



transportation
investment
corporation

Broadway Subway Project

Environmental and Socio-economic Review
Terms of Reference

OCTOBER 30, 2018

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Preface to Terms of Reference

This Terms of Reference document (ToR) identifies the information that the Ministry of Transportation and Infrastructure (MOTI) will provide in the environmental and socio-economic review (ESR) of the proposed Broadway Subway Project (the Project). The Project will extend the existing Millennium Line SkyTrain by 5.7 km from the current terminus at VCC-Clark Station to a new terminal station located at West Broadway and Arbutus Street. While the Project does not require environmental approval under federal or provincial environmental legislation, MOTI is committed to advancing the Project in a way that acknowledges, and protects, associated environmental and socio-economic values. Key objectives of the ESR process are:

- Demonstrate the Project's commitment to advancing a Project that protects environmental and socio-economic values associated with the Project
- Provide a clear and transparent mechanism for assisting MOTI in identifying potential Project-related effects on environmental and socio-economic values and approaches for protecting such values
- Provide opportunities for Aboriginal groups, the public, stakeholders, and government agencies to provide input on the scope of issues to be considered and approaches for protecting environmental and socio-economic values

This TOR describes the framework of the ESR, including Aboriginal consultation and public engagement, assessment methods, and environmental and socio-economic areas of interest that will be addressed (referred to as "Review Elements"). The preface of the TOR also explains why the Project does not require a federal or provincial environmental assessment, and provides a brief description of the Project.

Proponent

To contact MOTI regarding the Project, please refer to:

Project Website: <https://engage.gov.bc.ca/broadwaysubway/>

Regulatory Background

The proposed Project is not a reviewable project under the requirements of either the British Columbia *Environmental Assessment Act* (BCEAA) or the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). Both the British Columbia Environmental Assessment Office (EAO) and the Canadian Environmental Assessment Agency (CEA Agency) have confirmed in writing their decisions not to review the Project under either BCEAA or CEAA.

Project Description

The Project consists of a 5.7-km extension of the Millennium Line along Broadway from VCC-Clark Station to a new terminus at West Broadway and Arbutus Street. The Project will include an elevated guideway extending approximately 700 m westward from the existing terminus of the Millennium Line at VCC-Clark Station to an underground tunnel north-west of the Emily Carr University of Art + Design campus. From the Emily Carr University of Art + Design, SkyTrain cars will travel underground to the new terminus at Arbutus Street. Figure 1 illustrates the Project alignment.

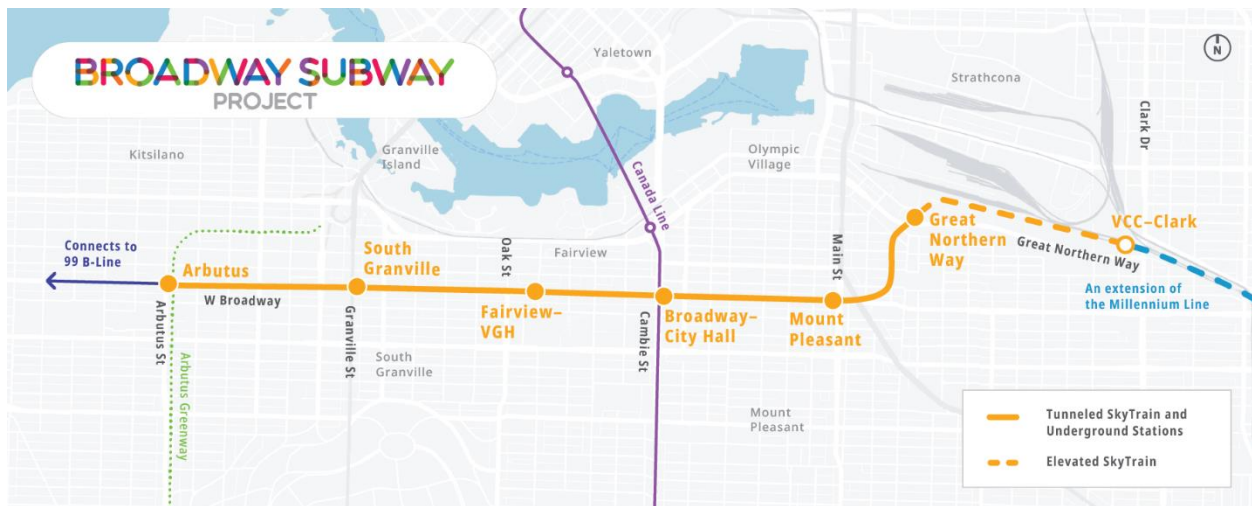


Figure 1: Broadway Subway Project Alignment

Elevated Guideway and Tunnels

The Project will include a section of elevated guideway extending approximately 700 m westward from the existing terminus of the Millennium Line at VCC-Clark Station, to an underground tunnel north-west of the Emily Carr University of Art + Design campus. The Project will transition to an underground alignment, either a bored or mined tunnel, or side-by-side tunnels, ending at the new terminus station at West Broadway and Arbutus Street.

Stations

The Project will include six underground stations in the vicinity of the following intersections (see Figure 1):

- Great Northern Way
- Mount Pleasant
- Broadway–City Hall
- Fairview–VGH
- South Granville
- Arbutus

Final station names have not yet been determined; interim station names were chosen for wayfinding purposes and are not considered final at this time. Stations are anticipated to include centre platforms between in-bound and out-bound rail tracks, which will be accessible by elevator, escalators, and stairs to street level station house structures.

Power, Control, and Communications Systems

Power, control, and communications systems for the Project will be integrated with those supporting the existing Millennium Line.

SkyTrain Vehicles

It is expected that the Project will operate using passenger trains that support the operation of the existing SkyTrain system. The SkyTrain fleet consists of various car models, ranging in passenger capacity from approximately 80 persons per car to 167 persons per car. Current train configurations include two, four, or six cars per train. Future configurations may vary from current configurations. SkyTrain trains are powered by linear induction motors, with power supplied by an electrified third rail. Vehicles will be procured independently from the Project as part of a series of SkyTrain system capacity enhancement projects delivered by TransLink.

Infrastructure Requirements

The Project will be fully integrated with existing SkyTrain systems and protocols. To accommodate the addition of the Project to the existing SkyTrain network and to meet demand growth in the Metro Vancouver area, TransLink has initiated independent projects to expand system capacity at other stations within the existing SkyTrain network, improve SkyTrain systems, and increase storage and maintenance capacity. SkyTrain is powered by electricity supplied by BC Hydro.

Construction Activities

The main construction activities associated with the Project include elevated guideway construction, underground civil works, architectural finishes, systems integration, and traffic and transit management. Table 1 summarizes the scope of construction work.

Table 1: Broadway Subway Project Construction Activities

Category	Components
Property requirements and land access	<ul style="list-style-type: none"> • Securing access to property required to support construction of the Project, including station locations
Site preparation and utility relocation	<ul style="list-style-type: none"> • Site preparation including clearing and grading, ground improvement, demolition, and set up of temporary facilities such as equipment and material storage areas • Relocation of utilities (e.g., electricity, telecommunications, municipal utilities)
Elevated guideway construction	<ul style="list-style-type: none"> • Construction of the elevated guideway
Tunnel construction	<ul style="list-style-type: none"> • Tunnel excavation, tunnel lining, track supply/install, and excavation of stations and ancillary facilities • Disposal and/or reuse of excavated materials
Station construction	<ul style="list-style-type: none"> • Underground and above-ground components of station structural concrete works, and installation of underground components and systems (e.g., rails, power systems, ventilation) • Disposal and/or reuse of excavated materials) • Architectural finishes including all non-structural components of the stations including the headhouse design and construction
Commissioning and start-up	<ul style="list-style-type: none"> • Testing and commissioning for all elements of the system, including electrical and mechanical systems, fixed facilities, and SkyTrain vehicles

Operation

Once operational, the Project will replace some bus services operating along Broadway. For example, with the Project, the 99 B-Line bus will operate between UBC and the new terminus station at West Broadway and Arbutus Street rather than between UBC and the existing Commercial/Broadway Station. TransLink’s Route 9 bus will continue to operate on Broadway.

The Project will increase SkyTrain ridership along the Millennium Line travelling both eastbound and westbound.

Project Schedule

The Project is currently in the Project Planning stage (Figure 2) with an assumed in service date of 2025.

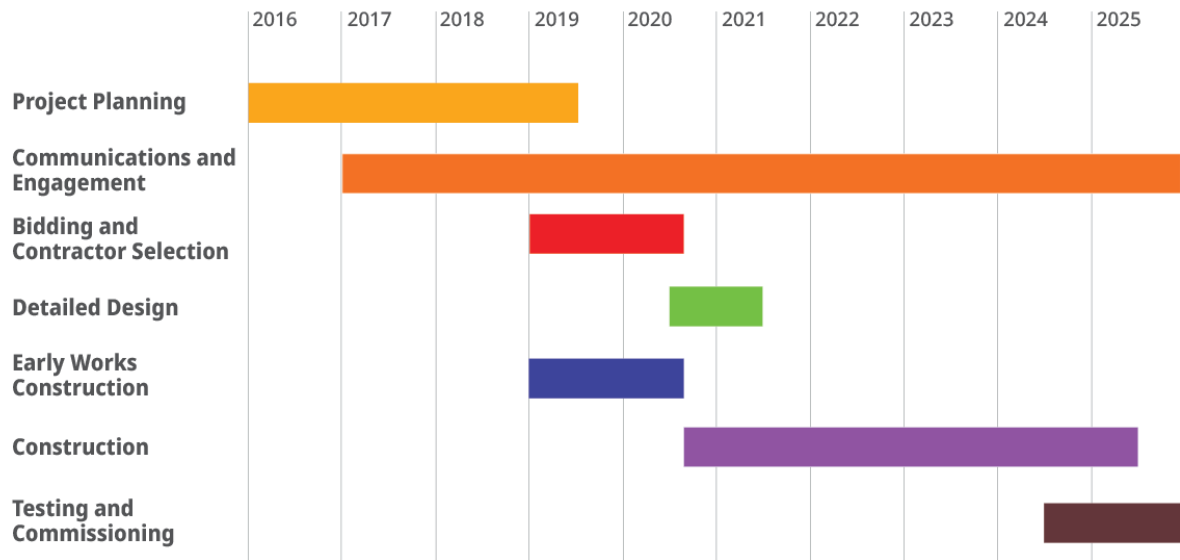


Figure 2: Broadway Subway Project Schedule

Abbreviations

BC	British Columbia
BCEAA	<i>British Columbia Environmental Assessment Act</i>
CEA Agency	Canadian Environmental Assessment Agency
CEAA 2012	<i>Canadian Environmental Assessment Act, 2012</i>
EAO	British Columbia Environmental Assessment Office
ESR	Environmental and Socio-economic Review
GHG	Greenhouse gas
TOR	Terms of Reference

EXECUTIVE SUMMARY

The Executive Summary will summarize the results of the analysis of project-related effects, and provide conclusions on the overall effects of the Project on the natural and human environment. The Executive Summary will also summarize the keys aspects of consultation with Aboriginal groups, and engagement with the public, stakeholders, and government agencies and how such consultation and engagement has informed the ESR.

1 INTRODUCTION AND PROJECT HISTORY

This section of the ESR report will describe:

- The purpose of the Project and how Project objectives align with provincial, regional, and local transportation and land use planning policies, plans, or programs
- The location of the Project and include maps showing regional context
- The relevant background of the Project, including exploratory or investigative studies, and Project alternatives considered during Project planning

2 PROJECT DESCRIPTION

This section of the ESR report will:

- Identify and describe Project components
- Describe all phases of the Project, including the duration and proposed schedule for construction and operation. Project decommissioning and reclamation will not be discussed since the Project has no fixed end of operation
- Describe activities associated with all components and phases of the Project

3 PROJECT BENEFITS

This section of the ESR report will describe anticipated benefits of the proposed Project, including transportation, social and community, economic, and environmental benefits.

3.1 Transportation Benefits

Description of transportation benefits that will result from the Project, including:

- Improved transit accessibility and reliability
- Travel time savings
- Increased transit ridership
- Improved regional connectivity
- Reduced congestion and collisions
- Improved transportation choice

3.2 Social and Community Benefits

Description of community benefits anticipated to result from the Project, including:

- Supports Metro Vancouver's 2040: Shaping our Future (Growth Strategy)
- Progressing towards Vancouver's Transportation 2040 Plan
- Improved affordability through greater mobility
- Improved safety
- Enhanced urban realm (e.g. improved sidewalks, cycle parking around station houses)

3.3 Economic Benefits

Description of the economic benefits that will result from the Project, including:

- Economic benefits from transportation improvements (e.g. travel time reduction, collision reduction)
- Construction related economic benefits (e.g. jobs and employment income)
- Wider economic benefits (e.g. improved transportation convenience may prompt greater labour force participation)

3.4 Environmental Benefits

Description of environmental benefits anticipated to result from the Project, including:

- Air quality improvement
- Greenhouse gas (GHG) reduction

4 ABORIGINAL CONSULTATION

This section of the ESR report will identify and provide a descriptive overview of Aboriginal groups with an interest in the Project. The Project is located on the traditional territory of the Musqueam, Tsleil-Waututh and Squamish Nations. In addition, the following tribal councils, treaty groups, and associations located outside of Metro Vancouver have been identified through the Consultative Area Database as having interests in the area where the Project is located:

- Hul'qumi'num Treaty Group
- Stó:lō Nation
- Stó:lō Tribal Council

The ESR will describe the approach taken by the Ministry of Transportation and Infrastructure (MOTI) to:

- Provide Project-related and ESR information to potentially-affected First Nations
- Provide opportunities for First Nations to review and comment on key environmental review documents
- Obtain the views of First Nations regarding the Project and the ESR process
- Obtain any applicable heritage permits (including First Nations issued permits), such as those for the Archaeological Overview Assessment
- Identify and respond to issues raised by First Nations in a respectful manner, including discussions regarding proposed mitigation measures within the ESR process

The ESR report will summarize MOTI's consultation activities with First Nations by:

- Summarizing MOTI's past and planned consultation activities with First Nations in support of the ESR
- Providing a summary of key issues raised by First Nations regarding the Project and the Environmental Review process along with MOTI's responses to those issues
- Summarizing how feedback from First Nations influenced the ESR and identification of proposed mitigation measures

MOTI will also prepare a supporting First Nations Consultation Report to provide additional information regarding the First Nations consultation program.

5 PUBLIC ENGAGEMENT AND INFORMATION DISTRIBUTION

The ESR will describe the results of the Public Engagement Plan including:

- Background Information:
 - Identification of local governments, residents, property owners, and other rights holders who are potentially impacted by the proposed Project
 - Maps of local government boundaries, private land, tenures/authorizations, or residences with respect to the proposed Project
 - Background information about each potentially affected municipality and/or stakeholder group
- Engagement:
 - A summary of past and planned engagement activities
 - Refinements to the Public Engagement Plan in response to feedback from local governments, stakeholders or individuals
 - A description of the key issues raised the responses to those issues including how they are considered in the ESR

6 ENVIRONMENTAL AND SOCIO-ECONOMIC REVIEW SCOPE AND METHODS

This section of the ESR report will describe the methods used to assess potential environmental or socio-economic effects of the Project.

6.1 Issues Scoping and Selection of Review Elements

The ESR will describe the process for selecting the various environmental and socio-economic aspects addressed in the review (referred to as “Review Elements”), the indicators used for measuring or describing Project-related change to the Review Elements, as well as the spatial and temporal boundaries of the review.

6.1.1 Selection of Review Elements

The ESR will describe how Review Elements were selected. Proposed Review Elements, identified in Table 2, were selected based on:

- Relevant environmental policies, regulations, or guidance
- Potential for effects based on the Project description
- What was assessed in similar projects (e.g., Evergreen Line)
- Interests and issues identified by First Nations, government agencies, stakeholders, and the public

6.1.2 Identification of Potential Effects and Indicators

The ESR will provide a table identifying the potential effects and indicators for each Review Element. Potential effects will be identified in consideration of information and concerns identified through consultation and engagement activities described in Section 4 and Section 5. The indicators will include, as appropriate, quantitative, and qualitative aspects. Where Project-related effects associated with a Review Element can be measured quantitatively, measurable indicators will be used.

6.1.3 Review Boundaries

The ESR will describe the methods used in identifying applicable spatial and temporal boundaries that may affect the assessment of Project-related effects. Information on Review Elements boundaries will be included in the appropriate sections of the ESR and will encompass relevant Project phases, components, and activities.

Table 2 summarizes proposed spatial boundaries supporting the assessment of specific Review Elements.

Table 2: Summary of the REs Identified for the Broadway Subway Project

Review Element (RE)	Rationale for Selection	Spatial Boundaries
Traffic and Transportation	Project construction is expected to impact modes of transportation (i.e., road traffic, pedestrian movements, cycling) within the Project corridor.	Area bounded by major roads adjacent to the Broadway corridor within the City of Vancouver
Housing, Residential Properties and Commercial Businesses	The Project may affect land use, housing stock and affordability Requirement to maintain access for properties along the corridor during construction. Requirement to maintain the continuity of commercial activities and businesses along the corridor during construction and operation.	Area bounded by major roads adjacent to the Broadway corridor within the City of Vancouver
Community and Emergency Services	Requirement to maintain access for and mobility for emergency service providers during construction.	Area bounded by major roads adjacent to the Broadway corridor within the City of Vancouver
Archaeological and Heritage Resources	Project construction may adversely affect archaeological and heritage resources.	Within 100 m of the Project alignment
Noise	Noise from construction fleets and other equipment will be emitted during construction and may affect the sensitive receptors (e.g., schools, hospitals, residences) Noise from train operation may affect the sensitive receptors.	Within 300 m of the Project alignment
Vibration	Vibration from construction fleets and other equipment will be emitted during construction and may affect the sensitive receptors. Vibration from train operation may affect the sensitive receptors.	Within 300 m Project alignment
Air Quality and Greenhouse Gases	Air emissions from equipment, vehicles, and other sources, will be emitted during construction and have the potential to affect air quality. GHG emissions from equipment and vehicles during Project construction.	City of Vancouver Lower Fraser Valley (LFV) airshed is considered the regional boundary
Contaminated Sites and Excavated Materials	Potential for encountering contaminated materials during construction.	Within 100 m of Project alignment
Electric and Magnetic Fields (EMF)	Public interest in the potential effects of EMF emissions from electrified transit lines on human health and electromagnetic interference.	Within 100 m of Project alignment

Table 2: Summary of the REs Identified for the Broadway Subway Project

Review Element (RE)	Rationale for Selection	Spatial Boundaries
Aquatic Resources	Project construction and operations may affect aquatic resources through impacts on water quality and indirect impacts on fish habitat.	Watercourses located within 50 m of Project alignment, and waterbodies that receive Project-related runoff
Vegetation and Wildlife Resources	Project construction activities may result in the loss or alternation of vegetation and wildlife habitat as well as potential conflicts with wildlife.	Within 100 m of Project alignment

The ESR will provide justification for why potential Review Elements suggested by government agencies, First Nations or the public, during consultation and engagement were excluded from the review. Generally, Review Elements may be excluded because of limited presence within the study area or limited potential for Project interactions.

6.2 Existing Conditions

Each Review Element will be addressed in a separate section of the ESR report. For each Review Element section, the ESR will include a description of the existing (or baseline) conditions within the study area in sufficient detail to enable potential project-related interactions to be identified and assessed. Where appropriate, this will include a discussion of anticipated trends, such as changes to conditions related to population growth.

The ESR will contain technical appendices for Review Elements with technical analyses or supplementary information, as appropriate. Key findings contained in these technical appendices will be summarized directly in the ESR.

6.3 Project Interactions

The ESR will summarize the overall process and methods used to identify and assess the potential effects of the proposed Project on the identified Review Elements. This includes a description of potential interactions between the Project and Review Elements, and pathways of consequent effects. Interactions between Project activities and potential effects will be identified in a matrix for each Review Element section. The assessment will provide a brief description of interactions between a Project activity or physical work and a Review Element, indicating how it could result in an effect to the Review Element.

6.4 Mitigation Measures

For each Review Element, the ESR will describe mitigation measures that will be incorporated into Project design and planning, including site and route selection, Project scheduling, and construction and operation (e.g., equipment selection, placement, emissions abatement measures) to avoid/reduce Project-related effects.

6.5 Discussion

The ESR will discuss Project effects for each Review Element, in consideration of the local environmental and socio-economic context, potential Project interactions, and proposed mitigation measures. Relevant criteria such as magnitude, geographical extent, and duration will be used to describe the effects. Where effects cannot be characterized quantitatively, they will be discussed qualitatively.

6.6 Conclusions

The ESR will present conclusions on potential Project effects on each Review Element.

7 ASSESSMENT OF POTENTIAL EFFECTS

The ESR will include an assessment of environmental and socio-economic effects based on selected Review Elements identified herein. The assessment of each Review Element will be conducted following the methods specified in Section 6.

7.1 Environmental and Socio-Economic Setting

The ESR will provide an overview of the environmental and socio-economic setting of the review area, including overview of geographical and biophysical features, built environment, and land use. Detailed baseline information will be provided in each Review Element subsection.

7.2 Traffic and Transportation

The ESR will evaluate potential Project-related effects on transportation networks within the Project corridor. The ESR will also describe how the results of the assessment of traffic and transportation, where relevant, will be integrated with the assessments of other Review Elements. Table 3 identifies potential Project-related effects on Traffic and Transportation and indicators used to support the assessment of Traffic and Transportation.

Table 3: Potential Effects and Indicators for Traffic and Transportation

Topics Included in Assessment	Potential Effects	Indicators
Traffic/Congestion Transportation Infrastructure Community Connectivity	Effects to existing transportation systems (e.g., road traffic, pedestrians, cyclists)	<ul style="list-style-type: none"> • Roadway description (e.g., number of lanes, traffic flow characteristics) • Change in parking • Change in vehicle volume (vehicles/day, vehicles-km travelled) • Transit (travel time, ridership) • Pedestrian/cyclist information mobility

7.3 Housing, Residential Properties, and Commercial Businesses

The ESR will evaluate potential Project-related effects on housing, residential properties and commercial businesses within the Project corridor. The ESR will also describe how the results of the assessment of residential properties and commercial businesses will be integrated, where relevant, with the assessments of other Review Elements. Table 4 identifies potential Project-related effects on Residential Properties and Commercial Businesses and indicators used to support the assessment of Residential Properties and Commercial Businesses.

Table 4: Potential Effects and Indicators for Residential Properties and Commercial Business

Topics Included in Assessment	Potential Effects	Indicators
Housing Residential Properties and Commercial Businesses	Effects to housing, residential properties and commercial businesses	<ul style="list-style-type: none"> • Change in access to properties • Population change • Number and type of residential properties affected by the Project • Housing availability and cost metrics • Number of businesses potentially affected by the Project and description of the anticipated effects

7.4 Community and Emergency Services

The ESR will evaluate potential Project-related effects on community and emergency services. The ESR will also describe how the results of the assessment of community and emergency services will be integrated, where relevant, with the assessments of other Review Elements. Table 5 identifies potential Project-related effects to Community and Emergency Services and indicators used to support the assessment of Community and Emergency Services.

Table 5: Potential Effects and Indicators for Community and Emergency Services

Topics Included in Assessment	Potential Effects	Indicators
Infrastructure and Services	Effects on emergency services, community amenities, and public safety	<ul style="list-style-type: none"> • Public access to emergency services • Access to response routes for emergency medical services, fire rescue, and police response • Potential change in public safety and security • Changes to community infrastructure, services, and amenities

7.5 Archaeological and Heritage Resources

The ESR will evaluate potential Project-related effects on Archaeological and Heritage Resources. The ESR will also identify which Review Elements are linked to Archaeological and Heritage Resources and describe how the results of assessment will be integrated with the assessments of other Review Elements. Table 6 identifies potential Project-related effects on Archaeology and Heritage Resources and indicators used to support the assessment of Archaeological and Heritage Resources.

Table 6: Potential Effects and Indicators for Archaeological and Heritage Resources

Topics Included in Assessment	Potential Effects	Indicators
Archaeological sites	Effects to archaeological site contents or context (known and unknown)	Inventory of potentially affected archaeological sites and description of potential effects Areas with high archeological potential (e.g. lost streams) may contain archeological sites
Heritage sites	Effects to heritage buildings, landscapes, or other sites of heritage value (known and unknown)	Inventory of potentially affected heritage sites and description of potential effects

7.6 Noise

The ESR will evaluate Project-related Noise effects. The ESR will also identify which Review Elements are linked to noise and describe how the results of the noise assessment will be integrated with the assessments of other Review Elements. Table 7 identifies potential Project-related Noise effects and indicators used to support the assessment of Noise.

Table 7: Potential Effects and Indicators for Noise

Topics Included in Assessment	Potential Effects	Indicators
Construction noise Operational noise	Change in Noise Levels	Predicted noise level during construction and operation phases quantified using following parameters: <ul style="list-style-type: none"> Overall equivalent continuous A-weighted (dBA) daytime and nighttime sound level (L_d and L_n) A-weighted (dBA) daytime and nighttime equivalent sound level (L_{dn})

7.7 Vibration

The ESR will evaluate potential Project-related Vibration effects. The ESR will also identify which Review Elements are linked to vibration and describe how the results of the vibration assessment will be integrated with the assessments of other Review Elements. Table 8 identifies potential Project-related Vibration effects and indicators used to support the assessment of Vibration.

Table 8: Potential Effects and Indicators for Vibration

Topics Included in Assessment	Potential Effects	Indicators
Project-related sources of Vibration	Change in Vibration Levels during construction and operation	Predicted ground vibration levels during construction and operation phases quantified using the following parameters: <ul style="list-style-type: none"> • Peak particle velocity (PPV) in mm/s • Root mean square (RMS) velocity in mm/s

7.8 Air Quality and Greenhouse Gases

The ESR will evaluate Project-related changes in air quality and greenhouse gas (GHG) emissions. The ESR will also identify which Review Elements are linked to air quality and GHGs and describe how the results of the assessment will be integrated, where relevant, with the assessments of other Review Elements.

The assessment will focus on the effects of criteria air contaminant (CAC) emissions, namely Sulphur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), particulate matter (PM₁₀ and PM_{2.5}) and volatile organic compounds (VOCs). The assessment will also consider GHG emissions of carbon dioxide (CO₂), nitrous oxide (N₂O) and methane (CH₄). Table 9 identifies potential Project-related effects on air quality and GHGs and indicators used to support the assessment of air quality and GHGs.

Table 9: Potential Effects and Indicators for Air Quality and Greenhouse Gases

Topics Included in Assessment	Potential Effects	Indicators
Project-related emissions of CACs	Project-related changes in emissions of CACs and changes in ambient air quality	Changes to release of CACs (SO ₂ , NO ₂ , CO, PM ₁₀ , PM _{2.5} , O ₃ , VOCs) as an indicator of changes in ambient CAC concentrations
Project-related emissions of GHGs	Project-related changes in emissions of GHGs within the regional airshed	Changes to release of GHGs (CO ₂ , CH ₄ , N ₂ O, reported as CO _{2e})

The Project will reduce the length of the corridor that diesel powered buses operate on along West Broadway. Thus, once operational, the Project will have a net beneficial effect on CAC and GHG emissions both from the reduction of diesel bus emissions and from the reduction in vehicle emissions due to riders switching from personal vehicle use. Project benefits with respect to GHG emissions will be discussed in Section 3.4.

7.9 Contaminated Sites and Excavated Materials

The ESR will evaluate contaminated sites that may be disturbed by the Project and discuss methods for disposal of excavated materials. The ESR will also identify which Review Elements are linked to contaminated sites and describe how the results of the contaminated sites assessment will be integrated with the assessments of other Review Elements.

The contaminated sites assessment will focus on the effects of disturbance to contaminated sites during Project construction. Table 10 identifies potential Project-related effects associated with Contaminated Sites and indicators used to support the assessment of Contaminated Sites.

Table 10: Potential Effects and Indicators for Contaminated Sites and Excavated Materials

Topics included in Assessment	Potential Effects	Indicators
Contaminated soils	Release of contaminants from contaminated soils or water encountered during construction	<ul style="list-style-type: none"> • Existence and location of contaminated sites • Nature of contaminated materials

7.10 Electric and Magnetic Fields

The ESR will provide an overview of potential electric and magnetic field (EMF) effects associated with Project operation. Table 11 identifies Project-related EMF effects and indicators used to support the assessment of EMF.

Table 11: Potential Effects and Indicators for EMF

Topics included in Assessment	Potential Effects	Indicators
EMF Effects	Human health and electromagnetic interference considerations associated with EMF levels	<ul style="list-style-type: none"> • Electric field (V/m) • Magnetic field (mG)

7.11 Aquatic Resources

The ESR will evaluate Aquatic Resources potentially affected by the Project. The ESR will also describe how the results of the review of Aquatic Resources, including lost streams, will be integrated, where relevant, with the analysis of other Review Elements. Table 12 identifies potential Project-related effects on Aquatic Resources and indicators used to support the assessment of Aquatic Resources.

Table 12: Potential Effects and Indicators for Aquatic Resources

Topics Included in Assessment	Potential Effects	Indicators
Aquatic Resources	Project-related influences on water quality	Presence of water quality contaminants including Total Suspended Solids that influence habitat quality for aquatic resources

7.12 Vegetation and Wildlife Resources

The ESR will include an assessment of Vegetation and Wildlife Resources and the rationale for its selection as a Review Element. The ESR will also describe how the results of the Vegetation and Wildlife Resources assessment will be integrated, where relevant, with the analysis of other Review Elements.

Table 13 identifies potential Project-related effects on Vegetation and Wildlife Resources and indicators used to support the assessment of Vegetation and Wildlife Resources.

Table 13: Potential Effects and Indicators for Vegetation and Wildlife Resources

Topics included in Assessment	Potential Effects	Indicators
Vegetation, Wildlife, and Wildlife Habitat	Direct and indirect project effects on vegetation, wildlife, and wildlife habitat	<ul style="list-style-type: none"> Change in the presence of species of management concern, abundance or quality of wildlife habitat and habitat features Change in vegetated areas Potential for injury or mortality risk to wildlife

8 ACCIDENTS, MALFUNCTIONS, AND NATURAL HAZARDS

The ESR will include:

- Identification of potential accidents and malfunctions, such as:
 - Fire
 - Fuel leak or spill
 - Power outage
 - Train derailment
- Methodology for assessing the potential risk of an event (likelihood and consequence)
- Identification of proposed measures to reduce the likelihood of the event
- Conclusions on the potential risk of the accident or malfunction to Review Elements

The ESR will include:

- The environmental factors deemed to have possible consequences on the Project, including, but not necessarily limited to, consideration of natural hazards such as:
 - Seismic events
 - Extreme weather (wind storms; heavy rain and/or snow)
- A description of any changes or effects on the proposed Project that may be caused by the above-mentioned environmental factors
- The likelihood and consequence of the changes or effects to relevant Review Elements
- Practical mitigation measures, including design strategies and environmental contingency plans, to avoid or limit the likelihood and consequence of natural hazards
- A conclusion about the potential risk of natural hazards to Review Elements

9 ENVIRONMENTAL MANAGEMENT PLANS

The ESR will include:

- A list of Management Plans for the construction and operation phases of the Project. This section may include but is not limited to:
 - A description of the contents of each Management Plan, including the identification of mitigation measures described in previous sections that will be included within the plans
 - A list of all applicable licenses, permits and/or approvals that are already received or required for the phases of the proposed Project, and the associated responsible regulatory body

10 SUMMARY AND CONCLUSIONS

The ESR will:

- Summarize potential Project effects in a table format that depicts the potential effect, project phases, project activity or physical work linked to the effect
- Summarize mitigation measures and environmental management plans that will be implemented to avoid and limit potential adverse project effects on environmental and socio-economic values
- Provide conclusions on overall environmental and socio-economic effects of the Project

11 REFERENCES

A list of reference material used in developing the ESR report will be included.