



Health, Safety, Security, and Environment Plan

FOR

BROADWAY SUBWAY PROJECT

BROADWAY-CITY HALL STATION INTEGRATION

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Approved by:	Ron Powell - General Manager	
	Name, Title	Signature
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DOCUMENT REVISIONS INDEX

Revision	Date	Description of Changes
A	March 11, 2019	Final Release

REVISION AND CONTROL

This Health, Safety and Security Plan is a controlled document. Changes to this document will be implemented under controlled conditions.

The Canada Line is responsible for the control of this Health, Safety and Security Plan. The Canada Line will prepare any required changes, which will be approved by the Project Director.



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CONTACTS LIST

(TO BE UPDATED AT PROJECT EXECUTION)

Emergency First Aid	Radio Channel 2	778-828-0941
The Canada Line/Canada Line	PRIMARY	ALTERNATE
Director Commercial & Special Projects: TBD	TBD	TBD
Special Projects Manager: TBD	TBD	TBD
HSSE Representative: TBD	TBD	TBD
Wayside Planner (Work Permitting): TBD	TBD	TBD
Canada Line Control Room	604-247-5706	
Project Co. MANAGEMENT	PRIMARY	ALTERNATE
Project Co Project Coordinating Representative: TBD	TBD	TBD
Construction Manager: TBD	TBD	TBD
Safety Manager: TBD	TBD	TBD
VP, Transportation: TBD	TBD	TBD
Divisional Safety Director: TBD	778 875 6290	604 605 4776
Environmental Manager: TBD	TBD	TBD
EMERGENCY AGENCIES	PRIMARY	ALTERNATE
Fire Department	604-990-3371	911
BC Ambulance Service	604-990-3371	911
RCMP	604-990-3371	911
Poison Control Centre	1-800-567-8911	604-682-5050
Gas Utility: FortisBC	1-800-663-9911	
Electrical Utility: BC Hydro	1-888 769 3766	Cell: *49376
BC Provincial Emergency Response Program	1-800-663-3456	
INDUSTRIAL AND SUPPORT	PRIMARY	ALTERNATE
Hospital: Vancouver General Hospital	(604) 875-4111	
WorkSafeBC	1- 888 621- 7233	



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1.0 Terms and Definitions

ATC Territory: Area of the Station, in the guideway or walkways past platform end gates, where automatically controlled trains, track switches, and power rail may be present.

Broadway Subway Project (“BSP”): The project to be designed and constructed by Project Co at the initiative of TransLink and the Province of British Columbia for a new rapid transit line under Broadway in the City of Vancouver, including integration of such new rapid transit line with the Canada Line’s existing Broadway – City Hall Station.

Canada Line Attendant (CLA): A Canada Line employee normally working in an area of three stations who will be designated to stay and assist passengers at stations where the works are ongoing.

Canada Line/The Canada Line: Refers to the legal entity ProtransBC Operations Ltd. The Canada Line is the operator of the Site and, unless otherwise noted in this HSSE Plan, “Prime Contractor” for the purposes of enforcing the applicable requirements of the BC Workers Compensation Act, Occupational Health and Safety Regulation, and company and corporate HSSE rules including permitting any work done on the Site which would be made available to Project Co at the start of the work.

Canada Line Project Representatives: Will be the Director Commercial & Special Projects, HSSE Representative, Wayside Planner, on-shift Duty Manager, or on-shift CRO. The Canada Line will assign representative(s) to serve as the Canada Line Project Coordinating Representative(s) with the intent to assist in the coordination of design and construction meetings including permit applications.

Control Room Operator (CRO): Canada Line employee who coordinates ATC protection, power isolation, and provision of emergency services.

Authorized Work Areas: Work areas that are separated and secured against unauthorized access from the public areas of the Station and either fully isolated or not fully isolated (such as within the guideway) from existing Canada Line operations within the Station. Project Co can work in these Authorized Work Areas without direct monitoring by Protrans but must abide by Protrans HSSE Plan. These work areas will be proposed by Project Co for review and acceptance by the Canada Line.

Engineering Hours: The hours are generally between 02:00 to 04:00 when stations are closed to the public and trains are not running on the mainline.



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Fire Command Post (FCP): The stainless steel panel marked fire command post located near the entrance to the station.

Field Modification Instruction (FMI): The Canada Line's formal change process to be followed by Project Co regarding all changes proposed by Project Co to existing Canada Line infrastructure, including all changes to existing Canada Line systems hardware and software. The FMI's are subject to review and approval by the Canada Line.

HSSE Orientation: An in class presentation presented by the Canada Line covering the health, safety, security, and environment requirements for working within the Station and Site.

HSSE Orientation Sticker: A sticker to be placed in a visible location on the hard hat identifying that individual has received their orientation and is permitted to be on the Site.

Job Hazard Analysis (JHA): A form created daily and reviewed before starting any work and signed by all persons on site identifying the hazards of the worksite and activities planned in that day.

Occupational First Aid Attendant (OFA): Personnel who have a valid certificate issued by a WorkSafe BC approved institution proving they are qualified to administer first aid.

Project Co: The Design Build Contractor retained by the Province to undertake the design and construction of the Broadway Subway Project ("BSP"), including integration of the new station with the existing Station. Project Co employees include all construction personnel, consultants, subcontractors, trades, inspectors and visitors either undertaking work and/or inspecting work performed by Project Co within the Site. Reference to consultant, contractor and subcontractor as pertaining to the Work within this HSSE Plan is implicit to Project Co.

Project Co Project Coordinating Representative: Project Co will assign representative(s) to serve as main contact person(s) with the Canada Line regarding coordination of design and construction, including HSSE associated with construction.

Revenue Hours: The 22-hour period between 04:00 to 02:00 of the next day where the Station is open to the public and trains are operating.

Routine Work Permit: The authorization from the Canada Line to perform work on the Canada Line which is of a routine nature where the hazards to workers and the public remain consistent. Application for a routine work permit must be submitted at least 2 weeks in advance with a scope of work to be performed by the requestor.



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Station: The existing Canada Line Broadway – City Hall Station (sometimes referenced as “BWS”) including the associated maintenance areas defined in the Maintenance Areas drawing provided as an appendix to this HSSE Plan.

Site: Means the Station plus those areas within the guideway, tunnel and Station that are part of integration with the BSP and will later be included within the scope of an amended Concession Agreement and Maintenance Area Plan.

Station Ancillary Areas: The non-public areas of the Station including storage rooms, electronic equipment rooms, alternating current electrical rooms, etc. These areas contain equipment sensitive to Canada Line systems and, unless otherwise agreed by the Canada Line, require an escort from the Canada Line to enter.

Stepback: A field level hazard assessment form to be completed for unplanned work or circumstances not covered in the daily JHA.

Transit Facility Construction Integration Plan: The plan to be developed by Project Co in consultation with the Canada Line to address the integration of the Work in relation to the existing Station, including the Canada Line guideway within the Station and tunnel.

Work or Works: All design and construction work to be performed and completed by Project Co within the Site, including work to integrate the Station with the BSP, and including all testing and commissioning thereof.

Work Permit: A permit issued by Canada Line confirming authority to perform work on a Canada Line operating or safety system. The work permit must be applied for at least 2 weeks in advance with a scope of the work to be performed by the requestor.

Workzone: A clearance issued by a CRO to a Person in Charge (PIC) who is trained in the Canada Line Rail Operating Rules and aware of the requirements and authorised for working in ATC territory.

2.0 Project Overview

The Broadway Subway Project (“BSP”) includes a new Broadway Subway Station that integrates with the existing Canada Line Station. This BSP HSSE Plan only applies to the Works within the Canada Line designed and constructed by Project Co that interfaces, supplements or modifies the existing Station or existing Canada Line guideway.



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3.0 Workers Compensation Act - “Prime Contractor” Designation

For Works within the Site, the Canada Line will retain the duties of the “Prime Contractor” responsible for health and safety in accordance with the BC Workers Compensation Act (WCA) and Occupational Health and Safety [OH&S] Regulations. The Canada Line has developed this Health, Safety Security, and Environment [HSSE] Plan to detail the health, safety, security and environmental expectations, measures, standards and performance criteria to be used on the BSP specific only to Works within the Site.

This HSSE Plan will be supplemented by the Canada Line company and corporate HSSE plans which provide the details of the specific health and safety measures which may only be highlighted in this Plan. These documents will be used together to provide the minimum health, safety, and security requirements and measures for working on the Canada Line.

Project Co is expected to be knowledgeable and compliant with the all OH&S Regulations, applicable Acts, Codes, and Standards governing construction health and safety applicable to their work activities; the requirement of this HSSE Plan and Canada Line company and corporate HSSE plans when working on the Canada Line; and any additional health, safety and security requirements stipulated by the Canada Line on specific activities.

For those Authorised Work Areas implemented by Project Co that are considered by the Canada Line to be sufficiently isolated and independent in terms of HSSE from ongoing existing Canada Line operations, the Canada Line may formally (in writing) reassign the duties of “Prime Contractor” to Project Co for the purposes of the WCA, and Project Co will then need to comply with requirements stipulated by Canada Line and Project Co’s own HSSE plan within these secured work area(s). In such circumstance, the Project Co will be solely responsible for monitoring compliance with health and safety regulations within these areas. Notwithstanding, the Canada Line reserves the right to reassume the role of “Prime Contractor” should at any time the Designated Work Areas, in the sole opinion of the Canada Line, become a risk to the Canada Line operations or impacts the safety of Canada Line workers and passengers.

Unless otherwise advised by the Canada Line, the Canada Line will always be “Prime Contractor” for the purposes of WCA for Authorised Work Areas that are not isolated from public access or within the guideway.

The Canada Line Project Representatives may, in event these requirements are not met, take such actions deemed necessary, including stoppage of work or removal of personnel and equipment from Site, to prevent harm to persons and/or property and to protect the



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operational integrity of the facilities and the environment. Project Co will be responsible for all costs incurred by the Canada Line for such interventions.

4.0 Project Work Procedures

The Canada Line will maintain overall control of Canada Line assets and property and, unless otherwise advised by the Canada Line, construction work performed by Project Co will be in accordance and compliance with the Canada Line's operational, health, safety, security and environmental expectations.

Project Co will be responsible for developing a Transit Facility Construction Integration Plan (TFCIP) in consultation with the Canada Line. This TFCIP will provide a high level overview of Project Co's proposed Works on, to or within the Station. More detailed breakdown of the specific works will need to be addressed through individual work permits applications. The TFCIP should as minimum cover the following:

- description and construction scheduling of those Works within the Site that directly integrate with the Canada Line;
- construction staging and access, including proposed placement of temporary hoarding and/or fencing, to separate the existing Canada Line operations from the Work;
- application of this HSSE Plan as related to Project Co's proposed construction staging sequences;
- pedestrian management, including and any emergency evacuation requirements that supplements and/or incorporates the Canada Line Emergency Response Programme set out in Section 10 of this BS Project HSSE Plan;
- proposed temporary signage;
- Project Risk Register and Job Hazard Analysis as set out in Sections 14 and 15 of this BS Project HSSE Plan;
- proposed design, work plans, and documentation such as a Field Modification Instruction to provide details on proposed modifications and additions to existing Canada Line infrastructure for approval; and
- schedule and identification of construction activities requiring Work Permits from the Canada Line;

All planned work on the Canada Line carried out by Project Co must be authorized by a Work Permit (WP) from the Canada Line. Project Co must submit a permit application detailing the activities, person in charge, and time and location of the work. The permit application will be reviewed by the Canada Line Wayside Planner. This review will involve review based on Site and



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resource availability and based on the proposed work scheduled; the use and allocation of shared space; limitations on the use of the space and/or restrictions in the period of time the space is available, and approval for the shut down and/or impact to any operational systems and/or equipment. Permit applications must be submitted at least two weeks in advance of the scheduled activities to minimized likelihood of scheduling conflict. Once approved, the Canada Line Wayside Planner will issue an approved Work Permit to Project Co Project Coordinating Representative.

Project Co shall only work within the approved scope, duration, and restrictions as approved on the WP. If technical escort is required, the work shall not start until the allocated technical escort is available at the work area. Project Co must call into the Canada Line Control Room to activate an approved WP and must notify Canada Line Control Room at the end of each daily shift that the work has ended and the site is safely returned to operating condition.

5.0 Access to Site

Access to the Authorised Work Areas is subject to approved time and durations as issued on a Canada Line Work Permit (WP). Canada Line may limit access to such areas to Revenue Hours or Engineering Hours, depending on the nature of the work and the implications it has on passengers and passenger services, subject to issuance of a Work Permit by the Canada Line. Depending on the location of the Work, such as within the Guideway/ATC territory, the Canada Line may also reduce the time period available within Engineering Hours to allow sufficient time to sweep the work site area to ensure it is safe and clear of any all construction materials and equipment that may pose a risk to customers and train operations. Project Co is responsible for providing its own contractor parking areas to access the Site. Unless otherwise advised by the Canada Line, parking belonging to the Canada Line will not be available to Project Co.

Project Co may request use of Canada Line rail borne equipment. Such request will require review and approval by the Canada Line and is subject to availability and risk assessments. In any case, Canada Line cannot guarantee that any of its rail borne equipment will be available to the Project Co. Canada Line will not be liable to TransLink and/or Project Co for the use of Canada Line rail borne equipment. Also, a specific work permit will be required and the use of rail borne equipment will be subject to additional charges.

Delivery of equipment and material to and from Designated Work Areas through the Station must be performed during Engineering Hours or as authorized by CRO or the permit. Delivery of large or heavy equipment must be reviewed in advanced to ensure that existing Station finishes are protected. Escalators must not be used by Project Co to move any equipment or materials.



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Limited use of elevators to move equipment and materials may be granted via Work Permit application and if this is required the total weight of any individual load must not exceed the load limit of the elevator. Project Co will be liable for the full costs of repair and lost revenue due damage to an elevator during or as a result of use by Project Co

6.0 Project Security

Canada Line Station access is controlled. All persons entering the Station, including project personnel, consultants, inspectors, visitors, delivery/pick-up personnel and any other long term or transient persons involved in the construction works, are subject to security requirements in Appendix A1.

7.0 Site Containment

Because of the potential for public exposure to worksite hazards, Designated Work Areas will be separated and secured from inadvertent entry from the public areas of the Station for the duration of the Work. Full containment of hazards generated from activities will be required where possible to reduce risk to the travelling public. Low risk activities may be performed with local containment as reviewed and accepted by the Canada Line (see appendix A10 for more information.)

When the hoarding is being installed to separate the construction areas from the public areas of the Station, minimum levels of access and egress must be maintained (additional information in appendix A10). All hoarding systems must comply with applicable code and regulatory requirements. The impact by hoarding on fire protection system or devices, paths of emergency egress, communication systems, and on lighting must also be assess and addressed. Project Co must complete a Containment and Hoarding plan in support of the WP and/or OP to minimize impact to the public, tenants, and Canada Line operations which will be reviewed and accepted by the Canada Line.

Project co is responsible for regular inspection and maintenance of the hoarding. The hoarding must be kept clean and safe for use in public spaces. Any unauthorized markings and graffiti must be removed within 24 hours.

8.0 Safety Orientation

Prior to starting work on the Site, Project Co, including all its contractors, workers, consultants, inspectors and visitors must receive the Canada Line Safety Orientation. The orientation will be



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delivered by the Canada Line HSSE Representative or designate and will include the following information:

- Overview of the Site and work locations,
- Project health, safety and security goals,
- First Aid and Emergency Response procedures,
- Project Security requirements,
- Hazard Identification and Control procedures, including use of SNC Lavalin's risk matrix to assess risk, (see appendix B4 for risk matrix).
- Incident and Accident reporting requirements,
- Inspection requirements,
- Safe work programs and practices,
- Personal Protective Equipment requirements,
- Safety Meetings,
- Codes of Conduct, Rules of Behaviour and Disciplinary Actions,

At completion of the BSP HSSE Orientation, all persons will complete an assessment confirming their understanding of the material. A score of 80% or greater will be required to pass; re-tries are allowed. After passing, an individual will be given a hard hat sticker or badge identifying they have successfully completed their orientation. Records related to HSSE orientation will be kept by the Canada Line HSSE representative.

9.0 First Aid

For its employees and activities where Canada Line is "Prime Contractor", Project Co will be responsible for providing occupational first aid trained personnel and supplies as required by schedule 3-A minimum levels of first aid of the WorkSafeBC occupational health and safety regulation. Where Project Co is "Prime Contractor", Project Co will be responsible for meeting all its occupation first aid obligations as required by WorkSafeBC occupational health and safety regulations.

10.0 Emergency Response Programs [ERP]

The Canada Line has an established Emergency Response Program for evacuation of stations and will initiate it as necessary. For all emergencies at a station, the Canada Line control room is



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the primary contact to coordinate with emergency services. Project Co is responsible for having the contacts list in this document readily available to their employees at the worksites. Project Co will need to supplement the contact list with its designated safety representatives.

A Canada Line Attendant(s) may be assigned where construction and installation activities are occurring during Revenue Hours to assist in providing direction to or evacuating the public. Current muster locations are identified in Appendix A2. Where current muster locations are in conflict with the Works, Project Co will need to work with the Canada Line to identify alternate muster locations. These new muster location(s) to be agreed with the Canada Line will need to be set out in the TFCIP. Project Co will need to work cooperatively with the Canada Line to support and provide any additional documentation required by the Canada Line from Project Co to address any modifications needed to the ERP to address the Site.

The process for emergency evacuation of a station is as follows:

1. CRO is informed of an emergency requiring evacuation or stage 2 fire alarm has been triggered.
2. Faregates are automatically controlled to open or manually opened by a CLA.
3. Project Co must safely stop all activities and proceed with the public outside the entrance of the Station and muster at the designated locations.
4. At the muster point to be agreed between Project Co and the Canada Line, Project Co will confirm whether all personnel are present and inform the status of their employees to the CLA also mustering at this point.
5. Project Co will wait at the mustering point until the CRO confirms it is safe to re-enter the station.

11.0 Personal Protective Equipment [PPE]

The following personal protective equipment **must** be worn by all personnel in the construction sites, signs stating this will be posted at entrances to all Authorized Work Areas.

1. CSA approved steel toed boots with a minimum 6 inch ankle support,
2. CSA approved hard hat,
3. High visibility vest,
4. CSA approved safety glasses,
5. Long pants,
6. Long sleeved shirts,
7. Appropriate hearing protection,



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8. Work appropriate gloves.

12.0 Specialty Personal Protective Equipment

The following specialized PPE is to be used when persons are exposed to the hazard for which the PPE is intended to provide protection. This is not an exhaustive list of specialized PPE and Project Co must provide specialized PPE as necessary to protect their employees.

1. Personal fall protection equipment including harness, lanyard and appropriate anchor point to meet the requirements of the Occupational Health and Safety Regulation (OH&SR) set out in WCA,
2. Welding shields, face shields or goggles as appropriate to protect against arc flash, grinding or flying materials,
3. Respiratory protection as appropriate when working with chemicals, silicates, dusts or other products which may be harmful to the respiratory system,
4. Hearing protection when working near noise sources which generate over-exposure sound levels.
5. Flame retardant clothing as appropriate when working with open flame or processes which generate sufficient heat to cause combustion,
6. Arc Flash protective equipment.

13.0 Hazard Identification, Assessment and Control

Project Co Representative will participate in weekly meetings with Canada Line Project Representatives looking ahead at their work for the following week. The purpose of these meetings will be to conduct hazard identification to determine controls for their assigned Scopes of Work including hazards created by their subcontractors.

The Canada Line HSSE representative or designate may conduct periodic examination of Project Co hazard identification and control processes to validate that hazards are being controlled as discussed and that no work is performed that has not been assessed for hazards. It is expected that Project Co will implement the required control measures and enforce them as necessary. Additional information on BSP hazard identification and risk assessment processes can be found in Appendix A7.

14.0 Project Risk Register

An active Project Risk Register (PRR) will be created and maintained by Project Co during each phase of a project's lifecycle to catalogue the significant risks, significant environmental aspects and their control methods. Those who best understand the risks, including the Canada Line



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HSSE Representative, will participate in meetings facilitated by Project Co to prepare or review the ranked list of the current and anticipated significant risks. The PRR, including control measures to mitigate the risk, will need to be reviewed and accepted by the Canada Line prior to the commencement of work. Notwithstanding the review and acceptance of the PRR by the Canada Line, Project Co will be fully responsible for identification and mitigation of all risks as related to its construction activities, including any potential impacts to ongoing Canada Line operations. Canada Line expects that no construction activity with a medium or greater risk level will be undertaken if it is not in the PRR. Project Co will be responsible for updating the PRR based on any changed work process, activity or Site condition.

15.0 Job Hazard Analysis

The Job Hazard Analysis (JHA) is a comprehensive safety and/or environmental hazard assessment process intended to establish standard safe and specific methods for specific activities associated the work. A JHA shall be conducted by Project Co in advance for all planned Works and the associated risks will also be identified in the Project Risk Register. Project Co will be responsible for updating the JHA based on any changed work process, activity or Site condition. Canada Line will provide Project Co with instructions and forms for JHAs. Canada Line will audit the JHA process performed by Project Co.

16.0 StepBack

The StepBack process is a guided field-level hazard assessment tool. It prompts all Project Co personnel to step back 2 meters and take 2 minutes to think critically about their working environment. Project Co will be expected complete a StepBack when the scopes of planned Work or hazard conditions have changed, and prior to commencing any unplanned task or activity.

As with JHA forms, the StepBack forms will be completed and retained by Project Co HHSE representative. Project Co may be requested to provide a copy of the StepBack to the Canada Line HSSE representative on a daily basis or alternatively the Canada Line may agree to a process whereby the Canada HSSE representative has the ability to review the daily StepBack retained by Project Co at designated site office location.

17.0 Pre-existing hazards

Project Co should be aware of the following pre-existing hazards associated with the Canada Line property. All Project Co personnel must be aware of these hazards as it relates to its Work.



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1. Automatic Train Control Territory

Canada Line is operated using automatically controlled trains and rail switches which can move without warning in either direction, and energized by a 750VDC power rail. For this reason, no construction personnel are permitted to enter any track areas area unless escorted by a Canada Line Employee PIC holding an active workzone.

2. Noise

Many of the activities performed by the Canada Line involve equipment and processes which generate noise at levels requiring hearing protection. In general terms, the construction personnel are to stay sufficiently distant from these processes to avoid over exposure to sound. All construction personnel are expected to use noise protection devices [ear plugs, ear muffs etc] when working near high noise areas, irrespective of whether that be construction equipment/processes or the Canada Line equipment/processes. All work must comply with City of Vancouver bylaws for noise. Construction noise levels whilst the Canada Line is open must respect that passengers may be in close proximity to the source of the noise. Canada Line will monitor noise levels from construction while the station is open and reserves the right to suspend work that is deemed too noisy to be performed when the station is open.

18.0 Safe Work Programs and Practices

Project Co will be required to establish general standards for safe work programs and will be responsible to ensure it has its own written safe work programs for the high risk Work performed by its forces. In addition, Project Co is expected to ensure its employees are properly instructed and trained in safe work procedures and practices.

Where Canada Line is the “Prime Contractor” in terms of the WCA, Canada Line will review Project Co safe work programs for compliance with OH&SR and to verify that Project Co employees and/or subcontractors are properly trained. Project Co will not be permitted to engage in any high risk Work activities without confirmation that its programs are adequate and its employees are properly trained.

19.0 Fall Protection

The OH&SR set out in the WCA including the Company and Corporate HSSE rules that contains a specific critical risk control protocol for fall protection.

Project Co will be required to provide the Canada Line with evidence of employee training, qualification or certification for fall protection systems used. Project Co will need to generate a fall protection plan and, where the Canada Line is “Prime Contractor” for the purposes of the



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WCA, Project Co will be required to provide the plan to the Canada Line HSSE representative for review and acceptance.

Additional information on fall protection requirements is available in the appendix section A3.

20.0 Mobile Equipment Operations

If Mobile equipment is to be used, Project Co will carry the responsibility to ensure its equipment is functioning properly and is used in a safe and environmentally responsible manner. The additional general requirements in Appendix A4 will apply.

21.0 Cranes

If crane operations are required, Project Co will need to identify proposed crane use in the TFCIP which will be reviewed for acceptance by the Canada Line. Project Co will be responsible for meeting OH&SR in the WCA including SNC Lavalin Blue Book requirements found in Appendix A8 as related to cranes.

22.0 Aerial Work Platforms

Aerial work platforms include manlifts and scissorlifts. The following requirements will apply where the Canada Line is "Prime Contractor" in terms of the WCA;

1. Operators must be trained and qualified in the use of the equipment. Where certification is required, Operators must be certified and records provided to the Canada Line HSSE representative.
2. Lifts must be inspected at the start of shift or before start of use. A record of the inspection must be kept in the machine.
3. If working above on an aerial work platform, a fall protection plan is required in accordance with Section 19.0 of this BSP HSSE Plan.
4. An exclusion zone must be set up around an aerial work platform to protect both operators, persons below the platform and the public.

23.0 Lock Out and Electrical Safety

For work on the Canada Line systems, the task specific requirements for lockout/tagout will be provided by the Canada Line, unless otherwise agreed with the Canada Line a minimum 48 hours advance. Written notice must be given by Project Co to the Canada Line for all lock outs. Project Co will be required to obtain a WP for the specific construction activity in accordance with Section 4.0 of this BSP HSSE Plan prior to requesting the lockout/tagout. The Canada Line



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may stipulate certain timeframes for when lock outs can be performed on operational systems, and/or may impose restrictions on the length of time a lock out can be maintained. The following general conditions will apply;

1. Unless otherwise approved, no source of energy may be worked on until it's been properly locked out. Project Co will be required to create a written procedure.
2. Project Co must have a process in place to remove the employee lock in the event the employee is absent from work and their lock must be removed.
3. Unless otherwise approved, GFCI systems must be used to prevent ground fault of tools and equipment used for construction.

See Appendix A5 for additional requirements.

24.0 Confined Space Entry

If a confined space is determined to exist during construction on the Site and where the Canada Line is considered to be "Prime Contractor" in terms of the WCA, no one may enter such confined space until the Canada Line HSSE representative together with Project Co has assessed and agreed on what control measures are to be implemented. See Appendix A9 for more information.

25.0 Inspections

Inspections are an essential means of determining the conditions of the Work being performed by Project Co within the Site and ensuring compliance to the requirements set out in this BSP HSSE Plan and OH&SR legislation in terms of the WCA. Project Co will be responsible for the following types of inspections relevant to its scope of work to ensure that unsafe acts or conditions are not occurring:

- Daily Site Inspection (documented)
- Mobile Equipment and Vehicle Operator Daily Inspection (documented)
- Tools and Equipment Pre-use Inspection
- PPE User Pre-use Inspection

Recorded Inspection Reports will include;

- Identification of the area, activity, equipment or materials being inspected;
- Any hazards or deficiencies found and corrective actions taken.



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Inspection Reports will be signed by the persons performing the inspection and, where the Canada Line is “Prime Contractor” in terms of WCA, either provided to the Canada Line HSSE representative or alternatively, if acceptable by the Canada Line HSSE representative, retained by Project Co at an acceptable site location where it is readily available for inspection.

Where Canada Line is “Prime Contractor”, the Canada Line may conduct regular formal inspections at interval periods to be determined by the Canada Line. Project Co’s HSSE representative will be required to attend these formal inspections. Notwithstanding these inspections, Project Co is responsible for conducting its own inspections which may be on a more frequent basis depending on the type and locality of the Work being performed including the PRR and JHA identified with this work. The inspections will encompass all construction areas and operations within the Site. Irrespective of designation of “Prime Contractor”, Canada Line reserves the right for the Canada Line HSSE representative to accompany any HSSE inspection.

26.0 Training

Any Project Co employee who will be on Site for 4 hours or more must attend the Site HSSE Orientation. Project Co personnel on site for less than 4 hours will be escorted by a person who has successfully completed the orientation. Where the Canada Line is “Prime Contractor”, it will provide general instruction training to project personnel relating to site conditions; project health, safety, security, environment objectives and requirements.

Project Co is responsible for ensuring that its employees are trained and qualified to perform the activities assigned in their scope of Work. The Canada Line may request copies of the Project Co training programs, records and/or employee certifications, and may stipulate that Project Co employees cannot perform Work which requires training until Project Co can provide adequate confirmation that training has been completed.

27.0 Incident Classification, Notification and Investigation

All events which meet the criteria identified in this section and/or by OH&S Regulations must be reported to the Canada Line HSSE representative. The HSSE representative based on designated “Prime Contractor” for the work area within which the event occurred will notify WorkSafeBC of the event if appropriate. The Canada Line uses the following classifications for events;

Incident

An event which resulted in injury, loss, equipment, property or environmental damage.

Reportable Incident



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The Canada Line HSSE representative requires, where the Canada Line is “Prime Contractor” in terms of the WCA, immediate notification for reporting to WorksafeBC in the event of:

- A worker is seriously injured or killed on the job.
- There is a major structural failure or collapse of a building, bridge, tower, crane, hoist, temporary construction support system, or excavation.
- There is a major release of a hazardous substance.
- There is a dangerous incident involving a fire or explosion that had potential for causing serious injury to a worker.
- There is a blasting incident that results in personal injury or injuries.

The Canada Line HSSE representative must be contacted and made aware of all first aid injuries, visits to a doctor for medical assistance (medical aid), lost-time or modified duty injuries, and serious near-misses. These incidents will be reported to WorkSafeBC as necessary.

Notwithstanding where Project Co is assigned “Prime Contractor” in terms of the WCA by the Canada Line, Project Co shall notify the Canada Line HSSE representative of any accident or injury occurring within the Site that has been reported by Project Co to WorkSafeBC.

Near Miss

An event which had the potential for injury, loss, equipment, property or environmental damage. An example of a Near Miss is:

A person drops a tool from height but it doesn't hit anyone or result in damage to the tool or the impacted surface.

Imminent Danger

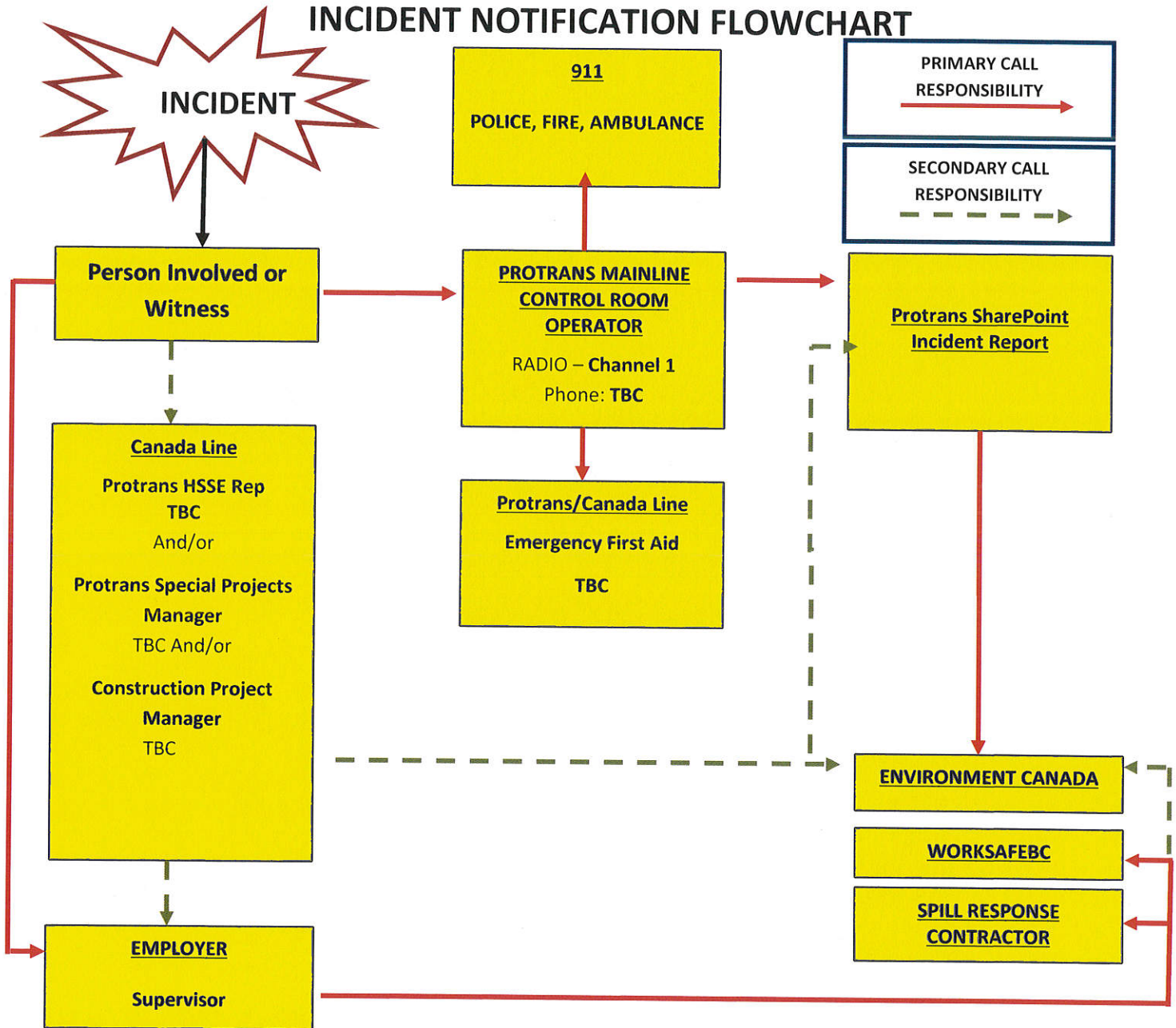
An Imminent Danger is any unsafe condition or unsafe behaviour (no energy release) where no incident occurred, but the possibility existed. The Canada Line HSSE representative will identify these during site inspections and, irrespective of assignment of “Prime Contractor”, require such conditions to be corrected immediately.



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INCIDENT NOTIFICATION FLOWCHART



Incident Notification: INITIATE NOTIFICATION FOR ANY OF THE FOLLOWING EVENTS

- Fatalities, serious disabling injuries, multiple injuries
- Incidents where 911 is called,
- Release/spill of hazardous substance with potential for significant environmental damage,
- Incidents involving, Police, Fire, Ambulance, public, Operational areas, utilities, transportation systems, adjacent business, community, motorists,
- Incidents where media attention may be expected. **ALL MEDIA INQUIRIES ARE TO BE DIRECTED TO THE PROVINCE.**



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28.0 Incident Investigation

All Incidents will be investigated by the Canada Line and Project Co HSSE representatives. Project Co will be required to participate in investigations and implement corrective actions resulting from the investigation.

29.0 Toolbox Safety Meetings

Toolbox meetings represent a focused health and safety discussion and will be conducted daily prior to the start of work by Project Co and may or may not be attended by the Canada Line HSSE representative. Every worker on site is expected to attend. The toolbox talk will address the following:

- Identification of the activities to be performed during the shift,
- A review of the hazards and safeguards associated with the daily activities in the daily JHA,
- A review of any incidents or accidents which are pertinent to the workers or the Work being performed,
- A review of any safety meetings/information bulletins which are pertinent to the workers or the Work being performed.

A signed JHA will serve as record of attendance at toolbox meetings which will be kept by Project Co HSSE representative and copies provided to the Canada Line's HSSE representative as part of project records. Alternatively, if agreed by the Canada Line HSSE representative, Project Co may be required to make the JHA available at an agreed site location to the Canada Line HSSE for review.

30.0 Behaviour Interaction Program (BIP)

A Behaviour Interaction is a face-to-face discussion about a safety topic between an employee or contractor doing the work and an observer that is recorded on a form. Where Canada Line is "Prime Contractor", the Canada Line HSSE representative may observe and conduct a BIP as desired throughout the course of the project.

31.0 Project Statistics

As part of the program administration, the Canada Line HSSE representative will maintain records and statistics of all health and safety matters on the Project. Project Co will supply records and statistics to Canada Line HSSE representative on request.

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APPENDIX A – Procedures

A1. Security Procedures.

The general security requirements are as follows;

1. The Site Supervisor will keep a log of all entrants to the sites. Those who have a badge or hard hat sticker indicating they have completed a site HSSE orientation will sign in and out. Other entrants who have not successfully completed an HSSE orientation will also sign in or out, be issued a visitor badge and be escorted by a person who has a badge or hard hat sticker while on site.
2. All persons who received a Visitor badge must surrender the badge when exiting the site.
3. The Canada Line Project Representatives reserve the right to remove any person from the Site at their sole discretion. Reasons for removal include, but are not limited to;
 - a) Rowdiness, horseplay, fighting, vandalism, theft, intoxication, being under the influence of legal or illegal substances; conflicts with the Canada Line personnel, inappropriate behaviour, non-compliance with health, safety, security or environmental requirements,
4. The Canada Line Project Representatives reserve the right to prohibit any equipment or materials onto the Site at their sole discretion. Prohibited items may include, but are not limited to;
 - a) Guns or other forms of weaponry.
 - a. Non-fixed blades are permitted when required for work.
 - b) Explosives which have not been specifically approved.
 - a. Powder actuated tool explosives are permitted subject to the proper control, storage and disposal,
 - c) Toxic, flammable, restricted or dangerous products which are not accompanied by the proper Material Safety Data Sheet and control mechanisms.
 - a. Such materials must have a legitimate business use for the construction works and are subject to all WHMIS requirements,
 - d) Equipment which is not properly inspected by the Construction Manager or certified as safe for use.
 - e) Equipment and/or materials which are not properly safe-guarded to prevent leakage or spills of hazardous materials.



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- a. Equipment and/or materials which may be subject to leakage or spillage are subject to environmental containment requirements. Drip pans are required for refuelling equipment or stationary equipment with diesel or gas engines.

A2. Primary and Secondary Muster Locations

The fire command posts, a steel panel located near the entrance to each station as marked in the pictures below, will serve as the muster point in the event of an evacuation at a station. Where the muster point is in conflict with the Works, Project Co will comply with the requirements set out in section 10 in establishing a new muster point.



A3. General Fall Protection Requirements

1. Fall protection systems must be used for all work above 1.8 meters/6 feet in height or less if there is an unusual risk of harm below,
2. Wherever possible, perimeter guardrail systems or other similar engineered controls will be used as the primary means of fall protection,
3. Wherever possible, workers will work from access landings or elevating devices to reach the work location. Personal fall protection systems should only be used if other means of reaching the work location are not available.
4. Fall restraint systems are to be used if perimeter guardrail systems are not in place and/or when working from elevating devices. Fall arrest will be used if guardrails or fall restraint is not achievable,
5. Unless otherwise approved, 100% tie off will be mandatory for all work activities above **1.8 meters/6 feet** in height where personal fall protection systems [harness, lanyard, anchor] are the primary means of fall protection,



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6. Unless otherwise specifically approved in writing, control zone fall protection systems are not permitted,
 - a) Contractor seeking to use control zone fall protection systems must provide a written safety plan outlining the means of establishing and enforcing a control zone fall protection system. Such plans are subject to review and approval by Canada Line before a control zone system can be used.
7. A written fall protection plan must be submitted to Canada Line for approval before any work at height involving fall restraint, fall arrest or work from man baskets.
8. No person may enter a fall hazard zone unless they're wearing the appropriate personal fall protection equipment and are properly trained in the use of the fall protection system,
9. Every individual is responsible to inspect their personal fall protection equipment before entering a fall hazard zone,
 - a) Any defective equipment must be immediately removed from service and repaired or destroyed,
10. A qualified person must confirm the adequacy of any temporary fall restraint or fall arrest anchors.
11. An Engineer must certify any horizontal or vertical anchor and/or lifeline systems,

A4. Mobile Equipment Requirements

1. All equipment that requires annual certification must have a current and valid certification before being brought onto the project,
2. No one may operate a piece of equipment for which they are not properly qualified or certified,
 - a) Contractors will be required to provide the Canada Line with evidence of employee training, qualification or certification,
3. The equipment operator must inspect the equipment at the start of shift or start of daily use,
 - a) Equipment inspections must be documented and made readily available for review by SNC-Lavalin or the Canada Line,
4. Equipment must be maintained in good working order and immediately removed from service if there are defects which impact the safe use of the equipment,
5. Equipment may only be used for its intended purpose.



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6. Equipment must have back up alarms or be guided by a spotter when backing up,
7. All equipment leaks or spills – regardless of size – must be reported to the Canada Line and contained from spreading and the contaminated soil responsibly disposed.
8. For Fueling, servicing, maintenance, and overnight storage of mobile equipment a designated area with drip pans and spill containment will be required.

A5. Lockout Tag Out Requirements

For work on the Canada Line systems, the specific requirement for lockout/tagout will be provided by the Canada Line. The following general conditions will apply:

4. Unless otherwise approved, no source of energy may be worked on until it's been properly locked out.
 - a) Electrical contractors approved to work on energized systems must have written safe work procedures and training records confirming the scope and limits of work on energized systems,
 - b) "Locked out" will include any blanking and purging needed to remove any residual materials or energy from the system,
5. A Request for Lock out must be submitted for all lock outs. A minimum of 48 hours advance notification must be provided for any lock outs affecting the Canada Line operational systems.
 - a) The Canada Line may stipulate certain timeframes for when lock outs can be performed on operational systems, and/or may impose restrictions on the length of time a lock out can be maintained.
6. All persons engaged in lock outs must put an individually keyed lock onto the lock out point or lock out device,
 - a) Combination locks are not acceptable,
 - b) Contractors will remain responsible to provide locks, keys, scissors and associated lock out equipment for their employees.
7. Contractors must have a process in place to remove the employee lock in the event the employee is absent from work and their lock must be removed.
 - a) These lock removal procedures must be documented by the employer and the employees must have received training,
8. Unless otherwise approved, GFCI systems must be used to prevent ground fault of tools and equipment used for construction.



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A6. SNC Lavalin Hazard Identification, Assessment and Control Procedures.

SNC-Lavalin's HSSE management approach is risk-based, systematic and responsive to change. This is accomplished by performing comprehensive risk assessments to ensure all hazards are identified, assessed and evaluated to effectively eliminate and/or control risk levels.

At a minimum:

- All work environments containing hazards shall be assessed.
- JHAs and Stepback forms shall be utilized and associated documentation shall be retained.
- Risk assessments shall be performed regularly and in a timely manner by qualified personnel and with sufficient management representation.
- Risk assessments shall be conducted whenever changes occur to the scope of Work, equipment or materials used, or in the organization of the work team (i.e. new shift). At a minimum, risk assessments shall be conducted at the following stages:
 - Early stages of new projects and studies
 - Detailed design of current projects
 - Critical decision points in current projects
 - Both routine and non-routine operations
 - Following modifications
 - Supplier site inspections
 - Travel
- Risk assessments shall be reviewed at specified intervals with management involvement.
- Following the risk assessment, corrective measures shall be taken to ensure that hazards are appropriately evaluated and controlled to levels as low as reasonably practicable (ALARP).
- A follow-up of the risk assessment action items shall be performed to ensure corrective measures are effective and sustainable.

SNC-Lavalin has developed a corporate Risk Matrix. The Risk Matrix is based on three components, which are used to assess site-related risks: severity of the consequences (C), probability of occurrence (P) and exposure to the hazard (E). Exposure is only modified for the Risk Register calculations. Training shall be provided on use of the matrix to assess risk as part of the site HSSE orientation.

A7. Aerial Work Platform Requirements

Aerial work platforms include manlifts and scissorlifts. The following requirements will apply;



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1. Operators must be trained and qualified in the use of the equipment. Where certification is required, Operators must be certified and records provided to the Canada Line HSSE representative.
2. Lifts must be inspected at the start of shift or before start of use. A record of the inspection must be kept in the machine.
3. If working above 1.8m or 6ft on an aerial work platform, a fall protection plan is required.
4. Climbing on handrails is not permitted while the equipment is elevated.
5. The use of ladders inside an aerial work platform is prohibited.
6. The Operator must check ground conditions and confirm the suitability of the ground before moving the equipment.

A8. Crane Requirements

1. Cranes must have a current and valid certification before being used on the Project. Copies of the certification must be provided to the Canada Line at the time the equipment arrives on the project.
2. Crane Operators must possess a valid BC Crane Operators Certificate. Copies of the certificates must be provided to the Canada Line prior to the Operator using the crane on the Project.
3. Prior to setting up the crane, the Operator must ensure the ground conditions are adequate to accept the load weight of the crane and expected loads.
4. Prior to erecting the boom, the Operator must ensure there are no overhead hazards or obstructions within the intended arc radius of the planned lift path,
5. Whenever possible, fully deployed outriggers will be used to provide maximum stability for the crane,
6. Unless otherwise specified, outrigger pads must be manufactured and not hand built,
 - a) A written plan must be provided to the Canada Line for hand built outrigger or leveling pads
7. Loads weight must be known and communicated to the Crane Operator before the lift occurs,
8. Cranes shall be equipped with load weight indicators and load limiting devices,
9. Only trained and qualified persons may provide signaling for the Crane Operator,



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10. All lifts exceeding 80% of the maximum lift capacity or in excess of 80 tons must have a written lift plan. The lift plan must be submitted to the Canada Line for review and approval before the lift(s) occurs,
11. All dual crane lifts must have a written lift plan. The lift plan must be submitted to the Canada Line for review and approval before the lift(s) occurs,
12. Contractors must have Crane safe work procedures and confirm their employees have been properly trained and instructed.
13. As directed by the Canada Line, a perimeter barrier or caution tape will be erected around the crane to prevent persons from walking within the swing radius of the machine.
14. Only qualified persons may rig and sling loads.

A9. Confined Space Requirements

The following general conditions apply;

1. No one may enter a confined space until the space has been properly assessed and the appropriate control measures are in place,
2. Person(s) conducting confined space assessment must be the OH&S Regulations Part 9 requirements with respect to qualification of the assessor,
3. Entry and rescue procedures must be communicated to all persons prior to entry into the confined space,
4. Gas detection equipment must be properly calibrated and tested before use in a confined space,
5. If respiratory protection is prescribed, entrants must be clean shaven,
6. All confined spaces must be placarded with warning signs indicated the space is confined and that entry is not permitted without authorization.

A10. Designated Work Area Containment Requirements

Projects Requiring Full Containment

Projects requiring full containment are as follows:

- Any demolition of existing walls, ceilings, flooring, building support systems, or operational equipment;



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- When the following processes are employed: finishing gypsum wallboard, concrete cutting or placement, applying fire sprays, installing insulation, or when structural welding or soil penetration is required;
- Where materials used contain toxins or carcinogens at levels where uncontrolled exposure could result in harmful effects;
- Where there is the potential for disturbing existing fire retardant sprayed-on materials;
- Where, at the discretion of Canada Line, full containment is deemed necessary to prevent the unwarranted escape of potentially hazardous substances, emissions, or processes.

Full Containment Requirements

Requirements for full containment include:

- Construction will be permitted only after establishment of physical containment of the construction site, blanking, rerouting, or locking out of building HVAC systems from the construction area, and installation of negative airflow systems to exhaust contaminated air from the construction area. Contractors should contact Canada Line to obtain details and specifications for HVAC requirements.
- Wooden hoarding, drywall or other protective barrier suitable for the conditions should be sealed. Openings between hoarding and the underside of ceilings will be sealed with white plastic and taped to ceilings and hoarding.
- All exit points from the construction site to public or occupied interior areas will have barrier vestibules installed to block migration of pollutants. All exterior doors from barrier vestibules will be equipped with self-closing devices and appropriate signage indicating "Construction Area, Authorized Access Only." All entry/exit points are required to open into the construction site.
- Minimum levels of general access and egress in public area must be maintained:
 - Minimum headroom 2285mm, on stairs 2030mm
 - Minimum width 915mm
 - Continuously maintained free of all obstructions or impediments
- Minimal access and egress from the Stations shall be maintained at a minimum aggregate exit width of 1200mm, as per NFPA130.
- When the work requires openings through the suspended ceilings, containment barriers will be established as required to prevent migration of pollutants within the ceiling spaces or plenums.
- All mechanical, HVAC, electrical and electronic access routes (chases), building systems, and subsystems (elevator shafts, etc.) will be sealed to prevent migration of pollutants.



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- Negative airflow systems will incorporate a HEPA filtering system on all air being discharged from the construction site. Negative airflow systems will provide at least four complete air changes per hour differential between the supply air and exhaust air. At the discretion of the Canada Line, HEPA filters on the negative airflow systems may be waived when air is discharged directly to outdoors and other effective means of controlling particulate emissions are in place.
- At the discretion of the Canada Line, charcoal filtering of negative airflow emissions may be stipulated in circumstances where odours from construction products or processes could migrate into occupied areas.
- Daily inspections of the containment barriers are to be performed by the contractor or designated representative to ensure barriers remain intact. Any deficiencies in the barriers will be immediately rectified.
- Air quality testing may be requested by Canada Line after initial establishment of the containment area, and as required throughout the construction process to demonstrate the ongoing effectiveness of containment procedures.
- Prior to the removal of any containment barriers, air clearance testing may be stipulated to demonstrate that the occupational environmental levels are within the established levels for occupied or public environments.

Projects Requiring Local Containment

Projects requiring local containment are as follows:

- Short-duration projects, where the work does not require demolition or other dust- and fibre-generating processes;
- When the work is in public areas or corridors that must remain operational;
- Where establishment of containment barriers is physically impossible due to location;
- Where the work is cosmetic, with little or no potential for using products containing human toxins or carcinogens at levels where ambient exposure could result in harmful health effects;
- Where the work is limited to modifications of mechanical, electrical, electronic, or building systems where the potential for exposure from harmful materials is minimal;
- When a project is undertaken in a location where exterior roll-up doors are part of the project site and are required to be maintained to provide access to other tenants;
- Where local mechanical ventilation is deemed adequate to capture or dissipate fugitive emissions;
- Where hot work is being performed in areas that are not fully contained;



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- Where, at the discretion of Canada Line, full containment procedures are deemed unnecessary.

Local Containment Requirements

Requirements for local containment include:

- Work involving removal of ceiling tiles from public or occupied areas will be subject to approval by Canada Line. All ceiling tiles will be replaced, and the surrounding area satisfactorily cleaned, prior to leaving the work area. Any ceiling tiles that are cut or damaged will be over-sealed with plastic and taped to the surrounding T-bar grid. Local mechanical ventilation will be used to remove or dissipate any fugitive fumes from the construction processes.
- Local HEPA filtering and exhaust devices will be used to remove any potentially harmful substances or emissions from the work area and adjacent occupied or public spaces.
- SDS will be available for reference by the Canada Line, provincial or federal regulatory agencies, or other concerned parties. Canada Line reserves the right to request the use of acceptable alternate products that contain less harmful materials, human toxins, or carcinogens.
- When WHMIS-controlled substances are being used, air quality testing may be required to ensure that the work is not generating any harmful emissions or by products above established levels.
- The work area will be thoroughly cleaned to the satisfaction of Canada Line, during and after each work period or day, before being deemed safe for occupancy.
- Canada Line reserves the right to restrict work in public areas to certain time periods when the areas can be closed or vacated during the work.



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APPENDIX B – Forms and Templates

B1. Construction Risk Register Template

Category	Description of the Hazard/Risk	Risk Rating	Legislation	SNC-Lavalin Policies/ Procedures	Controls



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B2. Job Hazard Assessment Form

Job Hazard Analysis						
JOB DESCRIPTION					DATE PREPARED	
LOCATION					PROJECT	
CONTRACTOR					ESTIMATED CREW SIZE	
WRITTEN BY					SIGNATURE	
REVIEWED BY					SIGNATURE	
APPROVED BY					SIGNATURE	
CRITICAL RISK CONTROL PROTOCOLS (Mark each box as applicable)						
<input type="checkbox"/> #1 - Vehicles <input type="checkbox"/> #2 - Hazardous Materials <input type="checkbox"/> #3 - Equipment Safeguarding <input type="checkbox"/> #4 - De-Energization <input type="checkbox"/> #5 - Working at Heights <input type="checkbox"/> #6 - Lifting Operations <input type="checkbox"/> #7 - Confined Space <input type="checkbox"/> #8 - Excavations <input type="checkbox"/> Not Applicable						
REQUIRED SAFE WORK PERMIT (Mark each box as applicable)						
<input type="checkbox"/> Confined Space Entry <input type="checkbox"/> Hot Work <input type="checkbox"/> Excavation <input type="checkbox"/> Electrical Work <input type="checkbox"/> Not Applicable						
COMMON HAZARD CATEGORIES (Mark each box as applicable)						
Work Area	Equipment & Tools (Powered)	Equipment & Tools (Non)	Weather Conditions	Hazardous Materials	Energy	Environment
<input type="checkbox"/> Communications	<input type="checkbox"/> Aerial mobile platform	<input type="checkbox"/> Elevated Platforms	<input type="checkbox"/> Heat / Cold	<input type="checkbox"/> Compressed gas	<input type="checkbox"/> Electrical	<input type="checkbox"/> Contaminant release to water
<input type="checkbox"/> Working alone	<input type="checkbox"/> Boom lifts / Scissor lifts	<input type="checkbox"/> Man-basket	<input type="checkbox"/> Windy	<input type="checkbox"/> Flammable / Combustible	<input type="checkbox"/> Mechanical	<input type="checkbox"/> Contaminant release to soil
<input type="checkbox"/> Remote location	<input type="checkbox"/> Forklifts	<input type="checkbox"/> Scaffolding	<input type="checkbox"/> Tidal	<input type="checkbox"/> Oxidizing	<input type="checkbox"/> Pneumatic	<input type="checkbox"/> Atmospheric emission
<input type="checkbox"/> Simultaneous operations	<input type="checkbox"/> Hoists / Bobcats	<input type="checkbox"/> Ladders	<input type="checkbox"/> Sea storm	<input type="checkbox"/> Toxic	<input checked="" type="checkbox"/> Hydraulic	<input type="checkbox"/> Erosion / sedimentation
<input type="checkbox"/> Superposed works	<input type="checkbox"/> Excavators	<input type="checkbox"/> Hand tools	<input type="checkbox"/> Snowing / freezing	<input type="checkbox"/> Corrosive	<input type="checkbox"/> Thermal	<input type="checkbox"/> Noise/vibration/light
<input type="checkbox"/> Landslide	<input type="checkbox"/> Cranes		<input type="checkbox"/> Foggy	<input type="checkbox"/> Biological / Biomedical	<input type="checkbox"/> Radiation	<input type="checkbox"/> Wastewater generation / disposal
<input type="checkbox"/> Traffic	<input type="checkbox"/> Trucks / Trailers			<input type="checkbox"/> Explosives	<input type="checkbox"/> Chemical	<input checked="" type="checkbox"/> Waste generation / disposal
	<input type="checkbox"/> Light trucks / Vehicles				<input type="checkbox"/> Potential	<input type="checkbox"/> Disturbance / removal of plants or animals
	<input type="checkbox"/> Powered Hand Tools				<input type="checkbox"/> Residual	<input type="checkbox"/> Work in or near sensitive areas
PERSONAL PROTECTIVE EQUIPMENT, SPECIAL TOOLS AND OTHER EQUIPMENT REQUIRED						
ADDITIONAL TRAINING REQUIRED						
JOB STEPS / ACTIVITIES	HAZARDS	Initial Risk			CONTROL MEASURES	PERSON
		P	C	RL		
I confirm that I have presented this Job Hazard Analysis to the workers under my supervision who will execute the work described in this JHA and that all control measures have correctly been implemented:						
Supervisor : _____ Date: _____ <small style="margin-left: 100px;">Name & Signature</small>						
I confirm that I have read and understood the Job Hazard Analysis which is provided for this work:						
NAME (Print)	SIGNATURE			COMPANY		



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B4. SNC Lavalin Risk Matrix

Risk level		Consequence				
		Negligible	Minor	Moderate	Major	Catastrophic
Low	Medium					
High	Extreme					
Probability	Almost impossible					
	Conceivable					
	Possible					
	Has Happened					
	Almost Certain					

StepBack Form

Supervisors Name: _____ Signature: _____

Employer: _____ Project / Site: _____

Date and Time: _____ Location: _____

Job Description: _____ Safe Work Permit (SWP) Required? Yes No

1 Look and see the Hazards

Below is a list of common hazards to help trigger you to potential ones you may encounter while doing your job.

Vehicles

- Information with pedestrians or other equipment
- Poor visibility and/or poor conditions
- Poor vehicle condition (seatbelts, tires, leaks, etc.)
- Drive if distractions exist (cell phone, food, fatigue, etc.)

Hazardous Materials

- Extensive accumulation of dust/mist/fumes
- Inadequate information (labels/SDS)
- Improper storage/containment/handling of materials
- Sources of ignition nearby

De-Energization

- Overhead/underground power lines/utilities involved
- Strong magnetic fields/induction
- Systems under pressure or not isolated
- Not at Zero Energy State

Working at Heights

- No proper anchor point
- Improper use of elevated work platforms or ladders
- Lack of guards/banquette toe boards
- Falling objects possible

Confined Space

- Confined space not identified and/or no watch person
- Inadequate gas testing
- Inadequate rescue equipment/plan
- Lock of proper access/egress

Excavations

- Buried utilities
- Inefficient protection (sloping/shoring)
- Spill plate/equipment placed too close to the edge
- Unstable soil conditions could exist

Equipment Safeguarding

- Exposed rotating parts
- Interlock guards
- Interlock bypassed/poor condition
- Pinch points or crushing

Lifting Operations

- Lack of exclusion zones
- Lift plans not available
- Overloading/heaving required
- Excessive wind

Environment

- Spill possibility
- Incomplete waste disposal
- Washwater not controlled
- Work near sewer/water, wastewater, wildlife habitat
- Housekeeping in work area

Occupational Health and Hygiene

- Awkward work position
- Lifting, heaving, and/or repetitive movements
- Potential for slips, trips and falls
- Excessive noise/dust
- Knife safety retained

2 Assess the Risk

	Yes	No
1. Have we looked and identified all hazards?	<input type="checkbox"/>	<input type="checkbox"/>
2. Are we trained and competent to conduct this task?	<input type="checkbox"/>	<input type="checkbox"/>
3. Can we do the job as planned in the JHA and/or safe work permit?	<input type="checkbox"/>	<input type="checkbox"/>
4. Are the resources (equipment, tools, PPE, and personnel) available?	<input type="checkbox"/>	<input type="checkbox"/>
5. Have we identified all the hazards since we last did the task?	<input type="checkbox"/>	<input type="checkbox"/>
6. Are other persons and the environment protected from our activities in the area?	<input type="checkbox"/>	<input type="checkbox"/>
7. Do we know what to do in case of an emergency?	<input type="checkbox"/>	<input type="checkbox"/>
8. Do we have safe access and egress to and from the work area?	<input type="checkbox"/>	<input type="checkbox"/>
9. Can we do this job without putting ourselves, others or the environment at risk?	<input type="checkbox"/>	<input type="checkbox"/>
10. Is our work area clean and tidy?	<input type="checkbox"/>	<input type="checkbox"/>

If you answered NO to any of these questions, consult your immediate supervisor for assistance.

68314.2 EN-Rev7



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StepBack 2x2

3 Take appropriate Action

Hazards: How can we get hurt?

Controls: What can we do about it?

What is the overall risk level for this job (post controls)?

- Extreme
- High
- Medium
- Low

Signing below indicates that all personnel understand the potential hazards that exist and agree that proper controls have been put in place.

Name:	Signature:	Name:	Signature:
Name:	Signature:	Name:	Signature:
Name:	Signature:	Name:	Signature:
Name:	Signature:	Name:	Signature:
Name:	Signature:	Name:	Signature:
Name:	Signature:	Name:	Signature:


Frequency	Risk level			Consequence		
	Low	Medium	High	Minor	Major	Critical
Extremely Frequent	High	Extreme	Extreme	High	Extreme	Extreme
Frequent	Medium	High	High	Medium	High	High
Occasional	Low	Medium	Medium	Low	Medium	Medium
Infrequent	Low	Low	Low	Low	Low	Low
Rarely Occurs	Low	Low	Low	Low	Low	Low



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BIP Card Templates (There are 34 pre-made BIP cards used by the Canada Line)

 Behaviour Interaction Program (BIP) Hand Safety Project Number: _____					
OBSERVATION		SAFE (S)	UNSAFE (U)	N/A (N)	Feedback Given (Y/N)
14.1	Is the worker wearing appropriate gloves for the work performed?				
14.2	Did the worker de-energize tools (i.e. unplugged electrical tools, disconnected air hose on pneumatic tools) before conducting maintenance (i.e. changing disks etc.)?				
14.3	Did the worker use screwdrivers as scrapers or on objects held in workers hand?				
14.4	Did the worker use the right tool for the task?				
14.5	Did the worker cut in proper direction away from body?				
14.6	Did the worker use a self retractable knife when cutting?				
14.7	Did the worker leave knife open when not in use?				
14.8	Did the worker use knife on a piece of material held by a co-worker?				
14.9	Did the worker keep his hands clear of pinch points while performing tasks?				
14.10	Was the worker distracted causing them to place their off-hand/free hand in harms way?				
14.11	Did the worker keep his hands out of the "Impact area" while swinging hammers?				
14.12	Did the worker have good footing when swinging hammers?				
14.13	Did the worker wear jewellery or rings while performing work that could have caused injury?				
14.14	Did the worker secure work piece before grinding on piece (did not hold work piece with one hand and grinding with other)?				
14.15	Did the worker use taglines on loads and keep his hands off of loads being lifted?				
14.16	Is the worker putting their hands in the Line of Fire while performing his task?				
Totals		0	0	0	0

N = Mark where question Not Applicable.
 S = Insert S if Safe
 U = Insert U if Unsafe

Requirements for Monitoring Construction Impact

Ryan Versteeg-Biln

Manager, Engineering

Infrastructure – Rail & Transit

SNC-Lavalin

Note: This document contains the expression of the professional opinion of ProTrans BC Operations Ltd. (“ProTrans”) as to the matters set out herein, using its professional judgment and reasonable care. It is to be read in the context of the Agreement - PCI72 Phase 1 MLBE Integration dated June 14, 2018 (the “Agreement”) between ProTrans and InTransitBC Limited Partnership (the “Concessionaire”). This document is written solely for the purpose stated in the Agreement, and for the sole and exclusive benefit of Concessionaire, (whose remedies are limited to those set out in the Agreement) and the South Coast British Columbia Transportation Authority (“TransLink”). This document is meant to be read as a whole, and sections or parts thereof should thus not be read or relied upon out of context. Unless expressly stated otherwise, assumptions, data and information supplied by the Concessionaire or TransLink upon which ProTrans’ opinion as set out herein is based has not been verified by ProTrans. ProTrans makes no representation as to the accuracy of the assumptions, data, and information supplied by the Concessionaire or TransLink and disclaims liability with respect thereto.

PURPOSE

This document is intended to propose as a minimum the methods by which the impact of the Broadway Subway Project (BSP) station expansion on the existing Canada Line Broadway-City Hall Station structure and rail must be monitored by Project Co, including threshold criteria.

PRE-CONSTRUCTION

Visual Assessment & Photo Documentation

Project Co will undertake a preconstruction visual inspection of the existing Canada Line Broadway-City Hall Station. Project Co will arrange to have the inspection coordinated with and attended by the Province and Canada Line representatives. Project Co will prepare a baseline condition report complete with detailed photo documentation of all areas potentially impacted by the BSP construction including but not limited to the following:

- a) All existing Canada Line Broadway-City Hall Station structures and systems, which are to remain over, underneath, or adjacent to, the construction sites of the proposed BSP, including the structures immediately adjacent to the BSP structures that will require temporary support during construction, and the structures that may be affected by groundwater lowering.
- b) All existing Canada Line Broadway-City Hall Station inbound and outbound platform areas, including trackwork guideway.

- c) All existing Canada Line Tunnel and ventilation structures over and extending at a minimum of 5 m on each side of the proposed BSP construction areas.
- d) Architectural finishes (i.e. tiles, etc.) adjacent to the proposed BSP breakout areas.
- e) Mechanical and electrical room.
- f) Fire command post and ventilation grilles.
- g) Water ingress including staining and any waterproofing system (which is exposed during excavation).

Project Co is responsible for preparing a detailed list of the structures potentially impacted by the BSP construction, which must be provided to the Province and Canada Line representatives. All observed cracks in finishes will be measured and documented by photograph. All measurable cracks in base concrete structures, including within the tunnel/guideway structures north of the platform will be measured and documented by photograph with crack gauges installed. All visible defects are to be documented. All observed water ingress including any staining of concrete should be photographed and documented.

Track Alignment and Geometry

Canada Line undertakes track geometry and alignment measurements on an annual basis. This information will be made available by Canada Line representative to the Province and Project Co for reference.

Project Co will perform a detailed vertical and horizontal baseline survey of the top of rail for each track at 2 m intervals. Project Co will be responsible for determining the full extent of the survey; this should as a minimum include the section between the south end of the station platform edge to 15 m north of Gridline A (north wall) of the new BSP station (approximately 50m north of the outbound platform extension edge).

Impact Assessment and Mitigation

Project Co will prepare an impact assessment on all construction activities with potential impacts to the Canada Line with the following information:

- a) Description of the Works.
- b) Anticipated or potential impacts to Canada Line assets or operations.
- c) Maximum movement thresholds suitable for all areas potentially impacted by the BSP construction. These monitoring areas will include the trackwork, key structures that are to be physically modified by the Works, as well as structures underneath or immediately adjacent to the BSP structures. The maximum movement thresholds will not adversely impact serviceability or structural integrity of the Canada Line or its operation. Note that safe rail operation thresholds (measured at the rail) are listed below under Impact Action Thresholds.
- d) Monitoring Plan.
- e) Mitigation Plan.

The impact assessment will be prepared by a Professional Engineer and based on the risk profile associated with the project activities. Project Co will comply with Protrans' operational procedures as set out in the Canada Line Health, Safety, Security and Environmental (HSSE) Plan.

Baseline Survey, Monitoring Points, and Mitigation Plan

Based on the overall construction program and impact assessment, Project Co will establish a baseline survey and monitoring plan that is tailored and coordinated with the proposed construction activities and will include drawings outlining all required survey and vibration monitoring points, as well as measurement method and frequency. The baseline survey must be tied back to an established control survey outside of the Project's zone of influence for the Canada Line Broadway-City Hall Station and Canada Line Tunnel. Although Project Co will be responsible for establishing the Project's zone of influence for the Canada Line, the Province and Canada Line representatives will require the opportunity to review and comment on Project Co's proposed zone of influence and monitoring plan.

At minimum, the following points must be baselined and monitored:

- a) Rail: baseline survey to be conducted before start of work and after completion of each major excavation and construction activity adjacent and beneath the tracks including tunnelling operations.. Rate of change and crossfall at 2 m intervals over and extending a minimum of 3 m on each side of the proposed construction/tunnelled areas. Monitoring survey to be conducted at a frequency appropriate for risk associated with the activity.
- b) Platform edge: baseline survey to be conducted before start of work and after completion of excavation and construction activities adjacent and beneath the platform. Monitoring survey to be conducted at a frequency appropriate for risk associated with the activity.
- c) Guideway slab over and extending a minimum of 3 m on each side of the proposed tunnelled areas: baseline survey to be conducted before start of work and after completion of tunnel operations. Monitoring survey to be conducted at a frequency appropriate for risk associated with the activity.
- d) Canada Line Broadway-City Hall Station East and West walls: baseline to be completed before and after construction. Monitoring to be conducted during excavation at 3 m intervals at 3 meters high. Tilt meters to be installed at points on the wall.
- e) Groundwater levels: monitoring to be conducted at a frequency appropriate for risk associated with the activity.

Project Co will be required to submit the baseline survey and monitoring plan to the Province for review and comments through the formal design submission process. Project Co will however consult with ITBC and Protrans on the plan development. The Province will provide ITBC and Protrans with the formal submission for review and comments with ITBC and Protrans providing their review comments formally back to the Province within 10 business days after receiving the submission from the Province. Upon acceptance of the monitoring plan by the Province, and prior to construction, Project Co will undertake a baseline survey and report on all measurements to the Province, which will also be made available to the Canada Line representative.

Vibration Monitors

Vibration monitors will be installed at key locations as identified by Project Co in the Project Co's station and structure monitoring plan. These sensors will be monitored continuously for vibration velocity to allow Project Co to implement appropriate mitigation should values get close to thresholds.

DURING CONSTRUCTION

Station and Structure Monitoring

Project Co will monitor the station and structure movement and vibrations as per the agreed plan and will put in place processes and safeguards to not exceed tolerances of the system. In addition, the monitoring processes will have safeguards established to alert Project Co when impact reaches 50% of the tolerance limit as well as stepped up monitoring and mitigation plan to not exceed tolerance limits. Project Co will be required to notify both the Province and Canada Line representatives if the 50% of the tolerance limit is reached, to keep both parties up to date on mitigation measures implemented to reduce movement and vibration, and to provide daily updates on the stepped up monitoring. Project Co may reduce the stepped up monitoring if the stepped up monitoring and mitigation show the values to be within acceptable limits over reasonable period that satisfies both the Province and Canada Line that the issue has been satisfactory resolved.

Detailed monitoring plans for each activity with potential impacts to Canada Line are to be develop by Project Co and accepted by Canada Line.

Impact Action Thresholds

Construction of the BSP will likely induce movements and vibration on the Canada Line. Project Co must carry out construction without exceeding the following tolerances:

1. Track Geometry and Alignment

The Canada Line operator will continue to measure track geometry and alignment on an annual basis. The following table outline actionable limits:

Items	Maintenance Limits for Main Line (Action Value)
Horizontal Track Alignment: Rate of Change	± 10 mm 1.5 mm per 2 m
Gauge Deviation:	1435 + 6 mm - 3 mm
Max. Gauge Variation Fastener to Fastener:	± 1 mm
Vertical Track Alignment: Rate of Change	± 10 mm 2 mm per 2 m
Cross Level: Rate of Change	± 5 mm 3 mm per 2 m

2. Survey Point Deflection

Movement thresholds will be developed by Project Co in consultation with Canada Line and the Province. The station and structure monitoring plan will be set to ensure track geometry thresholds outlined above are not exceeded, and that the structure is not subjected to significant stresses. Unless otherwise approved by the Province and ITBC, induced movements should not exceed the following thresholds:

Items	Threshold
Platform Edge – Horizontal (measured from rail head)	+10 mm / -5 mm
Platform Edge – Vertical (measured from rail head)	+/- 10 mm
Guideway Slab Geometry	Per track geometry
All Concrete Structures (permissible angular distortion)	1/500
Groundwater Levels	No higher than baseline

If in any case movement exceeds thresholds, Project Co, in collaboration with the Province and Canada Line, will review the conditions and an independent assessment may be required to be conducted to assess the damage, and develop a remediation plan.

3. Concrete Cracking and Damage

See the Canada Line Concrete Repair and Maintenance Manual (16876-1300-41PG-SW-0001) for a list of potential defects, and classifications all introduced defects classified as moderate or severe will be remediated.

4. Station Surfaces and Damage

Any visible cracked tiles glass or other cosmetic damages induced by construction activities will be remediated.

5. Vibration Limits

The maximum permitted level of vibration induced by construction activities is 15mm/s. If this threshold is exceeded, a visual inspection will be conducted to determine the extent of the induced damage, if any.

POST CONSTRUCTION

Final Inspection and Survey

Project Co will undertake a post-construction visual inspection before BSP substantial completion, coordinated with and attended by the Province and Canada Line representatives. This inspection will review and evaluate all scope included in the pre-construction structural inspection, trackwork survey, and station and structure monitoring plan outlined above.

Deliverables

Project Co will issue an impact report no more than 4 weeks after the completion of the post-construction inspection. This report will compare all measurements and assessments from the pre and post-construction inspections and surveys.

Remediation

Project Co will be responsible for remediation or repairs of all introduced defects reasonably attributed to construction activities and/or will be responsible for providing similar warranty to BSP for these defect repairs. All remediation work will be inspected by the Province and Canada Line to confirm acceptance. In particular:

1. Visual Structural Inspection

Project Co will be responsible for the remediation of all introduced concrete defects classified as moderate or severe per the Canada Line Concrete Repair and Maintenance Manual (16876-1300-41PG-SW-0001), any cosmetic defects to station surfaces such as tiles, and glass, and any other introduced issues that could reasonably affect safe and reliable operation of the Canada Line (e.g.: door alignment, drainage issues, etc.)

2. Trackwork Survey

Any changes in geometry and alignment not attributable to rail wear or broken trackwork components or fixtures will be assumed to be introduced by construction. The Canada Line operator will remediate any conditions in excess of listed thresholds, at Project Co's expense. Additionally, any change that introduces an operational or maintenance concern will be remediated and/or funds will be allocated for future maintenance intervention.

3. Station and Structure Monitoring Plan

In any case where established thresholds have been exceeded, an independent assessment will be conducted to assess the damage and develop a remediation plan. Project Co will be responsible for the execution of this plan.

**Broadway City Hall
Scope Split Matrix between BSP and ITBC
Structural and Systems Related Works
Revision K**

This Scope Split Matrix is specific to the modifications required to the existing Canada Line Broadway – City Hall (BCH-CL) Station including all interfaces to the new Millennium Line Broadway – City Hall (BCH-ML) Station, both of which ultimately forms the integrated Broadway – City Hall (BCH) Station.

BSP means scope of work assigned to Project Co. This Scope Split Matrix is to read in conjunction with “Scope of Work Drawings” for the Canada Line Broadway – City Hall Station modifications.

Systems Engineering Responsibility identifies the party responsible for establishing the overall system definition and developing system design requirements and interface coordination of the Work to ensure that each subsystem fully satisfies its intended role within the integrated Broadway-City Hall Station, meets the specified Technical Requirements, and interacts properly with other systems.

Design, Supply, Install, and Commission Responsibility relates to implementation of each work element, including certification, where:

- Design - Identifies the party responsible for the design of the scope split line activity.**
- Supply - Identifies the party responsible for supply of the component or system, which includes manufacture, delivery, assembly, purchase or construction thereof, as applicable.**
- Installation - Identifies the party responsible for on-site construction/installation of the scope split line activities, which includes:**

SCHEDULE 4: APPENDIX P: BROADWAY CITY HALL SCOPE SPLIT MATRIX BETWEEN BSP AND ITBC STRUCTURAL AND SYSTEMS RELATED WORKS

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- i) providing qualified construction/installation crews;**
- ii) management and coordination of the construction/installation activity**
- iii) directing and controlling activities of crews on a daily basis;**
- iv) providing all standard construction/installation equipment and special tools required to install components; and systems; and**
- v) quality control/assurance of the construction/installation activity.**

· **Commissioning - Identifies the party responsible for testing, commissioning and certification of the scope split activities.**

Maintenance Responsibility relates to ongoing maintenance once the work element is commissioned. This Scope Split Matrix as pertaining to maintenance responsibilities is to be read in conjunction with the Broadway City Hall Station Operational Boundaries Drawings.

Item/ Element	Work Element	System Engineering Responsibility Lead /(Support)	Design Supply Install Commission Responsibility	Maintenance Responsibility
Part A	BSP Structural & Architectural Modifications			
1.0	BSP Entry Level Elevator New Opening			
1.1	Concrete wall breakouts, transitions, and expansion joints including furred-out rainscreen wall	Project Co	Project Co	BCRTC
1.2	Wall mounted equipment removal and relocation (Refer to Systems elements Scope Split)	Project Co	Project Co	

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SCHEDULE 4: APPENDIX P: BROADWAY CITY HALL SCOPE SPLIT MATRIX BETWEEN BSP AND ITBC STRUCTURAL AND SYSTEMS RELATED WORKS

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Item/ Element	Work Element	System Engineering Responsibility Lead /(Support)	Design Supply Install Commission Responsibility	Maintenance Responsibility
1.3	Handrail removal, modification and additions	Project Co	Project Co	ITBC – cleaning up to coiling grill only
1.4	Furred-out wall including re-tilling	Project Co	Project Co	ITBC – cleaning up to coiling grill only
2.0	BSP Mezzanine Level New Opening			
2.1	Concrete wall breakouts, transitions, and expansion joints.	Project Co	Project Co	BCRTC
2.2	Knock-out Panel Removal	Project Co	Project Co	
2.3	Wall equipment removal and relocation (Refer to Systems elements Scope Split in Part B)	Project Co	Project Co	
2.4	Furred-out wall, including removal, modification and additions	Project Co	Project Co	ITBC – cleaning up to coiling grill only
3.0	BSP New Openings on CL Outbound Platform Level			
3.1	Station box breakout openings including furred-out wall removal	Project Co	Project Co	
3.2	Station box membrane and drainage (new)	Project Co	Project Co	BCRTC
3.3	Station box breakout collar frame (new)	Project Co	Project Co	BCRTC
3.4	New furred-out wall including tilling	Project Co	Project Co	BCRTC
3.5	Wall equipment removal and relocation (Refer to Systems elements Scope Split in Part B)	Project Co	Project Co	

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Item/ Element	Work Element	System Engineering Responsibility Lead /(Support)	Design Supply Install Commission Responsibility	Maintenance Responsibility
3.6	New beam(s) and new columns (in Canada Line Maintenance Area)	Project Co	Project Co	ITBC – Cleaning and finishes only, structural defects not included.
3.7	Seismic Joints (For all connections)	Project Co	Project Co	BCRTC (including any new seismic joints located within Canada Line Maintenance Area.
3.8	Waterproofing at BCH-CL Interface with BCH-ML	Project Co	Project Co	BCRTC
3.9	New BSP Wayfinding Tactile (from new BCH-ML elevator to existing BCH-CL Designated Waiting Area)	Project Co	Project Co	BCRTC
3.10	New glazing between expanded CL platform and Escalators	Project Co	Project Co	BCRTC (except cleaning on CL side to be performed by ITBC)
4.0	BSP New Opening on CL Inbound Platform Level			
4.1	Station box breakout openings including furred-out wall	Project Co	Project Co	
4.2	Station box membrane and modification to existing CL perimeter drainage (new)	Project Co	Project Co	BCRTC
4.3	Station box breakout collar frame (new)	Project Co	Project Co	BCRTC
4.4	New furred-out wall including tiling	Project Co	Project Co	BCRTC
4.5	Wall equipment removal (Refer to Systems elements Scope Split in Part B)	Project Co	Project Co	
4.6	Seismic Joints (For all connections)	Project Co	Project Co	BCRTC

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Item/ Element	Work Element	System Engineering Responsibility Lead /(Support)	Design Supply Install Commission Responsibility	Maintenance Responsibility
4.7	Waterproofing at BCH-CL and BCH-ML interface	Project Co	Project Co	BCRTC
4.8	New BSP Wayfinding Tactile (from new BCH-ML elevator to existing BCH-CL Designated Waiting Area)	Project Co	Project Co	BCRTC
5.0	CL Inbound and Outbound Platform Extensions			
5.1	Tilled drywall – metal stub (internal) removal	Project Co	Project Co	
5.2	Wall equipment removal (Refer to Systems elements Scope Split in Part B)	Project Co	Project Co	
5.3	New furred-out wall (station box) with tiling	Project Co	Project Co	ITBC
5.4	Step ladder relocation	ITBC	ITBC	ITBC
5.5	Platform Edge Tiles (including any modification to existing as may be required)	Project Co	Project Co	ITBC
5.6	Platform Drainage modifications/additions	Project Co	Project Co	ITBC
5.7	Smoke baffle glazing extension and sprinkler extension (if required) (new)	Project Co	Project Co	ITBC
5.8	Platform Floor Tile (to match existing CL tile) plus new BSP Wayfinding Tactile (from new BCH-ML elevator to existing BCH-CL Designated Waiting Area)	Project Co	Project Co	ITBC
Part B	CL Systems, Electrical and Mechanical Modifications			

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Item/ Element	Work Element	System Engineering Responsibility Lead /(Support)	Design Supply Install Commission Responsibility	Maintenance Responsibility
6.0	CL Platform Level and BSP Entrance Level related			
6.1	Relocation of Train Stopping position (ATC)	ITBC	ITBC	ITBC
6.2	Conduit Rough-ins for all existing CL systems modifications ¹	ITBC	Project Co	ITBC
6.3	Relocations of GIDS	ITBC	ITBC	ITBC
6.4	Relocation of WIDS	ITBC	ITBC	ITBC
6.5	New End Gates, Supply & Install (Monitoring contacts by ITBC)	Project Co	Project Co (ITBC to work with Project Co if monitoring system to be partial integrated inside end gate with ITBC responsible for supply, installation & commission of monitoring system)	ITBC
6.6	Removal of Existing End Gate and replacing floor finishes	Project Co	Project Co	
6.7	Relocation of end gate contacts and pressure plates (as may be required)	ITBC	ITBC	ITBC
6.8	Relocation of Blue Lights	ITBC	ITBC	ITBC
6.9	Relocation of CCTV, if required	ITBC	ITBC	ITBC
6.10	Relocation of Emergency Help Points (needs to be coordinated with BSP architectural design)	ITBC	ITBC	ITBC

¹ The party shown in the “Design, Supply, Install Commission Responsibility” column will be responsible for cabling.

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Item/ Element	Work Element	System Engineering Responsibility Lead /(Support)	Design Supply Install Commission Responsibility	Maintenance Responsibility
6.11	Relocation and additional Station and Platform Edge Lighting	ITBC	Project Co	ITBC
6.12	Fire Alarm relocations and additions	ITBC	ITBC	ITBC
6.13	Electrical Outlet relocation and additions	ITBC	Project Co	ITBC
6.14	Mechanical relocations and additions	ITBC	Project Co	ITBC
6.15	Relocation of YVR ticket machines	Project Co	Project Co	YVR
6.16	Advertising Signage in Canada Line Structure	ITBC	ITBC	ITBC
6.17	Chaseway modification/additions	ITBC	Project Co	ITBC
6.18	Operational signage relocations/additions	ITBC	ITBC	ITBC
6.19	Wayfinding signage removal, replacement and additions	Project Co	Project Co	ITBC (Cleaning)
	Station Wide Coordination Activities			
7.0	Fire Alarm Coordination			
7.1	CL Fire Alarm modifications and additions	ITBC (Project Co.)	ITBC	ITBC
7.2	BSP Fire Alarm	Project Co	Project Co	BCRTC
8.0	Public Address Coordination			
8.1	CL Public Address modifications and additions	Project Co (ITBC)	ITBC	ITBC

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Item/ Element	Work Element	System Engineering Responsibility Lead /(Support)	Design Supply Install Commission Responsibility	Maintenance Responsibility
8.2	BSP Public Address (not within CL station)	Project Co	Project Co	BCRTC
9.0	Emergency Telephones Coordination			
9.1	CL Station and Tunnel Phones	ITBC	ITBC	ITBC
9.2	BSP Station and Tunnel Phones	Project Co	Project Co	BCRTC
10.0	Fire Command Post ²			
10.1	CL Fire Alarm Annunciator	Project Co (ITBC)	ITBC	ITBC
10.2	CL Emergency Telephone	Project Co (ITBC)	ITBC	ITBC
10.3	Station Fire Fighter Microphone	Project Co (ITBC)	ITBC	ITBC
10.4	CL Fire Alarm Revised Graphic	Project Co (ITBC)	ITBC	ITBC
10.5	CL Tunnel Ventilation Revised Graphic	Project Co (ITBC)	ITBC	ITBC
10.6	CL Information Telephone	Project Co (ITBC)	ITBC	ITBC
10.7	CL Revised Labelling	Project Co (ITBC)	ITBC	ITBC
10.8	BSP Fire Alarm Annunciator	Project Co	Project Co	BCRTC
10.9	BSP Emergency Telephone	Project Co	Project Co	BCRTC
10.10	BSP Fire Alarm Graphic	Project Co	Project Co	BCRTC

² It is anticipated to have one temporary relocation and one permanent relocation.

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Item/ Element	Work Element	System Engineering Responsibility Lead /(Support)	Design Supply Install Commission Responsibility	Maintenance Responsibility
10.11	BSP Tunnel Ventilation Graphic	Project Co	Project Co	BCRTC
10.12	BSP Information Telephone	Project Co	Project Co	BCRTC
10.13	BSP Labelling	Project Co	Project Co	BCRTC
10.14	CL FCP relocation during construction	Project Co	ITBC	ITBC
10.15	FCP physical opening and conduit modifications	Project Co	Project Co	ITBC
10.16	Decommission of CL FCP after construction	Project Co	ITBC	ITBC
11.0	Standpipe/Sprinkler Connections in CL Mechanical Room			
11.1	CL mechanical engineering and certification (for modifications done to existing mechanical system)	ITBC		
11.2	BSP mechanical engineering and certification	Project Co		
11.3	Addition of BSP related valves, pipes and connections	Project Co (ITBC)	Project Co	ITBC
11.4	Pipes to BSP mechanical room	Project Co	Project Co	BCRTC
11.5	Valve supervision by CL fire alarm	ITBC (Project Co)	ITBC	ITBC
12.0	Fire Department Connections (no changes to CL connections)			
12.1	BSP EB and WB Tunnel Connections and pipes	Project Co	Project Co	BCRTC
13.0	CL EER and Mechanical Room Structural Openings			
13.1	Sprinkler pipe, Standpipe pipe and Domestic pipe into CL Mech. Room	Project Co	Project Co	N/A

SCHEDULE 4: APPENDIX P: BROADWAY CITY HALL SCOPE SPLIT MATRIX BETWEEN BSP AND ITBC STRUCTURAL AND SYSTEMS RELATED WORKS

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Item/ Element	Work Element	System Engineering Responsibility Lead /(Support)	Design Supply Install Commission Responsibility	Maintenance Responsibility
13.2	4x4inch conduits into CL EER	Project Co	Project Co	N/A
14.0	Tunnel Ventilation Coordination			
14.1	CL Ventilation Analysis and definition of modes	Project Co (ITBC)	Project Co (ITBC)	
14.2	BSP Ventilation Analysis and definition of modes	Project Co (ITBC)	Project Co (ITBC)	
14.3	CL TVSCADA station and headend modifications	ITBC	ITBC	ITBC
14.4	CL TV FCP modifications	ITBC	ITBC	ITBC
14.5	BSP TVS	Project Co	Project Co	BCRTC
14.6	BSP TV FCP	Project Co	Project Co	BCRTC
14.7	BSP EER to CL EER cabling and termination	Project Co	Project Co	BCRTC
15.0	Radio Coordination			
15.1	CL Radio Coverage in BSP	Project Co (ITBC)	Project Co	BCRTC
15.2	BSP Radio Coverage in CL	Project Co (ITBC)	Project Co	N/A ³

³ Note: For BSP radio in CL, after coax is run from BSP EER to CL EER (work by BSP), operation will be based on BSP's radio (but that CL's system is operational)

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Item/ Element	Work Element	System Engineering Responsibility Lead /(Support)	Design Supply Install Commission Responsibility	Maintenance Responsibility
15.3	ECOMM coverage in CL	ITBC	ITBC	ITBC
15.4	ECOMM coverage in BSP	Project Co	Project Co	BCRTC
15.5	BSP EER to CL EER cabling and termination	Project Co	Project Co	BCRTC
16.0	Coiling Grill			
16.1	Modification to existing Station entrance coiling grill access control, CCTV, electrical and E&M SCADA up to the CL EER	Project Co (ITBC)	Project Co	ITBC
16.2	Addition of new CL mezzanine entrance and platform (X3) coiling grills, access control, CCTV, electrical and E&M SCADA up to the CL EER	Project Co (ITBC)	Project Co	ITBC
16.3	CL E&MSCADA station and headend modifications	ITBC	ITBC	ITBC
16.4	BSP coiling grills, access control, CCTV, electrical and WMS	Project Co	Project Co	BCRTC
16.5	BSP EER to CL EER cabling and termination	Project Co	Project Co	BCRTC
17.0	CCTV Coordination			
17.1	CL CCTV modifications to share video streams	Project Co (ITBC)	Project Co (ITBC)	ITBC
17.2	CL CCTV modifications and additions	ITBC	ITBC	ITBC
17.3	BSP CCTV video stream sharing	Project Co (ITBC)	Project Co	BCRTC
17.4	CL CCTV video streaming to control room and recording	ITBC	ITBC	ITBC
17.5	BSP CCTV video streaming to control	Project Co	Project Co	BCRTC

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Item/ Element	Work Element	System Engineering Responsibility Lead /(Support)	Design Supply Install Commission Responsibility	Maintenance Responsibility
	room and recording			
17.6	CL related video stream pop-ups	ITBC	ITBC	ITBC
17.7	BSP related video stream pop-ups	Project Co	Project Co	BCRTC
17.8	BSP EER to CL EER cabling and termination	Project Co	Project Co	BCRTC
18.0	PID Coordination			
18.1	Station entrance E-PID (New)	Project Co	Project Co	ITBC – Cleaning only
18.2	CL T-PIDS (For Info Only, No Scope of Work)	ITBC	ITBC	ITBC
18.3	BSP T-PIDs and G-PIDs (Within BSP areas)	Project Co	Project Co	BCRTC
18.4	BSP EER to CL EER cabling and termination	Project Co	Project Co	BCRTC
19.0	Telephones (no coordination)			
19.1	CL telephone – ITBC (For information only, no scope)	ITBC	ITBC	ITBC
19.2	BSP telephones – BSP	Project Co	Project Co	BCRTC
20.0	FOTS/OTN Coordination (if required)			
20.1	BSP EER to CL EER cabling and termination	Project Co	Project Co	BCRTC
20.2	CL network configuration and firewall	Project Co (ITBC)	ITBC	ITBC
20.3	BSP network configuration and firewall	Project Co (ITBC)	Project Co	BCRTC
21.0	Fare Gates (no coordination)			

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Item/ Element	Work Element	System Engineering Responsibility Lead /(Support)	Design Supply Install Commission Responsibility	Maintenance Responsibility
21.1	Station entrance fare gates, manual gate, ticket machines, relocation and/or modification	Project Co	Project Co	Translink
22.0	Escalators and Elevators (no coordination)			
22.1	CL elevator and escalators, no changes	ITBC	ITBC	ITBC
22.2	BSP elevators and escalators	Project Co	Project Co	BCTRC

APPENDIX P

IntransitBC (ITBC) Resources

1. Introduction

- a. This document sets out the ITBC train and staff resources to support Project Co while Project Co undertakes the actual construction works within the existing Broadway - City Hall Canada Line Station subject to conditions set out in this Appendix and in Part 2 of Schedule 4. For clarity, these staff ITBC resources are not intended to cover engineering review by ITBC of Project Co's formal design drawing submissions, including TFCIPs and WPs.

2. Trains

- a. Project Co will require trains from ITBC to satisfy the testing and commissioning requirements for the Project. Project Co shall make all requests for trains for the purposes of testing and commissioning through the Canada Line work permit process.
- b. Project Co shall ensure that each work permit application that includes a request for trains for the purposes of testing and commissioning includes details of the testing activities as approved in the applicable FMI, a description of the risks, safety assessment and mitigations associated with the testing activities, and any specific train configurations required for the testing activities.
- c. Project Co shall submit each work permit request that requires trains for the purposes of testing and commissioning to ITBC a minimum of three weeks before the start of the applicable testing activities.
- d. Project Co is advised that any request for trains for the purposes of testing and commissioning is subject to availability of trains, staff resources, and guideway segment and may change without notice due to operational priorities or adverse weather conditions.

3. ITBC Staff Resources

- a. Project Co will require staff resources from ITBC to support the Project Work. The Province shall make specific staff resources from ITBC available to Project Co to support the Project Work, as set out in Table 1 [ITBC Staff Resources].
- b. Project Co shall make all requests for ITBC staff resources to support the Project Work through the Canada Line work permit process.

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- c. Project Co shall submit each work permit request that requires staff resources from ITBC a minimum of three weeks before the start of the applicable activities.
- d. Project Co shall consult with ITBC regarding:
 - i. the selection of the appropriate ITBC staff resource to support Project Co; and
 - ii. the allocation of ITBC staff resources for specific tasks.
- e. Project Co is advised that any request for staff resources from ITBC is subject to availability of staff resources and may change without notice due to operational priorities or adverse weather conditions.
- e. Project Co may require access into non-public areas of the Canada Line during Design, Construction, and testing and commissioning phases of the Project. Project Co must be escorted by an ITBC staff resource in all non-public areas of the Canada Line unless written authorization is provided by ITBC.
- f. The Province shall, at no cost to Project Co, provide a base level of ITBC staff resources as detailed in Table 1 [ITBC Staff Resources] in the column titled "Time Available (Base Level)".
- g. If Project Co requires hours of ITBC staff resources in addition to the base level of ITBC staff resources identified in Table 1 [ITBC Staff Resources], Project Co shall be responsible for the costs associated with such additional time in accordance with the hourly rates shown in Table 1 [ITBC Staff Resources].
- h. If at any time ITBC is unable to provide requested staff resources at the hourly rates shown in Table 1 [ITBC Staff Resources] to Project Co due to a conflict with operational priorities, Project Co can request ITBC to attempt to provide staff resources on overtime. When ITBC staff resources are supplied using overtime, the rate will be double the rates set out in Table 1 [ITBC Staff Resources] for hours worked inclusive of any travel time between the Canada Line OMC and Broadway-City Hall Station.
- i. At the end of each month in which any additional ITBC staff resources are utilized by Project Co, the Province shall submit an invoice to Project Co for the cost of all such additional ITBC staff resources utilized by Project Co during that month.
- j. Project Co shall pay the Province for the full amount of each invoice for any additional ITBC staff resources within 20 Business Days of the date of the invoice.

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- k. The Province shall include in each invoice the documentation received from ITBC as to the number of hours of all ITBC staff resources utilized for the relevant payment period, including a breakdown of the base level ITBC staff resources and the additional ITBC staff resources.
- l. Each ITBC staff resource, whether base level or additional level, shall be provided to Project Co based on a minimum of four hours per ITBC staff resource per request.

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Table 1: ITBC Staff Resources

ITBC Staff Resource	Description of Services Provided	Time Available (Base Level)	ITBC Staff Resource working day (hours) ¹	Rate for Additional Staff Resources over the Base Level at Project Co's Expense
Project Manager	Project Co's direct point of contact to coordinate all ITBC staff resources	42 person days	8	\$306 per hour
Quality Assurance Reviewer	undertake quality reviews of Project Co's work (during construction)	18 person days	8	\$136 per hour
HSSE Coordinator	monitors Project Co's work in terms of HSSE	18 person days	8	\$121 per hour
Canada Line Attendants	provide support for passenger movements around construction site areas within the station	210 person days	11.5	\$87 per hour
Wayside Planner	manages work permits and scheduling of staff resources including allocation of work space within station to potential conflicts by others	48 person days	11.5	\$121 per hour
Test Control Operator ³	supports operational tests as required	47 person days	11.5	\$121 per hour
Vehicle Technician incl. Train	attends and operates test Trains designated for testing and commissioning	4 person days	11.5	\$110 per hour

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ITBC Staff Resource	Description of Services Provided	Time Available (Base Level)	ITBC Staff Resource working day (hours) ¹	Rate for Additional Staff Resources over the Base Level at Project Co's Expense
Guideway (Wayside) Technician	supports integration testing of equipment, subsystems and systems	53 person days	11.5	\$110 per hour
Electronic Technician	supports testing and commissioning on all electronics, communications and safety and security systems	52 person days	11.5	\$110 per hour
Guideway (Power) Technician	supports testing and commissioning on all electrical systems in the Station.	5 person days	11.5	\$110 per hour
Building Technician	supports testing and commissioning on all mechanical systems in the Station	66 person days	11.5	\$110 per hour

¹ Inclusive of any travel required between Canada Line OMC and Broadway-City Hall Station.