

**SCHEDULE 17**

**ENVIRONMENTAL OBLIGATIONS**

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**PART 1**  
**DEFINITIONS**

“**Acoustical Engineer**” means an engineer who is eligible to be a licensed Professional Engineer in the province of Ontario with a minimum of 10 years experience in the field of acoustical engineering with proven experience in the acoustical assessment of rail transit projects.

“**CEAA**” means the Canadian Environmental Assessment Act.

“**Complaint Protocol**” means the protocol described in Schedule 17, Section 3.7(k) and further described in Schedule 18, Section 3.2(e).

“**Dust Control Plan**” means the plan to be prepared, submitted and implemented by Project Co in accordance with Section 3.7(l) of Schedule 17 – Environmental Obligations.

“**Environmental and Sustainability Director**” has the meaning given in Section 3.1 of Schedule 17 – Environmental Obligations.

“**Environmental and Sustainability Manager**” has the meaning given in Section 3.2 of Schedule 17 – Environmental Obligations.

“**Environmental Management Plan**” has the meaning given in Section 3.8 of Schedule 17 – Environmental Obligations.

“**Excavated Material Management Plan**” means the plan to be prepared, submitted and implemented by Project Co in accordance with Section 5.4 of Schedule 17 – Environmental Obligations.

“**OESA**” means the Ontario Endangered Species Act (2007).

“**Qualified Person**” when used in Schedule 17 – Environmental Obligations, has the meaning given in the “Guide to Permit to Take Water (PTTW) Application Form (September 2007)”, PIBS 5046e published by MOE.

“**SARA**” means Canada’s Species at Risk Act (2002).

“**Sensitive Receiver**” means the National Arts Centre building at 53 Elgin Street, the Canadian Broadcasting Corporation building at 181 Queen Street and the Government Conference Centre at 2 Rideau Street, as well as any other location where sensitivity to ground borne noise and vibration are determined to be high in accordance with Section 8.6(a).

“**Sustainability Plan**” has the meaning as given in Section 3.10 of Schedule 17 – Environmental Obligations.

“**Stakeholders**” means all parties who have an interest in the implementation of the OLRT project excluding the City. Stakeholders include groups such as the general public, businesses, community associations, educational institutions, approval agencies and other governmental agencies.

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**PART 2**  
**GENERAL PROVISIONS**

**2.0 Timing Principle**

For the avoidance of doubt, this Schedule 17 – Environmental Obligations shall be interpreted in accordance with the Timing Principle set out in Section 1.5(c) of this Agreement.

**2.1 Environmental Reference Documents**

(a) Project Co shall ensure that all of the Works and the Maintenance at all times during the Project Term, comply with all Environmental Approvals, standards, regulations, guidelines, policies, practices, and Environmental Laws applicable to the Project, the Works and the Maintenance issued by or on behalf of the City or the federal government, including but not limited to each of the following reference documents, in a manner such that if there is any conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply (provided that, in relation to the Stage 2 System, Project Co shall not be required to comply with any of the following reference documents to the extent that doing so would require Project Co to maintain the Stage 2 System at a higher standard than that which was required of the DB Co Works under the DB Co Works Agreement at the point of its handover to Project Co):

- (i) the Environmental Assessments;
- (ii) the following City reference documents:
  - (A) “Downtown Ottawa Transit Tunnel: Tunney’s Pasture to Blair Station via a Downtown LRT Tunnel, Environmental Project Report”, Delcan, January 2010;
  - (B) “Official Plan”, City of Ottawa;
  - (C) “Zoning By-law 2008-250”, City of Ottawa;
  - (D) “Bayview/Somerset Area Secondary Study”, City of Ottawa;
  - (E) “Downtown Ottawa Design Strategy – Phase I”, City of Ottawa;
  - (F) “Escarpment Area District Plan”, City of Ottawa;
  - (G) “Wellington Street Community Design Plan”, City of Ottawa;
  - (H) “Carling Bayview Light Rail Transit Corridor Community Design Plan”, City of Ottawa;
  - (I) “Nicholas Mann Gateway Precinct Design Plan”, City of Ottawa;

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- (J) “Transportation Master Plan”, City of Ottawa;
  - (K) “Infrastructure Master Plan”, City of Ottawa;
  - (L) “Ottawa 20/20 Environmental Strategy”, City of Ottawa;
  - (M) “Ottawa 20/20 Air Quality and Climate Change Master Plan”, City of Ottawa;
  - (N) “Choosing Our Future”, City of Ottawa, Ville de Gatineau and National Capital Commission;
  - (O) “Noise By-law 2004-253”, City of Ottawa;
  - (P) “Environmental Noise Control Guidelines”, City of Ottawa;
  - (Q) “Ottawa Travel Choices for Light Rail Implementation”, City of Ottawa;
  - (R) “Standard Tender Document, Volume 1 Construction Specifications, Special Provisions F-1004 and F-1005”, City of Ottawa; and
  - (S) “Sewer Use By-law 2003-514”, City of Ottawa.
- (iii) the following environmental reference documents:
- (A) “Environmental Protection Requirements for Transportation Planning and Highway Design, Construction, and Operation and Maintenance”, MTO;
  - (B) “Environmental Standards and Practices User Guide”, MTO;
  - (C) “Municipal Class Environmental Assessment”, Municipal Engineers Association;
  - (D) “Ontario Regulation 231/08 - Transit Projects and Metrolinx Undertakings”, MOE;
  - (E) “Protocol for the Management of Excess Materials in Road Construction and Maintenance”, MOE and MTO;
  - (F) “Environmental Reference for Highway Design”, MTO;
  - (G) “Environmental Guide for Built Heritage and Cultural Heritage Landscapes”, MTO;
  - (H) “Environmental Guide for Contaminated Property Identification and Management”, MTO;
  - (I) “Environmental Guide for Fish and Fish Habitat”, MTO;

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- (J) “Environmental Guide for Erosion and Sediment Control during Construction of Highway Projects”, MTO;
  - (K) “Environmental Guide for Noise”, MTO;
  - (L) “Environmental Reference for Contract Preparation”, MTO;
  - (M) “Highway Drainage Design Standards”, MTO;
  - (N) “Drainage Management Manual”, MTO;
  - (O) “Salt Management Plan”, MTO;
  - (P) “Construction Administration and Inspection Task Manual”, MTO;
  - (Q) “A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines”, Canadian Council of Ministers of the Environment (CCME) 1996;
  - (R) “Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities”, Environment Canada;
  - (S) “Stormwater Best Management Practice Handbook: Construction”, Environment Canada;
  - (T) “Assessment Best Practice Guide for Wildlife at Risk in Canada”, Environment Canada;
  - (U) “Best Management Practices: Fish and Wildlife Habitat Management”, Environment Canada;
  - (V) “Best Management Practices: Water Management”, Environment Canada;
  - (W) “Environmental Assessment Best Practice Guide for Wildlife at Risk in Canada”, Environment Canada;
  - (X) “Code of Practice for the Environmental Management of Road Salts (Environment Canada, 2004)”, Environment Canada;
  - (Y) “Ontario Regulation 174/06 – Development, Interference with Wetlands and Alterations to Shorelines and Watercourses”, Rideau Valley Conservation Authority;
  - (Z) “Policy for the Management of Fish Habitat”, DFO;
  - (AA) “Practitioners Guide to Habitat Compensation”, DFO;
  - (BB) “Freshwater Intake End-of-Pipe Fish Screen Guideline”, DFO;

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- (CC) “A Proponent’s Guide To Fisheries Act Reviews For Federally Funded Infrastructure Projects”, DFO;
- (DD) “Practitioners Guide to Writing a Subsection 35(2) Fisheries Act Authorization”, DFO;
- (EE) “Proponent’s Guide to Information Requirements for Review Under the Fish Habitat Protection Provisions of the Fisheries Act”, DFO;
- (FF) “Working Around Water Fact Sheets”, DFO;
- (GG) “The Fish Habitat Primer and Drain Primer”, DFO;
- (HH) “Fish Habitat and Conservation Protection. Guidelines for Attaining No Net Loss, 1998”, DFO;
- (II) “Federal Contaminated Site Risk Assessment in Canada. Part 1: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA). Environmental Health Assessment Services. Cat. No.: H46-2/04-367E”. Health Canada 2004a;
- (JJ) “Federal Contaminated Site Risk Assessment in Canada. Part II: Health Canada Toxicological Reference Values (TRVs). Environmental Health Assessment Services. Cat. No.: H46-2/04-368E.” Health Canada 2004b;
- (KK) “Water Management - Policies, Guidelines, Provincial Water Quality Objectives”, MOE;
- (LL) “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act”, MOE;
- (MM) “Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario”, MOE;
- (NN) “Summary of Standards and Guidelines to support Ontario Regulation 419: Air Pollution”, MOE;
- (OO) “Guidelines for Identifying, Assessing and Managing Contaminated Sediments in Ontario: An integrated approach. May 2008”, MOE;
- (PP) “Stormwater Pollution Prevention Handbook”, MOE;
- (QQ) “Guideline for Implementing Spill Prevention and Contingency Plans Regulatory Requirements”, MOE; <http://www.ene.gov.on.ca/envision/gp/3243.pdf>;
- (RR) “Spills Reporting - A Guide to Reporting Spills and Discharges”, MOE;

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- (SS) “Stormwater Management Planning and Design Manual, 2003”, MOE;
  - (TT) “Guide to Evaluation of Human Exposure to Vibration in Buildings. ANSI S3.29-1983”, American National Standard Institute;
  - (UU) “Noise Assessment Criteria in Land Use Planning”, MOE;
  - (VV) “Model Noise By-Law, NPC-115 Construction Equipment”, MOE;
  - (WW) “Natural Heritage Reference Manual for the Provincial Policy Statement”, MNR;
  - (XX) “Significant Wildlife Habitat: Technical Guide”, MNR;
  - (YY) “Environmental Guidelines for Access Roads and Water Crossings”, MNR;
  - (ZZ) “Sediment Control Plans: Reducing Sediment Concerns at Water Crossings MNR;
  - (AAA) Native Plant Resource Guide for Ontario (2001 – 2002), Society for Ecological Restoration – Ontario Chapter, 2002; and
  - (BBB) “Ontario Provincial Policy Statement”, Ministry of Municipal Affairs and Housing (Ontario).

## 2.2 Project Co’s Environmental Obligations

- (a) In addition to the requirements under Section 2.1 of this Schedule 17, throughout the Project Term, Project Co shall be responsible for managing all environmental matters associated with the Project, and shall perform the Works and the Maintenance in full compliance with this Schedule 17, including compliance with the objectives and targets arising from the following (in relation to the Stage 1 System only):
  - (i) “Sustainability Plan” – Capital Transit Partners.
- (b) Without limiting Project Co’s other obligations under the Environmental Approvals, Project Co shall:
  - (i) comply with those commitments, responsibilities and information extracted from the Environmental Assessments set forth in Appendix B to this Schedule 17 as expressly stated to be delivered or complied with by Project Co in the periods set forth therein; and
  - (ii) comply with those commitments, responsibilities, and assurances within the CEAA screening report for the Stage 1 System.



- (c) The City has prepared, the following reports, plans, programs and other environmental documents associated with meeting the commitments of the Environmental Approvals:
- (i) “Environmental Management Plan” Capital Transit Partners;
  - (ii) “Sustainability Plan”, Capital Transit Partners;
  - (iii) “Station Acoustics Guidelines Document”, Novus Environmental Inc.;
  - (iv) “Smoke Re-Entrainment Assessment - Albert Street Alignment”, Novus Environmental Inc.;
  - (v) “Tunnel Ventilation Shaft Noise Assessment - Albert Street Alignment”, Novus Environmental Inc.;
  - (vi) “University of Ottawa Campus and Parkdale Avenue / Merton Street Sections, Noise and Vibration Impact Assessment”, Novus Environmental Inc.;
  - (vii) “Maintenance and Storage Facility, Noise and Vibration Impact Assessment”, Novus Environmental Inc.;
  - (viii) “Maintenance and Storage Facility, Access Tunnel Construction Noise and Vibration Impact Assessment”, Novus Environmental Inc.;
  - (ix) “Stage 1 Archaeological Assessment”, Golder Associates;
  - (x) “Stage 1 Archaeological Assessment of the Maintenance and Storage Facility Site and the MSF Cut and Cover Access Tunnel”, Golder Associates;
  - (xi) “Heritage Impact Assessment (Built Heritage/Cultural Landscape)”, Golder Associates; and
  - (xii) “Tree Survey for the Maintenance and Storage Facility”, Capital Transit Partners.
- (d) Project Co shall submit, in accordance with the Schedule 10 – Review Procedure, any documentation of an environmental nature associated with the Project and not otherwise required at Commercial Close that:
- (i) in the Discretion of the City Representative, may be required at a later time and so requested for review by the City Representative, and
  - (ii) is required at any time pursuant to Section 3.9 of this Schedule 17.
- (e) Project Co’s use of lands outside the boundaries of the Lands to address its obligations shall be governed by Applicable Law and applicable Permits, Licences and Approvals.
- (f) If required, Project Co shall obtain any necessary Permits required under OESA or SARA.

- (g) Project Co shall participate with the City in Stakeholder consultation and implement any resulting commitments and requirements in accordance with the Environmental Assessments and in accordance with Schedule 18.
- (h) For greater certainty, Project Co shall be responsible, at its own cost and risk, for complying (and will cause all Project Co Parties to comply) with all obligations of an environmental nature under this Project Agreement that are specified as being the responsibility of Project Co.

### 2.3 The City's Environmental Obligations

- (a) Throughout the Project Term, the City Representative will be responsible for reviewing, in accordance with the Schedule 10 – Review Procedure, the following documents addressing environmental matters associated with the Project:
- (i) the plans, reports and other documents listed in Table 3.1 of this Schedule 17; and
  - (ii) any other documentation of an environmental nature not otherwise required at Commercial Close that:
    - (A) in the Discretion of the City Representative, may be required at a later time and so requested for review by the City Representative; and
    - (B) is required at any time pursuant to Section 3.9 of this Schedule 17.
- (b) The following works, associated with the requirements of the Environmental Approvals, have been or will be initiated by the City prior to Financial Close to facilitate completion of the Works (in the case of the matters referred to in paragraphs (i) and (ii) below) or prior to the signature of the DB Co Works Agreement (in the case of the matters referred to in paragraph (iii) below):
- (i) Environmental Reports, such as:
    - (A) Archaeological reports;
    - (B) Built heritage and cultural landscape reports;
    - (C) Noise and vibration reports;
    - (D) Air quality reports;
    - (E) Environmental Site Assessment reports;
    - (F) Landfill gas assessment reports;
    - (G) Designated substance survey reports; and

- (ii) Any other works associated with carrying out the obligations under the Environmental Assessments expressly stated to be delivered wholly or in part by the City in Appendix B to this Schedule 17
  - (iii) Any other works associated with carrying out the obligations under the Environmental Assessments expressly stated to be delivered wholly or in part by the City in Appendix A-1 to Schedule 17 of the DB Co Works Agreement (in so far as such obligations relate to the Construction Period (as defined therein) for the relevant part of the Site (as defined therein)).
- (c) The City shall lead the Stakeholder consultation program in accordance with Part 4 of this Schedule 17 and Schedule 18.
- (d) The City shall liaise with the Ontario Ministry of the Environment and Transport Canada (lead Relevant Authority for the federal CEAA screening) regarding obligations set forth in the federal and provincial Environmental Approvals to be performed by the City and/or federal government, as identified in Appendix B to this Schedule 17 or in Appendix A-1 to Schedule 17 of the DB Co Works Agreement (in so far as such obligations relate to the Construction Period (as defined therein) for the relevant part of the Site (as defined therein)).

#### **2.4 Environmental Approval Obligations**

- (a) Project Co shall be solely responsible to deliver or comply with all obligations, commitments and responsibilities stated in the Environmental Assessments appended to Appendix A to this Schedule 17 which are not expressly identified elsewhere in this Schedule 17 to be delivered or complied with by the City and/or federal government.
- (b) The intent of Appendix B is to clarify those obligations, commitments and responsibilities set forth in the Environmental Assessments that are being, or will be delivered by the City and/or federal government during the periods set forth therein.
- (c) Appendix B to this Schedule 17 shall be read in conjunction with the Environmental Assessments listed in Appendix A.
- (d) Without limiting the generality of Section 2.2 of this Schedule 17, Project Co shall comply with and shall do everything necessary to ensure satisfaction of, and will be responsible for, the obligations set forth in Appendix B of this Schedule 17 expressly stated to be delivered or complied with by Project Co, in each case during the periods set forth therein. Project Co shall be jointly responsible with the applicable governmental agencies in respect of matters expressly stated to be delivered or complied with jointly by Project Co and the City and/or federal government.
- (e) Those obligations, commitments and responsibilities that, as provided in Appendix B to this Schedule 17, are to be transferred to Project Co to carry out after Financial Close and will, 14 days after Financial Close, be transferred to Project Co for the remainder of the Project Term.

- (f) Project Co shall also comply with, those obligations, commitments and responsibilities set out in Appendix A to Schedule 17 of the DB Co Works Agreement that are stated in that Appendix A to be transferred to the City or its maintenance contractor to be carried out after the completion of the DB Co Works. Such obligations, commitments and responsibilities shall include, for the avoidance of doubt, the implementation of all mitigation measures applicable to maintenance and operations identified in the provincial Confederation West Extension Environmental Project Report and amendments, provincial Confederation East Extension Environmental Project Report and amendments as well as federal Confederation Line Extension Environmental Effects Evaluation Report, but excluding the following obligations which shall remain the responsibility of the City, namely:
- (i) any such measures which are to be carried out outside the perimeter of the Stage 2 Lands; and
  - (ii) any measures relating to the realignment of Pinecrest Creek (notwithstanding that part of such measures may need to be carried out within the perimeter of Stage 2 Lands, but subject always to Article 1.9 of Appendix A of Schedule 15-3 – Maintenance and Rehabilitation Requirements) and which are related to:
    - (a) its performance as a wildlife crossing (e.g. confirming if the culverts are being used by small/medium mammals, turtles, etc. to cross from one side of the rail corridor to another); and
    - (b) maintenance of the culverts to ensure Fisheries Act obligations are met including:
      - (A) gradual removal of debris such that flooding downstream, extreme flows downstream, release of suspended sediment and fish stranding can be avoided; and
      - (B) implementing DFO measures to avoid causing harm to fish and fish habitat including aquatic species at risk,
- but nothing in this paragraph (ii) shall affect Project Co's responsibility to maintain the physical structures of the relevant culverts to the extent they are within the Stage 2 Lands.
- (g) In the case of any conflict, ambiguity or inconsistency between Appendix B and any other provision within this Project Agreement, such other provision will prevail over Appendix B.

## 2.5 Environmental Impacts and Changes to Environmental Approvals

- (a) Project Co shall keep environmental impacts of the Project within the magnitude and extent identified in the documents listed in Sections 2.1(a)(i), Section 2.2(c) and Section 2.3(b)(vii) of this Schedule 17, and where not possible, Project Co shall follow amendment procedures in accordance with the Environmental Approvals and any other

Environmental Laws. Any proposal to amend the Environmental Approvals in accordance with procedures under Environmental Laws, will require the concurrence of the City Representative prior to contacting applicable Governmental Authorities. The proposal to amend the Environmental Approvals shall be submitted to the City Representative in accordance with the Schedule 10 – Review Procedure.

- (b) Any changes or amendments to the Environmental Approvals required as a result of Project Co's design or construction of the Project or any other action or inaction of Project Co, shall be at the cost and risk of Project Co whether or not the application for such change is made by the City or Project Co, and shall be in accordance with the Schedule 10 – Review Procedure whereby all documentation shall be shared with the City Representative prior to submittal to other Governmental Authorities. Any changes or amendments to the Environmental Approvals in respect of the Stage 1 System which are required as a result of DB Co's design or construction of the Stage 2 System shall be implemented by way of a Variation and the City shall issue a Variation Enquiry and the relevant provisions of Schedule 22 - Variation Procedure shall apply, except that the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree.
- (c) Project Co shall be responsible for obtaining, in accordance with Section 2.6 of this Schedule 17, all Permits, Licences and Approvals from relevant Governmental Authorities and satisfying all other requirements (including in respect of consultations, hearings, reviews, studies and reports and initial and ongoing mitigation and compensation works, and future work activities to satisfy requirements and conditions of the Environmental Approvals) in connection with or resulting from any such change or amendment to the Environmental Approvals and for all works, costs, fees, expenses and delays incurred in connection therewith.

## **2.6 Permits, Licences and Approvals**

- (a) Except as otherwise specifically provided in this Project Agreement in relation to Permits, Licences and Approvals, Project Co is required, at its own cost and risk, to obtain all Permits, Licences and Approvals which relate to, or are required under Environmental Laws in connection with the Project, or are otherwise necessary for Project Co to fulfill its environmental obligations under this Project Agreement.

## **2.7 Notification to the City**

- (a) Project Co shall notify the City Representative immediately of:
- (i) all charges, orders, investigations or notices of violation or non-compliance issued against Project Co or any Project Co Party or otherwise relating to the performance of the Works and Maintenance or the Lands under any Environmental Laws; and

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- (ii) any notice, claim, action or other proceeding by any person against Project Co or any Project Co Party or otherwise relating to the performance of the Works and Maintenance or the Lands under any Environmental Laws.

## 2.8 Inquiries to Governmental Authorities

- (a) Where required, Project Co shall promptly provide the City Representative with such written authorizations as the City may require from time to time in order to make inquiries of any Governmental Authorities regarding Project Co or Project Co's compliance with Environmental Laws and Permits, Licences and Approvals, including Project Co's applications for Permits, Licences and Approvals.
- (b) Project Co shall forward to the City Representative a copy of any report, submission, application or other document relating to environmental matters on or at or affecting or otherwise relating to the Lands concurrent with filing or lodging with or otherwise providing such document to any Governmental Authority.

## 2.9 Environmental Records

- (a) Project Co shall maintain in accordance with Schedule 26 – Record Provisions all documents and records relating to environmental matters (including the Environmental Approvals and all other Permits, Licences and Approvals) in connection with the Lands and the performance of the Works and Maintenance.

## 2.10 Transition Period

- (a) The following transition period activities shall be undertaken by the Parties within 14 days after Financial Close with regard to works performed by the City and/or federal government associated with carrying out those environmental obligations set forth in Appendix B that shall be transferred to Project Co 14 days after Financial Close:
  - (i) The City shall provide Project Co with a summation report of activities and status of works performed by the City and federal government associated with carrying out the obligations under the Environmental Approvals;
  - (ii) The City shall provide Project Co with all applicable documentation related to the obligations under the Environmental Approvals performed by the City and federal government;
  - (iii) The City and Project Co shall hold a meeting to review the summation report and transferred documentation; and
  - (iv) The City and Project Co shall hold an appropriate number of site visits to review field activities performed by the City.

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**PART 3**  
**ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY**

**3.1 Environmental and Sustainability Director**

- (a) Project Co shall appoint an Environmental and Sustainability Director who shall, throughout the Project Term and irrespective of such person's other responsibilities, have defined authority for ensuring the establishment and maintenance of the Environmental Management Plan, as well as auditing and reporting on the status of, and compliance with the Environmental Management Plan, the Environmental Approvals, the Sustainability Plan and the environmental plans and reports identified in Sections 3.7 and 3.9 of this Schedule 17 and any terms and conditions associated with environmental Permits, Licences and Approvals.
- (b) The Environmental and Sustainability Director shall be a Key Individual.
- (c) Without limiting the generality of the foregoing, the job specification and responsibilities of the Environmental and Sustainability Director shall include the following:
- (i) directing all aspects of Project Co's environmental and sustainability program for the Project, including overseeing the environmental sustainability auditing program;
  - (ii) ensuring environmental and sustainability issues are addressed and requirements are met in accordance with this Project Agreement and all Environmental Approvals;
  - (iii) ensuring the Sustainability Plan and the Works addresses the City's four sustainability dimensions (natural environment, social, cultural, and economic);
  - (iv) ensuring that all sustainability initiatives are coordinated with the City and that the initiatives fit within the City's corporate sustainability priorities and strategies;
  - (v) establishing and maintaining working relationships with relevant Governmental Authorities and Stakeholders through the City Representative;
  - (vi) taking a lead role in internal environmental and sustainability design reviews including development of mitigation and compensation proposals acceptable to the City Representative and Governmental Authorities;
  - (vii) liaising with the City Representative and with Governmental Authorities (through the City Representative) as required and acting as the single point representative for Project Co on all matters relating to environmental management and sustainability;
  - (viii) directing the preparation and submission to the City Representative of all reports required under the Environmental Approvals;

- (ix) supporting and maintaining working relationships with relevant First Nations, through the City Representative; and
- (x) directing the preparation and submission to the City Representative of all communication materials associated with the Stakeholder consultation program in accordance with Part 4 of this Schedule 17, and Schedule 18 of this Project Agreement.

### 3.2 Environmental and Sustainability Manager

- (a) Project Co shall appoint an Environmental and Sustainability Manager who shall, throughout the Project Term and under the direction of the Environmental and Sustainability Director, have defined authority for ensuring the day-to-day implementation of the Works and the Maintenance associated with the Environmental Management Plan, the Environmental Approvals, and the environmental plans and reports identified in Sections 3.7 and 3.9 of this Schedule 17, and auditing and reporting on the performance of such Works and Maintenance.
- (b) The Environmental and Sustainability Manager shall be a Key Individual.
- (c) Without limiting the generality of the foregoing, the job specification and responsibilities of the Environmental and Sustainability Manager shall include the following:
  - (i) managing all environmental and sustainability issues associated with the Project on a day-to-day basis, including overseeing the environmental monitoring and follow-up program in accordance with the Environmental Approvals;
  - (ii) establishing and maintaining working relationships with relevant Governmental Authorities and Stakeholders through the City Representative;
  - (iii) effective operation of the Environmental Management Plan on a day-to-day basis;
  - (iv) effective operation of the Sustainability Plan on a day-to-day basis;
  - (v) ensuring environmental issues are addressed and requirements are met in accordance with the Environmental Approvals and this Project Agreement;
  - (vi) supporting and maintaining working relationships with relevant First Nations, through the City Representative; and
  - (vii) preparing and submitting to the City Representative all communication materials associated with the Stakeholder consultation program in accordance with Part 4 of this Schedule 17 and Schedule 18.

### 3.3 Sustainability Coordinator

- (a) Project Co shall appoint a Sustainability Coordinator who shall, under the direction of the Environmental and Sustainability Manager, be responsible for the development and



implementation of a sustainability plan for the project and ensuring that the outlined sustainability requirements are met. The Sustainability Coordinator shall ensure that the development and implementation of the sustainability plan address all four sustainability dimensions including natural environment, social, cultural and economic.

### 3.4 Environmental Permits and Approvals Coordinator

- (a) Project Co shall appoint an Environmental Permits and Approvals Coordinator who shall, throughout the Project Term and under direction of the Environmental and Sustainability Manager, be responsible for obtaining and ensuring the compliance with environmental Permits, Licences and Approvals relating to the Works and the Maintenance.

### 3.5 Environmental Specialists

- (a) Project Co shall have available, at all times during the Project Term, under direction of the Environmental and Sustainability Manager, a multi-disciplinary team of specialists experienced in the disciplines required to meet Project Co's obligations under this Schedule 17.

### 3.6 Environmental Inspector(s)

- (a) Project Co shall appoint Environmental Inspectors who shall, under direction of the Environmental and Sustainability Manager, ensure compliance of the Works and the Maintenance with the Environmental Management Plan.
- (b) Without limiting the generality of the foregoing, the job specification and responsibilities of the Environmental Inspector(s) shall include the following:
- (i) monitor construction activities on a daily basis;
  - (ii) maintain a log of monitoring events;
  - (iii) complete a daily monitoring report and provide to the Environmental Sustainability Manager; and
  - (iv) provide advice and recommendations for improving environmental protection and correcting any inefficient practices and/or issues of non-compliance.

### 3.7 Environmental Plans and Reports

- (a) Project Co shall develop, implement, and update the plans and reports required pursuant to the Environmental Approvals, and in accordance with additional assessments completed during preliminary engineering to address Environmental Assessment commitments and other considerations that will include, but are not limited to, those listed in Table 3.1 and Schedule 33:

Table 3.1 – Schedule of Plans, and Reports Submission Requirements

Key Performance Measure (KPM)*	Deliverable Name	Schedule 17 Specification Reference	Due Date	Deliverable Submission Period	Submitted under the Review Procedure
n/a	Environmental Management Plan (First Submission)	Section 3.8(b)	45 days after Financial Close	By due date	Yes
KPM 3.8(c)	Environmental Management Plan (Updates)	Section 3.8(c)	As required, and in any event no later than June 1 <sup>st</sup> annually	Through Project Term	Yes
n/a	Monthly environmental reports	Section 3.7(e)	14 days after the end of the month for which the report is prepared	During any period during which construction activities are undertaken	Yes
n/a	Environmental completion report(s) (prepared for each Phase of the Project)	Section 3.7(f)	14 days prior to each Milestone Acceptance Date and the Revenue Service Commencement Date	Until Revenue Service Commencement	Yes
n/a	Bi-weekly environmental monitoring reports	Section 3.7(g)	1 week after the end of the period for which the report is prepared	Until Revenue Service Commencement	Yes
KPM 3.7(h)	Independent environmental audit	Section 3.7(h)	June 1 <sup>st</sup> biennially	Through Project Term	Yes
n/a	Landscape Plan and Landscape Plan Drawings	Section 3.7(i) and in accordance with Schedule 15.2, Part 1, Article 17	90 days prior to the commencement of the Works	By due date	Yes
n/a	Fisheries compensation plan(s) (prepared for each Phase of the Project) (if required)	Section 3.7(j)	60 days prior to the commencement of the Works	By due date	Yes
n/a	Complaint Protocol	Section 3.7(k)	60 days prior to the commencement of the Works	By due date	Yes
n/a	Dust Control Plan	Section 3.7(l)	45 days prior to the commencement of the Works	By due date	Yes
n/a	Sustainability Plan (First Submission)	Section 3.10	45 days after Financial Close	By due date	Yes
KPM 3.10(c)	Sustainability Plan (Updates)	Section 3.10	Subsequent updates as applicable and in any event no later than June 1 annually	By due date	

Key Performance Measure (KPM)*	Deliverable Name	Schedule 17 Specification Reference	Due Date	Deliverable Submission Period	Submitted under the Review Procedure
n/a	Excavated Material Management Plan	Section 5.4(a)	60 days prior to commencement of the Works	By due date	Yes
n/a	Excavated Material Management Plan	Section 5.4(c)	14 days prior to the Revenue Service Commencement	By due date	Yes
n/a	Dewatering Management Plan	Section 5.8(a)	60 days prior to commencement of the Works	By due date	Yes
n/a	Dewatering Management Plan	Section 5.8(b)	14 days prior to the Revenue Service Commencement	By due date	Yes
n/a	Erosion and Sediment Control Plan(s)	in accordance with Schedule 15.2, Part 1, Article 18	30 days prior to the commencement of any construction as part of the Works	By due date	Yes
n/a	Spill Prevention and Response Plan	Section 5.9(a)	60 days prior to commencement of the Works	By due date	Yes
n/a	Spill Prevention and Response Plan	Section 5.9(b)	14 days prior to the Revenue Service Commencement	By due date	Yes
n/a	Archaeological Risk Management Plan	Section 7.1(a)	60 days prior to commencement of the Works	By due date	Yes
n/a	Weekly noise and vibration construction monitoring reports	Section 8.7(c)	Friday each week in areas where construction is underway	By due date	Yes
KPM 8.8(a)	Noise and Vibration Survey	Section 8.8(a)	June 1 <sup>st</sup> biennially	During the Maintenance Term	Yes

\* Key Performance Measures are only applicable following Revenue Service Availability Date.

Project Co shall update its plans as appropriate to address the Belfast MSF Expansion and the DB Co Works, taking into account equivalent plans or reports prepared in respect of the Stage 2 Works under the DB Co Works Agreement and/or the Belfast MSF Expansion Variation.

- (b) The documents required to be submitted under the Schedule 10 – Review Procedure as set forth in Table 3.1 shall be submitted to the City Representative in accordance with Schedule 10 – Review Procedure.
- (c) Project Co shall promptly provide the City Representative with copies of all environmental site assessments, audits, reports, documents, and test results relating to the Site and the Project, including all assessments, audits, reports and tests conducted by or on behalf of or coming into the possession of Project Co at any time whether before or after Financial Close.

- (d) Project Co shall prepare and submit an Environmental Quality Management Plan in accordance with Schedule 11 – Quality Management.
- (e) Project Co shall prepare and submit to the City Representative and Governmental Authorities, during any period during which Construction Activities are undertaken, a monthly environmental report that includes, but is not limited to:
- (i) design and construction activities undertaken as part of the Works during the period;
  - (ii) key environmental issues associated with (i);
  - (iii) consultation activities and communication with Governmental Authorities;
  - (iv) mitigation measures (successes and failures) associated with (ii); and
  - (v) monitoring activities, resolutions to environmental impacts, and how Project Co was able to comply with all Environmental Approvals.
- (f) An environmental completion report shall be prepared by Project Co and submitted to the City Representative prior to Milestone Acceptance of each Milestone and Substantial Completion. The report shall, as a minimum, document compliance with requirements of the Environmental Approvals and all other environmental obligations under this Project Agreement.
- (g) Bi-weekly environmental monitoring reports shall be prepared during the Works and submitted to the City Representative. Bi-weekly environmental monitoring reports shall, as a minimum, document the status of environmental protection measures, ineffective measures/issues of non-compliance and associated corrective actions. This shall include description, photos and status of Works by area as they relate to the environmental obligations under this Project Agreement.
- (h) Project Co shall obtain and submit to the City Representative, from an independent environmental consultant (the qualifications of which have been accepted by the City Representative pursuant to the Review Procedure), biennial independent environmental audits of compliance with the environmental obligations under this Project Agreement. Compliance with this requirement shall be at Project Co's own cost, including obtaining any additional investigations recommended by the environmental consultant.
- (i) Landscape Plan and Landscape Plan Drawings, as defined in Part 1, Article 17 of Schedule 15-2, shall be prepared and submitted by Project Co in accordance with the requirements set forth therein.
- (j) If required, Project Co shall develop a detailed fisheries compensation plan to obtain *Fisheries Act* (Canada) approval in consultation with DFO, the Rideau Valley Conservation Authority, and the City Representative.

- (k) Project Co shall prepare a Complaint Protocol addressing how it will deal with and respond to inquiries and complaints received during the Project Term. Project Co acknowledges that its Complaint Protocol will be placed in the public record.
- (l) A Dust Control Plan shall be prepared by Project Co and submitted to the City Representative that documents how dust generated from construction activities will be mitigated, and addresses issues such as weather events, and how Project Co will adopt the dust control measures outlined in the Environmental Approvals.

### 3.8 Environmental Management Plan

- (a) Project Co shall develop, implement and update the Environmental Management Plan for the Project that is guided by the environmental management plan developed during the preliminary engineering phase and in accordance with the requirements of this Schedule 17.
- (b) Project Co shall prepare and submit the Environmental Management Plan (First Submission) to the City Representative. The Environmental Management Plan (First Submission) shall:
  - (i) comply with all of Project Co's environmental obligations, including without limitation those set forth in the Environmental Approvals and in this Schedule 17;
  - (ii) identify credentials of Project Co's environmental team referenced in Sections 3.1 to 3.6 of this Schedule 17 for performing specialized environmental tasks;
  - (iii) identify roles and responsibilities and reporting structure of Project Co's environmental team as identified within Sections 3.1 to 3.6 of this Schedule 17;
  - (iv) identify monitoring and reporting requirements;
  - (v) integrate with the Sustainability Plan defined under Section 3.10 of this Schedule 17;
  - (vi) include the component plans as set out in the Environmental Approvals; and
  - (vii) identify an Environmental Education Awareness Plan.
- (c) Project Co shall expand and update throughout the Project Term the Environmental Management Plan to reflect the Design and Construction Works and Maintenance scheduling, site conditions and weather-dependent contingency measures, and requirements of the Environmental Approvals, Permits, Licences and Approvals, and any other environmental plans and reports pursuant to Sections 3.7 and 3.9 of this Schedule 17. Environmental Management Plan (Updates) shall be prepared and submitted by Project Co to the City Representative as required, and in any event no later than June 1<sup>st</sup> annually.

**3.9 Schedule of Other Required Environmental Plans and Reports**

- (a) In addition to those plans and reports listed in Table 3.1, Project Co shall submit a list of other environmental plans and reports which Project Co is responsible for under the Environmental Approvals, Environmental Laws, and the requirements of this Schedule 17 to the City Representative, which details each deliverable, the environmental obligation that is being fulfilled and a due date.

**3.10 Sustainability Plan**

- (a) Project Co shall develop and implement, in consultation with the City, a Sustainability Plan for the Project that:
- (i) is guided by the framework outlined in the sustainability plan developed during the preliminary engineering phase; and
  - (ii) the Choosing Our Future initiative and the City's Environmental Strategy as part of the Ottawa 20/20 initiative (or as updated).
- (b) Project Co shall prepare and submit a Sustainability Plan (First Submission) for the Project that includes, but is not limited to, a description of:
- (i) development and implementation of sustainable practices and approaches for the Works and Maintenance;
  - (ii) the objectives and metrics relating to sustainable practices to be achieved throughout the Project Term;
  - (iii) a framework, strategy and methods and tools, including innovative approaches, to achieve the foregoing objectives and metrics;
  - (iv) the coordination of the Sustainability Plan with the Project Co's Environmental Management Plan;
  - (v) training, education and communication of sustainability objectives and activities for the Project Co Parties and all other parties involved in the Project;
  - (vi) approaches to promoting sustainability initiatives to Stakeholders and in accordance with the provisions of Schedule 18 – Communication Protocol;
  - (vii) methods and tools for monitoring and reporting on metrics to the City;
  - (viii) roles and responsibilities of Project Co's sustainability team, including those detailed within Section 3.1 to 3.6 of this Schedule 17; and
  - (ix) Project Co's decision and risk management approach relating to sustainable practices.

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- (c) Project Co shall expand and update throughout the Project Term the Sustainability Plan to reflect any City agreed changes resulting from refinements to the Design and Construction and Maintenance Works, and any sustainability requirements of the Environmental Approvals, Permits, Licences and Approvals, and any other environmental plans and reports pursuant to Sections 3.7 and 3.9 of this Schedule 17. The Sustainability Plan (Updates) shall be prepared and submitted by Project Co to the City Representative as required, and in any event no later than June 1st annually.

**PART 4**  
**CONSULTATION**

**4.1 General**

- (a) The design and development of the Project shall be implemented in coordination with Stakeholder consultation commitments and requirements as set out in the Environmental Approvals, this Schedule 17, and Schedule 18 – Communications Protocol.



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**PART 5**  
**CONTAMINATION AND EXCAVATED MATERIAL MANAGEMENT**

**5.1 Notification Requirements**

- (a) Without limiting the notification obligations of Project Co in Section 16.2 of the Project Agreement, Project Co shall also undertake the notifications requirements detailed in Sections 5.2 and 5.3 of this Schedule.

**5.2 Notification to the City**

- (a) Project Co shall immediately notify the City Representative of :
- (i) the discovery of Contamination;
  - (ii) any Release of Contamination which includes any Release that could cause an adverse effect on the Project, the Lands or any other lands or subject Project Co or the City to any fines, penalties, orders, investigations or other proceedings under any Environmental Laws, together with full particulars of such Release, including the location, time, Government Authorities notified, damages suffered or caused and remedial action taken;
  - (iii) all charges, orders, investigations or notices of violation or non-compliance issued against Project Co or any Project Co Party relating to the performance of the Works and the Maintenance or the Lands under any Environmental Laws; and
  - (iv) any notice, claim, action or other proceeding by any person against Project Co or any Project Co Party or otherwise relating to the performance of the Works and Maintenance or the Lands concerning the Release or alleged Release of any Contamination.

**5.3 Notification to Governmental Authorities**

- (a) In addition to notifying the City Representative in accordance with Subsection 5.2(a), whenever required by applicable Environmental Laws, Project Co shall notify the relevant Governmental Authorities of any Release of any Contamination at or from or to the Lands.

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**5.4 Excavated Material Management Plan**

- (a) Project Co shall prepare and submit an Excavated Material Management Plan to the City Representative that describes how Project Co will address management of Contamination including handling, transportation, testing, disposal and/or ultimate disposition of all excavated material, i.e. soil, rock and solid waste excavated as part of the Works. The Excavated Material Management Plan shall describe and include, but not be limited to, the following:
- (i) procedures for management including handling, transportation, testing, disposal and/or ultimate disposition of excavated material;
  - (ii) measures to be undertaken to minimize excess excavated material generation and maximize reuse of excavated material within the Lands;
  - (iii) how Project Co will ensure excess excavated material management for the Works will be performed in compliance with Environmental Laws;
  - (iv) estimated quantities of excess excavated material to be generated by the Works, including but not limited to total material excavation; excavated material to be used within the Lands, and excavated material to be managed outside the Lands;
  - (v) how all excess excavated material generated by the Works will be managed using best management practices;
  - (vi) estimated grain size distribution of excavated materials generated during tunnel construction and how this material will be re-used within the Lands as well as how and where it will be stockpiled/processed for re-use outside the Lands;
  - (vii) protocol for how areas of known Contamination will be managed and estimated quantities of contaminated material to be disposed outside of the Lands;
  - (viii) protocol outlining how the potential discovery of contamination in areas not previously identified will be managed including the preparation of a plan for the remediation or removal of Contamination as detailed in Section 5.5(c) and
  - (ix) reporting procedures to document how all management activities and best practices have been implemented.
- (b) Where Project Co intends to dispose of excess excavated material outside the Lands, demonstrate that testing and sampling protocols have been followed to establish concentrations for chemical parameters of concern and that Environmental Laws have been complied with.
- (c) Project Co shall prepare and submit a report to the City Representative prior to Substantial Completion that summarizes how all excavated material management activities have been implemented during the Works and summarizes final quantities described in Section 5.4(a)(iv).

**5.5 Management Removal and Remediation**

- (a) With respect to any Contamination located on, in or under the Lands for which Project Co is responsible pursuant to Subsections 16.2(a) or 16.2(a1) of the Project Agreement, Project Co shall:
- (i) Complete an assessment of risk with respect to such Contamination and, on demonstrating to the reasonable satisfaction of the City that the Contamination does not represent a Risk to Human Health or the Environment as required by Applicable Law and that the Contamination would not otherwise be disturbed or altered as a result of the Project Co execution of the Project Agreement, implement any management or remedial measures as are required to ensure that such Contamination continues not represent a Risk to Human Health or the Environment as required by Applicable Law; and/or,
  - (ii) To the extent that Project Co does not, for any reason, satisfy the City, acting reasonably, that any Contamination located on, in or under the Lands does not represent a Risk to Human Health or the Environment as required by Applicable Law, Project Co shall promptly, and in any event prior to the Expiry Date or earlier termination of this Project Agreement, remove from the Lands all such Contamination or remediate all such Contamination to the numerical or risk-based standards required or permitted by Applicable Laws, and otherwise in accordance with Applicable Laws.

The above provisions shall not be construed as limiting the obligations of Project Co under Subsections 5.4(a)(vii) and (viii) and Section 5.5(c) of this Schedule 17 or Section 16 of the Project Agreement. Nothing in this Section 5.5 shall require Project Co to re-assess any risk in relation to Contamination on the Stage 2 Lands, provided that DB Co addressed such Contamination in accordance with the terms of the DB Co Works Agreement or as otherwise instructed or agreed by the City. To the extent that DB Co has submitted any plans as part of the DB Co Works in relation to Contamination on the Stage 2 Lands and implemented such plans in accordance with the terms of the DB Co Works Agreement or as otherwise instructed or agreed by the City, the City agrees that it will not require Project Co to further remediate or remove such Contamination. To the extent DB Co has not implemented such plans in accordance with the terms of the DB Co Works Agreement or as otherwise instructed or agreed by the City, this shall constitute a DB Co Defect and the provisions of the DB Co Interface Agreement shall apply accordingly. Nothing in this Section 5.5 shall prevent Project Co from pursuing a claim under Section 9.12 of the Project Agreement for Equivalent Project Relief.

- (b) In addition to Project Co's obligations under Section 16 of the Project Agreement and this Schedule 17, with respect to any Contamination or Existing Contamination or Stage 2 Existing Contamination for which Project Co or any Project Co Party is responsible for Releasing as described in Section 16.2(b) of the Project Agreement, Project Co shall promptly remove or remediate all such Contamination to the numerical or risk-based standards required or permitted by Applicable Laws, and otherwise in accordance with

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Applicable Laws, all in accordance with a plan prepared and accepted by the City pursuant to Subsection 5.5(c) below.

- (c) Upon encountering any Contamination at the Lands that is not addressed in an Excavated Material Management Plan, for which Project Co is responsible pursuant to Section 16.2(a), Section 16.2(a1) or Section 16.2(b) of the Project Agreement or for which the City is responsible pursuant to Section 16.2(c) of the Project Agreement, if instructed to do so by the City Representative pursuant to Section 16.2(f) of the Project Agreement, Project Co shall:
- (i) prepare and submit to the City Representative pursuant to the Review Procedure a plan for the remediation or removal of such Contamination, if such remediation or removal is required in accordance with this Project Agreement, or otherwise confirming that no such remediation or removal is so required. Following the acceptance of such plan by the City Representative, Project Co shall commence and complete any required remedial or removal work in accordance with such plan, keeping the City Representative informed with respect to the status of the remedial or removal work. Any plan accepted by the City Representative pursuant to this Section 5.5(c) shall be incorporated into an Excavated Material Management Plan.

## 5.6 Hazardous Substances Brought onto Site

Notwithstanding any Applicable Laws or any other provision in this Project Agreement to the contrary, all products and materials, goods or other items which in their natural, original state, or through environmental transformation or degradation contain Hazardous Substances, brought onto the Lands by Project Co or any Project Co Party or any person for whom Project Co is in law responsible shall be and remain the sole and exclusive property and responsibility of Project Co and shall not become the property or responsibility of the City, notwithstanding their incorporation into or affixation to the Lands or the System Infrastructure and notwithstanding any termination or expiration of the Project Agreement. Any resulting Contamination at the Lands and the remediation and/or removal thereof and the cost of such remediation and/or removal shall be the sole responsibility of Project Co.

## 5.7 Designated Substances Listing

Without limiting the obligations of Project Co as defined in Schedule 15-2, Part 1, Article 16, or otherwise under Applicable Law, Project Co shall be responsible for providing each Subcontractor with the designated substances listing prepared by the City pursuant to the designated substances survey work initiated by the City prior to Financial Close as described in Sections 2.2 (c)(i)(V) and 2.3(b)(i)(G) of this Schedule 17, and to undertake any required work to update the designated substances listing throughout the Project Term.

## 5.8 Dewatering Management Plan

- (a) Project Co shall prepare and submit a Dewatering Management Plan to the City Representative that describes how Project Co will address the management of excess

water generated by the Project. The Dewatering Management Plan shall include any dewatering requirements detailed in Schedule 15-2, Part 1, Article 12 and Article 18 and shall include, but not be limited to, the following:

- (i) procedures for water testing, containment, classification, treatment, and disposal/discharge;
  - (ii) how Project Co will ensure water management for the Project will be performed in compliance with Environmental Laws; and
  - (iii) report procedures to document how all management activities and best practices have been implemented.
- (b) Project Co shall prepare and submit a report to the City Representative prior to Substantial Completion that summarizes how all dewatering management activities have been implemented during the Works and summarizes their outcomes.
- (c) For the avoidance of doubt, Project Co shall incorporate within its Dewatering Management Plan any obligations within the equivalent plan submitted to the City in respect of the DB Co Works and which relate to the Maintenance Services.

## **5.9 Spill Prevention and Response Plan**

- (a) Project Co shall prepare and submit a Spill Prevention and Response Plan to the City Representative that describes how the Project Co will address management of spills generated by the Works and Maintenance. The Spill Prevention and Response Plan shall describe and include, but not be limited to, the following:
- (i) procedures for notification and reporting, spill containment, and spot spills;
  - (ii) response strategy for spill adjacent to or into a waterbody; and
  - (iii) practices to be employed for reducing the potential for spill and materials/equipment from entering water including re-fuelling protocols.
- (b) Project Co shall prepare and submit a Spill Prevention and Response Plan report to the City Representative prior to Substantial Completion that summarizes how all Spill Prevention and Response Plan activities have been implemented during the Works and summarizes their outcomes.
- (c) For the avoidance of doubt, Project Co shall incorporate within its Spill Prevention and Response Plan any obligations within the equivalent plan submitted to the City in respect of the DB Co Works and which relate to the Maintenance Services.

**PART 6**  
**ELECTROMAGNETIC COMPATIBILITY AND INTERFERENCE (EMC/EMI)**

**6.1 EMC/EMI**

- (a) Project Co shall be responsible for the testing of and mitigation measures related to human exposure to static and time-varying electric and magnetic fields in accordance with the provision of Schedule 15-2, Part 4, Article 9.
- (b) For the avoidance of doubt, Project Co's obligations hereunder shall include the measures applicable to the DB Co Works set out in Article 11 of Part 3 of Schedule 15-2 – Design and Construction Requirements of the DB Co Works Agreement.

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**PART 7**  
**ARCHAEOLOGY AND CULTURAL HERITAGE**

**7.1 Archaeology Risk Management**

- (a) Project Co will be responsible to develop an Archaeology Risk Management Plan, as detailed in Table 3.1 of Schedule 17 and subject to Section 16.3 of this Project Agreement. The Archaeology Risk Management Plan will address any recommendations resulting from archaeological reports prepared for the Project and protocols for the discovery of human remains or undocumented archaeological resources. Consultation with the Algonquins of Ontario will be undertaken as part of the development of the protocols and the overall Archaeology Risk Management Plan. The Archaeology Risk Management Plan shall include as a minimum the following requirements:
- (i) the actions required resulting from the recommendations of the archaeological assessment reports completed by the City including any archaeological monitoring requirements by a licenced archaeologist during construction activities;
  - (ii) a process for amending the Archaeological Risk Management Plan to incorporate any additional actions required resulting from subsequent archaeological assessment reports completed;
  - (iii) a protocol to be followed should human remains be discovered which includes how Project Co will ensure that human remains are managed in compliance with Applicable Laws including the *Cemeteries Act*, R.S.O. 1990 c. C.4 and the *Funeral, Burial and Cremation Service Act*, 2002, S.O. 2002, c.33 (when proclaimed in force) whereby any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services, as well as the Ministry of Tourism and Culture;
  - (iv) a protocol to be followed should previously undocumented archaeological resources be discovered which includes how Project Co will ensure that previously undocumented archaeological resources are managed in compliance with Applicable Laws including Section 48 (1) of the *Ontario Heritage Act*, including assessing the need to monitor sites by a licensed archaeologist during construction whereby the proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork; and
  - (v) a process to ensure that Project Co complies with Applicable Laws for the management of archeological sites including Sections 48 and 69 of the *Ontario Heritage Act* which state that it is an offence for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artefact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister of Tourism and Culture

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stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Registrar of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

## 7.2 Built Heritage and Cultural Landscapes Best Practice Guidelines

- (a) Project Co shall be guided by the following best practice guidelines for the Works. The best practice guidelines shall include as a minimum the following:
- (i) new construction that will have an adverse visual impact on character defining elements of heritage structures, landscapes, and properties be mitigated by the design and placement of new structures to be sympathetic and secondary to the adjacent cultural heritage resources of the area;
  - (ii) any specifically identified views or cultural landscapes be conserved;
  - (iii) any policies relating to visual character in any supporting City policy document/by-law will be reflected;
  - (iv) the design for the tunnelled station entryways and supporting infrastructure take into account the surrounding cultural heritage resources and be both sympathetic and secondary to these resources; and
  - (v) prior to the finalization of entryway and supporting infrastructure designs, the draft designs be reviewed by the appropriate Stakeholders, and be assessed against the applicable municipal, provincial, and federal plans, guidelines or policies.



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**PART 8**  
**AIR QUALITY, NOISE AND VIBRATION**

**8.1 Air Quality**

- (a) Project Co, as part of the Works, will include the following:
- (i) requirements for designing, purchasing, and operating equipment according to applicable regulatory requirements, land use permits, and industry best management practices for air quality management;
  - (ii) measures for managing project related air emissions including fugitive dust and odour; and
  - (iii) meeting all applicable regulatory requirements and standards regarding air emissions including fugitive dust and odour.

**8.2 Noise and Vibration General**

- (a) Project Co, as part of the Works will include, without limiting the requirements set forth in Sections 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, and 8.11 of this Schedule 17, the following:
- (i) measures to manage the adverse effects of ground-borne and air-borne noise and vibration by minimizing and mitigating noise and vibration generated as a result of the Project activities;
  - (ii) meeting best management practices and standards as well as municipal, provincial and federal and regulatory requirements pertaining to ground-borne and air-borne noise and vibration; and
  - (iii) designing, constructing, procuring, and operating equipment according to Section 8.2 (a) (i) and (ii).
- (b) Project Co shall ensure that the effects from blasting during construction will be managed in accordance with the City of Ottawa's Specification S.P. No: F-1201 'Use of Explosives', except for Sensitive Receivers where more stringent criteria as detailed in Section 8.6 may apply.
- (c) Project Co will consider time of day impacts when assessing the mitigation measures during construction and maintenance including those from vibration effects of blasting.

**8.3 Ground-Borne Noise and Vibration Assessment**

- (a) Project Co shall engage a qualified Acoustical Engineer to assess potential noise and vibration impacts resulting from their design and construction plans.

- (b) Project Co shall, as a minimum, undertake ground-borne noise and vibration assessments such as those described in the Federal Transit Administration's Transit Noise and Vibration Impact Assessment, Report FTA-VA-90-1003-06, Federal Transit Authority, U.S. Department of Transportation, 2006, or as amended. Additional alternative methods of assessment may also be applied, as deemed appropriate by Project Co's Acoustical Engineer. Where an alternative assessment is proposed to be applied for a Sensitive Receiver, the alternative assessment shall be developed in consultation with the Sensitive Receiver and accepted by the City Representative.
- (c) For Sensitive Receivers, Project Co shall undertake detailed ground-borne noise and vibration assessments which will include measurement of the following as inputs:
- (i) line source force density levels for the proposed Vehicle; and
  - (ii) line source transfer mobilities from the tracks to the Sensitive Receiver (facility/space, as appropriate).

Additional alternative methods of assessment may also be applied, as deemed appropriate by Project Co's Acoustical Engineer. Where an alternative assessment is proposed to be applied for a Sensitive Receiver, the alternative assessment shall be developed in consultation with the Sensitive Receiver and accepted by the City Representative.

- (d) Project Co shall apply the resulting data from these measurements to the prediction of anticipated worst-case ground-borne noise and vibration impacts from construction, operations and maintenance within the receiver space(s) of the Sensitive Receiver. The estimation procedure shall include predictions of sound pressure levels within the space for comparison with the applicable design criteria set forth in Section 8.6.

#### **8.4 Ground-Borne Noise and Vibration Mitigation**

- (a) Project Co shall develop, in consultation with stakeholders and for the City Representative's review and acceptance, ground-borne noise and vibration mitigation measures to be implemented during construction and during the Maintenance Term in areas along the corridor to meet the applicable criteria detailed in this Schedule 17.
- (b) Given the sensitive uses along the Project alignment, mitigation measures will likely be necessary to ensure that the noise and vibration criteria limits are satisfied. Project Co shall design effective mitigation measures to ensure that the maximum allowable sound level limits outlined in Section 8.6 of this Schedule 17 are satisfied.
- (c) Project Co should understand the sensitivities along the Project alignment. Mitigation measures may include floating trackbed and resilient fasteners or equivalent measures.
- (d) Subject to the requirements and criteria for specific Sensitive Receivers set out in Section 8.6 of this Schedule, Project Co shall ensure that mitigation measures for Sensitive Receivers are developed to address ground borne noise and vibration impacts within buildings and or facilities resulting from the construction of the OLRT system, and due solely to construction sources.

- (e) Despite Section 8.4 (d), for Sensitive Receivers during construction, in cases where it is not practicable to meet the criteria outlined in Sections 8.6 of this Schedule 17, Project Co shall coordinate with the affected noise and vibration Sensitive Receivers and the City Representative to identify acceptable alternative means and measures to allow construction to proceed, which may include temporary relocation of the Sensitive Receivers.
- (f) The performance of selected mitigation measures for application during the Maintenance Term must be verified using test data measured on similar track conditions, vehicle type and operating conditions as provided in Project Co's detailed design.
- (g) For the avoidance of doubt, Project Co's maintenance obligations shall include implementing equivalent measures applicable to the DB Co Works.

### 8.5 Ground-Borne Noise and Vibration – General Design Criteria

- (a) Project Co shall develop noise and vibration criteria for use during the construction period. These criteria will be presented to the City's Representative for acceptance.
- (b) Subject to more stringent requirements applicable to Sensitive Receivers set out in Section 8.6, Project Co shall ensure that ground-borne noise and vibration impacts within buildings and or facilities resulting from the operations and maintenance of the LRT system during the Maintenance Term shall not exceed the criteria specified in Table 8.1 and in Table 8.2.

**Table 8.1 – Ground-Borne Noise Criteria<sup>5</sup>**

Land Use	Assessment Criteria (dB re 20 micro-Pascals) <sup>1,5</sup>		
	Frequent Events <sup>2</sup>	Occasional Events <sup>3</sup>	Infrequent Events <sup>4</sup>
Residences and buildings where people normally sleep.	35 dBA	38 dBA	43 dBA
Institutional land uses with primarily daytime use.	40 dBA	43 dBA	48 dBA

- Notes:
1. An event is defined as a single OLRT vehicle passby.
  2. Frequent events are defined as more than 70 OLRT vehicle passbys per day.
  3. Occasional events are defined as between 30 and 70 OLRT vehicle passbys per day.
  4. Infrequent events are defined as less than 30 OLRT vehicle passbys per day.
  5. Decibels (dB) reference to 20 micro-Pascals.
  6. The criteria in this table do not apply to vibrations resulting from use of explosives. Refer to Clause 8.2(b) for criteria applicable in connection with the use of explosives.

**Table 8.2 – Ground-Borne Vibration Criteria**

Land Use	Assessment Criteria (VdB re 1 micro-in/sec) <sup>1,5</sup>		
	Frequent Events <sup>2</sup>	Occasional Events <sup>3</sup>	Infrequent Events <sup>4</sup>
Residences and buildings where people normally sleep.	72	75	80
Institutional land uses with primarily daytime use.	75	78	83

- Notes:
1. An event is defined as a single OLRT vehicle passby.
  2. Frequent events are defined as more than 70 OLRT vehicle passbys per day.
  3. Occasional events are defined as between 30 and 70 OLRT vehicle passbys per day.
  4. Infrequent events are defined as less than 30 OLRT vehicle passbys per day.
  5. Vibration velocity levels reported in decibels relative to a level of 1 micro-inch/second denoted as VdB.
  6. The criteria in this table do not apply to vibrations resulting from use of explosives. Refer to Clause 8.2(b) for criteria applicable in connection with the use of explosives.

## 8.6 Ground-Borne Noise and Vibration Detailed Design Criteria – Sensitive Receivers

- (a) Project Co's Acoustical Engineer shall undertake the following in relation to potentially Sensitive Receivers of ground-borne noise and vibration:
- (i) a survey of the lands along the Project alignment and/or within a zone of influence of rail noise and vibration impacts, as determined by the Acoustical Engineer, to identify potential Sensitive Receivers including heritage structures; the survey will also include the identification of specific sensitive equipment or procedures;
  - (ii) the survey will be conducted in consultation with the potentially Sensitive Receivers and the list of Sensitive Receivers developed from the survey will be presented to the City for acceptance; and
  - (iii) baseline noise and vibration measurements at and/or within the Sensitive Receiver locations as determined by the Acoustical Engineer in consultation with the Sensitive Receiver and accepted by the City's Representative.
- (b) Project Co shall ensure that baseline measurements are done using methods and instrumentation that are appropriate for the evaluation of vibration performance of the space (i.e., transducer sensitivity, spectral resolution and spatial orientation).
- (c) Project Co's Acoustical Engineer shall develop a ground-borne noise and vibration standard criteria for Sensitive Receivers ("Ground Borne Noise and Vibration Standard for Sensitive Receivers"), through the assessment and evaluation of the baseline measurements, consultation with the Sensitive Receiver groups and a review of any sensitive equipment's specific manufacturer requirements except for the National Arts Centre, the Canadian Broadcasting Corporation and the Government Conference Centre, where the criteria detailed in Sections 8.6 (e) and 8.6 (f) will be used as the Ground Borne Noise and Vibration Standard. These standard criteria will be reviewed and accepted by the City Representative.
- (d) As a minimum, for a given noise and/or vibration Sensitive Receiver, the OLRT intrusion criteria listed in Table 8.3 and Table 8.4 shall be applied to assess noise and vibration intrusion due to the construction as well as the operation of OLRT unless acceptable means and measures have been determined, in accordance with Section 8.4 (d), for the construction period.

- (e) For the National Arts Centre, the Canadian Broadcasting Corporation and the Government Conference Centre, Project Co shall use the sound level limits for OLRT intrusion criteria listed in Tables 8.5, 8.6 and 8.7 as the respective representative Ground Borne Noise Standard for Sensitive Receivers. Working in concert with the Sensitive Receivers, Project Co's Acoustical Engineer will verify these sound level criteria by taking measurements during normal operations as part of the final design process in cooperation with the National Arts Centre, the Canadian Broadcasting Corporation and the Government Conference Centre. Should any revisions to these criteria be proposed by Project Co's Acoustical Engineer based on the verification process, these criteria will be presented to the City's Representative for acceptance.
- (f) For the National Arts Centre, the Canadian Broadcasting Corporation and the Government Conference Centre, Project Co shall use a vibration limit for tactile perceptibility of OLRT intrusion of 72 VdB re 1 micro-in/sec root-mean square vibration velocity as measured in one third octave bands of frequency over the range of 8 Hz to 80 Hz, in the critical spaces listed in Tables, 8.5, 8.6 and 8.7. Vibration levels lower than this limit may be required to comply with the criteria limits listed in Tables 8.5, 8.6 and 8.7, in which case a more stringent vibration threshold would apply.
- (g) Project Co shall ensure that ground borne noise and vibration intrusion levels due to the OLRT vehicle passby at Sensitive Receivers do not exceed the Ground Borne Noise and Vibration Standard for Sensitive Receivers.

### **8.7 Monitoring During Construction – Sensitive Receivers**

- (a) Prior to construction Project Co shall develop, as a component of their Complaint Protocol detailed in Schedule 18, a process for managing and responding to noise and vibration concerns during construction. This component of the Complaint Protocol shall be developed in consultation with Sensitive Receivers and presented to the City Representative for acceptance.
- (b) During construction which has the potential to impact a Sensitive Receiver Project Co's Acoustical Engineer shall provide noise and vibration monitoring. For the National Arts Centre, the Canadian Broadcasting Corporation and the Government Conference Centre, continuous monitoring shall be provided as a minimum.
- (c) Project Co shall prepare and submit to the City Representative, weekly reports of the monitoring detailed in Section 8.7(a).
- (d) Project Co shall report in a timely manner, and in any event within 24 hours, any identified non-conformance with the Ground Borne Noise and Vibration Standard for Sensitive Receivers resulting from the monitoring, to the City Representative.
- (e) To address any such non-conformance, Project Co shall develop and implement mitigation measures in consultation with the Sensitive Receiver and with the acceptance of the City Representative.

**8.8 Monitoring During the Maintenance Term**

- (a) Project Co's Acoustical Engineer shall carry out a survey of noise and vibration measurements for Sensitive Receivers, with reference to the baseline measurements and the Ground Borne Noise and Vibration Standard for Sensitive Receivers, once every two years during the Maintenance Term.
- (b) Project Co's Acoustical Engineer shall respond to requests from the City's Representative to investigate complaints regarding noise and vibration for Sensitive Receivers in accordance with its Complaint Protocol detailed in Schedule 18, and shall determine whether to initially apply mitigation strategies or conduct additional monitoring.
  - (i) In the case where Project Co applies mitigation measures, these measures shall be applied within 48 hours of the request for investigation being made by the City Representative to Project Co, or within an alternative time frame agreed to by the City Representative, acting reasonably. The mitigation measures shall be effective in ensuring compliance with the Ground Borne Noise and Vibration Standard for Sensitive Receivers.
  - (ii) In the case where Project Co conducts additional monitoring, Project Co's Acoustical Engineer shall carry out site-specific noise and vibration measurements for Sensitive Receivers within 48 hours of a request being made by the City to Project Co, or within an alternative time frame agreed to by the City Representative, acting reasonably.
- (c) Project Co's Acoustical Engineer shall provide the summary results and data of any such site-specific noise and vibration measurements, conducted in accordance with (a) or (b) above, to the City Representative within 48 hours of the completion of field measurements required for the survey, or within an alternative time frame agreed to by the City Representative, acting reasonably.
- (d) Project Co shall be responsible for the costs of noise and vibration measurements in response to complaints of up to ten (10) sites per Contract Year. Any additional site-specific noise and vibration measurements shall be: paid for by Project Co if the results indicate that Project Co was not in compliance with the Ground Borne Noise and Vibration Standard for Sensitive Receivers, or shall be paid for by Project Co and reimbursed by the City, by way of an adjustment to the immediately following Monthly Service Payment, if the results indicate that Project Co was in compliance with such standard.

**8.9 Penalty for Non-Conformance - KPM**

- (a) If the results of any survey conducted pursuant to Section 8.8 demonstrate that Project Co is not in full compliance with the Ground Borne Noise and Vibration Standard for Sensitive Receivers, or if Project Co's mitigation measures under Section 8.8(b)(i) do not result in full compliance with the Ground Borne Noise and Vibration Standard for

Sensitive Receivers, then Project Co shall rectify all such non-conformance within seven (7) days of the date of the survey being provided to the City Representative and Project Co. Project Co shall cause its Acoustical Engineer to carry out all necessary measurements to demonstrate that non-conformances have been rectified and shall provide these results to the City Representative.

- (b) The City Representative may provide Project Co with a longer period of time (greater than 7 days) to rectify non-conformance, at the City Representative's Discretion.
- (c) If Project Co fails to demonstrate that it has Rectified all such non-conformance within the seven (7) day time period, or such longer period as may be permitted by the City Representative in accordance with Section 8.9(b) above, a special Service Failure shall apply and the City shall deduct \$5000 per day from the Monthly Service Payment, and assess three (3) Failure Points per day, until Project Co demonstrates Rectification.

#### **8.10 Commissioning Noise and Vibration Compliance - Sensitive Receivers**

- (a) Project Co shall conduct compliance verification measurements for Sensitive Receivers in accordance with the requirements outlined in this Section 8.10. These measurements shall be conducted by Project Co's Acoustical Engineer in consultation with the Sensitive Receivers and for acceptance by the City Representative. Compliance testing may be subject to independent verification measurements conducted by the City.
- (b) Project Co shall prepare a compliance measurement plan prior to undertaking any measurements. A separate compliance measurement plan shall be prepared for each Sensitive Receiver facility and shall clearly outline the measurement process, measurement equipment, measurement locations and analysis methods. Measurement plans shall be developed in consultation with the Sensitive Receivers and for acceptance by the City Representative prior to commencing any measurements.
- (c) The compliance verification measurements shall be compared with the appropriate ground-borne noise and vibration criteria for Sensitive Receivers outlined in Section 8.6.
- (d) Measurements shall be conducted for sound and vibration simultaneously at sensitive receiver spaces at the most critical normal listening positions.
- (e) Test equipment, including all microphones and accelerometers, shall be selected appropriately to ensure that they have low enough noise floors to measure levels consistent with the criteria for Sensitive Receivers outlined in Section 8.6. As a minimum, Project Co shall use the following measurement equipment: Type 1 sound level meters with octave band filters and; seismic accelerometers with sensitivities of 1 V/g or higher.
- (f) Measurements shall be conducted in a manner that is appropriate for the intended use of the space and is consistent with best practices. Unless dictated otherwise by the usage of the space, ambient noise measurements shall be performed in octave bands with the meter time constant set to FAST (125ms), and shall be performed during ambient conditions

that are representative of the intended usage of the space. Where appropriate, and consistent with the intended use, extraneous noise interruptions shall be excluded from the measurements.

### **8.11 Commissioning Noise and Vibration Compliance - National Arts Centre and Canadian Broadcasting Corporation and the Government Conference Centre**

- (a) Compliance verification measurements for the National Arts Centre, the Canadian Broadcasting Corporation and the Government Conference Centre shall be conducted as outlined in Section 8.10 and in this Section 8.11.
- (b) The duration for ambient noise measurements shall be at least 20 seconds. Measurements of  $L_{min}$ ,  $L_{max}$  and  $L_{eq}$  in each octave band from 20 Hz to 8 kHz shall be reported for each of the measurement locations. The intention of the measurements is to quantify steady state ambient noise. If an intruding sound is audible during the 20 second measurement period, that measurement shall be discarded and a new one initiated. In order to ensure that occasional intrusions are excluded from the measurements and in the event of a disagreement, the following standard shall be satisfied. With the meter's time constant set to FAST, the overall  $L_{max}$  minus  $L_{min}$  (linear response) shall be less than 8 dB for all measurement locations. If this condition is not satisfied then the measurement shall be repeated.
- (c) The reported ambient noise level in each octave band shall be the average of all  $L_{eq}$  measurement locations, provided that the  $L_{max}$  minus  $L_{min}$  condition in Section 8.11(b) has been satisfied.
- (d) Project Co shall conduct measurements to quantify reasonable operating worst case OLRT noise and vibration intrusion levels. The OLRT noise levels shall be based on  $L_{max}$  with a FAST time constant (125ms). Measurements shall be made in octave bands. The  $L_{max}$  for each train passby shall be reported and shall not exceed the noise level limits outlined in Tables 8.5, 8.6 or 8.7, as applicable, at any measurement location.
- (e) Building systems may be turned off during these measurements to improve the signal to noise ratio and more clearly determine whether the sound levels measured are attributable to the operation of the OLRT.
- (f) If the  $L_{max}$  sound level demonstrates exceedance of the limits as outlined in Table 8.5, Table 8.6 or Table 8.7, as applicable, Project Co shall develop a rectification plan in consultation with the Sensitive receptor and for acceptance by the City Representative.



**Table 8.3 – Ground-borne Vibration Criteria for Sensitive Receiver Spaces**

Description of Use	Maximum RMS Vibration Velocity Level (VdB re 1 micro-in/sec)
Usually adequate for computer equipment, semiconductor probe test equipment, and microscopes with less than 40x magnification.	78 <sup>1</sup>
Suitable in most instances for general surgical suites, microscopes to 100x magnification and for other equipment of low sensitivity. Upper bound for animal spaces (vivaria etc.), residential sleep areas.	72 <sup>1</sup>
Adequate in most instances for optical microscopes to 400x magnification, microbalances, mass spectrometers other than MALDI and quadrupole or high-resolution, conventional spectrophotometers, etc. Lower bound of range appropriate for animal spaces (vivaria etc.).	66 <sup>1</sup>
Appropriate for microtomes and cryotomes for 5 - 10 micron slices, most tissue and cell cutters, except as noted below. Most CT, CAT, PET, fMRI, SPECT, DOT, EROS.	60 <sup>1</sup>
Appropriate standard for optical microscopes to 1000x magnification; moderately sensitive electron microscopes to 1 mm detail size; digital imaging and/or fluorescence with optical microscope; high precision balances measuring quantities less than 1 mg; MALDI mass spectrometer; nano-drop spectrophotometers, microtomes, and cryotomes for slices less than 5 microns; and tissue and cell culture of the following slices less than 5 microns; and tissue and cell culture of the following types - hanging drop, unstirred layers, embryonic stem cells, weakly adherent cells, very long-term cultures, chemotaxis, and invasion assays. TFT-LCD stepper/scanner processes.	54 <sup>2</sup>
Suitable in most instance for demanding equipment, including many electron microscopes (SEM and TEM) to 30,000x magnification, microinjection, micromanipulation, electrophysiology, confocal microscopy, and quadrupole and other high-resolution mass spectrometers. Many nuclear magnetic resonance (NMR) systems require this environment. Low strength MRI (1.5T or less).	48 <sup>2</sup>
Assumed to be adequate for the most demanding of sensitive systems, including long path, laser-based, small-target systems; systems working at nanometer scales; and other systems requiring extraordinary dynamic stability. Many NMR and MRI (3.0T and higher) systems perform best in this environment.	42 <sup>2</sup>

- Notes:
1. Root Mean Square (RMS) vibration velocity as measured in one-third octave bands of frequency over the range of 8 Hz to 80 Hz.
  2. RMS vibration velocity as measured in one-third octave bands of frequency over the range of 1 Hz to 80 Hz.

Table 8.4 – Ground-borne Noise Criteria for Detailed Assessment of Sensitive Facilities

Room Types	Room Criteria (RC)	Room Types	Room Criteria (RC)
<b>Residences/Apartments/ Condominiums</b>	25 to 35	<b>Performing Art Spaces</b>	
<b>Hotels/Motels</b>		Drama theatres, concert and recital halls	25
Individual rooms or suites	25 to 35	Music teaching studios	25
Meeting/banquet rooms	25 to 35	Music practice rooms	30 to 35
Corridors, lobbies	35 to 45	<b>Laboratories (with fume hoods)</b>	
Service/support areas	35 to 45	Testing/research, minimal speech communication	45 to 55
<b>Office Buildings</b>		Research, extensive telephone use, speech communication	40 to 50
Executive and private offices	25 to 35	Group teaching	35 to 45
Conference rooms	25 to 35	<b>Church, Mosque, Synagogue</b>	
Teleconference rooms	≤25	General assembly with critical music programs	25 to 35
Open-plan offices	≤40	<b>Schools</b>	
with sound masking	≤35	Classrooms	25 to 30
Corridors and lobbies	40 to 45	Large lecture rooms	25 to 30
<b>Hospitals and Clinics</b>		Without speech amplification	≤25
Private rooms	25 to 35	<b>Libraries</b>	30 to 40
Wards	30 to 40	<b>Indoor Stadiums, Gymnasiums</b>	
Operating rooms	25 to 35	Gymnasiums and natatoriums	40 to 50
Corridors and public areas	30 to 40	Large seating-capacity spaces with speech amplification	45 to 55
<b>Courtrooms</b>			
Unamplified speech	25 to 35		
Amplified speech	30 to 40		

Note: Table 8.4 per American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) Handbook, 2011, Chapter 48 Noise and Vibration Control, or as amended.

**Table 8.5 – Sound Pressure Level Limits Criteria for OLRT Intrusion NAC.**

Note: sound level limits were developed by subtracting 3dB from the measured ambient levels in the 31.5Hz, 63Hz, and 125Hz octave bands, and subtracting 6dB from the measured level in and above the 250Hz octave bands.

Room	Octave Band Centre Frequency (Hz)					
	31	63	125	250	500	1000
Southam Hall	47*	38	32	22	15	9
Theatre Hall	47*	38	32	22	14	7
Studio Hall	40*	34*	32	21	15	9
Rehearsal Hall A	37*	32*	31	9	1	0
Rehearsal Hall B	41*	34*	32	15	15	8
Hexagon Studio	55*	40	32	22	15	9

\* These values, which represent the existing conditions, are below the threshold of audibility. In the 31 Hz and 63 Hz octave bands, the threshold of audibility is 56 dB and 36 dB respectively. LRT intrusion levels do not need to satisfy criteria below the threshold of audibility.

**Table 8.6 – Sound Pressure Level Limits Criteria for OLRT Intrusion CBC**

Note: sound level limits were developed by subtracting 3dB from the measured ambient levels in the 31.5Hz, 63Hz, and 125Hz octave bands, and subtracting 6dB from the measured level in and above the 250Hz octave bands.

Room Types	31.5	63	125	250	500	1K	2K	4K	8K
Basement Level	57	44	43	36	35	25	17	8	3
1 <sup>st</sup> Floor									
TV Studios	57	39	32	24	21	16	11	7	5
Radio Studios	57	41	38	28	13	5	3	3	3
TV Plateaus	57	52	45	30	22	15	12	7	3
Control Rooms	57	42	39	32	24	21	13	9	4
Super Booths	57	41	41	25	18	18	14	9	3
Announce Booths	57	38	31	23	15	5	3	3	3
Open News Room	59	52	47	37	29	24	19	12	3
Isolation Booth	57	51	39	21	20	8	3	3	3
2 <sup>nd</sup> Floor									
TV Studios	57	47	36	18	12	5	4	3	3
Production Studios	57	37	27	13	11	5	3	3	3
Control Rooms	58	41	37	33	29	24	18	13	6
Edit Suites	57	47	45	30	20	17	13	8	3
Super Booths	57	36	33	14	8	5	3	3	3
Vocal Booths	57	41	36	16	14	6	3	3	3

**Table 8.7 – Sound Pressure Level Limits Criteria for OLRT Intrusion Government Conference Centre**

Note: sound level limits were developed by subtracting 3dB from the measured ambient levels in the 31.5Hz, 63Hz, and 125Hz octave bands, and subtracting 6dB from the measured level in and above the 250Hz octave bands.

Room Names & Numbers	Octave Band Centre Frequencies (Hz)								
	31.5	63	125	250	500	1K	2K	4K	8K
<b>1st Floor</b>									
Annex Room (103)	57	56	55	47	44	40	33	23	12
Sussex Lounge (104)	57	50	53	40	33	25	17	12	9
Sussex Room (106)	57	53	51	35	31	21	16	8	6
Sussex Room Translation Booth (typ.)	57	49	42	35	28	19	10	6	6
Main Hall	57	49	48	39	35	32	27	18	9
Main Hall Translation Booth (typ.)	57	37	28	18	15	13	9	6	5
Main Hall Broadcast Booth (typ.)	57	46	43	33	30	28	23	14	8
Office (168)	57	41	42	30	26	17	16	9	6
Meeting Room (175)	57	46	40	32	25	20	12	7	6
<b>2nd Floor</b>									
Conference Room (200)	57	47	47	37	33	30	19	12	6
Conference Room (200) Translation Booth	57	40	40	27	18	14	15	5	5
<b>3rd Floor</b>									
Open Office (304)	57	36	32	22	23	8	8	6	6
Office (303)	57	36	31	23	18	13	12	8	7
Office (312)	57	37	37	23	17	15	14	9	8
<b>4th Floor</b>									
Meeting Room (408)	57	41	40	25	20	11	6	5	5
Meeting Room / Office (411)	57	48	47	37	30	19	17	13	7
Gatineau Room (415)	57	50	44	32	28	25	20	10	6
Gatineau Room (415) Translation Booth	57	36	32	24	15	10	10	8	6
Colonel By Room (412) Translation Booth	57	36	22	13	8	5	4	5	6
Colonel By Room (412)	57	40	37	23	18	12	14	7	6
<b>5th Floor</b>									
Rideau Room (508)	58	44	43	36	32	26	21	9	6
Rideau Room (508) Translation Booth	57	40	35	28	22	26	22	13	7
Meeting Room (519)	57	40	42	28	28	18	11	6	6
Centennial Room (517)	57	48	43	32	30	23	15	10	7
Centennial Room (517) Translation Booth	57	41	37	23	18	13	9	5	6

**PART 9**  
**PERFORMANCE CRITERIA**

**9.1 Application of Performance Criteria**

The Quality Failures set out below and associated payment penalties shall not be applicable until following the Revenue Service Availability Date.

**9.2 Performance Criteria**

FE Type	Category	Response	Rectification/ Remedial	Recording Frequency
AF =Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime St. Avail = Captured by the Station Availability deduction regime	N/A = Not Applicable	N/A = Not Applicable ND = Correct by start of service the following day	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Application (Maximum Project Co exposure)
3.8(c)	Environmental Management Plan (Updates) shall be prepared and submitted by Project Co to the City Representative as required, and in any event no later than June 1st annually.	QF	Medium	N/A	1 day	PE	1 QF per day
3.10(c)	Sustainability Plan (Updates) shall be prepared and submitted by Project Co to the City Representative as required and in any event no later than June 1 annually.	QF	Medium	N/A	1 day	PE	1 QF per day

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Application (Maximum Project Co exposure)
8.5(b)	Project Co shall ensure that ground-borne noise and vibration impacts within buildings and or facilities resulting from the operations of the LRT system during the Maintenance Term shall not exceed the criteria specified in Table 8.1 and in Table 8.2.	SF	Major	N/A	2 days	PE	1 SF per day
8.6(f)	Project Co shall ensure that ground-borne noise and vibration impacts on Sensitive Receivers do not exceed the Ground Borne Noise and Vibration Standard for Sensitive Receivers.	SF	As per Section 8.9 - \$5000 per day and application of 3 FP per day	N/A	As per Section 8.9 – 7 days	PE	1 SF applied per day when condition of non-conformance is identified
8.8(a)	Project Co’s Acoustical Engineer shall carry out monitoring by undertaking a survey of noise and vibration measurements for Sensitive Receivers, with reference to the baseline measurements and the Ground Borne Noise and Vibration Standard for Sensitive Receivers biennially during the Maintenance Term and in any event no later than June 1 <sup>st</sup> in the year the monitoring is undertaken.	QF	Major	N/A	21 days	PE	1 QF per day
8.8(b)(i)	Project Co’s mitigation measures shall be applied within 48 hours of the request for investigation being made by the City Representative to Project Co, or within an alternative time frame agreed to by the City Representative, acting reasonably. The	SF	As per Section 8.9 - \$5000 per day and application of 3 FP per day	N/A	As per Section 8.9 – 7 days from delivery of original survey to City	PE	1 SF applied per day when condition of non-conformance is identified.

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Application (Maximum Project Co exposure)
	mitigation measures shall be effective in ensuring compliance with the Ground Borne Noise and Vibration Standard for Sensitive Receivers						
8.8(b)(ii)	Project Co's Acoustical Engineer shall carry out site-specific noise and vibration measurements for Sensitive Receivers, upon the request of the City Representative, within 48 hours of a request being made by the City Representative to Project Co, or within an alternative time frame agreed to by the City Representative, acting reasonably.	QF	Major	N/A	48 hours	PE	1 QF per day



**APPENDIX A**  
**ENVIRONMENTAL ASSESSMENTS**

The “Downtown Ottawa Transit Tunnel: Tunney’s Pasture to Blair Station via a Downtown LRT Tunnel” has been made available in the Data Room as a Reference Document.

The “Ottawa Light Rail Transit: Light Rail Transit from Tunney’s Pasture to Blair Station, including a Downtown Tunnel” CEEA Screening report has been made available in the Data Room.

**APPENDIX B**  
**PROVINCIAL AND FEDERAL ENVIRONMENTAL ASSESSMENTS - TABLE OF COMMITMENTS**  
**AND ASSURANCES**

<u>EPR Ref.</u>	<u>Commitments and Assurances</u>	<u>Commitments and Assurances that were met during preliminary engineering phase</u>	<u>Responsible Party following the Preliminary Engineering Phase</u>
<b>Part A - Provincial EA - Downtown Ottawa Transit Tunnel: Tunney's Pasture to Blair Station via a Downtown LRT Tunnel Environmental Project Report (July 2010)</b>			
<u>10.7</u>	<u>Consultation</u>		
	<u>To consult with all stakeholders, including First Nations, federal and provincial agencies, the business community and the public. A consultation plan will be developed to address the issues that arise and to meet the needs of the different stakeholder groups and will use a variety of media to maintain contact and provide updated information.</u>	<u>The City of Ottawa conducted a comprehensive consultation program throughout the preliminary engineering phase of the OLRT project. This program was designed to meet both the legislative requirements of the EA process and to inform and consult with local community associations, BIAs, the Ottawa Chamber of Commerce and the general public.</u>	<u>City of Ottawa and/or Project Co as detailed in Schedules 17 and 18</u>
<u>10.7</u>	<u>Property Acquisition</u>		
	<u>Proceed with the acquisition of temporary and permanent property needs, including temporary construction easements, as the design work proceeds and definitive property plans are developed. The process will include negotiation and expropriation for private properties as required.</u>  <u>For provincial and federal lands, the City will follow the approved land acquisition processes, working cooperatively with the respective agencies to acquire property for the project.</u>	<u>The City of Ottawa initiated the property acquisition process during the preliminary engineering phase and every effort will be made to complete prior to Financial Close.</u>	<u>City of Ottawa</u>
<u>10.7</u>	<u>Planning and Design Initiatives</u>		
	<u>Work with City's partners to apply the urban design and community planning policies and guidelines to all</u>	<u>The City of Ottawa initiated this planning and design initiative during the preliminary engineering phase.</u>	<u>Project Co</u>

<u>EPR Ref.</u>	<u>Commitments and Assurances</u>	<u>Commitments and Assurances that were met during preliminary engineering phase</u>	<u>Responsible Party following the Preliminary Engineering Phase</u>
	<p><u>elements of the project including runningway, stations, access points, ventilation shafts, electrical substations and the maintenance and storage facility.</u></p> <p><u>Opportunities to limit impacts, improve pedestrian and cycling accessibility and to improve overall mobility will be actively sought and evaluated in the design process.</u></p> <p><u>The process will consider long range policy statements for the National Capital and the City, and focus on implementing a transit solution that works at the local and regional level.</u></p>		
10.7	<u>Construction Issues</u>		
	<p><u>Conduct further research and analysis for the construction of the project, actively seeking ways to reduce construction impacts and speed up construction. The project will require contractors to meet the requirements of all applicable provincial and federal legislation related to construction including:</u></p> <ul style="list-style-type: none"> <li>• <u>control of noise and vibration;</u></li> <li>• <u>dust, fumes and other air quality factors;</u></li> <li>• <u>traffic management and monitoring for general traffic, transit vehicles, pedestrians and cyclists;</u></li> <li>• <u>groundwater control including permits to take water and dispose of it in the City's sewer system and settlement monitoring;</u></li> <li>• <u>utility services including both municipal and private utilities;</u></li> <li>• <u>emergency response planning to and around construction sites;</u></li> </ul>	<p>The City of Ottawa completed studies during the preliminary engineering phase which will be available for reference.</p>	<p>Project Co</p>

<u>EPR Ref.</u>	<u>Commitments and Assurances</u>	<u>Commitments and Assurances that were met during preliminary engineering phase</u>	<u>Responsible Party following the Preliminary Engineering Phase</u>
	<ul style="list-style-type: none"> <li>• <u>designated substance surveys for buildings requiring demolition or alteration;</u></li> <li>• <u>building pre-condition surveys to document the state of buildings adjacent to the construction;</u></li> <li>• <u>erosion and sediment control plans;</u></li> <li>• <u>stray current protection (if and where applicable) and monitoring for pipelines and other utilities;</u></li> <li>• <u>manage brownfield sites in accordance with provincial regulations;</u></li> <li>• <u>conduct environmental site assessments where warranted; and</u></li> <li>• <u>conduct archaeological investigations where warranted.</u></li> </ul>		
10.7	<u>Permits and Approvals</u>		
	<u>Secure all necessary permits and approvals for the implementation of the project including planning approvals, building permits and all permits required by any provincial or federal agency with jurisdiction over a portion of the project.</u>	<u>Permits and approvals that may be required for the implementation of the project have been identified and are listed in Schedule 1, Appendix 1 of the Project Agreement.</u>	<u>Project Co will be responsible for all permits and approvals following Financial Close</u>
10.7	<u>Noise and Vibration Protocols</u>		
	<u>The City will undertake studies during the design process in accordance with MOE protocols.</u>	<u>The City of Ottawa completed noise and vibration studies during the preliminary engineering phase which will be available for reference.</u>	<u>Project Co</u>
10.7	<u>Canadian Environmental Assessment Act Determination</u>		
	<u>A CEAA Screening and determination is required.</u>	<u>The City of Ottawa completed the CEAA Screening report and a determination was made by the federal Responsible Authorities on July 13, 2012 that in</u>	<u>City of Ottawa</u>

<u>EPR Ref.</u>	<u>Commitments and Assurances</u>	<u>Commitments and Assurances that were met during preliminary engineering phase</u>	<u>Responsible Party following the Preliminary Engineering Phase</u>
		<u>consideration of the Screening report and the implementation of appropriate mitigation measures, the project is not likely to cause significant adverse environmental effects.</u>	
10.7	<u>Municipal Approvals</u>		
	<u>The City will work internally to put all municipal approvals in place. The project will be reviewed by staff, with reports rising to several City committees for final approval by Council. This process mirrors the work done to date for the approval of the functional plan.</u>	<u>The City will work to put all required approvals for City committees and Council in place as expeditiously as possible.</u>	<u>City of Ottawa</u>
<b>Part B - Federal EA - Canadian Environmental Assessment Act Screening Report</b>			
n/a	<u>The CEAA Screening report was completed in July 2012 and the federal Responsible Authorities determined on July 13 2012 that in consideration of the Screening report and the implementation of appropriate mitigation measures, the project is not likely to cause significant adverse environmental effects.</u>	<u>Project Co is required to meet the commitments and assurances that are detailed in the July 2012 CEAA Screening report.</u>	<u>Project Co</u>