

# 10 Summary and Conclusion

## 10.1 Introduction

TransLink and the City of Surrey are proposing to develop the Surrey Newton-Guildford (SNG) Light Rail Transit (LRT) (the Project), which will connect the communities of Newton and Guildford to Surrey City Centre, including Surrey Central SkyTrain Station and the SkyTrain Expo Line. Construction and commissioning are anticipated to take three to five years and the operation phase is scheduled to continue for more than 30 years.

The Project is a proposed 10.5 km long LRT line to be built and operated along 104 Avenue between 152 Street in Guildford and City Parkway, along City Parkway between 104 Avenue and 102 Avenue, along 102 Avenue between City Parkway and King George Boulevard, and along King George Boulevard between 102 Avenue and Newton Exchange near 71 Avenue and 136b Street. The Project is in an urban area that includes some densely-populated residential neighbourhoods, commercial districts, businesses, and medical, recreational, and educational facilities. The Project will be built primarily along the center of the existing roadways, at grade, with a guideway width of up to 7.9 m. There are eleven proposed stops along the Project Alignment. Once operational, the Project will be fully integrated with existing TransLink systems and protocols.

The Project is designed to address current and forecasted transportation challenges in the area, including population and employment growth, traffic corridor congestions, sustainable transportation targets, and access to transit. The Project is expected to result in a net decrease in vehicle traffic and increase in transit use.

The Project does not trigger an environmental assessment under the *Canadian Environmental Assessment Act 2012* or the *British Columbia Environmental Assessment Act*, based on size thresholds of the proposed Project. However, TransLink undertook an Environmental and Socio-economic Review (ESR), following a similar evaluation structure as the formal environmental assessment process, including scoping, development of a Terms of Reference, baseline research, engagement and consultation, comprehensive reporting of findings for applicable environmental and socio-economic aspects, and development of mitigation and management measures. The review of potential effects of Project construction and operations was conducted based on the scope described in the Terms of Reference. Project Review Elements were selected because of their importance to stakeholders, First Nations communities, and the public.

Key Project activities are as follows:

- For construction
  - property acquisition
  - site preparation (e.g., clearing, grading, and set up of temporary facilities) and utility relocation

- roadworks, including: construction of guideway, system structures (e.g., substations, power and communication lines), exchanges and stops, excavation
- construction of an operations and maintenance building
- vehicle traffic (e.g., road use and construction traffic)
- management and disposal of waste and excavated materials
- commissioning and startup.
- For operation
  - train operation, including wayside and power
  - train and track maintenance, administration, transit police
  - train function (i.e., change in roadways and intersection functions).

## 10.2 Project Effects

Project effects for the 11 Review Elements assessed are summarized in Table 10-1, for applicable Project phases, type of activity or physical work associated with the effect, and mitigated effects.

In addition to the 11 Review Elements, effects of worst-case or probable accidents or malfunctions caused by equipment malfunction or failure, human error, or natural events were evaluated.

**Table 10-1: Summary of Review Elements, Effects, and Project Activities or Physical Works\***

Review Element	Potential Effects	Project Phase	Project Activity or Physical Works	Key Conclusion Findings
Traffic and Transportation	<ul style="list-style-type: none"> <li>Change in traffic and transportation from baseline due to the Project</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Site preparation (e.g., clearing, grading, and set up of temporary facilities), and utility relocation</li> <li>Roadworks; construction of transitway/guideway, system structures (e.g., substations, power and communication lines), exchanges and stops,</li> <li>Vehicle traffic (e.g., road use and construction traffic)</li> <li>Management and disposal of waste and excavated materials</li> <li>Commissioning and start-up</li> </ul>	<ul style="list-style-type: none"> <li>During construction, traffic delays are anticipated due to temporary lane closures and construction activities. However, it is anticipated that such delays will be managed through implementation of the Traffic Management Plan, construction sequencing, and CEMP, resulting in limited and manageable effects.</li> </ul>
		Operation	<ul style="list-style-type: none"> <li>Train operation, including wayside and power</li> <li>Traffic function (i.e., change in roadways and intersection functions)</li> </ul>	<ul style="list-style-type: none"> <li>During operation, the Project will deliver long-term benefits through improved transit services and travel times, pedestrian and cyclist mobility, and traffic safety</li> </ul>
Housing, Residential Properties, and Commercial Businesses	<ul style="list-style-type: none"> <li>Change in housing, residential properties, and commercial businesses from baseline due to the Project</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Property acquisition</li> <li>Site preparation (e.g., clearing, grading, and set up of temporary facilities), and utility relocation</li> <li>Roadworks; construction of transitway/guideway, system structures (e.g., substations, power and communication lines), exchanges and stops, and operations and maintenance building</li> <li>Vehicle traffic (e.g., road use and construction traffic)</li> </ul>	<ul style="list-style-type: none"> <li>During construction, there may be a temporary effect on housing and residences and on access to commercial businesses, with a permanent effect on some properties due to land acquisition. These effects are anticipated to be managed through implementation of the Business Liaison Plan, property acquisition plan, and Traffic Management Plan, resulting in limited and manageable effects.</li> </ul>
		Operation	<ul style="list-style-type: none"> <li>Train operation, including wayside and power</li> <li>Traffic function (i.e., change in roadways and intersection functions)</li> </ul>	<ul style="list-style-type: none"> <li>During operation, the Project will deliver long-term benefits through induced development, improved connectivity, and increased access to transit.</li> </ul>
Community and Emergency Services	<ul style="list-style-type: none"> <li>Change in emergency access, community amenities, and public safety</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Property acquisition</li> <li>Site preparation (e.g., clearing, grading, and set up of temporary facilities), and utility relocation</li> <li>Roadworks; construction of transitway/guideway, system structures (e.g., substations, power and communication lines), exchanges and stops, and operations and maintenance building</li> <li>Vehicle traffic (e.g., road use and construction traffic)</li> </ul>	<ul style="list-style-type: none"> <li>During construction, there may be temporary changes in access to community and emergency services. With implementation of mitigation measures, including the Traffic Management Plan, Incident Management Plan, and Project design requirements, these effects are expected to be limited and manageable.</li> </ul>
		Operation	<ul style="list-style-type: none"> <li>Train operation, including wayside and power</li> <li>Train maintenance, administration, transit police</li> <li>Traffic function (i.e., change in roadways and intersection functions)</li> </ul>	<ul style="list-style-type: none"> <li>During operation, the Project will deliver long-term benefits through improved connectivity and access to emergency services. Specifications for lighting and use of space to improve safety and security will be incorporated and are targeted at decreasing crime incident rates.</li> </ul>
Archaeological and Heritage Resources	<ul style="list-style-type: none"> <li>Alterations to archaeological site contents or context (known and unknown sites) and areas with archaeological potential</li> <li>Alterations to heritage buildings, landscapes, or other sites of heritage value (known and unknown sites)</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Site preparation (e.g., clearing, grading, and set up of temporary facilities), and utility relocation</li> <li>Roadworks; construction of transitway/guideway, system structures (e.g., substations, power and communication lines), exchanges and stops, and operations and maintenance building</li> </ul>	<ul style="list-style-type: none"> <li>Any activities involving ground disturbance have the potential to affect archaeological and heritage sites if and where they are present. Potential effects will be mitigated through use of the Archaeological Monitoring Plan, adhering to the <i>Heritage Conservation Act</i> and Provincial standards and guidance, and implementing an Archaeological and Heritage Resources Chance Find Procedure, in case potential archaeological and heritage sites are encountered. Potential Project effects are anticipated to be limited and manageable.</li> </ul>
Fisheries and Aquatic Resources	<ul style="list-style-type: none"> <li>Change in fish habitat</li> <li>Change in fish mortality or health</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Site preparation (e.g., clearing, grading, and set up of temporary facilities), and utility relocation</li> <li>Roadworks; construction of transitway/guideway, system structures (e.g., substations, power and communication lines), exchanges and stops</li> <li>Management and disposal of waste and excavated materials</li> </ul>	<ul style="list-style-type: none"> <li>During construction, culvert modifications, building of a new bridge over Bear Creek (to be completed by City of Surrey), and road widening parallel to Quibble Creek are estimated to result in permanent loss of approximately 2% of existing riparian habitat and less than 1% of instream habitat. These activities also have potential to introduce deleterious substances, including sediment, into watercourses. Mitigation measures, including Project design (routing, scheduling, equipment selection) and measures to be compiled in the CEMP, will be used to limit and manage these effects. The loss of fish habitat is considered minimal given the context of the Project (primarily within the limits of previously-developed urban roadway) and the proposed mitigation measures.</li> </ul>
		Operation	<ul style="list-style-type: none"> <li>Train maintenance, administration, transit police</li> </ul>	<ul style="list-style-type: none"> <li>Fish access to upstream habitat may increase and fish habitat improve through culvert replacements. Potential to introduce deleterious substances to watercourses during operation will be mitigated.</li> </ul>
Vegetation and Wildlife Resources	<ul style="list-style-type: none"> <li>Change in abundance of species of management concern from baseline due to the Project</li> <li>Change in abundance of ecological communities or abundance/quality of wildlife habitat from baseline due to the Project</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Site preparation (e.g., clearing, grading, and set up of temporary facilities), and utility relocation</li> <li>Roadworks; construction of transitway/guideway, system structures (e.g., substations, power and communication lines), exchanges and stops, and operations and maintenance building</li> <li>Vehicle traffic (e.g., road use and construction traffic)</li> <li>Management and disposal of waste and excavated materials</li> </ul>	<ul style="list-style-type: none"> <li>Project effects are anticipated to be negligible because the Alignment is mainly within an existing multilane road, with limited overlap with vegetated areas, and mitigation measures will be used to address potential effects. The clearing of up to 2.75 ha of forest canopy cover will result in some habitat loss and could result in introduction of invasive species and alteration of habitat connectivity. Traffic and infrastructure presence have the potential to increase the risk of injury or mortality of wildlife. Mitigation measures outlined in the Vegetation Management Plan and Wildlife Management Plan will result in Project effects that are limited and manageable.</li> </ul>

Review Element	Potential Effects	Project Phase	Project Activity or Physical Works	Key Conclusion Findings
	<ul style="list-style-type: none"> <li>Change in quantity, quality, or connectivity of green space from baseline due to the Project</li> <li>Change in injury or mortality of wildlife from baseline due to the Project</li> </ul>	Operation	<ul style="list-style-type: none"> <li>Train operation, including wayside and power</li> </ul>	<ul style="list-style-type: none"> <li>Traffic and infrastructure presence have the potential to increase the risk of injury or mortality of wildlife. Mitigation measures outlined in the Vegetation Management Plan and Wildlife Management Plan will result in Project effects that are limited and manageable</li> </ul>
Noise	<ul style="list-style-type: none"> <li>Change in noise levels</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Site preparation (e.g., clearing, grading, and set up of temporary facilities), and utility relocation</li> <li>Roadworks; construction of transitway/guideway, system structures (e.g., substations, power and communication lines), exchanges and stops, and operations and maintenance building</li> <li>Vehicle traffic (e.g., road use and construction traffic)</li> <li>Management and disposal of waste and excavated materials</li> </ul>	<ul style="list-style-type: none"> <li>Noise levels during construction were modelled. Considering the Project context (occurring primarily within the limits of previously-developed urban roadways), nominal Project effects on existing noise levels are anticipated and will be managed through suitable mitigation measures outlined in the Noise Management Plan.</li> </ul>
		Operation	<ul style="list-style-type: none"> <li>Train operation, including wayside and power</li> </ul>	<ul style="list-style-type: none"> <li>Noise levels during operation were modelled. Considering the Project context (occurring primarily within the limits of previously-developed urban roadways), nominal Project effects on existing noise levels are anticipated and will be managed through suitable mitigation measures outlined in the Noise Management Plan.</li> </ul>
Vibration	<ul style="list-style-type: none"> <li>Change in vibration levels</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Site preparation (e.g., clearing, grading, and set up of temporary facilities), and utility relocation</li> <li>Roadworks; construction of transitway/guideway, system structures (e.g., substations, power and communication lines), exchanges and stops, and operations and maintenance building</li> <li>Vehicle traffic (e.g., road use and construction traffic)</li> <li>Management and disposal of waste and excavated materials</li> <li>Commissioning and start-up</li> </ul>	<ul style="list-style-type: none"> <li>Construction-induced vibrations are expected to exceed baseline levels at some locations along the Alignment and will be like those experienced during road construction. Occupants of buildings within 48 to 80 m of construction activities may be disturbed by vibration from some of the equipment. Vibration levels will be below thresholds for potential damage for most buildings, except for those susceptible to vibration damage and within 13 m of the construction activity. At Surrey Memorial Hospital, estimated construction vibrations levels may be strong enough to intermittently interfere with sensitive equipment for a short period of time, when construction is directly outside the hospital. With use of mitigation measures, outlined in the Vibration Management Plan, effects are anticipated to be limited and manageable.</li> </ul>
		Operation	<ul style="list-style-type: none"> <li>Train operation, including wayside and power</li> <li>Train maintenance, administration, transit police</li> <li>Traffic function (i.e., change in roadways and intersection functions)</li> </ul>	<ul style="list-style-type: none"> <li>During operation, vibration levels associated with trains will be below thresholds for disturbance at buildings where people normally sleep, except those within 80 m of the track, and below thresholds for disturbance at buildings where vibrations would interfere with sensitive equipment, except if they occur within 165 m of the track. With use of mitigation measures outlined in the Vibration Management Plan, effects are anticipated to be limited and manageable.</li> </ul>
Air Quality and Greenhouse Gases	<ul style="list-style-type: none"> <li>Change in the ambient concentration of Criteria Air Contaminants</li> <li>Change in quantities of greenhouse gases released to the atmosphere</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Site preparation (e.g., clearing, grading, and set up of temporary facilities), and utility relocation</li> <li>Roadworks; construction of transitway/guideway, system structures (e.g., substations, power and communication lines), exchanges and stops, and operations and maintenance building</li> <li>Vehicle traffic (e.g., road use and construction traffic)</li> </ul>	<ul style="list-style-type: none"> <li>During construction, use of heavy equipment and vehicles could change air quality and GHG emissions. Use of mitigation measures, described in the Air Quality and Greenhouse Gas Management Plan, will result in a predicted increase of 0.04 to 2.83% for common air contaminant emissions and 0.74% (CO<sub>2e</sub>) in GHG emissions annually for the City of Surrey. These effects are considered negligible.</li> </ul>
		Operation	<ul style="list-style-type: none"> <li>Train operation, including wayside and power</li> <li>Train maintenance, administration, transit police</li> <li>Traffic function (i.e., change in roadways and intersection functions)</li> </ul>	<ul style="list-style-type: none"> <li>The Project air emissions may decrease as use of electric-powered trains is expected to reduce fuel consumption and associated air emissions from public transportation buses (diesel powered) and private vehicles compared to existing conditions. The decrease is predicted to be 0.03 to 1.22% for common air contaminant emissions and 0.32% for GHG emissions.</li> </ul>
Contaminated Sites and Demolition and Excavated Material Management	<ul style="list-style-type: none"> <li>Release of contaminants from contaminated soils or water encountered during construction</li> <li>Potential for dust generation and sedimentation from storage and handling of materials during construction</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Building demolition, material salvage and sorting, HazMat removal and management</li> <li>Site preparation (e.g., clearing, grading, and set up of temporary facilities), and utility relocation</li> <li>Roadworks; construction of transitway/guideway, system structures (e.g., substations, power and communication lines), exchanges and stops, and operations and maintenance building</li> <li>Vehicle traffic (e.g., road use and construction traffic)</li> <li>Management and disposal of waste and excavated materials</li> </ul>	<ul style="list-style-type: none"> <li>Construction activities that intersect with known and suspected contaminated sites will be managed and mitigated to meet provincial requirements for contaminated sites, and no adverse Project effects are expected to occur. Excavated materials and demolition waste will be handled, removed, and disposed of according to the CEMP and Contaminated Sites and Excavated Material Management Plan, and in accordance with the <i>Environmental Management Act</i>, Contaminated Sites Regulation, Hazardous Waste Regulation, City of Surrey and Metro Vancouver Bylaws, and <i>Workers Compensation Act</i>.</li> </ul>

Review Element	Potential Effects	Project Phase	Project Activity or Physical Works	Key Conclusion Findings
Electric and Magnetic Fields	<ul style="list-style-type: none"> <li>Change in electric and magnetic field levels</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Commissioning and start-up</li> </ul>	<ul style="list-style-type: none"> <li>EMFs generated by commissioning and start-up are not expected to interfere with other electrical systems (e.g., cell phones, computers, radiocommunication systems, pacemakers, electric wheelchairs) or to cause health effects.</li> </ul>
		Operation	<ul style="list-style-type: none"> <li>Train operation, including wayside and power</li> </ul>	<ul style="list-style-type: none"> <li>EMFs generated by the electrical system, infrastructure, and trains are not expected to interfere with other electrical systems (e.g., cell phones, computers, radiocommunication systems, pacemakers, electric wheelchairs) or to cause health effects. Project EMFs from these sources will be mitigated according to manufacturers' standards for EMF and interference and be consistent with other similar TransLink projects.</li> </ul>

NOTE:

\* Drafting note – At the time of drafting Table 10-1 and Section 10, no feedback from First Nations had been received. The section will be revised to incorporate any feedback received from participating First Nation groups prior to the finalization of the ESR.

### 10.3 Mitigation Measures

Mitigation measures were developed to manage Project effects on the Review Elements. Recommended measures are based on typical best practices for construction and operation in Metro Vancouver/BC. The Construction Contractor and Operation Contractor will be responsible for meeting performance objectives as appropriate to their means and methods. The measures may also incorporate applicable regulatory requirements, mitigation by design and through manufacturers specifications, best management practices, commitments to communicating Project activities to stakeholders, and other generic and Project-specific mitigation measures.

Key mitigation measures are related to traffic and noise management. Construction will be sequential (block-by-block where feasible) or phased to limit the potential for construction-related effects on traffic and access. Construction activities will comply with the City of Surrey Noise By-law, which limits hours of construction. Business and community liaison plans and associated committees will assist in notifying and informing stakeholders about upcoming construction activities. Public and First Nations engagement will be ongoing as the Project proceeds and throughout construction. Once operational, the SNG LRT system will be fully integrated with existing TransLink systems and protocols.

Several management plans and programs will provide TransLink and contractors with guidance on mitigating environmental and socio-economic effects of the Project. Key management plans are the Construction Environmental Management Plan (CEMP) and the Operations Environmental Management Plan (OEMP).

The CEMP will contain the following component plans:

- Air Quality and Greenhouse Gas Management Plan
- Archaeological Monitoring Plan, with Archaeological and Heritage Resources Chance Find Procedure
- Communications Plan
- Construction Waste Management Plan
- Contaminated Sites and Excavated Materials Management Plan
- Environmental Awareness and Education Plan
- Fill and Backfill Management Plan
- Fisheries Habitat Mitigation and Compensation Plan
- Fuels, Chemical and Material Storage and Handling Management Plan
- Hazardous Building and Demolition Materials Management Plan
- Landscape Design and Restoration Plan
- Noise Management Plan
- Sediment and Erosion Control Plan
- Spill Prevention and Emergency Response Plan
- Stormwater Management Plan
- Traffic Management Plan
- Vegetation Management Plan
- Vibration Management Plan
- Wildlife Management Plan

Other construction-phase management plans and programs, such as the Business Liaison Plan, will also address socio-economic effects of the Project.

The OEMP will describe roles and responsibilities, monitoring and reporting requirements, health and safety procedures, and specific plans for management of air quality, dust, fuel, chemicals and material storage and handling, noise, vibration, solid and liquid waste, snow, water and sediment quality, stormwater, and spill response.

The Project is designed with mitigation measures in place to address accidents, malfunctions and extreme weather events. Response measures, including operator training and standard TransLink procedures, will be effective in protecting public safety and in limiting most types of effects to the Review Elements.

Additional mitigation measures were developed for each Review Element, to address permitting requirements, discipline-specific practices, and design decisions and characteristics influenced through consultation with stakeholders. These are listed in Table 10-2.

## 10.4 Conclusions

The proposed 10.5 km long SNG LRT Project will be built and operated in a populated and traffic-congested urban environment in the City of Surrey, at grade on existing roadways mainly along King George Boulevard and 104 Avenue. Project-related effects will be typical of large roadway construction projects in an urban setting. Construction will result in temporary changes in traffic flow and access to businesses, residences, and community and emergency services in localized areas as construction proceeds along the Alignment, even with mitigation measures in place.

TransLink's understanding of potential interests and effects of the Project has been informed by comprehensive engagement with First Nations, stakeholders, and the public. Issues and concerns raised during engagement were considered in preparation of the ESR report, and are addressed through proposed mitigation and management measures identified in Table 10-1 and Table 10-2.

With implementation of the mitigation measures described above, Project-related effects to Review Elements are anticipated to be limited and manageable. Net environmental effects (e.g., small reductions in riparian and instream habitat and forest cover) are not anticipated to affect sustainable functioning of natural systems within the Review Area. Construction-related socio-economic effects, such as traffic congestion, change in access, noise, vibration, and air quality, will be comparable to other large civil infrastructure projects, and will be managed through design measures, policies, management plans, and best practices. Considering the preventative measures to mitigate the likelihood of accidents and malfunctions, and response measures to reduce potential effects of the worst-case or probable scenarios, the risk to public safety is low.

Over the long-term, the Project will benefit transit users, pedestrians, and cyclists. Benefits are anticipated primarily through reduced traffic volumes and improvements in time savings, transit system connections, mobility and traffic safety by alleviating over-reliance on personal vehicles and providing accessible transportation that links community infrastructure and services within this part of the City of Surrey. Change in traffic and transportation during operation is anticipated to be positive as area users become familiar with the system and shift modes from personal vehicles to LRT.

**Table 10-2: Mitigation Measures for Surrey-Newton-Guildford Light Rapid Transit Project\***

Review Element	No.	Objectives	Proposed Mitigation	Project Phase	Design Elements and Environmental Management Plan
Traffic and Transportation	7.2-1	Increase awareness of the Project, describe how feedback from the public and potentially-affected stakeholders has informed Project design, environmental management plans, and mitigation measures, and provide safety education for both LRT users and other road users	Implement a Public Education and Safety Campaign to increase awareness of the Project and what the public should expect when train testing and operation begins; this campaign will outline how engagement has been used to inform Project design, environmental management plans and mitigation measures, and will include procedures for stakeholders (e.g., residents, businesses, emergency services, and institutions) to safely interact with and use the LRT system	Preconstruction Construction Operation	Engineering and design CEMP OEMP
	7.2-2	Maintain safe and efficient goods and traffic movement (including vehicular, cyclist, pedestrian, and transit), well-connected street networks, and access to residential and non-residential properties, community amenities, and emergency services  Effective management of LRT vehicle operation and reduction of potential disruptions to passengers and roadway users	Implement the TransLink Adjacent and Integrated Development (AID) Project Consent Process in consultation with the City of Surrey to facilitate development adjacent to Project infrastructure and preserve the safe, secure, and uninterrupted operation of the LRT	Preconstruction Construction Operation	Engineering and design CEMP OEMP
	7.2-3	Maintain safe and efficient goods and traffic movement (including vehicular, cyclist, pedestrian, and transit), well-connected street networks, and access to residential and non-residential properties, community amenities, and emergency services	Sequence construction block by block, as feasible, to minimize the duration and extent of potential disruption to traffic and access	Construction	CEMP
	7.2-4	Maintain safe and efficient goods and traffic movement (including vehicular, cyclist, pedestrian, and transit), well-connected street networks, and access to residential and non-residential properties, community amenities, and emergency services	Develop and implement a Traffic Management Plan that considers all road users (e.g., transit buses, drivers, cyclists, and pedestrians, including those with disabilities) in accordance with the MoTI '2015 Interim Traffic Management Manual for Work on Roadways' and the City of Surrey's 'Traffic Management Plan Requirements'. Consult with MoTI, City of Surrey and other identified stakeholders, The Traffic Management Plan will include Traffic Control Plan, Incident Management Plan, Public Information Plan, and Implementation Plan that will also comply with MoTI's '2015 Interim Traffic Management Manual for Work on Roadways'.	Construction	CEMP
	7.2-5	Maintain safe and efficient goods and traffic movement (including vehicular, cyclist, pedestrian, and transit), well-connected street networks, and access to residential and non-residential properties, community amenities, and emergency services	Develop and implement a Traffic Control Plan that: <ul style="list-style-type: none"> <li>Outline the traffic control devices that will be used on the Project to protect workers and move road users safely through the work zone</li> <li>Accommodate road users (e.g., passenger vehicles, commercial vehicles, motorcycles, transit and school buses, emergency vehicles, police enforcement, pedestrians – including those who are mobility- and visually-impaired, and cyclists) and specifies access and egress to/from private, commercial, and public locations</li> </ul>	Preconstruction Construction	Traffic Management Plan
	7.2-6	Maintain safe and efficient goods and traffic movement (including vehicular, cyclist, pedestrian, and transit), well-connected street networks, and access to residential and non-residential properties, community amenities, and emergency services	Develop and implement an Incident Management Plan that identifies procedures for 1) responding to unplanned events or incidents, 2) for regular review and identification of actions that will reduce the frequency and severity of incidents; and 3) procedures for: <ul style="list-style-type: none"> <li>Identifying and verifying that an incident has occurred</li> <li>Quickly responding to an incident</li> <li>Contacting appropriate emergency response agencies and authorities</li> <li>Assisting emergency responders</li> <li>Quickly assessing an incident's impact on traffic operations and identifying the appropriate response measures</li> <li>Routing traffic away from an incident</li> <li>Restoring normal traffic operations by modifying work plans and activities, where necessary</li> <li>Reviewing and analysing incidents to identify causes and preventative actions, if any</li> <li>Recording incident details and reporting them to the appropriate authorities</li> </ul> The Incident Management Plan will also: <ul style="list-style-type: none"> <li>Detail the process for contacting and advising emergency services about planned work, potential issues regarding passage through the work zone, and viable alternative routes</li> <li>Outline procedures for stopping work and clearing the work zone to expedite safe passage of emergency responders past queued traffic</li> </ul>	Preconstruction Construction	Traffic Management Plan

Review Element	No.	Objectives	Proposed Mitigation	Project Phase	Design Elements and Environmental Management Plan
Traffic and Transportation (cont'd)	7.2-7	Increase awareness of the Project and solicit feedback from the public and potentially-affected stakeholders to inform Project design, environmental management plans, and mitigation measures	<p>Develop and implement a Public Information Plan that identifies actions and procedures for informing the travelling public and Project stakeholders of current and planned changes to roadways, traffic, and transportation during Project construction; at a minimum, the Public Information Plan will include procedures for:</p> <ul style="list-style-type: none"> <li>• Making stakeholders (including emergency services) aware of the Project and its traffic-related effects</li> <li>• Informing groups directly impacted by the Project (e.g., local residents, businesses, etc.)</li> <li>• Integrating changes in roadways, traffic, and transportation from nearby City of Surrey road network improvement projects that could interact cumulatively with the Project</li> </ul>	Preconstruction Construction	Traffic Management Plan
	7.2-8	Maintain safe and efficient goods and traffic movement (including vehicular, cyclist, pedestrian, and transit), well-connected street networks, and access to residential and non-residential properties, community amenities, and emergency services	<p>Develop and implement an Implementation Plan that identifies:</p> <ul style="list-style-type: none"> <li>• responsibilities and procedures for the coordinated implementation of other Traffic Management sub-plans;</li> <li>• the Implementation Plan will also identify the qualifications, responsibilities, and duties of the supervisory and management personnel who will implement the Traffic Management Plan, including the Traffic Control Manager and the Traffic Control Supervisor</li> </ul>	Preconstruction Construction	Traffic Management Plan
	7.2-9	<p>Maintain safe and efficient goods and traffic movement (including vehicular, cyclist, pedestrian, and transit), well-connected street networks, and access to residential and non-residential properties, community amenities, and emergency services</p> <p>Effective management of LRT vehicle operation and reduction of potential disruptions to passengers and roadway users</p>	<p>Develop and implement an LRT Operation Management Plan in consultation with stakeholders including:</p> <ul style="list-style-type: none"> <li>• Operating rules for emergency personnel vehicles and LRT</li> <li>• Allowances for emergency vehicles to cross the tracks or use the 104<sup>th</sup> Avenue guideway</li> <li>• A maximum two-cycle delay for LRT priority at intersections</li> <li>• Reference materials for emergency responders that identify guideway and LRT stop characteristics (e.g., location of ramps) and any mobility restrictions</li> </ul>	Operation	OEMP
	7.2-10	Maintain safe and efficient goods and traffic movement (including vehicular, cyclist, pedestrian, and transit), well-connected street networks, and access to residential and non-residential properties, community amenities, and emergency services	<p>Prior to Project operation, develop and implement an Access Management Plan in consultation with stakeholders that provides procedures for:</p> <ul style="list-style-type: none"> <li>• Addressing changes in the availability of on-street parking</li> <li>• Changes in access to residential and commercial properties, and to public institutions and spaces</li> <li>• Addressing residential and commercial property access, including for properties adjacent to side-running LRT</li> <li>• Identifying alternate routes to areas with restricted left turns or other physical access restrictions</li> <li>• Implementing cyclist and pedestrian access to provide safe and accessible pedestrian crossings and reduce or limit detours to the bike route</li> <li>• Reviewing the plan's effectiveness along with its component plans, and adjusting the plan as necessary</li> </ul>	Operation	OEMP
	7.2-11	<p>Maintain safe and efficient goods and traffic movement (including vehicular, cyclist, pedestrian, and transit), well-connected street networks, and access to residential and non-residential properties, community amenities, and emergency services</p> <p>Effective management of LRT vehicle operation and reduction of potential disruptions to passengers and roadway users</p>	<p>Develop and implement a Major Incident Plan in consultation with stakeholders to address how major incidents involving the Project will be managed, including roles and responsibilities for TransLink, the City of Surrey, emergency responders, and applicable contractors, and that considers historical data on incident locations and road closure times</p>	Operation	OEMP
	7.2-12	<p>Maintain safe and efficient goods and traffic movement (including vehicular, cyclist, pedestrian, and transit), well-connected street networks, and access to residential and non-residential properties, community amenities, and emergency services</p> <p>Effective management of LRT vehicle operation and reduction of potential disruptions to passengers and roadway users</p>	<p>Prior to operation, develop and test a Transit Priority and Integration Plan to facilitate seamless and efficient connections to the LRT line following opening day; the Transit Priority and Integration Plan will identify opportunities to:</p> <ul style="list-style-type: none"> <li>• Improve access and connections to LRT stop areas</li> <li>• Reduce duplicate bus services and connections, allowing for resources to be re-invested into the local bus network</li> <li>• Reallocate existing resources</li> </ul>	Prior to operation	OEMP
	7.2-13	Effective management of LRT vehicle operation and reduction of potential disruptions to passengers and roadway users	<p>Initiate and implement a range of travel demand management initiatives specific to the Project as part of TransLink's TravelSmart Program, to inform the public of sustainable transportation options.</p>	Construction Operation	OEMP

Review Element	No.	Objectives	Proposed Mitigation	Project Phase	Design Elements and Environmental Management Plan
Traffic and Transportation (cont'd)	7.2-14	Maintain safe and efficient goods and traffic movement (including vehicular, cyclist, pedestrian, and transit), well-connected street networks, and access to residential and non-residential properties, community amenities, and emergency services  Effective management of LRT vehicle operation and reduction of potential disruptions to passengers and roadway users	<p>Where feasible, implement the following, in consultation with MoTI, the City of Surrey, fire department, and emergency responders:</p> <ul style="list-style-type: none"> <li>• Employ construction methods to minimize wear on the road (e.g., installation of a sacrificial pavement layer during construction, to be milled and repaved at the completion of construction)</li> <li>• New signalised intersections</li> <li>• Advanced signal control systems that provide full priority to LRT vehicles and integrate with existing City of Surrey Traffic Control system</li> <li>• U-turn permissions at select signalized intersections</li> <li>• New wayfinding and road signage</li> <li>• Truck turning clearance requirements and mitigations, such as setback stop lines</li> <li>• Buffers, slow down zones, protected bicycle lanes, and shared lane markings,</li> <li>• Bicycle parking facilities at most LRT stops</li> <li>• Project system signal and control boxes, located in planted landscape boulevard or plaza spaces clear of primary cycling paths</li> <li>• 4.0 m wide crosswalks within LRT stop areas and delineated with a white zebra stripe design</li> <li>• 3.5m wide pedestrian crossings elsewhere along the Alignment, designated with a white-edge boundary</li> <li>• Communications systems, including closed circuit television at LRT stop areas</li> </ul>	Construction Operation	OEMP
	7.3- 1	Safe and effective development and integration of Project infrastructure into the built environment	Establish a Property Acquisition Program that provides a timely, transparent, and fair process that respects the confidentiality of negotiations for property owners	Pre-construction Construction	Engineering and design CEMP
Housing, Residential Properties and Commercial Businesses	7.3-2	Provide support for businesses throughout project construction	<p>Develop and implement a Business Liaison Plan in consultation with local businesses, business associations, and the City of Surrey to mitigate the potential adverse effects on business operations, not addressed by the Traffic Management Plan (Mitigation 7.2-4), that requires:</p> <ul style="list-style-type: none"> <li>• Maintenance of access, curb-side visibility (to the extent possible), and parking for businesses and business operations (e.g., deliveries)</li> <li>• Ongoing communications during construction with the Contractor, local businesses, and other interested stakeholders to address potential effects resulting from construction activities</li> <li>• Project signs, notices, and notifications</li> <li>• Tracking and resolution of issues, complaints, non-compliances, and other requests</li> <li>• Contact information, including a 24-hour contact number</li> </ul>	Pre-construction Construction	CEMP
	7.3-3	Safe and effective development and integration of Project infrastructure into the built environment	<p>Implement the following:</p> <ul style="list-style-type: none"> <li>• Conduct pre-construction and post-construction condition surveys of buildings adjacent to excavation areas to assess pre-existing conditions and quantify any resulting damage to buildings and utilities</li> </ul> <p>Restrict curb cuts for access to properties along the Alignment to locations where:</p> <ul style="list-style-type: none"> <li>• Property owners hold legal rights to curb cuts,</li> <li>• Where they are required for a business to be viable, or where they are otherwise determined to be required</li> </ul>	Design Construction	CEMP Engineering and design
	7.3-4	Support transit-oriented affordable housing and development	TransLink will continue to work with the City of Surrey in developing and implementing policy tools aimed specifically at increasing the supply of rental housing near existing and future rapid transit stops and will engage with organizations to identify how project planning can integrate with broader housing development initiatives, including consideration of transit-oriented development.	Operation	Engineering and design

Review Element	No.	Objectives	Proposed Mitigation	Project Phase	Design Elements and Environmental Management Plan
Community and Emergency Services	7.4-1	Safe and effective development and integration of project infrastructure into the built environment	Temporary or permanent utility relocations, as well as replacements and upgrades, will be reviewed and approved by the appropriate utility and municipality.	Design Construction	Engineering and design CEMP
	7.4-2	Maintain public safety and security	Transit Police will be deployed during operations to reduce crime and disorderly behaviour in and around the public transportation system.	Operations	OEMP
	7.4-3	<ul style="list-style-type: none"> <li>Maintain safe and efficient goods and traffic movement</li> <li>Effective management of LRT vehicle operation and reduction of potential disruptions to passengers and roadway users</li> <li>Safe and effective development and integration of project infrastructure into the built environment</li> </ul>	Implement the following design decisions and characteristics, as influenced through consultation with stakeholders: <ul style="list-style-type: none"> <li>Supporting infrastructure to accommodate children waiting to cross at intersections adjacent to schools</li> <li>Application of Crime Prevention Through Environmental Design (CPTED) throughout the LRT system, including lighting and high visibility stop areas</li> <li>Communications systems, including CCTV at LRT stop areas</li> <li>Integrate all intersections along the LRT alignment with the existing emergency vehicle priority management system</li> <li>Track switching systems and traffic light control interface</li> <li>Design guideway to be compliant with the Building Code and Fire Services Act / Code (minimum 6 metre setback)</li> </ul>	Design Construction	Engineering and design
	7.4-4	Safe and effective development and integration of project infrastructure into the built environment	Pre-construction and post-construction condition surveys of buildings adjacent to excavation areas will be conducted to assess pre-existing conditions and quantify any resulting damage to buildings and utilities	Operation	OEMP
Archaeological and Heritage Resources	7.5-1	Meet requirements of the HCA	Undertake targeted archaeological field studies (e.g., an archaeological impact assessment [AIA]) as needed to assess or monitor ground-altering developments within areas of high archaeological potential identified by the AOA.	Preconstruction/Construction	Archaeological and Heritage Resources Monitoring Plan
	7.5-2	Meet requirements of the HCA and municipal bylaws	Where feasible, avoid impacts to archaeological and heritage sites (if any) identified during the archaeological assessments overlay with Project ground-disturbing activities.	All phases	Archaeological and Heritage Resources Monitoring Plan
	7.5-3	Mitigate impacts to archaeological and heritage sites (if any) identified during the archaeological assessments for the Project in accordance with the HCA and provincial guidance. Specific measures will be determined in discussion with regulators, First Nations, and landowners.	Mitigate impacts to archaeological and heritage sites (if any) identified during the archaeological assessments for the Project in accordance with the <i>Heritage Conservation Act</i> and provincial guidance. Specific measures will be determined in discussion with regulators, First Nations, and landowners.	Preconstruction/Construction	Archaeological and Heritage Resources Monitoring Plan
	7.5-4	Meet requirements of the HCA and municipal bylaws	Implement an Archaeological and Heritage Resources Chance Find Procedure, in case potential archaeological and heritage sites are discovered during construction.	Construction	Archaeological and Heritage Resources Monitoring Plan
Fisheries and Aquatic Resources	7.6-1	Protect water quality	Obtain <i>Water Sustainability Act</i> notification and/or approval, including site specific mitigation measures, as required, for any works in or around a stream	Construction	CEMP
	7.6-2	Protect fish habitat and health	Obtain <i>Fisheries Act</i> Section 35(2)(b) Project Review and/or Authorization, as required, for any works that have the potential to cause <i>serious harm to fish</i>	Construction	CEMP, Operations EMP
	7.6-3	<ul style="list-style-type: none"> <li>Limit potential for erosion</li> <li>Maintain riparian cover to extent possible</li> </ul>	Limit Project activity encroachment on the riparian area, to the minimum area required for the work	Construction	CEMP
	7.6-4	<ul style="list-style-type: none"> <li>Limit potential for erosion</li> <li>Maintain riparian cover to extent possible</li> </ul>	Remove only those trees, shrubs, or herbaceous vegetation within the stream bank area that are necessary for construction	Construction	CEMP
	7.6-5	<ul style="list-style-type: none"> <li>Prevent changes to instream habitat and water quality</li> </ul>	Fell trees away from watercourses	Construction	CEMP
	7.6-6	<ul style="list-style-type: none"> <li>Prevent erosion and introduction of deleterious substances to watercourses</li> <li>Protect fish and aquatic organism health</li> </ul>	Implement erosion and sediment control measures, as directed by the environmental monitor, prior to any works in, or near, a stream	Construction	CEMP, Sediment and Erosion Control Plan
	7.6-7	<ul style="list-style-type: none"> <li>Prevent erosion and introduction of deleterious substances to watercourses</li> <li>Protect fish and aquatic organism health</li> </ul>	Manage stockpiled materials (e.g., soil) to prevent erosion into nearby watercourses or storm drain catch basins by locating stockpiles away from watercourse, covering stockpiles with fabric or straw and providing catch areas for sediment laden runoff water	Construction	CEMP Sediment & Erosion Control Plan
	7.6-8	<ul style="list-style-type: none"> <li>Prevent sedimentation run off into watercourses</li> <li>Protect fish health and aquatic organism health</li> </ul>	Avoid deposition of soil and organic material on road surfaces during Project work	Construction	CEMP, Sediment & Erosion Control Plan
	7.6-9	<ul style="list-style-type: none"> <li>Prevent introduction of deleterious substances into watercourses</li> <li>Protect fish health and aquatic organism health</li> </ul>	Manage washing, refuelling and servicing of machinery and storing of fuel and other materials for the machinery to prevent any deleterious substances from entering watercourses or catchbasins leading to watercourses.	Construction	CEMP Sediment & Erosion Control Plan
	7.6-10	Protect fish and aquatic organism health	Monitor water quality by the environmental monitor for Project work in or near watercourses in accordance with Provincial and Federal water quality guidelines for the protection of aquatic life	Construction	CEMP

Review Element	No.	Objectives	Proposed Mitigation	Project Phase	Design Elements and Environmental Management Plan
Fisheries and Aquatic Resources (cont'd)	7.6-11	<ul style="list-style-type: none"> <li>Prevent introduction of deleterious substances into watercourses</li> <li>Protect fish and aquatic organism health</li> </ul>	Park construction vehicles at least 30 m away from all watercourses, when not in use	Construction	CEMP
	7.6-12	<ul style="list-style-type: none"> <li>Prevent introduction of deleterious substances into watercourses</li> <li>Protect fish and aquatic organism health</li> </ul>	Clean all construction equipment to be used for instream construction and use biodegradable lubricants and fuels where feasible (as verified by the environmental monitor)	Construction	CEMP
	7.6-13	<ul style="list-style-type: none"> <li>Prevent introduction of deleterious substances into watercourses</li> <li>Protect fish and aquatic organism health</li> </ul>	Avoid release of concrete leachates to watercourses, including via storm drain systems, and resultant pH effects by using pre-cast materials, pouring concrete in isolation of water, or treating concrete-affected water with CO <sub>2</sub>	Construction	CEMP
	7.6-14	<ul style="list-style-type: none"> <li>Prevent introduction of deleterious substances into watercourses</li> <li>Protect fish and aquatic organism health</li> </ul>	Handle and dispose of waste (e.g., asphalt waste, concrete waste, and rock with acid generating potential) as per best management practices	Construction	CEMP
	7.6-15	<ul style="list-style-type: none"> <li>Prevent introduction of deleterious substances into watercourses</li> <li>Protect fish and aquatic organism health.</li> </ul>	Install oil-water separators immediately downstream of LRT stop locations and other areas with the potential for Project runoff to enter the storm drain system to restrict accidental discharge of deleterious substances into watercourses	Operations	Operations EMP
	7.6-16	Protect fish health	Work areas will be isolated and fish safely removed from the work area prior to commencement of instream works	Construction	CEMP
	7.6-17	Protect fish health	Limit the amount of time fish passage is disrupted to the minimum required to complete instream works	Construction	CEMP
	7.6-18	Protect fish health	Limit instream works to windows of least risk as identified by a qualified biologist and or/DFO	Construction	CEMP
Vegetation and Wildlife	7.7-1	<ul style="list-style-type: none"> <li>Protect sensitive wildlife habitat features from disturbance or destruction</li> <li>Restrict construction footprint outside of the Project Alignment</li> <li>Adhere to guidelines for sensitive timing windows and disturbance setbacks</li> </ul>	<p>Develop, as part of the CEMP and the Wildlife Management Plan, programs and procedures for protecting environmentally sensitive areas that are to be implemented prior to and during Project activities that have the potential to affect ecosystems of management concern, ecological communities at risk, sensitive wildlife habitat, and wildlife habitat features, and that:</p> <ul style="list-style-type: none"> <li>Specifies that Green Infrastructure Network Areas, their buffers, Sensitive Ecosystems Development Permit Areas, mapped occurrences of ecological communities at risk, and known wildlife habitat features and sensitive habitat (e.g., Surrey's Environmentally Sensitive Areas such as riparian habitats) that require avoidance and/or disturbance setbacks will be clearly marked on the project construction drawings and in the field so they can either be avoided entirely, or effects limited by restricting construction and the extent of clearing in these areas,</li> <li>Specifies that Project clearing and grubbing boundaries will be clearly marked in the construction work area with flagging and/or signage and monitored by environmental inspection personnel during construction for maintenance and compliance,</li> <li>Specifies that pre-clearing surveys will be completed prior to construction to identify sensitive wildlife habitat features, such as raptor nests protected under the BC Wildlife Act and amphibian breeding sites, and</li> <li>Addresses avoidance windows and clearing setbacks for protected features as described in the Wildlife Management Plan.</li> </ul>	Construction	CEMP; Wildlife Management Plan
	7.7-2	Compliance with the BC <i>Wildlife Act</i> and MBCA	Schedule site preparation (particularly vegetation clearing) to avoid the breeding period for migratory birds (March 28 through August 8) to limit risk of injury and mortality of birds as per the Government of Canada's (2017) nesting period guidance. If vegetation clearing must occur during the breeding period for migratory birds, conduct pre-clearing nest surveys in accordance with the procedures for surveys and monitoring to be described in the Wildlife Management Plan.	Construction	CEMP; Wildlife Management Plan
	7.7-3	Compliance with the BC <i>Wildlife Act</i>	<p>Develop, as part of the Wildlife Management Plan, a program and procedures for amphibian surveys and salvages that is to be implemented for Project activities that have the potential to affect habitat supporting standing or low-flow water and that:</p> <ul style="list-style-type: none"> <li>Complies with the BC Wildlife Act and BC MFLNRO (2016) guidance,</li> <li>Addresses the amphibian breeding season (approximately March through August),</li> <li>Conducts surveys no less than seven days prior to the start of construction, and</li> <li>Completes salvage for native amphibians prior to construction with environmental inspection personnel.</li> </ul>	Construction	CEMP; Wildlife Management Plan
	7.7-4	Compliance with the BC <i>Wildlife Act</i> to limit potential effects on species at risk	<p>Develop, as part of the Wildlife Management Plan, a program and procedures for Pacific water shrew surveys and salvage that is to be implemented for Project activities that that have the potential to affect suitable habitat (e.g., riparian habitat rated as low-to moderate- habitat suitability in Bear Creek Park and Quibble Creek) and that:</p> <ul style="list-style-type: none"> <li>Complies with the Species at Risk Act, the BC Wildlife Act, and BC MOE (2009) guidance including obtaining permits if salvage is required, and</li> <li>Specifies that pre-clearing surveys will be conducted to limit the likelihood of injury or mortality to Pacific water shrew.</li> </ul> <p>Note that typically, the permit process takes 30–90 days to complete and salvage programs may take four to eight days to complete prior to allowing construction activities to advance.</p>	Construction	CEMP; Wildlife Management Plan

Review Element	No.	Objectives	Proposed Mitigation	Project Phase	Design Elements and Environmental Management Plan
Vegetation and Wildlife (cont'd)	7.7-5	Compliance with the BC <i>Wildlife Act</i> to limit potential effects on species at risk	Develop, as part of the Wildlife Management Plan, a program and procedures for Oregon forestsnail surveys and salvage that is to be implemented for Project activities that have the potential to affect suitable habitat (e.g., in forest rated as having low to moderate suitability in Bear Creek Park) and that: <ul style="list-style-type: none"> <li>Complies with the Species at Risk Act, the BC <i>Wildlife Act</i>, and Environment Canada (2016) guidance including obtaining permits if salvage is required, and specifies that pre-clearing surveys will be conducted to limit the likelihood of injury or mortality to Oregon forestsnail.</li> </ul>	Construction	CEMP; Wildlife Management Plan
	7.7-6	Manage occurrences of invasive wildlife	Best practices for controlling invasive wildlife will be outlined in the Wildlife Management Plan. Occurrence in Surrey parks to be managed in consultation with Surrey staff and in consideration of species-specific best management practices.	Construction	CEMP; Wildlife Management Plan
	7.7-7	Facilitate regional wildlife movement	Design new or replacement watercourse crossings and landscaping that considers wildlife habitat connectivity.	Pre-construction Construction	CEMP
	7.7-8	Avoid or limit potential effects on migratory birds and urban wildlife	Design new light rail transit stops and nighttime lighting to reduce injury and mortality risk to migratory birds (e.g., designs on clear panels to reduce potential for collisions, nighttime light shields to reduce potential for attracting birds).	Pre-construction Construction Operation	CEMP
	7.7-9	Avoid or limit potential effects on incidental discovery of protected vegetation, wildlife, and wildlife habitat	Develop, as part of the Vegetation Management and Site Restoration Plan and the Wildlife Management Plan, procedures to be implemented during construction that are designed to: <ul style="list-style-type: none"> <li>Avoid or limit potential effects on plants, protected species, wildlife, and wildlife habitat features discovered during construction.</li> </ul>	Pre-construction Construction	CEMP; Vegetation Management and Site Restoration Plan
	7.7-10	Manage occurrences of noxious weeds	Develop and implement, as part of the Vegetation Management and Site Restoration Plan, procedures to manage noxious plants discovered during construction that: <ul style="list-style-type: none"> <li>Are in accordance with best available management practices (e.g., Invasive Species Council of BC) and Surrey's Biodiversity Conservation Strategy and are in compliance with the BC <i>Weed Control Act</i></li> <li>Outline proper control, handling, transportation, and disposal to be implemented to limit the risk of spread (e.g., clean vehicles arriving and/or leaving the site to remove debris that could contain seeds or portions of noxious plants and quarantine soils excavated from an area with known occurrences of noxious plants).</li> </ul>	Construction	CEMP; Vegetation Management and Site Restoration Plan
	7.7-11	<ul style="list-style-type: none"> <li>Compliance with the Tree Protection Bylaw</li> <li>Develop an inventory of trees removed in the Alignment to support tree replacement recommendations</li> </ul>	Develop and implement, as part of the Vegetation Management and Site Restoration Plan, procedures for compliance in Surrey's Tree Protection Bylaw, 2006 No. 16100 including: <ul style="list-style-type: none"> <li>Completion of an arborist survey and arborist report by a certified arborist prior to construction, and</li> <li>An arborist report provides detailed mapping of all trees to be removed by species, and surveyed location in the Alignment and recommendations for species and sizes of tree replacements in accordance with the reference landscape design for the Project.</li> </ul>	Pre-construction	CEMP; Vegetation Management and Site Restoration Plan
	7.7-12	<ul style="list-style-type: none"> <li>Replacement of trees removed for construction of the Project</li> <li>Long-term maintenance and survivorship of planted trees</li> </ul>	The Vegetation Management and Site Restoration Plan shall adhere to tree replacement requirements of Surrey's Tree Protection Bylaw, 2006 No. 16100, including: <ul style="list-style-type: none"> <li>Replacement trees planted at a minimum ratio of 2:1 for each tree that meets Surrey's criteria for a protected tree that is removed or damaged</li> <li>Replacement trees planted at a minimum ratio of 1:1 for each protected red alder or black cottonwood tree that is removed or damaged</li> <li>Procedures for monitoring tree survivorship for 12 months and replacing any diseased or dying trees that would otherwise cause the Project to be non-compliant with the Tree Protection Bylaw.</li> </ul>	Construction Operation	CEMP; Vegetation Management and Site Restoration Plan
	7.7-13	Replacement of vegetation with native plant species	Retain existing vegetation where possible or to the extent feasible, replace vegetation removed during construction with native or recommended boulevard plant species (TransLink 2017).	Construction Operation	CEMP; Vegetation Management and Site Restoration Plan

Review Element	No.	Objectives	Proposed Mitigation	Project Phase	Design Elements and Environmental Management Plan
Noise	7.8-1	Limit Project-related noise to meet applicable threshold of Surrey Noise By-law and Health Canada Noise Guidance	<p>Prior to construction, develop and implement a Noise Management Plan that identifies those activities with the potential to result in elevated noise levels, as well as site-specific mitigation measures. The Noise Management Plan shall specify and describe:</p> <ul style="list-style-type: none"> <li>• Allowable hours of work (7 am -10:00 pm, as outlined in the City of Surrey Noise By-Law No. 7044 (City of Surrey 2009)),</li> <li>• Type, location, and duration of construction activities</li> <li>• Protocols for communication with the public regarding construction noise, and response procedures for any noise complaints</li> <li>• Site-specific measures to mitigate noise impacts to nearby noise-sensitive receptors</li> <li>• Additional noise monitoring requirements during construction, where applicable</li> </ul>	Preconstruction Construction	Noise Management Plan
	7.8-2	Limit Project-related noise to meet applicable thresholds of Surrey Noise By-law and Health Canada Noise Guidance	Where noise mitigation is to be implemented during construction, consult with affected noise-sensitive receptors about the suggested mitigation measures prior to construction start. TransLink will provide received input from City of Surrey and affected stakeholders for the development and implementation of mutually- acceptable noise mitigation measures.	Preconstruction Construction Operation	Noise Management Plan
	7.8-3	Limit Project-related noise to meet applicable thresholds of Surrey Noise By-law and 72 dBa as defined by Health Canada Noise Guidance	<p>Use BAMPs to limit construction noise levels by selecting appropriate modifications and/or maintenance procedures including:</p> <ul style="list-style-type: none"> <li>• Select construction equipment or processes that have additional noise- control features added, such as better mufflers, enclosures, or other exhaust silencers</li> <li>• Avoid dropping materials from a height and consider the option of reducing noise from metal chutes and bins by placing damping material in the bin.</li> <li>• Schedule periods of respite in the case of unavoidable maximum noise level events</li> <li>• Schedule truck movements to avoid residential streets and place site vehicle entrances away from residences and other sensitive receptors</li> <li>• Avoid clustering of equipment near sensitive receptors, or large reflecting surfaces, and maintain as much distance as possible</li> <li>• Avoid idling of equipment if not in use</li> <li>• Where more than one equipment type can be selected for a specific task, with similar efficiency, select the quietest (e.g., hydraulic splitters as alternatives to rock-breaking work methods; hydraulic or electric powered equipment instead of diesel or gas fired equipment)</li> <li>• Carry out regular maintenance on equipment, in particular exhaust systems</li> <li>• For machines with enclosures, maintain doors closed</li> <li>• For pneumatic equipment, verify that air lines do not leak</li> <li>• Operate equipment at minimum engine speed, where feasible, while maintaining effective operation</li> <li>• Limit the need for reversing alarms and consider alternatives to the typical “beeper” alarms, like broadband alarms.</li> </ul>	Construction	Noise Management Plan
	7.8-4	Limit Project-related noise to meet applicable thresholds of Surrey Noise By-law	Schedule noisy work during hours when people are least affected or during times of high background noise (i.e., local peak traffic time).	Construction	Noise Management Plan
	7.8-5	Limit Project-related noise to meet applicable thresholds of Surrey Noise By-law and 72 dBa as defined by Health Canada Noise Guidance	Consult with affected school(s) to determine when examination periods are and schedule noisy construction activities in the vicinity of the schools to avoid examination periods	Construction	Noise Management Plan
	7.8-6	Limit Project-related noise to meet applicable thresholds of City of Surrey Noise By-law.	Should variance to the standard construction hours be required, inform the City of Surrey, and submit the variance application in accordance with By-Law 7044; this does not apply for emergency events, which could occur outside the allowable hours of work	Construction	Noise Management Plan
	7.8-7	Limit Project-related noise to meet applicable thresholds of Surrey Noise By-law and 72 dBa as defined by Health Canada Noise Guidance	<p>When noisy construction activities (e.g., compactors, diesel generators) are forecasted to affect noise-sensitive receptors, provide descriptions of the following to potentially affected stakeholders in advance of work:</p> <ul style="list-style-type: none"> <li>• Work locations</li> <li>• Construction activities and sources of noise, and anticipated noise levels</li> <li>• Rationale for the work</li> <li>• Anticipated duration of the work</li> <li>• Mitigation measures planned, if required</li> <li>• Timing and location of neighbourhood meetings to discuss issues</li> </ul>	Construction	Noise Management Plan
	7.8-8	Project-related noise to meet applicable thresholds of Surrey Noise By-law and Health Canada Noise Guidance	Monitor construction noise, as appropriate (e.g., complaint-based) and in accordance with BAMPs, to verify that short-term mitigation measures are effective.	Construction	Noise Management Plan

Review Element	No.	Objectives	Proposed Mitigation	Project Phase	Design Elements and Environmental Management Plan
Noise (cont'd)	7.8-9	Limit Project-related noise to meet applicable thresholds of Surrey Noise By-law and 72 dBA as defined by Health Canada Noise Guidance	<p>To mitigate construction noise:</p> <ul style="list-style-type: none"> <li>Use existing features to act as noise barriers during construction (e.g., material stock piles, temporary site buildings) where available;</li> <li>During construction erect, temporary noise barriers positioned close to an active noise source (e.g., generator) (where feasible)</li> </ul>	Construction Operation	Noise Management Plan
	7.8-10	Project-related noise to meet applicable thresholds of Surrey Noise By-law and Health Canada Noise Guidance	<p>Develop and implement a Noise Management Plan for operations and maintenance that:</p> <ul style="list-style-type: none"> <li>Specifies that operational noise is to adhere to existing TransLink system noise specifications</li> <li>Considers operational mitigation noise barriers such as on the guideway parapet, centerline or at-grade, if warranted,</li> <li>Includes a noise complaint resolution procedure to address noise concerns in a timely manner.</li> <li>Specifies strategically locating paging and bell signalling systems to minimize noise impacts to nearby sensitive receptors.</li> <li>Includes monitoring noise at baseline locations the first year after substantial completion of construction, to assess if impacts and mitigation measures are accurate and effective, or to identify locations that warrant additional noise-attenuation measures</li> </ul>	Operation	Noise Management Plan
	7.8-11	Project-related noise to meet applicable thresholds of Surrey Noise By-law and Health Canada Noise Guidance	Incorporate acoustical design consideration or noise control measures into ancillary systems (e.g., TPSS)	Operation	Noise Management Plan
	7.8-12	Project-related noise to meet applicable thresholds of Surrey Noise By-law and Health Canada Noise Guidance	Regularly maintain guideway track in a manner consistent with current SkyTrain practice, such that operating noise levels are limited (e.g., squeal of trains)	Operation	Noise Management Plan
	7.8-13	Project-related noise to meet applicable thresholds of Surrey Noise By-law and Health Canada Noise Guidance	<p>Consider the following source mitigation measures for train and guideway design:</p> <ul style="list-style-type: none"> <li>Resilient or damped wheels to limit rolling noise on tangent tracks and for wheel squeal on curved tracks</li> <li>Undercar absorption or vehicle skirts</li> <li>Spin-slide control (to prevent flats)</li> <li>Wheel truing (eliminates wheel flats)</li> <li>Rail grinding (eliminates corrugations)</li> <li>Limit turn radii to below 300m to avoid squeal (if feasible)</li> <li>Automated rail lubrication on sharp turns to reduce squeal</li> </ul>	Operation	Noise and Vibration Management Plan
Vibration	7.9-1	<ul style="list-style-type: none"> <li>Limit Project-related vibration to meet applicable thresholds</li> <li>Limit vibration effects on nearby receptors</li> </ul>	Develop and implement a Noise and Vibration Management Plan that outlines measures, monitoring protocol, notification procedures, and other information necessary to manage vibration levels.	Construction Operation	Vibration Management Plan
	7.9-2	<ul style="list-style-type: none"> <li>Limit Project-related vibration to meet applicable thresholds</li> <li>Limit vibration effects on nearby receptors</li> </ul>	Limit construction activities identified as sources of vibration (e.g., roller compaction) to daytime hours to the extent feasible.	Construction	Vibration Management Plan
	7.9-3	<ul style="list-style-type: none"> <li>Limit Project-related vibration to meet applicable thresholds</li> <li>Limit vibration effects on nearby receptors</li> </ul>	<p>As part of the Vibration Management Plan, describe the protocol for:</p> <ul style="list-style-type: none"> <li>Tracking and documenting public complaints and addressing them in a timely manner and promptly communicating this information to the Owner</li> <li>Conducting pre- and post-construction surveys of structures along the Alignment to baseline any damage before construction begins and check intermittently and at construction completion for any new signs of damage.</li> </ul>	Construction Operation	Vibration Management Plan
	7.9-4	<ul style="list-style-type: none"> <li>Limit Project-related vibration to meet applicable thresholds</li> <li>Limit vibration effects on nearby receptors</li> </ul>	Require a vibration monitoring specification in the contract and requirements for instrumentation.	Construction	Vibration Management Plan
	7.9-5	<ul style="list-style-type: none"> <li>Document any damage to structures along Alignment to verify if damage may be Project related or pre-dates Project</li> <li>Limit vibration effects on nearby receptors</li> </ul>	Conduct pre- and post-construction surveys of structures along the Alignment to baseline any damage before construction begins and check intermittently and at construction completion for any new signs of damage after construction is completed.	Construction	Vibration Management Plan
	7.9-6	<ul style="list-style-type: none"> <li>Limit Project-related vibration to meet applicable thresholds</li> <li>Limit vibration effects on nearby receptors</li> </ul>	Trackwork design should incorporate options that reduce vibrations. Examples of vibration dampening-features include: use of double-tie design, double-ended pocket tracks or crossovers, floating slabs, ballast mats, resilience fasteners, and regular maintenance and condition assessments. Actual features to be included would be addressed during detailed design.	Operation	Vibration Management Plan

Review Element	No.	Objectives	Proposed Mitigation	Project Phase	Design Elements and Environmental Management Plan
Air Quality and Greenhouse Gases	7.10-1	Reduce Project-related CAC and GHG emissions	<p>Develop and implement an Air Quality and Greenhouse Gas Management Plan that includes:</p> <ul style="list-style-type: none"> <li>Best available management practices and mitigation measures for fugitive dust emissions and air emissions from construction equipment</li> <li>An adaptive environmental monitoring program for the construction and operations phase of the Project</li> </ul>	Construction	Air Quality and Greenhouse Gas Management Plan
	7.10-2	Reduce Project-related dust emissions	<p>Potential fugitive dust emissions will be controlled by applying best management practices, including:</p> <ul style="list-style-type: none"> <li>Using water spray to reduce generation of fugitive dust</li> <li>Regularly sweeping paved surfaces and roadways to remove build-up sand and dirt</li> <li>Installing wheel wash stations to eliminate mud track-out issues at active construction sites</li> <li>Using water trucks on construction routes during dry conditions, where necessary.</li> </ul>	Construction	Air Quality and Greenhouse Gas Management Plan
	7.10-3	Reduce Project-related CAC and GHG emissions	<p>Air emissions from construction equipment will be reduced by applying best management practices, including:</p> <ul style="list-style-type: none"> <li>Construction fleet will meet requirements of Metro Vancouver Non-Road Diesel Engine Emission Regulation Bylaw No. 1161</li> <li>Construction fleet will use low-sulphur fuel</li> <li>Construction fleet will undergo regular tuning and maintenance</li> <li>A no-idling policy will be implemented</li> <li>Road closures and traffic restrictions will be limited where possible to minimize congestion-related idling</li> </ul>	Construction	Air Quality and Greenhouse Gas Management Plan
Contaminated Sites	7.11-1	<ul style="list-style-type: none"> <li>Allow for spatial and temporal contingency planning of segregation of any contaminated soils, and planning for appropriate disposal of contaminated soil/groundwater</li> <li>Avoid construction delays as a result of waiting on environmental testing</li> <li>Manage and dispose of contaminated materials in accordance with the EMA, CSR, HWR, and Transportation of Dangerous Goods (TDG) regulations</li> <li>Document limits of excavation as a best management practice</li> </ul>	<p>Develop and implement a Contaminated Sites and Excavated Materials Management Plan that complies with the BC <i>Environmental Management Act</i>, <i>Contaminated Sites Regulation</i>, and <i>Hazardous Waste Regulation</i>. On-site management of materials will be in accordance with WHMIS, and transportation of contaminated soils and hazardous materials will be in accordance with TDG and that describes:</p> <ul style="list-style-type: none"> <li>Soil, groundwater, and excavation water sampling program to be implemented in advance within areas of planned excavation to characterize conditions for planning the excavation and determining disposal requirements in accordance with regulatory requirements;</li> <li>Content for training program for construction workers regarding contaminated land issues;</li> <li>Procedures and required content for site-specific Environmental Work Plans including management, transport and disposal of contaminated soil, and management, treatment and discharge/disposal of groundwater and excavation water (contaminated or not).</li> <li>Map locations for origins and destinations of suspect and contaminated soils to be moved within the Project area as well as a process for documenting truck manifest records and soil quality results;</li> <li>Excavation Plans that address protection of workers, public health and safety, and the environment</li> </ul>	Construction	Contaminated Sites and Excavated Materials Management Plan in the CEMP
	7.11-2	Manage and dispose of contaminated materials in accordance with the EMA, CSR, HWR, TDG regulations, and Workers Compensation Act (and associated regulations)	<p>Develop and implement site-specific Environmental Work Plans that describe:</p> <ul style="list-style-type: none"> <li>Environmental sampling protocols for collection from excavation limits where contamination has been removed, to document contamination that remains in situ</li> <li>Temporary soil storage requirements including the adequacy, construction, and security of storage cell</li> <li>Baseline and post-construction site assessments to document pre-existing and post-construction site contamination for laydown, equipment maintenance and fuelling depots used by the Construction Contractor</li> </ul> <p>The Owner will have access to all Environmental Work Plans upon request.</p>	Construction	Site Specific Environmental Work Plans for Demolition / Excavation as outlined in CEMP
	7.11-3	Manage and dispose of contaminated materials in accordance with the EMA, CSR, HWR, and TDG regulations	<p>Develop and implement a Spill Prevention and Emergency Response Plan in accordance with the BC <i>Environmental Management Act</i>, <i>Contaminated Sites Regulation</i>, and <i>Hazardous Waste Regulation</i> that</p> <ul style="list-style-type: none"> <li>Will be developed by the Construction Contractor</li> <li>Describes emergency response procedures consistent with TransLink and City of Surrey requirements to address foreseeable emergencies for construction and that cross-references emergency procedures identified in the Traffic Management Plan (e.g., provisions for access/egress of emergency vehicles);</li> <li>Includes clean-up measures and associated reporting and follow-up in the event of spills of fuels and other hazardous materials</li> <li>Includes provisions for continuous improvement based on analysis of incident response.</li> </ul>	Construction	Spill Prevention and Emergency Response Plan in the CEMP
	7.11-4	Prevent contamination to the environment as a result of project activities (best management practice and as per the EMA)	Refuelling and maintenance will be in designated areas to prevent contamination to the environment as a result of these activities	Construction	Spill Prevention and Emergency Response Plan in the CEMP

Review Element	No.	Objectives	Proposed Mitigation	Project Phase	Design Elements and Environmental Management Plan
Contaminated Sites (cont'd)	7.11-5	Prevent contamination to the environment as a result of project activities (best management practice and as per the EMA)	Spill response and containment equipment is to be kept on the worksite near storage/handling and refuelling/maintenance areas.	Construction	Spill Prevention and Emergency Response Plan in the CEMP
	7.11-6	<ul style="list-style-type: none"> <li>Remove, manage, and dispose of hazardous building materials in accordance with the EMA, HWR, TDG regulations, and Workers Compensation Act.</li> <li>Manage and dispose of all other waste in accordance with the EMA.</li> </ul>	Develop and implement a Fuels, Chemical and Material Storage and Handling Management Plan that complies with the BC Hazardous Waste Regulation and provides for maintaining a register of all construction-related hazardous materials (such as fuels, lubricants, and other chemicals) including: <ul style="list-style-type: none"> <li>All storage location(s)</li> <li>Material-specific storage requirements, proper use and handling information</li> <li>Handling information</li> <li>Disposal procedures</li> </ul>	Construction	Spill Prevention, Fuel Management and Emergency Response Plan in the CEMP
	7.11-7	<ul style="list-style-type: none"> <li>Remove, manage, and dispose of hazardous building materials in accordance with the EMA, HWR, TDG regulations, and Workers Compensation Act.</li> <li>Manage and dispose of all other waste in accordance with the EMA.</li> </ul>	Develop and implement a Hazardous Building and Demolition Materials Management Plan that complies with the BC Hazardous Waste Regulation and Transportation of Dangerous Goods Regulations that details procedures for the following: <ul style="list-style-type: none"> <li>Completion of salvageable and hazardous building materials surveys and reporting for all buildings slated for demolition;</li> <li>Handling and removal of all identified salvageable hazardous building materials for appropriate transport and disposal prior to the remainder of demolition;</li> <li>Sorting and disposed/recycling of all other demolition waste</li> </ul>	Construction	Hazardous Building and Demolition Materials Management Plan Site Specific Environmental Work Plans for Demolition / Excavation as outlined in CEMP
Electric and Magnetic Fields	7.12-1	Limit Project related EMFs outside facility fence-line	Location of the traction-powered sub-stations and Operations and Maintenance Facility to optimize the distance between EMF sources and receptors that are sensitive to EMFs	Design	BMPs, comparable to other TransLink projects
	7.12-2	Limit Project related EMFs along the Alignment	Electrical design and layout – engineering design of the trains and electrical infrastructure to reduce stray EMFs (e.g., electrical arcing between the overhead catenary system and the train), to the extent feasible	Design	BMPs, comparable to other TransLink projects
	7.12-3	Limit Project related EMFs at the EMF source	Procure trains and LRT equipment that meet the available Canadian EMF standards or its equivalent standard by international agencies	Construction	BMPs, comparable to other TransLink projects
	7.12-4	Limit Project related EMFs along the Alignment	Design the Project with passive engineering controls (e.g., infrastructure or shielding) to block or redirect EMFs near its source	Construction	BMPs, comparable to other TransLink projects
	7.12-5	Confirm that EMF levels at sensitive locations are within the applicable EMI and health reference levels	Conduct EMF monitoring along the Alignment during start-up commissioning	Operations	BMPs, comparable to other TransLink projects

NOTES:  
 CEMP = Construction Environmental Management Plan  
 OEMP = Operation Environmental Management Plan  
 BMP = best management practices  
 MOTI = Ministry of Transportation and Infrastructure