 St) beside the Surrey Recreation Centre and the SFU campus in Surrey City Centre. Surrey Central includes a bus loop/exchange for approximately 12 bus routes linking the City Centre to other Surrey regional centres
- King George SkyTrain Station, on King George Blvd at 100 Ave

There are no dedicated bus lanes in either the New Westminster or Surrey parts of the LSA, and the bus transit system is reliant on the same street grid as other motor vehicle traffic. Dedicated guideways for the SkyTrain rapid transit system run through the LSA in both New Westminster and Surrey.

6.3.2.3.4 Connectivity Infrastructure: Non-Motorized Traffic

Non-motorized transportation infrastructure such as sidewalks and bicycling paths can influence community cohesion by facilitating convenient and safe travel within neighbourhoods and encouraging people to interact with their neighbours and community. Pedestrian and cycling facilities that provide efficient connections between popular origins and destinations (e.g. residential areas to commercial area, recreational facilities and/or transit services) can help people avoid having to rely on motorized transportation modes. Increased walking and cycling can help relieve traffic congestion, has personal and community health benefits, and can improve the perceived sense of personal safety and security. This is discussed more fully in **Section 8.2 Social Determinants of Human Health**.

Both New Westminster and Surrey have developed cycling and walking strategic plans that stress the importance of non-motorized infrastructure in fostering neighbourhood connectivity, cohesion, and sustainability. Non-motorized facilities are important to community mobility and connectivity and can mitigate barriers created by major transportation corridors such as railways and major roads.

There is a desire to improve pedestrian and cycling facilities across the region in order to encourage more walking and cycling. TransLink completed a regional cycling strategy for Metro Vancouver in 2011 and an implementation plan in 2013 to combine all existing and planned bikeway networks in the region. (TransLink 2011 and TransLink 2013a)

- Key objectives of the regional cycling strategy and implementation plans are to increase the share of all trips of less than 8 km by bicycle from 2.2% in 2011 to 15% by the year 2040, and to improve cycling safety (TransLink 2011, pp. iii, 7, and 27).

- The target range for trips that can be most easily switched to cycling are trips under 8 km.
- Investing in cycling infrastructure is an essential strategy for achieving a shift away from trips in personal vehicles while reducing greenhouse gas emissions. (TransLink 2013a) page 37

The Central Valley Greenway and the BC Parkway are the two main regional cycling routes that traverse the LSA and RSA:

- The Central Valley Greenway is a 24 km route connecting Downtown Vancouver, Burnaby (including Burnaby Lake Park), and Downtown New Westminster, including a section along East Columbia St/Columbia St in the LSA.
- The BC Parkway is a 26 km route that roughly parallels the Expo SkyTrain Line, connecting Downtown Vancouver, South Burnaby, New Westminster (including through Downtown, where it traverses the waterfront section of the LSA on Columbia St), and Surrey City Centre via the Pattullo Bridge, 110 Ave/111 Ave, and King George Blvd.
- The Pattullo Bridge is part of the BC Parkway and the Regional Cycling Network for Metro Vancouver. While bicycle traffic is currently permitted on the Pattullo Bridge sidewalk, the narrow two-way path is shared with pedestrians and attracts very little non-motorized traffic.

The sidewalk provided on the existing bridge for non-motorized traffic does not meet current standards in terms of width and protection from vehicle traffic. Bicycle counts reported in the 2011 TransLink Survey showed the Pattullo Bridge had the lowest non-motorized daily traffic (52 bicycles and 8 pedestrians) compared to other surveyed Metro Vancouver bridges (eg, 139 bicycles and 90 pedestrians for the Queensborough Bridge and 2,044 pedestrians and 1,934 bicycles for the Burrard Bridge, the highest bicycle traffic on a Metro Vancouver bridge at 6% of all vehicles for that bridge). (TransLink 2013b, p. 41)

Given the proximity between Downtown New Westminster and Surrey City Centre, the relatively low non-motorized traffic on the existing bridge suggests that unsatisfactory non-motorized infrastructure is likely impeding potential cycling and pedestrian traffic between New Westminster and Surrey:

- The distances between potential trip generation points in Downtown New Westminster and Surrey City Centre are within TransLink's target range of 8 km for cycling trips:
    - The distance from Downtown New Westminster (e.g., Douglas College) to City Surrey Centre (e.g., SFU campus) is approximately 7.5 km, comprising 6.4 km between Albert Crescent Park at the foot of the Pattullo Bridge in New Westminster and the intersection of 104 Ave and King George Blvd in Surrey; and 1.1 km between Douglas College in New Westminster to the Pattullo Bridge.
    - In 2009 TransLink reported that for all bicycling trips—not just to work or school but also for shopping, business, entertainment, and recreation—the median distance was 1.2 km for New Westminster and 2.8 km for Surrey compared to 3.6 km for Metro Vancouver (TransLink 2009, pp. 68 and 71).
- The Pattullo Bridge, including access ramps, is approximately 1.3 km long, a relatively easy cycling/ walking distance that is only slightly longer than the Queensborough Bridge (0.9 km) and the Burrard Bridge (0.8 km).

The topography between New Westminster and Surrey includes a major escarpment to reach Surrey City Centre and steep grades on north–south routes in New Westminster, which presents a potential constraint to a modal shift to non-motorized traffic.

6.3.2.3.5 LSA and RSA Commuting Patterns – A Reflection of Existing Connectivity

Commuting patterns reflect user choices given a community's existing transportation and transit infrastructure, the location of major employers and institutions, geographic attributes such as distance and grades, and other socio-economic indicators including age, labour force participation rates, education, and income levels.

New Westminster has good transit access with five SkyTrain stations within the municipal boundary, several bus routes and, has good road connections to most of the region. New Westminster also has good sidewalks and is developing more cycling infrastructure. All of this influences mode choice for users.

Surrey has excellent road connections to Provincial highways, regional arterials and local roads. It also has three SkyTrain stations, many bus routes and planned LRT infrastructure. Cycling and walking infrastructure is improving in Surrey and can be used to complement the transit services.

The 2016 Census and 2011 National Household Survey (NHS) by Statistics Canada provide data on labour force commuting patterns. Key findings for New Westminster and Surrey are summarized below.

- Use of Motor Vehicles: In 2016, the proportion of the employed labour force that commuted by automobile, as either passenger or driver, was lower in New Westminster (60%) than in Surrey (81%) and lower than the average for Metro Vancouver (69%). For the LSA part of New Westminster, the proportion was 47% for the Downtown/Albert Crescent Precinct, 69% for the two other New Westminster neighbourhoods combined, and 76% for the Surrey part of the LSA. As tends to be case throughout Metro Vancouver, LSA and RSA residents who commute by automobile are generally drivers of single-occupancy vehicles rather than passengers in an automobile, truck, or van.
- Use of Transit: In 2016, a higher proportion of commuters in New Westminster used public transit (31%) than in Surrey (15%) and Metro Vancouver (20%). Within the New Westminster part of the LSA, 44% of the employed labour force in the Downtown neighbourhood commuted by public transit compared to 21% in other neighbourhoods. A higher proportion of commuters in the Surrey part of the LSA used public transit (20%) than the average for Surrey (15%).
- Commuting by Bicycle or Walking: In 2016, the proportion of the employed labour force that walked or commuted by bicycle was 3% in Surrey, 7% in New Westminster, and 9% for all of Metro Vancouver. For the New Westminster part of the LSA, that same proportion was 9% for Downtown, 12% for Queen's Park/Glenbrooke North and 6% for Glenbrook South/Victory Heights. In 2016, 3% of the labour force in the Surrey part of the LSA reported commuting to work by either walking or cycling, about the same as the average for Surrey.

The 2016 Census data indicate commuting patterns by the labour force that are similar to those indicated by 2011 NHS data. In general, the proportions of transit users and commuters by bicycles and/or walking increased relative to those commuting by car between 2011 and 2016. **Appendix 18.11** includes 2016 Census data and 2011 NHS data on labour force commuting patterns.

In 2016, a profile of the Aboriginal population in Surrey prepared for Surrey's Urban Aboriginal Social Innovation Strategy shows that, on average, individuals of Aboriginal identity use transit more frequently than the overall Surrey population (Jacopo Miro 2016). Based on the 2011 NHS data:

- 72% of Aboriginal people in Surrey commute to work by car, while 22% take public transit, comparable to the overall population of Metro Vancouver, where 71% of people commute by car and 20% take public transit.
- Public transit use among Aboriginal people in Surrey is about twice as high as for all Surrey residents (22% compared to only 13%).
- 5% of Aboriginal people in Surrey commute by walking, compared to 3% for all of Surrey, and 1% commute by bicycle or other means.

Transit use by Aboriginal people residing in New Westminster and commuting to work was also higher (39%) than for the general population (28%), and the combined totals for the RSA were 25% of Aboriginal residents commuting to work by public transit compared to 15% for the general population (2011 NHS data, see **Appendix 18.11**).

Census data on commuting patterns for the LSA and RSA are somewhat reinforced by data collected by Fraser Health Authority in partnership with Vancouver Coastal Health through a detailed survey of Metro Vancouver residents that includes comprehensive health and lifestyle information. The latest survey, titled 2013/2014 My Health My Community, published results for several areas in New Westminster and Surrey:

- The New Westminster part of the LSA overlaps three of the five survey areas: Downtown New Westminster, Queen's Park (which for this survey includes Glenbrooke North and Victory Heights), and Sapperton (which for this survey includes Glenbrooke South, Sapperton, and Brunette creek).
- Near the Surrey part of the LSA, data are reported for Surrey City Centre and Whalley, an area east and north of Surrey City Centre that includes the LSA.

The 2013/2014 My Health My Community data are not directly comparable with Census data but indicate similar commuting patterns particularly when reviewed by neighbourhood survey areas (Fraser Health Authority 2015). The 2013/2014 My Health My Community survey also covered several indicators of physical connectivity and traffic patterns by neighbourhoods, including:

- demographic factors such as age and ethnic background
- amenities by walking/cycling distance
- availability of well-maintained sidewalks/lanes/pathways for cycling/walking

- whether respondents “feel safe walking after dark”
- whether traffic in the area makes walking difficult

For most of these indicators, the Whalley and Surrey City Centre neighbourhoods were less amenable to non-motorized transport than the Downtown New Westminster, Queen’s Park, and Sapperton neighbourhoods (**Appendix 18.11** provides the detailed data). **Section 8.2 Social Determinants of Health** provides more information on the My Health My Community survey results as part of the assessment of potential Project effects on lifestyle, social interactions and use of health services.

6.3.2.4 Current Conditions for the Social Equity Subcomponent

The Project is expected to benefit residents of the LSA and RSA through improved motor vehicle connectivity, improved non-motorized infrastructure, and improved safety. Despite being beneficial overall, some Project components could potentially have localized adverse effects on specific neighbourhoods and vulnerable populations within those neighbourhoods.

To support the assessment of Project effects on social equity, this section describes neighbourhood level demographic data on socio-economic indicators of vulnerability to identify neighbourhoods with a higher likelihood of including a greater proportion of vulnerable individuals or families, relative to surrounding neighbourhoods or community averages. Vulnerable populations are defined as individuals, families, or population groups that may be less able to adapt to, protect themselves from, or escape changes in their living environment, and may be coping with acute and/or chronic challenges to everyday life. Examples include low-income families, single parent families, the homeless, the elderly, new immigrants and people living with physical or mental disability. (based on **Section 8.2.2 Assessment of Effects on Social Determinants of Health** (**SDOH**)).

Information is provided for both the general population and for the Aboriginal population residing in the LSA and RSA.

6.3.2.4.1 Socio-Economic Characteristics in LSA and RSA

This section provides an overview of socio-economic characteristics by LSA neighbourhood and includes:

- population and population trends such as family size, education, employment, and income levels
- the stock of owner-occupied and rented dwellings, and the proportion of households in suitable housing

Population, Income, and Other Demographics Data

Based on the Statistics Canada Census, the LSA population in 2016 was approximately 22,200 people, 81% (18,000) in New Westminster and 19% (4,200) in Surrey. The New Westminster LSA population consisted of:

- 2,450 people in the eastern part of Downtown, which consists mainly of the Albert Crescent Precinct (Census Tract #207)
- 6,200 people in Queen’s Park/Glenbrooke North (Census Tract #208)

- 9,350 people in Glenbrooke South/Victory Heights (Census Tract #209. (**Figures 6.3-A-4** and **6.3-A-5** show the boundaries of the LSA Census Tracts)

In 2016, the population of 4,200 for the Surrey LSA (Census Tract #192) was made up of:

- 1,760 people in the Bridgeview neighbourhood west of Bridgeview Dr
- 1,720 people east of Bridgeview Dr, mainly east of the Bolivar Heights escarpment
- 720 people in the mainly industrial lands of South Westminster

As part of the Census, Statistics Canada collects and reports income and other data that may help assess the economic and social vulnerability of each LSA neighbourhood to potential adverse Project effects. Based on the mix of 2011 and 2016 Census information, relative to the BC average and to the RSA and other LSA neighbourhoods, the populations of the Surrey LSA and the Albert Crescent Precinct of Downtown New Westminster had:

- a higher proportion of private households that consisted of single parents with children
- a higher proportion of the adult population with education levels below high school certificate
- a lower proportion of the adult population with bachelor or higher university education
- a higher unemployment rate
- lower household incomes
- a higher proportion of people living below the low-income cut-off (LICO) defined by Statistics Canada (cut-offs represent levels of income where people spend disproportionate amounts of money for food, shelter, and clothing)

Table 6.3-7 highlights some of the key demographics for those neighbourhoods relative to the LSA, RSA, and BC averages**. Appendix 18.11** provides additional detail.

Table 6.3-7 Selected Socio-Economic Indicators of Vulnerability by LSA Neighbourhoods

Selected Demographic Data by Neighbourhood (2016 Census data unless otherwise specified)	New Westminster					Surrey		Metro Vancouver	BC
	Downtown (# 207)	Queen's P & Glen. N. (# 208)	Glen. S. & Victory H. (# 209)	LSA	City	LSA (# 192)	City		
2016 Population	2,447	6,215	9,351	18,013	70,996	4,194	517,887	2,463,431	4,648,055
Children between 0 and 14 as a % of Population	6%	15%	12%	12%	12%	15%	12%	13%	12%
Proportion of private households consisting of single parents with children	18%	14%	14%	14%	15%	21%	15%	15%	15%
Proportion of population aged 25 to 64 years with education below high school certificate	8%	5%	4%	5%	7%	21%	13%	8%	10%
Proportion of population aged 25 to 64 years with bachelor or higher university education	32%	39%	41%	39%	36%	15%	27%	37%	30%
2016 Unemployment rate	4.7%	4.1%	6.5%	5.4%	6.0%	6.7%	6.5%	5.8%	6.7%
2011 Unemployment rate	9.3%	7.0%	6.6%	7.1%	7.9%	9.6%	7.9%	7.1%	7.8%
2015 Median after tax income of population over 15 years	$32,626	$35,831	$38,382		$32,642	$24,352	$27,200	$29,422	$29,783
2015 Median after tax household income	$46,400	$63,296	$71,831		$56,143	$59,093	$68,060	$63,365	$61,280
2015 Proportion of individuals living in households reporting incomes below the low-income cut-off (LICO)	17.7%	11.2%	8.3%	10.6%	13.3%	16.7%	11.8%	13.9%	11.0%
Housing and Accommodation*:									
Proportion of occupied private dwellings requiring major repairs	17%	5%	6%	8%	8%	10%	4%	6%	6%
Proportion of private households in owned dwellings	42%	59%	79%	66%	56%	64%	71%	64%	68%
Proportion of private households in suitable housing	93%	96%	95%	95%	92%	89%	91%	93%	95%
Population of Aboriginal Identity*:	145	180	260	585	2,295	245	13,460	61,455	270,585
Aboriginal identity as a % of total population*	6%	3%	3%	3%	3%	6%	3%	3%	6%

Notes: * indicates Census 2016 data based on 25% sample.

The Census Tracts in the table represent data for the following LSA neighbourhoods: **Figures 6.3-A-4** and **6.3-A-5** provide boundaries for the Census Tracts #207, #208, and #209.

- in New Westminster: eastern part of Downtown (#207), Queen's Park/Glenbrooke North neighbourhoods (#208), and Glenbrooke South/Victory Heights neighbourhood (#209)
- in Surrey (#192): Bridgeview west of Bridgeview Dr, Bridgeview east of Bridgeview Dr (mainly east of the Bolivar Heights escarpment), and the mainly industrial lands of South Westminster

Source: Based on Statistics Canada. 2011 and 2016 Census Profiles by Census Tract; **Appendix 18.11** provides more detail.

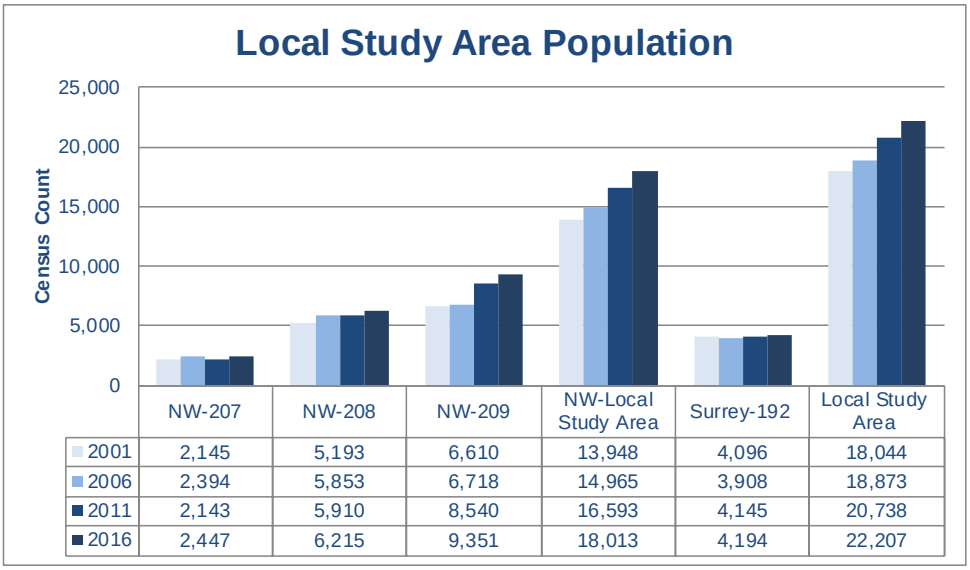
Table 6.3-7 shows 2016 data on housing stock, including the proportion of occupied dwellings requiring major repairs and type of tenure (owned vs. rented). In 2016, residents in Downtown New Westminster had a lower proportion of home ownership (42%) than the rest of the LSA and RSA and of the Metro Vancouver and BC averages. In the Surrey part of the LSA, the proportion of home ownership was 64%, comparable to the Metro Vancouver average. In 2016, 95% of LSA households in New Westminster resided in suitable housing, comparable to the Metro Vancouver average, but higher than the LSA proportion in Surrey of 89%.

In **Table 6.3-7** the City of New Westminster shows lower annual median after-tax income ($56,143) than the Metro Vancouver average ($63,365) and the Surrey average ($68,060). Also, within the New Westminster part of the LSA in 2016, Downtown New Westminster had the lowest after-tax household income ($46,400) and the highest proportion of individuals living in households reporting income below LICO (17.7%). Other New Westminster neighbourhoods not shown in the table also show signs of vulnerability, but these are outside the Project LSA and would not be adversely affected by the Project.

Table 6.3-7 shows that the Surrey part of the LSA had a higher after-tax household income ($59,093) than the LSA part of Downtown New Westminster but a similar proportion of individuals living in households reporting income below LICO (16.7%). Across the LSA neighbourhoods, the Surrey part of the LSA had the highest incidence of single parent households with children (21%), the highest proportion of adult population with education below high school certificate (21%), and the lowest proportion of adult population with bachelor or higher university education (15%).

Between 2001 and 2016, population growth in the Surrey part of the LSA was only 2% compared to 49% for all of Surrey. By comparison, the New Westminster LSA population grew by 29% between 2001 and 2016 compared to 30% for all of New Westminster. Within the LSA, Downtown New Westminster (mainly Albert Crescent Precinct) grew by 14%, Queen's Park/ Glenbrooke North by 20%, and Glenbrooke South/Victory Heights by 41%. Recent population growth by LSA neighbourhood is illustrated in **Figure 6.3-1**.

Figure 6.3-1 Population Data for LSA by Neighbourhood from 2001 to 2016



	NW-207	NW-208	NW-209	NW-Local Study Area	Surrey-192	Local Study Area
2001	2,145	5,193	6,610	13,948	4,096	18,044
2006	2,394	5,853	6,718	14,965	3,908	18,873
2011	2,143	5,910	8,540	16,593	4,145	20,738
2016	2,447	6,215	9,351	18,013	4,194	22,207

Source: Based on Statistics Canada. 2016 Census Profiles; **Appendix 18.11** provides more detail.

The Statistics Canada data suggest that at least some population groups within the Albert Crescent Precinct of Downtown New Westminster and the Bridgeview neighbourhood in Surrey may be less resilient to potential adverse Project effects than in other LSA and/or RSA neighbourhoods.

Shelters/ Non-Market Housing

Non-market housing facilities and/or shelters located in the LSA may also be an indicator of the incidence of vulnerable populations within a specific neighbourhood. In New Westminster, non-market housing/shelters in the LSA include:

- two transitional/correctional facilities, Genesis House (219 Carnarvon St) and Maria Keary Cottages (305/307 Carnarvon St), in the Albert Crescent Precinct
- a shelter at Stevenson House (32 Elliot St)
- family social housing units at McBride Place, 431 Ginger Dr near 6th Ave
- several housing co-ops in Glenbrooke South north of Blackberry Drive, and several non-market senior-specific housing developments in Glenbrooke North (City of New Westminster 2009)

No shelters were identified in the Surrey part of the LSA, although there are several types of social housing in and near Surrey City Centre, including shelters, transition/supportive, low-income senior, Aboriginal, and non-profit housing (BC Non-Profit Housing Association and M. Thompson Consulting 2017). In the Surrey LSA, people have engaged in unauthorized camping in non-residential areas near the western end of Old Yale Rd.

6.3.2.4.2 Aboriginal Populations in LSA and RSA

Currently, there are no Aboriginal reserves, treaty lands, or communities in or near the LSA. There is one reserve within the RSA: the Semiahmoo First Nation reserve in southwestern Surrey near the USA border, 23 km from the Project Boundary. Semiahmoo First Nation has confirmed that the population at Semiahmoo IR is currently 93, and that Semiahmoo First Nation has a total of 90 band members, 43 of whom reside on reserve (Councillor Joanne Charles, personal comm. 2018).

With regard to the off-reserve Aboriginal population, in the 2016 Census, 3.9% of the LSA population and 2.7% of the RSA population self-reported their Aboriginal identity. The Census data show that Registered First Nations peoples who resided in the LSA accounted for 39% of individuals who identified as Aboriginals (i.e., 61% are either non-registered First Nations or Metis). In BC, 50% of individuals who identified as Aboriginal were Registered First Nations.

Individuals of Aboriginal identity are overrepresented in potentially vulnerable populations in Metro Vancouver, as indicated by their proportion of the unemployed labour force, low income families, and homeless populations. An analysis of labour force statistics in **Section 5.1 Economic Activity** shows that in 2011, on average, Aboriginal populations had unemployment rates that were almost double the RSA and Metro Vancouver average, i.e., 13.7% of the RSA Aboriginal labour force compared to 7.9% for the total RSA labour force (see **Table 5.1-10** and **Appendix 18.11**).

A 2016 profile of the Aboriginal population in Surrey prepared for Surrey's Urban Aboriginal Social Innovation Strategy shows that, on average, individuals of Aboriginal identity had higher unemployment rates and lower incomes, and a greater proportion of children of Aboriginal identity lived in low-income households than the average Surrey population (Jacopo Miro 2016). Based on 2011 NHS data:

- 13% of Aboriginal people (ages 15 and over) in the labour force in Surrey were unemployed, which was slightly below the Aboriginal rate in Vancouver (15%), and similar to the Metro Vancouver Aboriginal average (13%). The unemployment rate for the Aboriginal community in Surrey was considerably higher than that of the overall Surrey labour force (8%).
- The annual median after-tax individual income for Aboriginal people in Surrey was $20,400, compared to an annual average overall individual income of $26,200 for Surrey. This disparity was similar for the Aboriginal population in Vancouver ($20,450 and $27,500 per annum) and the broader Aboriginal community in Metro Vancouver ($21,600 and $28,000 per annum).
- 54% of Aboriginal children (less than 6 years of age) in Surrey lived in low-income households, compared to 49% of Aboriginal children in the City of Vancouver and 36% of Aboriginal children in Metro Vancouver. The average proportion of Aboriginal and non-Aboriginal children living in low-income households in Surrey was 18%.
- The low-income Aboriginal population in Surrey was significantly younger than other low-income populations in Metro Vancouver.
- The Aboriginal community in Surrey has one of the highest child and youth poverty rates in the region.

The 2017 homelessness count for Metro Vancouver shows that one-third (34%) of Metro Vancouver's homeless population identified as Aboriginal in 2017. The Aboriginal component of the homeless count focused on targeted critical areas throughout Metro Vancouver. In the Community Cohesion RSA, these included the core area in New Westminster, Whalley City Centre in Surrey, and the Fraser River Waterfront in Surrey. Of the 746 homeless individuals who identified as Aboriginal in Metro Vancouver, 4% (31) were in New Westminster and 18% (137) were in Surrey, similar to the Aboriginal proportions of the total populations in those municipalities (Lu'Ma Native Housing Society 2017; BC Non-Profit Housing Association and M. Thompson Consulting 2017).

The report on the homeless count in Metro Vancouver does not describe specific locations where the surveys were conducted, but riverfront areas in the LSA near the end of Old Yale Rd in Surrey are known for unauthorized camping.

6.3.3 Potential Effects

This section identifies potential adverse effects to Community Cohesion in a manner consistent with **Section 3.4 Potential Effects** of the Application. As is demonstrated in **Table 6.3-2** Indicators for Assessment of Potential Effects, this includes:

- a review of the potential interactions of the proposed Project with the two VC subcomponents: Neighbourhood Connectivity and Social Equity
- a description of the potential adverse effects on Neighbourhood Connectivity; although effects on connectivity from the Project are expected to be generally positive during the Operations Phase, there could be some adverse local effects, particularly during Project construction
- a description of the potential adverse Project effects on Social Equity that could result from adverse effects being experienced by vulnerable population groups

The assessment of potential Project effects on Community Cohesion is informed in part by assessment of potential effects on other ICs/VCs addressed in the Application, as documented in the following:

- technical reports regarding Project effects on noise levels, vibration levels, air quality, and visual quality (**Section 18.0 Appendices**)
- Land Use (**Section 6.2**), which assesses Project consistency with neighbourhood plans and potential adverse Project effects on existing land uses by LSA neighbourhood
- Social Determinants of Health (**Section 8.2**) that assesses potential Project effects on access to health and social services, social interaction, livelihoods and active living

The potential Project effects on noise and vibration (**Section 4.7**) are incorporated into the consideration of effects on Land Use, and the potential Project effects on air quality are considered in **Section 4.8**.

Aboriginal peoples have lived at and accessed resources in the areas on each side of the Fraser River near the Project for millennia. The historical significance of the area to Aboriginal Groups is presented in Section 7.1 Heritage Resources (subsection 7.1.2.2.1 Aboriginal Traditional Knowledge and Archaeological Data). There are currently no Aboriginal reserves, villages or settlements or known fee-simple land holdings in or near the LSA. Within the RSA, Semiahmoo First Nation has a reserve in southwestern Surrey near the USA border, 23 km from the Project Boundary, beyond the anticipated area of Community Cohesion effects. Potential cultural effects on Aboriginal Groups resulting from changes to community cohesion are discussed as part of the assessment of use of lands and resources for traditional purposes and Aboriginal interests (**Section 11.0** and **Section 12.0**, respectively).

The Community Cohesion assessment considers potential Project effects that may affect Aboriginal peoples residing in the LSA and RSA. Given the higher proportion of Aboriginals residing in the LSA/RSA who commute by public transit, any effects on public transit could have a differentiated effect on the Aboriginal population relative to the general population. No other discernable pathways were identified whereby adverse Project effects on the neighbourhood connectivity subcomponent could have a differentiated effect on Aboriginal Groups or peoples. Potential project effects on the social equity subcomponent that may particularly affect Aboriginal peoples residing in the LSA and RSA are considered in respect of Project effects on vulnerable populations.

6.3.3.1 Potential Interactions

Table 3.4-1 in **Section 3.0 Assessment Methodology** is an interactions matrix for each candidate VC for the assessment of Project effects, including Community Cohesion. Potential Project interactions with the Neighbourhood Connectivity and Social Equity subcomponents during the Project Construction and Operations phases are outlined below.

During Construction, temporary adverse Project effects on Neighbourhood Connectivity could result from temporary road closures and detours for motor vehicles, and temporary closures and detours of sidewalks/multi-use paths for non-motorized traffic. Project components that have the greatest potential to present connectivity challenges in New Westminster during construction include:

- Temporary disruptions to Front St while constructing the new bridge and decommissioning the old bridge overhead
- Temporary disruptions to Royal Ave if the Royal Ave overpass, above the Pattullo Bridge Connector, is proposed to be modified by the successfully design-build contractor
- Temporary disruptions to East Columbia St and Columbia St while building the new road connections to/from the new bridge

In Surrey, the following Project components have the greatest potential to present connectivity challenges during construction:

- Temporary disruptions to Highway 17 during construction of the grade separation of Highway 17 over Old Yale Road
- Temporary disruptions to King George Blvd as the new bridge is proposed to tie-in at approximately the same location as the existing bridge
- Construction of Scott Road Extension while limiting disruptions for motorists accessing the neighbourhoods east and west of 124th St
- Construction of the Scott Road / King George Blvd interchange, while limiting disruptions for buses/motorists accessing the Scott Road Station Park and Ride and bus exchange

Potential adverse effects on Social Equity may result from construction disturbance being experienced predominantly and disproportionately in LSA neighbourhoods that have population groups that are more vulnerable and/or less able to adapt to those effects.

During Operations, the Project is expected to provide benefits to regional connectivity through improved connections from the bridge crossing to road networks on both sides of bridge. The effects of these benefits on improved time reliability and economic activity are described in **Section 1.0 Overview of Proposed Project**.

Some Project components may have potential to cause localised adverse effects on neighbourhood connectivity during Project operations through changes in motor vehicle traffic and at the more local level, physical barriers created by Project components such as the Scott Rd Extension and/or the access and egress ramps on and off the new bridge.

6.3.3.2 Potential Effect #1: Effects on Neighbourhood Connectivity Related to Motorized Traffic

This section assesses effects on neighbourhood connectivity related to motorized traffic during Project construction and Project operations.

6.3.3.2.1 Effects Related to Motorized Traffic During Project Construction

The Project is a major construction/demolition undertaking that will be constructed and operated largely within the existing Pattullo Bridge and associated road network rights-of-way. During Project construction there could be temporary adverse Project effects on motor vehicle access and/or increased traffic congestion resulting from temporary road or lane closures.

During Project construction:

- All neighbourhoods overlapping the LSA have the potential to see increased traffic congestion during Project construction.
- In New Westminster, the presence of highly urban areas in the LSA and RSA, coupled with the need to build much of the Project within existing transportation ROWs, may present challenges for traffic management during construction. Although City arterials within the Project Boundary do not provide street-side parking (e.g., McBride Blvd, Royal Ave, Columbia St and Front St), there could be temporary impacts to local street parking if construction workers, equipment, or vehicles are allowed to occupy street-side parking spaces during construction.
- In the Surrey part of the LSA – an area that relies heavily on motor vehicle connectivity - all residential and business areas are likely to experience some level of increased traffic congestion during Project construction.
- Increased traffic congestion on regional routes and city arterials could have an indirect adverse effect on local neighbourhood transit routes that also rely on the road network. The SkyTrain system connecting the City of Surrey and New Westminster is not anticipated to be affected by the project. **Section 6.2 Land Use** assesses the potential adverse effects resulting from the Project Boundary overlap with the SkyTrain infrastructure.

6.3.3.2.2 Effects Related to Motorized Traffic During Project Operations

A primary purpose of the Project is to maintain and improve connectivity for motor vehicle traffic between two growing municipalities, New Westminster and Surrey, and to provide a safe link for motorized and non-motorized traffic between two very vibrant and growing regional urban centres, Downtown New Westminster and Surrey City Centre. The assessment of neighbourhood connectivity includes a review of potential Project effects on connectivity for motor vehicle traffic and for non-motorized traffic. Potential Project effects on neighbourhood connectivity that may result from changes in traffic patterns are identified from traffic flow simulations developed for this assessment.

Traffic volume forecasts completed for the project (forecasted using EMME software) considered the following planning horizons / scenarios:

- 2014 existing baseline (this information was largely used for modelling validation purposes and as a starting point for forecasting traffic volumes in 2023 and 2030; note that the 2014 data assumes bridge tolls on the Port Mann and Golden Ear Bridges)
- 2023 and 2030 No-build Scenario (i.e., rehabilitated bridge that is reduced to three standard lanes, with a reversible centre lane)
- 2023 and 2030 Build Scenario (i.e., new four-lane bridge and improved road connections in City of Surrey and City of New Westminster)

In the following discussion of analytical results, potential effects during Project operations are identified mainly from the 2030 forecasted traffic volumes, with a focus on impacts to the Major Roads and arterials between the build and no-build scenarios.

All Annual Average Daily Traffic (AADT) as presented were obtained from the Traffic Analysis Report (**Appendix 18.1**). Analysis based on average daily volumes was considered appropriate to understand potential effects on neighbourhood connectivity.

The forecasted traffic volumes for 2030 show that compared to the no-build three-lane bridge (72,000 AADT), the build four-lane bridge is estimated to carry approximately 23% more motor vehicle traffic (88,000 AADT). The increase is primarily due to the extra traffic capacity of a four-lane bridge vs a three-lane bridge. In most neighbourhoods, the increased bridge traffic resulting from the Project (relative to the no-build scenario) is anticipated to be accommodated primarily on arterials or the Major Road Network. The following sections examine the potential for adverse effects on neighbourhood connectivity in New Westminster and Surrey.

Potential Project Effects on Neighbourhood Connectivity in New Westminster

In New Westminster, the traffic volume projections for 2030 indicate a general shift of bridge traffic from McBride Blvd to East Columbia St, primarily due to the availability of the westbound E. Columbia St on-ramp in the build scenario:

- The new direct on-ramp from westbound East Columbia St onto the Pattullo Bridge is projected to accommodate approximately 35% of southbound daily bridge traffic (16,000 AADT). Similarly, the projected traffic volumes show the new direct bridge off-ramp to East Columbia St will account for 31% of the northbound daily bridge traffic (13,000 AADT).
- Due to additional traffic using the new direct East Columbia St on and off ramps, daily traffic on McBride Blvd just south of Memorial Dr is estimated to be 20% lower compared to the no-build scenario.

This general shift in traffic away from McBride Blvd could potentially benefit motor vehicle connectivity in neighbourhoods with city collector roads that are currently used by regional Pattullo Bridge traffic, such as 8th Ave and 10th Ave:

- East of McBride Blvd, these neighbourhoods include Victory Heights and the northern part of Glenbrooke South where the proportion of average daily traffic on 6th Ave, 8th Ave, and 10th Ave relative to traffic crossing the bridge drops substantially with the Project, due to traffic using the direct E. Columbia St ramps to and from the bridge (i.e. average daily traffic volumes are estimated to be between 8% and 12% lower, as compared to the no-build scenario).
- West of McBride Blvd, these neighbourhoods include Downtown New Westminster, Glenbrooke North, and the Queen's Park neighbourhoods where minimal differences in traffic volumes are projected with the Project despite more traffic using the bridge traffic as compared to the no-build scenario:
    - The difference in daily volumes on Front St is negligible when comparing the Project scenario (9,400 AADT) and the Baseline no-build scenario (9,700 AADT).
    - On Royal Ave, the daily volumes between 1st St and 2nd St is not anticipated to change. The difference in daily volumes west of 6th is also minor, when comparing the Project scenario (17,000 AADT) and the Baseline no-build scenario (15,800 AADT).
    - West of McBride Blvd, changes in daily traffic on 6th Ave, 8th Ave, and 10th Ave are also anticipated to be minor, with volumes higher by 5% or less with the Project than with the Baseline no-build scenario.
- The decrease in AADT along McBride Blvd should also improve the pedestrian experience at the intersection of Royal Ave and McBride Blvd.
- The new East Columbia St off-ramp is projected to divert traffic away from the section of McBride Blvd south of Royal Ave.

As a result of the realigned McBride Blvd and proposed grade-separation over the East Columbia St bridge on-ramp, a small number of motorists accessing the bridge from Leopold Place, Bushby St and Glenbrooke South west of the Glenbrooke Ravine will need to divert to southbound McBride Blvd to get onto the bridge (i.e. using the same route that motorists would currently take when the East Columbia St on-ramp is closed between 3-6pm on weekdays).

The more-direct East Columbia St linkages provided with the Project are projected to lead to more daily traffic on Richmond St in Glenbrooke South and East Columbia St in Sapperton than with the no-build scenario:

- In Glenbrooke South, the traffic model indicates daily traffic volume on Richmond St north of East Columbia St could more than double to 6,500 motor vehicles with the Project, relative to the Baseline no-build scenario. Most of the increase is observed in the southbound direction, likely traffic destined to the East Columbia St ramp onto the Pattullo Bridge.
- In Sapperton, average daily traffic volume on East Columbia St near Royal Columbian Hospital (RCH) is projected at 10,700 vehicles south of Keary St and 9,500 vehicles north of Keary St by the year 2030 (approximately 35% higher than with the no-build scenario).

While traffic volumes with the Project are projected to be higher in some residential areas of Glenbrooke South and in Sapperton near RCH, no noticeable adverse effects on neighbourhood connectivity are expected:

- As Richmond St is classified by the City of New Westminster as a city collector street expected to accommodate up to 8,000 vehicles per day, the potential increase in traffic volumes is not inconsistent with the current road classification.
- The projected 10,700 vehicles per day by 2030 on East Columbia St at Keary St remains near the range of traffic volumes expected for city collectors and is similar to the average weekday traffic volumes of 12,000 vehicles noted in the New Westminster Master Transportation Plan. (Urban Systems 2014, p. 26)
- The City of New Westminster regularly monitors traffic patterns within municipal boundaries and implements traffic calming measures when warranted and desired in accordance with its Neighbourhood Traffic Calming Policy. (New Westminster 2010)
- The New Westminster Master Transportation Plan indicates that the Sapperton neighbourhood currently has a "medium level of calming measures" whereas Glenbrooke South has a "low level of calming measures", which suggests some opportunity to implement more aggressive calming measures should they be required/ desired. (Urban Systems 2014, p. 166)

Daily traffic volume on Brunette Ave at Sherbrooke is projected to be 11% higher with the Project than with the no-build scenario (i.e. AADT of 57,500 vehicles with the Project compared to 52,000 vehicles for the no-build scenario). Brunette Ave is part of the Major Road Network and a key access route to the Trans-Canada Highway (Highway 1), and increased traffic volume on Brunette Ave would not be expected to adversely affect neighbourhood connectivity.

Effects on Neighbourhood Connectivity in Surrey

In Surrey, traffic volume projections indicate additional bridge traffic from the Project will be channelled through the new Highway 17 connections and Scott Road Extension, resulting in reduced volumes on King George Blvd and other city streets. Based on the traffic projections for 2030:

- The direct southbound off-ramp from the new bridge to Highway 17 west is estimated to accommodate 5,700 daily vehicles, or 13% of the southbound bridge traffic (45,200 daily vehicles).
- Daily traffic on the new Scott Road Extension would be 13% of total daily bridge traffic volume, with most of that traffic transiting between Highway 17 and the new Pattullo Bridge.
- Total daily traffic on Bridgeview Dr north of King George Blvd is projected to be 19% lower compared to the no-build scenario due to increased use of the Scott Road Extension.
- With the Project, total daily traffic on King George Blvd at 126A St would increase slightly by 5% relative to the no-build scenario, despite the increased forecasted traffic crossing the bridge. This is likely due to traffic diverting to Scott Road Extension from Bridgeview Drive.

On a more local level, in Bridgeview:

- The proposed Scott Road Extension will physically separate the residential neighbourhood east of 124 St from the industrial lands west of 124 St, with 112 Ave remaining as the point of travel between the two areas. As a result, travel times for commuting between the two areas are anticipated to increase. Traffic volumes in the western portion of Bridgeview are currently very low with the busiest local street (124 St) having 2014 projected daily traffic volumes of less than 500 AADT (see **Appendix 18.1**).
- With the Scott Rd Extension, the Bridgeview residential area will no longer have direct access to Highway 17 along 124 St to the right-in/right-out connection to Highway 17. This is expected to potentially affect only some of the low volume of motor vehicle traffic on 124 St south of Highway 17**.** The primary and most commonly used access point to and from Highway 17 via 128 St/ Bridgeview Dr will become the only direct access point from Bridgeview to and from Highway 17.
- The expected traffic shift away from Bridgeview Dr and King George Blvd to the new routes to and from Highway 17 (Scott Road Extension and direct southbound off-ramp) could benefit the Bridgeview residential neighbourhood by reducing the amount of vehicle traffic that cuts through Bridgeview to and from Highway 17 and/or the industrial area east of 124 St.

South of King George Blvd, in the Yale Street Commercial district of South Westminster, the Project includes construction of a Highway 17 elevated crossing of Old Yale Rd that will eliminate the existing traffic signal:

- Old Yale Rd will continue to function as a through street linking the Surrey waterfront with the area east of the Highway 17, including the South Westminster commercial district and residential areas of Whalley and Surrey City Centre.
- Daily traffic on Old Yale Rd between Scott Rd and Highway 17 is projected to be 56% lower (4,650 motor vehicles) than with the Project compared to 10,700 vehicles with the Baseline no-build scenario. The lower traffic volumes support the City of Surrey's South Westminster planning vision of Old Yale Rd as a primarily local road linking the Surrey waterfront with the rest of North Surrey.
- Highway 17 will no longer be directly accessible from Old Yale Rd, with the majority of traffic instead shifting to the Tannery Road interchange.

South of King George Blvd in Surrey, traffic volume projections indicate no or very minor changes in LSA traffic levels on Scott Rd (120 St) and on Tannery Rd (104 Ave).

The forecasted traffic volumes for New Westminster and Surrey are summarized in **Table 6.3-8** and **Table 6.3-9**, respectively.

Table 6.3-8 Estimated AADTs in New Westminster

New Westminster Locations/Streets (**Major Road Network – existing or anticipated)	2014 Estimated AADT	2030 AADT		% Change 2030 (Build vs No Build)
		No Build	Build (Project)	
Pattullo Bridge **	74,470	71,770	88,060	23%
Access to Pattullo Bridge–Albert Crescent ramp	4,820	-	-	
New on-ramp from East Columbia St**			16,010	
New off ramp to East Columbia St **	-	-	13,120	
West of McBride Blvd				
Columbia St west of Pattullo Bridge	13,460	15,500	12,120	-22%
Front St	8,200	9,740	9,430	-3%
Royal Ave between Dufferin and 1st St **	30,840	33,130	32,850	-1%
Royal Ave between 1st St and 2nd St **	24,190	24,830	24,870	0%
Royal Ave west of 6th St (outside LSA) **	15,080	15,770	16,990	8%
6th Ave between 1st St and 2nd St	8,550	11,140	11,670	5%
8th Ave between 1st St and 2nd St	13,500	15,030	15,770	5%
10th Ave between 1st St and 2nd St **	39,430	41,430	42,980	4%
East of McBride Blvd				
E. Columbia St west of Front St merge **	31,130	28,230	44,780	59%
E. Columbia St east of Front St merge **	39,330	37,970	54,230	43%
Richmond St north of East Columbia St	3,180	2,940	6,510	121%
Cumberland St between Harvey St and 6th Ave	4,290	5,740	5,550	-3%
E. Columbia St near RCH north of Keary St	8,210	6,890	9,500	38%
Brunette Ave at Sherbrooke **	41,020	52,120	57,670	11%
6th Ave between McBride Blvd and Ginger Dr	12,260	15,270	13,560	-11%
8th Ave between McBride Blvd and Cumberland St	22,300	25,210	22,080	-12%
10th Ave between McBride Blvd and Cumberland St	18,600	19,220	17,610	-8%
McBride Blvd **				
McBride between Royal Ave and E. Columbia St	12,850	12,740	5,440	-57%
McBride north of Royal Ave (one way)	1,380	2,270	1,780	-22%
South of Memorial Dr	39,960	44,510	35,640	-20%
Between 6th Ave & 8th Ave	36,690	37,320	34,210	-8%

Table 6.3-9 Estimated AADTs in Surrey

Surrey Locations/Streets (**Major Road Network – existing or anticipated)	2014 Estimated AADT	2030 AADT		% Difference 2030 (Build vs No Build)
		No Build	Build (Project)	
Direct off-ramp to Highway 17 **	-	-	5,720	
King George Blvd **				
East of Pattullo Bridge	74,470	71,770	82,330	15%
At 126A St	45,160	44,690	47,060	5%
East of Bridgeview Dr	33,820	29,340	34,810	19%
North of King George Blvd/Bridgeview Neighbourhood				
Scott Rd Extension **	-	-	11,320	
114 Ave east of Scott Rd Extension	230	340	30	-91%
124 St near SFPR	340	570	30	-95%
128 St between 114A Ave and Bridgeview Dr	4,770	6,010	6,190	3%
Bridgeview Dr north of King George Blvd	13,840	13,820	11,200	-19%
Bridgeview Dr at SFPR	11,620	12,360	9,360	-24%
South of King George Blvd				
Scott Rd (120 St) between King George Blvd and Old Yale Rd **	35,100	32,890	30,660	-7%
Scott Rd (120 St) between Old Yale Rd and Tannery Rd (104 Ave) **	26,930	29,740	31,320	5%
110 Ave (becomes 128 St to King George Blvd and then Bridgeview Dr) – east of Scott Rd at 125 St	2,080	4,180	3,240	-22%
Old Yale Rd between 125 St and Scott Rd (120 St)	8,400	7,650	6,230	-19%
Old Yale Rd between Scott Rd and SFPR	8,680	10,660	4,640	-56%
Tannery Rd (104 Ave) between Scott Rd and SFPR	10,680	15,500	15,470	0%
Timberland Rd Extension to Bridge Rd – Traffic on Industrial Rd (NW of SFPR, west of Pattullo Bridge)	920	4,030	3,570	-11%
Timberland Rd south of Tannery Rd	2,380	4,670	5,190	11%
Hwy17 – south of Old Yale Rd before Tannery Rd	17,050	24,820	25,130	1%
Hwy17– 0.3 km south of Tannery Rd	24,020	33,870	36,460	8%
Hwy17– East of Bridgeview Dr	19,910	25,480	26,920	6%

Potential Project Effects on Connectivity for Transit Vehicles

Section 6.3.2 on existing conditions previously provided an overview of the transit infrastructure in the LSA and RSA.

During **Project construction**, temporary adverse Project effects on neighbourhood connectivity could result from temporary road closures and detours for vehicles, including buses. Also, as described in **Section 6.2 Land Use**, the Project Boundary overlaps with the SkyTrain guideway in New Westminster and in Surrey, and transit operations servicing these transit hubs could potentially be adversely affected during Project construction.

During **Project operations**, the analysis shows that buses within the LSA are not anticipated to be adversely affected:

New Westminster:

- No adverse effects are expected on transit routes along 8th Ave/East 8th Ave and 6th Ave, two key east–west transit corridors, or on local east–west bus routes west of McBride Blvd, including Royal Ave, Agnes St, and Columbia St.
- No adverse effects are expected on local north–south bus routes such as 2nd St in the Queen's Park neighbourhood.
- No noticeable adverse effects are expected on transit routes in Glenbrooke South and Sapperton that use city streets where some traffic volume increases (relative to the no-build scenario) are projected with the Project. Transit routes that could be adversely affected if the potential increase in motor vehicle traffic volumes resulted in increased congestion include the local C9 bus route through Glenbrooke South and Sapperton and Route 155 on East Columbia St near Royal Columbian Hospital (RCH). As indicated earlier, however, the changes in traffic volume on East Columbia St and Richmond St should not create levels of congestion that would noticeably alter connectivity or impede the operations of public transit services.

Surrey:

- Bus access to/from the Scott Road Station bus exchange will be modified to accommodate the realigned Scott Road / Scott Road Extension. Under the current reference concept, buses and vehicles are anticipated to access the Park and Ride and bus exchange via a new signalized intersection on 110 Ave. No noticeable adverse effects relating to community cohesion are anticipated from the change in bus access.
- Within the Surrey part of the LSA, motor vehicle traffic volumes along major transit routes such as King George Blvd and Scott Rd (south of King George Blvd) will not change significantly with the Project. As a result, transit vehicles should be able to continue to operate as efficiently with the Project as under the Baseline no-build scenario.

In summary, no noticeable adverse effects on neighbourhood connectivity related to transit operations are expected with the Project in either New Westminster or Surrey during Project operations.

6.3.3.3 Potential Effect #2: Effects on Neighbourhood Connectivity Related to Non-Motorized Traffic

This section assesses effects on neighbourhood connectivity related to non-motorized traffic during Project construction and operations.

6.3.3.3.1 Effects Related to Non-Motorized Traffic During Project Construction

During Project construction, non-motorized traffic could be affected by temporary closures/detours of paths and sidewalks. The Central Valley Greenway and the BC Parkway are the two main regional cycling routes that traverse the LSA. The BC Parkway parallels the Expo SkyTrain Line and connects

Downtown Vancouver with Surrey City Centre via the Pattullo Bridge, 110 Ave/111 Ave, and King George Blvd; the Central Valley Greenway links Downtown Vancouver to Downtown New Westminster.

Other major arteries in the LSA with provision for multi-use paths and/or sidewalks that could be affected during Project construction include the existing bicycle/multi-use paths on the Albert Crescent ramp, Columbia St, and McBride Blvd in New Westminster, and Old Yale Rd, Scott Rd, and King George Blvd in Surrey.

In New Westminster, special accommodation may be required for non-motorized access near the intersection of McBride Blvd and Royal Ave, and near Leopold Place/Bushby St. Special accommodation may be also required for non-motorized traffic between community infrastructure and services in the Albert Crescent Precinct, such as the École Qayquayt Elementary School, and residences in Glenbrooke South and the northeastern part of the Albert Crescent Precinct.

In Surrey, special accommodation may be required for non-motorized access between the Scott Road SkyTrain Station and nearby facilities, including CDI College, the worship centres, businesses in the multi-tenant facilities located on and near Pattullo Place. Non-motorized access to Brownsville Bar Park could also be disrupted during construction of the Highway 17 overpass of Old Yale Rd, and would require special accommodation. **Section 6.2 Land Use** assesses the Project effects of potential changes in access by type of land use including on nearby parks and other community infrastructure and services.

6.3.3.3.2 Effects Related to Non-Motorized Traffic During Project Operations

Bicycle traffic is currently permitted on the Pattullo Bridge sidewalk, but the narrow two-way path is shared with pedestrians and attracts very little non-motorized traffic. The Pattullo Bridge is part of the BC Parkway path and the Regional Cycling Network for Metro Vancouver.

The Project will provide a safer and more accessible Fraser River crossing for pedestrians and cyclists on both sides of the bridge by separating these pathways from traffic with a concrete barrier and steel railing. Cyclists will travel in the same direction as traffic on each side of the bridge, allowing ample room for passing without encountering oncoming cyclists. Pedestrians will be able to travel in either direction on both sides of the bridge. The new bridge design will include means prevention barrier fencing on both sides.

The Project will also provide connections to existing pedestrian and cycling facilities in the communities on each end of the bridge. The majority of new Project infrastructure for motorized vehicle traffic would be accompanied by provisions for non-motorized traffic, which is expected to considerably improve non-motorized connectivity in and near the Project LSA. As with the new motorized infrastructure incorporated into the Project, the benefits of these improvements would accrue not only within the LSA, but more broadly, with substantially better connections to dedicated regional non-motorized transport infrastructure.

The Scott Road Extension component of the Project in the Bridgeview neighbourhood of Surrey would present a new barrier to east–west non-motorized traffic. With the expected high motorized traffic volumes (11,320 AADT by 2030) on this major new north–south connector, and with no provisions for a safe crossing between 112A Ave and Highway 17, both non-motorized and motorized traffic would need to detour to 112 Ave. Although no estimates are available for current volumes of non-motorized traffic

crossing the existing 124 St, which closely parallels the location of the proposed Scott Road Extension, the level of demand for non-motorized travel between the residential/community service areas of Bridgeview east of the Scott Road Extension and the industrial area west of the road would likely be low.

For non-motorized traffic:

- The travel distance between the two areas may increase by up to 850m as an individual wanting to cross 124 St near 114 Ave would be required to walk to 112 Ave to safely cross the Scott Road Extension.
- As there are no current plans to expand bus service into the industrial area west of the Scott Road Extension, transit riders commuting to/from the industrial area may need to walk further (potentially up to 850 m) to access the bus stops on 124 St and 112 Ave (instead of accessing bus stops east of 124 St).4

Any potential adverse effects to non-motorized traffic due to the Scott Road Extension are expected to be more than offset by the benefits associated with the Scott Road Extension and other Project components, including a multi-use path on the northeast side of the new Pattullo Bridge; a new, grade-separated pedestrian and cyclist crossing of King George Blvd at 125A St; and a potentially safer intersection at 128 St/ Bridgeview Rd.

No other Project elements were identified that would adversely affect non-motorized traffic during Project operations.

Table 6.3-10 identifies changes to non-motorized connectivity infrastructure resulting from the Project, and the likely effects of those changes.

Table 6.3-10 Project Changes to Non-Motorized Connectivity Infrastructure in LSA

New Westminster Part of LSA		
Major Streets	**Existing Non-Motorized Infrastructure**	**Proposed changes to non-motorized transportation infrastructure and potential Project effects**
Pattullo Bridge	Single narrow sidewalk on west side of bridge with access from Albert Crescent ramp; negligible number of pedestrians/cyclists.	Project includes dedicated multi-use paths on each side of the bridge connecting to existing / new pedestrian and cycling facilities in both cities. The wider and safer cycling and pedestrian facilities will likely attract more users.
McBride Blvd (boundary between Glenbrooke South and Victory Heights to the east, and Downtown, Queen's Park, and Glenbrooke North to the west)		
Columbia St intersection	Traffic signal with a multi-use path crossing (Central Valley Greenway) on the north approach, and a pedestrian crossing on the west approach.	A Central Valley Greenway multi-use path crossing will be grade-separated, with the at-grade intersection shifting slightly to the west. Project will facilitate non-motorized traffic from McBride to and from the existing bicycle lanes along East Columbia and to and from Surrey.

New Westminster Part of LSA		
Major Streets	**Existing Non-Motorized Infrastructure**	**Proposed changes to non-motorized transportation infrastructure and potential Project effects**
Between Columbia St and Royal Ave	Sidewalks on both sides	The east sidewalk will be widened to become a multi-use path, connecting to the BC Parkway / Central Greenway network. The new multi-use path will provide a better walking/cycling experience for Victoria Heights neighbourhood to access the BC Parkway / Central Greenway.
Royal Ave intersection	Traffic signal with pedestrian crossings on the south and east approaches.	Improved pedestrian crossings in both directions (ie. across Royal ave and McBride).The better infrastructure for pedestrians will likely increase non-motorized traffic at that intersection. Better connections will also facilitate non-motorized traffic between Glenbrooke South and Albert Crescent community services including Qayqayt School.
Between Royal Ave and 6th Ave	Sidewalk on the east side, and a pedestrian overpass south of Memorial Dr	No change; but better connections at and below Royal Ave may prompt increased use of this path.
Between 6th Ave and 10th Ave	Sidewalk on the east side, and a pedestrian overpass at 7th Ave	No change; but better connections at and below Royal Ave may prompt increased use of this path.
Royal Ave west of McBride Blvd (Downtown New Westminster to the south and Queen's Park to the north)		
Between Granville St and McBride Blvd	Sidewalk on the south side	Project includes sidewalks on both sides of Royal Ave, which will provide more options for pedestrians and cyclists.
Exit lane for McBride Blvd southbound onto Royal Ave	No pedestrian / cyclist facilities	No change.
Royal Ave eastbound on-ramp to new Pattullo Bridge	Pedestrian activated special crosswalk, no pedestrian connection to the Central Valley Greenway	Project includes a pedestrian overpass, which would add approximately 100 m to the walking distance along Royal Ave. The proposed improvement eliminates a major pedestrian/vehicle conflict point along this walking route. A new sidewalk will also be provided to connect the south sidewalk on Royal Ave to the BC Parkway / Central Valley Greenway and the future Agnes St Greenway.
Leopold Place and Bushby St.	Sidewalk on west side of Leopold Place; path from foot of Leopold Place to McBride/ Columbia intersection	No change, except that potential modified vehicle access into Leopold Place will include sidewalks leading to the west side of McBride Blvd, thereby providing a new connection to the BC Parkway / Central Valley Greenway and the future Agnes St Greenway.
Albert Crescent Park – Access to Pattullo Bridge	Sidewalk onto the Pattullo Bridge	The existing sidewalk connection will be replaced with new and wider multi-use path connections to and from the bridge. This is anticipated to result in increased use by pedestrian and cyclists.

Surrey Part of LSA		
Major Streets	**Existing Non-Motorized Infrastructure**	**Proposed changes to non-motorized transportation infrastructure and potential Project effects**
Pattullo Bridge	Single narrow sidewalk on west side of bridge; negligible number of pedestrians/cyclists	Project will include dedicated multi-use paths on each side of the Pattullo Bridge and connect to the existing BC Parkway multi-use path. The wider and safer cycling and pedestrian facilities will likely attract more users.
King George Blvd (Bridgeview and South Westminster LSA neighbourhoods and Surrey City Centre)		
Between Highway 17 and west of 125A St	North sidewalk east of 124 St, BC parkway on the south side via 111A Ave and 110 Ave	New multi-use pathway on the north side of King George Blvd. New multi-use path on the south side of King George connecting to BC Parkway and Scott Road Station Modest increases in pedestrian and cycling traffic are expected with the improved pedestrian and cycling facilities.
At 125A St	No crossing	A new grade separated multi-use path crossing at 125A St will improve access to/from the Bridgeview neighbourhood, BC Parkway, Scott Road Station, and the new multi-use paths on both sides of new Pattullo Bridge. Improved connection between Bridgeview neighbourhood and Scott Road SkyTrain Station should encourage more cycling and pedestrian traffic.
At 126A St	Bicycle/Pedestrian overpass	No change, but Project improvements to the pedestrian and cycling infrastructure in the area may lead to greater use of this overpass.
At 128 St/ Bridgeview Rd	Traffic signal with pedestrian crossings on the north, east, and south approaches	Intersection likely to be more pedestrian/bike friendly due to reduced conflicts which motor vehicle traffic.
Scott Road Extension (Bridgeview and Transit-Oriented Urban Village of South Westminster)		
North of King George Blvd	No dedicated pedestrian / cyclist facilities on 124 St	The proposed Scott Road Extension will physically separate the residential neighbourhood east of 124 St from the industrial lands west of 124 St, with 112 Ave remaining as the point of travel between the two areas for pedestrians and cyclists. Cyclists travelling westbound on Highway 17 may use Scott Road Extension as a new connection to access the multi-use pathways on the Pattullo Bridge by riding on-street; no designated cycling facilities are proposed along Scott Road Extension.

6.3.3.4 Potential Effect #3: Effects on Social Equity

Data on indicators of neighbourhoods with higher incidence of vulnerable populations such as income levels, unemployment rates, the proportion of single-parent families, and housing ownership, indicate that Downtown New Westminster and Bridgeview may have more resident individuals and/or population groups that are vulnerable to adverse Project effects than other LSA areas of New Westminster and Surrey.

This section examines the potential Project effects on the Social Equity subcomponent of Community Cohesion during Project construction and Project operations.

6.3.3.4.1 Potential Adverse Project Effects on Social Equity During Project Construction

Potential adverse Project effects on neighbourhood residents were identified in the assessments of Land Use (**Section 6.2**) and the neighbourhood connectivity subcomponent of Community Cohesion. These assessments confirmed potential adverse effects in specific LSA neighbourhoods during Project construction. This section assesses the extent to which these adverse effects may be incurred disproportionately by vulnerable populations in these LSA neighbourhoods. (For the purpose of this assessment, vulnerable populations are defined as individuals, families, or population groups that may be less able to adapt to, or insulate themselves from, changes in their environment, and may be coping with acute and/or chronic challenges to everyday life. Examples include low-income families, single parent families, the homeless, the elderly, new immigrants and people living with physical or mental disability.)

Section 6.2 Land Use identifies the major Project components and potential Project effects from construction on residential land uses and on community infrastructure and services. The potential effects were examined for several pathways, including property acquisitions and disposals, changes in noise and vibration, and changes in access.

The analysis concludes that during Project construction, several residential areas and community infrastructure/services nearest to the Project Boundary could potentially experience higher noise levels than current neighbourhood averages, noticeable vibration levels from pile driving, and potential access disturbances. The following residential neighbourhoods could be subject to adverse effects from noise, vibration, and access disturbance:

- in New Westminster, the Albert Crescent Precinct of Downtown New Westminster, the Victoria Hill developments and nearby assisted living facility in Glenbrooke South, and the part of the Queen's Park neighbourhood closest to Royal Ave
- in Surrey, the Bridgeview neighbourhood west of Bridgeview Dr

Section 6.2 also concludes that community infrastructure/services likely to be affected by Project construction noise and/or vibration include three public parks near the Project Boundary in New Westminster, Albert Crescent Park, Queen's Park, and Sapperton Landing Park; and Brownsville Bar Park in Surrey.

The residential areas and parks identified in **Section 6.2** as likely to be adversely affected by Project construction disturbances are in neighbourhoods that may have higher incidence of vulnerable populations based on several socio-economic indicators.

Based on 2016 Census data, among the LSA neighbourhoods:

- In New Westminster, the Albert Crescent Precinct had the lowest median after-tax household income ($46,400) and the highest proportion of individuals living in households reporting income below the low-income cut-off (LICO) (defined by Statistics Canada as the levels of income where

people spend disproportionate amounts of money for food, shelter, and clothing) (17.7%). The Albert Crescent Precinct also had a higher proportion of private households that consisted of single parents with children (18%).

- The Surrey part of the LSA had a higher median after-tax household income ($59,093) than the Albert Crescent Precinct and a lower proportion of individuals living in households reporting income below LICO (14.4%). Across LSA neighbourhoods, however, the Surrey part of the LSA had the highest incidence of single-parent households with children (21%), the highest proportion of adult population with education below high school certificate (21%), and the lowest proportion of adult population with bachelor or higher university education (15%).
- While the Queen's Park/Glenbrooke North neighbourhoods do not appear to be generally disadvantaged, the part of the Queen's Park neighbourhood in Census DA #839 nearest to Royal Ave had some socio-economic indicators (e.g., a median after-tax household income of $51,088 and 14.4% of individuals living below LICO) that were similar to those of the Albert Crescent Precinct. Also, only 16% of private households in that area were owned dwellings.

The review of socio-economic indicators of vulnerability confirms the potential for adverse effects during Project construction to disproportionally affect neighbourhoods within and near the LSA that may have a higher incidence of vulnerable populations, particularly those in Surrey and in the Albert Crescent Precinct of Downtown New Westminster.

In the 2016 Census, 3.9% of the LSA population and 2.7% of the RSA population self-reported their Aboriginal identity (the average is 3% for Metro Vancouver and 6% for BC). Individuals of Aboriginal identity reside throughout the RSA and are overrepresented in potentially vulnerable populations in Metro Vancouver, as indicated by their proportion of the unemployed labour force, low-income families, and homeless populations. The vulnerable populations in the LSA neighbourhoods that could be adversely affected by the Project are likely to include a proportion of individuals of Aboriginal identity that is higher than their 3.9% share of the LSA population.

6.3.3.4.2 Potential Adverse Project Effects on Social Equity During Project Operations

The assessment of potential adverse Project effects on Neighbourhood Connectivity concludes that during Project operations, no noticeable adverse effects would result from the Project. Similarly, no adverse effects on neighbourhood residents were identified by the assessment of Land Use (**Section 6.2**) during Project operations. Therefore, no potential adverse effects on Social Equity were identified in this section.

6.3.3.5 Summary of Potential Adverse Effects on Community Cohesion

Table 6.3-11 and **Table 6.3-12** summarize potential adverse effects on Neighbourhood Connectivity and Social Equity on individual neighbourhoods in the New Westminster and Surrey LSA.

Table 6.3-11 Summary of Potential Project Effects on Community Cohesion by New Westminster Neighbourhoods

New Westminster Neighbourhood	Major Project Components by Neighbourhood	Potential Adverse Effects (X) to Community Cohesion in Each Neighbourhood (1)	Design /Construction			Operations		
			Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods	Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods
Downtown Neighbourhood (Waterfront Precinct)	Construction of new bridge and ramps over Front St; demolition of existing bridge and ramps	**Connectivity – motorized:** ▪ Construction: Potential for construction related traffic detours, traffic closures, and congestion on Front St and Columbia St. ▪ Operations: No adverse effects are anticipated as the existing connections to and from Front St are not anticipated to change. **Connectivity – non-motorized:** ▪ No adverse effects are anticipated, as there are no existing or proposed sidewalks or cycling facilities along Front St. **Social Equity/vulnerable neighbourhood:** ▪ No adverse effects, as there are no residential areas in neighbourhood.	X	–	–	–	–	–
Downtown Neighbourhood (Albert Crescent Precinct and Historic Precinct)	Revised ramps and road connections to and from the Pattullo Bridge; demolition of existing bridge and ramps	**Connectivity – motorized:** ▪ Construction: Potential for construction related traffic detours, temporary access disruption, and congestion. ▪ Operations: Minor routing changes required for motorists accessing the bridge from Leopold Place and adjacent areas. **Connectivity – non-motorized:** ▪ Construction: Potential for construction related detours and/or temporary closures of existing sidewalks and bike paths. ▪ Operations: No adverse effects are anticipated, as pedestrians and cyclists are likely to benefit from connectivity enhancements.	X	X	X	X	–	–

New Westminster Neighbourhood	Major Project Components by Neighbourhood	Potential Adverse Effects (X) to Community Cohesion in Each Neighbourhood (1)	Design /Construction			Operations		
			Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods	Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods
		Social Equity: ▪ On average, based on several socio-economic indicators neighbourhood may be more vulnerable to potential Project related adverse effects during construction.						
Queen's Park and Glenbrooke North neighbourhoods	No physical project infrastructure within this area.	**Connectivity – motorized**: ▪ Construction: Potential for construction related congestion. ▪ Operations: No adverse effects are anticipated. **Connectivity – non-motorized**: ▪ No adverse effects are anticipated, as pedestrians and cyclists are likely to benefit from connectivity enhancements. **Social Equity/vulnerable neighbourhood**: ▪ Generally, areas are not disadvantaged in terms of several socio-economic indicators with the possible exception of residential area nearest to Royal Ave, which could also be the most likely to be adversely affected during construction.	X	–	X	–	–	–
Glenbrooke South	Revised ramps and road connections to and from the Pattullo Bridge.	**Connectivity – motorized**: ▪ Construction: Potential for construction related traffic detours, access disruption, and congestion. ▪ Operations: Minor routing changes required for motorists accessing the bridge from residential areas nearest to East Royal Ave and McBride Blvd; anticipated traffic changes in the neighbourhood as a whole are generally not substantial and are within or near current road classifications.	X	X	–	X	–	–

New Westminster Neighbourhood	Major Project Components by Neighbourhood	Potential Adverse Effects (X) to Community Cohesion in Each Neighbourhood (1)	Design /Construction			Operations		
			Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods	Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods
		Connectivity – non-motorized: ▪ Construction: Potential for construction related detours and/or temporary closures of existing sidewalks and bike paths, including potential impacts to school walking routes. ▪ Operations: No adverse effects are anticipated as residents likely to benefit from Project enhancements to walking/cycling connectivity. **Social Equity/vulnerable neighbourhood**: ▪ On average, not a disadvantaged area in terms of several socio-economic indicators.						
Victory Heights	No physical project infrastructure within this area.	**Connectivity – motorized**: ▪ Construction: Potential for construction related traffic congestion. ▪ Operations: No adverse effects are anticipated, as daily traffic volumes along major arterials within Victory Heights are not expected to increase. **Connectivity – non-motorized**: ▪ No adverse effects are anticipated. **Social Equity/vulnerable neighbourhood**: ▪ On average, not a disadvantaged area in terms of several socio-economic indicators.	X	–	–	–	–	–

New Westminster Neighbourhood	Major Project Components by Neighbourhood	Potential Adverse Effects (X) to Community Cohesion in Each Neighbourhood (1)	Design /Construction			Operations		
			Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods	Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods
Outside LSA within RSA: Sapperton Neighbourhood	No physical project infrastructure within this area.	**Connectivity – motorized**: ▪ Construction: No adverse effects are anticipated. ▪ Operations: No noticeable adverse effects on connectivity as anticipated traffic changes in the neighbourhood as a whole are generally not substantial and are within or near current road classifications. **Connectivity – non-motorized**: ▪ No adverse effects are anticipated. **Social Equity/vulnerable neighbourhood**: ▪ No direct Project adverse effects are anticipated.	–	–	–	–	–	–

Note (1) For the purpose of this assessment, vulnerable populations are defined as individuals, families, or population groups that may be less able to adapt to, or insulate themselves from, changes in their environment, and may be coping with acute and/or chronic challenges to everyday life. Examples include low-income families, single parent families, the homeless, the elderly, new immigrants and people living with physical or mental disability.

Table 6.3-12 Summary of Potential Project Effects on Community Cohesion by Surrey Neighbourhoods

Surrey Neighbourhood	Major Project Components by Neighbourhood	Potential Adverse Effects (X) to Community Cohesion in Each Neighbourhood (1)	Design/Construction			Operations		
			Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods	Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods
Bridgeview (West of Bridgeview Dr)	Construction of new bridge with tie-in to King George Blvd, construction of Scott Road Extension and connections to Highway 17; other associated changes to local roads to connect to the reconfigured road network.	**Connectivity – motorized**: ▪ Construction: Potential for construction related traffic detours, traffic closures, and congestion. ▪ Operations: o adverse effects to neighbourhood connectivity are not anticipated as traffic volumes are not expected to increase. o Due to Scott Road Extension, travel times may increase for a small number of trips that currently use 124 St to access Highway 17. **Connectivity – non-motorized**: ▪ Construction: Potential for construction related detours and/or temporary closures of existing sidewalks and bike paths. ▪ Operations: Longer walking/cycling distances between the residential neighbourhood east of 124 St and the industrial area west of 124 St are anticipated as a result of the Scott Road Extension. Demand between these two areas are expected to be relatively low. **Social Equity/vulnerable neighbourhood**: ▪ On average, neighbourhood may be more vulnerable based on several socio-economic indicators.	X	X	X	X	X	–

Surrey Neighbourhood	Major Project Components by Neighbourhood	Potential Adverse Effects (X) to Community Cohesion in Each Neighbourhood (1)	Design/Construction			Operations		
			Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods	Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods
Bridgeview (East of Bridgeview Dr)	No physical project infrastructure within this area.	**Connectivity – motorized**: ▪ Construction: Potential for construction related traffic congestion. ▪ Operations: No adverse effects are anticipated, as substantial changes in traffic volumes are not expected. **Connectivity – non-motorized**: ▪ No adverse effects are anticipated. **Social Equity/vulnerable neighbourhood**: ▪ On average, neighbourhood may be more vulnerable based on several socio-economic indicators, but no Project adverse effects in neighbourhood are expected.	X	–	–	–	–	–
South Westminster (Fraser River Waterfront and Yale St Commercial District west of SFPR)	Grade-separation of Highway 17 / Old Yale Road and upgrade of Bridge Road to two-way.	**Connectivity – motorized**: ▪ Construction: Potential for construction related traffic detours, traffic closures, and congestion. ▪ Operations: o adverse effects to neighbourhood connectivity are not anticipated as traffic volumes are not expected to substantially increase. o Access to Highway 17 will change but is not expected to adversely affect neighbourhood connectivity because of available alternate routes. **Connectivity – non-motorized**: ▪ Potential for construction related detours for pedestrians and cyclists. ▪ Operations: No adverse effects are anticipated.	X	X	X	–	–	–

Surrey Neighbourhood	Major Project Components by Neighbourhood	Potential Adverse Effects (X) to Community Cohesion in Each Neighbourhood (1)	Design/Construction			Operations		
			Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods	Connectivity: Motorized	Connectivity: Non-Motorized	Effects on Vulnerable Neighbourhoods
		Social Equity/vulnerable neighbourhood: ▪ No residential areas identified; possible unauthorized camping/ homeless populations along the Fraser River.						
Transit-Oriented Urban Village District (South of King George Blvd and east of 124 St)	Construction of new Scott Road Interchange, and realignment of Scott Road to connect to the New Scott Road Extension.	**Connectivity – motorized**: ▪ Construction: Potential for construction related traffic detours, traffic closures, and congestion. ▪ Operations: No adverse effects are anticipated. **Connectivity – non-motorized**: ▪ Construction: Potential for construction related detours and/or temporary closures of existing sidewalks and bike paths. ▪ Operations: No adverse effects are anticipated. **Social Equity/vulnerable neighbourhood**: ▪ No residential areas identified.	X	X	–	–	–	–
Scott Road Commercial District and Light Industrial/ Business Park District	No physical project infrastructure within this area.	**Connectivity – motorized**: ▪ Construction: Potential for construction related traffic congestion. ▪ Operations: No adverse effects are anticipated. **Connectivity – non-motorized**: ▪ No adverse effects are anticipated during both construction and operations. **Social Equity/vulnerable neighbourhood**: ▪ No residential areas identified.	X	–	–	–	–	–

Note 1: see note 1 of previous table for a definition of vulnerable neighbourhoods.

6.3.3.5.1 Summary of Adverse Effects on Neighbourhood Connectivity Related to Motor Vehicle Traffic

The Project is expected to provide long-term benefits to New Westminster, Surrey, and Metro Vancouver by supplying safer and more reliable transportation infrastructure, which will enhance motor vehicle connectivity.

This section assesses the potential for adverse Project effects on neighbourhood connectivity related to motor vehicle traffic during the Construction and Operations phases of the Project.

As shown in **Table 6.3-11**, Project construction could result in access disturbances and traffic congestion nearest to the Project Boundary in the New Westminster part of the LSA, including along the Waterfront and Albert Crescent Precincts of Downtown New Westminster, the Victoria Hill area of Glenbrooke South, and in the part of Queen's Park neighbourhood nearest to Royal Ave. In Surrey (**Table 6.3-12**), the assessment identifies the potential for access disturbances related to Project construction in the Bridgeview area.

The estimated Project traffic volumes indicate that during Project operations, increased use of the TransLink Major Road Network will generally channel bridge traffic away from local streets in most neighbourhoods. The effects on motorized connectivity in New Westminster during Project operations are summarized below:

- The general shift in traffic away from McBride Blvd to East Columbia St could benefit motor vehicle connectivity by decreasing the amount of Pattullo Bridge traffic using city collector roads in these areas. In addition, lower traffic on McBride Blvd is generally expected to benefit the Glenbrooke North and Queen's Park neighbourhoods.
- As a result of the realigned McBride Blvd and proposed grade-separation over the East Columbia Street bridge on-ramp, a small number of motorists accessing the bridge from Leopold Place, Bushby St, and the nearby Victoria Heights neighbourhood will need to divert to southbound McBride Blvd to get onto the bridge.
- No noticeable adverse effects on neighbourhood connectivity from increased traffic volumes on East Columbia St including traffic increases projected in residential areas north of East Columbia St in Glenbrooke South and in the Sapperton neighbourhood near Royal Columbian Hospital (RCH). The changes in traffic volumes on East Columbia St and Richmond St should not create levels of congestion that would impede the operations of public transit services.

In Surrey, the estimated Project traffic volumes indicate that the southbound offramp for the new bridge to Highway 17, combined with the new Scott Road Extension, will divert regional Highway 17 traffic away from Bridgeview Dr and local streets in Bridgeview and South Westminster during Project operations. No adverse effects on connectivity related to motor vehicle traffic were identified in the Surrey LSA.

6.3.3.5.2 Summary of Adverse Effects on Neighbourhood Connectivity for Non-Motorized Traffic

The Project will provide a safer and more accessible Fraser River crossing for pedestrians and cyclists on both sides of the new bridge by separating these pathways from traffic with a concrete barrier and steel railing, and by adding connections to dedicated local and regional pedestrian and cycling routes in the communities on each end of the bridge.

The new Project infrastructure for motorized vehicle traffic would be accompanied by specific provisions that will considerably improve non-motorized connectivity across the Fraser River and in areas near the new bridge approaches. As with the new motor vehicle infrastructure incorporated into the Project, these improvements would be of benefit not only within the LSA, but more broadly, by providing substantially better connections to dedicated regional non-motorized transport infrastructure.

During Project construction, temporary closures/detours of multi-use paths or sidewalks could have adverse but temporary effects on non-motorized traffic. The Project components most likely to interact with non-motorized traffic include the replacement of the Royal Ave overpass of McBride Blvd and the construction of the elevated, realigned section of Lower McBride Blvd near East Columbia St. In Surrey, Project construction near the Scott Road SkyTrain Station could interfere with non-motorized traffic.

During operations, no noticeable adverse effects to non-motorized traffic are expected in either New Westminster or Surrey.

6.3.3.5.3 Summary of Adverse Effects on Social Equity

The Project is expected to benefit all residents of the LSA and RSA through improved motor vehicle connectivity, better non-motorized infrastructure, improved safety, and reduced congestion. While some vulnerable population groups may be less likely to experience direct advantages from improved motor vehicle connectivity, they may be more likely to benefit from improvements to non-motorized accessibility/connectivity, particularly for people living nearest to the Project Boundary.

The assessment of adverse effects on the Social Equity subcomponent identifies neighbourhoods that are more likely to include vulnerable population groups relative to other LSA neighbourhoods through a review of income levels and other demographics. As noted in **Section 6.2 Land Use**, the likelihood of vulnerable populations being potentially exposed to adverse effects from Project construction, such as noise, vibration, and access disturbances, is highest in the following neighbourhoods:

- the Albert Crescent Precinct of Downtown New Westminster
- the part of the Queen's Park neighbourhood nearest to Royal Ave
- the part of the Bridgeview neighbourhood on the east side of 124 St and along King George Blvd

Also in Surrey, people have engaged in unauthorized camping near the western end of Old Yale Rd, and these may represent a vulnerable population group.

There are currently no Aboriginal Group reserves, villages or settlements or known fee-simple land holdings in or near the LSA. Two historic reserves - Musqueam IR1 and Langley IR8 (now Kwantlen First Nation) – were located within the boundaries of the LSA in Surrey. Within the RSA, the Semiahmoo First Nation has a reserve in south western Surrey near the USA border, 23 km from the Project Boundary.

The vulnerable populations in the LSA neighbourhoods that could be adversely affected by the Project are likely to include a proportion of individuals of Aboriginal identity that is higher than their 3.9% share of the LSA population.

During Project operations no noticeable direct adverse effect on residential areas/ neighbourhoods in the LSA was identified, and therefore the assessment concludes no adverse effects on social equity once Project construction is completed.

6.3.4 Mitigation Measures

6.3.4.1 Mitigation Approach

Three types of mitigation measures may be applicable to Community Cohesion:

- Avoidance, i.e., identifying changes to Project design that could alleviate adverse effects on community cohesion, including changes to individual Project components that would affect neighbourhood connectivity.
- Minimization, where mitigation plans are developed to minimize adverse effects of specific pathways on community cohesion (e.g., changes in access, noise, and vibration).
- Offsetting, whereby the adverse effects on community cohesion are reduced through providing a benefit that at least partly offsets the adverse effect (e.g., non-motorized traffic would be adversely affected by multi-path closures/detours during Project construction, but would benefit from new improved multi-paths once the Project is complete).

The Community Cohesion effects assessment confirmed that the Project could have adverse effects on existing neighbourhood connectivity and/or social equity during Project construction. The following section identifies potential strategies for mitigating those effects.

6.3.4.2 Mitigation Plans and Minimization Measures for Effects on Community Cohesion

Section 1.0 Overview of Proposed Project and **Section 14.0 Management Plans** outline the proponent's commitments to a Construction Staging Plan, a Demolition Staging Plan and a Construction Traffic Management Plan (TMP).

A Communications and Engagement Plan will be developed prior to commencement of Project construction, and will include ongoing engagement with communities for the duration of Project construction. The communications and engagement program will provide community members and the public with regular project information, and provide opportunities for them to raise interests and concerns. The BC Ministry of Transportation and Infrastructure will also establish a Business Liaison Program including Business Liason Committees to help identify and minimize construction-related impacts to businesses as much as possible.

Table 6.3-13 further describes some key Project commitments to mitigate potentially adverse effects on community cohesion.

Table 6.3-13 Key Project Commitments for Mitigating Effects on Community Cohesion

Project Commitments:	Description
Construction Staging Plan and Demolition Staging Plan	See **Section 1.0 Overview of Proposed Project** and **Section 14.0 Management Plans**
Traffic Management Plan	See **Section 1.0 Overview of Proposed Project** and **Section 14.0 Management Plans**
Construction Noise and Vibration Management Plan	See **Section 4.7 Noise and Vibration**
Business Liaison Program (BLP)/ Communication Plan	The Proponent proposes to establish a Business Liaison Program to provide two-way communication between the Project construction team and businesses located along the Project Boundary to identify and minimize adverse construction-related effects on businesses. See **Section 5.1 Economic Activity**
Project Business Liaison Committees – New Westminster and Surrey	The Proponent proposes to establish Business Liaison Committees in New Westminster and in Surrey. See **Section 5.1 Economic Activity**
Communications and Engagement Plan – New Westminster and Surrey	The Proponent proposes to develop a Communications and Engagement Plan for New Westminster and Surrey in advance of Project construction that will: ▪ Facilitate regular, two-way communication with residents, businesses and the public to provide project information and seek to understand their interests and concerns ▪ Provide a conduit for residents, businesses and the public to raise concerns and provide advice on strategies to address Project issues ▪ Facilitate feedback regarding local interests and/or complaints ▪ Establish a Business Liaison Program to help to identify and minimize construction-related impacts to businesses as much as possible
Special outreach as part of Communications and Engagement Plan	As part of the Communications and Engagement Plan, the Proponent proposes to develop strategies aimed at engaging more vulnerable populations in and near the LSA and other potentially vulnerable populations nearest to the Project Boundary.

Mitigation measures were identified to address each of the following pathways by which community cohesion might be affected:

- Effects of increased traffic congestion and access disturbances on motor vehicle connectivity during Project construction
- Effects of access disturbances/detours on connectivity for non-motorized traffic (pedestrian and bicycles) during Project construction
- Effects on potentially vulnerable neighbourhoods/populations nearest to the Project Boundary that could be adversely affected by construction noise, vibration, and access disturbances, should notification and engagement strategies be less effective in these neighbourhoods

6.3.4.2.1 Mitigating the Effects of Increased Traffic Congestion / Access Disturbances on Motor Vehicle Connectivity

The extensive residential, recreation, institutional, commercial, and industrial areas surrounding the Project Boundary in both New Westminster and Surrey rely heavily on motor vehicle access provided by the existing Pattullo Bridge and related road network infrastructure. Within the LSA, the highly built-up urban residential areas of New Westminster, together with the high density of businesses, could make it particularly challenging to maintain motorized access while building the Project in some of the same ROW areas as the existing bridge and access and egress ramps.

This section on Community Cohesion assesses the anticipated Project effects on motorized and non-motorized transportation infrastructure and access. During Project construction:

- The assessment identifies the potential for access disturbances/detours and traffic congestion nearest to the Project Boundary in the New Westminster part of the LSA, including along the Waterfront and Albert Crescent Precincts of Downtown New Westminster, the Victoria Hill area of Glenbrooke South, and the part of Queen's Park neighbourhood nearest to Royal Ave. In Surrey, the assessment identifies the potential for some access disturbances related to Project construction throughout the LSA.
- The assessment identifies the potential for adverse effects to non-motorized traffic near the Project boundary in the New Westminster part of the LSA, including the Waterfront and Albert Crescent Precincts of Downtown New Westminster, the Victoria Hill area of Glenbrooke South, and the part of Queen's Park neighbourhood nearest to Royal Ave. In Surrey, the assessment identifies the potential for adverse effects to non-motorized traffic in the area near the Scott Road SkyTrain Station.
- To minimize potential adverse effects on traffic during Project construction, a Construction Traffic Management Plan will be developed to minimize disruptions to motorized and non-motorized travel while ensuring a safe work space for construction. The Construction Traffic Management Plan is expected to be effective at mitigating disturbances to neighbourhood connectivity resulting from changes in access; however, some temporarily access-related impacts are likely to remain throughout construction.

The Construction Traffic Management Plan will include provisions for minimizing construction effects on:

- Motor vehicle traffic along major arteries
- Motor vehicle access to and from all residences and community infrastructure and services
- Non-motorized access throughout the LSA, including the following sensitive areas: near the intersections of McBride Blvd/Royal Ave and McBride Blvd/Columbia St, where special consideration may be required to accommodate non-motorized traffic between Glenbrooke South and destinations in Downtown New Westminster; and near the Scott Road SkyTrain Station in Surrey
- Availability of street-side parking spaces for LSA residents and users of community infrastructure and services near the Project Boundary

The extent to which any particular community service, group of residents/users, businesses, and/or individuals will be sensitive to the disturbance, or to which Project construction activities could be modified to address access sensitivities, is currently unknown. As part of the Construction Traffic Management Plan, community engagement throughout the Project construction period will help the Project identify and mitigate adverse effects from changes in access.

6.3.4.2.2 Mitigating Effects on Social Equity

The assessment for the Social Equity subcomponent identifies the potential for some adverse Project effects during construction in LSA neighbourhoods that are more likely to include vulnerable population groups. These neighbourhoods are generally closest to the Project Boundary and may be affected by noise, vibration, and access disturbances.

Land Use Section 6.2 examines the potential effects of noise and vibration on residential areas and community infrastructure and services by neighbourhood, taking into account the results of **Section 4.7 Noise and Vibration**. While noise and vibration due to construction and piling activities could reach severe levels, several mitigation measures such as advance notification, restricted hours of activity, and the possibility of using construction equipment and processes that inherently create less noise and/or vibration where viable and necessary, are expected to reduce the magnitude of residual effects on existing land use to an acceptable levels. As the Project moves forward through design, additional details on feasible pile installation techniques to be used in specific locations are expected to reassure communities that construction noise and vibration can be mitigated to acceptable levels.

A communications and engagement program will be established in New Westminster and Surrey prior to commencement of Project construction to facilitate two-way communication between the Project and communities throughout Project construction. The communications and engagement program will provide community members and the public with regular project information, and provide opportunities for them to raise interests and concerns. Through noise and vibration monitoring, and subsequent adaptive management, it should be possible to avoid substantial effects on residential land/dwellings, parks located in and near the LSA, and other community infrastructure and services.

The assessment of Project effects on the social equity subcomponent presented in this section identifies neighbourhoods where a higher likelihood of vulnerable populations coincides with stronger potential for adverse effects from Project construction. These include:

- the Albert Crescent Precinct of Downtown New Westminster
- the part of the Queen's Park neighbourhood nearest to Royal Ave
- Surrey's Bridgeview neighbourhood, particularly on the east side of 124 St and along King George Blvd
- a potentially vulnerable population group in Surrey in a non-residential area near the western end of Old Yale Rd where unauthorized camping has been observed

Mitigation of potential adverse effects on these neighbourhoods relies in part on the CCP being generally effective in notifying parties that could be affected and identifying specific receptors needing more focused mitigation; however, the proposed notification and engagement strategies proposed could be less effective with particularly vulnerable population groups. Specific strategies aimed at engaging potentially more vulnerable populations in the CPP could be required such as specific outreach to shelters and social housing in Downtown New Westminster, the mobile home park, other specific residences in Bridgeview, and any temporary homeless camps that may form in the LSA along the Fraser River waterfront in Surrey.

Section 8.2 Social Determinants of Health (SDOH) identifies measures aimed at mitigating potential Project adverse effects to SDOH as they pertain to vulnerable groups. This includes a commitment by MoTI to work with the Fraser Health Authority (FHA) and other local stakeholders to help reduce the potential for adverse health outcomes on vulnerable populations during construction. Through these initiatives, specific strategies aimed at engaging potentially more vulnerable populations in the Communications and Engagement Plan may be identified. No residual effects on social equity or Community Cohesion are expected.

6.3.4.3 Summary of Proposed Mitigation Measures

Table 6.3-14 summarizes the proposed mitigation measures and their effectiveness at avoiding, offsetting, and/or minimizing residual effects.

Table 6.3-14 Summary of Proposed Mitigation Measures for Community Cohesion

VC/IC Subcomponent	Potential Effect	Mitigation Measure	Project Phase	Effectiveness	Certainty	Relevant Management Plan	Residual Effect (Y/N)
Neighbourhood Connectivity	Effect of increased traffic congestion and access disturbances on motor vehicle connectivity	Develop Traffic Management Plan that will aim to safely mitigate potential adverse effects of roadway construction and maintain mobility and worker safety	Construction	High	High	Traffic Management Plan, Communications and Engagement Plan	N
	Effect of access disturbances on connectivity for non-motorized traffic (pedestrian and bicycles)	Develop Traffic Management Plan that will aim to safely mitigate potential adverse effects of roadway construction and maintain non-motorized access to and from residences, community infrastructure, and services and businesses; and community engagement	Construction	Moderate to High	Moderate	Traffic Management Plan, Communications and Engagement Plan	N
Social Equity	Potentially vulnerable neighbourhoods/ populations nearest to Project Boundary may be adversely affected by noise, vibration, and access disturbances if notification and engagement strategies are less effective in these neighbourhoods	As part of community engagement, commitment by MoTI to work with Fraser Health Authority and other stakeholders and where warranted, specific outreach to potentially affected vulnerable populations in neighbourhoods nearest to Project Boundary	Construction	Moderate	Moderate	Communications and Engagement Plan includes strategies to engage potentially more vulnerable populations where warranted	N

Notes:

[1] Effectiveness:

- Low effectiveness: once the mitigation measures is implemented, the effect is relatively unchanged; there is little or no improvement in the condition of the VC or subcomponent.
- Moderate effectiveness: once the mitigation measure is implemented, the effect is moderately changed; there is moderate improvement in the condition of the VC or subcomponent.
- High effectiveness: once the mitigation measure is implemented, the effect is significantly improved; major improvement in the condition of the VC or subcomponent, or the effect is eliminated.
- Unknown effectiveness: mitigation measure has an unknown effectiveness because it has not been implemented elsewhere in a comparable project or environment.

[2] Certainty

- Low certainty: proposed measure is experimental or has not been applied in similar circumstances.
- Moderate certainty: proposed measure has been successfully implemented but perhaps not in a directly comparable situation.
- High certainty: proposed measure has been successfully applied in a similar situation.

6.3.5 Residual Effects and their Significance

No residual effects are expected on community cohesion, and as a result, no characterization of residual effects is required.

6.3.6 Cumulative Effects and their Significance

No residual adverse effects are expected on community cohesion, and as a result no cumulative adverse effects are expected from the Project.

6.3.7 Follow-up Strategy

No residual effects are expected, and as a result no follow-up strategies are identified.

6.3.8 Conclusions

The assessment concludes that after mitigation, the Project is not likely to result in noticeable adverse effects or residual effects on community cohesion due to the following:

- During Project construction, work on roadways has potential to disrupt motorized and non-motorized traffic. The Project Construction Traffic Management Plan, which will include community engagement throughout Project construction, is expected to safely mitigate the effects of construction on roadways and maintain mobility, worker safety and neighbourhood connectivity for motorized and non-motorized traffic.
- During operations, potential adverse effects on more localized neighbourhood connectivity could result from new physical barriers for motorized or non-motorized traffic being introduced by the Project, or from Project induced redistribution of motor vehicle traffic to neighbourhood streets not suited to carry regional traffic. The assessment of potential effects concludes that the Project's structural elements or roadways are not expected to create barriers that would noticeably affect neighbourhood connectivity in New Westminster or Surrey. Expected higher motor vehicle traffic volumes on two city collector streets in New Westminster are not expected to result in noticeable adverse effects on neighbourhood connectivity.
- There is potential for some adverse Project construction effects from noise, vibration, and access disturbances in neighbourhoods near the Project Boundary, and some of those neighbourhoods are more likely to include vulnerable population groups relative to other LSA neighbourhoods. Individuals of Aboriginal identity may be disproportionately represented in those vulnerable population groups. Successful mitigation of potential noise, vibration, and access disturbance relies in part on the Proponent implementing a Communications and Engagement Plan which will include ongoing engagement with communities for the duration of Project construction. The CCP will include commitments to work with the VFPA and local stakeholders and where warranted, adopt specific outreach strategies aimed at engaging potentially more vulnerable populations, including Aboriginal vulnerable populations. No residual effects on social equity are expected.
- The finding of no noticeable adverse effect on Community Cohesion applies to both the general populations and the Aboriginal populations in the LSA and RSA.

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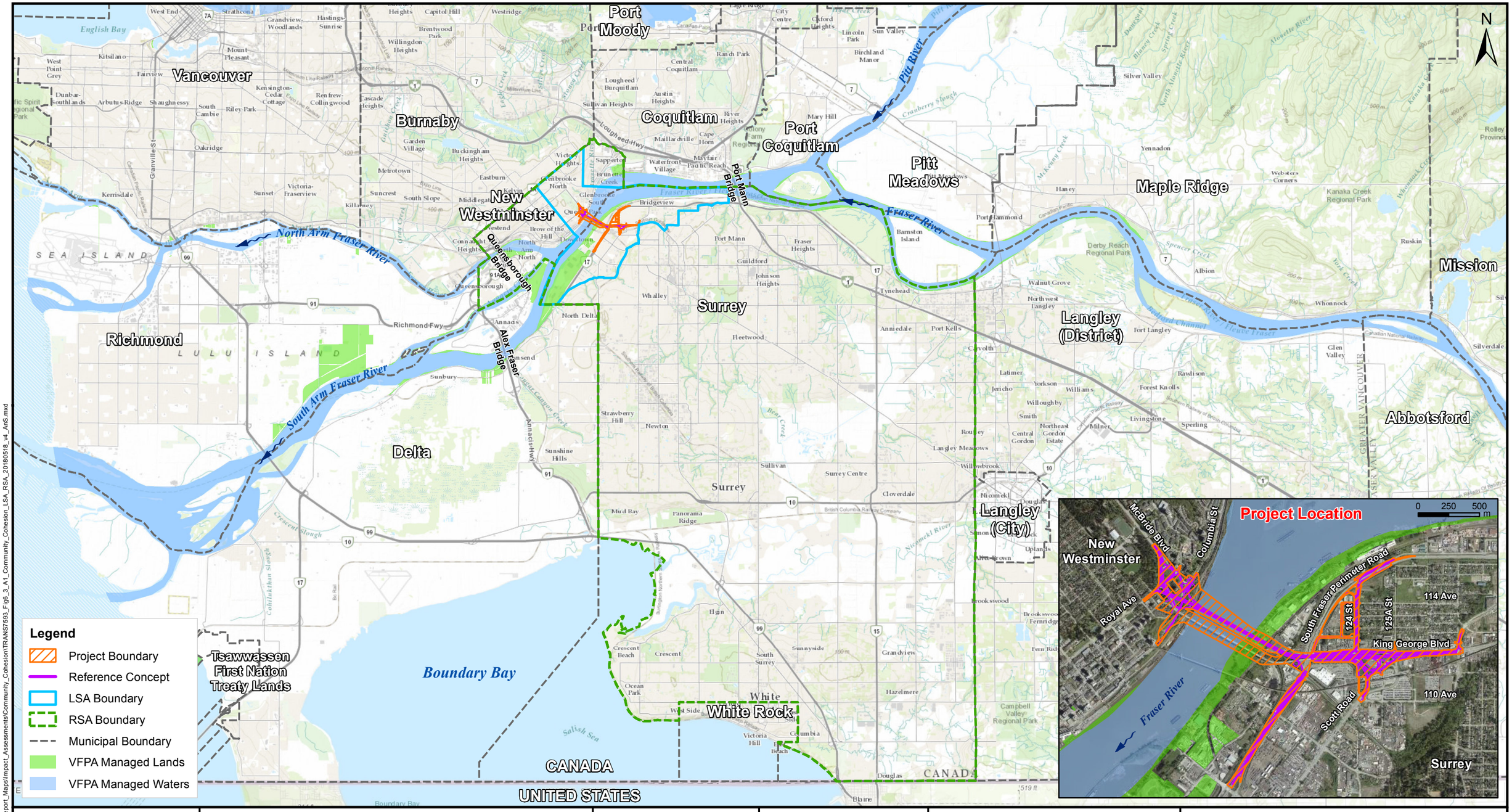
ATTACHMENTS

Attachment 6.3-A

Figures



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BRITISH COLUMBIA Ministry of Transportation and Infrastructure

Hatfield CONSULTANTS

Proposed Pattullo Bridge Replacement Project

Spatial Boundaries for the Community Cohesion Assessment

Contract No. 0906-14/SC001110CA

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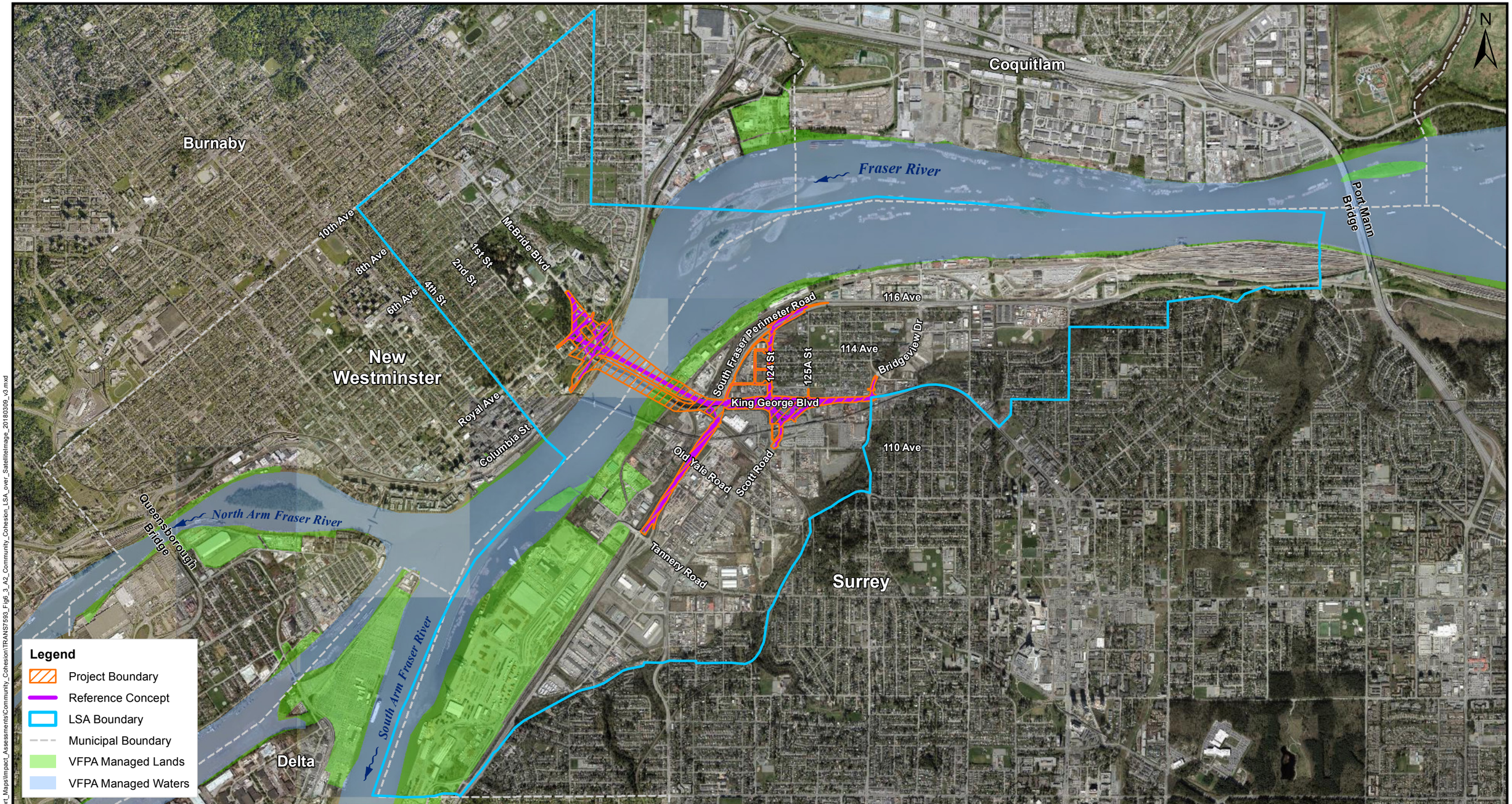

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1	Reference Concept, Parsons 2018.

BRITISH COLUMBIA Ministry of Transportation and Infrastructure

Hatfield CONSULTANTS

Proposed Pattullo Bridge Replacement Project

Community Cohesion Local Study Area

Contract No. 0906-14/SC001110CA

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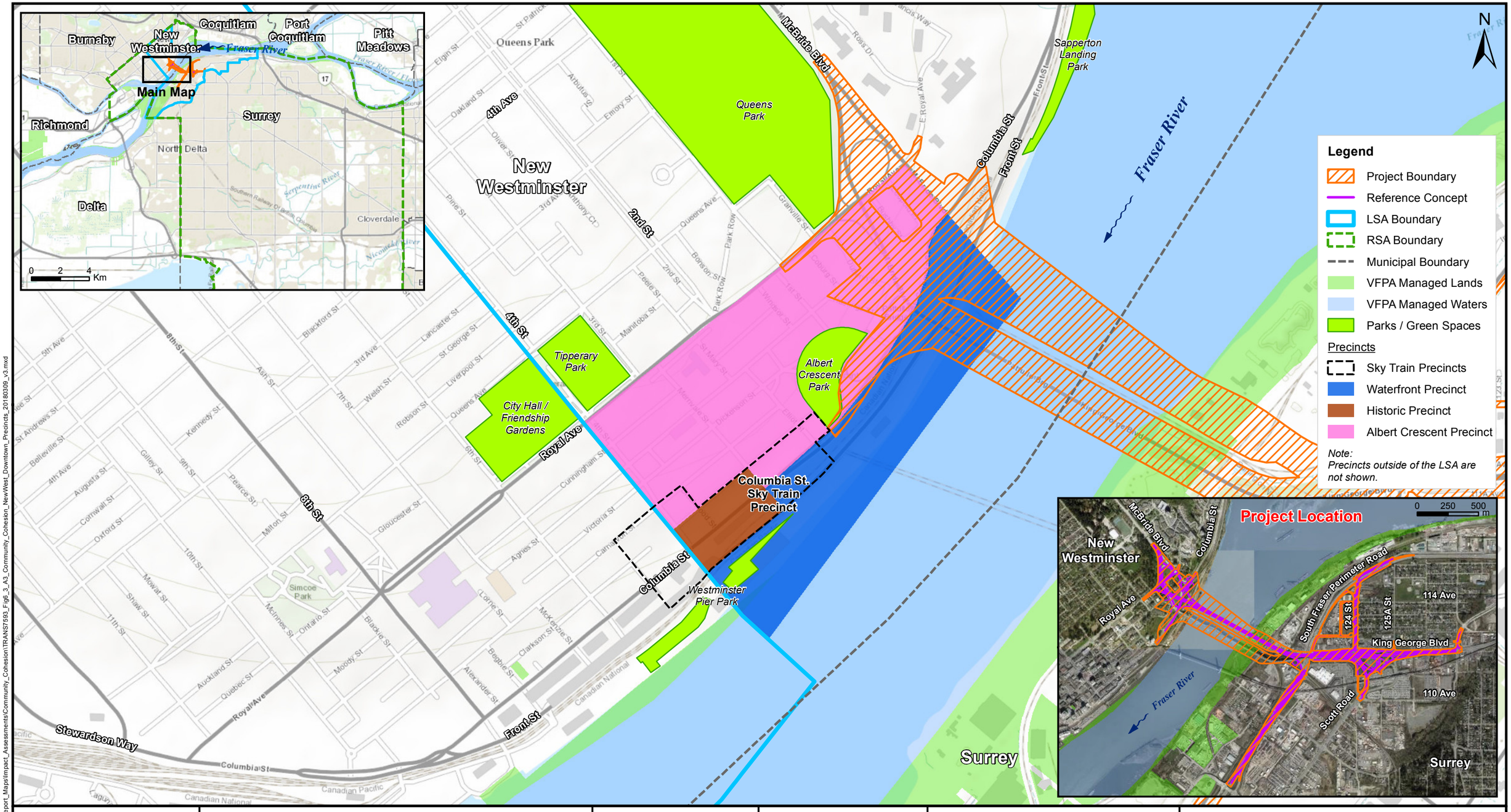

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NO.	DESCRIPTION
1	Reference Concept, Parsons 2018.
2	Precincts Boundary is delineated based on visual reference of the online map from City of New Westminster 2010. Hatfield 2017.

BRITISH COLUMBIA Ministry of Transportation and Infrastructure

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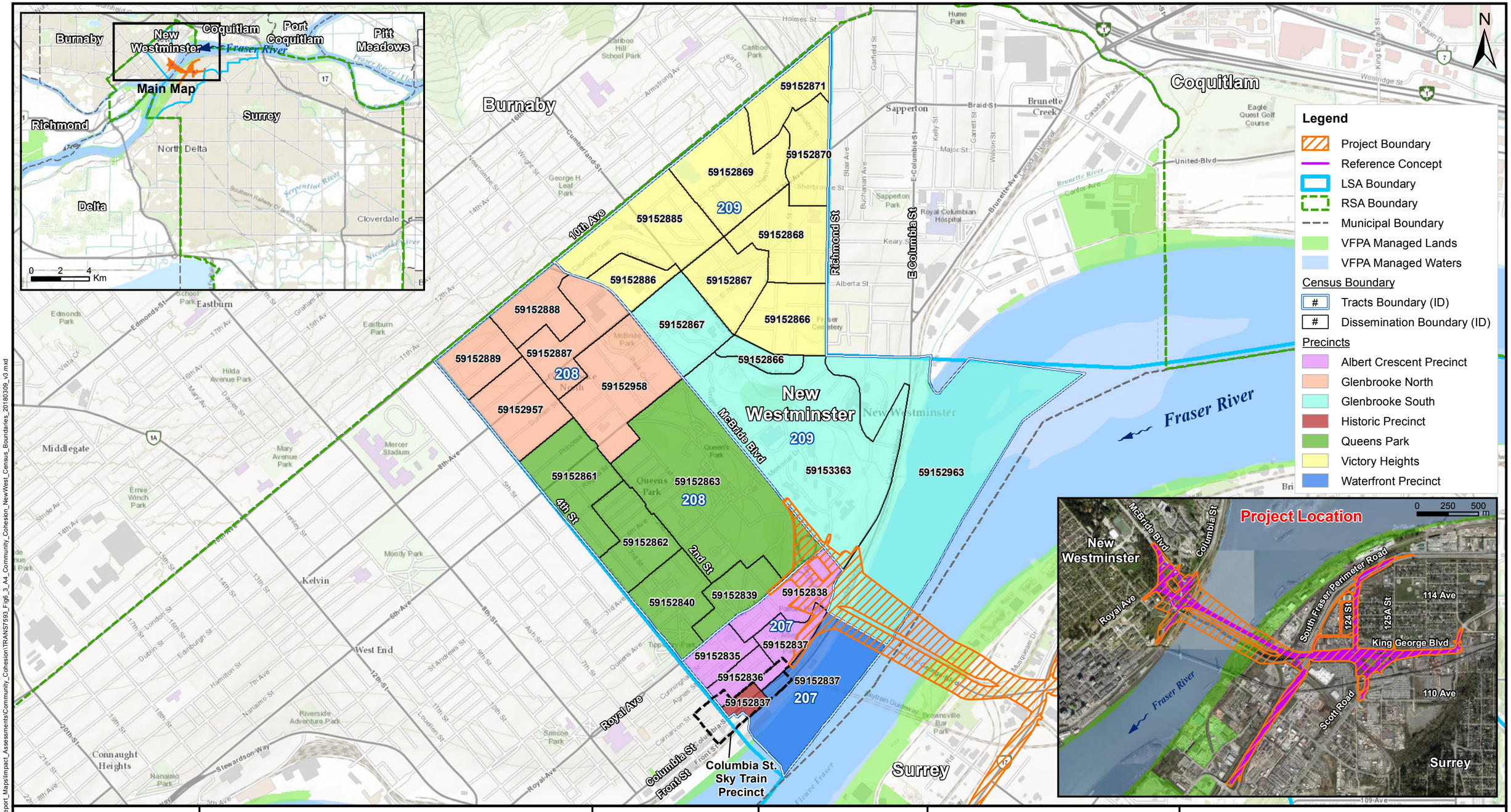
Proposed Pattullo Bridge Replacement Project

New Westminster Downtown Precincts

Contract No. 0906-14/SC001110CA

SCALE	FIGURE NO.	REV NO.
1:8,000 (0 50 100 200 m)	6.3-A-3	3



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DESIGNED	___	
DRAWN	AS	18 - 03 - 09
CHECKED	___	
APPROVAL	___	

REFERENCE DRAWING

NO.	DESCRIPTION
1	Reference Concept, Parsons 2018.
2	Census Tracts Boundary and Desseminations Boundary, City of New Westminster. Accessed in 2017.
3	Precincts within Tracts are defined by Pierce Lefebvre Consulting 2017.

BRITISH COLUMBIA Ministry of Transportation and Infrastructure

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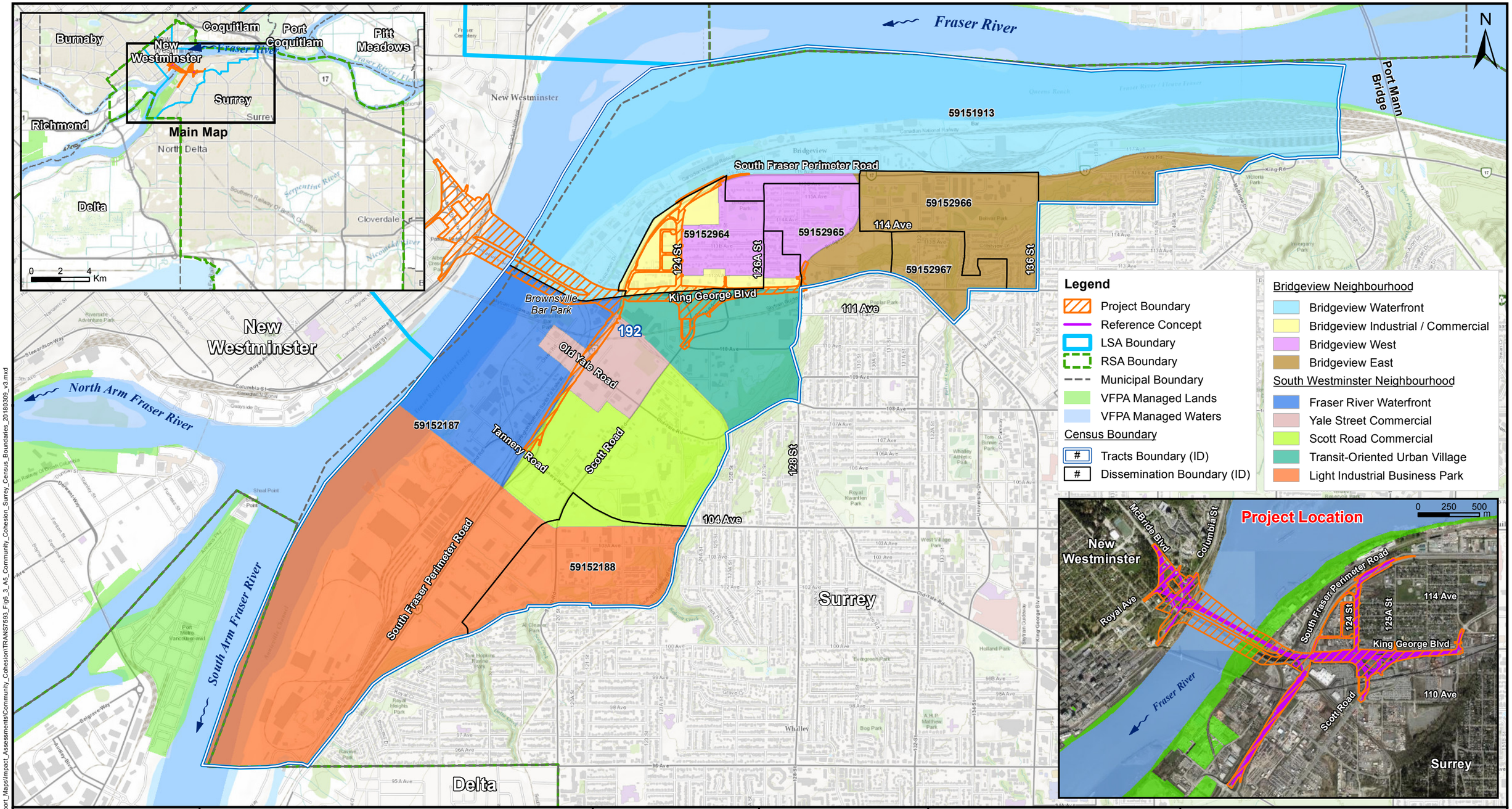
Proposed Pattullo Bridge Replacement Project

Census Tracts and Dissemination Areas in New Westminster

Contract No. 0906-14/SC001110CA

SCALE	FIGURE NO.	REV NO.
1:18,000 (0 100 200 400 m)	6.3-A-4	3



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DESIGNED	___	___
DRAWN	AS	18 - 03 - 09
CHECKED	___	___
APPROVAL	___	___

REFERENCE DRAWING

NO.	DESCRIPTION
1	Reference Concept, Parsons 2018.
2	Census Tracts Boundary and Desseminations Boundary, Statistics Canada, Accessed in 2017.
3	Bridgeview Neighbourhood Boundary is defined by Pierce Lefebvre Consulting 2017.
4	South Westminster Neighbourhood Boundary is delineated based on the Neighbourhood Concept Plan, City of Surrey, Accessed in 2017.

BRITISH COLUMBIA Ministry of Transportation and Infrastructure

Hatfield CONSULTANTS

Proposed Pattullo Bridge Replacement Project

Census Tracts and Dissemination Areas in Surrey

Contract No. 0906-14/SC001110CA

SCALE	FIGURE NO.	REV NO.
1:25,000 (0 250 500 m)	6.3-A-5	3