Transports Canada Transport Canada

REQUEST FOR PROPOSALS

FOR

NEW BRIDGE FOR THE ST. LAWRENCE CORRIDOR CONSULTING SERVICES

PHOTOGRAMMETRY, CARTOGRAPHY, DIGITAL TERRAIN MODELING AND SURVEYING SERVICES UPON REQUEST (2013-2015)

ANNEX 1

SECTION 3

REFERENCE TERMS

PROJECT N^{O} 7003

REVISION 0 (2013-07-05) – ISSUED FOR RFP

Canada

TABLE OF CONTENTS

APPENDICES

3.01 GENERAL

3.01.1 Scope and purpose of the Contract

Scope

This Contract is part of the preparatory work and studies for the New Bridge for the St. Lawrence (NBSL) project in Montreal. In general terms, it is a contract to provide the following consulting services:

- on-site geodetic surveys using precision aerial photography;
- aerial triangulation, photogrammetric control, photogrammetric capture, cartography and orthophotography;
- digital terrain modeling;
- on-site geodetic surveys using stationary LiDAR (Light Detection and Ranging) (3D laser scanning) or other conventional ground based method;
- geodetic surveys of the electrical towers and conductors belonging to Hydro-Québec by stationary LiDAR (3D laser scanning) if their survey by precision aerial photography is not sufficient;
- processing of data acquired during geodetic surveys and preparation of digital files, drawings and a bilingual report;
- technical surveying services at the request of **Canada**.

Most of the services enumerated in the paragraphs above will be performed in 2013. Updates to the geodetic surveys, site modeling, digital files, drawings and the report could be made in 2014 and/or 2015, following construction works and when the new installations in the area have been completed, at the request of **Canada**.

The specific services to be rendered under the Contract are more specifically described in Article 3.02 *Services to be Provided* of this Section 3 *Reference Terms*.

A graphical representation of the aerial photography, photogrammetric and terrain modeling work under this Contract is provided in Plan No. 72816 in Appendix E, *Graphical Representation of the Photogrammetric and Modeling Work to be Performed*.

The **Consultant**'s work shall conform to this Contract and the instructions of **Canada**.

It should be noted that Transport Canada is the technical authority and client for this Contract, whereas Public Works and Government Services Canada is responsible for the contracting process.

Purpose of the Contract

The services, information and deliverables stemming from this Contract will be used in the NPSL project for the following technical activities, without being limited to:

- to establish with precision and to properly document the overall true geometry of the corridor to be covered by the study;
- to support the development of roads and civil engineering works, namely roads and structures to be constructed along Highway 15, at the south-shore approach in Brossard and the connection to existing works and roadways;
- to establish, with greater precision and confidence, the alignment in elevation and in plan of the new roadways within the corridor, that is, from the southern end of the project in Brossard to the northern end at the Atwater interchange along Highway 15, over a length in excess of 8 km;
- to ensure an appropriate clearance, both vertically and horizontally, between Hydro-Québec electrical towers and power lines and the new structures to be constructed and to define the needs with respect to any modifications to said towers that may be necessary (relocation, raising or other);
- to support the design development of related works which will need to be implemented in or near the corridor, such as retaining walls, noise-barriers, overpasses a new public transit station to be constructed on Nuns' Island, etc.
- to supply subsequent technical studies with inputs, namely hydraulic and hydrodynamic studies of the river, taking into account both existing and future structures as well as the presence of islands, islets, dyke and the shorelines (according to the water levels at the time of survey), both upstream and downstream of the NBSL;
- if needed, to supply services and specific surveying measurements, for example, to validate any historical information that may appear to be incorrect, to validate the position or location of a buried structure once said structure is exposed in the course of an investigation pit made by others in a separate mandate, etc.

The general needs of **Canada** as they relate to legal/property issues and the needs if any for acquisition or transfer of property rights will be treated in future distinct mandates.

3.01.2 New Bridge for the St. Lawrence Project (context)

3.01.2.1 Main Elements of the Project

On October 5, 2011, the Government of Canada announced that it will proceed with the construction of a new crossing to replace the existing Champlain Bridge. This project is divided into seven (7) main elements as follows:

Element A Reconstruction and widening of Highway 15

Element B Replacement of the Nuns' Island Bridge

Element C Work on Nuns' Island

Element D New Bridge for the St. Lawrence

Element E Work on the Brossard shore

Element F Bonaventure Expressway and the Clément Bridge

Element G Demolition of the existing Champlain Bridge

A brief description of each of these elements is presented in Appendix A *Scope and Elements of the New Bridge for the St. Lawrence Project*.

3.01.2.2 Business Case, Traffic and Revenue Forecasts, Preliminary Design and Costing

In July 2012, Transport Canada awarded a contract to develop a business case for the NBSL project to a consortium headed by PricewaterhouseCoopers. The business case will include:

- a thorough analysis of the best method of procurement and the best way of building the new bridge for the St. Lawrence, the new Nuns' Island bridge and a portion of Highway 15 belonging to **Canada**;
- preparation of traffic and revenue forecasts;
- preliminary engineering work to determine the best options and their costs.

The **Consultant** will not have access to the data or results of the business case, with the exception of any information that may be made public by **Canada**. However, some of the results of the activities of the **Consultant** under this Contract could be used for some preliminary engineering components as part of the business case.

3.01.2.3 Investigations, geotechnical studies, soil and groundwater characterization, and other laboratory services

In April 2013, Transport Canada issued a public request for proposals for investigations, geotechnical studies, soil and groundwater characterization, and other laboratory services. Through these technical services, technical data and information will be acquired for the next steps in designing the structures that will be a part of the new corridor. The majority of investigations and studies are expected to be completed by late 2013. The on-site activities of the **Consultant** will be carried out at the same time as this work; coordination between the two activities will therefore be required.

3.01.2.4 Public Transit

The Government of Québec has jurisdiction for public transit and the highway network leading to the existing Champlain Bridge Corridor. Transport Canada has agreed to consider providing one (1) lane in each direction for public transit (deck only) in the new bridge corridor. The Government of Québec has indicated that the preferred type of public transit for the new bridge corridor is a light rail system (LRT). The Government of Québec will be responsible for financing and operating the public transit system. Transport Canada is working closely with the ministère des Transports du Québec (MTQ) and the Agence métropolitaine de transport (AMT) in this matter.

The results stemming from the activities of the **Consultant** could be shared (with the agreement of **Canada**) with the AMT and its agents to facilitate the development of design concepts.

3.01.3 The Jacques Cartier and Champlain Bridges Incorporated's (JCCBI) Projects

3.01.3.1 Projects for the Replacement of the N, V and Main Overpasses

JCCBI is planning three major transportation infrastructure projects over the next few years, in or near the area involved in this Contract:

- construction of a temporary bridge-causeway to replace the Nuns' Island Bridge;
- a project involving two contracts to reconstruct Overpasses N and V in an alignment slightly different from their existing configuration;
- reconstruction and widening of the Main Overpass, which is part of the Highway 15 corridor.

The location of the N, V and Main Overpasses is shown on plan No. 72816 of Appendix E *Graphical Representation of the Photogrammetric and Modeling Work to be Performed.*

While these projects are not an integral part of the services to be provided under this Contract, certain technical aspects are similar and relevant to the present project and to the NBSL project as a whole. Also, the **Consultant** must take these projects into consideration, specifically the possible presence of other contractors and consultants, when planning and coordinating the **Consultant's** activities at the work site. In addition, upon completion of these projects, the **Consultant** could, at the request of **Canada**, be asked to update the terrain modeling work, drawings and the report drafted under Part A of this Contract.

3.01.3.2 Temporary Bridge-Causeway Project for the Replacement of the Nuns' Island Bridge

As announced by Transport Canada on July 12, 2012, the existing Nuns' Island Bridge will be replaced as part of the NBSL project. The existing bridge will be put out of service once a temporary bridge-causeway is built. This temporary structure will be used until a new permanent Nuns' Island bridge is built in the same corridor as the existing bridge.

On September 19, 2012, JCCBI awarded the consulting firm Genivar a contract for project design, geotechnical studies (subcontracted) and environmental studies. Additionally, as part of the planning works for this project, a digital terrain model was developed for a segment of the Champlain Bridge corridor. A call for tender for the construction of the temporary bridge-causeway was published in June 2013.

Until the temporary bridge-causeway is built, JCCBI will continue to maintain the existing Nuns' Island Bridge. Work is in fact currently under way on this bridge, and it will continue over the next two years.

Although this project is not an integral part of the services under this Contract, the **Consultant** must take it into account, in particular the possible presence of other contractors and consultants, in the planning and coordination of its own activities on the work site. In addition, upon completion of this project, the **Consultant** could be asked, solely at the request of **Canada**, to update the terrain modeling work, drawings and the report prepared in 2013 under Part A of this Contract to add the temporary bridge-causeway and related roads.

3.01.4 Definitions

3.01.4.1 The following definitions apply to all sections of the Request for Proposals (RFP).

It should be noted that the term « Consultant » in this Section 3 *Reference Terms* is synonymous to the term « Contractor » in the general clauses and conditions document of the request for proposals.

A) General Definitions

3.01.4.1.1 JCCBI

The corporation *The Jacques Cartier and Champlain Bridges Incorporated*, herein referred to as "JCCBI".

3.01.4.1.2 SLSMC

The St. Lawrence Seaway Management Corporation herein referred to as "SLSMC".

3.01.4.1.3 MTQ

The *Ministère des Transports du Québec*, herein referred to as « MTQ ».

B) Resource Definitions

3.01.4.2 The **Consultant** shall refer to Article 3.02.5 *Resources Required and Positions to be Filled* of this Section 3 *Reference Terms* to learn of any additional qualifications that may be required. It should be noted that when calculating the number of years of pertinent experience for the positions listed below, the years spent obtaining a Masters degree or Doctorate degree pertinent to the Contract can be included, up to a maximum of one (1) year for a Masters degree and two (2) years for a Doctorate.

3.01.4.2.1 Project Manager

The Project Manager is a Senior Land Surveyor as defined in Article 3.01.4.2.2. He plans and distributes the tasks involved in controlling the quality of the services requested, coordinates the activities of his personnel with those of **Canada** and other stakeholders and standardizes the work practices of his group. He is responsible for formal communications between his team and **Canada** or its representative.

3.01.4.2.2 Senior Land Surveyor

The Senior Land Surveyor must have at least fifteen (15) years of pertinent experience and a university degree in a geomatics engineering or geomatics sciences program. He must be a member in good standing or hold a temporary permit delivered by the *Ordre des arpenteurs-géomètres du Québec* and must have the knowledge and skills required to prepare, approve and coordinate work plans so as to satisfy cost, quality and scheduling objectives. He exercises direct supervision over other land surveyors, technicians or specialists and is able to assume responsibility for complex and difficult assignments.

3.01.4.2.3 Intermediate Land Surveyor

The Intermediate Land Surveyor has at least seven (7) years of pertinent experience and a university degree in a geomatics engineering or geomatics sciences program. He must be a member in good standing or hold a temporary permit delivered by the *Ordre des arpenteurs-géomètres du Québec*. He has the knowledge and skills required to perform various types of assignments in keeping with pre-determined procedures. He conducts independent studies to guide his decisions and must use the information available judiciously. He refers decisions of an unusual or complex nature to the Senior Land Surveyor.

3.01.4.2.4 Junior Land Surveyor

The Junior Land Surveyor has a university degree in a geomatics engineering or geomatics sciences program and is either a member in good standing of, or eligible for certification with, the Ordre des arpenteurs-géomètres du Québec. The experience required is minimal; he prepares drawings and calculations or carries out inspections under close supervision so as to ensure that the tasks he performs comply with the prescribed procedure.

3.01.4.2.5 Senior Technician/Draftsman

The Senior Technician or Senior Draftsman has at least ten (10) years of pertinent experience and an attestation of college studies in his specialization or any combination of training and experience that is at least equivalent. He plans, organizes and coordinates a part of a project requiring the application of in-depth technical knowledge. He designs and develops new ways of applying existing criteria in an economical and practical manner (on site and / or for computer assisted drawings).

3.01.4.2.6 Intermediate Technician/Draftsman

The Intermediate Technician or Intermediate Draftsman has at least five (5) years of pertinent experience and an attestation of college studies in his specialization or any other combination of training and experience that is at least equivalent. He performs various tasks and conducts various studies, of limited complexity, under the supervision of a senior technician or land surveyor. He makes decisions as part of established procedures and practices (on site and / or for computer assisted drawings).

3.01.4.2.7 Junior Technician/Draftsman

The Junior Technician or Junior Draftsman has an attestation of college studies in his specialization or construction or any other combination of training and experience that is at least equivalent. He performs tasks applying clearly defined procedures and practices (on site and / or for computer assisted drawings).

3.01.4.2.8 Specialist (Other)

A Specialist (other) is a professional or other expert holding a degree in his field other than those listed in the definitions described above and whose services are required to perform any expertise under this Contract.

3.01.4.2.9 Technical Support

Technical Support refers to the personnel of the **Consultant** whose qualifications do not meet the descriptions in paragraphs 3.01.4.2.1 to 3.01.4.2.8, for which no specific Payment Item is provided in the Price Table.

3.01.4.2.10 Subcontracted Resources

Subcontracted Resources include all external resources, whose qualifications meet or do not meet the descriptions in paragraphs 3.01.4.2.1 to 3.01.4.2.9, which are temporarily employed or retained by the **Consultant** (subcontractor) to provide specific services under the Contract.

3.01.4.2.11 Client Manager

The **Consultant**'s Client Manager is the person to whom the **Consultant**'s Project Manager reports. The Client Manager is usually the hierarchical supervisor of the Project Manager.

3.01.4.2.12 Member in good standing or holder of a temporary permit

The aforementioned land surveyors shall be members in good standing or holders of a temporary permit issued by the *Ordre des arpenteurs-géomètres du Québec* at the time the services are rendered.

For the purpose of evaluating the candidates and award of this Contract, a resource of the **Consultant** that holds a professional license or a permit to practice as a professional land surveyor issued by a regulatory agency in a Canadian province or territory will be considered equivalent to a resource which is member of the *Ordre des arpenteurs-géomètres du Québec* without distinction with regards to its admissibility and its evaluation in accordance with the criteria identified in the Generic Evaluation Table.

3.02 SERVICES TO BE PROVIDED

3.02.1 Description of Professional Services and Deliverables

The services to be provided under this Contract fall under two distinct types of activities: Part A – *Terrain Modeling* and Part B – *Surveying Services upon Request*.

The articles and paragraphs under Article 3.02 *Services to be Provided* of this Section 3 *Reference Terms* details the services to be provided by the **Consultant**.

First, the **Consultant** shall provide the services falling under Part A.

Second, and only upon the request of **Canada**, the **Consultant** may be asked to provide the services falling under Part B.

Part A – Terrain Modeling includes, without limitation:

- geodetic site surveys using precision aerial photography;
- geodetic site surveys using stationary or other conventional ground based method, in particular for acquiring data where aerial photography is not suitable (e.g. under overpasses, on the ground under the bridges, etc.);
- geodetic surveys of Hydro-Québec towers and conductors using precision aerial photography, stationary LiDAR or other method if the survey by precision aerial photography is not sufficient for the needs of this Contract. In this regard, the survey technique must be able to trace out the conductors and their low point, at maximum 3m intervals, with a precision of +/-75mm in general and +/-50mm at its low point. For the towers, for both monotube and truss configurations, the survey technique used must be able to capture, at a minimum, the major changes in the shape. This includes, without being limited to, the location of the anchor bolts or the circumference at ground level, the top of the tower, the extremities of the overhanging crossmembers, etc., with a precision of +/-75mm;

- processing of data collected on the site and preparation of digital files (photogrammetric control, aerial triangulation, photogrammetric capture, cartography, digital terrain model, orthophotos, etc.), drawings and a bilingual report;

- in 2014 and/or 2015, carry out a total of two (2) updates to the data previously collected on the site, the files, the digital terrain models, the drawings and the bilingual report. This may be undertaken at the request of **Canada** only, when the construction of the Nuns' Island temporary bridge-causeway and the reconstruction of the N, V and Main Overpasses are fully or partially completed (see Item 3 of the Price Table and Payment Item description in the paragraphs of Article 3.03.16.3).

Further details about the activities listed above are provided in paragraphs of Article 3.02.2.

Part B – *Surveying Services upon Request* includes, without limitation:

- technical surveying services and related work at the request of **Canada**.

Further details about the technical surveying and related activities that could be performed by the **Consultant** are provided in paragraphs of Article 3.02.3.

3.02.2 Part A – Terrain Modeling

3.02.2.1 Detailed Work Plan

First, the **Consultant** shall prepare and submit to **Canada** a detailed work plan that establishes the scope of the tasks required to carry out Part A services of this Contract and a detailed list of the files and documents it intends to deliver. The **Consultant** shall accordingly identify all tasks to be performed starting from the Contract award until full completion of the Contract (for the services falling under Part A). The work plan shall at a minimum:

- identify surveys, studies, analyses, etc. that will be needed;

- prepare a detailed preliminary list of deliverables and the file naming convention;

- draft a detailed statement of tasks forming part of the Contract;

- draft a detailed statement of the Contract steps and milestones;

- identify the tasks to be performed by **Canada** or other authorities, such as providing data or complementary information, issuing special authorizations or permits for access to properties or traffic disruptions, unlocking of gates, etc.;

- describe the responsibilities and tasks of each member of the team;

- identify the materials and equipment needed to carry out the Contract work;

- propose a detailed schedule based on the identified tasks;

- identify the critical path of the schedule as it relates to the delivery of the **Consultant**'s services and the carrying out of the project.

In establishing the schedule, the **Consultant** shall take into consideration the number of days that will be lost to bad weather. **Canada** will not grant any extensions for completion of the work on the grounds of bad weather preventing work from being carried out, or if the quality of images captured is not adequate and images must be captured again.

A similar detailed work plan may be required for the Part B services under this Contract once **Canada** and the **Consultant** have agreed on the precise scope of the work to be done under Part B.

3.02.2.2 Review of Documents

The **Consultant** shall review the documents listed in Appendix C *List of Reference Drawings Provided* and in Appendix D *List of Documents Available for Consultation* of this Section 3 *Reference Terms* as well as all other relevant documents that are produced by other consultants or by **Canada** between the time of awarding this Contract and delivery of the services.

3.02.2.3 Applicable norms and standards

The **Consultant** shall carry out photogrammetry, cartography, terrain modeling and survey work, as well as all other activities under this Contract in accordance with the specific requirements of Section 3 *Reference Terms* and the most recent version available of the following, as applicable at the time of use:

- *Manuel d'arpentage et de géomatique*, Ministère des Transports du Québec (June 2008 or newer);

- *Guide de captage de données topographiques*, Ministère des Transports du Québec; and

- *Les instructions générales d'arpentage*, bureau de l'arpenteur général du Québec (April 2013 or newer).

Note that the above-mentioned standards are prepared by the Government of Québec for photogrammetric, geodetic surveying, modeling and land surveying purposes for infrastructures belonging to or located on the Government of Québec Network. The **Consultant** must comply with and adhere to the practices, methodologies and technical requirements described in those standards, and carry out the work in such manner as to ensure that the models delivered are compatible with the software, programs, databases and models used by the Government of Québec. However, the **Consultant** is not required to comply with the specific administrative requirements that are adapted to the processes used by the Government of Québec in those practices (communication procedures, approval procedures, title blocks for drawings, etc.).

3.02.2.4 Terrain modeling (digital terrain models)

The **Consultant** shall provide low-altitude aerial photography services (for a photography scale between 1:2000 and 1:4000, or a ground resolution of 3 cm to 5 cm) as briefly mentioned in Article 3.01.1 *Scope and purpose of the Contract*. The resulting photogrammetric surveys and terrain modeling may be used for a variety of purposes, and most importantly as technical input and basis for the preliminary design as well as for the definitive design of the structures, road works and related works for the NBSL project. Thus, the data must be sufficiently precise for its intended purpose and in keeping with rules and good practice.

3.02.2.4.1 Aerial photography

The **Consultant** shall, at minimum, do the following:

- mark and survey of the existing geodetic points and establishment of photogrammetric control points (uniformly distributed within the photogrammetric block);
- take aerial photographs of the Highway 15 corridor on the Island of Montreal, between a point to the left of **Canada**'s property (the access ramp to Highway 15 at De la Vérendrye Blvd. and the Highway 15 exit ramp at Atwater Ave.) and the Wellington Overpass, at a ground resolution of 3 cm;
- take aerial photographs of the road system surrounding the Champlain Bridge between Nuns' Island and Brossard, on the South Shore, at a ground resolution of 3 cm;
- take aerial shots of the shoreline around the eastern side of Nuns' Island, at a ground resolution of 5 cm;
- take aerial shots of the shoreline around the east and west of the Seaway dyke, Île de la Couvée, the island and the right-hand side of the river (South Shore), at a ground resolution of 5 cm;
- perform aerial triangulation of the 3-cm and 5-cm photos;

- capture photogrammetric data; and

- carry out cartographic mapping/editing.

Plan No. 72816 in Appendix E, *Graphical Representation of the Photogrammetric and Modeling Work to be Performed,* shows in greater detail the boundaries of the areas for which the **Consultant** must carry out aerial photography work at ground resolutions of 3 cm and 5 cm, as applicable. The **Consultant** will have to cover the entire area shown in Appendix E, which is the minimal area that must be covered and treated/processed, as well as ensuring that a minimum 100m band beyond the demarcated boundaries are captured by aerial photography (but not processed) should **Canada** or its partners need further input on a localised basis.

The **Consultant** shall also review in detail each aerial photograph and mask any element that can be sensitive in nature or violate privacy.

3.02.2.4.2 Geodetic surveys using LiDAR or other method, and terrain modeling

The **Consultant** shall, at minimum, do the following:

- a geodetic survey using stationary LiDAR (3D laser scanning) or other conventional ground method and production of a plan including all of the point (planimetric details, spot elevations, etc.) and linear elements (drainage network, road network, etc.) of the terrain within the study area where photogrammetry is not practicable or where LiDAR is considered more suitable. This includes surveys of the Champlain Bridge and of the Estacade (ice control structure);

- a geodetic survey using stationary LiDAR (3D laser scanning) or other conventional ground based method and production of a plan including all of the structures (overpasses, retaining walls, culverts, curbs/medians, etc.) in the study area and for which photogrammetry is not considered suitable or sufficient;

- a geodetic survey using stationary LiDAR (3D laser scanning) or other method and production of a plan and profile including all of the Hydro-Québec towers and conductors within the study area;

- in areas where these elements are not adequately surveyed using aerial photography, at ground level under bridges and/or any other infrastructure or object (including trees/vegetation that create an obstacle, if any), a geodetic survey using stationary LiDAR (3D laser scanning) or other conventional ground based method and production of a plan of the shorelines, including those along the Seaway dyke and neighbouring islands;

- in areas where these elements are not adequately surveyed using aerial photography, such as under the Champlain Bridge, under the Nuns' Island Bridge, under the overpasses and under other existing structures, a geodetic survey using stationary LiDAR (3D laser scanning), or other conventional ground based method, of the outer borders, medians, catch basins, soffit of beams, and any other element relevant to the design work to follow;

- processing of data collected and preparation of the digital files, drawings and 2D and 3D models.

Plan No. 72816 in Appendix E, *Graphical Representation of the Photogrammetric and Modeling Work to be Performed,* shows in greater detail the area boundaries, overpasses, structures, Hydro-Québec towers and other elements for which the **Consultant** must do geodetic survey work using LiDAR or other conventional methods. Geodetic surveys using LiDAR or other conventional methods may be used on firm ground only.

3.02.2.4.3 Detailed program of the surveys used for terrain modeling (digital models)

Before undertaking any on-site surveying work, the **Consultant** shall prepare and submit to **Canada** a detailed program of the surveys it intends to use for modeling purposes. The program shall include, at minimum, the following:

- the location of the existing geodetic points;

- the location of the photogrammetric control points;

- the flight lines within the area to be overflown;

- the equipment proposed for carrying out the photogrammetric surveys;

- the location of the equipment installation points for the LiDAR surveys, or other types of surveys, for each structure. The **Consultant** shall expect to conduct a site visit to properly plan the equipment installation points for its works;

- the equipment proposed for carrying out the LiDAR or other surveys;

- additional information (special equipment and transportation);

- areas where verification using geodetic survey or ground/conventional land survey techniques are required and will be carried out (under overpasses, under the Champlain Bridge, under the ice control structure, etc);

- the methods for ensuring adequate marriage and overlap of the 3D data already collected as part of the modeling work carried out in Montreal (Verdun sector) and Nuns' Island (2012-2013) and the validation of the interface zones;

- weather conditions applicable for image capturing;
- the work flow on site and in the office;
- a brief description of the areas where surveying could present special challenges and the methods proposed by the **Consultant** for dealing with those challenges;
- the personnel assigned to the various duties.

Plan No. 72817 in Appendix F *Drawing of the Terrain Modeling Work Performed in Montreal (Verdun Area) and Nuns' Island (2012-2013)* shows the area for which aerial photography, photogrammetry and terrain modeling work was carried out in 2012-2013, and is provided as a reference.

The **Consultant** shall develop a detailed survey program for terrain modeling purposes and, on the agreement of **Canada**, carry out the data acquisition in such a manner as to cover and process the area indicated in Plan No. 72816 in Appendix E, *Graphical Representation of the Photogrammetric and Modeling Work to be Performed*, to capture by aerial photography the extended 100m band as mentioned previously or in accordance with any other site plan agreed upon with **Canada**.

3.02.2.5 Land survey work for geodetic surveys

The location on the plan and the elevations of all of the survey points included in the land survey data collection must be connected to the existing geodetic benchmarks. All works shall be georeferenced.

The geodetic coordinates and elevations of existing survey monuments in the area in question shall be identified by the **Consultant**.

The system of coordinates (geodetic reference system) to use for the work is NAD83 SCRS for the horizontal Datum and NMM (CGVD28) for the vertical Datum.

3.02.2.6 Report on the surveys and the work carried out for terrain modeling

The **Consultant** shall prepare the documents and draft a report (using clear and simple language) describing the methodology used and the results obtained for all of the work carried out (aerial photography, geodetic surveys using LiDAR or alternate ground based method, photogrammetry, terrain modeling, land surveys, etc.), as well as any problems encountered during the work on the site and in the office, including that for producing the plans and drawings.

The report shall present factual information only and must, at minimum, include the following:

- A description of the nature of the work, the purpose of the study, and the location and a brief description of the work site and its geographical/topographical context;
- A description of the methods used for the modeling work carried out on site, including, but not limited to, the following:
    - the type of equipment used for data collection and terrain modeling work;
    - a summary of the methodology used to carry out the work;
    - the norms, standards and reference systems used;
    - the software used for processing the data and the commercial software available to exploit said data;
    - a detailed list with a description of the working digital files produced and delivered, as well as the naming convention for the files used.
- A list of the geodetic reference points and the control points used;
- A description of the geographical/topographical characteristics observed on site and problems encountered during the survey and terrain modeling work;
- A description of the analyses and data processing work done off-site;
- A description of the results and observations from the preceding activities and items;
- Where applicable, recommendations on complementary data acquisition activities that the **Consultant** deems desirable and/or necessary, as well as on the precautions that should be taken during the execution of subsequent steps in the NBSL project.

The following documents, at minimum, shall be appended to the final report:

- the general site plan;
- drawings showing the boundaries of the terrain modeling work site;
- general site photos (ground photographs), if any;
- any other reports and calculations relevant to the work.

All terrain modeling reports and land survey and geodetic survey drawings shall be signed by a licensed land surveyor who is a member in good standing of the *Order des arpenteurs-géomètres du Québec*.

3.02.2.7 Working files, photographs and 2D and 3D modeling

The **Consultant** shall provide **Canada** with the electronic working files and paper drawings showing the location and elevation of every element in the corridor.

The **Consultant** shall provide **Canada** with all of the data files in an electronic format compatible with commercial Building Information Modeling or Bridge Information Modeling (BIM/BRIM) type software, such as Autodesk Civil 3D and Bentley Inroads, or equivalent approved by **Canada**.

More specifically, the **Contractor** shall provide, at minimum, the following aerial photography and photogrammetry working files:

- drawings identifying and showing the location of the photogrammetric controls, in Word format;
- the photogrammetric control coordinates, in Text format;
- geodetic or arbitrary survey data that determine the exact map location and elevation of the benchmarks used to model the terrain;
- a geo-referenced index of the 1 km x 1 km tiles, the photogrammetric controls and the 3 cm and 5 cm original aerial photographs (digital images) in DWG format;
- the uncompressed 3 cm and 5 cm aerial photographs (digital images) in TIFF format;
- a 3 cm and 5 cm aerial triangulation report in Text format;
- the external orientation parameters after 3 cm and 5 cm aerial triangulation, in Text format;
- a montage of the orthophotos (4-cm orthophotomosaic), divided into 1 km x 1 km tiles, in GeoTIFF, TIFF World and ECW formats.

The **Consultant** shall provide, at minimum, the following terrain modeling working files:

- the project boundaries in DWG format;
- the 2D cartographic files with all the elements identified on the site, including their hypsometry (altitude), in DWG and paper format, at a scale of 1:500;

- the 3D cartographic files with all the elements identified on the site, including their hypsometry (altitude), in DWG format;

- a 3D digital terrain model (DTM) in DWG, ASK (ASCII) and PDF formats, as well as in paper format, at a scale of 1:500;

- site surveys by LiDAR (3D laser scan) or other conventional ground based method, when applicable, under overpasses, towers and any other structure or element surveyed, in DWG format.

3.02.3 Part B – Surveying Services upon Request

The **Consultant** may be asked to provide land surveying services at the request of **Canada.** These services could include, without limitation:

- land surveys using conventional ground surveying equipment;

- boundary plans, cadastral survey plans, title searches, location certificates and/or any other service of this nature.

For example, Part B services could be used by **Canada** for various purposes, including but not limited to analyses and checks to:

- identify or confirm the positions of structures, works, stakes, points, boundaries and surfaces of any property potentially affected by the NBSL project;

- identify the exact area required on all neighbouring grounds in order to carry out the projected construction;

- update the terrain models produced under Part A, based on the most recent information, in particular in areas where construction work will be carried out over the next few years (i.e. the construction of a temporary bridge-causeway to replace the Nuns' Island Bridge, the reconstruction of three overpasses, etc.).

3.02.4 Consultant's Drawings

For Parts A and B, the **Consultant** shall prepare all of the drawings and sketches required for the development of the complete 3D terrain modeling study, the 2D and 3D drawings and the survey work, and submit them to **Canada**. These drawings are hereinafter referred to as the "***Consultant****'s Drawings*".

The 3D modelling drawings and their respective files shall include the information identified in *Manuel d'arpentage et de géomatique* du MTQ, such as:

- all the point features (planimetric details and rated points) and linear elements (hydrological systems, road networks, etc.) describing the terrain;

- the altitude, systematically for all points including planimetric detail points (datum points at ground level on the vehicular route, parapets, curbs, etc., as well as datum points under overpasses or other elevated works (non-visible details), on towers and conductors, etc.).

Plan No. 72818 in Appendix G, *Extract of Cartographical Drawings Stemming from Modeling Work Performed in Montreal (Verdun Area) and on Nuns' Island (2012-2013)*, is provided as an example and a reference, and shows the minimum level of precision and detail required for the 2D and 3D terrain modeling plans to be produced under this Contract.

The exact format of the *Consultant's Drawings* will be established and agreed on between the **Consultant** and **Canada** during the first four (4) weeks following the award of the Contract. Nevertheless, the *Consultant's Drawings* shall comply with the following requirements:

- the *Consultant's Drawings* shall be computer assisted drawings (CAD) produced with the most recent version of the AutoCAD software available on the market using an IBM-compatible PC and shall be prepared in keeping with recognized standards and to the satisfaction of **Canada**;

- the *Consultant's Drawings* shall be bilingual;

- all *Consultant's Drawings* shall include the Contract and Project Number in the title block and immediately above the title block, a reference bar scale. The title block is to be prepared by the **Consultant**, shall include Transport Canada's logo and shall be approved by **Canada**;

- the first or general drawing for the Contract shall contain a list of all *Consultant's Drawings* titles and numbers related to that Contract;

- blow-ups are permitted, and in such case, these can generally be presented on separate sheets;

- all *Consultant's Drawings* shall be produced on 24-inch by 36-inch printable "D" paper or on 36-inch by 48-inch printable "E" paper, at **Canada**'s choice. All of the *Consultant's Drawings* shall be produced full-size (Paper space/Model space) using AutoCAD;

- drawings in paper format included in the report shall be printed in colour if any data, legends, etc. are produced in colour.

In accordance with the schedule set out in the paragraphs of Article 3.02.7, the **Consultant** shall provide to **Canada**:

- a proposed format for the *Consultant's Drawings*, including without being limited to, the paper dimensions/format or reproducible drawings, the drawing scale (1:1000 or other appropriate), the legend, the cartographic sectioning (standard used in Québec, standard used by JCCBI for property drawings or other appropriate), the format and information to be found in the title block, index plan, etc. The details regarding the format of the drawings will be agreed upon between the **Consultant** and **Canada**, to **Canada**'s satisfaction;

- a complete set of *Consultant's Drawings*, including the modeling and survey drawings that will form a part of the modeling and survey reports, signed and sealed by the land surveyor(s) responsible for the geodesic survey, modeling and land survey work, as defined under Articles 3.02.5.1.3 and 3.02.5.1.4, and signed by the Project Manager, in four (4) reproducible copies;

- the .dwg and .pdf files of the *Consultant's Drawings* on USB key;

- The *Consultant's Drawings* indicated above and the French and English versions of the reports shall be identified « *Révision 0 – Émis pour consultation / Revision 0 - Issued for Consultation* ».

3.02.5 Resources Required and Positions to be Filled

The **Consultant** shall provide all of the personnel required for performing this Contract. The **Consultant** shall also provide all the human resources and equipment required for the services in this Contract.

For safety reasons, a minimum of two (2) people must be assigned to the site geodetic survey and land survey work, and/or related work on site.

3.02.5.1 The following positions are determined by **Canada** as essential to carrying out this Contract:

3.02.5.1.1 A Project Manager, as defined in Article 3.01.4.2.1, who must have at least fifteen (15) years' experience in the fields of aerial photography, photogrammetry, terrain modeling and/or surveying and must have carried out at least four (4) similar contracts, in particular projects involving aerial photography, photogrammetry, cartography, digital terrain modeling for various fields and surveying (conventional, aerial or long range). In this regard, it is not necessary that each project include all of these components for a particular project that the candidate plans to use to demonstrate its experience. Furthermore, for the purposes of this paragraph, a similar contract may consist of a major roadway infrastructure project including a major bridge and/or other major civil engineering works. Incidentally, the candidate must be able to ensure the administrative and technical management of all aspects of the Contract

Part A – Terrain Modeling

3.02.5.1.2 An Aerial Photogrammetry Specialist, who must be a Senior Land Surveyor as defined in Article 3.01.4.2.2, and must have at least fifteen (15) years' experience as a land surveyor, of which the majority of the experience was gained in the field of photogrammetry.

3.02.5.1.3 A Terrain Modeling Specialist, who must be a Senior Land Surveyor as defined in Article 3.01.4.2.2, and must have at least fifteen (15) years' experience as a land surveyor, of which the majority of the experience was gained in the field of terrain modeling (2D and 3D).

3.02.5.1.4 A Surveying Specialist, who must be an Intermediate Land Surveyor as defined in Article 3.01.4.2.3, and must have at least seven (7) years' experience as a land surveyor, of which the majority of the experience was gained in the field of surveying.

3.02.5.1.5 A Modeling Technician, who must be a Senior Technician as defined in Article 3.01.4.2.5, and must have at least ten (10) years' experience as a technician, of which the majority of the experience was gained in the field of terrain modeling (2D and 3D).

Part B – Surveying Services upon Request

3.02.5.1.6 The human resources assigned to Part B services shall include the categories of resources described below.

3.02.5.1.6.1 Project Manager: The Project Manager assigned to Part B services shall be the same individual who is the Project Manager for Part A services as described in Articles 3.01.4.2.1 and 3.02.5.1.1.

3.02.5.1.6.2 Every Senior Land Surveyor must be a Senior Land Surveyor as defined in Article 3.01.4.2.2 and must have at least fifteen (15) years' experience as a land surveyor, of which the majority of the experience was gained in the field to which he is assigned.

3.02.5.1.6.3 Every Intermediate Land Surveyor must a an Intermediate Land Surveyor as defined in Article 3.01.4.2.3 and must have at least seven (7) years' experience as a land surveyor, of which the majority of the experience was gained in the field to which he is assigned.

3.02.5.1.6.4 Every Senior Technician or Senior Draftsman must be a Senior Technician or Intermediate Draftsman as defined in Article 3.01.4.2.5 and must have at least ten (10) years' experience as a technician or draftsman, of which the majority of the experience was gained in the field to which he is assigned.

3.02.5.1.6.5 Every Intermediate Technician or Intermediate Draftsman must be an Intermediate Technician or Intermediate Draftsman as defined in Article 3.01.4.2.6 and must have at least five (5) years' experience as a technician or a draftsman, of which the majority of the experience has been gained in the field to which he is assigned.

3.02.5.1.6.6 Every Other Specialist must be a Specialist (Other) as defined in Article 3.01.4.2.8 and must be assigned to expert assessments that cannot be performed by one or another of the human resources described in Articles 3.02.5.1.6.1 to 3.02.5.1.6.5 above.

3.02.5.1.7 For tendering purposes, the **Consultant** does not need to provide the names of those it intends to assign to the surveying activities that are to be performed upon request under Part B. However, the human resources so assigned can be the same as those assigned to Part A when the nature of the services is relevant.

Parts A & B

3.02.5.1.8 A Draftsman, who must be an Intermediate Technician as defined in Article 3.01.4.2.6, and must have at least five (5) years' experience as a technician or draftsman in the specified field.

3.02.5.1.9 Any other specialist, technician and/or land surveyor whose expertise is deemed important by the **Consultant**.

3.02.5.2 The team must also include a secretariat officer.

3.02.5.3 Those assigned to the aerial photography, photogrammetry, terrain modeling and surveying teams must have the technical knowledge needed to fulfill the terms of the Contract.

3.02.6 Proposed Candidates

The **Consultant** shall propose a single candidate for each position and shall ensure that the proposed candidate possesses the minimal qualifications for the position

In the case of candidates proposed for Part A, the **Consultant** shall not propose the same candidate for more than two (2) positions deemed by **Canada** to be essential, i.e. the positions identified in paragraphs 3.02.5.1.1 to 3.02.5.1.5. However, candidates assigned to Part A may be the same as those assigned to Part B when the nature of the services is relevant.

3.02.7 Schedule of the Consultant's Services and Deliverables

The **Consultant** cannot start any work whatsoever on the sites on the grounds on which surveys and terrain modeling work will take place before providing to **Canada** the proofs of insurance required.

3.02.7.1 Detailed Work Plan

Within seven (7) calendar days of the date of the written notification of Contract award, the **Consultant** shall submit to **Canada**, for approval, a detailed work plan for completion of the work covered by Part A of the Contract.

The **Consultant** shall submit to **Canada** a final version of the detailed work plan for Part A within fourteen (14) days of the notice of Contract award.

For each of the aerial photography, photogrammetry/modeling and surveying activities and for the studies specified in the Contract, the **Consultant** shall provide **Canada** a detailed program for its own activities and those of its subcontractors with the dates and planned durations for the lease of specialized and signalling equipment, and send everything to **Canada** for approval fourteen (14) days before the start of the work.

3.02.7.2 Attendance at Meetings

The **Consultant** shall attend the meeting described below.

For services falling under Part A *Terrain Modeling*:

- start-up meeting to plan the work to be done;
- meeting with JCCBI, MTQ, the cities of Montréal and Brossard, the SLSMC and/or any other affected partner or owner of land on which work will be done, before the work on such land is done;
- weekly on-site coordination meetings: for the entire period during which the **Consultant** anticipates being on the work site to carry out one or more surveys or other related activities, the presence (every Friday for approximately one hour) of a representative of the **Consultant** (in charge of on-site activities) at the JCCBI site office (located at the Champlain Bridge Plaza on Nuns' Island) to briefly present in person its weekly program to **Canada** and JCCBI teams for the coming week(s), to enable JCCBI to coordinate together the **Consultant**'s interactions with those of the other consultants and contractors that will be on the work site at the same time;
- meeting to present the preliminary report and other preliminary deliverables;
- meeting to present the final report and other final deliverables.

For each specific service falling under Part B *Surveying Services upon Request:*

- start-up meeting to plan the specific work to be done;

- meeting with JCCBI, the MTQ, the City of Montreal and the City of Brossard, the SLSMC and/or any other partners involved or owner of grounds on which survey work will take place before undertaking the work on those grounds;

- weekly on-site coordination meetings: for the entire period during which the **Consultant** anticipates being on the work site to carry out one or more surveys or other related activities, the presence (every Friday for approximately one hour) of a representative of the **Consultant** (in charge of on-site activities) at the JCCBI site office (located at the Champlain Bridge Plaza on Nuns' Island) to briefly present in person its weekly program to **Canada** and JCCBI teams for the coming week(s), to enable the **Consultant**, **Canada** and JCCBI to coordinate together the **Consultant**'s survey activities with the activities of the other consultants and contractors that will be on the work site at the same time;

- meeting at 50% advancement of the report or deliverable for the specific surveying services;

- presentation to **Canada** of the final report or deliverable for the specific surveying services.

Unless indicated otherwise, the **Consultant** shall draft the minutes for each of the meetings. The minutes shall be submitted to the participants at the latest ten (10) calendar days following the meeting.

At least two (2) days before each meeting, the **Consultant** shall submit an agenda and the pertinent documents that will be reviewed during the meeting.

3.02.7.3 Conditions on Preparation of Schedule

In general and unless otherwise specified in Article 3.02.7 *Schedule of the **Consultant's** Services and Deliverables* of this Section 3 *Reference Terms*, the **Consultant** shall establish its schedule so that the following conditions are met, without limitation:

- The **Consultant** shall allow ten (10) working days for comments by **Canada** after submitting a preliminary report, set of drawings or other deliverable.

- The **Consultant** shall incorporate **Canada**'s comments (with which it agrees) pertaining to a report, set of drawings or other deliverable within five (5) working days of receiving them.

- The **Consultant** shall allow fifteen (15) working days for **Canada**'s technical comments after submitting a final report, set of drawing or other deliverable.

The **Consultant** shall familiarize itself with JCCBI's, MTQ's, SLSMC's and neighbouring municipalities' other construction contracts to be performed in the sector concerned at the same time as this Contract. For information, the current planning of JCCBI'S work for 2013 is presented in Appendix H *Planning of JCCBI's Work*. **Canada** will provide the **Consultant**, in due course and if needed, the planning of the work covering the subsequent years.

The **Consultant** shall plan and coordinate the work covered by this Contract so that it does not interfere with JCCBI's, MTQ's, SLSMC's and neighbouring municipalities' other work that will be in progress at the same time. To that end, the **Contractor** shall attend the weekly coordination meetings identified in Article 3.02.7.2 *Attendance at Meetings*.

Canada will not be responsible for any delay incurred in the performance of the **Consultant**'s work as a result of conflicts with other work carried out by JCCBI, the MTQ, SLSMC and neighbouring municipalities.

3.02.7.4 Work Progress Reports

The **Consultant** shall, every four (4) weeks during this Contract, prepare and submit to **Canada** work progress reports, including the following:

- a descriptive text about work progress, reporting on the status of all of the activities underway and those planned for the next two weeks;
- an update of the detailed schedule modified to reflect the actual progress of its work. The updated schedules shall indicate how any activity that is behind with respect to the planned schedule will be accelerated so as to meet the deadlines set in the Contract;
- a report on the situation of the costs incurred and the estimates of the forecast costs, along with a detailed report for each Item of the Price Table:
    - for Part A, the percentage of completeness for the items paid on a lump sum or allocation basis;
    - for Part B, precise data on quantities completed and final expected quantities;
- a progress claim and progress of work report, including a statement that the amounts and quantities for which payment is requested meet the requirements of the Contract and are accurate.

3.02.7.5 Terrain Modeling Study under Part A

The reports and deliverables for the terrain modeling works, including the plans, drawings and other appended documents, shall be prepared in accordance with the following deadlines:

- The **Consultant** shall submit to **Canada** a preliminary version of the table of contents for the terrain modeling reports as well as a detailed list of the type and structure of the files it intends to deliver within twenty-one (21) days of the notice of Contract award.

- The **Consultant** shall submit the preliminary terrain modeling reports and deliverables to **Canada** for comments within four (4) months of the date of notice of Contract award.

- The **Consultant** shall submit the final terrain modeling reports and deliverables to **Canada**, in a first official language, within five (5) months of the notice of Contract award.

- The **Consultant** shall provide the preliminary terrain modeling reports and deliverables identified "*Issued for comments*".

- The **Consultant** shall schedule a meeting with **Canada** to present the preliminary terrain modeling reports and deliverables within seven (7) days of submission of the preliminary report for discussion.

- The **Consultant** shall incorporate **Canada**'s comments, if any, in the final terrain modeling reports and deliverables.

3.02.7.6 Language and Translation of Deliverables

The **Consultant** shall have the terrain modeling reports, as well as any other report or deliverable document produced for this Contract (including plans and drawings), prepared in both official languages (French and English). Plans and drawings must be bilingual (French and English on the same drawing). Unless otherwise indicated by **Canada**, the **Consultant** shall wait to receive **Canada**'s comments on the deliverable document prepared in the first official language before preparing the second official language version of the deliverable document. The second official language translation of the reports shall be performed by a translation specialist and reviewed by one or more specialists in the fields concerned, to ensure proper technical terminology.

Where appropriate, the **Consultant** shall submit the second official language (or bilingual) report or other deliverable document for **Canada**'s review one (1) month after receiving **Canada**'s comments on the report or other document in the first official language and incorporate the required corrections in said document.

3.02.7.7 Format of Deliverables

The format of reports and other deliverables will be subject to approval by **Canada**. All prints shall be made double-sided on recycled paper and in color, except for drawings which shall be one-sided.

Any report, plan/drawing or other deliverable written in preliminary form shall be submitted in electronic version (Word/Excel or other, and PDF formats) with four (4) hard copies. These reports, plans/drawings and other deliverables shall include all files, tables and figures in Word, Excel or other appropriate digital workable format. Unless otherwise indicated by **Canada**, the PDF documents shall be generated from the original document (Word, Excel, AutoCAD or other appropriate software).

Any report, plan/drawing or other deliverable written in final version shall be submitted in electronic version (Word/Excel or other, and PDF formats) with four (4) hard copies. These reports, plans/drawings and other deliverables shall include all files, tables and figures in Word, Excel or other appropriate digital workable format. Unless otherwise indicated by **Canada**, the PDF documents shall be generated from the original document (Word, Excel, AutoCAD or other appropriate software).

The working files and the digital files, including the files in Word, PDF, DWG 2D, DWG 3D, ASK, GeoTIFF, TIFF World and EWC format, shall be delivered on a USB key with a Text file describing its contents.

3.02.8 Summary of Deliverables

The Table below summarizes the deliverables and schedules for the services falling under Part A only.

Deliverables (Part A)	Term of delivery (unless otherwise indicated, from the contract award date)	References
1. Work Plan		
1.1 Detailed Work Plan (preliminary version)	7 calendar days	3.02.2.1/3.02.7.1
1.2 Detailed Work Plan (final version)	14 calendar days	3.02.2.1/3.02.7.1
2. Detailed Program		
2.1 Detailed program of the surveys carried out for terrain modeling purposes	14 calendar days before beginning on-site work	3.02.2.4.2/3.02.7.1
3. Reports		
3.1 Table of Contents (reports)	21 days	3.02.7.5
3.2 Preliminary Report in a first official language (including appendices and plans/drawings)	4 months	3.02.7.5
3.3 Final Report in a first official language (including appendices and plans/drawings)	5 months	3.02.7.5
3.4 Preliminary Report in the second official language (including appendices and plans/drawings)	1 month after receiving **Canada**'s comments on the report in the first official language	3.02.7.6
3.5 Original final reports in reproducible format (including appendices and plans/drawings)	At the same time as the submission of any electronic version of a final report as noted above	n/a
4. Consultant's Drawings		
4.1 Proposed format for the *Consultant's Drawings*	4 weeks	3.02.4
5. Working files, photographs and 2D and 3D modeling		
5.1 Working files (digital files) and deliverables on paper	5 months	3.02.2.6/3.02.7.5

The Table below summarizes the deliverables and schedules for the services falling under both Part A and Part B.

Other Deliverables (Parts A & B)	Term of delivery	References
6. Meetings		
6.1 Meeting agenda	2 work days before each meeting	3.02.7.2
6.2 Meeting minutes	10 calendar days after each meeting	3.02.7.2
7. Work Progress		
7.1 Progress reports	Every 4 weeks	3.02.7.4
8. Other data collection activities		
8.1 Detailed program for all other data collection activities	14 calendar days before beginning on-site work	3.02.7.1

3.02.9 Documents Provided

The reference drawings listed in Appendix C *List of Reference Drawings Provided*, the documents listed in Appendix D, *List of Documents Available for Consultation*, and the plans provided in Appendix F, *Drawing of Terrain Modeling Work Performed in Montreal (Verdun Area) and Nuns' Island (2012-2013)*, and Appendix G, *Extract of Cartographical Drawings Stemming from Modeling Work Performed in Montreal (Verdun Area) and on Nuns' Island (2012-2013)*, are appended for information purposes only. They comprise available drawings/plans and documents and may be used by the **Consultant** to carry out photogrammetry, survey, terrain modeling and any other activity under this Contract.

The content of these reference drawings has not been reviewed by **Canada**. In addition, the use of some of the drawings is restricted due to copyright.

The **Consultant** shall note that modifications may have been made to the dimensions indicated on the original reference drawings or in the reports available for information purposes. Modifications may also have been made to the structures after the reference drawings provided for information purposes were issued.

Therefore, before undertaking the work, the **Consultant** shall verify all of the pertinent dimensions by inspecting the sites and taking field measurements.

The reference drawings are PDF and/or TIF reproductions. After the Contract is awarded, the **Consultant** which is awarded the Contract may obtain all of the files, drawings, plans, images or other documents that it needs in DWG, ECW, ASK, TIFF World, GeoTIFF or other available format, at no cost. The **Consultant** shall consult and do research at the offices of **Canada** and/or JCCBI to obtain for its work the available pertinent drawings and/or plans.

Canada disclaims all liability toward the **Consultant** with respect to the reference drawings, particularly with respect to their accuracy.

3.03 OTHER SPECIAL CONDITIONS

3.03.1 Services provided by Canada

The **Consultant** which is awarded the Contract may obtain from **Canada**, at no cost, one paper or numeric copy, at **Canada**'s choice, of the drawings and other technical documents available from **Canada** or JCCBI and which the **Consultant** will need and which **Canada** and JCCBI deem necessary to perform the Contract.

Canada will not provide the **Consultant** with any labour, materials, equipment or tools.

3.03.2 Permits, Orders and Regulations

The **Consultant** shall comply with all federal, provincial and other legislation, ordinances, codes and regulations that govern these professional services and shall assume responsibility for any breach of such legislation, ordinances, codes and regulations.

The **Consultant** shall obtain all of the permits, licenses and authorizations required to perform these professional services, including those required by the City of Montreal, the City of Brossard, the MTQ, the SLSMC and the Canadian National Railway (CN) if the **Consultant** intervenes on their territory.

3.03.3 General Requirements

The **Consultant** shall comply with standards and regulations in effect.

The **Consultant** shall at all times check all sizes, measurements and other information needed to ensure the precision and accuracy of work, whether based on reference drawings, reports provided by **Canada** or contract drawings.

For purposes of carrying out the services and the work, and regardless of the versions of standards prescribed in this Section 3 *Reference Terms*, the applicable versions of standards shall be those in effect on the date when the Request for Proposals (RFP) was issued. However, if a new version of a standard is published after that date, the parties may agree to apply the new version. The **Consultant** shall inform **Canada** that it intends to use a new version of a standard at least seven (7) calendar days before work commences at the site and/or in the laboratory and **Canada's** permission shall be obtained before such work begins.

When required, the **Consultant** shall lease equipment and / or hire subcontractors and plan, coordinate and supervise their activities.

3.03.4 Works and existing services

The **Consultant** shall always take suitable measures to protect all existing works, properties and facilities against damage, loss or interruption of service, including roadways, curbs, fences, structures, conduits for gas, water and electricity, telephone lines and other facilities and equipment in or near the area where investigation, testing or boring is to take place

The costs of any breakage or damage to utilities, works and structures as a result of field work or other preparatory work shall be borne by the **Consultant**. It shall be the responsibility of the **Consultant** to obtain any permits required for field work and for related activities such as land surveying.

Trees shall not be cut without the prior written authorization of **Canada**. The **Consultant** shall not paint, damage or mark the natural elements (in particular rocks and trees) present on the site and surroundings for surveying purposes or others, without obtaining prior authorization from **Canada**.

3.03.5 Traffic Control

Generally, no traffic lane will be made available for the **Consultant**'s work.

In the event that a traffic lane on the structure must be closed for the **Consultant**'s work, this work must be performed outside peak hours, namely at times when reducing the number of traffic lanes is permitted.

In connection with its activities to plan traffic management and control, the **Consultant** shall amongst other things:

- plan its access to the sites for the purpose of terrain modeling and survey work;
- reduce to a minimum the impact of its work on users and on the activities of the JCCBI and its contractors, as wells as the SLSMC, the CN and any other owner affected by the **Consultant**'s works;
- prepare scenarios for traffic diversion in order to minimize the impact on cars, pedestrians, cyclists, heavy trucks, buses and emergency vehicles.

The **Consultant**, also designated as "Contractor" in Appendix J *Standard Specifications – Standard Technical Conditions / Subsection 6.14 "Traffic Control and Temporary Traffic Control Devices"*, shall ensure that road signs and traffic control respect the requirements of this paragraph and of said appendix, with the exception of Article 6.14.9 *Lane Rental System* which does not apply to this Contract.

Traffic maintenance and control shall be in accordance with the ministère des Transports du Québec document *Signalisation routière, Tome V, Volumes 1 et 2* when that document prescribes requirements stricter than the JCCBI requirements identified in Appendix J.

The **Consultant** shall plan its work in keeping with the *Tables of Traffic Lanes to be Maintained Opened* attached in Appendix J described above and shall obtain the approval of JCCBI at least two (2) working days before any intervention planned in the lanes, in keeping with the procedure described in Appendix N *Procedure for Requesting Interruption or Intervention and Request Form for Interruption or Intervention*.

It is possible that JCCBI may close one or more traffic lanes during the day or at night, outside peak hours, in order to perform maintenance or construction work. In this case, the **Consultant** may make the most of these closings for its inspections / surveys, after obtaining authorization from JCCBI.

Canada and JCCBI reserve the right to modify the *Tables of Traffic Lanes to be Maintained Opened* every year.

In case of an emergency, the **Consultant** shall immediately clear the lanes in which work is underway as soon as **Canada** and/or a representative of JCCBI give the order.

The **Consultant** shall inform the Canadian Coast Guard (Fisheries and Oceans Canada), the St. Lawrence Seaway Management Corporation and / or Parks Canada in writing about any intervention by the **Consultant** in or above the navigable waterways and submit a copy of the notice to **Canada**, if applicable.

The **Consultant** shall come to an agreement with SLSMC regarding interventions on the Seaway dyke and islands in the vicinity. It shall also come to an agreement with JCCBI about any traffic on the Estacade (ice control structure).

If the **Consultant** occupies spaces or lanes not belonging to JCCBI in order to conduct terrain modeling and surveying work, it shall apply for occupancy licences and cover all related costs.

Canada will not pay the **Consultant** any financial compensation if the CSST imposes any safety instructions, regulations or restrictions, such as a requirement to provide additional vehicles equipped with impact attenuators, closure of additional lanes, a requirement to provide an escort boat, or any other safety measure.

3.03.6 Safety Measures

The **Consultant** shall provide all the safety and protection equipment and take all the measures needed to protect its employees, those of **Canada**, those of JCCBI and its contractors, and the public.

The **Consultant** shall comply with all legislations, codes and regulations relating to occupational health and safety, both federal (including without limitation the Canada Labour Code (Part II – Occupational Health and Safety)), and provincial (including, without limitation, the *Act respecting Occupational Health and Safety* (R.S.Q., c. S-2.1), and the policies and guidelines in this respect, all as amended from time to time.

Before commencing its services, the **Consultant** shall familiarize itself with the accident prevention practices in effect on the property of JCCBI, and apply those relating to these professional services. These practices will be communicated to the **Consultant** at the start-up meeting.

Vehicle, pedestrian and bicycle traffic shall be protected from materials and equipment at all times.

The **Consultant** shall ensure that no damage is caused to **Canada**'s property, to JCCBI's property or to any other public or private property.

It is prohibited for the **Consultant's** employees and visitors to park private vehicles on JCCBI's property other than in the places designated by JCCBI.

Special safety measures may be required when ground based survey activities are carried out in proximity to power lines. The **Consultant** is responsible for the establishment of any particular safety measure after consultation with Hydro-Québec.

3.03.7 Methods of Communication

The **Consultant**'s Project Manager shall at all times carry a cell phone so that **Canada** can contact the **Consultant** at any time during the period when the work is under way.

Outside working hours, the **Consultant** shall provide to **Canada,** and to the Centre Cartier-Champlain of the Sûreté du Québec, telephone numbers at which a representative of the **Consultant** can be reached in the event of an emergency.

Before commencing the work, the **Consultant** shall prepare and submit to **Canada** a list of those involved in the work and their telephone numbers.

3.03.8 Material Resources, Equipment and Incidental Expenses

The **Consultant** shall provide all material resources and equipment at its expense and defray all expenses not provided for under specific Payment Items but required for execution of the Contract. These resources include but are not limited to:

- all accessories used by the **Consultant** in connection with its professional activities such as cell phones, pagers, digital cameras, digital video cameras, pocket calculators, electronic organizers, tape recorders, laptop computers, handheld computers and geologist hammers;

- all work and safety accessories and clothes used by the **Consultant** in connection with its professional activities such as helmets, goggles, bibs, raincoats, boots, gloves, safety belts, harnesses, ear protection, gas detectors and other;

- all office accessories and small devices needed in the offices of the **Consultant** when going about activities that are part of the Contract, such as punches, staplers, electronic accessories, calculators and other;

- all paper products and products made of plastic or other similar materials required by the personnel of the **Consultant** when going about activities that are part or inherent to the Contract such as fax paper, printer paper, copy paper and other;

- all products of general commodity required in the offices of the **Consultant** when going about activities that are part or inherent to the Contract, such as adhesive tape, paper clips, CDs, DVDs, flash memory, USB, data cartridges, pens, ink for copier, printer cartridge and other;

- all computers and software required for the execution of this Contract;

- all training required or necessary for the execution of this Contract;

- all books, manuals and other reference documents used by the **Consultant** in connection with its professional activities;

- all costs related to production and delivery of documents required by this Contract, such as costs of printing, reproduction, binders, production of CD, packaging, courier, priority mail, delivery by taxi or bus and other;

- all devices and equipment required to deliver services on site or elsewhere;

- all required vehicles and other means of transporting, loading and unloading devices, equipment, and other;

- all required vehicles and other means of transporting personnel;

- all equipment and materials required to ensure the safety of the **Consultant's** personnel and of the public, and to comply with applicable safety laws and regulations.

All of the **Consultant**'s and sub-contractors' vehicles, if any, must be equipped with yellow revolving lights that must be activated when the vehicles are circulating in the traffic lanes and on any property for works in this Contract.

3.03.9 Accreditation

The **Consultant** and its subcontractors shall have the accreditations, registrations and certifications required to calibrate the photography, terrain modeling and survey equipment and devices used under the Contract in accordance with applicable standards

3.03.10 Consultant's Responsibilities

The **Consultant** shall assume entire responsibility for all damage resulting from the rendering of these professional services and the performance of the Contract, including the damage caused following the negligence, carelessness or lack of skill of its representatives, employees, agents, sub-contractors, suppliers or any other person for which it is responsible.

Without restricting the scope of the requirements of the General Conditions (2010B), the **Consultant** shall indemnify and hold harmless Her Majesty in Right of Canada, Transport Canada, The Jacques Cartier and Champlain Bridges Incorporated, The Federal Bridge Corporation Limited and the St. Lawrence Seaway Management Corporation and their representatives, from and against all claims for loss, damage, expenses (legal, extra-judicial and others), actions, lawsuits or other recourse resulting from the rendering of these professional services and the performance of the Contract.

3.03.11 Sub-contracting

The **Consultant** shall submit a written request for authorization from **Canada** to sub-contract parts of the work to companies or individuals other than those identified in its technical proposal. The request shall identify the proposed sub-contractor and the part of the work that the **Consultant** intends to delegate to that sub-contractor.

Certain services and work may be performed by subcontractors, such as:

- the translation of reports or other deliverable documents;
- the activities relating to field preparatory work, including equipment mobilization and demobilization, site signage and roadway traffic control;
- specialized surveys, such as those designated by the following items in the Price Table:
    - Item 2.2, *Site surveys using aerial photography*;
    - Item 2.3, *Site surveys using stationary LiDAR (3D digital scanning) or other conventional ground based method*;
    - Item 2.4, *Survey of Hydro-Québec towers and conductors using aerial photography, LiDAR (3D laser scanning) or other method*;
    - Item 3.2, *Site surveys using aerial photography*;
    - Item 3.3, *Site surveys using stationary LiDAR (3D laser scanning) or other conventional ground based method*.

For Parts A and B, the **Consultant** cannot sub-contract the management and administration activities related to this Contract. However, the **Contractor** must maintain full control of the data collection protocol and the quality of the data obtained through sub-contracted activities, as applicable.

For Parts A and B, the Project Manager must be an employee of the **Consultant** and the activities and responsibilities of the Project Manager cannot be sub-contracted.

The **Consultant** may not subcontract the Part A services falling under the following Items:

- Item 2.5, *Data processing and the preparation of files, drawings and the bilingual report*, with the exception of the translation and the processing of the results stemming from the specialized sub-contracted activities identified above;

- Item 3.4, *Data processing, file and drawing preparation, and bilingual report update*, with the exception of the translation and the processing of the results stemming from the specialized sub-contracted activities identified above.

The **Consultant** may not subcontract the services falling under the following Part B Items:

- Item 5.1 *Project Manager*;

- Item 5.2, *Senior Land Surveyors*;

- Item 5.3, *Intermediate Land Surveyors*;

- Item 5.4 *Senior Technicians/Draftsmen*;

- Item 5.5 *Intermediate Technicians/Draftsmen*;

3.03.12 Address of Transport Canada's Representative

The address of Transport Canada's representative is provided in Article 5.2 *Technical Authority* of Part 6 *Resulting Contract Clauses*.

3.03.13 Contract Administration

Transport Canada's Chief Engineer, New Bridge for the St. Lawrence, at the address indicated in Article 5.2 *Technical Authority* of Part 6 *Resulting Contract Clauses*, or anyone he designates, shall assume responsibility for administering the Contract.

3.03.14 Confidentiality

The requirements in terms of confidentiality are described in Article 18 *Confidentiality* of the *General Conditions (2010B) – Professional Services (Medium Complexity)* applicable to this Contract.

3.03.15 Method of Remuneration

The professional services provided by the **Consultant** shall be remunerated on a lump sum basis, an hourly basis for the number of hours worked, in keeping with unit prices plus mark-up or on the basis of net cost plus mark-up. The **Consultant** shall refer to the Price Table to determine the remuneration method that applies.

The amounts shown in the column "Amount" of the Price Table shall include without limitation all costs for labour, equipment, materials, report writing, material resources and incidental expenses, as well as expenditures for travel, meals and accommodation required to deliver all the services set out under the Items concerned in accordance with trade practices and with this Contract, unless a specific Item is provided for such expenditures.

Unless otherwise stated, any aspect of labour that constitutes a Payment Item or portion of a Payment Item shall include without limitation:

- the employee's base pay;
- any increases in base pay;
- premiums and allowances, including an increased rate of pay for overtime;
- social benefits;
- fringe benefits (or any benefits having a pecuniary value) including costs of group insurance and private pension plans;
- lost or unproductive time, including travel time, waiting time, and time spent on failed tests;
- costs for supplying, operating and maintaining equipment, apparatuses, tools, instruments, accessories, clothing, safety devices and the like used by staff to deliver services;
- travel costs for staff;
- insurance costs including insurance for general civil liability, motor vehicle liability, marine liability (if applicable), professional liability and work accidents;
- costs related to use by staff of IT and related equipment and software to deliver services;
- costs for administrative support, including the secretariat for preparing reports; costs for copying documents and communication costs;
- administrative costs;

- all other costs for delivery of the Contract services by the **Consultant**'s staff, including worksite overhead;

- equipment, tools, clothing and materials needed by the **Consultant**'s staff to deliver the Contract services;

- profit.

Unless otherwise stated, any aspect of equipment that constitutes a Payment Item or portion of a Payment Item shall include, without limitation:

- the costs of loading, unloading, transportation, installation, dismantling, cleaning etc., regardless of where such costs are incurred;

- any fuel (or other form of energy) or lubricant required to operate the equipment;

- the calibration of specialized equipment and devices and the obtaining of related certificates;

- any repairs that must be made to the equipment to keep it in good repair and working order;

- the cost of replacing broken or worn parts, including normal wear;

- the cost of providing operators for equipment;

- the cost of any loss of or damage to equipment;

- equipment insurance costs;

- all local, municipal, provincial and federal taxes, levies and duties on equipment during the period of use under the Contract;

- worksite overhead costs;

- administrative costs;

- profit.

Unless otherwise stated, any aspect of materials that constitutes a Payment Item or portion of a Payment Item shall include without limitation:

- the purchase price of the materials;

- all local, municipal, provincial and federal taxes, levies and duties on materials;

- the cost of loading, unloading, transporting, packing, etc.

- the cost of any loss of or damage to materials;
- insurance costs;
- worksite overhead costs;
- administrative costs;
- profit.

The **Consultant** shall submit to **Canada** for approval the price of any new category of work not found on the Price Table before undertaking such new work. **Canada** reserves the right to request proposals from other suppliers for any category of work not found on the Price Table, and to have such new work done by another supplier.

In the case of a remuneration method based on a lump sum, the price tendered must include, without limitation, the following:

- Any human resources required to provide the professional services indicated in the Payment Item concerned, specifically including: salaries, fringe benefits, bonuses, insurance and social benefits;
- Fees for computer equipment, including the software applications required to provide the professional services;
- Communication fees (telephones, fax machines, email, cellular telephones, radios, etc.) including the cost of the equipment and user fees;
- In the case of reports payable on the basis of a lump sum, the price tendered shall include, without limitation, the following: the review of the documentation, on-site investigations necessary for the preparation of the report that are not included in another distinct Payment Item, additional visits and on-site surveys by the Project Manager and/or the senior land surveyor to validate all particular observations, where applicable, the analysis of the results and the recommendations, the cost of reproductions and electronic copies of the documents, including the reports in PDF format;
- All other material resources and incidental expenses required, including the resources and the expenses described in the paragraphs of Article 3.03.8 *Material Resources, Equipments and Incidental Expenses* of this Section 3 *Reference Terms* as well as travel expenses, meals and accommodation, unless a specific Payment Item is provided for such expenses;
- The administration fees and the profit on the costs listed above.

In the case of a means of remuneration on an hourly basis (billable hourly rate), the following provisions apply:

- The amounts listed in column 6 "Amount" of the Price Table for the Items payable on an hourly basis (billable hourly rate) shall include, without limitation, all costs for human resources, equipment, materials and report writing.

- The personnel provided by the **Consultant** to provide the professional services for said Items will be payable on the basis of a billable hourly rate for the number of hours worked, in accordance with the remuneration terms set out below.

- For the **Consultant**'s resources, the basic billable hourly rate for the Items payable on an hourly basis shall correspond to the product of the employee's base hourly salary multiplied by the mark-up rate.

- The hours allocated by **Canada** on the Price Table for any Item paid at the billable hourly rate may be used in whole or in part, or not used at all.

The billable hourly rate shall take the following expenses into consideration:

- Premiums, including overtime charges and charges for work done at night and on weekends;

- Fringe benefits and inflation;

- Insurance;

- Social benefits;

- Expenses for administration and the head office;

- Profit.

The tendered hourly rates (billable) are valid and set for the entire term of the Contract.

In the case of a means of remuneration based on a net cost plus mark-up (allowance), the following provisions apply:

- Unless otherwise indicated, the fees will be payable on the basis of a net cost plus mark-up of 10% for administration costs and profit. The allowance set aside by **Canada** on the Price Table includes the 10% mark-up.

The **Consultant** shall at all times be able to demonstrate to **Canada** that any expenditure it has made is justified and that the price paid is fair and reasonable, by soliciting competitive quotes in an appropriate manner, taking into account the amount of the expenditure and the particular circumstances.

3.03.16 Description of Payment Items

The professional services, equipment and expenses covered by the Payment Items described below will be payable on a lump sum basis, on an hourly basis (billable hourly rate), on the basis of a unit cost or on the basis of a net cost plus mark-up (allowance), as indicated in the Price Table, and described below for each Payment Item.

Any allowance (net cost plus mark-up) provided by **Canada** is indicated in the Price Table and may be used in whole or in part. When the services covered by a Payment Item are payable on the basis of a net cost plus mark-up, the **Consultant** shall provide evidence that it has obtained competitive prices on the market along with all pertinent supporting documents.

Items 1 to 3 of the Price Table, described below, cover the aerial photography, photogrammetric and 3D terrain modeling services that fall under Part A of the Contract.

Items 4 and 5 of the Price Table, described below, cover the additional surveying services that fall under Part B of the Contract, to be done only at the request of **Canada**.

Part A – Terrain Modeling

3.03.16.1 Item 1 – Signage and vehicle traffic control during the site surveys in 2013, 2014 and 2015

Signage and vehicle traffic control activities during the site surveys in 2013, 2014 and 2015 (services under Part A of this Contract) are payable on the basis of the following allowance specified by **Canada**:

- an allowance (net cost plus mark-up) of ten thousand dollars (10 000 $) for signage and vehicle traffic control services during the site surveys in 2013, 2014 and 2015 under Part A.

The price tendered for Item 1 shall cover, without limitation, all the work mentioned in Article 3.03.5 *Traffic Control* (including cycling on the ice control structure), in Appendix I *Procedure for Requesting Interruption or Intervention and Request Form for Interruption or Intervention,* and in Appendix J *Standard Specifications – Standard Technical Conditions / Subsection 6.14 "Traffic Control and Temporary Traffic Control Devices"* of this Section 3 *Reference Terms* and it shall include, without limitation, labour and the supply, rental (if applicable), transport, installation, moving, maintenance and removal of barriers and the like; flagmen to control roadway traffic; engineering costs; all labour to prepare drawings of traffic control devices and obtain permits from the bodies that manage requests for interruptions

3.03.16.2 Item 2 – Site surveys in 2013 and terrain modeling

3.03.16.2.1 Item 2.1 – Mobilization, demobilization and general organization of the surveys

Activities for mobilization, demobilization and general organization of the surveys for Part A *Terrain Modeling* services are payable on a lump sum basis.

The price tendered for Item 2.1 shall include, without limitation, all labour, materials, equipment, resources and travel costs for the following activities:

- obtaining all required permits and authorizations as well as insurance (attestation shall be presented to **Canada** before beginning works);
- providing all required contractual and professional documents, including but not limited to the detailed work plan, the detailed schedule, the detailed program for the modeling activities and their update, statutory declarations, and the various procedures not specifically included under other Payment Items;
- attending the weekly coordination meetings during the surveys as identified in Article 3.02.7.2 *Attendance at Meetings*;
- attending other meetings, with the exception of meetings to present reports and deliverables;
- rental of any land belonging to third parties that may be needed for carrying out the work, if required;
- transporting to the worksite and installing there the equipment needed to carry out work not specifically included under other Payment Items;
- storing machinery, equipment, materials, accessories and tools at an appropriate place at the worksite, if required;
- all temporary utilities and connections such as water, hydro and sanitary facilities, if required;
- methods of communication with **Canada** and with JCCBI, including all costs such as line activation, accessories, monthly charges and calling charges, as required by Articles 3.03.7 *Methods of Communication* and 3.03.8 *Material Resources, Equipment and Incidental Expenses* of this Section 3 *Reference Terms*.

Payment of the lump sum amount tendered for Item 2.1 of the Price Table will be prorated to the weighted progress of Items 2.2 to 2.5.

3.03.16.2.2 Item 2.2 – Site surveys using aerial photography

Site surveys using aerial photography are payable on a lump sum basis.

The price tendered for Item 2.2 shall cover, without limitation, all of the labour, materials, ground and air travel, and resources required for the provision of (including rental, as applicable) the transportation, installation, moving, maintenance and removal of all the equipment required to carry out the aerial photography surveys and related work, in accordance with the requirements of this Contract.

The lump sum amount tendered for Item 2.2 of the Price Table will be payable at 50% once all of the aerial photography surveys carried out in 2013 under Part A have been completed and the raw data or other data have been provided to **Canada** (on a USB key). The balance of the lump sum amount tendered for Item 2.2 shall be payable at 100% once the preliminary report has been delivered to **Canada** in the first official language.

3.03.16.2.3 Item 2.3 – Site surveys using stationary LiDAR (3D digital scanning) or other conventional ground based method

Stationary LiDAR site surveying (3D digital scanning) activities or those of other conventional ground based survey are payable on a lump sum basis.

The price tendered for Item 2.3 shall cover, without limitation, all of the labour, materials, travel and resources required for the provision of (including rental, as applicable), transportation, installation, moving, maintenance and removal of the equipment required to carry out the LiDAR surveys (3D laser scanning) or other conventional ground based surveys and related work, in accordance with the requirements of this Contract.

The lump sum amount tendered for Item 2.3 of the Price Table will be payable at 50% once all of the site surveys using LiDAR (3D laser scanning) or other conventional ground based method carried out in 2013 under part A have been completed and the raw data or other data have been provided to **Canada** (on a USB key). The balance of the lump sum amount tendered for Item 2.3 shall be payable at 100% once the preliminary report has been delivered to **Canada** in a first official language.

3.03.16.2.4 Item 2.4 – Survey of Hydro-Québec towers and conductors using aerial photography, LiDAR (3D laser scanning) or other method

The surveys of Hydro-Québec's towers and conductors using aerial photography, LiDAR (3D laser scanning) or other method are payable on a lump sum basis.

The price tendered for Item 2.4 shall cover, without limitation, all of the labour, materials, travel and resources required for the provision (including rental, as applicable) of transportation, moving, maintenance and removal of the equipment required to carry out the survey activities by aerial photography, LiDAR surveys (3D laser scanning) or other method and related work, in accordance with the requirements of Articles 3.02.1 and 3.02.2.4 as well as any other requirement of this Contract.

The lump sum amount tendered for Item 2.4 of the Price Table will be payable at 50% once all of the surveys of Hydro-Québec towers and conductors, using aerial photography, LiDAR (3D laser scanning) or other method carried out in 2013 under Part A have been completed and the raw data or other data have been provided to **Canada** (on a USB key). The balance of the lump sum tendered for Item 2.4 shall be payable at 100% once the preliminary report has been delivered to **Canada** in a first official language.

3.03.16.2.5 Item 2.5 – Data processing and the preparation of files, drawings and the bilingual report

Data processing and digital file and drawing preparation, as well as the production of the bilingual report based on the surveys carried out under items 2.2 to 2.4 are payable on a lump sum basis.

The price tendered for Item 2.5 shall cover, without limitation, all of the labour, equipment, materials, supplies and resources, including those identified in Article 3.03.8 *Material Resources, Equipment and Incidental Expenses*, required for the drafting, preparation, translation, printing, submission and revision/integration of the comments of **Canada** on the bilingual reports and drawings, in accordance with all applicable requirements and instructions under Article 3.02.7.6 *Language and Translation of Deliverables*, and Article 3.02.7.7, *Format of Deliverables*, and any other instruction under Section 3, *Terms of Reference*.

The price tendered for Item 2.5 shall also include the translation of the reports and drawings and their delivery to **Canada**.

Payment of the lump sum amount tendered for Item 2.5 will be done as follows:

- 50% of the amount tendered upon submission of a complete report, in a first official language, for comments, and upon presentation of the preliminary report to **Canada**, as defined under Article 3.02.7.2 *Attendance at Meetings*;

- 80% of the amount tendered is payable upon integration of the comments and the submission of a complete report in the second official language;

- 100% of the amount tendered upon submission of the final reports approved by **Canada** in both official languages, signed, and including the reports in digital format, and upon the presentation of the final reports to **Canada**, as defined in Article 3.02.7.2 *Attendance at Meetings*.

3.03.16.3 Item 3 – Site surveys in 2014 or 2015 and update of terrain modeling

3.03.16.3.1 Item 3.1 – Mobilization, demobilization and general organization of the new surveys

Subject to the requirements and provisions of this Article, the mobilization, demobilization, and the general organization of the new surveys (in 2014 and 2015) are payable on the basis of the same instructions and conditions as those under Item 2.1 and described under Article 3.03.16.2.1.

If the Item 3 activities are carried out in two (2) distinct phases, a maximum of 50% of the tendered amount for Item 3.1 shall be payable for each of the phases, and payment will be prorated to the weighted progress of Items 3.2 to 3.4

3.03.16.3.2 Item 3.2 – Site surveys using aerial photography

Subject to the requirements and provisions of this Article, the site surveys using aerial photography, in 2014 or 2015, are payable on the basis of the same instructions and conditions as those under Item 2.2 and defined under Article 3.03.16.2.2.

If the Item 3 activities are carried out in two (2) distinct phases, a maximum of 50% of the tendered amount for Item 3.2 shall be payable when each of the phases are carried out at **Canada**'s request.

3.03.16.3.3 Item 3.3 – Site surveys using stationary LiDAR (3D laser scanning) or other conventional ground based method

Subject to the requirements and provisions of this Article, the site surveys using stationary LiDAR (3D laser scanning) or other conventional ground based method, in 2014 or 2015, are payable on the basis of the same instructions and conditions as those under Item 2.3 and defined under Article 3.03.16.2.3.

If the Item 3 activities are carried out in two (2) distinct phases, a maximum of 50% of the tendered amount for Item 3.2 shall be payable when each of the phases are carried out at **Canada**'s request.

3.03.16.3.4 Item 3.4 – Data processing, file and drawing preparation, and bilingual report update

Subject to the requirements and provisions of this Article, the data processing, the preparation of files and drawings and the updating of the bilingual report for the work carried out under items 3.1 to 3.3, in 2014 or 2015, are payable on the basis of the same instructions and terms as those under Item 2.5 and defined under Article 3.03.16.2.5.

If the Item 3 activities are carried out in two (2) distinct phases, a maximum of 50% of the tendered amount for Item 3.2 shall be payable when each of the phases are carried out at **Canada**'s request.

Part B – Surveying Services upon Request

3.03.16.4 Item 4 – General organization for survey services upon request

3.03.16.4.1 Item 4.1 – Equipment for access and traffic control

Equipment for access and traffic control falling under Item 4.1 is payable on the basis of the following allowance set aside by **Canada**:

- an allowance (net cost plus mark-up) of six thousand dollars (6 000 $) for equipment to provide access and traffic control when carrying out additional surveying services on request under Part B.

Work performed under Item 4.1 shall include, without limitation:

- all the work mentioned in Article 3.03.5 *Traffic control*, in Appendix I *Procedure for Requesting Interruption or Intervention and Request Form for Interruption or Intervention* and in Appendix J *Standard Specifications – Standard Technical Conditions / Subsection 6.14 "Traffic Control and Temporary Traffic Control Devices"* of this Section 3 *Reference Terms*, and it shall include labour and the supply, rental (if applicable), transport, installation, moving, maintenance and removal of barriers and other required devices; flagmen to control traffic; engineering costs; and all labour to prepare drawings of traffic control devices

- maintenance of streets, traffic lanes, sidewalks and cycling lanes as well as traffic control, including acquisition of occupancy permits if necessary for streets and traffic lanes belonging to the MTQ and the municipalities;

- keeping streets, traffic lanes, sidewalks and cycling lanes free of mud and other waste from the worksite or from the **Consultant's** activities.

3.03.16.4.2 Item 4.2 – Miscellaneous expenses

Miscellaneous expenses for the general organization of additional surveying services upon request under Part B are payable on a lump sum basis.

Item 4.2 reimburses costs not already covered by one or another of Items 4 and 5 and includes, without limitation:

- methods of communication with **Canada** as required by the paragraphs of Article 3.03.7 *Methods of communication*;
- incidental expenses as described in the paragraphs of Article 3.03.8 *Material Resources, Equipment and Incidental Expenses*;
- local travel costs, i.e. for ground travel within a radius of fifty (50) kilometres of the old toll booth on the Champlain Bridge, which are not covered by Item 4.3.

Payment of the lump sum amount tendered for Item 4.2 of the Price Table will be prorated to the progress of Part B services.

3.03.16.4.3 Item 4.3 – Travel and living costs

Travel and living costs for the **Consultant's** staff, when at the request of **Canada** they are performing services under Part B of this Contract that are not covered by Items 4 and 5, are payable on the basis of the following allowance set aside by **Canada** :

- an allowance (net cost plus mark-up) of two thousand dollars (2 000 $) for travel and living costs when exceptional travel is requested and approved by **Canada** to carry out tasks under Part B of this Contract.

All travel-related expenses shall have **Canada's** prior approval.

The cost of travel, as well as the costing baseline, shall not exceed the limits set out in the Treasury Board's Travel Directive. Only allowances for meals, incidentals and personal car use, as set out in Appendices B, C and D of the Travel Directive, are applicable along with other provisions that refer to "travellers" rather than to "employees".

The **Consultant** will be reimbursed for appropriate travel and living costs reasonably incurred in carrying out the work, at cost price and with no allowance for profit and(or) general overhead, in accordance with the allowances for meals, personal car use and incidentals set out in Appendices B, C and D of the Treasury Board's Travel Directive (http://www.tbs-sct.gc.ca/pubs_pol/hrpubs/TBM_113/td-dv_e.asp), and other provisions of the Travel Directive that refer to "travellers" rather than to "employees".

Travel and living costs authorized by **Canada** will be reimbursed upon submission of a detailed statement of costs along with appropriate receipts. All payments may be audited by **Canada**.

Travel and living costs do not include expenditures for travel between the work site and the **Consultant's** business address. These costs must be included under other Items of Part B.

Travel costs do not include the time taken by the **Consultant**'s staff to make a trip.

Canada will not accept any travel and living costs incurred to relocate human resources in order to meet the conditions of the Contract.

3.03.16.5 Item 5 – Human resources for surveying services upon request

The human resources for performing surveying services upon request, as described in Items 5.1 to 5.6 below, are remunerated by the hour for the number of hours during which the human resources assigned to the Contract were actually working at the request of **Canada.**

A single billable hourly rate will apply to each human resource used within each of the categories described in Items 5.1 to 5.6 below.

The billable hourly rates tendered for Items 5.1 to 5.6 shall include everything which each of the assigned human resources needs to carry out their duties.

Specialists required under Item 5.7 to provide various surveying services and expert assessments upon request are payable on the basis of the following allowance (net cost plus mark-up) set aside by **Canada:**

- an allowance (net cost plus mark-up) of eight thousand dollars (8 000 $) for the fees of other specialists required and approved by **Canada** to carry out the services under Part B of this Contract.

3.03.16.5.1 Item 5.1 – Project Manager

The work of the Project Manager consists in, without being limited to, attending meetings, preparing studies and reports, giving technical advice, preparing weekly and monthly forms and submitting all required reports, documents and deliverables to **Canada**, all of which is done at **Canada**'s request. The Project Manager must also coordinate technical staff assigned to the Contract, including any subcontractors, and report to **Canada** all observations or comments regarding the surveying activities. He must participate in weekly coordination meetings as identified in Article 3.02.7.2 *Attendance at Meetings*.

3.03.16.5.2 Item 5.2 – Senior Land Surveyors

The work of the Senior Land Surveyors consists in, without being limited to, providing the necessary services and producing the required documents, ensuring that the shape, dimensions and location of the grounds and the elements surveyed comply with the agreements between the parties involved, and obtaining all necessary authorizations within the mandate, at the request of **Canada**, while adhering to best practices and complying with applicable statutes, orders and regulations.

3.03.16.5.3 Item 5.3 – Intermediate Land Surveyors

The work of the Intermediate Land Surveyors consists in, without being limited to, assisting the Senior Land Surveyors. Thus, at the request of **Canada**, they may be required to contribute to the provision of the necessary services, verify that the shape, dimensions and location of the grounds and elements surveyed comply with agreements, and assist in any other task of the Senior Land Surveyors, while adhering to best practices and complying with applicable statutes, orders and regulations.

3.03.16.5.4 Item 5.4 – Senior Technicians/Draftsmen

The work of the Senior Technicians or Senior Draftsmen consists in, without being limited to, carrying out site surveys, processing data at the office, reporting to the Project Manager all relevant comments regarding survey activities in progress, plot the acquired data and survey results on a survey plan, and any other technical activity necessary for the execution of this Contract, at the request of **Canada**.

The hourly rate tendered for Item 5.4 shall include everything required to carry out the duties of Senior Technicians or Draftsman, including but not limited to:

- providing the instruments necessary to carry out survey activities on the site, such as chains, levels, total stations, lasers, LiDAR, prisms, GPS, tripods, paint, compasses, and other relevant instruments.

- necessary equipment and materials.

3.03.16.5.5 Item 5.5 – Intermediate Technicians/Draftsmen

The work of the Intermediate Technicians or Intermediate Draftsmen consists in, without being limited to, assisting the Senior Technicians or Senior Draftsmen. Thus, at the request of **Canada**, they may be required to contribute to the execution of site survey work, in-office data processing, report to the Project Manager all relevant comments regarding survey activities in progress, plot the data acquired on site on a survey plan, and any other related technical activity necessary for the execution of this Contract. The hourly rate tendered shall include all elements and equipment required for the performance of the duties of Intermediate Technicians or Intermediate Draftsmen.

3.03.16.5.6 Item 5.6 – Secretariat Officer

Item 5.6 concerns the Secretariat Officer who is needed to plan, organize and carry out secretariat tasks. At the request of **Canada**, he could be asked, without limitation, to draft correspondences, produce documents, edit, amend and ensure the quality of documents, reports and drawings, coordinate and perform the work of copying and transmitting documents, files, reports and drawings.

3.03.16.5.7 Item 5.7 – Other Specialists

Item 5.7 concerns Other Specialists required to carry out activities related to Part B of this Contract. At the request of **Canada**, they could be asked to carry out specialized work, the treatment of data and the preparation of reports for activities agreed upon with **Canada** for the present Contract that cannot be done by the human resources already identified in Items 5.1 to 5.6. The hourly rate tendered shall include all elements and equipment required for the performance of the duties of the Other Specialists.

3.03.17 Invoicing of the Consultant's services

The **Consultant**'s services shall be invoiced and paid in accordance with the requirements prescribed in Articles 6 *Payment* and 7 *Invoicing Instructions* of Part 6 *Resulting Contract Clauses*.

For the surveying services upon request, **Canada** reserves the right to verify the salaries actually paid by the **Consultant** to its employees if it considers that the hourly rates are excessive in relation to market rates or to the rates tendered for other Payment Items of the Price Table. **Canada** reserves the right in such a case to refuse a resource of the **Consultant**.

3.03.18 Variations in Service Prices

The value of changes to the Contract in terms of services, fees and reimbursable expenses will be established by means of a written mutual agreement by **Canada** and the **Consultant**. In the event that the parties cannot reach an agreement, **Canada** will establish the monetary value of the changes in order to adjust the price of services.

END OF SECTION

APPENDIX A

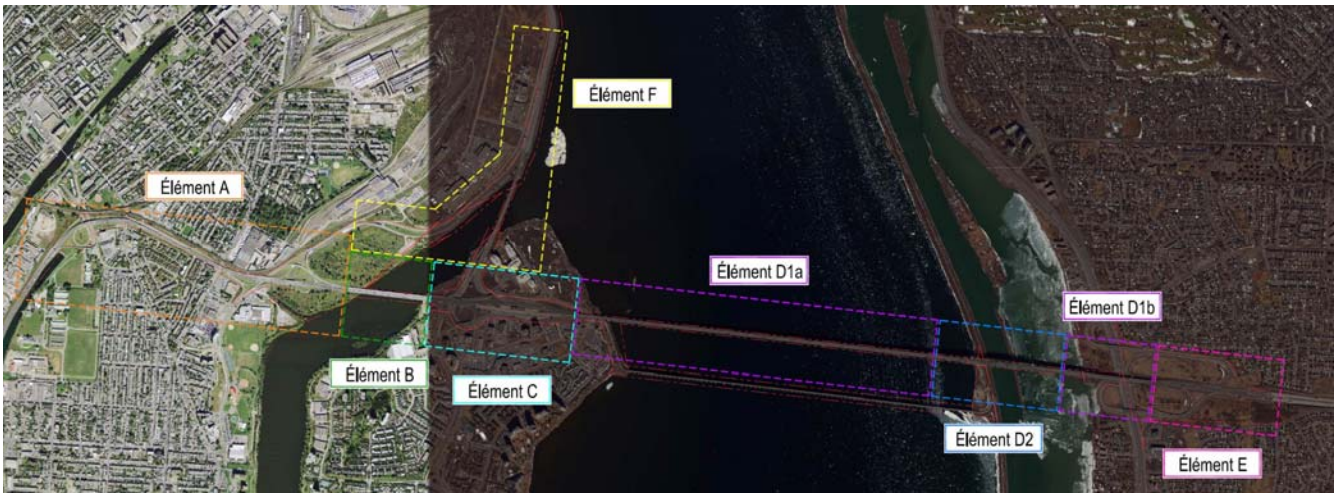
SCOPE AND ELEMENTS OF THE NEW BRIDGE FOR THE ST.LAWRENCE PROJECT

(3 PAGES)

SCOPE AND ELEMENTS OF *THE NEW BRIDGE FOR THE ST. LAWRENCE* PROJECT

For the moment, the New Bridge for the St. Lawrence project is divided into seven (7) main elements as shown on Figure 1.

Figure 1: Elements of the New Bridge for the St. Lawrence project



The following sections present the expected project scope of work and modifications for each element of the project.

Element A – Reconstruction and Widening of Highway 15

The federal portion of Highway 15 will be reconstructed. This work includes the complete reconstruction of this section of the highway (approximately 3 km in length), with the addition of one (1) lane in each direction. It is likely that the new highway will provide three (3) lanes per direction over the entire stretch between the Turcot Interchange and the new Nuns' Island Bridge. This will allow a better connectivity to the existing provincial network, as well as improve safety in this corridor.

It is likely that the main portion of this work will be done on federal land. Widening of Highway 15 will be
done mostly on the north side of the highway, towards the Hydro-Québec towers and Canadian National Railway Company's (CN) railway line. The work to be done also includes, without however being limited to, modifications to access and exit ramps, reconfiguration of the Atwater Avenue and Gaétan Laberge Street interchanges, adjustments to acceleration/deceleration lanes and adjustment to the highway's longitudinal profile.

Additionally, this work includes the reconstruction, demolition and modification of overpasses. The Jacques Cartier and Champlain Bridges Incorporated (JCCBI) has already started the process for the design and, over the next few years, will undertake the reconstruction of three (3) overpasses in this corridor (Overpass N, Overpass V (project underway) and Main Overpass according to its current functionality).

Element B – Replacement of the Nuns' Island Bridge

The existing Nuns' Island Bridge will be replaced. The new bridge will be similar in length to the existing bridge as it will be located at approximately the same location. The preferred solution has not yet been determined. **Canada** is currently evaluating various scenarios, including those that have been retained in the *Pre-feasibility Study on the Replacement of the Nuns' Island Bridge*. It is likely that the new bridge will have three (3) lanes in each direction for traffic and one (1) multifunctional path. The needs in terms of public transit on this bridge have not yet been confirmed and it is possible that the new bridge will have a fourth lane in each direction reserved for public transit.

Canada is planning for a 125 year planned/expected service life for the new Nuns' Island Bridge. The new Nuns' Island Bridge shall satisfy the design requirements of standard CAN/CSA-S6-06 *Canadian Highway Bridge Design Code* for a "lifeline" bridge.

The existing Nuns' Island Bridge will have to be demolished. The *Pre-feasibility Study on the Replacement of the Nuns' Island Bridge* does not identify preferred methods for the demolition of the existing Nuns' Island Bridge.

By 2015, JCCBI will construct a temporary bridge-causeway just north of the existing bridge and the existing bridge will be put out of service. This temporary structure will be used until the new permanent Nuns' Island Bridge is built as part of the NBSL project works. The temporary bridge-causeway will be demolished in the NBSL project.

Element C – Work on Nuns' Island

The work on Nuns' Island will mainly consist of adjusting the ramps leading to the New Bridge for the St. Lawrence and to the new Nuns' Island Bridge, and adding one (1) lane in each direction to the portion of Highway 10 located on Nuns' Island. The proposed modifications include the integration of the two (2) eastbound access ramps into one (1) ramp leading onto the Highway 10 East acceleration lane. This acceleration lane will also be extended. The exit ramps westbound or toward Nuns' Island will require minor adjustments.

The work may also require adjusting the alignment of the René Levesque Boulevard and other local streets on Nuns' Island so that they do not interfere with the proposed location for the New Bridge for the St. Lawrence. This may also require adjusting the nearby roundabout and the bicycle path to line-up with the new geometry of the boulevard.

The details associated with this work are discussed in the *Pre-feasibility Report - Reconstruction of the Highway 15 Corridor, including the Nuns' Island Bridge*, in the *Pre-feasibility Study on the Replacement of the Nuns' Island Bridge* and in the *Pre-feasibility Study Concerning the Replacement of the Existing Champlain Bridge*.

Element D (D1 and D2) – The New Bridge for the St. Lawrence

The New Bridge for the St. Lawrence will replace the existing Champlain Bridge which connects the Island of Montreal and the City of Brossard. As recommended in the *Pre-feasibility Study Concerning the Replacement of the Existing Champlain Bridge*, the New Bridge for the St. Lawrence will be located approximately 10 m downstream from the existing Champlain Bridge. It will be approximately 3.5 km in length, which can be separated into three (3) sections:

- D1a: spans the St. Lawrence River between Nuns' Island and the St. Lawrence Seaway (approximately 2,300 m in length);

- D2: spans the St. Lawrence seaway (approximately 400 m in length); and

- D1b: span from the St. Lawrence Seaway to the Brossard shore (approximately 800 m in length).

The New Bridge for the St. Lawrence will likely have three (3) lanes in each direction, one (1) additional lane in each direction dedicated to public transit and a multiuse path.

The preferred configuration of the deck has not yet been determined but could consist of two (2) separate decks or one (1) wider deck, or a multi-level deck.

Canada is planning for a 125 year service life for the new bridge. The New Bridge for the St. Lawrence shall satisfy the design requirements of standard CAN/CSA-S6-06 *Canadian Highway Bridge Design Code* for a "lifeline" bridge.

Canada is currently evaluating the various options.

Element E – Work on the Brossard Shore

The work to be done on the Brossard shore consists mainly in aligning Highway 10 and the ramps with the New Bridge for the St. Lawrence. The main modifications are related to extension of the acceleration lane of the access ramp from route 132 toward Highway 10 Westbound, and the extension of the deceleration lane for the exit ramp from Highway 10 Eastbound to route 132.

The details associated with this work are discussed in the *Pre-feasibility Study Concerning the Replacement of the Existing Champlain Bridge*. Le **Canada** is currently validating the modifications that are needed to connect the New Bridge for the St. Lawrence to the existing roadway network.

Element F –Bonaventure Expressway and the Clément Bridge

At this time, no work is expected to be required on the federal portion of the Bonaventure Expressway and the Clément Bridge as part the New Bridge for the St. Lawrence project. These structures are otherwise part of the Champlain Bridge Corridor.

Element G – Demolition of the Existing Champlain Bridge

The existing Champlain Bridge will need to be demolished when the New Bridge for the St. Lawrence is open to traffic. Two options for demolishing the existing bridge have been considered in the *Pre-feasibility Study Concerning the Replacement of the Existing Champlain Bridge*: controlled explosion and dismantling. Analysis of anticipated impacts reveals that a controlled explosion is not advisable because of major impacts on sensitive habitats. Dismantling poses the fewest environmental risks. The spans will be dismantled one by one, which will allow the maintenance of traffic on the Seaway and minimize impacts on the environment.

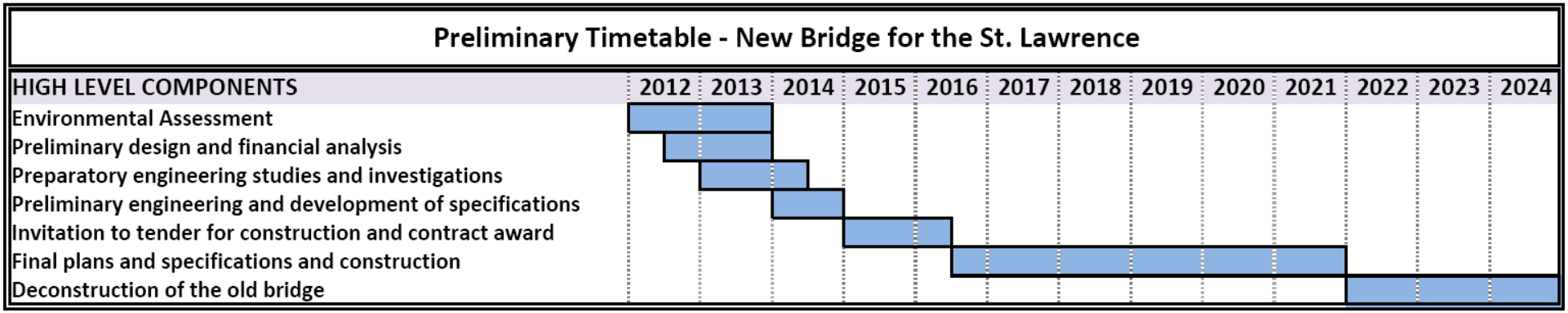
END OF APPENDIX A

APPENDIX B

PRELIMINARY MASTER SCHEDULE – NEW BRIDGE FOR THE ST. LAWRENCE PROJECT

(1 PAGE)

Preliminary Timetable - New Bridge for the St. Lawrence



APPENDIX C

LIST OF REFERENCE DRAWINGS PROVIDED

(1 PAGE)

List of reference drawings provided

Part A : Property Drawings*

N^{O} DESSIN PJCCI/ JCCBI DRAWING N^{o}	DATE	TITRE COMMUN FRANÇAIS / COMMON FRENCH TITLE
M2004-9048 06-13 (Sans ID)	2004-02-11	PONT CHAMPLAIN ET ESTACADE, AUTOROUTE BONAVENTURE : PLAN DE PROPRIÉTÉ - FEUILLE 6 DE 13
M2004-9048 07-13 (Sans ID)	2004-02-11	PONT CHAMPLAIN ET ESTACADE, AUTOROUTE BONAVENTURE : PLAN DE PROPRIÉTÉ - FEUILLE 7 DE 13
M2004-9048 08-13 (Sans ID)	2004-02-11	PONT CHAMPLAIN ET ESTACADE, AUTOROUTE BONAVENTURE : PLAN DE PROPRIÉTÉ - FEUILLE 8 DE 13
M2004-9048 09-13 (Sans ID)	2004-02-11	PONT CHAMPLAIN ET ESTACADE, AUTOROUTE BONAVENTURE : PLAN DE PROPRIÉTÉ - FEUILLE 9 DE 13
M2004-9048 10-13 (Sans ID)	2004-02-11	PONT CHAMPLAIN ET ESTACADE, AUTOROUTE BONAVENTURE : PLAN DE PROPRIÉTÉ - FEUILLE 10 DE 13
M2004-9048 11-13 (Sans ID)	2004-02-11	PONT CHAMPLAIN ET ESTACADE, AUTOROUTE BONAVENTURE : PLAN DE PROPRIÉTÉ - FEUILLE 11 DE 13
M2004-9048 12-13 (Sans ID)	2004-02-11	PONT CHAMPLAIN ET ESTACADE, AUTOROUTE BONAVENTURE : PLAN DE PROPRIÉTÉ - FEUILLE 12 DE 13
M2004-9048 13-13 (Sans ID)	2004-02-11	PONT CHAMPLAIN ET ESTACADE, AUTOROUTE BONAVENTURE : PLAN DE PROPRIÉTÉ - FEUILLE 13 DE 13

**Some of the drawings provided above have been subject to modifications in regards to land ownership and consequently may not be up to date.*

END OF APPENDIX C

APPENDIX D

LIST OF DOCUMENTS AVAILABLE FOR CONSULTATION

(1 PAGE)

The following documents are available for consultation:

REPORTS :

N°	Report Title	To be consulted
Pre-Feasibility Studies		
1.	**Restoration of the Nuns' Island Bridge –** Technical Report, Minute no 163; PHB; February 2013	Attached document *****
2.	**Restoration of the Nuns' Island Bridge** – Set of digital files; February 2013	DVD-ROM or USB key ******

***** Available to all Bidders during the Request for Proposals

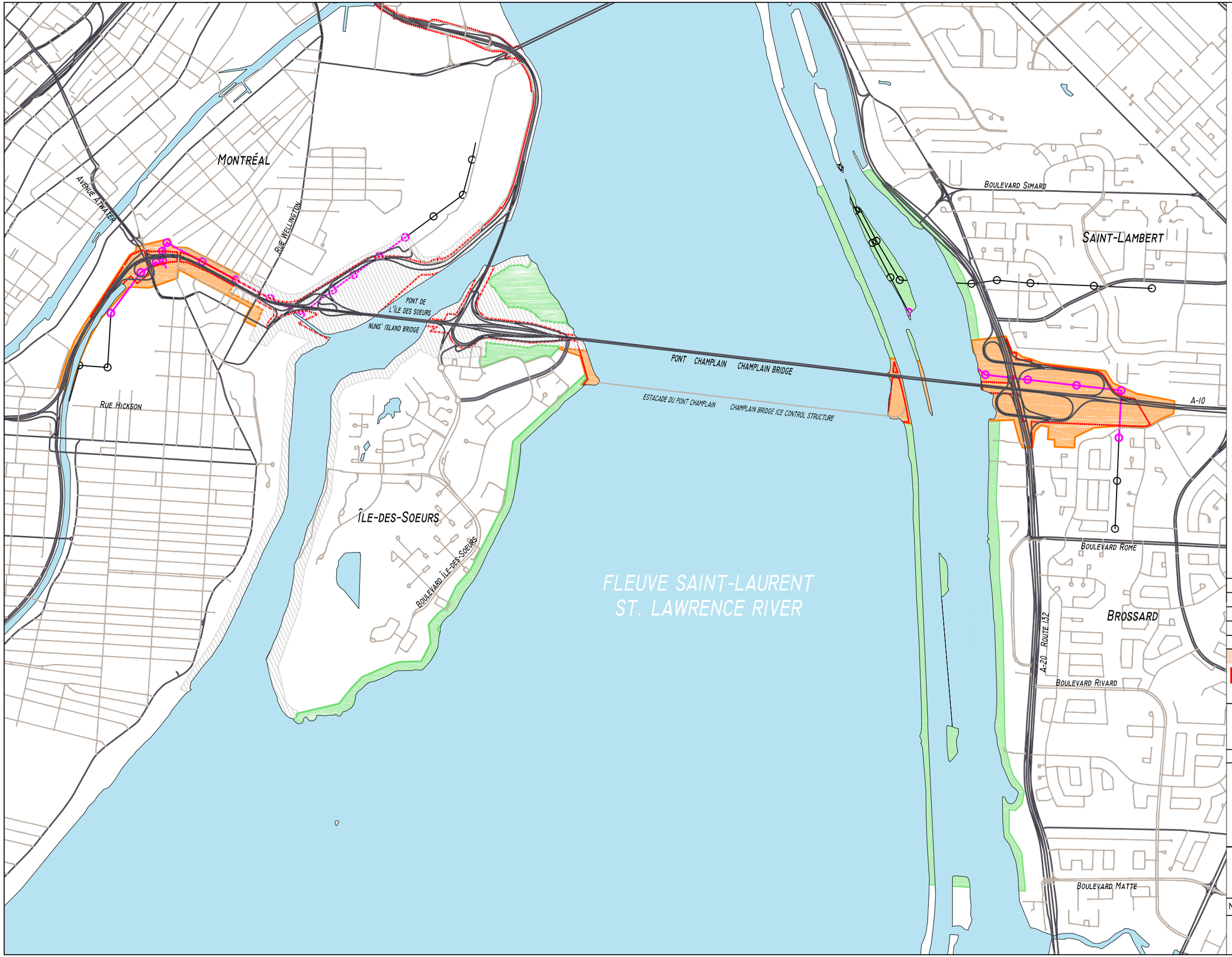
****** Will be made available only to the successful Bidder

END OF APPENDIX D

APPENDIX E

GRAPHICAL REPRESENTATION OF THE PHOTOGRAMMETRIC AND MODELING WORK TO BE PERFORMED

(4 DRAWINGS)



LÉGENDE / LEGEND

- Propriété du Canada - Property of Canada
- Levés photogrammétriques à 3 cm projeté
  Proposed photogrammetric surveys at 3 cm
- Levés photogrammétriques à 5 cm projeté
  Proposed photogrammetric surveys at 5 cm
- Levés photogrammétriques réalisés en novembre 2012
  Photogrammetric surveys done in November 2012
- Pylônes et axes des conducteurs d'Hydro-Québec à lever pour modélisation
  Hydro-Quebec Towers and conductors Axis to survey for modeling
- Pylônes et axes des conducteurs d'Hydro-Québec
  Hydro-Quebec Towers and conductors Axis

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DATE	DESCRIPTION
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Transports Canada Programmes / Transport Canada Programs

Nouveau pont pour le Saint-Laurent
New Bridge for the St. Lawrence

Date: 19 avril 2013 / 19 April 2013

Représentation graphique des travaux de photogrammétrie et de modélisation à réaliser
Projet No. 7003

Graphic Representation of the Photogrammetry and Terrain Modeling to be Performed
Project No. 7003

ÉCHELLE / SCALE

500 0 500 1000

Numéro du plan / Plan number: 72816 (1 de / of 4)

Ce plan n'est pas un plan d'arpentage ni un dessin pour fins de construction et a été préparé pour des fins d'illustration seulement.
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STRUCTURE FERROVIÈRE "2"
RAILWAY STRUCTURE "2"

STRUCTURE FERROVIÈRE "1"
RAILWAY STRUCTURE "1"

STRUCTURE FERROVIÈRE "3"
RAILWAY STRUCTURE "3"

STRUCTURE FERROVIÈRE "4"
RAILWAY STRUCTURE "4"

STRUCTURE FERROVIÈRE "5"
RAILWAY STRUCTURE "5"

VIADUC "C"
OVERPASS "C"

VIADUC "B"
OVERPASS "B"

VIADUC "A"
OVERPASS "A"

VIADUC "D"
OVERPASS "D"

VIADUC "WELLINGTON"
OVERPASS "WELLINGTON"

VIADUC "N"
OVERPASS "N"

VIADUC "V"
OVERPASS "V"

VIADUC "T"
OVERPASS "T"

VIADUC "PRINCIPAL"
"MAIN" OVERPASS

VIADUC "AB"
OVERPASS "AB"

APPROCHE/CULÉE OUEST
WEST ABUTMENT/APPROACH

PONT DE L'ÎLE DES SOEURS

NUNS' ISLAND BRIDGE

APPROCHE/CULÉE EST
EAST ABUTMENT/APPROACH

VIADUC "EST"
OVERPASS "EST"

VIADUC "Z-4"
OVERPASS "Z-4"

VIADUC "6"
OVERPASS "6"

RUE DE COLERAINE

RUE RUSHBROOKE

RUE BUTLER

RUE DITZ

RUE DUPUIS

RUE HICKSON

MONTRÉAL

ÎLE-DES-SOEURS

N

LÉGENDE / LEGEND

Propriété du Canada - Property of Canada

Levés photogrammétriques à 3 cm projeté
Proposed photogrammetric surveys at 3 cm

Levés photogrammétriques à 5 cm projeté
Proposed photogrammetric surveys at 5 cm

Levés photogrammétriques réalisés en novembre 2012
Photogrammetric surveys done in November 2012

Pylônes et axes des conducteurs d'Hydro-Québec à lever pour modélisation
Hydro-Quebec Towers and conductors Axis to survey for modeling

Pylônes et axes des conducteurs d'Hydro-Québec
Hydro-Quebec Towers and conductors Axis

Viaducs "XX"
Overpass "XX"

Viaducs et structures ferrovières à lever pour modélisation
Overpass and Railway Structures to survey for modeling

RÉVISIONS / REVISION

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Graphic Representation of the Photogrammetry and Terrain Modeling to be Performed
Project No. 7003

ÉCHELLE SCALE

250 0 250 m

Numéro du plan 72816 (2 de / of 4) Plan number

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- Pylônes et axes des conducteurs d'Hydro-Québec
  Hydro-Quebec Towers and conductors Axis
- Viaducs "XX" / Overpass "XX": Viaducs et structures ferrovières à lever pour modélisation
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250 0 250 m

Numéro du plan / Plan number: 72816 (3 de / of 4)

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FLEUVE SAINT-LAURENT
ST. LAWRENCE RIVER

CANAL DE LA RIVE SUD
SOUTH SHORE CANAL

A-20 ROUTE 132

BOULEVARD PROVENCHER

SAINT-LAMBERT

VIADUC "132 NORD"
OVERPASS "132 NORTH"

AVENUE VAN DYCK

RUE VOLTAIRE

PONT CHAMPLAIN
CHAMPLAIN BRIDGE

ESTACADE DU PONT CHAMPLAIN
CHAMPLAIN BRIDGE ICE CONTROL STRUCTURE

AUTOROUTE 10

RUE PINARD

VIADUC "132 SUD"
OVERPASS "132 SOUTH"

VOIE MARITIME DU SAINT-LAURENT
ST. LAWRENCE SEAWAY

PLACE TOULOUSE

PLACE TALBOT

AVENUE TISSERAND

AVENUE THÉRÈSE

BROSSARD

BOULEVARD ROMÉ

N

LÉGENDE / LEGEND

- Propriété du Canada - Property of Canada
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ÉCHELLE / SCALE

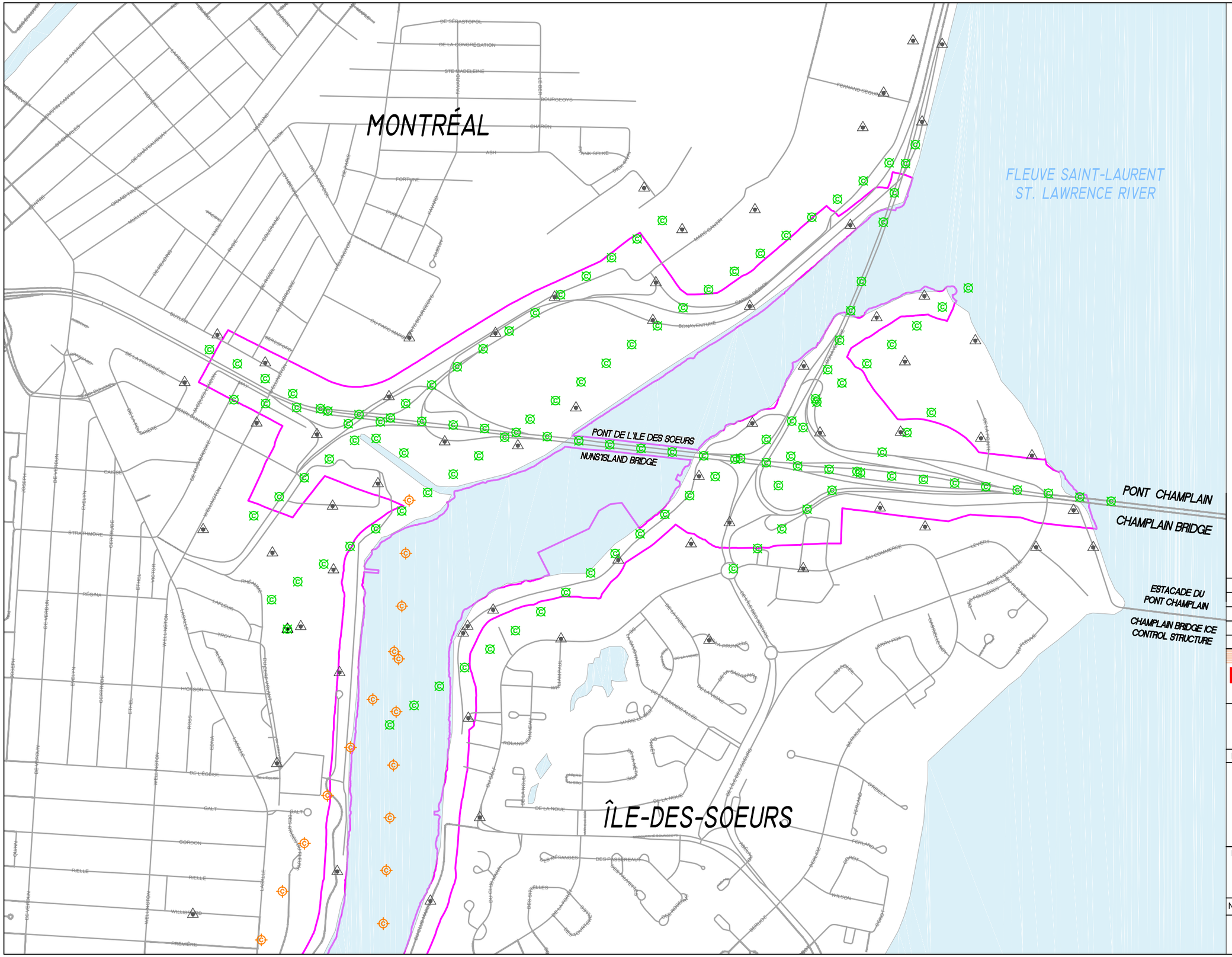
250 0 250 m

Numéro du plan / Plan number: 72816 (4 de / of 4)

APPENDIX F

DRAWING OF THE TERRAIN MODELING WORK PERFORMED IN MONTREAL (VERDUN AREA) AND ON NUNS' ISLAND (2012-2013)

(2 DRAWINGS)



LÉGENDE / LEGEND

- Points de contrôles / Control points
- Centre de photo à 3 cm de résolution / 3 cm resolution principal point
- Centre de photo à 5 cm de résolution / 5 cm resolution principal point
- Limites de la zone modélisée / Modeled zone limits

RÉVISIONS / REVISION	
DATE	DESCRIPTION
2013-07-05	Émis pour DDP/Issued for RFP

Transports Canada Programmes / Transport Canada Programs

Nouveau pont pour le Saint-Laurent
New Bridge for the St. Lawrence

Date: 3 mai 2013 / 3 May 2013

Plan des travaux de modélisation de terrain réalisés à Montréal (secteur Verdun) et à l'Île des Sœurs (2012-2013)
Projet No. 7003

Drawing of Terrain Modeling Work Performed in Montreal (Verdun Area) and on Nuns' Island (2012-2013)
Project No. 7003

ÉCHELLE / SCALE

250 0 250 m

Numéro du plan / Plan number: 72817 (1 de / of 2)

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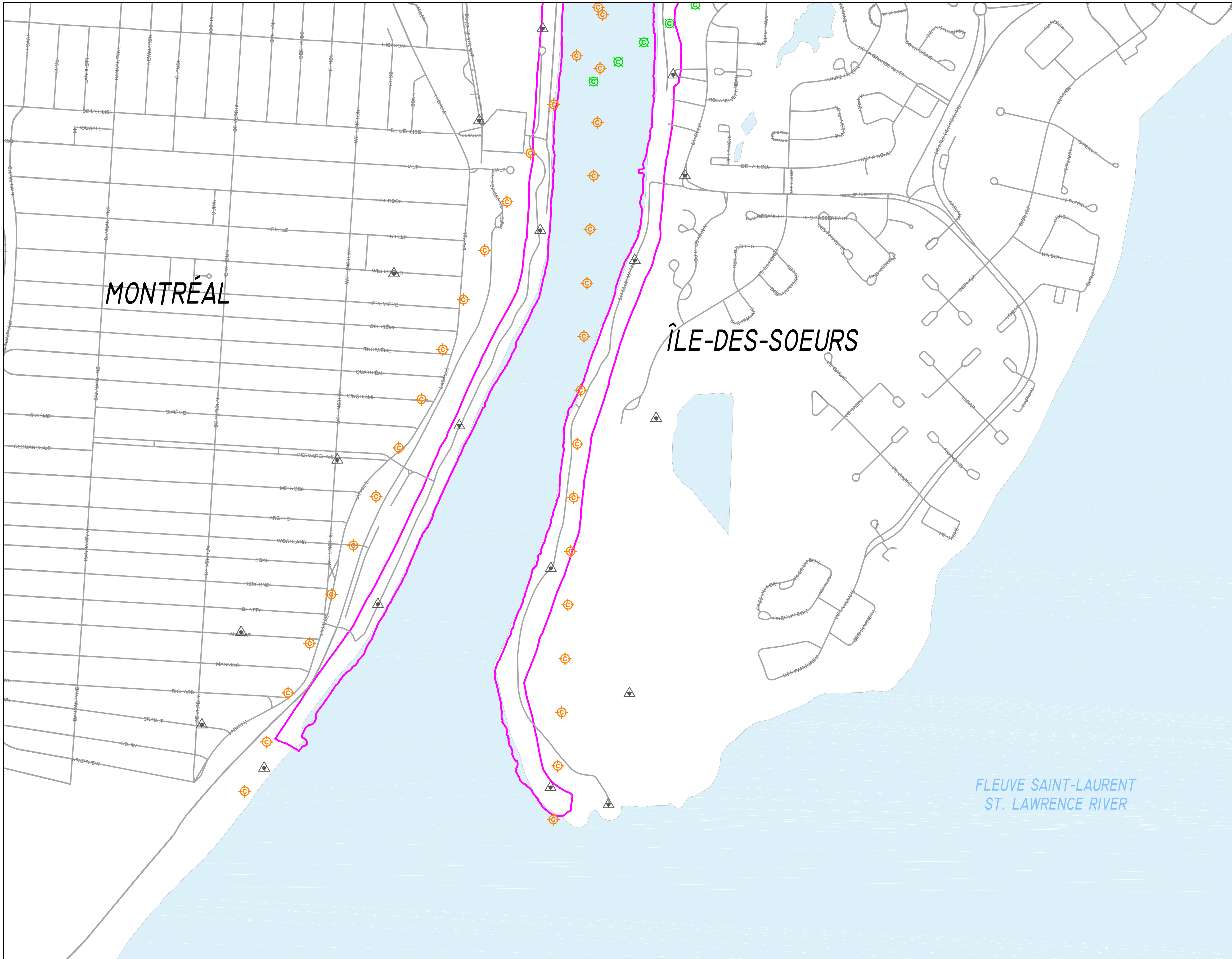

LÉGENDE / LEGEND

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Drawing of Terrain Modeling Work Performed in Montreal (Verdun Area) and on Nuns' Island (2012-2013)
Project No. 7003

ÉCHELLE SCALE

250 0 250 m

Numéro du plan 72817 (2 de / of 2) Plan number

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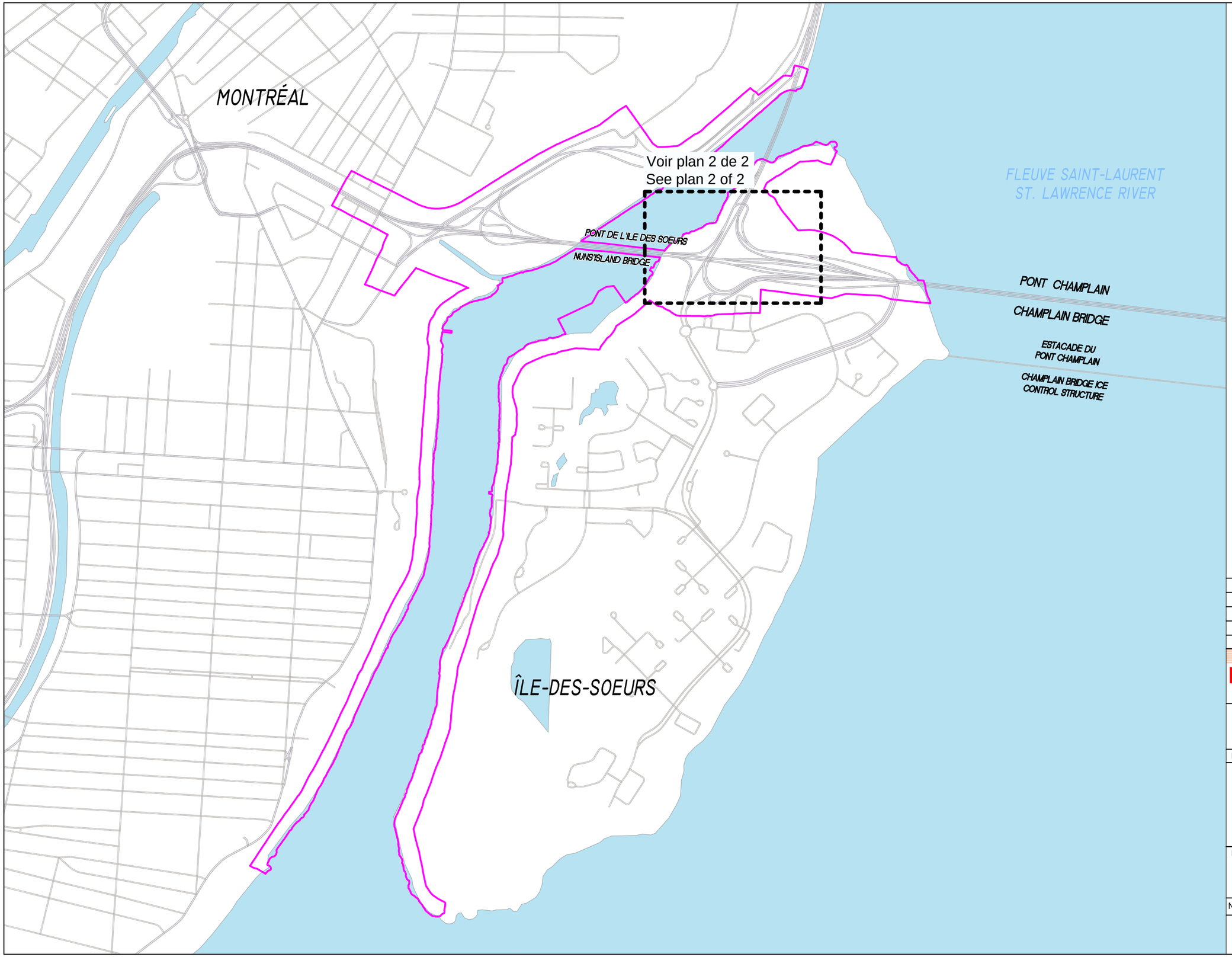
APPENDIX G

EXTRACT OF CARTOGRAPHICAL DRAWINGS STEMMING FROM MODELING WORK PERFORMED IN MONTREAL (VERDUN AREA) AND ON NUNS' ISLAND (2012-2013)

(2 DRAWINGS)



LÉGENDE / LEGEND

Limites de la zone modélisé
Modeled zone limits

RÉVISIONS / REVISION	
DATE	DESCRIPTION
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Transports Canada Programmes
Transport Canada Programs

Nouveau pont pour le Saint-Laurent
New Bridge for the St. Lawrence

Date 3 mai 2013 / 3 May 2013 Date

Extrait des plans cartographiques découlant de la modélisation réalisés à Montréal (secteur Verdun) et à l'Île des Sœurs (2012-2013) Projet No. 7003

Extract of Cartographical Drawings Stemming from Modeling Work Performed in Montreal (Verdun Area) and on Nuns' Island (2012-2013) Projet No. 7003

ÉCHELLE SCALE

250 0 250 m

Numéro du plan 72818 (1 de / of 2) Plan number

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FLEUVE SAINT-LAURENT

BOULEVARD DE L'ÎLE-DES-SŒURS

VENTILATION

VENTILATION

VENTILATION

STRUCTURE DE BÉTON

N

RÉVISIONS / REVISION	
DATE	DESCRIPTION
2013-07-05	Émis pour DDP / Issued for RFP

Transports Canada Programmes
Transport Canada Programs

Nouveau pont pour le Saint-Laurent
New Bridge for the St. Lawrence

Date: 3 mai 2013 / 3 May 2013

Extrait des plans cartographiques découlant de la modélisation réalisés à Montréal (secteur Verdun) et à l'Île des Sœurs (2012-2013) Projet No. 7003

Extract of Cartographical Drawings Stemming from Modeling Work Performed in Montreal (Verdun Area) and on Nuns' Island (2012-2013) Project No. 7003

ÉCHELLE / SCALE

250 0 250 m

Numéro du plan / Plan number: 72818 (2 de / of 2)

Ce plan n'est pas un plan d'arpentage ni un dessin pour fins de construction et a été préparé pour des fins d'illustration seulement.
This plan is not a legal survey plan and is not a drawing for construction and was prepared for illustration purposes only.

APPENDIX H

PLANNING OF JCCBI'S WORK

(1 DRAWING)

CH-A15-AB-CONSTRUCTION-2013-RD

LS 00 — STRUCTURE DE SIGNALISATION DES VOIES No.00
LANE SIGNAL STRUCTURE NUMBER No.00

PANNEAU DE SIGNALISATION À MESSAGE VARIABLE
VARIABLE MESSAGE SIGNALISATION

AV/DS — EN AVAL SEULEMENT / DOWNSTREAM ONLY

AM/US — EN AMONT SEULEMENT / UPSTREAM ONLY

ROUTES GÉRÉES PAR D'AUTRES
ROADS MANAGED BY OTHERS

GLISSIÈRES MÉDIANES AMOVIBLES – OUVERTURE DE 72m (x8):
MOVABLE MEDIAN BARRIERS – 72m OPENING (x8):

CHEMIN DE DÉVIATION EN X POUR CONTRESENS
X SHAPED DEVIATION ROAD FOR CONTRAFLOW

(A) CHEMIN DE DÉVIATION OUEST (PLAZA CHAMPLAIN)
WEST DEVIATION ROAD (CHAMPLAIN PLAZA)

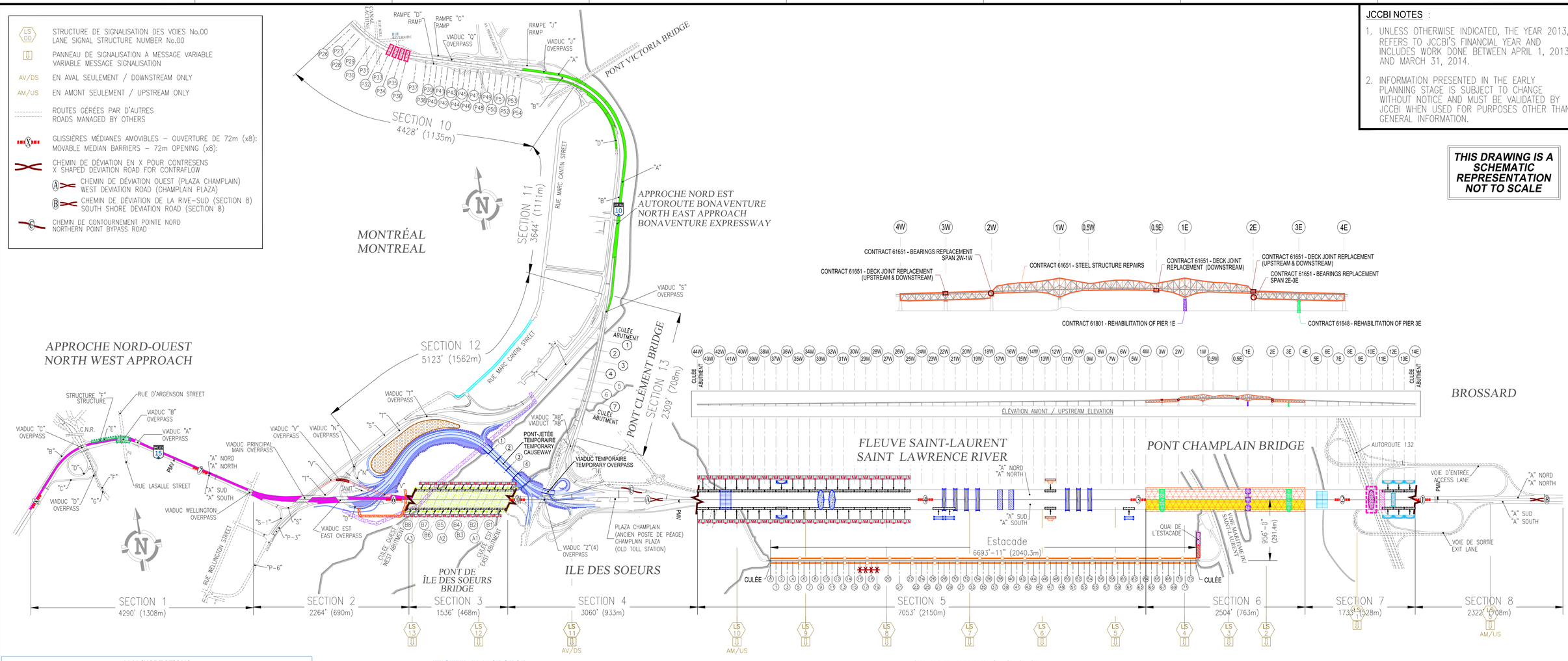
(B) CHEMIN DE DÉVIATION DE LA RIVE-SUD (SECTION 8)
SOUTH SHORE DEVIATION ROAD (SECTION 8)

(C) CHEMIN DE CONTOURNEMENT POINTE NORD
NORTHERN POINT BYPASS ROAD

JCCBI NOTES :

1. UNLESS OTHERWISE INDICATED, THE YEAR 2013, REFERS TO JCCBI'S FINANCIAL YEAR AND INCLUDES WORK DONE BETWEEN APRIL 1, 2013 AND MARCH 31, 2014.
2. INFORMATION PRESENTED IN THE EARLY PLANNING STAGE IS SUBJECT TO CHANGE WITHOUT NOTICE AND MUST BE VALIDATED BY JCCBI WHEN USED FOR PURPOSES OTHER THAN GENERAL INFORMATION.

THIS DRAWING IS A SCHEMATIC REPRESENTATION NOT TO SCALE



2013 INSPECTIONS

Contract 61663
Champlain Bridge Ice Control Structure, Inspection Services and Underwater Repairs (2013)

Contract 61195
Champlain Bridge and Highway 15, Consultant services, Annual inspections (2012-2015)

Contract 61362
Bonaventure Expressway and Champlain Bridge Estacade, Consultant services, Annual inspections (2012-2015)

2013 CONSTRUCTION WORKS

BONAVENTURE EXPRESSWAY

Contract 61876
Bonaventure Expressway, Section 10, Deck Replacement and Rehabilitation of Piers (2013)

Contract 61258
Bonaventure Expressway, Section 11, Rehabilitation of Pavement and Several Related Elements (2013)

Contract 61062
Highway 15 and Bonaventure Expressway, Sections 2 and 12, Design-Build-Operate a Ground Water Pumping and Treatment System (2013-2028)

Contract 61875
Champlain Bridge and Bonaventure Expressway, Sections 2 and 12, Construction of a Snow Disposal Site (2013)

Contract 9535-117 - 1
Bonaventure Expressway, Section 12, Extension of Marc Cantin Street (2012)
- Completion works

HIGHWAY 15 SECTOR

Contract 61686
Highway 15, Section 1, Repairs to Overpass B and Structure F (2013)
- Concrete rehabilitations and roadway repairs to Overpass "B" and Structure "F"

Contract 60911
Highway 15, Sections 1 and 2, Repairs to Northbound Roadway (2013)
- Miscellaneous works: concrete barrier, underground drainage, anti-glare screens, snow fence

Contract 61597
Highway 15, Section 2, Replacement of Viaduct V (2013)
Approach lane "V" pavement rehabilitation

Contract 61454
Île des Sœurs Bridge, Deck Slab Rehabilitations and Miscellaneous Works (2013)
- Miscellaneous works detail and location to come (at pier and deck level)

Contract 61678 - 3
Île des Sœurs Bridge, Concrete Deck : Full Depth Slab Repairs and Joint Repairs (2013)

Contract 61YYY
Île des Sœurs Bridge and Champlain Bridge, Section 3, Axis W.A. to E.A. and Section 5, Axis 44W to 26W, Prestressed Outer Beams Instrumentation □□□□□ (2013)

Contract 61XXX
Highway 15, Section 2, Construction of a Temporary Access Road (2013)

Contract 62000
Highway 15, Sections 2 to 4, Construction of a Temporary Causeway-Bridge (2013-2015)
Construction works on abutments 1 and 4, and on piers 2 and 3
Backfilling works along the Causeway-Bridge approaches

CHAMPLAIN BRIDGE SECTOR

Contract 61579
Champlain Bridge, Sections 4, 5 and 6, Rehabilitation of Piers, Pier Caps, Beams and Deck Joints (2012-2013)
Deck joint replacements : Axis 17W and 16W
Outer beams reinforcement □□□□□ "Deflected Greased-Sheated Single Strand System" : Span 36W-37W
Addition of exterior post-tensioning on outer beams □□□□□ : Upstream side (P7), spans 22W-21W, 21W-20W and 6W-5W
Addition of post-tensioning on pier caps : Axis 22W, 21W, 20W, 19W, 11W, 10W and 9W
Slab support and reinforcement (between prestressed beams) : Span 42W-41W
Pier shaft and footing rehabilitation : Piers 33W and 32W

Contract 61580
Champlain bridge, sections 7 and 8, rehabilitation of piers, pier caps, beams and deck joints (2012-2013)
Rehabilitation of beam ends, pier shaft, pier cap, end diaphragm, bearings and deck underside : Axis 10E
Deck joint replacements : axes 10E et 11E
Pier shaft and footing rehabilitation : Pier 10E / Relocation of electrical equipment on west side face of pier to a new shelter on the ground, between axis 9E and 10E

Contract 61692
Pont champlain, section 7, renforcement de poutres precontraintes et du tablier et refection d'un fut (2012-2013)
Outer beams reinforcement □□□□□ "Deflected Greased-Sheated Single Strand System" : Spans 11E-12E, 12E-13E et 13E-14E
Slab support and reinforcement (between prestressed beams) : Span 5E-6E
Pier shaft rehabilitation : 12E

Contract 61648
Champlain bridge, section 6, rehabilitation of piers 3E and 3W (2012-2014)
- Completion works on pier 3W and rehabilitation of pier 3E

Contract 61801
Champlain bridge, Section 6, Rehabilitation of Pier 1E (2013)

Contract 61650
Champlain Bridge, Section 6, Replacement of Orthotropic Deck Asphalt Pavement (2012-2013)

Contract 61651
Champlain Bridge, Section 6, Painting and Miscellaneous Steel Work, Replacement of Bearings and Expansion Joints (2012-2013)
Steel structure miscellaneous repairs between axis 4W and 4E
Bearings remplacement at axis : 1W (span 1W-2W) and at axis 2E (span 2E-3E)
Deck joint replacements at axis : 3W and 2E (North and South Dir.), and 0.5E (North Dir. only)
Outer beams reinforcement □□□□□ "Queen Posts" at span 12W-13W (end sheduled for April 2013)

CHAMPLAIN BRIDGE ICE CONTROL STRUCTURE SECTOR

Contract 60717
Champlain Bridge Ice Control Structure, Guardrail Replacement Works (2012-2013)

Contract 61696
Champlain Bridge Ice Control Structure Dock Rehabilitation and Extension (2012-2013)
2012-2013 Winter - Construction of dock extension
2013-2014 Winter - Rehabilitation of existing dock

Contract 61663
Champlain Bridge Ice Control Structure, Inspection Services and Underwater Repairs (2012-2013)
Concrete repairs to piers 16, 17, 18 and 19

Révision: Revision:	Description:	Date:
D	PLANNING UPDATE BY ENGINEERING	2013-03-27
C	PLANNING UPDATE BY ENGINEERING	2013-02-19
B	PLANNING UPDATE BY ENGINEERING	2013-01-18
A	PLANNING UPDATE BY ENGINEERING	2012-11-14

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

CHAMPLAIN BRIDGE, BONAVENTURE EXPRESSWAY, HIGHWAY 15 & CHAMPLAIN BRIDGE ICE CONTROL STRUCTURE, 2013 INSPECTIONS AND CONSTRUCTION WORKS

2013 PLANNING INFORMATION
UPDATED MARCH 27, 2013

Échelle / Scale: N.À.É. / N.T.S.	Conçu / Designed: 2012-07-24
Dessiné / Drawn: P. GRÉGOIRE	
Vérifié / Checked: ENGINEERING	No Dessin / Dwg. No.: CH-A15-AB-CONSTRUCTION-2013-RD
Approuvé / Approved: S. MARTEL	

File i. D. No. CH-A15-AB-CONSTRUCTION-2013-RD.DWG

2004-02-16

APPENDIX I

PROCEDURE FOR REQUESTING INTERRUPTION OR INTERVENTION

AND

REQUEST FORM FOR INTERRUPTION OR INTERVENTION

(4 PAGES)

NOTE:

The procedure set out below was prepared by and for the needs of The Jacques Cartier and Champlain Bridges Incorporated (JCCBI). The following terms used in the Procedure and Form of this Appendix N of Section 3 *Reference Terms* shall be deemed to be equivalent to the terms in the right-hand column below, which are used in Project No. 7003:

Term used in the Procedure or Form	**Equivalent term used in Project No. 7003**
Owner	**Canada** or JCCBI (depending on context)
Owner's Engineer acting as Project Manager	Representative of **Canada** or JCCBI
Owner's Traffic Coordinator	JCCBI traffic coordinator

A copy of every request for JCBBI to interrupt traffic shall be sent to **Canada** for information.

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

PROCEDURE: REQUEST FOR INTERRUPTION OR INTERVENTION (Consultant Contract)

- Any Request for Interruption or Intervention on the **Owner**'s territory shall be submitted by the **Consultant** to the attention of the Engineer acting as Project Manager for the **Owner** (or to the person designated by the latter) using the "Request for Interruption or Intervention" form duly completed, and this, at least two (2) business days in advance of the expected date of the Interruption or Intervention. **For works scheduled between the Friday evening and following Monday morning, the Consultant shall submit its request on Tuesday, before 6:30 pm. The request shall be accompanied by the Traffic Management Plates duly signed (including seal) by an engineer specialised in this field, and a procedure for the installation and removal of the traffic signalisation, when needed.** The Request may be transmitted by Fax: (450) 651-7888.

- After examination, the **Owner**'s Engineer acting as Project Manager (or the person designated by the latter) will forward the Request to the **Owner**'s Traffic Coordinator for approval, and this, within a delay of 0.5 business day from the time of reception of said Request.

Note:
No *Request for Interruption or Intervention* shall be sent by the Consultant directly to the Owner's Traffic Coordinator.

- In order to optimize the treatment of a Request, while in keeping with the need to prepare and issue Notices regarding lane closures at the appropriate time, the **Owner**'s Engineer acting as Project Manager (or the person designated by the latter) must meet the delay limits for transmission of information as prescribed below:

  - **Before Noon (12 am) the day preceding the Interruption for evening and/or night works, that is work scheduled between 4:30 pm the next day until 8:00 am the following morning (Monday through Thursday);**
  - **Before 16h30 on Wednesday for weekend works (Friday night through to the following Monday morning inclusively).**

Note:
Among other reasons, the above specified delays are established in order to hold a teleconference meeting with the MTQ and other partners, on Thursday morning at 10 am. Such interaction will enable the global coordination of planed works on the Greater roadway network for the upcoming weekend, and by so doing, help minimize traffic disruptions.

- The Request should normally be approved within a delay of 0.5 business days. Upon reception of the Form, the latter is signed by the **Owner**'s Traffic Coordinator and a copy is returned by Fax to the Engineer acting as Project Manager for the **Owner** (or to the person designated by the latter), who will then transmit a copy to the **Consultant.** The **Consultant** will be responsible for the transmission of said document to its subcontractor responsible for traffic control, if applicable, unless instructed otherwise by the Engineer acting as Project Manager for the **Owner** (or the person designated by the latter).

- The **Consultant** shall inform the Engineer acting as Project Manager for the **Owner** (or the person designated by the latter) in a timely manner, concerning any addition, modification or cancelation. To contact said person at their office, dial (450) 651-8771.

- In the event of a cancellation occurring outside of the **Owner**'s normal business hours (Monday to Friday, 8:00 am to 4:30 pm), the **Consultant** shall call directly the Sûreté du Québec (SQ) at (450) 442-1036.

Note:
No modification or addition will be authorized outside of the Owner's normal business hours.

- Upon obtaining the authorization to intervene, the **Consultant** shall contact a representative of the **Owner** (as noted above) in real-time to inform him that the **Consultant** is ready to start its work. When there is an interruption of traffic in a lane equipped lane signals, the latter devices will be activated to indicate a lane closure by way of an "X" signal displayed in red (**X**). Following this step, the **Consultant** will then be in a position to have the traffic signs and control devices installed. Following completion of the works, the **Consultant** shall arrange to have the traffic equipment removed, if applicable, and then contact an **Owner** representative without delay.

Depending on time of day, Owner representatives to be contacted are:
During normal business hours of the Owner's Maintenance Centre, (Monday to Friday, 8:00 am to 16:30 pm), contact the Traffic Coordinator by phone at **(514) 914-3524 or (450) 928-4116 extension 226.**
Outside of normal business hours and on Holidays, contact the SQ (Cartier-Champlain Highway Station) at (450) 442-1036.

IN THE EVENT THAT YOU ARE UNABLE TO REACH THE TRAFFIC COORDINATOR OR IN THE CASE OF AN EMERGENCY, CONTACT THE SÛRETÉ DU QUÉBEC – CARTIER-CHAMPLAIN HIGHWAY STATION AT (450) 442-1036.

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

1111, St-Charles Street West
West Tower, Suite 600
Longueuil (Quebec) J4K 5G4

REQUEST FOR INTERUPTION & INTERVENTION NOTICE

(Consultant Contract)

Contractor				**Contract N°**	
Structure		**Route / Section**		**Direction :**	**North** ☐ **South** ☐ **East** ☐ **West** ☐

Description of Interruption

Date of Inter.	Start (Hour)	Finish (Hour)	Lane(s)	Section (s)	From Axe	To Axe	Nature of works

Nature of Intervention / Interruption

Type of Interruption	☐ **Lane closure** ☐ **Narrowing of lane** ☐ **Closure with detour** ☐ **Other : _____**	☐ **Complete Closure with Detour** ☐ **Works on Shoulder** ☐ **Closure with contraflow** ☐ **Works without Lane closures**
Additional Details		

Person in Charge (Contact Person in case of Emergency)

	Site	Name	Telephone	Fax	Cellular
Consultant on Site	**Day**				
	Night				
	Week-end				
Consultant at Office	**Day**				
	Night				
	Week-end				
Signalisation _____ (Firme)	**Day**				
	Night				
	Week-end				
Project Manager (Eng.) JCCBI	**Day**				
	Night				
	Week-end				

Requested by: **Date :**

Recommended by:	**Authorised by:**
_____ _____	_____ _____
Project Manager (JCCBI) **Date**	**Lane Coordinator** **Date**

Important: **Please note that JCCBI reserves the right to withdrawal all authorisations (with or without lane closures) in the event of poor weather and/or emergency.**

APPENDIX J

STANDARD SPECIFICATIONS
STANDARD TECHNICAL CONDITIONS /

SUBSECTION 6.14
TRAFFIC CONTROL AND TEMPORARY TRAFFIC CONTROL DEVICES

(48 PAGES)

NOTE:

The standard specifications below (subsection 6.14) were prepared by The Jacques Cartier and Champlain Bridges Incorporated (JCCBI) for purposes of traffic control and temporary traffic control devices to be provided at the time of any intervention affecting traffic on works belonging to JCCBI.

For the purposes of this Contract, unless otherwise specified by JCCBI or **Canada**, the **Consultant** shall carry out activities related to traffic control and traffic control devices in accordance with the requirements specified by JCCBI in this Appendix O.

For the purposes of this Project No. 7003, the term "**Owner**" in Appendix O refers to JCCBI, and the term "**Contractor**" is equivalent to the term "**Consultant**". Additionally, any reference to "**Section 4 *Special Technical Conditions***", for the purposes of this Project No. 7003, refers to "**Appendix O1 *Table(s) of Traffic Lanes to be Maintained Opened***" and/or "**Appendix O2 *Signage Plates***".

SUBSECTION 6.14
TRAFFIC CONTROL AND
TEMPORARY TRAFFIC CONTROL DEVICES

Modification date : 2012-10-12

TABLE OF CONTENTS

PAGE

SUBSECTION 6.14 TRAFFIC CONTROL AND TEMPORARY TRAFFIC CONTROL DEVICES

6.14.1 SCOPE

6.14.1.1 The present subsection specifies the requirements for traffic control and temporary traffic control devices for all interventions affecting traffic on the **Owner**'s roadway infrastructures**,** including the Jacques-Cartier Bridge, Champlain Bridge, the federal portion of the Honoré-Mercier Bridge and their approaches, the Melocheville Tunnel and the Bonaventure Expressway.

6.14.1.2 The **Owner**'s requirements with respect to traffic control and temporary signs are consistent with the *Ministère des Transports du Québec*'s (MTQ) specifications on traffic control devices. Their aim is not to repeat these standards, but to define the **Owner**'s particular traffic control requirements on its property, considering the significant amount of traffic travelling thereon. The objective of the **Owner**'s requirements is to minimize the risk of accidents or incidents during work periods and to reduce inconveniences to users.

6.14.1.3 The present requirements for traffic control and signs take into consideration the special conditions met on the **Owner**'s roadway network. The main changes to the minimum requirements of MTQ standards account first for the speed governing the design of traffic control devices. Rather than base the design on the posted speed limit, the actual speed used by drivers (higher in some places than the posted speed) has been used to increase safety at construction sites. This adjustment results in greater perception distances, stopping site distances and increased anticipation time and decision making opportunity for the drivers. Specifications for advance-warning signs have consequently been adjusted and taper lengths increased. Secondly, the distance between visual markers and beacons has or could be reduced in some areas according to signalization plates and as directed by the Engineer to avoid traffic infiltration into work zones or protected zones during traffic congestion. Finally, the quantity of certain traffic control devices has been increased to account for actual speeds, and to address the reduced visibility caused by numerous heavy vehicles using the **Owner**'s roadway network. M5

6.14.1.4 «Traffic Management and Control Plan» in the present section indicates all documents and works which are related to traffic control and traffic control devices that the **Contractor** shall provide and execute under the terms of the Contract.

6.14.1.5 «Global Traffic Management Plan» in the present section indicates the general measures defined by the Engineer to ensure co-ordination of the **Owner**'s various construction sites. The **Contractor**'s Traffic Management and Control Plan shall be compatible with the Global Traffic Management Plan.

6.14.1.6 «TCD» in the present section indicates the most recent version of the document entitled «Traffic Control Devices» Parts 1 and 2 of the «Normes Ouvrages routiers, Tome V» issued by the MTQ. Although the TCD apply to the present Contract, the present section describes a significant number of measures which are different and more restrictive than the TCD.

6.14.1.7 The following definitions of work durations, as prescribed by the TCD, apply to the Contract. However, temporary traffic control devices and recommended measures may differ significantly from those prescribed by the TCD for each work-duration category.

Brief Duration Work:

Work requiring less than fifteen (15) minutes to be performed.

Short Duration Work:

Work requiring less than twenty-four (24) hours to be performed.

Long Duration Work:

Work requiring more than twenty-four (24) hours to be performed.

Moving Operations:

Work involving a vehicle moving at a speed of at least 5 km/h and at most 20 km/h (slow-moving work) or of at least 20 km/h and at most 60 km/h (fast-moving work).

The expression «Contraflow lane» indicates any lane in which the direction of the traffic, when work is underway, is redirected in the opposite direction.

6.14.2 SPECIFIC STANDARDS AND REQUIREMENTS

6.14.2.1 The **Contractor** shall provide, design, set up and maintain all necessary temporary traffic control devices in order to properly guide vehicular, pedestrian and cyclist traffic at all times on the work site. Signs shall be designed first in conformity with the requirements of this subsection, including the attached **Owner**'s signalization plates in Section 4 *Special Technical Requirements*, and also in conformity with appropriate provisions of the TCD. M5

6.14.2.2 At all times, the **Contractor** remains responsible for the temporary traffic control devices on his work site.

6.14.2.3 In the event of contradiction or discrepancy between TCD requirements and those prescribed in the present subsection, the most demanding requirements shall apply.

6.14.3 **TEMPORARY TRAFFIC SIGNS PLANNING**

6.14.3.1 TRAFFIC MANAGEMENT AND CONTROL PLAN

6.14.3.1.1 As the principal contractor, the **Contractor** is responsible for the safety of users traveling through the construction site as well as the health and safety of its employees and all workers on site; the **Contractor** shall therefore provide a detailed and complete traffic management and control plan for the duration of the Contract. This plan shall include drawings showing all details of traffic control devices planned for each traffic management scenario under consideration by the **Contractor** in the course of completing the works. The Traffic Management and Control Plan shall account for vehicular traffic and if applicable, pedestrian and bicycle traffic.

6.14.3.1.2 The Traffic Management and Control Plan shall include:

6.14.3.1.2.1 Drawings of temporary signs for each of the various scenarios involving lane closures, traffic diversion or contraflow operations (vehicles, bicycles and pedestrians) such drawings indicating the new panels, devices and pavement markings to be added or removed as well as devices which shall be temporarily masked or removed, and minimal lane width requirements;

6.14.3.1.2.2 Traffic diversion drawings, including if applicable, indications for alternate roads and detours or proposed bypass routes to be identified to users;

6.14.3.1.2.3 The protocol (dates, schedules and sequence of operations) for lane closures and re-openings as well as implementation of traffic signs, markings and traffic control devices;

6.14.3.1.2.4 Restrictions (including, but not limited to, weight, speed, dimensions);

6.14.3.1.2.5 The users information program (including, but not limited to, communication plan, variable message signs);

6.14.3.1.2.6 The **Contractor**'s measures to ensure effective management of the temporary traffic control devices.

6.14.3.1.3 The **Contractor**'s Traffic Management and Control Plan shall be established jointly and in coordination with the **Owner** and shall be incorporated in the, Global Traffic Management Plan of the **Owner**. This plan shall be submitted to the Engineer at least fourteen (14) days prior to the start of the **Contractor**'s work on site.

6.14.3.1.4 The **Contractor**'s temporary traffic control devices shall be designed and installed to provide users with the best possible guidance throughout the affected area. They shall clearly illustrate the best route to follow, and inform users well in advance of any potential dangers. They shall allow users to adapt their driving behavior to the variety of situations which they may confront and enable them to anticipate and respond appropriately.

6.14.3.1.5 To be completely effective, temporary traffic signs shall:

6.14.3.1.5.1 be bilingual (French and English) on all of the **Owner**'s property;

6.14.3.1.5.2 be uniform, homogeneous and completely integrated with adjacent road signs;

6.14.3.1.5.3 attract attention;

6.14.3.1.5.4 be perfectly visible and legible at distances required by standards;

6.14.3.1.5.5 be easily understandable;

6.14.3.1.5.6 be adapted to the dangers and specific situations requiring signalization.

6.14.3.1.6 Implementation of construction site traffic control devices shall:

6.14.3.1.6.1 comply with the sign and traffic management requirements described in the present specifications in order to ensure the safety of users and workers;

6.14.3.1.6.2 be executed according to well-defined procedures agreed upon by all parties involved, more specifically the Engineer and the **Contractor**.

6.14.3.2 PREPARATION OF TEMPORARY TRAFFIC CONTROL DRAWINGS

6.14.3.2.1 The drawings for temporary road signs shall be designed to:

6.14.3.2.1.1 indicate all dangers;

6.14.3.2.1.2 ensure the safety of users in the lanes affected by the works as well as those on lanes adjacent to the work;

6.14.3.2.1.3 ensure the safety of workers during execution of the works;

6.14.3.2.1.4 provide users with all relevant signals and information;

6.14.3.2.1.5 account for local peculiarities (including, but not limited to, geometry and actual vehicle speed).

6.14.3.2.2 For every necessary configuration, submitted drawings shall contain, but not limited to, the following information:

6.14.3.2.2.1 A diagram showing the geometry and profile of the structure affected and also the detour route;

6.14.3.2.2.2 Identification of the planned work zone;

6.14.3.2.2.3 Implementation (position, distances, alignment) and symbols for traffic signs and other proposed devices;

6.14.3.2.2.4 Sequential grouping of devices according to the order in which they will be implemented and removed;

6.14.3.2.2.5 All necessary explanatory notes required for a thorough understanding of the proposed implementation;

6.14.3.2.2.6 If applicable, an operational timetable for each suggested configuration;

6.14.3.2.2.7 A suitable legend that complies with the **Owner**'s standards.

6.14.3.2.3 The **Contractor**'s drawings for temporary traffic control devices shall be designed and prepared by an engineer specialized in traffic management who is a member of the Ordre des ingénieurs du Québec and has at least five (5) years of relevant experience. All drawings (and specifications if required) shall be sealed and signed by this engineer.

6.14.3.2.4 The **Contractor** shall submit to the Engineer the drawings relating to temporary signs that the **Contractor** intends to install on and in the vicinity of the construction site. The Engineer will examine the drawings and provide comments within seven (7) days. The **Contractor** shall correct the drawings in light of the comments. No traffic sign installation may be carried out by the **Contractor** before written authorization is issued by the Engineer.

6.14.3.2.5 The **Contractor**'s drawings of the temporary signs shall be to a minimum scale of at least 1:1000. The drawings showing signs for contraflow lanes or for specific situations not described in these specifications or in TCD, however, shall be to a minimum scale of 1:500.

6.14.3.2.6 The **Contractor** shall place construction traffic signs so that the delineation of the work zone and tapers do not begin in a horizontal curve or a vertical curve, such as the apex of a bridge.

6.14.3.2.7 Tapers shall begin on a straight segment where the visibility is at least two hundred (200) meters in all directions.

6.14.3.2.8 To assist the **Contractor** in preparing its signage drawings, the **Owner** may, on request, provide plan templates to be used for that purpose.

6.14.3.3 AUTHORIZED LANE CLOSURES

6.14.3.3.1 Unless noted otherwise in Section 4 *Special Technical Conditions* of the present specifications, on the **Owner**'s property, lane closures are only permitted according to the *"Table(*s) *of traffic lanes to be maintained opened"* in Section 4 *Special Technical Requirements* of the present specifications. For purposes of application of these tables, the following legal holidays shall be considered as Saturdays or Sundays: Victoria Day, Saint-Jean-Baptiste Day, Canada Day, Labour Day and Thanksgiving Day. Moreover, no lane closures are permitted in the afternoon of the preceding day of a civic holiday or a long week-end. These schedules shall be complied with at all times, and no exceptions will be tolerated. M5

6.14.3.3.2 In addition to the requirements mentioned in paragraph 6.14.3.3.1, for work which will be carried out on the roadway infrastructures comprising of two lanes or more in a direction and for which the posted speed is higher than 50 km/h, or if specified in Section 4 *Special Technical Conditions* of these specifications, or if so required by the CSST, the **Contractor** must conform to the following particular elements:

6.14.3.3.2.1 In the presence of workers not protected by a rigid barrier in a traffic lane, the **Contractor** must also close the adjacent lane in addition to the required lane in order to increase the level of safety of the people working on the structure, unless a special authorisation is given out by the Engineer.

6.14.3.3.2.1.1 In spite of what precedes, installation and removal procedures of the road signal devices may be carried out by closing only one lane.

6.14.3.3.2.1.2 These double or single lane closings are allowed only according to the *Table(s) of traffic lanes to be maintained opened* in Section 4 *Special Technical Requirements* of these present specifications. M5

6.14.3.3.2.1.3 During double lane closings, lane rental fees, as described in article 6.14.9 *Lane rental system*, apply to each lane closed. In such a case the lane rental fees shall be 100 $/hour/lane x 2 lanes.

6.14.3.3.3 All work to install and remove signalization including the evacuation of workers shall be completed and all lanes opened to traffic per the schedules specified in the *"Table(s) of traffic lanes to be maintained opened"* in Section 4 *Special Technical Requirements* of these hours will be granted. TC

6.14.3.3.4 n/a

TC

TC

6.14.3.3.5 As a prerequisite, all lane closures must be authorized by the Engineer according to the **Owner**'s procedure.

6.14.3.4 ROAD TRAFFIC MANAGEMENT

6.14.3.4.1 The **Contractor** shall perform all works covered by the Contract in such a way so as not to interfere with traffic, except when authorized by the Engineer in exceptional circumstances, necessary due to the nature of the works.

6.14.3.4.2 The **Contractor** shall always comply with the Engineer's instructions regarding the prompt reopening of a lane when the situation requires it, even during off peak hours. The **Contractor** may not request compensation for the cost of travel by his work teams from one area of the worksite to another.

6.14.3.4.3 The **Contractor** shall provide and maintain a sufficient number of road signs, barriers, signals lights, signal arrows, concrete site guardrails and any other material required to direct and control road traffic.

6.14.3.4.4 With respect to all detours and alternate routes, the **Contractor** shall obtain, at his expense, all permits required from the relevant authorities.

6.14.3.4.5 The **Contractor** shall protect roadway traffic against all damages which may result from his work and shall assign flagmen if required (including, in particular, when trucks are entering and exiting the worksite).

6.14.3.4.6 In the event of an accident or incident on or in the vicinity of the construction site, the **Contractor** shall immediately contact the Cartier-Champlain Sûreté du Québec station at 450 442-1036 and inform the dispatcher of the situation on the site and shall also inform the Engineer.

6.14.3.5 SIGNALIZATION CREW

6.14.3.5.1 The workers in charge of temporary signs and traffic control shall be at least eighteen (18) years old, shall have attended the course « *Supervision et surveillance de la signalisation de travaux de chantiers routiers* » (STC-102) given by the Association québécoise du transport et des routes (AQTR) pertaining to traffic management and safety during road works, and shall hold a valid AQTR certificate for the duration of the works.

6.14.3.6 IMPACT ATTENUATOR EQUIPPED VEHICLE

6.14.3.6.1 During lane closure and reopening operations or for the setting up of a contraflow lane, the **Contractor** shall always equip the upstream vehicle with an impact attenuator. This vehicle shall also be used for brief duration work, moving operations or work near open traffic lanes.

6.14.3.6.2 The impact attenuator shall be connected to the back of the vehicle, TMA type, in compliance with the National Cooperative Highway Research Program (NCHRP) Report 350 – *Recommended Procedures for the Safety Performance Evaluation of Highway Features* and shall be designed for a minimum speed of at least 100 km/h, (level TL-3).

6.14.3.6.3 Every truck equipped with an impact attenuator shall have a total loaded mass (including the attenuator) in compliance with the manufacturer's specifications for the model used, have a flashing luminous signal arrow, revolving lights and type III reflective striping on the sides and back in conformity to the MTQ's standard 14101 *''Pellicules rétroréfléchissantes''*.

6.14.3.7 ACCOMPANYING WORK VEHICLE

6.14.3.7.1 The **Contractor** shall, for the entire duration of any closure of one or more lanes, provide, operate and maintain an accompanying work vehicle which will do the following:

6.14.3.7.1.1 Continuously travel in the traffic lanes at the legal speed limit when contraflow lanes are in use;

6.14.3.7.1.2 Make a minimum of one run every hour in all other cases.

6.14.3.7.2 Tasks of the accompanying work vehicle operator :

6.14.3.7.2.1 To contact the Sûreté du Québec and arrange for the towing off the work site of any stopped vehicle requiring such assistance;

6.14.3.7.2.2 To reinstall and/or replace any faulty sign or other traffic control device;

6.14.3.7.2.3 To remove any obstacle or debris of any kind and to forward to the **Contractor**'s superintendent all information concerning any moved or inoperative devices which could block or impair correct operation of traffic lanes.

6.14.3.7.2.4 Facilitate vehicle exiting and entering the work area.

6.14.3.7.3 The accompanying work vehicle shall have the following characteristics:

6.14.3.7.3.1 Be a pickup;

6.14.3.7.3.2 Have a total loaded weight of at least 2,700 kg;

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6.14.3.7.3.3 Have insurance coverage in conformity with the requirements of the Contract.

6.14.3.7.4 Every accompanying work vehicle shall contain or be equipped with the following :

6.14.3.7.4.1 One (1) shovel;

6.14.3.7.4.2 One (1) broom brush;

6.14.3.7.4.3 One (1) first aid kit;

6.14.3.7.4.4 One (1) A-B-C class fire extinguisher having a minimal size of five (5) kg;

6.14.3.7.4.5 Twenty-four (24) safety flares;

6.14.3.7.4.6 Three (3) bags of twenty (20) kg of absorbent;

6.14.3.7.4.7 Three (3) bags of twenty (20) kg of abrasive;

6.14.3.7.4.8 Three (3) bags of twenty (20) kg of cold patch asphalt;

6.14.3.7.4.9 One (1) cellular telephone;

6.14.3.7.4.10 360^{o} Emergency rotating light and a signal arrow that complies with TCD standards;

6.14.3.7.4.11 Be equipped with a wide type III reflective yellow stripe conforming to the most recent version of standard 14101 *Pellicules rétroréfléchissantes* contained in Chapter 14 "*Matériaux divers"* of the MTQ "Normes – *Ouvrages routiers* – Tome VII – *Matériaux"*, on each side and on the back of the vehicle. |

6.14.3.7.4.12 Have an identification «*Patrouille*» in the back (with reflective material).

6.14.3.7.5 Upon written request from the Engineer, the **Contractor** shall provide all missing or replacement equipment within twenty-four (24) hours.

6.14.3.8 WORK ZONE SIGNALIZATION

6.14.3.8.1 Signalization requirements

6.14.3.8.1.1 The **Contractor** shall use a signal arrow for each lane partially or completely closed to traffic. The signal arrows shall be installed to close a lane even though the open lane/close lane indicator lights indicate that one or more lanes are closed. The signal arrow shall meet the requirements of these specifications and of the TCD standards. Its use shall be in compliance with these documents during all stages of performance of the work and in all situations encountered.

6.14.3.8.2 Visual markers

6.14.3.8.2.1 Unless otherwise indicated, the only authorized visual markers are direction chevrons T-RV-1 and the non-metallic T-RV-2 construction markers or T-RV-7 or equivalents approved by the Engineer. The use of cones is forbidden.

6.14.3.8.2.2 The visual markers shall meet the TCD requirements.

6.14.3.8.2.3 The space between visual markers (variable E defined in Chapter 4 «*Roadwork Signing*» of the TCD) shall be at most ten (10) meters. The spacing in the tapers shall be at most five (5) meters. M5

6.14.3.8.2.4 In tapers, the direction chevrons shall be spaced at ten (10) meters maximum for 75 meters tapers, or to a maximum of twenty (20) meters for 150 meters tapers.

6.14.3.8.2.5 The **Contractor** shall use, as visual markers, the T-RV-1 direction chevron signs in the tapers which are used to reduce the number of available lanes.

6.14.3.8.2.6 In the deviation zone, the **Contractor** shall install direction chevron signs at ten (10) meters intervals in curves. The height of the chevron, measured from the road surface to the lower edge, shall be 1200 mm.

6.14.3.8.2.7 For all encountered situations, sign spacing (variable B, defined in Chapter 4 "*Roadwork Signing*" of the TCD) and visual markers spacing shall be as shown on the **Owner**'s signalization plates in the attached Section 4 *Special Technical Requirements*.

6.14.3.8.2.8 As a general guide, Table 1 summarizes the spacing shown on the signing plates for posted speeds of fifty (50) km/h and seventy (70) km/h.

Table 1: Owner's requirements for sign spacing

	Posted Speed	
	50 km/h	**70 km/h**
D (Lane width)	3.65 m	3.65 m
L (Taper length)	75 m	150 m
E (Visual marker spacing - Lanes)	10 m	10 m
E (Visual market spacing – Tapers)	5 m	5 m
E_b (Spacing of chevrons in 75m tapers)	10 m	10 m
E_b (Spacing of chevrons in 150m tapers)	20 m	20 m
E_c (Spacing of visual markers for contraflow lane)	10 m	10 m
B (Sign spacing)	75 m	125 m

6.14.3.8.2.9 When lanes closures are in effect, acceleration and deceleration lanes shall be provided. These shall have a length at least twice that of the taper length (variable L). Tapers shall be laid out in conformity with TCD (variable L) specifications, but their length shall be as shown in the signalization plates in the attached Section 4 *Special Technical Requirements*.

6.14.3.8.3 Roadwork signing

6.14.3.8.3.1 The roadwork signing shall have an orange background with a fluorescent type VII reflective film conforming to TCD requirements.

6.14.3.8.3.2 The use of pictograms shall be favoured to lettering. The pictograms shall conform to the prescriptions of Appendix B of Chapter 4 of the TCD entitled "*Roadwork Signing*".

6.14.3.8.3.3 The signing lettering on the panels shall be bilingual (French and English) and appear on two (2) different panels in accordance to TCD requirements.

6.14.3.8.3.4 When required, the **Contractor** shall provide appropriate signing for motorcyclists, cyclists and pedestrians.

6.14.3.9 INSTALLATION OF TEMPORARY TRAFFIC CONTROL DEVICES

6.14.3.9.1 Traffic control devices used for securing work zones shall be:

6.14.3.9.1.1 Installed before work begins, starting from the furthest distance and proceeding towards the work zone;

6.14.3.9.1.2 Installed in sufficient number according to their location and in conformity with the **Owner**'s signalization plates, TCD standards and the **Contractor**'s temporary traffic signalization drawings and shall be sealed and signed by a an engineer member of the "Ordre des ingénieurs du Québec";

6.14.3.9.1.3 In good working order (e.g. reflectivity, brightness);

6.14.3.9.1.4 Visible at the expected visibility distance range or at least twice the visibility stopping distance.

6.14.3.10 During the installation and removal of the temporary traffic control devices, the **Contractor** shall comply with occupational health and safety requirements and respect the safety requirements of the **Owner**. The signalization crew shall be protected by a vehicle equipped with an impact attenuator placed upstream of traffic per the requirements stipulated in subsection 6.14.3.6 "*Impact Attenuator Equipped Vehicle*".

6.14.3.10.1 The **Contractor** shall also supply, install, clean and maintain all signs, concrete site guardrails and appropriate visual markers in conformity with occupational health and safety requirements and to the satisfaction of the Engineer.

6.14.3.10.2 During the installation of the traffic advance signing, the **Contractor** shall arrange for their installation outside of the traffic lanes. For the signs installed on the bridges, the **Contractor** shall place them on the guard rails or on fixed adjacent elements outside the traffic lanes. The fasteners and supports shall withstand the force of the wind and the turbulence created by the passage of the trucks. The type of fasteners used shall be submitted to the Engineer for review.

6.14.3.10.3 Traffic signs, barriers, guard rails, traffic lights, signal arrows and the flagmen shall be installed and maintained by the **Contractor** for the entire duration of work to ensure public and personnel safety and to secure the work zone to the satisfaction of the Engineer and in conformity with occupational health and safety requirements.

6.14.3.10.4 The **Contractor** shall provide, for and in the vicinity of his work zone, a sequence of operations covering the installation of temporary traffic control devices as well as safety measures and indicators that ensure users' safety.

6.14.3.10.5 The **Contractor** shall protect motorists, pedestrians and cyclists from all damages that may result from the **Contractor**'s work.

6.14.3.10.6 The **Contractor** shall stabilize traffic signs using only weights made for this purpose. At least two weights shall be used to keep each device in place.

6.14.3.10.7 All the traffic control measures and devices described in the **Contractor**'s Traffic Management and Control Plan shall be completely put in place before any construction work may begin.

6.14.3.11 MAINTENANCE OF TEMPORARY TRAFFIC CONTROL DEVICES

6.14.3.11.1 The **Contractor** shall take all necessary measures to replace or reinstall any removed, displaced, or damaged traffic control device within a period of at most thirty (30) minutes after being notified by the *Sûreté du Québec*, the Engineer, an employee of the **Owner** or any other person. Should the **Contractor** fail to conform to these requirements or fail to be reached by the **Owner** within this delay, corrective measures will be taken by the **Owner**, the Engineer or the *Sûreté du Québec* at the **Contractor**'s expense; costs incurred by the **Owner** for corrective measures will be deducted from the amounts payable to the **Contractor** under this Contract.

6.14.3.11.2 The **Contractor** shall clean, repair and if necessary replace devices in order to maintain their visibility and reflectivity.

6.14.3.12 SIGN MASKING DURING WORK

6.14.3.12.1 Permanent signs installed adjacent to or above a traffic lane which, for the duration or part of the duration of the roadwork are not useful or give messages contradictory to the temporary traffic signalization, shall be removed or masked using materials which are totally opaque during both day and night.

6.14.3.12.2 Temporary signs adjacent to or above a traffic lane installed previously for the duration or part of the duration of roadwork that contradict planned signals for the current phase of roadwork shall be removed or masked using materials which are totally opaque during both day and night.

6.14.3.13 REMOVAL OF TEMPORARY SIGNS

6.14.3.13.1 Temporary signs shall be removed in the opposite order of their installation or according to specific sequences described in the Traffic Management and Control Plan. The **Contractor** shall thoroughly clean closed lanes before reopening them to traffic.

6.14.3.13.2 The signalization crew shall be protected by an impact attenuator vehicle placed on the upstream side of traffic.

6.14.3.13.3 It is prohibited to leave any temporary traffic control device, including traffic signs and other devices, on traffic lanes or shoulders outside of working hours. Indications on temporary traffic control devices moved to authorized locations shall not be visible from the traffic lanes.

6.14.3.13.4 No removed signalization device shall be left on the **Owner**'s road network including road shoulders.

6.14.3.14 ENTRIES AND EXITS FROM THE WORK ZONE

6.14.3.14.1 Vehicles accessing the work zone shall be equipped with a revolving flashing light, failing which they shall be followed by at least one accompanying work vehicle.

6.14.3.14.2 Vehicles exiting the work zone shall do so downstream of this zone and in the extension of the lane closed for construction. An accompanying work vehicle, as defined in the present subsection, shall be used to slow down or stop traffic in order to ease the merging of the vehicle into an open traffic lane.

6.14.3.14.3 Movement of vehicles exiting and entering the work zone shall be coordinated with flagmen and the accompanying work vehicle operations and shall account for construction site configuration, drivers' visibility and the Traffic Management and Control Plan of the **Contractor**. A description of tasks and co-ordination mechanisms and detailed signalization drawings, shall be used for each situation. Accompanying work vehicles shall be equipped with specific signals to inform road users of slowdowns, or bypass manoeuvres.

6.14.3.15 USE OF T-20 "CONSTRUCTION AHEAD" PANEL

6.14.3.15.1 One (1) T-20 panel shall be installed one (1) kilometre upstream of the work zone in accordance with the TCD long-term work. T-20 panels shall be installed at the intervals specific in the drawings for the structure on which work is being done.

6.14.3.15.2 For work on the Champlain Bridge, the **Contractor** shall install T-20 panels every kilometers and on each of the access ramps leading to and/or exiting from the bridge within a three (3) kilometers radius from the construction site. All highway lanes leading to the bridge within this radius shall have one or several T-20 panels posted on them.

6.14.3.15.3 For work on the Jacques-Cartier Bridge, T-20 panels shall be installed at each of the major intersections leading to the bridge within a five hundred (500) meters radius from the work site.

6.14.3.15.4 For work on the Honoré-Mercier Bridge, T-20 panels shall be installed at every kilometer and on each access ramp leading to and/or exiting from the bridge over a distance of two (2) kilometers from the work site.

6.14.3.15.5 For work in the Melocheville Tunnel, T-20 panels shall be installed on each major intersection leading to the tunnel within a radius of one (1) kilometer from the tunnel's entry point.

6.14.3.15.6 For work on Highway 15, Bonaventure Expressway and "S" and "T" lanes, the **Contractor** shall install T-20 panels at every kilometer as well as on each of the access ramps leading to or exiting from these highways or lanes within a radius of three (3) kilometers from the work site. All expressway and bridge lanes leading to these highways or lanes in this radius shall be equipped with one or more T-20 panels. T-20 panels shall also be installed at each major intersection leading to the Bonaventure Expressway from downtown Montreal within a radius of five hundred (500) meters around the work site.

6.14.3.16 SPECIAL REQUIREMENTS FOR BRIEF DURATION WORKS AND MOVING OPERATIONS

6.14.3.16.1 For brief duration work and moving operations, the **Contractor** shall position an impact attenuator vehicle upstream of the work site.

6.14.4 SPECIFIC REQUIREMENTS FOR CONTRAFLOW TRAFFIC SIGNS

6.14.4.1 GENERAL

6.14.4.1.1 The **Contractor** shall make sure that the signalization work for the contraflow traffic complies with the TCD requirements and the characteristics on the appended signalization plates in Section 4 *Special Technical Requirements* for the various deviation scenarios. M5

6.14.4.1.2 The **Contractor** shall note that lane number three (3) of the Jacques-Cartier Bridge (center lane) has no predominant traffic flow direction since it is reversible and equipped with a lane control system showing actual lane operation. Consequently, when the **Contractor** is working in either lane 1 (right lane towards the South Shore) or lane 5 (right lane towards Montreal) of the Jacques-Cartier Bridge, or in lanes 1 and 5 at the same time using lane 3 for traffic in one of the two direction, special traffic control devices are not required for the centre lane.

6.14.4.1.3 For work requiring contraflow lane operations, the **Contractor** shall submit to the Engineer for examination, the sequence for traffic control device installation and removal. The signalization plates attached in Section 4 *Special Technical Requirements* indicate minimal requirements for signalization and contraflow traffic implementation. The **Contractor** remains responsible for temporary traffic control devices in place on his construction site at all times. M5

6.14.4.2 IMPACT ATTENUATOR INSTALLED AT THE END OF THE DISPLACED RIGID BARRIER FOR CONTRAFLOW TRAFFIC:

6.14.4.2.1 The **Contractor** shall install impact attenuators at the end of central rigid barriers which are displaced to allow contraflow traffic (refer to signalization plates in Section 4 *Special Technical Requirements* for additional information). M5

6.14.4.2.2 The impact attenuator shall be a frontal retained device meeting NCHRP Report 350 – *Recommended Procedures for the Safety Performance Evaluation of Highway Features* standard and be designed for speeds of at least 70 km/h (TC-2 level).

6.14.4.2.3 The impact attenuator shall be on the MTQ approved products list. The impact attenuator shall be of temporary use, easy to install, easy to move and easy to remove.

6.14.4.3 ADDITIONAL SIGNALIZATION REQUIREMENTS

6.14.4.3.1 T-D-80 "Two-Way Traffic Ahead" signs indicating that there are two adjacent lanes with traffic moving in opposite directions, and P-140-1 "No Passing" signs shall be installed every two hundred fifty (250) meters in zones consisting of adjacent lanes of opposing traffic.

6.14.4.3.2 The **Owner's** general requirements concerning the use of visual markers are presented in Table 1 "*Owner's Requirements for Sign Spacing*".

6.14.4.3.3 When contraflow lanes are used outside the work area over distances longer than one (1) kilometer, and when temporary sign modifications are required for safety purposes, the distance between visual markers shall be five metres (5 m) over a distance of five hundred metres (500 m) before and after the detour and twenty-five metres (25 m) in the detour in accordance with section 4.4, "*Delineators*," Chapter 4 "*Roadwork Signing*", TCD, Part I.

6.14.5 TEMPORARY PAVEMENT MARKINGS

6.14.5.1 The **Contractor** shall design, supply, install, maintain and remove temporary pavement markings on the roadway as required in order to better direct traffic at all times.

6.14.5.2 Before the start of the marking work, the **Contractor** shall provide drawings of the lane markings, bearing an engineer signature and seal, for all traffic configurations planned for control of traffic. The lane marking drawings shall comply with the TCD requirements.

6.14.5.3 When temporary pavement marking is necessary, existing markings shall be removed and replaced by the marking required to suit the work. Upon completion of the work, the temporary marking shall be removed and replaced with the appropriate permanent markings before reopening lanes to traffic. Removal of the temporary marking (alkyd paint) shall be done using sandblasting or steel shot. The use of abrasive rollers or black opaque paint is prohibited.

6.14.5.4 The **Contractor** shall make sure that the surface of lanes open to traffic is appropriately marked; if the use of paint is impossible, the **Contractor** shall install temporary reflective lane delineators for a period not exceeding fifteen (15) days.

6.14.5.5 Until the final marking is painted in place, the **Contractor** shall ensure that temporary pavement markings are adequate at all times. The use of reflective lane delineators shall be considered to be a temporary measure.

6.14.5.6 When used, reflective lane delineators shall be installed every three (3) meters for continuous lines, intermittent lane lines, nosings and approaches in the vicinity of obstacles, and every two (2) meters for double yellow lines. For double lines, delineators shall be installed in pairs in order to take the shape of double lines. The delineator's colour shall comply with the TCD standards.

6.14.5.7 Temporary delineators shall be replaced by temporary or permanent markings (according to specifications) as soon as possible.

6.14.5.8 When the work deals with the replacement of sections of a concrete bridge deck or approaches of a concrete based roadway, the temporary pavement markings shall be done on a black background in order to emphasize the marking.

6.14.6 BRIDGE LANE CONTROL SYSTEM

6.14.6.1 The Jacques-Cartier and Champlain Bridges are equipped with lane control systems. These systems, operated by the *Sûreté du Québec*, offer relatively limited display possibilities.

6.14.6.2 Table 2 "Jacques-Cartier Bridge System Characteristics" and Table 3 "Champlain Bridge System Characteristics" set out the system characteristics of the Jacques-Cartier Bridge and Champlain Bridge.

Table 2: Jacques-Cartier Bridge System Characteristics

Lanes	Possible displays*	
	Toward Montreal	Toward the South Shore
1 (upstream)	Closed	Open or Closed
2	Closed	Open or Closed
3	Open or Closed	Open or Closed
4	Open or Closed	Closed
5 (downstream)	Open or Closed	Closed

*Uniform indication over the entire length of the lane.

Table 3: Champlain Bridge System Characteristics

Lanes	Possible displays*	
	Toward Montreal	Toward the South Shore
1 (upstream)	None	Open or Closed
2	None	Open or Closed
3	Open or Closed	Open or Closed
4	Open or Closed	Open or Closed
5	Open or Closed	None
6 (downstream)	Open or Closed	None

6.14.6.3 While developing its Traffic Management and Control Plan, the **Contractor** shall take these lane control systems into consideration. The **Contractor** shall also consult the **Owner** and the *Sûreté du Québec* for operational details. The Traffic Management and Control Plan shall be developed and implemented in perfect co-ordination with these lane control systems.

6.14.7 INFORMATION SIGNS

6.14.7.1 PERIPHERAL SIGNS

6.14.7.1.1 The **Owner** may enter into contracts with other contractors for the planning, implementation and maintenance of all peripheral signs required for any number of projects, including proposed alternate signs during lane closures. Management of these contracts falls under the Engineer's responsibility.

6.14.7.1.2 When preparing his Traffic Management and Control Plan, the **Contractor** shall ensure that its plan integrates perfectly into the **Owner**'s Global Traffic Management Plan. In this regard, the **Contractor** shall co-operate with the Engineer, consultants and other contractors whose services are retained by the **Owner**, the MTQ, concerned municipalities and any other parties involved in traffic management in the Greater Montreal area.

6.14.7.1.3 The **Contractor** shall coordinate, operate, integrate and modify, if required, his temporary signing, in order to ensure an effective interface with the peripheral signing and to make it compatible with other contractors signing. The **Contractor** may be required to supply and operate mobile variable message signs (VMS) so as to manage lane closure and opening operations more effectively.

6.14.7.2 COMPLEMENTARY TRAFFIC CONTROL DEVICES

6.14.7.2.1 Letters and numbers displayed on complementary traffic control devices shall meet the "*Metric Edition Standard Alphabets for Highway Signs and Pavement Markings*" requirements as published by the U.S. Department of Transport and approved by the Transport Association of Canada.

6.14.7.2.2 These complementary traffic control devices shall have an orange background with a type III or IV fluorescent reflecting film. The signs shall be of rectangular shape and shall comply with TCD specifications. Letters shall be at least 150 mm high and of the C, D and E series. Shop drawings shall be submitted for review to the Engineer before fabrication. Sign messages shall be bilingual (French and English) and the characters of the same height for both languages.

6.14.8 MOBILE VARIABLE MESSAGE SIGNS (VMS)

6.14.8.1 SCOPE

6.14.8.1.1 This section deals with the supply and operation of mobile variable message signs (VMS) when required. These signs are used foremost to transmit to users and motorists information relating to lane closure schedules, to open traffic lanes in each direction, to road conditions, potential dangers and the distance until the work zone.

6.14.8.2 STANDARDS AND SPECIFIC REQUIREMENTS

6.14.8.2.1 Mobile VMS shall be placed in such a way as to allow them to be moved upon request from the Engineer. They shall remain operational for the entire duration of the works.

6.14.8.2.2 Logistics pertaining to the operation of these VMS shall be included in the **Contractor**'s Traffic Management and Control Plan.

6.14.8.2.3 When signs are installed on the **Owner**'s property, messages shall be bilingual (French-English) and the characters of the same height for both languages.

6.14.8.2.4 Each variable message sign shall be of a matrix type allowing a display of at least three (3) lines of twelve (12) characters each. Lettering shall have a minimum height of 300 mm. The matrix shall be at least 27 x 72 pixels. The base of the VMS shall be at least 3.0 m wide by 1.2 m high. The VMS shall display a sequence of clear and visible messages. Every VMS shall be numbered according to their identification.

6.14.8.2.5 The VMS shall be installed on a trailer which provides stability and safety. The VMS shall be mounted on a hydraulic mast, allowing it to be raised once installed. In order to improve the message visibility, the VMS installation shall allow it to be oriented without the trailer being moved.

6.14.8.2.6 The panel shall provide a luminous intensity which adapts automatically to ambient light, allowing the messages to always be perfectly readable at a distance of two hundred fifty meters (250 m).

6.14.8.2.7 The VMS shall have the following operational characteristics:

6.14.8.2.7.1 The VMS shall not require any external connection for its energy supply. It shall be of the stand-alone type and be powered by a diesel generator or by one or more solar panels, whichever is best suited to construction site characteristics. Furthermore, the VMS shall be able to run twenty-four (24) hours a day. When using solar panels, the **Contractor** shall take into account obstructions (shade) created by surrounding structures.

6.14.8.2.7.2 For the solar powered panels, the **Contractor** shall make sure that they operate adequately in bad weather or on a cloudy day. The **Contractor** shall remedy all defective power supply, at his own expenses.

6.14.8.2.7.3 For VMS powered by a diesel generator, the **Contractor** shall take into account the impact of noise created locally by the use of such generators.

6.14.8.2.7.4 The VMS shall be able to store displayed messages in its memory. It shall also be programmable using an IBM-compatible computer. The VMS programming language shall be NTCIP. The VMS shall be programmable on-site and via cellular communication.

6.14.8.2.7.5 Each VMS shall be equipped with a cellular communication device, and cellular communication expenses for every VMS shall be paid by the **Contractor**.

6.14.8.2.7.6 The **Contractor** shall supply the software for communications between the computer and the VMS.

6.14.8.2.7.7 In case of a breakdown, the VMS shall automatically display a general message selected by the **Owner** to ensure road users' safety.

6.14.8.2.8 The **Owner** uses six (6) large permanent variable message signs to display information to users. The **Contractor** may not use these signs for his own purposes or for signal needs. The **Contractor** should plan, obtain and operate its own VMS.

6.14.8.2.9 The **Contractor** shall provide the **Owner** with all assistance required for modifying or controlling the displayed messages at all times. The **Contractor** shall make sure that the **Owner** has full control of the messages.

6.14.8.2.10 The **Contractor** shall clear the VMS of snow after each snowfall and shall also make sure that the messages are visible by the users.

6.14.9 **LANE RENTAL SYSTEM**

6.14.9.1 Subject to any restrictions as may be applicable in Section 4 *Special Technical Conditions* of the specifications, the **Contractor** shall in the course of performing the work stipulated in the Contract, close one or more traffic lanes pursuant to *the Table(s) of traffic lanes to be maintained opened*" in Section 4 *Special Technical Requirements* of the present specifications. M5

6.14.9.2 Even if such closures are allowed under this Contract, they are still disruptive to traffic flow during the periods specified and therefore affect the level of service provided to users. In an effort to minimize the impact on users, the **Owner** hereby implements a system to minimize lane closures.

6.14.9.3 The **Contractor** shall reimburse lane rental fees when the **Contractor** intends on closing lanes. For each lane closed, within the periods authorized in the *"Table(s) of traffic lanes to be maintained opened"* in Section 4 *Special Technical Requirements*, the **Contractor** shall pay to the **Owner** rental fees in the amount of one hundred dollars ($100) per hour not including taxes. M5

6.14.9.4 The Lane Rental System applies to all types of work (such as Moving Operations, Short Duration Work) which require lane closures.

6.14.9.5 The number of hours during which lanes are closed under the Lane Rental System shall be compiled jointly by the **Contractor** and the Engineer. When lanes are controlled by a lane control system, each lane closure time is started when the red light comes on and stopped when the green signal returns. When lanes are not controlled by a lane control system, the hours during which the lanes are closed shall be counted from the exact time when the free and safe flow of traffic on each lane is interrupted until the exact time the free and safe flow of traffic resumes.

6.14.9.5.1 For fee calculations, every partial hour of lane closure shall be rounded up to the next half hour.

6.14.9.6 Consequently, in preparing its tender, if the **Contractor** deems it necessary to use lane closures, he shall include the pertinent related lane rental fees in his tender in pay item(s) *Worksite Signs and signals and traffic control* of the Price Table. TC

6.14.9.7 The lane closure fees payable by the **Contractor** shall be applied by the **Owner** against the Contract progress payments.

END OF SUBSECTION

APPENDIX O1

TABLE(S) OF TRAFFIC LANES TO BE MAINTAINED OPENED

(6 pages)

Périodes de validité :

Validity periods :

1 juillet au 31 août
July 1 to August 31

			00h00	01h00	02h00	03h00	04h00	05h00	06h00	07h00	08h00	09h00	10h00	11h00	12h00	13h00	14h00	15h00	16h00	17h00	18h00	19h00	20h00	21h00	22h00	23h00
Lundi	N	Montréal	1					2																		1
Monday	S	R-sud/S-shore	1					2																		1
Mardi	N	Montréal	1					2																		1
Tuesday	S	R-sud/S-shore	1					2																		1
Mercredi	N	Montréal	1					2																		1
Wednesday	S	R-sud/S-shore	1					2																		1
Jeudi	N	Montréal	1					2																		1
Thursday	S	R-sud/S-shore	1					2																		1
Vendredi	N	Montréal	1					2																		1
Friday	S	R-sud/S-shore	1					2																		1
Samedi	N	Montréal	1					2																		
Saturday	S	R-sud/S-shore	1					2																		
Dimanche	N	Montréal	2			1			2																	
Sunday	S	R-sud/S-shore	2			1			2																	

1 avril au 30 juin & 1 septembre au 31 octobre
April 1 to June 30 & September 1 to October 31

			00h00	01h00	02h00	03h00	04h00	05h00	06h00	07h00	08h00	09h00	10h00	11h00	12h00	13h00	14h00	15h00	16h00	17h00	18h00	19h00	20h00	21h00	22h00	23h00
Lundi	N	Montréal	1					2																		1
Monday	S	R-sud/S-shore	1					2																		1
Mardi	N	Montréal	1					2																		1
Tuesday	S	R-sud/S-shore	1					2																		1
Mercredi	N	Montréal	1					2																		1
Wednesday	S	R-sud/S-shore	1					2																		1
Jeudi	N	Montréal	1					2																		1
Thursday	S	R-sud/S-shore	1					2																		1
Vendredi	N	Montréal	1					2																		1
Friday	S	R-sud/S-shore	1					2																		
Samedi	N	Montréal	1						2																	1
Saturday	S	R-sud/S-shore	1							2																1
Dimanche	N	Montréal	1							2															1	
Sunday	S	R-sud/S-shore	1							2															1	

Légende / Legend

1 — 1 voie ouverte / 1 lane opened

2 — 2 voies ouvertes / 2 lanes opened

Début d'une période / Beginning of a Period

05h00

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated

Canada

AUTOROUTE 15
HIGHWAY 15
SECTIONS 1 & 2

Tableau du nombre de voies devant être maintenues ouvertes

Table of lanes to be maintained opened

Version	Révision
2012-10-12	2012-10-12

Validity periods :

1 novembre au 31 mars
November 1 to March 31

			00h00	01h00	02h00	03h00	04h00	05h00	06h00	07h00	08h00	09h00	10h00	11h00	12h00	13h00	14h00	15h00	16h00	17h00	18h00	19h00	20h00	21h00	22h00	23h00
Lundi	N	Montréal	1					2																		1
Monday	S	R-sud/S-shore	1					2																		1
Mardi	N	Montréal	1					2																		1
Tuesday	S	R-sud/S-shore	1					2																		1
Mercredi	N	Montréal	1					2																		1
Wednesday	S	R-sud/S-shore	1					2																		1
Jeudi	N	Montréal	1					2																		1
Thursday	S	R-sud/S-shore	1					2																		1
Vendredi	N	Montréal	1					2																		1
Friday	S	R-sud/S-shore	1					2																		1
Samedi	N	Montréal	1										2													1
Saturday	S	R-sud/S-shore	1											2												1
Dimanche	N	Montréal	1												2											1
Sunday	S	R-sud/S-shore	1													2										1

Légende / Legend

1 1 voie ouverte / 1 lane opened

2 2 voies ouvertes / 2 lanes opened

Début d'une période / Beginning of a Period

05h00

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

AUTOROUTE 15
HIGHWAY 15
SECTIONS 1 & 2

Tableau du nombre de voies devant être maintenues ouvertes

Table of lanes to be maintained opened

Version	Révision
2012-10-12	2012-10-12

Périodes de validité :

Validity periods :

1 juillet au 31 août
July 1 to August 31

			00h00	01h00	02h00	03h00	04h00	05h00	06h00	07h00	08h00	09h00	10h00	11h00	12h00	13h00	14h00	15h00	16h00	17h00	18h00	19h00	20h00	21h00	22h00	23h00
Lundi	N	Montréal	1					3																2		1
Monday	S	R-sud/S-shore	1					3																2		1
Mardi	N	Montréal	1					3																2		1
Tuesday	S	R-sud/S-shore	1					3																2		1
Mercredi	N	Montréal	1					3																2		1
Wednesday	S	R-sud/S-shore	1					3																2		1
Jeudi	N	Montréal	1					3																2		1
Thursday	S	R-sud/S-shore	1					3																2		1
Vendredi	N	Montréal	1					3																		1
Friday	S	R-sud/S-shore	1					3																		1
Samedi	N	Montréal	1					2			3															
Saturday	S	R-sud/S-shore	1					2			3															
Dimanche	N	Montréal	2		1			2			3															
Sunday	S	R-sud/S-shore	2		1			2			3															

1 avril au 30 juin & 1 septembre au 31 octobre
April 1 to June 30 & September 1 to October 31

			00h00	01h00	02h00	03h00	04h00	05h00	06h00	07h00	08h00	09h00	10h00	11h00	12h00	13h00	14h00	15h00	16h00	17h00	18h00	19h00	20h00	21h00	22h00	23h00
Lundi	N	Montréal	1					3																2		1
Monday	S	R-sud/S-shore	1					3																2		1
Mardi	N	Montréal	1					3																2		1
Tuesday	S	R-sud/S-shore	1					3																2		1
Mercredi	N	Montréal	1					3																2		1
Wednesday	S	R-sud/S-shore	1					3																2		1
Jeudi	N	Montréal	1					3																2		1
Thursday	S	R-sud/S-shore	1					3																2		1
Vendredi	N	Montréal	1					3																2		1
Friday	S	R-sud/S-shore	1					3																	2	
Samedi	N	Montréal	1					2					3										2			1
Saturday	S	R-sud/S-shore	1					3															2			1
Dimanche	N	Montréal	1					2					3										2			1
Sunday	S	R-sud/S-shore	1					2					3										2			1

Légende / Legend

- **1** — 1 voie ouverte / 1 lane opened
- **2** — 2 voies ouvertes / 2 lanes opened
- **3** — 3 voies ouvertes / 3 lanes opened
- Début d'une période / Beginning of a Period — 05h00

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

PONT CHAMPLAIN BRIDGE

SECTIONS 3, 4, 5, 6, 7 & 8

Tableau du nombre de voies devant être maintenues ouvertes

Table of lanes to be maintained opened

Voie réservée aux autobus /
Reserved Bus Lane

(Considérée dans le tableau / Considered in table)

5h45 à/to 10h00 en direction Rive-Sud / towards South-Shore
15h00 à/to 19h30 en direction Montréal / towards Montreal

Version	Rénision
2012-10-12	2012-10-12

Périodes de validité :

Validity periods :

1 novembre au 31 mars
November 1 to March 31

			00h00	01h00	02h00	03h00	04h00	05h00	06h00	07h00	08h00	09h00	10h00	11h00	12h00	13h00	14h00	15h00	16h00	17h00	18h00	19h00	20h00	21h00	22h00	23h00
Lundi	N	Montréal	1					3																2		1
Monday	S	R-sud/S-shore	1					3																2		1
Mardi	N	Montréal	1					3																2		1
Tuesday	S	R-sud/S-shore	1					3																2		1
Mercredi	N	Montréal	1					3																2		1
Wednesday	S	R-sud/S-shore	1					3																2		1
Jeudi	N	Montréal	1					3																2		1
Thursday	S	R-sud/S-shore	1					3																2		1
Vendredi	N	Montréal	1					3																2		1
Friday	S	R-sud/S-shore	1					3																		1
Samedi	N	Montréal	1						2							3								2		1
Saturday	S	R-sud/S-shore	1									3												2		1
Dimanche	N	Montréal	1													3										1
Sunday	S	R-sud/S-shore	1													3								2		1

Légende / Legend

1 1 voie ouverte / 1 lane opened

2 2 voies ouvertes / 2 lanes opened

3 3 voies ouvertes / 3 lanes opened

Début d'une période / Beginning of a Period

05h00

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

PONT CHAMPLAIN BRIDGE

SECTIONS 3, 4, 5, 6, 7 & 8

Tableau du nombre de voies devant être maintenues ouvertes

Table of lanes to be maintained opened

Voie réservée aux autobus /
Reserved Bus Lane

(Considérée dans le tableau / Considered in table)

5h45 à/to 10h00 en direction Rive-Sud / towards South-Shore
15h00 à/to 19h30 en direction Montréal / towards Montreal

Version	Rénision
2012-10-12	2012-10-12

Autoroute Bonaventure expressway / Sections 10 & 11

Direction : Est (vers le pont Champlain) / East (towards Champlain Bridge)

Direction : Ouest (vers Montréal / centre-ville) / West (towards Montreal / Downtown)

Périodes de validité :

Validity periods :

1 avril au 31 octobre
April 1 to October 31

			00h00	01h00	02h00	03h00	04h00	05h00	06h00	07h00	08h00	09h00	10h00	11h00	12h00	13h00	14h00	15h00	16h00	17h00	18h00	19h00	20h00	21h00	22h00	23h00
Lundi	O	Montréal	1						3				1													
Monday	E	Champlain	1														3						1			
Mardi	O	Montréal	1						3				1													
Tuesday	E	Champlain	1														3						1			
Mercredi	O	Montréal	1						3				1													
Wednesday	E	Champlain	1														3						1			
Jeudi	O	Montréal	1						3				1													
Thursday	E	Champlain	1														3							2		
Vendredi	O	Montréal	1						3				1													
Friday	E	Champlain	1												3								2			
Samedi	O	Montréal	1												2				1							
Saturday	E	Champlain	2					1									2				1					
Dimanche	O	Montréal	1										2													
Sunday	E	Champlain	1														2									

1 novembre au 31 mars
November 1 to March 31

			00h00	01h00	02h00	03h00	04h00	05h00	06h00	07h00	08h00	09h00	10h00	11h00	12h00	13h00	14h00	15h00	16h00	17h00	18h00	19h00	20h00	21h00	22h00	23h00
Lundi	O	Montréal	1						3				1													
Monday	E	Champlain	1															3					1			
Mardi	O	Montréal	1						3				1													
Tuesday	E	Champlain	1															3					1			
Mercredi	O	Montréal	1						3				1													
Wednesday	E	Champlain	1															3					1			
Jeudi	O	Montréal	1						3				1													
Thursday	E	Champlain	1															3						1		
Vendredi	O	Montréal	1						3				1													
Friday	E	Champlain	1													3								1		
Samedi	O	Montréal	1												2				1							
Saturday	E	Champlain	1														2				1					
Dimanche	O	Montréal	1												2				1							
Sunday	E	Champlain	1														2				1					

Légende / Legend

- **1** — 1 voie ouverte / 1 lane opened
- **2** — 2 voies ouvertes / 2 lanes opened
- **3** — 3 voies ouvertes / 3 lanes opened
- Début d'une période / Beginning of a Period — 05h00
- O = Ouest / West
- E = Est / East

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

AUTOROUTE BONAVENTURE EXPRESSWAY
SECTIONS 10 & 11

Tableau du nombre de voies devant être maintenues ouvertes

Table of lanes to be maintained opened

NOTE

Routes à 3 voies par direction /
Roads with 3 lanes per direction

Version 2012-10-12

Révision 2012-10-12

Autoroute Bonaventure expressway / Section 13

Direction : Est (vers le pont Champlain) / East (towards Champlain Bridge)

Direction : Ouest (vers Montréal / centre-ville) / West (towards Montreal / Downtown)

Périodes de validité :

Validity periods :

1 avril au 31 octobre
April 1 to October 31

			00h00	01h00	02h00	03h00	04h00	05h00	06h00	07h00	08h00	09h00	10h00	11h00	12h00	13h00	14h00	15h00	16h00	17h00	18h00	19h00	20h00	21h00	22h00	23h00
Lundi	O	Montréal	1						2						1											
Monday	E	Champlain	1														2						1			
Mardi	O	Montréal	1						2						1											
Tuesday	E	Champlain	1														2						1			
Mercredi	O	Montréal	1						2						1											
Wednesday	E	Champlain	1														2						1			
Jeudi	O	Montréal	1						2						1											
Thursday	E	Champlain	1														2									
Vendredi	O	Montréal	1						2						1											
Friday	E	Champlain	1												2											
Samedi	O	Montréal	1												2				1							
Saturday	E	Champlain	2					1									2				1					
Dimanche	O	Montréal	1												2											
Sunday	E	Champlain	1														2									

1 novembre au 31 mars
November 1 to March 31

			00h00	01h00	02h00	03h00	04h00	05h00	06h00	07h00	08h00	09h00	10h00	11h00	12h00	13h00	14h00	15h00	16h00	17h00	18h00	19h00	20h00	21h00	22h00	23h00
Lundi	O	Montréal	1						2						1											
Monday	E	Champlain	1															2					1			
Mardi	O	Montréal	1						2						1											
Tuesday	E	Champlain	1															2					1			
Mercredi	O	Montréal	1						2						1											
Wednesday	E	Champlain	1															2					1			
Jeudi	O	Montréal	1						2						1											
Thursday	E	Champlain	1															2					1			
Vendredi	O	Montréal	1						2						1											
Friday	E	Champlain	1												2								1			
Samedi	O	Montréal	1												2				1							
Saturday	E	Champlain	1														2				1					
Dimanche	O	Montréal	1												2				1							
Sunday	E	Champlain	1														2				1					

Légende / Legend

1 — 1 voie ouverte / 1 lane opened

2 — 2 voies ouvertes / 2 lanes opened

Début d'une période / Beginning of a Period

05h00

O = Ouest / West
E = Est / East

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

AUTOROUTE BONAVENTURE EXPRESSWAY
SECTIONS 12 & 13

Tableau du nombre de voies devant être maintenues ouvertes

Table of lanes to be maintained opened

NOTE

Routes à 2 voies par direction / Roads with 2 lanes per direction

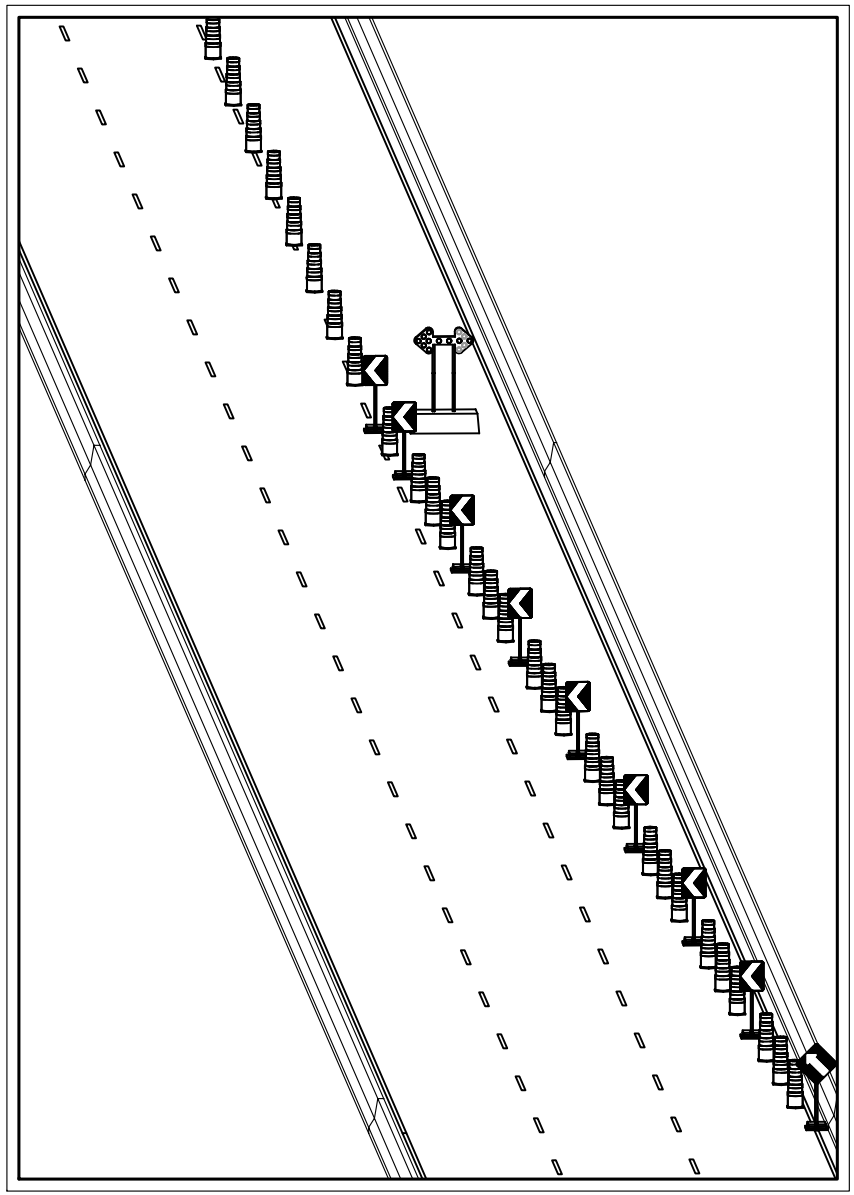
SECTION 12 (S&T) - Bretelles d'accès reliant l'autoroute 15 et Bonaventure / Ramps linking Highway 15 and Bonaventure:
En tout temps, une voie doit être maintenue ouverte dans chaque direction. / At all times, one lane shall be opened in each direction.

Version	Révision
2012-10-12	2012-10-12

APPENDIX O2

SIGNAGE PLATES

(16 pages)



List of Plates

6 Lanes divided Highway

01 Closure of Right Lane
02 Closure of Center Lane
03 Closure of Left lane
04 Closure of Right Lane and Center Lane
05 Closure of Left Lane and Right Lane
06 Closure of Left Lane and Center Lane
07 Closure of 3 Lanes in One Direction with Contraflow of One Lane per Direction
08 Closure of 3 Lanes in One Direction with Contraflow (One Lane and Two Lanes)
09 Closure of Left and Center Lane with Contraflow of Two Lanes per Direction
10 Closure of Right and Center Lane with Contraflow of Two Lanes per direction
11 Work on the Shoulder

Jacques-Cartier Bridge
Two Direction 5 Lane Highway

12 Closure of Right Lane (1 or 5)
13 Closure of Two right Lane (1-2 or 4-5)
14 Closure of 2 Right Lanes with Contraflow
15 Closure of 3 Right Lanes with Contraflow
16 Closure of Center Lane (3)
17 Closure of 2 Center Lanes (2-3 or 3-4)
18 Closure of 3 Center Lanes (2, 3 and 4)
19 Closure of the Second Right Lane (2 or 4)

4 lanes Divided Highway

20 Closure of Right Lane
21 Closure of Left Lane
22 Closure of 2 Lanes in One Direction with Contraflow
23 Work on Shoulder

Melocheville Tunnel

24 Closure of One Lane - Valleyfield Direction, Alternating Circulation

plate 00.dwg

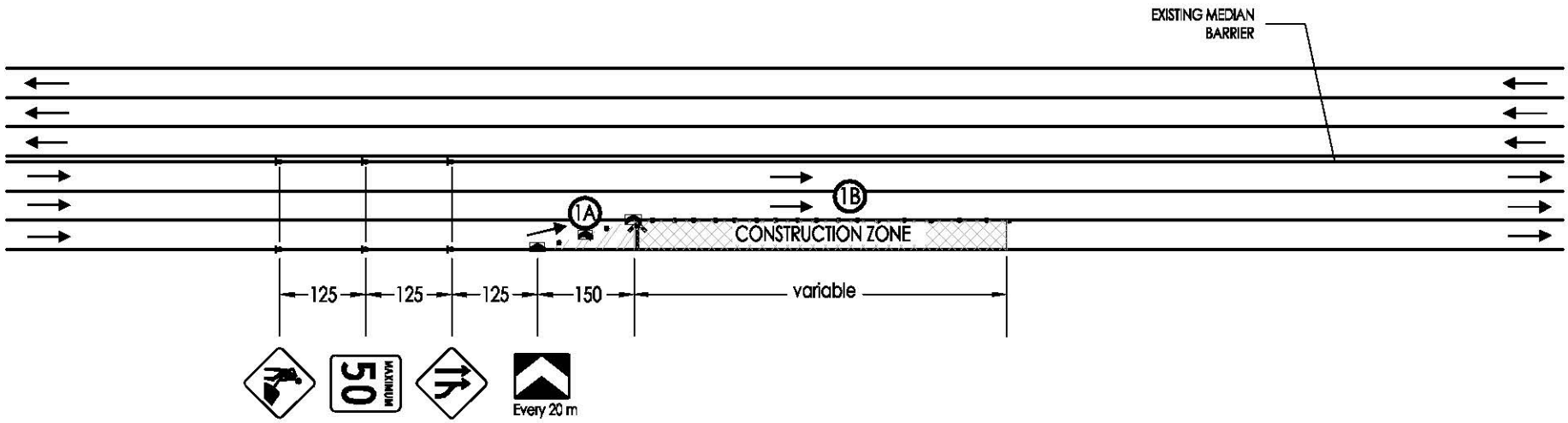
Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

Fast Lanes with or without Median Border
CLOSURES OF LANES
List of Plates

dessiné / drawn	conçu / designed	échelle / scale	date
			2012–02–02

Plate 00

A "man at work" sign must be added in every access ramp or road leading to the bridge, at a distance of 125m of the second sign.



LEGEND	
⊗	Suggested Sequence
→	Illuminated Arrow Indicator
●	Visual Marker Every 5 m - Taper
●	Visual Marker Every 10 m - Lane
◧	Chevron
■	Impact Attenuator
▮●	Sign
⊢	Gate
▨	Buffer Zone
▩	Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

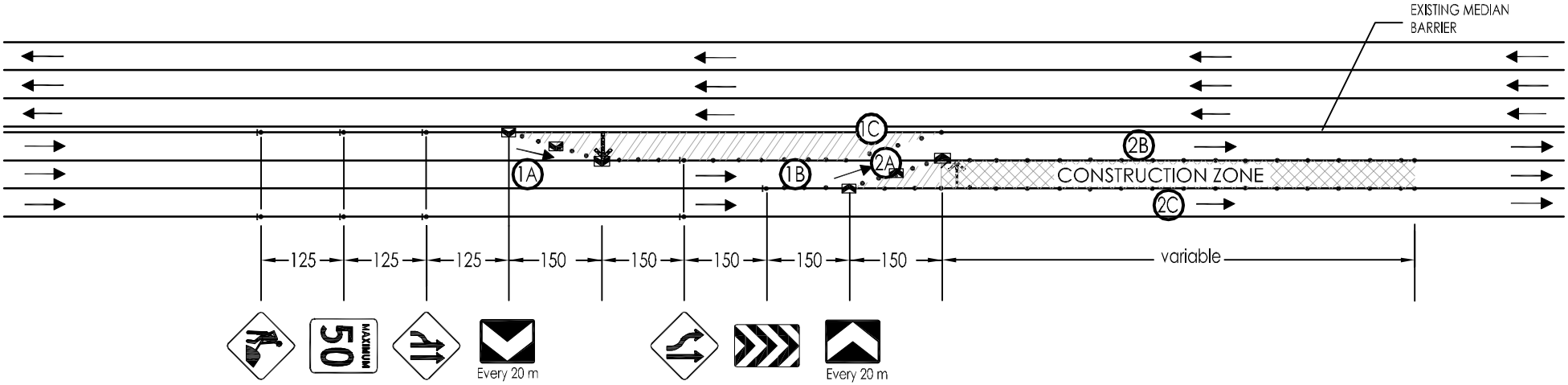
The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : 1A, 1B.... 2A, 2B);

Cegertec

planche 01.dwg

Les Ponts Jacques Cartier et Champlain Incorporée The Jacques Cartier and Champlain Bridges Incorporated Canada	6 Lane Divided Highway CLOSURE OF RIGHT LANE	dessiné / drawn M. DRAPEAU	conçu / designed C. FOUCAULT, ing.	échelle / scale N/A	date 2012-02-02
		Plate 01			short term

A "man at work" sign must be added in every access ramp or road leading to the bridge, at a distance of 125m of the second sign.



LEGEND

- Suggested Sequence
- Illuminated Arrow Indicator
- Visual Marker Every 5 m - Taper
- Visual Marker Every 10 m - Lane
- Chevron
- Impact Attenuator
- Sign
- Gate
- Buffer Zone
- Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

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- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : (1A), (1B).... (2A), (2B));

Cegertec

planche 02.dwg

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

6 Lane Divided Highway

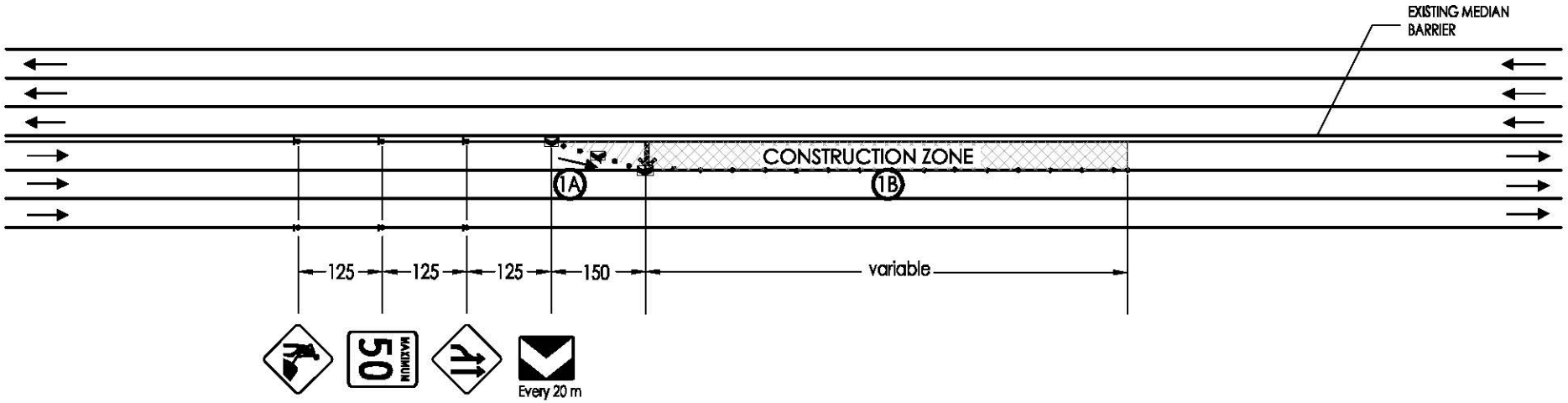
CLOSURE OF CENTER LANE

dessiné / drawn	conçu / designed	échelle / scale	date
M. DRAPEAU	C. FOUCAULT, ing.	N/A	2012-02-02

Plate 02

short term

A "man at work" sign must be added in every access ramp or road leading to the bridge, at a distance of 125m of the second sign.



LEGEND

- Suggested Sequence
- Illuminated Arrow Indicator
- Visual Marker Every 5 m - Taper
- Visual Marker Every 10 m - Lane
- Chevron
- Impact Attenuator
- Sign
- Gate
- Buffer Zone
- Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

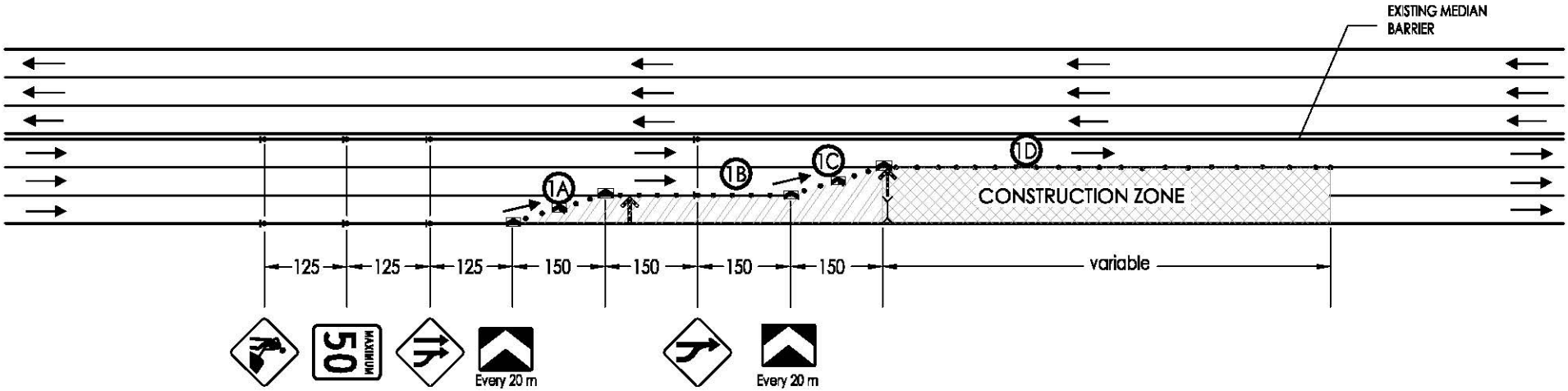
The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : 1A, 1B.... 2A, 2B);

Cegertec

planche 03.dwg

Les Ponts Jacques Cartier et Champlain Incorporée The Jacques Cartier and Champlain Bridges Incorporated Canada	6 Lane Divided Highway CLOSURE OF LEFT LANE	dessiné / drawn M. DRAPEAU	conçu / designed C. FOUCAULT, ing.	échelle / scale N/A	date 2012-02-02
		Plate 03			short term

A "man at work" sign must be added in every access ramp or road leading to the bridge, at a distance of 125m of the second sign.



LEGEND

- Suggested Sequence
- Illuminated Arrow Indicator
- Visual Marker Every 5 m - Taper
- Visual Marker Every 10 m - Lane
- Chevron
- Impact Attenuator
- Sign
- Gate
- Buffer Zone
- Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : (1A), (1B).... (2A), (2B));

Cegertec

planche 04.dwg

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

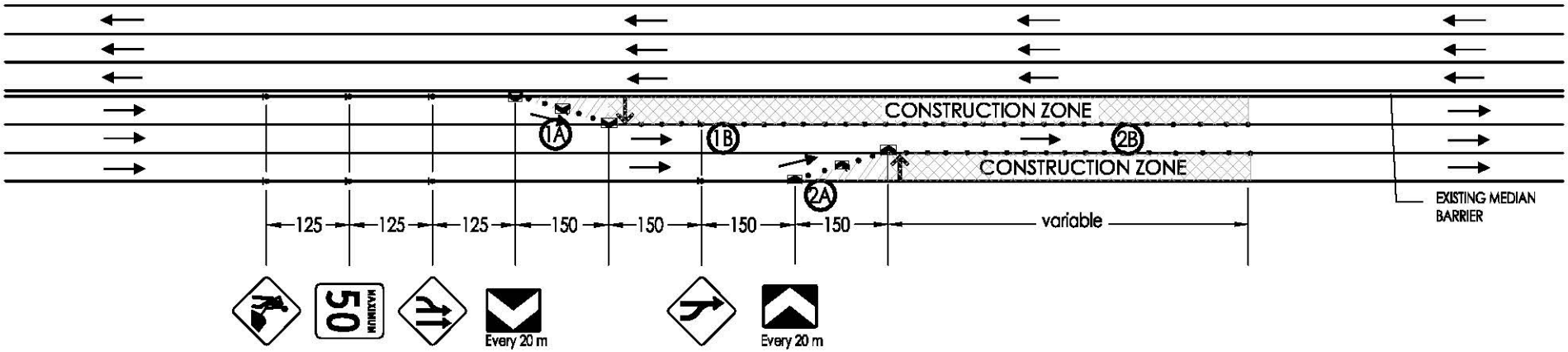
6 Lane Divided Highway
CLOSURE OF RIGHT LANE
AND CENTER LANE

dessiné / drawn	conçu / designed	échelle / scale	date
M. DRAPEAU	C. FOUCAULT, ing.	N/A	2012-02-02

Plate 04

short term

A "man at work" sign must be added in every access ramp or road leading to the bridge, at a distance of 125m of the second sign.



LEGEND

- Suggested Sequence
- Illuminated Arrow Indicator
- Visual Marker Every 5 m - Taper
- Visual Marker Every 10 m - Lane
- Chevron
- Impact Attenuator
- Sign
- Gate
- Buffer Zone
- Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates [i.e. : (1A), (1B).... (2A), (2B)];

Cegertec

planche 05.dwg

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

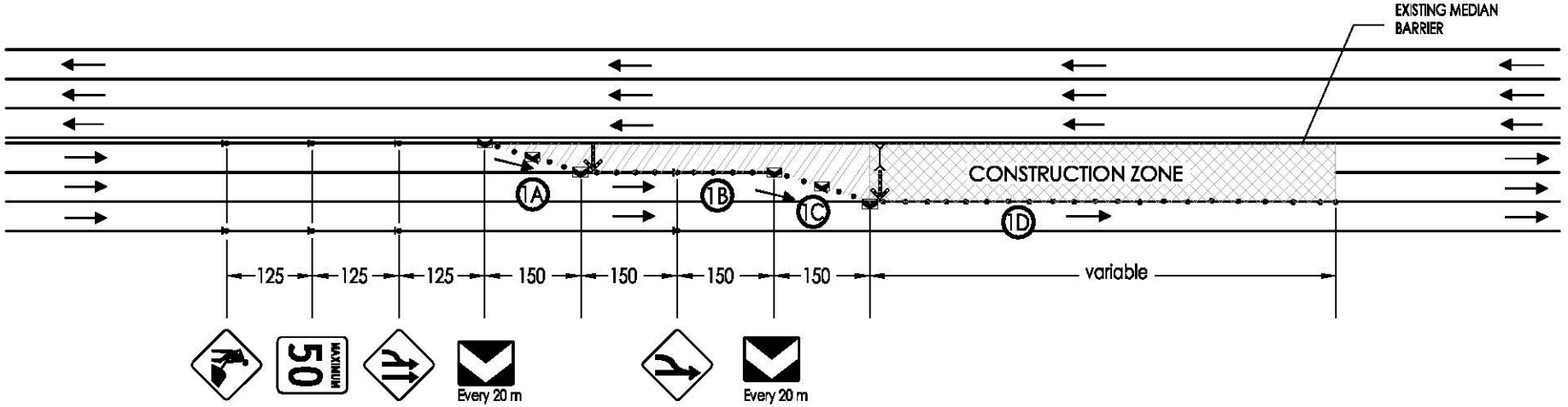
6 Lane Divided Highway
CLOSURE OF LEFT LANE
AND RIGHT LANE

dessiné / drawn	conçu / designed	échelle / scale	date
M. DRAPEAU	C. FOUCAULT, ing.	N/A	2012-02-02

Plate 05

short term

A "man at work" sign must be added in every access ramp or road leading to the bridge, at a distance of 125m of the second sign.



LEGEND	
⊗	Suggested Sequence
→	Illuminated Arrow Indicator
●	Visual Marker Every 5 m - Taper
●	Visual Marker Every 10 m - Lane
◧	Chevron
■	Impact Attenuator
▮●	Sign
⊢	Gate
▨	Buffer Zone
▩	Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : (1A), (1B).... (2A), (2B));

Cegertec

planche 06.dwg

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

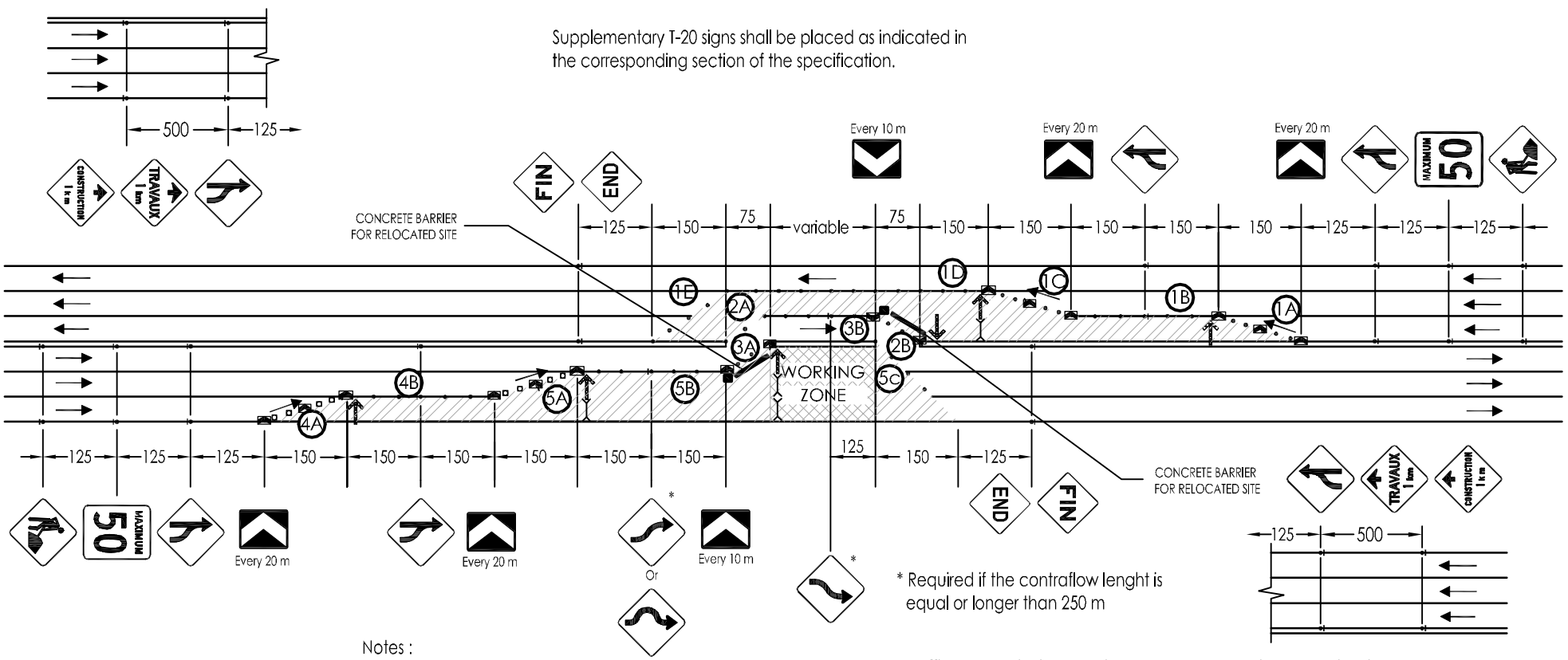
6 Lane Divided Highway
CLOSURE OF LEFT LANE
AND CENTER LANE

dessiné / drawn	conçu / designed	échelle / scale	date
M. DRAPEAU	C. FOUCAULT, ing.	N/A	2012-02-02

Plate 06

short term

Supplementary T-20 signs shall be placed as indicated in the corresponding section of the specification.



* Required if the contraflow lenght is equal or longer than 250 m

LEGEND	
⊗	Suggested Sequence
⇒	Illuminated Arrow Indicator
●	Visual Marker Every 5 m - Taper
●	Visual Marker Every 10 m - Lane
◧	Chevron
■	Impact Attenuator
●▮	Sign
⊢	Gate
//////	Buffer Zone
▒▒▒	Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : (1A), (1B).... (2A), (2B));

The contractor must close the left and center lanes before beganing sequence 3.

The contractor must open the center lane before beganing sequence 4.

Cegertec

planche 07.dwg

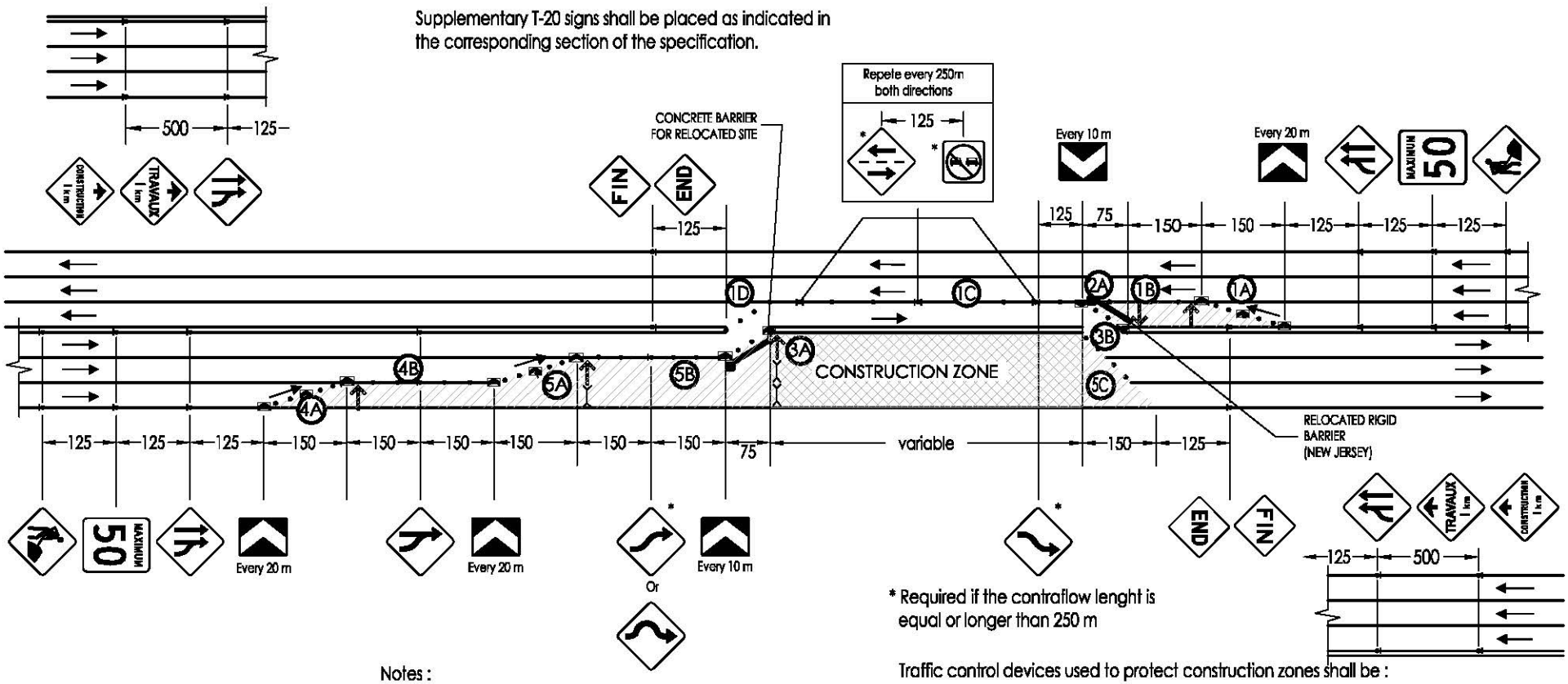
Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

6 Lane Divided Highway
CLOSURE OF 3 LANE IN ONE DIRECTION
WITH CONTRAFLOW OF ONE LANE PER DIRECTION

dessiné / drawn	conçu / designed	échelle / scale	date
M. DRAPEAU	C. FOUCAULT, ing.	N/A	2012-02-02

Plate 07

Supplementary T-20 signs shall be placed as indicated in the corresponding section of the specification.



* Required if the contraflow lenght is equal or longer than 250 m

LEGEND

- Suggested Sequence
- Illuminated Arrow Indicator
- Visual Marker Every 5 m - Taper
- Visual Marker Every 10 m - Lane
- Chevron
- Impact Attenuator
- Sign
- Gate
- Buffer Zone
- Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : (1A), (1B).... (2A), (2B));

The contractor must close the left and center lanes before beganing sequence 3.

The contractor must open the center lane before beganing sequence 4.

Cegertec

planche 08.dwg

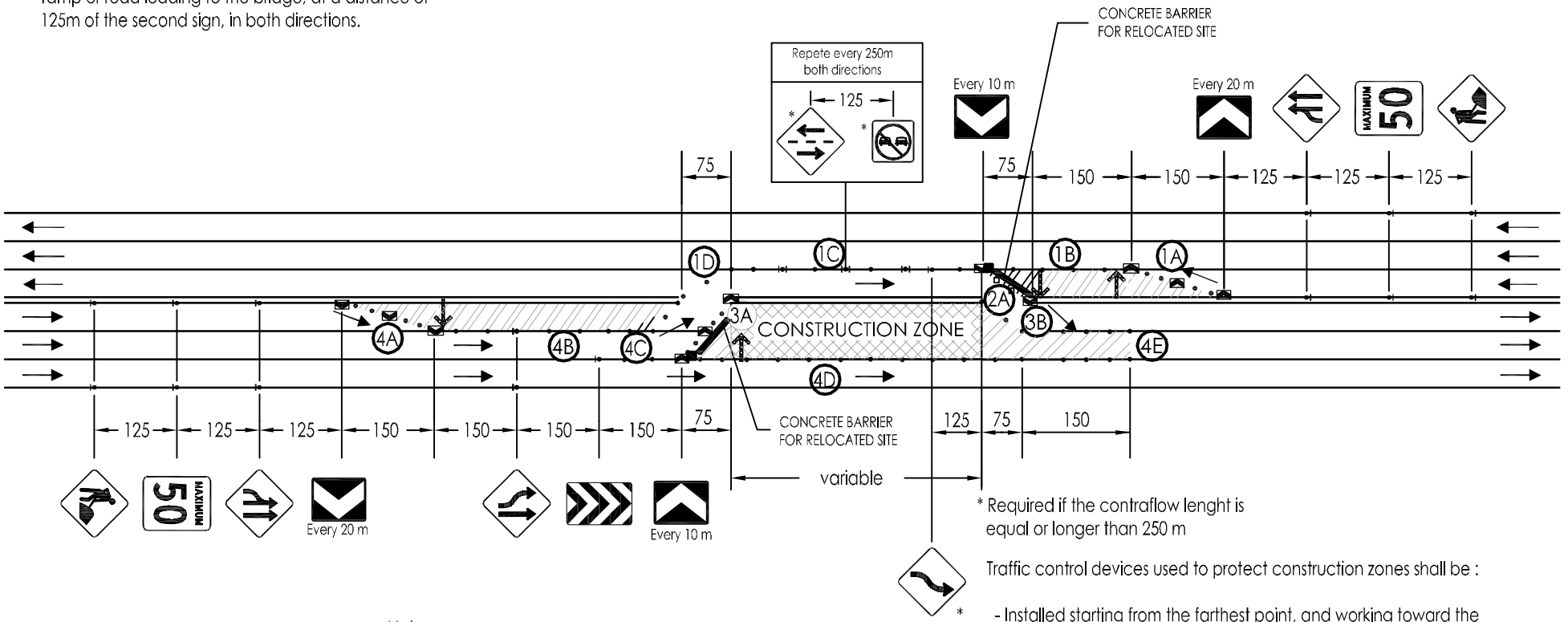
Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

6 Lane Divided Highway
CLOSURE OF 3 LANE IN ONE DIRECTION
WITH CONTRAFLOW (ONE LANE AND TWO LANES)

dessiné / drawn	compu / designed	échelle / scale	date
M. DRAPEAU	C. FOUCAULT, ing.	N/A	2012-02-02

Plate 08

A "man at work" sign must be added in every access ramp or road leading to the bridge, at a distance of 125m of the second sign, in both directions.



* Required if the contraflow lenght is equal or longer than 250 m

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : (1A), (1B) .... (2A), (2B));

The contractor must close the left and center lanes before beganing sequence 3.

The contractor must open the center lane before beganing sequence 4.

LEGEND

- Suggested Sequence
- Illuminated Arrow Indicator
- Visual Marker Every 5 m - Taper
- Visual Marker Every 10 m - Lane
- Chevron
- Impact Attenuator
- Sign
- Gate
- Buffer Zone
- Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Cegertec

planche 09.dwg

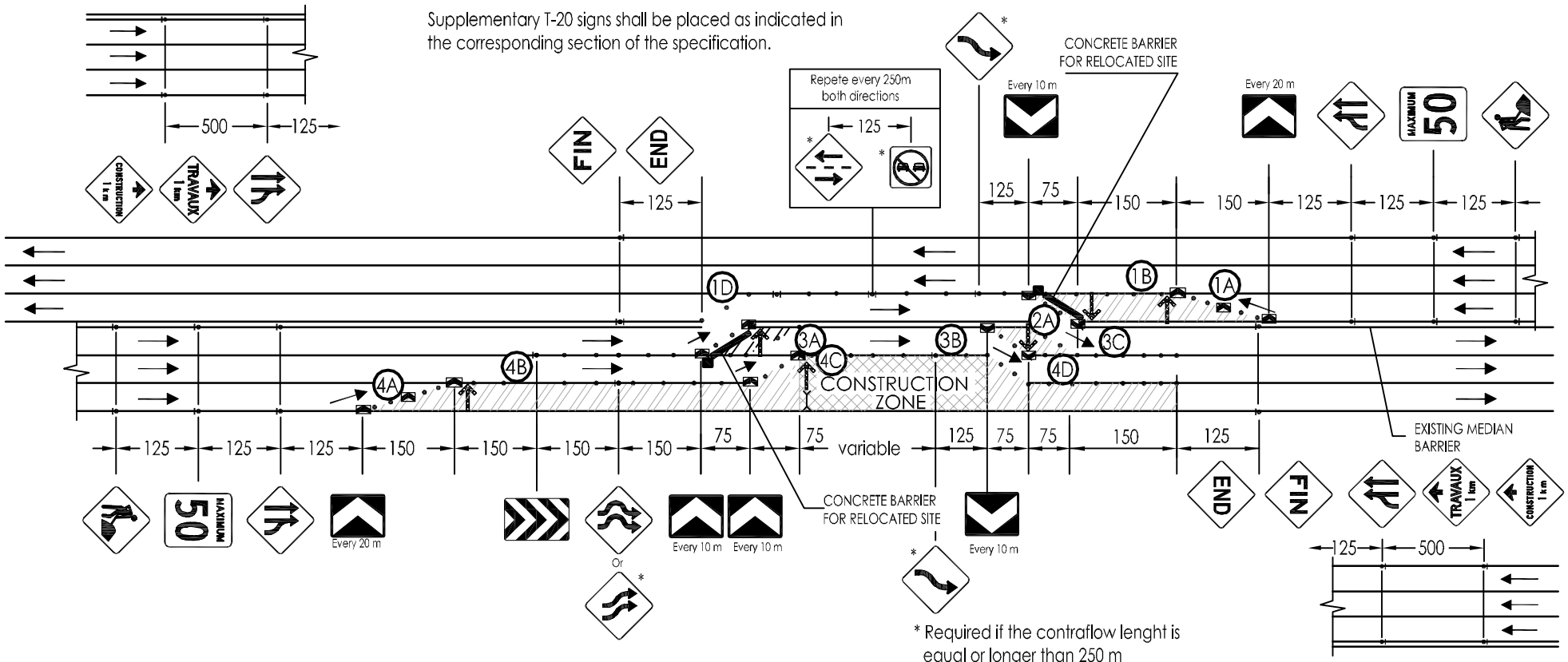
Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

6 Lane Divided Highway
CLOSURE OF LEFT AND CENTER LANE
WITH CONTRAFLOW OF TWO LANES PER DIRECTION

dessiné / drawn	conçu / designed	échelle / scale	date
M. DRAPEAU	C. FOUCAULT, ing.	N/A	2012-02-02

Plate 09

short term



* Required if the contraflow lenght is equal or longer than 250 m

LEGEND

- Suggested Sequence
- Illuminated Arrow Indicator
- Visual Marker Every 5 m - Taper
- Visual Marker Every 10 m - Lane
- Chevron
- Impact Attenuator
- Sign
- Gate
- Buffer Zone
- Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : (1A), (1B).... (2A), (2B));

The contractor must close the left and center lanes before beganing sequence 3.

The contractor must open the center lane before beganing sequence 4.

Cegertec

planche 10.dwg

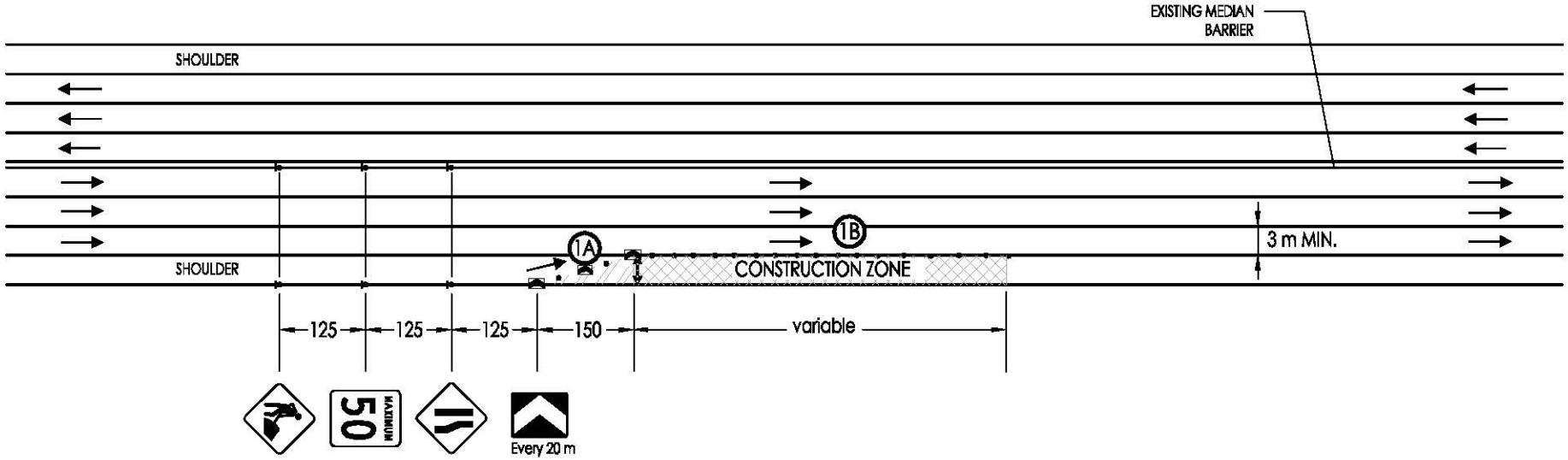
Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

6 Lane Divided Highway
CLOSURE OF RIGHT AND CENTER LANE
WITH CONTRAFLOW OF TWO LANES PER DIRECTION

dessiné / drawn	conçu / designed	échelle / scale	date
M. DRAPEAU	C. FOUCAULT, ing.	N/A	2012-02-02

Plate 10

A "man at work" sign must be added in every access ramp or road leading to the bridge, at a distance of 125m of the second sign.



LEGEND	
⊗	Suggested Sequence
→	Illuminated Arrow Indicator
●	Visual Marker Every 5 m - Taper
●	Visual Marker Every 10 m - Lane
◪	Chevron
■	Impact Attenuator
▮●	Sign
⊢	Gate
▨	Buffer Zone
▩	Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : 1A, 1B.... 2A, 2B);

Cegertec

planche 11.dwg

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

6 Lane Divided Highway

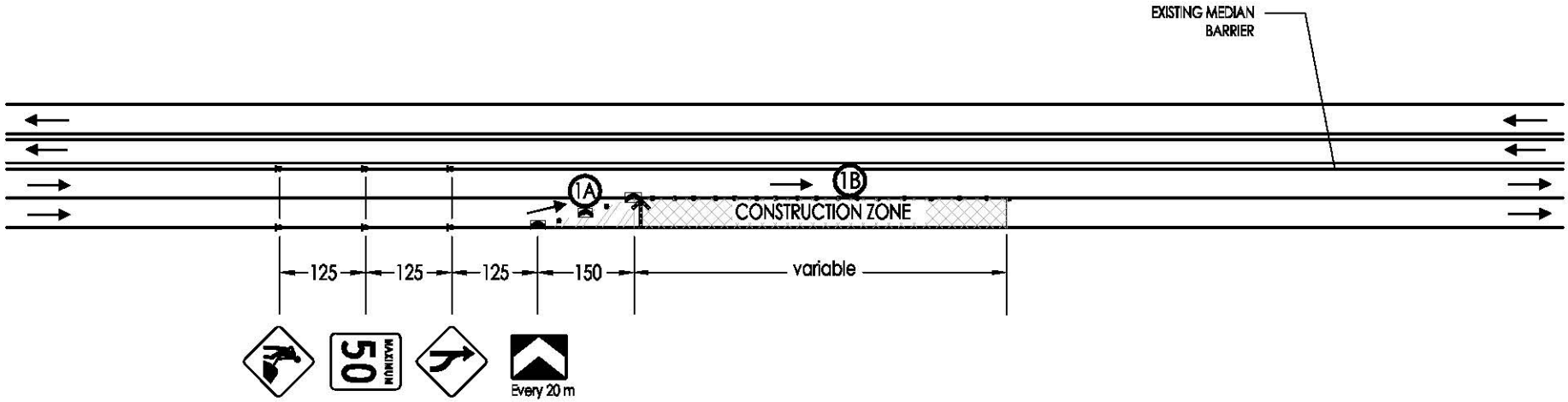
WORK ON THE SHOULDER

dessiné / drawn	conçu / designed	échelle / scale	date
M. DRAPEAU	C. FOUCAULT, ing.	N/A	2012-02-02

Plate 11

short term

A "man at work" sign must be added in every access ramp or road leading to the bridge, at a distance of 125m of the second sign.



LEGEND	
⊗	Suggested Sequence
→	Illuminated Arrow Indicator
●	Visual Marker Every 5 m - Taper
●	Visual Marker Every 10 m - Lane
◧	Chevron
■	Impact Attenuator
▮●	Sign
⊢	Gate
▨	Buffer Zone
▩	Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

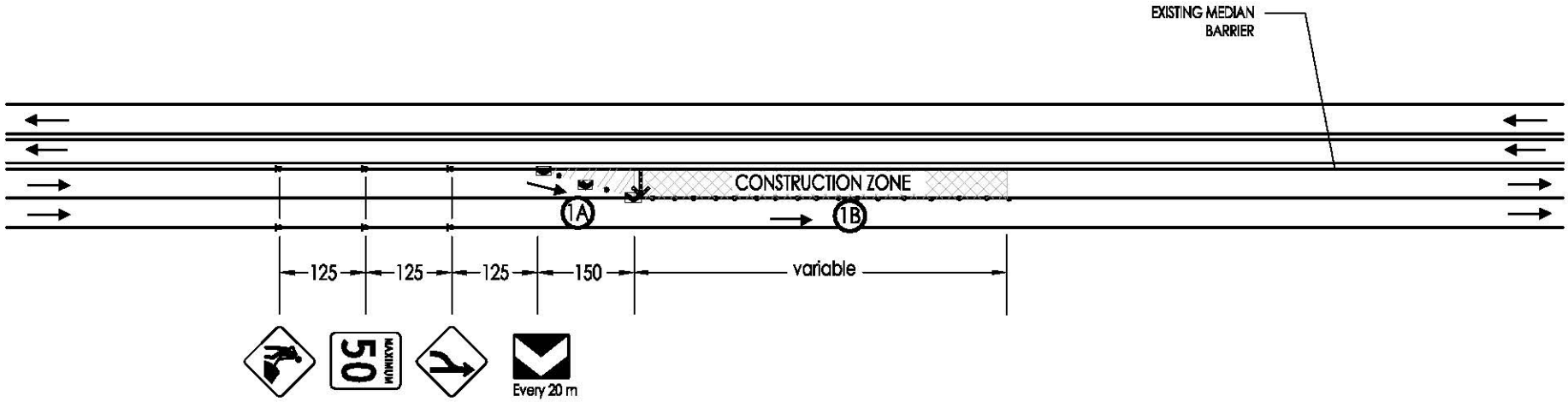
The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : (1A), (1B).... (2A), (2B));

Cegertec

planche 20.dwg

Les Ponts Jacques Cartier et Champlain Incorporée The Jacques Cartier and Champlain Bridges Incorporated Canada	4 Lane Divided Highway CLOSURE OF THE RIGHT LANE	dessiné / drawn M. DRAPEAU	conçu / designed C. FOUCAULT, ing.	échelle / scale N/A	date 2012-02-02
		Plate 20			short term

A "man at work" sign must be added in every access ramp or road leading to the bridge, at a distance of 125m of the second sign.



LEGEND	
⊗	Suggested Sequence
→	Illuminated Arrow Indicator
●	Visual Marker Every 5 m - Taper
●	Visual Marker Every 10 m - Lane
◧	Chevron
■	Impact Attenuator
▮●	Sign
⊢	Gate
▨	Buffer Zone
▩	Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

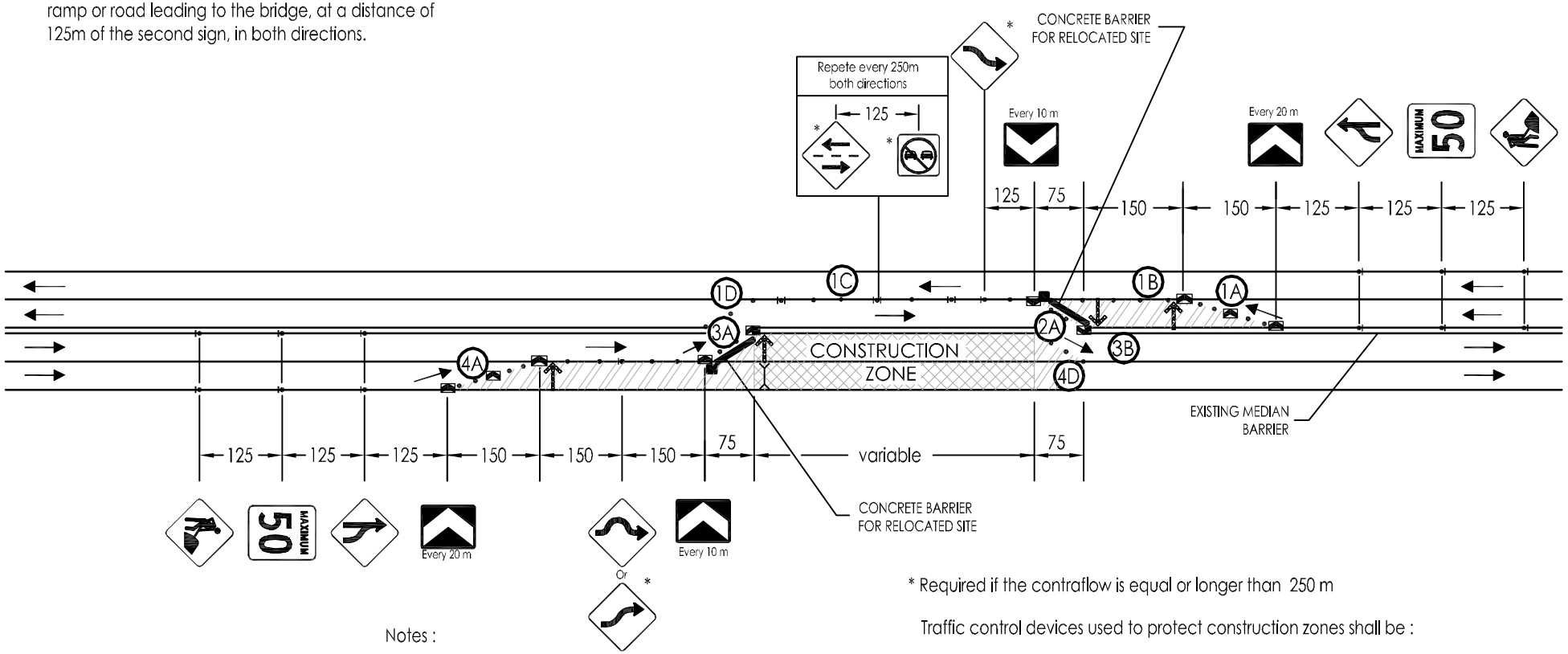
The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : (1A), (1B).... (2A), (2B));

Cegertec

planche 21.dwg

Les Ponts Jacques Cartier et Champlain Incorporée The Jacques Cartier and Champlain Bridges Incorporated Canada	4 Lane Divided Highway CLOSURE OF THE LEFT LANE	dessiné / drawn M. DRAPEAU	conçu / designed C. FOUCAULT, ing.	échelle / scale N/A	date 2012-02-02
			Plate 21		short term

A "man at work" sign must be added in every access ramp or road leading to the bridge, at a distance of 125m of the second sign, in both directions.



* Required if the contraflow is equal or longer than 250 m

LEGEND

- Suggested Sequence
- Illuminated Arrow Indicator
- Visual Marker Every 5 m - Taper
- Visual Marker Every 10 m - Lane
- Chevron
- Impact Attenuator
- Sign
- Gate
- Buffer Zone
- Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : (1A), (1B).... (2A), (2B));

The contractor must close the left lane before beganing sequence 3.

The contractor must open the left lane before beganing sequence 4.

Cegertec

planche 22.dwg

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

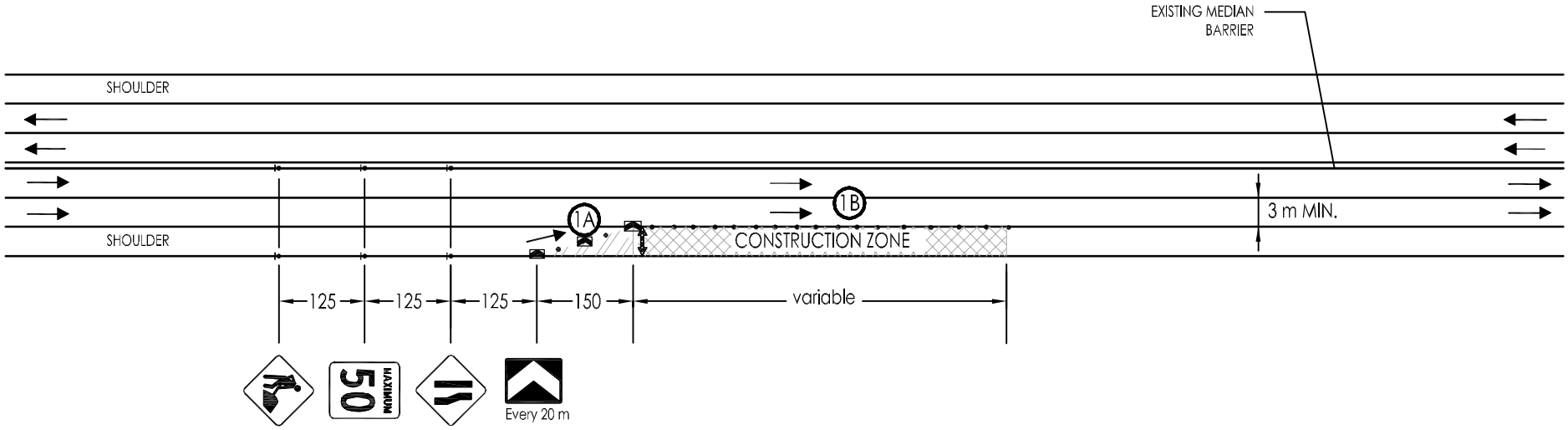
4 Lane Divided Highway
CLOSURE OF TWO LANE IN ONE DIRECTION
WITH CONTRAFLOW

dessiné / drawn	conçu / designed	échelle / scale	date
M. DRAPEAU	C. FOUCAULT, ing.	N/A	2012-02-02

Plate 22

short term

A "man at work" sign must be added in every access ramp or road leading to the bridge, at a distance of 125m of the second sign.



LEGEND

- Suggested Sequence
- Illuminated Arrow Indicator
- Visual Marker Every 5 m - Taper
- Visual Marker Every 10 m - Lane
- Chevron
- Impact Attenuator
- Sign
- Gate
- Buffer Zone
- Construction Zone

Notes :

The present plate establishes the minimal requirements concerning the quantity, spacing and layout of signs required when one traffic lane is closed.

All dimensions are in metres.

All lane closures shall be approved by the **Owner** and undertaken using drawings which shall be sealed and signed by an engineer.

In certain cases, the space between the visual markers may be reduced, when necessary, according to the indications outlined in the Special Technical Conditions (section 4) of the Contract.

Traffic control devices used to protect construction zones shall be :

- Installed starting from the farthest point, and working toward the construction zone;
- Installed in sufficient quantity according to the location and in compliance with these standardized drawings;
- In good condition;
- Removal shall be in reversed order;
- In accordance with the specification requirements of the contract.

The suggested sequence for placement of traffic control devices is as indicated by the symbol (X) identified on plates (i.e. : (1A), (1B).... (2A), (2B));

Cegertec

planche 23.dwg

Les Ponts Jacques Cartier et Champlain Incorporée
The Jacques Cartier and Champlain Bridges Incorporated
Canada

4 Lane Divided Highway

WORK ON THE SHOULDER

dessiné / drawn	conçu / designed	échelle / scale	date
M. DRAPEAU	C. FOUCAULT, ing.	N/A	2012-02-02

Plate 23

short term